Chapter 1
Tactical Concepts

This chapter provides an overview of the tactical level of military art. To understand OPFOR tactics, it is important to know the vocabulary and conceptual framework of OPFOR military theory and practice. Therefore, this chapter includes definitions of basic OPFOR military terminology; discusses key concepts; and introduces the basic units that make up tactical combat formations. For a more comprehensive discussion of OPFOR military thought, see Chapter 1, FM 100-61.

MILITARY DOCTRINE

Military doctrine is the State's officially accepted system of views on the nature of war and the use of the armed forces. Formulating military doctrine is a continuous and evolutionary process. The State bases doctrine on the following:

- Political ideology.
- National security interests.
- Threat perceptions.
- Foreign policy.
- Economic and military strengths.
- Resources and geography.
- History.
- Science and technology.

Military doctrine has two closely linked aspects: the political and the military.

The political aspect of military doctrine reflects political aims of the State, in addition to security interests and threat perceptions. The State's political leadership determines the political objectives reflected in military doctrine. Once handed down by the political leadership, doctrine is not open to debate; it has the weight of law.

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The military aspect of doctrine conforms to the State's political aims. It encompasses the following elements that directly pertain to the OPFOR:

- Organizational development.
- Training.
- Combat readiness.
- Equipment types and numbers.
- Development of military art.
- Improvements in command and control (C^2).
- Research and development priorities.

Evolutionary change in the OPFOR's military doctrine is a continuous process. The impetus for such change is often emerging technologies, changing national security interests, or foreign policy goals.

MILITARY SCIENCE

The OPFOR defines military science as a system of knowledge concerning the nature, essence, and content of armed conflict. It studies and analyzes the manpower, facilities, and methods for conducting operations by means of armed forces. Its purpose is to develop practical recommendations for victory in war.

Military doctrine and military science are fundamentally interrelated and interdependent. OPFOR military doctrine governs the nature of war, and the means for prosecuting such a war. Military science examines all military affairs—past, present, and future—and it categorizes military knowledge along functional lines into various components. These components are—

- Military art.
- Organization.
- Geography.
- History.
- Training and education.
- Economics.
- C^2.

Although all components are important, the OPFOR regards military art as the preeminent component of military science.

Military Art

Military art is the theory and practice of preparing for and conducting military actions on land, sea, and in the air. During wartime, military art implements doctrine. The components of military art normally relate to a specific level of combat activity:

- Military strategy (national- and theater-level).
- Operational art (army group-, army-, and corps-level).
- Tactics (division-level and below).

The OPFOR considers these components interconnected, interdependent, and mutually conditioned. They supplement each other.

The ***principles of military art*** are the basic guidelines for organizing and conducting battles, operations, and war as a whole. Lists of principles can vary from broad guides for action to achieve victory in war or operations to more specific recommendations for victory in battle. Among these principles are—

- High combat readiness.
- Surprise.
- Aggressiveness and decisiveness.
- Persistence and initiative.
- Combined arms coordination and joint operations.
- Decisive concentration of forces.
- Deep battle or deep operations.
- Integration of information warfare.
- Exploitation of moral-political factors.
- Firm and continuous C^2.
- Comprehensive combat support.
- Timely restoration of reserves and combat potential.

These principles are idealistic. They show what the OPFOR would like to do, but not, in all cases, what it might be capable of doing. Thus, they apply in varying degrees of importance to strategy, operational art, and tactics.

Military Strategy

Military strategy is the highest component of military art. It concerns both the theory and practice of preparing the nation and armed forces for war, as well as the planning and conduct of strategic operations and of war as a whole. The theoretical side of strategy studies the laws and character of war and methods for conducting it. In the applied sense, military strategy determines the strategic missions of the armed forces and the necessary forces to achieve these missions. Within the OPFOR C^2 structure, the Ministry of Defense and General Staff are responsible for developing military strategy. All State ministries and military organizations work under a unified military strategy.

Operational Art

Operational art concerns the theory and practice of preparing for and conducting combined and independent operations by OPFOR army groups, armies, or corps. It is the connecting link between strategy and tactics. On the basis of strategic requirements, operational art determines effective methods of using available military resources to achieve strategic goals. Consequently, plans developed from operational art determine tactical actions.

Tactics

Tactics is the theory and practice of employing available means to win battles at division level and lower. To determine how best to employ forces, tacticians study the principles of combined arms combat. Because tactics relates directly to combat, specific tactical principles relate to each type of unit, weapon, and situation.

Although tactics may change rapidly to conform with changes in weaponry, it is inseparably linked with other components of military art—strategy and operational art. It is subordinate to operational art and strategy and must achieve the goals set by operational art in the interests of strategy.

Understanding what the OPFOR means by tactics, operations, and the words and verbal formulas that it associates with each concept is important. To the OPFOR, the word ***operation*** implies that the activity involves at least an army group, army, or corps that was probably tailored for the mission.

Tactics refers to combat actions at division level and lower. Divisions and below fight ***battle¾*** armies conduct ***operations***. First-echelon divisions usually pursue tactical missions in the enemy's tactical depth. Armies and corps, using their second-echelon divisions, pursue operational missions in the enemy's operational depth.

The study of tactics involves the examination of the nature and content of battle, as well as the development of methods of preparing for and conducting combat. The practice of tactics encompasses the activity of commanders, staffs, and troops in preparing for and conducting battle. It includes—

- Updating situation data.
- Decision making.
- Communicating missions to subordinates.
- Organizing coordination of forces and assets.
- Comprehensive support of battle.
- Battle planning.
- Preparing troops for battle.
- Conducting combat actions.
- Exercising C^2.

Interrelationships

Separating OPFOR tactics from operational art is often difficult; maneuver divisions are the tactical maneuver elements that achieve the operational missions of army groups, armies, and corps. The overriding goal of the combined arms offensive is to turn tactical success into operational success using a well-orchestrated combination of massive fire, maneuver, and deep, violent strikes. Similarly, tactical and operational successes contribute to the accomplishment of strategic goals.

Like the other areas of military art, tactics is constantly evolving. Weapons and military equipment, the level of troop training, and the art of leading troops all affect the status and development of tactics.

TACTICAL PRINCIPLES

In OPFOR doctrine, principles are concepts or ideas that apply to all components of the military art—strategy, operational art, and tactics. However, the application of these principles may vary somewhat between operational art and tactics.

Mobility

The mobility of combat forces facilitates the success of any battle. The scope and depth of the modern battlefield and the absence of solid and contiguous fronts demand mobility. A high degree of mobility enables forces to use combat power with maximum effect at the decisive time and place on the battlefield.

The essence of mobility is the swift, organized displacement of troops to important axes and sectors to create a more favorable correlation of forces. Mobility permits seizing and holding the initiative, disrupting the enemy concept, and successfully conducting battle in the changed situation. It is possible to compensate for a shortage of forces with the help of an aggressive maneuver, redeploying assets quickly to threatened sectors and to new positions and lines.

Speed

Speed of advance is an important principle, with high rates of advance regarded as an indicator of success. Modern warfare requires great emphasis on the speed and timing of operations. The more rapid the advance, the more difficult it becomes for the enemy to react to OPFOR actions. Controlling or altering the rate of advance is critical to maintaining the initiative.

A rapid advance is of crucial importance in achieving success on the battlefield. It can prevent the enemy's recovery from surprise and stop him from regaining his balance. The goal is to keep the momentum firmly in OPFOR hands, thus negating the advantages which terrain and preparation would normally give to a stable defense. The OPFOR seeks to—

- Split the enemy defense into isolated, demoralized fragments.
- Disrupt enemy C^2.
- Paralyze the will of enemy commanders.
- Make organized resistance impossible.

The concept of speed also describes the OPFOR goal of achieving the most decisive results in the shortest time. The OPFOR believes that victory usually goes to the force that acts most quickly. Consequently, it places emphasis on a simple plan, quickly and violently executed, as opposed to elaborate, complex plans that take a great deal of time to develop.

Initiative

Success in battle goes to the side that conducts itself more actively and resolutely. The goals of a battle and the methods devised for their attainment must reflect initiative. The success of these plans rests with the ability of commanders at all levels to make bold decisions, then implement those decisions.

Commanders must be able to act decisively in the absence or orders or when communications are disrupted. It is possible to overcome a position of relative tactical inferiority by creating conditions of local superiority through initiative.

It is now accepted by the OPFOR that, on the modern battlefield, commanders at battalion level and below may find themselves operating independently with little time to ask senior commanders for orders. Junior commanders must possess not just initiative, but the ability to develop their own solutions to tactical problems.

Flexibility

Even the best-developed plans can and do go wrong in war. Commanders must remain flexible, prepared to alter missions and groupings to meet the inevitable unexpected and achieve the overall tactical goal. Thus, great emphasis is on commanders and their staffs reacting quickly and remaining flexible in their reaction to developments. To facilitate flexibility, commands are being structured and deployed to react quickly and appropriately to changing situations.

The OPFOR does not adhere to rigid templates or "cookie cutter" solutions to tactical problems. Its commanders employ their forces flexibly on the battlefield, taking into account the effects of terrain and the ever-increasing range and accuracy of newer weapon systems. OPFOR tactical doctrine contains many norms and recommended distances for unit formations, zones, and so on. However, commanders are nearly always free to adjust normative distances as the situation requires.

Concentration of Main Effort

A unit that dissipates its forces equally across the entire frontage is not likely to achieve victory. This statement is equally true of the offense and the defense. Concentration of the main effort at the decisive time and place on the battlefield is critical to success. In the offense, attacking commanders must carefully plan their concentration of forces, while seeking to manipulate the enemy's. They designate the main attack, allocate or focus the forces to conduct and support it, and try to conceal this attack until it is too late for the enemy to react. In the defense, commanders must counter the enemy's main attack by focusing combat support assets without massing maneuver assets.

Just as force concentrations are unacceptable in the face of an enemy prepared to attack with nuclear weapons, so they will be equally unacceptable in the face of precision weapons. OPFOR commanders seek to keep forces as widely dispersed as possible until the decisive moment when concentration and mass become essential. Then, they concentrate forces for only as long as is necessary to achieve a decisive result before again dispersing. This, too, puts a premium on surprise and preemption. Concentration now consists of massing the effects of various weapon systems rather than physically massing the systems themselves. For example, the OPFOR still believes strongly in massed, concentrated artillery fires. However, the OPFOR understands that it is no longer desirable or acceptable to mass great quantities of guns "hub to hub."

Surprise

Surprise may be strategic, operational, or tactical. The classification depends on the scale, the quantity of forces and equipment involved, and the results achieved. Distinguishing between the types of surprise is difficult. They are linked and interdependent. Experience shows that surprise is harder to achieve as the scale of combat increases. Concealing one's intentions from the enemy becomes more difficult with increased personnel and equipment.

Still, an OPFOR commander's use of unexpected timing, direction, or forces can often achieve tactical surprise, even if operational surprise is not possible. Denying the enemy the ability to conduct good reconnaissance is critical to this effort. OPFOR commanders believe it is realistic at the tactical level to conceal not only the scope of the operation, but also the location of the main attack and time it will begin. Surprise delivers victory as a result of timing, boldness, and concentration of forces masked by deception.

Integration of Information Warfare

The OPFOR defines ***information warfare*** (IW) as specifically planned and integrated actions taken to achieve an information advantage at critical points and times. IW includes an offensive, "attack" element, as well as defensive, protective measures. The goal is to influence an adversary's information, information-based processes and systems, while retaining the ability to employ friendly information systems and processes. The OPFOR attempts to gain an ***information advantage*** at critical times and places on the battlefield. Knowing it cannot maintain this superiority continuously, the OPFOR can select for disruption only those targets most critical to ensuring the OPFOR achieves its objectives.

There are six components to the OPFOR IW doctrine:

- Protection and security measures.
- Deception.
- Electromagnetic spectrum operations.
- Perception management.
- Destruction.
- Computer warfare.

Each of these components receives varying emphasis, depending upon the situation, throughout the course of tactical activities.

The blending of separate components into a single, integrated doctrine for the control of information is not a new concept. The OPFOR has for years employed an integrated approach to attacking the enemy's decision-making cycle and structure. While embracing the concepts of IW, the OPFOR is deliberate in its application. It understands the distinction between modern information-age warfare, which uses information technology as a tool in more or less traditional combat operations, and information warfare, which treats information itself as a weapon and target.

IW has not rendered existing methods of warfare obsolete. Particularly at the tactical level, IW is viewed as another (though important) means to achieve a military objective. Nevertheless, forcing the enemy to accept the OPFOR's will still requires decisive ground combat actions.

In many instances, however, IW activities may precede or replace combat to some degree. Certainly the methods employed and supporting systems increase combat capabilities significantly and may compensate for a shortage of conventional forces. Indeed, skillful application of IW principles might help the OPFOR to defeat a technologically superior enemy. See Chapter 12 for more information on IW.

Preservation of Combat Effectiveness

Preservation of combat effectiveness has always been an important principle. However, it is becoming more difficult to realize as war becomes more complex. Soldiers require more training to function on the modern battlefield, and their equipment is more difficult and expensive to produce. In the course of combat actions, the force's combat effectiveness must stay at a level that enables accomplishment of the mission. Measures for preserving combat effectiveness fall into three groups:

- Protection against weapons of high destructive potential.
- Maintenance of combat readiness.
- Restoration of combat effectiveness.

The OPFOR believes that the best way to maintain combat effectiveness is to adhere strictly to the principle of surprise. A surprise offensive, pursued at a high tempo without let-up, can prevent the enemy from establishing a well-organized defense.

Effective Coordination

Success can occur only through the coordinated efforts of all the forces participating in an operation. This coordinated effort depends on effective and reliable C^2. Commanders must closely coordinate the combat roles of many diverse elements to ensure the mutual support of all elements involved in the operation.

Detailed plans and rehearsals ensure that each element fully understands its mission relative to the overall operation. To this end, the OPFOR has created a doctrine integrating all forces into a cohesive, coordinated war effort.

MODERN WARFARE

The OPFOR expects that modern war will consist of a battlefield on which there are often no recognizable frontline, no secure flanks and no safe rear areas. Combat may be spread over an area of considerable width and depth, with the forces of both sides intermingled. Precision weapons, high-speed maneuver systems, unmanned aerial vehicles, IW, and battlefield automation impact how the OPFOR fights.

Tactical Decision Making

The OPFOR favors simple plans that are well rehearsed and violently executed. Simplicity does not imply a lack of detail or analytical thought. However, the concept of simplicity does mean the avoidance of unnecessary complexity through the use of an uncomplicated, rapidly executed decision-making process. See Chapter 2 for more information on the decision-making process.

The OPFOR decision-making process involves a thorough calculation of several variables: maneuver, distance, time, quantity, and capabilities, including likely changes, losses, and reconstitution. Deceiving the enemy is a requirement for success in battle. For this, the OPFOR must thoroughly estimate the enemy's strong and weak points and take into account terrain and weather. For example, a maneuver on difficult terrain can ensure surprise in attacking the enemy from a direction that he does not expect.

Types of Combat

The OPFOR recognizes two types of combat: ***offense*** and ***defense***. Offensive combat is the only type that is ultimately decisive. However, defensive action can occur out of necessity or as a means of allowing the OPFOR to launch or resume the offense at another time or place.

Offense

The goal of offense is the enemy's defeat and the capture of important objectives. To achieve this goal, the OPFOR can use its long-range missiles, aircraft, and artillery fire to destroy enemy precision and NBC weapons (including support elements) and artillery, air, and maneuver formations. This enables the swift advance of OPFOR tank and mechanized infantry units in coordination with aviation and airborne assault forces. These units defeat the enemy by assaulting his flanks and rear, by encirclement, and by splitting his forces and defeating them in detail. See Chapter 4 for more information on the offense.

Defense

The goal of the defense is to repel an attack by enemy forces, inflict considerable losses, and hold important terrain and objectives. It can also allow the OPFOR to concentrate forces in other sectors and create favorable conditions for launching an attack.

A successful defense requires the fire of all available weapon systems and a wide maneuver of fire, forces, and assets. It can involve the stubborn holding of occupied positions, lines, and objectives in combination with conduct of counterattacks. See Chapter 5 for more information on the defense.

Combined Arms Battle

The essence of the tactical ground combat is ***combined arms battle***. OPFOR commanders coordinate the actions of tactical units of the ground forces and aviation in terms of mission, place, and time, to achieve the rapid destruction of the enemy. The characteristics of modern combined arms combat include—

- Maneuverability.
- Decisiveness.
- Nonlinear actions.
- Use of precision and NBC weapons.
- Swift changes in the combat situation.

This means that units of different combat arms and special troops, as well as of aviation, conduct combined arms combat by joint efforts. Different combat forces and assets aligned in combat formations take part, including mechanized infantry, tank, artillery, air defense, engineer, and chemical defense units. Close, continuous coordination of all forces and assets in a single combat formation permits the OPFOR to perform combat missions successfully. Its combat attributes and capabilities are mutually supporting, ensuring the most effective combination of strikes, fire and maneuver.

Strike

The ***strike*** is a component part of combined arms battle. It consists of a simultaneous engagement of enemy groupings and targets by all available assets and forces. There can be NBC strikes, fire strikes, or troop strikes, as well as missile, artillery, or air strikes.

Fire

The OPFOR concept of ***fire*** is the engagement of the enemy by fire using all available weapons. It is conducted to annihilate, neutralize, or harass the enemy and to destroy targets. Fire differs in terms of intensity, direction, methods, and types. Fire is the chief factor in achieving success in battle, inflicting damage that deprives the enemy of combat effectiveness.

Fire prepares and accompanies an attack, supports its development, and creates necessary conditions for executing a maneuver. In the defense, fire in combination with obstacles determines the possibility of repelling an enemy attack.

The effectiveness of OPFOR weapons, especially with the appearance of precision weapons, has led to a significant increase in the depth and accuracy of fire delivery, and to the destruction or damage of targets in the shortest time periods. Use of precision weapons has significantly increased effectiveness of OPFOR antitank fire.

Maneuver

Maneuver is the third component of modern battle. It consists of the organized, rapid displacement of troops in the course of combat. It allows occupation of a favorable position with respect to the enemy and creates favorable groupings of forces and assets. It also allows the transfer or retargeting of strikes and fires for maximum effectiveness.

The maneuver of forces, assets, and fire is a constant element of tactics employed in both offense and defense, in all stages of battle. In the defense, the OPFOR maneuvers units to change a position for a more favorable one, cover a threatened axis more reliably, or to reinforce or replace other units. Maneuver can also allow the OPFOR to defeat an enemy strike, occupy a line of firing positions, or move to a counterattack position.

COMBAT FORMATION

Mission requirements and the commander's concept determine the tactical alignment of forces at division and below. The OPFOR term for this is ***combat formation***.[1]

The combat formation of a division, brigade, or battalion is the grouping created for the conduct of a particular battle. It normally includes—

- A first echelon.
- A second echelon and/or a combined arms reserve (CAR).[2]
- A forward detachment (at division or brigade).
- Artillery groups (at division or brigade).
- Antitank reserves.
- Special reserves.

A combat formation involves more than just echelons. Thus, the OPFOR concept of combat formation is broader than the term ***echelonment***.

The combat formation includes all assets organic or attached to a particular level of command. The commander who creates a combat formation can reorganize it at any time. However, he would normally do this on completion of a mission or phase of battle.

Divisions

Divisions are the basic building blocks of operational commanders. A division's organic assets are sufficient for it to attack or defend on a secondary sector. When fighting on the axis of main effort, however, a division normally requires additional combat support (CS) and combat service support (CSS).

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[1] This is the tactical-level equivalent of the operational-level term ***operational formation***.

[2] The commander has the flexibility to employ both a second echelon and a CAR if the situation warrants. However, he often employs only one or the other.

Army or corps commanders may reinforce some divisions at the expense of others; for example, they may detach elements from second-echelon divisions to reinforce a first-echelon unit. Second-echelon divisions may also find that the army or corps commander takes direct control of a unit for a specific mission. In such cases, that senior commander tries to make up any losses before the division is committed into battle.

The two primary types of maneuver division are the ***mechanized infantry division (MID)*** and the ***tank division (TD)***.[3] A typical OPFOR division consists of four maneuver brigades, organic combat and service support units, and any reinforcements attached by higher levels of command. The main elements within a division's organization are as follows:

Mechanized Infantry Division

An MID typically consists of three mechanized infantry brigades (MIBRs) and a tank brigade (TBR), with CS and CSS units. The three MIBRs may either consist of two IFV-equipped brigades and one APC-equipped brigade or vice versa. An MID is most likely to be in the first echelon of an army or corps, unless that parent organization has no TD to use in its second echelon.

Tank Division

A TD typically consists of three TBRs and one IFV-equipped MIBR. A TD is most suited to exploitation roles in the offensive and in defense is deployed in the second echelon of the army or corps to provide a counterattack force. If a TD has to attack prepared defenses, the IFV-equipped MIBR would usually be in the first echelon. IFV-equipped brigades and battalions are also often used for security and forward detachment missions.

Divisional Maneuver Brigades

The deployment of brigades is determined by the echelon structure of the division, usually in either one or two echelons. Two-echelon structures are appropriate when attacking or defending as the main effort, against an enemy deployed in depth. Grouping three brigades in the first echelon and one in the second is the most commonly adopted variant. A two-and-two deployment is sometimes found in the defense, on an army's or corps' most threatened sector.

Mechanized infantry brigades. Because of their firepower and mobility, IFV-equipped MIBRs are often found on the division's main axis in the attack or its most threatened sector in the defense. They are usually in the first echelon, although in the attack an IFV-equipped brigade may be used for an exploitation role in the second echelon.

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[3] This manual will address the MID and TD, since these are the most common types in an armor- and mechanized-based OPFOR. However, such an OPFOR could also have some motorized infantry divisions. For information on the organization of a motorized infantry division, see FM 100-60 and FM 100-63. For information on the tactical employment of a motorized infantry division, see FM 100-64.

Battalions of an IFV-equipped brigade are often chosen for special missions by the divisional headquarters, for example, to act as forward or raiding detachments. APC-equipped brigades are more suited to secondary sectors or those that favor wheeled vehicles. Infantry from APC-equipped units may often be chosen for heliborne landings because of their man-portable antitank weapons.

Tank brigades. Because of its lack of infantry, the TBR is not suitable for use in the first echelon of MIDs when attacking reasonably strong defenses. It is better used in the second echelon, where it can rapidly exploit success. A TBR might be in the first echelon against a weak defense, when the aim is to strike as deeply as possible before the enemy strengthens his position.

In defense, the TBR is also likely to be in the second echelon because its equipment and organization are better for a counterattack or counterpenetration role, rather than for holding ground. In any of these roles, the TBR would normally be reinforced with mechanized infantry units.

Organic Support

Although a division would reinforce its brigades from its CS and CSS assets, the commander would always strive to keep some of these assets under his own control. He usually employs them to support the brigades on the main axis, but they are his personal means of influencing the battle and can be switched elsewhere as the situation develops. Some of these elements may be designated as reserves such as an antitank, engineer, or chemical defense reserve, but artillery is never placed in reserve.

Reinforcements

The exact composition of any reinforcements received by a division depends on its mission, the terrain, and so on. Reinforcements may be retained under division control, allowing the division commander to push some of his own assets down to brigades, or may be allocated to brigades themselves. The most common form of reinforcement is artillery, allowing a division to create an artillery group while reinforcing brigades, particularly on its main sector.

Divisional Maneuver Brigades

The brigade is the basic tactical unit of the OPFOR division. Brigades are not expected to operate independently of their parent unit without reinforcement, and then only for a limited time.

Mechanized Infantry Brigade

A divisional MIBR in an MID has three mechanized infantry battalions (MIBNs) and one tank battalion (TBN). In a TD, the MIBR has only two MIBNs and one TBN. It is rare for an MIBR in an MID to fight as four maneuver units. The most common employment options are—

- In a single-echelon formation, to allocate a tank company (TC) to each MIBN. Sometimes one TC (with the TBN headquarters) is retained under brigade command, as a CAR.
- In a two-echelon formation, to allocate one or two TC to the two first-echelon MIBNs, while retaining the rest of the TBN under the brigade headquarters as a CAR. Tanks are not usually subordinated to second-echelon MIBNs until they are about to be committed into battle.
- In defense, particularly in IFV-equipped brigades, to deploy four battalions (two up, two back). Even in this case, the TBN may lose a company to one or both of the first-echelon MIBNs.

Of course, the brigade commander may choose to fight his TBN as a single entity if he believes the tactical situation requires it. This might happen in a meeting battle when a powerful armored force is most necessary.

Tank Brigade

A divisional TBR in an MID has three TBNs as its only maneuver elements. In a TD, each TBR has three TBNs and an IFV-equipped MIBN. TBRs of TDs are most often organized with the IFV-equipped battalion split by companies among the TBNs. In some circumstances, the IFV-equipped battalion may remain intact and even be reinforced with a TC and other assets. This may happen if the IFV-equipped battalion is acting as the brigade's forward detachment, especially when chosen, because of its amphibious capability, to secure a river crossing. It is rare for the TBR of an MID to be reinforced with mechanized infantry troops from another brigade.

Separate Maneuver Brigades

The OPFOR also has separate MIBRs and separate TBRs that are not subordinate to divisions. Compared to a divisional brigade, a separate brigade has more maneuver battalions and expanded CS and CSS assets. This structure makes the separate brigade well suited for independent action, for example, as a CAR or forward detachment for an army or corps. The ***separate MIBR*** combat formation would most likely use two echelons. It would have three to four MIBNs, each reinforced with a TC, in the first echelon and a TBN or TBN(-) in the second echelon, along with any remaining MIBN(s).

Because of its lack of infantry, the ***separate TBR*** is not suitable for use in the army's or corps' first echelon when attacking reasonably strong defenses. It is better used in the second echelon, where it can rapidly exploit success.

Separate TBRs are often used in an exploitation role. In defense, the TB is also likely to be in the second echelon because its equipment and organization are better for a counterattack or counterpenetration role, rather than for holding ground.

Like the separate MIBR, the separate TBR combat formation would most likely use two echelons. It would deploy three to four TBNs in the first echelon and an MIBN or MIBN(-) in the second echelon, along with any remaining TBNs. If assigned to attack prepared defenses, the separate TBR would place its MIBN(s) in the first echelon in lieu of one or more TBNs.

Maneuver Battalions

The combat formation of OPFOR battalions never involves the cross-attachment of units with other battalions. For example, an MIBN would not exchange a mechanized infantry company (MIC) for a TC with a TBN. Battalions are either reinforced with brigade assets or are themselves used as reinforcements.

Within the battalion, the commander organizes his force in one or two echelons. He may use his own CS assets, and any he receives from higher level, to reinforce subordinate companies (especially on his main axis), or he may retain these assets under his own control.

When a TC is ***attached*** to an MIBN, the TC may be employed as a whole, or tank platoons (TPs) may be attached to each of the MICs. When attached to an MIC, the tank platoon leader takes his orders from the MIC commander. The TP normally is under the tank platoon leader's control, even when individual tanks are used to lead mechanized infantry platoon (MIP) columns.

In rare cases, such as when conducting combat in urban areas or when very widely dispersed, individual tanks may be attached to MIPs. When an MIC is attached to a TBN, the MIPs are normally attached to each of the TCs.

Chapter 3
March

The ***march*** represents the organized column movement of troops along roads and cross-country routes to a designated area or line. This chapter examines the OPFOR's planning and conduct of marches. The OPFOR employs two main types of marches—***administrative*** and ***tactical***. The type of march depends on the probability of contact with the enemy.

MOVEMENT NORMS

For planning purposes, the OPFOR uses norms to quantify the capability of units to move from one area to another. Average rate of movement and daily march distance are the principal indicators of unit march capabilities. These norms apply to both administrative and tactical marches.

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Average Rate of Movement

The OPFOR defines ***average rate of movement*** as the ratio of the entire route covered (or planned) to overall movement time, not counting time for halts. It is not a constant value over the entire route. It depends on the mission, unit march proficiency, commanders' ability to lead columns, mechanical condition of vehicles, condition of the route, weather, and organization and support of the march. The established average rate of movement on the march should be maintained for the entire march.

The terrain, weather, and combat situation determine the rate of march. On roads, wheeled vehicles can move faster than tanks or mixed columns. Wheeled vehicles can attain average speeds of 30 to 40 km/hr during the day and 25 to 30 km/hr at night. This average speed drops to 20 km per hour or lower under less favorable conditions.

Tracked vehicles and mixed columns average speeds of 20 to 30 km/hr during the day and 15 to 20 km/hr at night. Columns making contact with the enemy may move at maximum speeds. Figure 3-1 illustrates movement rates of march columns on different surfaces.

Column Type	Paved Roads		Dry, Dirt Roads		Muddy, Hilly, Urban Roads	
	Day	Night	Day	Night	Day	Night
Wheeled	30-40	25-30	20-25	18-20	10-15	8-12
Tracked/Mixed	20-30	15-20	15-20	12-15	10-12	8-10
Note: During fog, reduce day speed 25 to 30 percent.						

Figure 3-1. Average rates of movement (km/hr).

Daily March Distance

Another measure of march performance is the ***daily march distance***. This is the distance a unit can cover during the march in a 24-hour period. The daily march distance depends on the average rate of movement, the overall length of the marching distance, and the physical capabilities of the drivers and vehicles.

OPFOR experience shows that vehicle drivers can maintain combat effectiveness during a march of 10 to 12 hours. Figure 3-2 shows average daily march performance data for wheeled and tracked or mixed columns. Travel in mountains, deserts, arctic, or marshy areas might reduce performance sharply.

Column Type	Paved Roads	Dry, Dirt Roads	Muddy, Hilly, Urban Roads
Wheeled	250-480	180-300	80-180
Tracked/Mixed	150-350	120-240	80-140

Figure 3-2. Daily march distance (km).

Daily march performance calculations assume that units march from 10 to 12 hours of each day. The remaining 12 to 14 hours are spent as follows:

- Maintenance: 3 to 4 hours.
- Deployment and camouflage: 1 to 1.5 hours.
- Movement to start line: 1 to 1.5 hours.
- Rest: 4 to 8 hours.
- Hot meal: 1 to 1.5 hours.

During a march of over 1,000 km, there is likely to be at least one rest day, for essential repair and maintenance work.

ADMINISTRATIVE MARCHES

The OPFOR employs an administrative march when the chance of contact with the enemy is very low or nonexistent. There is almost always some risk of air or missile attack or actions by enemy special-purpose forces, but this does not preclude using an administrative march. The commander can decide to use an administrative march when the speed and convenience of moving administratively outweighs the low risk of enemy attack.

Administrative marches are planned on a map, using standard norms. Routes are chosen to provide the best possible protection from enemy reconnaissance and possible enemy fire. The OPFOR prefers to conduct administrative marches at night or in periods of limited visibility. The length of routes is subdivided according to the type of terrain and allowable speed. Regular periods of rest allow for routine maintenance, refueling, feeding, and sleep.

March Formations

In an administrative march, columns are organized primarily for convenience. Vehicles of similar type, speed, and cross-country capability are kept together rather than being tactically grouped. Tracked and wheeled vehicles may use different routes. However, the deployment of certain units is determined primarily by tactical considerations, even on an administrative march.

Route Allocation

The OPFOR considers two or three routes sufficient for a division on an administrative march, while a brigade moves on one or two routes. An alternative route is planned for each primary route, in the event the primary route becomes unusable. Planners identify lateral routes to permit changing from one route to another. The OPFOR does not limit movement to roads hard surfaces—secondary gravel roads or dirt tracks also may be used.

March Security

First-echelon brigades always deploy some form of forward march security, even on administrative marches. However, a second-echelon brigade following immediately behind the first does not normally deploy any additional forward security elements. The number and strength of march security elements increase as a unit approaches its line of deployment. Security patrols and outposts deploy around halt and assembly areas.

Air Defense

During an administrative march, primary responsibility for air defense lies with the higher headquarters through whose area the tactical unit is marching. The higher unit's air defense assets provide early warning and engage enemy aircraft at long range. They also provide coverage for obstacle crossings and other chokepoints.

The tactical unit's organic air defense units deploy throughout its march columns or assume advance positions along the route. Air defense radars normally do not emit until the unit is threatened with air attack. Priority in deployment of air defense assets is normally given to headquarters, missile and artillery units, and the first echelon. Actual priorities can vary, depending on the enemy threat and the mission.

Combat Support and Combat Service Support

The OPFOR deploys engineer reconnaissance, route-clearing, and obstacle-crossing units throughout march columns. The primary responsibility for maintaining routes still lies with the higher headquarters. Chemical reconnaissance and other chemical defense assets are also tactically deployed within columns, in case of enemy strikes during the march. Higher headquarters are responsible for maintaining, refueling, and feeding units marching in their rear areas. This ensures units on the march are committed into battle at full strength with their combat loads intact.

Deployment of Command Posts

Command posts or command observation posts (CPs or COPs) typically lead columns within brigades and battalions. Within marching divisions or brigades, one CP must always be deployed while the others are moving. The commander normally remains with the deployed CP. The preferred option is for the main CP to move with the first echelon, while march control is exercised from the forward CP situated in the next halt area. When the main body moves into that halt area, the forward CP moves on to the next one.

A second, less-preferred, option is to have the forward CP move at the head of the first echelon throughout, with the main CP moving in the second echelon. If a brigade marches on more than one route, the main CP normally leads the march column along the main brigade route.

Transition from Administrative March

At the end of an administrative march, the OPFOR normally occupies an assembly area to reorganize for tactical actions. In the assembly area, units carry out final maintenance and logistics checks. From this assembly area, units may continue to move using a tactical march formation. The new march order is determined by the mission, the terrain through which the unit must march, and the nature of the threat.

TACTICAL MARCHES

The OPFOR conducts tactical marches when it anticipates contact with enemy ground forces. The march formation must permit a smooth and rapid deployment into prebattle or battle formation, in accordance with the commander's plan. It must include sufficient march security to prevent the enemy from disrupting that deployment. A unit may conduct a tactical march when—

- Leaving an assembly area to launch an attack from the march.
- Moving forward in anticipation of a meeting battle.
- Conducting a pursuit.
- Conducting a passage of lines.
- Moving laterally to a new zone of attack or defense.

March Planning

Commanders and staffs plan marches in as much detail as time and information permit. Having received an order to conduct a march, the commander issues preliminary instructions to his subordinate commanders. He then makes an estimate of the situation. The commander's estimate includes the following information:

- Mission of the march.
- Time available.
- Locations of possible or anticipated enemy contact.
- Disposition and strength of enemy forces.
- Disposition of friendly forces and missions of adjacent units.
- Attachments and supporting units.
- Terrain, weather, and light data.
- Possible march routes.
- Disposition of enemy precision weapons.
- NBC conditions.
- Control measures.
- Reconnaissance and security requirements.

On the basis of his estimate, the commander selects and assigns routes, if his senior commander has not already specified them. The commander's estimate also influences dispersion, rate of march, and order of march of units. See Chapter 2 for more information on the OPFOR's decisionmaking process.

Movement Norms

The movement norms described earlier in this chapter apply to units conducting tactical marches as well as administrative marches. (See the Movement Norms section.) However, the tactical situation may cause the commander to modify rates of movement based on the terrain, the greater requirement for dispersion, and the likelihood of enemy contact.

Route Reconnaissance

Whenever possible, the commander orders a route reconnaissance before a tactical march. The purpose of this reconnaissance is to—

- Determine route conditions.
- Classify roads and bridges.
- Locate contaminated areas, chokepoints, and obstacles.
- Determine requirements for engineer or decontamination support.

The route reconnaissance is conducted by the unit's organic engineer or reconnaissance elements. (See Chapter 11 for more information on route reconnaissance.) Engineer and chemical defense elements may perform a separate route reconnaissance, but, if so, their actions should be closely coordinated with the maneuver unit's reconnaissance elements. The unit's chief of reconnaissance has responsibility for developing and coordinating the route reconnaissance plan.

March Routes

The OPFOR applies the following norms to tactical march routes:

- A division receives either a zone of advance or one to six march routes.
- A brigade normally receives one or two march routes.
- A battalion receives one march route.

A division normally has a zone of advance 15 to 30 km wide for a tactical march. The number of routes a division uses depends on the number of brigades in its first echelon. One or two routes are allocated to each first-echelon brigade. In mixed terrain, brigades normally advance on two routes until beginning their deployment into battle.[1] A division's march columns are typically 80 to 100 km deep from the lead march security elements to the tail. A first-echelon brigade requires over 40 km of road space; a second-echelon brigade, with fewer march security elements deployed, needs 20 to 30 km.

March Formations

The march formation of a given unit includes organic elements, plus any elements ***attached*** as reinforcements. Elements allocated in a ***supporting*** relationship to the marching unit may or may not be integrated into its march formation.

March formations must maintain dispersion laterally and in depth. This dispersion is especially critical when the enemy has precision weapons or is capable of achieving local air superiority.

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[1] ***Mixed terrain*** describes a mixture of hills and valleys, clear and wooded terrain. An example of an area where mixed terrain predominates is Western Europe. ***Close terrain*** describes terrain that is mountainous or covered with dense vegetation, and that is not easily trafficable by armored vehicles. Examples of close terrain are jungles, large swamps or marshes, and mountainous regions. ***Open terrain*** is flat, with sparse vegetation, and is readily trafficable by armored vehicles. Examples of open terrain are deserts and steppes.

March routes within a division are normally 3 to 4 km apart. The commander balances the requirement for dispersion in depth with that for timely commitment of his forces upon contact. Figure 3-3 shows typical tactical march intervals. The depth of a march formation depends on three factors:

- The intervals between units and vehicles in each column.
- The number of march routes.
- The organization of the forces on each route.

Elements Involved	Normal Intervals	Variations
Vehicles in a Company	25-50 m	Increased at high speeds, in contaminated or rugged terrain, or on icy roads. May decrease at night. May increase (to 100-150 m) in open terrain, when threatened by aviation or precision weapons.
Companies in a Battalion	25-50 m	Up to 300 m or more under threat from aviation or precision weapons.
Battalions on the Same Route	3-5 km	Can vary as contact becomes imminent.
Brigades on the Same Route	5-10 km	

Figure 3-3. Typical tactical march intervals.

Order of March

The order of elements within a march column depends on the combat situation and on the expectation of enemy contact. In any tactical march, the commander places combat support (CS) and combat service support (CSS) elements within the column to ensure efficient transition into combat. He establishes the column organization before starting the march to minimize or preclude the need to reorganize before commitment to battle.

The main body of the force employs reconnaissance and forward security forces in most situations. The reconnaissance forces move ahead of the security force. They try to avoid contact while reporting information back to the unit commander in the main body. The security forces are responsible for ensuring the unhindered movement of the main body; to accomplish this, they may engage enemy forces.

Within the main body, tanks and mechanized infantry units normally move at or near the head of the column, along with the commander and key staff officers. Attached and organic artillery elements also move well forward in the column, occasionally traveling ahead of the tanks and mechanized infantry. Air defense, engineer, antitank, and chemical reconnaissance elements are dispersed throughout the march column.

The main body is responsible for its own flank security. In some cases, flank security may be provided by adjacent marching units, thereby reducing the requirement for a unit to detach flank security elements. Logistics elements normally bring up the rear of the column, followed by a rear security force.

Control Measures

The commander and his staff also establish control measures to ensure that the unit arrives in good order at the area designated for the completion of the march. These measures include the following:

Start Line

The senior commander in the marching unit establishes a march start line based on visible reference points. This is the line at which units begin performing the assigned march. It is normally 5 to 10 km from the assembly area, allowing units to form up into column(s), reach the prescribed rate of movement, and establish the correct intervals between units.

Control Lines

Commanders establish control lines to facilitate timely and orderly movement. The number of control lines depends on—

- The distance the march is to cover.
- The terrain and weather.
- The time of day or night.
- Road conditions.

Control lines usually are assigned at points on the march route separated by of 3 to 4 hours of movement. Commanders indicate designated times for each major element of the force to cross these control lines.

Halts

Commanders plan rest halts to preserve the strength of personnel and allow for maintenance of equipment. Designated halt lines often coincide with control lines. Short halts are scheduled for every 3 to 4 hours of movement. Short halts may last up to an hour, but 20 to 30 minutes is normal. The column formation remains intact at halts, with units maintaining their intervals.

A full day's march of 10 to 12 hours usually includes one long halt, lasting no more than 2 hours. (In a forced march of 12 to 14 hours, the long halt can last 2 to 4 hours.) The long halt occurs during the second half of a day's movement. Units disperse off the route in camouflaged positions. Soldiers use the time to perform any needed maintenance, refueling, resupply, or decontamination. They may also receive a hot meal. Long halts are not normally scheduled at night, so as to allow maximum time for night movement.

Traffic Control

Traffic control posts are designated for every 3 to 4 hours of movement. They help regulate the rate of movement and keep the march organized. To assist movement and enforce march control, divisions designate specific traffic control personnel. They can be augmented by designated traffic control personnel from subordinate levels. Before the march, they normally take up

posts at critical points: turns, intersections, chokepoints, and control lines. The use of traffic control posts decreases reliance on maps and radio communications.

Communications

During the march, units limit the use of radios, to minimize the risk of detection, jamming, and enemy attack. They march under radio silence, relying on planning and rehearsal, hand and arm signals, flags, and light signaling devices to control movement. During long halts, units may establish wire communications. The OPFOR also employs couriers extensively during the march. Traffic control posts may operate separate wire and radio nets.

Reconnaissance

Continuous reconnaissance on the march provides timely collection of information on the enemy and terrain in the direction of movement and on the flanks. The principal method of reconnaissance on the march is observation. Each unit organizes all-around observation for prompt detection of the enemy. Technical equipment may also be used to collect data.

A reconnaissance element provides security indirectly; by reporting what it sees, it keeps the commander from being surprised. However, the reconnaissance element's main mission causes it to avoid contact whenever possible, in order to continue to collect and pass on information.

March Security

The OPFOR makes a clear distinction between security and reconnaissance. (See the section on Reconnaissance Versus Security in Chapter 6.) ***Security*** is an aggressive, localized mission, whereby units are assigned to prevent penetration by enemy reconnaissance elements and ensure advantageous conditions for the deployment of the unit's main body. The distance from the security elements to the supported unit is determined chiefly by the form of security, size and capabilities of the supported unit, and the mission.

Reconnaissance, on the other hand, is a longer-range, more passive mission to identify and evaluate aspects of terrain and enemy forces. An OPFOR commander may assign a unit to perform either a reconnaissance or a security mission, but normally not both at the same time. A march security unit can provide some reconnaissance information by reporting on what it encounters, but reconnaissance is not its primary mission.

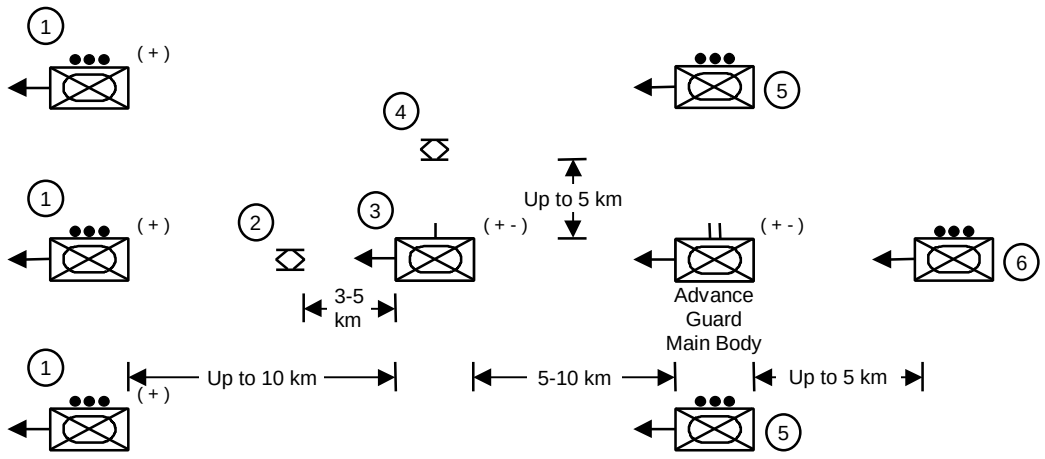
A mechanized infantry brigade (MIBR) or tank brigade (TBR) on the march sends out march security elements to prevent surprise attacks by the enemy, keep the enemy's reconnaissance from penetrating to the main body, and assist the main body's deployment into battle. These elements move ahead of the main body at a distance that allows sufficient time for the main body to maneuver and deploy into battle formation before making contact with the enemy force detected by the security elements.

The strength and composition of the march security elements depend upon the terrain and the intensity of the enemy threat. The greater the threat and more difficult the terrain, the stronger the march security required.

The OPFOR classifies march security elements as advance guard, security elements (forward, flank and rear), and patrols. Figure 3-4 shows an example of a brigade's advance guard and the other march security elements that can be associated with it. For more information on the various types of security elements, see the sections of this chapter dealing with tactical march at brigade level and below.

Support of the March

The commander employs his CS and CSS elements to protect his force from enemy action and to facilitate the march. The actions of these elements are closely coordinated with those of security elements and the main body during the planning process.



Note: This diagram shows some, but not all, variants of march security elements that an advance guard battalion could dispatch, depending on the situation.

1. Combat reconnaissance patrol (CRP)—usually a reinforced platoon. A battalion may send out as many as three CRPs to reconnoiter flanks and alternate routes, as well as the primary route.
2. Forward patrol (FP)—a squad or platoon that provides march security ahead of the forward security element.
3. Forward security element (FSE)—a reinforced platoon or company that provides march security ahead of the advanced guard main body.
4. Patrol squad—a single IFV, APC, or tank that either conducts reconnaissance or provides march security for the unit that dispatched it. In this example, it provides flank security or reconnaissance for the FSE. However, an FP could send a patrol squad forward along its route of march for additional security.
5. Flank security element—a platoon or company that provides march security to the flank of the main body.
6. Rear security element—a platoon or company that provides march security to the rear of the main body.

Figure 3-4. March security elements.

Engineer

The purpose of engineer support for the march is to allow the force to overcome or bypass areas that might disrupt movement. Engineer units organic or attached to divisions and brigades can form movement support detachments (MSDs) and mobile obstacle detachments (MODs). See Chapter 11 for more information about engineer support.

Movement support detachment. The MSD is a temporary, task-oriented engineer grouping formed to support a maneuver force in preparation for, and during, the march. Its purpose is to reduce obstacles along the march route and to make the route usable by the maneuver force. The work of the MSD is vital to a rapid advance and to security. It fills craters or constructs bypasses, bridges minor gaps, and clears and marks lanes through minefields. The goal is for the MSD to complete all these tasks before the main body arrives at the obstacles, so that it is not forced to halt, disperse, or seek another route.

MSDs may include engineer equipment such as bulldozers, cranes, dump trucks, tank- and truck-launched bridges, mine detectors, and trucks to carry explosives and metal track. They may have mechanized infantry and tank troops attached for security. Chemical reconnaissance troops can be part of the MSD. With organic resources, a division and its subordinate brigades can form up to six MSDs of approximately company strength. Typically, the division or brigade chief of engineers forms at least one MSD per movement route.

An MSD is organized into two or three subgroups. They are the reconnaissance and obstacle-clearing group (which can be one consolidated group or two separate ones), and one or two road and bridge construction and groups. Grouping depends on terrain and the tactical situation and can vary during the course of operations.

The MSD normally follows the forward security element (FSE)—or the advance guard, if an FSE is not employed—improving the axis of advance. The MSD remains close enough to the march security element it is following to achieve security. The exact interval depends on the terrain and the likelihood of enemy contact. The MSD coordinates its activities closely with adjacent maneuver units, but it remains under engineer control. Once the first echelon is committed to battle, the MSD follows behind it to prepare the route for the second echelon.

Mobile obstacle detachment. MODs are temporary, task-organized engineer groupings intended to create minefields and obstacles. During the march, the MOD normally travels behind the advance guard and in front of the main body. The MOD protects advancing columns by mechanically laying minefields and creating expedient obstacles on likely enemy approaches. MODs often work in conjunction with antitank elements to protect the flanks of marching units.

Air Defense

The commander plans air defense for the march in advance. His plan incorporates organic and supporting air defense weapons, as well as aviation. The commander can position air defense weapons in the column or in stationary positions occupied in advance. He normally distributes the weapons throughout the column.

The commander also establishes the conditions under which air defense weapons are permitted to engage enemy aircraft. All combat vehicles can contribute to the air defense effort through the use of onboard cannons, machineguns, small arms, and even antitank guided missiles (ATGMs), in some cases.

If the march column comes under air attack, it speeds up, and the interval may increase to a distance of up to 150 m between vehicles. If a large group of aircraft attacks, the column may have to disperse or seek off-road concealment. See Chapter 10 for more information on air defense.

Aviation

Air support to the tactical march is normally provided by rotary-wing aircraft allocated to a division or brigade to screen its march columns. These aircraft may perform reconnaissance and security missions. They may also provide an on-call force to react against unexpected enemy contact. See Chapter 9 for more information on air support.

Information Warfare

The primary goal of information warfare (IW) activities in support of the march is to ensure the OPFOR can safely move its forces to the desired locations on the battlefield, at the appropriate times, prior to employment. Two specific objectives support this goal: minimize the enemy's ability to successfully identify the OPFOR's intentions, and reduce or negate the enemy's capability to disrupt or delay the movement.

Extensive planning is undertaken to reduce the enemy's ability to collect information that leads to accurate assessment of the OPFOR's force structure, movement, and intentions. The OPFOR does desire the enemy to see enough of the battlefield picture to draw the wrong conclusions. Measures to reduce the effects of enemy disruptive efforts, to include physical destruction and electronic combat (EC), heavily emphasize targeting the enemy's long-range fire systems. Active and passive measures focus not only on the weapon systems themselves, but also the supporting target acquisition systems and sensor-to-shooter links.

The IW components of deception, protection and security measures, electromagnetic spectrum operations, and destruction are especially relevant to the march. The OPFOR conducts IW activities throughout the movement, during halts, and while occupying assembly areas. While the potential threat to the OPFOR is greatest during tactical road marches, administrative marches may also be threatened. Given the increased ranges of enemy long-range sensors (especially airborne) and precision weapons, movement deep in the OPFOR rear is no longer relatively secure from attack. For more information on IW, see Chapter 12.

Chemical

Chemical defense units are organized to facilitate NBC reconnaissance, decontamination, and smokescreening missions. Radiological and chemical reconnaissance is accomplished using radiation and chemical reconnaissance devices onboard NBC reconnaissance vehicles. Radiological monitoring, using dosimeters and radiation reconnaissance devices, is accomplished after exiting contaminated areas.

Logistics

Control of logistics during the march relies on detailed planning and coordination between the chief of logistics, commanders of logistics elements, and the supported commander. At brigade and division levels, the chief of logistics establishes and heads a rear CP. This CP normally moves at the head of the column of logistics elements, or on the main axis if there is more than one column.

Logistics support of the march has two phases: before the march and during the march. Before the march, logistics elements move forward to replenish supplies, perform maintenance, and to evacuate the wounded. During preparation for the march, combat vehicles and tanks are serviced and maintained, and vehicles are filled with oils and coolant. Serviceability of weapons, night-vision devices, communications equipment, and blackout equipment is checked, and damaged weapons and equipment are repaired. Refueling and maintenance elements can then move ahead to halt areas.

During the march, units receive logistics support at rest halts. Daily routine servicing and maintenance is performed in halt areas. When possible, battalion- and brigade-level maintenance assets are positioned in halt areas to perform higher-level maintenance. If vehicles break down between these areas, maintenance personnel move them off the road and repair them there or leave them for follow-on units to repair. Wounded personnel receive medical aid in-place, with medics evacuating the seriously wounded. Units make every attempt to replenish fuel reserves on vehicles before commitment to combat.

DIVISION TACTICAL MARCH

Mechanized infantry divisions (MIDs) or tank divisions (TDs) use similar march formation. The division moves along as many as six march routes, with brigade reconnaissance companies and advance guards or other security elements preceding the main body. The division commander may dispatch a forward detachment (FD) for independent missions forward of the lead brigades' advance guards.

The division order of march depends on the enemy situation, mission, terrain, and the commander's concept for deployment into combat. The division's main body may march in two echelons or one echelon and a combined arms reserve (CAR). In some cases, especially when the division does not deploy an FD, there might be both a second echelon and a CAR. Figure 3-5 shows an example of the tactical march formation of an MID marching in two echelons.

The choice of echelonment generally depends on the nature of enemy defenses. In very difficult terrain, with poor lateral lines of communication, the division might advance in one echelon, with a strong CAR. The same might be true when the division is marching in anticipation of contact with a weak, unprepared enemy. A second-echelon division generally advances on fewer routes than a first-echelon division. When exploiting a penetration, a MID might employ its TBR in the first echelon. Other variations are possible, and OPFOR march formations should not be expected to follow a single pattern.

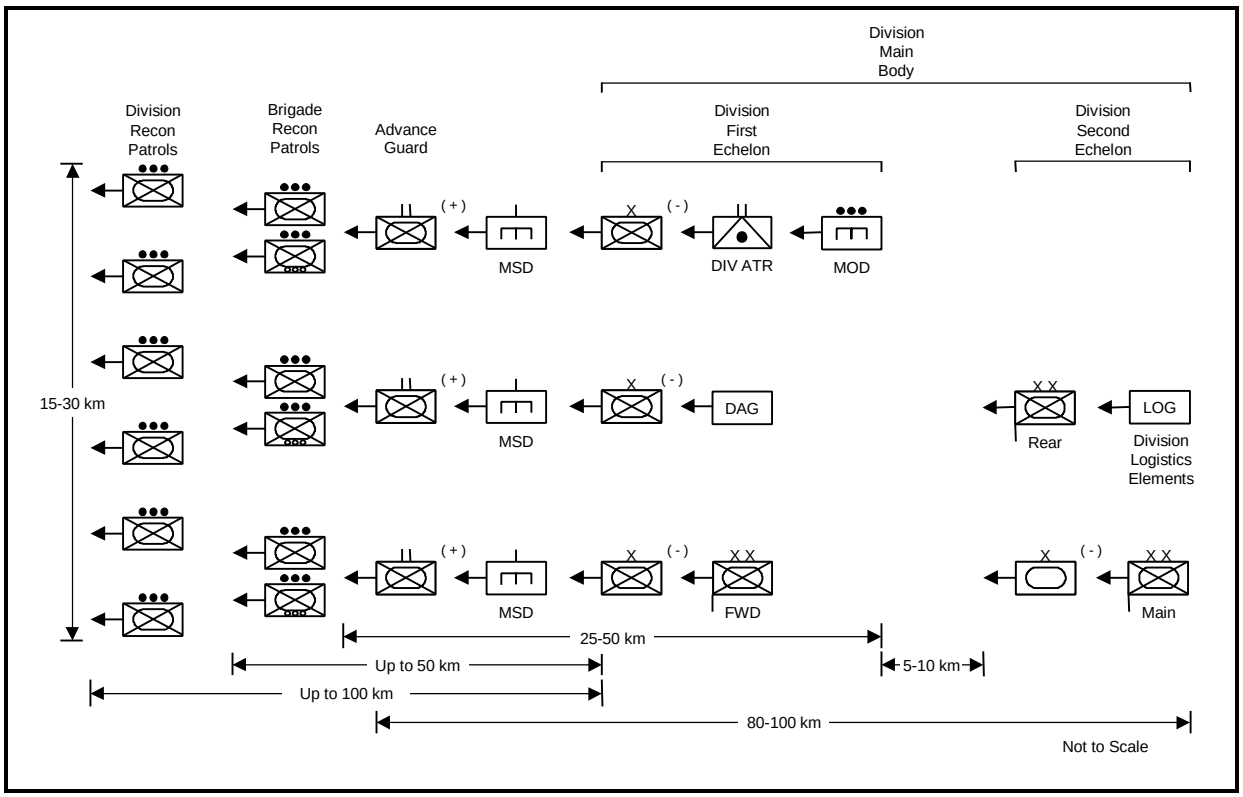


Figure 3-5. MID tactical march formation (example).

Reconnaissance

Ground reconnaissance elements concentrate on the major axes of advance and the most likely enemy concentrations. Elements of the division reconnaissance and EC battalion can precede the division's movement out to a range of 100 km. These and independent reconnaissance patrols from the division's brigades cover the width of the zone of advance. On the main axis, the reconnaissance screen may also include a reconnaissance detachment formed on the basis of a mechanized infantry or tank battalion or company.

Forward Detachment

An FD normally is a reinforced battalion. The purpose of the FD is to facilitate the success of the division's attack. The FD's mission is normally to seize key terrain, but its mission could be oriented on an enemy force in some circumstances.

The FD may also conduct raids against important enemy sites—such as precision and NBC weapon systems, artillery positions, and CPs. Because of its special mission, the FD may or may not use the same march routes as other division elements. The FD normally operates 2 to 3 hours ahead of the division's first-echelon brigades. See Chapter 4 for more information on the FD.

March Security

The division does not send out its own march security elements. First-echelon brigades normally provide advance guards or FSEs and other forward march security elements. There is no actual divisional advance guard. Each maneuver brigade provides flank security elements for itself, as necessary, based on the relative positions of other OPFOR units. Thus, flank brigades provide flank security for the division. Second-echelon brigades or CARs provide rear security for the division, as well as their own local security to the front and flanks.

One exception to this concept is that a division may use its organic or an attached antitank battalion to secure an exposed flank, usually in conjunction with an MOD. Even in this case, the flank brigade provides additional flank security elements to support its own movement and the division's.

Movement Support Detachments

MSDs move immediately behind each first-echelon brigade's FSE or advance guard. The MSDs improve routes so that the main body is not delayed.

First Echelon of Main Body

Although the brigades are prepared to deploy into battle as rapidly as possible, they remain in march formation as long as possible. The decision to deploy, or to bypass an enemy too strong for the advance guard to dislodge, is approved by the division commander.

Command Posts

The division commander, in his forward CP, travels in the column of the main-axis first-echelon brigade. He is normally close to the brigade CP, ensuring quick reaction to enemy contact. The division's main CP accompanies a second-echelon brigade or CAR, also on the main axis. The rear CP leads the division's logistics elements.

Division Artillery Groups

The division may have one or more division artillery groups (DAGs) composed of organic and attached artillery. A DAG usually moves on the main axis immediately behind the first-echelon brigades. A DAG might also move even farther forward in the march column, perhaps following security elements on a secondary route so that it can quickly support an attack from the march. A DAG may move as one element or it may move as separate battalions on different routes. The latter possibility is more likely when there is a high threat of air or precision weapon attack.

Air Defense

If marching out of contact, the division's surface-to-air missile (SAM) regiment, and lower-level assets, are likely to rely on army group, army, or corps assets for long-range surveillance and early warning. The tactical air defense units would activate their organic electronic sensors in the event of a direct threat to the division. In the latter case, the SAM regiment is placed on full alert and possibly deployed with a battery accompanying each first-echelon brigade and other batteries on the flanks of the second echelon or CAR.

The division's SAM regiment may move its SAM assets in a bounding overwatch configuration to keep the march columns under an air defense umbrella. During the march, short- and medium-range SAM assets might depend upon visual detection for early warning. Radars are normally turned off, or only operated for short periods, to reduce vulnerability to antiradiation missiles.

Second Echelon or Reserve

The second-echelon brigade or CAR generally moves on the main axis. Part of the second echelon may be designated as an antilanding reserve. See Chapter 5 for more information on antilanding reserves.

Combat Support and Combat Service Support

Division CS and CSS elements are distributed in accordance with the terrain and tactical circumstances. In the example in Figure 3-5, the bulk of the engineer assets, less route-clearing elements, are kept in reserve in the second echelon of the division. If a water obstacle is to be crossed, assault crossing elements would accompany the first echelon, or they might be with the FD or advance guards. The division's bridging units follow the first-echelon brigades. The chemical defense battalion provides chemical reconnaissance patrols throughout the division's formation. If the NBC threat is high, decontamination assets may be split between first and second echelons. The bulk of the division's logistics elements are shown at the end of the march formation. Maintenance and medical evacuation assets may be divided between the two echelons and, in a long march in difficult terrain, resupply facilities may also be split.

BRIGADE TACTICAL MARCH

MIBRs and TBRs can use various march formations, similar to those a division. The brigade may advance on one or two march routes, with reconnaissance and security elements preceding the main body. These formations provide reconnaissance and early warning to the brigade commander. If necessary, a brigade may send out an FD to accomplish missions similar to those of the divisional FD. Figure 3-6 shows an example of a brigade moving on one route, and Figure 3-7 shows one moving on two routes.

Many variations of the brigade march formation are possible, depending on the enemy situation, mission, terrain, and the commander's concept for deployment into combat. The bri-

gade main body may march in two echelons or one echelon and a CAR. In some cases, there might be both a second echelon and a CAR.

Brigades on the division's flanks have to provide their own flank security elements. A brigade in the division's second echelon needs little or no forward security but must provide rear security for itself and for the division. The same second-echelon brigade may have to give up one of its battalions to serve as a division FD. If part of a single-echelon division march formation, a brigade on a less threatened axis may give up one of its battalions to serve as a division FD or CAR. A separate brigade must provide its own all-around march security.

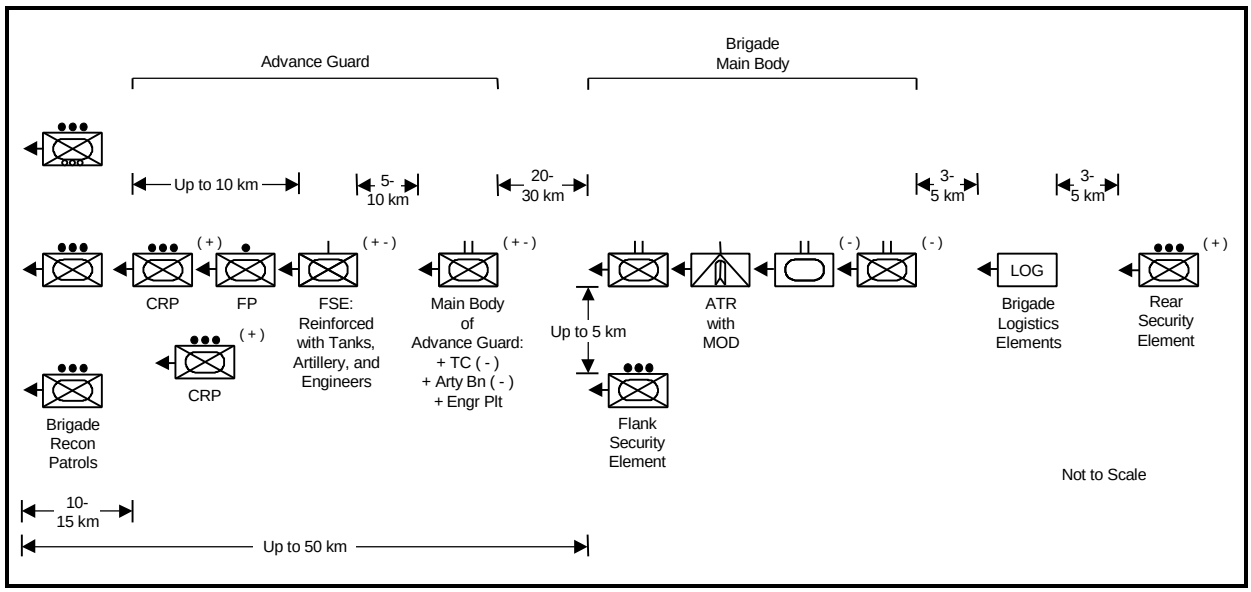


Figure 3-6. MIBR in a tactical march formation moving on one route (example).

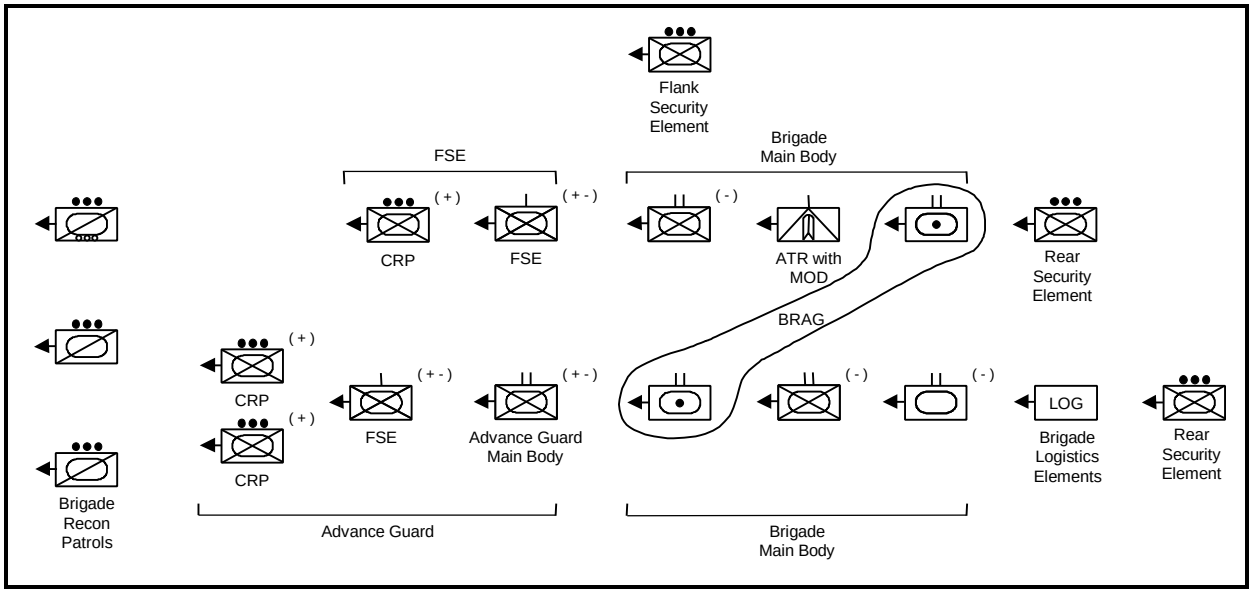


Figure 3-7. MIBR in a tactical march formation moving on two routes (example).

Reconnaissance

A brigade's organic reconnaissance company may send out patrols that can advance up to 50 km or more ahead of the brigade main body. Even though division reconnaissance is moving ahead, the brigade commander deploys his own independent reconnaissance patrols, which report directly and immediately to his headquarters. A second-echelon brigade does not deploy such patrols until receiving confirmation of its mission and orders for commitment.

The distance between reconnaissance patrols and the brigade main body also depends on the number and types of march security elements present. Figure 3-8 illustrates the possible relationships. If, for example, an MIBR deploys all possible march security elements at their maximum strengths and maximum intervals, these may reach up to 50 km ahead of the main body. For another brigade requiring only minimum forward security, they may reach to less than 15 km. Ideally, brigade reconnaissance precedes march security by about 10 to 15 km. Thus, brigade reconnaissance patrols could be from 25 to 30 km ahead of the brigade main body, or in the extreme case 60 to 65 km.

	Maximum March Security	Minimum March Security
March Security Ahead of Main Body	Up to 50 km	Up to 15 km
Recon Ahead of Security	10-15 km	10-15 km
Recon Ahead of Main Body	60-65 km	25-30 km

Figure 3-8. MIBR and TBR reconnaissance in relationship to march security and brigade main body.

Specially trained reconnaissance patrols from the brigade's reconnaissance company or platoon collect the following information:

- Nature and location of enemy precision weapons and NBC delivery systems.
- Movement axes of enemy columns.
- Strength and composition of enemy forces.
- Deployment lines and routes.
- Location of contaminated areas.

If the situation demands, a divisional brigade may supplement these with additional reconnaissance patrols based on regular mechanized infantry platoons.

March Security

A brigade conducting a tactical march deploys march security elements as needed to secure its movement and also to provide security for the division's movement. A brigade deploys forward, flank, and rear security elements to cover exposed areas. March security elements from the advance guard or FSE should encounter the enemy or obstacles well before the main body. This allows each successive commander to minimize losses in a surprise encounter by meeting the enemy with the smallest possible force. This also allows space and time for the maneuver of follow-on forces. Figure 3-9 shows the typical intervals between these security elements and the next-larger force.

Interval Between			Interval (at Average March Rate of 25 km/hr)
CRP	and	FP, FSE, or Advance Guard	3-5 km
FP	and	FSE or Advance Guard	3-5 km
FSE	and	Advance Guard or Main Body	5-10 km
Advance Guard	and	Main Body	20-30 km
Flank Security Element	and	Main Body	Up to 5 km
Rear Security Element	and	Main Body	3-5 km
CRP = Combat Reconnaissance Patrol		FP = Forward Patrol	FSE = Forward Security Element

Figure 3-9. Typical intervals between march security elements.

If a particular march security element cannot overcome enemy forces that it encounters, it can at least develop the situation for the commitment of next-larger security element or the main body. It is unlikely that even the next-larger force would assault strong positions frontally if this can be avoided. The preferred option is to envelope the position, forcing the defender to pull back, and then to attempt to destroy the withdrawing force on the move.

Advance Guard

A brigade often deploys an advance guard for march security on its main axis during a tactical march. The advance guard, in the form of a reinforced battalion, normally comprises about one-third of the brigade's total combat power. The OPFOR prefers to use reinforced mechanized infantry battalions (MIBNs) for this role, but it also may use tank battalions (TBNs). In an MIBR, a MIBN is most likely to serve as the base unit for the advance guard; in a TBR, it is more likely to be a reinforced TBN.

In this role, an MIBN is typically reinforced with a tank company (TC); a TBN would be similarly reinforced with a mechanized infantry company (MIC). Other typical reinforcements for either type of battalion can include an artillery battalion, an air defense platoon, an engineer platoon, and perhaps a chemical reconnaissance squad. Reinforcements for an MIBN are also likely to include an antitank element.

The mission of the advance guard is to facilitate the advance of the main body. This can be when the brigade is marching in anticipation of a meeting battle, exploiting a penetration, or executing a pursuit. An advance guard can engage and destroy enemy units, but only if that combat does not inhibit fulfillment of its primary task.

In anticipation of a clash with the enemy, the main body of the advance guard deploys up to one hour ahead of the brigade main body. Assuming an average march rate of about 25 km/hr, this translates to a distance of between 20 and 30 km. The advance guard precedes the main body on the same route, providing movement security and warning. A brigade marching on two routes may deploy an advance guard on the main axis and an FSE on the other route (See Figure 3-6). The advance guards of first-echelon brigades provide forward security for the division march formation.

The advance guard usually dispatches an FSE to its front. The FSE is normally a reinforced company, comprising about one-third of the advance guard's combat power. A brigade may send an FSE forward for march security even if it does not send forward an entire advance guard.

The advance guard may also send out one or more combat reconnaissance patrols (CRPs). The CRP is a mechanized infantry or tank platoon that may be reinforced with engineer and NBC reconnaissance elements. It reports intelligence information and makes the initial contact with any enemy forces encountered.

Forward Security Element

The FSE is normally a reinforced company commonly sent ahead of a first-echelon battalion or a battalion operating away from the main body (for example, an advance guard, a forward detachment, or a raiding detachment). MICs often perform this role, even in TBRs. Typical reinforcements include an artillery or mortar element, and possibly an antitank platoon. An engineer element may accompany an FSE, or an MSD may be marching in the immediate vicinity. Against a weak threat, or when limited assets are available for march security, a battalion might send out only a reinforced platoon as its FSE.

When the threat is weak, a brigade (on a supporting axis or in the second echelon) can use an FSE in lieu of an advance guard. When a brigade is marching on two routes, it may deploy an advance guard on the main axis and an FSE on the other route, or FSEs on both routes.

The distance between the FSE and the battalion (advance guard) main body relates to the speed of movement. It also reflects the length of time the FSE can fight a possibly superior enemy force before the parent battalion arrives. For example, the OPFOR believes that time to be 20 to 30 minutes when a tank or mechanized infantry unit sends out the FSE. From the time the FSE becomes engaged, that is the time required for both the following actions:

- For the battalion commander to estimate the situation, make his decision, and assign missions to subordinates while on the move.
- For the battalion to deploy into battle formation.

At an average rate of 25 km/hr a battalion of tracked vehicles can cover a straight-line distance of 5 to 10 km in 12 to 24 minutes. However, the battalion main body may move over a longer route to engage the enemy from a flank. Thus, the total time interval from engagement of the FSE to engagement of the battalion main body may be 20 to 30 minutes. This means that the advisable distance is 5 km for a platoon-sized FSE and up to 10 km for a company-sized FSE.

Flank Security Element

A brigade may deploy flank security elements, in platoon or company strength, on threatened flanks. They can be reinforced with antitank and minelaying assets, or operate with an antitank reserve and an MOD. Static flank security elements are often used to block the exit from a mountain pass while the main body passes by. Mobile flank security elements usually march even with the head of the main body and about 3 to 5 km off the main route.

Rear Security Element

The rear security element for a brigade is normally a reinforced mechanized infantry company or platoon, depending upon the rear threat. The rear security element moves 3 to 5 km behind the trail elements of the brigade. These trail elements are normally supporting logistics elements.

Main Body Battalions

The brigade main body attempts to maintain uninterrupted forward movement as a result of the actions of the reconnaissance and march security elements. It remains in march columns to help maintain the speed of movement. However, its march formation corresponds to its combat formation, to facilitate the transition to combat when necessary.

For divisional brigades, the march and combat formations of first-echelon battalions may differ between tank and mechanized infantry brigades. A TBR often allocates a company of its MIBN to each of its TBNs. In MIBRs, the TBN (less any company allocated to the advance guard) is kept together on the march and placed at the head of the main body column after the forward or main CP. As commitment to battle approaches, the TBN may be split up and its companies allocated to first-echelon MIBNs, with one TC kept under brigade control as a CAR. Second-echelon battalions, in both TBRs and MIBRs, receive little reinforcement before their commitment to battle.[2]

Artillery Elements

A brigade's organic artillery battalion, or a brigade artillery group (BRAG) if it is formed, may be allocated varying positions in the march column, depending on the situation. When contact with the enemy is imminent, the artillery follows close behind the main CP at the head of the column. In second-echelon brigades and on other occasions when contact is not expected, the artillery may be farther to the rear. A MIBR's antitank battalion may cover an exposed flank or march well forward, depending on the tactical situation.

BATTALION TACTICAL MARCH

Battalion commanders organize their marches based upon brigade plans and orders. The march formation of an MIBN or TBN depends upon its mission. A battalion may function as one of the following—

- The advance guard of a brigade.
- The FD of a division or brigade.
- Part of the brigade's main body.

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[2] A ***separate TBR*** or ***MIBR*** has more organizational variations. The separate brigade may have different combinations of TBNs and MIBNs. See FM 100-60 for details on the possible organizations of separate brigades. The concepts discussed above apply only to the combat formations of divisional brigades.

Advance Guard or Forward Detachment

Reinforced battalions performing as advance guards or FDs generally use the same types of formation. They normally deploy one to three CRPs, an FSE, other march security elements as appropriate, and a main body. An example of the march formation of a reinforced TBN in this role is shown in Figure 3-10.

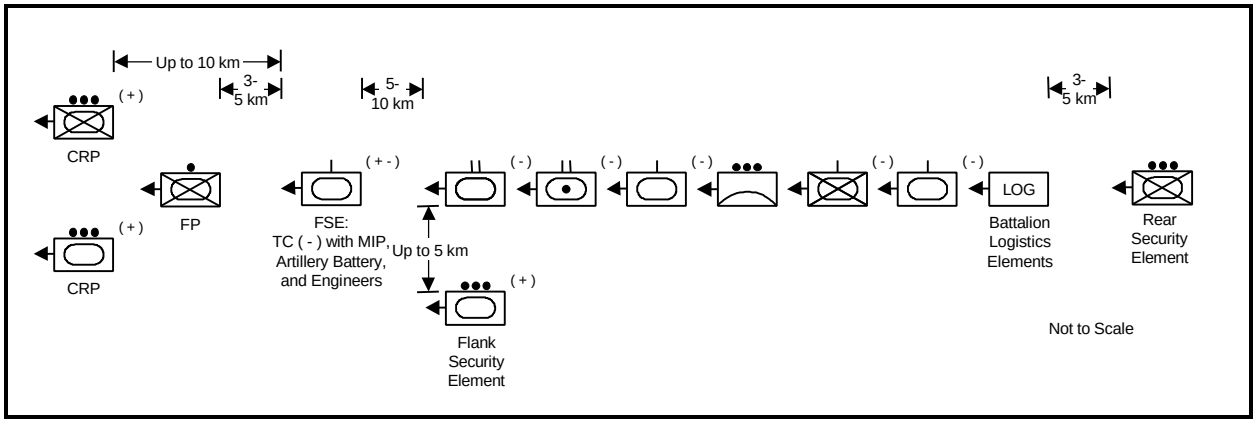


Figure 3-10. Tactical march formation of a reinforced TBN acting as an advance guard or FD (example).

Battalion in Brigade Main Body

A battalion that is part of the brigade main body marches in a column formation on one route. For an MIBN with an attached TC, the commander might have the TC lead his formation, followed by the MICs. Alternatively, individual tank platoons might march at the head of MIC columns. This alignment might occur even when the tank platoons are not attached to the MICs. When an MIC is attached to a TBN, the individual mechanized infantry platoons would normally be attached to the TCs.

The battalion commander usually follows the lead company. The commander normally orders special units—such as the automatic grenade launcher platoon, antitank platoon, or mortar battery—to follow him, but he may place them elsewhere in the formation depending upon the situation.

Battalions maintain strict radio listening silence during the march. The commander controls the battalion through planning, rehearsals, flag and hand signals, and couriers.

Reconnaissance

In anticipation of contact with the enemy, a battalion acting as an advance guard or FD, or at the head of a brigade main body column, sends out a reconnaissance patrol. If an MIBN does not use its reconnaissance platoon for this purpose, that platoon marches at the head of the battalion main body, behind the battalion COP.

March Security

During the march, the battalion commander deploys march security elements as needed and ensures that his unit maintains continuous, all-around observation and security. When functioning as an advance guard or FD, or as the lead battalion on a route that has no advance guard, a battalion generally employs a greater percentage of its strength as march security elements. On a brigade route that has an advance guard, he generally deploys fewer march security elements than the advance guard but may deploy forward, flank, or rear security patrols, as necessary.

Forward Security Element

A battalion acting as an advance guard or FD or leading on a march route may deploy an FSE. See the earlier section on FSEs in this chapter.

Combat Reconnaissance Patrol

The CRP is a mechanized infantry or tank platoon that may be reinforced with engineer and NBC reconnaissance elements. A CRP can precede the FSE company main body by 3 to 5 km. This distance precludes the enemy from being able to simultaneously engage both the CRP and the FSE with direct fire. It also permits the FSE to use fires of reinforcing artillery to support the CRP's battle and allows the FSE to engage the encountered enemy force in an organized manner.

In some cases, both a CRP and a forward patrol (FP) may precede the FSE. In this case, the CRP could be 3 to 5 km ahead of the FP and 6 to 10 km ahead of the FSE. Once his platoon-size CRP becomes engaged, an MIC commander needs about 8 to 12 minutes to move up the rest of the company at a speed of 25 km/hr. During that time, he must estimate the situation, make his decision, and assign missions to subordinates.

Forward Patrols

The most common march security patrol is the FP, found throughout a division's formation. The FSEs of first-echelon battalions, advance guards, and forward detachments are led by FPs of platoon or squad strength. Second-echelon battalions can also employ FPs. When the likelihood of contact with the enemy is low, an FP may be used in lieu of an FSE. Forward patrols operate close to the FSE or battalion main body, generally 3 to 5 km ahead, traveling along the main body's actual route.

Flank and Rear Patrols

Flank and rear patrols are employed as necessary to cover open flanks and the rear of marching units. Mechanized infantry and tank platoons and squads are commonly used to perform this mission.

COMPANY TACTICAL MARCH

Companies conduct tactical marches in accordance with the plans and orders of the battalion commander. The company commander plans his march to ensure a high rate of movement, enable the company to deploy rapidly into prebattle and battle formation, and limit vulnerability to enemy precision weapons or air attacks.

The company marches in a column formation. The standard interval is 25 to 50 m between vehicles, but this interval may expand to as much as 150 m based on terrain, visibility, and the possibility of enemy contact.

During the march, the company commander normally follows the lead platoon. Command and control is maintained through planning, rehearsals, and hand signals. The company maintains strict radio listening silence during the march. Listening silence is normally broken only if the company makes contact with the enemy.

If a tank platoon is allocated to an MIC, the entire platoon marches at the head of the company column. Any other attachments to the company normally follow the lead platoon or the company commander. An example of the march formation of a reinforced MIC is shown in Figure 3-11.

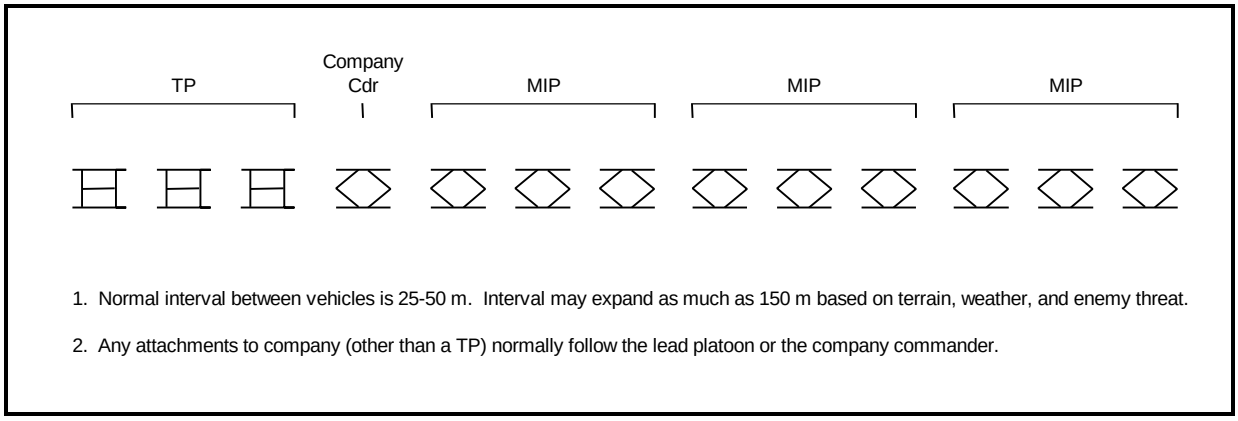


Figure 3-11. Reinforced MIC in tactical march formation (example).

A TC allocated a mechanized infantry platoon may use it as a forward patrol, if the tactical situation requires one. If not, the mechanized infantry platoon can be split among the tank platoons, and individual vehicles follow the tanks of their assigned platoon.

March Security

During the march, the company commander ensures that his unit maintains continuous, all-around observation and security. The commander may assign specific sectors of observation to his platoons.

The company protects itself against precision and NBC weapons through maintaining proper march intervals and by not bunching up at halts, obstacles, or chokepoints. Units disperse at halts, using the terrain for cover and vegetation or any other means at hand for camouflage.

Air Defense

Within the company, platoons assign air guards to watch for enemy aircraft that might attack the column. If attacked by enemy aircraft, the company responds with all weapons that are capable of engaging the enemy. This includes IFV cannons, machineguns, and small arms. Additionally, tank guns and even ATGMs may be used to engage enemy helicopters.

MARCH UNDER SPECIAL CONDITIONS

The environment can greatly effect the conduct of the march. The following paragraphs discuss the effects of special conditions on the march.

Mountains

Sharply rugged relief, limited number of roads, and sharp changes in road conditions have a substantial effect on marches in the mountains. As a rule, roads are narrow with a large number of steep ascents, descents, and turns. At higher altitudes, the output of vehicle engines decreases and fuel consumption rates increase, making equipment movement difficult.

In contrast to mixed or open terrain, the length of a day's march is shortened and column length increases by one and a half to two times or more. Where possible, halts are designated in level sectors near water sources and away from potential landslides and avalanches. In preparing for the march, special attention is given to serviceability of vehicle engines, transmissions, and brakes.

Desert

Sandy deserts are characterized by loose, moving dunes and poorly stabilized sands that are difficult to negotiate in dry conditions. Sand and dust penetrate the tiniest openings in vehicles and weapons, affecting operation, increasing wear, and causing maintenance problems. An acute water shortage is normal, and available water requires purification.

Vehicular movement in the desert is characterized by poor traction of tracks and wheels causing odometer readings to exceed the distance actually covered by 10 to 15 percent. The difficult conditions require thorough preparation of equipment for high temperatures, lack of roads, and dustiness.

Extreme Cold

Snow cover and low temperatures create difficulties in organizing and conducting a march in extremely cold areas. The commander must provide personnel with adequate cold weather clothing and equipment. He must also ensure vehicles are prepared with winter diesel fuel and coolant.

Vehicle halt locations should be placed on level sites, protected from the wind; hatches should be closed and covered with insulating mats. It is important to periodically warm-up vehicle engines and personnel. Other measures may include constantly keeping an eye on coolant temperature readings, and taking measures to prevent tracks from freezing to the soil.

Contaminated Areas

When fighting under NBC conditions, units are likely to encounter contaminated areas. Bypassing such zones reduces casualties and saves time spent on decontaminating personnel and equipment. Bypassing, however, may not always be possible, since some zones could be too large to avoid.

Two methods of crossing contaminated zones are possible. The first is immediate movement across the zone. The second is movement across the zone after waiting for a reduction in contamination levels. Crossing on primary routes ensures high speed and control. Troops may use other axes to reduce the distance traveled or to bypass highly contaminated areas.

Chapter 6
Reconnaissance

Reconnaissance represents all measures associated with organizing, collecting, and studying information on the enemy, terrain, and weather in area of upcoming battles. Aggressive, continuous reconnaissance allows the timely accomplishment of combat missions with minimum losses. Poor reconnaissance can lead to failure.

Reconnaissance is a combined arms mission, not solely the business of reconnaissance troops. It involves the integrated efforts of troops from several branches. This chapter focuses on the reconnaissance activities of ground maneuver forces and specialized ground reconnaissance troops. However, there are also dedicated reconnaissance assets which other chapters in this manual discuss in more detail:

- Artillery target acquisition (Chapter 7).
- Aerial reconnaissance (Chapter 9).
- Air defense reconnaissance, early warning, and target acquisition (Chapter 10).
- Engineer reconnaissance (Chapter 11).
- Signals reconnaissance (Chapter 13).
- NBC reconnaissance (Chapter 14).

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The integrated efforts of any or all of these reconnaissance means may be necessary to support specific missions. Efficient and accurate reconnaissance is also crucial to ensuring the success of information warfare activities.

Reconnaissance is especially important with OPFOR emphasis on the conduct of high-speed, continuous, combined arms combat. In order to have a reasonable chance of success, the OPFOR commander's desired goal is to locate at least 75 to 80 percent of possible targets before launching an attack. Commanders attempt to locate 100 percent of the highest priority targets, such as NBC and precision weapons and command posts (CPs). This degree of target location demands a high level of skill from all levels of reconnaissance troops. Commanders normally confirm their plans only after thorough reconnaissance.

CONCEPT

For the OPFOR, reconnaissance is a critical element of combat support. In modern combat, the battlefield develops unevenly, and units cannot rely on the security of their flanks or rear. Friendly and enemy forces can become mixed, with the combat situation developing and changing quickly. Reconnaissance elements must warn commanders of developing threats and identify enemy strengths and vulnerabilities. All commanders and staffs organize reconnaissance to acquire continuous, timely, and accurate information about the enemy's NBC and precision weapons; force disposition and intentions; and terrain and weather. This information is vital to the OPFOR decision-making and planning process. Reconnaissance can decisively influence the outcome of a battle.

Principles

With the speed and depth of modern combat, the role of reconnaissance has increased in importance. Without decisive actions of reconnaissance forces and assets, it is impossible to preempt the enemy, seize the initiative, and conduct a successful battle. The OPFOR uses the following set of interrelated principles to guide its reconnaissance activities:

Focus

The actions of reconnaissance units must serve the commander's needs and focus on elements and objectives critical to the execution of combat missions. Each division and brigade develops a comprehensive reconnaissance plan in accordance with the organization's mission. The reconnaissance plan must coordinate all available assets into an integrated plan. This unified reconnaissance plan, with centralized command and control of assets, funnels all information collected to the commander and his staff.

Reconnaissance resources are always scarce. In his reconnaissance plan, the commander focuses the reconnaissance effort by carefully defining missions, areas, and targets, based on knowledge of the situation. He must limit ground reconnaissance objectives to concentrate on the critical sectors of the battlefield. To use reconnaissance assets effectively, the commander also must be flexible. He must be able to quickly redirect the reconnaissance effort, and even change the plan if the situation changes.

The OPFOR understands that information is not the same thing as knowledge. With the number of sensors available to the tactical commander, the danger exists that analysts and decision makers could become overwhelmed with raw data. Therefore, all reconnaissance activities should focus on answering specific information requirements.

Continuity

The modern, fluid battlefield demands continuous reconnaissance to provide an uninterrupted flow of information under all conditions. Reconnaissance provides constant coverage of the enemy situation, using a wide variety of assets with deep, overlapping coverage. Not only must reconnaissance units answer specific requests for information; they must continuously collect information on all aspects of the enemy, weather, and terrain to fully meet future requirements. The variety of overlapping assets ensures greater validity of collected information. Continuous reconnaissance decreases the likelihood that the enemy could carry out successful deception.

Reconnaissance units attempt to maintain contact with the enemy at all times. They conduct reconnaissance in all directions, including the flanks and rear, in order to prevent surprise. They collect information during all battle phases, 24 hours a day, 7 days a week, in all weather conditions.

To ensure this continuity, units conducting reconnaissance must maintain a high state of combat readiness. They must be able to sustain themselves wherever they deploy, without relying on others for transport or subsistence. In the event that a dedicated reconnaissance unit is destroyed or becomes combat ineffective, maneuver commanders must designate a maneuver element of appropriate size and capability as a possible replacement.

Aggressiveness

Aggressiveness is the vigorous search for information, including the willingness to fight for it if necessary. Reconnaissance troops must collect information creatively and make maximum use of all assets and methods to ensure success on the battlefield. The OPFOR vigorously employs all available collection resources and adheres carefully to the reconnaissance plan. However, it may alter the plan when its own initiatives or enemy actions dictate.

Although reconnaissance is the primary mission, all reconnaissance units train to defend themselves. However, reconnaissance units do not regularly conduct reconnaissance by combat; normally a maneuver unit of reinforced company or battalion size performs that mission. Reconnaissance units are to assist the commander in obtaining pertinent information, not lead the charge into battle. If reconnaissance units are drawn into prolonged engagements with the enemy, they are less capable of fulfilling their reconnaissance missions. Thus, the commander loses the advantage of the reconnaissance units' special skills. Nevertheless, the OPFOR stresses initiative, resourcefulness, and daring in the conduct of reconnaissance. Reconnaissance troops attempt to penetrate enemy defenses, avoiding contact if possible. When required, they can ambush and raid enemy forces or, as a last resort, draw fire to determine enemy positions. In short, they do what is necessary to fulfill the commander's information needs.

The information requirement determines the techniques to use. Reconnaissance patrols by mechanized forces are not always the best means. Ambushes and raids are fruitful sources of information from captured prisoners, documents, and equipment. Such information-gathering actions are generally more important than any associated damage, but there are exceptions. Reconnaissance elements must sometimes destroy high-value targets they find.

Timeliness

Timely information is critical on the modern battlefield. Because of the high mobility of modern forces, there are frequent and sharp changes in the battlefield situation. As a result, information quickly becomes outdated. The best intelligence is useless if it is not received in time. Timely reporting enables the commander to exploit temporary enemy vulnerabilities. Using increased data automation, he can adjust plans to fit a dynamic battlefield. The OPFOR achieves timeliness through increased automation for command and control (C^2) and processing of information; real-time or near real-time aerial downlinks; and satellite downlinks. This timeliness is especially critical for the success of reconnaissance-fire complexes. (See Chapter 7.)

Camouflage, Concealment, and Deception

The OPFOR is aware that the enemy may learn a great deal about its intentions by discovering its reconnaissance plan. Commanders understand it is not possible to hide the fact that reconnaissance is being conducted. However, they do try to conceal the scale, missions, targets, and nature of reconnaissance efforts. Thus, they strive to prevent the enemy from discovering where they are concentrating their main strength in the defense or where they are preparing to launch their main attack. Specific measures can include conducting reconnaissance across a broad frontage, concealing the actions of reconnaissance elements, and covering and concealing assembly areas of reconnaissance forces and assets.

The OPFOR can also use camouflage, concealment, and deception to “paint a picture” that confirms the enemy’s stereotyped views of how the OPFOR fights. By showing the enemy what he expects to see, the reconnaissance effort can help to establish the conditions for success during ensuing combat. This is a critical part of information warfare.

Accuracy and Reliability

The OPFOR uses all available reconnaissance means to verify the accuracy and reliability of reported information. A commander must base his decisions on reconnaissance information; so, the more accurate and complete the information, the better the decision. To maximize results, the commander’s plan requires accurate information on the enemy’s size, location, equipment, and combat readiness. The accuracy and reliability of reconnaissance information are critical to the destruction of high-value targets such as enemy NBC and precision weapons, reconnaissance-strike complexes, logistics centers, C^2, and communications. The OPFOR achieves accuracy through the creation of overlapping coverage and the use of improved technology.

Reconnaissance must reliably clarify the true enemy situation in spite of enemy camouflage, deception, and counterreconnaissance activities. The first step is to tailor reconnaissance efforts to the tactical situation, selecting and distributing reconnaissance forces in accordance with their capabilities in terms of missions and targets.

The next step is to compare, cross-check, recheck, and integrate reconnaissance reports from multiple means of acquisition. The study and integration of reconnaissance information collected by multiple sources can help in identifying and assessing false targets and other false indicators of enemy actions or intentions.

Zones of Reconnaissance Responsibility

Each headquarters, from division to battalion, has a zone of reconnaissance responsibility. The width of this zone broadly equates to the headquarters' offensive or defensive frontage. In terms of depth, it is possible to divide the overall zone of reconnaissance responsibility into three parts, as follows:

Detailed Reconnaissance Zone

The detailed reconnaissance zone extends beyond the forward edge out to the effective range of weapon systems at the disposal of the headquarters. This is true in either offense or defense. For a maneuver battalion, for example, the depth of this zone typically can be up to 5 km.

General Reconnaissance Zone

Beyond the detailed reconnaissance zone is a general reconnaissance zone. The general reconnaissance zone may overlap into the zones of flanking elements. Within this zone, the headquarters must be able to monitor enemy activity sufficiently to ensure that unexpected enemy moves do not disrupt its own plans. Reconnaissance in this zone should provide early warning of potential enemy movement into the commander's area of responsibility, especially on the flanks.

The depth to which this tactical reconnaissance is conducted depends on several factors. These include—

- The scale of combat actions.
- The nature of the combat mission of first-echelon divisions and brigades.
- The preparedness and depth of deployment of the enemy's forces.
- The nature of the terrain.

Figures 6-1 and 6-2 show examples of the depths of general reconnaissance zones for divisions, brigades, and battalions in the attack against partially prepared and fully prepared enemy defenses, respectively.

Division. In the offense, the general reconnaissance zone extends at least to the depth of the unit's combat mission. Thus, the reconnaissance information of interest to a division commander typically involves the enemy and terrain out to a depth of enemy corps reserve (a distance of perhaps 100 to 150 km) when attacking against a partially prepared enemy defense.[1] Against a fully prepared defense, the depth of the general reconnaissance zone could be to the rear boundary of the enemy's first-echelon defending division (up to 50 km).

In the defense out of direct contact with the enemy, the division's general reconnaissance zone should extend at least to the depth of the security zone (up to 50 km).[2] Therefore, division-level reconnaissance troops typically have the capability to operate out to approximately 50 km. When necessary, the division commander can insert small teams from the airborne-qualified, long-range reconnaissance company up to 100 km deep without their vehicles.

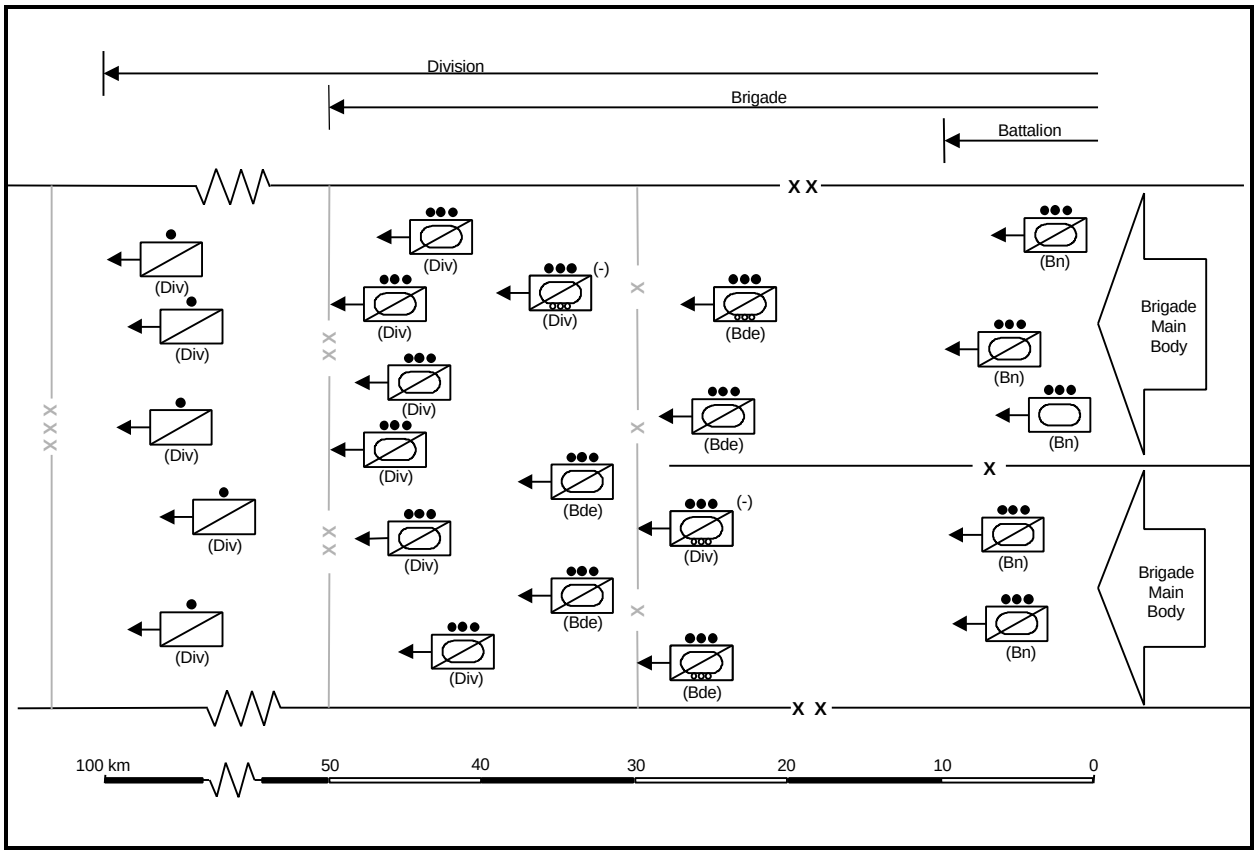


Figure 6-1. General reconnaissance zones for attack against partially prepared defense (example).

[1] Since division tactical reconnaissance assets are not always adequate to cover this entire area of responsibility, operational-level assets must provide longer-range reconnaissance support. In return, operational commanders receive information derived from tactical reconnaissance within their area of interest.

[2] Since a security zone could be as shallow as 15 km, some of these division assets could actually operate beyond the security zone in the defense.

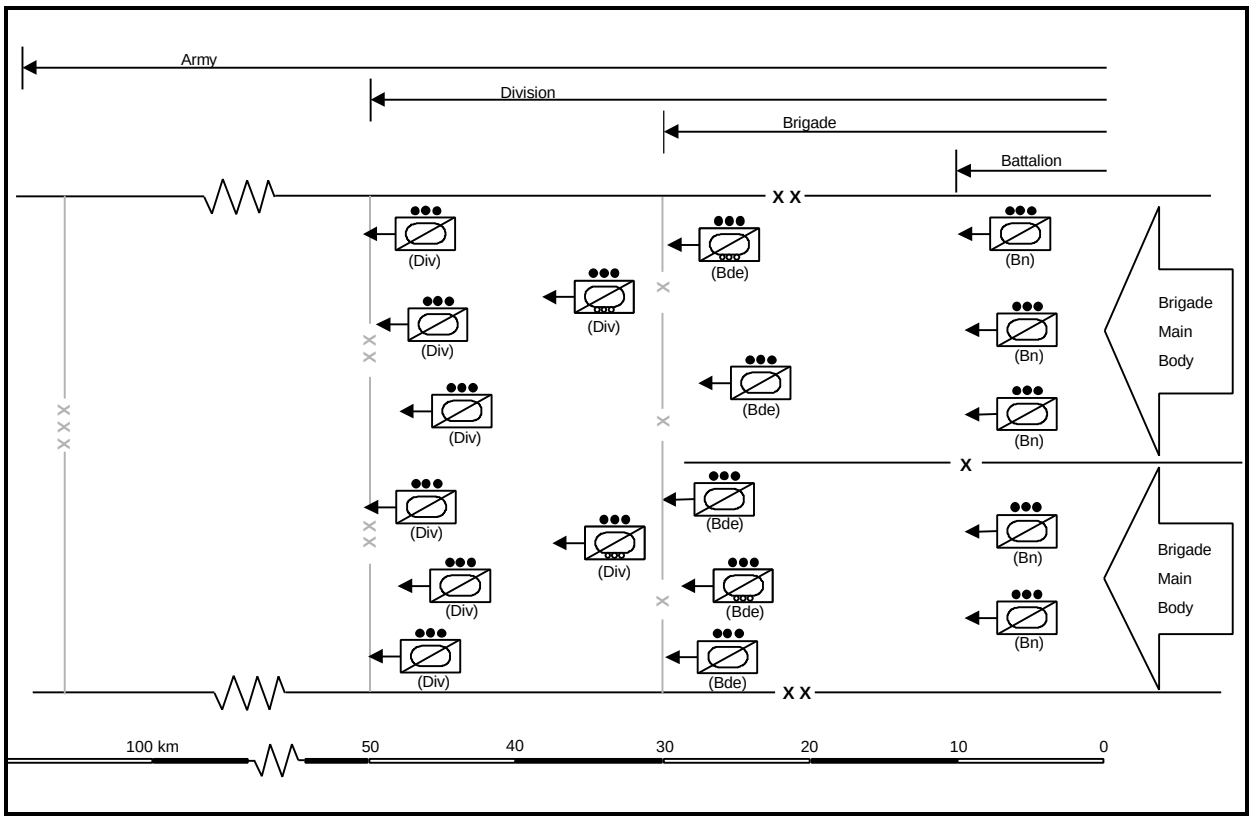


Figure 6-2. General reconnaissance zones for attack against fully prepared defense (example).

Brigade. For a brigade in the offense, the area of reconnaissance interest may extend out to the rear boundary of a first-echelon enemy division (up to 50 km) against a partially prepared defense. Against a fully prepared defense, it may be only to the depth of the enemy first-echelon brigade's reserve (up to 25 km).

In the offense, brigade-level reconnaissance troops normally conduct reconnaissance 25 to 30 km forward of the main body; when necessary, they can operate out to a maximum distance of 50 km. The distances would be similar in the defense, except that the maximum normally would not exceed the depth of the security zone. See Chapter 3 for more information on distances of brigade reconnaissance from the brigade main body and march security elements in the march.

Battalion. For a maneuver battalion, the general reconnaissance zone it typically up to 10 km. The width of this zone usually coincides with the battalion's assigned frontage.

Rear Reconnaissance Zone

Within its own rear area, the headquarters must be able to monitor enemy activity, particularly the use of precision weapons, NBC strikes, or airborne forces. Rear area reconnaissance also includes locating suitable deployment areas for logistics elements; resupply and evacuation routes; and sources of water supply. Another task may be to determine the protective and concealment properties of the terrain.

ASSETS

Tactical reconnaissance supports division and below. It provides reconnaissance needed to plan and carry out tactical actions within each commander's area of responsibility. Maneuver divisions, brigades, and battalions perform tactical reconnaissance using dedicated reconnaissance resources and combat troops from maneuver units. However, army groups and armies/corps can provide tactical ***intelligence*** in support of division or brigade combat activities.

Dedicated assets organic to maneuver divisions and brigades provide ground reconnaissance; artillery and air defense target acquisition; and chemical, and engineer reconnaissance coverage. Divisions and separate brigades also have signals reconnaissance assets.

Nondivisional Support

The general reconnaissance zone of interest to a division commander can extend out to a depth of as much as 100 to 150 km. His own reconnaissance assets are not always adequate to cover his entire area of responsibility. As a result, higher command support is vital to the performance of the division's missions. There are no ground reconnaissance units (other than special-purpose forces) above division level. So nondivisional reconnaissance support is most likely to come in the form of air, signals, artillery, NBC, and engineer reconnaissance assets. Special-purpose forces (SPF) and airborne units operating in the enemy rear could also relay information to tactical headquarters. See FM 100-61 for more information on these operational-level assets.

Division-Level Assets

The reconnaissance resources organic to a division are summarized below. In addition to dedicated ground reconnaissance units, the OPFOR employs remotely-piloted vehicle (RPV) and signals reconnaissance units to gather tactical reconnaissance information. Given the size of the division area of responsibility and the level of detail required, commanders are always likely to feel a shortage of reconnaissance assets in their sector of responsibility.

Reconnaissance and Electronic Combat Battalion

A mechanized infantry or tank division (MID or TD) has a reconnaissance and electronic combat (EC) battalion, consisting of two reconnaissance companies, a long-range reconnaissance company, a signals reconnaissance company, and a jamming company. It may also include an RPV squadron.

Ground reconnaissance. The two reconnaissance companies typically deploy as platoon-size independent reconnaissance patrols (IRPs). These division-level IRPs move on multiple axes, to a depth between that of the reconnaissance teams of the division's long-range reconnaissance company and the IRPs of maneuver brigades.

The long-range reconnaissance company may form additional IRPs, or its vehicles can supplement patrols formed by the other reconnaissance companies. However, its personnel are specially trained for insertion in small reconnaissance teams at distances up to 100 km in advance of the division.

Signals reconnaissance. The signals reconnaissance company has a radio intercept and direction-finding (DF) platoon and a radar intercept and DF platoon. For more information on this company, see Chapter 13, Electronic Combat.

Remotely-piloted vehicles.[3] The division-level RPV squadron typically includes two flights with a total of four RPV launchers and associated ground control stations. A division receiving additional artillery assets from higher levels could also receive additional RPVs or dedicated RPV missions from the RPV squadron of an operational-level target acquisition regiment to support these artillery assets.

Division-level RPV missions are planned by the division's chief of reconnaissance (COR). Flight profiles can vary according to the mission. For surveillance missions, the RPV typically uses a figure-eight or racetrack pattern to maintain it over the assigned surveillance area. (See Figures 6-3 and 6-4.) For reconnaissance, intelligence collection, target acquisition, and battle damage assessment missions, a zigzag or loop pattern allows thorough coverage over a specific target area. (See Figures 6-5 and 6-6.) RPV operators can vary these basic flight patterns by taking control of the RPV and changing its altitude, speed, or direction of flight. This allows RPVs to search for high-priority targets or to collect more detailed information on such targets once it locates them.

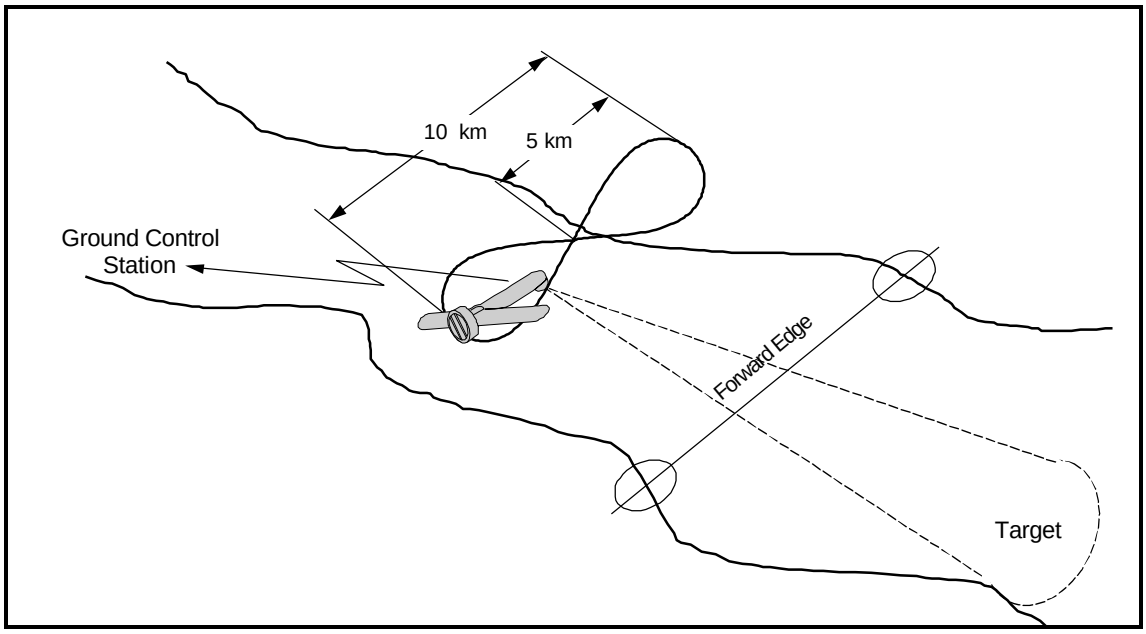


Figure 6-3. Figure eight flight path for RPV.

[3] The RPV represents one of two types of unmanned aerial vehicle (UAV); the other type is the drone. An RPV can be flown by remote control from a ground station, over a flight path of the controller's choosing. A drone, on the other hand, flies a set course programmed into its onboard flight control system prior to launch. Only the RPV type is organic at the division level; however, a division could receive UAV support from army group, army, or corps level. An army or corps can have a drone squadron. An army or army group can have an RPV squadron in its (artillery) target acquisition regiment. An army group can have a UAV regiment with three squadrons of multimission UAVs (RPV/drone). See FM 100-60 for details.

While the radio command link gives an RPV greater flexibility, it also limits the range of the RPV to the line-of-sight transmission range from its control station. However, many RPVs can also operate in a preprogrammed mode at longer ranges.

As the RPV acquires priority point and area targets during these missions, it immediately transmits video imagery of the target to its ground control station. Personnel at the ground control station must use terrain and map association to determine target location in terms of grid coordinates. By this method, trained personnel can usually determine target location to within 100 m. Even with modern RPVs equipped with Global Positioning System (GPS) receivers, the transmission from the RPV gives the location of the RPV, not the location of the target. However, knowing the precise location of the RPV at the time it took the imagery can greatly facilitate terrain and map association.

Having determined the target location, the ground control station personnel must then transmit the target location via secure radio communications to the supported unit. For RPVs from the division's reconnaissance and EC battalion, this transmission would normally be to the division COR. For RPVs from artillery target acquisition elements, the target data would go directly to the artillery fire control element.

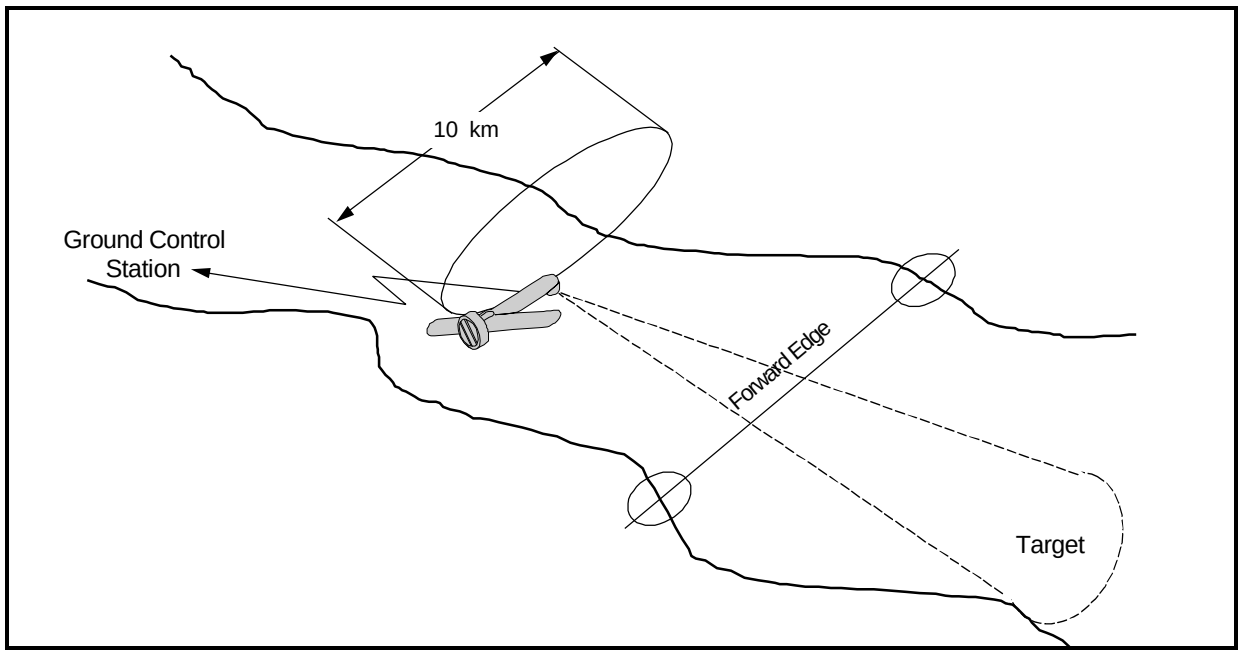


Figure 6-4. Racetrack flight path for RPV.

Air Reconnaissance Assets

The only organic aerial reconnaissance assets in a division are its RPVs. Divisions do not have drones nor their own helicopter assets. However, helicopters from army level are frequently available for engineer and chemical troops to assess routes, obstacles, and areas of contamination behind the forward edge. This is not generally done within enemy airspace, though opportunities may arise in a highly fluid battle.

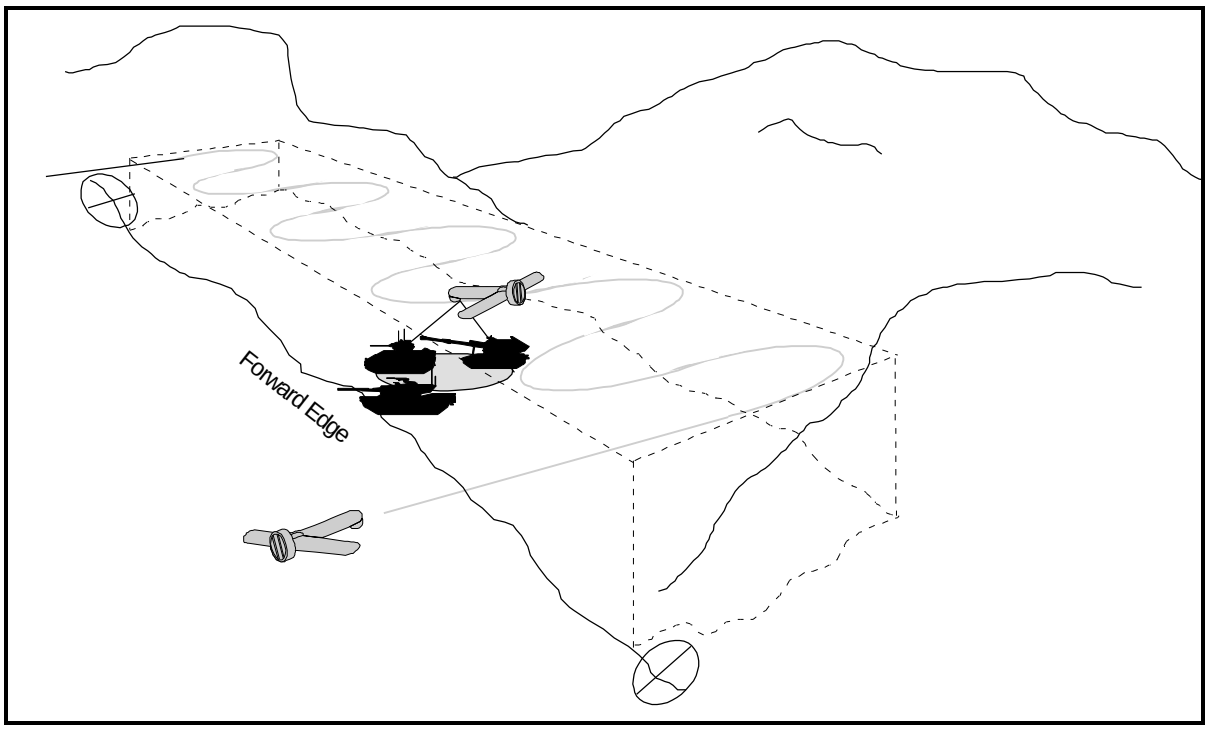


Figure 6-5. Zigzag flight path for RPV.

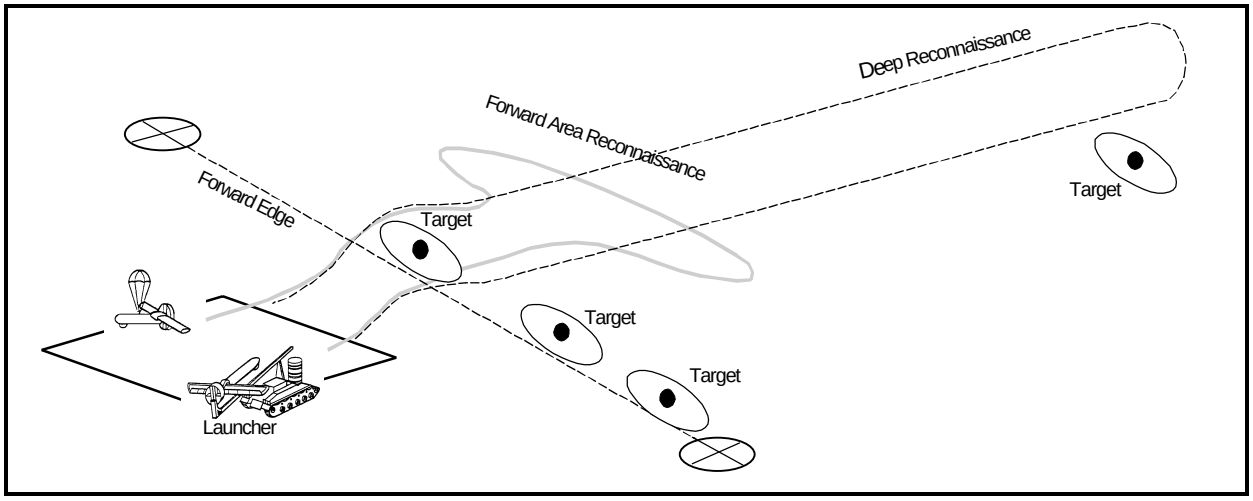


Figure 6-6. Loop flight path for RPV.

Transport helicopters or fixed-wing aircraft from army or army group level can insert elements of the division's long-range reconnaissance company to distances not practicable with armored reconnaissance vehicles. Attack helicopter crews report any unexpected enemy activity observed during their missions. They can report such perishable information immediately by radio to a ground CP unless such reporting would interfere with successful completion of their assigned mission. In the latter case, they report this information during post-mission debriefing. Dedicated reconnaissance helicopters, depending on equipment, can conduct visual, thermal imaging, photographic, infrared, and signals reconnaissance. See Chapter 9 for more information on aerial reconnaissance.

Artillery Assets

There is a target acquisition battery organic to the division's artillery regiment. This battery has battlefield surveillance radars mounted on mobile reconnaissance post vehicles. Each of the regiment's howitzer battalions also has a battlefield surveillance radar, and each howitzer and multiple rocket launcher (MRL) battalion has artillery command and reconnaissance vehicles. See Chapter 7 for more detail on artillery target acquisition assets.

Air Defense Assets

The division's surface-to-air missile (SAM) regiment has a target acquisition/early warning battery. See Chapter 10 for more information on air defense early warning and target acquisition assets.

Engineer Assets

The division's engineer battalion includes an engineer reconnaissance platoon. This platoon has APCs for battlefield mobility. These assets may serve as reinforcements for other reconnaissance patrols.

A division (or separate brigade) can also dispatch one or more engineer reconnaissance patrols. This type of patrol consists of a squad or a platoon of engineer specialists sent out to obtain engineer intelligence on the enemy and the terrain. In enemy territory, it deploys jointly with another ground reconnaissance element. It can also include one or two chemical reconnaissance specialists. See Chapter 11 for more detail on engineer reconnaissance.

Chemical Assets

The division's chemical defense battalion has a chemical reconnaissance company. It establishes NBC observation posts (OPs) as well as NBC reconnaissance patrols. The chemical defense battalion can attach individual chemical and radiological specialists to elements operating in advance of the main forces, such as advance guards, security elements, or reconnaissance patrols. See Chapter 14 for more detail on NBC reconnaissance.

Brigade-Level Organizations and Assets

Mechanized infantry and tank brigades (MIBRs and TBRs) have organic reconnaissance units that include a reconnaissance (and EC) company, reconnaissance elements of a howitzer battalion, an engineer company, and a chemical defense platoon. The brigade-level COR plans and coordinates the reconnaissance effort in the same manner as the division COR.

Reconnaissance Company

MIBRs and TBRs have an organic reconnaissance company with two to three reconnaissance platoons.[4] Each platoon can form the basis of an IRP.

[4] A separate MIBR or TBR has a reconnaissance and EC company that differs from the reconnaissance company only by the addition of a jamming platoon. The only additional reconnaissance means are a limited radio intercept and DF capability that supports the jamming mission.

Artillery Assets

The howitzer battalion organic to an MIBR or TBR has its own reconnaissance assets. These include artillery command and reconnaissance vehicles and a mobile reconnaissance post with a battlefield surveillance radar. When organized for combat, the brigade may have additional artillery battalions assigned to its brigade artillery group (BRAG). These battalions have similar reconnaissance assets and can bring additional radars from the target acquisition battery of the parent artillery regiment. In addition, artillery reconnaissance assets may be made available from army/corps level. See Chapter 7 for more detail on artillery target acquisition.

Engineer Assets

A divisional brigade's engineer company normally does not have a separate reconnaissance unit. However, a separate brigade does have in its engineer battalion an engineer reconnaissance platoon that could form one or more engineer reconnaissance patrols. The brigade-level reconnaissance (and EC) company often integrates engineer specialists into the different types of reconnaissance patrols as the situation requires. See Chapter 11 for more detail on engineer reconnaissance.

Chemical Assets

A brigade's chemical defense platoon employs three chemical reconnaissance squads. Each squad has an NBC reconnaissance vehicle. These squads may reinforce the reconnaissance patrols formed by the brigade-level reconnaissance (and EC) company. Their role is to identify and mark areas of contamination finding routes around the contamination. They may also find the shortest route through it and select certain areas for decontamination. They monitor the effects of chemical or nuclear weapons and provide warning of downwind hazards.

A brigade (or division) can also send out an NBC reconnaissance patrol to determine the extent and nature of any NBC contamination. These patrols come from chemical reconnaissance elements of organic chemical defense units. They may operate independently or as part of other maneuver and reconnaissance elements. The normal size of an NBC reconnaissance patrol is a chemical reconnaissance squad with one special chemical reconnaissance vehicle. See Chapter 14 for more detail on NBC reconnaissance.

Battalion Organizations and Assets

Some mechanized infantry battalions (MIBNs) have an organic reconnaissance platoon that can act as a reconnaissance patrol (RP). This platoon has a short-range battlefield surveillance radar capable of identifying vehicle movement and possibly personnel. Although normally carried in a reconnaissance vehicle, this radar is dismountable to supplement the battalion's OPs in static phases of battle. In addition, mechanized infantry platoons may be used as RPs or combat reconnaissance patrols (CRPs). A tank battalion (TBN) has no dedicated reconnaissance resources and uses tank platoons to provide RPs or CRPs, unless reinforced with a mechanized infantry unit that can perform that mission.

Battalions may deploy a variety of reconnaissance elements. A patrol squad on the axis of advance is the absolute minimum. In the march and in mobile battles, for example after penetrating the enemy's tactical defense and in meeting battles, a battalion normally forms a CRP. When the terrain or tactical situation warrants, a battalion can form two or three CRPs.

RECONNAISSANCE PLANNING

The purpose of reconnaissance planning is to thoroughly coordinate the actions of all reconnaissance organizations and levels. Ultimately, the planning must ensure that missions, targets, times, forms of action, areas of responsibility, and the exchange of information are fully coordinated.

The primary participants in division- and brigade-level reconnaissance planning are the commander, the chief of staff, and the chief of reconnaissance (COR). In maneuver battalions, the chief of staff is responsible for planning and organizing reconnaissance, based on the commander's guidance. In MIBNs that include a reconnaissance platoon, that platoon leader often acts as an advisor to the chief of staff on reconnaissance matters.

Commander

Reconnaissance planning begins with the maneuver commander. He begins the planning process with general instructions that receive greater definition at each lower level of command. The commander at each level receives combat orders and limited information on the enemy from higher headquarters.

Following the receipt of combat orders, the maneuver commander determines what additional information is necessary to conduct his mission. To fight the battle properly, the tactical commander typically needs information on—

- The general outlines of the enemy positions, flanks, boundaries, and strong and weak points.
- The location and movement of enemy reserves.
- The possible axis for enemy counterattacks.
- The terrain trafficability and cover.
- The location of and approaches to countermobility obstacles.

There are several pieces of information that can be of great interest before and during the battle. General aims that guide the reconnaissance process prior to the initiation of combat are the timely detection or determination of—

- Enemy preparations for an attack with conventional, precision, or NBC weapons.
- Indications of the enemy's concept for upcoming action.
- Groupings of enemy forces and their preparation for combat.
- Changes in the grouping or composition of these forces.

After combat begins, general information requirements can include—

- The effects of conventional, precision, or NBC weapons.
- Further changes in the grouping or composition of enemy forces.
- Activities and composition of enemy reserves.
- Enemy preparations to prevent the deployment of friendly troops.
- Enemy preparations to launch amphibious, airmobile, or airborne assaults.

These are all pieces of information that a commander may receive from higher headquarters. They are also items on which lower-level commanders would submit reports to the higher headquarters.

The maneuver commander analyzes his requirements for information and determines the reconnaissance needed. He defines the data he wants and when he needs it. Then he states broad reconnaissance instructions to his chief of staff. The amount of time available for conducting reconnaissance determines the amount of detail contained in the commander's instructions to the chief of staff. If little time is available, the commander's instructions may be very short and simple.

The commander's instructions to the chief of staff outline the overall aim or goal of reconnaissance and the priorities of the reconnaissance mission. This can include specific reconnaissance tasks assigned by the commander or by higher headquarters. The commander can also assign specific objectives, sectors, areas, or axes for concentrating the main reconnaissance effort. His instructions may specify which reconnaissance assets may or may not be used prior to combat. He establishes the type of information required and the deadline for receipt of this information.

Chief of Staff

The chief of staff interprets the commander's instructions and converts them into specific tasks. At this point, if not before, the general aims of the reconnaissance effort become specific information requirements and taskings to reconnaissance units.

The chief of staff has overall responsibility for providing the necessary information for the commander to make decisions. At the tactical level, he has a more clearly defined role in structuring the reconnaissance effort than at higher levels.

Because reconnaissance is a combined arms task, the chief of staff must coordinate the overall reconnaissance effort. Aside from reconnaissance troops, various other combat, combat support, and combat service support branches have reconnaissance tasks and capabilities. Thus, coordination involves not only ground reconnaissance, but also the efforts of target acquisition elements and chemical, engineer, and signals reconnaissance, as well as any air reconnaissance assets allocated to support the maneuver unit's mission. The chief of staff can ensure that the various branches report the results of all these reconnaissance efforts through the COR and himself to the commander.

Upon receipt of the commander's reconnaissance instructions, the chief of staff refines the requirements and passes them to the COR for the detailed development of the reconnaissance plan. The chief of staff provides any other information available on targets and areas for concentration of the reconnaissance effort. His instructions to the COR specify details of the missions identified by the commander, and the method of execution. He determines the sequence for the performance of these tasks and the manpower and equipment necessary to complete them. He specifies the reconnaissance assets to be used for the priority reconnaissance tasks. He determines the principal means of preparing and supporting reconnaissance units, and ensuring their interaction and coordination. He then specifies to the COR the times for preparing the reconnaissance plan and issuing combat instructions to reconnaissance units.

Chief of Reconnaissance

In maneuver division and brigade headquarters, the staff includes an intelligence section headed by the COR. This staff officer is responsible for organizing reconnaissance in accordance with the commanders' general plan. At the division or brigade level, the COR works for and reports to the chief of staff. Along with or through the chief of staff, he reports to the commander concerning the organization of reconnaissance planning. The functions of the brigade and division CORs are essentially the same.[5]

Like other branch chiefs on the division and brigade staff, the COR has a dual reporting chain. He is responsible to the commander and chief of staff in whose headquarters he serves. However, he also receives additional instructions and guidance from his COR counterpart at the next higher level. For example, the division COR coordinates with the army/corps COR and with the CORs of subordinate brigades. Through these channels, he can request reconnaissance support from higher levels or task reconnaissance elements of subordinate brigades to perform missions for the division. Thus, a tactical-level COR has access to information collected by means not available to him, such as aerial reconnaissance. He is also responsible for passing the results of reconnaissance both up and down the chain of command.

To the reconnaissance taskings he receives from the chief of staff, the COR adds specific instructions to complete the reconnaissance plan. His knowledge of enemy doctrine, and his access to current intelligence enable him to assign precise missions to reconnaissance assets at his own level of command. He establishes time constraints, reporting schedules, and reporting methods. He also establishes measures for interaction and coordination of reconnaissance actions to ensure accomplishment of all missions and objectives. He organizes and continuously monitors communications with all maneuver units and with the headquarters of subordinate reconnaissance units. He can also provide guidance to immediately subordinate maneuver units regarding their contribution to the higher unit's reconnaissance effort.

[5] One difference is that the COR at brigade level, in addition to his staff function, may also be the commander of the brigade's reconnaissance (and EC) company. In the latter role, he is directly involved with the execution of the reconnaissance plan.

Reconnaissance Plan

The COR at division or brigade level and the chief of staff at battalion level each develop a reconnaissance plan within the framework of the higher headquarters' mission and the higher commander's decision for combat. They combine this information with the higher headquarters' instructions on conduct of the reconnaissance mission, information currently available on the enemy, and status of reconnaissance assets.

Depending on the situation, the reconnaissance plan may be in written form with a map annex, or it may be in the form of a map with a written annex. In either case, it should include—

- The boundaries of friendly units.
- The commander's concept and mission.
- All available information regarding known and suspected enemy groupings and intentions.
- The sectors, areas, or axes for concentrating the main reconnaissance effort.
- A list of tasks (including both obtaining new information and confirming previously available information).
- A list of priority targets for reconnaissance.
- The deployment of reconnaissance assets in terms of these tasks and targets.
- The time and sequence for executing the tasks.
- Restrictions on reconnaissance actions during specific times or in certain areas.
- The method and time for reporting.

The content of reconnaissance missions depends on the commander's information requirements. These, in turn, depend on the nature of the unit's combat missions.

In the offense, the reconnaissance plan should cover the entire time and space involved in the accomplishment of immediate and subsequent missions. Reconnaissance must establish the enemy's effective combat strength, affiliation, combat effectiveness, and whether or not he has NBC or precision weapons. It must discover firing positions for weapons, strongpoints, gaps, and the nature of engineer preparation of defensive positions. Of special importance are the locations of enemy antitank weapons and countermobility obstacles. It is also important to locate and track enemy reserves and possible axes for counterattacks. Reconnaissance must identify terrain from the forward edge of the enemy defenses into their depth that may present trafficability problems for advancing OPFOR units.

In the defense, reconnaissance must cover enemy preparation for an attack and determine the possible time of the attack. It must establish the makeup of the enemy grouping and identify the axis of his main attack and the nature of his maneuver.

It is especially important to determine the locations of firing positions of artillery and other weapons, locations of C^2 facilities, the combat effectiveness of enemy troops, and their affiliation. The plan should include reconnaissance tasks for the entire course of defensive actions, as well as tasks that support an eventual transition to the offense.

Detailed Instructions

The reconnaissance company commander gives his platoon leaders detailed instructions on their respective reconnaissance missions and taskings. After informing the platoon leaders of the enemy situation and the missions of other reconnaissance units, he tells them precisely where to focus their reconnaissance. The platoons operate in a given sector, and within that sector they have specific locations to reconnoiter in specific sequence to obtain information. The company commander informs the platoon leaders when and by what means they are to report information, normally according to the set schedule. He also instructs the platoon leaders on how to respond to all forms of contact with the enemy.

The reconnaissance platoon leaders add more detail to the reconnaissance plan. They divide tasks among the different elements under their command. Each platoon leader designates a lead vehicle, assigns missions to other vehicles, and determines the intervals between vehicles. Each vehicle is responsible for observing a designated sector. This ensures thorough and continuous observation of the entire area. The platoon leaders also explain hand and arm signals, and procedures to follow if detected by the enemy.

The reconnaissance squad leader determines the route times for his own vehicle and briefs the driver on the terrain, orientation points, and stopping places. The squad leader assigns his reconnaissance personnel sectors to observe from the vehicle. He provides the squad with pertinent information on the enemy and procedures to follow in case of enemy contact.

Information Flow and Communications

The commander's instructions, the reconnaissance plan, and detailed instructions to reconnaissance elements identify information requirements and specify how and when to report this information. To minimize radio traffic on command nets, the flow of information both up and down the chain of command normally is through reconnaissance channels. Commanders determine how frequently they wish to receive various types of situational data.

A reconnaissance element typically reports to the commander of its parent reconnaissance unit or to the COR (or chief of staff) of the maneuver unit that dispatched it. In exceptional cases, however, the capability for skip-echelon communications allows the leader of a platoon-size or larger reconnaissance unit to report to a higher level if so directed in specific instructions. Figure 6-7 illustrates the typical flow of information during the reconnaissance planning and reporting process.

Reporting

Standard operating procedures developed for reconnaissance reporting seek to ensure the supported commander receives critical information he requires to make a decision. To reduce the likelihood of information overload, there are two different reporting categories: periodic (reports submitted at a set time) and aperiodic (reports submitted on the staff's own initiative resulting from significant changes in the situation).

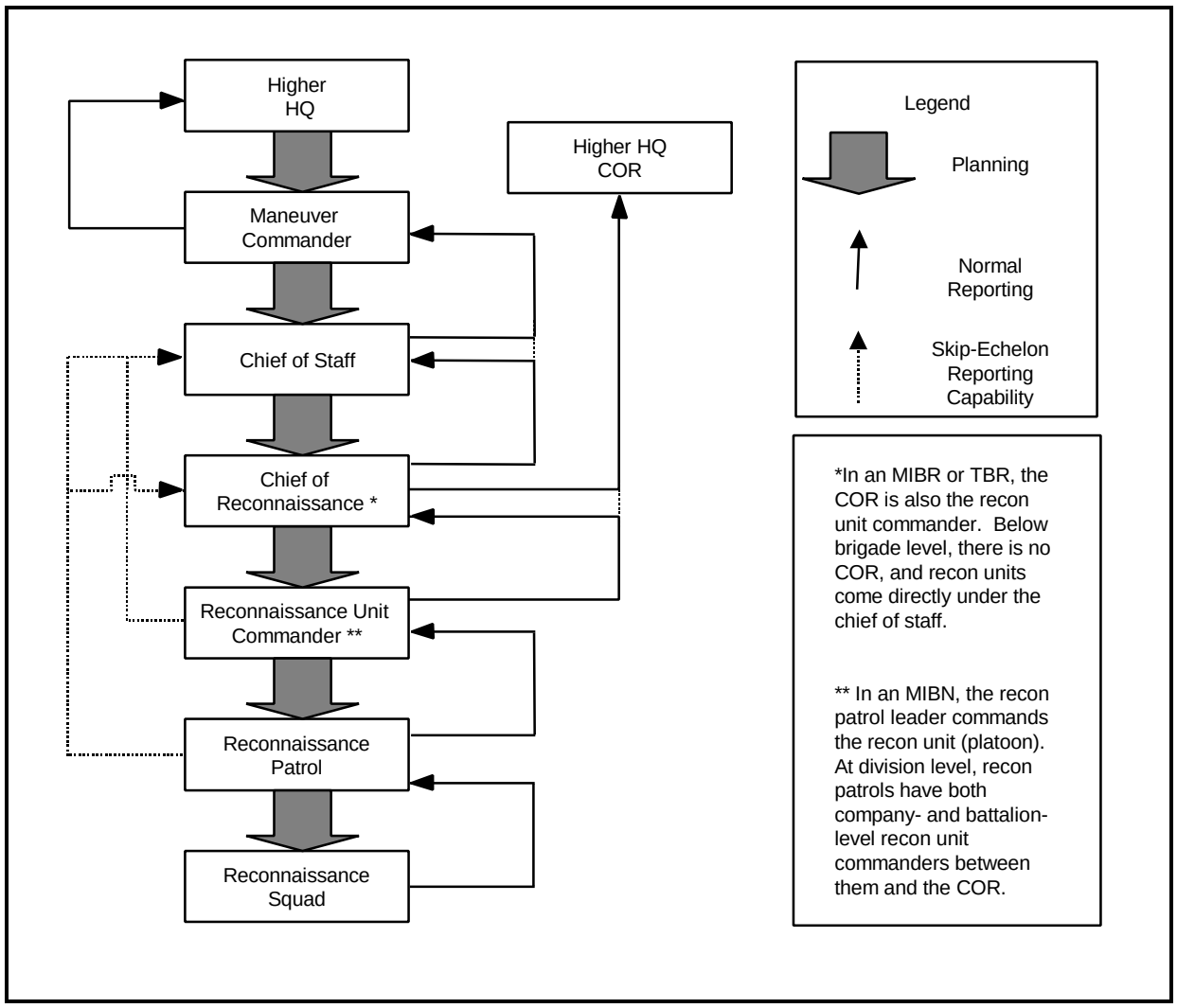


Figure 6-7. Information flow in reconnaissance planning and reporting.

In the MIBN, for example, the reconnaissance platoon leader's net ensures communication between the platoon leader and his deployed squads using armored reconnaissance vehicles. When the platoon identifies critical information, or unexpected developments occur, the reconnaissance platoon leader immediately reports to the battalion commander (or chief of staff) via the battalion command net. The use of the platoon leader's net ensures the routine reconnaissance reporting of the squads does not clutter the battalion's command net. This is the reporting method employed for reconnaissance elements at all levels.

Under the direction of the COR, the intelligence section on a division or brigade staff evaluates and summarizes incoming information for the commander. It disseminates this information to those command and staff elements that require it, including higher headquarters and adjacent units. It is important to study information from all sources before reaching conclusions. This includes even information believed to be false because it contradicts information from other sources and does not correspond to the developing situation. The study of this false information can reveal the methods the enemy is using for deception.

Reconnaissance report. Maneuver unit commanders and staffs receive reports from reconnaissance elements and/or CORs. Depending on the situation, these reports may be in the form of briefings, radio communications, or written reports.

Within any type of reconnaissance patrol, the platoon leader receives information from his subordinate squads and observers as they report on their performance of assigned tasks. The platoon leader checks and revises the assembled information based on his own personal observation. Then he reports to the commander (or chief of staff) of the company or battalion that dispatched the patrol on the completion of assigned tasks, or as the commander orders. No special documents recording the reconnaissance information are normally kept at the platoon or company level.

The maneuver company commander receives reconnaissance information from platoon leaders, a CRP, observers, or OPs, and from the interrogation of any prisoners captured by the company. He may also receive reports from the forward observers and command observation posts (COPs) of mortar or artillery units located within his combat formation and on the flanks of the company. As with the platoon leader, the company commander also conducts personal observation. He assembles, assesses, and consolidates reconnaissance information from all these sources and reports this information to the battalion commander or chief of staff.

At maneuver battalion level, the chief of staff assembles the reconnaissance information from the battalion's OPs, CRPs, and subordinate units conducting raids or ambushes. In an MIBN, he also receives reports from a dedicated RP. Additionally, he can receive reconnaissance information from commanders of attached and supporting units, as well as from flanking units, higher headquarters, or reconnaissance elements of the higher headquarters that are operating within the combat formation of the battalion. He may have the results of brief interrogations of prisoners captured by the battalion, before they are evacuated to higher headquarters for further interrogation. The chief of staff and the battalion commander check this information by personal observation from their own COP and by comparing it with data obtained from other sources. Because of the variety of sources involved, the battalion chief of staff normally maintains a written record of the consolidated and verified information. The battalion commander can include this information in any report on the progress of his assigned mission or according to a reporting schedule assigned by the higher headquarters. In addition, he can report any significant information immediately.

At maneuver battalion level and above, a reconnaissance element provides a reconnaissance report on the results of a specific reconnaissance mission to the staff of the organization that assigned it that mission. This report gives the situation as of a specific time. It provides information not only about the enemy, but also about the status of the reporting reconnaissance element. It can include the following:

- Answers to specific reconnaissance taskings, indicating where and when the reconnaissance element conducted the reconnaissance and whether or not it found the required information.
- Additional information acquired during the performance of this reconnaissance task.
- The current status, capabilities, location, and activities of the reconnaissance element.
- Requests for assistance.

The term ***reconnaissance report*** also applies to a specific document prepared by the headquarters of a brigade, division, corps, or army for reporting information about the enemy to a higher headquarters. It may be a periodic reconnaissance report forwarded every few hours at set times specified in instructions. It may also be an aperiodic report prepared at the initiative of the subordinate commander or by special request from the higher commander. In either case, it indicates the following:

- The general nature of enemy activities throughout the reporting unit's entire zone of reconnaissance responsibility.
- The disposition and grouping of enemy forces in each area or axis within the zone of responsibility.
- Significant changes that have occurred since the previous report.
- The reporting unit's conclusions about possible enemy actions based on these indications.
- The source of the data and the time received.

Reconnaissance summary. The ***reconnaissance summary*** is a report prepared by the headquarters of a division or army/corps that contains information about the enemy covering a given period of time. The reporting unit sends this summary to the higher headquarters at times established in instructions. It is normally provided once a day as a brief narrative of the highlights of the past 24 hours. It is also sent to adjacent and subordinate headquarters for information purposes. It typically includes the following:

- The general nature of enemy activities in front of and on the flanks of the reporting unit.
- Data about the enemy's precision and NBC weapons and their employment.
- The positions of enemy forces at the time of preparation of the summary.
- Data about the combat strength, deployments, and the nature of enemy ground force activities in sectors of the reporting unit's frontage or on specific axes, indicating lines of contact with the enemy.
- The identification of enemy divisions or armies and their condition.
- Information about the enemy's air (and naval) forces, air defense, CPs, radar equipment, logistics installations, obstacles, and field fortifications.
- The reporting unit's general assessment of the disposition, activities, and condition of enemy forces and the nature of forthcoming enemy activities
- Information gaps to be addressed during further reconnaissance.

The summary may include the significant results of prisoner interrogation or exploitation of captured documents or equipment.

Radio Nets

Reconnaissance elements must have reliable communications. They may successfully gather all necessary information, but if they cannot transmit this information to the commander who needs it, the entire effort is useless. Therefore, the OPFOR has designed reconnaissance reporting and command links to be consistent with its C^2 doctrinal tenants of redundancy, multiple systems, and skip-echelon communications.

Divisions and brigades use dedicated radio nets to link reconnaissance units with the headquarters. Maneuver battalions monitor these nets, especially when operating independently of the main body. An MIBN with a reconnaissance platoon would also establish a dedicated net for control and reporting within that platoon. See Chapter 2, Command and Control, for more detail on communications nets.

Battalion-level reconnaissance. The reconnaissance platoon leader may colocate with the battalion's COP, or he may deploy independently. He typically remains with the COP during defensive operations. His reconnaissance command vehicle includes at least two VHF radios and one HF radio.

The platoon leader uses one VHF radio to report on the battalion command net. He uses the second VHF radio for the platoon leader's net to communicate with the deployed reconnaissance squads.

The platoon leader uses his HF radio to monitor the parent brigade's reconnaissance net. He normally uses this net to listen for developments that may affect the battalion, but the brigade may also use this net to task the battalion's reconnaissance platoon. This radio also provides an additional link with the brigade commander, if necessary.

The armored reconnaissance vehicle of a reconnaissance squad has a vehicle-mounted VHF radio for use on the platoon leader's net. Squad vehicles also carry man-portable, short-range VHF radios that provide communications between the vehicles and deployed foot patrols.

Brigade-level reconnaissance. The platoons of the brigade's reconnaissance company have the same type of platoon leader's net as in the MIBN's reconnaissance platoon. However, the platoon leader normally reports on the net of his reconnaissance (and EC) company commander rather than that of a maneuver commander. Each of these platoon leaders and commanders has an HF capability for skip-echelon communications, when this rarely becomes necessary. At brigade level, the reconnaissance company commander typically is also the COR and, therefore, is also on the division COR net.[6] Because of his dual function, this officer normally remains in the brigade main or forward CP rather than deploying with his platoons. Due to the distance to which the platoons deploy as IRPs and the necessity of ensuring communications, the platoon leaders do deploy forward.

Division-level reconnaissance. At division level, the COR and normally the commander of the division's reconnaissance and EC battalion remain with the division main or forward CP. The commanders of the various companies of that battalion are on their battalion commander's net and can also monitor the division COR net. The commanders of the ground reconnaissance companies normally deploy forward with their companies and report back to their battalion commander or to the division COR. The commander of the reconnaissance and EC battalion is on the division COR net and can monitor the net of the COR at the next higher headquarters.

[6] In a separate brigade, the commander of the reconnaissance and EC company, as brigade COR, would be on the COR net of the parent army/corps.

RECONNAISSANCE ELEMENTS

The general term ***reconnaissance element*** applies to any organic or temporarily established grouping with necessary reconnaissance equipment to perform a specific reconnaissance mission. Some reconnaissance elements are formed on the basis of a reconnaissance unit, but others come from maneuver units.

At the tactical level, the ground forces employ a variety of small reconnaissance elements, tasked and tailored to fit the specific needs of the tactical commander in a particular situation. These elements vary in size and composition from a few scouts to a battalion.

Dedicated reconnaissance units at the tactical level may either operate independently or be task-organized with personnel from maneuver units into special types of reconnaissance elements. They may or may not have reinforcements such as mechanized infantry troops, tanks, artillery, engineers, NBC reconnaissance personnel, and other specialists.

Commander's Reconnaissance

Tactical commanders, company and above, conduct a personal commander's reconnaissance, where possible, as part of the planning process. The commander goes to a field site in the vicinity of planned combat actions to conduct a visual study of the enemy and terrain. He takes with him his subordinate maneuver commanders, the commanders of attached or supporting units, branch chiefs, and other staff officers. The purpose of this reconnaissance is to refine and verify, on the terrain, and add details to the general plan already made on a map and missions already assigned to the troops; however, it can also occur prior to making battle plans. During the reconnaissance, the commander issues an oral combat order and organizes coordination.

Prior to departure for the field site, time permitting, a commander's reconnaissance plan is drawn up. It specifies the purpose and objective of the commander's personal reconnaissance, principal tasks, the composition of the reconnaissance group, routes and means of transportation, halt points for reconnaissance activity, and the principal items to be covered at each halt point. The OPFOR takes elaborate measures to disguise the conduct of this reconnaissance and the ranks of the participants in the commander's reconnaissance group.

Observer

Within a squad, platoon, or company, an assigned observer can reconnoiter the ground and airspace, enemy and terrain, and observe the actions and position of his own unit, its subordinate units, and adjacent units. Normal assignment is one observer per squad; one or two per platoon, company, or battalion COP; and two or three per brigade or division CP. The observer positions himself near the unit commander and reports to him everything noticed during observation. He uses all observation devices available, such as binoculars and rangefinders, to conduct reconnaissance.

Observation Post

The OP is a team assigned within a battalion for reconnoitering the ground and air enemy in a given sector. The OP is also the place from which the team performs the assigned mission. An OP is assigned from reconnaissance, artillery, engineer, mechanized infantry, and tank units.

OPs are organized in the defense and when preparing an attack. Their location can be on the forward edge of unit combat formations or on the flanks. An OP can be a stationary position in a trench, bunker, tree, or tall building. Alternatively, it may be mobile, located in a tank, IFV, APC, or helicopter. The OP contains instruments for observation and surveillance, in accordance with its mission, and communications equipment.

Patrol Squad

A patrol squad is, as the name implies, a single squad sent out with a reconnaissance mission. It can be a single vehicle (patrol vehicle or tank) or a dismounted reconnaissance or mechanized infantry squad on foot. Patrol squads may be the only reconnaissance element deployed when the risk of meeting the enemy is low. However, they can also be deployed from a larger reconnaissance element, such as an RP, CRP, or IRP. Any maneuver company or battalion operating in isolation from the main force can send out a patrol squad even when not performing reconnaissance missions. This occurs chiefly when the maneuver unit is on the move or when occupying an assembly area. Patrol squads may also be deployed to cover the flanks or rear of a unit.

All platoon-size patrols can deploy patrol squads to the limit of visibility ahead of them. Depending on the nature of the terrain, time of day, and weather, this distance can vary from 300 m to 1500 m. These squads can examine terrain features in order to find the enemy, or they can provide march security for the rest of the patrol.

As a rule, the patrol squad operates off-road, moving from one suitable observation point to another. It typically reconnoiters places where an enemy unit could be concealed, such as hills, woods, or built-up areas. If it sights the enemy, the patrol squad immediately reports this to the commander or platoon leader who dispatched it, and then continues to carry out observation. In the event of a sudden meeting with the enemy, the patrol squad can open fire on him.

Reconnaissance Team

The reconnaissance team is an element, usually at squad strength, formed from specially trained personnel of the division's long-range reconnaissance company. It conducts independent actions in the enemy rear to discover precision and NBC weapons, C^2 facilities, reserves, airfields, and other priority targets. A reconnaissance team may be inserted into the enemy rear on foot or in an armored reconnaissance vehicle. If the team leaves its vehicle behind, insertion could also be by helicopter or by parachute landing from fixed-wing aircraft.

Reconnaissance Patrol

A reconnaissance patrol (RP) is a platoon-size tactical reconnaissance element with the mission of acquiring information about the enemy and the terrain. The OPFOR distinguishes among various types of patrols that fit under the general descriptive term ***reconnaissance patrol***. These specific types of reconnaissance include the IRP, officer reconnaissance patrol, and CRP. The generic term also includes engineer reconnaissance patrols and NBC reconnaissance patrols (see Chapters 11 and 14, respectively).

Other than a generic descriptor for these specific types, the OPFOR also uses the term ***reconnaissance patrol*** to describe a tactical reconnaissance element dispatched from a reconnaissance detachment in the process of accomplishing its mission. This type of RP is not "independent," because it is a subordinate of a larger reconnaissance element. The same term can also denote the RP sent out by an MIBN based on its organic reconnaissance platoon. An RP sent out from a reconnaissance detachment or an MIBN can operate up to 10 km from the detachment's or MIBN's main body, while an IRP sent out by a brigade or division may deploy up to 20 km or more from friendly forces.

It is difficult to distinguish among the various types of RP by their strength, composition, or position on the battlefield. The size of each patrol is up to a platoon, reinforced when necessary by tanks, engineers, and chemical reconnaissance personnel. A patrol in this configuration could be an RP, CRP, or IRP.[7] Any of these patrols may operate several kilometers to the front or to the flanks of the parent brigade or division. They all accomplish their missions through observation, ambushes, raids, and—when necessary—combat.

Whatever the designation of the patrol, its tactics are fairly standardized. On the move, a patrol can send a patrol squad forward to the limit of visibility and support by fire (usually 300 to 1,500 m).

When not expecting contact with the enemy, all types of RP move at the maximum speed possible and may use roads. All patrol vehicles would be moving at the same time. When contact with the enemy is possible, they move off roads and by tactical bounds. The patrol occupies a good observation position, from which the patrol leader can see the axis or area to be reconnoitered. A patrol squad can bound forward to another good observation position, moving tactically, while the remainder of the patrol observes its progress. The main body of the patrol then joins the patrol squad, and repeats the process.

In the event of unexpected contact with the enemy, all types of RP try to withdraw, break contact, and then reach a position from which to identify and report the strength, composition, and location of the enemy unit. If the patrol discovers the enemy in an unexpected position, the patrol leader immediately reports the location to his headquarters.

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[7] A similarly reinforced platoon could also be acting as a forward patrol (FP). Because the FP has a march security function rather than a reconnaissance role, it is more likely to follow roads and may be more willing to engage the enemy in battle.

If a patrol observes enemy reconnaissance or march security elements, its task is to avoid contact and continue on to locate the main force as rapidly as possible. In the event of a surprise encounter with a small enemy force, when evasion is impossible, the patrol acts decisively to destroy the enemy, capture prisoners, if possible, and continue its mission.

Independent Reconnaissance Patrol

A division or brigade may send out IRPs with a specific mission to conduct reconnaissance of the enemy and terrain. Each IRP is usually a reconnaissance or combat arms platoon, reinforced with engineers and NBC specialists. If based on a mechanized infantry platoon, the IRP may also be supplemented with reconnaissance troops. The size and vehicle mix of each patrol depends on the terrain, enemy strength, and the importance of the axis.

The IRP is similar to the reconnaissance detachment in that it is deployed in the offense (in an attack against a defending enemy, in the march in anticipation of a meeting battle or during it, or in the pursuit), or in the defense out of direct contact with the enemy. In the offense, it is assigned a mission and either an axis or an objective. In defensive situations, the IRPs are used to scout enemy reserves moving up from the rear or attacking on an open flank. An IRP can also support antilanding defense during an airborne or amphibious landing by the enemy.

As with the RP, the IRP accomplishes its missions through observation, ambushes, or raids. It may conduct reconnaissance by combat, if necessary, but becomes engaged in battle only if it cannot carry out its mission by any other method, if it suddenly encounters the enemy, or if it detects enemy precision weapons or other high-priority targets. Both the RP and the IRP can dispatch patrol squads to examine terrain features, detect enemy forces, or provide security. However, an IRP operates at a greater distance from the parent brigade or division than the RP and may stay out longer.

The distance from the parent unit depends on the nature of the mission, the composition of the patrol, the terrain, and ability to maintain communications with the unit that dispatched it. The IRPs dispatched by division normally conduct reconnaissance across the division's frontage and to a depth of up to 50 km in the march, offense, or defense. They move on multiple axes, although the main axis receives the primary reconnaissance effort. In the march or in an attack against a partially prepared enemy defense, some brigade-level IRPs could also be as far as 50 km from the brigade main body. Against a fully prepared defense, a brigade's IRPs would typically operate about 25 to 30 km forward of the brigade. In the defense, a divisional brigade's IRPs normally operate 8 to 30 km in front of the forward edge, depending on the depth of the security zone. IRPs of a separate brigade can operate up to 50 km ahead of the forward edge.

Officer Reconnaissance Patrol

A maneuver unit can send out an officer reconnaissance patrol when there has been an abrupt, unexpected situation change. Its purpose can be to update information on the enemy and terrain in the battle area, to determine the position of friendly troops, or to check contradictory situation data.

Depending on assigned missions, this patrol can consist of one to three officers with communications equipment, and possibly two to five soldiers assigned for security. This patrol can move by helicopter, tank, IFV, APC, or other vehicle. The officer reconnaissance patrol allows the commander to oversee and maintain tight control over the maneuver of his subordinate force. These patrols usually do not go outside the area under the immediate control of that commander's unit.

Combat Reconnaissance Patrol

The CRP is a platoon-size element, normally composed of combat troops, dispatched from maneuver battalions (and sometimes companies).[8] An MIBN has one organic reconnaissance platoon; a TBN has none, nor do any maneuver companies. This means that most CRPs do not have dedicated reconnaissance specialists. Therefore, the CRP is limited in the depth of its actions and has more of a security function than the types of reconnaissance elements mentioned above. Like the RP or IRP, the CRP consists of a reinforced platoon. A mechanized infantry platoon typically is reinforced with tanks, and a tank platoon is reinforced with mechanized infantry. When necessary, engineer and chemical reconnaissance elements can be attached as reinforcements.

The CRP is generally deployed to the immediate front and flanks of its parent unit to reconnoiter and provide security. CRPs are dispatched from first-echelon battalions and companies on the march, during battle in the absence of direct contact with the enemy, and in other cases where it is difficult for the battalion (or company) to directly observe the enemy's actions. The main mission of the CRP is the timely detection of advancing enemy reserves, locating enemy direct fire weapons, especially antitank weapons, and locating minefields. A CRP normally moves 3 to 5 km ahead of the next friendly company- or battalion-size element, so that the latter can observe it and provide fire support. In the absence of direct contact, this distance can be greater, but normally no more than 10 km. When used as flank security, a CRP can be located out to 5 km laterally from the supported forces.

A maneuver battalion conducting an independent mission, such as a forward detachment or advance guard, may send out one or more CRPs. During combat or in the absence of direct contact with the enemy, any battalion may do so if the commander feels he has insufficient information about the situation. A battalion can employ two to three CRPs on alternate routes and the flanks.

A CRP employs the same techniques as other reconnaissance patrols. Because of its security function, however, it is harder for the CPR to avoid become engaged in combat with the enemy. It may engage a weaker enemy force using an ambush, or it may avoid contact altogether, taking up a concealed observation point or maneuvering around superior enemy forces. If it encounters what it considers to be enemy scouts or security forces, it attempts to penetrate them to locate the enemy's main force. The CRP's mission is reconnaissance, first and foremost. If it ob-

[8] The unit that dispatches the CRP is normally a mechanized infantry or tank battalion (or company). However, an airborne or naval infantry battalion (or company) can also send out CRPs.

serves a threat to its parent unit, it can serve better by reporting on the enemy's activity than by sacrificing itself to stop the threat.

Reconnaissance Detachment

The largest organization the OPFOR employs at the tactical level to supplement specialized reconnaissance is the reconnaissance detachment (RD). It is typically a reinforced maneuver company sent out from a maneuver brigade or division, although a division could employ a battalion-size RD.[9] Battalion-size detachments reconnoiter objectives that can be advantageous to seize and hold for some time, such as a river crossing. The detachment may receive such reinforcements as tanks (if it is not a tank unit), artillery, engineers, or NBC specialists.

Although an RD typically consists of combat troops, its primary mission is reconnaissance. If it does encounter a weak enemy force, it may engage that force. and take prisoners. When the detachment encounters the enemy's main forces, it assumes an observation mission, attempts to determine the composition and disposition of those forces, reports to the supported commander, and continues its mission.

The RD is employed primarily in the attack against a defending enemy. Its mission is to acquire information on the terrain and the enemy's location or gaps in his defenses. It can also reconnoiter key objectives in depth. It conducts reconnaissance by observation, terrain inspection, ambushes, raids, and—only when necessary—by combat.

An RD can also deploy on the main axis during the march in anticipation of a meeting battle. In either type of offensive action, its distance from the main force or march security forces (such as an advance guard) and the width of its zone depend on its composition, mission, terrain, and the ability to maintain communications. As a rule, however, a division or brigade can send out an RD to the same distance as it sends its IRPs, which the RD supplements.

In the defense, in the absence of close contact with the enemy, a division or brigade may send out an RD into the security zone (or even forward of the security zone) to determine the enemy's composition and main avenue of attack. The role of the RD is to establish contact with an advancing enemy force and monitor its progress. An RD can also reconnoiter enemy airborne or amphibious landing forces in support of an antilanding reserve.

The RD dispatches platoon-size RPs to reconnoiter specific objectives along the detachment's axis. Lacking such specific objectives, even a company-size RD would normally dispatch one or two such patrols to lead the way. These patrols typically move 3 to 5 km ahead of the remainder of the RD, but the distance can be up to 10 km. Each forward-deployed patrol can send out a patrol squad. With two patrols forward, a company-size RD can cover a frontage of 6 km or more. The company's third platoon is available to act as a reserve to support a patrol in trouble or to replace a patrol that suffers serious casualties.

[9] It is also possible to form an RD on the basis of a reconnaissance unit. However, brigades and divisions normally have other, more important tasks for their reconnaissance companies, and the division's reconnaissance and EC battalion is ill suited for this role.

RECONNAISSANCE METHODS

Reconnaissance information is collected by various methods. These can include observation, listening (eavesdropping), raids, ambushes, photography, interception of transmissions and DF of electronic resources, questioning of local inhabitants, interrogation of prisoners-of-war and defectors, and the study of documents and equipment captured from the enemy.

Information is also acquired during combat by maneuver units. Tactical units may also receive information on the enemy from higher headquarters and adjacent units.

More specifically, reconnaissance patrols can gather information using a number of standard methods, including—

- Observation.
- Raids.
- Ambushes.
- Reconnaissance by combat.

Other tactical reconnaissance elements may use some of the same techniques.

Observation

Observation is the coordinated inspection of the enemy, terrain, weather, obstacles, and adjacent friendly forces during all types of combat activity. This type of reconnaissance, performed by troops conducting direct observation of the objective, is the most common method of gathering reconnaissance information. It is also one of the most reliable and accurate methods. In many cases, it is the only source of information. The OPFOR conducts observation from IFVs, APCs, tanks, rotary- and fixed-wing aircraft, as well as from static ground positions.

The OPFOR has great confidence in the utility of observation, but it also recognizes the limitations. It is often difficult to determine enemy intentions through observation alone. To supplement observation, the OPFOR conducts raids and ambushes to capture information that can give a clearer picture of enemy strengths and intentions.

Raids

The raid is more aggressive than most methods of reconnaissance because it involves the active search for and engagement of selected enemy targets. A raid can occur in any terrain, in any season, at any time of day or night, and under various weather conditions. However, it is generally conducted at night or under conditions of limited visibility.

Reconnaissance tactics involve two methods of conducting raids. The difference is in the purpose of the raid, the depth of the target, and the type of reconnaissance element performing it. The raids are classified as either a reconnaissance raid or a reconnaissance and destruction raid.

Reconnaissance Raid

The primary goal of a ***reconnaissance raid*** is to obtain information; any damage or destruction of enemy installations is incidental. It consists of the covert approach of the raiding unit to a preplanned and previously studied target (objective); a surprise attack to capture prisoners, documents, and equipment; and a swift withdrawal to friendly positions. The depth of the raid is limited to the forward edge or the immediate tactical depth of the enemy. The raiding unit is usually a reinforced reconnaissance or maneuver unit up to platoon size.

The reconnaissance raid is normally conducted when friendly forces are in direct contact with the enemy. It takes place in enemy-held terrain at the forward edge or not far beyond it. Its widest applications are during preparation for an attack against a defending enemy and in the defense in direct contact. This is because other reconnaissance methods are more difficult in the absence of dynamic activity.

The raiding unit or its senior commander selects target in advance, and ideally there is time to observe and study the target before undertaking the mission. Typical targets are individual soldiers or small groups of soldiers near the forward edge of friendly troops. These might be isolated firing positions to the enemy's front or flanks; OPs and observers; isolated sentries and guard posts; or couriers. In the enemy's immediate tactical depth, targets may include small, isolated work details, staffs, or communications centers. The most favorable of these targets are those located on the flanks and boundaries of enemy units.

A dedicated reconnaissance patrol or a mechanized infantry unit up to platoon strength may conduct this raid. In either case, the patrol can have attached engineer, chemical defense, and communications personnel. The patrol can receive artillery or mortar support if the situation dictates. The raiding unit normally forms an assault (capture) element, one or two fire support elements, and an obstacle-clearing element.

The purpose of the assault element is to capture prisoners, documents, and specimens of enemy weapons and combat equipment. The size of the assault element depends on the nature and distance of the target of the raid; however, it is normally about half the strength of the raiding unit.

The fire support element is responsible for covering and supporting by fire the actions of the assault element, if necessary. It can also cover the assault element's withdrawal after completing the mission. In the event the enemy detects the raiding element, artillery and mortar fire may cover its actions and withdrawal.

The purpose of the obstacle-clearing element is to breach obstacles on the way to the raid target. The commander planning the raid attempts to find a movement route to the target that has no serious obstacles. However, the most favorable route is the one that is shortest and offers the best concealment from enemy observation.

In executing the raid, engineers of the obstacle-clearing element normally move out first to create breaches in obstacles near the start point. If the obstacles are a considerable distance from the forward edge, one of the fire support elements may lead the way, followed by the obstacle-clearing element, possibly a second fire support element, and the assault element. On reaching the obstacle, the leading fire support element deploys to cover the breach being created by the engineers. Having created a breach, the obstacle-clearing element takes up positions on either side of the gap to guard it. The fire support element is the first to pass through the breach, to occupy designated positions for covering the actions of the assault element with fire. The assault element then approaches the objective until it is close enough to overcome it in one short assault. As soon as it reaches that distance, it must launch the assault before being detected by the enemy.

The leader of the raiding unit moves with the assault element and gives the signal to begin the attack. The best option is to attack the raid objective from the rear or a flank. Depending on the nature of the objective, the terrain, and the size of the assault element, the assault may take place from one side only or simultaneously from two sides. The preferred method is to conduct the attack silently, using hand-to-hand combat rather than shooting. Captured prisoners are to be bound and gagged quickly to prevent alerting others.

During the assault, the fire support element(s) are in their positions, ready to support the assault element with fire and to hinder other enemy forces from coming to the aid of the raid objective. If the enemy detects the assault element before it is in position to attack, the leader requests fire support from supporting artillery and mortar units and carries out the attack under cover of their fire and that of the fire support element(s).

If the raiding unit has not been detected, the assault element withdraws with captured prisoners, documents and equipment. The fire support element(s) remain ready to repel any attempt by the enemy to prevent the withdrawal of the assault element and then follow the assault element in withdrawing. If the enemy has detected the raiding unit, it withdraws under cover of fire from the fire support element(s) and supporting mortars and artillery.

Reconnaissance and Destruction Raid

A ***reconnaissance and destruction raid*** is conducted in the enemy rear. In contrast to a reconnaissance raid, which is conducted silently where possible, the basis of this type of raid is a skillful combination of fire, surprise, and swift strike. Its purpose is not only to take prisoners, documents, and combat equipment; but also to destroy or disable high-value targets. Such targets may include CPs of brigade-level and above commanders; NBC and precision weapons and delivery means; elements of enemy reconnaissance-strike complexes; or forward operating sites for attack helicopters or ground-attack aviation.

The composition of the attacking element in this type of raid varies, but is probably a dedicated reconnaissance or SPF team not larger than a platoon inserted deep into the enemy's rear area. Regular ground force units may also execute this type of raid after penetrating the enemy's forward defenses. A platoon-size raiding unit may organize into subgroups: personnel to destroy the target's security, an assault (capture) element, and a fire support element.

The platoon (or squad) leader studies the target and designates which elements to destroy or capture. As with the reconnaissance raid, the raiding unit stealthily moves as close to the objective as possible. Then the attack may be swift and silent, or it may follow a surprise delivery of fire. In either case, the goal is to destroy the enemy either by fire or by hand-to-hand combat and to seize the objective. The raiding unit then takes prisoner any enemy personnel still alive. It sends back to the commander who dispatched it any prisoners, along with documents and equipment taken from the dead, vehicles, or the seized objective.

Ambush

Reconnaissance by ambush is a method of reconnaissance accomplished by surprise attack, from cover, on solitary enemy soldiers or small groups for the purpose of seizing prisoners, documents, and samples of weapons or equipment. The ambush is similar to the raid with two exceptions:

- The ambush is more of a passive tactic than the raid; the ambush unit selects a concealed position along a probable route of enemy travel and attacks enemy units when the situation is favorable.
- The ambushing unit can consist of a dedicated reconnaissance patrol or a mechanized infantry unit; however, it might also consist primarily of tanks up to a platoon in strength

Typical targets for ambush are individual enemy soldiers or small groups moving on foot or in vehicles. The most favorable conditions for finding such isolated targets are when the enemy is preparing for an attack or when he is regrouping or relieving his forces. In preparing for an attack, the enemy sends out reconnaissance elements and small groups of engineers looking for passages in obstacles; there is also increased movement within the enemy position. During regrouping or relief, newly assigned enemy personnel that are unfamiliar with the terrain and situation may become isolated.

Information collection is the most common purpose of an ambush conducted by reconnaissance patrols. However, patrols may also execute an ambush to delay reserves or to inflict damage on a target of opportunity. Reconnaissance ambushes can occur in all kinds of battle, on any terrain, at any time or year or day, and under various weather conditions. A unit may set up an ambush in front of its own forward edge, between friendly strongpoints, or behind enemy lines.

The element assigned to set up an ambush may be a reinforced platoon or sometimes even a company. The platoon-size element may be an RP, CRP, or IRP. A squad-size reconnaissance team from the long-range reconnaissance company operating in the enemy rear can also conduct an ambush. The platoon leader (or company commander) assigned to conduct an ambush normally divides his force into three subgroups: a security element (observers), an assault (capture) element, and a fire support element. When a squad carries out an ambush, it is not always divided into subgroups. In that case, the squad leader would assign some personnel as observers, some for capturing the prisoner, and others for covering the ambush with fire and killing enemy soldiers trying to escape. In some cases, the ambush may be supported by artillery or mortar fire.

In setting up an ambush, a reconnaissance element selects a concealed position along a probable route of enemy travel and then camouflages itself, if necessary. It places observers to give early warning of approaching enemy personnel and vehicles. Even after the ambush has begun, the observers continue to report on any approaching enemy reinforcements. Observers may be in vehicles or dismounted.

Depending on the circumstances and the terrain, the leader/commander of the ambush unit may assign one or two fire support elements. The fire support element(s) occupy positions on the flanks of the assault element from which they can fire on the enemy as he appears. The ambush unit positions its combat or reconnaissance vehicles to support with fire both the assault element and the fire-support element(s).

The task of the fire support element is to allow the enemy to approach to almost point-blank range and then overwhelm him with firepower. This should prevent him from deploying to fight or from escaping from the ambush. The fire support element also has the responsibility of covering the flanks of the assault element and, when necessary, securing its retreat.

As a rule, the assault element is situated in the center of the ambush site, directly adjacent to the probable route of enemy movement. Under cover from the fire support element, it rushes forward in vehicles or on foot and takes prisoner any surviving enemy personnel. It then searches enemy personnel and vehicles for documents or equipment it can remove for later exploitation.

Reconnaissance by Combat

The most ambitious—and least preferred—ground reconnaissance tactic is reconnaissance by combat. When other means of gaining information have failed, a reconnaissance patrol can undertake reconnaissance by combat. However, a platoon-size patrol is not well suited for such a role and would only use this tactic as a last resort or if it cannot avoid combat.

The unit that conducts reconnaissance by combat is normally a reinforced mechanized infantry or tank company from the brigade, or a reinforced battalion from the division. Reinforcements can include specially trained reconnaissance personnel, as well as engineer reconnaissance, chemical reconnaissance, and artillery target acquisition personnel. An MIBN or TBN (sometimes a company) allocated for reconnaissance by combat normally receives artillery support and might also receive air support. Reconnaissance patrols or special groups of scouts organic or allocated to the battalion or company may be designated to capture prisoners, documents, and equipment.

Even for a maneuver battalion- or company-size force, reconnaissance by combat is a last resort. If all other reconnaissance collection means have failed to provide the required information, a commander can conduct it only after approval by a higher headquarters. The commander of the brigade or division who authorized it in his area of responsibility must personally observe the progress of the action and have other forces ready to exploit the results.

The unit performing this mission penetrates enemy defenses to a depth sufficient to cause him to reveal his dispositions and firing systems in response to the penetration. Its primary purpose is to discover weak points in the enemy's defenses. This aggressive tactic carries with it a distinct risk. When used against an enemy prepared for it, or when attempted without sufficient preparation or expertise, it can fail. Aside from resulting in heavy casualties, it could also reveal OPFOR intentions.

The most common use of reconnaissance by combat is to gather information for an attack when all other reconnaissance efforts have failed. The commander employs it on the sector of the main attack but, in order not to reveal this sector, directs other units to conduct diversionary reconnaissance across the whole frontage.

Each effort typically involves a reinforced company or battalion, supported by heavy artillery fire (and possibly air strikes) and deception measures to convince the enemy that a major assault is beginning. The attacking force aims to penetrate 1 to 2 km and then launch raiding parties to capture prisoners, documents, or equipment. Every possible reconnaissance asset monitors the progress of the unit conducting reconnaissance by combat, with commanders located in forward CPs or COPs to assess the enemy defenses. First-echelon forces must be ready to launch major attacks in the event reconnaissance reveals exploitable weaknesses in the enemy defenses.

SUPPORT OF TACTICAL ACTIONS

Ground reconnaissance elements can form various types of reconnaissance patrols. However, during each type of tactical action, these elements emphasize certain aspects of the general mission profile. They perform one set of roles during the march, another set in the offense, and yet another in the defense.

March

Reconnaissance on the march concentrates on collecting information on the enemy and terrain on the axis of movement and on the flanks. The principal method of reconnaissance on the march is observation by reconnaissance patrols. See Chapter 3 for more information on the conduct of reconnaissance in the march.

Reconnaissance Versus Security

The OPFOR differentiates between reconnaissance and security missions in support of a march. (See Chapter 3.) A commander may send out a unit to perform either reconnaissance or security, but normally not both at the same time. Reconnaissance is a longer-range, more passive concept that identifies and evaluates aspects of targets and terrain necessary for OPFOR planners and decision makers. On the other hand, security is more of an aggressive, close-in action by units assigned to prevent penetration of enemy reconnaissance, provide early warning, and ensure advantageous conditions for the deployment of the main forces. To do this, security elements actively seek out and engage enemy forces along a designated route or axis.

Units performing security missions can take the form of an advance guard, or a forward, flank, or rear security element. The size of the security element and its distance from the supported unit depend chiefly on the form of security, the size and capabilities of the supported unit, and the mission. For example, a unit in direct contact with the enemy may have no special security organization, since other friendly units to its front and rear provide its security. On the other hand, when on the march or at a halt, a unit may dispatch security elements up to several dozen kilometers in the direction of the main enemy threat.

Security elements can also provide information to the supported unit commander on what they encounter, and as such they are a valuable source of additional reconnaissance information. However, that is not their primary mission. Likewise, a reconnaissance grouping provides security indirectly; by reporting what it sees, it keeps the commander from being surprised. However, the reconnaissance grouping's main mission causes it to avoid contact whenever possible, in order to continue to collect and pass on information.

Reconnaissance Patrols

A division on the march normally covers its frontage with IRPs. Each patrol typically covers a sector of 2 to 3 km. An RD could advance on the main axis; with the remainder of the frontage covered by IRPs. This screen avoids combat and moves to locate the main body of the enemy force.

If the enemy is preparing to hold a main defensive position, some patrols establish a line of static OPs reporting on enemy defenses. Other patrols attempt to find gaps or open flanks in enemy positions. IRPs are also deployed on the flanks of the division, with the number of these patrols determined by the proximity of friendly formations.

First-echelon brigades deploy their IRPs behind the division's patrols. The advanced guard battalions of these leading brigades, along with any forward detachments, deploy CRPs and their own RPs. Battalions in the main body of first-echelon brigades can deploy forward patrols (as march security elements), but do not employ CRPs unless they are about to contact the enemy. Second-echelon or reserve brigades are likely to use only patrol squads.

Signals Reconnaissance

During a march, signals reconnaissance assets conduct reconnaissance on the move. They may also forward with an advance guard, depending on the tactical situation. When they approach the enemy, they may detect and intercept enemy reconnaissance elements, provide march security, and provide security for advancing troops.

To ensure the fastest deployment of radio intercept and DF posts, the signals reconnaissance assets travel directly behind the forward units. The signals reconnaissance company can intercept, identify, and locate radio communications transmissions and electronic emissions to identify the composition and location of all enemy units engaged and any possible reserves.

Offense

The conduct of reconnaissance varies according to the type of the offensive battle. Reconnaissance may support a parent organization in its movement forward (in a meeting battle or attack from the march) or in its penetration of enemy defenses. Reconnaissance missions continue as the attacking force moves into the enemy depth to exploit the penetration or pursue a withdrawing enemy.

Meeting Battle

In anticipation of a meeting battle, IRPs (and RPs) move ahead of march security elements on the axis of anticipated encounter, along roads at maximum possible speed. Patrols anticipating a meeting battle may also use some of the tactics described above for reconnaissance in the march.

In the area of probable engagement, patrols move stealthily behind a patrol squad from point to point, observing terrain and inspecting local objects as necessary. They maintain continuous surveillance of roads that the enemy might use. They do not seek to engage enemy forces unless conditions are favorable. On encountering a small enemy party, a patrol might destroy it or take prisoners. When they discover the lead elements of the enemy force and those elements are superior in strength, patrols bypass them or take cover behind local obstacles to let them pass. Some patrols might keep the leading enemy units under observation as they approach the OPFOR formation, while other patrols attempt to penetrate the enemy main body. After locating the main body, patrols maintain continuous observation, sometimes moving on a route parallel to the main body's advance. They determine the composition of enemy forces, locations of his artillery and CPs, and the axis of forward movement of reserve units.

When detecting the start of the enemy's deployment for a meeting battle, patrols immediately report this to the commander who dispatched them. Then they act according to the commander's orders. During the meeting battle, an IRP (or RP) may carry out reconnaissance on one of the flanks or in the depth of the enemy's position. There it would look for enemy precision or NBC weapons, the advance of his reserves, or any maneuver to attack the flank or rear of friendly forces.

Attack Against a Defending Enemy

When moving forward from an assembly area or penetrating an enemy covering force, division and brigade IRPs conduct reconnaissance on the march. (See the March section above.) Once the division comes in contact with the enemy, reconnaissance patrols (including CRPs and IRPs) take up positions behind the first-echelon maneuver units that are preparing to attack. At this point, the division acquires much of its reconnaissance information from OPs in the frontline. By this time, elements of the division's long-range reconnaissance company may have been inserted into the depth of the enemy defenses. Radar, DF, and artillery target acquisition assets are fully deployed.

Penetration battle. As the penetration battle begins, the division reconnaissance and EC battalion and the first-echelon brigades' reconnaissance companies try to find gaps through which they can insert IRPs. First-echelon brigades do the same for their CRPs and other reconnaissance elements. Reconnaissance or mechanized infantry units can mount raids to identify enemy units. If reconnaissance sources fail to provide the detailed targeting information needed for the success of the fire plan, the OPFOR may be forced to employ reconnaissance by combat.

The start of penetration by reconnaissance elements into enemy positions depends on the situation. If there are gaps in the enemy's formation or if the enemy's defense can be suppressed, then the reconnaissance patrols rush forward simultaneously with the transition of units to the attack. But, if there are no gaps and the defense cannot be suppressed, the patrols follow the advancing first-echelon units and penetrate enemy positions at the first opportunity. Figure 6-8 illustrates an example of reconnaissance being conducted during the penetration battle.

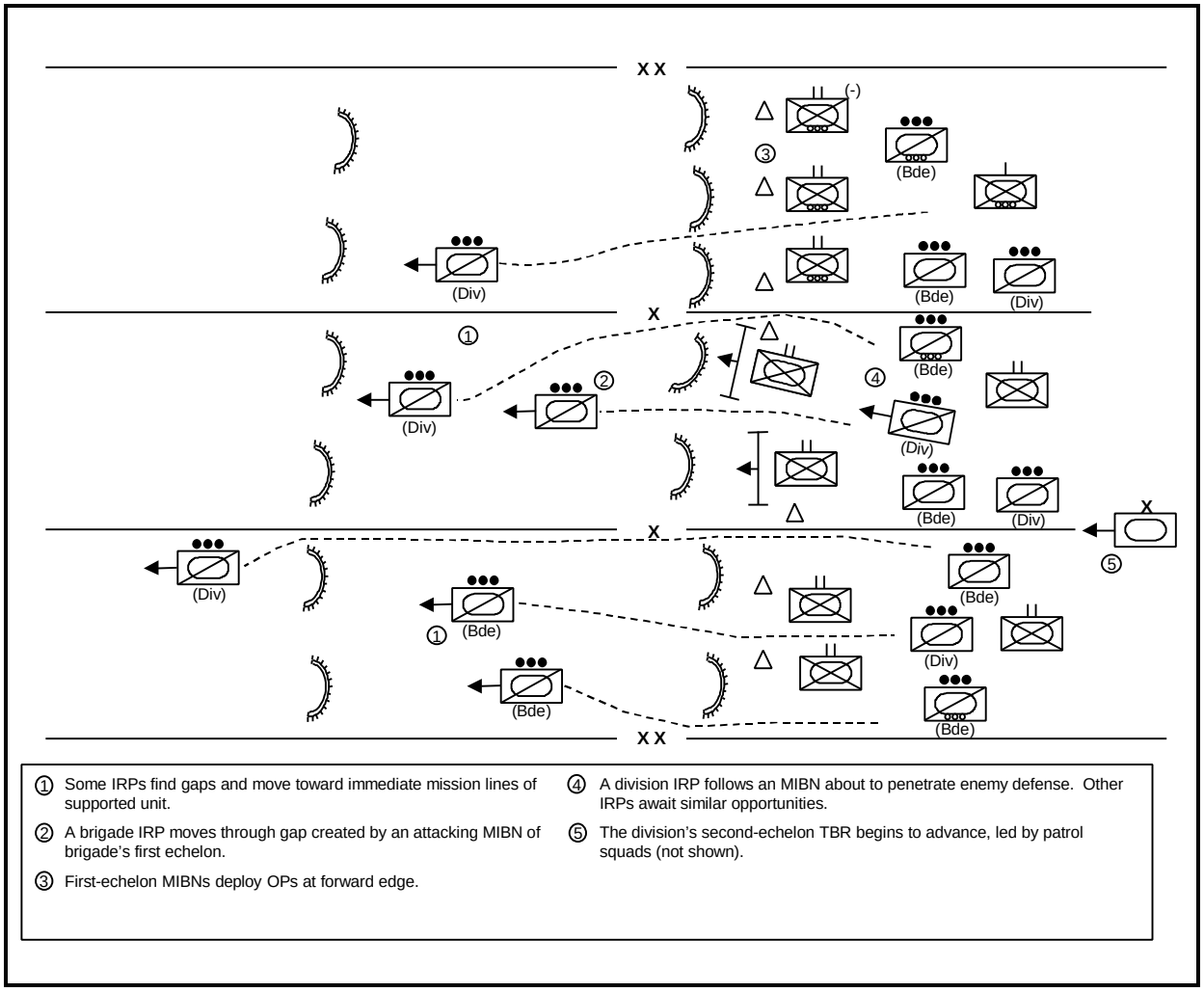


Figure 6-8. Reconnaissance at the beginning of a penetration battle (example).

Exploitation. Once an attack on the enemy's main defenses begins, reconnaissance elements are ready immediately behind the assaulting troops. First-echelon battalions place CRPs immediately behind their first-echelon companies, committing them once those companies have overcome the enemy's forward company positions.

Brigade- and division-level IRPs, and possibly a division-level RD, are inserted once gaps have been created. Artillery strikes and smokescreens cover their commitment. When exploiting a penetration, units operate with open flanks, using additional RPs and CRPs to cover these flanks. Figure 6-9 shows an example of reconnaissance during the exploitation phase.

After penetrating across the frontline, the various reconnaissance patrols attempt to establish the required distance between themselves and the attacking units. Operating in the depth of the enemy position, the patrols try to locate enemy fire support means, CPs, and reserves. The leader of a patrol may decide, independently, to destroy fire support means if conditions are favorable and then report the results to his commander.

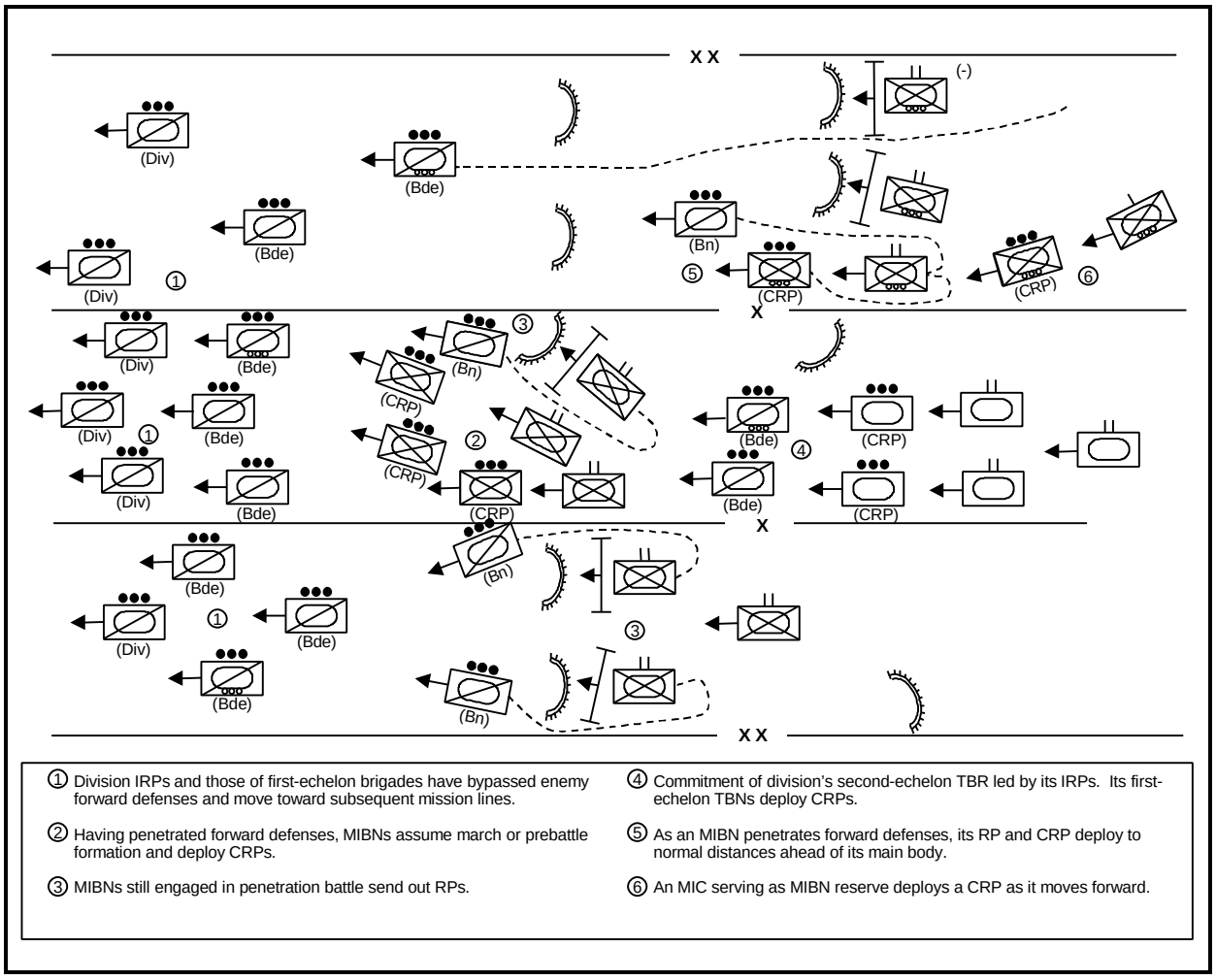


Figure 6-9. Reconnaissance during exploitation (example).

On discovering enemy strongpoints or defensive areas, a reconnaissance patrol determines their size, the location of their forward edge, and the nature of any obstacles. Once it reports these, the patrol looks for unoccupied areas of terrain and continues its penetration into the depth of the enemy defenses.

Pursuit

Pursuit is one of the principal forms of exploitation. OPFOR commanders rely on active reconnaissance to detect the beginning of an enemy withdrawal. During the pursuit, reconnaissance concentrates on enemy withdrawal routes. However, it generally does not move on the same roads on which the enemy is retreating, because the enemy would have his own security and reconnaissance elements there and could leave behind obstacles and demolitions. As the pursuit develops, reconnaissance elements provide information on the disposition of withdrawing enemy forces and on any forward movement of his reserves.

In either frontal or parallel pursuit, reconnaissance elements lead the way, followed by march security elements (including CRPs) and then the main body of the maneuver unit in march or prebattle formation. Reconnaissance must also try to ensure that the enemy withdrawal is not an attempt to draw the OPFOR into a kill zone. A pursuit force may use IRPs, RPs, or CRPs on its open flanks. Because of the potential depth of a pursuit, aerial reconnaissance may be the primary means of identifying significant threats to pursuit forces.

During the pursuit, a reconnaissance element attempts to discover—

- The direction and order of the enemy retreat.
- The presence and composition of covering units.
- The presence, composition, and direction of movement of enemy reserves.
- Enemy preparation and occupation of a defense in depth.

The following paragraphs describe the actions of an IRP in frontal or parallel pursuit. However, the same tactics would apply to other types of reconnaissance patrol as well.

Frontal. An IRP in a frontal pursuit sends out patrol squads in the direction of the enemy and advances at maximum possible speed. It bounds from one favorable observation position to the next. It does not engage in combat with enemy covering units but bypasses them on parallel routes. It attempts to emerge on the flank of the enemy main force's column and to determine that force's composition and direction of withdrawal. The IRP tries not to lose contact with the enemy. When possible, it takes prisoners, documents and equipment specimens.

Parallel. An IRP on a parallel pursuit route conducts reconnaissance in the direction the enemy's retreat from a neighboring sector and searches for possible enemy reserves. After discovering the enemy's composition and direction of movement, the IRP sets up ambushes to capture prisoners, documents, or equipment. Particularly on a parallel pursuit route, reconnaissance elements must determine the nature of any obstacles and possible enemy defensive positions to the flanks of the withdrawing force.

Defense

In the defense, reconnaissance focuses on the security zone. Patrols conduct reconnaissance in front of the forward edge of the main defense zone or on an open flank. They may be assigned an axis to patrol or a small area that encompasses one of the probable axes of the enemy's advance. If the enemy's main force approaches, the patrol determines and reports the strength of the enemy, and it may then either remain in position to scout approaching reserves or continue to scout the enemy's advancing main forces by moving parallel to the enemy's movement. During a defensive battle, patrols can conduct reconnaissance on the open flanks or in the gaps of enemy units. They could also return to their parent unit's position or to the planned line of commitment for a counterattack.

Division

Division ground reconnaissance elements are in and forward of the security zone. IRPs from the long-range company and two ground reconnaissance companies of the division's reconnaissance and EC battalion operate up to 50 km from the forward edge of the main defense. Consequently, they are often likely to be forward of the security zone. They may also conduct reconnaissance on an open flank. The battalion's signals reconnaissance company may deploy forward in the security zone to achieve increased range and early warning. The target acquisition battery of the division's artillery regiment and possibly the division's artillery command battery deploy reconnaissance elements in the security zone for artillery reconnaissance.

The SAM regiment of the division can have elements of its early warning/target acquisition battery in the security zone. The engineer reconnaissance platoon of the division's engineer battalion and the chemical reconnaissance platoon of the division's chemical defense battalion also work in the security zone.

The security zone battle begins with reports from deep reconnaissance elements which detect the movement of significant enemy forces and the locations of enemy precision weapon systems. As the enemy force approaches the security zone, echeloned reconnaissance elements monitor their progress.

The next phase of the battle is the counterreconnaissance battle. The forward detachment (FD) tries to eliminate enemy reconnaissance and march security elements, making maximum efforts to take enemy prisoners. As the enemy begins to penetrate the first positions of the FD, bypassed ground reconnaissance elements and aerial reconnaissance identify targets for artillery strikes.

If the division withdraws to occupy its defensive position, it can leave some reconnaissance teams of the long-range reconnaissance company as stay-behind parties. If the division goes over to the defense out of contact with the enemy, it can send an RD to establish contact with the attacking enemy, monitoring his approach. Second-echelon brigades or reserves can also deploy reconnaissance assets into the intervals between defense lines.

Brigade

Brigade reconnaissance elements also operate in the security zone, but not normally beyond it. Thus, IRPs from the reconnaissance and EC company of a separate brigade can operate to at least 15 km and possibly as much as 50 km ahead of the forward edge. However, IRPs from a divisional brigade's reconnaissance company would normally have division-level IRPs operating ahead of them. In that case, the divisional brigade's IRPs could operate 8 to 10 km in front of the forward edge in a security zone with a minimum depth of 15 km; for a security zone as deep as 50 km, the same IRPs might typically go out as far as 25 to 30 km.

The brigade's self-propelled howitzer battalion usually has its rangefinders and battlefield surveillance radar forward. Additionally, elements of the chemical reconnaissance platoon of the brigade's chemical defense company may perform reconnaissance in the security zone. Combined arms forces defending in the security zone also deploy reconnaissance elements.

Should the enemy penetrate the security zone, the brigade would withdraw some special and technical reconnaissance elements, but the bulk of reconnaissance forces would go to ground or move to the flanks of the penetration and continue to report. Some patrols might stay in place to observe approaching enemy reserves, while others might move stealthily on routes parallel to the movement of the enemy main force and continue to observe that force without losing contact.

Battalion

When assuming the defense out of contact with the enemy, a battalion can push forward a CRP. A battalion may deploy more than one CRP to cover different areas. An MIBN can also send out an RP based on its reconnaissance platoon. A company often sends out a CRP, or at least a patrol squad. Figure 6-10 shows an example of reconnaissance in a reinforced MIBN in the defense.

An RP can reconnoiter in the battalion's general reconnaissance zone, up to 10 km forward of the main defense. CRPs sent out by either battalion or company typically reconnoiter in the battalion's detailed reconnaissance zone, out to a depth of 5 km.

The RPs and CRPs try to detect the enemy's forward movement and deployment for the attack. They also look for the disposition of his precision weapons and artillery, deployment areas for his CPs, and follow-on forces.

Once the enemy attack begins, CRPs try to detect enemy forces that have penetrated into the defense or are attempting to make a deep envelopment. CRPs can also reconnoiter an enemy airborne or heliborne landing near the battalion's defensive area.

There is considerable emphasis on the use of static OPs in the defense. Within each first-echelon battalion, these may include the battalion COP, numerous company and platoon OPs, NBC and artillery OPs, listening posts, and battlefield surveillance radar.

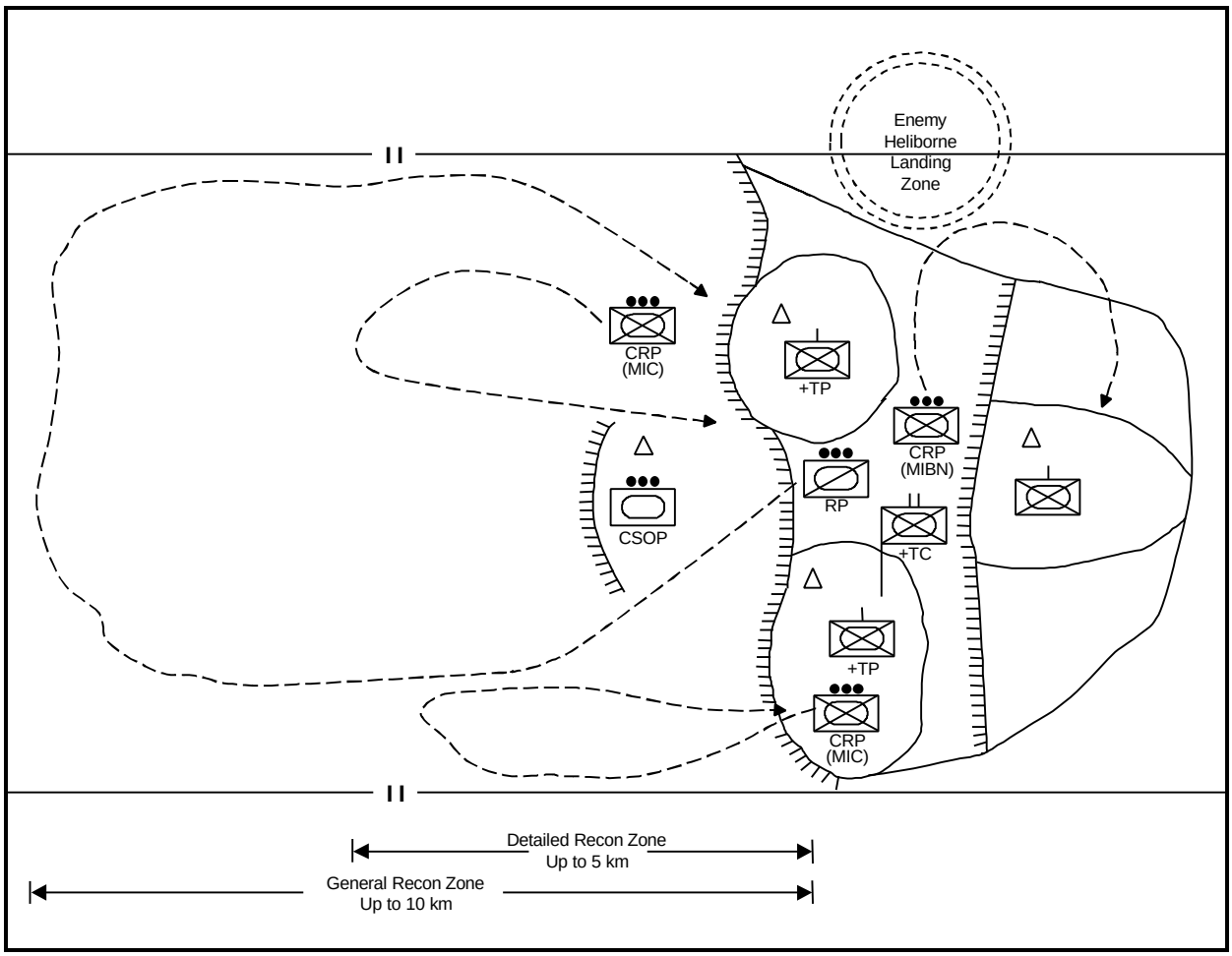


Figure 6-10. Reconnaissance of a reinforced MIBN in defense (example).

RECONNAISSANCE UNDER SPECIAL CONDITIONS

The OPFOR must conduct reconnaissance under all conditions and in all types of terrain. In particular, reconnaissance in mountainous, wooded, desert, extreme cold, and built-up areas requires some modifications to standard reconnaissance methods and practices.

Mountains

Mountains can offer the possibility of long-range surveillance in some directions and limited observation in others. Where two or three OPs could cover an area in level terrain, mountainous conditions can require additional posts. Employment of ground reconnaissance patrols is more important as a result of limitations imposed on OPs. However, the limited roads and numerous obstacles can hinder the movement of patrols. Difficulties in maintaining radio communications in mountains may reduce the distance between patrol squads and their parent patrol and between the patrol and the parent unit.

The conduct of raids is difficult in mountainous areas, but the OPFOR expects to successfully conduct ambushes. The restriction of enemy units to established road and trail networks increases the number of targets that might pass through an ambush site and at the same time decreases the possibility of the ambush team's being detected. However, the same conditions also increase the possibility that the enemy could ambush OPFOR reconnaissance elements.

Reconnaissance patrols must reconnoiter all roads, paths, and ravines leading off to the sides of their main axis of reconnaissance. They must pay particular attention to defiles, wooded areas, and other places that could conceal the enemy. Patrols periodically dispatch patrol squads to observe these terrain features. Entire patrol squads or some squad members can conduct reconnaissance on foot in terrain sectors that are inaccessible to reconnaissance vehicles.

Forests

The limitations of wooded areas are similar to those found in mountainous regions. Terrain conditions in wooded areas can change drastically within a short period of time depending on the weather and season. Rolling, forested terrain allows raiding units good concealment along the approach to their objective, increasing their chance of success.

The OPFOR prefers to infiltrate raiding units through lightly defended forward areas and attack objectives in the enemy rear, where OPFOR troops are not expected and where success can demoralize enemy forces. Wooded terrain is also ideal for conducting ambushes.

Desert

Features of desert areas and the nature of combat and logistics support in the desert place a number of additional requirements on reconnaissance. In addition to usual missions, reconnaissance must establish the degree to which enemy troops are equipped and trained for desert combat; features of alignment of enemy combat formations; and the degree of engineer preparation of positions. Reconnaissance tries to determine the presence of water sources in the enemy disposition, their capacity, and the presence and capacity of pipelines. It also looks for convenient bypass routes to deliver strikes against the enemy from the flanks and rear.

The open character of terrain in a desert favors reconnaissance by observation. The possibility of off-road movement in any direction and the difficulty of camouflaging make it more difficult to organize ambushes, since it is difficult to determine which route an enemy will follow. However, the same conditions can lead to large gaps in the enemy's battle formation and permit reconnaissance elements to penetrate into his flanks and rear. In desert terrain, the distance between patrol squads and the main body of the patrol can increase, as can the distance of the reconnaissance patrol from the parent unit. These increased distances require movement by vehicle to the area for reconnaissance, although camouflage of vehicles can be difficult.

Extreme Cold

In addition to usual missions, reconnaissance in areas of extreme cold must establish the organization, weapons, and logistics support of enemy troops for combat in the given area; the enemy's special equipment; alignment of combat formations; and presence of snow and ice obstacles. Reconnaissance elements also try to determine any structures for personnel shelter and warming; ice thickness and strength on rivers and lakes; the depth and density of snow cover; the freezing of marshes; and the presence and trafficability of off-road trails.

Cities

Combat in cities differs significantly from tactical actions in normal field conditions. Therefore, reconnaissance requirements differ.

The OPFOR places emphasis on precombat information gained from informers, refugees, SPF, maps, and aerial photography. It also uses information from town plans, tourist brochures, and service facility charts. These sources provide the latest information about the condition of communications systems, utilities, enemy defensive deployments, location of civilian concentrations, and other related data.

Additional reconnaissance tasks include determining the main routes through the built-up area and key objectives (such as buildings) that dominate the area. Reconnaissance emphasizes a three-dimensional perspective of cities. It attempts to gain information on conditions above as well as below the street level (that is, in multi-story buildings or in sewers and subways).

IRPs operate mainly in the terrain surrounding and along the immediate approach routes into the city. Once the battle within built-up areas begins, new reconnaissance information comes primarily from OPs, patrols, and helicopters. The OPFOR often increases the number of OPs and positions them in upper stories of buildings. This added elevation may give improved observation among the ruins where activity is usually more difficult to detect.

Chapter 7
Artillery Support

At the tactical level, artillery support is the principal means of achieving fire superiority, which is an essential condition for victory. The ability to concentrate fires is one of the primary ways to attain a favorable correlation of forces against an enemy in a given sector. The OPFOR depends on artillery to destroy attacking or defending enemy forces. The major task for a combined arms commander is the integration of artillery assets into a unified fire support plan.

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CONCEPTS

Modern battle is, above all, a firefight. Artillery, as the main firepower of the Ground Forces, plays a decisive role in effective engagement of the enemy. Uninterrupted and very close cooperation with the attack and maneuver of supported combined arms units is the basis of the actions of all artillery units.

Artillery

In OPFOR terms, ***artillery*** includes two major subcategories of units and systems:

- Field artillery: field guns, gun-howitzers, howitzers, mortars, and multiple rocket launchers (MRLs).
- Antitank (AT) artillery: AT guns, recoilless guns, and antitank guided missiles (ATGMs).

In a broader sense, each type of artillery includes not only the system, but also the associated ammunition, target acquisition, and firing-related instruments. This chapter focuses on the aspect of field artillery support. Chapter 8 deals separately with AT artillery.

In the Ground Forces, the branch of ***missile troops and artillery*** encompasses all of the above-mentioned types of artillery, plus surface-to-surface missiles (SSMs) in the category of short-range ballistic missiles (SRBMs) found at the operational level. Longer-range SSMs come under the purview of the strategic missile forces.

Fire Support

Artillery support is part of the larger concept of ***fire support***. The OPFOR concept of fire support includes all combat support actions provided to ground maneuver forces by artillery, missiles, and aviation. Although SSMs (SRBMs) can sometimes support tactical actions, they are operational-level assets (see FM 100-60 and FM 100-61). Air support, also from the operational level, is addressed separately in Chapter 10.

The OPFOR distinguishes between close and long-range fire support zones. The ***close-range fire support zone*** extends as far as the range of the OPFOR's direct fire weapons, up to 5 km beyond the forward edge of friendly troops. The close-range fire support battle must destroy attacking or forward-defending enemy troops and their supporting weapons.

As the OPFOR modernizes fire support assets, the depth of the ***long-range fire support zone*** continues to increase. At division and below, the long-range fire support zone extends out to the limit of a division's subsequent mission in the offense and at least to the depth of the security zone in the defense. Today, critical enemy targets such as deep-strike precision and NBC weapon systems located deep in the enemy's rear area make domination of the long-range fire support battle very important.

Fire Superiority

The OPFOR defines ***fire superiority*** as a firepower advantage over the enemy in a given battle or operation. This allows a unit to execute its own fire missions successfully while suppressing enemy counterfire. The OPFOR believes that fire superiority is relatively assured for the side that—

- Opens fire first.
- Achieves surprise.
- Delivers highly accurate and effective fire.
- Masses fires effectively, either through maneuver by fire or maneuver of fire support means.

To gain and keep fire superiority, the OPFOR seeks to maintain continuous fire on the enemy's fire support systems, especially on his artillery.

In the offense, the integrated fire plan should combine air assets, SSMs, and artillery into a coordinated attack throughout the enemy's defenses. The struggle for fire superiority can begin with long-range fire strikes long before maneuver forces begin to advance for an attack. During fire preparation for the attack, the combined arms commander needs a high volume of air and missile strikes and artillery fire to destroy enemy weapons, especially AT systems. If an extensive fire preparation can win fire superiority, this vital advantage should continue during the entire offensive battle. This enables the maneuver forces to attack successfully and quickly, exploiting weaknesses caused by such overwhelming fires. It also provides continuous fire support for maneuver units while they move though enemy defenses.

In the defense, fire planners try to achieve fire superiority by quickly massing fires in selected sectors for a given period of time. This can begin with counterpreparatory fires against enemy forces preparing to attack. Once the enemy attack begins, fires concentrate on the sectors of his main effort. Later, units may fire in a sector in support of a counterattack force. In the course of a defensive battle, maneuver of fire, weapons, or units can create fire sacks where artillery and direct-fire weapons can engage the attacking enemy with surprise, concentrated fire.

Maneuver by Fire

Maneuver by fire occurs when a unit shifts fire from one target, or group of targets, to another without changing firing positions. This is a combined arms concept in which the artillery plays a critical role. Maneuver by fire masses fires on the most important enemy installations and force groupings. Its goal is to destroy the enemy in a short period of time or to redistribute fires to destroy several targets simultaneously. The method also may shift the OPFOR's main effort from one axis to another.

In the offense, maneuver by fire in the depth of the enemy's defenses—

- Suppresses enemy strongpoints.
- Repulses counterattacks.
- Covers the attacking unit's flanks with protective fires.

In the defense, maneuver by fire—

- Destroys the enemy as he deploys to attack.
- Repulses the attack.
- Supports a counterattack force.
- Protects gaps in the defenses.
- Seals off enemy penetrations.

Wide use of maneuver by fire helps the defending commander achieve fire superiority at the critical time in decisive sectors.

Fire plans normally include plans for maneuver. In such planning, artillery units can have several supplementary assigned sectors of fire. These sectors cover areas along the supported unit's flanks and the gaps between units.

Counterbattery Fire

Counterbattery fire accomplishes the annihilation or neutralization of enemy artillery batteries. Combat with enemy artillery is one of the artillery's most important missions. It enables the ground forces to achieve fire superiority on the battlefield. It is especially important for the early destruction of the enemy's long-range and precision weapons. However, combat with enemy artillery requires more than counterbattery fire. It requires the destruction of the enemy C^2 centers as well as his artillery. To be effective, it also requires the cooperation of the other ground combat arms and aviation.

ASSETS

Assets include not only artillery organizations and their weapons, but also their target acquisition means and the types of munitions available to them. Modern conventional fire support means, especially precision weapons, approach the destructive effect of low-yield nuclear weapons.

Organizations

Field artillery and target acquisition units do not necessarily stay at the level to which they are organic. In organization for combat, the common practice is for divisions and brigades to allocate these assets downward to their subordinates. In turn, divisions and brigades may receive assets originally organic to the parent army group, army, or corps. From the various organic and nonorganic assets available to them, divisions and brigades form artillery groups.[1] (See Organization for Combat.) However, it is useful to know what assets are organic at each level before the allocation process begins.

[1] Some divisions may receive SSM support for their actions as part of an army or army group operation, although the operational-level SSM units do not come under their control.

Army Group

Some army groups could have an artillery division or perhaps even two of them. Such a division typically has four cannon artillery brigades (152-mm guns, gun-howitzers, and 122-mm howitzers) and one brigade of large-caliber MRLs (220- or 300-mm). If an army group has no more than one artillery division, it may also have a separate self-propelled (SP) gun brigade and/or a separate MRL regiment or brigade. For additional support, higher command may allocate a heavy artillery brigade to an army group. This brigade is not part of an artillery division. It may have four battalions of 203-mm SP guns or two battalions of those guns and two battalions of 240-mm SP mortars. An army group also has at least one or perhaps two SSM brigades.

Army and Corps

A mechanized army or a tank army normally has an artillery brigade with four or five gun battalions (152-mm towed or SP). Both types of army also have an MRL regiment (220- or 122-mm) and two SSM brigades.

A corps has the same types of field artillery assets as the army, except that the artillery brigade is smaller, and the corps may have only one battalion of MRLs rather than an entire regiment. The corps has only one SSM brigade.

Division

A mechanized infantry division (MID) has an organic SP artillery regiment, with three 152-mm SP howitzer battalions and an 122-mm MRL battalion. A tank division (TD) has a similar SP artillery regiment, but with one less SP howitzer battalion.

Brigade and Below

Mechanized infantry brigades (MIBRs) and tank brigades (TBRs) have their own organic field artillery. These comprise an SP howitzer battalion (122-mm) for a divisional brigade, and one or two SP howitzer battalions (122- or 152-mm) for a separate brigade. A mechanized infantry battalion (MIBN) has an organic mortar battery, but a tank battalion (TBN) has no organic artillery or mortar unit.

Target Acquisition

As with the field artillery systems they support, target acquisition assets do not necessarily stay at the level to which they are organic. In organization for combat, higher headquarters normally allocate target acquisition batteries or battalions downward along with the artillery battalions that form artillery groups.

Artillery Battalions

Each cannon artillery or MRL battery and battalion has its own artillery command and reconnaissance vehicles (ACRVs) and rangefinders. The ACRVs serve as command observation posts (COPs) and fire direction centers (FDCs). There are both tracked or wheeled versions, so that ACRVs are compatible in mobility with the unit's artillery systems. Typical equipment in an ACRV includes—

- Day/night observation and rangefinding equipment.
- Topographic survey equipment.
- Artillery fire direction computation equipment (automated and/or manual).
- Communications equipment.

MRL battalions (220-mm and above) and cannon artillery battalions also have a mobile reconnaissance post vehicle with a battlefield surveillance radar, as well as observation and rangefinding equipment.

Division-Level

At the tactical level, target acquisition batteries have a variety of battlefield surveillance and countermortar/counterbattery radars, plus sound-ranging sets, rangefinders, and topographic survey equipment. The artillery regiment of the MID and TD has an organic target acquisition battery. This battery provides the bulk of the division's artillery reconnaissance. The battery includes—

- A sound-ranging platoon.
- A radar platoon (with a countermortar/counterbattery radar section and two surveillance radar sections).
- A topographic survey platoon.

While the division may allocate some of these assets to subordinate brigades, the sound-ranging systems normally stay at division level.

An MID or TD also has an artillery command battery with assets similar to those of the target acquisition battery, except that it replaces the topographic survey platoon with a meteorological survey section. This section includes a meteorological radar.

Operational-Level

At the operational level, target acquisition batteries of artillery and MRL brigades and regiments add a meteorological survey section with a meteorological radar. Some of these brigades may have a target acquisition battalion comprising three such batteries. At army and army group level, there is a target acquisition regiment comprised of three such battalions, plus a squadron of remotely-piloted vehicles (RPVs). A corps, however, has only a target acquisition battalion. An army or corps also has an artillery command battalion comprising three of the same type artillery command batteries as found at division level.

Weapons

OPFOR field artillery consists of cannon systems, MRLs, and mortars. These systems can be either towed or SP.

Cannon Systems

Cannon artillery includes field guns, howitzers, and hybrid systems. Of the two basic types, field guns generally have longer tubes, higher muzzle velocities, and longer ranges with higher-trajectory fire. Howitzers can deliver both low- and high-angle fire; the high-angle fire lends itself to attacking targets located behind cover or on reserve slopes. Hybrid cannon systems include gun-howitzers, which combine the principal characteristics of both guns and howitzers, and are particularly useful for counterbattery fire. There are also combination guns that can fire fin-stabilized direct-fire projectiles, spin-stabilized howitzer projectiles, and conventional mortar projectiles.

The various systems make tradeoffs in their performance. Guns generally sacrifice mobility and projectile lethality for increased range, howitzers sacrifice range for versatility, and combination guns trade some of everything in order to gain versatility.

Towed cannon systems are lightweight, low-cost, simple, and extremely mobile on hard surfaces. Their disadvantages are a lack of cross-country mobility and no gun crew protection against NBC or conventional counterbattery strikes. The OPFOR continues to employ towed weapons, especially in nondivisional artillery units, but its current emphasis is on acquiring SP artillery systems.

Tracked, SP systems greatly enhance the artillery's ability to provide continuous support to mechanized infantry and tank brigades. Their cross-country mobility and speed allows them to keep pace with combined arms operations. Their armor protection improves crew and weapon survivability. However, these SP systems can have ammunition resupply limitations because they depend on soft-skinned, wheeled vehicles for logistics support.

Multiple Rocket Launchers

Compared to cannon artillery, MRLs are relatively uncomplicated and easy to operate and maintain, and they are highly mobile. They offer an economical means to deliver massive, destructive fires on an area-type target in a very short period of time. The principal disadvantage of MRLs is that excessive dispersion does not permit direct, close support to maneuver elements. To compensate for this relative lack of accuracy, MRLs use salvo fire from their multiple tubes and often fire as battery and battalion groups. Some MRLs can fire guided projectiles.

The OPFOR rarely uses MRLs alone, but rather as a complement to mortar and cannon artillery fires. For instance, MRLs can provide the initial area coverage fires, while cannons and mortars either maintain fire at a steady volume or attack high-value point targets. MRLs are also excellent weapons for counterbattery fire, especially when the enemy uses large-area dispersion for survivability.

The OPFOR categorizes MRLs as large-caliber (220-mm and larger) and medium-caliber (100- up to 220-mm).[2] It uses MRLs to deliver heavy fire on important targets at decisive moments in a battle. The MRL is an excellent area coverage weapon, and its rapid ripple fire is an excellent delivery system for high-explosive (HE), fuel-air explosive (See VEX later in this chapter.), and smoke projectiles; chemical agents; submunitions; and scatterable mines.

Mortars

Each MIBN also has an organic mortar battery. These indirect fire support weapons help the brigade to maintain fire superiority.

Compared to cannon systems, mortars generally sacrifice range. However, their mobility makes them well suited for close support of maneuver units. Their high-angle fire enhances fragmentation effects and permits attack of targets in deep defilade. They are ideal weapons for attacking targets on reverse slopes, in narrow gullies, in ditches, in cities, and in other areas that are difficult to reach with low-angle fire. Mortars are especially effective for smoke and illumination missions.

Traditionally, mortars have been area-type weapons due to their lack of accuracy. However, modern ammunition developments have led to the availability of "smart" mortar projectiles, as well as improved terminal effectiveness for all mortar rounds.

Ammunition Types

The ***standard ammunition*** for OPFOR artillery (cannon systems, MRLs, and mortars) is fragmentation-high-explosive (Frag-HE). Some cannon systems also have high-explosive antitank (HEAT) projectiles for self-protection. Other common projectiles include some types of ***special ammunition*** found primarily in special weapons platoons:

- Smoke.
- Illuminating.
- Leaflet.
- Concrete-piercing.

Depending on the situation, a variety of ***advanced munitions*** may be available. Among them may be—

- Improved conventional munitions (ICM), including dual-purpose ICM (DPICM).
- Laser-guided projectiles (LGP), including semiactive laser-guided projectiles (SALP).
- Scatterable mines, including antipersonnel scatterable mines (APSM) and antitank scatterable mines (ATSM).
- Terminally homing mortar projectiles (THMP).

[2] The OPFOR recognizes a third category of small-caliber (less than 100-mm) MRLs, but regards these as relatively low in combat effectiveness.

- Sensor-fuzed submunitions (SFSM).
- Flechettes.
- Volumetric explosives (VEX).

Some of these advanced munitions also fall into the category of precision munitions. (See Precision Weapons, later in this chapter.) Some advanced munitions are delivered by a special weapons platoon or duty unit. Artillery systems can also deliver sensors or expendable jammers. When authorized, artillery can deliver nuclear or chemical munitions.

COMMAND AND CONTROL

OPFOR commanders believe in controlling artillery at the highest possible level. This ensures flexibility, maximum effort at the decisive point, and logistics economy. What the highest level is depends on the combat situation. During a penetration, control is normally at the army level. In an attack on a broad frontage against weak opposition, control is at the division level. In pursuit, control may devolve to individual maneuver brigades. In the defense, the army would control a counterpreparation or support for an army counterstrike, while the rest of the defensive action might see the division as the main focus.

Command and Staff Responsibilities

On the staff of maneuver unit commanders at brigade and above, there is an artillery officer responsible for planning and coordinating artillery fires. His title is ***chief of artillery*** (COA) at brigade and division level.[3] At the tactical level, this officer controls, but does not command, the artillery units organic or attached to his maneuver unit.

The commander of the organic or attached artillery unit commands and is directly responsible for the performance of his unit. At maneuver battalion level, the commander of an attached artillery unit is the battalion commander's fire support coordinator. He advises the commander on how best to use available fire support assets.

In combat, artillery groups form the framework for the control of artillery fires in the division. Centralized decisions govern the employment of artillery. Through his COA, the division commander exercises control over all organic and allocated (attached or supporting) artillery within the division. He bases his decision on the recommendations of his COA. The following procedures apply to this process:

- The division commander specifies the artillery organization for combat and the tasks for the artillery.
- The COA conducts and coordinates fire planning. He also coordinates with the intelligence section and the chief of reconnaissance for targeting data.

[3] At army group, army, or corps level, the title is ***chief of missile troops and artillery*** (CMTA). This is due to the presence of missile troops in the SSM units at those levels.

- The division artillery group (DAG) commanders report directly to the COA.
- Brigade artillery group (BRAG) commanders report directly to the supported maneuver brigade commander or his COA, but retain contact with the division COA.
- Commanders of artillery batteries and battalions in an attached status report directly to the commander of the maneuver unit or artillery group to which they are attached.
- Commanders of artillery batteries and battalions in a supporting status keep their supported maneuver commanders informed and report to their controlling artillery headquarters.

Responsibilities of Officers in the Artillery Battalion

The battalion commander (and chief of staff) and the battery commanders bear the responsibility for the organization of stable and secure control and for timely and effective preparation and execution of fire missions. Preparation for combat begins with the battalion or battery commander's receipt of a mission, usually from the senior artillery commander. Information on that mission may come initially in the form of preliminary instructions. The recipient must begin preparation for the mission based on this incomplete information. Later, more complete information in a combat order becomes the basis for more detailed planning.

Figure 7-1 outlines the typical responsibilities and the sequence of actions of officers of an artillery battalion in preparing for combat. Individual steps in this process may not occur in the sequence shown in this example; some steps may not occur at all. Rapidly changing situations on the modern battlefield may limit the time available for preparation for combat. Especially when the artillery unit is already engaged in combat, the commander and staff may have to use a creative approach in preparing for the unit's next mission.

For example, the commander of a supporting artillery battalion may not be able to participate in the commander's reconnaissance of the supported maneuver unit, if he is required to participate in that of his senior artillery commander. If the artillery battalion is already in battle formation and carrying out a mission, its commander may not be able to leave his COP to participate in a senior commander's reconnaissance or conduct his own. If the artillery battalion commander does have time for his own commander's reconnaissance, it includes at least the commanders of batteries assigned to support specific maneuver units. If more time is available, it would include all battery commanders, the battalion intelligence and signal officers, and possibly the battalion chief of staff.

Battalion Commander	Battalion Staff		Battery Commander
	Chief of Staff	Intel Officer	
1.Receive and clarify the mission. 2.Determine measures that must be carried out immediately. 3.Determine sequence of work within available time for preparation. 4.Issue instructions for preparing subordinate units for combat. 5.Assigns tasks of organizing recon of enemy positions to battalion intel officer. 6.Assigns tasks to commander of artillery recon patrol for recon of battalion firing position area. 7.Estimate situation. 8.Make decision. 9.Inform battery commanders and battalion staff of the decision. 10.Receive briefing from commander of artillery recon patrol on selection of firing positions. 11.Receive briefing from intel officer and assign him additional tasks. 12.Task battalion signal officer with organization of communications. 13.Participate in commander's recon of senior artillery commander. 14.Participate in commander's recon of maneuver unit commander. 15.(Conduct own commander's recon with subordinates.) 16.Issue combat order, assign missions. 17.Monitor and assist subordinates in preparing to execute missions. 18.Control subordinates when deploying into battle formation.	1.Participate in clarification of mission and estimate of situation. 2.Plan fire missions 3.Inform subordinate units of missions. 4.Supervise calculation of firing data. 5.Organize and monitor preparation of subordinate units for combat. 6.(Assigns tasks of organizing recon of enemy positions to battalion intel officer.) 7.(Assigns tasks to commander of artillery recon patrol for recon of battalion firing position area.) 8.Receive briefing from intel officer and assign him additional tasks. 9.Update planning based on recon data.	1.Prepare subordinate units to conduct recon. 2.Assess enemy, prepare data for artillery recon mission assignment. 3.Organize and plan artillery reconnaissance. 4.Control artillery recon units and deployment of OPs. 5.Conduct recon, gather and process recon information, 6.Organize coordination with any attached recon unit. 7.Brief battalion commander and chief of staff on recon results. 8.Conduct additional recon. **Signal Officer** 1.Prepare signal units to carry out missions. 2.Plan communications. 3.Assign missions for organizing communications. 4.Supervise measures for organizing communications. 5.Supervise measures for organizing communications in subordinate units.	1.Prepare battery for carrying out missions. 2.Assign personnel and assets for conducting recon of enemy and battery firing positions. 3.Clarify mission. 4.Determine measures that must be carried out immediately. 5.Determine sequence of work within available time for preparation. 6.Assign missions for preparing for combat. 7.Estimate situation. 8.Study terrain and conduct recon of enemy. (This may occur while participating in commander's recon with artillery battalion commander or maneuver unit commander.) 10.Receive combat order and instructions for maintaining coordination. 11.Issue combat order, assign missions. 12.Monitor and assist subordinates in preparing to execute assigned missions.

Figure 7-1. Sequence of actions of officers in an artillery battalion in preparing for combat (example).

Battalion and Battery Commanders

The battalion (battery) commander controls fire from his COP, deployed in the vehicle or on the ground. His responsibilities are to—

- Continuously be aware of the situation, combat strength, location, ammunition supply, and firing capability of subordinate artillery units and reconnaissance means.
- Personally conduct reconnaissance of the enemy and registration of targets.
- Observe the progress of the battle and the results of firing.
- Make and refine decisions for carrying out firing missions.
- Assign fire missions to subordinate units.
- Give commands (signals) for calling down (opening), shifting, and ceasing fire.
- Monitor the execution of fire missions.
- Report to the senior commander on the execution of fire missions, on the opening and shifting of fire against targets, and on the expenditure of ammunition.
- Be prepared, in case it is necessary, to assume by himself the control of the artillery group (battalion) of which the battalion (battery) is part, and take measures for immediate restoration of disrupted command and control (C^2).

Based on his clarification of the mission and estimate of the situation, the battalion commander's decision specifies—

- Any allocation of batteries to support specific maneuver units.
- Fire missions for the batteries.
- Locations of firing position areas and the time and sequence for occupying them.
- The time and sequence for movement during the course of combat.
- Basic measures for comprehensive combat support.
- Organization of C^2 and provisions for reestablishing disrupted control.

There are a number of measures for quick restoration of disrupted C^2. In his combat order, the artillery battalion commander typically designates one of the battery commanders to assume C^2 of the battalion. Thus, there is an established procedure for battery commanders to enter the radio net of the commander of the artillery group or the supported maneuver unit. All battery commanders must be ready to assume C^2 if the battalion COP is put out of action. However, the battery COP farthest from the artillery battalion COP is usually designated to do so. The commander of this battery has the fire plan, radio operating data, and call signs of stations. The battery commander assuming C^2 must notify other battery commanders by a prescribed signal, inform them of the location of his COP, and receive reports on the locations and status of the other batteries.

If C^2 of a battery is disrupted during the course of combat, the artillery battalion commander (or battery commander assuming C^2 of a battalion) immediately takes steps to restore it. He may take direct control of firing platoons whose battery COP is out of action or form a composite battery using remaining COPs and firing platoons.

Battalion Chief of Staff

The battalion chief of staff organizes and participates in the fire control of the battalion. He is in the battalion FDC, normally deployed within the battalion firing position area. His responsibilities are to—

- Continuously be aware of the situation, combat strength, location, ammunition supply, and firing capability of subordinate artillery units and reconnaissance means.
- Be prepared, in the absence of the battalion commander, to make decisions on the conduct of fire missions.
- Plan the execution of fire missions assigned to the battalion.
- Organize the determination of settings for firing and supervise the work of the battalion FDC and of firing units for carrying out the fire missions.
- Monitor the execution of fire missions.
- Supervise calculation of corrections and make adjustments in the course of registration and firing for effect, at the direction of the battalion commander or based on reports of battery commanders.
- Organize communications, ensuring secure control of subordinates with protection against enemy jamming.
- Organize restoration of disrupted C^2.
- Report to the battalion commander and to higher headquarters on preparedness for carrying out missions, the execution of fire missions, and the expenditure and availability of ammunition.

Battalion Intelligence Officer

The battalion intelligence officer (also known as chief of reconnaissance) is responsible for the accuracy and timeliness of determination of coordinates, dimensions of targets, and deviation of bursts from the target for adjusting the fire of the weapons of the battalion. His responsibilities are to—

- Organize and personally conduct reconnaissance, to monitor the accuracy of determining the coordinates and elevation of targets.
- Report to the commander and chief of staff of the battalion the information on the targets derived from reconnaissance, and the disposition of organic and attached reconnaissance means.
- Determine (or receive from attached reconnaissance means) the deviation of bursts from the targets for adjustment of fire.

At battery level, the platoon leader of the control platoon performs these functions.

Battalion Signal Officer

The battalion signal officer (also known as chief of communications) is responsible for—

- Ensuring steady and uninterrupted communications in the battalion.
- Establishing measures for secure C^2.
- Monitoring the receipt and transmission of commands and orders.

At battalion level, he works under the guidance of the chief of staff. At battery level, there is no officer designated as chief of communications.

Battery Senior Officer

The battery senior officer may be the commander of one firing platoon, or a separate officer may perform this role. In either case, he is responsible for preparation of fires and execution of fire missions by the firing platoons, the correctness of determination of settings, and the accuracy of laying of weapons. He has further responsibilities to—

- Be aware of the status of firing units.
- Receive and accurately report commands from the battalion FDC or the battery commander.
- Report in timely manner to the battalion FDC and the battery commander, if necessary, data for the determination of settings and calculation of correction and adjustment.
- Supervise the work of fire direction specialists for determining the settings for firing and report the calculated settings and other data to the battalion FDC and battery commander.
- If necessary (at the direction of the battery commander), supervise calculation of corrections and adjustments in the course of registration and fire for effect.
- Assign missions to the weapon commanders for preparing and carrying out fire missions, and monitor their execution.
- Report to the battalion chief of staff and the battery commander on the readiness of carry out missions, the execution of fire missions, and the expenditure and resupply of ammunition.
- Take stock of the expenditure and availability of ammunition.

Command Relationships

It is standard procedure to augment the organic artillery available to maneuver units at various levels of command by allocating additional artillery. This allocation can result in one of two possible command relationships: the artillery unit can be ***attached*** to the maneuver unit, or it can be assigned as ***supporting*** the maneuver unit. The senior commander may also keep some artillery in a ***standby*** status, directly subordinate to himself, to fire missions in support of his entire unit or missions that arise suddenly.

The senior commander allocating the artillery can change the mission of attached or supporting artillery during the course of combat. However, the period of attachment normally covers the time needed to accomplish a particular tactical mission. This period could vary from a matter of hours to several days.

Attached

An ***attached*** artillery unit is fully subordinated to the lower-level maneuver unit commander, along with his organic artillery. An attached artillery battalion takes its orders from that maneuver commander or his artillery group commander. That commander can even assign its

subordinate batteries to support his subordinate maneuver units. However, it is infrequent for an artillery battery to actually be attached to a maneuver battalion or company. Sometimes an entire artillery regiment or brigade (or major portions of it) can be attached to a subordinate maneuver unit, but at the tactical level attachment is normally by battalions.

In order for an artillery battalion from one level of command to become part of an artillery group at a lower level, it must be allocated in an attached status. If designated as attached, the artillery battalion no longer belongs to the senior commander's artillery group. The fire plan of an attached battalion reflects the specific support of the maneuver unit to which it is attached.

For example, a maneuver brigade commander may attach an artillery battalion to a first-echelon maneuver battalion, particularly during a penetration, deep attack, meeting battle, or some defensive actions. A brigade often attaches an artillery battalion to a maneuver battalion serving as an advance guard. A brigade or division commander may attach an artillery battalion to a maneuver battalion acting as a forward detachment (FD). The maneuver battalion commander gives orders to an attached artillery battalion. He can allocate batteries to support his maneuver companies.

An attached artillery battalion may support both the maneuver battalion and brigade. Although attached to a maneuver battalion, an artillery battalion commander must be aware of missions planned for the senior commander's artillery group in or adjacent to the maneuver battalion's area. For this reason, the senior commander approves the maneuver battalion's fire plan and makes it part of his fire plan. In some cases, the senior maneuver commander or his artillery group commander may still assign fire missions to this artillery battalion.

At crucial moments of a battle, the senior commander may bring attached battalions back under his centralized control, particularly when he needs a larger amount of artillery for carrying out certain fire missions. This usually happens when repelling counterattacks by a superior enemy force, supporting commitment of second-echelon forces, and penetrating densely occupied positions of enemy brigade or division reserves and other positions deep in enemy defenses.

A senior commander normally orders the attachment of artillery for the duration of a particular mission. For example, once a first-echelon unit has accomplished its mission, he can reallocate attached artillery to a second-echelon unit being committed to the battle. After a successful penetration, usually during the exploitation or pursuit phases, a brigade commander can attach battalions originally allocated to the BRAG to leading maneuver battalions. Later, the brigade or BRAG commander could return the artillery battalions to central control, for example to defeat an enemy counterattack.

Supporting

A ***supporting*** artillery unit remains subordinate to the parent artillery unit or artillery group. The parent organization merely delegates the fires of that artillery battalion or battery to support a particular maneuver force. Thus, an artillery battalion assigned to a BRAG could be directed to support a maneuver battalion during the course of a battle or in a particular phase.

The maneuver battalion commander cannot task its batteries separately to support his subordinate companies, even though supporting and supported commanders may be colocated. However, the artillery battalion commander tasked to support a maneuver battalion *can* order one or more of his batteries to support first-echelon maneuver companies.

Through his COA, the division or brigade commander may assign specific artillery units to provide support to designated maneuver units. The supporting artillery carries out tasks assigned by the senior artillery commander and also the tasks assigned by the combined arms commander that it is supporting. If a battalion in the BRAG has no brigade missions, it can fire missions for the battalion that it supports. The fire plan of a supporting battalion reflects the tasks of the parent maneuver force and its artillery group.

In certain phases of a battle, the supporting artillery carries out missions for the supported maneuver unit, but only if the artillery group commander permits or specifically directs the action. The release from centralized control permits the artillery battalion to carry out missions in support of the specific maneuver battalion while remaining subordinate to the BRAG.

Standby

A ***standby*** battalion or battery, like a supporting unit, remains directly subordinate to the senior maneuver or artillery commander. However, it does not have a designated mission of supporting a subordinate maneuver unit. Rather, it stands ready to carry out fire missions in support of the maneuver brigade (or battalion) and missions that arise suddenly.

If a maneuver brigade has not created a BRAG, an artillery battalion can remain directly subordinate to the brigade commander. A battery usually operates as part of an artillery battalion; when not assigned to support a maneuver company or battalion, the battery can be on standby with the artillery battalion commander.

Observation and Fire Direction

The OPFOR uses an extensive system of observation posts (OPs) to provide fire support to the maneuver forces. These OPs are mobile in order to accompany rapidly moving forces. They may be in wheeled or tracked vehicles, or in the air. The configuration depends upon the level of command and the type of units.

After establishing a functional OP, scout observers can construct a dummy OP to confuse the enemy about the actual position of the OP. Figure 7-2 shows an example of the deployment of some of the most common types of OPs discussed below.

Other vehicles serve as fire direction centers (FDCs) and mobile reconnaissance posts (MRPs). Artillery commanders can also send out artillery reconnaissance patrols.

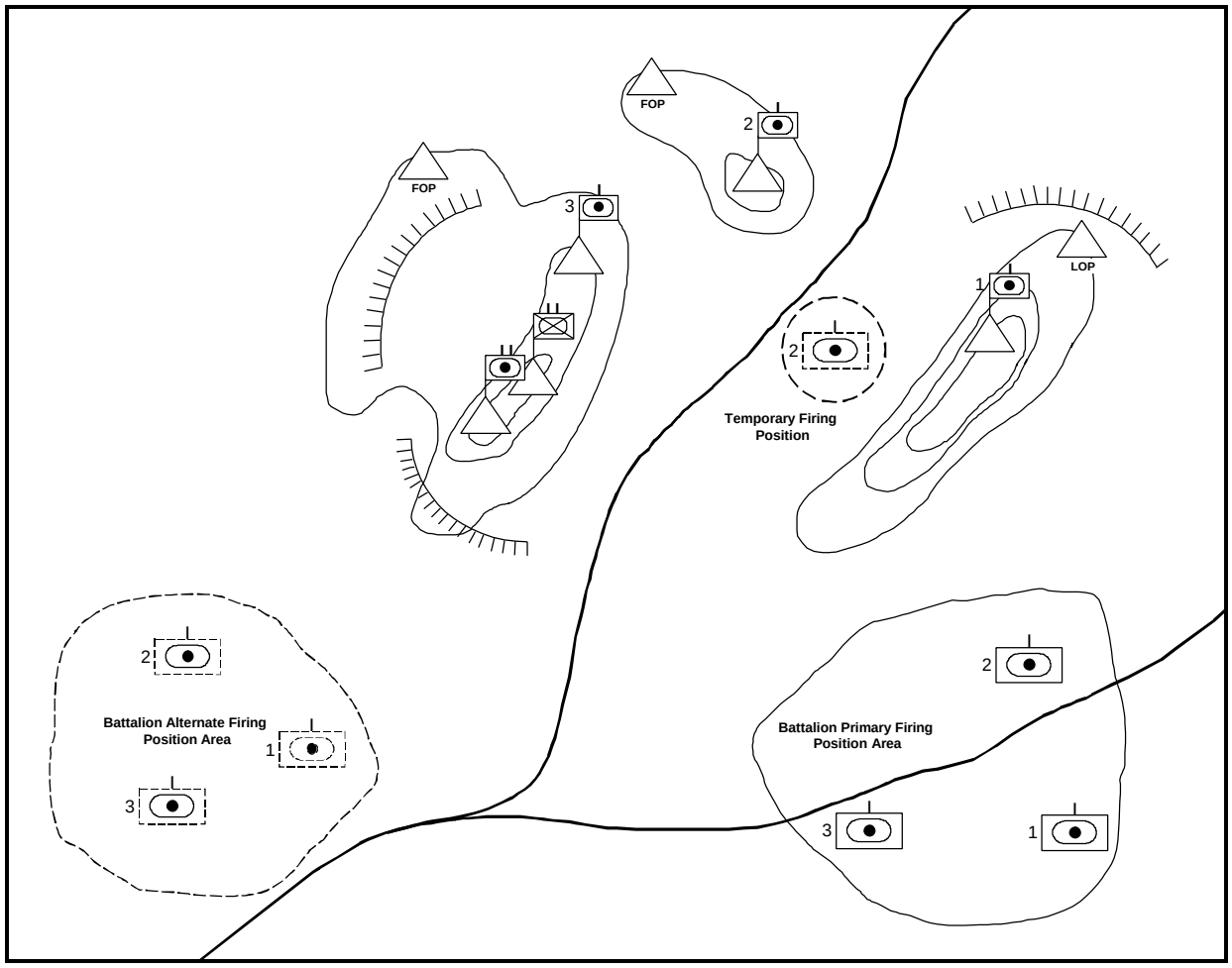


Figure 7-2. Observation posts in the battle formation of an artillery battalion.

Command Observation Posts

In artillery battalions and batteries, the command observation post (COP) serves as both an OP and command post (CP).[4] From it, the artillery commander—

- Controls the fire and maneuver of his subordinates.
- Conducts reconnaissance of the enemy and terrain in his zone or sector of fire.
- Observes the actions of friendly combined arms units and maintains coordination with them.

Since the artillery battalion is the basic firing unit, its COP is the place where decisions are made and from which orders stem.

[4] An artillery regiment/brigade or an artillery group can have a COP, sometimes called a forward CP. It can also have other types of OPs. Although these observers could adjust fire on selected targets, they normally pass target information to subordinate battalions for engagement.

The battalion COP normally contains the battalion commander, intelligence officer, and signal officer.[5] The battery COP normally includes the battery commander and the control platoon leader (who is responsible for reconnaissance and signal functions).[6] In addition to these officers, COPs at both battalion and battery level include fire direction, communications, and reconnaissance personnel. In either case, these personnel can operate the COP either on the ground or mounted in an ACRV.

In most cases, the commander of an attached or supporting artillery unit colocates his COP with the COP or forward CP of the maneuver unit commander to which the artillery unit is attached or which it is supporting, or at least locates it near that COP. From that position, both the maneuver and artillery commanders should be able to observe the zone of responsibility or sector of fire. When the artillery unit is neither attached nor supporting, but remains directly subordinate to the senior maneuver or artillery group commander, its COP is positioned near that commander's CP or COP.

Other OPs and artillery reconnaissance patrols send reconnaissance data to the COP. The artillery commander determines which targets are to be engaged, and the COP relays target data to the firing position.

Fire Direction Centers

In addition to a COP, both battalions and batteries have FDCs at the firing position. The FDC contains the artillery battalion chief of staff or the battery senior officer, plus fire direction specialists and communications personnel. The COP and the FDC may conduct fire direction computations simultaneously. However, the battalion FDC has primary responsibility for obtaining and processing meteorological and survey data and determining firing data using computers and backup instruments. A battery FDC may receive fully computed firing data from the battalion FDC. Like the COPs, FDCs are mounted in tracked or wheeled ACRVs.

Forward Observation Posts

Artillery commanders can establish one or more forward observation posts (FOPs) to supplement the COP. The purpose of the FOP is to conduct reconnaissance of the enemy and observe the terrain directly in front of the forward maneuver units. It can locate and adjust fires against targets that the COP is not in a position to observe. It also assures continuous close fire support for the maneuver forces when the COP is displacing. An FOP may be with the supported unit commander or with one of the advance maneuver elements. This enables it to maintain closer communication and coordination with supported maneuver forces.

At the battalion and battery levels, the FOPs often contain the battalion intelligence officer (or the battery's control platoon leader), a scout, and a radio operator. The FOP can deploy on

[5] Depending on the type of combat action, the signal officer may be part of the battalion FDC, rather than the COP.

[6] Depending on the type of combat action, the platoon leader of the control platoon may be part of the battery FDC, rather than the COP.

foot or mounted in an MRP vehicle that has a battlefield surveillance radar, as well as observation and rangefinding equipment.

Lateral Observation Posts

An artillery commander may establish a lateral observation post (LOP) to cover areas not observable from the COP or FOPs. The LOP is usually on the flank of the supported unit and should have a good view of the artillery unit's zone of responsibility. An LOP can work with a COP or FOP to conduct bilateral observation of a target area for improved accuracy. At battalion level and higher artillery echelons, the LOP accurately locates targets, reference and registration points, and can adjust fire. The artillery unit or the division's artillery regiment may send reconnaissance and communications personnel to form the LOP. The LOP can deploy on foot or in a vehicle, such as an MRP. An LOP is generally smaller that a COP, manned by two to three reconnaissance specialists who communicate back to the COP.

Aerial Observation Posts

The artillery commander may use an aerial observation post (AOP) to supplement FOPs and LOPs. The AOP is generally established to cover rapidly moving forces in areas larger than can be covered by a ground OP. The AOP is especially effective during heliborne assaults or a pursuit.

Mobile Reconnaissance Posts

An ***MRP*** is an armored, tracked vehicle with a battlefield surveillance radar and other observation and rangefinding equipment. This vehicle is designed to operate near—or even across—the forward edge of friendly troops. It has a data transmission system for passing target information and fire missions directly to associated FDCs. There is typically one of these vehicles per artillery battalion, one in the artillery regiment's headquarters, and one in its target acquisition battery. However, the regiment typically uses an MRP to support its own COP. At battalion level, an MRP may function as an FOP or LOP. However, it can also remain near the COP in a forward position or within the artillery battalion firing position area. The artillery regiment or battalion commander designates the position and the sector of observation for the MRP.

In the offense, the MRP may advance closely behind or within lead mechanized infantry or tank units. It can conduct reconnaissance and fire missions on the move or during short halts. During a march, the MRP can move as part of an artillery reconnaissance patrol in the forward security element (FSE) of the supported mechanized infantry or tank unit. This single vehicle can perform reconnaissance and adjust artillery fire on targets while located with these units. In the defense, MRPs may form part of the combat outposts in the forward security zone. In either offense or defense, an artillery reconnaissance patrol can also set up an FOP behind enemy lines to adjust artillery fire and to report on enemy organization and deployment. Its primary mission is to locate enemy artillery units.

Artillery Reconnaissance Patrols

An artillery reconnaissance patrol is an ad hoc group that can have different missions. When sent out by an artillery unit (battalion or regiment) or artillery group, it typically conducts reconnaissance of the terrain in order to find possible firing positions or sites for COPs and routes of movement to them. When sent out by a target acquisition unit, it can have a target acquisition mission. It can also have a mission of artillery spotting and adjustment of fire. The patrol may include staff officers or commanders of subordinate artillery firing units (or target acquisition units), along with engineer, NBC reconnaissance, survey, and signal personnel. A patrol with a target acquisition mission may use an MRP or another type of vehicle.

In a meeting battle or other march situations, an artillery reconnaissance patrol may march as part of an FD or advance guard that is reinforced with artillery. Such a patrol, or a smaller artillery reconnaissance squad, may accompany an FSE, especially one that is reinforced by an artillery battery. During the march, the artillery reconnaissance mission is to perform route reconnaissance. When encountering an enemy force, the artillery reconnaissance patrol or squad seeks to determine the size, composition, and intentions of the enemy force and the locations of his supporting artillery weapons. When the maneuver element begins to deploy for combat, the artillery reconnaissance element selects firing positions and sites for COPs and other OPs.

In the defense, an artillery reconnaissance patrol can be assigned to the combat reconnaissance patrol of a maneuver battalion operating in the security zone. In this case, its mission is to reconnoiter the approaching enemy and observe the results of artillery battalion or battery fire on distant approaches. Within the main defensive zone, an artillery battalion typically uses an artillery reconnaissance patrol for reconnaissance, survey, and perhaps engineer preparation of new firing positions when relocating to alternate or temporary firing positions.

ORGANIZATION FOR COMBAT

Combined arms theory calls for artillery support to brigade- and division-size battles that typically exceeds the capabilities of organic artillery resources. Therefore, the OPFOR uses a combination of organic and allocated artillery to form artillery groups created by decision of the senior combined arms commander. Numerous longer-range cannon artillery and MRL battalions from army group, army, corps, and division provide massive reinforcing fires when required.

Allocation Procedures

Fire planners use established norms to calculate artillery requirements in terms of weapons and rounds needed to produce a required effect on enemy targets. Based on these calculations, a higher headquarters allocates artillery to a maneuver force to execute that subordinate's mission in a given operation or battle. For example—

- Army group, army, and corps normally allocate artillery battalions to subordinate armies, corps, and divisions according to the importance of the subordinates' missions; subordinates executing the main effort receive the most artillery.

- The army may temporarily attach second-echelon divisional artillery to first-echelon divisions.
- A division can allocate some of its organic and attached artillery to its first-echelon brigades.
- A brigade can allocate artillery to leading maneuver battalions.
- The brigade(s) in a division's second echelon normally retain their organic artillery.

Second-echelon divisions, brigades, and battalions normally do not receive reinforcement with additional artillery until they are committed.

Figure 7-3 illustrates how of various artillery assets might deploy within the area of responsibility of a division's first-echelon brigades. Most of these assets become part of artillery groups. This example labels each artillery battalion according to the group of which it is a part. One label indicates an artillery battalion attached to a maneuver battalion; that battalion is not part of an artillery group during the period of that attachment. Without such labels, it would be difficult to tell a battalion's subordination. Moreover, its subordination could very well change during the course of a battle, without the battalion's having to physically relocate.

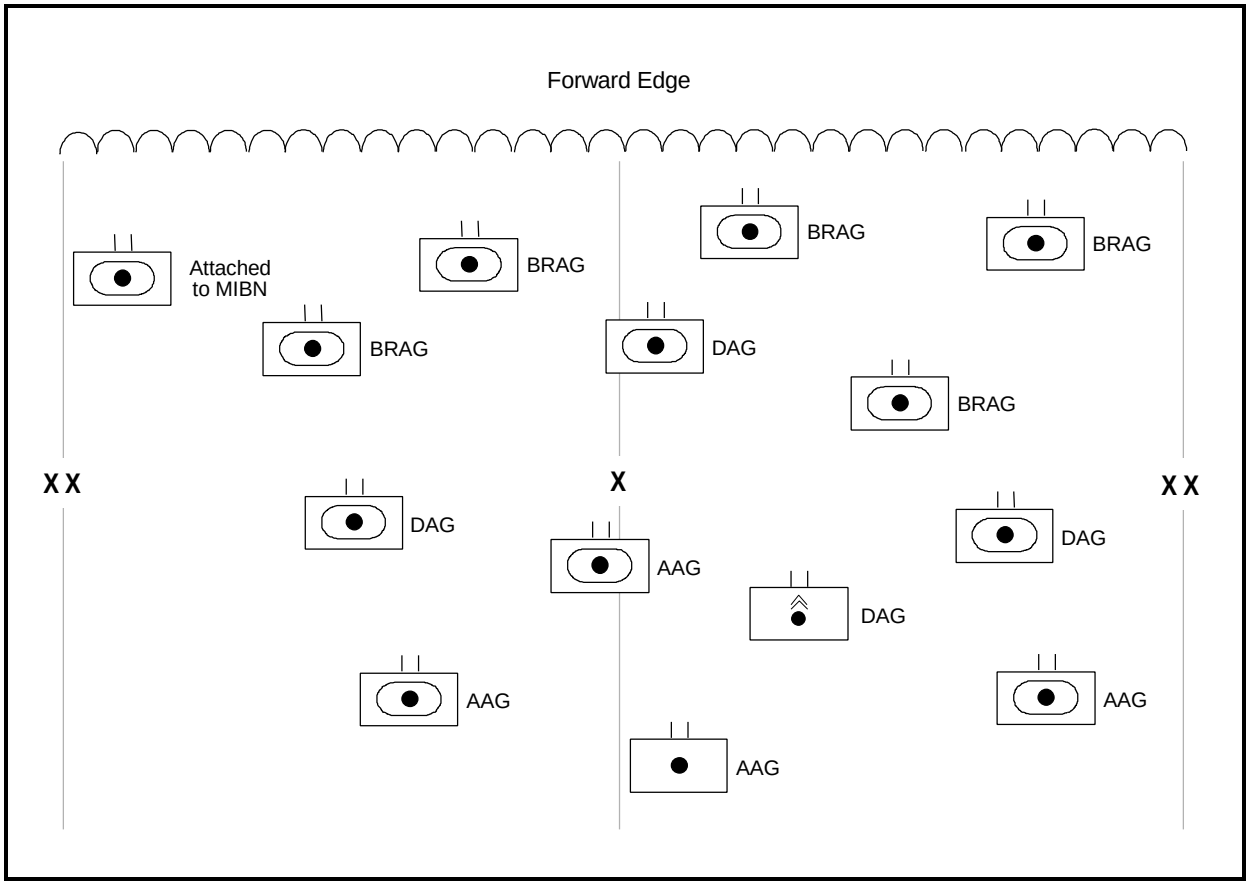


Figure 7-3. Deployment of artillery assets (example).

Artillery Groups

The OPFOR forms temporary, mission-oriented groupings to ensure flexibility in concentrating artillery fire. Army, corps, division, and brigade artillery groups provide continuous artillery support to maneuver commanders and allow the required degree of centralized control. The strength of artillery groupings depends on the mission of the supported unit, the strength of the enemy, and the importance of the axis. The guiding principle is the achievement of maximum concentration on the decisive axis. Artillery groups usually consist of a least two battalions of similar or mixed-type units: field guns, gun-howitzers, howitzers, and MRLs. Figure 7-4 illustrates how the OPFOR forms artillery groups.

Employment of the artillery battalion in the group depends on—

- The commander's concept of the upcoming battle.
- The battalion's organizational affiliation.
- The type (towed or SP) and caliber of its weapons.
- The battalion's combat capabilities.

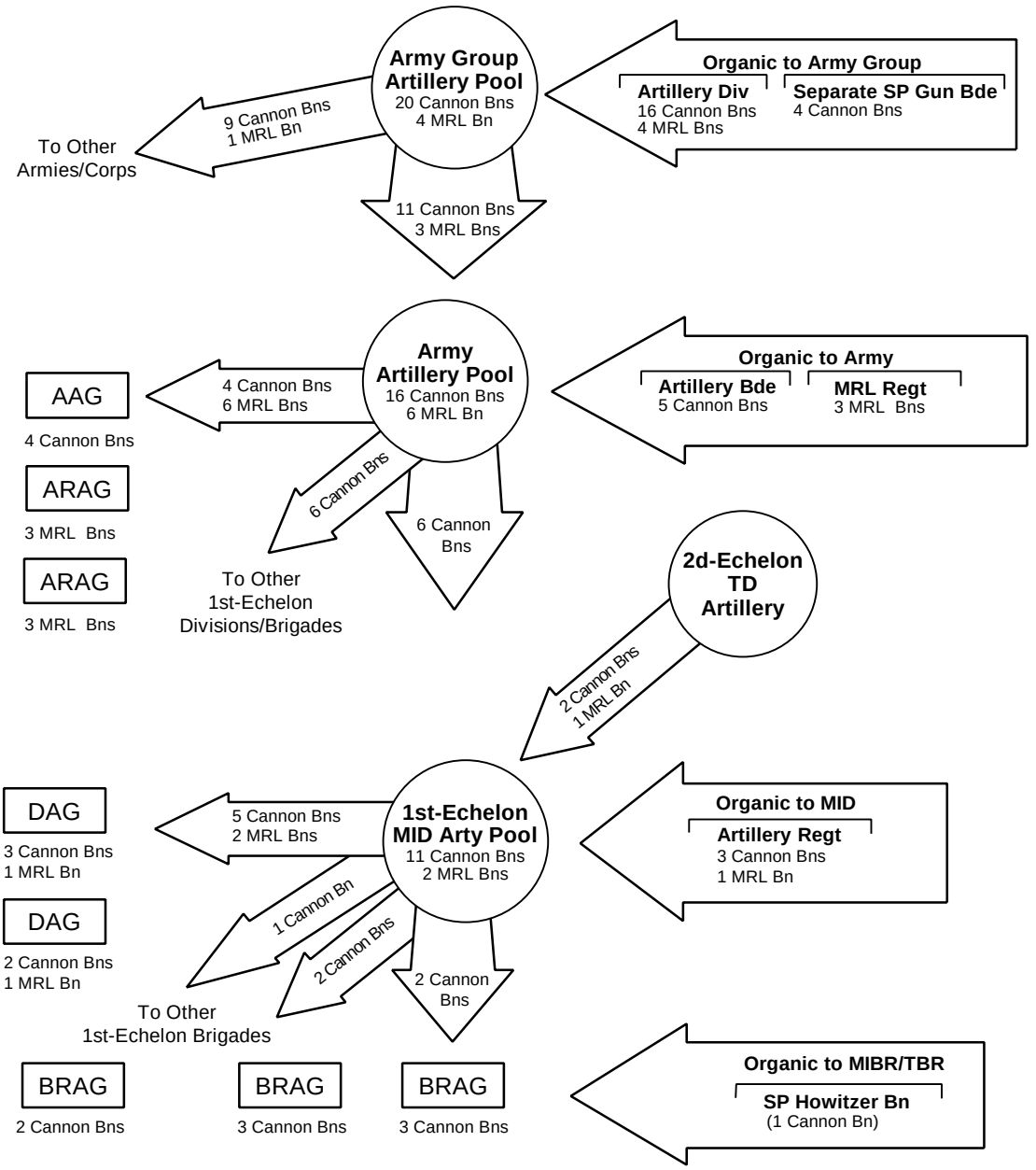
As part of an artillery group at a given level of command, an artillery battalion can *support* a subordinate combined arms unit or remain on *standby* with the artillery group commander.

As higher headquarters allocate artillery battalions to subordinates, they also pass down target acquisition batteries or battalions to support them in the artillery groups being formed. If the higher headquarters allocates all or most of an artillery brigade or regiment to an artillery group, it may also allocate downward that brigade's or regiment's headquarters element, which would no longer be needed at the level to which it was organic.

The maneuver commander positions the groups' assets to support his concept of maneuver. He seeks to achieve the required densities of fire without sacrificing the mobility artillery units need to survive and perform their missions. Therefore, the various artillery battalions that make up artillery groups do not physically concentrate in one small area. All that is necessary is that they be within range of the targets or areas on which they are to mass their fires. These groupings are C^2 relationships and do not imply close positioning.[7]

While close positioning may be necessary to achieve desired effects, artillery groups disperse as much as possible to avoid becoming a target for enemy precision weapons, air attack, and counterfire. Also, one or more of the group's artillery battalions may have a mission of firing in support of a particular subordinate of the maneuver unit. Thus, it might need to be in the vicinity of that subordinate.

[7] On maps and diagrams, artillery groups often appear as "goose eggs" for the sake of convenience. However, this does not mean that all battalions assigned to a group are physically located in such a small area.



The distribution of artillery battalions shown above is only an example. Actual allocation patterns depend on the situation and the mission of the receiving organization. In this example, the army illustrated is in the army group's main attack. The mechanized infantry division is in the army's main attack, and the two brigades on the right are the division's main attack. It is not necessary that all second-echelon divisions give up artillery assets to reinforce first-echelon divisions; this is only an option the army or corps commander could use.

Figure 7-4. Formation of artillery groups (example).

A designated commander and staff provide C^2 for the artillery group. This is usually the commander and staff of the artillery brigade, regiment, or battalion that forms the core of the group, regardless of whether or not that artillery unit was organic to the maneuver unit. The commander and staff of the organic artillery regiment or battalion usually form the core of the group's C^2 element. This arrangement takes advantage of the habitual relationship between that artillery commander and his division or brigade commander. When the bulk of the artillery group constitutes assets of an artillery brigade or regiment allocated from higher level, that artillery unit may bring with it its own headquarters element, which would then serve as the group's C^2 element. In that case, there would be an advantage in the habitual relationship between the artillery commander and the artillery battalions in the group.

Army Artillery Group

The army commander forms the army artillery group (AAG) from army group assets allocated to an army and the army's own assets, less any allocated to divisions. The army group commander usually distributes army group artillery assets to committed armies according to the importance of assigned tasks. When an army commander receives army group artillery assets, he decides which artillery he will allocate to his first-echelon divisions. He bases his decision on the concept of the operation. The division executing the major army mission receives the most artillery.

The AAG comprises largely the longer-range systems. Its primary tasks are counterbattery fire and the engagement of deep targets such as NBC or precision weapons, headquarters, air defenses, and reserves. It can also maneuver concentrations of fire to support main-axis divisions.

An army could have four to eight battalions of cannon artillery with which to form one or two AAGs.[8] If the number is closer to four battalions, the army would form one AAG; with closer to eight, it is probable that an army would form subgroups or two AAGs. The latter may be necessary to support more than one division or to perform more than one mission (for example, divisional support, counterbattery, or demolition of fortifications). The OPFOR might not form an AAG in fluid operations or if the army has a wide frontage.

Army Rocket Artillery Group

An army would not normally allocate the MRLs of its organic MRL regiment to its subordinate divisions.[9] With these and additional MRL battalions possibly allocated to the army from an army group-level MRL brigade or regiment, the army commander would form an army rocket artillery group (ARAG).[10] The three to seven battalions in the ARAG do not include any SSM units. With closer to seven battalions, an army might form two ARAGs. An ARAG normally

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[8] A corps would form a ***corps artillery group (CAG)*** to serve the same function, but on a smaller scale. It might comprise from four to six battalions and include the corps' organic MRL battalion.

[9] An army group would normally allocate most of its MRL assets to subordinate armies or corps. However, it may retain some MRLs for its own use, probably as part of a reconnaissance-strike complex.

[10] If a corps has two or more MRL battalions (organic or allocated from army group), it might form a ***corps rocket artillery group (CRAG)***. Otherwise, MRLs would be part of the CAG.

fires under centralized control in support of the army's main effort. However, it could also conduct rapid maneuver to any axis, as required, to inflict losses on main enemy groupings.

Division Artillery Group

A first-echelon division, particularly one on the main axis, would receive additional artillery. The parent army or corps may take these reinforcements from its organic artillery, assets allocated from army group, or units taken temporarily from its second-echelon or reserve divisions. The division commander allocates some units from this attached artillery or the division's organic regiment, less any units he allocates to brigades, to form a DAG.[11]

The DAG can vary in size from two to four battalions. The division may organize more than one DAG, if necessary, due to span of control, number of battalions available, and assigned missions. With as many as six to eight battalions, a division would normally form two DAGs. A DAG's mission is to provide supporting fires for the division. It assists the army or corps with the counterbattery mission; when possible, it may perform this mission itself.

Brigade Artillery Group

BRAGs provide fire support to first-echelon maneuver brigades and battalions. A division commander can also form strong BRAGs in a brigade performing an independent mission, such as a pursuit or FD. Likewise, an operational-level commander could allocate additional resources to form a BRAG in a separate brigade or any brigade performing an independent mission for him, such as an FD.

A BRAG includes artillery battalions attached from divisional or nondivisional artillery units. The brigade's organic howitzer battalion(s) would be part of the BRAG, unless attached to a maneuver battalion. Normally, BRAGs have two to four artillery battalions. The BRAG destroys targets that hinder the advance of the attacking forces or supports the defense of the brigade. After artillery preparation and a successful penetration, battalions of the BRAG may be directly subordinated to leading maneuver battalions. Even so, the commander of the BRAG is able to bring the artillery battalions back under his control, if necessary.

The maneuver brigade commander, or his COA, may designate one or more battalions in the BRAG as *supporting* artillery for first-echelon maneuver battalion(s). However, if he *attaches* an artillery battalion to a maneuver battalion, it ceases to be part of the BRAG.

Regrouping

Where possible, commanders meet changing situations by the maneuver of fire from one axis to another. As the situation becomes more fluid, artillery groupings change in line with the nature of combat and the strengths of supported groupings. Artillery groups established for the defense normally remain intact until the offense resumes.

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[11] If a first-echelon division temporarily receives artillery assets from a second-echelon division, it would typically use them in a DAG rather that further allocating them to a subordinate brigade. This would facilitate the eventual return of these assets to their parent division when it is committed.

Groups formed for the offense are often dissolved or reorganized when the supported maneuver units enter the exploitation or pursuit phase. The centralization of logistics support at army group, army, and corps levels makes substantial regroupings relatively quick and easy.

Higher headquarters forms or dissolves DAGs and BRAGs in accordance with plans and the tempo of operations. The OPFOR normally releases BRAGs from firing preparation targets first, then releases the DAGs. When higher headquarters dissolves these groups, army group and army assets may revert to centralized control. Thus they can provide long-range reinforcement for divisional and brigade artillery.

Reconnaissance-Fire Complex

The same types of artillery assets normally found in artillery groups may also act as part of a tactical-level ***reconnaissance-fire complex (RFC)***.[12] The RFC integrates reconnaissance and target acquisition, fire control, and weapon systems into a closed-loop, automated strike system that detects, identifies, and destroys critical targets in minutes. One reason for this requirement for accelerated engagement is that high-value targets may expose themselves for only fleeting periods. As with artillery groups, the assets assigned to an RFC are organizationally and functionally interconnected only for the duration of the RFC mission and do not necessarily have to be colocated.

Normally, the tactical-level commander designates specific reconnaissance, C^2, and fire support assets to conduct the RFC. This type of arrangement allows the assets to remain silent or concealed until the desired high-priority targets are detected in the RFC target area. However, it is more likely that OPFOR commanders would establish a window of time (based on a reconnaissance assessment of when the enemy targets should be in the designated target area) for assets tasked to support the RFC. Thus, the designated RFC assets can execute other missions or taskings prior to executing the RFC.

The RFC system enables the OPFOR to deliver artillery fires (including precision munitions) on enemy targets in real time or near-real time. The OPFOR can use RFCs in offensive and defensive phases of combat. The size of the target area, the objectives to be achieved, and the forces available will determine the number and types of RFCs formed. Assets designated for RFC use are under control of tactical-level commanders, and control remains centralized for planning, analysis and evaluation of reconnaissance data, and execution of the RFC mission.

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[12] Operational commanders can use aircraft, SSMs, cannon artillery, and MRLs under their control as a ***reconnaissance-strike complex (RSC)*** for operational missions similar to those of a tactical-level RFC. A collective term that includes both RSCs and RFCs is ***reconnaissance destruction complexes***.

Reconnaissance and Target Acquisition

The RFC employs a target acquisition system or multiple systems capable of detecting and determining the location of specific type(s) of target assigned to the RFC. To locate critical enemy systems and complexes, the OPFOR may use—

- UAV (drone and RPV) systems.
- Battlefield surveillance radars.
- Weapon-locating radars.
- Sound-ranging systems.
- Ground-based signals reconnaissance systems.
- Brigade and division reconnaissance troops.

Fire Control

The RFC is a closed-loop system with direct communications links between reconnaissance assets and fire support systems to support real-time or near real-time targeting. The OPFOR employs a fire control system capable of providing automated and non-automated control of designated fire support systems. Once firing begins, the reconnaissance unit observes the results and controls any additional fires necessary to destroy the target.

Fire Support Assets

Using targeting criteria established during the planning process, fire support systems automatically (or semiautomatically) deliver fires against critical targets upon detection. The OPFOR may use MRLs or cannon artillery (with standard conventional munitions, precision munitions, or other advanced conventional munitions) during the execution of the RFC.[13] For targets detected on the move, the RFC might use artillery-delivered scatterable mines to fix the target in place and then engage it with precision weapons or other advanced conventional munitions.

When reconnaissance and target acquisition assets locate critical targets that take precedence over artillery group missions, predesignated fire assets come under the control of the RFC until they complete their engagement of those critical targets. Only on completion of the RFC mission do these assets revert to control of their parent units or the artillery groups to which they had been allocated.

Targets

An RFC may engage moving or stationary targets. These targets include—

- Precision weapons.
- NBC delivery systems.

[13] The RFC can also include tactical aircraft and attack helicopters, if an operational-level commander allocates those assets to support a division. However, attack helicopters would not operate outside of an air defense umbrella.

- Long-range conventional artillery weapon systems and MRLs.

- C^4I facilities.
- Weapon guidance systems.
- Air defense assets.
- Helicopter forward arming and refueling points (FARPs).
- Specified maneuver units.

The OPFOR wants to neutralize enemy equivalents of the RFC to maximize its own offensive or defensive capabilities.

Engagement Time

Recent technological advances in target acquisition and fire control systems provide the OPFOR with a capability to rapidly disseminate information on suspected enemy targets within one minute or less. This includes from time of acquisition to computation by a fire direction center and the initial transmission of data to a firing battery. Under favorable conditions, the first artillery round may be on target within 2 to 4 minutes of acquisition. The desired identify-destroy cycle should not last any longer than 6 to 10 minutes. In essence, the RFC allows the detection and simultaneous attack and destruction of a target in near real time.

FIRE PLANNING

Fire planning is the determination of the content, manner, and sequence of delivery of fire on the enemy in a battle or operation. It includes consideration of the following:

- The scheme of maneuver of the supported forces.
- The enemy force to receive fire.
- The location and character of individual targets within the designated enemy force.
- The required or desired level of target damage.
- Phases of integrated fire support.
- Fire support assets available, both delivery systems and ordnance.
- Requirements for allocation of weapons and units (organization for combat)
- Missions assigned to artillery groups, units, and weapons.
- The manner and procedure of delivery of fire during the performance of missions.
- Requirements and distribution of ammunition by missions and phases of fire.
- Organization of coordination and C^2.
- Preparation of appropriately detailed fire plans at various levels.

In the OPFOR's "top-down" approach to the planning and allocation of artillery support, fire planning occurs at the highest level possible. The CMTA at the operational level or the COA at division or brigade level plan and coordinate artillery support, always under the direction of the maneuver commander. The highest level of participating units coordinates and approves the fire plan, with input from subordinate units. Army group, army, and corps headquarters perform general fire planning. Detailed planning occurs in maneuver divisions and brigades, artillery groups, and artillery battalions. The fires of all artillery units within a division are incorporated into the division fire plan. In turn, division fire plans become part of army/corps and army group fire plans.

In its simplest form, fire planning is the process of determining the best way to engage all of the enemy's units with fires—ensuring that the required level of damage is inflicted in a manner consistent with the commander's concept of the battle. Above all else, this means that the fire plan must match his concept for the sequence with which the battle will develop. The focus of fire planning is on establishing and maintaining fire superiority over the enemy. Therefore, timing is critical.

Estimate of Situation

The planning process begins with an estimate of the situation. This estimate includes the following:

- Scheme of maneuver of supported forces.
- Locations and type of enemy targets.
- Required level of damage.
- Delivery means and ordnance available.

For more detail, see Fire Planning under March, Offense, and Defense later in this chapter.

The division commander, his COA, and other staff members establish the basis for division artillery fire planning during the commander's reconnaissance of the area of anticipated action. During this reconnaissance, the commander refines the organization for combat and means of coordination. The maneuver commander gives the artillery representative the information base to determine the following:

- Targets for artillery to fire upon.
- Priority of each target.
- Sequence in which to attack targets.
- Time to attack each target.

The artillery commander at each level coordinates the fires under his control. He determines new requirements and missions and, with the COA, makes suggestions to the maneuver commander about adjustments in tactical organization as the situation develops.

Fire Support Coordination Measures

Fires from mortars, cannon artillery, MRLs, and SSMs pose a potential hazard to friendly maneuver forces and aircraft activities. The highest probability of conflict between aircraft and indirect fire weapons occurs at relatively low altitudes in the immediate vicinity of firing positions and targeted areas. (See Chapter 9, for more information on air and artillery coordination measures.) To reduce potential conflicts between indirect fires and maneuver forces or aircraft, information pertaining to firing positions, targeted areas, and fire support plans are distributed to commanders and their staffs. The fire plan includes a map with graphics outlining the following control lines:

- **Lines of deployment.** Denotes the position where the brigade deploys into battalion columns, battalions into company columns, and companies into individual platoon columns. The artillery preparation for the attack is usually timed to begin as the attacking force reaches the line of deployment into battalion columns.

- **Assault line.** Denotes the position where platoons deploy into battle formation. The shift from fire preparation to fire support of the attack occurs when the supported maneuver unit reaches this line.
- **Safety line.** Denotes the fragmentation footprint of artillery munitions or bombs/rockets released from aircraft. This indicates the minimum distance between the impact area and the forward edge of friendly troops.
- **Final coordination line.** Can be used to prohibit fires or the effects of fires across the line without coordination with the affected force. For example, this line may be used during link-up operations between an airborne or heliborne insertion and converging ground forces.
- **Dismount line.** Denotes the point at which troops disembark from vehicles prior to an attack.
- **Line of commitment.** Designates the planned line for commitment of a second-echelon force or combined arms reserves (CAR) in the offense or during a counterattack.
- **Phases of fire.** Indicates where (and when) each phase of fire should begin, if combat actions proceed as expected.
- **Mission lines.** Denote the immediate and subsequent missions of the supported maneuver unit.

Assigning Fire Missions

When assigning missions, artillery commanders and fire planners use certain ***norms*** as planning tools. Based on study of past wars and of improvements in weapon systems, the OPFOR has established norms for achieving different effects on targets with artillery fire. There are norms for—

- Target damage criteria.
- Ammunition expenditure.
- Area coverage.
- Density of fire over time.

When applying these norms, planners consider several variables, depending on the situation. The norms can change as any one or more of the variables change. These variables include—

- Type of target (for example, equipment or personnel, deliberate or hasty defensive positions, hard- or soft-skinned vehicles, point or area targets).
- Deployment of target (dug-in or in the open).
- Whether the target is stationary or moving.
- Whether the target is under direct observation during the artillery attack.
- Range to the target.
- Type, caliber, and number of weapons engaging the target.
- Types of ammunition available.
- Time available to prepare for firing.

Standard tables of norms include normative values for the most common of these variables. For other variables, fire planers must look up the norm for standard conditions and perform a calculation to determine the value for the variable.

Target Damage Criteria

Target damage is the effect of fires on a given military target. It results in total, partial, or temporary loss of the target's combat effectiveness. The OPFOR categories of target damage are as follows: annihilation, demolition, neutralization, and harassment.[14] Of these categories, the first three fall under the general term ***destruction***. When ordered to inflict a specific level of damage on a target, the artillery commander refers to tables of norms to find out how much ammunition to expend.

Annihilation. ***Annihilation*** fires render targets completely combat-ineffective and incapable of reconstitution or token resistance. For a point target such as an ATGM launcher, the OPFOR expends enough rounds to assure a 70 to 90 percent probability of kill. For area targets such as platoon strongpoints or artillery batteries, the OPFOR fires enough rounds to destroy 50 to 60 percent of the targets within the group. These fires result in the group ceasing to exist as a viable fighting force.

Annihilation is costly in ammunition, requiring three or more times the expenditure involved in neutralization of a target. Because of this, the OPFOR rarely uses annihilation except against high-value targets such as nuclear weapons and elements of precision deep-strike systems.

Demolition. The OPFOR uses the term ***demolition*** in reference to making engineer works such as fortifications, bridges, and roads unfit for further use. Demolition requires enough rounds to damage the target so that it cannot be reconstituted without a significant expenditure of time and resources and is capable of only sporadic and uncoordinated resistance.

Neutralization. Fire for ***neutralization*** inflicts enough losses on a target to—

- Cause it to temporarily lose its combat effectiveness, or
- Restrict or prohibit its maneuver, or
- Disrupt its C^2 capability.

To achieve neutralization, artillery delivers enough rounds to destroy 30 percent of a group of unobserved targets. The expectation is that the target is severely damaged but could again become capable of coordinated resistance after the fire is lifted.

Harassment. The OPFOR uses a limited number of artillery pieces and rounds within a prescribed time to deliver sporadic ***harassment*** fires. The goal of these fires is to put psychological pressure on enemy personnel in locations such as defensive positions, assembly areas, CPs, and logistics installations. Successful harassment fires impede troop movement in the open, lower morale, and interrupt rest. All these effects weaken enemy combat readiness.

[14] The use of precision weapons may render such target damage criteria obsolete, since precision weapons are always supposed to "annihilate" the targets completely, not just destroy a certain percentage of them.

Firing platoons or batteries normally conduct harassing fire from temporary firing positions or positions previously occupied by a larger artillery force. They normally alternate rapid fire with systematic fire.

Ammunition Expenditure

When making his decision and issuing combat orders, the artillery unit commander allocates missions by specifying the targets for destruction and the ammunition expenditure required to achieve the required degree of target damage. He may state the expenditure of ammunition in organizational UOFs (or parts of UOFs), in norms (or parts of norms), or in quantity of rounds per target, per artillery unit, or per artillery piece.

Organizational units of fire (partial UOFs). At brigade level and above, the senior commander's combat order or fire plan often specifies ammunition expenditure in organizational units of fire (or fractions of UOFs). See Chapter 15 and Logistics in the Tactical Employment section of this chapter for an explanation of UOF. For example, a BRAG commander could inform the commander of a subordinate artillery battalion of the planned ammunition expenditure for a defensive battle as shown in Figure 7-5. This reflects the BRAG commander's assessment of the amount of ammunition he can make available to that battalion for the planned period.[15] In this case, it includes not only the four phases of defensive fire support, but also participation in a preceding counterpreparation. Sometimes, a BRAG commander would express ammunition expenditure for each phase as UOFs, but for specific missions within each phase as a number of rounds.

Mission	UOFs
Counterpreparatory Fire	0.2
Fire Interdiction	0.3
Fire to Repel Enemy Attack	0.7
Fire Support of Defending Troops	0.7
Fire Destruction of Enemy During Counterattack	0.5
Total	**2.4**

Figure 7-5. Ammunition expenditure for defense (example).

To prepare for more detailed fire planning, the artillery battalion commander (or his chief of staff) must convert the ammunition expenditure from battalion UOFs into rounds. To do so, he multiplies them by the number of rounds in the weapon UOF and then by the quantity of weapons in the battalion and gets the ammunition expenditure in rounds per battalion. The battalion commander normally communicates missions to his subordinate batteries with ammunition expenditure expressed in rounds per battery per target.

[15] Whenever possible, the senior commander makes available enough additional ammunition that the firing unit does not expend its own mobile stocks.

Norms (partial norms). The senior commander's combat order can specify ammunition expenditure in terms of target damage norms (or partial norms). The target damage norms for annihilation and neutralization relate directly to the percentage of destruction required. Standard tables of ammunition expenditure norms show the amount of ammunition normally required to achieve the desired degree of destruction in given circumstances. (See examples of such tables later in this chapter.)

Most ammunition expenditure norms estimate the number of rounds required to either annihilate or neutralize a particular target type. Unless otherwise stated, the norms are for Frag-HE rounds with TNT fill and point-detonating fuzes. The norms depend on whether the target is observed or unobserved, moving or stationary. There are also differences in norms for fire assaults and accompanying fires.

When a combat order gives the mission of neutralizing a target, it may also direct the expenditure of only ***part*** of the norm for neutralization, expressed as a percentage or fraction. For example, the order could state that ammunition expenditure is three-fourths, half, or one-fourth of the norm. This reduction can be due to various factors, including the availability of ammunition, the relative importance of the target, or the time available for firing. Other conditions may dictate an increase in the norm to a ***multiple*** of its tabular value.

Given such an order, the artillery battalion commander (or his chief of staff) consults a standard table to determine the general ammunition expenditure norm for the type of target and the caliber of projectiles used. To correspond to the specific conditions, he may have to perform calculations that adjust the general norm according to the degree of target protection, the ability to adjust fire from a registration point, or the use of a different type of projectile or fuze than described by the norm. After that, he multiplies that norm by the indicated partial norm (or multiple of norm) and gets the expenditure of ammunition in rounds per artillery battalion.

Rounds per firing unit or per target. In combat orders and fire plans received at artillery battalion and below, the senior commander normally specifies ammunition expenditure in rounds per artillery battalion (or battery) for each target. In that case**,** the artillery battalion (or battery) commander divides the number of rounds by the number of batteries (platoons) or the number of weapons and gets the ammunition expenditure according to battery (platoon) or weapon. He then passes on this ammunition expenditure in rounds per target or per weapon to the subordinate batteries (platoons).

Density of Fire

Fire missions often specify a specific period of time for delivering fire. Artillery must not only deliver the required number of rounds, but do so within that period. This can maximize surprise and prevent mobile targets from escaping the target area before the artillery has accomplished its mission.

Artillery calculations measure ***density of fire*** as the number of rounds striking a hectare of target area in one minute. The higher the density, the higher the level of target damage. High density of fire can be extremely effective in neutralizing or annihilating targets such as—

- Enemy defenses, especially ATGM positions.
- Moving armored targets, since the effect is so intense and sudden that the target is unable to escape or take cover.

(See examples of norms for density of fire for successive fire concentration and rolling barrage in the Offense section of this chapter.)

When the same number of rounds strike a target over a shorter period of time, the result is an increase in the density of fire on the target. One way to increase density is to have an entire battalion fire a mission, rather than a single battery.[16] Improvements in target acquisition capabilities allow shorter, more intense fires on well-defined targets. Thus, fire missions tend to consist of short, intense concentrations, rather than lengthy barrages.

Area Coverage

In assigning fire missions, the senior commander must take into consideration the capability of a firing unit to cover a particular target area with fire of the required density. The OPFOR follows specific guidelines to achieve the optimum coverage in a battery or battalion concentration. It calculates fire coverage in terms of the number of rounds per hectare. (See Figure 7-6.) Each weapon should be able to neutralize an area, given in hectares, the size of which depends on the time allotted and the type of target.

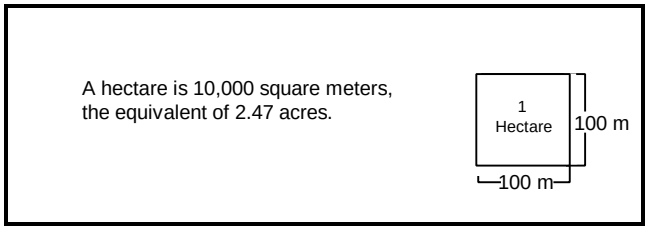


Figure 7-6. Hectare as measure of fire coverage.

Battery missions. When an entire artillery battalion delivers concentrated fire on a single target, it can use one of three methods in assigning missions to its batteries::

- Overlapping fires by batteries.
- Echeloned fires by batteries.
- Allocation of sectors of target among batteries.

The choice of method depends on the nature of the target and the amount of time available to prepare for firing.

[16] This also enables OPFOR batteries to fire quickly and then move to escape counterbattery fire. This is especially important for the accompaniment phase. However, in a large-scale attack, fires in the preparation and support phases must often be longer. When the enemy is defending and the OPFOR has overwhelming fire superiority, its vulnerability to enemy counterbattery fire is greatly reduced.

Overlapping fires are particularly useful against unobserved targets when adjustment is not possible. All batteries open fire simultaneously, with each battery on a different range setting. Settings are as follows:

- **Range settings.** If the target depth is less than the minimum, all tubes fire on a single elevation setting. If the target depth is greater than the minimum, all tubes fire on three different elevation settings. The interval between settings is equal to one-third of the depth of the target. After expending a designated number of rounds, each battery shifts to another of the three range settings in a prearranged sequence (as in Figure 7-8).
- **Deflection settings.** Each battery fires on a single deflection setting that ensures coverage of the entire frontage of the battalion's target. As a result, each of the three batteries in the battalion superimposes its fire on that of the other two.

Normally the ammunition expenditure at each range and deflection setting is roughly the same. Figure 7-7 illustrates this method for the distribution of rounds fired by batteries.

For ***echeloned fires***, as with overlapping fires, all batteries open fire simultaneously, with each on a different range setting. The difference is that, for echeloned fires, the batteries remain on the initial settings (first setting in Figure 7-8) throughout the engagement of the target. An artillery battalion uses echeloned fires by battery, when it cannot use overlapping battery fire:

- When engaging enemy columns and other moving targets (due to the short time for firing and lack of time to change settings).
- When firing projectiles with time fuzes (due to the complexity of setting the fuze).
- When delivering salvo fire by MRLs.

For fires with cassette projectiles, and also for participation in a successive fire concentration, concentrated fire, or massed fire, a cannon artillery battalion can deliver fire echeloned by battery.

An artillery battalion can also ***subdivide its target area*** among its batteries into three roughly equal target groupings. It can use this method against an observed target, when adjustments are possible. It may also use it when the dimensions of a stationary, unobserved target exceed the maximum for the battalion. Two batteries have target groups side by side across the target's frontage. The third battery attacks targets in the depth of the target area. Figure 7-9 shows battery target groupings for firing on an observed target. Settings are as follows:

- **Range settings.** Each battery fires on a single elevation setting if the depth of the target is not greater than the minimum. If the depth of the target exceeds the minimum, each battery fires on three different range settings. The interval between lines of concentration is equal to one-third of the depth of the target.
- **Deflection settings.** Dividing the target frontage by the number of weapons in the firing battery yields the target coverage (sheaf) per piece. If the target coverage per weapon is 25 m or less, each battery fires all tubes on a single deflection setting. The battery fires on two different deflection settings, if the target coverage (sheaf) per weapon is greater than 25 against dug-in and armored targets or greater than 50 m against unarmored targets in the open. Mortar batteries always fire on a single deflection setting.

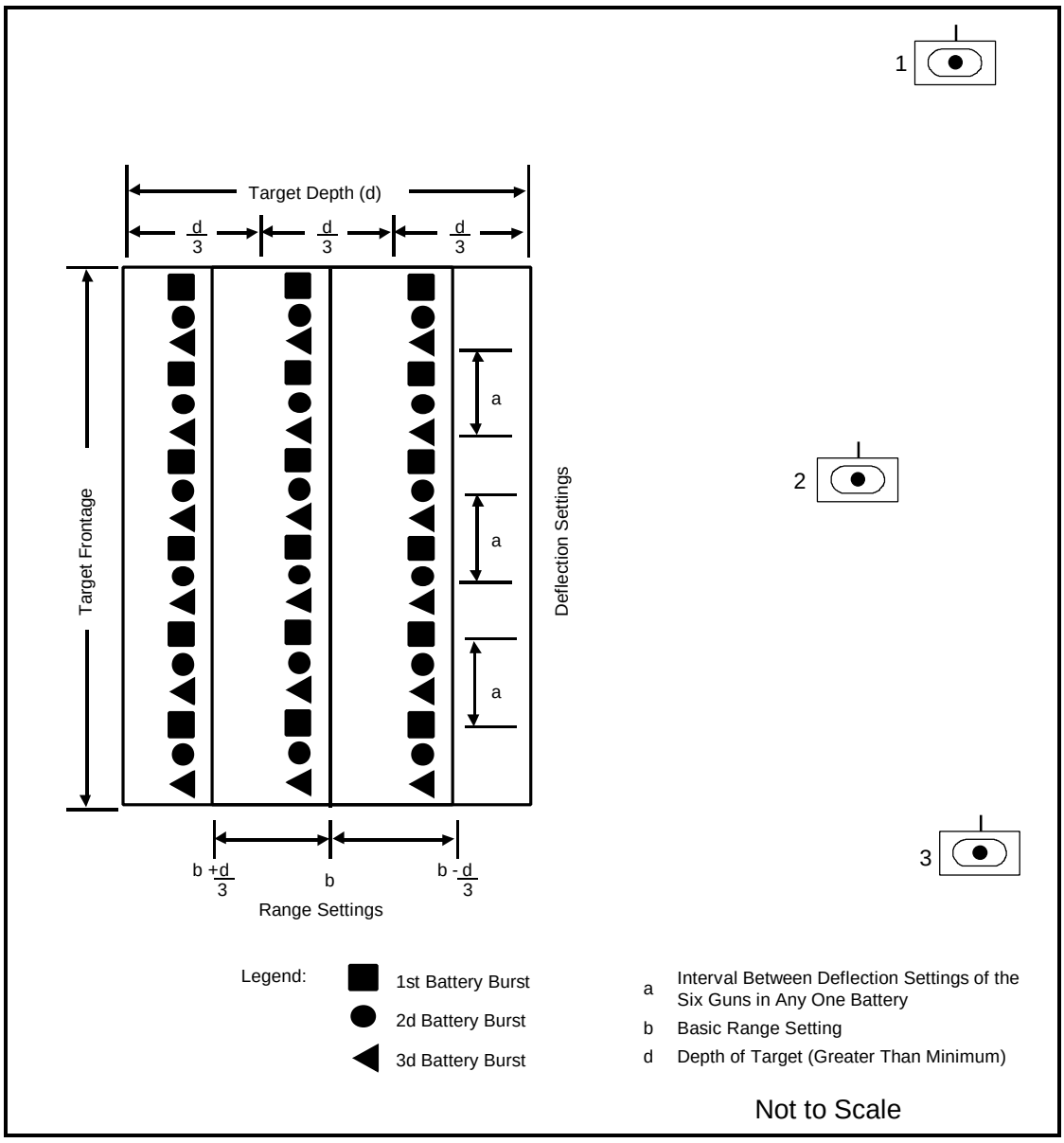


Figure 7-7. Overlapping battery fires on an unobserved target area (example).

Battery in Battalion	Sequence of Changing Range Settings		
	1st Setting	2d Setting	3d Setting
1st Battery	b-1/3d	b	b+1/3d
2d Battery	b	b+1/3d	b-1/3d
3d Battery	b+1/3d	b-1/3d	b
b = base range setting (center of target); d = depth of target.			

Figure 7-8. Sequence of changing range settings when a battalion fires on a single grouped or individual target using overlapping battery fire.

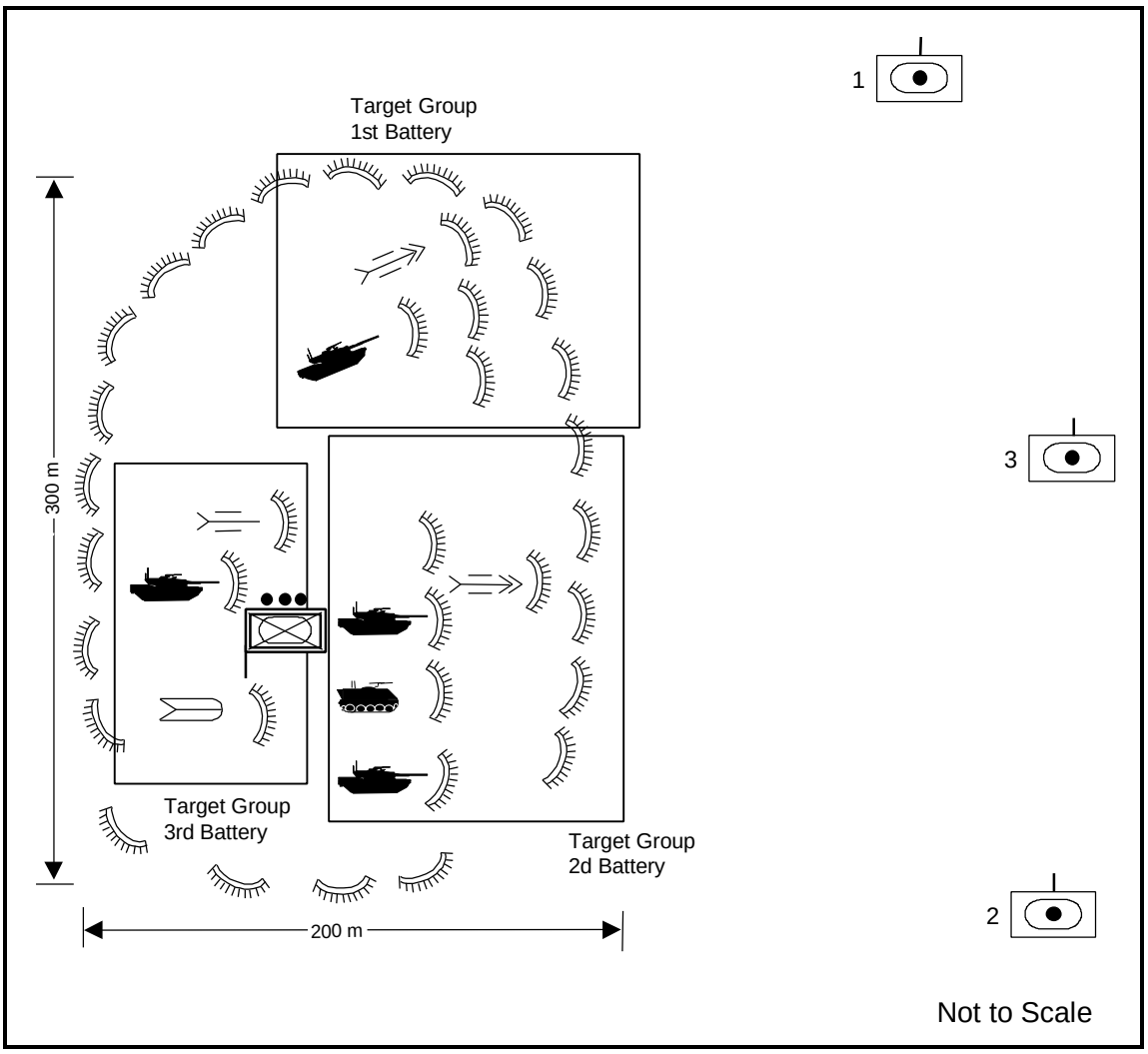


Figure 7-9. Battery target grouping assignments for an observed target (example).

Maximum target dimensions. The frontage and depth of grouped targets destroyed by concentrated fire of an artillery battalion by overlapping or echeloned fire of batteries or the fire of one battery should not exceed certain maximum dimensions. Figure 7-10 shows the maximum target area dimensions for cannon systems, and Figure 7-11 does the same for MRLs.

Number of Guns in Battery	Dimensions of Target					
	For Battery			For Battalion		
	Frontage (m)	Depth (m)	Area (ha)	Frontage (m)	Depth (m)	Area (ha)
4-6	300	200	6	400	400	16
8	400	200	8	500	400	20

Figure 7-10. Maximum dimensions of unobserved grouped targets fired on by cannon systems.

Type of MRL	Type of Round	Dimensions of Target					
		For Battery			For Battalion		
		Frontage (m)	Depth (m)	Area (ha)	Frontage (m)	Depth (m)	Area (ha)
Medium-Caliber	Frag-HE	300	300	9	400	400	16
Large-Caliber	Frag-HE	500	200	10	600	500	30
Medium-Caliber, Medium-Range	Frag-HE	700	400	21	900	900	81
Medium-Caliber, Long-Range	Frag-HE	500	400	20	800	700	56
Large-Caliber, Long-Range	Frag-HE	700	500	35	1000	1000	100
	Fragmentation Submunitions	800	600	48	1200	1200	144

Figure 7-11. Maximum dimensions of grouped targets fired on by MRLs.

If the dimensions of the target exceed those given in Figure 7-10 or 7-11, the battalion can deliver concentrated fire by dividing sectors of target among the batteries. In that case, the dimensions of sectors of the target should not exceed the size for battery fire indicated in Figure 7-10 or 7-11.

If an MRL battalion is firing with submunition projectiles, and the target area exceeds 150 hectares, the battalion has two options. If the disposition of the target's separate elements is known, the firing batteries (or platoons) use settings for the center of those elements. In the absence of data on the positions of the separate elements, the battalion divides the target area among its batteries in accordance with their firing capabilities.

Minimum target dimensions. When norms express ammunition expenditure for destruction of a target in rounds per hectare, there is also a minimum target size. Figure 7-12 shows the minimum dimensions of unobserved grouped or individual targets in frontage and depth, when fired on by cannon artillery systems. Figure 7-13 shows the same for targets fired on by MRLs. If a battalion or battery has the mission of destroying an individual or grouped target with a frontage or depth less than the minimums shown in Figure 7-12 or 7-13, then it fires the number of rounds required for the minimum-size target. For cannon systems, the minimum target size varies with range to target and weapon dispersion factors.

Range (km)	Frontage or Depth (m)	
	Individual	Grouped)
6 or Less	150	150
Greater than 6	200	200
Greater than 16	300	N/A

Figure 7-12. Minimum dimensions of unobserved individual and grouped targets fired on by cannon systems.

Type of MRL	Type of Round	Frontage or Depth (m)
Medium-Caliber	Frag-HE	300
Large-Caliber	Frag-HE	200
Medium-Caliber, Medium-Range	Frag-HE	400
Medium-Caliber, Long-Range	Frag-HE	400
Large-Caliber, Long-Range	Frag-HE	500
	Fragmentation Submunitions	600

Figure 7-13. Minimum dimensions of individual and grouped targets fired on by MRLs.

MRLs normally engage stationary unobserved or observed targets with at least a battery salvo. When target dimensions do not exceed the minimum, the MRL battalion delivers salvo fire by all batteries on one range setting with overlapping sheaf coverage.

If the depth of the target exceeds the minimum, the MRL battalion delivers echeloned fire by battery, with intervals between range settings equal to one-third of the target depth. An MRL battery firing independently at such a target would do the same for its firing platoons.

Unobserved Targets

Sometimes the OPs cannot observe the targets because of battlefield conditions. For these unobserved targets, there are established norms for ammunition expenditure, density of fire, and area coverage. Important targets for annihilation or neutralization include—

- Cannon artillery systems, MRLs, and mortars.
- ATGMs and AT guns.
- SAM and SP AA gun systems.
- Tanks, IFVs, and APCs.
- CPs and radio stations.
- Radar, signals reconnaissance, and jamming stations.

The norms can vary according to the protection level of the target. Even when a table of norms does not specifically mention one of the above target types, the norm for a listed type may apply to another target with similar characteristics. For example, the norms for fire against an artillery battery (platoon) also apply to an MRL, mortar, or AA gun battery (platoon).

Destruction of Stationary Targets

Figure 7-14 gives the ammunition expenditure norms for cannon and mortar systems of various calibers to neutralize or annihilate such stationary, unobserved targets in the open or dug-in. Figure 7-15 does the same for MRLs. These general norms are for unobserved targets at a range of 10 km or less from the artillery. They assume batteries have made deliberate occupation of their positions and are laid based on survey data. They also assume that they fire with meteorological data that is no more than 3 hours old.

The norms in figures 7-14 and 7-15 do not take into consideration the time required to deliver the number of rounds specified for neutralization or annihilation. However, a combat order or fire plan may require some fires to occur in a particular time span, for example, during a 10-minute fire assault. On receipt of the mission, an artillery commander must determine if the rate of fire of his weapons permits him to deliver the specified number of rounds in the specified time with the number of weapons available. If he determines that this is not possible, the senior commander who issued the order or fire plan must alter his plan. The options include—

- Increasing the time for delivering the fires.
- Increasing the number of artillery units firing at the target.
- Decreasing the required level of target damage.
- Assigning the target to a different unit.

If an individual or group target becomes unobserved before registration is complete, the firing unit can destroy it by selecting the type of fire and expenditure of projectiles stipulated for destruction of an unobserved target of analogous nature. If the target becomes unobserved after completed registration or in the course of firing for effect, then the firing unit does not change the method of fire, but uses the expenditure norm as for an unobserved target, less one-fourth of that norm (not including previously expended projectiles).

The target damage norms for annihilation and neutralization relate directly to the percentage of destruction. Standard tables of ammunition expenditure norms (see Figures 7-14 and 7-15) are based on 30 percent destruction for neutralization. Sometimes combat orders direct the expenditure of only a percentage or fraction of that norm. For example, the order could state that ammunition expenditure is three-fourths, half, or one-fourth of the norm. In other cases, the directed expenditure could be greater than the general norm. This reduction or increase can be due to various factors, including the availability of ammunition, the relative importance of the target, or the time available for firing. An artillery unit receiving such an order must multiply the number of rounds specified in the general norm by the indicated partial norm or multiple of norm.

In counterbattery fire, there are cases when ammunition expenditure must exceed the levels shown in the standard tables. If preparation of survey data is incomplete, ammunition expenditure may be 1.5 times the norm for targets at ranges up to 10 km and twice the norm for those at over 10 km. Norms for battery-size targets assume a battery frontage of only 150 m. For a battery frontage of 200 m or more, especially if it is only possible to determine coordinates for one or two guns of the battery, it may be necessary to double the ammunition expenditure.

In order to increase the level of target damage, it is necessary to increase the density of rounds per target or per hectare. Above a certain level, the amount of ammunition required to achieve a given degree of destruction does not increase in direct proportion. Thus, to achieve 60 percent destruction requires not double but rather 3.4 times the amount of ammunition needed for 30 percent destruction. Figure 7-16 provides the coefficient by which planners must multiply the norms for neutralization in the standard table in order to achieve greater (or lesser) degrees of destruction.

	Number of Rounds by Nature of Target and Fire Mission				
	Battery (platoon) of dug-in, towed artillery pieces (mortars)	Radar station, group of radar stations, or radio stations on motor vehicles, battery (platoon) of SAMs, deployed in the open	Personnel and fire means, or CPs, dug-in; tanks, IFVs, APCs in concentration areas	Personnel and fire means, or CPs on motor vehicles deployed in the open	Separate unarmored targets (ATGMs, AT guns, etc.) deployed in the open
	Neutralization			Annihilation	
Caliber (mm)	**Per Target**	**Per Target**	**Per Hectare**	**Per Hectare**	**Per Target**
Cannon Systems					
76	540	450	450	150	900
85	480	400	400	120	800
100	360	300	300	80	350
120	200	160	150	50	300
122	240	200	180	50	300
130	220	180	160	50	300
152	180 (60)	150 (50)	120 (—)	40 (15)	300 (100)
203	180 (60)	100 (30)	40 (—)	30 (10)	— (—)
Mortars					
82	500	350	700	100	500
120	300	180	200	60	350
160	300	80	100	20	200
240	150	40	50	20	—

Notes:

1. This table gives the expenditure of Frag-HE projectiles; numbers in parentheses are for the expenditure of cassette projectiles with fragmentation submunitions; a dash (—) signifies that firing for effect is inexpedient or unsuitable.
2. Ammunition expenditure norms given for the following conditions:
   - Range of fire up to and including 10 km.
   - Setting for firing for effect determined based on full preparation or use of data from registered artillery pieces.
3. When firing at ranges greater than 10 km, the ammunition expenditure increases by 1/10 for each additional km of range beyond 10 km.
4. When determining settings for firing for effect on registered targets, by shifting of fire from a registration point or, in some cases, when firing for effect with a base piece, the ammunition expenditure decreases by 1/4.
5. If an unarmored target is dug-in, the ammunition expenditure increases by 2 to 3 times. If a battery (platoon) of towed artillery pieces (mortars) is deployed in the open, the ammunition expenditure decreases by 2 to 3 times.
6. For annihilation of targets for which the given norms when firing for neutralization, the ammunition expenditure increases by 3 to 4 times. For neutralization of targets for which the given norms when firing for annihilation, the ammunition expenditure decreases by 3 to 4 times.
7. For firing against armored radar stations, separate armored targets, or CPs in APCs, the ammunition expenditure given for the corresponding target increases by 2 to 3 times.

Figure 7-14. Norms for expenditure of cannon and mortar projectiles for destruction of stationary, unobserved targets.

	Number of Rounds by Nature of Target and Fire Mission				
	Battery (platoon) of dug-in, towed artillery pieces (mortars)	Radar station, group of radar stations, or radio stations on motor vehicles, battery (platoon) of SAMs, deployed in the open	Personnel and fire means, or CPs, dug-in; tanks, IFVs, APCs in concentration areas	Personnel and fire means, or CPs on motor vehicles deployed in the open	Separate unarmored targets (ATGMs, AT guns, etc.) deployed in the open
	Neutralization			Annihilation	
Caliber	**Per Target**	**Per Target**	**Per Hectare**	**Per Hectare**	**Per Target**
MRLs					
Medium-caliber	450	300	300	60	—
Large-caliber	300	100	90	25	—
Medium-caliber medium-range	400	150	120	25	—
Medium-caliber long-range	500	240	160	40	—
Large-caliber long-range	180 (40)	120 (80)	15 (—)	10 (3)	— (—)

Notes:

1. This table gives the expenditure of Frag-HE projectiles; numbers in parentheses are for the expenditure of cassette projectiles with fragmentation submunitions; a dash (—) signifies that firing for effect is inexpedient or unsuitable.
2. Ammunition expenditure norms given for the following conditions:
   - Range of fire up to and including 10 km.
   - Setting for firing for effect determined based on full or abbreviated preparation for MRLs.
3. When firing at ranges greater than 10 km, the ammunition expenditure increases by 1/10 for each additional km of range beyond 10 km.
4. When determining settings for firing for effect on registered targets, by shifting of fire from a registration point or, in some cases, when firing for effect with a base piece, the ammunition expenditure decreases by 1/4.
5. If an unarmored target is dug-in, the ammunition expenditure increases by 2 to 3 times. If a battery (platoon) of towed artillery pieces (mortars) is deployed in the open, the ammunition expenditure decreases by 2 to 3 times.
6. For annihilation of targets for which the given norms when firing for neutralization, the ammunition expenditure increases by 3 to 4 times. For neutralization of targets for which the given norms when firing for annihilation, the ammunition expenditure decreases by 3 to 4 times.
7. For firing against armored radar stations, separate armored targets, or CPs in APCs, the ammunition expenditure given for the corresponding target increases by 2 to 3 times.

Figure 7-15. Norms for expenditure of MRL projectiles for destruction of stationary, unobserved targets.

Degree of Destruction (%)	20	30	40	50	60	80
Coefficient Relative to 30% (Neutralization)	0.57	1	1.6	2.3	3.4	7.4

Figure 7-16. Increase in ammunition norms reflecting requirement for increase in density of fire.

For any percentage other than those shown in the table, interpolation is necessary. For example, for a 122-mm howitzer unit may have the mission of firing against unobserved APCs in a concentration area at a range of 10 km or less. The norm is to fire 180 rounds per hectare of target area for neutralization (30 percent destruction). In order to affect a desired change in the correlation of forces, the supported commander may need the artillery to achieve 39 percent destruction. An increase from 30 to 39 percent destruction would require an ammunition expenditure increase of nine-tenths of the difference in coefficients between 30 and 40 percent: 0.9 x 0.6 = 0.54. Thus, the calculated expenditure would be 180 x 1.54 = 277 rounds per hectare.

If the fire plan calls for several fire assaults against the target, the ammunition expenditure for its destruction is distributed among them in proportion to their duration. For controlling fire between fire assaults, the designated firing unit expends one-tenth to one-fifth of the general norm of ammunition prescribed for neutralization of the unobserved target.

Remote Minelaying

Aside from neutralization and annihilation missions, MRLs can also conduct remote minelaying. This can involve the delivery of scatterable mines by several units of MRLs. Remote minelaying can create two types of minefields: covering and containing.

A ***covering*** minefield can block the movement route of an advancing or withdrawing enemy. MRLs typically establish a covering minefield 1,000 m in front of the forward edge of advancing enemy units. The frontage of battalion and battery sectors of minelaying can be up to 1,200 m. For large-caliber, long-range MRLs, the distance is 1,500 m and the frontage is up to 1,600 m.

A ***containing*** minefield can prevent the enemy unit from moving out of a deployment area (or firing position) or within the area. The minimum dimensions for containing minefields are the same as those for the destruction of grouped, stationary targets, shown in Figure 7-13. (For large-caliber, long-range MRLs use the minimum dimensions for firing projectiles with submunitions.) The maximum dimensions of the minefield delivered by an MRL platoon, battery, or battalion cannot exceed the values given in Figure 7-17.

Harassment

The ammunition expenditure and the duration of fire for harassment depend on the situation. Firing is by single rounds, a series of rapid or systematic fires, or a combination of these,

with irregular intervals of time between fires. Fire can be by battery, platoon, or individual artillery piece.

Type of MRL	Dimensions of Minefield (m)					
	For Platoon		For Battery		For Battalion	
	Frontage	Depth	Frontage	Depth	Frontage	Depth
Antitank Minefield						
Medium-Caliber, Medium-Range and Long-Range	600	400	1200	400	1200	1200
Large Caliber, Long-Range	600	600	800	600	1200	1200
Antipersonnel Minefield						
Medium-Caliber, Medium-Range and Long-Range	1200	400	2300	400	2700	1200
Large Caliber, Long-Range	600	600	800	600	1200	1200

Figure 7-17. Maximum dimensions of containing minefield.

Observed Targets

Most ammunition expenditure norms are for firing against unobserved targets with Frag-HE projectiles. Such norms, which merely estimate the amount of such ammunition required to destroy an unobserved target, do not apply to observed targets. When the firing unit can observe the target, it usually fires with registration, adjusts fire, and stops firing when the observer confirms target hit or kill. Target observation also permits the use of other ammunition types.

Destruction of Stationary Targets

Flechette-filled artillery projectiles are particularly effective against personnel in the open. They can be as much as five times as lethal as conventional Frag-HE projectiles. However, their effects are very sensitive to burst height, using mechanical time fuzes. A single cannon artillery battery can cover a target area of up to 8 hectares. Massed fires can involve a battalion or multiple battalions. Figure 7-18 shows average expenditure norms for flechette projectiles against observed targets.

Destruction of Moving Targets by Indirect Fire

The purpose of indirect fire against moving targets can be to engage an enemy march column or to deliver standing or rolling barrier fires in front of attacking enemy units. Figure 7-19 gives expenditure norms for cannon systems and MRLs against moving targets.

Destruction of columns. As a rule, the intent of fire against enemy columns is to delay columns or to prohibit their movement. A single artillery battery can destroy individual, observed groups of dismounted infantry. Fires against columns of unarmored vehicles or dismounted troops with a length of up to 700 m take one artillery battalion. Delivering fire against an armored column (tanks, IFVs, APCs, or SP artillery) takes at least two artillery battalions. The preferred method of destroying armored or unarmored columns is with one fire assault conducted with rapid fire from cannon systems or salvo fire from MRLs.

		Number of Rounds by Nature of Target and Fire Mission			
		Personnel deployed in the open		Portable ATGMs or AT guns, deployed in the open	Battery (platoon) of towed artillery pieces (mortars) or SP unarmored artillery pieces deployed in the open
Cannon		**Annihilation**	**Neutralization**		
System	**Charges**	**Per Hectare**	**Per Target**	**Per Target**	**Per Target**
122-mm SP or Towed Howitzer	Full	20	8	15	50
	Reduced	25	10	20	100
152-mm SP or Towed Howitzer	Full	15	5	10	40
	Second	20	7	20	50

Figure 7-18. Average expenditure of flechette projectiles with mechanical time fuzes for destruction of observed grouped or separate targets.

An MRL battalion can assign individual sections of a column to its batteries. The MRL batteries deliver echeloned fire, with each battery firing in a salvo on one setting for range and deflection with overlapping sheaf.

A cannon artillery battalion delivers echeloned fires by battery against columns. Batteries engage the column with rapid fire on three range settings with range intervals of at least 100 m. They fire at one deflection setting with sheaf interval of 50 m, regardless of the column's direction of movement.

Unarmored columns of greater length can require several battalions. In this case, one of the battalions delivers fire against the deepest part of the column, and the fires of the other battalions are distributed against its length so that the interval between the aiming points of the battalions is not greater than 700 m.

Barrier fires. See the Defense section of this chapter for more information on standing and rolling barrier fires.

Direct Fire

Artillery of all calibers must be ready for direct fire. For destruction of armored targets, most howitzers have HEAT projectiles. In the absence of HEAT rounds, howitzers can use Frag-HE projectiles with impact fuzes set for fragmentation effect against armored targets. Figure 7-20 shows average ammunition expenditures for HEAT and Frag-HE projectiles fired by howitzers. Field guns and larger-caliber howitzers can use other types of armor-piercing projectiles. Cannon and mortar systems of calibers 152-mm and greater can engage armored targets with concrete-piercing projectiles with impact fuzes set for delayed action.

	Number of Rounds by Nature of Target and Fire Mission			
	Column	Battery (Platoon)		Tactical missile launcher, battery (platoon) of missile launchers, SAM, SP AA gun, helicopters on landing fields, deployed in the open
		SP armored artillery pieces (mortars)	SP unarmored artillery pieces	
Caliber (mm)	**Delay or Denial of Movement**	**Neutralization**	**Annihilation**	**Annihilation**
Cannon Systems				
76	20	—	—	—
85	16	—	—	—
100	10	16	16	18
122	8	16	16	10
130	8	10	10	10
152	6 (6)	10	10	8 (8)
MRLs				
Medium-Caliber	1 salvo	—	—	—
Large-Caliber	1 salvo	—	—	12
Medium-Caliber Medium-Range	1 salvo	40	35	20
Medium-Caliber Long-Range	1 salvo	40	40	30
Large-Caliber Long-Range	1 salvo	—	16 (10)	16 (16)

Notes:
1. This table gives the expenditure of Frag-HE projectiles; numbers in parentheses are for the expenditure of cassette projectiles with fragmentation submunitions. A dash (—) signifies that firing is inexpedient or unsuitable.
2. The ammunition expenditure norms given for artillery pieces and MRL launchers are independent of range of fire.

Figure 7-19. Norms for expenditure of projectiles for destruction of moving targets.

Demolition

Another type of destruction that applies particularly to stationary, observed targets is demolition. The demolition of defensive works, emplacements, and trenches with overhead cover can result in annihilation of personnel, weapons, and combat equipment in those shelters. Firing for demolition can also target bridges, takeoff-landing areas, buildings, and other objects to make it impossible for the enemy to use them subsequently.

Precision munitions are ideal for demolition of such targets. If precision munitions are not available, the munition of choice for this mission is high-explosive (Frag-HE or concrete-piercing) projectiles. Especially sturdy buildings or installations require fire of guns and mortars of caliber 152-mm and larger.

Target	Range of Fire (m)	Artillery System, Type of Projectile			
		122-mm Towed or SP Howitzer		152-mm Towed or SP Howitzer	
		HEAT	Frag-HE	HEAT	Frag-HE
Dug-in Tank	500	2	2	—	3
	1000	4	3	6	4
	1500	10	—	10	—
Dug-in APC (ATGM Launcher Vehicle)	500	—	2	—	3
	1000	—	5	8	5
	1500	—	12	10	—
SP Armored AT Gun	500	—	2	—	—
	1000	—	3	—	—
	1500	—	5	—	—
	2000	—	10	—	—

Figure 7-20. Average ammunition expenditure for destruction of targets by direct fire from artillery pieces.

Firing for demolition is normally against observed targets. Fire can be by battery, platoon, or individual artillery piece. It is important to select an OP as close as possible to the target and to the gun-target line. The firing unit calculates settings for firing based on registered targets. It engages the target by systematic fire with four to six rounds per gun at a rate assuring observation of each burst. After each series of systematic fire, it adjusts fire and continues until the OP reports full, clearly visible demolition of the target.

For demolition of buildings or defensive works with vertical walls, guns, gun-howitzers, and howitzers conduct flat-trajectory fire with maximum charges. They use indirect fire only when direct fire is not possible. Against defensive works with overhead cover, mortars fire with the lowest charge, and howitzers use plunging (high-angle) fire with charges providing the least dispersion and maximum angle of fall.

EMPLOYMENT TECHNIQUES

Before discussing those aspects of artillery support that are peculiar to the march, offense, and defense, there are some basics of artillery employment that apply to any tactical situation. These include tactical deployment, fire direction and computation, target-marking techniques, methods of fire, ammunition options, and logistics.

Deployment

Two factors govern deployment of artillery: continuity and dispersion. The need for continuity of fire support leads to groups being deployed well forward to eliminate the need to relocate. Dispersion is the requirement to space batteries and battalions so that the enemy cannot destroy them with a single fire strike. Figure 7-21 provides tactical deployment guidelines for OPFOR artillery.

Distances	Mortars	Guns and Howitzers	MRLs
Between Weapons	20-50 m	20-50 m	50-60 m
Between Batteries	N/A	500-2,000 m	1,000-2,000 m

Figure 7-21. Tactical deployment guidelines for artillery.

Battalion Firing Position Area

Based on detailed map analysis, the senior maneuver or artillery headquarters selects the firing position areas for the artillery battalion. When possible, the commander also conducts ground reconnaissance of the area. When moving into an unfamiliar area, an artillery battalion or regiment/brigade may send out an artillery reconnaissance patrol to find possible firing positions or sites for COPs and routes of movement to them. The artillery battalion commander designates the individual battery positions or position areas in his orders to the batteries.

Types of areas. According to their purpose, firing position areas may be primary, alternate, or temporary areas. These have applications in both offense and defense.

The ***primary*** firing position area is designated for carrying out the primary fire missions in all types of battle. Its distance from the forward edge of friendly units depends on the battalion's place in the artillery grouping, the range of artillery systems, the nature of the terrain, and other conditions. Within the battalion firing position area, each battery has a primary firing position and possibly one or two alternate positions.

The ***alternate*** firing position area is usually designated in a defensive situation for battalion or battery maneuver and to carry out fire missions during an intentional or forced abandonment of the primary firing position area. A battalion usually has one or two alternate firing position areas to the flanks of the primary area or in the depth of the defense. An alternate area can be several kilometers from the original location.

The ***temporary*** firing position area can be designated for carrying out individual fire missions. It could be forward of the main defense zone, for supporting maneuver units defending in the security zone or for firing on distant targets. It could also be for carrying out missions as roving units. Other missions could include supporting the commitment of a second-echelon or reserve unit to an attack or counterattack.

Battle formation. Within a battalion firing position area, batteries typically locate 500 to 2,000 m apart. At any given time, the firing positions of the three dispersed batteries normally form a large triangle. The triangle can be a forward or reverse wedge pointed toward or away from the enemy. The triangle is not always equilateral and sometimes even takes a form approaching a straight line. As batteries occupy alternate firing positions, the size and shape of the triangle can change considerably. Taking into account one or two alternate firing positions for each battery, the actual shape of the firing position area may not be a triangle at all.

For a battalion minus one battery (attached to a lower-level maneuver unit), the firing position area is a straight line, possibly echeloned left or right. Figure 7-22 shows an example of an artillery battalion battle formation. (For the sake of simplicity, this figure does not show alternate battery firing positions within the battalion temporary and alternate firing position areas.) The battalion chief of staff operates the battalion FDC, which normally is inside the triangle of batteries and located 300 to 500 m from one of the batteries.

The artillery battalion commander typically positions his COP vehicle on a hill where he can observe as much as possible of the battalion's sector of fire. Since this COP needs to communicate over longer distances, it may locate on the reverse slope of the hill, where it can elevate its antenna mast. The battalion battle formation can also include an FOP or LOP, if employed. (See Figure 7-2 for an example of deployment of the various OPs in a battalion battle formation.) It could also include attached artillery reconnaissance elements.

Battery Firing Positions

A ***firing position*** is the sector of terrain occupied or prepared for occupation by a battery's firing platoons for delivery of fire. Selection of this location it is normally the responsibility of the battery commander, but he may receive guidance from the artillery battalion commander. The artillery battalion commander can assign the battery a firing position and COP location. If, instead, he designates a battery firing position area, the battery commander can select two or three firing positions for the battery within that area. At a given time, both of the battery's firing platoons are usually at a single firing position. In certain cases, each firing platoon may deploy at an independent firing position when using split-battery or roving unit tactics.

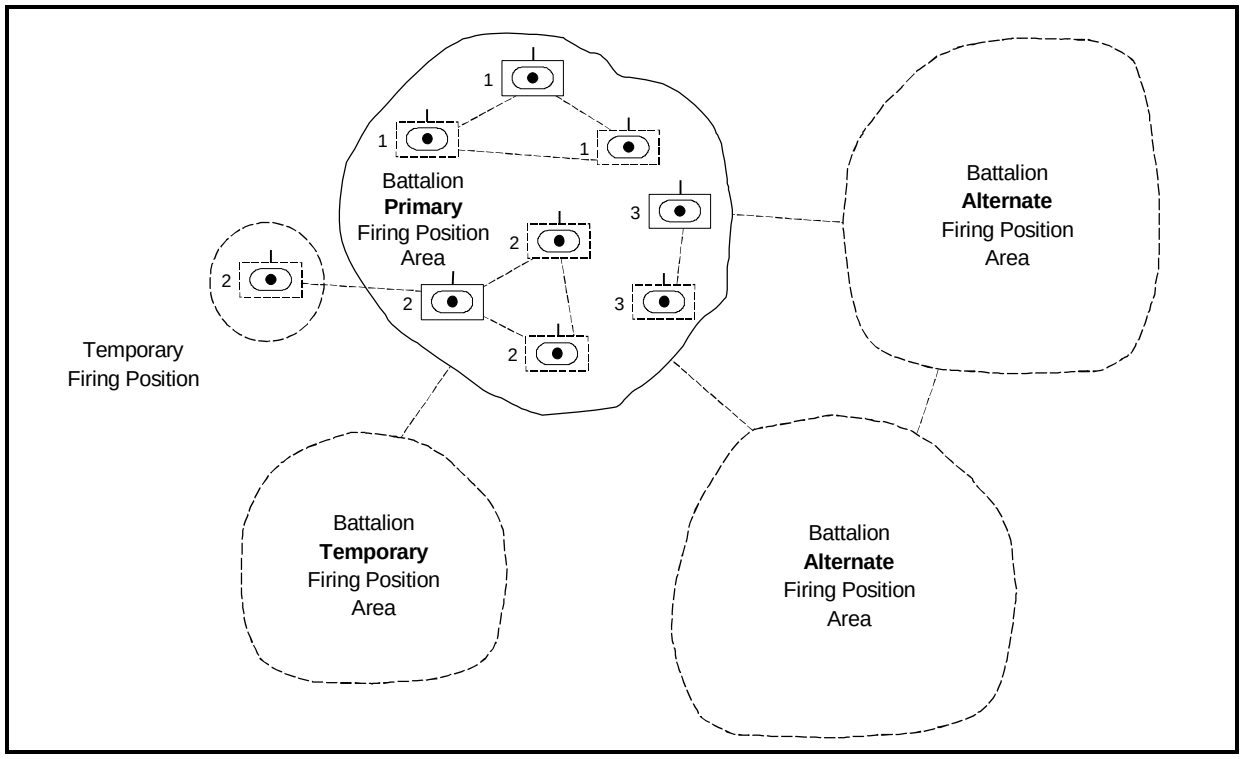


Figure 7-22. Artillery battalion battle formation (example).

Types of positions. As with firing position areas, firing positions may be primary, alternate, or temporary. In an attack against a defending enemy, an artillery battery can use any or all of those, and possibly create dummy firing positions. In a meeting battle or pursuit, there is usually only a single, primary firing position. The defense can require primary, alternate, temporary, and dummy positions.

A ***temporary*** firing position can allow a battery to accomplish special, short-term, or emergency missions. In the defense, a battery can use a temporary firing position near the forward edge or forward of the main defensive zone to support maneuver units defending in the security zone or to fire on a distant target. A temporary position can also be for use by a roving battery or platoon. Although temporary, these firing positions can be prepared and camouflaged.

A battery (or battalion) may prepare ***dummy*** firing positions and COP sites on its own or as part of the senior commander's deception plan. Their purpose is to mislead the enemy as to the actual deployment of artillery units. Their preparation and camouflage must not differ sharply from that of actual positions and sites. A roving unit may periodically deliver fire from the dummy firing position.

Battle formation. A battery firing position includes places for artillery systems and ammunition, the battery senior officer's vehicle (FDC), and prime movers or ammunition resupply vehicles. The battery COP may or may not be within the firing position. The battery battle formation can also include an FOP or LOP, if employed.

The battery commander normally positions his COP vehicle in hull defilade on terrain that permits him to observe the entire sector of fire for his battery. Depending on the situation, he can also choose to keep his vehicle in complete defilade and dismount his COP. The battery senior officer operates the battery FDC, which can be up to 200 m from the nearest artillery weapon. The battery senior officer or gun position officers select individual gun firing positions.

Figure 7-23 is an example of a howitzer battery deployment in linear formation. In this example, the battery forms a straight line with equal intervals between guns. This pattern of deployment reduces emplacement and displacement time. It also simplifies the computation procedures required for battery fire missions. The reduced computation and mission times enable batteries to complete missions and relocate more quickly. This lessens their exposure to enemy fire and compensates for the vulnerability inherent in the formation.

For increased survivability, artillery uses formations that vary the interval between guns and disperse the guns in depth with the aid of computers. Guns may be in a wave formation, a forward or reverse wedge, or a semicircle. Figure 7-24 gives some examples of the nonlinear formations a battery might use. Even with computers, batteries may retain the linear formation for speed and simplicity. Its goal is to reduce the time that a firing battery remains in position after the first round fires.

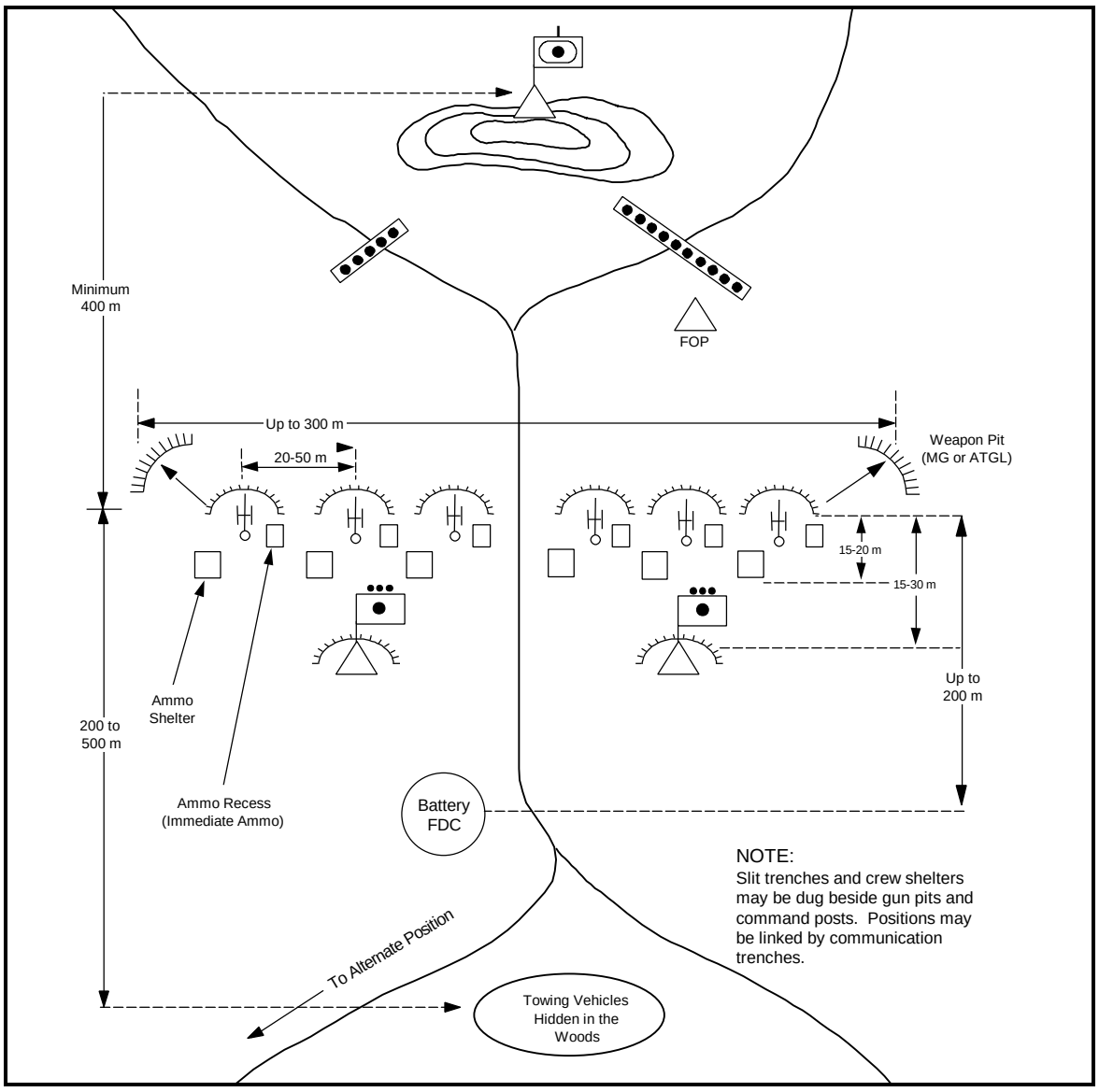


Figure 7-23. Howitzer battery deployment (linear formation).

Given the tempo of modern combat, artillery must now deliver effective fire from emergency positions without firing a registration. The use of improved rangefinders can reduce adjustment time and eliminate the need for registration for many types of missions.

Battery firing positions consist of two firing platoons of three guns each.[17] The interval between guns is normally 20 to 50 m. The platoons may be separated a few hundred meters for greater survivability. Each platoon has a platoon headquarters and three gun sections. The platoon leader of one firing platoon is the battery senior officer, if there is not a separate officer for that position. The battery commander of an attached or supporting battery normally deploys near the COP of the maneuver unit to which it is attached or which it is supporting.

[17] Some artillery units at the operational level have firing platoons of four guns.

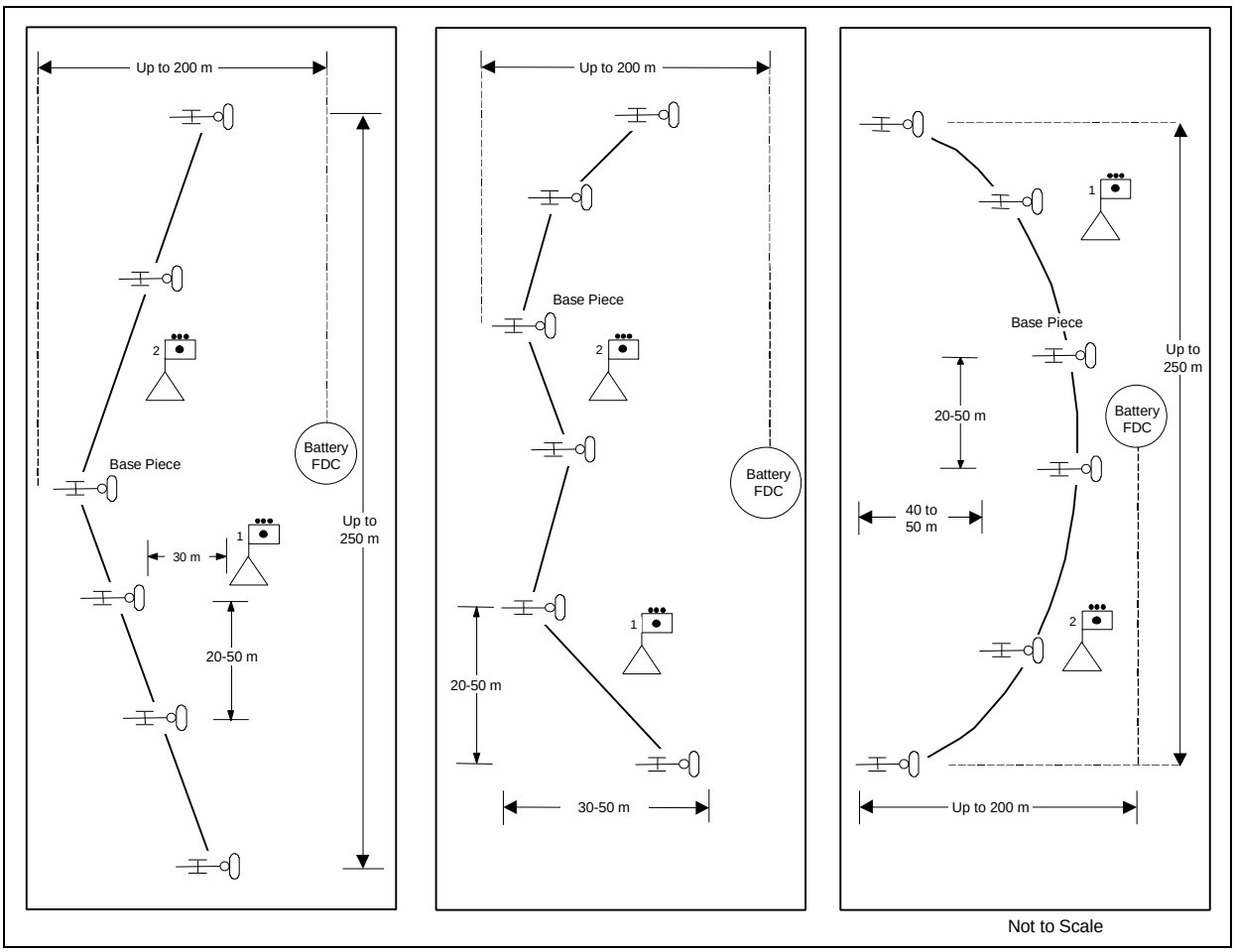


Figure 7-24. Nonlinear deployment patterns of a howitzer battery (examples).

Multiple rocket launchers. Prior to occupying their firing positions, MRLs usually remain in a camouflaged assembly area some 1 to 1.5 km away. The launchers usually have their full complement of ready rockets loaded. Then MRL batteries move forward to support the battle, with one or more ammunition trucks accompanying each launcher to the firing position.

Immediately after firing, MRLs normally move to either a camouflaged position or to a new firing position to evade counterbattery fire. The OPFOR also employs MRLs in roving unit missions and counterattacks.

For MRLs, the battery firing position includes all the same things listed above for a cannon artillery firing position. In addition, it includes a loading point and a meteorological station. The interval between MRLs is normally 50 to 60 m. For some MRLs, crews can launch rockets remotely from shallow trench shelters located 50 m or more from the launcher vehicle. The battery senior officer operates the battery FDC, which usually is 150 to 300 m behind the line of MRLs.

Concealment. In selecting firing positions, both battalion and battery commanders consider the concealment offered by the terrain. With respect to concealment, firing positions can fall into one of two categories:

- Concealed (indirect fire) positions.
- Unconcealed or open (direct fire) positions.

In either case, the entrance to and exit from all gun positions should be concealed as much as possible.

An ***indirect fire (concealed)*** position is one in which the artillery systems are not exposed to enemy ground observation during delivery of fire. Site selection for an indirect fire position takes into account—

- The possibility of delivering fire at given minimum quadrant elevations and large deflection shifts from the base line.
- The possibility of direct fire for self-defense.
- The availability of convenient access routes and camouflage conditions.

For cannon systems, it is advisable to select firing positions primarily on avenues of likely tank approach, but behind natural AT obstacles and minefields. For mortar and MRL units, firing positions should be in areas inaccessible to tanks, as much as possible. Deployment of artillery systems within the firing position depends on the terrain. As a norm, intervals should be 20 to 50 m between cannon or mortar systems, and 50 to 60 m between MRLs.

A ***direct fire (unconcealed or open)*** position is one in which the firing systems are not concealed from enemy ground observation. Such a position is usually near the positions of forward-deployed maneuver units, and thus close to the enemy. Even for an "unconcealed" position, site selection takes into account the possibility of camouflaging the artillery systems and the availability of concealed access routes. The firing position should afford cover for the gun crews and their ammunition. Good locations for unconcealed firing positions may be near fences, thickets, and roads, or in ditches. Even if initially concealed and camouflaged, the systems become exposed and observable at the start of firing.

Terrain masking is important, especially when deploying within range of enemy ATGMs and other direct fire weapons. The position should allow the battery to accomplish a direct fire mission at the weapons' maximum effective direct fire range. Individual weapons should have interlocking fires with adjacent weapons. From such a position, the unit can deliver direct fire to destroy enemy tanks, other armored vehicles, and AT weapons or to demolish weapon emplacements and fortifications.

Battery Dispersion Techniques

The OPFOR employs artillery tactical concepts that include a variety of dispersed battery techniques. The techniques include split-battery (two-platoon) and roving-battery operations and are applicable to both cannon and MRL units. These tactics also provide the battery commander with more flexibility to conduct multiple fire missions simultaneously, since the battery can organize into two distinct firing units.

The plans for the employment of split-battery and roving-battery tactics are very thorough. The plan covers—

- Mission.
- Location of positions.
- Method of fire.
- Number of rounds to be fired from each position.
- Movement schedule of the battery.
- Duration of the battery mission.

Split-Battery

Split-battery tactics can increase the survivability of OPFOR artillery against enemy counterbattery fires. Positioning the firing platoons 200 to 500 m apart can move at least one platoon from the beaten zone of a conventional fire strike. As a countermeasure to precision munitions and submunitions, the increased dispersion can keep one platoon out of the seeker footprint of munitions employed against the other platoon. This can force the enemy to either employ more munitions over a larger target area or increase the number of targets to be serviced. In most cases, the battery COP can control the fires of both platoons. The battery FDC would deploy with one of the platoons but maintain communications with the other platoon.

When using advanced or precision munitions, a single firing platoon can provide fire support with the lethality of a battery or battalion using conventional munitions. This reduces the time required for a unit to execute fire missions, thereby reducing its exposure time to enemy reconnaissance systems and precision weapons strikes. This reduction involves the battery engaging targets from hide positions and engaging only one, or at most two targets from one position without moving.

Roving Units

Taking advantage of the mobility of SP artillery, the OPFOR can move artillery batteries or platoons within an assigned firing position area to escape enemy counterbattery fire. Within his assigned area, the battery commander selects a primary position and one or more alternate firing positions. Each position is at least 500 m away from the previous position. The roving battery or platoon fires a mission of no more than 3 to 4 minutes duration and then moves to an alternate position. This technique is useful during a long offensive preparation or in the defense when forward or rearward movement is limited.

The goal of roving artillery units is to confuse the enemy as to the deployment and fire plans of friendly artillery forces. They can also engage important targets without disclosing the location of the main artillery formation. Therefore, the brigade COA usually develops the plans for the deployment of roving units in detail.

Based on instructions from the senior commander or COA, the artillery battalion commander organizes the execution of the plan by a battery or platoon. The roving unit may leave camouflaged decoys in the primary firing position to create the impression of use. For convenience or to enhance the deception, the roving unit could fire from a site prepared as a dummy firing position. The COP of the battery supplying the roving artillery controls the fire of the entire battery. When one platoon performs the roving mission, the battery FDC may maneuver with a roving platoon or remain in the primary firing position.

Movement

The movement of an artillery battalion can follow several different patterns depending on such factors as enemy situation, mission, terrain, weather, and visibility. Once the battalion has reached the assembly area and completed its organization for combat, it may move by battalion or by battery. See the March section of this chapter for more detail on the tactical march.

Movement is particularly important during offensive actions, when the artillery must keep pace with the advance of supported maneuver units. Fire planners strive to maintain continuous support from the initiation of preparatory fires until the accomplishment of the offensive mission, including the commitment of the second echelon. As the artillery shifts its fires successively deeper into the enemy defenses, displacement of artillery units becomes necessary. Thus, after the preparation phase and the initial fires in support of the attack, artillery units supporting or attached to first-echelon battalions and brigades begin to displace. This displacement is preplanned to accommodate the advance of the attacking maneuver forces. After the initial phases of fire, there can also be modifications in command relationships between artillery and supported maneuver units; these changes may or may not necessitate relocation.

In Bounds

The artillery normally displaces in bounds, attempting to retain two-thirds of its weapons in positions within range to provide continuous support for the attacking force. In planning deployment of their units, artillery commanders follow the “rule of a third.” When only a third of the maximum range of their artillery remains in front of the attacking OPFOR troops, they move a third of their force forward. Once redeployment starts, no more than a third of the available guns is moving at any one time. This leaves two-thirds of the artillery in position to support operations.

By Battalion

Redeployment is by battalions whenever possible, with a typical bound being 5 to 10 km long. However, movement by battalion is possible only when the battalion has not been committed to battle or when there are other units available to perform any required fire missions while the battalion is moving. All elements of the battalion displace at the same time (based on a movement schedule) and are typically expected to be in their new positions at the same time.

By Battery

In the offensive, the most common movement technique is for the artillery battalion to move by battery. The battalion leapfrogs its batteries forward individually in bounds of some 3 to 4 km. Depending on the route and the pace of combat, there may be a temporary halt to rearm and refuel during the movement. Once the battery is in position and ready to fire, the next battery starts to displace. Typically, the battalion FDC displaces with the center battery.

Movement of an artillery battery is typically by order of the battery or battalion commander and is under the command of the battery senior officer. His vehicle (battery FDC in an ACRV) leads the battery column, followed by the artillery pieces. The artillery piece designated as the base pieced leads the other pieces. They are followed, in turn, by battery ammunition and supply vehicles.

Fire Direction and Computation

Fire direction (sometimes called *technical fire control*) is the process of determining the specific data required by the crew to orient the weapon and set (or possibly program) the fuze to function properly. The OPFOR may employ either manual or automated computation to determine firing data. Figure 7-25 reflects the average processing time for the indicated computational method for an average FDC.

Data Requirement	Manual	Automated
Determine Initial Data	2 minutes 15 seconds	45 seconds (estimated)
Determine Subsequent Data	55 seconds	20-30 seconds (estimated)

Figure 7-25. Average time required for an FDC to compute firing data.

The battery commander in the COP chooses the targets of opportunity for firing. He also decides how to attack the targets relayed to him by the maneuver forces he is supporting. Figure 7-26 gives the average reaction times from the receipt of fire orders by units in firing positions to the first rounds on the ground (on preplanned targets). The standard reaction time for shifting fire is 2 minutes or less.

Unit	Time (in Minutes)
Mortar Battery	1 to 1.5
Artillery Battalion	2 to 3
MRL Battery	4
BRAG	4
DAG	5

Figure 7-26. Average reaction time.

Manual

Manual computation requires the FDC to mark the firing unit's location a chart and then determining the direction and range to the target. The range determines the propelling charge, and the effect of the two determines the elevation setting and time of flight. Time of flight is used to determine the fuze setting. The major factor determining responsiveness is operator training, while accuracy depends on both operator training and the validity of supporting data (such as survey, meteorological data, and propellant temperatures). Adding a simple hand-held calculator to perform arithmetic computations can enhance the responsiveness and accuracy of manual fire direction.

Automated

Automation can greatly enhance the responsiveness of fire direction computations. The level of automation can range from a single battalion- or battery-level computer that determines a single solution for each battery to computers (located at the battery FDC) capable of determining data for individual weapon platforms. These fire direction computers can quickly calculate corrections in elevation and deflection settings for each firing platoon and possibly for each weapon. This is particularly useful during frequent moves.

The fire direction computers may be part of an automated fire control system. The OPFOR can employ automated fire control systems comprised of subsystems for reconnaissance, initial orientation and location fixing, weather and ballistic information, communications, and data transmission that are automatically linked to a data-processing computer. Automatic connections to external reconnaissance means can include radars, sound-ranging systems, UAVs (drones or RPVs), and reconnaissance helicopters. The system can also have links with higher, lower, and adjacent headquarters. The OPFOR can adapt the automated fire control system to new types of weapon platforms, ammunition, and reconnaissance systems.

Firing Data

The following individuals are responsible for the preparation and accuracy of firing data:

- The battalion chief of staff (in the battalion FDC).
- The battery senior officer (in the battery FDC).
- The fire direction specialists located in the firing position (in the battery FDC).
- The fire direction specialists located in the battalion FDC.
- The fire direction specialists located in the battalion and battery COPs.

The battalion and battery commanders have overall responsibility for the execution of fire missions. Therefore, they supervise the fire direction specialists in their respective COPs, who must be prepared to assume the functions of the FDC if the latter is put out of action. The battery senior officer and the battalion chief of staff supervise the work of the fire direction specialists in their respective FDCs.

The FDC in the battery firing position receives target data from artillery reconnaissance patrols, OPs, or COPs. The fire direction specialists located at the battery firing position compute (either manually or electronically) the firing data for the targets. A battery FDC may receive fully computed firing data from the battalion FDC, or even the battalion COP. In any case, the battery senior officer (or his designated representative) verifies the firing data and relays the data to the gun platoons, where the gunners set the data on the gun in preparation to fire. He also reports this data to the battalion FDC and the battery commander.

The fire direction specialists in the battery COP may also compute the firing data as a separate check on the data supplied by the firing position fire direction specialists. If for some reason the data from the battery COP is ready before that of the firing position, the battery commander transmits his data directly to the firing position. If a difference exists between the firing data supplied by the fire direction specialists at the firing battery and the COP, the battery commander or battalion chief of staff decides which data is passed to the gun platoons to fire.

This system demands that the battery commander, senior officer, and battalion chief of staff be as proficient in computing firing data as the fire direction specialists. The independent computation of firing data by different individuals significantly reduces the chances for a large error. This technique also ensures that a fire direction system is readily available if the fire direction capability at either the COP or FDC is destroyed or suppressed.

When the artillery battalion controls the conduct of fire, it conducts the observation, computation, and firing similar to battery level. The battalion commander is at the battalion COP near the CP of the supported commander. Target acquisition and fire direction specialists assist him in acquiring targets, computing fire missions, and adjusting fire. Normally the battalion chief of staff is in charge of the battalion firing position and the battalion FDC. Depending on the type of mission, battalion dispersion, and time available, battalion fire direction personnel may compute the gunnery problem for the entire battalion or run check computations while each battery computes its own data. The battalion commander gives the order to fire. He can require each battery commander to adjust fire for his own unit by weapon or by battery salvos.

Forward ground or air OPs supplement battery and battalion COPs. Observation teams can locate forward in armored vehicles. Forward and air observers transmit target data to the battalion chief of staff, at the battalion FDC, for computation.

The OPFOR also integrates electronic computers into its field artillery battalions to exploit this new capability for firing procedures. The battalion probably still has centralized control of fire mission computation and fire control. It can give battery fire direction personnel fully computed data that is ready to pass to the guns. Centralizing electronic computation at battalion level is consistent with establishing the battalion as the basic firing unit in OPFOR artillery. The battalion and battery may run check computations manually on a routine or random basis.

Target Marking Techniques

Since firing unit commanders/observers do not always select their own targets, it is often necessary to mark the target to facilitate its identification and subsequent attack. The two principal methods are by computation and marking the target with smoke.

Computational Method

The preferred technique for identifying targets is to provide the orientation data for the observer. This would normally be done in situations where the artillery regiment's FDC is passing a target it has located to a subordinate artillery battalion commander or when a battalion commander passes a target to a subordinate battery commander. Using the standard plotting board, the original observer can plot the location of the target and the new observer, and then compute the new observer's direction and range to the target. At that point, the new observer can simply orient his observation equipment on the directed azimuth and locate the target at the indicated range. While leaving little room for error, this technique is time-consuming and not well suited to a fluid or fast-moving battle.

Target-Marking Smoke

The fastest and easiest method of target marking is simply to mark the target with a colored smoke projectile. This allows all observers to immediately identify and locate the target. This also has the disadvantage of warning the target, but is acceptable when the target is unable to move (at least between being marked and being engaged). Almost any projectile could be used to mark the target, but smoke projectiles offer longer dwell times and therefore increase the chance of all observers being able to locate the target.

Methods of Fire

Fire missions normally specify the method of fire. Cannon and mortar systems can conduct missions with rapid or systematic fire, or a combination of the two. However, MRL systems normally deliver fire by salvo, and the salvos can be part of systematic fire.

Rapid Fire

Rapid fire is a method to conduct artillery fire by firing the weapon as quickly as possible. The weapon does not exceed its maximum rate of fire or sacrifice accuracy. When the commander orders rapid fire, each individual weapon crew begins to fire independently when ready. To destroy a target in the shortest possible time, the firing units conduct the mission at rapid fire until they expend the allocated ammunition. Rapid fire is appropriate when—

- The mission is to annihilate (rather than just neutralize) the target.
- The mission is to neutralize a target deployed in the open.
- A target is moving (in column).

Salvo Fire

A single MRL or a platoon or battery of MRLs can fire a salvo. In a platoon or battery salvo, all launchers fire simultaneously at the maximum rate of fire.

Systematic Fire

Systematic fire is a method that fires every round, or salvo, on command at a set interval. A single weapon, a firing platoon, or an entire battery may fire systematic fire. On receiving the mission, the firing unit also receives an ammunition expenditure requirement. When a single cannon or mortar system delivers the fire, it fires the designated number of rounds at a rate given in the command or order. When a cannon, mortar, or MRL platoon or battery fires the mission, all systems fire in turn (usually from left to right) with the interval between rounds or salvos given in the order.

The OPFOR uses this method for firing on observed targets during registration or when the unit is firing a demolition mission. The OPFOR also uses systematic fire against unobserved targets under the following circumstances:

- In the course of fire assaults of a given duration.
- During controlling fire.
- During harassing fire, usually alternating with rapid fire.

The tempo of systematic fire against observed targets depends on the capabilities and equipment of the observer. The time allotted for the expenditure of an amount of ammunition determines the tempo of fire against an unobserved target. The tempo of systematic fire is constant during a fire assault, but controlling or harassing fire may have an intermittent tempo.

Ammunition Options

A wide variety of ammunition types may be available. In addition to standard ammunition, there are various types of advanced munitions for use against high-priority targets.

Standard Munitions

The default munition is Frag-HE with a proximity or time fuze, except when the target is dug-in troops, vehicles, and equipment. These targets would be engaged with a 50-50 mix of point-detonating and short-delay-fuzed Frag-HE projectiles. Dug-in targets are assumed to have overhead cover for personnel positions and hull-down positions for vehicles. Frag-HE with a 25-75 mix of airburst and point-detonating projectiles is the preferred engagement when the target is unidentified troops and equipment.

Advanced Munitions

Field artillery targeting with advanced munitions prioritizes targets for engagement. Prioritization is essential to avoid the waste of highly capable, relatively costly munitions. Numerous factors can affect prioritization, with the following five determinants predominating:

- Classification of the target.
- Location accuracy.
- Timeliness of targeting data.
- Type of operation.
- Availability of advanced munitions.

Figure 7-27 indicates a relative priority of munitions against generic target types. A dash indicates that a particular munition type is not appropriate for a given target. The default munition in every case in Frag-HE.

Target Type	Munition Type							
	DPICM	SALP	APSM	ATSM	THMP[d]	SFSM[d]	Flechette	VEX
SP Artillery	4	3[b]	6	5	2	1	—	7
Towed or Unidentified Artillery	1	3[b]	5	6	—	—	2[e]	4
Lightly Armored Vehicle Column	3	4[b]	6	5	2	1	—	7
Heavy Armored/ Mixed Vehicle Column	4	3[c]	6	5	1	2	—	7
Electronics or Radar Sites[a]	2	3[b]	5	6	1	7	4	1
Armored CPs	4	3[b]	5	6	2	1	—	7
Unarmored CPs	3	4[b]	7	8	6	5	1	2
Prepared Fighting Position with Armored Vehicles	2	1[c]	6	5	4	3	—	7
Armored Missile or Rocket Launcher	4	3[b]	7	6	5	2	—	1
Unarmored Missile or Rocket Launcher	2	4[b]	8	7	6	5	3	1
Exposed Troops	2	4[b]	5	—	—	—	1	3
Dug-In Troops and Equipment	4	1[b]	5	—	—	—	2[e]	3
Field Logistics Site/Port[a]	2	3[b]	4	5	7	8	6	1
Airfield/FARP[a]	2	3[b]	4	5	7	8	6	1

[a] ATSM, THMP, and SFSM are only effective if vehicles are present.
[b] SALP with Frag-HE warhead is preferred, if available.
[c] SALP with HEAT warhead is preferred, if available.
[d] Targeting data for these munitions should be less than 10 minutes old for mobile targets.
[e] Flechette is second choice *only* if artillery is known to be towed or open-mount, or if dug-in troops or equipment lack overhead cover.

Figure 7-27. Targeting priority matrix for advanced artillery munitions.

Dual-purpose improved conventional munitions (DPICM). A DPICM round is a good general-purpose munition for most targets. Targets engaged by cannon-delivered DPICM have to be located to accuracy's no less than 200 m for group targets and 150 m for point targets. Targets engaged by MRL-delivered DPICM have to be located to accuracy's no less than 350 m for group targets and 250 m for point targets.

The preferred cannon engagement method for large-area targets (greater than 200 x 200 m) is at least one battalion (12 to 24 guns). Smaller targets are normally engaged by a battery (4 to 8 guns) and point targets by a platoon (2 to 4 guns). MRL engagements are normally by platoon or battery.

Semiactive laser-guided projectiles (SALP). Two classes of SALP exist for field artillery. The first is equipped with a Frag-HE warhead, and the other is equipped with a HEAT warhead, with a limited secondary fragmentation effect. The former is, like its unguided counterpart, more of a general-purpose munition. The laser guidance is simply a mechanism to get a projectile close to or atop the targeted point. While not primarily designed to penetrate armor, the kinetic energy of the impacting shell, delay fuzing, and the explosive lethal mechanism can result in extensive damage to tanks in virtually all cases.

OPFOR artillery units train under realistic field conditions in order to effectively use laser-guided munitions. The training includes both gun crews and laser target designator (LTD) operators engaging and destroying stationary and moving targets. The targets are arrayed as a potential enemy would deploy forces on the battlefield. Thus, the LTD operator develops the skills required to determine laser-guided munition targets and learns the conditions that either enhance or degrade the use of the munition. Predicting when a target will enter a kill zone is a very difficult task when using a laser-guided munition. Therefore, LTD operators learn how to plan kill zones along avenues of approach or counterattacks in order to engage and destroy moving targets.

Timeliness is critical during the engagement of a moving target. The likelihood of a SALP achieving a first-round hit is severely reduced if the projectile is not delivered on time. Even the likelihood of a second-round hit is diminished due to the variation in location of a moving target. Therefore, the employment of the SALP is enhanced through the training of units in preplanning kill zones. Prior to engagement, the LTD operator conducts a terrain reconnaissance of the kill zone using the laser rangefinder on the target designator. He predetermines the points of engagement covered by the SALP's seeker footprint. The battery FDC calculates gun range and azimuth settings in advance, and the gun crew chief records them. This translates into a higher probability of a first-round hit and destruction of the moving target. LTD operators and firing units train to the standard of achieving a direct hit on a moving vehicle on the first or second shot.

A major shortcoming of employing laser-guided munitions is the requirement to illuminate the target with the laser beam for 5 to 15 seconds. Long target-illumination times enable enemy targets equipped with laser warning detectors to effectively employ countermeasures that prevent the target from further illumination by the laser beam. Thus, the guidance of the SALP is disrupted, and the target survives the engagement.[18]

[18]The most effective means of protection are laser warning detectors that automatically cue grenade launchers to fire a number of smoke grenades within 2 to 3 seconds after detection of a laser beam. A smoke cloud builds up around the vehicle 6 to 8 seconds after firing. The smoke cloud bends or refracts the laser beam and provides a false homing point for the SALP. In essence, an effective laser protection screen is deployed around the target within 8 to 11 seconds after a laser detection.

An effective counter-countermeasure is the use of an initial laser offset procedure. This requires the LTD operator to first determine a land feature or easily referenced landmark within the kill zone. The operator surveys the kill zone for background conditions that may cause sufficient backscatter (from other reflecting surfaces) to provide the target early warning of the LTD laser beam. The LTD operator lases at the predetermined offset point (15 to 20 m from the target) at the beginning of the fire mission. Either a "munition approach" light-emitting diode on the shot-synchronization equipment or a blinking signal light in the optics of the LTD alerts the operator or his assistant to the SALP's acquisition of the laser beam. The operator begins shifting the LTD crosshairs to the center of the target 4 to 5 seconds after the signal prompt. The shifting of the laser beam from the offset point to the target is 2 to 3 seconds prior to the terminal phase of projectile flight. ***The offset procedure process takes a total of 6 to 8 seconds.*** Thus, the SALP is able hit and destroy the target prior to employment of laser countermeasures. The offset procedure requires a skilled LTD operator due to the requirement for increased hand and eye coordination during the laser beam-shifting process.

Antipersonnel scatterable mines (APSM) and antitank scatterable mines (ATSM). Although very different in effects, APSM and ATSM are nearly always dispensed together to make mineclearing operations more difficult. These mixed minefields can be dropped on the target directly or can be emplaced to retard traffic, either anticipated or confirmed. Target locations provided by radar or signals reconnaissance must be known with a location error of not more than 650 m for MRL scatterable mines and 350 m for cannon-delivered mines.

MRL engagements normally take place by battery or battalion, with AT mine densities of 0.005 to 0.01 mine/m^2 for an area minefield, or 1 mine per meter of frontage for a linear minefield. A common mix is one or two antipersonnel mines per every seven to nine AT mines. The maximum minefield size depends on the desired mine density but normally does not exceed 75 to 100 hectares. The desired method of engagement is mixed minefields, with batteries or platoons mixing one launcher carrying APSM and the remainder carrying ATSM. Moving columns may be engaged by MRL firing ATSM, with the mines acting as the primary damage-causing mechanism.

Cannon engagements invariably take place by battalion due to the large number of mines emplaced. A duty unit that is assigned the mining mission for a specific time is most likely to deliver cannon-delivered mines. This unit may constitute the commander's emergency scatterable mine capability, because of the cannon unit's ability to deliver mines in a wide variety of conditions. The maximum size of a cannon-delivered minefield would be 16 to 20 hectares.

One technique used to increase the effectiveness of advanced top-attack munitions is to immobilize the target first with mines. On-call mining missions from either cannon or MRL units can stop howitzers or MRLs using "shoot-and-scoot" tactics, with a follow-up engagement by top-attack munitions. This type of attack can enhance the effectiveness of both types of munitions.

The last-minute or surprise use of scatterable mines from MRLs or cannon artillery (or from minelayers, helicopters, or aircraft) increases the effectiveness of the minefield. The sudden introduction of minefields into areas thought to be clear can either delay the enemy or canalize him into other minefields or fire sacks. Enemy forces in such a case would have little to no intelligence as to the existence of these mines until it was too late and would have little time to organize clearing efforts.

One method is to lay MRL-delivered minefields in a "checkerboard" pattern of smaller (400 x 400 m) minefields. This makes it harder for the enemy to locate the separate fields and delays his mineclearing efforts. Repeated encounters with smaller minefields can cause him more attrition and confusion than a single, long minefield that he only needs to breach once. It can break up attacking formations and cause loss of morale and momentum. Breaching multiple minefields also can cause increased expenditure of mineclearing means.

Terminally homing mortar projectiles (THMP). THMP are generally limited to targets within 5 to 8 km of the forward edge. They are employed against vehicles of all types. However, they will generally be reserved for tanks and ATGM-firing vehicles. Although these munitions have a secondary fragmentation effect, they generally are not used against personnel.

THMP are generally fired by battery salvos (six to eight mortars) to maximize the number of engagements that occur in a relatively clean environment. Each platoon in the battery fires two to four mortar projectiles at each vehicle when vehicles are deployed in fighting positions and in columns with a spacing of 50 m or more. Vehicles that are tightly grouped (less than 50 m) or congested columns are engaged with several battery salvos. Each firing battery fires up to three to four rounds per tube to ensure the target area is covered.

If the targeted force is employing countermeasures such as thermal decoys or infrared-suppressive materials (that the firing unit considers to be effective), the firing unit uses the next best munition that is available. It does not use THMP if the target vehicles have negligible thermal signatures (engines not running or otherwise in low contrast with background or vehicles under trees). If countermeasures are of an unknown type or capability, the firing unit defers to the next best munition until it can determine the countermeasure efficacy.

Sensor-fuzed submunitions (SFSM). Although SFSM can be used against a wide variety of targets, armored vehicles of various types are the primary targets. These munitions have a relatively small search area and a kinetic-energy kill mechanism. Because of the accuracy of the delivery system and the small footprint, cannon-delivered SFSM can be used against targets 2 km or more from friendly ground forces.

The engagement is normally by platoon or battery, with each unit firing at a specifically targeted area. The size of target area can be up to 12 hectares for a firing platoon or 20 hectares for a battery. Larger targets will be divided up and engaged by separate platoons. The target-location error for employment cannot be greater than 350 m. Preferably, it should be less than 200 m. If only a small number of SFSM are available (four to five rounds per tube per day), then the firing unit would use the next best munition until the target location error is reduced below 200 m. Moving targets (such as convoys) will generally not be engaged by SFSM.

Flechette. Flechette-filled artillery projectiles are antipersonnel munitions that are highly lethal, as much as five times as lethal as conventional Frag-HE projectiles. They are useful against all targets with large numbers of personnel, excluding personnel in armored vehicles, bunkers, and field fortifications with overhead cover. Because of the shape, distribution density, and terminal velocity of flechettes, they are useful against personnel wearing woven-fabric body armor and against personnel in shallow trenches and positions without overhead cover.

Flechette projectiles require adjustment due to their use of mechanical time fuzes, and their effects are very sensitive to burst height. An offset adjustment is normally used to avoid warning the target. To maximize shock effects, an engagement with flechette projectiles normally occurs with a minimum of a battery (six to eight guns), and battalion massed fires are most desirable. The target area is normally 8 hectares or less for a single battery or battalion, with larger effects requiring multiple battalions.

Volumetric explosives (VEX).[19] The use of VEX is normally limited to MRL warheads, with diameters normally greater than 160 mm. These warheads are used against any target that has a target-location error less than 500 m and consists primarily of soft-skinned vehicles, personnel, and equipment presenting a large surface area (such as radars, bridging equipment, frame buildings, and aircraft on the ground). Increasing the accuracy of the delivery system can enhance VEX warhead effectiveness. For example, a course-corrected rocket can reduce dispersion in the target area.

Engagement with VEX warheads in normally by battery (six to eight launchers). Battalion missions would consist of three independent targets in the same vicinity. The maximum target size for a battery strike can be 25 to 36 hectares, depending on the hardness of the target. VEX warheads can also be targeted against minefields that use simple, single-impulse-detonated mines. VEX warheads are not used (except as a last resort) on targets that contain numerous armored vehicles or troops in extensive enclosed fortifications.

Precision Weapons

The OPFOR defines a ***precision weapon*** as one capable of delivering guided conventional munitions with a 50- to 60-percent probability of destroying enemy targets with a first-round hit (within range of the weapon delivery system). This capability is possible only by employing ***precision munitions*** that have a guidance or homing element. The presence of the precision munition transforms a weapon into a precision weapon. However, a precision weapon system must also incorporate a target acquisition and tracking subsystem and a missile or projectile guidance subsystem. Some of these subsystems may be combined.

Precision weapons have enabled the OPFOR to mass firepower at critical points on the battlefield and simultaneously reduce ammunition expenditure and mission time. A reconnaissance-fire complex (defined later in this chapter) is the most effective form of precision weapon system. This complex, sometimes called a unified precision weapon system, links the highly accurate weapon to an automated reconnaissance and control system.

[19] Artillery VEX are commonly referred to as fuel-air explosives or enhanced-blast explosives.

Precision munitions delivered by MRLs, cannon artillery, and mortars can include—

- SALP.
- SFSM.
- THMP.
- Artillery rounds with unguided antiarmor submunitions.

The artillery precision munitions are primarily designed to effectively defeat armored vehicles; SP artillery systems; MRLs; command, control, communications, computers, and intelligence (C^4I) centers; defensive fortifications; and bridges.[20]

The fielding of precision munitions provides distinct advantages for a cannon artillery unit. First, cannon artillery units are capable of firing at individual targets (to include pinpoint targets such as tanks, infantry fighting vehicles (IFV), or field fortifications) with a high probability of a first-round kill. For example, a unit firing 152-mm laser-guided projectiles (LGPs) can reduce its ammunition expenditure by 40 to 50 times, compared to using 152-mm conventional munitions, and also destroy the target three to five times faster. This eliminates the traditional requirement for an area fire or artillery barrage. Second, a cannon artillery unit can fire at group targets using the same gun settings computed relative to the center of mass of the group target.

Not all OPFOR artillery units have precision munitions, making it necessary to allocated those rounds available against high-value targets. Even the units that do receive them do not distribute them evenly among all available tubes, but typically designate one particular subelement to fire them. For example, a typical allocation for a 152-mm SP gun battalion that receives LGPs could be four equipment sets. Each set typically includes a laser target designator, a shot synchronization system, and 50 LGPs. Thus, an SP gun battalion could receive a total of 200 LGPs.

The commander of that battalion could designate one of his three batteries as the special-weapons or LGP battery. In turn, that battery commander designates one platoon (possibly on a rotating basis to maintain crew proficiency) as the principal LGP firing unit.[21] The LGP firing platoon retains 140 LGPs, with the 60 remaining projectiles distributed throughout the battalion at a rate of four LGPs per tube.

NBC Weapons

If needed, the majority of OPFOR artillery (152-mm and above) is capable of firing nuclear or chemical munitions. However, continued improvements in conventional munitions, especially precision munitions, increase the likelihood that the OPFOR can achieve operational- or tactical-level fire superiority at the desired location and time without resorting to NBC weapons.

[20] At the operational level, there are also SSMs with homing and guided warheads (some delivering advanced submunitions). Air-delivered precision munitions include homing and guided air-to-surface missiles (including radar-seeking antiradiation missiles); guided bombs and cluster bombs containing homing elements; and air-launched cruise missiles.

[21] The special weapons platoon might also be responsible for firing other special types on munitions. Thus, its combat load could include LGP, smoke, and illuminating rounds.

OPFOR military doctrine distinguishes between fire support and an NBC strike. However, the two are closely related. Strategic and operational fire support units must plan and deliver the strikes. In addition to nuclear-capable artillery, these strikes could involve SSMs, aircraft, or cruise missiles. Even tactical units would need to adjust their fire plan to account for the effects of NBC strikes on the enemy. Such strikes greatly affect the tempo of combat activity. This, in turn, influences the type of fire support required. It also influences the kind of logistics support needed, such as fuel or ammunition.

Logistics

The OPFOR applies the "push forward" concept of logistics. Units do not request ammunition; rather they are allocated ammunition in the fire plan by a number of units of fire to support the maneuver battle. Ammunition has the highest priority within the OPFOR supply system. The determination of required expenditures is the responsibility of the COA, while the deputy commander for the rear is responsible for delivery.

Ammunition Unit of Fire

A ***unit of fire*** is a planning and accounting unit of measure used in calculating the supply, allocation, and expenditure of ammunition. It provides a shorthand method for dealing with large amounts of ammunition. For more information on the use of this methodology, see Chapter 15, Logistics.

The most basic element of such calculations is the ***weapon UOF***. This is a fixed quantity, expressed in number of rounds, of ammunition of a particular type associated with a weapon or combat vehicle that uses that type of ammunition. However, this number may or may not be related to the ammunition-carrying capacity of the weapon or vehicle or associated means of transport.[22]

The UOF for a particular weapon is established by directive and does not change from that established norm. For example, the weapon UOF for 122-mm Frag-HE ammunition is 80 rounds, and the weapon UOF for 152-mm Frag-HE ammunition is 60 rounds. It makes no difference whether these howitzers are SP or towed.

An ***organizational UOF*** relates to the total quantity of ammunition for all weapons in a given unit that use a particular type of ammunition. This quantity represents the weapon UOF multiplied by the total number of weapons in the unit that use this ammunition (by caliber and type). The same unit (or artillery group) would also have organizational UOFs of various sizes for all the other ammunition types expected to be used by the total number of weapons of all types present in that unit.

[22] The OPFOR uses the term ***combat load*** for the number and types of rounds carried on board a system or its prime mover. In some cases, the combat load also includes rounds carried on organic transport vehicles in the firing unit.

For example, a battalion of eighteen 122-mm howitzers would have a battalion UOF of 1,440 Frag-HE rounds (18 x 80). For 152-mm howitzers, a battalion of 18 would have a battalion UOF of 1,080 Frag-HE rounds (18 x 60), and a battalion of 24 would have a battalion UOF of 1,440 Frag-HE rounds (24 x 60). An artillery regiment with two 122-mm howitzer battalions would have a regimental UOF of 2,880 122-mm Frag-HE rounds. A BRAG consisting of one 122-mm howitzer battalion, one 18-tube 152-mm howitzer battalion, and one 24-tube 152-mm howitzer battalion would have an organizational UOF of 1,440 122-mm and 2,520 152-mm Frag-HE rounds.

Logisticians use organizational UOFs to determine ammunition stockage and transportation requirements at various levels in the logistics chain. They have tables to convert the number of UOFs into the number of metric tons to be moved or held in stocks. Artillery planners use organizational UOFs as a means of expressing expected ammunition consumption for a particular combat action and for allocating ammunition to subordinates for particular missions. At the lowest levels, fire plans for artillery battalions and batteries normally convert the UOFs back into rounds.

A ***mission allocation*** is the actual number of rounds (expressed in organizational UOFs) allocated to a unit for mission accomplishment. It is a multiple (or fraction) of the organizational UOF allocated to a particular unit based on its mission and the enemy situation. This mission allocation includes the amount of ammunition carried by the unit (combat load) and transported by unit trains; it may also include some ammunition to be delivered from mobile stocks at the next higher headquarters. For example, Figure 7-28 shows examples of mission allocations a BRAG might receive of Frag-HE rounds for its artillery weapons, based on expected expenditure by phase, for a given offensive or defensive action.

Offense	
Phase	**UOFs**
Fire Support of Movement Forward	0.5
Fire Preparation for Attack	1.3
Fire Support of Attack	0.3
Fire Accompaniment	0.9
Total	**3.0**

Defense	
Phase	**UOFs**
Fire Interdiction	0.4
Fire to Repel Enemy Attack	0.6
Fire Support of Defending Troops	0.6
Fire Destruction of Enemy During Counterattack	0.4
Total	**2.0**

Figure 7-28. Mission allocations (examples).

The examples of artillery UOFs in Figure 7-28 are for Frag-HE rounds only. Normally, ammunition supply points issue Frag-HE shells. They may keep some illuminating and smoke rounds in stock, but these are not part of the normal UOF batch. The basic UOF does not include special rounds, such as smoke, illuminating, concrete-piercing, incendiary, leaflet, or laser-guided projectiles. The various kinds of special rounds may come in their own UOFs (possibly differing in number of rounds from the UOF for Frag-HE), in sets of rounds, or by individual rounds. Units must put in special requests for special rounds, and they receive their allocations of such rounds in separate lots. For example, a 122-mm howitzer battalion supporting an attack that begins just before dawn might receive 0.3 UOF of Frag-HE rounds and 0.1 UOF of illuminating rounds. Another battalion could receive 1.0 UOF of Frag-HE and 50 to 70 illuminating rounds.

Resupply

The OPFOR uses standard cargo trucks as resupply vehicles for cannon and mortar systems; for towed systems, they also serve as prime movers. The only dedicated ammunition resupply vehicles are for some MRL systems. These vehicles have the same chassis as the rocket launcher and are fitted with racks to hold the rockets during transport. Resupply vehicles for large-caliber MRLs have cranes for reloading the launcher.

To the maximum extent possible, the ammunition remains loaded on resupply vehicles to maintain mobility. In most cases, the ammunition packaging is designed so that two men can easily move any single item, lessening the requirement for materiel-handling equipment at ammunition transfer points and in the firing position.

To facilitate the movement of ammunition, general practice is to establish ammunition transfer points for each artillery group. Under normal circumstances, the battalion sends its resupply vehicles to this point to pick up ammunition and deliver it to the firing unit. Transport units may skip an echelon, if necessary, to keep units resupplied. Whenever feasible, the transport unit offloads in the firing position any ammunition the firing unit will consume prior to repositioning. This is often the case for towed cannon and mortar units or for other units in the defense or during the preparation for the attack.

Reconstitution/Reorganization

Restoring combat effectiveness of subordinates is one of the most important duties of artillery battalion and battery commanders. It includes—

- Determining the degree of combat effectiveness of subordinates.
- Detailing missions to subordinates that are still combat-effective.
- Withdrawing units from areas of destruction or contamination.
- Providing units with replacement personnel, weapons, ammunition, fuel, and other supplies.
- Restoring disrupted C^2.

The OPFOR makes an effort to keep some units at full strength rather than all units at an equally reduced level. Usually, the unit with the fewest losses is the first to receive replacement personnel and equipment. However, once the casualties or equipment losses are sufficient to threaten the total loss of combat effectiveness, the commander may apply the concept of composite unit replacement. The composite unit concept involves a unit formed from other units reduced by combat action.

MARCH

As a rule, an artillery battalion or battery moves as part of the march column of an artillery or maneuver unit. In a tactical march, in anticipation of engagement with the enemy, primary consideration is to ensure the artillery unit's constant readiness for rapid deployment and opening fire.

Depending on conditions, an artillery battalion may be attached to an advance guard or FD, or it may be directly subordinate to the maneuver brigade commander. In some cases, an artillery battalion may march as an independent column on a separate route.

The maneuver battalion commander determines the place of an attached artillery unit within his march column; usually, the artillery unit moves at the tail of the battalion column, and the artillery unit commander, with communications equipment, moves with the maneuver battalion commander. An artillery battery can march as part of a forward, flank, or rear security element; in an advance guard; or as part of the artillery battalion. If the artillery battalion is marching on a separate route or as part of an artillery regiment, the battalion commander and usually his chief of staff march at the head of the battalion column and the battery commanders at the heads of their columns.

March Planning

The artillery battalion commander organizes his unit's march based on the combat order or instruction received from the senior artillery or maneuver unit commander. The commander of an attached artillery battalion must report his march plan to the maneuver unit commander. When in a supporting status, the artillery battalion commander reports to the maneuver unit commander on missions and directives received from the senior artillery commander.

The artillery battalion commander studies the march route and plans firing position areas and sites for his COP and other OPs on that route. He can send out an artillery reconnaissance patrol to reconnoiter those sites.

When the artillery battalion marches as a whole, march planning is much the same as outlined in Chapter 3. In addition, the battalion commander determines—

- The alignment of the artillery battalion column.
- The location of the battalion and battery commanders, the battalion chief of staff, and the battery senior officer in the march column.
- For batteries in the artillery battalion march column, their sequence of deployment and missions at lines of possible encounter with the enemy.
- The distribution of batteries to reinforce maneuver units during the march or upon engagement.
- For a battery or artillery reconnaissance patrol/squad assigned to an FSE or advance guard, the time and place to join that march security element.
- The composition and mission of artillery reconnaissance patrol(s).
- Procedures for employment of the MRP.
- Observation and communications procedures during the march.
- The organization of C^2 on the march and during engagement.

In his march order, the artillery battalion commander designates the succession of command. For example, the succession could be the battalion chief of staff and then one of the battery commanders.

Fire Planning

Prior to the march, the artillery battalion commander reports to the senior artillery or maneuver unit commander to whom he is subordinate. He informs that commander of the amount of artillery systems, ammunition, and fuel available. After assessing the situation, he reports what his battalion is capable of doing with the available artillery systems and ammunition in various contingencies. Figure 7-29 shows examples of tentative fire plans for such contingencies.

Artillery Battalion with 1.2 UOF Available			
Action of Maneuver Unit	**Action of Artillery**	**Type of Fire**	**Ammunition Expenditure (UOF)**
Defending an Occupied Area	Neutralize Approaching Enemy	Fire Concentration (on 2-3 Targets)	0.2-0.3
	Repel an Enemy Attack	Rolling Barrier Fire (on 2-3 Lines) and Standing Barrier Fire (on 1-2 Lines)	0.3-0.5
	Engage Individual Targets	Fire on Individual Targets (on 10-12 Targets)	0.4
Artillery Battalion with 1.2 UOF Available			
Meeting Battle	Neutralize Enemy Deploying for Battle	Fire Concentration (in 2-3 Sectors)	0.2-0.3
	Repel Enemy Attack and Cover Flanks	Standing Barrier Fire (on 2-3 Lines)	0.2-0.3
	Engage Individual Targets	Fire on Individual Targets (on 12-16 Targets)	0.5-0.6

Figure 7-29. Artillery battalion tentative fire plan (examples).

During the course of the march, the artillery unit commander refines or revises the fire plan, based on newly acquired information about the enemy or guidance from the senior commander. However, detailed fire planning normally occurs only when the supported unit it about to transition from the march into offensive or defensive action. Only then can the plan indicate specific sectors, lines, or targets for artillery fires.

The commander of an artillery battalion attached to a maneuver battalion can also propose the allocation of his batteries for supporting maneuver companies. For example, he could recommend allocating one battery to each of two first-echelon companies and keeping the third battery on standby. In that case, the battery commanders would march with the commanders of the supported companies; the commander of the standby battery and the artillery battalion commander would march with the supported battalion commander. If a mechanized infantry battalion plans to deploy in a single echelon, he may recommend that the mortar battery support one of the companies.

If an artillery battalion is attached to an advance guard, the commander of the advance guard battalion may further allocate one of its batteries to the FSE. If the FSE encounters a small enemy force, it may destroy them on the move. If it encounters a superior enemy force, the artillery battalion attached to the advance guard deploys into battle formation to repel the enemy attack or support the holding of the area until the rest of the brigade arrives; it also must develop a fire plan to support the deployment of the brigade's main body.

Artillery Reconnaissance

If an artillery battalion marches as part of the advance guard, the battalion intelligence officer can direct an artillery reconnaissance patrol (or at least a few artillery reconnaissance personnel) to move forward with the FSE. The battalion's own artillery reconnaissance patrol typically follows the FSE. The artillery battalion commander maintains radio contact with his intelligence officer and the commander of the artillery reconnaissance patrol.

Artillery reconnaissance squads or patrols of the artillery battery or battalion in the advance guard main body may march with the FSE to conduct route reconnaissance. If the FSE encounters the enemy, artillery reconnaissance assists other reconnaissance assets in gathering information on the enemy force, particularly the coordinates of any detected weapons. If the advance guard assumes a defense, artillery reconnaissance selects locations for COPs and other OPs in the defensive area. It also determines lines for concentrated fire, rolling or standing barrier fires.

OFFENSE

Artillery support plays an important role in the integrated fire support planned to weaken the enemy by the continuous supporting fire through the depth of the his defense. Therefore, artillery support takes place to the entire depth of the division's combat mission and across its entire zone of attack, as well as on axes of independent tactical missions. It delivers fires in designated areas at the appointed time in order to gain and maintain fire superiority over the enemy. The types and duration of fires vary with circumstances.

Deployment

Generally, the artillery or mortar system should be available to fire one-half to two-thirds of the maximum range of the weapon ahead of the lead element. Figure 7-30 shows some general guidelines for artillery deployment in the offense. However, the actual distance from the forward edge can vary from these general guidelines, based on the tactical situation and the range capabilities of the particular weapon systems.

Systems	Mortars	Cannon Systems	MRLs
Distance from Forward Edge of Enemy Defenses	500-1,000 m	1-4 km (BRAG) 3-6 km (DAG) 4-8 km (AAG)	 3-6 km (DAG) 4-8 km (ARAG)

Figure 7-30. General deployment guidelines for artillery in the offense.

Types of Fire

For offensive fire support, artillery can use the following types of fire: fire against individual targets, fire assault, controlling fire, fire concentration, massed fire, standing and rolling barrier fires, successive fire concentration, rolling barrage, and moving fire zone. Since barrier fires are more common in the defense, see the Defense section of this chapter for more detail on them.

Fire Against an Individual Target

A battery, platoon, or single artillery piece can deliver fire independently against a single target by either direct or indirect fire. Examples of single targets are—

- Individual weapons (ATGM launcher, recoilless gun, tank, APC, or machinegun), either dug-in or in the open.
- OPs, mobile or dismounted.
- Radars.
- Fortifications.

To annihilate armored targets or destroy weapons dug-in in permanent emplacements by direct fire, it is normal to assign one or two guns per target. When delivering indirect fire, a battery may engage one target. If it fires by platoon, it can engage two targets simultaneously. In the latter case, the battery commander normally controls one platoon and the platoon leader of the battery's control platoon controls the other firing platoon.

Fire Assault

Fire assaults are the major subelements of an artillery preparation for an attack or counterattack. Their purpose is to annihilate or neutralize targets. Surprise and a high density of fire on the target characterize the offensive fire assault. Most or all of the artillery assets organic or allocated to a division carry out these assaults simultaneously on a large group of targets. Each assault consists of several batteries or battalions firing against an individual target or group of targets. Factors determining the number of fire assaults on a target are—

- The nature of the target to be destroyed.
- The number of rounds allocated for its annihilation or neutralization.
- The range to the target.
- The number of tubes available.
- The types of ammunition available.
- The time required for artillery to prepare and expend the rounds allocated.

The duration of the fire assault depends on the tactical situation and the maximum rate of fire of the weapons firing the mission. A fire assault of a given duration typically begins with rapid fire of two to four rounds per weapon. After one minute, it continues with deliberate fire at a rate that uses the allocated ammunition in the time allotted for the mission. When it is necessary to destroy a target in the shortest possible time, planners do not fix the duration of the assault. Instead, the firing units conduct the mission at rapid fire until they expend the allocated ammunition.

Controlling Fire

Artillery can deliver controlling fire on a target in the intervals between fire assaults on the same target. Controlling fire denies the enemy the freedom to conduct combat activity and prevents his escape before the next fire assault. The planner uses this method when the interval between fire assaults exceeds 15 minutes. A single battery usually conducts this fire at a systematic

rate of fire, rapid fire, or a combination of the two. Ammunition expenditure during controlling fire is about one-tenth to one-fifth of the norm for neutralization.

Fire Concentration

Several batteries or battalions may simultaneously conduct a fire concentration against a common target. It can be against a single target or a group of targets. Artillery units can use this type of fire against various observed and unobserved targets, including—

- Personnel and weapons in strongpoints and concentration areas.
- CPs.
- Artillery and mortar batteries.
- Unit columns.

The dimensions of the fire concentration target area depend on the fire mission and the firepower of the artillery unit firing the mission. Batteries and battalions conduct fire concentrations with all weapons firing at once on the center of the target area. All weapons may fire on the same range and deflection settings, or some units may use different settings. This depends on factors such as target disposition and whether the target is observed.

Massed Fire

All or most of a division's artillery can mass fires against one or more important objectives, with the goal of destroying the target in the shortest possible time. This massed fire can be one large fire concentration or several large fire concentrations fired simultaneously. Before conducting massed fire, each firing unit is assigned a target area. If the dimensions of the target area do not exceed 800 by 800 m, all participating artillery groups fire simultaneously on the center of the target area, applying the principles used for fire concentrations. If the target area is larger than 800 by 800 m, it is necessary to divide into smaller targets or target sectors. The fire planners designate targets or target sectors to the assigned artillery groups or units to annihilate or neutralize with fire concentrations. The artillery units fire the mission simultaneously to the extent possible.

Successive Fire Concentrations

Successive fire concentrations primarily support the offense, but can support counterattacks during the defense. In the attack, artillery delivers this type of fire when the supported maneuver unit begins the final assault on enemy defensive positions. Figure 7-31 shows an example of a successive fire concentration. The artillery fires concentrations for the successive neutralization or annihilation of specific targets or target groupings deployed to the front and on the flanks of attacking troops. Figure 7-32 shows ammunition expenditure norms for a successive fire concentration.

Fire planners group identified targets into a series of lines. Each line consists of targets that are roughly the same distance from the forward edge. The first line of concentration covers the defender's forward positions. Subsequent lines of concentration are 300 to 1,000 m apart through the depth of the enemy's defenses. Planners assign each line a name, which also serves as the signal for opening fire on that line or shifting fire to it. Successive fire concentrations may be fired on one, two, or three lines simultaneously.

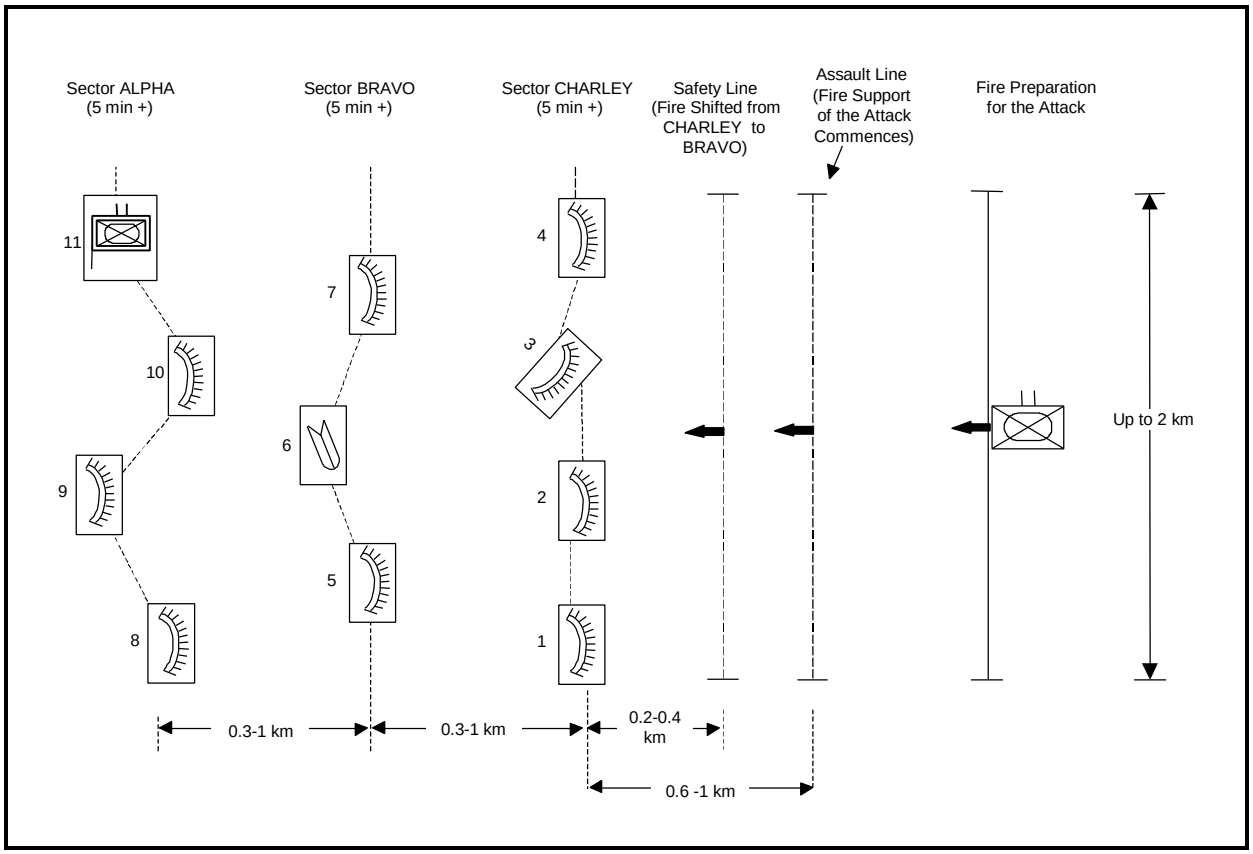


Figure 7-31. Successive fire concentration (example).

	Number of Rounds per Minute							
Nature of Target	**Cannon Systems**						**Mortars**	
	76-mm	85-mm	100-mm	122-mm	130-mm	152-mm	120-mm	160-mm
Grouped Target (Per Hectare)	9	8	6	4	3	3	3	2
Individual Target (Per Target)	18	16	12	8	6	6	6	4
Expenditure for the second successive fire concentration line may be 1/2 to 2/3 of these norms.								

Figure 7-32. Ammunition expenditure norms per minute
for conducting successive fire concentration.

In a single successive fire concentration, an artillery unit or group fires initially on the single line of targets closest to the attacking troops. It shifts the single fire concentration to progressively deeper lines or groups of enemy targets as the supported attacking troops advance. The principal weight of fire concentrates on neutralizing the enemy's forward defensive positions.

A double successive fire concentration requires two artillery groups, or two elements of an artillery group, to fire simultaneously. The first element fires on the line of targets closest to the supported attacking troops. The second group or element fires on the next line of targets. The first group or element then shifts its fires from the first line of concentration to the second line. The second group or element shifts its fires from the second line to the third and so on. In a double successive fire concentration every line of targets, except the first, receives fire twice.

The successive fire concentration normally begins at the signal of the maneuver division commander, when attacking troops begin to deploy into a battle formation at the assault line. Here, preparatory fires give way to supporting fires. The time required for troops to travel from here to the troop safety line is important, since it determines the duration of fire on the initial line of targets (concentrations). As the maneuver units reach the safety line for each line of concentration, the supported maneuver brigade or battalion commander gives a signal to shift fire to each subsequent line of concentration.

On each successive fire concentration, the fire planner assigns concentration sectors to every battalion or battery firing the mission. An artillery battalion typically can engage one group target (such as a platoon strongpoint) or two to three single targets on each line. The size of a group target for a battalion should not exceed nine hectares. A battery can deliver fire as part of a battalion or independently. Firing independently, a battery typically engages one target that is no larger than three hectares.

When necessary, artillery battalions or batteries may receive additional missions to deliver fire concentrations or fire against single targets that fall between the lines of the successive fire concentration. This is particularly the case with enemy AT weapons.

Rolling Barrage

The support of the attack phase can use the rolling barrage. The rolling barrage is a continuous curtain of fire. It shifts fires from one phase line to another in front of attacking troops. Like the successive fire concentration, it may be fired against a single line or against two lines simultaneously. The supported maneuver commander orders the fires to shift to support the advance. The rolling barrage differs from the successive fire concentration in that it assumes a uniform distribution of targets throughout the target area. It then shifts fire between uniformly spaced phase lines, while the successive fire concentration focuses on targets that require concentrated fires. The rolling barrage may have a fire concentration superimposed to ensure the destruction of the most important targets.

In the rolling barrage, main phase lines are planned every 400 to 800 m. The spacing depends on the density of targets in the target area. Planned intermediate phase lines are every 100 to 300 m. Artillery units fire on each main phase line for at least 5 minutes at an ammunition expenditure rate in number of rounds per 100 m per minute established by norm (see Figure 7-33). They fire on each intermediate line for 1 to 3 minutes at the same rate. A rolling barrage has battalion and battery sectors with standard widths as outlined in Figure 7-34.

Nature of Target	Number of Rounds per Minute							
	Cannon Systems						Mortars	
	76-mm	85-mm	100-mm	122-mm	130-mm	152-mm	120-mm	160-mm
Primary or Intermediate Phase Line (Per 100 m)	18	16	12	8	6	6	6	4
In a double rolling barrage, sector widths for the second artillery group or element may increase by 1.5 to 2 times. This can result in a reduction of expenditure (per 100 m) to 1/2 to 2/3 of these norms.								

Figure 7-33. Ammunition expenditure norms per minute per 100 m of rolling barrage frontage.

Type of Weapon	Widths (m)		
	Per Weapon	Per Battery	Per Battalion
Field Guns	20-25	150	450
Howitzers	35	200	600-650
In a double rolling barrage, sector widths for the second artillery group or element may increase by 1.5 to 2 times.			

Figure 7-34. Sector widths for rolling barrage.

As with a double successive fire concentration, a double rolling barrage involves the fires of two artillery groups, or two elements of an artillery group. In this case, the first group or element delivers fire as in a single rolling barrage. The second group or element fires only on the main phase lines, beginning with the second line.

The maneuver division commander gives the order to open fire on the first phase line. The maneuver brigade commander gives the order to shift from a main phase line; this order goes directly to commanders of artillery battalions delivering fire in support of a given brigade. The artillery battalion commanders shift fires automatically from intermediate lines in accordance with a timed firing program. The depth of a rolling barrage depends on the nature of the enemy's defenses, the attack plan, and the availability of artillery and ammunition. Normally, there is a rolling barrage through the depth of the defenses of the enemy's first-echelon battalions. The rolling barrage requires a great deal of ammunition and is not, therefore, the most likely method of offensive fire.

Moving Fire Zone

A moving fire zone is a deep, continuous fire curtain, created concurrently on three or more lines ahead of the attacking forces. This method is particularly effective on the main attack axis during the penetration of an enemy defense saturated with a large quantity of AT weapons. Ammunition expenditure for sectors of moving fire zone is in accordance with norms for a rolling barrage (see Figure 7-33). This requires a large amount of ammunition and artillery systems. Therefore, it often takes place in conjunction with other, less resource-intensive types of fire.

A moving fire zone can involve several artillery battalions. At least one battalion fires on each line of the zone. On a given line, each artillery battalion has an assigned sector usually equal to the frontage of an attacking maneuver battalion in the strike sector. Each battalion sector is further divided into battery sectors.

As with a successive fire concentration or rolling barrage, the first line of moving fire zone is usually at the forward edge of enemy defense. Fire on this line and other lines lifts at the signal of the brigade commander, when the attacking units reach the safety line.

Successive lines are 150 to 200 m apart in depth, depending to the nature of enemy defense and the terrain. Depending on the number of artillery battalions participating and the distance between lines, the moving fire zone can fire simultaneously on several lines of targets covering a total depth of 400 to 600 m or more. As the battalions shift their fires to successively deeper lines, the fire zone moves progressively deeper. It usually lasts until the penetration reaches the depth of the defense of enemy first-echelon battalions.

The batteries deliver fires on their respective sectors of the lines of the moving fire zone at one range setting and one deflection setting with sheaf covering the width of the battery sector. They begin firing by rapid fire and continue by systematic fire at the established rate.

The first element of the artillery group (one or more battalions) fires on the first line until receipt of the signal to shift fire to the next line. If the signal has not occurred by the end of the planned time of delivering fire on a given line, the batteries continue with systematic fire at the established rate until receipt of the signal. The remaining artillery battalions fire on their deeper lines until the first element receives its signal for shifting fire; then the commanders of these artillery battalions give the commands for shifting fire to the next lines independently.

Target Priorities

Actual target priorities will vary based on the enemy situation, the OPFOR maneuver plan, and the artillery weapons and munitions available. Generally, the highest priority targets, in the approximate order of importance, are—

- Precision and NBC weapons.
- Conventional artillery and air defense systems and mortars.
- Defensive strongpoints, especially ATGMs and tanks within them.
- Command posts, observation posts, communications, and radar facilities.
- Reserves and logistic support units and routes units could use when moving up to counterattack.

With the possible exception of precision and NBC weapons, the priority each target receives can obviously vary according to the situation and the stage of the battle. For example, enemy reserves are a high priority at the time of commitment of a second echelon.

Fire Planning

Planners follow specific principles when developing offensive fire plans. Their plans are also influenced by targeting priorities. The single, coordinated fire plan includes precision weapons, conventional fires, fixed-wing aircraft, and fire support helicopters, plus any contingency plans for NBC strikes.

Artillery fire planning for an attack is a deliberate and precise process. Planners consider weapons and ammunition available, target characteristics, and the plan of the maneuver commander in terms of target damage criteria. If the ammunition available is limited, the maneuver commander may have to accept a lower level of damage.

Nature of Attack	Tubes per km of Strike Sector
1st Echelon on Main Attack Axis	
Against Well-Prepared Defense	60-100
Against Partially Prepared Defense	60-80
1st Echelon on Supporting Attack Axis	40
Commitment of 2d Echelon	50-60

Figure 7-35. General norms of tubes per km of strike sector during preparation for attack.

Operational Level

The ***army group CMTA*** begins the planning process by assessing the requirements for artillery preparation for the attack. Since that phase requires the greatest density of artillery fires, the other phases can make do with this amount of artillery. Lacking information of specific targets at this point, the CMTA uses the general norms for number of tubes per km of strike sector frontage. These norms indicate the density of fire typically required to achieve at least neutralization (30 percent destruction) of targets in the strike sector, depending on the tactical situation. This does not mean that the required number of tubes must be physically located in that narrow a sector, but only that they must be able to concentrate their fire on the sector. Figure 7-35 gives some average guidelines for desired densities.

These densities include all calibers of canon systems and mortars that can deliver fire on the strike sector. However, planners often use a 152-mm artillery piece as the basis of density calculations. In that case, there are coefficients for converting actual artillery pieces of various calibers into 152-mm equivalents. (See Figure 7-36 for examples.) Densities computed in number of tubes may increase by 50 to 75 percent when the fire planners include MRLs. Density figures can be reduced if direct air support is available.

	Cannon Systems				Mortars	
Caliber (mm)	120/122	130	152	203	120	240
Coefficient	0.8	1.0	1.0	2.5-3.0	0.6	2.5

Table 7-36. Coefficients for conversion of tubes per km of strike sector from 152-mm to other calibers (examples).

The CMTA thus calculates artillery requirements in terms of the number of battalions needed for the strike sector. Then, he compares this with the number of battalions available in first-echelon armies. The difference indicates how many additional battalions the army group must provide to its first-echelon armies.

The ***army (or corps) CMTA*** must distribute the army's organic artillery and that received from army group to first-echelon divisions. If he has information on specific targets, he can use the hectare method to determine artillery requirements. If he still lacks information on specific targets, he uses the general norms for tubes per km of strike sector. By one method or the other, he determines the number of battalions and artillery headquarters needed. Then he compares this with the available artillery of the army's subordinate divisions and regiments on the main attack and supporting axes, including supporting artillery from the AAG and ARAG. He considers various options and determines first how many additional artillery battalions to attach to each first-echelon division. Then he calculates the artillery support required for commitment of the army's second echelon or CAR, including support from the AAG and ARAG, and from first-echelon divisions. The general density norm in this case is about 50 to 60 tubes per km of width of the planned axis/line of commitment. (It is also possible that the army commander could calculate the width of his strike sector based on the number of artillery battalions available.)

Division Chief of Artillery

At division level, artillery planning becomes more detailed. There is usually a list of specific targets for the preparation phase; so the division COA can use ammunition expenditure norms to determine the number of rounds required to achieve the desired level of destruction of specific targets identified in the division zone of attack. (See Figures 7-14 and 7-15.) Based on the rate of fire of available weapons, he can calculate the number of tubes and batteries needed to fire that number of rounds in the time allotted for the preparation. Then he compares this requirement with the number of battalions available at division level and in the first-echelon brigades, including support from higher echelon (AAG and ARAG).

At division level, the COA must also calculate artillery requirements for the support of the attack phase. He must determine the number of main and intermediate fire lines for support of the attack and the time required on each line, assuming the rate of advance of the attacking troops. For ammunition expenditure norms, he would use tables such as Figures 7-32 and 7-33.

The division COA calculates the distribution of artillery to BRAGs. If necessary, he can base this calculation on general norms. However, it is more likely that he and his staff would use a detailed analysis of the quantity of specific targets for each brigade. After determining the number of battalions needed, he compares this with the number of battalions available; this includes all battalions organic at division level and in first-echelon brigades, plus support from the DAG and/or higher-level artillery groups. Then he determines the number of battalions to attach to the first-echelon brigades.

Maneuver Battalion

In his combat order, the maneuver battalion commander indicates the following in the combat order for an organic mortar battery and any artillery attached to him or his subordinates:

- Targets for annihilation and neutralization during the fire preparation for the attack and with the start of the attack and whom to support.
- Missions for supporting commitment of the second echelon and repelling enemy counter-attacks.
- Firing positions; the route and sequence of advance to them; readiness time for opening fire.
- The sequence of relocation during the course of combat.
- Actions after carrying out the immediate and subsequent missions.

He also issues instructions for coordination between maneuver and artillery units. For the period of fire preparation of the attack, he instructs subordinate commanders as to what targets artillery is to neutralize by indirect fire in front of the battalion's zone of advance. He also identifies targets are to be destroyed by direct fire from artillery and/or tanks and other direct-fire weapons during the preparation and the support of the attack phase, up to the accomplishment of the battalion's immediate mission.

For the time of carrying out the subsequent mission, the maneuver battalion commander coordinates the actions of tank and mechanized infantry units with artillery fire. He instructs the maneuver unit commanders as to the order of artillery support of the attack and changing of positions by supporting artillery and mortars. He also coordinates artillery fire with the maneuver by units when seizing enemy strongpoints.

Artillery Battalion

The commander of an artillery battalion *supporting* a maneuver battalion may participate in commander's ground reconnaissance with the commander of the BRAG and then conduct ground reconnaissance with his own subordinate artillery battery commanders. After that, time permitting, he may also participate in ground reconnaissance being conducted by the supported maneuver battalion commander. During the latter, the maneuver battalion commander may direct him to inform the other officers of the artillery tasks to be carried out in front of the battalion's zone of advance.

An artillery battalion bases its fire plan on its portion of the fire plan of the senior artillery group or unit commander. Figure 7-37 shows an example of a fire plan for a 122-mm howitzer battalion that is part of a BRAG. Since the maneuver brigade in this example is conducting an attack from positions in direct contact with the enemy, there is no need for a separate phase of fire support of the movement forward. During the preparation phase and the initial fires of the support of the attack phase, this howitzer battalion has the mission of supporting a maneuver battalion. Thus, the initial fire plan in the example provides detailed information on times, targets, firing units, and ammunition expenditure only for those two periods. Attached to the actual fire plan would be a list of target coordinates. During the support of the attack, in this example, the howitzer battalion may revert to centralized control of the BRAG for on-call fires to repel an

enemy counterattack. In this example, all that is known of the accompaniment phase is the estimated total ammunition expenditure. In some cases, it may be possible to identify in advance specific targets or lines for fires during accompaniment. This example does not indicate the command relationship for the accompaniment phase.

Actions of Maneuver	**Fire Preparation for the Attack** Total Rounds 1584 (1.1 UOF)					
Units	**Time**	**Method of Fire and Targets**	**Signals**	**1st Btry**	**2d Btry**	**3d Btry**
At H-40, start deployment into battalion columns	H-40 to H-27 (13 min)	Fire Assault: Artillery and mortar batteries, CPs, radar, platoon strongpoint of companies in 1st echelon of defense.	Green flares Snowstorm 2121 (Radio/Telephone)	Tgt 60: 90 rds Sector 11: 120 rds	Tgt 18: 140 rds Sector 11: 90 rds	Tgt 40: 80 rds Sector 11: 120 rds
At H-25, reach line for deployment into company columns	H-27 to H-17 (10 min)	Fire Assault: Platoon strongpoints within deeper defensive positions; destruction of targets by direct fire; controlling fires against artillery and mortar batteries.	Star flares Hail 3131 (Radio/Telephone)	Sector 16: 120 rds Tgt 69: 14 rds	Sector 16: 165 rds	Sector 16: 165 rds
Deploy into battle formation and at H-7 reach assault line	H-17 to H-5 (12 min)	Fire Assault: Platoon strongpoints within companies of first echelon of defense.	Yellow flares Rain 4141 (Radio/Telephone)	Sector 11: 120 rds	Sector 11: 150 rds	Sector 11: 150 rds
Begin final movement to attack	H-7 to H-1 (6 min)	Overlapping Fire: 1st Battery fires at artillery and mortar batteries.	Yellow flares Rain 4141 (Radio/Telephone)	Tgt 60: 60 rds		
	Fire Support of the Attack Total Rounds 1152 (0.8 UOF)					
	Time	**Method of Fire and Targets**	**Signals**	**1st Btry**	**2d Btry**	**3d Btry**
Continue movement to attack. At H-hour, attack enemy at forward edge and destroy defensive positions of his 1st-echelon battalions	H-5 to H-Hour (5 min)	Successive Fire Concentration on the following lines: 5-minute fires on Line 1 Wolf (Sector 11)	Line 1 Wolf Green flares Hurricane 5555 (Radio/Telephone)	Overlapping fires, as above	45 rds	45 rds
	On Call (5 min)	5-minute fires on Line 2 Rat (Sector 21)	Line 2 Rat Star flares Thunder 6666 (Radio/Telephone)	50 rds	50 rds	50 rds
	On Call (5 min)	5-minute fires on Line 3 Tiger (Sector 16)	Line 3 Tiger Yellow flares Typhoon 7777 (Radio/Telephone)	32 rds	32 rds	32 rds
Repel counterattack by enemy brigade reserves	On Call*	Fire Concentrations Fire on Individual Targets Barrage Fires	Jackal	Readiness to open fire on targets 20, 25, 32, 33, 69, 71 Targets A and B		
Develop attack into depth of enemy 1st-echelon brigade	**Fire Accompaniment of the Attack** Total Rounds 1008 (0.7 UOF)					

* Overlaps transition from preparatory to supporting fires.

** These fire concentrations and barrage fires are contingency plans to use depending on the progress of the attack. Of the total of 1152 rounds allocated to the support phase, only 336 are for the planned successive fire concentrations. The remaining 816 rounds are for engaging contingency on-call targets and other targets newly identified during this phase.

Figure 7-37. Illustrative fire plan for 122-mm howitzer battalion

in attack from positions in direct contact (example).

An artillery battalion *attached* to or supporting the maneuver battalion may have some of its batteries tasked to *support* first-echelon maneuver companies during the artillery support of the attack. The entire artillery battalion may have tasks during the preparation and accompaniment phases, including support for the commitment of the maneuver battalion's second echelon and repelling enemy counterattack.

Phases of Offensive Fire Support

The goal of offensive fire support is to provide continuous supporting fires throughout the attack zone and to the depth of the enemy defense. Fire support in an offensive begins before the supported maneuver unit starts it attack and continues until that unit has achieved its immediate and subsequent missions. Thus, the offensive fire support plan can have up to four phases:

- Fire support of the movement forward.
- Fire preparation for the attack.
- Fire support of the attack.
- Fire accompaniment to the depth of the enemy defense.

These phases relate directly to the anticipated actions of supported maneuver units in response to the enemy situation. Thus, the number of phases, their content, and their duration may be different and are determined according to a specific situation. See Figure 7-38.

Type of Offensive Action	Support of Movement Forward	Preparation for the Attack	Fire Support of the Attack	Fire Accompaniment
Attack Against a Defending Enemy				
Attack from the March	X	X	X	X
Attack from Positions in Direct Contact	(X)	X	X	X
Commitment of OMG	X	X	X	(X)
Commitment of 2d Echelon or CAR	(X)	X	X	(X)
Meeting Battle	—	X	(X)	X
Pursuit	—	X	(X)	X
X = Phase normally occurs. (X) = Phase may or may not occur. — = Phase normally does not occur.				

Figure 7-38. Phases of fire support by type of offensive action.

When a division or brigade moves forward from the depth, enemy long-range weapons become active in order to interdict the redeploying unit. It is important to annihilate these weapons immediately upon detection. In some cases, it may be necessary to conduct a separate phase for fire support of the movement forward. This normally occurs only when the supported maneuver unit must redeploy in march formation from a position at least 20 km from the forward edge of the enemy defense. For shorter distances, the fire preparation phase can start with the beginning of the unit's redeployment, and a separate phase is unnecessary. Support of the movement forward may also be required if the supported unit must cross a water obstacle from the march.

A phase of fire preparation for the attack typically precedes all types of major offensive action. In an effort to achieve surprise, an attack at night may sometimes start without the fire preparation for the attack.

One relative constant is that any successful attack should lead to a penetration into the depth of the enemy defense. Therefore, most offensive fire plans call for a phase of fire accompaniment. The phase called support of the attack applies mainly to situations when the supported maneuver unit must create its own penetration. Otherwise, fire support can go directly from the preparation phase to accompaniment of forces developing the attack into the depth of the enemy defense.

During an attack against a defending enemy, higher headquarters may decide to provide additional fire support in the attack zone of a first-echelon division or brigade. During any or all of phases up to accompaniment, the parent army or corps can temporarily add the support of artillery from a second-echelon division or CAR.[23] This artillery usually is included in the DAG of the first-echelon division, together with the organic and attached artillery. A unit conducting an attack from the march can also receive fire support from friendly units already in direct contact with the enemy.

Attack Against a Defending Enemy

The phases of fire support in the offense occur in their purest and most complete form in an attack against a defending enemy. Thus, Figure 7-39 illustrates the use of all four phases in that context.

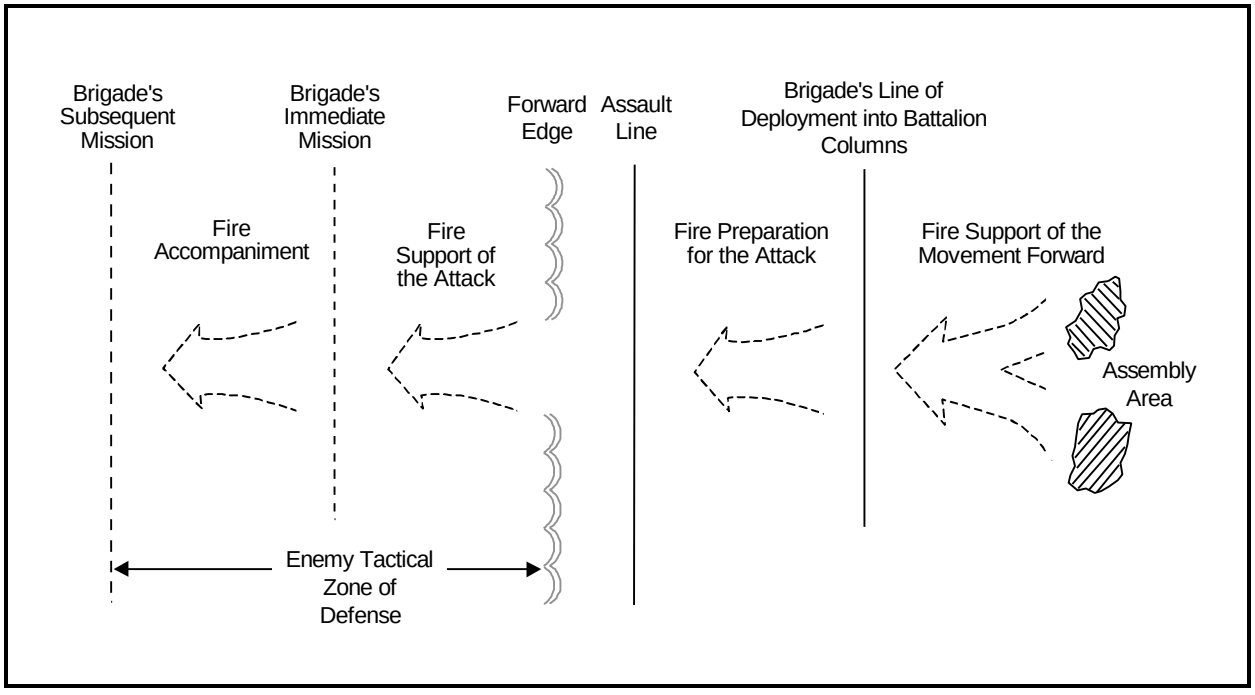


Figure 7-39. Phases of offensive fire support for attack against a defending enemy.

[23] For a division or brigade that is directly subordinate to an army group, it is possible to use artillery from an army, corps, or division assigned to the army group's second echelon or CAR.

Fire Support of the Movement Forward

Fire support of the movement forward is normally employed only in an attack from the march or to cover a unit's movement from an assembly area more than 20 km from the forward edge of the enemy defense. This phase may also cover a follow-on force's movement forward before commitment or the crossing of a water obstacle from the march.

This phase targets enemy long-range weapons that might strike the supported unit while it is still a considerable distance from the forward edge of enemy defenses. These targets consist of enemy long-range artillery, SSMs, aircraft on airfields, and combat helicopters. The OPFOR uses aviation, operational-tactical SSMs, long-range guns, and MRLs to destroy or at least harass these deep targets.

This phase is planed in advance, according to instructions from higher headquarters. Depending on the situation, it can start—

- Immediately prior to the beginning of the redeployment from the point of departure.
- Concurrently with the beginning of redeployment.
- During the redeployment.

It continues until the start of the fire preparation for the attack, when the maneuver units are ready to deploy into battalion columns.

Preferably, the fires for this phase can come not from the advancing force, but rather from the artillery of the other units already in direct contact with the enemy. In case of division attacking from the march, the necessary quantity of artillery may come from the DAG and/or a subgroup of the AAG supporting the division.

Artillery units participating in this phase are likely to fire from temporary firing positions, shifting to their primary positions for the next phase. The goal is to prevent the enemy from disrupting column movement with counterpreparatory fires and at the same time prevent him from learning the axis of the main attack from the positions of missile and artillery units.

Fire Preparation for the Attack

Fire preparation for the attack includes artillery and air preparation carried out prior to all major offensive actions. This phase can apply to the attack or the counterattack, or can precede the commitment of second-echelon or reserve forces. For an attack by a division or brigade, its fires extend to the depth of the defense of the enemy division, and to the depth of effective fire against individual, important targets. Fires in this phase concentrate on destruction of enemy forces and demolition of his defensive works in strike sectors designated for penetration into his tactical depth. They also target for annihilation any detected NBC delivery and precision weapon systems.

Artillery preparation for the attack may consist of one or several fire assaults by indirect fire. These can occur in combination with fire of guns, tanks, and ATGMs allocated for direct fire, and with actions of aviation against planned objectives in the depth of the enemy defense.

Air preparation for the attack may precede the artillery preparation or run concurrently. In the latter case, there might be only one or two fire assaults by the artillery.

The artillery preparation should neutralize and/or annihilate a defending enemy with organized, planned, fire assaults that deny him the opportunity to organize resistance. It should engage enemy weapon systems, C^2 elements, and troops in the tactical and immediate operational depth of the enemy's defenses. Fire planning for the preparation phase must take into consideration—

- The commander's intent and overall attack plan.
- The nature of the enemy defense.
- The required degree of target destruction.
- The extent of fire missions.
- The type and density of artillery weapons available.
- The time necessary to for the maneuver force to deploy for the attack.

Targets for the preparation are assigned according to their type, size, degree of hardness, mobility, and depth in the enemy's defenses.

The duration and composition of the fire preparation can vary according to the specific situation and do not fit a stereotyped pattern. Variables can include—

- The number of fire assaults and aviation strikes.
- The methods of delivering fire.
- The types of ammunition used.
- The sequence of carrying out mission.

Various combinations can provide the necessary degree of target damage. It is important that the selected order of their execution be sudden and unexpected for the enemy.

This phase begins at a predesignated time with a sudden, powerful fire assault on planned targets at the forward edge of enemy defense. For an attack from the march, it is advantageous to start not later than the arrival of the first-echelon units at the line for deployment into battalion columns. The first fire assault targets the enemy's first-echelon company strongpoints, AT weapons deployed in or near them, artillery batteries, and other important targets. Succeeding assaults concentrate fires on targets or sectors within deeper defensive positions. Controlling fires prevent targets from recovering or moving between fire assaults. The fire preparation ends at a predetermined time with another fire assault on the enemy's first-echelon company strongpoints, AT weapons, and artillery. This normally coincides with the arrival of the supported maneuver units at the assault line for the attack. The last fire assault of the preparation can overlap with the initial fires of the next phase. Thus, the fire of artillery should achieve maximum intensity at the start of the attack.

Depending on the combat situation, the preparation may take as little as 10 minutes, or it may extend to over an hour. However, it typically begins at least 20 to 30 minutes before the supported force reaches the forward edge of enemy defenses. The OPFOR may repeat this fire against well fortified, deeply-echeloned defenses.

Because of the mobility of potential targets and the threat of enemy counterbattery fire, the OPFOR strives to increase the intensity of fire. It tries to reduce the length of this phase by adding more artillery to the force structure, with special emphasis on MRL units. Fires of tanks and AT artillery may be used during these preparations. If time is available, the OPFOR positions

on the ground the ammunition planned for use during the preparation. This allows it to keep ammunition loaded on battery and battalion (and possibly brigade) transports for later use.

Fire Support of the Attack

Fire support of the attack includes artillery and air support. It begins, at the signal of the division commander, with the arrival of the supported maneuver force at the assault line. The transition from fire preparation to fire support of the attack should occur so that it is imperceptible for the enemy, without any break in the fire or reduction in its density. As a rule, the support phase begins simultaneously in all sectors of the attack zone, with the main effort concentrating on the destroying the enemy within the first positions. It continues without break until the attacking force has achieved its immediate mission. In an attack against a partially prepared defense, that mission for a supported maneuver battalion could be the destruction or seizure of defensive positions to the depth of the enemy first-echelon battalion. For a maneuver brigade, it could be to the depth of the enemy first-echelon brigade.

In this phase, artillery support tries to maintaining the fire superiority attained during the artillery preparation phase. Fires continue to neutralize enemy troop activity and weapon systems and should prevent the enemy from restoring fire, C^2, and observation systems disrupted during the preparation. The artillery fires on the enemy that is directly in front of, and on the flanks of, attacking troops. The fires shift in bands progressively deeper into the enemy's defensive positions. Emphasis is on the continuity of support, ensuring the fire of the artillery and the advance of the maneuver units do not get out of phase. This also hastens the forward movement of assaulting units.

During the support of the attack, artillery can employ several types of fire, including—

- Moving fire zone.
- Single or double rolling barrage.
- Single, double, or triple successive fire concentration.
- Fire concentration.
- Fire against individual targets.

It can also use a combination of these types.

The choice of type of fire in the artillery support of the attack depends on—

- The nature of the enemy defense.
- The degree of target acquisition.
- The method of attack.
- The availability and capabilities of artillery weapons.

For penetration of an enemy defense saturated with AT weapons, the most effective method may be a moving fire zone or rolling barrage on the main axis. Concurrently with these or with a successive fire concentration, some battalions or batteries may engage on-call targets and other important targets newly detected during this phase. Such targets could include enemy NBC delivery and precision weapon systems, artillery units, CPs, and reserves. In all conditions, indirect fire, including precision munitions, is supplemented by weapons designated for direct fire.

During the support of the attack phase, artillery units may begin to move forward. For instance, after a supported maneuver battalion seizes enemy first-echelon company strongpoints, an artillery battalion may redeploy in order to support the deeper attack. An artillery battalion normally makes its first relocation at full strength and makes subsequent moves by battery.

Fire Accompaniment to the Depth of the Defense

The final phase is fire accompaniment, which includes artillery and air strikes against troops and weapon systems opposing the attackers' advance and against enemy reserves deep in the rear. Artillery units support maneuver units with on-call fires as the attackers exploit their success. They conduct uninterrupted, intensive artillery fire on the enemy's first and second echelons, his reserves, and other objectives and targets. Fire planners constantly refine the artillery accompaniment plan during the course of the attack. Artillery and combat aviation units coordinate mutually supporting fires with each other and with the supported maneuver unit.

If the attacking unit does not need to create its own penetration of the enemy's forward defenses, artillery fire may transition directly from the preparation to the accompaniment phase. Otherwise, fire accompaniment begins after the end of fire support of the attack. In either case, it continues into the entire depth of the division's combat mission.

The accompanying artillery fires on newly acquired targets or targets that have survived the preparation and support phases. Particularly, it can engage newly detected NBC delivery and precision weapon systems.

In the course of the accompaniment phase, artillery can—

- Neutralize and annihilate enemy artillery batteries, personnel, and weapons that offer resistance to attacking first-echelon units.
- Support commitment and battle by the second echelon or CAR.
- Support units crossing water obstacles.
- Prevent the enemy from consolidating on favorable lines.
- Destroy the enemy defending intermediate lines.
- Block gaps and protect friendly flanks.
- Participate in the reinforcement of gained lines
- Repel counterattacks by enemy reserves.
- Prevent the enemy from executing maneuvers.
- Engage targets to support a tactical airborne assault.

During this phase, artillery often has to conduct unscheduled fire missions assigned by the senior artillery commander or supported maneuver unit commander, or sometimes at the decision of the artillery battalion commander. Battalions and batteries can use—

- Fire against individual targets.
- Fire concentration.
- Barrier fire.

They may also participate in massed fires and successive fire concentrations according to the plan of the senior artillery commander.

Artillery units displace with the units they support during this phase. Frequent relocation is necessary due to the depth of combat actions and the need to keep pace with rapidly advancing maneuver units and open fire quickly to support them. An artillery battalion may displace at full strength or by battery, depending on the extent of enemy resistance, the actions of the supported maneuver unit, and the battalion's place in the artillery grouping. During fire accompaniment an artillery battalion often makes its first relocation at full strength and makes subsequent moves by battery.

In highly mobile actions deep in the enemy's defenses, artillery units often accomplish destruction of various targets at less than the full ammunition expenditure norm. For example, they may use 0.7 or 0.8 of the norm or even 0.5 of the norm. This allows them to carry out a larger number of missions.

Meeting Battle

The mission of artillery in the meeting battle is to preempt the enemy in deploying his artillery and opening fire. This early establishment of fire superiority enables supported maneuver units to deploy and seize the initiative.

Fire support starts prior to the mutual approach of the two sides. Artillery fires at maximum ranges at the advancing enemy, especially at chokepoints. The goal is to disrupt his movement, prevent him from starting the battle in an organized manner, and create conditions for destroying him by parts.

Deployment

In a march in anticipation of a meeting battle, an artillery battalion may act as part of a forward security element (FSE), an advance guard or FD, or the main body. An artillery battalion in the main body may be part of an artillery group, or it may support or be attached to a first-echelon battalion. In the latter case, the artillery battalion may move in the maneuver battalion's column, be deployed in battle formation, or relocate from one firing position area to another at full strength or by battery.

An artillery battalion attached to an advance guard, or FD normally moves forward behind the battle formation of the supported maneuver unit. It can relocate at full strength or more likely by leapfrogging batteries in order to provide continuous support. A BRAG or an artillery battalion in the main body normally marches behind the main CP at the head of the column. This artillery can leapfrog by battalion or battery.

As the meeting battle begins, artillery deploys from the march into battle formation and opens fire against the advancing enemy, as soon as the batteries and battalions have had time to prepare. It supports the action of the advance guard, as well as the deployment of the main body into battle formation. With the advance and deployment of the main body of the division or brigade, the control of artillery fire becomes centralized on the axis of the main strike. Artillery preparation for the attack precedes the start of the attack of the main forces of the division or brigade.

Types of Fire

Fire missions are carried out by decision of the artillery battalion commander, the maneuver battalion commander, or the senior artillery commander. Artillery units engage the enemy with concentrated fire or fire against individual targets; they may use barrier fire to repel enemy attacks or counterattacks.

Target Priorities

When carrying out these missions, an artillery battalion engages the following targets:

- NBC and precision weapons.
- Artillery and mortar batteries.
- Approaching columns, particularly at crossing sites and other chokepoints.

The purpose is to hinder the deployment of enemy forces, above all his AT weapons. Artillery tries to blind his ATGM guidance systems with smoke and aerosols. Other targets include his CPs and electronic warfare systems.

Fire Planning

In anticipation of a meeting battle, the COA conducts basic fire planning in as much detail as possible. Senior commanders can give artillery units orders and amendments to orders while moving. Units initially engaging the enemy conduct detailed fire planning. As the battle develops and additional artillery is deployed, the artillery staff refines the fire plan. It also expands the plan to provide maximum fire at critical points. The artillery commander positions accompanying artillery to facilitate prompt fires for each maneuver unit as the maneuver commander commits it. Supporting artillery displaces with supported units deeper into the enemy defenses to be in the best location to support the battles with fire.

When assigning missions to the artillery group (or units), the commander of the maneuver division or brigade announces tasks for—

- Supporting the battle of the FD and advance guard.
- Annihilation and neutralization of the enemy's NBC delivery means, precision weapon systems, artillery and mortar batteries.
- Destruction of the enemy's advancing columns and disruption of his deployment.
- Destruction of the enemy during the deployment of the main forces of the division or brigade.

His instructions may also include—

- Firing position areas.
- Time of readiness to open fire and the sequence of shifting fire or relocating.

During a meeting battle, artillery normally relocates by battery.

An artillery battalion can carry out the following missions:

- Block the advance of enemy columns and their deployment into battle formation.
- Screen the advance of friendly maneuver units and support their attack.
- Screen exposed flanks and repel enemy attacks.
- Block the enemy's withdrawal and consolidation on favorable lines.
- Support maneuver units in consolidating captured lines.

Phases of Fire Support

In meeting battles, planning normally includes two or three phases of fire support:

- Fire preparation for the attack.
- Fire support of the attack (not always included).
- Fire accompaniment to the depth of the enemy defense.

Support of Forward Security Element

When an artillery battalion is attached to an advance guard, one of its batteries may be part of the FSE. In that case, the battery commander and part of the control platoon move at the front of the column with the commander of the FSE. To ensure rapid deployment of the battery, he conducts continuous reconnaissance to locate possible firing positions, and maintains continuous radio communications with the firing platoons. If the FSE sends out a forward patrol, the control platoon leader may go with it to perform reconnaissance. The battery's firing platoons, under the control of the battery senior officer, are at the tail of the FSE column.

When the FSE encounters superior enemy forces or when the enemy has preempted the FSE in deployment, the FSE commander takes steps to engage the enemy with fire from all weapons and ensure favorable conditions for deployment of the advance guard main body. On the order of the FSE commander, the artillery battery deploys immediately into battle formation. The battery commander indicates to the battery senior officer—

- The firing position area.
- The baseline for fire.
- The minimum range of fire.
- The location of the battery COP.

The battery commander informs the artillery battalion commander when the meeting battle has started, when the battery deploys into battle formation, and when it opens fire.

The battery COP normally deploys together with the FSE's COP, and firing platoons deploy into firing positions near the march route. The battery commander instructs the control platoon leader to reconnoiter advancing enemy columns, determine coordinates of enemy weapons ahead of the FSE, and reconnoiter enemy OPs and artillery and mortar batteries.

The battery supports the FSE primarily by neutralizing enemy maneuver units that pose the greatest threat to the FSE, as both sides attempt to deploy and attack. The battery usually fires against one or two individual targets. When firing against two targets simultaneously, the battery commander can control the fires of one platoon, while the control platoon leader controls the other firing platoon. The battery commander prepares a fixed barrier fire for use if necessary to repel an enemy attack. The battery senior officer determines likely armor avenues of approach, so that the battery can engage a penetrating enemy with direct fire.

Support of Advance Guard or Forward Detachment

As soon as the FSE starts to deploy, the artillery battalion's intelligence officer selects the site for the battalion's COP, near the COP of the advance guard (or FD) commander. If that maneuver commander moves up to the FSE to assess the situation, the artillery battalion commander goes with him and can receive missions from him on the move. At this point, the artillery battalion commander—

- Updates missions for reconnaissance of the enemy.
- Plans the battalion's firing position area.
- Determines the fire missions (to neutralize targets) in accordance with the decision of the advance guard (or FD) commander.
- Issues instructions to the artillery battalion for movement and deployment into battle formation in the planned area.
- Assigns missions to batteries.
- Establishes procedures for coordination of batteries with supported maneuver units.

In his instructions on the firing position area, the artillery battalion commander can specify the locations of the battery firing positions and battery COPs. In doing so, he takes into consideration the allocation of batteries to support maneuver companies. In such cases, the battery and company COPs are usually colocated.

By preempting the enemy in deployment of batteries and opening fire, the artillery battalion can inflict losses even before contact between friendly and enemy maneuver forces. Artillery fire can disrupt the planned deployment of enemy units and enable the advance guard (or FD) to deploy and attack in an organized manner.

The artillery battalion uses its fires to immediately neutralize observed targets whose fire is hindering the attack of friendly maneuver forces. In doing so, it must be careful to expend the available mobile stocks of artillery ammunition as economically as possible, to keep some ammunition in reserve. The artillery battalion commander must also prepare fixed barrier fire to prevent the enemy from enveloping the flanks of the advance guard (or FD).

If the enemy has preempted the FD in moving to the designated line with superior forces or has preempted the advance guard in deploying and conducting the attack, the artillery battalion's immediate task is to repel enemy attacks in cooperation with other weapons. It must prevent him from penetrating into gaps between companies, cover exposed flanks, and destroy by direct fire any enemy maneuver units that penetrate into the battalion firing position area. Subsequently, the artillery battalion uses its fire to cover the deployment and commitment of the maneuver brigade's main body.

Support of Main Body

As a rule, an artillery battalion that is part of the brigade's main body moves at the head of the main column. It must be ready for immediate deployment into battle formation to support the advance guard and to cover the deployment of units in the main body and their commitment to battle. The artillery battalion commander receives information about the enemy from the artillery battalion intelligence officer who is with the advance guard. (This intelligence officer could come from the artillery battalion in the main body, or from another battalion attached to the advance guard.) The artillery battalion commander receives the order to deploy his unit from the senior artillery commander or from the commander of a maneuver unit to which the artillery battalion is attached.

An artillery battalion from the BRAG may be assigned to support a maneuver battalion that is part of the main body, and its batteries may be assigned to support maneuver companies. In this case, the artillery battalion commander makes contact with the maneuver battalion commander during the march, before reaching the main body's line of commitment. Based on the mission received, he—

- Tasks the battalion intelligence officer to select a location for the battalion COP.
- Moves with the supported maneuver battalion commander to a designated place.
- Receives the intelligence officer's report on targets identified and located.
- Determines and assigns missions for the batteries.
- Organizes artillery battalion fire control.
- Briefs subordinate batteries on procedures for coordination with supported maneuver units.

Advancing at the head of the column of batteries, the artillery battalion staff directs battery deployment and sets up the battalion FDC.

Depending on its command relationship, the artillery battalion receives the command to open fire from the senior artillery commander or maneuver commander. Prior to the attack by the main body, the artillery battalion begins a fire preparation with fire assaults to neutralize enemy personnel, weapons, artillery batteries, and mortar platoons on the axis of the attack. These assaults continue until friendly units arrive at the troop safety line. During support of the attack and accompaniment, the artillery battalion uses fire concentrations and battery fire against individual targets to neutralize enemy forces blocking exploitation by the main body. As the units of the main body advance, the artillery battalion usually relocates by batteries to ensure continuous support of the advance.

Pursuit

Besides frontal and parallel pursuit by maneuver forces, defeat of the withdrawing enemy requires destruction of his main force by missile, air, and artillery strikes. Phases of fire support are much like those for a meeting battle.

Deployment

The mobile nature of combat and rapid, abrupt changes in the situation can cause frequent relocations and deployments of artillery batteries into battle formation. In these conditions, the artillery battalion commander must maintain uninterrupted coordination between artillery and maneuver units. Battery commanders often receive missions while on the move. To open fire quickly, batteries often occupy firing positions near roads or movement routes.

Types of Fire

The primary types of artillery fire during a pursuit are fire concentration, barrier fire, and fire against individual targets. Once the pursuit has slowed or stopped the enemy withdrawal, artillery can maneuver into positions to complete his destruction by massed fires.

Target Priorities

Together with other fire support means, artillery can neutralize the enemy's NBC and precision weapon delivery means, artillery, tanks, and AT weapons that cover his withdrawal. To inflict maximum losses on the withdrawing enemy and prevent the approach of his reserves, it fires on road junctions, chokepoints, water obstacle crossings, bridges, and other vulnerable points. It can also conduct remote minelaying on terrain along the enemy's departure routes, delay the departure of his main forces, destroy approaching reinforcements, and prevent the enemy from organizing defense on intermediate lines.

Fire Planning

As with other offensive actions, there is centralized planning for a pursuit, but forces conduct it in a decentralized manner. Commanders and fire planners tend to dissolve earlier command relationships, such as attachment to artillery groups, and decentralize control of artillery.

An artillery battalion, especially SP artillery, can be attached to a first-echelon maneuver battalion. The artillery battalion commander—

- Dispatches an artillery reconnaissance group along with the maneuver unit's reconnaissance.
- Assigns missions to the batteries.
- Monitors timely displacement of batteries.

When carrying out assigned missions, battalion and battery commanders must display considerable initiative to engage various targets effectively.

Commitment of Second Echelon or Reserve

Fire support for commitment of a second echelon or CAR involves types of fire and target priorities similar to those in the first echelon's attack against a defending enemy. In fact, the artillery of those first echelon units often supports the deployment and commitment of the follow-on forces. The artillery of the senior commander may also provide support.

Deployment

The organic artillery of a second-echelon division or brigade often deploys ahead of the main forces prior to commitment. This is possible due to the presence of friendly first-echelon units in that area. Indeed, the senior commander may have temporarily detached artillery from a second-echelon division to augment first-echelon assets during the penetration. At the point when the senior commander allocates additional artillery for the second echelon unit to form its own artillery group, the DAG or BRAG can also deploy forward.

Fire Planning

An artillery unit or group may keep one of its subordinates in standby status, under the direct control of the senior artillery commander. When there is limited time to prepare for the commitment of a second echelon into battle, that senior commander often assigns that mission to the standby unit. For example, a standby battalion could support a second-echelon maneuver battalion, or a standby battery might support a second-echelon company.

An artillery battalion that earlier was supporting a first-echelon maneuver battalion may receive the new mission to support a second-echelon battalion's commitment. However, this re-assignment of mission could involve regrouping the artillery battalion's forces and possibly repositioning to support a new axis. Thus, it could require more time than assigning the mission to a standby unit.

An artillery battalion can be attached to a second-echelon maneuver battalion or assigned to support it during its commitment to battle. After receiving the mission from the senior artillery commander, the commander of the artillery battalion—

- Assigns or updates missions for reconnaissance of the enemy forward of the second echelon's line of commitment.
- Assigns tasks for preparing battalion fire.
- Establishes personal contact with the maneuver battalion commander.
- Possibly assigns batteries to support individual companies.

When a maneuver battalion commits its second echelon, the commander of an attached or supporting artillery battalion—

- Assigns or updates missions for reconnaissance of the enemy forward of the second echelon's line of commitment.
- Assigns a battery to the second-echelon company in an attached or supporting role.
- Indicates to that battery commander the time and place for meeting the company commander.
- Assigns or updates fire missions to all the battery commanders.

Phases of Fire Support

During commitment of a second echelon (or CAR), fire support can include, two, three, and sometimes four phases. The number of phases and their duration differ according to the specific situation.

A separate phase of fire support of the movement forward is normally employed only when a unit must move from an assembly area more than 20 km from the forward edge of the enemy defense. This is usually the case for a division in the second echelon of an army or corps and sometimes the case for a division's second echelon or CAR. For a brigade's or battalion's second echelon or CAR, there would be no need for a separate phase.

During the commitment of a second-echelon division, brigade, or battalion (or a CAR) into battle, fire support can include phases of fire preparation, fire support of the attack. If necessary, there may be a fire accompaniment phase.

Prior to the commitment of the second echelon (or CAR) of a division, the fire preparation consists of one or two fire assaults. For commitment of those elements of a brigade, there is usually only one fire assault. This assault should be long enough to deliver the required ammunition expenditure at the rate of fire of participating weapons. It also should cover the time needed for the second-echelon unit to move from the line of effective range of enemy AT fire to the troop safety line of friendly fires. The fire assault should eliminate or sharply reduce the effectiveness of enemy AT weapons when the second-echelon unit arrives at its line of commitment.

Commitment of a Division as an OMG

A maneuver division may serve as an operational maneuver group (OMG) for its parent army. Ideally, the OMG does not use its own artillery to support its commitment, since the artillery would have to deploy out of the division's march formation to do so. The division normally is committed on an axis where the senior commander can support it with fire.

Deployment

During the march, organic and attached artillery usually redeploys with the advance guards or FDs. Artillery that remains directly subordinate to the division or brigade commanders moves in the columns of the main body.

Fire Planning

In his combat order, the division commander can assign artillery—

- Tasks to support the activity of the FD, advance guards, the main forces of the OMG.
- The starting time and duration of fire support phases prior to commitment of main forces and during fulfillment of the most important combat missions.
- The composition of artillery groups and their place in the march and battle formations.
- March routes, possible areas for deployment into firing positions, and time of readiness for opening fire from each of them.

The COA incorporates this guidance into the fire plan.

Phases of Fire Support

An army commander may hold a division-size OMG well forward, probably not more than 30 to 50 km from the line of contact, ready for early commitment. Thus, there is usually a phase of fire support of the movement forward.

Since the OMG normally does not have to create its own penetration of the enemy's forward defenses, the support of the movement forward can continue until the division approaches its objective in the enemy rear. Then there is a short but intensive fire preparation for the attack, consisting of one or several fire assaults on the OMG's objectives and enemy reserves. With the transition to the attack, there is a phase of fire support of the attack against defending enemy units or centers of resistance. If necessary, there could be an accompaniment phase.

DEFENSE

In the defense, the fire planners allocate fire strikes by all available means against the likely avenues of approach to defensive positions. The COA closely coordinates the integrated use of all available precision weapons, conventional artillery, and supporting aircraft. Reconnaissance efforts concentrate on determining enemy formations and locating his artillery systems, especially his precision weapons and NBC delivery means.

As in the offense, maneuver by fire in the defense means shifting concentrated fires. An essential element of this is the ability to shift fires onto new targets as the enemy maneuvers. This delivers a high volume of fire against the enemy's most important target groupings and against targets in the enemy's rear areas. It also covers friendly flanks with fire. It provides comprehensive fire for effect on approaches to defense in front of the forward edge and in the depth of defense.

Artillery is used in the defense to—

- Destroy enemy precision weapons and NBC delivery means.
- Destroy troops at distant approaches to defense, during the redeployment to the forward edge and on the lines of deployment (in areas of departure) for attack.
- Neutralize artillery, antiaircraft, and electronic warfare systems, and CPs.
- Repel assaults by tanks and infantry.
- Annihilate or neutralize the enemy who penetrated the defenses, including his airborne troops.
- Carry out remote minelaying.
- Participate in artillery preparation and support of counterattacks by second echelon or CAR.

During night battles, artillery can illuminate the terrain and also destroy enemy means of illumination and his infrared instruments.

Deployment

In the defense, it is difficult to identify even the most general guidance or norms for deployment of artillery units. Assets organic or allocated to division and below can locate virtually anywhere within the main defensive zone and possibly forward of that, in the security zone. Generally, cannon and mortar systems should be able to fire one-half to two-thirds of the maximum range of the weapon ahead of the element they are supporting. A maneuver battalion conducting the security zone fight may have an attached artillery battalion.

A BRAG may occupy positions forward of the main defensive zone to provide reinforcing fire to support the security zone units. The DAG may occupy positions near the forward edge of the main defensive zone to provide counterbattery and continuous deep fires. Army-level assets in AAGs or ARAGs supporting a first-echelon division can deploy in the main defensive zone, typically about 10 to 12 km from the forward edge of the defense. However, an ARAG with longer-range MRLs can also deploy farther back, in the space between the army's first (main) defensive zone and its second defensive zone.

Key to the success of the defense is the forward positioning of artillery and mortars to provide fire support to maneuver units repositioning from individual battle positions. The objective is to lure the enemy into areas where he can either be neutralized or annihilated through a series of fire sacks and reconnaissance fire complexes. Typically, SP artillery systems are allocated to units conducting a maneuver defense. Roving units of SP artillery play an important role in the maneuver defense; they can fill gaps between defensive strongpoints, help create fire sacks, and mislead enemy reconnaissance. Towed artillery systems are better suited for supporting units conducting a positional defense.

The artillery planner locates artillery groups so that they can execute their primary mission and still be able to mass fires in support of forward positions, especially against armor. Artillery groups and units in the defense select firing position areas primarily on tank-threatened axes. Concealed and dispersed positions allow units to employ flanking and interlocking fires at very close ranges with great intensity. Firing positions echeloned in depth allow the artillery to support friendly units withdrawing to deeper defensive positions.

Each battalion and battery prepares primary, alternate, and temporary positions and has planned routes of movement to them. Selected artillery units can occupy temporary firing positions to provide fire support to units in the security zone. Temporary positions in the security zone enable artillery to strike targets at greater distances in the enemy's depth.

Roving batteries can confuse the enemy about the deployment and fire plans for friendly artillery. The COA plans in detail the deployment of a roving unit. The plans include positions, missions, method of fire, and number of rounds to fire from each position, itinerary, and duration of the mission. The roving unit may leave camouflaged decoys in a position to create the impression that it is still occupied.

Types of Fire

Barrier fires are the primary type of defensive fires. Barrier fire is a continuous curtain of defensive fire across the approach of attacking enemy forces. Although normally used in the defense, it also has applications in offensive operations against enemy counterattacks. Barrier fire can occur in combination with fire concentrations, massed fires, and direct fire from tanks and guns. The two types of barrier fire are standing barrier fire and rolling barrier fire. For more information on the other types of fire, see the Offense section of this chapter.

Standing Barrier Fire

Standing barrier fire uses a single line of concentration to disrupt an enemy attack. The OPFOR plans standing barrier fires well in advance, for likely tank avenues of approach. A ground OP observes these fires planned in front of, and to the flanks of, the defensive positions. All available artillery, except MRLs, fires the standing barrier fire. The fire planner assigns each battalion or battery a sector on the line of fire concentration. The width of each unit's sector is computed based on no more than 50 m of coverage per cannon or mortar system.

The line of concentration for the standing barrier fire must be no closer than 300 to 400 m from friendly troops for safety. This allows gunners to fire AT weapons in direct fire at enemy tanks and armored vehicles as they come through the barrier fires.

Standing barrier fires begin at the moment enemy tanks and infantry approach the planned line of fire concentration. The fires continue at rapid fire until they cut off enemy infantry from their tanks and halt their attack. If the enemy maneuvers around the fire concentration line, the fires shift to the new approach.

Rolling Barrier Fire

Rolling barrier fire lands on several lines of concentration. Each line lies successively closer to defending troops. Lines of concentration for the rolling barrier fire should impact on terrain that a ground OP can see. Distances between lines of fire concentration are 400 to 600 m or more. The final line of concentration closest to friendly troops is 700 to 1,000 m from forward defensive positions.

The fire planner assigns each battalion or battery participating in the fire mission a sector of fire on each of the lines of fire concentration. He bases the width of each sector on 25 m of coverage for each cannon or mortar system. The entire area has a general code name. Each individual line of concentration has a number in sequence, beginning with the one farthest from the defensive positions.

The rolling barrier fire begins the moment the lead tanks or armored vehicles approach the initial line of fire concentration. Fire continues on that line until the bulk of the advancing force has moved out of the zone where rounds impact. Then the fire shifts to the next line of concentration. Fires continue to shift until surviving enemy armored vehicles or tanks have passed through the last line of concentration.

Target Priorities

In the defense, the general order of importance is as follows:

- Precision and NBC weapons.
- Conventional artillery.
- C^2 nodes.
- Attacking groupings.
- Penetrations.
- Key terrain.

With the possible exception of precision and NBC weapons, the priority each target receives can vary according to the situation and the phase of fire support.

Fire Planning

The organization of fire support in the defense stems from the decision of the division or higher commander. That senior commander takes into consideration—

- The friendly forces and systems available and their capabilities.
- The composition of the enemy force and its activity.

From that, he determines the density of artillery weapons (in tubes per km of frontage) needed to achieve the degree of target damage required for a successful defense.

From the senior commander's order to defend, the division or brigade commander establishes the required degree of target damage. In his estimate of the situation, he determines firing position areas for deployment of artillery, targets for destruction, and methods of fire in the various phases of fire support.

In his own combat order, the division or brigade commander specifies—

- The composition of the DAG or BRAG.
- Artillery missions during counterpreparatory fires and in each phase of fire support.
- Primary, alternate, and temporary firing position areas.
- Areas for remote minelaying.
- The time of readiness to fire.

He also organizes coordination among artillery, other fire support means, and maneuver units during the defense.

Fire planners use all available assets to carry out the commander's plan. They may produce several variations of the plan, based on the approach and deployment options open to the enemy. Effective fires in the defense require surprise, accuracy, and massed fires.

An artillery battalion bases its fire plan on its portion of the fire plan of the senior artillery group or unit commander. Figure 7-40 provides an example of a fire plan for a 122-mm howitzer battalion that is part of a BRAG in the defense. Having received its fire missions from the BRAG commander, the battalion chief of staff allocates the missions among the batteries. In doing so, he assigns several batteries to engage the most important targets. An actual fire plan would also include a list of target coordinates.

Actions of Maneuver	Fire Interdiction Total Rounds 432 (0.3 UOF)				
Units	**Method of Fire and Targets**	**Signals***	**1st Btry**	**2d Btry**	**3d Btry**
Defend occupied areas and strongpoints	Fire against enemy columns during his advance and deployment: Fire concentrations.		Tgts 80, 82, 84: 144 rds	Tgts 80, 82, 84: 144 rds	Tgts 80, 82, 84: 144 rds
	Fire to Repel Enemy Attack Total Rounds 1008 (0.7 UOF)				
	Method of Fire and Targets	**Signals***	**1st Btry**	**2d Btry**	**3d Btry**
Defend occupied areas and strongpoints; repel enemy attack with all types of weapons	Engage enemy in front of forward edge and during fighting for first defensive position:				
	Rolling barrier	Hyena or Wolf	Hyena-1, -2, -3 or Wolf-1, -2, -3: 144 rds	Hyena-1, -2, -3 or Wolf-1, -2, -3: 144 rds	Hyena-1, -2, -3 or Wolf-1, -2, -3: 144 rds
	Stationary barrier	Aspen or Birch	Aspen or Birch: 48 rds	Aspen or Birch: 48 rds	Aspen or Birch: 48 rds
	Stationary barrier	Maple or Oak	Maple or Oak: 48 rds	Maple or Oak: 48 rds	Maple or Oak: 48 rds
	Fire concentration or Fire against 4-5 individual targets		Tgt 85: 144 rds	Tgt 85: 144 rds	
	Fire Support of Defending Troops Total Rounds 1008 (0.7 UOF)				
	Method of Fire and Targets	**Signals***	**1st Btry**	**2d Btry**	**3d Btry**
Prevent expansion of enemy penetration in the depth and to the flanks	Engage the penetrating enemy and cover the battalion flanks and the gaps between company strongpoints:				
	Fire concentration		Tgts 92, 93, 94: 120 rds	Tgts 62, 63: 84 rds	Tgts 62, 63: 84 rds
	Stationary barrier	Fir	Fir: 48 rds	Fir: 48 rds	Fir: 48 rds
	Stationary barrier	Pine	Pine: 72 rds	Pine: 72 rds	
	Fire concentration		Tgt 85: 144 rds	Tgt 85: 144 rds	
	Fire against 4-5 individual targets		96 rds	96 rds	96 rds
	Fire Destruction of the Enemy During Counterattack Total Rounds 720 (0.5 UOF)				
	Method of Fire and Targets	**Signals***	**1st Btry**	**2d Btry**	**3d Btry**
Brigade's 2d echelon moves up for counterattack while 1st-echelon battalions hold positions	Fire support of movement forward: Be ready to deliver fire concentrations against targets to cover advance of 2d echelon to counterattack line.		(48 rds)	(48 rds)	(48 rds)
	Fire preparation of counterattack: 10-minute fire assault (fire concentration)	Storm	Tgt 94 144 rds	Tgt 94 144 rds	Tgt 94 144 rds
2d echelon destroys enemy penetration and restores position	Fire support of counterattack: fire concentration		Tgts 92, 93: 48-96 rds	Tgts 92, 93: 48-96 rds	Tgts 92, 93: 48-96 rds
* General signals: Request for fire—green flares; cease fire—red flares, Halt; friendly troops—white flares.					

Figure 7-40. Illustrative fire plan for 122-mm howitzer battalion in defense (example).

Counterpreparatory Fires

Counterpreparatory fires are an intense delivery of SSM, artillery, and air strikes. Their intent is to disorganize and weaken enemy forces preparing to attack. This type of the defensive fires should surprise the enemy when he is still in assembly areas or moving up to the line where he deploys into battalion columns in preparation for the attack. It should start before the enemy's preparation fires. The intelligence necessary to achieve this is not easy to acquire, and the time required to organize it may be lacking. When accomplished successfully, however, it can be devastatingly effective.

Counterpreparatory fire is organized at army group level, but detailed fire planning and execution of these fires is an army or corps responsibility. In addition to operational-level artillery groups, DAGs of first-echelon divisions participate.

When conducting counterpreparatory fires, an artillery battalion or battery engages assigned targets according to the fire plan. Targets can be NBC delivery means, artillery and mortar batteries, CPs, and maneuver units during their advance and deployment or when they have prepared for an attack from assault positions. After conducting counterpreparatory missions, the battalion returns to its previous firing position or moves to a newly assigned position area. There it prepares to repel the enemy attack.

Phases

To facilitate centralized control and effectiveness, the OPFOR divides defensive fire support into four phases. These are—

- Fire interdiction of advancing enemy troops.
- Fire to repel the enemy attack.
- Fire support of defending troops.
- Fire destruction of the enemy during a counterattack.

Fire Interdiction

Fire interdiction of advancing enemy troops can involve artillery, SSM, and air strikes against enemy units as they relocate and deploy for the attack. This phase can also target detected NBC and precision weapons, artillery batteries, and CPs. For enemy maneuver forces, the goal is to engage and destroy them at maximum range. Artillery and aircraft can also conduct, remote minelaying as the enemy reaches predetermined lines.

As soon as the division or brigade commander determines that the enemy main forces have started a redeployment from the depth or departed the assembly area for attack positions, he informs the senior combines arms commander, issues orders to artillery, and gives the signal to commence firing. An artillery battalion executes fire missions on commands of the senior artillery commander or sometimes on the artillery battalion commander's initiative.

In a defense established out of contact with the enemy, the fire interdiction phase normally supports the battle in the security zone. Fire interdiction of advancing enemy troops begins when the enemy deploys into battalion columns. It continues until the enemy forces reach their assault line. An FD can have artillery attached to it, but FDs and combat security outposts can also receive support from artillery of the main forces.

Division and brigade commanders can support the battle for the security zone with artillery fire from elements of the DAG or BRAG occupying temporary fire positions near or beyond the forward edge of defense. These positions also allow artillery to strike the enemy at greater depth. Fixed-wing aviation, SSMs, and long-range artillery carry out fire on distant approaches. Where possible, all available assets destroy enemy units as they move up, but if target intelligence is inadequate, they can at least inflict delay.

If a defense established when already in contact with the enemy, this phase concentrates on the enemy's second echelon. Throughout the period before the enemy's attack, the focus is denying the enemy good target intelligence for his preparation. Artillery remains silent, if possible, until needed to repel a major attack. Batteries used prior to the main enemy attack can fire from temporary firing positions or act as roving batteries to confuse enemy intelligence.

An artillery battalion or battery assigned to support a maneuver battalion or company in the security zone or defending a forward position engages advancing enemy columns at maximum range. Together with weapons of the supported unit, this artillery repels the attack of forward enemy units, prevents their envelopment of the position, and covers the disengagement and withdrawal of friendly units to the next position. Artillery units select and prepare several firing position areas echeloned in depth and along maneuver routes in order to provide continuous support to maneuver units in the security zone.

Fire to Repel the Enemy Attack

Fire to repel the enemy attack is the most important phase of defensive artillery fire. As the enemy nears the defense lines to initiate the attack, the fire of defending troops intensifies to the highest possible levels with full utilization of all means of fire. It concentrates mainly at destruction of tanks and other enemy armored vehicles. It also targets enemy artillery carrying out fire preparation of the attack.

This phase begins when the enemy crosses the assault line and ends when he enters the first defensive positions. The goal is to create a zone of continuous fires in front of the defense, engage enemy maneuver units, and put their battle formations into disarray. This creates favorable conditions for destroying the enemy by coordinated fire of AT weapons and maneuver units.

Ahead of the forward edge, DAGs, BRAGs, and individual artillery units use barrier fire to cut off infantry from tanks and destroy it. The artillery can also employ fire on individual targets, fire concentrations, rolling barrier fire, and massed fires.

Since the enemy tries to conceal his plan of attack, the mission of repelling the attack may arise unexpectedly. As a rule, artillery battalions and batteries execute fire missions from their primary firing positions. They normally deliver fire on the command of the senior artillery commander or the commander of the supported maneuver unit. However, they can also act on the initiative of the artillery battalion or battery commander in order to open fire in the shortest possible time.

Guns and MRLs typically start to engage the enemy 15 to 25 km from the forward edge and howitzers fire when the enemy is within 10 to 15 km. Artillery units deliver short but intense fire assaults, no more than 15 to 20 minutes in duration. Then they displace to alternate firing positions to avoid counterbattery fire.

Fire Support of Defending Troops

Fire support of defending troops occurs when artillery units attack enemy forces that have penetrated the defensive positions of first-echelon maneuver battalions. The OPFOR expects the enemy to penetrate the defense but to pay a heavy price in losses of forces and momentum. Its goal is to canalize the enemy into fire sacks and prevent him from developing the attack further into friendly positions.

Artillery battalions and batteries carry out fire missions from primary and alternate firing positions. The battalion can maneuver to an alternate position area on the order of the senior artillery or combined arms commander. Some batteries may enter preselected direct fire positions.

The artillery supports defensive positions in depth and disrupts the enemy by separating his infantry from armor and his combat units from their logistics support. It uses fire concentrations and fires against individual targets against enemy units that penetrate into the defensive positions. Barrier fire is used to prevent the enemy from expanding the penetration, to cover exposed flanks, and to concentrate fire on destroying enemy tanks.

If necessary, artillery can use direct fire as a backstop against armored penetrations. Generally, it plays a key role in creating suitable conditions for the launching of a counterattack.

In conjunction with minefields other obstacles, preplanned artillery fire concentrations and barrier fires channel the enemy penetration into fire sacks. Then the artillery can seal the penetration with indirect fires and participate along with direct fire weapons in the destruction of the trapped enemy force.

Fire Destruction of the Enemy During Counterattack

The final phase of defensive fires is the destruction of the enemy during the counterattack. Its goals are to recover lost positions, destroy penetrating enemy forces, and to capture a line to launch offensive operations. This phase has three subphases for artillery support:

- Fire support for the forward movement of troops.
- Fire preparation for the counterattack.
- Fire support of the counterattack.

If a successful counterattack is part of an operational-level counterstrike, there can also be a phase of fire accompaniment.

During the support of the movement forward, artillery destroys (annihilates or neutralizes) enemy artillery and mortar batteries and other targets that are capable of impeding the advance of friendly units for a counterattack. Artillery fires also stabilize the line of contact long enough for second-echelon or reserve forces to advance and deploy for the counterattack.

The fire preparation normally consists of one fire assault to destroy enemy AT systems, tanks, and other weapons on the axis of the counterattack, as well as newly detected artillery and mortar batteries. The preparation begins no later than when the counterattacking units come within range of enemy AT fire and ends when they reach the safety line for friendly fires. At the line for commitment of the counterattacking force, the norm is to concentrate the fires of at least 50 to 60 tubes per km of frontage.

During fire support of the counterattack, artillery uses fire concentrations and fires on individual targets to destroy enemy troops and weapons on the axis of the counterattack and on its flanks. After a successful counterattack, artillery conducts fire missions to consolidate the captured line.

Chapter 8
Antitank Support

For the OPFOR, the term ***antitank*** (AT) refers to the destruction of not only tanks, but other types of armored vehicles as well. The high density of armored vehicles on the battlefield makes it necessary to completely integrate AT weapon systems, at every level, into the fire support plan. The most effective way to destroy enemy armored vehicles in the close battle is direct fire from AT guns, antitank guided missiles (ATGMs), and tanks.

The concept of AT defense is not limited to repelling enemy armor attacks when the OPFOR is on the defense. AT defense is as critical during the offense. As OPFOR brigades and divisions maneuver, they accept open flanks as a matter of course. They need effective AT fire support to protect flanks and stop counterattacks.

ASSETS

Like most modern armies, the OPFOR divides AT weapons into two categories: general and special. Although both types of weapons contribute to the overall AT effort, this chapter focuses on the latter type. The special weapons comprise AT units throughout the OPFOR organizational structure.

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General Weapons

General AT weapon systems include surface-to surface missiles (SSMs), fixed-wing aircraft, helicopters, cannon artillery, multiple rocket launchers (MRLs), tanks, and flamethrowers. The purpose of these systems is to destroy a wide array of battlefield targets, but they can fire successfully against tanks and other armored vehicles. Some helicopters, tanks, and IFVs can also fire ATGMs. Any artillery-type weapon over 20 mm has some AT capability. Antiaircraft guns can also engage ground targets.

All cannon artillery up to 152-mm is effective for direct-fire AT use and carries some armor-defeating ammunition. Guns and howitzers have the sights necessary for direct-fire engagements, primarily for self-protection. Artillery systems with 360-degree traverse are particularly effective in this role. In the defense, some artillery weapons may be used to reinforce the AT firepower of mechanized infantry strongpoints. Should enemy armor penetrate into the defense, direct fire from artillery weapons can delay and disrupt the attackers and, thus, create favorable conditions for a counterattack.

Artillery with precision munitions such as laser-guided projectiles can engage enemy armor without direct fire. Even some mortars can have laser-guided rounds designed to kill armored vehicles.

Special Weapons

Special AT weapon systems consist of ATGMs, AT guns, recoilless guns, AT grenade launchers (ATGLs), and AT rocket launchers (ATRLs). The purpose of these weapons to destroy armored vehicles by direct fire. ATGMs are effective AT weapons, although sometimes limited by minimum ranges, low rates of fire, and visibility requirements. Therefore, some AT forces have a mix of ATGMs and other direct-fire AT weapons. The AT guns, recoilless rifles, ATGLs, and ATRLs provide quick-response fires at medium, short, and point-blank ranges, on broken terrain, and under favorable visibility conditions. Some AT guns can also fire ATGMs. The main purpose of this chapter is to discuss specialized AT units and their employment.

ATGM systems and ATGLs are intended for repelling assaults by enemy tanks and other armored vehicles. However, they can also destroy other ground weapons in the open or in covered fortifications. In certain cases, they can engage enemy helicopters flying at low altitudes.

Antitank Units

From division down to company level, mechanized infantry units have organic AT units with special AT weapons. Even at squad level, mechanized infantry has ATGLs and ATRLs for additional protection. In tank units, the tank is the primary AT weapon; so these units have no AT units organic to them. See FM 100-60 for more detail on organizations.

The most common employment of an AT unit is as a special antitank reserve (ATR) for a maneuver unit. However, the maneuver unit commander may choose use the AT unit as an element of his combined arms reserve (CAR) or to integrate all or part of it into subordinate maneuver units (usually in the defense).

If the AT unit is an ATR force for its parent maneuver unit, it remains under the direct control of the maneuver commander, who assigns missions to the AT unit commander. If the AT unit is part of the CAR, the commander of the CAR assigns these missions. Command relations of AT units allocated to subordinate maneuver units are comparable to those of field artillery units: the AT unit may be either ***attached*** or ***supporting***. See Chapter 7 for additional information.

Nondivisional

Above division level, there are no fixed organizational structures. However, a mechanized army or corps typically has an organic AT regiment consisting of three AT battalions. If an army or corps receives additional AT assets from the army group, it may allocate some of its organic assets to reinforce first-echelon divisions or separate brigades. The amount of AT reinforcement at all levels depends on the subordinate unit's mission and the assessment of the threat of armored attack or counterattack.

Attack helicopters from army or corps level may support a division or separate brigade. Helicopters firing ATGMs play an important part in the coordinated destruction of the enemy. (See Chapter 9 for information on helicopter tactics, including ATGM attack profiles.)

Maneuver Divisions

The AT battalion in a mechanized infantry division (MID) normally has an ATGM battery and two AT gun batteries.[1] An AT gun battery has two 3-gun platoons. The ATGM battery has three firing platoons; each platoon has three or four ATGM launcher vehicles. When possible, engineer units reinforce the battalion to help construct AT obstacles.

There is no AT battalion at tank division (TD) level. The only AT units in the TDs are in their mechanized infantry brigade (MIBR) and in the mechanized infantry battalions (MIBNs) of the tank brigades (TBRs).

Maneuver Brigades

Divisional MIBRs have at least an ATGM battery. Like the ATGM battery at MID level, this battery has three firing platoons, but the platoons have only three ATGM launcher vehicles each. Separate MIBRs and some divisional MIBRs may have an AT battalion rather than just an ATGM battery.[2]

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[1] As an alternative to the AT battalion structures shown in FM 100-60, an MID could have an ATGM battalion of the type shown in FM 100-63, with three ATGM batteries.

[2] The ATGM battalion in FM 100-63 is also an alternative to an AT battalion at MIBR level.

The AT battalion in a divisional MIBR differs from the one in an MID by having only one AT gun battery and one ATGM battery. These batteries have the same structures as their MID-level counterparts. In a separate MIBR, the AT battalion can have a second AT gun battery, and the ATGM battery has three firing platoons of four launcher vehicles each.

There is no AT unit at TBR level. The only ATGMs in either separate or divisional TBRs are in their MIBN(s). The TBR of an MID does not have an MIBN.

Maneuver Battalions

An APC-equipped MIBN has an AT platoon with six manpack ATGMs and three recoilless guns, plus one ATRL in each of the platoon's five APCs. Some IFV-equipped MIBNs have an ATGM platoon with six manpack ATGMs, plus one ATRL in each of the platoon's three IFVs.[3] Each APC or IFV in the battalion, including armored command vehicle variants, usually carries an ATRL, and most also have an encapsulated flamethrower. All such vehicles in the reconnaissance platoon, plus one in the battalion headquarters, also have an ATGL. The mortar battery also has six ATGLs. The mechanized infantry companies (MICs) have the AT weapons listed below.

A tank battalion (TBN) has no organic AT unit. Aside from firing conventional AT projectiles from their main guns, many modern tanks also have the capability to fire ATGMs. A TBN has two ATGLs, found in armored command vehicle variants of APCs and IFVs in the battalion headquarters.

Mechanized Infantry Companies

All APC-equipped MICs and many IFV-equipped MICs have an ATGM section with three short-range, manpack ATGMs.[4] This section has one APC or IFV for transport. Each mechanized infantry squad has one ATGL. Each APC or IFV in the company usually carries an ATRL and an encapsulated flamethrower.

COMBAT FORMATIONS

Antitank units may deploy in various formations: one line, two lines, or echelon right or left, horseshoe, circle, or "L"-shaped. However, some of these formations are more likely for platoons within batteries, and others are more likely for batteries within a battalion. Some of these formations are possible only when the AT unit is deployed at full strength. The terrain, direction of enemy movement, and requirements for defense in depth and mutually supporting fires determine the battalion formation and the placement of the weapons within a platoon or battery.

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[3] This ATGM platoon is more likely to be present in an IFV-equipped MIBN, if the IFVs do not have an ATGM-firing capability.

[4] This ATGM section is more likely to be present in an IFV-equipped MIC, if the IFVs do not have an ATGM-firing capability.

The two-line formation works best when the enemy is approaching directly toward the AT unit's deployment line. The echelon-right or -left formations apply when at least part of the enemy formation is advancing in a direction oblique to the AT unit's deployment line. A one-line formation is most likely when the AT battalion or battery deploys on one side of a movement route in order to ambush an enemy armor column as it passes by. The "L"-shaped formation (primarily used at AT battalion level) allows an ambush from one side with blocking of the route at one end. The horseshoe formation has applications for a fire sack or for an ambush from both sides of a movement route with one closed end. The circle formation is for self-defense and is more likely to involve an AT gun or ATGM battery rather than a whole AT battalion.

The AT battalion and AT gun or ATGM battery commanders control fire from command observation posts (COPs) colocated with one of the firing positions. A small group of personnel with a man-portable battlefield surveillance radar and laser rangefinder from the battery headquarters deploys forward as an observation post (OP) to give warning of approaching enemy armored vehicles. If the battalion or battery deploys for an ambush on a suspected enemy approach route, the OP deploys ahead of the unit's flank that is toward the expected direction of approach.

Division-Level Antitank Battalion

Figure 8-1 gives examples of possible formations for a division-level AT battalion. These examples apply to a standard AT battalion deployed at full strength. Depending on the formation, the battalion typically can cover a sector 3.5 to 5 km wide.

The most common deployment of the division-level AT battalion is two lines of batteries. This arrangement typically has the two AT gun batteries forward and the longer-range ATGM battery in the second echelon, providing depth. Since batteries should be positioned to provide mutual support, the distance between batteries depends on the maximum effective direct fire range of each battery's AT weapons. Alternate firing positions for the battery in the second line are normally on the flanks.

The echelon-right (or -left) formation covers tank approaches from both the front and one of the flanks. Again, the batteries are positioned for mutual support. The terrain dictates the precise shape of deployment.

In a horseshoe formation, an AT battalion would normally put its AT guns on the flanks of the horseshoe, with the ATGM battery at the closed end.[5] Weapons employed at the closed end open fire at extreme ranges, inviting enemy tank attacks so that the other guns or ATGMs can open flank fire. Another tactic is for the ATGM battery to deploy initially in a forward position at the mouth of the horseshoe. After delivering long-range fire on approaching armored vehicles, it would then fall back to a position at the other end of the horseshoe. If enemy armored vehicles penetrate the fire sack of a horseshoe, all weapons deliver fire simultaneously.

[5] If an ATGM battalion uses a horseshoe formation, it would have to use ATGMs on the flanks, too. The same is true of an ATGM battery.

The AT battalion can also use an "L"-shaped formation. It combines the fires of AT guns with ATGMs. The AT gun platoon(s) are on the longer portion of the "L" to fire flank shots. The ATGMs are on the short leg of the "L," firing at longer ranges and blocking forward movement by the enemy. This type of formation maximizes the capabilities of both weapon systems.

Brigade-Level Antitank Battalion

The AT battalion of a divisional MIBR has only two batteries: one AT gun battery and one ATGM battery. Thus, its deployment options are basically limited to a one-line, echelon-left, or echelon-right formation. It might also use a version of the "L"-shaped formation with two short legs. However, this two-battery AT battalion might use formations analogous to those of a battery with two platoons. (See Figure 8-2.) Some formations would be possible only if some elements of the ATGM battery and/or the AT gun battery occupied positions separated from the rest of the battery and under the direct control of the battalion commander.

The AT battalion of a separate MIBR could have the same organization and possible deployment patterns as for the divisional MIBR, or it could have a second AT gun battery. In the latter case, the battalion's deployment could be the same as for a division-level AT battalion.

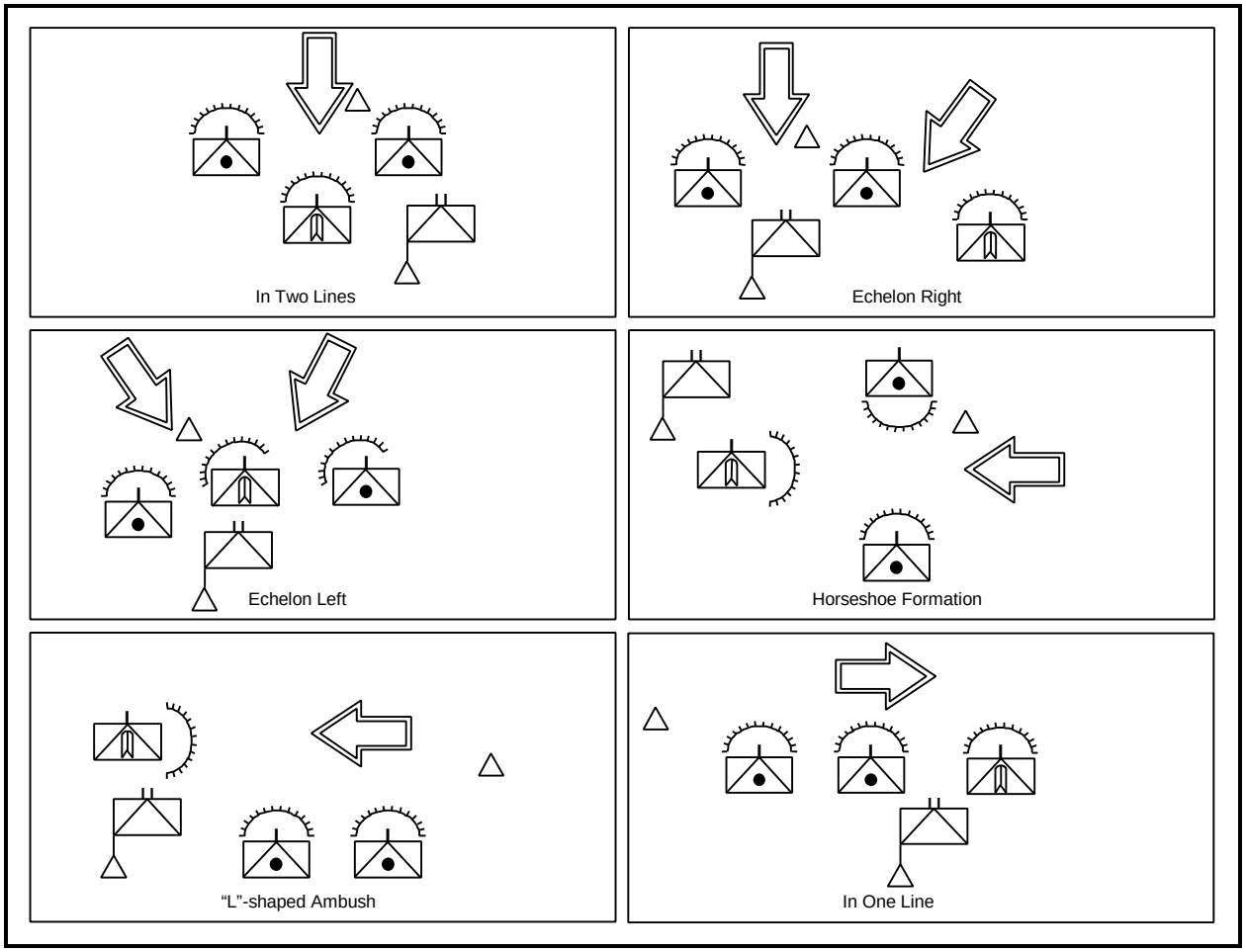


Figure 8-1. Division-level AT battalion formations (examples).

Antitank Gun Battery

Antitank gun batteries and platoons are usually 300 to 500 m apart, but the spacing may be up to 1,000 m if the terrain dictates. Antitank guns usually are about 100 m apart laterally; and may occasionally be up to 300 m apart. These distances can vary according to the range of the AT gun system and whether or not it has an ATGM-firing capability. Longer-range systems could deploy at greater intervals and still meet the requirement for mutually supporting and overlapping fires. The direction of the threat also helps determine the details of the layout. Figure 8-2 gives examples of possible AT gun battery formations. Some of these formations are possible only by placing one gun from each of the two platoons under the direct control of the battery commander.

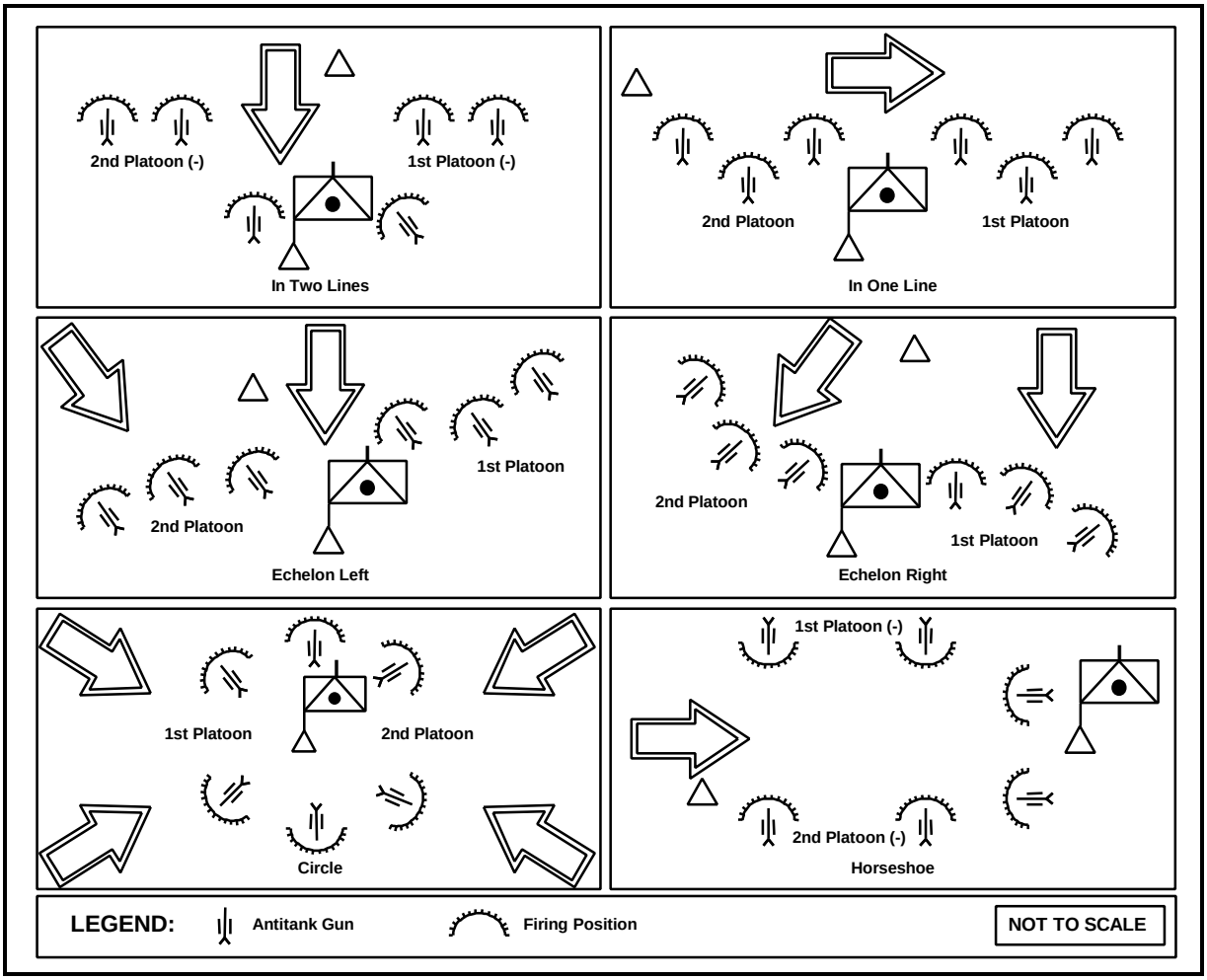


Figure 8-2. Antitank gun battery formations (examples).

ATGM Battery

An ATGM battery deploys with distances of 100 to 200 m between ATGM launcher vehicles and up to 1,500 m between platoons. These distances can vary according to the range of the

ATGM system; longer-range systems could deploy at greater intervals and still meet the requirement for mutually supporting and overlapping fires.

Each ATGM launcher vehicle is normally responsible for an 80-degree arc of fire overlapping with each of its neighbors. Normal frontages are 500 m per platoon and 1,500 m per battery.

Since an ATGM battery has three firing platoons (versus two in an AT gun battery), it might use formations analogous to those shown in Figure 8-1 for an AT battalion. A battery minus one platoon could use formations more like those shown in Figure 8-2 for an AT gun battery. Battery commanders and platoon leaders control the fire of the launchers from COPs that usually are slightly to the rear and preferably on high ground. Within platoons, vehicles may be one-up, two-up, or echeloned to a flank. Whenever possible, ATGMs are on high ground, clear of close or wooded terrain. Normal procedure is for an ATGM launcher vehicle to relocate to a new firing position about 200 m away after engaging one or two targets.

Battalion-Level ATGM or Antitank Platoon

Both the ATGM platoon and the AT platoon have three ATGM sections. The ATGMs deploy by sections; each of three sections has two teams, each containing one manpack ATGM launcher. The AT platoon also has a recoilless gun section that deploys in three teams of one gun each.

When deployed at full strength, an IFV-equipped MIBN's ATGM platoon, with three ATGM sections, can deploy in smaller versions of many of the same formations used by AT battalions and batteries. Each section comprises a pair of manpack launchers carried in an IFV.

In the AT platoon of an APC-equipped MIBN, the three ATGM sections each ride in one APC. The recoilless gun section is split (unevenly) in two additional APCs. Since two of those guns move in one APC and the third in a separate vehicle, deployment patterns often feature a pair of recoilless guns between or to the flank of the forward-deployed ATGM sections and the third gun deployed independently, sometimes near one of the ATGM sections.

In the offense, an ATGM or AT platoon advancing in its IFVs or APCs moves in an extended line of vehicles with an interval of up to 150 m between vehicles. When dismounted, the first line of ATGM sections (and the recoilless gun section in the AT platoon) normally deploy up to 300 m to the rear of the leading maneuver elements. An ATGM section in a second line could be 100 to 200 m to the rear of the first line.

When dismounted, the interval between ATGM launchers in a section is at least 15 m, and the distance between recoilless guns in a pair may be 10 to 20 m. A single recoilless gun could be within 10 to 20 m of the nearest ATGM section. IFVs and APCs follow up to 100 m behind the dismounted sections, attempting to remain concealed behind terrain features. Figure 8-3 shows an example of an AT platoon in dismounted formation in the offense.

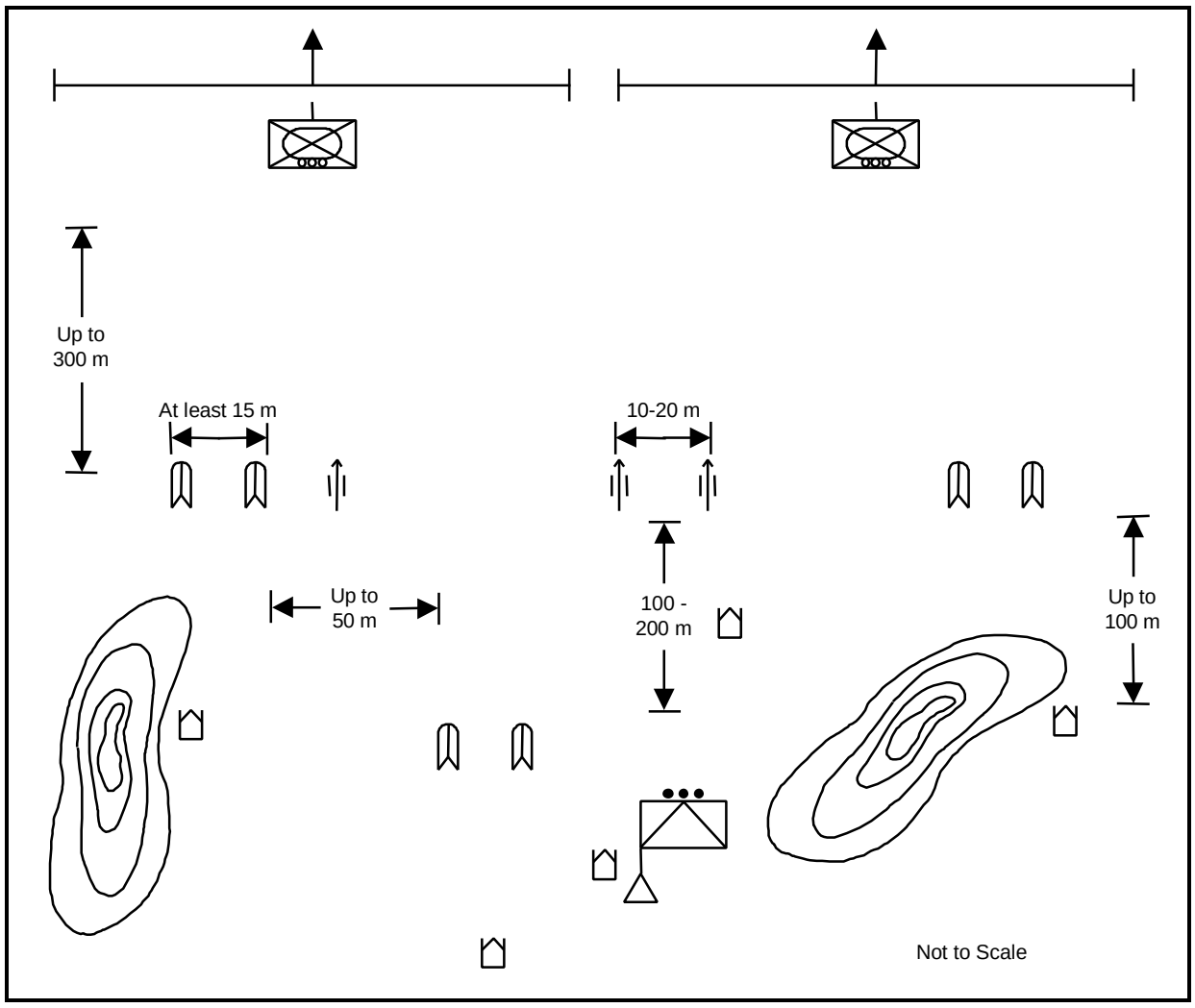


Figure 8-3. Antitank platoon formation in the offense (example).

In the defense, an AT or ATGM platoon normally has a frontage of 500 to 1,000 m, with 100 to 200 m between ATGM sections. Within sections, ATGM launchers remain at least 15 m apart. In the AT platoon, a pair of recoilless guns can deploy as much as 100 to 200 m from each other and 100 to 200 m from the nearest ATGM section, although a single gun could be as close as 10 to 20 m to a nearby ATGM section. The various sections normally are within 50 m of their IFV or APC, since they may have to relocate rapidly to another deployment line within the battalion defensive area. Figure 8-4 shows an example of an AT platoon formation in the defense.

Company-Level ATGM Section

All three manpack ATGM launchers in an MIC's ATGM section travel in one vehicle. Thus, they tend to deploy in a simple, one-line formation. In the defense, the section normally has a frontage of up to 50 m, with the launchers least 15 m apart. They normally deploy no more than 50 m from their APC or IFV, since they may need to relocate rapidly to another deployment line within the company strongpoint.

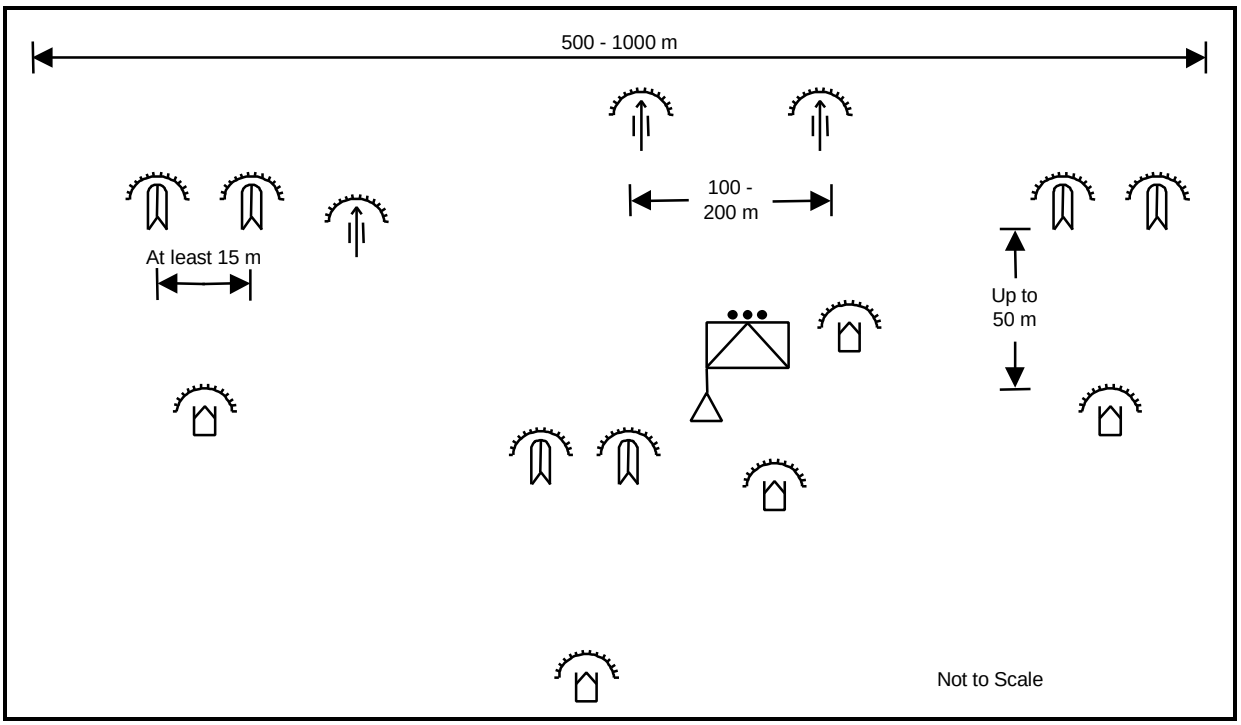


Figure 8-4. Antitank platoon formation in the defense (example).

ANTITANK RESERVES

All MID and MIBR commanders form ATRs. The commanders of MIBNs and MICs can also do so. This allows a commander to deal with developing armor threats without having to weaken his attacking or defending echelons or CAR.

Composition

In MIDs and MIBRs, the commander normally uses his organic AT unit to form an ATR. When an MID or MIBR receives additional AT assets from higher headquarters, it may use these assets to form a second ATR.[6] Another option is to keep the reinforcing assets as the receiving unit's ATR and allocate some or all of the unit's organic AT assets to its own subordinates. An MIBN that has an AT or ATGM platoon normally uses that platoon as an ATR. An MIC can use an organic or attached ATGM section in this role. Tank units, lacking special AT elements, can use a subordinate tank unit for this purpose.

Attack helicopters allocated from army or corps level can reinforce the ATR of a division or separate brigade or possibly act as an additional ATR. This adds a more mobile and longer-range AT capability.

[6] For example, a separate MIBR has its own AT battalion. When performing independent, deep missions in the enemy rear, it might receive an additional AT battalion as reinforcement. This would allow it to form two ATRs, in order to protect both its flanks.

A typical ATR may consist of AT guns and/or ATGMs and generally includes an engineer element to prepare positions and lay hasty minefields. The ATR can also include tanks to deploy rapidly and meet tank threats. When the ATR has additional assets (flamethrowers, tanks, or engineers) attached, these elements are normally subordinate to the AT unit commander. Rather than having engineers attached, an ATR at division or brigade level often operates in conjunction with a mobile obstacle detachment (MOD).

Mobile Obstacle Detachment

MODs are temporary engineer groupings intended to create minefields and obstacles. Their basic equipment includes mechanical minelayers and trucks carrying mines, explosives, and other equipment. They are sometimes reinforced with mechanized infantry troops for close protection and extra labor. The size and composition of the MOD depends on the tactical situation and the needs of the maneuver commander. See Chapter 11 for more detail on the MOD.

The mission of the MOD is to deny key terrain to the enemy. In particular, it can emplace AT obstacles along routes of advance that are suitable for armored vehicles. Although the MOD can operate independently, the division or brigade chief of engineers often assigns it to operate with the ATR. This arrangement provides the commander with an organization capable of emplacing AT obstacles as well as covering the obstacles with AT fires.

Missions

This ATR has applications for support of the march, offense, and defense. As a reserve, it does not receive a specific mission but must be ready to perform a number of different missions, as the situation demands. The maneuver commander may position his ATR in the area or axis of an anticipated armor threat. However, it would also have planned deployment lines for dealing with contingencies in other locations.

In the offense, the basic missions of the ATRs are to—

- Screen the advance of friendly units moving to attack.
- Protect the flanks of attacking units and gaps in deployment.
- Repel enemy tank counterattacks.
- Cover the commitment of the second echelon or CAR.
- Assist in consolidation on captured lines.
- Seal off enveloped enemy forces.

In the defense, possible missions of the ATRs are to—

- Reinforce the AT defense of the first echelon on an important axis.
- Destroy armored groupings that have penetrated the defense.
- Cover boundaries, flanks, or deployment lines for counterattack forces.
- Gain time for mounting a counterattack.

Deployment

Where the commander holds his ATR and how far from the line of contact (or head of a march column), depends on the tactical situation. As a rule, the ATR deploys between the first and second echelon. Both in offense and defense, it is usual to designate two, three, or even more alternate lines of commitment on each axis depending on the assessment of likely enemy actions.

A maneuver commander may order his ATR to deploy within the combat formation of a subordinate maneuver unit. In that case, it is important to coordinate its actions with those of the subordinate's AT unit. This coordination may result in separate but coordinated actions or possibly in the combined use of AT units from more than one level.

Figure 8-5 shows an example of a brigade- and division-level ATR being employed in combination. In this example, the division-level ATR (AT battalion) deploys in a horseshoe formation. Ahead of it, a brigade-level ATR (ATGM battery) deploys from its hide position to deliver long-range ATGM fire from behind a hasty minefield laid by an MOD. Then it falls back to a position at the closed end of the horseshoe, alongside the division-level ATGM battery.

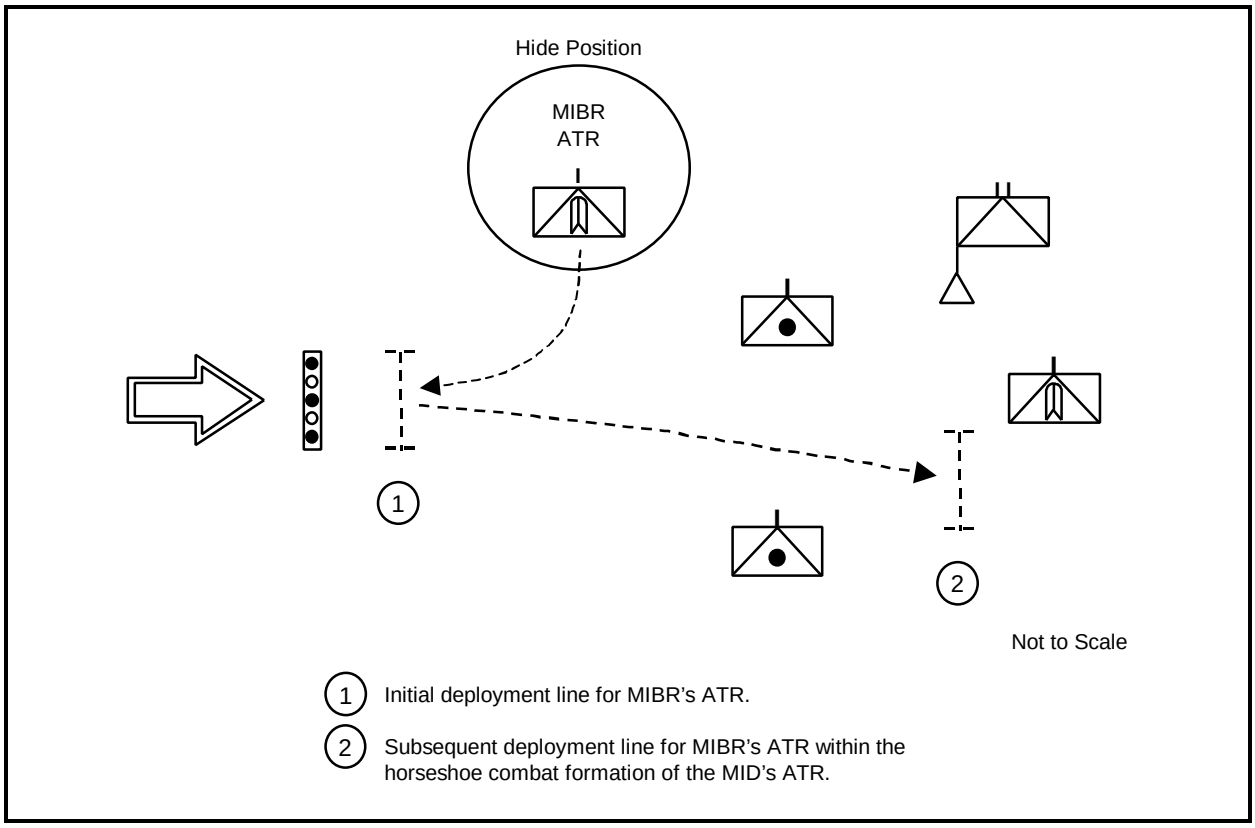


Figure 8-5. Brigade- and division-level ATRs in combined horseshoe formation (example).

MARCH

During tactical marches, AT elements are deployed throughout march columns. At halts or in assembly areas, they are given deployment lines and missions for repelling enemy ground attack.

March Security Elements

Company- or battalion-size march security elements often receive AT units as reinforcements. Typical reinforcements for an MIC employed as a forward security element (FSE) include an AT (or ATGM) platoon from the parent MIBN. The advance guard of an MIBR is an MIBN reinforced with AT elements.

A brigade can deploy a company-strength flank security element on a threatened flank. This element can be reinforced with AT and minelaying assets, or operate with an ATR and an MOD. In the absence of an armor threat on a particular flank, the MOD ordinarily travels behind the advance guard and in front of the main body.

Main Body

A division-level ATR normally marches behind the first-echelon brigades, but can move to cover the most exposed flank. An MIBR's AT battalion or ATGM battery may cover an exposed flank or march well forward, depending on the tactical situation. It is common for AT units at brigade level and lower to move ahead of the maneuver units in the march column.

OFFENSE

In the offense, mechanized infantry units normally use their organic AT units, possibly reinforced by tank or mechanized infantry troops, to form an ATR. Since TBRs and divisions have no special AT units for this purpose, they have to detach tanks from their subordinate units to form such a reserve.

The ATR, often in conjunction with an MOD, moves parallel to the main body on an open flank, within the main body ready to deploy to either flank, or behind units advancing in battle formation. The goal is to position it wherever it can cover the deployment of the main body or quickly counter any armored threat to the advance. Attack helicopters can provide a very flexible and potent ATR or flank protection force.

Attack Against a Defending Enemy

During an attack against a defending enemy, planned AT fire support consists of three phases: preparation, support, and accompaniment. These phases are closely related to the last three phases or artillery fire support in the offense. (See Chapter 7.) The fires of general and special AT weapons are part of the overall fire plan.

Fire Preparation for the Attack

During the fire preparation for the attack, AT units, along with tanks and other weapons assigned for direct fire, engage armored vehicles and AT weapons on or near the forward edge of the enemy defense. Their mission is to contain enemy armor and to cover the deployment of the attacking friendly units. It is common to assign two or three AT weapons to destroy one target.

For these tasks, ATRs at division and brigade level position themselves well forward, on the most likely enemy armor approaches. The AT or ATGM platoon of an MIBN can also join in the fire preparation for the attack. Artillery attached to the battalion and assigned to conduct direct fire can also destroy and neutralize enemy weapons in his forward strongpoints. IFVs and ATGM sections of MICs also participate, as do any tanks reinforcing the battalion.

Fire Support of the Attack

During the fire support of the attack, AT units cover the flanks of attacking maneuver units and support the deployment of the second echelon or reserve. They can also assist in consolidation on the maneuver unit's objective or mission line.

When supported maneuver units deploy into battle formation for the assault, artillery shifts to the support of the attack phase. At the same time, tanks, AT guns, ATGM launchers, and other weapons assigned for direct fire begin firing into gaps between assaulting units and from their flanks. These general and special AT weapons destroy enemy targets that have survived the preparation or have newly appeared. Subsequently, these weapons act in accordance with assigned missions.

Fire support of the attack is conducted continuously to the full depth of the enemy first-echelon brigade. Fighter-bombers from army group aviation destroy newly detected targets in the depth of the enemy defense. Attack helicopters deliver strikes against tanks, other armored targets, AT weapons, and counterattacking enemy units 2 to 3 km or more ahead of the attacking units.

Division and brigade level. Once the attack begins, AT weapons at division and brigade level are most likely to be used in an ATR, working with an MOD, to block any enemy counterattacks. The ATR and the MOD usually move forward, either on an open flank or in a central position ready to deploy to a threatened axis. Figure 8-6 illustrates an example of the deployment of a brigade-level ATR in the preparation and support of an attack.

During an attack, the ATR usually moves behind advancing first-echelon maneuver units on the most exposed axis of attack, ready to repulse enemy armored counterattacks. This means that it does not necessarily follow the units conducting the main attack.

An MIBR in the main attack can place its ATR on a flank that may become exposed when it penetrates the enemy's forward defensive positions. An MIBR in the supporting attack could place its ATR on the division's other flank.

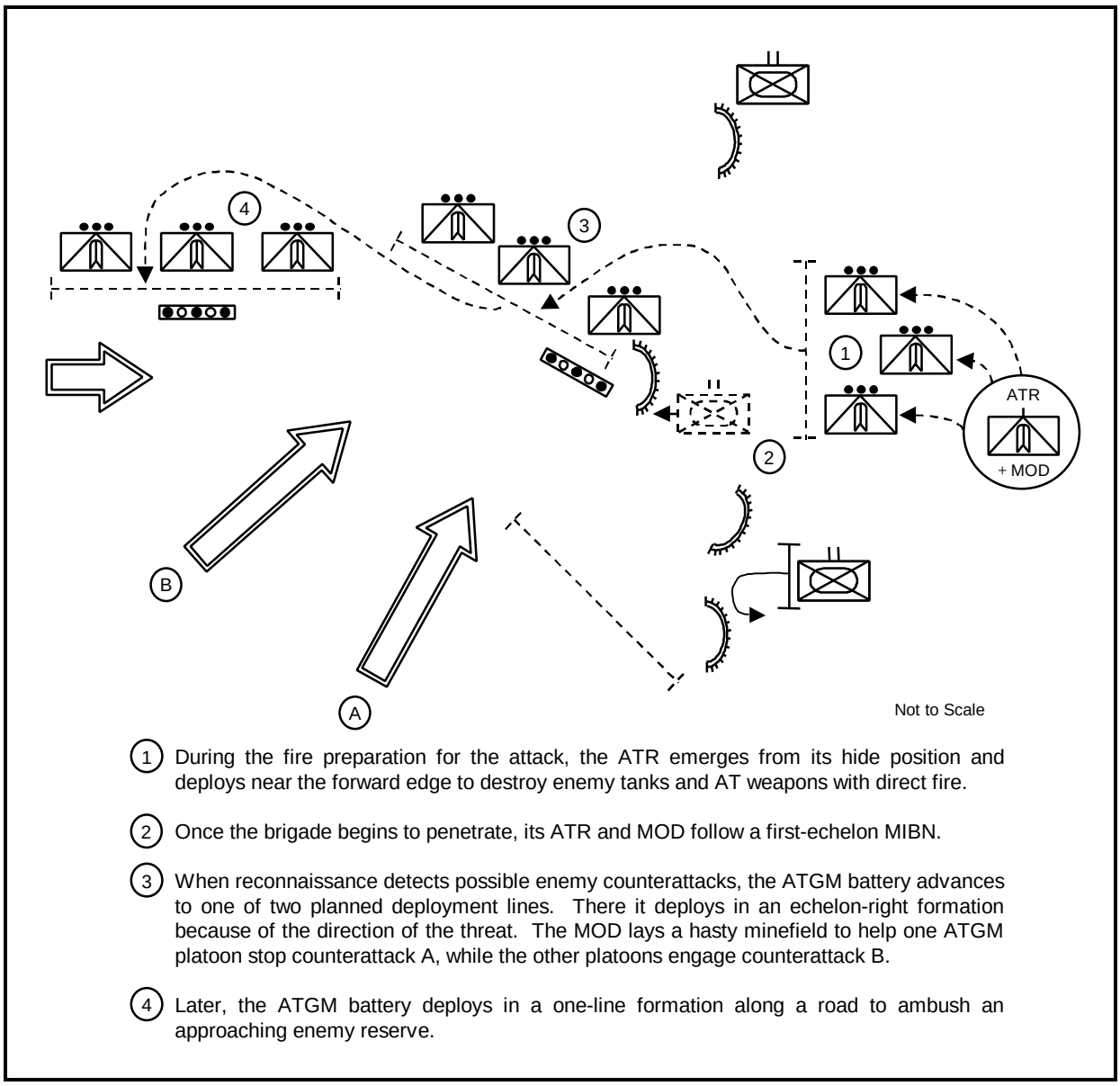


Figure 8-6. Brigade-level ATR in the offense (example).

If an MID has an open flank, its ATR and MOD can deploy to cover that flank. Otherwise, they may be assigned a more central position with the primary role of covering a flank of the penetration against a possible enemy counterattack. Alternatively, they could cover a boundary between brigades, where an enemy counterattack is likely to occur.

The maneuver commander or the chief of artillery chooses successive firing lines and alternate locations for the ATR to cover likely tank approaches. The AT unit commander selects the firing positions. The ATR advances to these successive lines on the order of the maneuver commander, in coordination with the progress of the attacking force.

Figure 8-7 gives an example of how an AT battalion as an ATR could maneuver to repel an enemy counterattack. When the enemy launches a counterattack in a gap between advancing first-echelon units, the ATR following that echelon deploys its AT gun batteries forward on either side of the gap. The MOD associated with the ATR moves forward to lay a minefield in the gap and then withdraws to a position behind the ATGM battery. The ATGMs fire at long range, and the AT guns engage the enemy armored vehicles as they come within range.

Battalion level. The AT platoon of an MIBN (APC) or the ATGM platoon of an MIBN (IFV) as a rule remains at the disposal of the battalion commander and operates at full strength. The MIBN commander assigns the platoon targets for engagement, a direction of fire, and a direction of advance.

The platoon (or sections from it) advances up to 300 m behind combat formations of first-echelon MICs, in gaps between them, or on one of the battalion's flanks. It often moves behind a first-echelon company on the flank most exposed to enemy armor. If necessary, the AT weapons can move right up into combat formations of the company whose assault they are supporting.

The AT or ATGM platoon leader assigns missions to sections. He indicates in the combat order targets to be engaged, firing position (line of firing positions), direction of attack, and each section's place in the combat formation. In a dismounted assault, he also indicates dismount location.

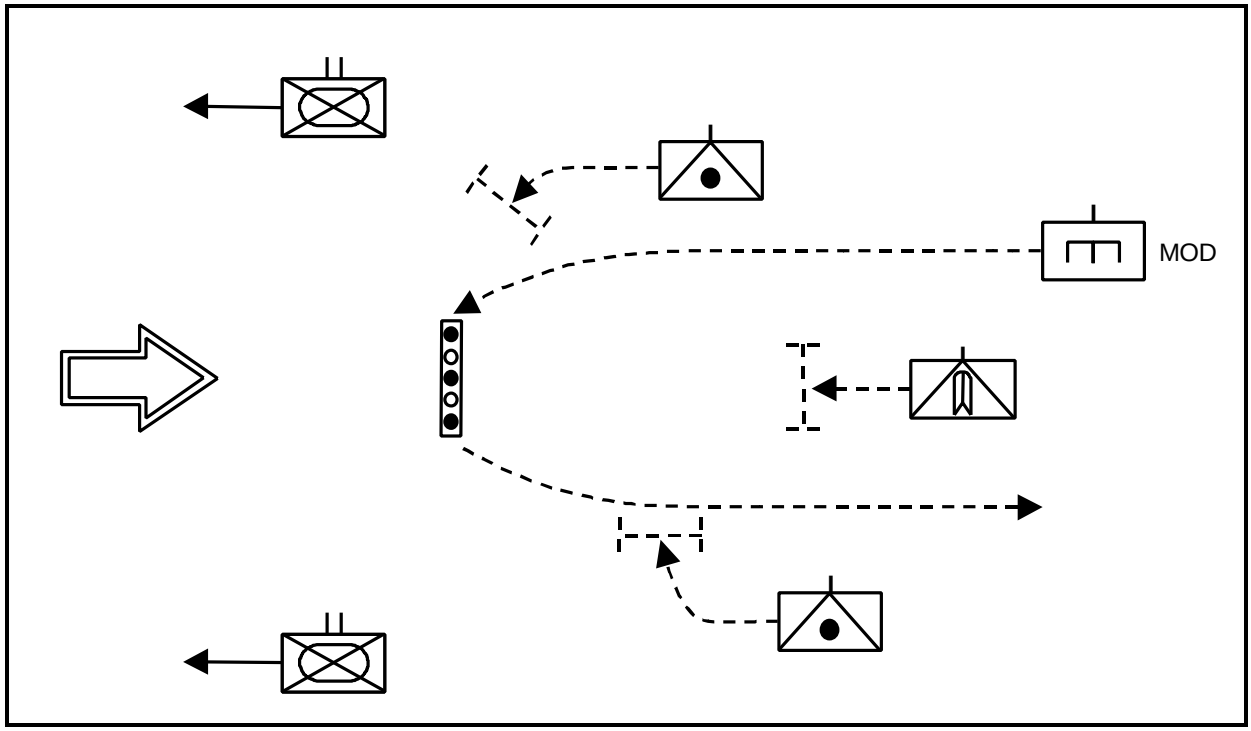


Figure 8-7. Actions of an ATR in repelling an enemy counterattack (example).

When the AT or ATGM platoon operates as a whole, the platoon leader exercises command and control from platoon COP. In rare occasions when the platoon is attached to MICs by sections, the platoon leader stays with one of the sections. However, command and control of separately operating sections would be exercised by commanders of the MICs to which they are attached.

As the AT or ATGM platoon advances, it successively occupies firing positions within combat formation of the MIBN. At the battalion commander's command or independently, the platoon destroys tanks and other armored vehicles impeding the advance of the MICs. When ATGM or recoilless gun sections dismount to conduct fire, their IFVs or APCs take cover nearby or up to 100 m behind the weapons. The vehicles use their own fire to cover the AT firing positions and support the assault by mechanized infantry units.

The combat formation of an MIBN can include AT weapons attached from the MIBR's ATGM battery or AT battalion, as well as one or two tank companies and an engineer platoon. If the battalion is on an exposed flank in the first echelon of an MIBR, the brigade's ATR may also be moving just behind the battalion. In addition, the battalion sometimes can be supported by fire of attack helicopters.

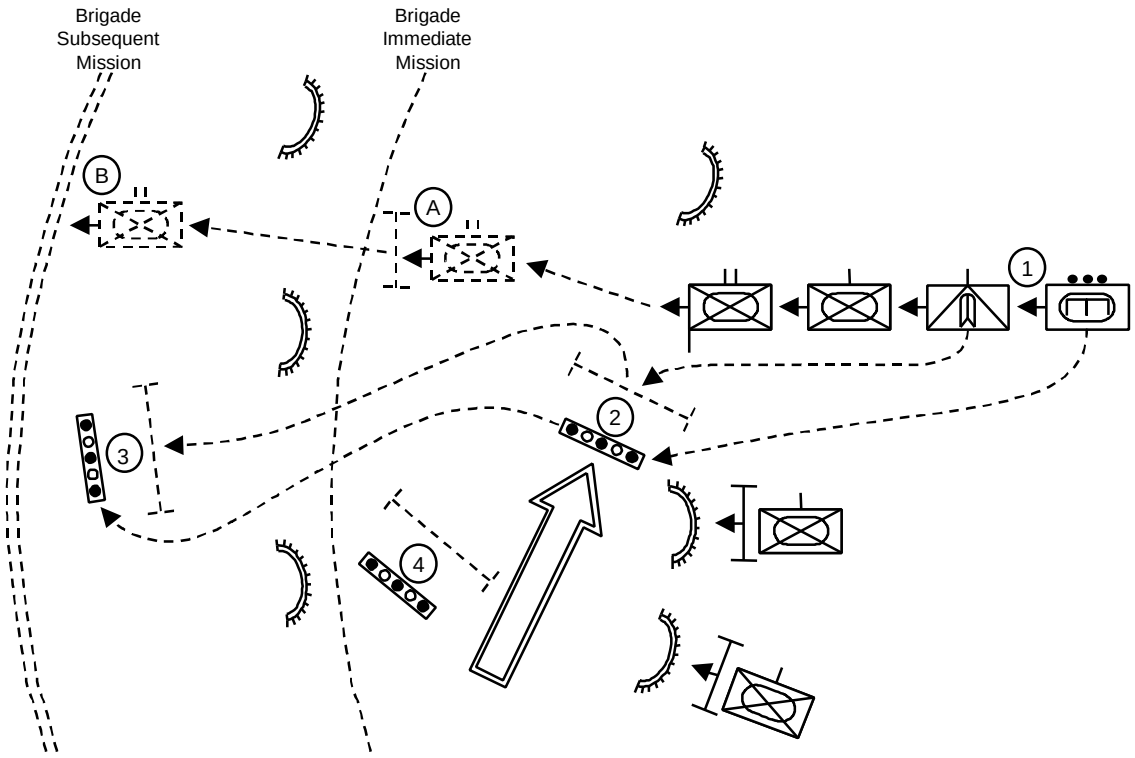
Company level. The ATGM section of an MIC as a rule remains at the disposal of the company commander and operates at full strength. The section usually attacks in the battle formation of mechanized infantry platoons (MIP), just behind first-echelon platoons, in gaps between them, or on one of the company flanks. Occupying firing positions in succession, it destroys tanks, IFVs, and other armored targets hampering the company's advance.

If the company is on an exposed flank in the first echelon of an MIBN, the battalion's AT or ATGM platoon may also be moving just behind the company. Depending on the assigned mission, the battalion might attach a section from that platoon to an MIC.

Fire Accompaniment to Depth of Enemy Defense

During the accompaniment phase, the maneuver commander employs the ATR to cover threatened areas and open flanks. Specifically, he can use it as a blocking force against enemy counterattack. He selects firing positions in the depth of the enemy positions from which to defeat armored counterattacks. If ordered to deploy to one of these positions, the AT unit commander leads his weapons forward, puts out OPs, and moves himself to a position from which he can direct fire. He maintains close contact with the maneuver force commander and any MOD operating in the same area.

AT assets concentrate on the threatened axis of the counterattack, and a brigade- or division-level MOD can surface-lay a minefield in the enemy's path. Figure 8-8 shows an example of how a brigade-level ATR and an associated MOD can support the action of a second-echelon MIBN.



1 As a second-echelon MIBN advances toward its line of commitment (A), the brigade's ATR and MOD move with it, near the head of the battalion column. Anticipating a counterattack from the left flank, they have planned deployment lines (3 and 4).

2 When the enemy counterattacks earlier than expected, the MOD lays a hasty minefield, and the ATR deploys behind the minefield to halt or destroy the counterattacking force. This makes it unnecessary to use the originally planned deployment line (4).

3 As the MIBN continues to advance to the brigade's subsequent mission (B), the MOD lays a minefield at a preplanned line (3), and the ATR is prepared to deploy there if necessary.

Figure 8-8. Antitank reserve and MOD providing flank protection for second echelon in the depth of the enemy defense.

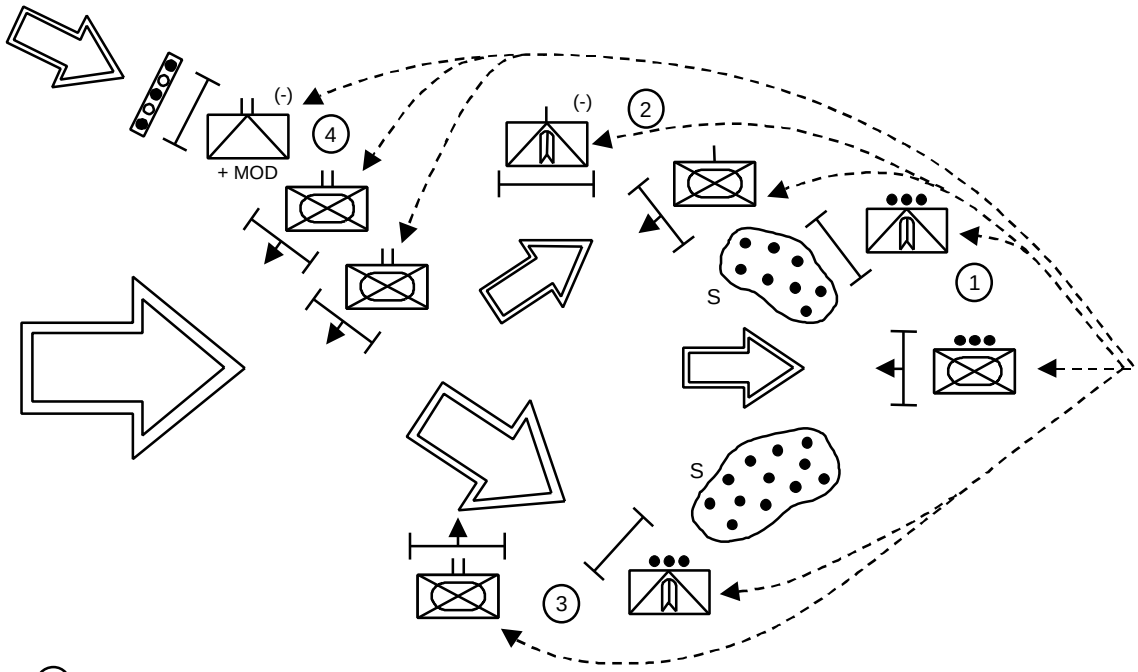
During battle in the depth of the enemy defense, the AT or ATGM platoon of an MIBN displaces behind one of the first-echelon companies on a likely avenue of armor approach in readiness to repel enemy counterattacks. Even an MIC must be ready to repel counterattacks. Its ATGM section also takes up firing positions on a likely avenue of armor approach, usually in gaps or on the company flank.

However, not just AT units with special AT weapons are involved in defeating an armor counterattack. General AT weapons including artillery, mortars, tanks, IFVs, and attack helicopters try to inflict maximum damage on the enemy. Army aviation can deliver strikes against a withdrawing enemy, above all against tanks and AT weapons.

Meeting Battle

In a meeting battle, both sides accept open flanks and gaps in their deployment, as they maneuver over a wide area with rapid and sharp changes in the situation. There is a premium on deploying and firing first to attack vigorously into the enemy's gaps and flanks.

In anticipation of a meeting battle, AT units march with the advance guard or at the head of the main body. They prepare to deploy immediately to provide fire support. At the beginning of a meeting battle, these units deploy in the threatened sector on an assigned firing line, covering the deployment of the main body. Figure 8-9 shows an example of the deployment of antitank units in support of a meeting battle.



1. One ATGM platoon from the FSE deploys behind a remotely-delivered minefield to help the CRP pin down an enemy reconnaissance element.

2. The FSE deploys, along with the remaining AT elements organic or attached to it, to engage an enemy march security element.

3. The advanced guard, with an ATGM platoon (or perhaps an attached ATGM battery), engages the next larger enemy element from a flank.

4. The brigade-level MOD and ATR (minus any AT units attached to march security elements) deploy with the brigade's main body. In this example, they deploy to protect an exposed flank. However, they could also join the maneuver units of the main body in engaging the main enemy force.

Figure 8-9. Antitank support in a meeting battle (example).

March Security Elements

An MIC acting as an FSE marches with AT elements well forward in its march formation, so that they can join in the task of engaging the enemy force. In addition to its organic ATGM section, the MIC could have AT weapons attached from its parent MIBN.

The FSE can occupy a blocking position and begin engaging the approaching enemy. If a combat reconnaissance patrol (CRP) ahead of the FSE has engaged an enemy march security element, all or part of the AT element(s) in the FSE could deploy alongside the CRP to pin down that enemy force on a designated line. This would allow the rest of the FSE to maneuver to attack the enemy march security element or main body from a flank. An AT element remaining with the FSE would deploy centrally behind the company's first echelon for that attack.

An MIBN performing the role of advance guard (or forward detachment) for a brigade is normally reinforced with various elements, including tanks and AT units. This could allow the MIBN to attach all or part of its own AT or ATGM platoon to the FSE. To the AT unit(s) under his direct control, the battalion commander assigns deployment lines, firing positions, time to occupy them, procedure for commencing and ceasing fire, and procedure for displacement in the course of battle. Organic and attached AT units deploy on likely avenues of armor approach and cover the battalion main body flanks against possible enemy assaults. They often operate together with the FSE in supporting commitment of the main body.

Main Body

In anticipation of a meeting battle, AT units of MIBNs and MICs in the main body typically march at the head of their respective march columns. As a battalion deploys into battle formation, it often reinforces its first-echelon MICs with AT elements.

If not attached to the advance guard, an MIBR's AT battalion or ATGM battery may cover an exposed flank or march well forward, depending on the tactical situation. The brigade's MOD typically moves at the head of the main body, following the advance guard. If reconnaissance reports enemy activity on a particular axis, the MOD deploys there to emplace mines. Some AT unit would normally deploy along with the MOD; it could be the brigade's ATR and/or an AT or ATGM platoon from the nearest MIBN. It is also possible that both the ATR and the MOD could follow the brigade's first echelon.

The first-echelon brigades of a division actually fight the meeting battle. The rest of the division normally remains in march formation. An MID's ATR normally marches together with the MOD behind the first-echelon brigades. From that position, it can deploy to cover likely areas for enemy counterattack, on an open flank or a boundary between brigades. When reconnaissance detects an enemy armor threat on one of those areas, the ATR and MOD deploy there to counter it.

Pursuit

In a parallel pursuit, maneuver units in march or prebattle formation would normally have AT units near the front of the column, close behind reconnaissance and security elements. From that position, they can deploy quickly in case a meeting battle occurs. Once the pursuit force overtakes the enemy force, the AT units can attack a withdrawing unit from the flank or block withdrawal routes for bypassed enemy units. They can also cover minefields, demolitions, and other obstacles emplaced by an MOD on a withdrawal route. Attack helicopters can also deliver strikes against the withdrawing enemy, particularly against armored vehicles.

DEFENSE

Because tanks and other armored vehicles are the mainstays of offensive action, the AT defense is the basis of the OPFOR defense. The defense must be capable of withstanding massed assaults of tanks and mechanized infantry and destroying them both ahead of the forward edge and in the depth of the friendly unit's defense. This requires a carefully organized system of fire, especially AT fire, in combination with systems of engineer obstacles, strongpoints, and firing positions. Fire planners analyze the terrain to identify armor approaches. They then site AT weapons to provide in-depth, mutually supporting coverage of armor approaches and protection to flanks.

In a maneuver defense, highly mobile ATRs and MODs play critical roles. They support the maneuver of CAR or second-echelon forces into counterattack positions the intervals between lines of defensive positions. In the depth of the defense, there are often gaps between the defensive positions. Rapid minelaying by an MOD or remotely-delivered scatterable mines can fill a gap and block an enemy penetration. At the same time, the ATR can deploy rapidly from its hide position and cover the minefield to prevent breaching. Ideally, the AT fires can also destroy the halted enemy force or at least buy time for a counterattack force to maneuver into position to engage the enemy by surprise from a flank.

Counterpreparatory Fires

The AT defense can begin long before armored vehicles come within range of special AT weapons and other direct fire systems. Counterpreparatory fires by SSM, artillery, and fixed-wing aircraft can destroy or at least disrupt detected concentrations of enemy armored forces preparing to attack. These fires by general AT weapons can surprise the enemy when he is still in assembly areas or moving up to the line where he deploys into battalion columns in preparation for the attack.

Fires Against an Attacking Enemy

The AT portion of the fire support plan has greater detail in the defense than in the offense. The basic system of fire in the defense is AT fire. The AT fire plan should place an enemy armored force under continuous fire from the point of its first detection until it is destroyed in a first-echelon fire sack. If that fails, ATRs at various levels can still destroy it.

In the defense, AT units have these missions:

- Destroy enemy armored vehicles forward of the first echelon.
- Destroy armored vehicles that have penetrated the first defensive echelon.
- Cover gaps in the defense.
- Support the counterattack.
- These tasks occur during the various phases of fire support in the defense.

Fire Interdiction

Fire interdiction of advancing enemy troops begins when the enemy units deploy into battalion columns and continues until they reach their assault line. Although targets are still beyond the range of special AT weapons, this phase involves general AT weapons. It can include fixed-wing aviation, SSMs, massed fires or precision-weapon strikes by long-range artillery, and MRLs emplacing minefields. Engineer MODs with mechanical minelayers can rapidly emplace AT minefields in the security zone before falling back to positions with the ATRs in the main defensive zone.

Fixed-wing aircraft, especially ground-attack aircraft with ATGMs, are the most effective weapons to engage moving armor forces at greater ranges. When the enemy is 2 to 3 km or more from the forward edge, ATGM-equipped attack helicopters can conduct ambushes along the most likely armor avenues of approach. Other helicopters can also lay hasty minefields to help canalize the enemy force into fire sacks.

Long-range MRLs can fire rockets with scatterable-mine warheads along the enemy's axes of advance. Indirect artillery and MRL fires can increase the vulnerability of tanks to special AT weapons by stripping them of their supporting infantry forces.

During the fire interdiction phase in a defense established out of direct contact with the enemy, both general and special AT weapons can support maneuver units defending in the security zone. These combat security elements can include forward detachments, forward positions, and combat security outposts.

Forward detachment. The first special AT weapons the enemy encounters may be in a forward detachment (FD) in the security zone. A division can deploy a reinforced battalion or even a brigade as an FD. A brigade can send out its own FD in the form of a reinforced battalion. Reinforcements for a brigade-size FD can include tanks, one or two artillery battalions, two or three AT gun or ATGM batteries, and one or two engineer companies. Even a battalion-size FD can receive tanks, one or two artillery battalions, an ATGM battery, and an engineer company.

Engineer obstacles on the most likely armor approaches channel the enemy into fire sacks where AT units and artillery engage him with direct fire. If this weakens the enemy sufficiently, the FD's reserve can counterattack. Otherwise, the FD withdraws to another prepared defense line and repeats the process. Artillery, AT weapons, and sometimes attack helicopters cover the withdrawal.

Forward position. Whether or not there is enough separation from the enemy to establish a security zone, a brigade can also establish a reinforced company- or battalion-size forward position 4 to 6 km ahead of the forward edge. An MIC in this role may be reinforced with a tank platoon (TP), an AT or ATGM platoon, and an engineer squad. The company commander can integrate some of the organic and attached AT weapons into MIP strongpoints. He can deploy some AT weapons remaining under his own control in gaps between platoon strongpoints or in the depth of the company strongpoint.

As an FD withdraws toward the main defense zone, it may use the forward position as its final defense line in the security zone or it may pass through the forward position. In the latter case, the reinforced company defending in the forward position may have an opportunity to engage the enemy in his flank with fires from its tanks and AT weapons. Finally, the company in the forward position withdraws into the main defense zone under cover of its AT weapons.

Combat security outpost. At the direction of the brigade commander, a maneuver battalion can establish a platoon-size combat security outpost (CSOP) up to 4 km in front of the forward edge of the defense, on the most threatened axis. This location should be within range of direct AT fire from first-echelon company strongpoints in the main defensive zone. An MIP sent out as a CSOP can have reinforcements that include an ATGM section, an engineer unit, a tank, and flamethrowers.

When major enemy forces approach the CSOP position, they are engaged not only by fire of the assigned platoon, but also by assigned weapons from companies on the forward edge. In coordination with assigned weapons, the CSOP destroys enemy tanks and other armored vehicles ahead of its frontage. Assigned tanks, AT weapons, and supporting artillery of the battalion, as well as the brigade commander's duty weapons destroy enemy armored vehicles attempting to go around the CSOP and move to its flank or rear.

Fire to Repel Enemy Attack

Fire to repel the enemy attack begins when the enemy crosses the assault line and ends when he enters the first defensive position in the main defensive zone. The first defensive position consists of battalion defensive areas of first-echelon maneuver battalions. Therefore, the special AT weapons involved in this phase are primarily those organic or attached at battalion level and below.

This phase coordinates the fire of special AT weapons with the fires of artillery and all weapons of the maneuver units. The goal is to create a zone of continuous fires in front of the defense.

Army aviation resources remain under army direction to continue hitting deep targets and to provide a flexible firepower reserve that can quickly maneuver to meet dangerous developments. Division and brigade artillery groups attempt to break up attacks and split armor from the infantry, making it more vulnerable to AT weapons.

In combination with natural barriers, obstacles placed at the forward edge and within the main defensive area can force the enemy into fire sacks or confine him within a fire sack until he is destroyed. Minefields can be emplaced by hand, MODs with mechanical minelayers, artillery, or helicopters. The OPFOR stresses the importance of covering minefields with fire, particularly with long-range AT weapons.

Division and brigade level. Typically, the division or brigade commander would locate his ATR to the rear of first-echelon defending units, in a hide position from which it can deploy to react to various contingencies. Figure 8-10 shows an example of possible employment of a brigade-level ATR in the defense. In this example, the ATR of an MIBR initially occupies a hide position to the rear of defending MIBNs. The brigade commander orders the preparation of three deployment lines, to cover gaps between MIBNs or to repel a penetration. As the enemy approaches the forward edge, the brigade's MOD emerges from its hide position and lays additional mines on a threatened axis between two first-echelon MIBNs.[7] The ATR is prepared to deploy to a line behind that minefield, to another forward deployment line, or to a line in the depth of the brigade's sector. Each first-echelon MIBN also has deployment lines for its AT or ATGM platoon near the forward edge. These AT units must coordinate with the brigade's ATR.

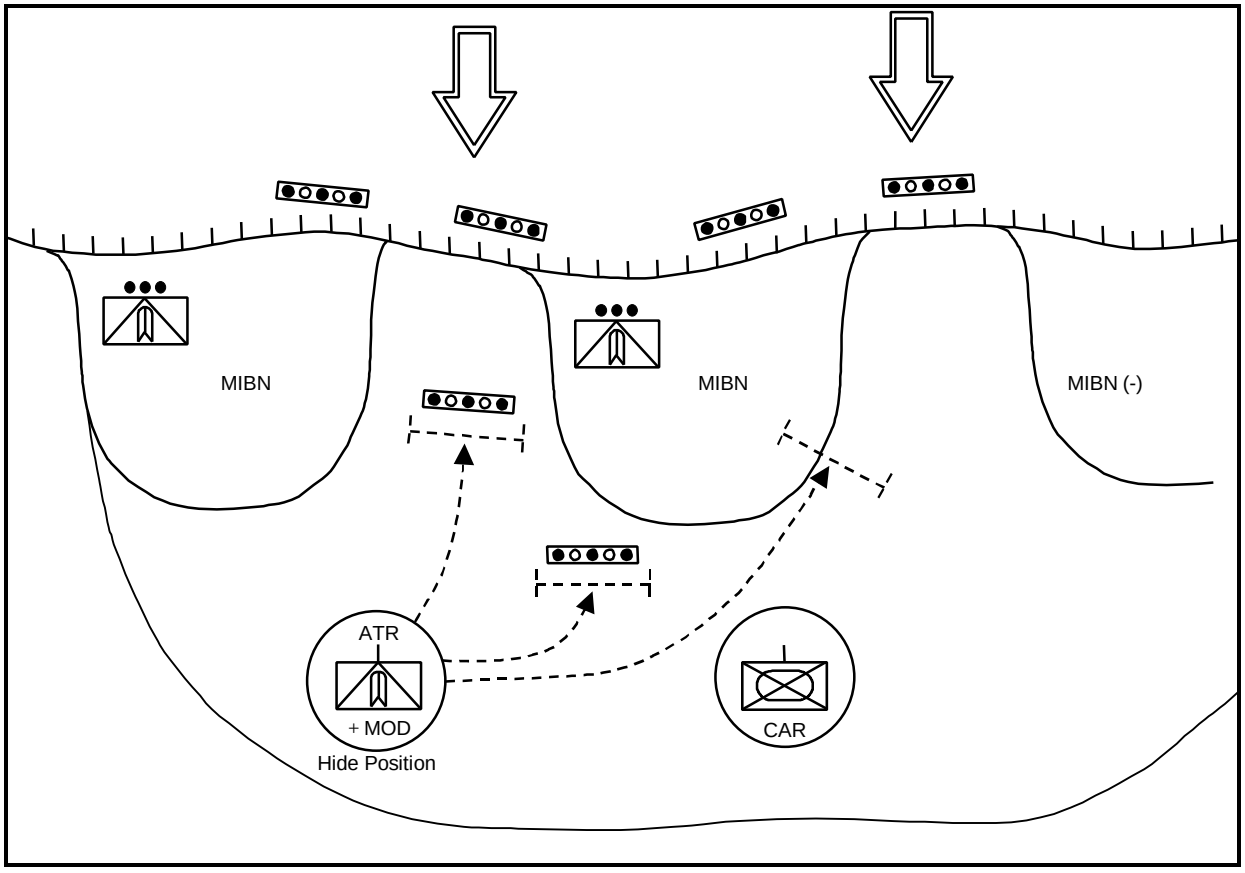


Figure 8-10. Brigade-level ATR in the defense (example).

[7] If the MOD has two minelaying platoons, it can lay minefields simultaneously on two axes or lay one minefield near the forward edge and another in the depth of the defense.

Alternatively, the brigade or division commander could choose to integrate an AT unit into the defensive first echelon and designate positions to occupy in either a battalion defensive area or company strongpoint on the forward edge. This type of deployment is usually by platoon, with the separation between platoons ensuring mutually supporting fires.

The specific combat formation of the AT unit depends on the mission and terrain. It must ensure the ability to—

- Concentrate direct fire on armored vehicles along armor avenues of approach.
- Cover approaches to AT barriers by fire.
- Closely coordinate the weapons of the AT units and the AT weapons of the company strongpoint or the battalion defensive area.
- Echelon its firing positions in depth.
- Conduct flanking fire on enemy tanks.
- Maneuver within the area of deployment and to other designated firing lines.

Battalion level. As a rule, the MIBN's AT or ATGM platoon remains directly subordinate to the battalion commander. He normally uses it as his ATR, at full strength. In this role, the platoon occupies an assembly area, and the commander assigns it firing positions or deployment lines to occupy as the enemy attack develops. These lines might be on an exposed flank or a likely avenue of armor approach to repel attacks by enemy tanks and other armored vehicles. Deployment lines could be within an MIC strongpoint or in a gap between strongpoints. Figure 8-11 shows an example of a defensive fire plan for an AT platoon. The ATR could also support a counterattack. On close terrain, however, the battalion commander could attach the platoon at full strength or by sections to his first-echelon companies.

The AT or ATGM platoon leader exercises command and control of the platoon while at the platoon COP, or with one of the sections when the platoon operates by sections. Command and control of separately operating sections is exercised by commanders of the MICs (or MIPs) to which they are attached.[8]

The battalion defensive area consists of a network of company strongpoints, with interlocking fields of fire integrated with a barrier plan. In emplacing these strongpoints, priority is given to the armored threat. In an MIBN, the organic AT capability can be reinforced by tanks, howitzers, or AT systems from higher level. The mission of the strongpoints is to cause casualties, disrupt the cohesion of the enemy attack and canalize the enemy into prepared fire sacks.

The basis of the battalion system of fire is the AT fire of companies, organic and attached AT weapons and direct fire of attached artillery. The system of fire must ensure continuous, multilayered fire of all kinds ahead of the forward edge, in gaps, on flanks, and in the depth of the battalion defensive area. It must also allow conduct of fire to maximum range and a rapid transfer and concentration of fire on any threatened axis.

[8] This attachment is particularly important for an IFV-equipped MIC, which may or may not have an organic ATGM section. An MIC that already has an ATGM section could attach a section to one of its MIPs.

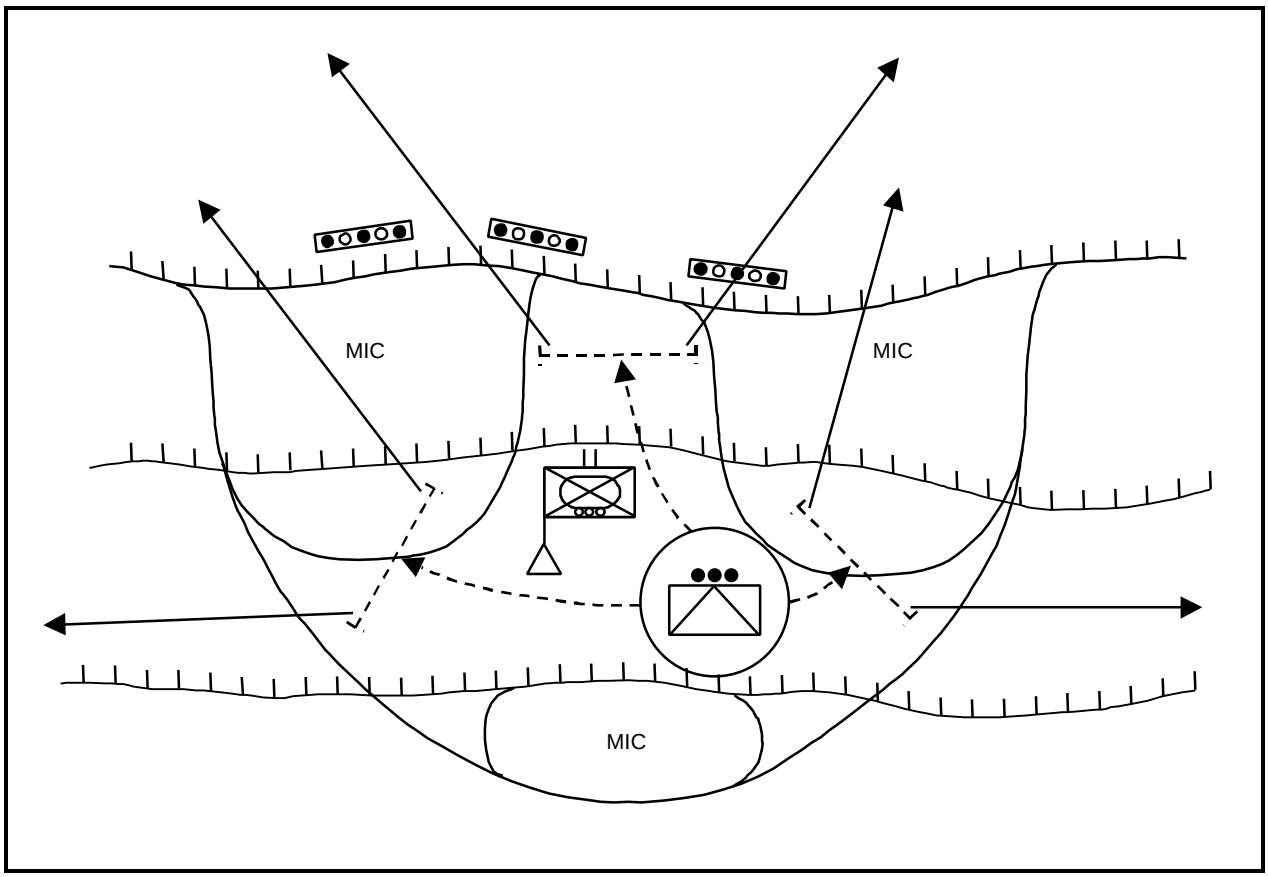


Figure 8-11. Battalion-level AT platoon fire plan in the defense (example).

Fire sacks may be created by a maneuver of fire, weapons, and units in the course of a defensive battle. The disposition of strongpoints and weapons around a fire sack must ensure engagement of the enemy by flanking fire, crossfire, and surprise, close-range, concentrated fire. Figure 8-12 illustrates an integrated MIBN AT defense.

Enemy tanks and other armored vehicles that have penetrated onto the depth of the defense are destroyed by fire of artillery, all AT weapons, tanks, and IFVs of the battalion from occupied positions or lines of firing positions. In addition, the battalion commander may move second-echelon (reserve) tanks or IFVs up to a line of firing positions at the spot of the penetration, and the AT unit to a deployment line prepared on this axis. There is also the possibility of the brigade's employing its ATR and MOD on a likely avenue of armor approach within the battalion defensive area.

When an enemy unit approaches the prepared firing lines, tanks, IFVs, and AT weapons commence fire suddenly at the battalion commander's command or independently, destroying enemy tanks and other armored vehicles. They can also force surviving enemy tanks and infantry to advance in a direction unfavorable to them or into previously prepared minefields.

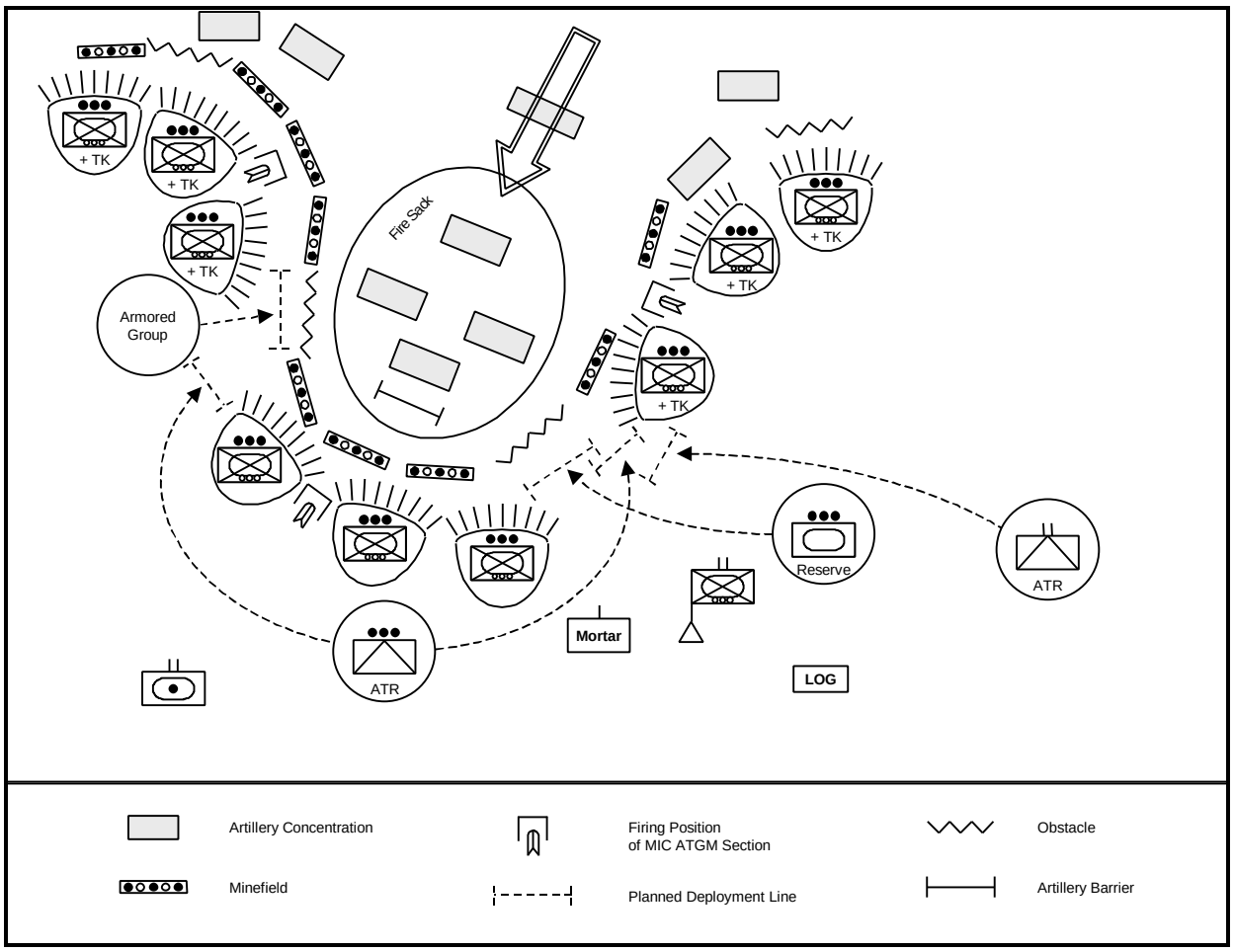


Figure 8-12. Integrated MIBN AT defense (example).

Particularly in the defense, an MIBN may receive all or part of a brigade-level ATGM battery (or of a battery from an AT battalion) as an attached reinforcement. The battalion might also receive an engineer platoon for employment with AT assets. Any attached ATGM or AT gun platoon(s) usually would remain at the MIBN commander's disposal. Alternatively, an MIBN might have brigade-level AT assets in or near its defensive area in a supporting role, or the brigade commander might have designated a possible deployment line for his ATR (possibly with an MOD) in the vicinity of the MIBN.

Company-level. To assist in AT defense, an MIC defending in the first echelon can receive reinforcement in the form of a TP, an AT unit, and an engineer unit. All weapons within company strongpoints, including tanks attached to MICs, are emplaced with interlocking fires to ensure continuous AT coverage of the front. With these assets, a company can create and employ a fire sack in a manner similar to that described above for a battalion, but on a smaller scale. This involves skillful deployment of platoon strongpoints, obstacles, and all organic and attached weapons.

To combat enemy tanks and other armored vehicles, the company commander specifies the zone of AT weapon fire. It represents a terrain sector ahead of the unit's forward edge, on flanks, in gaps between strongpoints, and in the depth of the defense, against which fire is prepared in advance and conducted from tanks, ATGMs, IFVs, and other AT weapons.

The depth of the AT fire zone should ensure engagement of enemy tanks and other armored vehicles when they move into the impact zone of the defender's AT weapons. The far boundary is established depending on the terrain and the effective range of the weapon being used.

In his combat order for defense, the MIC commander gives specific instructions to his ATGM section. He specifies its initial place in the company battle formation, deployment lines, procedure for occupying them, and missions to be ready to execute; signals for commencing and ceasing fire; procedure for actions after performing the mission. The ATGM section usually deploys on an avenue of possible armor approach. It can also operate as a fire ambush.

Figure 8-13 shows an example of a defensive fire plan for an MIC's ATGM section. In this example, the initial deployment line of the section is in the gap between first-echelon MIP strongpoints. However, the commander can order it to move to another deployment line within the company strongpoint, depending on the armor threat.

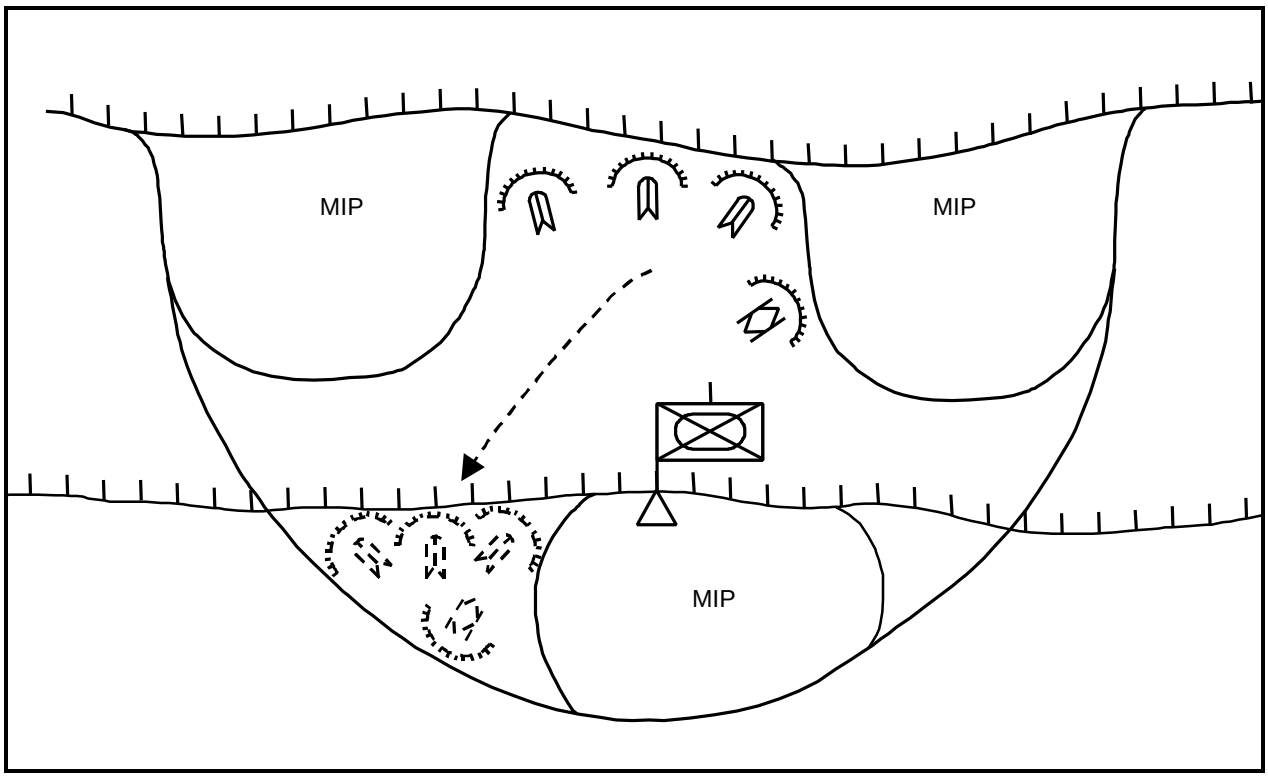


Figure 8-13. MIC ATGM section fire plan in the defense (example).

Platoon level. A TP, or an IFV-equipped MIP reinforced with one tank, can successfully repel assaults of tanks and IFVs while defending a strongpoint up to 400 m in frontage. However, an APC-equipped MIP, with its limited AT capabilities, can defend such a frontage only when reinforced by at least two tanks or by an ATGM section.[9]

Reinforcements to either type of MIP can include an ATGM section. The attached ATGM section can deploy at positions of mechanized infantry squads. During combat, this section can maneuver to the most threatened axis or occupy a perimeter defense.

The basis of the fire plan in the MIP defense is the fire of IFVs (APCs), ATGLs, and machineguns, as well as attached AT weapons and tanks. The platoon leader assigns IFVs (APCs), tanks, and ATGM systems primary and alternate firing positions, and primary and secondary sectors of fire to the range of their effective fire. The range to which the AT fire zone reaches depends on the terrain and the range of the ATGMs at the platoon leader's disposal. The fire of an ATGL is within the zone of fire of its own mechanized infantry squad.

For an MIP, the platoon leader indicates commence-fire lines for tanks, IFVs, and AT weapons. When enemy armored vehicles reach that line, the IFVs, tanks, and platoon AT weapons deliver concentrated fire to repel the assault. First they engage the lead tanks (representing the greatest threat) and tanks with mineclearing devices, and then the remaining tanks and other armored vehicles. If the enemy is attempting to breach obstacles ahead of the forward edge, the MIP platoon leader organizes a maneuver by AT weapons to engage the armored vehicles negotiating the obstacles (especially by fire against the side and rear).

If the enemy penetrates the platoon strongpoint, all available weapons engage him with point-blank fire. Squads use ATGL and ATRL fire and AT hand grenades to destroy armored vehicles from the rear and flanks.

Besides those organic or attached assets under the platoon leader's control, other AT weapons and tanks may occupy firing positions in the platoon strongpoint and on its flanks under the company commander's plan. The platoon leader must know their missions and maintain coordination with them.

Squad level. In addition to AT armament of IFVs, the ATGL grenadier is the mechanized infantry squad's main weapon for countering enemy armored targets. A squad also normally has an ATRL and AT hand grenades for engaging targets at shorter ranges.

As the enemy approaches the forward edge, squad AT weapons concentrate fire first against the lead tank or tank with mineclearing equipment crossing the obstacle ahead of the forward edge, and then against the remaining attacking tanks and other armored vehicles. With favorable conditions, the squad leader may send the ATGL grenadier forward with an assistant grenadier (a rifleman with AT grenades for the ATGL) to destroy tanks crossing obstacles in front of the squad position.

[9] The same would be true of an MIP equipped with IFVs that lack an ATGM-firing capability.

Withdrawal. If the defending maneuver units must withdraw, ATGMs and AT guns cover the withdrawal of forward elements. The AT units break contact and withdraw to a new firing position when enemy armor has closed to 500 m.

Fire Support of Defending Troops

Fire support of defending troops occurs when enemy forces are penetrating the defensive positions of first-echelon maneuver battalions. At this point, brigade- and division-level ATRs play a crucial role in destroying or blocking the penetrations. Often working in combination with an MOD, they can conduct counterpenetrations or dominate possible fire sacks. This allows the OPFOR to keep the bulk of its tank strength held back to destroy the enemy's armor in a counter-attack. Some artillery batteries also may enter preselected direct fire positions as a backstop against armored penetrations.[10]

In mixed terrain, AT battalions are unlikely to be deployed in forward defensive positions. Rather, the MID or MIBR normally would use its AT battalion as an ATR, generally in cooperation with an MOD. Even in close terrain, the division or brigade would retain at least part of the AT battalion as a reserve. The same would be true of an MIBR with only an ATGM battery. The combat formations and tactics these battalions and batteries employ are similar to those described in an offensive context.

In the defense, the OPFOR places great stress on the surprise use of ATRs. At the start of a defensive action, the AT unit ideally occupies a camouflaged hide position from which it can deploy to firing positions on each likely tank approach.[11]

The commander selects from one to three firing lines to which his weapons may deploy on each possible approach. If time allows, units then conduct reconnaissance and begin engineer preparation of routes and firing positions. Figure 8-14 shows an example of how an ATR might deploy to successive positions throughout the depth of the defense.

Once the enemy has penetrated the first defensive position, the OPFOR begins a maneuver defense. Brigades and divisions try to create additional fire sacks using their ATRs and MODs. The MOD lays minefields across the axis of an enemy armored advance to block the enemy penetration or channel it into a fire sack. The accompanying ATR then tries to destroy the halted enemy or at least create favorable conditions for counterattacks.

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[10] An artillery battalion in the brigade artillery group can designate one battery for self-defense of gun platoons in the event of a penetration by enemy tanks into the battalion firing position. The designated battery would coordinate its actions with the brigade's ATR. If armored vehicles break into the firing position, the ATR and the artillery battery together would destroy the enemy tanks by direct fire.

[11] When faced by an adverse air situation, commanders prefer not to deploy their ATR in a hide position initially, due to the risk it might suffer heavy casualties while deploying to firing positions. In such cases, it is preferable for the ATR to dig in on a well-camouflaged firing line covering the most threatened axis. Alternate firing lines are planned, and the MOD still operates from a hide position, only laying its mines at the last moment to achieve surprise.

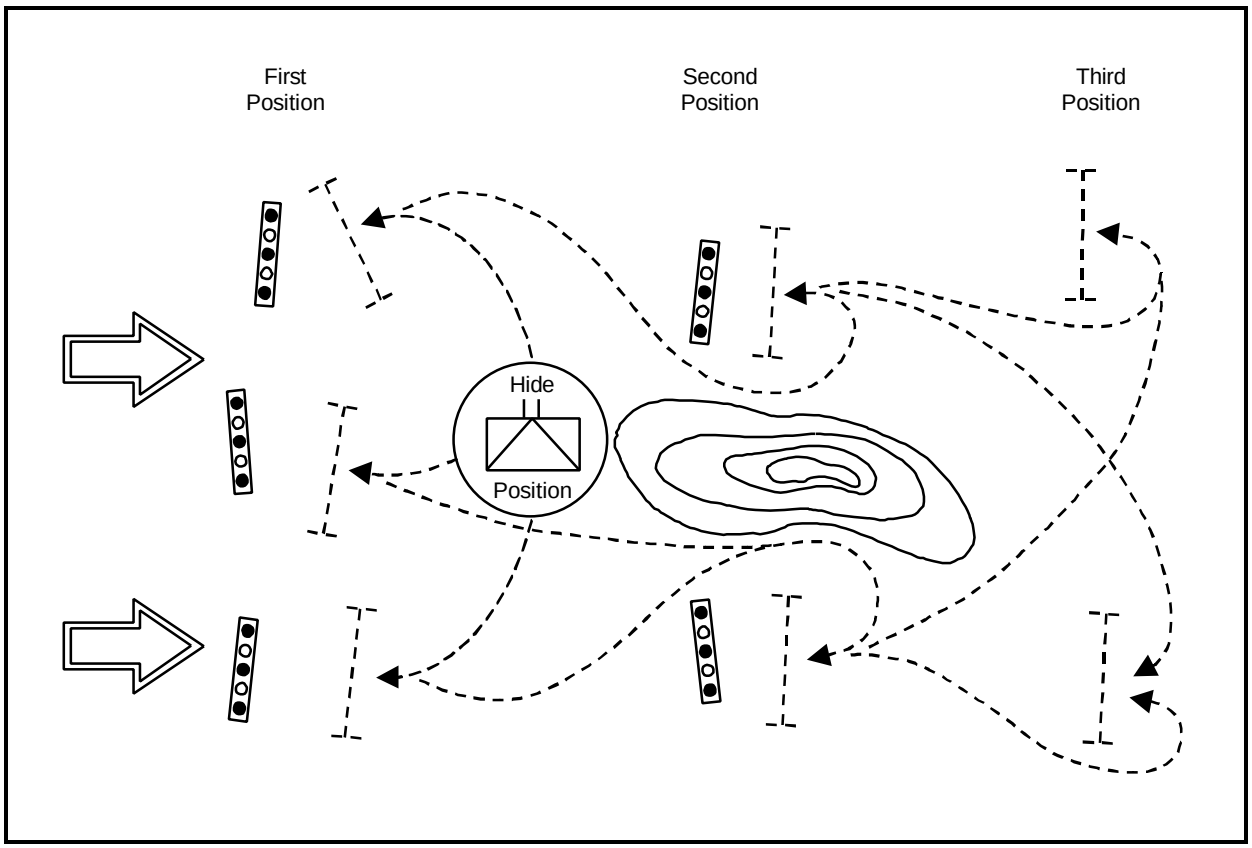


Figure 8-14. Deployment lines for ATR in the defense (example).

It may not be possible to destroy the attacking enemy force in a single fire sack or counterattack. Instead, the division may use a series of subsequent fire sacks through the depth of the defensive zone.

First, the brigade ATR and MOD would conduct a counterpenetration to block the further advance of the penetrating force and hopefully destroy it. If the ATR and MOD can halt the enemy's attack or at least break its momentum, the brigade's CAR or second echelon can counterattack it from a flank. If that is unsuccessful, the division's ATR and MOD could conduct counterpenetrations on one or more successive lines. This should either destroy the enemy or create an opportunity for a division-level counterattack.

Fire Destruction of the Enemy During Counterattack

AT fires in preparation and support of a counterattack would be similar to their role in those phases of fire support in the offense. In preparation, AT units cover the forward movement of counterattacking forces and their deployment lines. In support of the counterattack, they destroy enemy armored vehicles or other weapons that could impede the counterattack.

Chapter 9
Air Support

Although army group aviation (AGA) and army aviation (AAV) are operational-level assets, they often support tactical combat actions of the ground forces. Their speed and maneuverability give them a key role. Aviation has the advantage over ground forces because it—

- Allows the commander to exploit flexibility and surprise throughout the operation.
- Executes rapid, wide maneuvers.
- Engages enemy air and ground forces.
- Conducts autonomous (limited) cross-forward edge operations.
- Supports ground-force operational/tactical deep maneuver.
- Concentrates forces quickly for the execution of unexpected missions.
- Allows a redirection of assets to different targets after launch.
- Executes missions under diverse tactical and environmental conditions.
- Provides fire, reconnaissance, and electronic combat (EC) support to the ground forces by extending sensor and jamming ranges over those of similar ground-based systems.

Refer to FM 100-61, Chapter 10, for further discussion on the role of aviation assets in the long-range fire strike, and air defense. Those missions are strategic- and operational-level operations, and army group and army aviation assets supporting ground forces may participate in them.

ASSETS

Specified levels of command have their own aviation forces to meet mission requirements. This organizational structure reduces the delay of waiting for aviation support from higher headquarters. Although these elements are not normally found at the tactical level, they are often tasked to provide support to divisions. Therefore, they must be addressed in a tactical context.

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The primary function for tactical aviation is to provide continuous fire support to ground forces by serving as "flying artillery" and to quickly respond to changes in the battlefield situation. They can be used to strike targets out of artillery range and to support maneuver to the tactical and operational depth of the enemy. The fixed-wing assets available to the ground commander are found at the army group level, and are a part of AGA, or the air army. However, the majority of aerial support the ground commander receives is in the form of helicopters. These assets are a major part of the AAV. See FM 100-60 for details of organization.

Army Group Aviation (or Air Army)

An air army can have fixed-wing aviation regiments of fighter, fighter-bomber, bomber, reconnaissance aircraft and possibly regiments of ground-attack or airborne jamming aircraft. It can also include medium transport, heavy transport, and air ambulance helicopters, and a heliborne jamming squadron.

Army Aviation

A mechanized army or a tank army can have one or two combat helicopter regiments and a separate helicopter squadron. Thus, army aviation is typically a helicopter-pure force. However, some armies may have a mixed aviation squadron in lieu of the separate helicopter squadron[1]. These units comprise Army Aviation.

COMMAND RELATIONSHIPS

Since aviation assets are only found at the operational levels of the force, it is the OPFOR practice to reinforce tactical maneuver units by allocating aviation assets, either through attachment or assignment as supporting aviation. An attached aviation unit is under the control of the maneuver unit commander; an aviation unit assigned to support a maneuver force remains subordinate to its parent squadron or regiment, but carries out missions in support of the maneuver commander.

Attached

The army group and army commander may attach rotary-wing assets to a maneuver division or separate brigade during the march, offense, or defense. He may further allocate the aviation assets to subordinate units in a supporting role based on his scheme of maneuver. He may assign missions to the aviation units during critical times—

- To accompany the advance guard or forward detachment.
- To penetrate enemy defenses.
- To support the commitment of second-echelon forces.
- To repel a counterattack.
- To support in defense.

[1] The OPFOR would form a ***corps aviation group*** to serve the same functions as their AGA and AAV counterparts, but on a smaller scale. It could include a combat helicopter regiment and a separate helicopter or mixed aviation squadron.

Supporting

A supporting aviation regiment or squadron remains under the command of its parent organization and subordinate to the parent aviation regiment, aviation division, or air army. It executes a specific number of sorties approved by the operational commander. The principle advantage of this to the army group or army commander is that he retains maximum control of his most flexible and responsive asset. The commander supports subordinate divisions by allocating aircraft sorties to them based on the division's requirement, and his own overall plan. Fixed-wing assets are always allocated on a supporting basis.

AIRSPACE MANAGEMENT

The coordinated use of battlefield airspace and aerial delivery of ordnance close to friendly troops are two problems any combined military force faces. Achieving air superiority early on can simplify the airspace management problem. To reduce air-to-ground coordination problems during the execution of missions, the OPFOR employs proactive staff elements and control measures to ensure coordination with maneuver units. Planners try not to use fire support helicopters, fixed-wing ground-attack aircraft, unmanned aerial vehicles (UAVs), and artillery simultaneously in the same fire zone unless coordination measures exist, and controlling elements are working in conjunction with each other to ensure deconfliction.

Air-to-Ground Coordination

Air and ground force commanders and staffs work out coordination procedures between aviation elements and ground forces before the launch of combat air missions. These procedures are disseminated through airspace control organizations to all levels of command. This information, coupled with the OPFOR emphasis that combined arms forces must be generally familiar with each other's tactics and equipment, alleviates problems that arise in coordination during combat.

Organization

OPFOR doctrine stresses the need to provide maximum aviation support to ground force commanders. Therefore, aviation control and communications are closely aligned with the ground force to ensure effective and continuous communications. At every levels of command, the air defense commander is responsible for airspace deconfliction. To assist in that function, he has several organizations at his disposal for coordination and deconfliction of air missions. Members of the aviation, fire support, and air defense elements must continually coordinate all operations with each other. Since aviation assets are not organic to the division or brigade levels, the primary functions of these staff elements are to support subordinate units, and monitor employment of army group- and army-level assets.

This activity normally occurs in a staff element generically referred to as an aviation control element (ACE). There is an ACE at each level of command down to and including brigades, each with differing titles to suggest their respective size. These ACEs all perform the same mission, but vary in size and complexity.

The mission of the ACE is to advise commanders and staffs on the use of air assets. The ACEs form a vertical and horizontal channel through which airspace coordination requirements, plans, orders, and information are coordinated, disseminated, and synchronized with the tactical plan. They transmit air support requests to higher level-of-command ACEs and aviation organizations, coordinate air support from the air army, interface with AAV, and maintain communication with and control of aircraft in the battle area. The ACE has two sections. The primary section colocates with the chief of staff in the main command post (CP). The other is a smaller ACE cell in the forward CP.

Army Group

The controlling authorities at army group level for air support and interface with aviation assets within the ACE are: the air army CP, the combat control center (CCC), and elements of the supporting air defense and artillery units. The ACE at army group level consists of several dozen individuals with aviation, artillery, or air defense coordination experience filling permanent staff positions acting as liaisons with the listed CPs.

The CCC is the army group commander's primary means of turning his guidance into a comprehensive air operations plan. It allocates resources and tasks forces through the publishing of the air tasking order (ATO), and ensures the dissemination of the airspace control order (ACO) with the guidance of the chief of air defense. See Request Net and Air Tasking Order/Airspace Control Order Cycle later in this chapter for more information.

The air army establishes vectoring and target designation posts (VTDPs) as necessary to exercise control of aircraft in a designated air sector. These posts are air traffic control facilities that support the introduction of aviation assets into a combat area and can also direct aircraft to ground targets. The VTDPs are primarily ground-based and serve as an intermediate air traffic control facility between the aircraft's parent division, regiment, or squadron and the forward air controller. (FAC, see below under Brigade.) They accomplish direct coordination among helicopters, ground-attack and fighter aircraft, ground-based air defense units, and FACs, primarily through VHF voice transmission. These posts are equipped with radar, communications, and automated equipment used for aircraft identification and tracking.

Occasionally the OPFOR can employ airborne command and control (C^2) aircraft to perform the same intercept function as a VTDP. These aircraft are referred to as airborne control stations (ABNCS), and may be used to augment or replace VTDPs within the OPFOR area of responsibility.

In mountainous terrain with VTDP radar deadspace, visual observers (VOs) are used. These observers are connected into the VTDP network via VHF communications. Each observer section is equipped with radios, binoculars, and sound detection devices.

If the OPFOR uses an ABNCS or VOs within the scheme of maneuver, their employment is no different than that of a VTDP. They control the flow of friendly aircraft forward, and provide enemy intercept data to OPFOR counterair interdiction aircraft and air defense units.

Army or Corps

The ACE controlling authorities at army or corps level are the aviation control center (ACC). This cell consists of 30 to 36 permanently assigned personnel colocated or interactive with CPs and staffs from aviation, artillery, air defense, and EC elements at their respective level of command. These agencies primarily work in close proximity to the army main CP.

Division

At the division level, commanders have within their staffs an ACE, known as the aviation control group (ACG). This section would comprise 18 to 20 persons filling permanent staff positions. Air support coordination is controlled by the interaction between staffs within the artillery, AAV and air defense CPs. These staffs monitor all aircraft operating within their areas of responsibility by monitoring the use of air situation radar covering their area of operations from the VTDPs, and radio communications.

The CPs of supporting aviation regiments or squadrons are colocated with the division main CPs, with cells in the division forward CPs. All interactions between maneuver divisions and brigades are conducted using organic unit communications means rather than data transfer via dedicated digital circuits.

Brigade

The maneuver brigade's aviation control team (ACT) is formed from personnel assigned to the division ACG. It is the smallest form of an ACE. The ACT consists of four to five personnel colocated with the brigade main CP to assist the commander and staff in all tasks associated with planning and employing air support assets. These individuals are: an aviation interaction chief (AIC), an airspace interaction officer, an aviation situation officer and one or two FACs.

The ACT is responsible for coordinating air support by serving as the primary—

- Liaision between the ground force and the division's ACE.
- Liaision between ground forces and supporting fixed-or rotary-wing aircraft.
- Director for attacking aircraft by passing messages directly to the flight leader about targets.

The AIC is responsible for the operation of the ACT. He coordinates with the brigade commander to ensure proper integration of air operations into the overall scheme of maneuver. If a brigade forward CP is employed, the AIC may locate forward with the commander and other chiefs if required. He is also qualified to perform the duties of a FAC if necessary, but this is not preferred.

The other key coordinating officers of the ACT excluding the FAC(s) remain colocated with the brigade main CP. The airspace interaction officer is responsible for the coordination of all airspace and air routes within the brigade sector. He coordinates with the chief of air defense and the chief of artillery. The aviation situation officer serves as the central point of contact for all actions between the ground force and the aviation unit. He continually monitors the status of ongoing and planned missions and the availability of air support.

The FACs move forward to assist the battalions when air strikes or support missions are planned, or when the brigade commander expects the battalions to require immediate or on-call air support. The FAC is a senior helicopter pilot experienced in combat helicopter regiment support procedures. The FAC's goal is to employ fixed- and/or rotary-wing aircraft simultaneously in the same area, and coordinate the execution of aircraft with artillery strikes. If successful, strikes coincide in time, with different target sectors allocated. If battalion forward CPs are employed, the FACs may accompany the battalion staff members in forward positions. Alternatively, the battalion commander may locate the FAC to the forward edge if necessary. See figure 9-1 for clarification on the locations of these individuals during aerial actions.

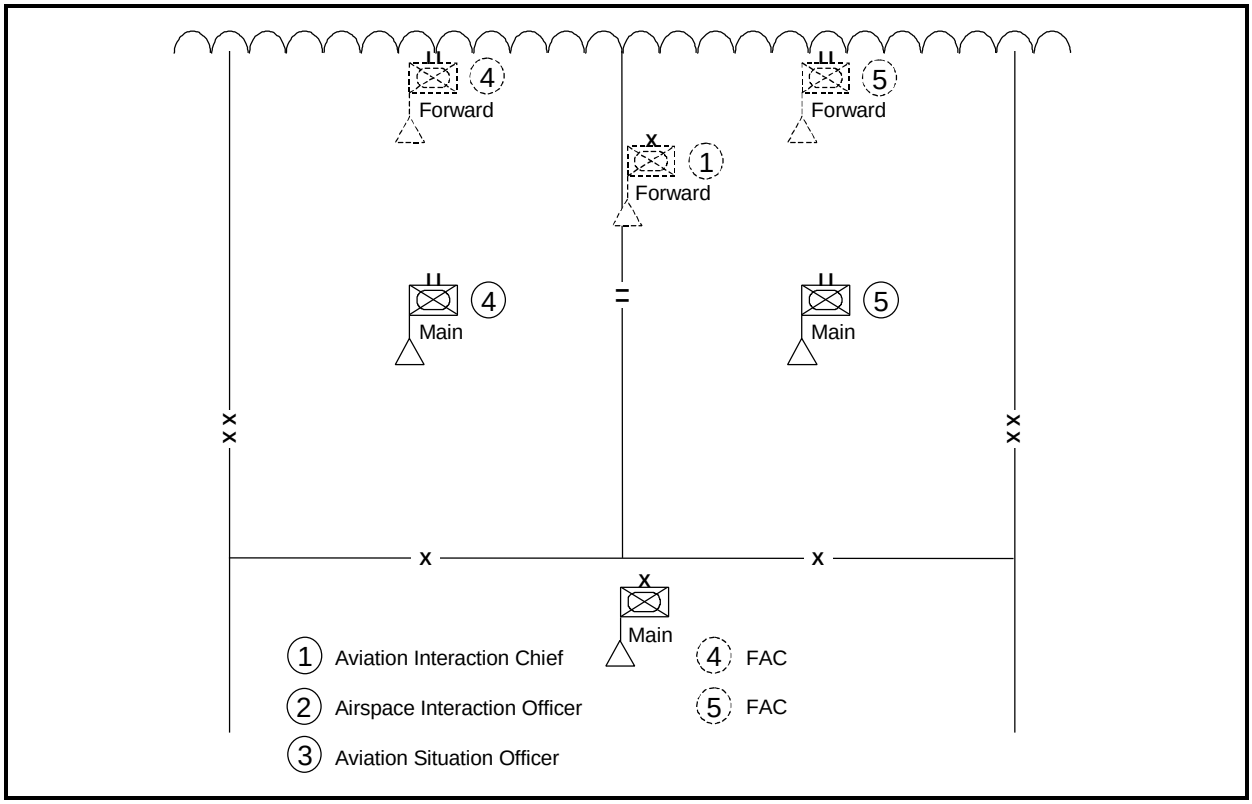


Figure 9-1. Positioning of ACT personnel.

The FAC officer arrives at the supported unit prior to a mission carrying his own radio set for communications with helicopters or fixed-wing aircraft. The type of radio, which he must provide, is based on the type of aviation he supports, since fixed-wing and rotary-wing missions use different frequencies for communication. The radio is either VHF or UHF frequency. Provision is made in the brigade headquarters for a FAC vehicle, and it has unique mounts for these radio sets.

A FAC plans air missions to support the ground commander's scheme of maneuver (based on aircraft allocations from higher headquarters), establishes control procedures, and orchestrates mission execution. The FAC serves as the ground commander's direct liaison with aviation support. Once the predetermined ground mission is completed, the FAC returns to his parent unit or higher headquarters to await further missions.

Battalion

A maneuver battalion seldom has a staff member dedicated to serve as an air representative and rarely receives a dedicated FAC. The brigade may attach a FAC to a battalion when air support is planned specifically in its area of responsibility or when acting as a forward detachment, assault detachment, or as a heliborne landing force. In cases such as these, and especially under urban warfare conditions, a FAC works in conjunction with the commander and artillery observer in the assault detachment CP. For example, he may coordinate the actions of fire support helicopters assisting assault teams attacking along two streets. He may also manage direct air support in proximity to the friendly troops along the forward edge.

Airspace Control Measures

The purpose of airspace control is to maximize the effectiveness of combat operations. Airspace control systems are established so that ground and air forces may apply timely, efficient, and mutually supporting combat power while minimizing the risk of fratricide. This is accomplished through two methods: positive control and procedural control.

To enforce a buffer zone between friendly troops and minimize fratricide while maximizing ordnance capabilities, the OPFOR employs coordination procedures that separate three-dimensional airspace horizontally, vertically, or both. These procedures ensure the minimum safety distance of 200 m between friendly troops and aviation strikes in combat.

Airspace Coordination Procedures

Positive control is a method of airspace control that relies on electronic means such as positive identification, tracking, and aircraft vectoring, done by radar control or electronic monitoring. Procedural control relies on previously coordinated and disseminated orders and procedures to control the operation and flow of air traffic.

Positive control. Positive control is established by air traffic control services around airbases and in the rear areas. As aircraft depart these areas toward the forward areas, they are handed off to subordinate airspace coordination facilities such as a VTDP, an ABNCS or VO, and then finally to the FAC as they approach the forward edge.

Coordinating altitudes. A coordinating altitude outlines an arbitrary altitude below which fixed-wing aircraft do not fly, and above which rotary-wing aircraft do not fly. Artillery coordinating altitudes exist to deconflict artillery shell trajectories and fixed-wing traffic at high altitudes. A buffer zone may exist between coordinating altitudes to allow small altitude deviations. For example, coordinating altitudes are generally no higher than 175 m above ground level (AGL) for helicopters and no lower than 275 m AGL for fixed-wing aircraft. These altitudes may be established lower as aviation operations approach the forward edge of troops to enhance survivability. Artillery coordinating altitudes are generally established at 6,000 m AGL or higher. Fixed- or rotary-wing aircraft planning extended penetration of the coordinating altitudes must notify the appropriate ACE, but prior coordinating altitude deviation approval is not required. See Figure 9-2 for clarification.

Airspace control zones. These zones define airspace that is characterized by a high density of aircraft or a high concentration of usage. The airspace control zone has defined dimensions that coincide with geographic or manmade features and extends vertically to a given altitude. The requesting authority, such as a brigade or division commander, dictates air defense weapon control status within the airspace control zone. See Figure 9-2 for clarification.

Unable to convert graphic, see hardcopy of FM for figure 9-2.
Figure 9-2. Airspace coordination procedures.

Restricted operations zones. A restricted operations zone (ROZ) is established to define a volume of airspace for a specific mission or purpose, such as a drop zone, landing zone, UAV flight patterns, or electronic mission aircraft flight routes. A ROZ is used to restrict some or all airspace users until termination of the mission. It may restrict airspace horizontally and/or vertically and by time of usage. A ROZ, for example, may be set up to restrict airspace from 1,500 to 3,000 m AGL, 5 km in all directions from a given point, from 0200 to 0600 hours, for the purpose of unmanned aerial vehicle overflights. The requesting authority, such as a brigade or division commander, controls air defense weapon control status within the ROZ. See Figure 9-2 for clarification.

Air routes. Air routes are made up of air corridors and air control points. These procedures are implemented to control the travel of aircraft through friendly airspace and to prevent friendly forces from firing on friendly aircraft. Air routes may extend across the forward edge of friendly troops into the enemy's airspace. Air control points are predetermined points over the ground at a given altitude where the air route changes direction or links with another air route. An air corridor is the path of linked air control points starting at the initial point and ending at the release point.

Longer air routes may include the use of mandatory reporting points. These points serve to control and monitor the flow of air traffic by requiring radio calls to the controlling authority stating the aircraft's position. An air route for example may dictate: returning aircraft fly above 1,500 m AGL, outbound aircraft fly below 1,500 m AGL, all helicopters below 30 m AGL. All aircraft should see-and-avoid other aircraft and remain within 500 m of the corridor centerline for safe transit. See Figure 9-2 for clarification.

Every level of command has a unique airspace structure. Air routes run from the rear airfield, through the army group and army's airspace controlled by the VTDPs, to a "crossing checkpoint" at the division rear boundary. The supporting aircraft then follows the airspace structure unique to that particular division until it reaches a brigade rear boundary. It then follows that brigade's routes to the landing zone (LZ)/pick-up zone (PZ) or to an initial checkpoint where control is assumed by the FAC. Through the ACEs, the routes are published to each level of command, and each air defense element is responsible to disseminate the information to the troops within those boundaries to prevent the fratricide of friendly aircraft. These routes incorporate all forward arming and refueling points (FARPs), and all planned LZ/PZs. The ACO can change the published structure on a daily basis.

Air Defense Measures

To coordinate the use of aviation assets with ground forces, the OPFOR utilizes different types of air defense weapons control status and procedural controls. Primarily, it employs a system of identification, friend or foe (IFF) between aircraft and larger radar-based air defense systems. To protect friendly aircraft from fratricide from non-radar-based systems like guns and shoulder-fired surface-to-air missiles, strict procedural controls are enacted. These control measures were mentioned in the previous section and are disseminated daily through the ACO through ACE channels and aviation unit headquarters elements. See Air Tasking Order/Airspace Control Order later in this chapter for more information.

The air defense coverage may be "switched off" to allow friendly aircraft to pass on a mission planned in advance and then "switched on" as they exit the area. For other missions, air defense coverage may allow aircraft to transit only on "safe corridors" based on air routes or other procedural methods. If aircraft deviate from these coordinated areas, they risk being shot down by friendly ground force units. The OPFOR views the possible loss of aircraft through fratricide as a lesser risk than allowing gaps in its radar and air defense coverage which the enemy may exploit. See also Chapter 10 in this manual, and FM 100-61, Chapter 11, for more information on air defense asset employment.

Fire Support Coordination Measures

Fires from mortars, cannon and rocket artillery, and guided missiles pose a potential hazard to friendly aircraft activities. The highest probability of conflict between aircraft and surface-to-surface indirect weapons fire occurs at relatively low altitudes in the immediate vicinity of firing positions and targeted areas. To reduce these potential conflicts between indirect fires and aircraft, information pertaining to firing positions, targeted areas, and fire support plans is provided to the ACE element at each level of command by the CMTA or Chief of Artillery. See Chapter 7 for more information on artillery asset employment and coordination measures.

MISSIONS

The OPFOR considers the ability of its aviation assets to provide responsive and continuous fire support to ground forces a tremendous influence on the battlefield. It emphasizes that aviation must be employed early to achieve the following goals:

- Early attainment of air superiority.
- Effective reconnaissance and targeting.
- A coordinated attack on enemy targets at all tactical and operational depths.
- Employment in mass during all phases of combat.
- Survivability and responsiveness using effective planning and preparation.

Army Group Aviation

As air and ground forces are introduced into an area of operations, the air forces (primarily the AGA) must concentrate missions to gain airspace control. How this is accomplished is determined by the operational situation. However, this dictates the amount of aircraft dedicated to the attainment of air superiority versus support of ground forces.

Initially, most AGA assets conduct strategic- and operational-level missions. Examples of these higher-level missions are strategic bombing, long-range fire strikes, counterair, air interdiction, theater air reconnaissance, EC, and NBC delivery.

Early operational and tactical aviation missions (such as air interdiction, air strikes, and ground missions such as attacks on enemy airfields, or defending friendly airfields) allow the OPFOR to attain air superiority from the outset. The airspace condition dictates aircraft employment throughout the theater of operations at the strategic, operational, and tactical levels. This factor in turn affects the employment of AGA to support ground maneuver forces.

Conditions for Employment

The army group commander, and his subordinate commanders use standardized terms to define the operational characteristics of their airspace. This allows them to best employ assets in the theater of military operations to satisfy the requirements to support ground forces.

Air supremacy. ***Air supremacy*** is defined as the condition when the enemy air force is incapable of effective interference. Through the complete destruction of the enemy air forces, this condition is the ultimate goal of an air campaign. Yet, this condition may be difficult or even impossible to achieve. It may occur however, through the establishment of a diplomatic “no-fly zone”. Under the condition of air supremacy, the OPFOR commander employs all of his aircraft at will.

Air superiority. ***Air superiority*** is defined as the condition when the conduct of operations is possible at a given time and place without prohibitive interference by the enemy. This is a necessary and obligatory condition to attain success in combat and overall victory in a war. The most efficient method of attaining air superiority is to attack enemy aviation assets close to their source at maintenance and launch facilities, early warning and C^2 sites, and ground-based air defense sites.

Local air superiority. Even though the OPFOR hopes to attain air superiority, it recognizes the potential for only ***local air superiority*** to exist. Purely geographic in nature, this condition is characterized by well timed air attacks to coincide with enemy aircraft downtime, returning sorties, aircraft rearming, or gaps in air defense coverage. This condition may also occur in sectors across the theater of military operations where the OPFOR or the enemy may not have adequate assets available to ensure air superiority. In certain situations or against certain enemies, local air superiority for a specified period of time may be a more realistic goal.

Air parity. ***Air parity*** is defined as the functional equivalency between enemy and friendly air forces in strength and capability to attack and destroy targets. Under the condition of air parity, where neither side has gained superiority, some enemy capabilities affect friendly ground forces at times and places on the battlefield. Air parity manifests itself to the commander primarily in the amount of fixed-wing aircraft used for direct support of ground forces. More aircraft are dedicated to interdiction and strike missions to gain air superiority. For more detail on interdiction and strike missions, see below.

All of these conditions affect the missions of the AGA and how it supports the ground force. Depending on the condition of the airspace—

- Aircraft sortie rates change.
- Aircraft missions may be restricted.
- Depth and distance of mission execution may be limited.
- Aircraft may assume other roles than they are specifically designed for.
- Aircraft ordnance changes.

The OPFOR expects to be capable of achieving at least local air superiority. However, if it is faced with a superior enemy, the army group commander may be forced to hold more aircraft in reserve and to redirect aircraft from ground support to air defense operations. This will increase the burden on rotary-wing assets to fill the ground support role.

Reconnaissance and Targeting

The army group commander's staff (to include the chief of reconnaissance and the deputy commander for aviation) prepares an overall reconnaissance plan detailing tasks for operational and tactical aviation assets. Operational-level air reconnaissance is the principal method to gather deep target intelligence. Yet, the information the aircrews obtain from those missions is analyzed and disseminated to tactical commanders.

Other aviation assets (such as the reconnaissance aviation regiment) have the primary responsibility for air reconnaissance. They provide reconnaissance support for division combat actions by transmitting target information to ground CPs via radio from specially equipped reconnaissance aircraft. The division conducts its own tactical reconnaissance primarily through dedicated ground reconnaissance and UAV assets. Aircrews at all levels of command returning from missions are instructed to report sighted enemy locations and activities. The classification and location of targets obtained through intelligence gathering is the basis for planning air interdiction missions and air strikes.

Interdiction

The AGA conducts air interdiction missions to annihilate, or neutralize the enemy's military potential before it can be used to inflict damage on friendly forces. These missions are flown to the extent of the enemy's operational width and depth, and they require little integration between friendly air and ground assets.

Interdiction missions are flown to attack targets forward of the ground force commander's forward edge and beyond the range of friendly surface weapons. These missions are usually planned and conducted at an operational level by the army group commander and the air army commander to achieve theater objectives. Therefore, the tactical ground force commanders provide very little input to target selection and little or no assistance to the AGA during the mission. Maneuver commanders may notice the impact of these missions and factor their results into their planning process.

Air interdiction missions are planned at the highest level to synchronize, complement, and reinforce ground force scheme of maneuver. Typical targets are lines of communication, such as bridges, roads, railroads, or airfields, and large troop support facilities like supply depots or logistics bases.

Interdiction missions coupled with bold ground maneuver present the enemy force with a dilemma. These missions may require the enemy to attempt more rapid movement and resupply. This can force the enemy to become further exposed to greater losses because of interdiction missions. Alternatively, the enemy force may not expose itself as a target for interdiction missions and restrict its surface maneuver, allowing OPFOR ground forces to exploit successes.

Strike

The OPFOR considers AGA attacks within the enemy's tactical depth to be strike missions. These are deliberate missions to attack priority enemy targets such as assembly areas, supply routes, artillery or antitank positions, multiple rocket launcher (MRL) positions, forward air bases, and reserves.

With strike missions, the ground force commander nominates targets to facilitate his scheme of maneuver (For more information, see Planning and Preparation later in this chapter.) Targets are classified as single, multiple, line, or area. Figure 9-3 shows the OPFOR classification of targets, and attack techniques.

Classification	Example Target	Attack Technique
Single (or Point)	An MRL, tank, or armored vehicle; parked aircraft or helicopter; radar, op, or bunker.	Single pair of aircraft using lower level or dive delivery of ordnance.
Multiple	Group of 10-20 single targets, occupying an area of 1-1.5 m.	Attack by a small group of (2-8) aircraft.
Line	Tactical march column (usually 1 km or longer), a train, or a runway.	Attack by a single or small group of aircraft along the long axis of the target, or flanks.
Area	Assembly areas of battalion or larger unit, supply depot, large C^2 center, airfield.	Massive and concentrated air strikes delivered from various altitudes and directions.

Figure 9-3. Classification of air strike targets.

Strike missions are planned by the ACE to ensure coordination between the aviation force and the ground force and to ensure survivability. Based on the target classification, aircraft sorties and ordnance types are requested to achieve the desired results. The missions are well planned with triggers to signal aircraft launch, and procedures for airspace deconfliction are enacted prior to launch.

By committing aircraft to strike missions, the ground force commander shapes the battlefield. By attacking priority targets, these missions should prepare the conditions for his success over the ensuing 24 hours or reinforce successful attacks by his ground forces. Strike missions, although planned in advance, can help create penetrations, cover withdrawals, and guard flanks, and can be most effective when employed at decisive points in a battle. The ground force commander realizes this and plans an energetic scheme of maneuver to complement strike missions and trap or destroy major elements of the enemy force.

Direct Air Support

The objective of direct air support (DAS) is to disrupt and destroy enemy forces in close proximity to friendly forces. Although DAS is the least efficient application of air forces in terms of damaging enemy capabilities, it is the most critical to ensuring the success and survival of ground forces. These missions have the greatest potential to make an especially important contribution to the ground force commander's campaign. He must be ready to exploit the effects of DAS through rapid maneuver, either by closing with and destroying the enemy or bypassing enemy forces.

Due to the proximity of these missions to friendly ground forces, extensive care is taken to minimize fratricide. Effective DAS requires reliable air-to-ground communications and flexible, responsive C^2. (See Air-to-Ground Coordination and Airspace Control Measures earlier in this chapter.) It requires aviation components to appreciate the capabilities, limitations, and risks to ground forces; it also requires the ground component to understand the capabilities and limitations of DAS.

The OPFOR normally conducts DAS with fixed-wing ground-attack aircraft. These missions typically extend beyond the forward edge only to the range of friendly ground-based systems. That is, OPFOR aircraft are covered by the direct fire of friendly weapon systems, and under the air defense coverage of friendly systems. They target objects of immediate concern to the ground force commander when his organic fires are not capable of engaging the enemy or when a mass concentration of fire is required.

DAS missions are entirely controlled by the FAC assigned to the maneuver division ACG and employed at brigade within the ACT. These missions are orchestrated in conjunction with the battalion commanders. Once the ACT or the VTDP notifies the FAC that aircraft are inbound to his location, he establishes communication with the aircraft and provides the necessary data for the aircraft to complete their mission. A FAC controls all aspects of their mission. FAC control procedures include—

- Establishing an initial point (IP) 15 km behind the forward edge of friendly forces.
- Establishing attack positions (APs), normally at maximum effective weapons range.
- Issuing control graphics.
- Identifying/marking friendly troop locations.

As the aircraft travel inbound from the IP, the FAC provides the pilots with target location (either in grid coordinates or in relation to a predetermined reference point), the exact time to execute the attack, and information on the ground situation. The FAC does not attempt to mark the target, but frequently employs pyrotechnics to mark friendly troop locations. He may also give the flight leader a signal to direct the flight to climb, acquire the target, and attack.

The primary responsibility of pinpointing the target is left up to the flight leader; he orders the flight into different formations, divides the target, and assigns individual sectors to his flight. The FAC assesses damage and adjusts the flight for successive target runs if necessary. So, the FAC must maintain visual contact with the target while the aircraft are on station.

Army Aviation

AAV is a component of the ground forces and is intended for actions directly in the interests of combined arms organizations. Based on the type of missions performed, AAV is divided by predominate aircraft capabilities into fire support, combat support, and combat service support aviation. These characteristics have a direct bearing on how and when each type of aircraft is employed in support of the ground forces.

Fire support helicopters are the primary assets used to support ground forces. These assets can perform armed reconnaissance or fire support in all types and phases of ground combat. They can also provide fire support for tactical air assault landings. Other helicopters can also conduct tactical air assault landings, lay minefields, or perform a variety of logistics, reconnaissance, liaison, and communications functions in accordance with the plans of the supported combined arms organizations.

Fire Support Helicopters

Fire support helicopters, rather than fixed-wing aircraft from the AGA, provide the preponderance of the support to the ground force and provide an excellent fire and maneuver capability to the supported commander. These helicopters are aircraft that are designed to fill an attack role only, with a crew of two pilots. They may have integral cannons or miniguns, and have the provisions to mount antitank guided missiles (ATGMs), rockets, bombs, or other ordnance on fuselage or under-wing hardpoints. Most employ target acquisition and sighting systems.

The OPFOR may employ smaller helicopters in a fire support/reconnaissance role. These aircraft have the provisions to carry a few passengers and may have mounts for a cannon, rocket pods, or a few ATGMs. They are small, relatively quiet, and easy to conceal from radar and visual detection when silhouetted against background clutter.

The primary categories of tactical fire support helicopter missions are based on the depth of the attack into the enemy area. They are strike, DAS air support, and reconnaissance and security. Within these categories, there are several specific missions that fire support helicopters perform.

Strike. As with the AGA, helicopter strike missions are missions conducted within the enemy's tactical depth. They too are deliberate missions to attack priority enemy targets such as artillery or antitank positions, MRL positions, and reserves. The OPFOR may employ AAV helicopters to attack enemy columns moving forward to reinforce engaged units, or in flanking attacks against reinforcing or counterattacking enemy armor columns.

The forward edge of troops is the forward line of friendly ground maneuver forces excluding reconnaissance and combat security elements and units acting as forward detachments. The OPFOR does not conduct autonomous actions across the forward edge with fire support helicopters for the sole purpose of a deep strike unless it is against an extremely high-priority target. The commander understands the risks involved in a mission such as this and considers the impact of the potential loss of his firepower and flexibility prior to employing helicopters alone.

Deep autonomous fire support helicopter missions are the exception rather than the rule of aviation, yet they may occur on limited occasions. If so, the OPFOR would only launch a small number of aircraft (two to four) for the mission and conduct a suppression of air enemy defenses (SEAD) prior to the aircraft crossing the forward edge. The focus of the SEAD would be to destroy, degrade, or neutralize enemy air defense systems in a specific area through either direct attack or electronic jamming. Also, the aircraft would not fly to the limits of their capabilities to deliver their ordnance. They would only fly to a depth of 20 to 25 km in the attack, or only to the limits of the ranges or their supporting divisional artillery.

Normally, if fire support helicopters are operating across the forward edge of friendly troops, they are supporting a ground force. Even though it may appear they are operating across the forward edge of friendly troops, they are probably supporting an operational maneuver group from a higher level of command, or a ground force as small as a division forward detachment. In these cases only, fire support helicopters operate from outside the range of supporting divisional artillery fire.

The primary deep mission for fire support helicopters is in support of the air assault. These helicopters can provide security and armed escort for troop-carrying helicopters across the forward edge to LZs located within the tactical depths of the enemy defense. They may prepare the LZ by fire and remain after the insertion to provide direct air support to the ground force. The number of aircraft employed depends on the size of the landing force, the degree of protection desired, and expected enemy resistance. For more information on the air assault, see Combat Support Helicopters.

Like AGA strike missions, AAV strike missions are planned by the ACE to ensure coordination between the aviation force and the ground force, and aircraft survivability. Based on the target, aircraft sorties, and ordnance type, missions are planned to achieve the desired results. The missions are well planned with triggers to signal aircraft launch, and procedures for airspace deconfliction are enacted prior to launch.

Direct air support. The close battle provides opportunities to the commander to employ fire support helicopters, since the enemy presents many targets in the open. Armed with ATGMs and rockets, helicopters provide direct support for the advance of the ground forces by flying behind OPFOR ground forces and firing over them. This places the helicopters out of friendly direct fire ranges and behind or under friendly artillery trajectories.

Since AAV primarily serves the ground force commander's requirements for air support, DAS is the most common type of mission. In the DAS role, helicopters can augment AGA strike missions, ground-based artillery and direct fires from ground forces. This fire support is conducted to the full depth of the defense of the enemy first-echelon brigade. DAS missions are flown by a multiple flights, or formations of eight or more aircraft using either ATGM or rocket/gun attacks. Fire support helicopters destroy tanks, antitank weapons, and other armored targets located 2 to 3 km or more ahead of friendly attacking units.

Antitank missions use two to eight aircraft per mission. Helicopters are exposed and vulnerable during missile flight. The typical exposure time for an attack is 20 seconds. During transit and weapons delivery, helicopters try to avoid detection, but accept limited exposure time during weapons firing. Helicopters can also employ rockets in lieu of ATGMs, yet rockets are less effective.

While in proximity to friendly forces, fire support helicopters are afforded the protection of air defense assets and the covering fire of ground systems. Using the integrated fires of tank or mechanized forces, artillery, and fire support helicopters, the commander creates corridors through the enemy's forward ground forces. These corridors, coupled with SEAD, allow further employment of all other types of air assets.

In the defense, helicopters can be used to counterattack tank or mechanized forces or to serve as the commander's antitank reserve. The commander may employ them to independently execute a counterattack into the flanks of an enemy formation. The aircraft do not conduct actions forward of the ground force they are supporting. Armed with ATGMs and rockets, the helicopter force seeks routes allowing undetected approach to the flanks of the enemy force. If terrain variations do not provide adequate concealment for the force, the helicopters may use smoke to conceal their approach. The helicopter formation then engages enemy tank formations from APs along preplanned attack routes.

Reconnaissance and security. Fire support helicopters are used for armed reconnaissance when visibility is limited, target information is incomplete, or enemy flanks are unprotected. In these circumstances attack helicopters, by flights of formations of two, conduct high-speed, low-altitude penetration of enemy lines. Targets of opportunity such as radars, communication nodes, missile launchers, and antitank weapons are engaged at the discretion of the flight or formation leader. Because these missions are considered hazardous, they are normally reserved for very experienced pilots, and therefore are quite risky to the ground force commander.

Commanders also employ fire support helicopters to provide assistance with the ground force counterreconnaissance battle. Fire support helicopters are launched in small numbers to positions forward of the ground force to engage enemy ground reconnaissance assets as they approach friendly positions. The commander's intent is to deny the enemy the reconnaissance information that may expose weaknesses in his scheme of maneuver.

Fire support helicopters may be employed to protect the flanks of a tank or mechanized column in the attack or counterattack and in a tactical march by screening the column from the enemy. The aircraft protect the column by flying in circular patterns along the march route, or maneuvering by bounds using the cover and concealment of the terrain along the route. Similarly, they may be employed to serve as convoy escort.

Combat Support Helicopters

Combat support helicopters serve in numerous roles. They are designed with troop- or cargo-carrying capabilities and are armed with miniguns or machineguns fired by crewmembers other than the pilots. They have provisions to carry external loads such as fuel tanks, ATGMs, rockets, or collection/jamming equipment on external hardpoints or underslung on cargo hooks. They may have target-sighting systems. Their primary function is to act as transport aircraft in the air assault and to serve in other supporting roles. Thus, the resulting cargo weights limit the type and amount of armament used. If the OPFOR lacks a dedicated fire support airframe, these helicopters may perform both roles with fairly little transition time. They would be less effective than designed attack helicopters, however, because they lack an integral fire control and sensor/optic system.

The OPFOR launches an air assault for the purpose of placing a ground force or reconnaissance assets usually 20 to 25 km, but possibly up to the tactical depth of the enemy beyond the forward edge. This normally occurs in the early morning hours, with dawn being the preferred arrival time in the LZ, and up to 2 to 6 hours prior to a planned ground attack. For more information on heliborne landings, see FM 100-61, Chapter 16.

LZs are located beyond the range of enemy direct fire weapon systems and are targeted with artillery (if within range) and escorting fire support aircraft prior to insertion. After troop insertion, the combat support helicopters depart, and the fire support helicopters may remain. Forces remaining in position longer than 24 hours are resupplied by helicopter.

In addition, combat support helicopters are called upon to transport antitank squads, lay minefields, perform electronic jamming, and fill a variety of support or logistics functions. They are highly versatile, and many types of equipment and ordnance are compatible with the aircraft.

Combat Service Support Helicopters

Helicopters providing combat service support are large and lightly armed (if at all). They have large cargo areas with provisions to load freight and fuel internally or carry them underslung on cargo hooks. Their movement is usually limited to rear areas supporting resupply missions, yet they may be employed near the forward edge in certain circumstances.

These aircraft may be employed to transport an airborne or air assault force. In this capacity, fire support aircraft escort them to the drop/landing zone. The forces they carry are used to augment the prior insertion of an air assault force by combat support helicopters once the objective is secured.

Some combat service support helicopters can be fitted with extra fuel tanks and pressurized refueling hoses and may be employed to establish a FARP prior to a heliborne insertion or strike mission. They do not perform this mission across the forward edge.

These helicopters may be used in a search and rescue, and downed-aircraft recovery roles also. Missions such as these are characterized by one aircraft escorted by two to four fire support helicopters. The formation would be seen across the width and depth of the battlefield as it flies to recover downed fixed- and rotary-wing aircrews and attempt to repair/salvage downed aircraft.

Conditions for Employment

Helicopters are employed throughout the battle. Because of their unique design and employment characteristics, they are not limited to any one particular phase. Helicopters can easily adapt to employment in the march, offense, and defense.

March. As stated in Chapter 3, the OPFOR can use two types of marches— administrative and tactical. The type of march employed depends on the probability of contact with the enemy. See FM 100-61, Chapter 3, for additional clarification on operational-level marches.

In an administrative march, AAV assets move to forward areas along with other army-level assets. At this time, they have not yet received specific roles to support ground forces. Movement is usually conducted by flights divided along unit organizational structure. This is viewed as a repositioning of assets and may be accomplished via ship or rail, or by cross-country flight.

In a tactical march, the commander recognizes the likelihood for enemy contact. Depending on the circumstances, he may alert an AAV force to fly in advance of his ground forces to destroy targets that may hamper continued movement, or to provide march security. In some cases, he may dictate their readiness level to account for the possibility of meeting a sizeable enemy force. (See Readiness Conditions later in this chapter.) In any event, the aircraft are always positioned to provide timely air support if needed.

If required to assist ground forces in contact while marching, aircraft move forward near the march route, but along air routes that utilize the terrain for maximum cover and concealment. By doing so, they are afforded the coverage of friendly air defense assets, as well as the advantages of terrain masking. The movement is usually conducted in formations divided by aircraft capabilities and mission and in pairs. The ACE at every level of command coordinates all required support between the ground force commander and the aviation force.

Offense. See Chapter 4 of this manual for more information on offensive combat. The ultimate objective of the OPFOR commander is decisive victory through the employment of combined arms. Aviation units best support the ground force by providing continuous fire support and serving as “flying artillery.”

The goal of fire support in the offense is to weaken the enemy through the conduct of a concentrated attack by various fire support means. This goal is accomplished by the continuous supporting fire of aviation, and artillery assets through the depth of the enemy defense. There are four overall phases in the fire support of the offense. They are—

- Fire support of the movement forward.
- Fire preparation for the attack.
- Fire support of the attack.
- Fire accompaniment through the depth of the enemy defense.

Fire support for the movement forward protects units as they move up from assembly areas. AGA air support performs interdiction and strike missions against targets such as aircraft on airfields and combat helicopters, before they can be brought to bear on friendly forces.

AAV fire support helicopter units may be called on to perform any of their primary missions. This phase targets the most dangerous enemy long-range weapons capable of striking the supported unit while it is still far from the forward edge of enemy defenses.

Fire preparation for the attack occurs prior to the onset of a ground attack across a specified frontage. It can be simultaneous with the fire preparation of both the artillery and missile units. It requires close, detailed coordination with these forces with regard to targeting and timing. Again in this phase, AGA and AAV assets perform primarily interdiction and strike missions against the enemy to influence the upcoming battle, shape the battlefield, and allow the ground force commander to achieve his scheme of maneuver. Where possible, targets are attacked outside of the area of the main effort during those times when a deception plan is being carried out, to lend greater credence to the plan.

Fire support of the attack allows the ground force commander an opportunity to use the advantages aviation can provide. This phase begins as ground forces initiate their attack. Timely air attacks allow the commander to mass firepower to assist ground forces in contact, or create or exploit penetrations. Targets include enemy CPs, key weapons systems, maneuver units, and reserves at tactical and immediate operational depths. Air support closely follows the ground force scheme of maneuver and is an extension of a robust fire support plan. Missions are usually planned well in advance. Air assets (primarily helicopters) support these missions, serve as a reserve force, or prepare to meet enemy counterattacks. Some combat support helicopters may be used to transport mobile obstacle detachments or prepare minefields in the path of enemy counterattacks.

Fire accompaniment through the depth of the enemy defense gives the ground forces air accompaniment as they penetrate deeply into enemy defenses. This phase occurs during the advanced stage of the offense, when the progress of the ground forces requires the speed and flexibility aviation employment affords. In this phase, the OPFOR prefers to keep aviation assets on the ground and at a high state of readiness to execute timely missions against high-priority targets as required by the ground force commander as contingencies develop.

In a ***meeting battle***, aerial fires, particularly those from helicopters, would screen and support the deployment of maneuver formations. Air strikes would be employed against enemy columns moving forward to reinforce engaged OPFOR units.

In a ***pursuit***, air support would be employed to harass withdrawing enemy units and impede the enemy's attempts to establish defensive positions. Helicopters would be employed to establish ambushes along enemy withdraw routes. Fixed-wing aircraft would primarily serve in an armed reconnaissance role conducting interdiction and strike missions.

Defense. In the defense, AGA and AAV aircraft are relied upon to provide rapid firepower to halt enemy advances. If a penetration is apparent, they can also be used to block major enemy penetrations by fire or possibly to deliver chemical munitions. Fire support /reconnaissance helicopters perform screening missions to alert the commander of enemy force dispositions and offensive intentions.

There is a defense counter-preparation plan, and there are also phases of fire support in the defense—

- Fire interdiction of advancing enemy troops.
- Fire to repel the enemy attack.
- Fire support of defending troops.
- Fire destruction of the enemy during a counterattack.

The purpose of the aviation counter-preparation plan is to launch a powerful, concentrated, surprise strike of short duration to preempt the enemy's attack prior to his reaching the main defensive zone. The targets of the counter-preparation are—

- Tank or mechanized forces preparing to attack.
- Artillery in firing positions.
- Aviation on airfields.
- Headquarters and communications centers.
- Water obstacle crossing sites
- Ammunition and fuel dumps.

Fire interdiction of advancing enemy troops integrates all air fire support available into the defensive fire plan. The air fire support extends to the immediate operational depth of the enemy by interdiction and strike missions, seeking to disrupt his attack plans and capabilities and attrit his forces before they can be brought to bear on friendly ground forces. The air fire support plan contains several detailed variants, taking into account the anticipated actions of the enemy and his most probable avenues of approach into the main defensive zone.

To ***repel the enemy attack by fire***, the OPFOR plans to use all fire support weapons, concentrating fires on forces that have reached forward defensive positions. Once the enemy is in direct contact with ground maneuver forces, the OPFOR considers the repelling of the attack one of the less favorable times to use aviation. Every available ground-based direct and indirect fire system is in action. Without effective coordination measures, some of them may have to check fire as aviation approaches the forward edge.

Fire support of defending troops allows for some fixed- and rotary-wing resources to be kept on call to provide a quick-reaction strike force wherever the enemy threatens to penetrate the forward defenses. Ground-attack aircraft, and fire support helicopters are held in forward deployment areas or at rear airfields waiting for the call forward from the FACs in ground maneuver units. Combat support aircraft can supplement mobile obstacle detachments by laying mines along threatened flanks and gaps, and assist in the preparation of the defensive positions by providing logistics support. They may also serve as the transport mechanism for a tactical combat force if the ground force commander dictates their employment. Combat service support aircraft in the defense facilitate the dispersal of priority materiel, such as ammunition and fuel, to the battlefield. On return to the rear areas, these aircraft may serve as air ambulances to evacuate wounded from the forward edge.

As the OPFOR transitions to the ***counterattack***, support to the ground maneuver forces, and the destruction of the enemy through aerial delivered means becomes the paramount mission. Many of the missions undertaken by aviation assets during this phase adopt the same flavor as the fire support of the attack, and fire accompaniment phases of the offense.

Planning and Preparation

Ground commanders can employ air support, integrated with other forms of fire support, throughout the width and depth of the battlefield to attack the greatest threats to successful ground combat. Mission planners are responsible for incorporating the most current information on enemy and friendly positions, current weather, terrain, fire support plans, and EC targets to plan air support missions that complement the ground maneuver plan.

Planned missions afford ground maneuver commanders greater freedom of movement and flexibility by allowing them to mass firepower at decisive points to annihilate or neutralize enemy forces in all phases of the march, offense, or defense. At every level of command from battalion to army group, ground commanders nominate targets for air support assets to attack. Assets are requested, forces are allocated, an air tasking order is produced, and pre-mission planning is performed to ensure aircraft survivability.

Target Selection

At higher levels, the targets are selected based on strategic or operational-level goals. At lower levels, targets are selected to destroy the threats to ground forces. The targeting process is mostly preplanned, based on integrating the fires of supporting ground assets like artillery, MRLs, surface-to-surface missiles (SSMs), and aviation assets. It is a continuous, ongoing process designed to exploit current intelligence and attack high-priority targets in all phases of the battle to best achieve the commander's scheme of maneuver. As the tactical battle continues, targets are selected from the existing targeting database, or new ones emerge as contingencies develop. For additional information on targeting, see Chapter 7, Artillery Support.

Target selections are always nominated for engagement in the following order (based on depth into the enemy forces), and a priority and precedence is recommended:

- Enemy forward positions, maneuver units, artillery, and C^2 nodes.
- Deeper artillery, C^2 nodes, reserves, assembly areas, supply routes, artillery or antitank positions, MRL positions, forward air bases.
- Deeper reserves, lines of communication, airbases, troop support and logistics facilities.

From these target lists, requests for artillery fire and air support are generated at every level. The targeting responsibilities of the ground force do not end with target nomination. Commanders and ACE elements planing fires must continue to refine and update target information until the desired results are achieved. The forum for this is the daily targeting meeting held at every level of command. These meetings incorporate the artillery, AGA, AAV, artillery and missile forces, with the purpose of nominating targets and refining targeting information based on current battle damage assessments, aviation effectiveness, and the operational/tactical plan or scheme of maneuver. They relate the ground force commander's targeting priorities with actual targets, plan APs, incorporate FAC input from prior missions, and discuss mobile targets. The latter is particularly important, since mobile targets represent the most difficult problem facing ground force commanders. When considering mobile targets, commanders may employ one of three methods to control the timing of the air attack: on-call, immediate, or preplanned. For more information on this subject, see Air Tasking Order below.

Because of this, commanders plan for targeting contingencies during the course of a battle. If a target of opportunity presents itself, the commander has the ability to redirect his air support to attack the new target through his ACE and/or by the FACs. Additionally, pilots have a unique capability of acquiring additional targets in the performance of their mission. This presents an ability to exploit targets of opportunity that present themselves to the pilots, provided the targets are included on the commander's targeting list.

Request Net

Formally, the lowest command level capable of requesting aviation support is the brigade. Battalion commanders input requests to the brigade. However, as every commander plans and conducts combat actions, he identifies situations where strikes or direct air support can be employed to enhance mission accomplishment. The brigade ACT also assists in nominating targets and integrating aviation into the overall scheme of maneuver. This same procedure occurs at each level of organization by the supporting ACE.

Air support requests from ground maneuver forces are screened at every level of command to determine whether or not—

- Ground support missions can be supported while meeting strategic or operational-level air requirements.
- The level of air support to ground forces meets operational and tactical requirements required to achieve goals of ground tactical plan.
- Supporting ground assets, such as artillery, MRLs, or SSMs could achieve the same results without dedicating aviation assets to the mission.
- Air requests are supportable based on current aircraft readiness, and maintenance posture.
- Planned airspace usage, artillery fires, and intelligence requirements can be met.

All requests for aviation support are compiled and submitted through ACE channels for approval by the army group commander and air army commander for fixed-wing missions, or the army commander for rotary-wing missions. The army commander and his ACE must divide the requests between those supportable by rotary-wing assets and those supportable by fixed-wing assets. The majority of approved requests for ground support stop at this level, since helicopters provide most of the direct support to ground force commanders. Helicopter missions are ranked by assigned priority and precedence, and given to the AAV headquarters for processing. Some air support requests continue on to be filled by the army group and AGA as fixed-wing missions. If approved, these requests are also assigned a priority and precedence. Requests for air support are submitted as early as 72 hours prior to the requested aircraft on-station time and no later than 24 hours prior to the start of the ATO. See Air Tasking Order below for more information.

Preplanned and ***immediate*** refer to the requests themselves. ***Preplanned*** requests are those submitted in time to be included in the published joint ATO (see below). ***Immediate*** requests fill operational requirements that are too late to be published in the ATO. ***On-call*** mission requests do not state a specific aircraft time-on-target. They involve dedicated aircraft placed on an appropriate alert status and employed when requested by the supported unit. Aircraft used to fill immediate requests may come from on-call missions established for this purpose. Refer to Figure 9-4 for clarification.

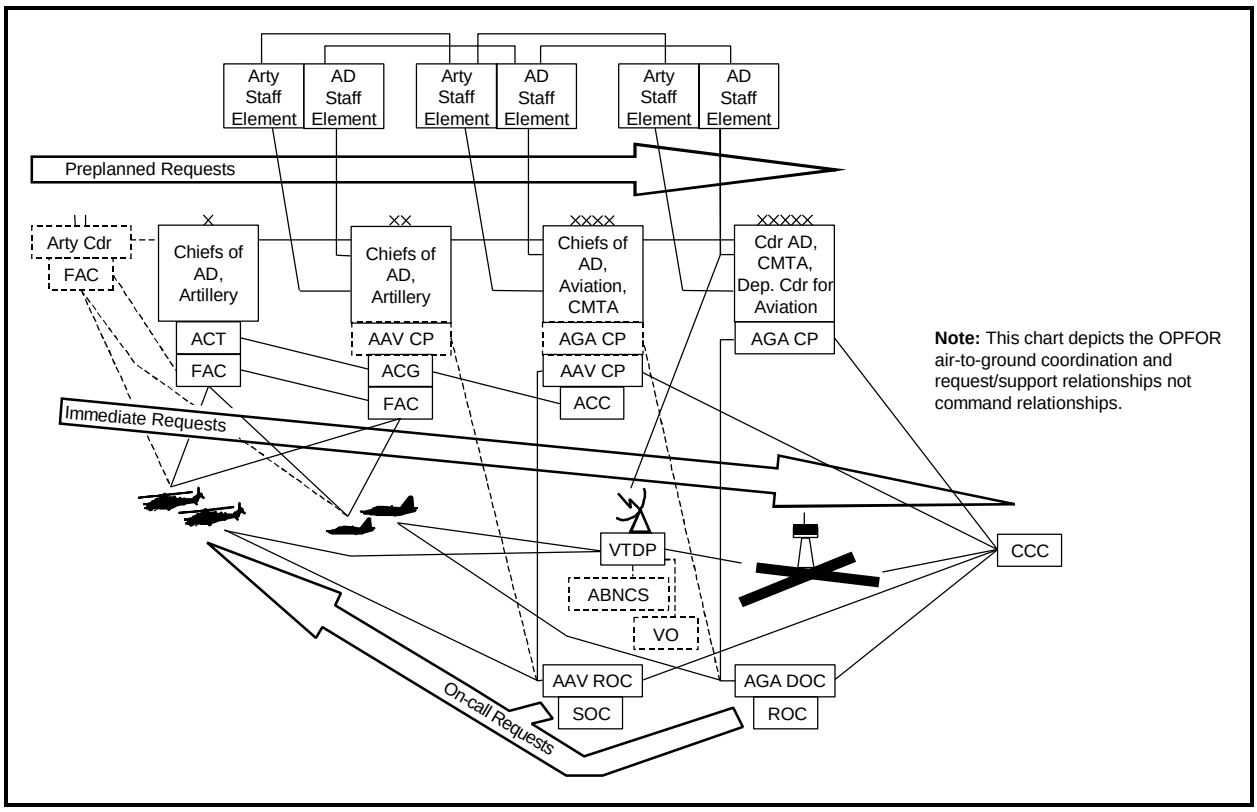


Figure 9-4. Air coordination links.

The CCC at army group level is of key importance in the processing of immediate air support requests. This type of request is primarily passed via the FACs and ACEs to the army level. If a dedicated aviation unit supports the requesting ground force, it fills the support requirement. If not, the request will be passed up to the CCC. Once an immediate request is approved at the army or army group level (depending on the type of supporting aircraft), the CCC tasks on-call missions or diverts scheduled missions to satisfy that request.

At the brigade level, the aviation interaction chief submits the air support requests, with assistance from the aviation situation officer and the FACs. They submit preplanned requests through ground command and staff channels, or immediate DAS requests through ACE channels. FACs or the ACT transmit on-call requests to the ACT and supporting aircraft using VHF communications. See Air Tasking Order below for explanation on these topics.

If disapproved at any level, the requests are returned to the originator through ACE channels with an explanation or a substituted fire support asset. Once a request is approved at either army group or army level, it is forwarded to the supporting AGA division or AAV regiment to determine if it is supportable based on the projected sortie generation rate and operational tempo. If the tasked aviation unit requires additional assets to accomplish the mission, the request is forwarded to the army staff, and later to the army group. The CCC tasks an aviation unit to support the requests. If the supporting AGA division or AAV regiment can support the mission with its current assets, a squadron is then further tasked.

For all requests, the higher aviation command provides needed information to the tasked unit on target, location, required on-station time, and radio frequency to contact the FAC with the supported unit. Each squadron then conducts its own mission planning and coordinates directly with the supported unit. The approved missions and enacted airspace procedures are disseminated to all levels of ground and air commands through the ATO and ACO.

Sortie Generation

AGA and AAV commanders are able to manipulate and predict to some extent their ability to launch and sustain aircraft. This information is compiled and forwarded up to the army group level where it is reconciled with the commander's scheme of maneuver and the requests for air support. There, the commander determines the allocation of air assets to best fit into his plans for the operation. The decision is made how to employ all of the available air assets to accomplish the operational goals, including support to ground forces. The resulting product is known as the maximum sorties available in a single 24-hour period.

The OPFOR defines an ***aircraft sortie*** as a flight by one aircraft in an air action. Across the theater, the maximum aircraft sortie rates are determined daily incorporating many factors, at every level of organization. Figure 9-5 contains a generic formula that holds true for both fixed- and rotary-wing aircraft. It can incorporate many of the factors involved. The factors are—

Total Aircraft Available

Total aircraft available, or "flyable," is calculated to incorporate all aircraft in theater regardless of type or mission. This number can be calculated to account for aircraft by specific mission type. This negates the requirement to calculate apportionment.

Attrition

Attrited, or "non-flyable," aircraft is the number of aircraft losses due to combat, fratricide, or unrepairable enemy damage since last sortie generation calculation.

Allocation

Allocation or "how flying," is the ground force commander's intent on how sorties should be allocated to individual missions, such as interdiction, strike, DAS, counterair, airlift, or transport. As hostilities develop in a region, the OPFOR balances the strategic- and operational-level air campaign goals against the tactical air support requirements to determine how to best allocate the aircraft to specific missions to attain the desired effect or change upon the enemy. At the strategic levels, this allows the ground commander to account for the air campaign objectives and ground force objectives. At the operational and tactical levels, it allows ground force commanders to allocate percentages of air support assets to main and supporting efforts to best fit the ground scheme of maneuver.

Depending on how the OPFOR perceives the air situation , the allocation may differ. (See Air Superiority, Local Air Superiority, or Air Parity earlier in this chapter.) Multirole aircraft prove most valuable in considering allocation. They can quickly and easily be tailored to perform different missions based on the commander's needs. Commanders may also elect to keep a number aircraft ready to serve as a reserve if needed for unexpected contingencies.

Operational Readiness Rate

The operational readiness rate (OR rate), or "ready to fly rate", refers to the capability of a unit, equipment, or weapon system to perform the mission or function for which it was organized or designed. This encompasses the ability of the OPFOR to sustain its aerial forces. Factors such as on-hand major end items, spare part availability, scheduled aircraft maintenance, logistical and resupply procedures, transportation capabilities, and aircraft cannibalization and/or transfer procedures are considered. Initially, an OR rate in excess of 85 to 90 percent is considered normal. As hostilities continue, this rate can diminish considerably, based on the above-listed factors.

Aircraft Sorties per Day

The number of aircraft sorties each day, or "turns per day," varies with each type of aircraft and is primarily a function of mission duration and the time required to refuel/rearm the aircraft for the next mission. This also can incorporate the human factors of pilot-to-aircraft ratio, aircrew availability, proficiency, endurance, and training level. It can also encompass the availability of fuel and proper munitions for the intended mission. If the aircraft is fueled, properly armed, and mission-ready, it cannot fly the planned number of sorties per day without a qualified, prepared crew to man the cockpit.

Maximum theoretical sorties/day =
(Total aircraft available – Attrition) x Allocation x OR Rates x Aircraft sorties/day

An example calculation of sortie generation rate follows. Conditions:

- 110 aircraft in theater.
- 10 lost yesterday through combat action.
- The commander wants 40% dedicated to direct support, 30% to strike, and 30% to interdiction.
- OR rate today = 80% based on logistics sustainability and maintenance posture.
- Aircraft sorties/day are: 3.5 direct support, 2.0 strike, and 2.5 interdiction, based on individual mission duration, aircraft refuel/rearm times, and aircrew readiness.

(110-10) X 40% X 80% X 3.5 = 112 direct air support sorties today
(110-10) X 30% X 80% X 2.0 = 48 strike sorties today
(110-10) X 30% X 80% X 2.5 = 60 interdiction sorties today

Figure 9-5. Calculation of aircraft sorties.

Over a prolonged campaign, commanders must determine their ability to regenerate their aviation assets, versus their willingness to allow that ability to degrade to achieve their goals. Planning rates allow aviation units to operate at a certain sortie rate for a certain period of time, normally 30 days, without resupply. Units may elect to operate in a "sustain mode" with a slower operational tempo, planned maintenance, and a normal logistics flow. This allows them to operate at a higher rate over a longer stretch of time.

Alternatively, units may elect to conduct "surge operations." This is characterized by a higher than usual operational tempo, and neglecting preventive maintenance and scheduled services for 1 to 2 weeks. This gives them the ability to fly more sorties than normal in a short period of time. Compared to sustain mode, surge operations actually force a slower operational tempo over the long term, since more extensive maintenance needs to be performed on these aircraft. Eventually logistics stocks are depleted, and fatigue increases. Following an extended surge, a unit must recover by performing the maintenance that has been neglected. If the unit returns to surge rate prior to recovery, its sortie generation capability may continue to fall, and future recovery time increases.

Air Tasking Order/Airspace Control Order Cycle

All filled missions are published daily by the CCC in the form of the ATO. This document is a description of the entire air plan that outlines all approved fixed-wing, rotary-wing, and UAV missions in theater to include interdiction, strike, DAS, counterair, airlift, transport, or aerial refueling. The ATO development process is continual. This generates requirements for air support that are submitted as requests no earlier than 72 hours prior to aircraft requested time-on-target. These requests are changed, refined, or reviewed at each day's targeting meeting. (See Target Selection earlier in this chapter for more information.) All requests must be finalized and submitted no later than 24 hours prior to the beginning of the next ATO cycle. The ATO is published 12 hours prior to going into effect, which occurs in the early morning hours and continues for 24 hours.

To publish the ATO, the army group-level CCC, with the assistance of the air army CP and the army aviation CP, reconciles air support requests from all levels of command with sortie generation capabilities and command objectives for the allocation of air assets to publish the ATO. Supported commanders are advised to submit preplanned requests for on-call missions to ensure availability of sufficient sorties with appropriate ordnance to respond to immediate air support requests. If more aircraft are available on a given day than required for combat operations, the excess are either assigned missions to augment the air missions already planned or held in reserve. Conversely, if there are more air support requests than available aircraft, missions are filled based on the priority assigned to each request.

Once the ATO is published, it is an execution order. All published missions occur for that 24-hour period. Ground force commanders may not know which unit or what type of aircraft will support them, but they are guaranteed the support. Issued simultaneously with the ATO is the ACO. This is also an execution order that delineates all airspace positive and procedural controls enacted to best accomplish the ATO. See Airspace Coordination Measures earlier in this chapter for more information.

The CCC publishes the ACO with guidance from the army group chief of air defense, since the chief of air defense at every level controls the airspace of that element. The ACO controls the combined efforts of the AGA, AAV, and missile and artillery forces. The ATO and the ACO are disseminated to all air and ground force units through unit headquarters and ACEs, respectively.

The OPFOR uses three types of air support missions to meet the needs of ground force commanders. The names are based on the types of request, and on the timing of the air support. They are preplanned, immediate, and on-call. Refer back to Figure 9-4 for additional clarification.

Preplanned

Air strikes in direct support of ground maneuver forces are primarily preplanned. The ground force commander identifies the targets, times, and desired damage for air strikes. The aviation commander determines the force, size, ordnance, and attack technique that can accomplish the strike mission. The staff plans these strikes in great detail and integrates them with other forms of fire support. The target selection process identifies possible engagement area for the application of aviation assets. The sortie generation process coupled with the ATO cycle, assigns aviation assets to the highest-priority missions to attack targets allowing the ground force commander to achieve his scheme of maneuver. Aircraft are allocated, prepared with the proper ordnance and countermeasures, and launched to attack a target at a specific time and place as a part of an integrated ground and air scheme of maneuver.

After ATO confirmation of preplanned requests for air support, a ground force commander consults his ACE staff to finalize detailed plans for the coordinated air/ground scheme of maneuver in his area of responsibility. If they plan to use fire support helicopters, the planners coordinate directly with the supporting AAV unit to ensure target deconfliction and to limit fratricide. The planned attack allows the ground force to update targets, current enemy and friendly situation, and disposition of enemy air defenses just prior to the mission.

Additional detailed pre-mission planning and coordination done prior to a preplanned strike by the ground force and the aviation force specifies—

- Target description and desired results.
- Strike force required to accomplish the mission.
- Time.
- Location.
- Attack technique.
- Ordnance required.
- Communication frequencies and codes.
- Approach and departure routes.
- EC support.

Once airborne, the aircraft proceed to a designated checkpoint behind friendly lines and confirm their target assignment with VTDPs controlling their transit to the forward areas or attack positions. En route to the forward edge, the flight receives target updates from the VTDP or the FAC.

Preplanned missions are similar for combat support and combat service support helicopters. Most of the missions flown by these types of helicopters are preplanned in nature. The lack of time-critical constraints allows the supporting aviation unit and the supported maneuver unit to conduct total coordination before the mission even commences. This coordination can cover issues such as LZ/PZ preparation, equipment preparation, pick-up/drop-off times, airspace management, and communications. Preplanned missions also allow aviation units the greatest amount of coordination to occur between the ground forces and the supporting aviation units because of the lack of time-critical constraints. They also allow the aviation units to take all possible preventive steps to ensure aircraft survivability throughout the course of the mission. See Survivability later in this chapter.

Immediate

Most air support missions are preplanned, but immediate missions are used heavily. Ground force commanders can request them through ACE channels for inclusion on the ATO. By doing this, ground force commanders identify general times and places where they believe air support is required, but without finalizing the intricate details like a preplanned mission. This type of mission allows the ground force commander to have dedicated air support assets readily available to employ at a given time against targets. This type of request is used primarily for fire support aircraft. If a combat support aircraft is needed for this type of mission, it locates in the vicinity of the requesting CP and assumes more of an on-call role.

The ATO allocates air support assets for this sort of mission, some pre-mission planning and coordination occurs between the supported and supporting forces to ensure aircraft survivability. Aircraft designated for immediate missions can be airborne in deployment areas or on the ground at airfields. Before takeoff, pilots are briefed on a checkpoint to proceed to, and possible target type and location. Aircraft are prepared with the ordnance and countermeasures for the most probable target they may encounter. As the ground force commander decides he needs the air support to engage, he notifies the ACE or the FAC to pass the request. The request is passed to the supporting attack helicopter squadrons of fire support aircraft at army level or attached to division, or to supporting fixed-wing units at army group level. See Figure 9-6 for details on the immediate DAS request process.

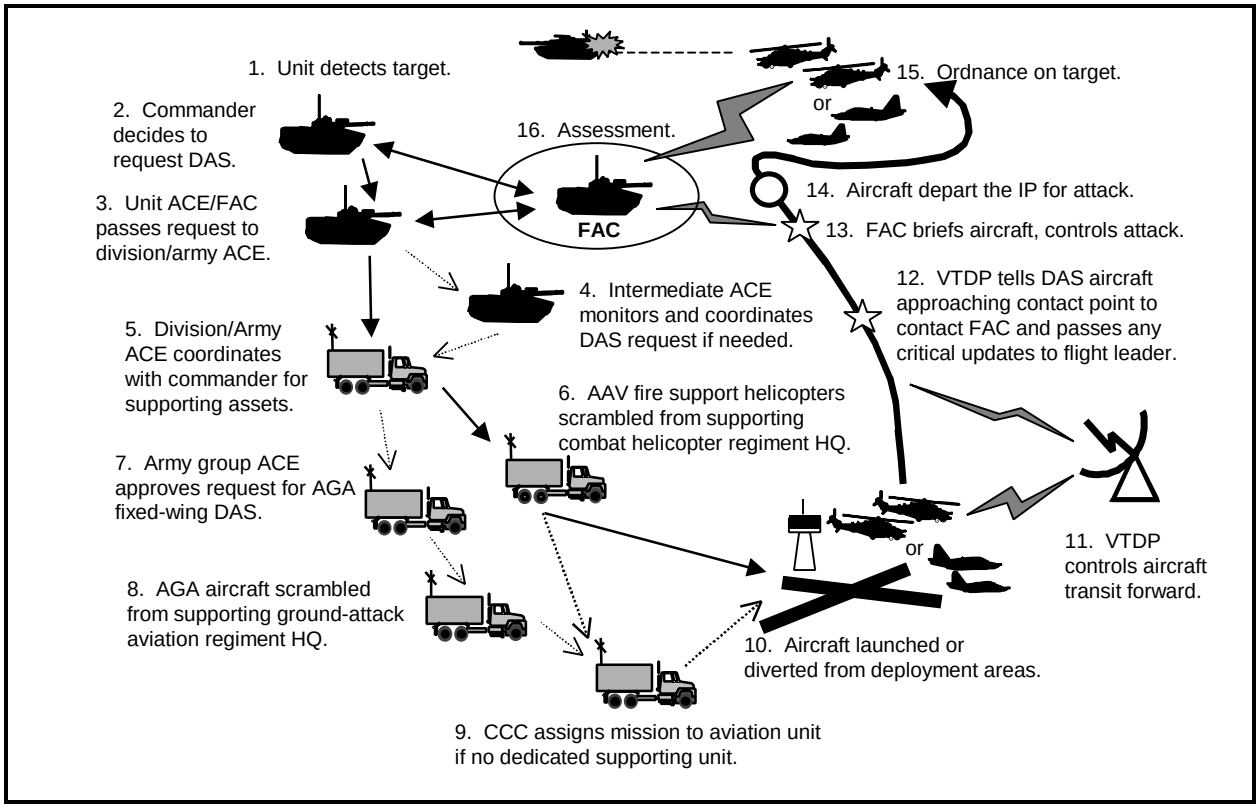


Figure 9-6. Immediate DAS request process.

The aircraft are launched from airbases, or released from forward deployment areas located 20 to 40 km to the rear of the supported division or brigade. The flight or formation establishes communications with the VTDP as it moves forward. En route, the aircraft are briefed on the frequency and contact point to establish communications with the FAC, and critical mission updates are passed. With communication established, the FAC gives them final target designation and confirmation, and the aircraft depart the IP for the attack. Depending on the aircraft type and distance of the deployment area to the engagement area, aircraft response times can vary from 5 to 15 minutes.

In some cases, there may be an excess of aircraft available as compared to requested missions outlined in the ATO. Then the army group commander can establish a pool of fixed-wing aircraft, and the army commander a pool of rotary-wing assets, to be available for immediate missions if unforeseen contingencies develop. He may also designate that multirole aircraft be configured for direct support. These extra aircraft may be armed and prepared for "generic" targets and launched to holding patterns behind the forward edge of the main or supporting effort. Once on station, they serve as an available asset to subordinate ground force commanders that require immediate air support. They can be called forward by the requesting commander's FAC and briefed on the target en route. Sometimes the OPFOR refers to this practice as "push" DAS.

On Call

Planners may allocate aviation assets for on-call attacks where the ground force commander can time the strike at his discretion. He bases the trigger for the attack on the enemy's reaction to the OPFOR scheme of maneuver at planned decision points. This allows him to mass his fires at decisive places and times on the battlefield, and to refrain from employing the attack assets if the target no longer threatens. Additionally, he may elect to shift the assets to attack another target. If not supporting a preplanned mission, support helicopters assume an on-call role. By using these methods of employment, the commander can conserve his air assets for use when needed, or avoid the need for the ground forces to halt their attack to wait for an unnecessary preplanned air support mission.

On-call mission requests do not state a specific aircraft time-on-target. They involve dedicated aircraft placed on an appropriate alert status and then employed when requested by the supported unit. Prior to the employment of air assets, the ground force will have established communications or liaison with the supporting aviation unit. On cue from the ground force, the aviation unit performs the necessary preparations to launch when the ground force requires the air support. Regiment or squadron operations centers (ROCs/SOCs) use varying levels of alert status or readiness conditions to guide the supporting aviation unit to total mission preparedness for the most probable launch execution order from the ground force commander.

Readiness Conditions

The OPFOR recognizes three levels of combat readiness for fixed- and rotary-wing aircrews. Aircraft in categories one and two can be expected to respond to on-call missions timed by the ground force commander. Figure 9-7 lists the categories and shows their duration and time before assets can be in the air. Based on his decision points, the ground force commander tells the dedicated aviation unit when to increase the level of readiness. Under these conditions, both parties prepare to execute the air support mission when needed.

Category	Crew and Aircraft	Duration of Readiness	Time Before Takeoff
One	Aircraft are fully serviced and armed. Combat crews are briefed on their mission and are in the aircraft ready to start engines. Ground personnel are assisting the combat crews.	1-2 hours	3-5 minutes
Two	Aircraft are fully serviced and armed. Combat crews are briefed and are on standby in the vicinity of the aircraft ready to take off within a specified short period of time after receiving a mission order.	2-4 hours	15 minutes
Three	Aircraft are refueled and serviced. Cannons are loaded. External systems (bombs, rockets, missiles, fuel tanks, etc.) are not loaded. Combat crews are designated, but not on standby; they have not been briefed on the air and ground situation, but will be before takeoff.	2-4 days	1-2 hours

Figure 9-7. Levels of combat readiness.

AAV tends to operate from FARPs or deployment areas within 20 to 40 km of the forward edge. A flight of helicopters held at the highest state of readiness should reach its target in 15 to 20 minutes; a full squadron requires up to 25 minutes. Preparation of a second strike could take as little as 15 to 20 minutes depending on the number of helicopters involved and refuel/rearm procedures. AGA aircraft, at the highest readiness state, should reach their target in 20 to 30 minutes after launch, since the aircraft are based further to the rear. Ground commanders are aware of these approximate aircraft transit times and factor them into the launch trigger.

Survivability

Effective pre-mission planning and preparation are paramount to ensuring the survivability of aircraft in combat. Prior to any aviation mission, aircrews must have a detailed intelligence picture of the battlefield. They use this information to plan every aspect of the mission. This helps crews to determine ingress and egress routes through gaps in enemy air defense coverage and to plan tactical maneuvers. Similarly, they try to use routes that afford cover and concealment from the enemy, while allowing the protection of friendly air defense assets.

The OPFOR emphasizes the importance of deception and surprise to paralyze hostile air defenses and enhance aircraft survivability. Aircraft approach targets area at the lowest permissible altitude, given weather and terrain restrictions. They maintain minimum radio transmissions, while emanating only the minimum required communications and sensor signals. The OPFOR exploits detected gaps in enemy radar coverage and often uses decoy flights in advance of attacking aircraft to distract enemy air defense systems. If more than one pass is necessary to destroy the target, attacking formations approach the target from different directions or from bright sunlight, minimizing air defense effectiveness, visual detection, and recognition.

Whenever possible, the commander includes a plan for SEAD. He can employ other aviation assets, artillery, MRLs, SSMs, and EC assets to prepare the ingress and egress routes for helicopters and fixed-wing aircraft air support missions. The entire purpose behind SEAD preparation is to disarm or disable enemy early-warning radars and to destroy or reduce enemy air defense assets that may come to bear on friendly aircraft. If SEAD is employed, it precedes the approaching aircraft by 20 seconds to one minute. SEAD may be employed along the flight route to cover areas where the aircraft are unprotected by terrain or friendly weapon systems. It may also be employed to prepare the AP prior to aircraft occupation.

The effectiveness of air support may be increased through the use of artillery to suppress enemy air defenses. Additionally, suppression of electronic systems that provide early warning, target acquisition, fire control, communications and data support for air defense systems is a high priority. Dedicated airborne- and ground-based EC systems target both the radar and C^2 networks used by enemy air defense. Both fixed- and rotary-wing aircraft, particularly the most advanced, employ a mix of radar warning receivers, self-protection jammers, flares, and chaff.

TACTICS

To obtain the full potential desired from an air attack, different tactics are employed by fixed-wing and rotary-wing assets. The OPFOR prefers to employ fixed-wing aircraft more frequently in strikes on previously reconnoitered, fixed or semifixed targets, in the immediate rear or at greater depths. Fixed-wing aircraft are vulnerable to ground-based air defenses when executing ground attacks. This necessitates a low-altitude, high-speed target approach and minimum time in the target area. Under such conditions the pilot's ability to visually acquire and properly identify the target may be extremely limited.

The OPFOR prefers to use helicopters for time-sensitive strikes close to friendly forces. Helicopters have reduced logistics requirements compared to fixed-wing aircraft, allowing their deployment close to the main battle area. This proximity enhances their ability to respond to missions and provide air support as required by the commander. Tactically, helicopters have two advantages over fixed-wing aircraft: their ability to concentrate and maneuver relatively undetected to strike, and systems that allow the pilots to rapidly evaluate and react to battlefield conditions.

Fixed-Wing

AGA assets are employed at the strategic, operational, and tactical levels simultaneously. The tactics employed by fixed-wing assets to support tactical ground force battles are designed to ensure aircraft survivability in a high-threat air defense environment and provide supporting fires to the scheme of maneuver. Fixed-wing aircraft are employed much less than fire support helicopters to support the ground force commander. Yet when effectively employed, AGA assets have the ability to give friendly forces great advantages in firepower, mobility, and shock effects.

Formations

AGA DAS is usually conducted in two-ship formations. The wingman flies in an echelon or trail position, with lateral and vertical separation depending on terrain and enemy air defense threat.

Techniques

During low-level air interdiction missions, AGA assets can employ several attack profiles. The first is the 90-degree battle curve. In this profile, the attacking aircraft approach the AP 3 km abeam of the target. At the AP, the aircraft initiate a 90-degree turn toward the target. As the aircraft turn, they gain altitude. The aircraft are at the peak of their climb when they turn the full 90 degrees and should be aligned with the target. The aircraft dive toward the target at a 10- to 20-degree angle, release their ordnance, and egress the area at a high-speed, low-level flight.

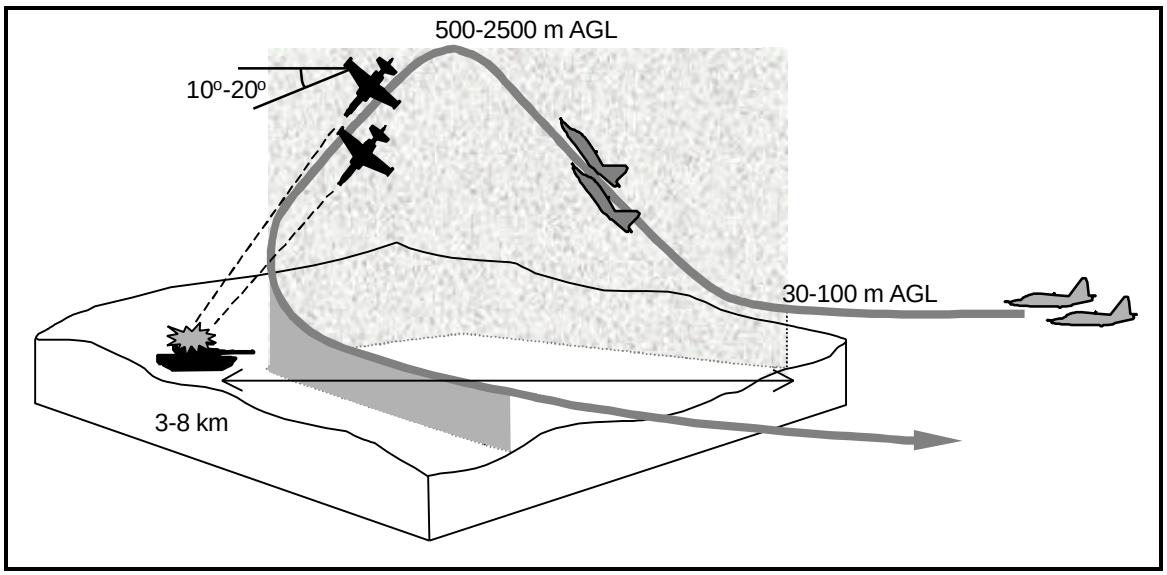


Figure 9-8. The 90-degree battle curve.

The second profile used is the 180-degree battle curve. This profile requires the attacking aircraft to fly at least 3 km past the target. They continue past this point for another 10 seconds, then begin a climb while executing a sweeping 180-degree turn. The aircraft are at the peak of their climb when they end the turn, and should be aligned with the target. The aircraft dive toward the target at a 10- to 20-degree angle, release their ordnance, and egress the area at a high speed, low-level flight.

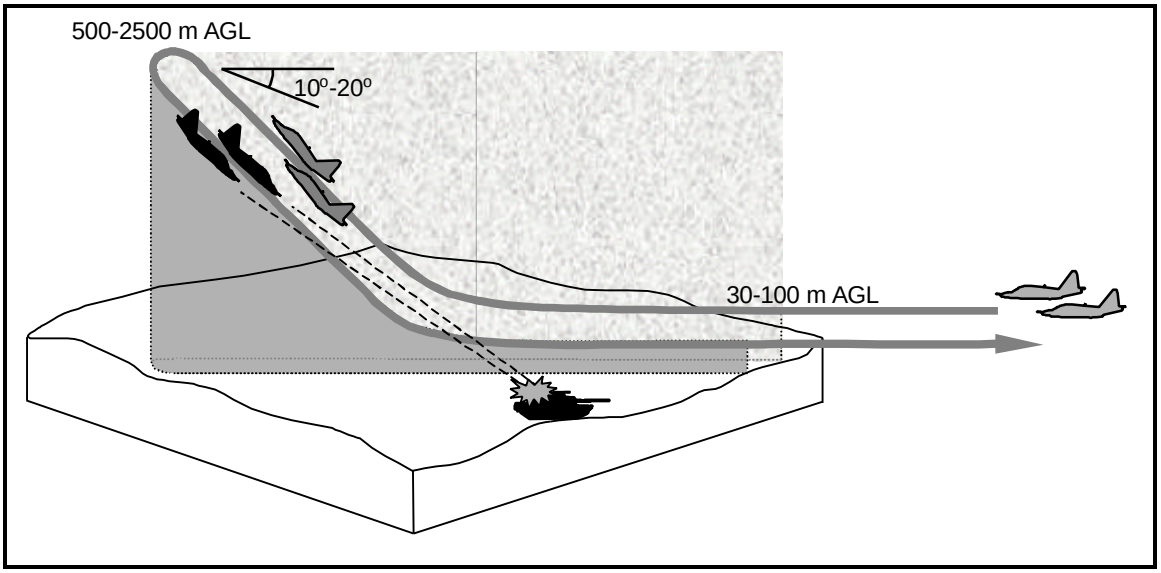


Figure 9-9. The 180-degree battle curve.

Another attack maneuver is the attack from the loop. In this method the aircraft execute a climbing inside loop beginning approximately 3 km away from the target. On the downward side of the loop, the aircraft align themselves with the target, release their ordnance, and egress the area at a high speed, low-level flight.

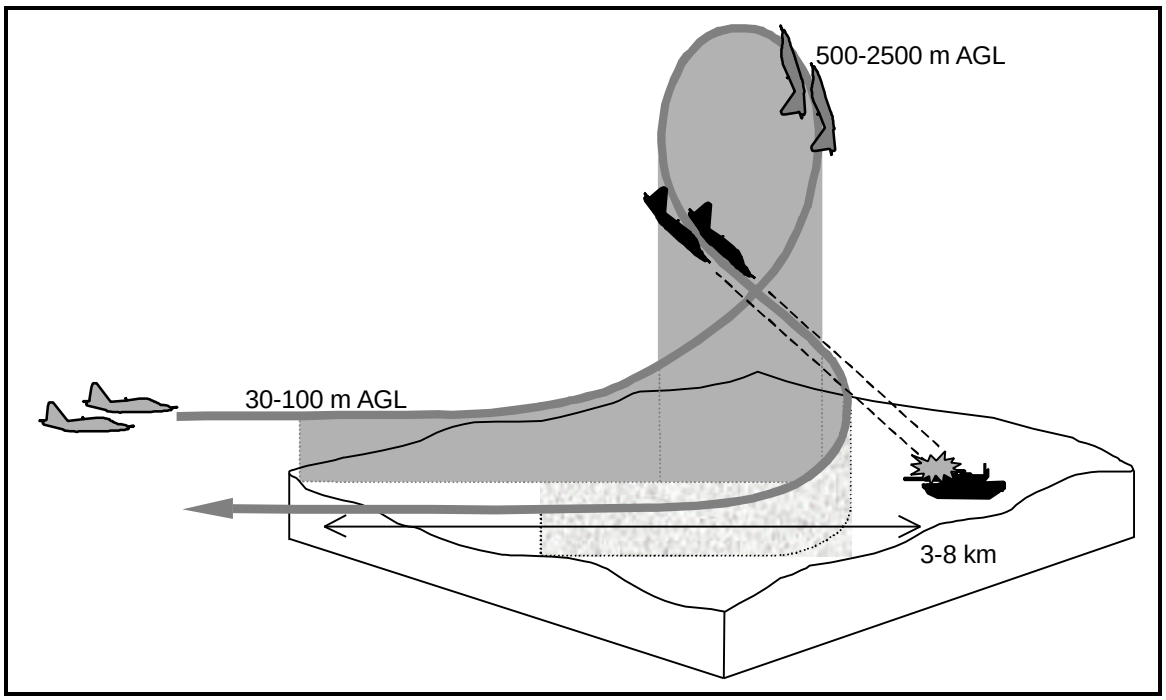


Figure 9-10. Attack from the loop.

The final attack profile used is a combination of the loop, and the battle curve. This profile requires the attacking aircraft to fly at least 3 kilometers past the target. The aircraft will continue past this point for another 10 seconds, then begin a climb while executing an inside loop. At the apex of the loop, the aircraft roll level, and align with the target. The aircraft dive toward the target at a 10- to 20-degree angle, release their ordnance, and egress the area at a high-speed, low-level flight.

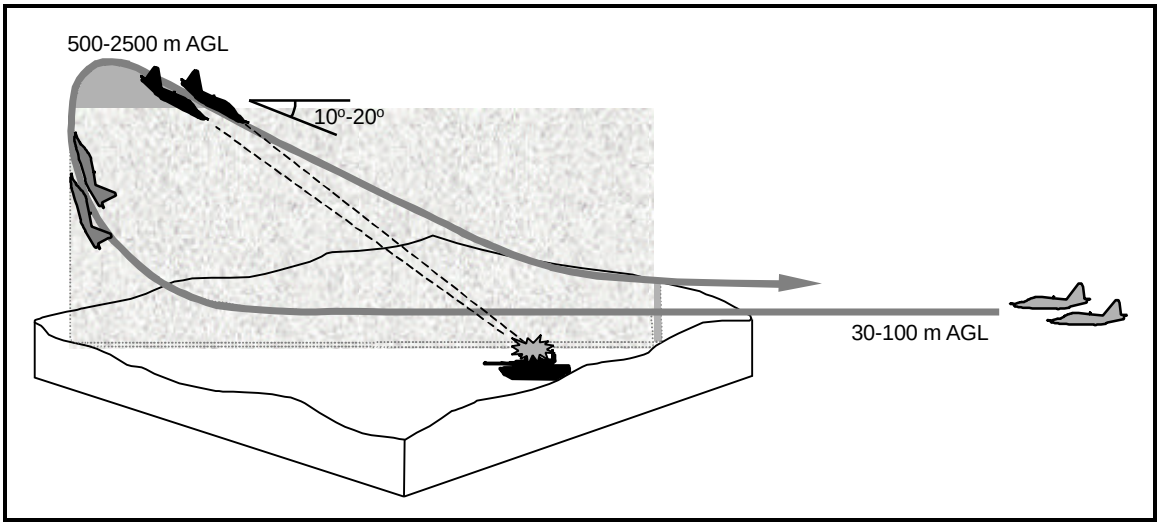


Figure 9-11. Combined looping battle curve.

AGA DAS missions can follow another flight profile. Approach altitude to the AP varies depending on the enemy air defense threat. Once the aircraft are within 1,500 m of the target, they will into a fixed dive angle of approximately 15 degrees. The attacking aircraft fly a non-evasive approach toward the target, release their ordnance, and execute evasive maneuvers (varying airspeed and altitudes while using available terrain for cover) to exit the target area.

Rotary-Wing

Many of the tactics and techniques used by the OPFOR are similar to tactics employed worldwide. Helicopter design dictates the capabilities and limitations of each aircraft and, to a large extent, their employment. Some minor variations between models can cause similarly designed helicopters to differ in hovering capabilities, cargo and load capacities, and employment characteristics.

Types of Employment

Employment of AAV helicopters varies according to supported scheme of maneuver and to achieve the desired results in an attack. Ground force commanders may elect to subdivide supporting AAV units in thirds and employ them at varying strengths as needed. This allows for longer asset employment and accounts for variations in strength of asset coverage. For example, if an attack helicopter squadron supporting a division has 20 fire support aircraft, it is divided into five flights of four aircraft each (assuming that the unit has no aircraft are in scheduled maintenance). The squadron commander will employ his aircraft as flights, unless conditions dictate employment as a squadron. Subordinate flight commanders decide employment within the flights. They may choose employment as a flight, or in pairs. The OPFOR categorizes these employment methods as maximum, alternating, and continual. See Figure 9-12 for clarification. The descriptions below apply to the employment of a squadron; however, with minor adjustment they also apply to employment of flights.

Maximum. The entire helicopter force is launched simultaneously to different APs to produce a great force multiplier and shock effect for the ground force commander to rapidly defeat the enemy. The aircraft remain in the APs as long as their fuel and ammunition last, and as long as they are afforded the security of friendly air defense coverage. This employment method allows the commander a great advantage in the battle, yet it removes his supporting aviation assets from the battle for several hours, since they must return to rear areas for refueling and rearming. This high number of aircraft requiring service at the FARP at the same time places a heavy demand on the logistics system.

Alternating. The alternating method allows for flights of helicopters to attack the target, while the others wait in a deployment area or at the FARP. For example, as the two flights engaging the enemy begin to break contact, the third and fourth fly in to continue the air support. As the latter leave station, they are replaced by the fifth flight to continue the attack, but at a diminished rate. The alternating method allows the commander to achieve a relative amount of shock effects and force multiplier initially, but it allows him to continue the engagement longer than the maximum method. This method also does not strain the logistics system as much. Therefore, the aircraft serviced at the FARP have the potential to return to the battle quicker and replace the flight or flights in the AP.

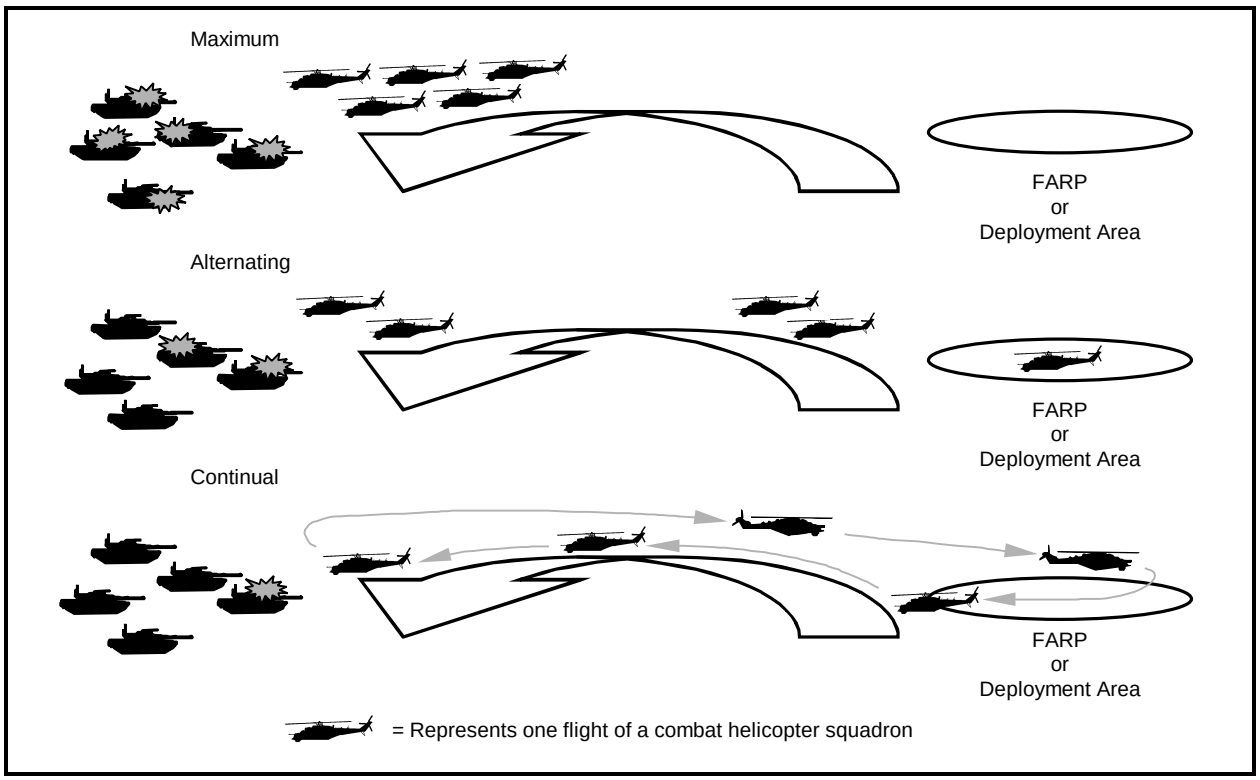


Figure 9-12. Helicopter employment.

Continual. The continual method employs only one helicopter flight at any given time. While one flight is in the AP, another is waiting in a deployment area to replace it, and the third is waiting in the FARP, and the other two flights are in transit between any two of the points. As the first breaks contact to return to the FARP, the others rotate forward. One moves in to continue the attack, while another assumes its position in the deployment area. This method allows the commander the opportunity to keep constant pressure on the enemy with supporting aviation assets. It has little strain on the operation of the FARP, so individual flights can expect a quick turnaround time. This method allows the engagement to continue indefinitely, based only on the logistics capabilities to resupply the FARP, and the fatigue of the aircrews.

Combat support and combat service support helicopters can operate autonomously in the rear areas to perform their individual missions as required. If they are flying toward or across the forward edge, they operate in pairs or groups, with fire support helicopter escort.

Flight Modes

Helicopters can be flown in any of three differing modes, and their flight profiles can be grouped accordingly. See Figure 9-13 for clarification.

Nap-of-the-earth. Nap-of-the-earth or (NOE) is flown at varying airspeeds and altitudes as close to the earth's surface as possible while following the contours of the terrain. It is a weaving flight path that orients along the axis of movement and takes advantage of terrain masking.

Contour. This mode is flown at low altitudes conforming generally to the contours of the terrain. The flight is characterized by varying altitudes and varying airspeed. This mode of flight is most often employed with helicopters offering limited maneuverability. Because of increased altitudes, aircrews fly at higher airspeeds to reduce exposure times.

Low-level. This mode is flown at low altitude, with constant heading, airspeed, and altitude to facilitate speed and ease of movement while minimizing detection. It is used only in rear areas.

All OPFOR helicopters can employ each of these flight modes. The aircraft begin in rear areas at contour altitudes and reduce altitude and airspeed to NOE flight as they approach the forward edge of the battle area.

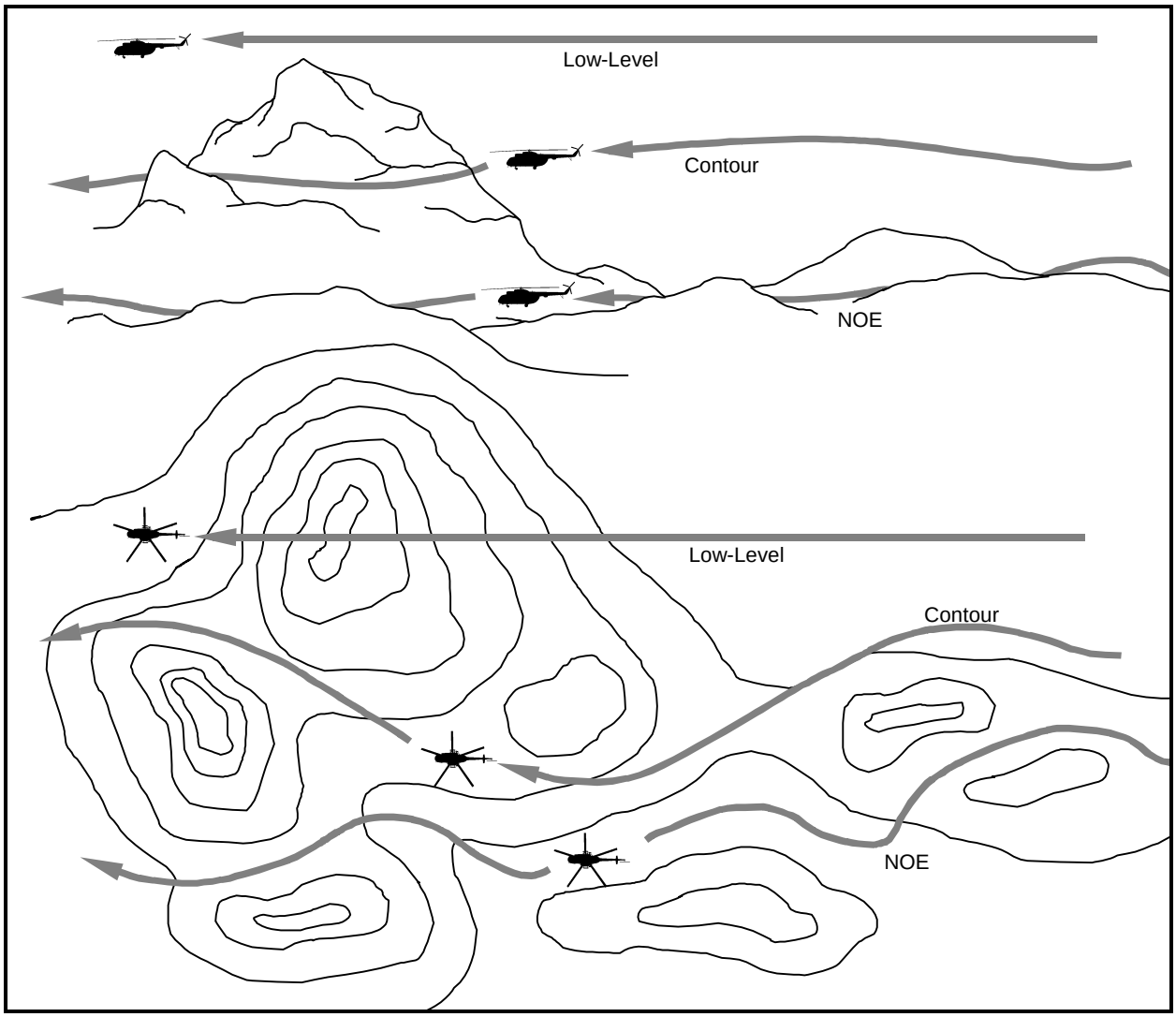


Figure 9-13. Helicopter flight modes.

Formations

Fire support helicopters utilize several formations in the attack, and the OPFOR stresses their use in flights, pairs, and finally in sets of pairs. Once the FAC provides the formation with target location, the flight or formation leader executes attack control. Inbound to the AP from the IP, he orders the appropriate formation, divides the target, assigns individual target sectors, and determines the attack profile. The most common formations used are line abreast, echelon (left or right), or trail. See Figure 9-14 for examples of these formations.

Depending on terrain and visibility, separation between pairs in trail varies from 20 to 40 seconds. Lateral separation varies between 100 and 300 m. The standard formation for a leader and his wingman is an echelon with lateral and vertical separation depending on terrain, aircrew proficiency, and enemy air defense threat. The wingman maintains his position during the attack run and releases his ordnance simultaneously with the leader.

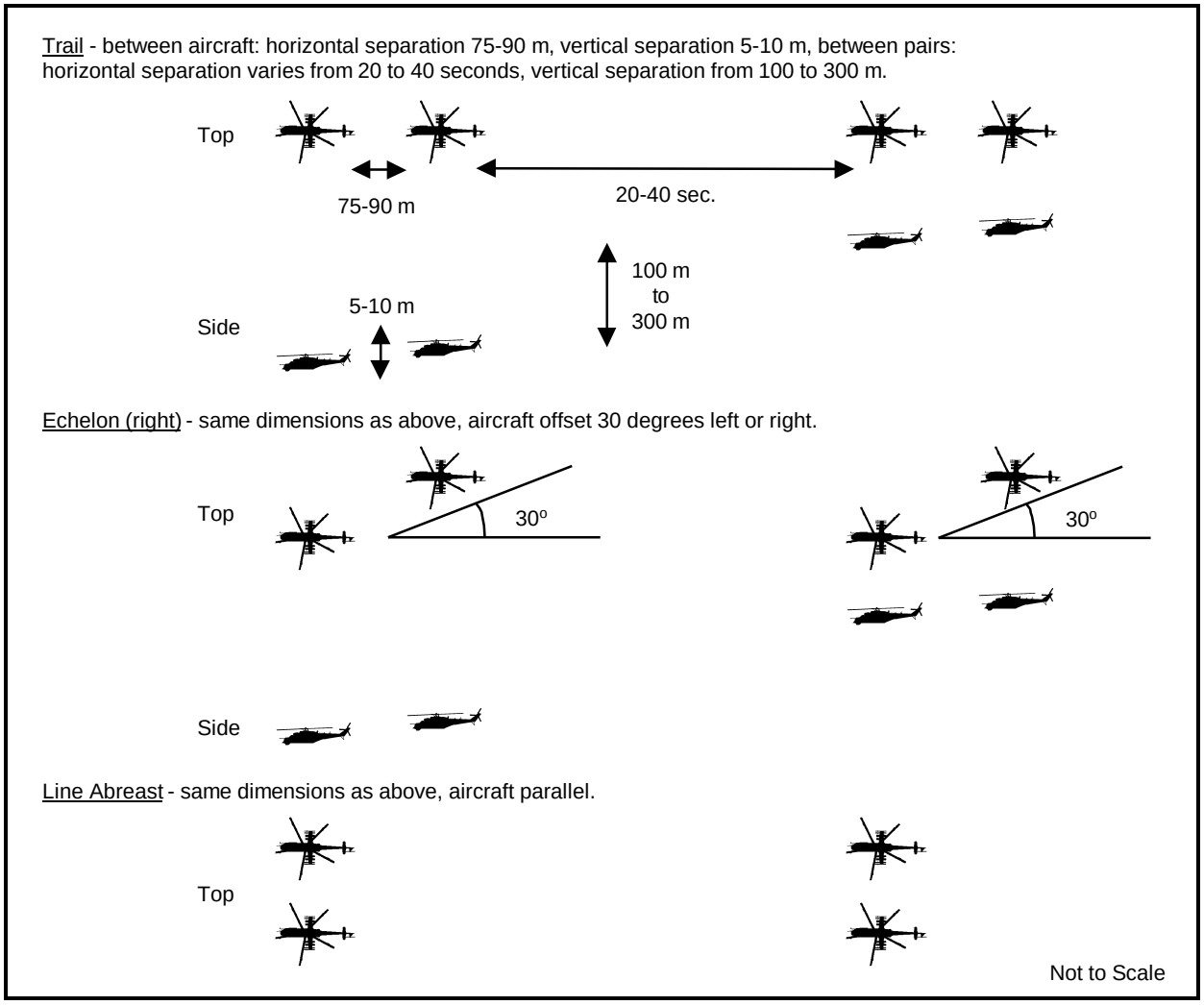


Figure 9-14. Helicopter formations.

Techniques

Much of the helicopter doctrine and employment techniques used worldwide are based on the capabilities and performance of the aircraft. These techniques manifest themselves primarily in the attack as varying airspeeds, hover abilities, and maneuverability. Other variables inherent to the battlefield environment dictate the use of helicopters.

The flight leader selects the appropriate attack profile for his formation as determined by the situation. Either a hovering fire or a running fire is employed. The design of some helicopters makes them more conducive to the employment of the hovering technique, versus other helicopters that may require a running technique. For example, two of the exact same helicopters flying similar profiles under the same atmospheric conditions may perform differently based on gross weight. One may be able to hover because of a lighter fuel load and no cargo. However, the other may have a full fuel tank and be loaded to its maximum gross weight. This would cause the latter helicopter to require a moving attack technique.

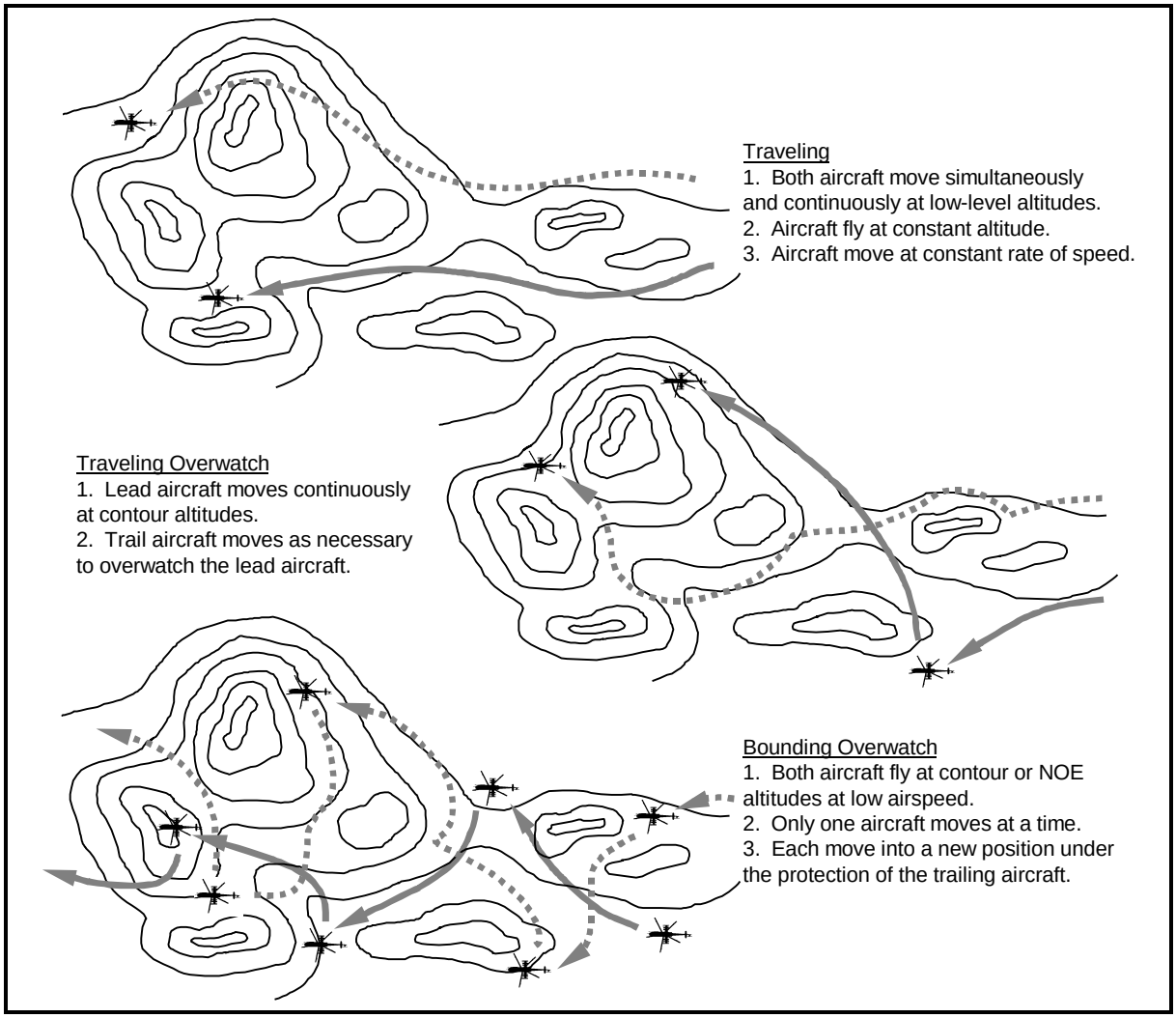


Figure 9-15. Helicopter movement techniques.

Approaching the AP from the IP, the flight leader may employ movement techniques based on the likelihood of enemy contact. The techniques are traveling, traveling overwatch, and bounding overwatch. See Figure 9-15 for additional clarification.

Hovering fire. Some helicopters cannot fire, or have difficulty firing, while hovering. This is generally due to the design of the helicopter, and its incorporated engines. The OPFOR employs hovering fire in the attack if the capabilities of the aircraft allow. APs are chosen so that surrounding terrain provides cover and concealment for fire support helicopters. They should also afford good, unrestricted fields of fire. The OPFOR attempts to engage the enemy at the maximum effective range of its weapons and before the helicopters are vulnerable to enemy air defense assets. These APs are near the supported ground force, within the range of friendly air defense assets, and within range of supporting artillery. This technique is primarily performed in daylight, since long-range target identification is difficult for the OPFOR at night or under periods of poor visibility.

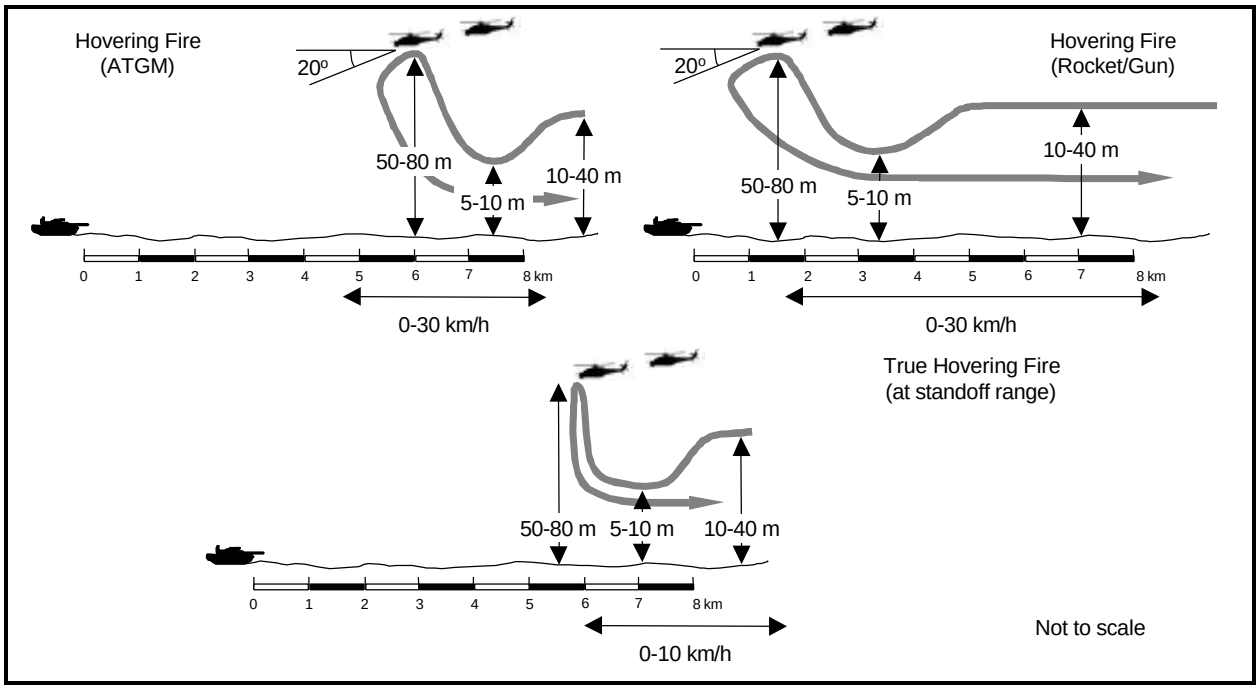


Figure 9-16. Hovering fire profiles.

In the APs, the aircraft form into the attack pair, and mask themselves behind covering terrain. They unmask vertically or horizontally, fire their ordnance, and then remask. Based on a quick battle damage assessment, the FAC then directs the aircraft to engage the enemy again or to disengage. Because the position was compromised, standard practice is to move to another location within the AP or to an alternate AP before firing again.

If their weapons afford them a greater standoff range than enemy air defense systems can range, fire support helicopters may even fire from higher altitudes at a hover. This allows them to employ their ordnance at the maximum range capable, and with a clearer shot at the target. This technique is preferred by the OPFOR in the defense rather than the running attack, and APs are chosen to provide flanking fire on advancing enemy formations.

Running attack. If not employing a static attack position with hovering fire, fire support helicopters can perform a running attack. They can attack as a flight or break down into pairs. Both simultaneous and successive attacks can be conducted from either one or two directions depending on the situation and target area.

Attacks begin with a high-speed, low-altitude run using the movement techniques from the IP to the AP. Once the AP is reached, the aircraft form into their attack pair, and the formation leader directs the helicopters to climb and acquire the target. When the target is identified, the helicopters execute a shallow dive toward the target and engage it. At the end of the firing run, all aircraft dive down and away from the target area, leaving at minimum altitude and again using terrain masking. The FAC then directs the aircraft to return to the same AP, a different AP, the IP, or a refueling point. If more than one pass is needed, helicopters may approach from another direction, or from the sun, to hinder visual identification. This type of attack is normally conducted during daylight. Yet, attacks using this technique can be conducted with the use of flares during darkness or periods of limited visibility if the target is illuminated. Target identification and engagement distances are shorter using this technique.

The straight-in attack profile can be used for both guided and unguided munitions delivery. This attack profile is flown with an altitude that is terrain-dependant and is characterized by an increase in altitude prior to weapons release in order to acquire line of sight to the target. Airspeed varies between 90 to 290 km/h. For rocket delivery, helicopter pairs acquire the target and enter a shallow dive, not exceeding 20 degrees, along the attack heading. The wingman generally maintains an echelon position behind the leader, and both aircraft fire their rockets 1,000 to 1,500 m from the target, disengaging as soon as the ordnance is expended. Disengaging the attack run features a descending turn in an attempt to remask. The disengagement turn is away from the wingman. This maneuver allows multiple pairs to attack the same target, with each pair covering the disengagement maneuvers of the preceding pair. Timing between pairs can be as little as 15 seconds, but is normally 20 to 30 seconds. The timing is dependent on the overall threat to helicopters, and their ability to cycle sorties into the target area. Total exposure time from attack initiation to remasking averages 15 to 30 seconds, dependant on if the target location is known, or if the pilots must search before acquiring.

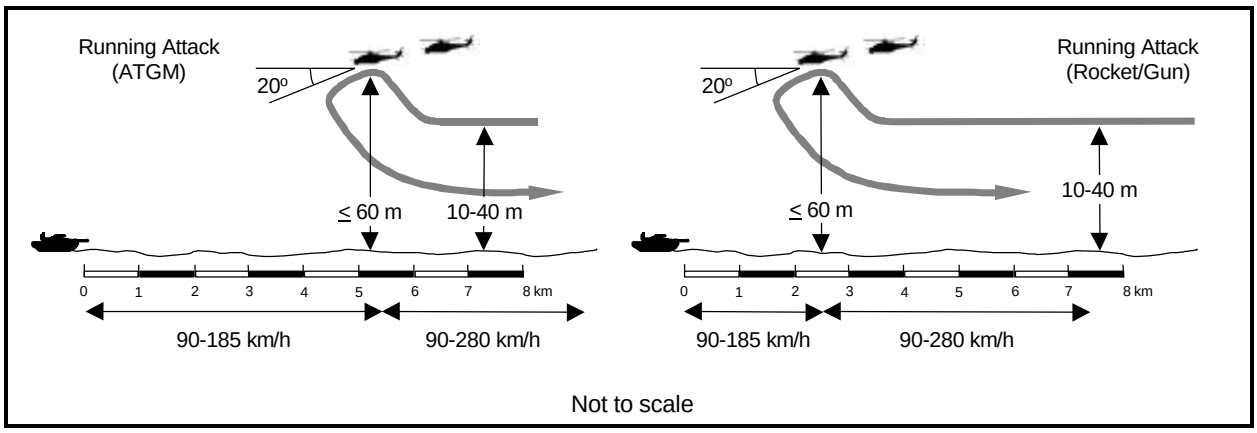


Figure 9-17. Running attack profiles.

The straight-in profile can be used to fire wire-guided ATGMs with some modification. Altitude on the approach may vary with terrain, but usually is within contour flight profiles. During the pass the pilot initiates the approach, while the weapons operator attempts to visually acquire the target and gain line of sight for the weapon system. Once the target is acquired, the helicopter must be kept on a stable flight path as the weapons operator tracks the target and fires the ATGM. Firing usually occurs from 3 to 8 km away from the target, depending on ATGM carried. After launch, the helicopter must remain stable to keep the target within the constraints of the operator's sights to maintain line-of-sight with the target. Minimum aircraft exposure times, at missile maximum effective ranges, are 10 to 25 seconds depending on whether the missile is wireguided or fire-and-forget.

Support Operations

Combat support and combat service support helicopters primarily perform preplanned missions to support the ground force commander. In this role, these helicopters are employed individually or in pairs across the width and depth of the battlefield. These aircraft fly to a LZ/PZ established by the supported ground force unit. It is carefully planned to ensure a landing area clear of debris and with minimal slope. The takeoff and landing direction is into the wind, and landing spots within the LZ/PZ are carefully marked to allow proper spacing and safe operating distances between each type of aircraft. The marked sites should allow for both larger and smaller helicopters to maneuver in the LZ/PZ without their respective rotor downwash interfering with the operation of each other.

An airfield or LZ/PZ without a dedicated air traffic controller would have an assigned air to air radio frequency. Inbound flights make a call "in the blind" on that frequency approximately 10 km away. In this radio call, the flight or formation leader states his intentions, requests information on the wind direction and the established landing direction, and passes all pertinent information like: number of aircraft and formation used, and loads carried. If other aircraft are already operating in the LZ/PZ, they return the call stating their intentions, size of helicopter, and their location and number within the LZ/PZ. They also notify the incoming flight of the landing and traffic direction in use, and the inbound flight adopts the same procedures.

Similarly, if the helicopter or flight is arriving at a specific unit's LZ/PZ, the flight or formation leader makes a radio call to the ground force point of contact on a predetermined frequency. The ground commander may delegate this duty to his ACE if the mission is to land near the CP; otherwise, a member of the headquarters section performs this duty. Regardless, neither the ground element nor the ACE has any positive control over the aircraft. Only the FAC, if not controlling fire support missions, can assume any positive control over the inbound aircraft. Another radio call is made 3 to 5 km away from the LZ/PZ. If there are no other aircraft operating in the vicinity, the helicopter unit commander or flight leader states his intended landing direction. Once communication is established with the ground force and landing is assured, the aircraft requests a frequency change with the VTDP, and continues with no positive air traffic control into the LZ/PZ.

On takeoff, similar procedures are followed. The flight leader announces his intentions to taxi and takeoff. If operating alone in the LZ/PZ, he can set his own procedures. If operating in conjunction with other aircraft, he uses the procedures already in effect. Another radio call is made to notify the LZ/PZ traffic the flight is clear by 3 to 5 km, and then again notifying of a frequency change, and clear outbound at 10 km.

Combined Operations

Coordinated use of airspace is a difficult problem. To facilitate control, fire planners employ fire support helicopters or fixed-wing aircraft after the completion of the artillery preparation. In such a situation, the helicopters have entrance and exit corridors parallel to, and between, artillery fire concentrations and under the trajectory of artillery rounds. The AGA assets do the same, using airspace procedural methods to deconflict the operation in proximity with helicopters.

Defense in particular is considered an excellent time to use combined operations of air assets. This presents the commander with an opportunity to combine fixed-wing ground-attack aircraft with fire support helicopters. These groups may be used against approaching enemy columns, to reinforce defending forces, or to block penetrations and envelopments.

Weather and Night Capabilities

Some OPFOR aircraft possess limited aerial night and adverse weather capabilities. Night-vision goggles or night systems are not regularly employed, yet the OPFOR continually improves techniques for air support operations in bad weather and at night. Although most aircraft are equipped for navigation during darkness and limited visibility, they are not equipped well enough to perform their tactical mission the same as if it were daylight. Night systems, infrared radar, or avionics upgrades are readily available for procurement on the open market. Regardless of modern systems capabilities, the OPFOR still expects pilots to navigate by land, search for targets visually, and determine distances to targets. The effectiveness of air support depends on the ability of aircrews to positively identify targets in prevailing weather and light conditions.

The OPFOR realizes that system upgrades and improvements are financially more attainable and easier to procure in smaller numbers. It also understands that every aircraft in the inventory does not require the modification. Similarly equipped units or higher-capability aircraft working in conjunction with unimproved aircraft can still present a definitive edge to OPFOR aviation and the ground force commander. Even a limited number of upgraded aircraft may have a significant impact on the battle.

Currently, flights in poor weather or at night are primarily conducted by helicopters, since they are routinely employed in marginal weather conditions, well below those acceptable to fixed-wing aircraft. They navigate through the use of instruments. This forces air assets to fly at a higher altitude and at slower airspeeds. Although this allows the OPFOR to accomplish missions in less than ideal conditions, it exposes the aircraft to greater danger. They are no longer afforded the cover and concealment of terrain, and may be unsupported by the direct fire coverage from friendly ground force units.

Older or unmodified OPFOR aircraft are not likely to have any night-fighting capabilities without the aid of artificial illumination. Artificial illumination is still not adequate to fire ATGMs using day-only visual sighting, although guns and rockets can be effective under these conditions. If employed, illumination (flares or illuminating rounds) is fired from artillery or aerial platforms to assist friendly forces in engaging the enemy during periods of darkness or limited visibility.

The use of precision munitions offers a higher probability of the ordnance hitting the target than conventional projectiles or rockets that have ballistic trajectories. Precision munitions may be used for surgical air strikes in minimal weather conditions against targets like bridges, small targets (weapon emplacements or armored vehicles), and specific buildings. OPFOR aircraft external stores racks may allow them to carry precision munitions, yet most aircraft do not have the systems to aim or deliver these weapons to hit their intended targets. They must be guided by other ground-based sources. Newer or recently modified aircraft may be able to deliver precision munitions in bad weather or at night.

NBC Considerations

Many OPFOR aircraft have an overpressurization system in order to fight in a NBC environment. This manifests itself on the battlefield by the unencumbered use of air assets and the unrestricted ability of aircrews in combat actions. It is possible, however, that aircraft refuel/rearm time and ground maintenance procedures may be degraded if the aircraft were flown into a contaminated environment, or if NBC conditions exist in the OPFOR rear areas.

If no overpressurization system exists in the aircraft, the crew can fly in personal NBC protective clothing. This limits visibility, target acquisition, pilot peripheral vision, communications abilities, responsiveness, aircrew coordination, and can cause a much increased aircrew fatigue factor. A noticeable degradation of aircrew and mission performance will occur over a shorter period of time. Aircraft refuel/rearm time and ground maintenance procedures are degraded if the aircraft are flown into a contaminated environment, or if NBC conditions exist in the OPFOR rear areas.

Other Missions

Aviation assets perform numerous other missions to support ground forces in combat and logistics roles. Many of these missions are performed by elements located at the operational or strategic level. However, tactical ground force commanders may feel their impact.

Counterair Interdiction

For the mission of countering enemy air interdiction, the OPFOR is heavily reliant on VTDPs as well as friendly air defense assets. OPFOR aircraft survivability and success in counterair interdiction missions depend on the ability of the VTDP network to identify enemy targets and redirect fighters in flight to the proper location at the most opportune time for a successful engagement. This mission primarily falls on the assets of the AGA, at the operational level. OPFOR ground force commanders may feel the effects of this, because assets needed to support counterair interdiction may detract from the ability of the AGA to support their tactical maneuver.

Helicopter air-to-air combat modifications are commonly available on the open market, and newer helicopters may be designed with the capability. Helicopters can employ from external weapon racks the same missiles used as surface-to-air missiles in the ground forces. Several ATGMs are able to engage other aircraft from aerial platforms, and mounted automatic weapons may also be employed. Helicopters equipped with such weapons may be the only forms of air-to-air engagement available to the tactical ground force commander.

Airlift/Transport, Airborne, Airdrop, and Aerial Resupply

Airlift/transport, airborne, airdrop, and aerial resupply missions are all fixed-wing transport aircraft missions that are performed by operational-level assets. They may, however, have impacts on the tactical ground force commander, by limiting his maneuver. For example, if a forward airbase or an airdrop site is set up by the army group commander to resupply adjacent tactical units, a large area is dedicated to the air forces for the mission. This area may present an obstacle or a restriction to the ground scheme of maneuver for the tactical commander.

Forward Arming and Refueling Point Operations

The flight services section of the combat helicopter regiment, and the service and support elements of the AGA divisions, have the personnel and equipment to establish FARPs. The OPFOR does not place as much emphasis on FARP operations as some nations. This is due to the lack of autonomous fire support helicopter strike missions that would require FARPs. Normally, the AAV employs FARPs, and AGA assets may employ them if the logistics requirements dictate.

The flight services section of the combat helicopter regiment, and the service and support elements of the AGA divisions prefer to establish FARPs on the OPFOR side of the forward edge to support helicopter operations. FARPs are placed near open areas to allow for landing sites, but with nearby terrain that affords cover and concealment from the enemy. FARP operations will move to an alternate site if compromised and may set up temporary or deception FARPs based on supporting the ground force scheme of maneuver. The combat helicopter regiment has the ability to place one FARP per attack helicopter squadron. The FARP includes 4 to 6 refueling points and an area for rearming. Under reasonable conditions, a flight of four aircraft can expect to be replenished with fuel and ammunition in 45 minutes. In maximum attack conditions, this time increases due to logistics constraints and a finite number of refueling points. Also, in adverse weather and at night, these times increase. Some aircraft may perform area security while others in the flight are refueled/rearmed. Upon completion of the air support, the FARPs are moved or removed, while aircraft recover to their assembly areas or rear airfields.

Chapter 10
Air Defense Support

The OPFOR system of air defense includes the strategic, operational, and tactical levels. This chapter concentrates on tactical-level air defense, and only a briefly mentions operational level assets and their role. More detailed information on those assets and air defense at the strategic/operational level can be found in Chapter 11, FM 100-61. The goal of the tactical air defense system is to reduce the effectiveness of enemy air attacks preventing enemy air action from disrupting the activities of ground forces.

INTEGRATED AIR DEFENSE SYSTEM

Air defense effectively supports the concept and requirements of combined arms combat. A large number and variety of weapons and associated equipment integrated into a redundant air defense system best accomplish air defense.

Concepts

OPFOR air defense doctrine emphasizes the importance of two key and interrelated concepts. The first is that air defense is an integral part of combined arms combat. The maneuver unit commander who disregards the enemy air threat or fails to properly plan for defending against it risks mission failure.

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The second concept is that air defense weapons, radars, and associated equipment cannot be regarded as single pieces of equipment or even units engaged in combat actions but as parts of an integrated system of air defense. Proper integration of these assets as both a system and integral part of planning and execution for mission accomplishment is the only way the commander can effectively deal with the enemy air threat.

Essential to integration and successful employment is the use of three phases. The first includes all actions taken to destroy enemy aircraft before they are employed. Aviation, surface-to-surface missiles (SSM), special-purpose forces, and artillery are used to destroy air command and control facilities, aviation support facilities, and the enemy's aircraft while they are still on the ground. This phase is conducted using primarily army group and army assets. The second phase aims at destroying enemy aircraft while in flight and before they enter the airspace over OPFOR ground maneuver forces. Interceptor aircraft and long- and medium-range surface-to-air missiles (SAMs) conduct this phase of the air defense. The third phase entails the destruction of enemy aircraft that have penetrated into the airspace over OPFOR ground maneuver forces. Tactical fighters, short- to medium-range SAMs and antiaircraft (AA) guns and other weapons of the ground maneuver units execute this phase. It is important to emphasize that, while these phases may begin sequentially at the initiation of hostilities, they are not wholly distinct and are normally conducted concurrently.

The intent is for air defense forces at all levels of command to create a continuous, unbroken umbrella of air defense coverage. Radars are used to provide a detection envelope extending well into enemy territory and across the entire zone of responsibility. An integrated communications system is established to provide target information and early warning to air defense and ground maneuver units. Commanders should be flexible and prepared to use nonstandard solutions to prevent gaps from developing during combat. The objective is to deny enemy aviation the ability to interfere with ground maneuver units. Air defense forces can accomplish this either by destroying enemy aircraft or by forcing them expend their munitions beyond effective range or diverting their aircraft before reaching their targets. Figure 10-1 illustrates an example of the vertical coverage and one dimension of horizontal coverage provided by OPFOR air defense systems. The example systems are illustrative of a principle. The actual systems and their capabilities can vary.

Principles

The OPFOR follows several basic principles when conducting air defense: surprise, firepower, mobility, continuity, initiative, coordination, and security. Of these, the element of surprise is the most critical.

Surprise

Achieving surprise is fundamental to any successful air defense battle. The OPFOR is aware of the potential physical destruction it can achieve by attacking an unsuspecting and unprepared enemy. The OPFOR is also aware of the psychological effects of violent and unexpected fires on aviation crews. These effects are often only temporary, but at critical moments, they can reduce the effectiveness of aircrews preparing to attack.

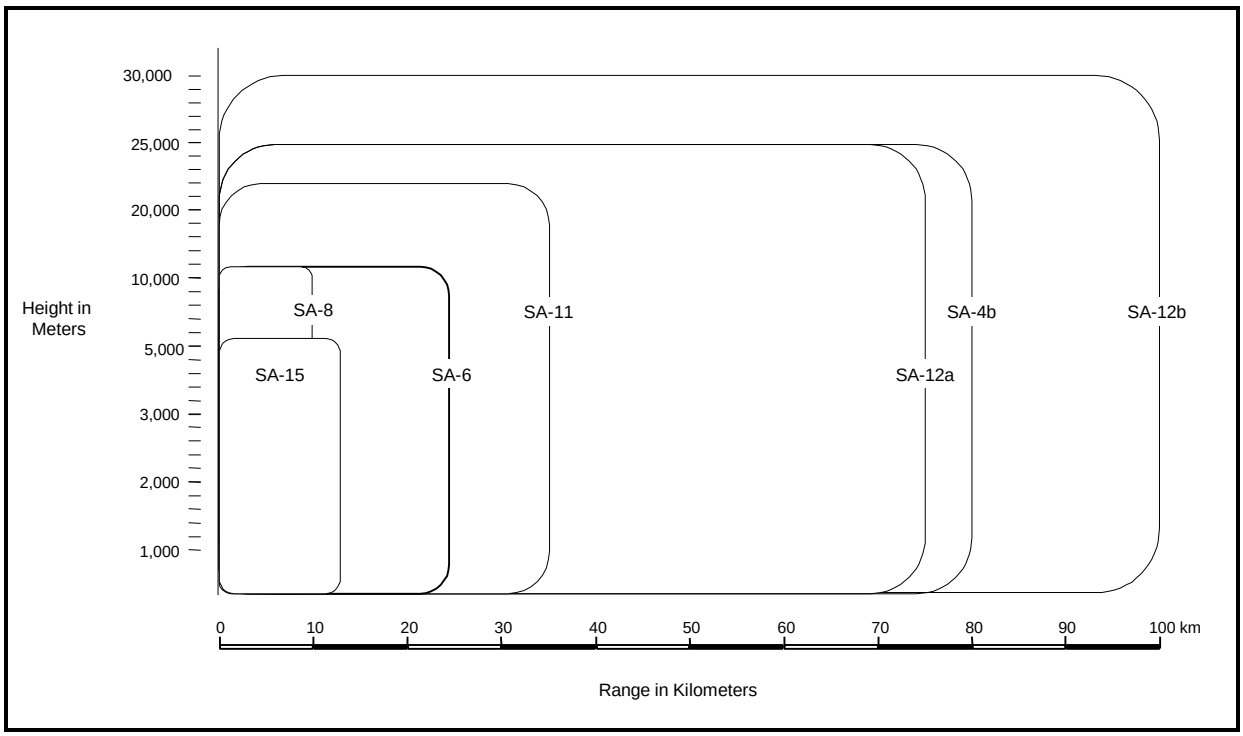


Figure 10-1. Air defense coverage (example).

The element of surprise is also increasingly important because of modern technological advances. The speed and evasiveness of modern aircraft reduce engagement times. Modern aircraft also have a great amount of firepower with which to suppress air defenses. These two factors make it necessary for units to achieve some degree of surprise.

Of course, the air enemy also is trying to achieve surprise, and the OPFOR must give careful consideration to how he might exploit the terrain in making a concealed approach. The principle of surprise is also important in the wider context of denying the enemy's intelligence organization an accurate and comprehensive picture of the deployment of air defense radars.

Firepower

The OPFOR force structure includes a wide variety of air defense weapons (both missiles and guns). This mix of capabilities gives ground force commanders outstanding firepower for air defense.

Mobility

When planning air defense, the commander must always consider the mobility of air defense weapons and the time required for their deployment. The ground forces, for which air defenses provide cover, are quite mobile and frequently change formation as they deploy. The air enemy is mobile and can attack from many directions or altitudes. Therefore, the commander must use to the maximum the mobility and firepower of his assets, creating optimum groupings and fire plans.

Continuity

Air defense forces must provide continuous protection of critical organizations and assets. Only constantly moving air defense units that have adequate logistics support can ensure comprehensive coverage. They must provide air defense day or night in all weather conditions. Mobility contributes directly to continuity.

Initiative

The modern battlefield is a fluid and volatile environment where air defense unit commanders must respond to constant changes in the situation. This demands aggressive action, initiative, and originality. Commanders must operate efficiently when communications with other air defense units fail. If the supported unit receives a modified mission, the commander must reevaluate his own unit's deployment in light of the new requirements. He also must be aware of changes in the tactics enemy air forces employ.

Coordination

The OPFOR stresses coordination between supported maneuver and supporting air defense units and between air defense units. It views air defense as a single system composed of various parts. All division-level air defense weapons must coordinate precisely with flanking units and with operational-level air defense, and with aviation. Failure to coordinate can result in gaps in the air defense umbrella, excessive ammunition expenditure, and casualties to friendly air forces. To achieve efficient coordination, the OPFOR stresses centralization, with army group headquarters playing a key role as a land-air interface.

Security

The OPFOR recognizes that enemy air assets can attack from any quarter. Therefore, it must provide security for units at any depth and from any direction. Air defense must function with unremitting reliability and overall security. This requires careful deployment, uninterrupted ammunition supply, and a comprehensive early-warning system. Commanders must factor security into air defense planning.

ASSETS

The OPFOR inventory of ground-based air defense weapons includes a variety of missiles, guns, and support equipment. There are air defense weapons at every organizational level from army group through maneuver company. The OPFOR has large numbers of surveillance and target acquisition radars.

The majority of air defense surveillance radars are concentrated above division level. Since OPFOR air defense is so closely integrated at various levels of command, it is difficult to discuss air defense assets without some examination of those systems found at the army group and army level.

Army Group

Regardless of the number of armies/corps, an army group will normally include an early warning regiment or brigade, two long-range SAM brigades, an air defense division, an air defense jamming regiment, and an air army. Of special note is the early warning regiment and brigade. The key difference between the two is that the regiment normally has three early warning battalions while the brigade has four. The air defense division's structure, that is the number of SAM brigades and AA gun regiments it will have, corresponds directly to the number of armies/corps assigned to the army group. See FM 100-60 for more information regarding air defense assets at army group level.

Army-and Corps

Armies contain a long-range SAM brigade and an early warning battalion while the corps has the long range SAM brigade but no early warning battalion. See FM 100-60 for more information regarding air defense assets at army and corps level.

Division and Separate Brigade

Most maneuver divisions contain a SAM regiment. The regiment is fully capable of providing air defense coverage for the entire division. It consists of four to five missile firing batteries and a target acquisition and early warning battery. In some cases a division may be equipped with an AA gun regiment which consists of four AA gun batteries and a fire control battery. The separate brigade air defense battalion is a particularly unique organization. It contains three SAM batteries, a self-propelled AA battery, and a shoulder-fired SAM battery. Like the divisional SAM regiment, it too is capable of providing air defense coverage for the entire organization.

Divisional Brigade

Divisional tank brigades (TBR) and mechanized infantry brigades (MIBR) contain an air defense battalion or battery**.** The air defense battalion is composed of a self-propelled AA battery, a shoulder-fired SAM battery and can include a short range SAM battery. The self-propelled AA battery may be equipped with gun-missile systems. When the brigade has an air defense battery rather than a battalion it includes a SAM platoon and a self-propelled AA-platoon. This platoon can be equipped with gun-missile systems. When the brigade is configured with an air defense battery, the mechanized infantry battalions (MIBN) have an organic platoon of shoulder-fired SAMs.

Battalion

In those maneuver brigades that have an organic air defense battery, rather than a battalion, the MIBNs have an organic platoon of shoulder-fired SAMs. Brigades organized with an air defense battalion have no organic air defense units in their maneuver battalions. Each organization type has advantages and disadvantages.

The air defense battalion has all of the brigades shoulder-fired SAMs organized in a battery. This gives the brigade commander the flexibility of assigning those assets where he believes they will best support the mission. Brigade commanders with organic air defense batteries have less flexibility since all the shoulder-fired SAM units are with the maneuver battalions. The TBN, in either brigade type, has no organic air defense units but tanks are equipped with turret mounted AA machineguns.

Other Assets

There are a number of systems throughout the maneuver division, which are designed for air defense or that can be employed in an air defense role. The heavy machineguns on tanks are specifically designed for air defense. Antitank guided missiles (ATGMs) fired from tanks can be effective against low-flying rotary-wing aircraft. Artillery and small arms are an integral part of the air defense scheme.

COMMAND AND CONTROL

While the OPFOR combines ground based air defense assets with fixed-wing aircraft forces to provide integrated air defense coverage to ground forces, there is also an increasing requirement to coordinate with other arms to take advantage of assets that can support air defense. The complexity of the battlefield and its fluid nature is not restricted to the ground battle and there is a greater requirement than ever for effective airspace management. The OPFOR recognizes the need for various air defense forces to adopt a common terminology. It also stresses the need for operations conducted with a single integrated plan under unified command and control (C^2).

Centralization versus Decentralization

Air defense C^2 relationships are subject to conflicting pressures for centralization and decentralization. Factors favoring the former include greater efficiency and effectiveness of centralized target detection systems and the increased ranges of modern SAM systems. Factors favoring the latter include the need for flexibility to support fast paced operations by maneuver units and the many contingencies that can arise in local situations.

Centralized control is necessary, especially during defensive operations, to ensure that the coverage of air defense units is mutually supporting and comprehensive. At the same time, decentralized control is required as OPFOR air defense commanders are expected to demonstrate aggressive action and originality, responding to changes in the tactical situation and operating effectively when cut off from communications with other air defense units.

Duties and Responsibilities

There is a chief of air defense at each level of command from army group through maneuver brigade. At division and maneuver brigade the chief of air defense is also the commander of the air defense unit at that level.

The duties and responsibilities of the chiefs of air defense in these organizations are similar, especially at army group, army and division:

- Organize, plan and conduct the air defense of the organization.
- Prepare recommendations on the employment of air defense assets during the commander's decision-making process.
- Know the situation, status and capabilities of air defense units at any stage of the battle.
- Issue orders to air defense units and staffs of subordinate units.
- Direct the regrouping of forces during the battle.
- Coordinate logistics support of air defense units.
- Establish coordination between air defense units.
- Organize communications.
- Organize airspace management and reconnaissance.
- Monitor the execution of orders, assist subordinate units/staffs.

Although air defense is, in fact, directed by a chief of air defense at all levels above the maneuver battalion, it is the unit commander who is responsible for the success or failure of these operations. For example, during the planning phase, the division commander (assisted by the chief of air defense) personally directs the deployment of his air defense weapons to support his mission, lays down the coordination lines, and establishes priorities and procedures for logistics support. At the maneuver battalion level, where there is no chief of air defense, the maneuver battalion commander has overall responsibility for the organization and conduct of air defense.

The army group commander plays a major role in the control of air defense assets of his subordinates. He may direct some assets be used to augment the air defenses of army/corps. He may direct that other assets be used to provide army group-wide coverage of gaps between armies/corps. There may be situations when army or even army group will specify how divisional maneuver brigades employ their air defense batteries. The division can dictate how maneuver regiments employ their air defense batteries. Finally, the maneuver brigades air defense commander has overall responsibility for the coordinated air defense coverage and administrative control of the shoulder-fired SAM gunners organic or attached to the maneuver battalions.

Command Posts and Communications

The division chief of air defense and his staff normally colocates with the division staff at the division main command post (CP). Also located there is the aviation control group with whom he closely coordinates for airspace management. (See Chapter 9 for additional information on airspace management.) An air defense officer is located at the forward CP to represent the chief of air defense and advise the division commander.

The division air defense regiment has a target acquisition battery that includes surveillance and height-finding radars, identification friend or foe (IFF) interrogators, communications vehicles, and CPs. The surveillance section of the battery provides redundancy in that it can take over the CPs function in an emergency.

The basic rule for the establishment of communications between supported and supporting unit is that the higher command allocates landline, radio relay, and mobile communication means, while radio equipment is allocated by both higher and subordinate levels. This ensures proper coordination of communications. If communication is lost, the commanders and staffs of all units involved are responsible for the immediate restoration of communication. An air attack and NBC warning communications net is established to warn maneuver units, the staffs, and logistics units of incoming enemy aircraft. The warning is communicated through signal equipment that is specially allocated for this purpose.

RECONNAISSANCE

Reconnaissance is a perfect example of the systematic approach the OPFOR takes in conducting air defense. Although this chapter primarily addresses ground-based air defense at the tactical level, ground-based and airborne reconnaissance assets at the operational level play a major role in gathering, integrating, and disseminating information to tactical units. The principal objective of reconnaissance is to establish a system that not only provides the earliest possible warning of approaching enemy aircraft but also develops target information for planning and conducting the air defense. The OPFOR concept of air defense reconnaissance includes terrain reconnaissance and air surveillance.

Terrain Reconnaissance

Both the commander of the supported maneuver unit and the commander of the supporting air defense element usually conduct terrain reconnaissance. A preliminary map reconnaissance can tentatively identify positions for deployment of air defense weapons in defensive areas, along routes of march or in areas to be seized by advancing forces. See also Movement of Air Defense Units in this chapter. Significant emphasis is placed on identifying all potential attack routes for low-flying enemy aircraft of all types. Routes of approach suitable for armed helicopters and positions from which these helicopters might fire ATGMs are of special concern, since the OPFOR considers such helicopters an especially serious threat to ground maneuver units.

Air Surveillance

Air surveillance is conducted by radar, radar and radio direction-finding equipment, electro-optical means, and by visual observation. Radar is used for technical surveillance, providing an all-weather detection capability. Radars fall into the general categories of surveillance and fire control. Surveillance radars include early warning, target acquisition, and height-finding radars. Some fire control radars also have a limited target acquisition capability.

Air defense planners at all levels integrate radars into an overall system of coverage. Army early warning battalions typically deploy their radars 10 km or so from the forward edge. This gives them the ability to detect medium- and high-altitude targets up to 160 km or more in the enemy's depth and low-flying aircraft out to 80 km or more.

Battalions of the army group's early warning regiment or brigade establish a second line of radars posts about 50 km behind the first to give depth. Obviously, these example distances vary with the type of systems employed and their capabilities. Preliminary target data is passed from these higher-level radar units to air defense commanders and their firing batteries; this practice reduces the vulnerability of battery radars and radar-equipped gun carriages and missile launchers to electronic countermeasures. Ideally, only those aircraft that have been positively identified as hostile will be engaged.

Despite the presence of a technologically advanced early warning system, the OPFOR continues to stress the importance of visual surveillance. An effective system of visual surveillance may often provide the first warning of an enemy air attack, especially one conducted by armed helicopters using nap-of-the-earth techniques. This is especially true at the small unit level. Air observers are posted in all units when operating close to enemy forces or in areas where enemy air attack is considered likely. In the defense, posts are set up at suitable locations, usually on terrain offering good visibility, near CPs, and/or close to air defense units in firing positions. During road marches and during both the defense and offense, observers are posted on each vehicle. Observers are changed frequently to reduce fatigue and maintain their effectiveness.

Visual air surveillance is conducted on a 360° basis, and observers are assigned sectors of airspace to monitor. An observer assigned a 60 to 90° sector can detect an aircraft at ranges from 2 to 5 km while one assigned a 30° sector can detect an aircraft out to 7 km. The use of binoculars can increase these ranges to 12 km and the use of more sophisticated optical rangefinding equipment gives the observer the capability to spot aircraft flying at high altitudes out to 50 km. These distances, of course, are affected by terrain configuration and lighting conditions.

The information required by air defense units is divided into two categories. The first category includes all data from which a determination of probable enemy air actions may be derived. These data are necessary for planning and organizing the air defense system. Included in this category are-

- Basic methods of the combat capability of enemy aircraft.
- Tactical-technical characteristics and combat capability of enemy aircraft.
- Composition and strength of enemy air power.
- Locations of forward arming and refueling points (FARPs).
- Avenues of low-level flight.
- C^2 sites.
- Potential armed-helicopter firing positions.

The second category includes data on which to develop a clear picture of the air situation and determine the enemy's plans, air order of battle, and strike objectives. These data are needed to conduct the air battle (assign targets to fire units, reposition units, etc.). Included in this category are the exact coordinates (which change constantly), types, numbers, direction, speed, and altitude of aircraft in flight. The determination of the first category of information is a joint responsibility of all reconnaissance elements, and the second is the specific responsibility of air defense reconnaissance elements.

MISSION ASSIGNMENT

Whatever the nature of combat being conducted by maneuver forces, the actions of supporting air defense units are, as the term implies, inherently defensive. Assigning specific missions to air defense units requires an understanding of the types of missions, the planning considerations involved, and the engagement procedures used to achieve mission accomplishment.

Missions

The primary mission of OPFOR ground-based air defense systems is to protect maneuver units and installations from attack by fixed- and rotary-wing aircraft, thus reducing the availability of enemy air assets to influence the development of the ground battle. As part of the overall air defense effort, these forces also perform a variety of other missions, including the following:

- Timely detection of incoming aircraft, continuous tracking of airborne targets, and warning troops of airborne targets.
- Protection of the immediate rear with a primary emphasis on protecting targets that play key roles in supplying troops.
- Destruction of enemy reconnaissance aircraft.
- Destruction of airborne/air assaults during overflight, airdrop, or landing.
- Prevention of deeper penetration by enemy aircraft, in cooperation with adjacent air defense elements.
- The prevention of reinforcement or resupply of encircled enemy forces.

Mission Planning and Employment Considerations

Missions are assigned to air defense units after detailed studies are made of the role and features of the defended unit or area. Assignment of an air defense mission normally is based on the availability and technical characteristics of air defense units. Consideration is given to-

- The effective range of the air defense unit's specific weapon system. If the effective range does not exceed 10 km, the air defense unit is not assigned a mission covering 30 km. The same applies to altitude; a unit of small-caliber AA guns is not assigned a mission of independently protecting an object that can be successfully hit by an airstrike from altitudes over 2,000 m.
- Effectiveness of fire of an air defense unit's weapon usually is described by its probability of destroying an air target. If the probability is small, the object may be covered by several air defense elements.
- If enemy aircraft are capable of striking the object during any weather condition, units without fire control radar are not capable of providing adequate air defense.
- An air defense system chosen to defend a given object must have at least the same mobility as the object defended.
- The availability and capability of early warning/target acquisition radars, their weapons electronic jamming and electronic protection measures ability, and their operating requirements.

The essence of an air defense unit's combat mission can be expressed in two words: "to cover." Combat orders indicate the combat units to be covered, as well as the starting time and duration of the air defense mission. Also given are the degree of readiness and procedures for conducting fire, procedures for organizing early warning/target acquisition and communications, routes of movement to the fire or launch position area, coordination between ground troops and friendly aviation, control, communications, logistics, and other applicable instructions.

The characteristics of the objects to be defended are the determining factors in the tactical employment of air defense units. Primary among these are the combat function and location of the defended unit or object. This is determined primarily by the role and location of ground combat units, logistics units, and the current tactical situation. Other factors have a considerable influence on a decision as to the type and quantity of air defense units assigned, such as—

- Sensitivity of the target. A fuel dump is more sensitive to airstrikes than a fuel depot. A mountain road is considerably more critical than a road on a plain, since damage to the road surface would forces troops to halt in the first case, but not necessarily in the second.
- Geometric dimensions of a target. The larger the target, the greater the probability of its being hit. If a target's dimensions are large, it can be attacked from horizontal flight at medium-to-high altitudes. In most cases, targets of smaller dimensions would be attacked from very low altitudes or by diving aircraft.
- Mobility of a target. Targets maneuvering on the battlefield are harder to locate and attack than are fixed targets. The enemy will, therefore, most likely attempt to destroy them immediately upon detection. Stationary or immobile targets are not necessarily subject to airstrikes immediately upon their detection, but as the tactical situation warrants.
- The possibility of attacking aircraft locating a target in various kinds of weather and at night. Reference points on the approaches to, and at the target's location, can be used for navigational fixes to more accurately acquire the target.

The tactical importance of units and facilities is not constant but changes during the course of combat as assigned missions are accomplished. For example, the role of a battalion advancing in the first-echelon along the main axis and that of a battalion removed to the second-echelon are not of equal importance with respect to successful accomplishment of the combat mission. Also, a river-crossing site loses value after the main body of troops has crossed it. There is a systematic reappraisal of the role and function of combat units and support facilities in accomplishing the overall mission of air defense units. In certain cases, there may be insufficient air defense assets to cover all targets. In those cases, air defense units are relieved from covering targets that have become of secondary importance and are assigned to cover new, more important targets to ensure the ability of the combined arms forces to complete their missions without interference from enemy air action.

Air defense planning is not strictly limited to considerations for the employment of air defense systems. The air defense commander should view planning for air defense as pulling together all aspects and potential contributions of other arms to supplement and complement the air defense plan It also includes coordination with other arms. Airspace management is one obvious requirement; however, there is also the need to identify likely air avenues of approach and hovering sites for enemy rotary-wing aircraft. (See Chapter 9, Air Support.) The hovering sites would be submitted through artillery channels as preplanned targets available on-call. Similar coordination is also required with electronic combat elements and engineers.

Engagement Procedures

Aircraft posing the greatest threat are engaged on a priority basis. Aircraft are engaged with as many weapons as possible and in the shortest time possible to achieve the greatest destructive and deterrent effect. The preferred engagement technique is to continue firing at an already engaged target rather than to switch from target to target, unless a later-acquired target seriously threatens the air defense unit itself or a high-priority target. The OPFOR would rather engage an enemy aircraft prematurely and waste some ammunition than wait too long and allow the aircraft to gain a favorable attack position. Aircraft are fired on as long as they remain within range. Air observers and weapons crews outside the attacked sector maintain continuous observation and readiness to fire in order to prevent the enemy from conducting a successful attack from several directions simultaneously.

The OPFOR emphasizes that air defense units do not have to destroy aircraft to accomplish their mission, although such destruction is obviously desirable. The mission is accomplished if air defense units prevent enemy aircraft from conducting successful air activities. For example, air defense units can force enemy aircraft to break off their attacks or to expend their ordnance inaccurately without having to destroy the aircraft. In fact, the mere presence of active and effective air defense weapons systems can reduce the effectiveness of enemy air activities by forcing aircraft to avoid the systems or to operate using less than optimum procedures.

EMPLOYMENT TECHNIQUES

The details of the employment of air defense assets are not templated, carbon copy solutions. Employment options depend on several factors, some of which are the—

- Missions assigned.
- Scale of the missions.
- Availability and capability of systems.
- Enemy air order of battle.
- Priority of the protected target.
- Conditions under which combat is waged and the type of combat.
- Specific terrain and meteorological conditions.

Whatever the nature of operations conducted by maneuver forces, the actions of supporting air defense units are, as the term implies, inherently defensive. They must prevent enemy aircraft from successfully attacking maneuver forces engaged in either offensive or defensive operations.

Movement of Air Defense Units

Where time permits, alternate positions are reconnoitered and prepared in advance. Ideally, major movements are conducted at night or in adverse atmospheric conditions. The OPFOR seeks to maintain effective air defense coverage by ensuring that not all elements relocate at the same time, leaving one or more firing batteries in their positions to provide coverage while others move.

If the air threat is not imminent, the air defense unit may move separately to its new position. In this case, the air defense battery commander usually conducts an initial map reconnaissance and designates the march route and tentative firing positions in the new area. He sends out a reconnaissance patrol that normally consists of one of the firing platoon leaders, several soldiers and a vehicle. This patrol conducts route reconnaissance, identifies temporary firing positions along the march route, and conducts limited NBC reconnaissance. The reconnaissance patrol then confirms the suitability and location of the new positions. The reconnaissance patrol can operate as part of a supported maneuver unit's reconnaissance patrol, as part of the reconnaissance patrol of the next higher air defense unit, or it can carry out its mission independently.

Ideally, every air defense unit should have two to three alternate positions; movement to them can be carried out at night or under conditions of limited visibility whenever possible. Air defense units would most likely move to alternate positions immediately after reconnaissance aircraft have overflown their current position, after an airstrike has been repulsed, or after units have been at a single position for an extended period.

For divisional air defense assets, this extended period of time would consist of approximately 4 to 6 hours, after which they would move to alternate positions. This time could obviously be reduced in high air/precision weapon threat environments. In some cases, given the systems' capability to do so, moves could take place as often as every 10 minutes. For more information see Passive Air Defense Measures.

The total time for movement of air defense units includes the time for leaving the position, conducting the march to the area of the new position, and occupying this position. It is the mission of commanders and staffs to reduce this time to the minimum, since during this period the unit is removed from battle. However, a necessary condition for air defense effectiveness is the destruction of enemy aircraft on the approaches to the supported units (before the mission accomplishment line). This must be taken into account, along with survivability considerations, when determining the frequency of changing positions. The procedure and time periods for movement, and occupying and preparing positions, are determined during planning for combat.

Local Security and Self-Defense

Since army group and army assets are located farther to the rear, the requirement for protection against enemy attack is much less than for units at lower levels located much closer to the forward edge. Air defense units at division and below are usually deployed close to enemy ground forces, where vulnerability to both ground and air attack is significantly greater. Self-defense against air attack is accomplished through the use of the unit's primary weapons and small-caliber AA guns and shoulder-fired SAMs.

Units equipped with AA guns can defend themselves against ground attack, to some extent, through the employment of their systems in a direct fire role. Personnel armed with light antitank weapons can augment local ground defense capabilities. If SAM batteries are threatened by ground attack they can move to more secure positions without seriously degrading their capability to continue their primary mission.

Air Defense of March Columns

The OPFOR anticipates that units conducting marches may be subjected to intense attacks by both fixed-wing ground attack aircraft and armed rotary-wing aircraft. They also recognize that these attacks can occur anywhere on the battlefield, including deep in the rear. Accordingly, units engaged in movement are protected by their organic assets and in many cases, are allocated additional air defense assets from their parent unit.

In general, air defense units are integrated into march columns and are ready to fire. Many SAM and AA gun systems can be fired on the move; however, stationary engagements are preferred. SAM units that require setup time may move along separate routes in "leapfrog" fashion, alternating moves by platoon or battery. March columns also receive air defense coverage by air defense units of higher echelons and possibly adjacent units. Therefore, in the interests of secrecy, air defense radars and associated communications systems of the moving unit are placed in a standby and receive-only mode, respectively, unless absolutely required to engage enemy aircraft.

Enemy air attacks are considered particularly likely at obstacles (e.g., river crossings) or at chokepoints (mountain passes, defiles, or places where off-road movement is restricted, such as in swampy areas). To ensure air defense coverage of such areas, a portion of a unit's air defense weapons may be dispatched ahead of the main body to deploy in and around the obstacle to provide effective coverage for the passage of the main body, while the remainder is spread throughout the parent unit's column(s). The proportion of air defense assets dispatched ahead of the main body depends on the situation. If adequate coverage of the main body can be maintained by higher-echelon and adjacent unit assets, then the entire air defense unit may be sent forward of the parents unit's formation. Alternatively, individual batteries or sections may be sent ahead of the parent unit's main body. If the restricted terrain area is of such size as to exceed weapon/sensor coverage of the air defense weapons, then air defense elements may "leapfrog" ahead of each other to provide continuous coverage for the parent unit.

Reconnaissance and air surveillance are vital to protecting columns from air attack. Air observers are posted on all vehicles, and air defense elements, including shoulder-fired SAM gunners, remain ready to engage targets at all times. As in other tactical situations, shoulder-fired SAM gunners are assigned specific sectors of observation and fire to preclude several gunners engaging one target. Vehicle-mounted weapons are also employed. For example, heavy machineguns on tanks are specifically designed for this purpose; missile-firing tanks have a capability against rotary-wing aircraft.

If the tactical situation requires and terrain conditions permit, surveillance/target acquisition radars may be set up at suitable locations adjacent to the march routes to provide continuous radar coverage. Additional radars from the division's air defense regiment may be employed if increased radar coverage is desired. Two radars are usually used to ensure continuous coverage. Only one radar moves at a time. If the commander determines that the additional radars need not be employed during the march, one is placed with the advance guard and one with the main body of the unit; both are kept ready for rapid employment.

Brigade air defense weapons play a major role in the defense of units making tactical marches. These systems are normally employed in mutually supporting pairs. System range determines the distance that can be maintained between them. The systems must also ensure that they maintain sufficient distance from other vehicles (normally 50 m or more) to ensure an unobstructed field of fire in engaging low-flying aircraft. Whenever a column stops, even for brief periods, brigade systems pull off to the side of the road with the rest of the column and remain ready for action.

Brigades marching independently or in the lead of a division march deploy an advanced guard. Deployment of the brigade's air defense assets when marching with an advanced guard varies with the air threat to the march column, assets provided by the division, and coverage provided by units occupying the area through which the brigade is marching. As a minimum, the brigade allocates one platoon of AA guns or gun-missile systems and a platoon of shoulder-fired SAMs to the advanced guard. In those gun or gun-missile batteries containing three platoons of two systems each the commander could allocate three systems by splitting a platoon. In high air threat situations, especially those where significant obstacles may be encountered, the entire gun or gun-missile battery could be allocated to the advanced guard.

Battery personnel who are not operating with the firing platoons may be directed to engage enemy aircraft with small-arms fire. In some circumstances, a column may continue to move while the air defense elements halt to engage enemy aircraft. This is not the recommended course of action, because it leaves the supported unit with reduced or no coverage while the elements are engaged and while they are trying to catch up with the column.

Air Defense Ambushes and Roving Units

The OPFOR recognizes the disproportionate effects that sudden, unexpected destruction of an aircraft or small group of aircraft can have can on enemy tactics and morale. For example, the surprise destruction of one or two lead aircraft on what the enemy perceived to be a clear avenue of approach, could cause an enemy airmobile assault to be called off or seriously disrupted. Air defense ambushes may set up at temporary firing positions to surprise and destroy enemy aircraft and disorganize enemy fixed-wing aircraft and rotary-wing operations. Ambushes and roving air defense units can cause the enemy to believe that significant air defense units are located in areas where actually there are only a few weapons. This can reduce the effectiveness of enemy reconnaissance and the likelihood of enemy air attack in the area concerned. Tactical air defense ambushes usually comprise a single AA gun or SAM weapon, section, platoon, or battery with the mission of engaging enemy aircraft from a hidden or unexpected position.

Air defense ambushes are placed on secondary and tertiary air avenues of approach, along flanks, forward, behind and in gaps between units. Often they are placed in terrain that offers poor fields of observation and fire "window shots." Ambushes can be placed in valleys or defiles likely to be used as ingress/egress routes by infiltrating aircraft, or placed on adjacent heights to shoot down onto them; or placed just behind a crest to catch aircraft from behind as they clear a ridge. Single launcher shoulder-fired SAM ambushes may be set up on wooden platforms built in treetops to catch aircraft flying over a forest.

In urban areas, AA guns or blinding lasers could be set up within the top or middle floors of buildings to fire laterally or even down on low-flying aircraft while remaining unseen from almost every angle. Weather conditions may also facilitate the use of an air defense ambush. For example, low cloud bases may force enemy aircraft down into the envelope of a particular weapon. Ambushing units may work in concert with smoke/aerosol dispensing units, or ground-based jammers that jam low-flying aircraft's terrain-following radar, forcing it up into the ambush weapon's optimum engagement envelope.

Occasionally AA guns may choose not to employ their radars, using strictly electro-optical sights. This tactic takes into account the capability of modern aircraft, including attack helicopters, to detect radar and infared systems.

Air defense ambushes are often employed when there is a perceived inadequacy of air defense assets. Typical missions include defending second-echelon maneuver units, CPs and reserves, artillery and missile units, other air defense units in firing positions, river-crossing sites, and first-echelon maneuver units.

The unit or weapon assigned to an air defense ambush usually occupies the site in hours of darkness or under the cover of poor visibility conditions. The unit or weapon is carefully camouflaged and keeps all its emitters off or in "dummy load" until ordered to engage a target. It may assume a hide position and establish local ground security and air observers. Depending on the unit or weapon involved and the situation, it may be able to receive automated surveillance and target tracking data from its parent unit. More than one air defense ambush, involving more than one weapon type may be established along an air avenue of approach. These may work independently or in concert depending on the situation. Target engagement decisions may be left up to the ambushing unit commander.

Air defense ambushes may be planned and executed on short notice with little preparation, or involve elaborate preparation and camouflage, tracking enemy aircraft over several days to discern operational patterns and possibly weaknesses, optimum weather patterns for a specific ambush site. Detailed preparations can involve removal of tracer ammunition from AA gun ammunition belts so that near misses do not alert the target aircraft, or construction of air observers/shoulder-fired SAM "tree-stands" in remote locations, with provision made for the alert of the ambush unit through wire, visual, or radio signals. Decoys or derelict weapons may be placed to draw the attention of enemy aircrews, causing them to enter the ambush zone or fire at the wrong target. Special engagement techniques may be used, such as delaying radar illumination until the last possible moment, coupled with a favorable cloud base and remote track information from other sensors.

When a target is detected, the ambushing weapon/unit prepares to engage, which may involve removal of some camouflage, or a short movement from its hide position to its firing position. The ambushing unit fires on the target until it is destroyed or until the target moves out of its firing zone. After ensuring that it is safe to move, the ambushing unit or weapon immediately displaces via a concealed route to a new ambush site or returns to its parent unit.

Employment of roving units is similar to that of air defense ambushes. The primary difference is that, while an ambushing units lies in wait for approaching enemy aircraft, a roving unit moves to the most likely areas of enemy air attack and occupies a series of predesignated positions in the supported unit's area of responsibility. The commander of the roving unit identifies these positions during his terrain reconnaissance, and coordinates them with the air defense and maneuver unit commanders. The roving unit occupies these positions according to a prearranged schedule or on order of the air defense unit commander. Ambushing and roving units terminate their missions and return to previously designated primary firing positions upon direction of the commander of the parent air defense unit. In most cases, the brigade chief of air defense plays a major role in the decision to terminate the mission.

Air Defense Against Unmanned Aerial Vehicles

The OPFOR recognizes the increasing importance of unmanned aerial vehicles (UAVs) on the battlefield to both its own forces and those of the enemy. They can perform high-and low- altitude missions, collect the full spectrum of intelligence, and immediately downlink the data to a ground station. They have the capability to loiter or to fly deep. They can collect against a predetermined target or look for targets of opportunity. Their construction can make them difficult or easy to detect.

Typically the enemy conducts reconnaissance missions using UAVs operating in the "window" between low-flying helicopters and higher-altitude fixed-wing aircraft. This altitude window is between 300 to 4,000 m. The most common technique is to approach the target area at high altitude and, once at the target area, drop down to a lower altitude that optimizes the capabilities of the sensor package on board. Once the mission is complete in the target area, the UAV climbs to higher altitude and departs the mission area.

Most UAV systems consist of three basic subsystems: the air vehicle, the ground station, and the launcher. (In some cases the latter two may be one vehicle.) There are also a variety of communication data links between the ground station and the air vehicle. Some systems also include satellite links. Countering tactical UAVs requires not only an integrated air defense system but also an integrated all arms approach. Air defense commanders and planners should view the three UAV subsystems as three separate targets which can be countered through a variety of means. This view reinforces the concept of an integrated system that includes coordination with others arms to ensure all targets are addressed. These means are both passive and active.

Since the mission the UAV is executing may not be apparent, actions should be taken to counter all possibilities. The integrated use of the passive measures described under survivability combined with camouflage, concealment and deception can reduce the effectiveness of UAVs. The use of a variety of decoys provides a false picture of the mission area to the enemy and to a large extent can deny information or distort the information collected by the UAV.

A wide variety and large number of active measures are available to the OPFOR to counter UAVs. The effectiveness of air defense radars can vary dependent on the radar cross section (RCS) and altitude of the vehicle. Of course, this does not preclude the use of radar, since these factors are considerations in detecting any aircraft. The relative small size of many UAVs obviously reduces their RCS.

A variety of sound-ranging systems are available which can provide early warning and azimuth of an approaching UAV. This in turn provides air defense weapons and maneuver unit weapons an opportunity to prepare for the vehicle's approach and to put up a large volume of fire, provided the UAV can subsequently be visually detected. The early warning provided by sound ranging increases the probability that visual observers will be able to spot the vehicle.

The location of UAV ground stations and launchers should constitute a high priority for reconnaissance. Since UAVs can also support enemy MRL targeting and fires from long range, their priority for destruction increases. Locating these targets can be tied to artillery, MRL or aircraft strike complexes which can quickly engage the targets once the information is received. The use special-purpose forces operating in the enemy rear can also be a valuable asset in locating launchers and ground stations. They can either take direct action to destroy the targets or relay location information to allow other means to be employed against them.

Jamming techniques can also be used to counter UAV system data links. In some cases data links cannot be jammed but they can be monitored. The effectiveness of these procedures varies according to the UAV system being attacked. High power spot/barrage noise jammers can be effectively used to mask ground targets from side looking airborne radars. Many satellite up- and downlinks employed are through the use of the commercial telecommunication infrastructure. This infrastructure and supporting satellites can be jammed or monitored to some degree. Countering UAVs should not be viewed as just a defense against the aerial vehicle, although that is important. The air defense commander must coordinate with other arms to ensure that UAVs are being attacked not just in the air, but that their related subsystems are also addressed. The successful destruction of a UAV ground station has a far greater impact than the destruction of a single air vehicle.

Air Defense at Night

Air defense can be conducted at night or during other periods of reduced visibility almost as effectively as during periods of normal visibility, because of the numerous target detection and fire control radars in air defense units and the inherent limitations of enemy aircraft maneuvers and coordination at night. Commanders prefer to move to realign units at night or during other periods of reduced visibility to reduce the likelihood of detection by the enemy and such moves must be covered by air defenses.

Air defense units frequently deploy closer to supported units at night and like other units are more likely to conduct maintenance and resupply at night. The OPFOR recognizes, however, that the increasing night capabilities of aircraft and the proliferation of "night strike packages" requires air defenses be ready 24 hours a day.

The greatest difficulty in tactical night air defense is in evaluating the impact of terrain on a unit's tactical mission, especially if the unit is moving into a previously unoccupied area. If a timely and comprehensive terrain reconnaissance cannot be conducted because of darkness, movement and establishment of new positions are far more difficult. To assist in the accurate assessment of local terrain positions, use reconnaissance patrols when they relocate at night.

From a technical standpoint, infrared systems have trouble acquiring targets during hours of darkness, because the gunner must visually acquire the target before launch. (This problem is shared by all shoulder-fired systems. Thus, it is a target acquisition problem not a seeker limitation.) These problems can be significantly reduced with the use of available night-vision devices. In addition, various "clip-on" image intensifier night sights can be fitted to some shoulder-fired SAMs. Some or all radar-guided SAMs possess electro-optical tracking backup that can be used in daylight hours in the event the radar is jammed, and a night low-light-level television channel for engagements in clear night time conditions. On some systems, the electro-optical mode is considered the primary mode for target engagement, with radar-only engagement mode being the second choice.

OFFENSE

The OPFOR ground force structure includes air defense units, which are equipped with a variety of systems having the firepower, mobility, and range to fully support fast-moving tank and mechanized forces in dynamic offensive operations. Air defense units of the army group and army conduct basically an area defense, engaging enemy aircraft at some distance from the supported maneuver divisions and themselves. The divisional air defense regiments conduct primarily an area defense, though there is a significant element of point defense in support of the divisions maneuver brigades. Air defense by batteries and the shoulder-fired SAMs of the maneuver brigades is largely of the point type, owing to the nature of the units to be defended and the capabilities of their weapons. Requirements differ for units involved in the three types of offensive actions: the attack against a defending enemy, the pursuit, and the meeting battle. These types of offensive actions are discussed in the following paragraphs as are river-crossing operations.

Attack Against a Defending Enemy

An attack against a defending enemy, as a rule, begins with the penetration of his defense, and may, depending on the situation, be conducted from positions in direct contact with the enemy, or from the march. When the latter method is used, troops moving up from the depth typically deploy sequentially into pre-battle and battle formations to assault the defending enemy from the line of march. The missions and organization of air defense units when supporting the penetration, opposed crossing of water obstacles, or the commitment of the second-echelon, are determined during planning of the battle for the period of accomplishment of the immediate (in greater detail) and subsequent missions.

Assembly Area

Assembly areas are most commonly used in the offense and therefore are addressed in this section. Brigade or division assembly areas are essentially composed of a series of battalion assembly areas. The brigade commander assigns air defense elements, normally a platoon of AA gun or gun-missile systems, the mission of supporting a particular battalion for a specified period of time. This period can begin before the battalion moves into its assembly area, in which case the platoon provides protection to the battalion during the road march to the assembly area.

The air defense element may also join the maneuver battalion in the assembly area, though it is preferable to have both arrive at the same time to ensure the battalion is not exposed to possible enemy air attack. In either case, the platoon leader reports to the maneuver battalion commander, and direct communications are established between the two units. The platoon continues to maintain communications with the brigades air defense battery or battalion. It also receives information from the division air defense target identification and warning network; this ensures timely receipt of information on the tactical situation.

While in the assembly area, the battalion commander uses all available cover, concealment, and camouflage techniques to reduce the likelihood of detection. Additionally, a 360-degree surveillance of the surrounding airspace provides early warning, while proper placement of air defense weapons increases the engagement envelope to the maximum extent possible. The maneuver battalion commander and the attached air defense platoon leader, from the parent brigade air defense battalion, work closely to integrate their weapons into an effective air defense plan. The battalion commander provides guidance for the placement of all air defense systems while the air defense platoon leader supervises the details of the placement of his weapons. As is the case in most tactical situations, the platoon leader must ensure that his AA gun-missile or gun systems are kept within mutually supporting distance. As a rule, one crew in each pair of systems remain alert except when warning of an air attack is received. Any attached or organic shoulder-fired SAMs supplement the defense and the attached air defense platoon leader may be given some degree of control over the SAM gunners. Radio silence and light discipline are observed. If the unit is to remain overnight, the air defense systems are dug in.

Observation posts and firing positions are often colocated. This is especially true in the case of shoulder-fired missile systems. The posts and firing positions should be positioned to provide comprehensive observation and interlocking fires on the most likely approach routes for low-flying fixed or rotary-wing aircraft. All other weapons, to include AA machineguns on tanks and ATGMs, are further integrated. Even planning for the use and integration of massed small-arms fire is essential to an effective air defense at the tactical level. The net result of the proper planning and execution at battalion and further integration into the overall air defense scheme of the brigade, division, and higher levels of command is the requirement for enemy aviation to pass through overlapping coverage to attack the assembly area. Attacking enemy aircraft must first penetrate the army group, army, and division engagement envelopes formed by their respective missile units. The aircraft then come within range of the maneuver brigade and battalion systems. Missile, gun and gun-missile systems engage enemy aircraft as soon as they come within range. Shoulder-fired SAM gunners engage aircraft that maneuver to avoid these systems or pass over the shoulder-fired SAM positions. Finally, small arms and vehicle-mounted weapons engage enemy aircraft that pass over the maneuver battalions' positions.

Attack

When attacking from positions in direct contact, before the start of the assault, it is especially important to support units in the penetration sector, prevent the enemy from conducting air reconnaissance, and prevent him from locating the movement of forces and assets. During troop movement and deployment for the attack from the march, an attack from the air represents the greatest danger; therefore, the primary mission of air defense is to protect that movement and deployment.

During the attack, the position of supported maneuver units changes and the success of air defense units in performing their missions is determined by their ability to accompany maneuver forces without separating from them by a distance at which effective coverage is not maintained. The complexity and dynamism of the situation require systematic analysis of the supported unit's missions and maintaining continuous communication with them.

Division. The assets contained in the division's air defense regiment are capable of providing the commander with a true area defense and medium-altitude coverage. The mission of the regiment is to protect the division's maneuver brigades and other units within its area of responsibility. The batteries of the regiment redeploy as necessary to maintain coverage of advancing forces. Many systems are capable of providing air surveillance on the move and rely on their short setup time to respond to enemy aircraft. They can also displace by pairs or as batteries to provide stationary coverage of the force as it moves.

There is no fixed pattern for the deployment of the air defense regiment's firing batteries. The decision for their deployment depends primarily on the supported unit's mission, the terrain, and on the ground and air tactical situations. Generally, weapons at army group level and below deploy rearward from the forward edge at from one-third to one-half their engagement range. This rule of thumb applies to both the offense and the defense. (Some differences are identified in the defense section of this chapter.) The OPFOR recognizes that "rules of thumb" are just that, and the tactical situation and common sense may dictate that these distances be modified. Redeployment of the firing batteries takes into account the requirement for maintaining mutual support among air defense batteries, covering the main threat, and providing comprehensive coverage to all elements within the division area. In addition to maneuver units, coverage must include the division headquarters, artillery units, and logistics units. Command and control, terrain mobility, and dispersion to reduce vulnerability are also considered in both deploying and redeploying.

Brigade. Allocation of air defense units is weighted in favor of maneuver units in those areas where the threat is perceived to be the greatest. Accordingly, ground maneuver brigades normally have their organic air defense assets augmented by divisional air defense assets. Air defense tactics are the most complex in the maneuver brigades. A maneuver brigade in the division's first-echelon usually receives one or more batteries from the division's air defense regiment. If these batteries are equipped with SAMs, they need not operate in the maneuver brigade's formation; the range capability of their radars and missiles allows them to provide support to the first-echelon from positions farther in the rear. This provides an additional advantage to the commander in enabling him to more quickly shift priorities of air defense coverage in the event the enemy increases its attacks on his follow-on forces. Consideration of follow-on forces attack is an increasingly important factor in the allocation of air defense assets and assigning their priorities.

As the supported unit performs its assigned missions, it continuously changes its location and combat formation. The air defense unit commander must respond to these changes and redeploy his weapons in a timely manner to provide continuous and effective coverage to the supported unit. The methods of movement of air defense units in the offensive depend on the situation, missions of the supported units, the effective range of systems, and their maneuver capabilities.

The following methods of movement may be employed for covering the first-echelon: by lines within an air defense unit, consecutively while maintaining continuous coverage of the supported units; as part of the supported units in their battle, pre-battle and march formations, ready to fire while moving, from a brief halt, or upon deployment. For additional information see Movement of Air Defense Units.

Battalion. Assets from the parent brigade often directly support a MIBN or TBN in the first-echelon of an attack. These assets normally consist of AA gun or gun-missile systems and shoulder-fired SAMs. If the supported battalion is operating on a broad frontage, assigned gun or gun-missile systems are deployed in line formation to provide protection to widely dispersed elements. When attacking on a narrow frontage, systems are likely to be employed in column to provide greater control and increased concentration of the platoon's fire. Also, the battalion on the narrow frontage might require fewer supporting assets. In either case, no less than a section consisting of two or three systems would normally be assigned, since they doctrinally operate as mutually supporting systems. There should be approximately 250-500 m between systems, although this too can vary. The ability to provide mutual support, adequate coverage, and the threat to the systems themselves are three of the guiding principles when determining this distance. The distance between platoons is approximately 1,000 to 2,000 m. Here again the platoons are placed so as to be mutually supporting. Allocation of assets at this level is similar to that at higher levels. The main attack will receive priority of coverage tempered by the consideration of where the greatest air threat is expected. The two are not always the same. Shoulder-fired SAM gunners ride aboard IFV/APCs until the infantry dismounts. Then they usually follow, in a group, closely behind dismounted troops. The gunners normally keep within 15 to 20 m of each other and within 20 to 30 m of the command group of the unit they are supporting. This method of employment offers greater control and increased probability of a target's destruction.

Example employment. Figure 10-2 is an example of how a divisional MIBR might typically employ its air defense assets employed to support two MIBNs, each reinforced by a tank company, attacking as the brigade's first-echelon. A third battalion follows as the second-echelon of the brigade. It too has been reinforced by a tank company. The example uses a maneuver brigade air defense battalion consisting of a self-propelled gun-missile system battery, a SAM battery, and a shoulder-fired SAM battery. The lead battalions are each supported by a gun-missile platoon consisting of two systems each. The third platoon provides coverage for the second-echelon battalion. The platoons follow each battalion's lead companies at a distance of approximately 400 m. They are well within the battalion's formation, which provides some protection against direct fire weapons. Given the range of modern anti-tank weapons and the distinct profile of air defense systems, location relative to the supported unit's formation and the terrain are key to survival. The SAM battery provides general support to the brigade. It is located further to the rear to provide coverage to the brigade's artillery assets and the second-echelon. One platoon of shoulder-fired SAMs is allocated to the forward battalion conducting the main attack. The remaining shoulder-fired SAM platoon is retained under the control of the brigade commander who elects to use one squad from the platoon to protect the brigade forward CP. He assigns the remaining two squads of the platoon air defense ambush missions on the southern flank of the brigade.

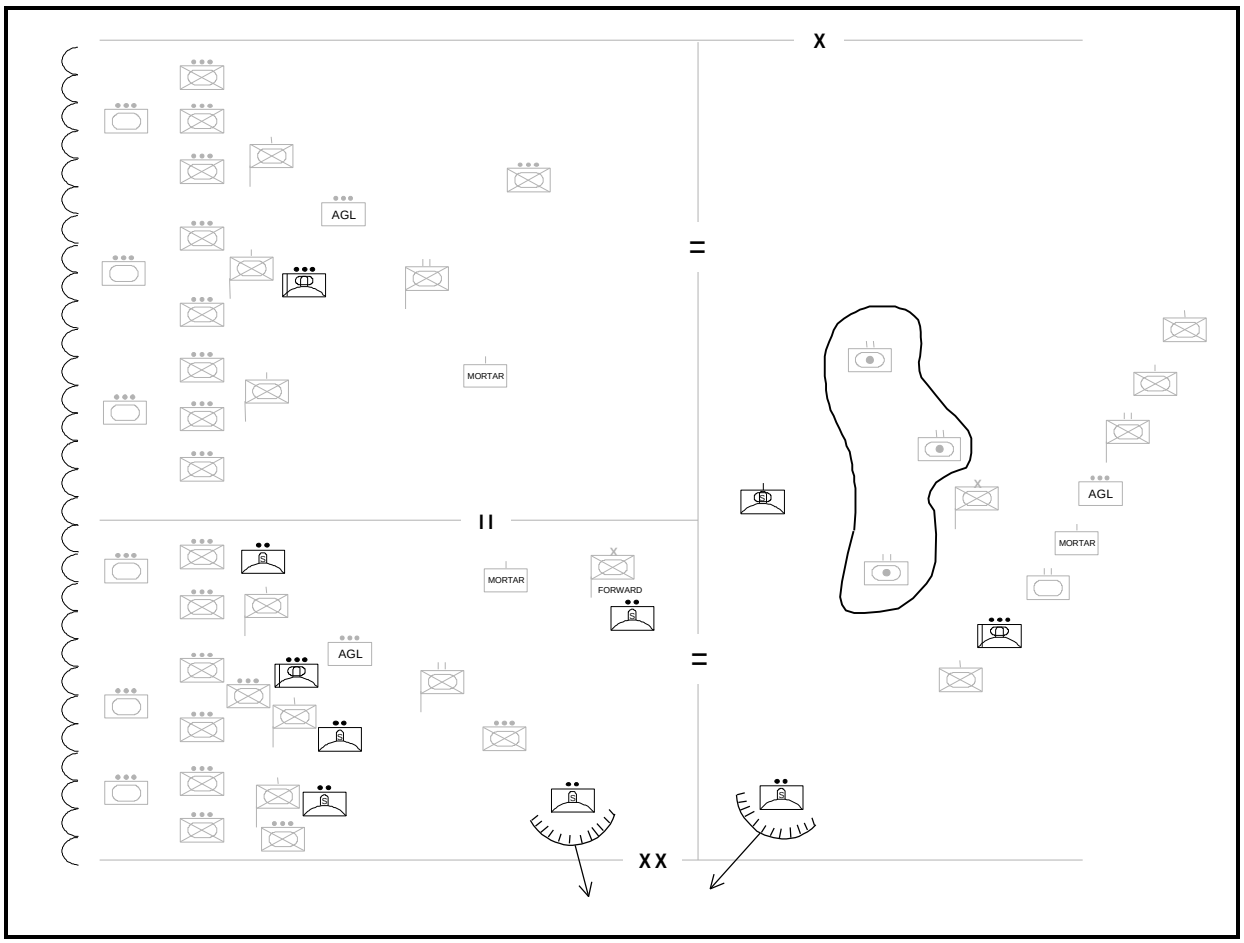


Figure 10-2. Allocation of a divisional brigade's air defense assets in the attack (example).

The MIBN commander can further allocate the attached shoulder-fired SAM platoon's three squads as necessary to support his tactical plan. In this case, he chooses to allocate a squad to each maneuver company. For coordination of shoulder-fired SAM system fires with air activities, the gunners can be given instructions by radio concerning the passage of friendly aircraft. For the most part, however, the gunners have a free-fire authorization for targets in their area or zone, and any exceptions be closely coordinated (between the division and brigade air defense chief and the air forces) before friendly aircraft can operate in those areas or zones. The tank companies reinforcing the battalions have turret mounted AA machineguns, which provide additional coverage. The OPFOR also uses tank fired time-fuzed Frag-HE rounds, usually fired in platoon volley, against enemy attack helicopter firing positions. Some tanks are capable of firing ATGMs through their main gun tubes and are capable of engaging rotary-wing aircraft at considerable ranges.

The example is limited to the employment of air defense weapons within the brigade. It is not the only way that the brigade's assets could be employed, and the alternatives available are innumerable. Of course, the brigade operates within the area air defense comprised by the SAM batteries of the division. The air defense by the division's SAM batteries would be weighted in the area of the main attack, although the SAM batteries need not be deployed forward in a maneuver brigade's area of responsibility.

Meeting Battle

The OPFOR defines a meeting battle as combat between opposing columns rapidly advancing toward each other. Although offensive in nature, it is an integral part of both offensive and defensive combat. It is expected to occur most frequently in the offense. It is perceived as a deliberate tactic, not always as an accidental or chance encounter. For more detail on the meeting battle, see Chapter 4.

The OPFOR expect that meeting battles can occur in any of the following situations:

- At the outbreak of hostilities, when the enemy has been surprised and is attempting to deploy to forward defensive areas.
- When the enemy reserve is deploying to counterattack or to plug a gap in his defenses.
- Deep in the enemy's defensive area, where he is deploying his reserves to blocking positions.
- During a withdrawal when the enemy has been flanked.
- In defensive battles, especially the maneuver defense, when OPFOR units are counterattacking penetrating enemy units.

In all these situations the OPFOR expects enemy air forces to play a major role in efforts to stabilize the ground combat situation and contain advancing or counterattacking OPFOR. Basic employment techniques for air defense units in meeting battles do not differ significantly from those for movement and attack against a defending enemy. The advance guard for a regiment may receive the up to two platoons of gun or gun-missile systems from the brigade's air defense battalion. (In exceptional cases, they could receive the entire battery.) The main body of the brigade normally includes the remainder of its air defense assets plus any reinforcement from division. From locations within the main body, these assets can better cover the bulk of the unit and, in the case of some division assets also cover the advanced guard. Air observers are posted on all vehicles. Shoulder-fired SAM gunners are prepared to engage designated targets in their sectors of observation and fire, and a high state of alert on air defense weapons be maintained.

A serious concern in meeting battles is the need to protect air defense weapons from direct fire when deployed with the advance guard. The air defense unit commander must closely follow the course of the meeting engagement battle to ensure his air defense assets continue to support the maneuver unit in a rapidly changing tactical situation, and that his assets do not become unnecessarily exposed to the effects of ground combat action. Air defense units remaining with the brigade's main body will not be exposed to ground fire to a significant degree.

Pursuit

The fundamental purpose of a pursuit is to destroy a withdrawing enemy force. It requires the commander to organize his force to accomplish three basic tasks:

- Maintain frontal pressure on the enemy to prevent disengagement.
- Move part of his force on routes parallel to the enemy withdrawal to attack his flanks.
- Move another part of his force to outdistance the enemy and block the withdrawal.

Air defense weapons will support OPFOR units engaged in pursuit. However, the forces committed to support various tactical units cannot be determined precisely. A pursuit usually involves a very fluid tactical situation and, in such a situation, the placement of air defense weapons too far forward can lead to their destruction or reduction in effectiveness of C^2.

Depending on the scale of the battle, the OPFOR attempting to prevent enemy disengagement and those trying to flank the enemy probably remain within the air defense coverage of army, divisional, and brigade SAM systems. The force attempting to outdistance the enemy may move out from under army, division and brigade SAM coverage. In that case, the force would use its organic assets and, depending on the air threat, receive additional reinforcement. For example, if the force is a battalion, it could receive additional assets in the form of AA gun or gun-missile systems. Although less likely, a brigade could receive additional SAM assets from division. A decision to place additional assets so far forward would have to be weighed against the increased likelihood of their destruction by enemy ground or air action of the enemy.

Water Obstacle Crossing

Whenever terrain restricts the movement of advancing forces, the importance of air defense increases, and air defense units play a major role in crossing water obstacles. The mission of air defense in these operations is to protect the crossing site. Air defense units accomplish this mission by creating envelopes of protected airspace above and around the crossing sites.

Forces conducting water crossings would be high priority targets for airstrikes. Accordingly, doctrine calls for rapidly overcoming obstacles without slowing the pace of the offense. For unopposed crossings a mechanized infantry or tank unit may cross a water obstacle without deploying from its march formation. In this case, the division air defense regiment or the brigade air defense battalion can establish firing positions on the near bank to cover the site for the time it takes the column to cross. The air defense unit would then move to the far bank and either establish firing positions or continue to move. When AA guns are employed, when the water obstacle is wide, or under other circumstances, an air defense unit may deploy its elements on both sides of the obstacle to provide more comprehensive coverage. The OPFOR expects, however, that most river crossings will be opposed by air and ground defense and made without the advantage of an existing bridge or convenient fording sites. Additionally, the OPFOR does not expect that defensive air cover, airstrikes, and electronic protection measures will necessarily be available.

To cross a river as quickly as possible with minimum losses, a mechanized infantry or tank division may use different formations, as dictated by the tactical and geographical conditions. The speed of the crossing is greater and the air defense and other task greatly simplified if the division can cross its maneuver brigades at several crossing sites simultaneously at sites a few kilometers apart. In many cases, however, this may not be possible, and the division may have to cross at two sites or a single site. In these cases, maneuver brigades typically approach the river in column with each having a MIBN operating as an advanced guard.

The mission of the advanced guard battalion is to clear enemy forces from the near river bank, cross the river, and secure a bridgehead on the far side, to permit crossing by the brigade. The battalion may be reinforced by one or more of the following air defense elements platoon or more of AA or gun-missile systems plus a platoon of shoulder-fired SAMs. During the reconnaissance of the near side of the river by the brigade's reconnaissance company and the advance guard's forward reconnaissance elements, the only air defense available to them would be organic vehicle-mounted machineguns and small arms. Division and corps/army assets would also afford them some protection.

As the advance guard approaches the river, its attached air defense platoon(s) would move just behind the lead company. If assets are available, the advance guard may choose to locate a pair of AA guns or shoulder-fired SAMs farther back, near supporting artillery. If the advanced guard is opposed while approaching the near bank it may employ its AA guns in a direct fire role. Such employment is risky, since it would require moving guns farther forward, thus exposing them to enemy direct fire systems. In an attempt to avoid this exposure, air defense commanders may seek alternative approach routes to the near bank.

As the near bank is secured, air defense elements take up firing positions approximately 500 m from the near bank, depending on terrain and system capability. AA guns or gun-missile systems must locate in mutually supporting positions. From these positions, they can engage aircraft attacking the site and, if necessary, support crossing elements with direct fire against ground targets. During this period AA guns or gun-missile systems and shoulder-fired SAMs would deal with rotary-wing threats while brigade SAMs and those of higher echelons would deal with fixed-wing threats to the crossing sites. Shoulder-fired SAMs accompany the first companies across the river where they take up positions to cover the crossing unit. As soon as possible, AA guns and gun-missile systems are ferried to the far side, usually in pairs, to ensure constant coverage of the crossing site.

If the situation warrants, one or more batteries of the division air defense regiment can be sent forward to support the crossing site, deploying as close as 1,500 m from the water's edge, to provide very-low-level-air surveillance and SAM coverage across the river. A pair, or even an entire battery, of SAMs drawn from the division's main body is sent across the river on the heels of the first mechanized battalion across. The bulk of the divisional SAM regiment remains on the near bank until the bridgehead is enlarged to where it can cross and deploy with acceptable risk to enemy direct fires and direct observation. This may not be until the entire brigade has expanded the entire bridgehead to a few kilometers in depth. As the bridgehead expands, more batteries can move across. Though this entails some risks to division assets, risking the entire bridgehead through inadequate air defense is intolerable. Therefore, if the division cannot provide adequate air defense coverage from the near side of the river, assets are moved across into the newly formed bridgehead.

Finally, most opposed crossings are conducted under smoke and aerosol cover, which can degrade or prevent visual acquisition of air threats by some air defense systems. Therefore, wind and obscurant conditions must be accounted for in the deployment of air defense weapons for the river crossing. For additional information on water obstacle crossings see Chapter 11.

DEFENSE

The OPFOR regards the defense as a temporary expedient to be adopted only when forced to do so by enemy action, or as an economy of force measure. When conducting the defense, commanders at each level typically organize their defense in echelons. A mechanized infantry division or tank division normally establishes two defensive echelons. The first-echelon is usually composed of two MIBRs with reinforcing elements such as additional artillery, antitank, and air defense units. The second-echelon usually contains MIBR and a TBR. The defensive areas of each maneuver brigade also are organized in two echelons, each containing two maneuver battalions. TBNs are normally deployed in the second-echelon. These are "typical" deployments for units in a positional defense and the actual deployment can vary with the situation.

Division

In the defense, priority of air defense coverage will be given is to forces defending on the assumed axis of the enemy's main thrust. If the air threat is judged to be sufficiently serious, batteries of the division's air defense regiment may be allocated to any of the division's maneuver brigades. Such augmentation most likely, but not always, goes to the division's first-echelon brigades. The remaining batteries of the air defense regiment defend units in the division area such as the division main CP and artillery units. The coverage of units designated as counterattack forces and preventing enemy reconnaissance are also priority tasks. The basic concept for the defense should enable units to accomplish their mission, to include reacting to possible variants in enemy operations, with a minimum amount of repositioning of air defense forces. Distances from the forward edge these batteries deploy depend mostly upon the area or unit to be defended and the capabilities of the system. Obviously, those systems allocated to defend first-echelon units are going to be located farther forward than those assigned other missions. Units can be placed as close as 1.5 to 2 km from the forward edge; however, placement close to the forward edge increases their vulnerability to direct fire systems. A basic and flexible guideline line is that depending on their functions, air defense units occupy positions at a distance from the forward edge that ensures the accomplishment of their mission and safety from enemy fire.

Brigade

Elements of the maneuver brigade's air defense battalion deploy to cover the first-echelon battalions. Air defense units equipped with gun-missile systems have sufficient assets to provide coverage to first-and second-echelon battalions if the commanders choose to do so. This is accomplished by providing a platoon to support each battalion. If the commander chooses to use his gun-missile systems to support two first-echelon battalions, he would split one platoon, providing a gun-missile system to each of the remaining two platoons. These units, in either configuration, are generally located in the center of each battalion's defensive area. The SAM battery of the brigade air defense battalion is normally located, farther to the rear, but just forward of the brigades artillery units. This battery provides general coverage to the brigade and complements the capabilities of the gun-missile systems. This is accomplished by providing different acquisition means thus resisting enemy countermeasures directed at the gun-missile systems. The brigade air defense battalion can use its shoulder-fired SAM platoon to reinforce the maneuver battalions, to close gaps in the coverage, or establish ambushes.

In cases where the gun or gun-missile platoons are all allocated to forward units the brigade battalion air defense commander may choose to allocate some of the shoulder-fired SAMs to the second-echelon battalion. The maneuver battalion commander may choose to further allocate some or all of these assets to the companies.

Battalion

In the defense, battalion air defense preparations begin at company level. Air observation posts are established in each company area, close to command observation posts, on terrain affording good visibility and along likely routes of enemy air approach. Schedules for rotating air observers are established, and sectors of observation and fire are designated for air defense weapons to ensure 360° coverage of the airspace surrounding the battalion's defensive area.

Shoulder-fired SAM positions are typically established in each mechanized infantry company's area. These positions are often colocated with air observation posts near the perimeters of the company's defensive positions to extend the engagement envelopes as far as possible.

With the occupation of firing positions, observation is organized in case of a surprise attack by air or ground maneuver forces, and the position is camouflaged. Then positions are prepared for personnel, as are emplacements for air defense systems, and shelters for vehicles and ammunition. When possible, this is accomplished following a thorough reconnaissance, at night, based on the calculation that this work will be completed by first light.

Subsequently, second-priority fortification structures are built, and camouflage is continuously improved. A system of alternate, temporary, and dummy firing positions is prepared, and movement routes readied. A systematic change of positions is carried out to conceal the air defense system, confuse the enemy, and move units out from under an air or artillery strike. Change of positions must take the minimum possible time. Advance preparation of the position area and of maneuver variants contributes to this. For additional information see Passive Air Defense Measures below.

For a hasty transition to the defense in the course of the offense, or as the result of an unsuccessful outcome of a meeting battle, the limited time available determines the air defense organization. Under these conditions the role of mobility in the actions of commanders and staffs, speed and secrecy in the maneuver of units and of their deployment, and the organization of C^2 increases.

SURVIVABILITY

An air defense can remain effective only as long as it can survive on the battlefield. The effective and continuous planning for the use of the following measures is essential and the key to survivability.

Electronic Jamming

The principle active means of countering enemy aircraft electronic capabilities is the employment of electronic combat (EC). (See Chapter 12.) The primary methods of jamming in support of air defense weapons are—

- Active radar jamming by using barrage and spot noise, pulse jamming methods, and chaff.
- Passive jamming with chaff and radar corner reflectors.
- Electronic jamming of command and weapon guidance systems, using pulse and simulation techniques.
- Barrage, sweep, and spot jamming.

Electronic Protection Measures

The OPFOR is aware of the developments in enemy electronic jamming and radar homing ordnance. Countermeasures such as chaff, jamming devices, and radar-homing weapons are employed by enemy air forces. OPFOR air defense units employ the following measures to combat the effects of electronic jamming:

- Signal security-radars remain silent until absolutely required.
- Frequency spread-each of the air defense radar systems operate within separate radar frequency bands.
- Frequency diversity-OPFOR tracking and guidance radars change frequencies to overcome jamming.
- Missile guidance system diversity-Multiple and interchangeable missile guidance systems are available for employment.

Related to the measures listed above is the technique of placing limitations on the operation of electronic systems. These limitations can be quantitative, temporal, frequency, spatial, or territorial:

- Quantitative limitations involve the use of a minimum number of electronic systems operating simultaneously at a particular time or during execution of a mission.
- Temporal limitations involve reduction of operating times for electronic systems to the minimum period that ensures execution of a particular mission. Temporal limitations would be controlled by a higher air defense CP, would be coordinated with quantitative limitations, and could involve bringing only a portion of available air defense assets to the highest level of combat readiness when there is an immediate threat of enemy airstrikes.
- Frequency limitations involve advance determination of, and adherence to, operating frequency bands for individual electronic systems, as well as procedures for switching to reserve frequencies, based on electromagnetic compatibility.
- Spatial limitations involve the establishment of sectors into which, or axes along which, emissions are forbidden for particular systems.
- Territorial limitations restrict deployment of emitters within particularly important areas because of the unique signatures of the emitters.

Passive Air Defense Measures

In addition to active air defense, the OPFOR practices a variety of passive air defense measures, particularly use of cover, camouflage, concealment, dummy positions, and decoys. It emphasizes the use of natural terrain and vegetation, camouflage netting and other artificial materials, smokescreens, and decoy equipment to provide camouflage, concealment and deception. It also employs corner reflectors to introduce false radar targets and to mask or distort radar reference points; simple heat sources to confuse IR sensors and weapons seekers; quick setup; high-fidelity decoys; derelict vehicles; radar emitter decoys; quick hardening foams; and many other types of manufactured and field-expedient means.

Maneuver and dispersal of air defense assets, both emitters and other types of equipment, is important for their survival in both combat and march formations. Sudden maneuver and periodic changes of position are simple and effective means to counter enemy reconnaissance and precision weapons; these measures are planned at the brigade level as part of combat support, and implemented at battalion level and below.

All, or only a portion of, the elements of air defense units may maneuver to alternate positions, depending on such factors as the degree of air threat, time of day, and meteorological conditions. The first elements to shift positions are those that have performed combat alert duty for an extended period, or that have been deployed in the position they currently occupy since before the onset of combat. The optimum configuration for shifting to alternate positions involves no more than one-third of the assets of a given unit or large unit shifting at one time, to maintain adequate air defense coverage.

The OPFOR uses certain rules of thumb pertaining to distances systems are located from the forward edge, distances related to dispersion, and distances of air defense units as they relate to supported units. The OPFOR recognizes that these distances vary with the situation and the threat. Of special concern is the enemy anti-tank guided missile and precision weapon capability. If it is high, the spacing between SAM launchers and the distances of division and brigade air defense systems from the forward edge increases. Ideally, the degree of dispersal for units would be the same whether conventional or precision weapons or even tactical nuclear weapons are employed. A general rule for the degree of dispersion is that the strike should not destroy two adjacent units simultaneously. A maximum of one-third of a unit should be vulnerable to a single precision weapon or nuclear strike.

The dispersion measures discussed above should be employed with consideration of the protective and screening properties of natural and artificial screens, and would be combined with thermal camouflage and engineer preparation of positions. Natural screens consist of vegetation, terrain folds, populated areas, and local features or objects. Artificial screens include camouflage nets that would enhance natural screens, and radar-opaque screens using local features, radar nets, metallic nets, and corner reflectors. Concealment would be combined with the use of dummy positions, using decoy equipment and activities. Like real positions, dummy positions would be changed periodically. Dummy emitters and jammers would be used to attract enemy reconnaissance and targeting.

Chapter 11
Engineer Support

The OPFOR recognizes that engineer support is vital for the successful execution of combat. Due to the fluid nature of modern combat, effective engineer support is essential for ground forces to maintain a high tempo.

Engineer tasks are a shared responsibility throughout the OPFOR. For instance, combat troops, as well as engineers, perform mine warfare tasks such as minelaying, minefield recording, and mine removal or breaching. Engineer and combat personnel also perform survivability tasks such as constructing fortifications, clearing fields of fire, and camouflage. The same is true for water obstacle crossings, where some units and equipment can ford, swim, or snorkel across with little or no engineer support. Although the highest level of engineer training and the greatest technical capabilities exist in the engineer troops, all military personnel and units train to some degree in fundamental engineer tasks.

The OPFOR's intent is to make the entire force as flexible and capable as possible while minimizing dependence on limited engineer support. This allows maneuver forces to autonomously execute rudimentary or basic engineer tasks. It also frees the engineer troops to—

- Perform engineer-specific or critical tasks supporting the maneuver commander's intent.
- Exploit and expand successful engineer effort begun by the combat troops.
- Support units that have little or no engineer capability.

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ASSETS

The OPFOR classifies engineer troops, along with signal and chemical troops, as "special troops." They carry out unique functions for all elements of the ground forces. Within this category of special troops, there are two basic types of engineers: combat engineers and special-category engineers. Combat engineers perform tasks that can require direct contact with the enemy, while special-category engineers do not normally engage the enemy. Together, these engineers perform the engineer support missions necessary for the OPFOR to succeed on the modern battlefield.

Nondivisional

An engineer brigade is organic to corps, army, and army group. The engineer brigade normally has two engineer battalions, a road and bridge battalion, an obstacle battalion, an obstacle-clearing battalion, and one (or possibly two) pontoon bridge battalions. See FM 100-60 for more detail on organizations.

If an army or corps receives additional engineer assets from the army group, it may allocate some of its organic assets to support first-echelon divisions or separate brigades. The amount of engineer support allocated at all levels depends on the subordinate unit's mission and the availability of engineers at higher levels.

Maneuver Divisions

From division down to brigade level, mechanized infantry and tank units have organic engineer units. The engineer battalion in a mechanized infantry division (MID) or tank division (TD) normally has a mine warfare company, an assault crossing company, a construction company, a road and bridge construction company, a pontoon bridge company, and a engineer reconnaissance platoon. See FM 100-60 for more detail on organizations.

Maneuver Brigades

The maneuver brigade is the lowest level with an organic engineer unit. Divisional brigades have an organic engineer company, which supports all brigade efforts. A separate brigade has an engineer battalion with assets similar to those at division level; it lacks the road and bridge construction company and the pontoon bridge company and has a construction platoon rather than a company. Under certain circumstances, the commander of either type of brigade may require some of these engineers to support his subordinate maneuver battalions for a specific mission.

The engineer company organic to the divisional brigade consists of a mine warfare platoon, a bridge platoon, a construction platoon, and one to three transport platoons. The amount of engineer equipment varies depending on the type of unit. For example, the divisional mechanized infantry brigade (MIBR) requires only one tank-launched bridge and only one transport platoon (for three mineclearing rollers), while the divisional tank brigade (TBR) requires three tank-launched bridges and three transport platoons. (See FM 100-60 for more detail on organi-

zations.) Since brigade engineer companies have limited assets, the division may allocate some of its own engineer assets to decisively shift, augment, or reinforce critical engineer effort in the brigades, as necessary.

Maneuver Battalions

Mechanized infantry and tank battalions (MIBNs and TBNs) have no organic engineers. However, as stated earlier, OPFOR maneuver units do have some engineer training and related equipment giving them a rudimentary autonomous capability to perform some engineer tasks. For instance, many tracked vehicles have an integral self-entrenching blade. Tanks, artillery, and other tracked vehicles so equipped can dig their own hasty fighting positions when going over to the defense. Additionally, during water obstacle crossings, a large portion of the OPFOR mechanized fleet is amphibious. This allows some APCs, IFVs, air defense, artillery, and other vehicles to cross without extensive engineer preparation.

In the area of mine warfare, every member of the OPFOR learns how to emplace landmines by hand as a common task skill. The bulk of the mechanical mineclearing assets either belongs to the tank companies (TCs) or can reinforce them. If the tactical situation warrants, as many as one tank per tank platoon (and possibly one vehicle in a few IFV-equipped mechanized infantry platoons) can have a track-width mineclearing plow continuously mounted to the vehicle.[1] Additionally, the brigade engineer unit has enough mineclearing rollers to assign one to each TC in the brigade. Engineer transport carries the rollers on trucks until they are required to support route clearing or a deliberate breach. When needed, the engineers attach the rollers to a tank (usually one per TC) at a preplanned assembly area, using a truck-mounted crane.

When necessary, higher headquarters allocates additional engineer support to augment the maneuver battalion's limited autonomous capabilities. This enhances the battalion's ability to cross natural and manmade obstacles, and to improve or construct defensive positions and barriers. Reinforcements can include heavy engineer equipment to support breaching of enemy defenses and barriers.

ORGANIZATION FOR COMBAT

The tactical employment of engineers does not adhere to strict organizational lines or groupings. Instead, the chief of engineers (COE) task-organizes the engineers to perform multiple missions simultaneously. This is a result of the diversity in types and functions of equipment, and the unique mission or capabilities of the various engineer units (especially in the engineer battalion). These engineer assets frequently deploy throughout the battlefield and perform numerous distinct missions simultaneously during the course of the battle. In this way, route-clearing assets perform one function, while others perform demolitions, lay mines, construct obstacles, prepare defensive fighting positions, or set up water purification sites. Occasionally, the combined arms commander can also attach to these groupings additional non-engineer assets, such as chemical, tank, or mechanized infantry troops.

[1] Some tanks (particularly older models) may have a different model of mineclearing plow that is not permanently attached. In this case, the plow is transported by the brigade engineers until needed, and mounted using an engineer crane at a preplanned assembly area.

The following is a list of typical task-oriented engineer groupings:

- Mobile obstacle detachment (MOD).
- Movement support detachment (MSD).
- Engineer reconnaissance patrol.
- Engineer observation post.
- Engineer photographic reconnaissance post.
- Obstacle-clearing group.

Mobile Obstacle Detachment

MODs are temporary, task-organized groupings of engineer assets intended to create minefields and obstacles. Their basic equipment includes mechanical minelayers and trucks carrying mines, explosives, and other equipment. They are sometimes reinforced with mechanized infantry troops for close protection and extra labor. The size and composition of the MOD depend on the tactical situation and the needs of the maneuver commander. For more information on the employment of MODs, see the March, Offense, and Defense sections of this chapter.

The core of every MOD is a minelayer section from the mine warfare platoon from a divisional brigade's engineer company, or from a minelayer platoon of the mine warfare company organic to a division's or separate brigade's engineer battalion. These minelayers provide rapid response, flexibility, and obstacle-creating ability other systems or techniques cannot provide.

The primary minelaying system in the MOD is the armored mechanical minelayer. The engineer company in each divisional brigade has a section of three armored minelayers, or it may have three towed mechanical minelayers. The engineer battalion of a division or separate brigade has twelve minelayers. At division level, scatterable systems may supplement the armored mechanical minelayers. The division can use its twelve minelayers (usually in sections of three or four) to reinforce an existing MOD on a critical brigade sector, or use them to form additional MODs. However, a division with scatterable mine systems would probably not task-organize these assets out to individual brigades.

In addition to minelayers, MODs may add other engineer resources to support critical obstacle development. The division may supplement the MOD with engineers for demolition work, ditchers to create antitank (AT) ditches, and other engineer systems. This reinforcement does not normally occur until the earthmoving equipment completes other tasks, such as preparing fortifications.

Movement Support Detachment

The MSD is a task-oriented, temporary grouping of engineer assets to support route clearance and movement of the force in preparation for, and during, the march. A typical brigade-level MSD has an engineer squad, one tank with a mineclearing plow or roller-plow set, one or two route-clearing vehicles, and one or two tank-launched bridges. For more information on the employment of MSDs, see the March section of this chapter.

In a divisional brigade, the core of the MSD can come from the bridge platoon, construction platoon, and the mineclearing section of the mine warfare platoon of the engineer company. In a separate brigade, it can come from the assault crossing company, construction platoon, engineer reconnaissance platoon, and a mineclearing platoon of the mine warfare company of the engineer battalion. In addition, the brigade may attach a mechanized infantry platoon to provide limited security or manual labor, or a tank platoon to operate mineclearing plows and rollers. It may also attach NBC reconnaissance personnel to monitor the chemical and radiological situation.

The division COE can also attach division-level engineer assets to augment MSDs created by divisional brigades. These additional assets can reinforce an existing MSD or support the creation of an additional MSD, if necessary.

Once the tactical situation changes and the force transitions into the offense or defense, the commander dissolves the MSD, resubordinates the equipment, and assigns new taskings, such as—

- Breaching or mineclearing assets may return to parent units or be attached to obstacle-clearing groups.
- Route-clearing equipment returns to preparing lateral routes or assembly areas.
- Earthmoving equipment returns to constructing obstacles or fortifications.

When the force resumes the march, the commander creates a new MSD, with much of the same equipment, to support the movement of the force along the route.

Since its different technical tasks involve different types of equipment, the MSD frequently breaks down into several work groups to allow simultaneous actions along the march route. Typical groups are a reconnaissance and obstacle-clearing group, plus one or two road and bridge construction and repair groups.

Reconnaissance and Obstacle-Clearing Group

The reconnaissance and obstacle-clearing group usually has—

- An engineer squad.
- Hand-held or vehicle-mounted mine-detection equipment.
- Explosives.
- Mineclearing vehicles such a tank with roller and plows.
- One or two route- or obstacle-clearing vehicles.

The MSD commander may break the reconnaissance and obstacle-clearing group into a reconnaissance group and an obstacle-clearing group.

Reinforcements from division may include an engineer reconnaissance vehicle or a specialized mineclearing vehicle. The division's engineer battalion also has specialized obstacle-clearing and route-clearing equipment complete with large, full-width articulated dozer blades and cranes or booms with grabbing arms.

Road and Bridge Construction and Repair Group

The road and bridge construction and repair group usually has tank- or truck-launched bridges, route-clearing vehicles, one or more engineer squads, plus cranes and road graders. In a separate brigade, this group can include tracked amphibians and ferries. In a divisional brigade, it can include pontoon bridges, tracked amphibians, or ferries from the division engineer battalion. The equipment varies depending on what was passed down from higher levels of command.

Engineer Reconnaissance Patrol

Engineer reconnaissance patrols vary in strength from a squad to a platoon. A division or separate brigade can use all or part of the engineer reconnaissance platoon organic to its engineer battalion. A divisional brigade is more likely to form a squad-size patrol from its engineer company. The engineer reconnaissance patrol can also include one or two chemical reconnaissance specialists. For more information on the employment of these patrols, as well as engineer observation posts and photographic reconnaissance posts, see the Engineer Reconnaissance, March, Offense, and Defense sections of this chapter.

MISSIONS AND TASKS

The basic missions of combat engineer support have both tactical and technical parameters. The ***technical tasks*** that engineer troops perform in support of combat are—

- Conduct engineer reconnaissance of enemy and terrain.
- Prepare fortifications.
- Prepare and maintain march routes.
- Clear passages in obstacles and perform demolition work.
- Establish and maintain water obstacle-crossing sites.
- Establish obstacles.
- Carry out engineer camouflage measures.
- Extract and purify water and establish water supply points. See Chapter 15 for more detail on water supply.
- Eliminate aftereffects of NBC strikes.

Of the tasks listed above, the three that are primarily combat engineer tasks are reconnaissance, obstacle clearing, and establishing obstacles. The remaining six tasks are considered special-category engineer tasks. However, regardless of specialty, all engineers continually train in all the engineer functions so that they can perform secondary or augmentation missions as necessary.

Figures 11-1, 11-2, and 11-7 reflect the tactical missions and required technical subtasks engineer troops perform in support of each tactical action. Engineer support missions and their related technical tasks vary according to the activity or tactical mission of the supported maneuver units, plus preparation for upcoming missions. The three major types of tactical combat action are the march, the offense, and the defense.

COMMAND AND CONTROL

The COE is a key member of the commander's staff at brigade level and higher.[2] He advises the commander on engineer matters and coordinates and supervises the employment of organic and attached engineer assets. The maneuver commander specifies the tactical combat action(s), the start time and duration, and the area for these actions to take place. With this information, the COE determines the required engineer missions to support the maneuver commander's plan. He prioritizes engineer efforts to execute the technical tasks necessary to accomplish the overall mission. He can then determine the appropriate mix of troops, equipment, and materials necessary to perform the tasks under current conditions. He is responsible for determining the best employment of engineer assets available to the command to support the maneuver commander's mission, intent, and objectives.

The COE determines the priority of effort, organizes the necessary engineer support, tasks engineer unit commanders, and monitors the execution of the directed missions. He provides input to the commander's combat orders and battle plans, the reconnaissance plan, the obstacle plan, and defensive plans. He organizes the crossing of water obstacles and other barriers, and preparation and maintenance of march routes. He coordinates with the division or brigade chief of logistics regarding the preparation, improvement, and maintenance of supply and evacuation routes.

In the absence of the COE, the senior engineer commander is responsible for planning the employment of engineer assets. Engineer unit commanders are responsible for—

- Proper execution of the mission.
- Supervising the unit.
- Ensuring combat readiness of the unit.
- Maintaining the equipment.
- Ensuring the welfare, training, and care of the personnel.

OPFOR doctrine reinforces success and concentrates massed resources to quickly and decisively influence the battle. The COE usually focuses engineer efforts in support of the main attack or in a critical defensive sector. The main steps that the COE performs in support of combat actions are—

- Deciding appropriate organization of engineer support and reporting it to the maneuver commander.
- Participating in the reconnaissance conducted by the maneuver commander.
- Planning the execution of engineer support and tasking engineer units.
- Controlling and directing engineer groupings and monitoring the completion of tasks during the preparation for, and conduct of, combat.
- Organizing engineer construction support.
- Reporting the status of engineer support to the maneuver commander.

[2] At brigade level, the COE is normally the commander of the organic engineer unit. At division and higher, the COE is a staff officer who is not a commander.

ENGINEER RECONNAISSANCE

Engineers conduct reconnaissance independently, or combined with chemical and reconnaissance elements. If the COE needs unique, specific engineer data for planning and preparation, he may use engineer assets to form engineer reconnaissance patrols and groups, observation posts, and photographic reconnaissance posts. (For specific information on engineer reconnaissance tasks and responsibilities see the March, Offense, and Defense sections of this chapter.) Engineer reconnaissance elements usually gather the following information:

- Enemy engineer preparation of fighting positions.
- Location, type, and composition of enemy obstacles.
- Conditions of roads, bridges, water obstacle-crossing sites, and routes.
- Presence of local building materials and water supplies.
- Protective and camouflaging properties of the terrain.

The commander and his staff use this information to determine—

- Enemy courses of action and posture.
- The nature of the terrain.
- The necessary engineer effort required for the combat plan.

Assets

To provide engineer expertise, the OPFOR can attach engineer specialists to accompany a division or brigade tactical reconnaissance patrols. Additionally, reconnaissance elements of maneuver units can provide limited engineer-related information, although with less technical precision. However, under most conditions, the missions of all these reconnaissance elements preclude them from concentrating solely on engineer requirements. Therefore, the COE may form his own engineer reconnaissance elements to provide the specific data he needs for planning.

Patrols

A first-echelon brigade (or a maneuver battalion marching independently) can include two or three engineer reconnaissance personnel in a regular reconnaissance patrol or march security element. When engineer personnel reinforce other patrols in this manner, there is not likely to be a separate engineer reconnaissance patrol.

When the engineer mission is expected to be a complicated one, however, it is better to form one or two engineer reconnaissance patrols. Such patrols vary in strength from a squad to a platoon. The use of two patrols allows the conduct of engineer reconnaissance by the leapfrog method. Ideally, the engineer reconnaissance patrol(s) would begin their mission 1 to 2 hours before the main column of the brigade or battalion starts to move. They assess the routes chosen by the staff, checking the validity of plans made from a map and reporting on—

- Obstacles and the effort required to overcome them.
- Conditions of crossing sites on water obstacles.
- The general nature of the terrain.

Engineer advice is an important element in the selection of routes and crossing points.

Observation Posts

When enemy forces are within visible range, the OPFOR may simply establish engineer observation posts (OPs) to watch critical sectors. It supplements these with listening posts during restricted visibility. Two to three combat engineers equipped with observation instruments, maps, and compasses, normally man engineer OPs. They position the OP close to the forward edge of friendly troops in terrain that provides natural camouflage, protection, unobstructed viewing, and communications to the rear. With modern equipment, an engineer OP can view a sector 1 to 2 km wide and 5 to 6 km in depth.

MARCH

In support of the march, combat engineers are responsible for accomplishing tasks that permit the unimpeded movement of forces along the march route, plus activities at assembly and halt areas. They also support the crossing of water obstacles. Figure 11-1 lists the specific engineer technical tasks that provide the required support for tactical missions prior to and during the march.

Tactical Missions Requiring Engineer Support	Engineer Technical Tasks
• Preparation of Assembly and Halt Areas. • Troop Movement. • Crossing Water Obstacles.	• Conduct Engineer Reconnaissance of Enemy and Terrain. • Clear Passages in Obstacles and Perform Demolition Work. • Establish and Maintain Water Obstacle-Crossing Sites. • Extract/Purify Water and Establish Water Supply Points. • Carry out Engineer Camouflage Measures. • Prepare and Maintain March Routes. • Prepare Fortifications at Assembly and Halt Areas. • Eliminate Aftereffects of NBC Strikes.

Figure 11-1. Engineer support for preparation and conduct of the march.

Reconnaissance

When engineers reconnoiter routes, one of their goals is to identify anything that could impede mobility. They report information on the condition of the roads, obstacles and bypasses, and bridge locations to the COE and the commander of the engineer units. The COE can increase the size of his reconnaissance element and divide it into smaller teams in order to cover several points simultaneously. This allows him to assess a large number of features in the shortest amount of time.

If the march takes place in the rear of friendly forces, the maneuver commander can send an engineer reconnaissance patrol ahead to obtain the required data. When conducting a march in anticipation of contact, engineer reconnaissance and data collection may be limited to reports from troop reconnaissance elements reporting on the engineer aspects observed along the route.

When reconnoitering routes, engineers attempt to—

- Verify the condition of the march route.
- Determine aspects of off-road terrain.
- Identify all obstacles and locate bypasses or recommended breach sites.
- Inspect bridges and dams.
- Identify suitable halt and assembly areas.

When the OPFOR route of advance encompasses potential water obstacles, engineer reconnaissance patrols try to find spots to set up ferry and bridge crossings, plus assembly or preparation areas. If bridges exist, engineers gather information on the support structure, load capacity, necessary repairs, and the presence of mines and demolitions on the approaches and on the bridge itself. For more detail on this type of reconnaissance, see the discussion of Water Obstacle Crossing in the Offense section of this chapter.

March Routes

The maneuver commander uses information gathered during engineer reconnaissance to select an appropriate march route. The march route selected should require the least amount of engineer preparation and route clearing.

The OPFOR defines a ***march route*** as a direction of movement that is assigned to a ground forces unit and designated on a map or on the terrain. A march route can use any military road or cross-country road, or movement can be off-road. For either type of road, a march route is also categorized by direction (frontal and lateral), significance (primary and secondary), and vehicle type (tracked, wheeled, and mixed).

Military Road

A ***military road*** is an existing or newly built road equipped for the movement of combat equipment and truck transportation. A military road should meet the following requirements. Roadway width should be 3 to 3.5 m for one-way wheeled vehicle and artillery traffic and 4 to 4.5 m for tanks.

For two-way traffic, the widths are 6 to 7 m and 8 to 9 m, respectively. The transverse slope should not exceed 3 percent (2°), and the longitudinal slope should not be more than 9 percent (5°). This provides for movement of mixed columns at 25 to 30 km/hr and 30 to 40 km/hr for truck columns.

Cross-Country Road

A ***cross-country road*** is a direction of movement, selected and prepared for the one-time passage of military columns. The width of a one-way cross-country road in close terrain is 3.5 m for wheeled vehicle and artillery traffic and 4.5 m for tanks. For two-way traffic, the widths are 6 to 7 m and 8 to 9 m, respectively. The steepest transverse and longitudinal slopes are 9 percent (5°) and 20 percent (11°), respectively. The minimum turning radius is 25 m.

Selection

A maneuver commander determines the march route. It can follow any line of march and may include existing roads, cross-country roads, and off-road areas. After careful consideration of reconnaissance data and consultation with his COE, he specifies the particular march route(s) his force will use. The COE is then responsible for planning and coordinating engineer support to prepare and maintain the specified march routes. He prepares the engineer support plan for the commander, then issues orders, missions, and requirements to the organic and attached engineer unit commanders for execution.

Marking

The OPFOR uses standard fabricated signs to control traffic along a march route. The three basic types of signs it uses for march routes are route markers, warnings, and prohibitions. On cross-country routes, it places route markers on the right side on a march route, or in pairs along both sides of prepared routes, every 75 to 100 m, enabling a driver to see two markers simultaneously. It uses fewer markers on paved roads. Warning signs are also on the right side of the route, 50 to 70 m from a hazard. Their goal is to get the driver's attention and call for a reduction in speed. Prohibition signs designate areas where traffic is forbidden.

Preparation and Maintenance

The capability of engineer assets to prepare and maintain routes depends on the amount of work necessary. Optimally, a road and bridge construction company maintains up to 80 to 100 km of military road per day in mixed terrain. These figures assume minimum earthmoving and obstacle-clearing requirements. If the roads are severely damaged, this capability drops to 20 to 40 km per day.

One road and bridge construction company can prepare up to 70 km of cross-country roads per day. The OPFOR reduces these planning figures by 25 percent to 30 percent at night, by 20 percent to 25 percent in the spring and autumn, and by 15 percent to 20 percent in winter. It increases the capabilities by a factor of 1.5 to 2.0 when preparing cross-country roads for tracked vehicles only.

To provide the longest possible service life, a military road is usually prepared for wheeled vehicle traffic. A cross-country road is prepared for use by tracked vehicles, and may parallel a military road.

Where it is difficult to create a cross-country road, the roadway of the military road is prepared for mixed traffic: one lane for wheeled and the other for tracked vehicles. In this case, wheeled vehicles is directed to cross water obstacles on bridges (existing or newly built), while fords are prepared for the tracked vehicles.

If non-engineer assets (such as chemical troops, infantry troops for manual labor, or tank units with mine roller-plow sets) are required to support the march route, then the COE coordinates with the other appropriate staff elements to attach this support. Depending on the situation, he may concentrate work on one section of road or divide the march route into critical sections, assigning an element to work on each.

Movement Support Detachment

To support the preparation of march routes and make them usable by the maneuver force, the COE creates an MSDs before the march. Their mission includes—

- Route reconnaissance.
- Mineclearing and obstacle clearing along the march route.
- Reinforcement of bridges and minor repairs to roads.
- Creation of column tracks.
- Construction of bypasses.
- Construction of passages through debris and areas of destruction.
- Route marking.

The composition of an MSD is not fixed and varies depending upon the—

- Condition of the terrain.
- Character of enemy actions.
- Amount of work necessary.
- Assigned rate of movement for the columns.
- Availability of engineer troops and equipment.

See the Organization for Combat section of this chapter for more detail on the task-organization of the MSD and its subordinate work groups.

Reinforcements

MSDs are employed at brigade level, but often include engineer assets from division level or even higher. Each divisional brigade's organic assets are normally sufficient to form only one MSD; a division could provide two or three more. However, a brigade can march on one or two routes and a division on a total of up to six. Doctrinally, there should be an MSD on each route.

The division COE augments or reinforces brigade engineer companies by sending additional engineer assets from division level to support creation of MSDs in lead brigades if necessary. The type and amount of labor required drives the numbers and type of engineer equipment reinforcing the brigade. Additionally, division-level engineers are responsible for capitalizing on the first-echelon brigades' engineer efforts and creating conditions favorable for committing a second-echelon brigade.

Examples of conditions that could stress the capabilities of the brigade engineer assets and require augmentation are—

- A first-echelon brigade traveling on more than one march route.
- Routes requiring considerable clearing, repair, or maintenance that tax or exceed brigade engineer capabilities.

In cases such as these, MSDs in the lead brigades can be a combination of brigade and division engineer equipment working together. Second-echelon brigades and those brigades not in the main attack may not receive additional reinforcement and may have to rely on their organic engineer company alone. If the division is in the army's first echelon and is participating in the main attack, army may reinforce the division with additional combat engineers.

A brigade usually assigns an engineer officer to act as the overall MSD commander. This officer oversees all the equipment and personnel assigned or attached to him for movement support. That can include brigade engineer assets, divisional engineer assets, and any combat troops attached to him (IFVs with plows and tanks with rollers or plows) during the MSD mission. He keeps the brigade COE advised of the route status and progress of work. Frequently, the MSD commander is the brigade's engineer company commander. If the brigade is on two march routes, there should be an MSD for each. In this case, the brigade must receive reinforcement from an engineer battalion of a higher level of command. The brigade's overall MSD commander then has a subordinate leader in charge of an MSD for each route.

Work Groups

An MSD on a particular brigade march route typically performs several functions simultaneously. Examples of such functions are—

- Filling craters.
- Removing rubble.
- Leveling a grade.
- Clearing minefields and minefield residue.
- Marking route and detour locations.

Therefore, the MSD often breaks down into separate work groups to perform the different functions. It usually has a reconnaissance and obstacle-clearing group and one or two road and bridge construction and repair groups.

The MSD commander monitors and doublechecks the progress of each work group along the way and coordinates their labor from one site to the next. If necessary, he spends a lot of his time at critical locations making sure all goes well and providing immediate supervision. Normally, the MSD commander travels with the reconnaissance and obstacle-clearing group, or the group completing the most complex tasks.

Based on reports from the MSD commander on the ground, the brigade COE keeps the brigade commander informed. He also apprises the division of the work groups' status via the division COE. The division COE then informs his commander and advises him of any problems or delays.

Reconnaissance and obstacle-clearing group. Responsibilities of the reconnaissance and obstacle-clearing group include—

- Marking the march route.
- Making immediate assessments of the terrain and obstacles.
- Identifying bypasses.
- Creating and marking passages through obstacles.
- Determining the character of destruction along the route.
- Locating building materials.

If the MSD commander breaks the reconnaissance and obstacle-clearing group into two subgroups, the reconnaissance group is the lead MSD element, and the obstacle-clearing group follows the reconnaissance group.

Reinforcing assets from the division engineer battalion can use explosive charges or mechanical equipment to overcome rubble, rock barriers, and dragon's teeth (concrete pillars or iron posts). Engineers can breach wire obstacles after examining them for boobytraps and electrification. Tree barriers may require the use of dozer blades or explosives.

Road and bridge construction and repair group. The road and bridge construction and repair group follows behind the reconnaissance and obstacle-clearing group. The construction and repair group—

- Makes crossings through or over obstructions.
- Builds and reinforces bridges.
- Establishes fords and bypasses.
- Strengthens the route in swampy sections.
- Removes rubble.
- Repairs damage.

This group also completes the marking of the route begun by the reconnaissance and obstacle-clearing group.

Position in March Column

During the march, the MSD travels in advance of the main body preparing the route so the main body can continue its advance unimpeded. Normally, the lead elements of the MSD appear in the vicinity of the advance guard to begin work in their assigned sectors. The location of the MD in relation to the forward security element (FSE) depends upon the possibility of enemy contact. If supporting a first-echelon brigade with enemy contact likely, the MSD may follow the FSE. If supporting a second-echelon brigade or when enemy contact is unlikely, the MSD may be well ahead of the FSE.

To ensure the unimpeded movement of the main body, the MSD must complete all engineer preparation before the arrival of the main body. Once the MSD completes one section of work, it then proceeds to the next critical sector on the march route and begins again.

When engineer personnel and equipment are not performing engineer-specific functions, the COE determines their position in the march column, ensuring proper distribution throughout the column. However, the commander does not assign engineer personnel duties other than engineer functions. The COE deploys engineers with recovery equipment forward and stations them at bridges, dams, and difficult sectors on the route.

Mobile Obstacle Detachment

In preparation for the march, the division or brigade COE creates one or more MODs to maximize mechanical minelaying and explosive obstacle support for maneuver forces. (See the Organization for Combat section of this chapter for more detail on the composition of an MOD.) The MOD provides countermobility support and denies key terrain to the enemy. Its mission is to alter the tactical situation by emplacing obstacles in response to enemy actions. During the march, the OPFOR commander's greatest concern is armor attacks against the flanks of the march formation. Therefore, the MOD emplaces AT obstacles in front of detected armor threats or along possible routes suitable for armored vehicles.

Although the MOD can act independently, the division or brigade COE often assigns it to move and act in close coordination with the antitank reserve (ATR). Even in the latter case, the MOD still reports directly to the COE, who assigns its priorities, areas of concern, and task organization. This arrangement provides the maneuver commander with a combination of organizations capable of rapidly emplacing AT obstacles as well as covering the obstacles with AT fires. A minelaying squad of an engineer mine warfare platoon or minelayer platoon usually serves as the core of an MOD.

Employment

During the march, the MOD may travel behind the advance guard and in front of the main body. Sometimes, it may move on a threatened flank or forward within the main body, ready to deploy to either flank.

Following the maneuver commander's guidance, the COE positions the MOD so it can quickly deploy in response to enemy actions. This may be to seal a critical sector or to provide time to shift forces and fires. The maneuver commander, the COE, and other staff elements monitor the progress of the march and plan for possible enemy courses of action. They then identify possible deployment lines for the ATR and obstacle emplacement locations for the MOD. If reconnaissance assets report enemy activity along a given sector that confirms a course of action, the commander dispatches an MOD and an ATR to the appropriate deployment line to conduct their missions.

Survivability Support

During the march, the OPFOR establishes rest halt and assembly areas to protect the unit from attack. In doing so, engineers check the entire area for mines and prepare routes within the vicinity. They erect protective covers for personnel and material and, at a minimum, dig positions for air defense weapons. They erect security structures at control lines and halt areas, identify

water sources, and employ camouflage measures.

Halt and Assembly Areas

Whenever feasible, engineers carry out fortification preparation of assembly areas before the march and halt areas during the march. The basic preparation includes configuring occupied positions for an all-around defense, emplacing air defense weapons, providing cover for personnel, and digging in combat equipment. When terrain features can be used as protection, the amount of time required to fortify equipment is greatly reduced. When forces are located in open terrain, engineer preparations are carried out at night.

When the unit is in a halt area for a day or more, it can spend 10 to 12 hours carrying out engineer tasks. These tasks include preparing covered slit trenches and partially dug shelters for all personnel. Engineers also prepare hasty or prefabricated shelters for command posts (CPs) and medical points and covered revetments for supply points.

Water Obstacle Crossings

To aid in water obstacle crossings, engineers can construct dummy crossing sites, before or at the same time they are establishing actual ones. They try to draw the enemy's attention to simulated crossing sites while real ones remain carefully camouflaged. They give authenticity to simulated crossings by using corner reflectors, by deploying vehicles on roads and other approaches to them, by moving simulated vehicles across them, and by positioning construction and bridging equipment near simulated sites.

OFFENSE

In support of the offense, engineers are responsible for providing the troops, equipment, and materials required to satisfy the tactical missions specified in Figure 11-2. This figure also identifies the nine technical tasks that the engineers must perform in support of the attack. For more information on the offense, see Chapter 4.

During ***preparation for the offense***, the engineers focus on four major activities:

- Preparing routes for the advance and employment of combat forces.
- Providing survivability support to units in assembly areas.
- Establishing passages in obstacles and minefields.
- Equipping crossings over water obstacles.

During the offense, the engineers' primary mission is to support the attack and assist in maintaining a high tempo of combat. Once the attack has started, engineer troops continue to perform tasks contributing to high rates of advance. Occasionally, they create obstacles to protect flanks, disrupt counterattacks, and block enemy reinforcements. Ongoing engineer reconnaissance is performed independently or with other reconnaissance elements.

The OPFOR views commitment of a second echelon or CAR as one of the most critical and vulnerable periods of combat. Engineer troops play a vital part in ensuring its success. They ensure the force's timely arrival on the line of commitment and provide support for its deployment and protection against flank attacks.

Tactical Missions Requiring Engineer Support	Engineer Technical Tasks
• Movement Forward, Deployment, and Transition to the Offense. • Preparation of Assembly Areas. • Crossing Water Obstacles. • Overcoming Covering Force Zone. • Repelling Counterattacks. • Penetration of Enemy Defenses. • Conduct of Meeting Battle. • Commitment of Second Echelon or CAR. • Reinforcing Captured Positions.	• Conduct Engineer Reconnaissance of Enemy and Terrain. • Prepare Fortifications in Assembly Areas. • Clear Passages in Obstacles and Perform Demolition Work. • Establish and Maintain Water Obstacle-Crossing Sites. • Establish Obstacles. • Extract/Purify Water and Establish Water Supply Points. • Carry out Engineer Camouflage measures. • Prepare and Maintain March Routes. • Eliminate Aftereffects of NBC Strikes.

Figure 11-2. Engineer support for preparation and conduct of the offense.

Reconnaissance

Engineer reconnaissance during preparation for offensive battle tries to obtain information on the nature of enemy fortifications and defensive positions, and the composition and types of enemy equipment and obstacles. The basic methods for obtaining this information are observation and aerial or ground photography.

Direct observation is useful to gain knowledge of terrain or to assess enemy equipment and fortifications. Ground photography provides information on the enemy defensive posture and engineer preparations within range and direct line of sight. Aerial photography provides information deep within the battle area.

Engineer OPs with maneuver battalions and companies in direct contact with the enemy and with troops going into an attack from the march carry out reconnaissance by observation. Engineer photographic reconnaissance posts photograph enemy defenses from the ground. Aerial photography is requested through channels.

During the offense, the primary engineer reconnaissance mission is to obtain precise information on—

- Enemy obstacles and demolitions created both during the preparation for the attack and during the attack.
- March routes and trafficability of off-road terrain for attacking combat units.
- Locations where the enemy established obstacles during his withdrawal.
- Water obstacles on the main axis of advance.
- Local materials available for engineer tasks.

Engineers reconnoiter the area of the advance and the sector of commitment. This is usually a map reconnaissance backed up by a ground or aerial survey of the routes. Once the attack has started, aerial reconnaissance and assets of higher-level commanders continue to reconnoiter obstacles deep in the enemy's defensive area. Engineer and maneuver troops confirm this information through the course of battle.

Mobile Obstacle Detachment

In a meeting battle, the MOD moves on the axis that supports the deployment of the main body for the attack. In an attack against a defending enemy, the MOD usually moves forward with the ATR, either on an open flank or in a central position ready to deploy to a threatened direction. Once the attack begins, the MOD and ATR work together to block any enemy counterattacks. During the exploitation phase, the maneuver commander employs them to cover threatened areas and open flanks. The leader of the MOD maintains close contact with the maneuver force commander and any ATR operating in the same area. See the Organization for Combat section of this chapter for more detail on the composition of an MOD; see Chapter 8 for more information on the ATR and examples of its employment along with an MOD in support of an attack.

Route Preparation

The methods and means of preparing and maintaining routes when on the march generally apply to the offense. However, there are some aspects peculiar to the offense, as described in the following paragraphs.

Attack from the March

In preparation for an attack from the march, the road net includes frontal and lateral routes in the assembly area and in the zone of advance to the forward edge. On the march, one frontal route serves one or several units, and there are routes for units to get from halt and assembly areas to the primary frontal route. In each battalion assembly area, there should be one frontal route and one lateral route, with cross-country routes for the companies to advance from their own areas to the frontal route. With favorable conditions and enough existing roads, a battalion may have a secondary frontal route. Route preparation and marking begins immediately after battalions and companies occupy their assembly areas and ends 2 to 3 hours before movement begins.

A battalion usually moves from its assembly area on one frontal route until it reaches the line for deployment into company columns (battalion prebattle formation). Using one route per company, it moves from that line to the line of deployment into platoon columns (company prebattle formation). There can be lateral routes at the lines for deployment into company and platoon columns. The companies remain in prebattle formation until they arrive at their assault line, where the platoons deploy laterally into battle formation. The first-echelon maneuver units, reinforced with engineers, must create breaches in minefields and other obstacles in front of the forward edge. Engineers expand the breach lanes and mark directions from the deployment or assault line to the cleared lanes.

Engineer road construction and repair units normally maintain only those routes which they have prepared. The maneuver commander may identify other areas that are difficult to cross on the way to the assault line. In that case, he would send out combat troops and vehicles to monitor the condition of the route, extract equipment that becomes stuck, avoid traffic jams, and repair or reinforce damaged and weak sections of the route.

During the attack, each first-echelon battalion needs a prepared battalion column route. The brigade COE tasks some of the same engineer route-clearing equipment with supporting the first echelon's transition to the offense and the commitment of the second echelon or CAR. Engineer assets of the brigade (or perhaps division) commander prepare frontal routes for movement of second-echelon battalions (or CAR) and artillery.

Engineer support of second-echelon movement focuses on preparing routes and breaching obstacles for the advance and deployment of the combat formation. During its advance, the first echelon may also use these roads. In its move to its line of deployment, a division requires up to six routes. Ideally, the first-echelon brigades' engineer resources complete the engineer work for the commitment of second-echelon forces. This allows the second-echelon's organic engineers to remain fresh, unburdened, and properly deployed for upcoming combat action.

When the second-echelon forces reach their line of commitment, they need more routes to deploy for battle: at least two for each first-echelon brigade. The preparation of these, together with associated minefield breaching and water obstacle crossing, is the responsibility of the unit being committed to battle.

Attack from Positions in Direct Contact

For an attack from positions in direct contact with the enemy, the maneuver units (possibly with engineer assistance) prepare cross-country routes for APCs, IFV, and tanks to leave their fighting positions or assembly area and move toward cleared lanes in obstacles in front of the forward edge. Mechanized infantry and tank battalions and companies prepare and mark lanes across natural and manmade obstacles.

Breaching Obstacles

In the offense, troops expect to cross obstacles in assembly areas, on movement routes, and in front of and in the depths of the enemy defense. Creating passages for the advance of the force is an engineer task. However, TBNs and MIBNs also have equipment and trained personnel to conduct limited independent countermine functions.

The methods for creating breaches and passages depend on the situation and on the type of barriers the enemy uses. See Countermobility Support in the Defense section of this chapter for definitions and examples of the three categories of engineer obstacles: explosive, nonexplosive, and combination.

Explosive Obstacles

Of the obstacles the OPFOR expects to encounter, mines are the most significant. The development of remotely delivered, scatterable mines increases the threat to the rear area. It has made clearing explosive obstacles a primary task for the MSD. The OPFOR has three basic means of breaching a minefield. The primary means are explosive and mechanical. The least preferred is by hand. Explosive line charges, and mechanical mineclearing plows or roller-plow combinations mounted on combat vehicles provide the main countermine capability.

Scatterable minefields. A maneuver company may find itself "straddled" by a scatterable minefield during movement in columns. When this happens, it stops, reports its location, and initiates a self-extraction. It accomplishes self-extraction by having—

- Elements near the edges self-extract to the perimeter.
- Interior elements gravitate to a central extraction lane.

Some tank- and IFV-equipped units may have one mounted mine plow per platoon. If the straddled unit does not have plows, or if the mines have full-width-attack fuzes that negate the effectiveness of the track-width plows, the crew dismounts and clears passage lanes by hand. Platoons or companies not on the central lane use their own forces to create passages to it. Dismounted infantry crosses minefields by following in the tracks of tanks, IFVs, or APCs, or along cleared passages. Follow-on elements attempt to bypass known scatterable minefields or use the established, marked lanes created by first-echelon battalions and companies. When available, engineers clear scatterable minefields by hand, using explosive line charges or obstacle- and route-clearing vehicles with full-width blades.

Passages in OPFOR minefields. Before launching an attack from positions in direct contact, the OPFOR must clear lanes in its own minefields. This usually occurs 1 or 2 hours before the attack and preferably at night. As a rule, the engineer battalions or companies clear the obstacles that they established. The COE assigns the engineer battalion or company commander the mission to clear minefields in a specific area. The company commander then organizes teams to manually clear breach lanes using probes, hand-held mine detectors, and shovels. In one night, an engineer squad usually clears one lane, a platoon clears three, and an engineer company clears up to nine.

Breaching enemy minefields. Breaching enemy minefields is a combined effort involving all troops and a combination of mechanical and explosive means. This is especially true when breaching minefields in front of the forward edge of the enemy defenses and within the enemy's defensive area.

Normally, engineers reconnoiter the minefield, determine its characteristics, attempt to locate a bypass, and mark the best breach locations if a bypass is unavailable. Engineers attempt to infiltrate the minefields and manually prepare a breach lane. When possible, they accomplish the breaching or marking at night or under cover of smoke and artillery fire.

Maneuver commanders create ***obstacle-clearing groups*** composed of tanks and mechanized elements (with mineclearing plows or roller-plows) from the lead battalions, possibly reinforced with engineer support. (See Figure 11-3.) One tank in each tank platoon can have an attached mineclearing plow, in anticipation of encountering a minefield. One tank in each TC can also have a mineclearing roller, which is mounted using engineer cranes to complete a roller-plow set. Some OPFOR IFVs may have mine plows. Alternatively, the commander may use these mechanical mineclearing assets to reinforce engineer elements task-organized as a work group (obstacle-clearing group or reconnaissance and obstacle-clearing group) within an MSD.

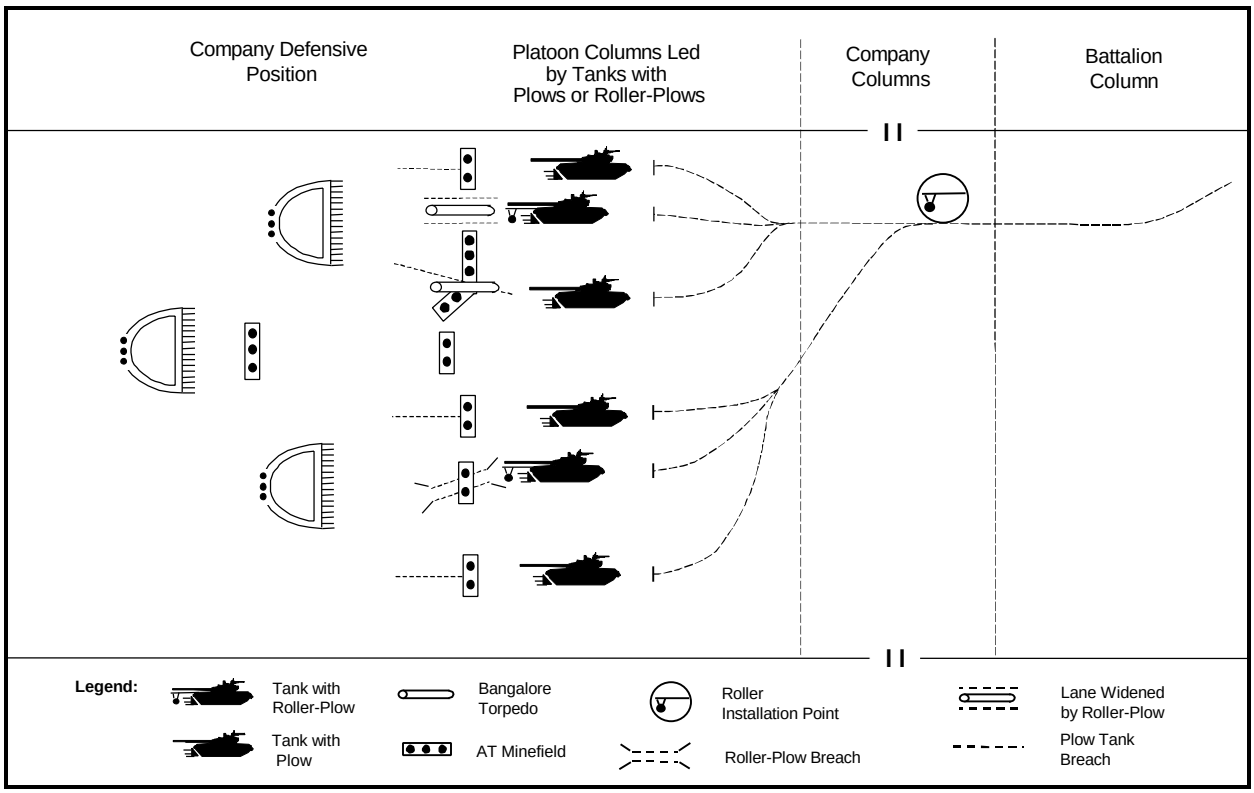


Figure 11-3. Obstacle-clearing group of a TBN leading an attack through a minefield (example).

Engineers prepare breach lanes using bangalore torpedoes and rocket-propelled line charges, or assemble explosive line charges for towing behind the breaching tanks. A TBN commander plans a minimum of six lanes, when there are two TCs in the battalion's first echelon. However, the battalion can clear a maximum of nine lanes, if the commander puts all plow- and plow-roller-equipped tanks in the first echelon. Engineers then expand successful breach lanes to facilitate the passage of the force with the goal of making gaps a minimum of 6 to 8 m wide.

Once the engineers clear and mark the lanes with flags or lighted markers, the remainder of battalions and companies begin crossing. Engineers direct traffic through the cleared lanes. They station guides at the entrance of each lane and, if necessary, at the exit point. They widen, mark, maintain, guard, and re-clear the breach, as required. The maneuver commander designates a crossing commander from the engineer company to supervise the crossing of the maneuver elements.

Nonexplosive Obstacles

During the attack, the obstacle-clearing group also creates gaps in nonexplosive obstacles. In this case, the group requires additional engineer reinforcement beyond just countermine equipment. The obstacle-clearing group may employ obstacle-clearing vehicles to knock down berms. It may also use truck-launched bridges to cross AT ditches.

Water Obstacle Crossing

In order to conduct (or continue) an attack, maneuver units must often cross water obstacles whose opposite banks may or may not be occupied by the enemy. See Chapter 4 for more information on the conduct of water obstacle crossings during the offense.

Crossing is a generic term identifying the site of a water obstacle crossing or the act of crossing.[3] Crossing involves using bridges, ferries, fords, or amphibious combat equipment. The OPFOR identifies two methods of overcoming water obstacles—***opposed crossing*** (when expecting enemy contact) and ***unopposed crossing*** (when not expecting enemy contact). However, it expects that most crossings will be opposed.

The OPFOR also expects to make most crossings without the advantage of an existing bridge or convenient fording site. Therefore, engineers must provide specialized bridging and amphibious transport (tracked amphibians and ferries) to facilitate a timely crossing. Crossing of water obstacles always requires some measure of engineer preparation, even if it is only limited to engineer reconnaissance at the crossing site. Therefore, organic and attached engineer units deploy well forward.

Reconnaissance

Depending on the situation, an engineer reconnaissance patrol, the reconnaissance element of an MSD, or engineers attached to other division and brigade reconnaissance elements can reconnoiter a water obstacle. The reconnaissance includes determining—

- The depth, width, and current velocity.
- The composition of the bottom.
- The presence of underwater obstructions or mines.
- Possible fording, ferrying, bridging, and snorkeling sites.
- The composition, height, and slope of the banks.
- Approach and exit routes.
- The camouflage potential of the area.
- The presence and nature of obstacles on the banks.
- Critical terrain features overlooking both banks.
- Information on enemy defenses.

[3] Aside from water obstacles, crossings can involve other kinds of gaps, such as ravines. These other kinds of *gap crossing* can employ some of the same engineer assets and methods used to overcome water obstacles.

The engineers transmit this information to the COE for planning purposes. They mark recommended crossing sites, bypasses, routes, and critical areas for the follow-on engineer elements responsible for establishing the crossing.

The division's engineer battalion has qualified divers with scuba gear; specialized vehicles and equipment to analyze soil data, stream velocities and depth; and mine-detection equipment. Commanders can also use maps, aerial photographs, engineer and combat patrols, radars, signals reconnaissance, and human intelligence to gather data on crossing sites.

The number of reconnaissance patrols depends on the width of the water obstacle and the number of required crossing sites—patrols vary from squad to platoon size. The patrols can be equipped with tracked amphibians, scout cars, or APCs and sometimes with special engineer reconnaissance vehicles. These vehicles often mount a profilograph (a device used to determine width and depth of water obstacles) or an echo depth finder. Although such equipment significantly reduces exposure and reconnaissance time, most engineers use less sophisticated gear—a variety of bottom probes, rangefinders, and hydrometric propellers or simply floats of some type, with a stopwatch for measuring velocity. An engineer platoon assigned a reconnaissance mission typically has six mine detectors, grapnels with cables, radiation detectors, and light diving equipment.

Categories

The width of the water obstacle affects the method of crossing, the type of crossing, the need for reinforcement, and the length of time to conduct the crossing. In terms of width, obstacle categories are narrow (less than 100 m), medium (100 to 250 m), wide (250 to 600 m), and large (greater than 600 m). In terms of depth, shallow water obstacles are up to 1.5 m in depth, deep obstacles are 1.5 to 5 m in depth, and very deep obstacles are over 5 m deep.

Although canals are narrow obstacles, engineers place them in a special category because their deep water and steep banks make it difficult to use tracked amphibians, ferries, and standard bridging equipment. It is often necessary to erect piers and special constructions to negotiate them.

Means

The OPFOR employs amphibious combat vehicles and dedicated water obstacle-crossing systems at the brigade and division level whenever possible. Many OPFOR APCs, IFVs, and reconnaissance vehicles are amphibious, as are some self-propelled artillery and tactical surface-to air missile (SAM) carriers. If APCs and IFVs are amphibious, virtually all vehicles within first-echelon battalions would have either an amphibious or snorkeling capability.

Engineer assets available for supporting opposed crossings include tracked amphibians and ferries. During crossings, the amphibians are primarily used for carrying towed artillery pieces, trucks, small vehicles, and troops. When not engaged in a crossing, they may be used as tracked cargo carriers. The OPFOR recognizes the need for tactical water obstacle-crossing assets during all types of combat and ensures sufficient assets are readily available in engineer units at higher

levels.

The characteristics of the water obstacle mainly determine the method chosen for the crossing, although the nature of enemy defenses, the mission, and the availability of engineer systems are also factors. For instance, if the water depth is less than 1.5 m, the current velocity is less than 1.5 m/s, and a hard bottom is present, the OPFOR would attempt to ford. Figure 11-4 lists the preferred crossing methods.

Water Obstacle Characteristics	Preferred Crossing Method
Depth <1.5 m	Ford
Depth >1.5 m	Ferry or Bridge
Width <20 m	Tank- or Truck-Launched Bridge
Width 20-100 m	Pontoon Bridge
Width >100 m	Ferry or Tracked Amphibian

Figure 11-4. Preferred water obstacle-crossing methods.

The OPFOR crosses some narrow water obstacles by fording, by swimming with amphibious combat vehicles, or by using tank- or truck-mounted and low-water bridges. Other narrow obstacles (up to 100 m) and medium obstacles require tracked amphibians, ferries, or pontoon bridges.

Wide and large water obstacles require tracked amphibians, ferries, or pontoon bridges (sometimes configured as rafts or ferries). Except for the amphibious combat vehicles and the tank- and truck-launched bridges, these assets are not organic to divisional brigades and must come from division or higher. Crossing large water obstacles may necessitate the use of heavy floating bridges or girder bridges erected by special-category engineers of the strategic-level transportation services.

Crossing Sectors and Sites

The senior maneuver unit commander determines the unit's ***crossing sector***, based on the tactical situation. Within that sector, the division, brigade, or battalion commander can designate crossing sectors for subordinate units or allow the subordinate unit commanders to select their own sectors within his sector. At each level, the maneuver commander (or his chief of staff) normally serves as the overall ***crossing sector commander***. See Chapter 4 for more information on crossing sectors.

The number of ***crossing sites*** within a sector depends on the tactical situation, nature of the water obstacle and surrounding terrain, combat formation, and types of crossing equipment available. There are usually separate sites for each type of crossing means: swimming, fording snorkeling, tracked amphibian, ferry, and bridge.

At division and brigade level, the COE advises the commander on selection of crossing sites within the crossing sector based on reconnaissance of the water obstacle and approaches to it. Some of these sites may fall within the sector of a particular battalion.

The crossing sector commander selects a ***crossing commander*** for each crossing site. For swimming, fording, and snorkeling sites, the crossing commander is usually the maneuver battalion's chief of staff or another officer from the mechanized infantry or tank troops involved in the crossing.

For tracked amphibian, ferry, or bridge crossings, the crossing commander is more likely to be the commander of engineer unit operating the crossing site. In either case, ***assistant crossing commanders*** are also designated for each crossing site. The assistant crossing commander, usually from the maneuver unit, crosses with the first wave and remains on the far side of the water obstacle to facilitate movement from the crossing site.

Assembly and Preparation Areas

Engineers assist in the preparation of assembly areas and of boarding and preparation areas near crossing sites. As units leave assembly areas, they pass through an engineer regulating point (ERP). The ERP is a checkpoint to ensure that vehicles do not exceed the capacity of the crossing means. At the ERP, vehicle drivers receive final instructions on site-specific procedures and information, such as vehicle speed and interval. Near the ERP is the first of a series of traffic control posts (TCPs) to direct the unit to the appropriate crossing site and avoid bunching up at the crossing site or on the approach route.

Opposed Crossing

An opposed crossing is a mounted crossing in which amphibious combat vehicles, tracked amphibians, and ferries, or local means (rafts, boats, barges, launches) are used. In the initial wave of the lead or first-echelon elements, amphibious APCs or IFVs make a rapid amphibious crossing to seize a bridgehead on the far bank. Then tanks cross by ferry, by fording, or by snorkeling. Tracked amphibians transport artillery and other combat support equipment across. All subsequent waves use one or a combination of the other types, such as pontoon bridges or ferries. Tactical bridging is emplaced for follow-on forces.

There are two types of opposed crossings: from the march and from positions in direct contact. Ideally, an opposed crossing is conducted from the march. In that case, preparation begins as soon as possible prior to the final approach to the water obstacle. If the crossing from the march does not succeed or is not feasible, the opposed crossing may be attempted from positions in direct contact with the enemy. The latter requires additional preparation and could involve crossing from the march out of an assembly area.

From the march. The opposed crossing from the march is executed in waves. Even the first wave can use engineer assault crossing equipment (tracked amphibians and ferries), if available, to carry nonamphibious combat material. After the initial crossing, the modes of crossing used by follow-on forces depend on the capabilities of the enemy, the time available, and the characteristics of the water obstacle.

From positions in direct contact. Conducting a water crossing from positions in direct contact is the least preferred method. This method of opposed crossing requires extensive reconnaissance and preparation. During preparation, engineers prepare roads and cross-country routes to crossing sites, as well as assembly areas and artillery positions.

Mechanized infantry units cross water obstacles in IFVs or APCs; tanks cross on ferries, by fording, or by snorkeling. Nonamphibious artillery and wheeled vehicles cross on tracked amphibians. The number and types of crossings are determined by the availability of crossing equipment, nature of the water obstacle, and military mission.

Division and brigade. For the initial phase of a major water crossing from the march, a division's FD and its first-echelon brigades usually attempt the crossing in battalion strength with engineer support. A division might receive reinforcement from army or army group engineer units.

Brigades are allocated tracked amphibians, ferries, and pontoon bridging from division, army, or army group organizations as mission and resources dictate. Tracked amphibians carry artillery, air defense, and support units, while ferries transport tanks and other heavy equipment. Normally, second-echelon brigades can cross unopposed.

Mechanized infantry battalion. Most opposed crossings are conducted by battalions in the first echelon of a brigade. However, a battalion could also be acting as an FD or advance guard. (See Chapter 4 for more detail on crossings by an FD or advance guard.) An MIBN can receive ferries and amphibian platoons (and possibly even pontoon bridges) from brigade and division.

A combat reconnaissance patrol, possibly with engineers attached, may reconnoiter two or three favorable crossing sites and their approaches. In addition, the engineer units supporting each crossing can send out engineer reconnaissance patrols to refine information.

IFVs and APCs of the first-echelon mechanized infantry companies (MICs) enter the water at H-hour. On reaching the far bank, attached engineers then begin clearing obstacles from the far bank, if required. Direct fire from attached tanks and artillery, if available, can support the engineers from the near bank.

Attached tanks make ferry crossings in waves. Because of the limited number of ferries, few tanks are transported in the first wave. AT weapons, mortars, and attached artillery cross as soon as possible, on tracked amphibians or ferries.

After a bridgehead is established, the remaining attached and organic artillery, air defense, AT, and automatic grenade launcher units cross in amphibious combat vehicles or on tracked amphibians or ferries to provide support and cover of units on the far bank. Battalion logistics elements cross on amphibians or ferries, following the artillery and air defense elements. Amphibians or ferries returning to reload can transport wounded personnel back to the near bank.

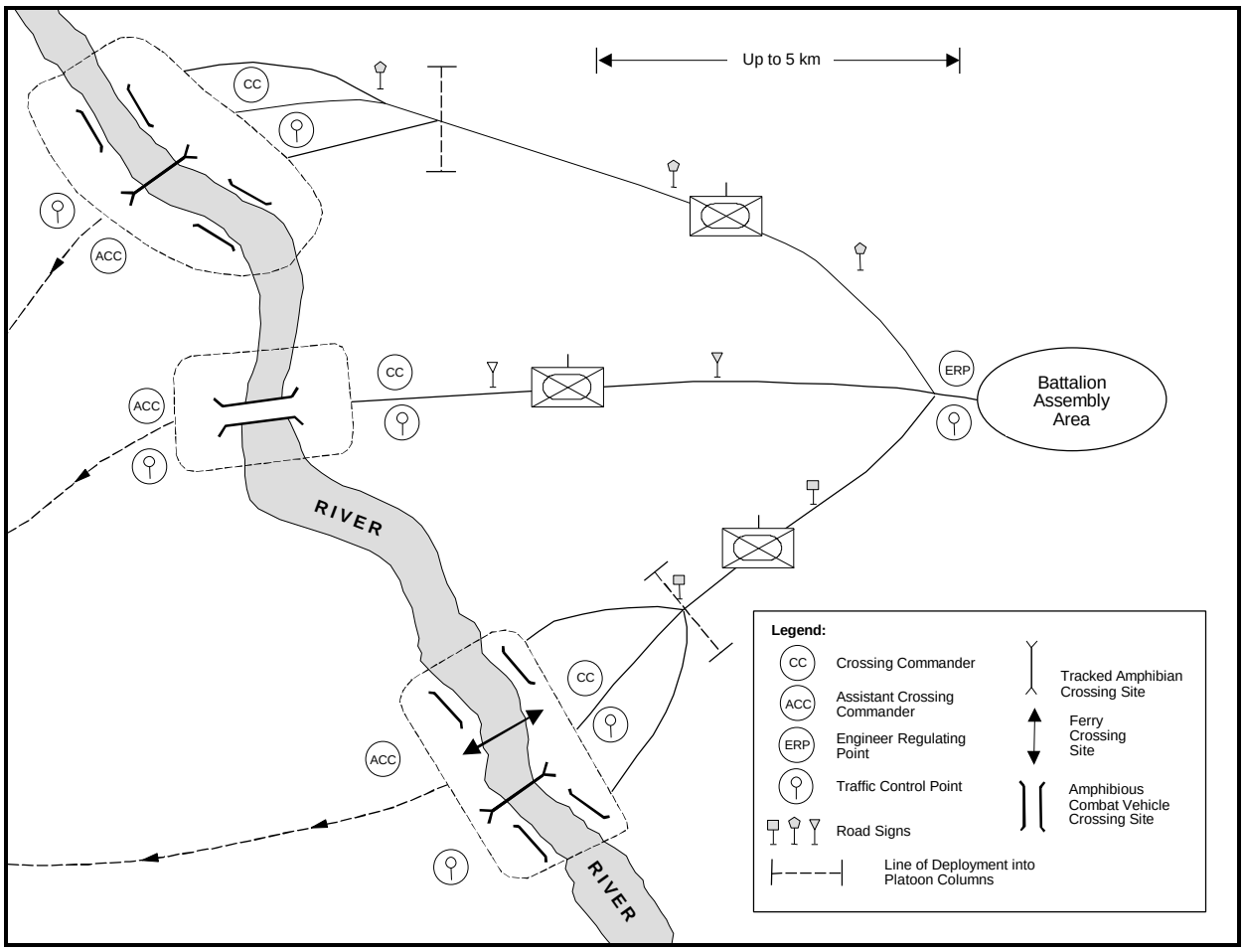


Figure 11-5. Engineer support of MIBN crossing (example).

Figure 11-5 shows an example of an MIBN crossing supported by tracked amphibians, ferries, and a pontoon bridge. In this example, two MICs cross by amphibious means, while the third company and support elements cross over a pontoon bridge. When a pontoon bridge is available, a second-echelon MIC and logistics elements can cross it in march formation. Normally, bridges are erected only after the far bank is secured to a depth precluding enemy direct fire on the crossing site. However, if the enemy defense has been neutralized by fire or the opposite bank has been seized by airborne or heliborne forces, bridge construction may begin along with the opposed crossing. For more information on bridge crossings, see the Unopposed Crossing section in this chapter.

Tank battalion. A TBN crosses a water obstacle by fording, by going over bridges, by being transported aboard ferries or on tactical pontoon bridging, or by snorkeling. Snorkeling is the least-preferred option, since it requires tank crews and engineers that are very well trained in snorkeling. See the Unopposed Crossing section for more information on tank snorkeling.

Unopposed Crossing

If an FD or heliborne force or an advance guard that precedes it has eliminated enemy resistance at the water obstacle, battalions in the main body of a first echelon brigade can conduct an unopposed crossing. If the first-echelon brigades must conduct an opposed crossing and are successful, this allows follow-on forces to conduct an unopposed crossing. In addition to existing bridges and fording or snorkeling sites, an unopposed crossing can make extensive use of bridges and ferries from engineer units.

Bridges. Bridge crossings are a typical feature of unopposed crossings. They can be made using pontoon bridges or tank- or truck-launched bridges. Depending on the situation, fixed wooden bridges may also be constructed. All units can cross rapidly once the bridges are in place. Bridges have greater load-bearing and throughput capacities than other crossing means and are preferred in order to maintain high rates of advance.

After an opposed crossing, company- or platoon-size pontoon bridge units usually follow first-echelon units to the crossing site. Construction of bridges starts when the enemy is denied the ability to subject the crossing to direct or observed fire. Launching activity begins with the unloading of pontoon sections. At the crossing site, vehicles unload by backing into the water and releasing the pontoons. Engineer construction of a division bridge, on which second-echelon brigades or the division CAR can cross, is unlikely to begin before H+30 minutes. The engineers may complete it 30 to 60 minutes later. Thus, bridge crossings can begin within 60 to 90 minutes after the start of an opposed crossing. Once bridging has been erected, a second-echelon MIBR or TBR normally can cross in less than an hour.

Engineer units perform reconnaissance of bridge assembly areas, approaches, and pontoon launching sites while engineers prepare movement routes. Assembly areas are located near the crossing site but out of the range of direct fire from the opposite bank. Routes to the site are checked to assure that sufficient overhead clearance is available. Once a bridge is in place, engineer troops are responsible for bridge maintenance and traffic control. They are also responsible for extracting or relocating the bridge when all elements of the parent unit have crossed, or during daylight hours if the threat of destruction by enemy air or indirect fire is considered possible.

Engineer reconnaissance posts are set up to monitor the overall bridging activity, chemical and radiological contamination, enemy diversionary actions, and floating debris. These outposts can consist of a squad or platoon of mechanized infantry or engineer personnel. One outpost can be established 1.5 to 2 km upstream and another approximately 500 to 700 m downstream from the bridge. Engineers may also emplace booms and nets upstream to impede floating mines and debris.

The crossing commander designates TCPs, OPs, and work teams at the crossing site. A ***bridge team*** is assigned to inspect pontoon couplings and bank moorings, to evaluate and repair damage, and to monitor entry and exit of vehicles. This team consists of one pontooneer for every three center pontoon sections and three pontooneers for every ramp section.

A ***bridge security team*** is designated to provide protective fire for the bridge teams. This team normally consists of personnel from a pontoon squad with one individual stationed every 75 to 100 m along the bridge and a two-man post on each bank. A ***shore team***, appointed to maintain and monitor the bridge approaches, may be equipped with route-clearing and obstacle-clearing vehicles. An engineer unit assists in relocating a bridge, removing debris that has floated into the bridge, or improving routes and assembly areas.

OPFOR doctrine asserts the flexible use of bridging assets. "Combination" bridging techniques are used to overcome otherwise complex situations. For example, a steep river bank can be prohibitive to bridge emplacement and to the subsequent crossing. This can be overcome by using tank- or truck-launched bridges in combination with other bridge types. An example is to use vehicle-launched bridge spans to lessen the approach slope from a steep bank down to the pontoon bridge sections in the river. Dedicated engineer units and even individual engineer vehicles available at brigade level can also prepare the banks. Brigades also can "couple" the spans of their tank-launched bridges in two- or three-bridge configurations. Thus, the span length can be greatly expanded.

Low-water bridges can free pontoon bridges, ferries, and tracked amphibians for use in other crossings. Low-water bridging is relatively permanent, using piling to provide support. On rivers with stream velocities exceeding 2 m/s, crib supports are used in lieu of piling. These bridges are constructed by the construction company or the road and bridge construction company of the division engineer battalion with assigned high-capacity gangsaws to produce bridge timbers. A construction company has the organic piledrivers and cranes required to build a 40-m bridge in 8 hours.

Ferries. Ferry crossings are used to transport nonamphibious heavy equipment across medium to wide water obstacles. This usually requires three to four ferries per site. Ferries can be joined into a pontoon bridge or can be used as individual ferries. Individual folding pontoon bridge sections can also be used as ferries. These dual capabilities greatly expand the response options of the commander to different obstacles encountered. Ferries are not usually employed in the initial wave of an opposed or unopposed crossing but rather in subsequent waves of tanks and other combat vehicles.

Engineer missions in the unopposed crossing are the same as they are in the opposed crossing, but engineers are also assigned to prepare mooring and launching sites and to assemble the ferries. Based on engineer reconnaissance data, the crossing commander selects mooring sites, determines the number and disposition of ferries or pontoon bridges used as ferries, and plans traffic control.

The assault crossing company of the division engineer battalion has a platoon of ferries and two amphibious platoons. The pontoon bridge company of the division engineer battalion can conduct ferry crossings using its powerboat platoon and two pontoon bridge platoons. A road and bridge squad is assigned to each ferry site to prepare the approaches to the launch sites. An engineer squad or a traffic control squad directs movement to the sites.

Ferry crossings begin can 15 to 20 minutes after the start of an opposed crossing. The pontoon bridge and ferry units assemble their equipment while engineers prepare approaches to the launch site using dozers and route-clearing or obstacle-clearing vehicles. Ferries are launched from prepared ramps, and personnel from the ferry platoon create landing ramps on the far bank. Floating pontoon bridge rafts are maneuvered and positioned by powerboats.

Tank snorkeling. As long as two months of training is required to gain the level of crew proficiency required to conduct the snorkel crossing. Therefore, snorkeling is attempted only at water obstacles that have—

- Depths of 5.5 m or less.
- Prepared entry and exit points.
- Entry slope of 47 percent (25°) or less.
- Exit slope of 27 percent (15°) or less.
- Stream velocities of 3 m/s or less.
- Hard, level bottoms with no boulders, craters, or soft spots.

Such crossings are attempted when fording, bridge, or ferry crossing sites are not available or when an opportunity for surprise exists.

Engineer reconnaissance patrols have significant roles in determining whether underwater crossings should be undertaken. A diving team from the patrol reconnoiters the bottom to check soil quality and to look for underwater obstacles, including mines. The remainder of the patrol, possibly one or two engineer squads, marks the crossing lanes and approach routes and prepares the assembly areas and crossing sites. Patrol members may use a tracked amphibian when marking obstacles and lanes with buoys. An engineer reconnaissance vehicle can be used for water-crossing reconnaissance. Special attention is placed on examining overhead clearance on approach routes. Explosive line charges and manual clearing techniques are used to clear mines on the opposite bank.

The far bank must be secured before tank snorkeling can begin. If that bank is not already in friendly possession, the crossing commander normally dispatches a security force to the far bank to secure exit points from direct enemy observation. Efficient traffic control is also essential to keep tanks from massing at the crossing site and becoming a lucrative target for enemy aviation and artillery.

As little as 15 minutes are required to prepare some OPFOR tanks for underwater fording, although up to 30 minutes is required for older tanks. On medium water obstacles, a fording or snorkeling site is usually 25 to 30 m wide. On wide water obstacles, it can be up to 50 m. A TBN is assigned one or two prepared routes for fording or snorkeling. Some elements may snorkel across at one site while others cross elsewhere by other means.

Figure 11-6 depicts an example of a snorkeling site for a TBN crossing a medium water obstacle. Sealing areas are selected near concealed routes about 3 to 5 km from the water obstacle. Snorkels are installed about 1 to 2 km from the obstacle.

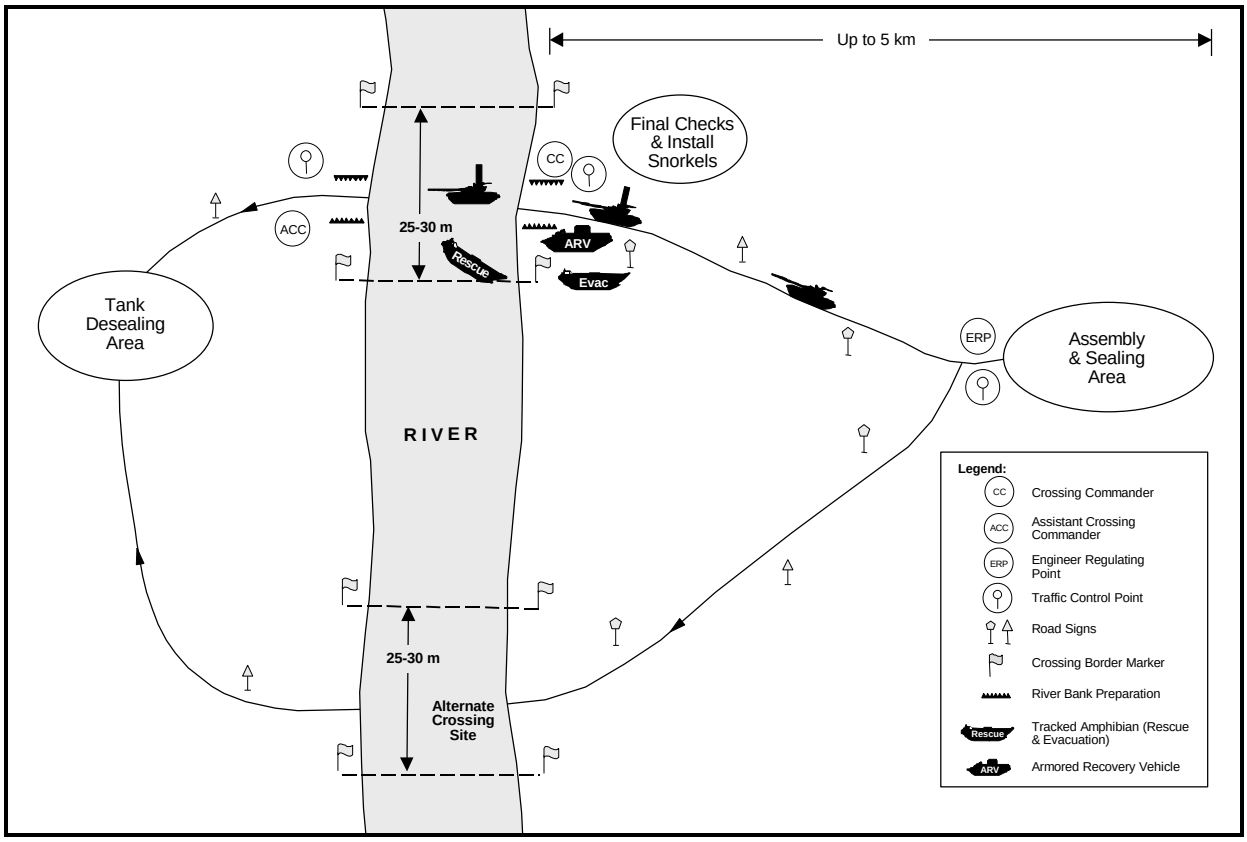


Figure 11-6. Tank underwater (snorkel) crossing site (example).

Tanks cross underwater in column formation at approximately 30- to 50-m intervals. They cross in first gear, without shifting gears or halting, and follow a predetermined azimuth with the aid of the on-board gyrocompass. This direction can be altered by instructions radioed to the tanks from the unit commander. Once the tank has completed the crossing, it must be halted to remove waterproofing before the turret can traverse and the main gun can fire.

If a tank stalls on the bottom, it must be flooded before crewmembers can open the hatches and escape using their breathing apparatus. Snorkeling is not feasible during winter, because drifting or unbroken ice could rip away the snorkel.

Unmanned tanks can be moved across a water obstacle by means of a winch system. This system permits a TC of 10 tanks to be moved across an obstacle up to 200 m wide in about 35 minutes (excluding preparation). One pulley block and an anchoring unit are transported to the far bank in a tracked amphibian, IFV, APC, or powerboat. It must be installed 30 to 45 m from the water's edge if three tanks cross simultaneously or 10 to 15 m for a single tank. After tanks are prepared for underwater crossing, two armored recovery vehicles (ARVs) pull them across while their crews cross in IFVs, APCs, or tracked amphibians.

Fording. In opposed and unopposed crossings, the OPFOR establishes fords at shallow water crossing sites. Since fordings are not as complicated as other crossings, the unit may remain in march formation. If possible, units cross simultaneously on a wide frontage.

Deeper fords can be undertaken by tanks without the use of snorkels but may require partial sealing of the tanks up to the turret ring. When partially sealed, air for the engine and crew is drawn in through open turret hatches. Deep fording by tanks is limited to depths not exceeding 2.3 to 2.5 m, depending on currents.

Survivability Support

In preparation for offensive action, the primary use of field fortification is in the preparation of assembly areas. Even there, the tasks of preparation typically exceed the capability of engineers organic to the brigade and even that of those likely attached as reinforcements. Maneuver commanders realize that fortification of offensive positions is a shared responsibility. Consequently, the preparation of assembly area positions becomes a shared responsibility involving all available personnel and equipment.

This process is performed simultaneously throughout the force, with infantry using shovels and armored vehicles using integral self-entrenching blades, if available. Meanwhile, specialized engineer equipment digs positions for critical sites such as medical facilities and C^2 centers. As scarce engineer equipment becomes available, it is then tasked to support maneuver units by augmenting and improving on the work the units have already begun.

The goal is to prepare a separate assembly area for each battalion-size unit, using engineer equipment to construct positions for vehicles shortly after they arrive at their assigned location. Within 1 to 2 hours, engineers dig assembly area fighting positions for all personnel. The engineers may prepare prefabricated structures for battalion command observation posts (COPs) and carefully camouflage all structures.

During the offense, the goals of CCD are essentially the same as on the march. Offensive measures include—

- Selection of terrain for its screening effect.
- Use of obscurants (smokescreens).
- Use of artificial and natural camouflage screens.
- Simulation of characteristic defensive measures—to "mine" the terrain in view of the enemy with decoy minefields or to give the appearance of reinforced defensive positions.
- Use of concealed routes for movement of supplies and reserves.

DEFENSE

Engineer support for the defense focuses on reconnaissance, fortifying friendly troop positions, carrying out engineer camouflage measures, and adapting the terrain for defense. This last item includes—

- Preparing lateral routes.
- Decontaminating terrain.
- Clearing minefields.
- Emplacing minefields and obstacles.
- Locating, extracting, and purifying water.

Defensive planning measures ensure extensive use of obstacles, integrated with preplanned direct and indirect fires, to affect the enemy's advance and facilitate his destruction. Figure 11-7 identifies nine specific tactical missions supported by engineer efforts. The performance of nine technical tasks satisfies the tactical requirements for engineers. For more information on the defense, see Chapter 5.

Tactical Missions Requiring Engineer Support	Engineer Technical Tasks
• Repelling Enemy Attacks in Front of the Forward Edge. • Preparation of Defensive Areas. • Troop Movement. • Battle to Hold Positions. • Repelling Enemy Penetrations of Defense. • Overcoming Covering Force Zone. • Counterattack by Second Echelon or CAR. • Reinforcing Lines Taken in Counterattack. • Transition to the Offense.	• Conduct Engineer Reconnaissance of Enemy and Terrain. • Prepare Fortifications in Defensive Positions. • Clear Passages in Obstacles and Perform Demolition Work. • Establish and Maintain Water Obstacle-Crossing Sites. • Establish and Improve Obstacles. • Extract/Purify Water and Establish Water Supply Points. • Carry out Engineer Camouflage measures. • Prepare and Maintain March Routes. • Eliminate Aftereffects of NBC Strikes.

Figure 11-7. Engineer support for preparation and conduct of the defense.

The COE determines the extent of engineer preparation necessary after considering the conditions that caused the OPFOR to assume the defense. If it is during the course of the offense, support begins with the MODs and ATRs protecting threatened axes and the improving of the route(s) needed for regrouping. If it is a defense out of contact with the enemy, support begins with the creation of defense works and the improvement of routes for the unit to deploy. In both cases, engineer work supports development of the defensive area by enhancing the effectiveness of OPFOR weapons and protecting personnel and equipment from the effects of conventional fire and weapons of mass destruction.

Reconnaissance

During defensive combat, engineer OPs monitor enemy engineer activity, evaluate zones of destruction, and report areas where the enemy is breaching defensive obstacles. At least one of the posts provides detailed photography of the battle area. The posts forward all information to the maneuver commander and the COE. In the defense, engineer reconnaissance elements reconnoiter terrain and the enemy situation to determine routes best suited for a return to offensive action.

Mobile Obstacle Detachment

In the defense, the division or brigade commander generally locates his MOD, along with his ATR, in a covered and concealed position to the rear of first-echelon defending units. This hide position can be on a threatened axis or flank or in a central location, from which it can deploy to react to various contingencies. The MOD can lay minefields—

- To close gaps in the defense.
- To block the axis of an enemy armored advance.
- To block enemy penetrations.
- To channel the enemy into a fire sack and contain him there.
- To protect the flank of a counterattacking force.
- To contain an enemy air assault in the rear area.

See the Organization for Combat section of this chapter for more detail on the composition of an MOD; see Chapter 8 for additional details on the employment of AT assets in conjunction with the MOD.

Route Preparation

In the defense, the OPFOR prepares and maintains march routes as it does in the march or offense. However, damage from enemy attacks may require continual repair work. Defensive route preparation is peculiar in that it is necessary to prepare both frontal and lateral routes on the sole basis of usage time, regardless of who uses them.

At brigade level, organic assets prepare all routes. Engineers prepare routes for the rapid and concealed deployment of counterattack or blocking forces. They clear, improve, and mark existing roads. Engineers also prepare maneuver routes to the front and flanks, as well as supply and evacuation routes.

Within a battalion defensive area, the OPFOR prepares one frontal route from the closest lateral route to the battalion supply points. It prepares cross-country tracks from the battalion supply points to company strongpoints. If artillery is attached to the battalion, approach routes to artillery firing positions are marked from the closest lateral or frontal route. The OPFOR also prepares routes of advance to the counterattack deployment line for a second-echelon company or CAR.

When a company or battalion employs some of its vehicles as an armored group, there could be some engineer assistance in creating routes of withdrawal of the armored group to hide areas. However, the vehicle crews normally prepare their own routes to designated firing lines, as well as routes back to their original platoon strongpoints.

Countermobility Support

OPFOR engineer obstacles include any actions taken to inflict losses and to delay and impede enemy movement. The creation of engineer obstacles and execution of demolition activities are critical engineer functions in all phases of the battle. In the defense, engineer obstacles—

- Protect flanks.
- Disrupt attacks.
- Block enemy reinforcements, second echelon, or reserves.
- Strengthen the defense.
- Disrupt enemy activities.
- Canalize the enemy into fire sacks.
- Cover gaps between defenders.

The OPFOR divides engineer obstacles into three categories:

- **Explosive obstacles**—minefields, groups of mines, and objects prepared for demolition.
- **Nonexplosive obstacles**—AT ditches, escarpments, abatis, wire barriers, and water obstacles.
- **Combination obstacles**—a combination of explosive and nonexplosive obstacles.

Of the three categories, explosive obstacles are the most common. Engineers and others can emplace minefields more easily and quickly when compared to the construction effort for nonexplosive obstacles. Additionally, the OPFOR plans for the self-destruct or self-neutralization capabilities frequently found in scatterable mines. It can also lay mines with remote-control devices to activate or deactivate the minefield at will. This minimizes the adverse effect of friendly minefields on future actions and reduces the need for the OPFOR to breach its own obstacles.

However, this is not the case with nonexplosive obstacles, which are time- and resource-intensive to install and eliminate. For these reasons, the OPFOR usually emplaces mines and other explosive obstacles first, and eventually supplements them by constructing nonexplosive obstacles.

When this occurs, they create combination obstacles, which are the next most common after the explosive type. It is extremely rare for the OPFOR to use a nonexplosive obstacle in isolation without any mines, explosives, or booby traps.

Minefields

The OPFOR frequently uses minefields during all phases of combat. There are five basic types of OPFOR minefield:

- Antitank (AT).
- Antipersonnel (AP).
- Mixed.
- Decoy.
- Antilanding.

The OPFOR stresses the importance of covering minefields with both direct and indirect fires, particularly with long-range AT weapons. Minefields inflict damage on attacking enemy forces and slow and canalize enemy forces into fire sacks covered by massed fires. Whenever possible, the OPFOR contains enemy forces in a window of vulnerability for the longest time possible. This facilitates the destruction of the enemy.

Conventional OPFOR minefields generally conform to doctrinal standards. This standardization ensures that engineers and combat personnel follow consistent, uniform practices. Scatterable minefields, however, are much less predictable in pattern. Maneuver commanders use combat personnel to emplace protective minefields around fighting positions, while engineers shape the battlefield for the maneuver commander. Commanders of battalions and companies emplacing mines prepare minefield records in three copies: one for the unit, one to the brigade, and one to the division. The COE at division and brigade level then uses the records to prepare combined obstacle overlays for the maneuver commander. Minefields are a fundamental part of the total obstacle plan that incorporates barriers and terrain features.

Antitank. AT minefields are the primary type of OPFOR engineer obstacle. AT minefields are primarily established on avenues that are favorable for tanks, in front of the forward edge, and on the flanks. They are also placed at unit boundaries and in the depths to cover artillery firing positions, COPs, and other objectives.

The OPFOR usually emplaces AT minefields on a frontage of 200 to 300 m or more and to a depth of 60 to 120 m. The mines are laid in three or four rows with approximately 20 to 40 m separating each row. The normal spacing between AT mines in the rows is 4 to 5.5 m for pressure-activated mines, and 9 to 12 m for full-width-attack mines. The normal mine outlay for 1 km of frontage in AT minefields is usually 300 to 400 full-width-attack mines, or 550 to 750 pressure-activated mines. This mine outlay can reach 1,000 or more AT mines per km of frontage on major avenues of approach. The OPFOR refers to this density of mines as a "minefield of increased effectiveness."

In urban environments, the OPFOR may place groups of AT mines on narrow streets and alleys. It calculates emplacement of AT mines at the rate of one mine per 100 m of street or alley. Figure 11-8 illustrates the general emplacement of an AT minefield with track-attack mines. Figure 11-9 shows an AT minefield with full-width-attack mines.

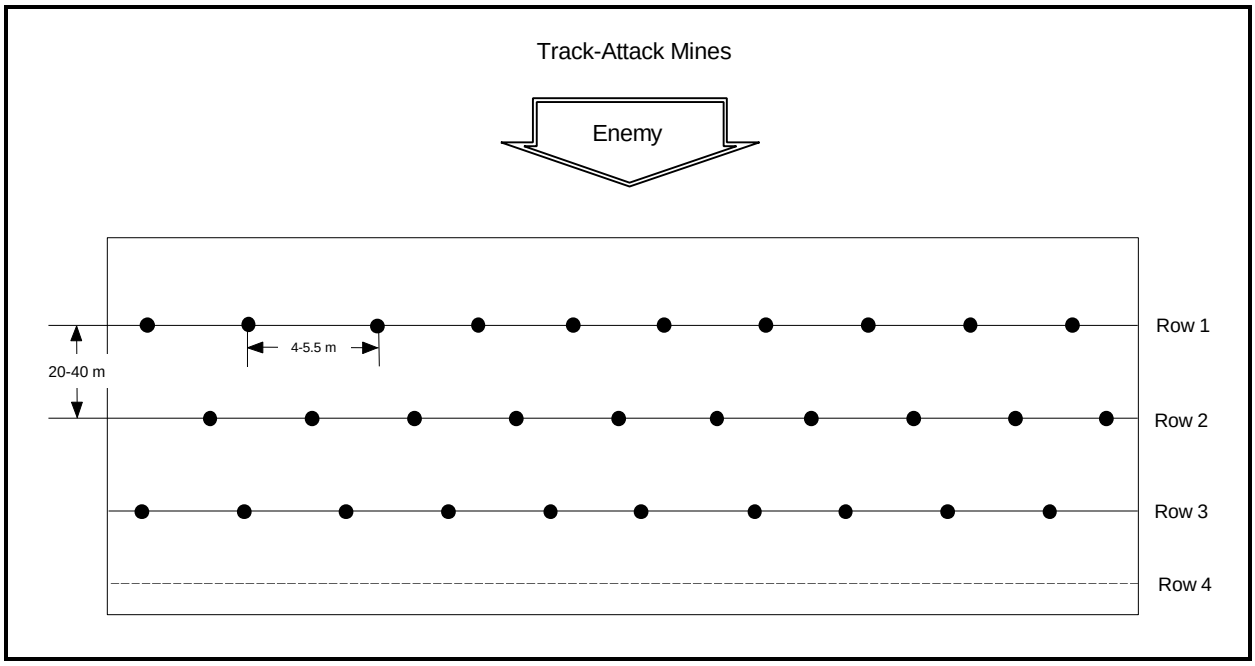


Figure 11-8. AT minefield configuration with track-attack mines (example).

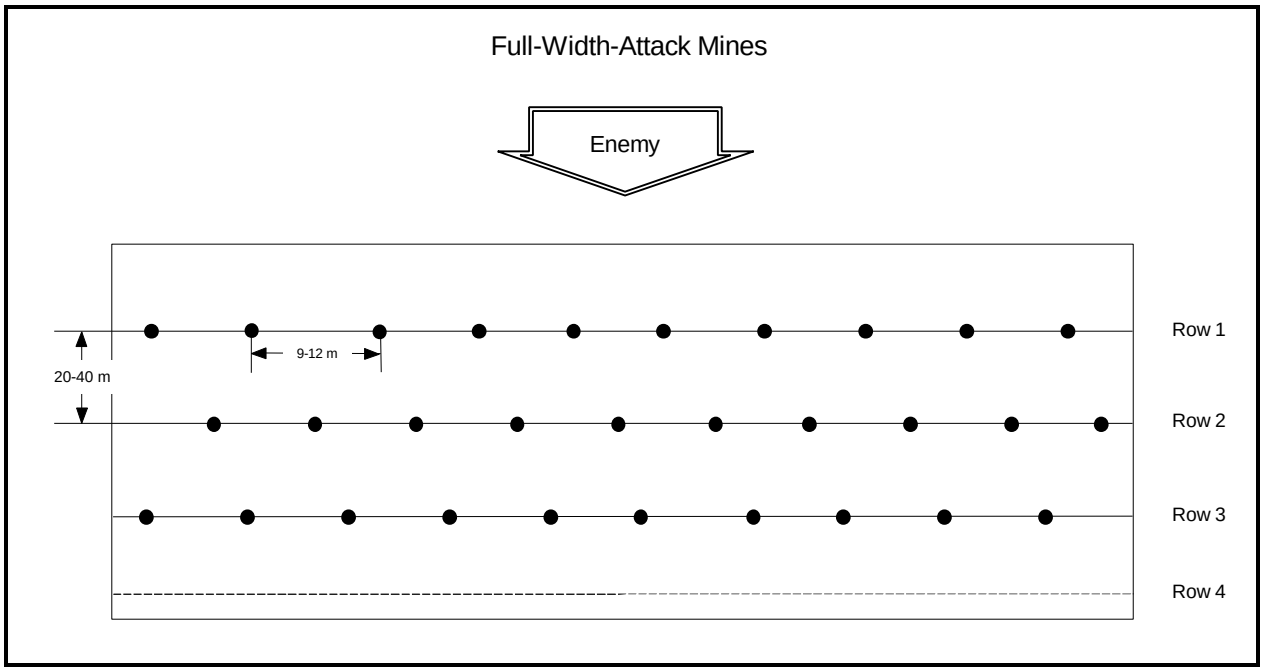


Figure 11-9. AT minefield configuration with full-width-attack mines (example).

Antipersonnel. The OPFOR can set up conventional AP minefields on the forward edge of friendly defensive positions, in front of AT minefields, or along dismounted avenues of approach. These minefields can consist of blast mines, fragmentation mines, or a mixture of the two. The OPFOR emplaces AP minefields on a frontage of 30 to 300 m or more with a depth of 10 to 50 m or more. It usually lays AP mines in two to four rows with a distance of 5 m or more between rows.

The OPFOR may emplace 2,000 to 3,000 blast and 100 to 300 fragmentation mines per km of frontage. An AP minefield of increased effectiveness may have as much as three times the normal outlay of AP mines. Intervals between mines in a row are at least 1 m for blast mines and up to twice their destructive radius for fragmentation mines. Figure 11-10 shows variations of the employment of AP minefields.

Emplacement of minefields with increased effectiveness is more likely on dismounted avenues of approach. In urban environments, the OPFOR can emplace 2 to 3 fragmentation mines for every 50 to 100 m of street. It prefers to use blast mines and fragmentation mines within buildings.

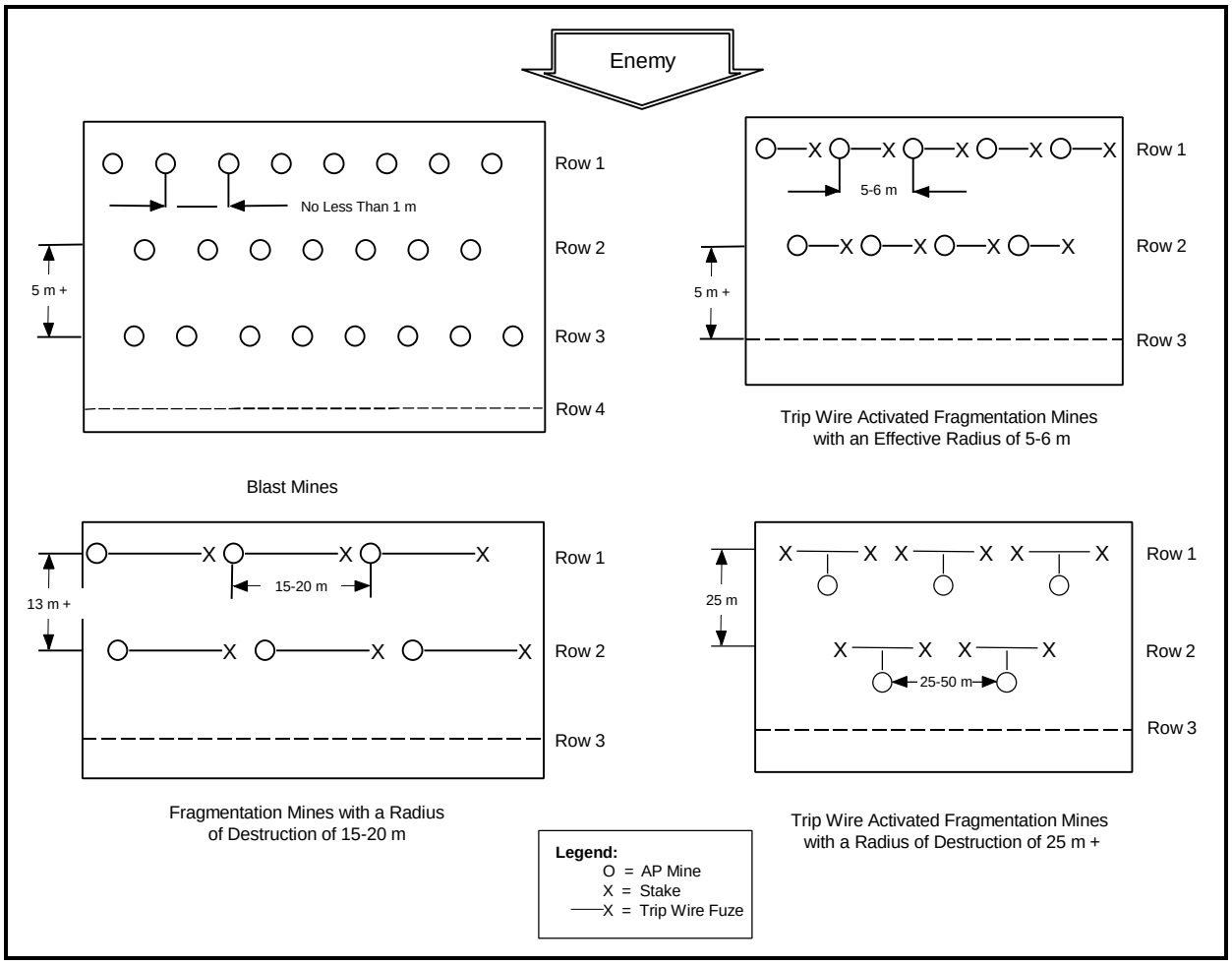


Figure 11-10. AP minefield configuration (example).

Mixed. Mixed minefields contain both AT and AP mines. However, the OPFOR does not mix AT and AP mines within a mine row. A mixed minefield is a minefield with pure homogenous rows of either AP or AT mines. The AT mine requirements govern the mixed minefield's parameters, outlay, and density. In areas that are not suitable for armored vehicles, AP mines constitute the majority of mixed mine obstacles. Figure 11-11 shows an example of a mixed minefield with blast AP rows between AT rows.

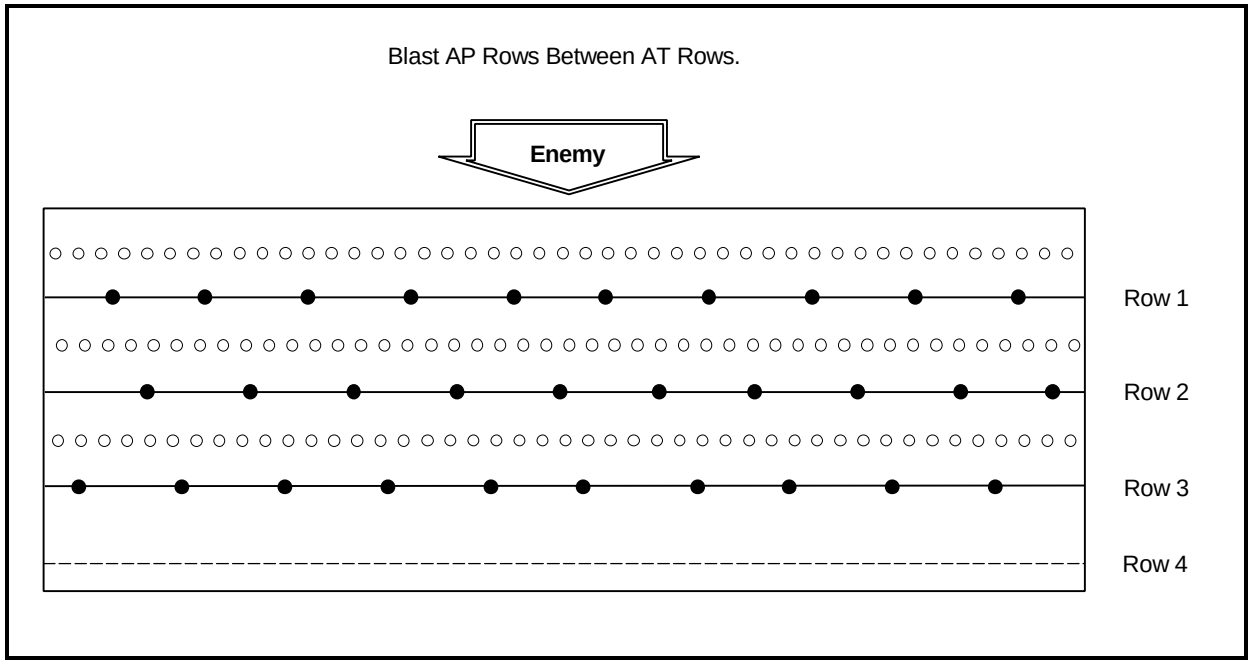


Figure 11-11. Mixed minefield with blast AP rows between AT rows (example).

Combat arms personnel set up nonexplosive and mixed minefield obstacles to cover their defensive positions. Engineers lay mixed minefields in front of the forward edge and on primary avenues into the defensive depth. Mixed minefields are usually established in front of unit positions that are transitioning to the defense. Figure 11-12 illustrates an example of a mixed minefield with an AP minefield leading to full width AT minefield.

Decoy. The OPFOR uses decoy, or false minefields to mislead the enemy as to the locations of actual minefields. Decoy minefields are part of tactical deception. They typically give the impression of minelaying activity, usually scarification of the soil, minelaying debris, minefield fences and markers.

Antilanding. The OPFOR uses antilanding mines when conducting combat along the seacoast or inland water features or at possible landing or drop zones. It employs explosive, nonexplosive, and combination obstacles. Minefields established in the water consist of bottom and anchored mines and, at shallower depths, waterproof mines. The OPFOR uses all types of mines above the shoreline, emplacing them following normal minefield doctrine. At landing and drop zones it uses fragmentation and directional AP mines.

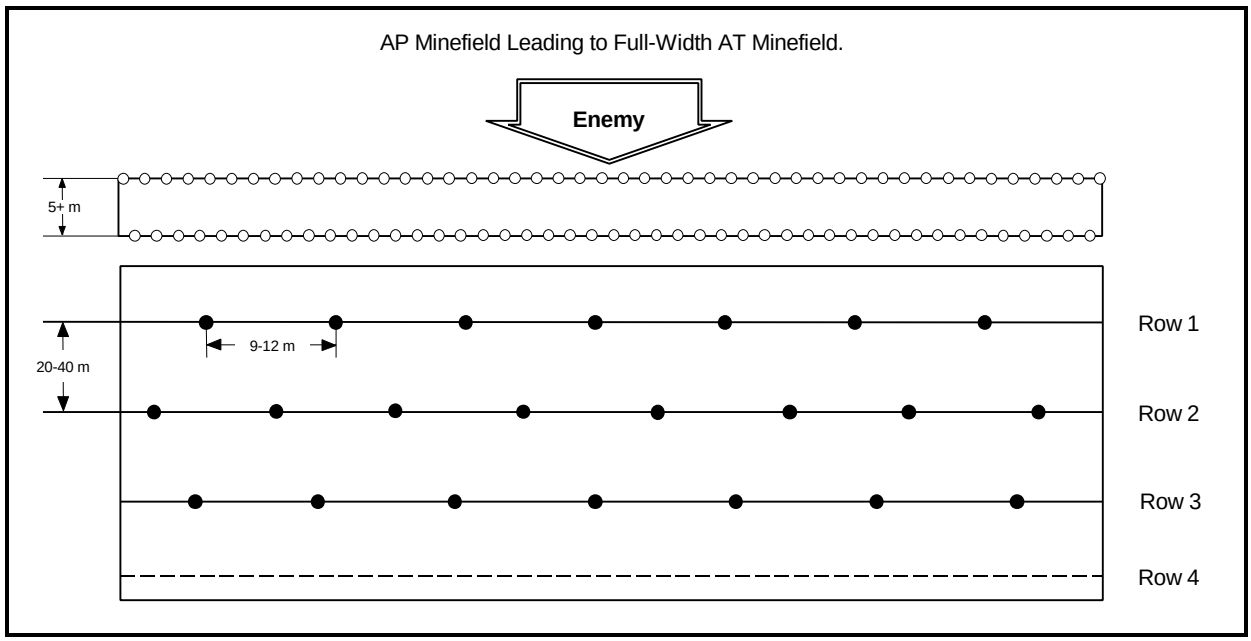


Figure 11-12. Mixed minefield with an AP minefield leading to full-width AT minefield (example).

Obstacle Planning

The OPFOR fully integrates obstacles with mutually supporting systems of fire, as exemplified by the habitual association between the MOD and the ATR. Just as it develops a fire plan, it also develops an integrated obstacle plan tailored specifically to each unique tactical situation.

To develop the obstacle plan, the COE conducts an evaluation of the situation from an engineer perspective. He usually performs his analysis in the sequence outlined in Figure 11-13. Using this information, plus his commander's scheme of maneuver, he determines engineer allocations and priorities, and directs obstacle development and other engineer preparation.

Sequence	Determine and Evaluate
1. Enemy	Enemy engineer capabilities. Possible enemy engineer courses of action. Composition of enemy engineer units, with available equipment.
2. Terrain	Masking properties. Suitability for fortifications, sustainment, mobility, and countermobility measures. Fields of fire and avenues of approach. Target acquisition and weapon ranges. Natural obstacles and key terrain features. Impact on friendly and enemy forces and actions.
3. Weather	Impact on friendly and enemy forces and actions.
4. Time Available	Impact on friendly and enemy forces and actions.
5. Resources Available	Composition of engineer resources. Available equipment and types of mines. Capabilities of available resources to support the current battle. Resources required to support upcoming combat actions.

Figure 11-13. Sequence of analysis of tactical situation in obstacle planning.

Minelaying

The OPFOR views mines as an essential element of both offensive and defensive combat. The means of emplacing minefields can be manual, mechanical, or remote. Since minelaying is a common task skill, manual emplacement can be performed by anybody and is the method employed by maneuver units. However, manually emplaced conventional minefields are. However, manual minelaying is labor-intensive and requires the expenditure of more time than may be available during high-speed maneuver. Therefore, OPFOR engineers may have towed and/or tracked conventional mechanical minelaying vehicles that can quickly emplace both buried and surface-laid minefields. The engineers may also have vehicle-mounted scatterable minelaying systems. These mechanical systems to allow engineer forces to quickly mine an area just prior to or during the battle. Engineer resources are supplemented by remote mine delivery from artillery and aircraft. Infantry units can also have man-portable remote mine dispensers.

With the high tempo of the modern mobile battlefield, the use of remotely-delivered mines is increasing. In volume, however, they do not exceed the use of conventional landmines. Conventional minefields are better suited to protecting defensive positions that the OPFOR intends to maintain for some time. In this case, it takes greater time to bury and camouflage the mines and integrate the minefields into the total defensive scheme. Mine density in these types of fields is also greater. These minefields are more likely to have a mix of AT and AP mines. In setting up a fully prepared defense, troops of all units take part in preparing obstacles and laying mines.

Manual. The OPFOR manually emplaces minefields when—

- There is no contact with the enemy.
- Mechanical minelayers are unavailable.
- It is inadvisable to use mechanical minelayer because of terrain restrictions.

A mine warfare platoon can manually lay 200 to 300 AT mines in 1 to 2 hours. It can recover about 200 AT mines an hour, if the mines are not equipped with self-destruct or antihandling devices.

Mechanical. OPFOR engineers rely extensively on mechanical minelayers. These can bury or surface-lay AT mines. The layout of mechanically emplaced minefields is the same as those emplaced by hand.

The normal sequence for mechanically laying mines is to emplace the most forward minefield first and to work progressively back to friendly defensive positions. The engineers align the mechanical minelayers parallel to the forward edge. The minelayers start at separate intervals. This staggers the minelayers in a 30- to 45-degree echelon formation as they travel along the forward edge. This method ensures that mines in one row are directly behind those in another when approached by the enemy. This increases the probability for a mine encounter by ensuring that if an attacker misses the first mine, he should still encounter one in subsequent rows. Figure 11-14 illustrates the mechanical AT minelaying sequence.

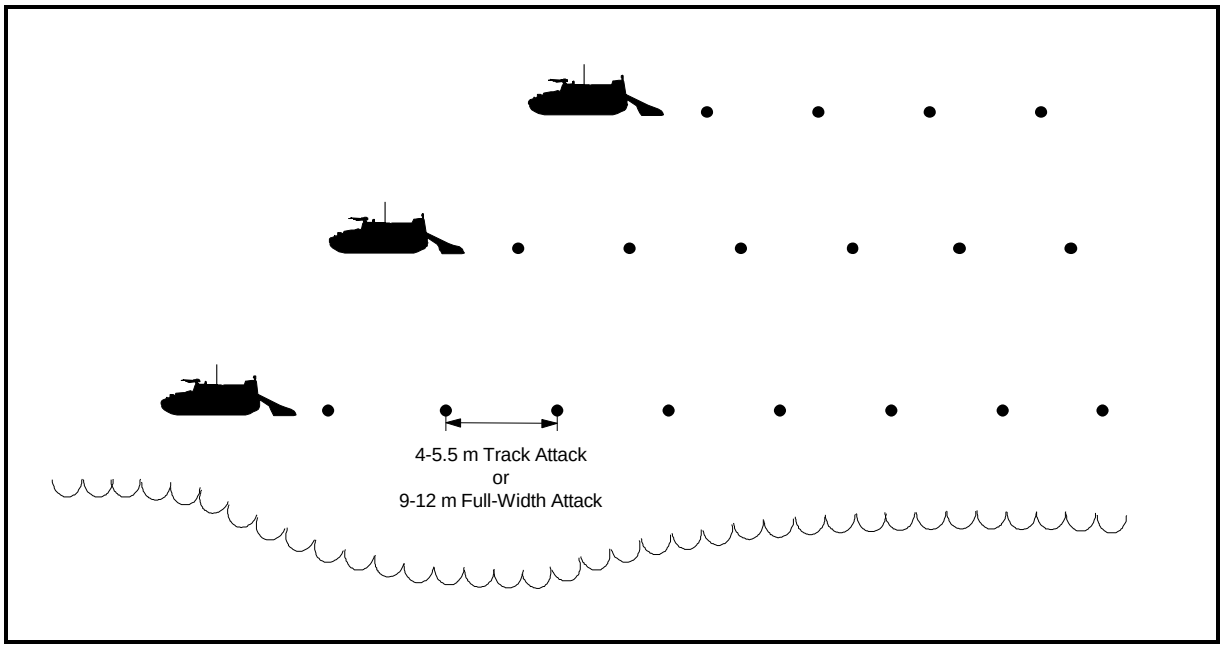


Figure 11-14. Mechanical AT minelaying sequence (example).

Remote. Remote minelaying gives the OPFOR a capability to strike targets and rapidly project mines deep in enemy territory. It provides increased tactical responsiveness and flexibility and reduces the manpower requirement for minelaying, as well as minimizes exposure of the minelaying equipment to enemy fire. Once emplaced, these minefields can instantaneously affect the tactical situation and degrade the enemy's reaction time to the sudden appearance of the obstacle. Thus they are ideally suited to the highly mobile, lethal battlefield of modern warfare.

Remote delivery is useful against enemy reinforcing echelons, areas of troop concentration, CPs, firing positions, and other objectives. It can protect flanks or block enemy penetrations. The OPFOR prefers to trap a force inside a minefield rather than merely creating an obstacle that the enemy can bypass.

Therefore, remote minelaying can create two types of minefields: covering and containing. A ***covering*** minefield can block the movement route of an advancing or withdrawing enemy. A ***containing*** minefield can prevent the enemy unit from moving out of a deployment area (or firing position) or within the area.

These can be delivered from jet aircraft, helicopters, multiple rocket launchers (MRLs), trucks, and other ground vehicles, or by dismounted soldiers in the forward parapet of fighting positions. These mines are scattered randomly on the ground with no semblance to classical patterns. Frequently, these types of landmines also incorporate self-destruct or self-neutralization features to control and limit their active duration once emplaced.

The OPFOR uses remotely-delivered or scatterable mines to reduce enemy mobility, inflict losses and to create the conditions for the destruction of an enemy force. Scatterable mines also have a psychological effect on enemy morale. They can be laid close to friendly positions and covered by friendly fire or laid deep in the enemy territory. Minefields created by scatterable mines lack precise boundaries or a definitive mine emplacement pattern, and generally remain on or near the surface of the ground.

The OPFOR prefers to retain the element of surprise and therefore employs remotely-delivered, scatterable mines immediately before combat or during the course of the battle. When dispensed, these minefields are generally laid immediately in front of attacking, reinforcing, and withdrawing enemy troops, or may be emplaced directly on enemy formations. Possible uses of scatterable mines are to—

- Isolate enemy forces, enabling the OPFOR to maintain a superior correlation of forces.
- Disrupt the attacking forces, causing them to deploy early and expend mineclearing assets.
- Disrupt and delay enemy second echelons, reserves, or counterattack forces.
- Prevent enemy artillery from displacing during counterbattery fire.
- Interdict lines of communication.
- Prevent the use of a logistics site.
- Obstruct a chokepoint.
- Protect flanks.
- Seal breaches in friendly obstacles or gaps between units.

Multiple rocket launchers are the primary means of remote minelaying. The principal advantage of MRL mine delivery is its ability to quickly emplace large minefields in a single volley, while minimizing exposure to enemy targeting and weapon systems. For example, a single volley from a 220-mm MRL battery can deliver over 2,300 AT scatterable mines to a range of 10 to 35 km. With these mines, it can emplace a covering minefield approximately 3 km wide or a containing minefield about 1,200 m wide and 1,200 m deep. For further information on remote minelaying with MRLs, see Chapter 7.

The OPFOR may also employ ***man-portable remote mine dispensers*** with its lower-level infantry units. These mine dispensers are small and can be either pulled like a handcart, or carried by a soldier. Depending upon the design, infantry remote minelaying systems propel mine canisters out to approximately 100 m, while rocket-dispensed systems may go out as far as 3,000 m. With a trained operator, they require only a few minutes to set up the dispenser and create a minefield.

These man-portable dispensers, weighing only a few pounds, are ideal for installing small, defensive, AP or AT minefields. The operator loads the mine-filled rockets (or a propelling charge and mine canister) into the launch tube, mounts the system on the edge of a trench or firing parapet, aims the tube, connects the wire to the tube, moves off to a safe distance, and connects the wire to the blasting mechanism.

Infantry-fired ground dispensers allow low-level units to remotely emplace minefields to protect their fighting positions, flanks, and boundaries between units, or to cover firing lines and gaps in combat formations. They can quickly close breaches in existing protective minefields and increase the density of mines on armor avenues of approach.

Other than the above-mentioned ground force systems for remote minelaying, aircraft and helicopters can remotely deliver mines. The following paragraphs describe aerial minelaying capabilities.

Aerial. Bombers and fighter-bombers can lay remotely-delivered minefields in the operational depths (up to 250 km). Aircraft are only used to deliver mines beyond the forward edge when they cannot be delivered by indirect fire means. Delivering mines from low altitudes deep in enemy territory increases the risk of losing the aircraft to ground fires or SAMs. Therefore, fixed-wing aircraft are generally used to deliver ordnance such as scatterable mines beyond the range of OPFOR artillery systems (including MRLs). Ground-attack aircraft lay these minefields in the enemy's tactical depths.

High-performance aircraft can lay mines at a speed of 400 to 800 km/hr from an elevation of 50 to 200 m. Aircraft-delivered scatterable mine canisters are dropped on parachutes. The canisters are set to burst open at a predetermined height to scatter the mines.

Helicopter minelaying systems are used to emplace large barrier minefields in the execution of army or division offensive or defensive maneuver plans. This type of aerial minelaying is normally conducted over friendly territory—along the flanks or in the rear areas. When supporting an airborne or air assault landing, helicopters may lay mines on enemy territory.

Both AT and AP minefields can be laid using aerial minelaying systems. Some attack and medium transport helicopters and a few light helicopters have the capability to perform minelaying missions. A light helicopter does not carry armament when accomplishing these missions. Medium transport and attack helicopters are most commonly used for aerial minelaying.

Some helicopters can dispense conventional mines by the addition of an internal minelaying chute within their cargo area. Mines are contained on custom mine racks and then fed manually or automatically onto the chute. The mines are then armed as they are dispensed. These heliborne minelaying systems can be used in formations of two, three or four and operate relatively similar to the ground mechanical minelaying systems. The speed of minelaying can vary from 20 300 km/hr from an altitude of 30 to 100 m. While at a near hover above the ground, the helicopters operate 20 to 40 m apart, with each laying a straight-line row. The mines in each row can be staggered and the distance between mines depends on whether the mines are pressure-initiated or full-width attack mines.

One light helicopter can deliver 60 to 80 AT mines or 100 or 120 AP mines. The medium transport helicopter equipped with a minelaying system delivers 100 to 140 AT mines or 200 to 220 AP mines on a single sortie. To lay a minefield 15 by 30 m with AT mines takes approximately six sorties of a single light helicopter or approximately four flights of a single medium transport helicopter.

Controlled Minefields

Some OPFOR units have the capability to lay controlled minefields. These minefields consist of landmines with electronic switches (on/off) giving the operator control over the operational status of the minefield. The operator can change the status of an area of the battlefield and make it either hazardous for the enemy or render the area safe for friendly troops. This is done either by a direct hardwire link or by radio. An entire minefield can be emplaced and turned on or off, as necessary, to best support friendly operations.

On a smaller scale, select passages in a conventional minefield can contain controllable landmines, allowing for the option of clearing safe lanes for friendly use. The addition of selectable anti-removal and self-destruct features to controlled mines enhances flexibility and overall effectiveness. Controlled minefields can also be established in a maneuver defense to ensure unrestricted maneuver of units over mined areas and to cut off enemy units in pursuit.

Demolitions

The OPFOR emphasizes the importance of roads as high-speed avenues of attack for both friendly and enemy forces. It views the use of demolitions on roads as a significant way to disrupt enemy movement. Critical points at which the OPFOR might use demolitions include overpasses, bridges, ravines, intersections, bypasses, approaches to water obstacles, and roadways through urban or close terrain.

Nonexplosive Obstacles

Nonexplosive obstacles fall into three categories: AT, AP, and antilanding. Nonexplosive AT obstacles include ditches, dragon's teeth, and various other manmade and natural barriers. AP obstacles include concertina and barbed wire. Antilanding obstacles include dragon's teeth, AT ditches, and wire obstacles. The OPFOR uses these obstacles at potential drop or landing zones for amphibious, airborne, or heliborne assaults. The primary responsibility for the construction of nonexplosive obstacles rests with the maneuver unit.

Survivability Support

The fortification of defensive positions is a labor-intensive process and is therefore a shared responsibility of engineers and other branches. Full preparation of defensive positions involves—

- Fighting positions for individual and crew-served weapons.
- Fighting trenches and communication trenches.
- Firing positions for tanks, IFVs, APCs, air defense, and other weapon systems.
- Protection for CPs and logistics sites.

These tasks exceed the capability of engineers organic to the brigade and even that of those likely attached as reinforcements. Consequently, the OPFOR approach is to use all available personnel and equipment. See Chapter 5 for more information on preparation of fortifications in the defense.

Although engineers have the bulk of specialized equipment for constructing sophisticated survivability positions, engineer support at brigade level and lower is very limited. Therefore maneuver units at battalion and below exert maximum effort to develop and improve their own positions. This process starts with infantry using shovels and armored vehicles using integral self-entrenching blades, if available. When building the positions, they must take advantage of the protective and camouflaging properties of the terrain, local building materials, engineer construction equipment, explosives, and prefabricated installations.

Meanwhile, engineers using specialized equipment dig positions for critical sites such as medical facilities and C^2 centers. As scarce engineer equipment becomes available, it supports maneuver units by augmenting and improving on the work the units have already begun. Considering the projected time of stay, the conditions of the terrain, and the upcoming combat tasks, the maneuver commander determines the amount, sequence, and time for the fortification of an area.

Levels of Fortification Protection

Fortified positions increase OPFOR weapons effectiveness. They also protect personnel, weapons, and material from enemy targeting and reconnaissance assets, and from the effects of enemy attack. The OPFOR categorizes field fortifications according to purpose. It divides them into structures for—

- Firing and observation.
- Protection for personnel, equipment, and material.

The OPFOR also classifies fortified structures according to the level of protection provided against direct and indirect fire, as indicated below.

Open. These structures include emplacements for mechanized infantry squads and fighting equipment, fighting trenches, communication trenches, slit trenches, and the simplest installations for observation and vehicle pits. These positions protect personnel and equipment from direct fire. They also reduce the effects of conventional and nuclear munitions blasts by a factor of 1.5 to 2 times over unprotected positions.

Semi-closed. These structures are partially covered sections of fighting trenches and communication trenches. They have light overhead trench covers with a layer of dirt, or partially covered pits for the fighting and transportation equipment.

Closed. Closed structures include trenches, dugouts, shelters, and permanent weapon emplacements. These provide protection for the personnel from all types of enemy fire and from all destructive factors of nuclear weapons or incendiaries.

Fortification Priorities

Commanders assign fortification priorities to tasks that provide the best level of protection at all times against a possible enemy attack. The normal priority is from front to rear, beginning with the primary fighting positions, then the temporary positions, alternate positions, and if possible dummy positions. One of the greatest factors influencing the level and sequence of fortification preparation is whether the transition to the defense occurs in contact or out of contact with the enemy.

If first-echelon maneuver units are in direct contact with the enemy, they prepare their own hasty positions as best as possible. The maneuver unit is responsible for the majority of defensive fortifications. This includes emplacing explosive (minefields) and nonexplosive obstacles.

In the absence of direct contact and when the situation permits, engineer excavating and bulldozer equipment may be used to—

- Dig communications and fighting trenches and tank and IFV or APC emplacements. (For the most effective use of the heavy equipment, the supported mechanized infantry or tank unit must lay out and mark the areas for ditching.)
- Fortify squad trenches and platoon strongpoints.
- Provide engineer reconnaissance.
- Emplace engineer obstacles.
- Prepare alternate fighting positions.

Preferably, engineer preparations occur at night or under other conditions of reduced visibility.

Shared Responsibilities for Field Fortifications

Engineer tasks are a shared responsibility throughout the OPFOR. Engineer and combat personnel perform survivability tasks such as constructing fortifications, clearing fields of fire, and camouflage. Although the highest level of engineer training and the greatest technical capabilities exist in the engineer troops, all military personnel and units train to some degree in fundamental engineer tasks. The majority of defensive preparation is conducted at the maneuver unit level. The following are several examples of specific responsibilities:

- Soldiers: dig individual fighting positions and trenches.
- Combat vehicles: up to 400 vehicles in an MID may have self-entrenching capability.
- Engineers: construct fortified positions and communications trenches; dig in critical equipment, C^2 sites, and logistics facilities.

Camouflage, Concealment, and Deception

The OPFOR uses various CCD measures to mislead the enemy about size and location of forces and weapon systems and about the nature of defensive engineer preparations. Defensive measures include—

- Use of screening properties of terrain, darkness, and other conditions of limited visibility during engineer preparation of defensive positions and positioning of forces.
- Camouflage painting of material.
- Use of local materials and standard-issue camouflage screens.
- Strict camouflage discipline.
- Construction of false strongpoints, decoy positions, and dummy equipment.
- False actions to draw attention.
- Assimilation of minefields and obstacles to the terrain.

Artificial camouflage. The OPFOR employs artificial camouflage as a supplement when natural screens cannot provide the concealment of forces and combat material. It includes both natural and manufactured camouflage. The OPFOR uses camouflage nets and screens extensively. It improves multispectral screening by using camouflage nets, covers, and individual camouflage equipment.

Decoys. The OPFOR uses deception activities and equipment to counter enemy reconnaissance. All engineer units receive special training in constructing decoys from locally available materials. They may use obsolete equipment for deceptive purposes. The emphasis is on tactical systems and measures that provide effective concealment and deception.

The OPFOR plans to employ mock-ups and decoys as an integral part of battles. Simulations can obscure OPFOR intentions and cause the enemy to waste effort by destroying decoys. The engineers bear a major responsibility for constructing simulations. The OPFOR places emphasis on those engineer camouflage measures that it can transport easily and construct rapidly.

The following conditions must exist in order for decoy equipment to be successful:

- Placement must be in areas where the enemy would reasonably expect to find that type of actual equipment in use.
- Dimensions of simulated equipment must approximate those of actual equipment.

Decoy equipment may be "animated," giving the impression it is mobile. The animation or movement of simulated equipment should suggest movement patterns characteristic of real equipment. Engineers can supply simulation teams to accomplish this.

The simulations that engineers construct can represent any type equipment in the OPFOR inventory. Actual equipment that is not functional due to combat damage or mechanical malfunction can be made to appear operational by repainting it to conceal damage or by constructing components to simulate destroyed parts.

Engineers may also construct large area simulations such as dummy/decoy airfields or logistics facilities in rear areas. Extensive animation activities, such as the movement of vehicles within these false installations, can add credibility to the simulation.

Engineers can create false excavations to simulate revetments, hull-defilade vehicle trenches, or individual fighting positions. These false excavations may be only half the depth of actual excavations, although the engineers may create the appearance of greater depth by adding dark materials such as branches, grass, or soil to the bottoms. Troops can temporarily occupy these simulated positions and fire from them to aid deception.

Chapter 12
Information Warfare

The OPFOR has rapidly increased the levels of technology used by military communications, automation, reconnaissance, and target acquisition systems employed at the tactical level. Additionally, it has fielded altogether new capabilities integrating the latest in computer and electronics advances. These developments have resulted in the refinement and sophistication of the doctrine developed to ensure their successful use—information warfare (IW).

The OPFOR defines IW as ***specifically planned and integrated actions taken to achieve an information advantage at critical points and times***. The goal is to influence an enemy's decision making through his collected and available information, information systems, and information-based processes, while retaining the ability to employ friendly information, information-based processes, and systems.

Knowing it cannot maintain continuous information dominance, the OPFOR selects for disruption only those targets most critical to ensuring the successful achievement of its objectives. The OPFOR attempts to gain an information advantage only at critical times and places on the battlefield.

Integrated within the IW doctrine are six elements:
- Protection and security measures.
- Deception.
- Electromagnetic spectrum operations (ESO)
- Perception management.
- Physical destruction.
- Computer warfare.

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Described in detail below, the components greatly differ in the systems and tactics used to accomplish their specific objectives. The priority each component receives, and its associated level of allocated assets, can vary depending on the tactical situation. The OPFOR may employ the same component in an offensive, "attack" role, or in a defensive, protective role, depending on the situation.

TACTICAL APPLICABILITY

The blending of separate components into a single, integrated doctrine for the control of information is not a new concept. The OPFOR has for years employed an integrated approach to attacking the enemy's decision-making cycle and structure. Objectives have included not only the systems and information their enemies collect, process, and analyze, but the leaders and the decisions they make.

The OPFOR has designed, and is continuing to develop further, what it considers the proper mix of doctrine, organization, and technology. It understands that the advanced technologies aggressively marketed for military applications worldwide cannot ensure information dominance. Furthermore, comprehensive force modernization is prohibitively expensive for all but the wealthiest nations. The fielding and integration of these capabilities will by necessity progress by degree.

The OPFOR is pursuing an incremental and gradual approach to incorporating information-age technologies. For instance, it believes that integrating sensors and reconnaissance fire complexes offers the potential for an effective deep-strike capability at reasonable cost without the need for comprehensive command and control (C^2) system upgrades. Downloading unmanned aerial vehicle imagery directly to an artillery or surface-to-surface missile (SSM) unit would be a much more cost effective, and less risky, method of providing responsive deep targeting than attempting to streamline and digitize the entire reconnaissance system.

Relying on advanced technologies produces its own problems. For example, a modern soldier, dependent on global positioning systems and digital links, may not be able to successfully navigate by map and compass (assuming the proper maps are available) and call for fire support once OPFOR IW activities have disrupted those capabilities. While making these advanced technologies available to its forces, the OPFOR continues to ensure its forces train with older, simpler, yet highly effective techniques of navigation and control.

While enthusiastically embracing the concepts of IW, the OPFOR is selective and deliberate in its application. It believes IW has not rendered existing methods of warfare obsolete. It views IW as another (though highly vital) means to achieve a national objective, military or otherwise. At the tactical level, forcing the enemy to accept the OPFOR's will (still the objective of warfare), nevertheless requires the placing of lethal, destructive firepower on a target and the seizure of an objective.

However, in many instances, IW activities may precede or replace combat. Certainly the methods employed and supporting systems can increase combat capabilities significantly, and may compensate for a shortage of conventional forces and arms. In the OPFOR's view, skillful application of IW principles can facilitate the defeat of a technologically superior enemy.

The tools employed by the OPFOR have included almost all of the current components of IW. Electronic combat (EC), for example, has been an integral part of OPFOR tactics for decades. Various forms of camouflage, concealment, deception, and psychological warfare are as old as history. What has changed is the widespread addition of computers and related high-technology capabilities to the tactical battlefield.

IW ACROSS THE CONFLICT SPECTRUM

The OPFOR conducts IW across the full spectrum of conflict; it occurs during peacetime, through all forms of unconventional warfare, during combat, and through conflict termination and the return to peace. IW activities are continuous and ongoing. The extent to which the OPFOR employs individual elements of IW varies from point to point along the conflict spectrum.

Physical destruction and many of the active elements of ***ESO*** are conducted almost solely during combat and, if conducted during peacetime, may be a justification for the declaration of war. However, signals reconnaissance activities conducted during peacetime are vital to identifying enemy capabilities and intentions.

Deception activities conducted during peacetime can deny information a potential enemy requires to effectively plan offensive or defensive activities. Properly carried out, deception activities aid the OPFOR in achieving tactical or even operational surprise once hostilities begin. During conflict, deception can also increase force survivability.

Peacetime OPFOR ***perception management*** focuses on both achieving national goals through diplomacy and statecraft, and preparing and controlling the State's own population. During war, the OPFOR targets the enemy's military forces with psychological warfare and propaganda.

Current technology generally limits the battlefield application of ***computer warfare*** activities. For example, the delivery of viruses and the unauthorized access to enemy information systems are carried out off the battlefield and target those information systems and databases that may be employed by the deployed military. The OPFOR may target site servers for destruction or disruption using local national sympathizers or third-party hackers.

The OPFOR allocates substantial resources to protect information systems, processes, and databases, as part of the ***protection and security measures*** component. Information security is a high priority for the military, during all periods of conflict. During war, the military aspects of protection and security measures come into play, to include the reconnaissance/counterreconnaissance battle, and extensive use of camouflage, cover, and concealment.

IW activities are designed to meet certain goals and are not ends in and of themselves. The OPFOR designs deception activities to increase force survivability and enable it to achieve surprise. It conducts ESO to disrupt the synchronization of enemy activities, allowing the OPFOR to retain the initiative and outmaneuver the enemy. Protection and security measures include efforts to preserve combat groupings and enhance survivability.

ELEMENTS

The following sections provide a description of and details for each element of IW. Also included are general guidelines for the employment of each element. Guidance for employing IW during specific periods of combat is provided later in the chapter.

Protection and Security Measures

Protection and security measures encompass a great range of activities, integrating elements of deception and ESO with operations security measures. Successfully conducted protection and security measures significantly enhance survivability and preserve combat power. Activities conducted as part of IW include—

- Information collection, processing, and utilization.
- Reconnaissance and counterreconnaissance.
- Information security.
- Operations security.

The OPFOR continually analyzes its own force structure and C^2 process in order to identify the minimum essential information processes and structures required to maintain coherence of its combat forces and ensure continuity of its actions. It devotes considerable effort to the ***protection*** of these essential elements. The denial of required combat information wrests the initiative away from the enemy, forcing him to react to the OPFOR.

It is often more advantageous to provide enemy intelligence officers with an overabundance of information, with varying degrees of truthfulness, than to deny information. The OPFOR tries to exploit the large number and apparently superior technology of the enemy's sensors. For example, it employs software at the tactical level that allows it to analyze the enemy's satellite intelligence collection capabilities and warn friendly forces of the risk of detection. The use of signature-reducing and signature-altering devices, along with diligent application of operations security measures, supports deception activities in addition to denying information.

Information ***collected*** through reconnaissance is critical to the OPFOR planning process. It uses all forms of information collection, ranging from signals, radar, and ground reconnaissance, to engineer and NBC detection systems. They can also use human intelligence assets such as agents and sympathizers. Each type provides critical pieces of the enemy commander's plan that, when integrated, provide an accurate understanding of the plan while minimizing the likelihood of accepting deception for reality.

The OPFOR requires precise and reliable knowledge of the enemy's military information architecture, including the design and training of its command structure, decision-making philosophies, and communications and sensor capabilities. While not necessarily collected by tactical assets, information related to an enemy nation's civil communications, information system software, and even how the media influence decision makers may be exploited on the battlefield.

The OPFOR is deliberate in its collection planning. Information is of value only when it contributes to effective decision making in combat. Just as it seeks to overload enemy collectors and analysts, it guards against indiscriminate, "vacuum cleaner" approaches to acquiring information. Commanders must be able to trust the information on which they must base decisions.

Deception

The OPFOR integrates deception activities into every tactical military action; it does not plan deception activities in an ad hoc manner. It formulates its course of action and deception activities concurrently. It attempts to deceive the enemy concerning the exact strength and composition of its forces, their deployment and orientation, and their intended manner of employment. When successfully conducted, deception activities ensure the OPFOR achieves tactical surprise, while enhancing force survivability. All deception activities are continuously coordinated with deception operations at higher levels.

The OPFOR employs all forms of deception, ranging from physical and electronic devices to tactical activities and behaviors. Due to the sophistication and variety of sensors available to the enemy, successfully deceiving him requires a multispectral effort. The OPFOR must provide false or misleading thermal, visual, and electronic signatures.

Integral to the planning of deception activities is the OPFOR's identification of the deception target. This target is that individual, organization, or group that has the necessary decision-making authority to take action (or to neglect to do so), in line with the deceiver's deception objective. On the tactical battlefield, this target is typically the enemy commander, though the OPFOR recognizes the importance of focusing actions to affect specific staff elements.

Deception planners attempt to exploit enemy commanders' (and their staffs') known biases and predispositions. Deception measures are designed to confirm these biases concerning the OPFOR's course of action, leading the enemy to accept as true the false formations and plans while hiding the actual force dispositions and intentions.

Successful deception activities depend on the identification and exploitation of enemy information "conduits." Knowing how the conduits receive, process, analyze, and distribute information allows for the provision of specific signatures that meet the conduits' requirements. On the tactical battlefield, the enemy reconnaissance system is the primary conduit, though others are targeted. The international media may be a target for deceptive information at the tactical level, being fed false stories and video that portray tactical-level actions with the goal of influencing operational or even strategic decisions.

Feedback is also critical. The planners constantly monitor the situation for information that confirms the attainment of, or failure to achieve, the deception's objectives.

Electromagnetic Spectrum Operations

ESO are activities conducted to deny the enemy's use of the electromagnetic spectrum, while ensuring its use by the OPFOR. The goal of ESO is to control this use of the spectrum at specific locations and times on the battlefield selected by the OPFOR.

The OPFOR employs both nonlethal and lethal means. Nonlethal means range from signals reconnaissance and electronic jamming to the deployment of corner reflectors, protective countermeasures, and deception jammers. Lethal ESO activities include the physical destruction of high-priority targets supporting the enemy's decision-making process such as reconnaissance sensors, command posts (CPs), and communications systems, as well activities such as lethal air defense suppression measures.

Systems and countermeasures target a wide range of frequencies, to include—

- Low-frequency radio waves used for communications, television, and integrated circuits.
- Microwave frequencies used by radar and high-capacity communication systems.
- Infrared (IR) and ultraviolet wavelengths used by rangefinders, designators, and thermal sights.

OPFOR ESO activities especially focus on the enemy's advanced C^2 systems developed to provide real-time force synchronization and shared situational awareness. By targeting vulnerable communications links, the OPFOR can disrupt the enemy's ability to digitally transfer and share information such as friendly and enemy force composition and locations, digital mapping displays, and threat targeting data. The OPFOR enhances survivability through disrupting the enemy's ability to mass fires with dispersed forces, while increasing enemy crew and staff workloads and disrupting fratricide prevention measures.

The ESO element is a prime example of the integrated nature of IW activities, overlapping significantly with all ESO elements, and primarily the protection and security, deception, and destruction elements. Supporting activities of ESO include, as a minimum, EC, reconnaissance, signal, aviation, air defense, artillery, and engineer assets.

Perception Management

The OPFOR integrates a number of widely differing activities with one common goal: creating a perception of truth that best suits OPFOR objectives. As with deception, OPFOR perception management activities use a combination of true, false, and misleading information. Targeted audiences range from enemy forces to the State's own populace.

The various perception management activities include efforts conducted as part of—

- Psychological warfare (PSYWAR).
- Public affairs.
- Censorship.
- Statecraft.
- Public diplomacy.

The last two components, while not conducted at the tactical level, certainly have a great impact on how and where the OPFOR conducts tactical-level activities. Perception management activities conducted at the tactical level must be consistent with the State's operational and strategic goals.

PSYWAR is a major contributor to perception management during combat. Targeting the military forces of the enemy, PSYWAR attempts to influence the attitudes, emotions, motivations, and reasoning of the enemy personnel. Specialists plan PSYWAR activities at all command levels down to division. In addition to the enemy's military forces, the specialists also concentrate on manipulating the local population and international media in favor of the OPFOR, turning opinion against the enemy's objectives. Planners focus special emphasis on highlighting enemy casualties and the lack of success. The enemy state's population is a major target of these activities, due to the importance of public support for enemy military activities.

Statecraft (the art of conducting state affairs) and diplomacy (the art and practice of conducting negotiations with other states) are aspects of perception management conducted with foreign governments, and include the states' populations as a target. The OPFOR skillfully employs media and other neutral players, such as nongovernmental and international organizations, to influence further public and private perceptions. It exploits the international media's willingness to report information without independent and timely confirmation.

The State employs public affairs and censorship to control its own population's access to information and perception of reality. Successful preparation of the population significantly enhances public support for the OPFOR's military actions. As part of this, the State prepares its forces and population for enemy IW.

Physical Destruction

The preferred method for disrupting enemy control is through the physical destruction of the target. The OPFOR integrates all types of conventional and precision weapon systems to conduct the destructive fires, to include fixed- and rotary-wing aviation, cannon artillery, multiple rocket launchers (MRLs), and SSMs. While it may employ any of these methods at the tactical level, the most commonly used are cannon artillery and MRLs. For a high-priority target, such as a division or corps CP, the division can expect aviation support to strike the target.

The accuracy of modern precision weapons allows the OPFOR to strike at specific IW-related targets with deadly accuracy and timing. Due to the mobility and short-duration nature of many IW targets, precision weapons deliver the munitions of choice against many high-priority targets.

The OPFOR continues to research and develop directed energy weapons, to include radio frequency weapons and high-power lasers. While the OPFOR has fielded no dedicated weapon systems, it may employ low-powered laser rangefinders and laser target designators in a sensor-blinding role.

Computer Warfare

Computer warfare includes a wide variety of activities, ranging from unauthorized access ("hacking") of information systems for collection purposes, to the insertion of destructive viruses and deceptive information into enemy computer systems. The OPFOR attempts to accomplish these activities through agents with direct access to enemy information systems. It also continually accesses systems at great distances via communications links such as the Internet or any modem.

The OPFOR recognizes the increasing dependence of modern armies on tactical computer systems. Command and control, intelligence processing, and fire support systems are increasingly reliant on computers for their successful operation. Current technological limitations prevent the widespread conduct of computer warfare activities on the tactical battlefield. Therefore, the OPFOR prepares extensively for computer warfare in peacetime and during periods of limited conflict.

OPFOR computer warfare activities conducted during peacetime are expected to provide major payoffs as hostilities approach and then commence. For example, by accessing databases related to an enemy's projected force deployments and troop movements, the OPFOR can effectively disrupt planning and misdirect movement, producing substantial confusion and delays. As modern armies increasingly rely on "just-in-time" logistics support, targeting the logistics-related computers and databases can produce delays in the arrival of critical materiel such as ammunition, fuel, and spare parts during critical phases of a conflict. Given the seamless nature of computer access, with the ability to reach targeted computers anywhere in the world (as long as they are on the Internet), the OPFOR conducts these invasive computer warfare activities from the safety of its own territory.

SUPPORT TO THE MARCH

The primary goal of IW activities in support of the march is to ensure the OPFOR can safely move its forces to the desired locations on the battlefield, at the appropriate times, prior to employment. Two specific objectives support this goal: minimize the enemy's ability to successfully identify the OPFOR's intentions, and reduce or negate the enemy's capability to disrupt or delay the movement.

Extensive planning is undertaken to ***reduce the enemy's ability to collect information that leads to accurate assessment*** of the OPFOR's force structure, movement, and intentions. The OPFOR does desire the enemy to see enough of the battlefield picture to draw the wrong conclusions. Measures to ***reduce the effects of enemy disruptive efforts***, to include physical destruction and EC, heavily emphasize targeting the enemy's long-range fire systems. Active and passive measures focus not only on the weapon systems themselves, but also the supporting target acquisition systems and sensor-to-shooter links.

The OPFOR conducts IW activities throughout the movement, during halts, and while occupying assembly areas. While the potential threat to the OPFOR is greatest during tactical road marches, administrative marches may also be threatened. Given the increased ranges of enemy long-range sensors (especially airborne) and precision weapons, administrative marches deep in the OPFOR rear are no longer relatively secure from attack.

No single element of IW is by itself more important than the others. To attain successfully the two objectives stated above, the OPFOR thoroughly integrates the elements across the battlefield, both in space and time. Those most applicable to the tactical march are covered here.

Deception

During the march, the OPFOR's deception activities aim at providing the enemy commander with significant amounts of information regarding the OPFOR's composition and intentions. However, the actual information is a mix of true, false, misleading, and extraneous information. The OPFOR does not want to break the enemy commander's confidence in his own system. If possible, the desire is to increase it.

The preparation of the deception plan revolves around specific objectives or actions, to which the OPFOR desires the enemy to commit. For example, the OPFOR may want to hide the movement forward of a force prior to commitment, while providing the appearance of the force moving elsewhere. The preparation of the deception plan must include activity providing all expected signatures of an appropriate-size force in movement, and when appropriate, associated assembly areas.

The false picture portrayed must include a believable, viable course of action. The enemy understands OPFOR tactics and doctrine, and would look for a reasonable course of action. The enemy must be capable of collecting the false or misleading signatures throughout the depth of the march. The OPFOR replicates *all* related signatures. Examples of activities representative of a force in movement include—

- Targets portrayed by radar corner reflectors and deception jammers deployed along the false march route, supported by actual vehicle movement.
- Deceptive emissions, such as false radio traffic (not limited to only maneuver forces), and related noncommunications emissions such as air defense radars.
- Heat sources providing IR signatures.
- Actual vehicle movement providing expected sound, smoke, and dust signatures.

The more supporting activity portrayed, the greater likelihood that the enemy believes the false picture. For example, if the false route crosses an obstacle requiring engineer support, such as a river, associated activity such as preparation of the crossing site should be present. This should include actual engineer equipment and associated communications. Additionally, the OPFOR commander must be willing to commit a portion of his combat forces to the deception, to include artillery and air defense assets. If returning aircrews report that they received *absolutely no* surface-to-surface missile or antiaircraft gun fire while attacking a tank brigade, the enemy is going to look closer at who or what they just attacked.

The false targets must be consistent with established norms, such as movement rates, vehicle separation, unit intervals, and timing and locations of rest areas. Enemy analysts tend to be overdependent on the use of such templates, and may be deceived by a false pattern that meets expectations. However, the false targets should not be too precise, exactly matching established norms in all cases.

The OPFOR portrays specific units, to ensure the enemy sees the type of doctrinal formation he expects. For example, a battalion-size element may move forward of the false march column, portraying an advanced guard or forward detachment. Not only does this contribute to the authenticity of the deception, but it also can provide early warning of an enemy ground response in the area. Another example is reconnaissance reporting, provided by assets deployed within the doctrinal limits where the enemy would expect ground reconnaissance patrols.

The OPFOR undertakes extensive efforts to disguise the authentic plan. Staffs plan specific protection and security measures (discussed below) in detail, minimizing all potential signature types. The OPFOR knows it cannot completely hide the forces of the primary course of action. Instead, it attempts to sufficiently alter the picture that is available, to cause the enemy to look elsewhere for the greatest threat. Specific techniques the OPFOR may employ include adjusting formation movement speeds and vehicle dispersion to greater than doctrinal limits, potentially confusing the picture an enemy analyst receives.

Prior to the actual conduct of the deception, the OPFOR identifies a number of indicators that verify the enemy has "bought" the false picture. For example, one indicator might be the movement of the enemy's reserve force into a position where it could best block or attack the false unit. Another indicator would be extensive use of deep attack assets such as attack helicopters, fixed-wing ground-attack aircraft, and precision weapons.

Protection and Security Measures

Elements of protection and security measures widely vary and include—

- Information collection, processing, and utilization systems.
- Reconnaissance and counterreconnaissance activities.
- Information security measures.
- Operations security measures.

These activities have two basic goals: the protection of collected information and the limitation and control of the information the enemy is allowed to collect.

Route Selection

The OPFOR actively combines operations security and camouflage, cover, and concealment prior to movement, during the planning stage, as well as during the march. It attempts to limit movement to nighttime, and avoids population centers when possible (OPFOR-controlled areas are potential locations for enemy agents). Even the amount of information provided to tactical commanders is generally limited to the next day's movement, to include the locations of the march routes, and assembly and rest areas.

The OPFOR gives particular attention to the selection of the march route itself. The route maximizes use of natural terrain features such as mountains, ridges, forests, and ravines. When unable to move through a forested area, the OPFOR moves along its edge. Remaining close to the forest edge ensures that much, if not all, of the column remains lost in the ground clutter to which surveillance radars (without moving-target-indicator capability) are susceptible.

Counterreconnaissance

Counterreconnaissance activities conducted during the march do not focus on totally disrupting or destroying enemy reconnaissance assets, capabilities, and reporting. Instead, they attempt to shape the picture created by deception to ensure the proper indicators of false activity, while limiting the enemy's ability to target the actual main effort.

The OPFOR deploys a large variety of radar corner reflectors along march routes. They disrupt reconnaissance and target acquisition radars, both ground-based and airborne, by providing clutter and false signatures of equipment, vehicles, and even facilities such as buildings and towns.

Ground-based air defense jammers provide a capability to disrupt radars such as those associated with airborne surveillance. These jammers can provide additional false targets, or may use simpler barrage or spot jamming techniques to disrupt the radar altogether. They provide the additional benefit of disrupting airborne radar-aided bombing and navigation systems.

Units dedicate time and resources for the preparation of camouflage, cover, and concealment during halts and while occupying assembly areas. Extensive use is made of natural materials such as dirt, branches, and vegetation. The OPFOR is also acquiring manmade, multispectral camouflage systems for the protection of forces while halted, as well as when on the move. These include camouflage nets, paints, and materials that reduce thermal signatures and millimeter-wave reflectivity. In addition to the new technologies, the OPFOR widely uses engineer assets to provide camouflage, cover, and concealment.

Communications Protection

The OPFOR rigidly adheres to communications security procedures. These include the employment of operating instructions and codes, the strict use of communications security (COMSEC) systems, and where possible the use of wire communications (when halted or in assembly areas), couriers, and radio operator procedures.

Commanders limit radio transmissions to the absolute minimum required to maintain control of the units. As the OPFOR approaches the enemy, communications are restricted where possible to those systems with COMSEC capabilities. Traffic control posts assist in limiting radio traffic, by providing guidance and acting as communications relays. The OPFOR uses the existing civilian communications structure, to include cellular telephone networks, when traveling through areas it controls. By establishing communications centers linked to telephone exchanges, over-the-air emissions are significantly reduced.

Deception Support

Protection and security measures are major contributors to the deception effort. Much of the credibility of any deception plan rests on the ability to generate the appropriate, realistic signatures expected for a given activity.

The deployment of deception jammers and corner reflectors provides the false targets expected of a march column. Heat sources portray the thermal images of vehicle engines and fires. To contribute to the authenticity, as well as provide a viable alternative course of action in many cases, the commander provides maneuver and support assets to the false march column.

Because the enemy expects to collect a significant amount of his intelligence information through signals intelligence (SIGINT), this aspect of the deception plan receives close attention. All of the types of radio communications associated with a unit on the march must be portrayed. Examples include—

- Tactical command nets.
- Reconnaissance nets.
- Traffic control nets.
- Logistics nets.
- Engineer nets.
- Air and NBC warning nets.

Detailed planning is required to ensure the radio traffic of actual units does not conflict with the false tactical command nets. Authentic reconnaissance reporting is perhaps the easiest to replicate, since the OPFOR typically requires reconnaissance and march security in the area of the deception. False traffic control posts, reporting movement that is consistent with other radio nets, visual, radar, and thermal signatures, provide another key indicator of movement. During any long road march, tracked and wheeled vehicles break down, and false communications associated with support units can be representative of this activity. Engineer traffic, such as that associated with a movement support detachment or mobile obstacle detachment, may be portrayed. Obviously, the emitters portraying air and NBC warning nets must be linked to authentic early warning assets in order to report the real air picture. While not all encompassing, these radio nets are representative of the types that should be detected by enemy SIGINT.

False radio traffic planning should include a number of sophisticated elements. Carefully choreographed "lapses" in signals security can appear to provide critical information the enemy is seeking. Perhaps the most complicated deception is the portrayal of the effects of an air attack. The OPFOR expects some form of deep strike, whether by attack helicopters, fixed-wing aircraft, or missiles, on the false column if the deception has been successful. Therefore, planning must include chaotic radio traffic associated with confused units, requests for medical assistance and maintenance support. Explosives and smoke pots can contribute to the picture.

Electromagnetic Spectrum Operations

Tactical ESO during the march are primarily in the form of limited signals reconnaissance and electronic jamming. Other aspects of EC (the primary component of ESO), such as electronic counterreconnaissance, electronic protection measures, and destruction, are discussed elsewhere in this section.[1]

Signals Reconnaissance

The OPFOR attempts to identify the composition and intentions of enemy forces along or near the route of advance, as well as those in the eventual area of commitment. Due to the limited ranges of tactical signals reconnaissance equipment, OPFOR divisions seldom employ organic systems during the march. Ground-based and airborne signals reconnaissance systems of the parent army support the divisions as they move forward. Assets from the division's reconnaissance and EC battalion travel at or near the head of the division's march column, allowing the earliest possible employment as the OPFOR approaches the enemy.

Electronic Jamming

Divisions conduct little communications jamming during the march, due primarily to the short effective ranges of the jamming systems. Even within range of potential targets, the OPFOR limits jamming in order to minimize indicators of its activity. However, employing jammers along the false march route is an option.

[1] For additional detail, see Chapter 13, Electronic Combat.

Physical Destruction

The division seldom conducts destructive strikes during the march. However, one of the top priorities for the parent army are those enemy systems that provide target acquisition for and control of deep-strike weapon systems capable of reaching the division, along with the control elements of the enemy's operational and tactical forces. Priority targets include—

- Satellite and airborne reconnaissance ground stations.
- Ground-based and airborne SIGINT platforms.
- Area distribution system communications centers and nodes.
- Corps, division, and brigade CPs.
- Air defense early warning and surveillance radars.
- Control nodes of deep-strike systems.

Careful timing of the destructive strikes maximizes the effects. Destroying a main CP well before the OPFOR transitions from the march may allow the enemy time to transfer control to the forward CP, or even reconstitute the main CP. However, destroying the enemy CP just prior to commitment of the OPFOR can significantly disrupt a coordinated, comprehensive response to OPFOR actions.

SUPPORT TO THE OFFENSE

Planners develop a detailed offensive IW plan with the goal of ensuring OPFOR forces are capable of defeating a defending enemy, with sufficient forces surviving to exploit their success and continue the attack. Specific objectives include: deceiving the enemy as to where and when the OPFOR will attack and the OPFOR's composition; disrupting or destroying enemy second echelon and reserve forces; and ensuring maximum survivability of friendly high-value assets and combat power.

Deception

A deception plan will be prepared to the extent that time will allow. Most deception activities in the offense focus on preventing the enemy from identifying specific OPFOR force structures and intentions. While the best case for the OPFOR is to force the enemy into an unprepared or ill-prepared defense with limited covering forces, this also provides the least time for preparing a deception plan. However, the necessity to deceive the enemy is greatly reduced when they are unable to present a strong, coordinated defense.

Due to the nature of the offense, and the conduct of a meeting engagement in particular, deception operations will often be of a protective nature as much as an attempt to influence the enemy's decision-making process. Deception measures and activities will include:

- Feints and probes to provide a false picture of where the main effort will be.
- Creating the false "picture" of a major offensive effort.
- Maximizing protective measures to conceal movement.
- Creating false high-value assets such as SSM launchers, command posts, and armor concentrations.

The fact that there is no fixed army group or army organization lends itself to deception operations aimed at misleading the enemy as to the OPFOR's composition and strength. Specific goals include denying the information required to identify the composition of the first and second echelons, combined arms and antitank reserves, and an OMG (when formed).

Enemy force calculations based upon incorrect analysis of the OPFOR's strength, especially in the main strike sector, may create more favorable force ratios. When successful, the deception forces the enemy to tie down assets outside of the main strike sector, instead concentrating on limited or non-existent forces and axis.

Protection and Security Measures

The elements of protection and security measures during the attack are the same as during the march, as are the goals. The OPFOR protects its own information systems and ensures the validity of collected information, while limiting what and how much information the enemy is able to obtain on the OPFOR during the attack.

Commitment of Second Echelon

The OPFOR must deny from the enemy information concerning the forward movement and subsequent commitment of the second echelon. The same techniques and procedures employed to mask the movement of the division during the march can mask the movement of the second echelon.

The OPFOR ensures the maximum use of natural terrain features such as mountains and forests. When possible, it travels through terrain normally viewed by the enemy as nontraversible, such as heavy forests. This provides the element of surprise while masking the unit from detection by airborne radar.

Radio transmissions are limited to the absolute minimum required, preferably only by those communications systems equipped with encryption capabilities. The second echelon continues to use traffic controllers as much as possible, allowing for uninterrupted forward movement and control of the unit without the need for extensive radio traffic. Engaged first-echelon units (and second-echelon units once committed) do require radio communications to control their forces and coordinate the attack. However, these units continue to emphasize the proper use of operating instructions, codes, and available COMSEC systems.

Counterreconnaissance

The OPFOR continues attacking the enemy reconnaissance capabilities. All enemy target acquisition systems and sensors are potential targets. Long-range sensors in particular are a high priority for attack by fires or electronic jamming, limiting the enemy's knowledge of the second echelon. For the first echelon, counterreconnaissance efforts are oriented primarily towards survivability.

Electromagnetic Spectrum Operations

Signals reconnaissance and jamming activities conducted in support of the offense focus on identifying and disrupting the coordination of the enemy's defense. In addition to the maneuver forces in the defense, the OPFOR targets control links of fire support and tactical aviation assets, maneuver and antitank reserves, and engineer elements. It targets all forms of target acquisition systems and sensors, especially those associated with enemy electronic warfare activities.

The success of ESO during the offense relies on the effectiveness of earlier activities. Before the attack, the OPFOR reconnaissance effort completes the identification of the type of defense deployed by the enemy, along with exact locations of defensive positions and strongpoints. Signals reconnaissance elements identify enemy reconnaissance reporting links for exploitation during the attack. All fire support and tactical aviation nets are identified and monitored. Combat engineer units are a high priority, since their composition and disposition on the battlefield are indicators of how and where the enemy expects to conduct his main defensive effort. Of particular interest are all obstacle-creating assets, such as minelayers.

The OPFOR directly links ESO activities with the actions of the attacking maneuver force. The following sections address the jamming and signals reconnaissance priorities as they specifically support the developing attack.

Preparation

Throughout the preparation for the attack, the maneuver force transitions from its brigade march formation into successive prebattle formations. This phase is completed as the companies move into platoon columns and prepare to assault the enemy's first-echelon defensive positions. As fire support missions target the first- and second-echelon defenders, the OPFOR conducts the following ESO activities.

Signals reconnaissance. Collection efforts continue to refine knowledge of the enemy's defensive disposition. Once it determines the company defensive positions and strongpoints of the first-echelon battalions and the overall disposition of the first-echelon brigades, the OPFOR focuses on identifying the enemy second echelon.

A high priority is identifying the composition and location of the enemy's reserves, which could block a penetration or conduct a counterattack. Army- or corps-level signals reconnaissance units provide additional targeting information for the reserves, since they normally are deployed out of range of most of the division's signals reconnaissance assets.

Priorities for intercept and direction finding (DF) include—

- Maneuver unit CPs and nets.
- Maneuver reserves.
- Antitank reserves.
- Forward air controller (FAC) nets.

Electronic jamming. Jamming missions are very intense during the preparation for the attack. The OPFOR heavily targets reconnaissance reporting links, minimizing the enemy first echelon's knowledge of the approaching force's composition and intentions. It jams fire support nets, and in particular reporting links between forward observers and firing batteries, to limit the number of calls for fire and fire missions. Depending on the amount of air activity conducted by both the enemy and the OPFOR, air defenses and FACs are targeted.

Specific targets jammed include—

- Artillery fire direction center (FDC) and command nets.
- Ground-reconnaissance and forward observer reporting links.
- Electronic warfare command and reporting links.
- Air defense target acquisition, command, and air and NBC warning nets.
- FAC-associated nets controlling attack aircraft.

Assault and Penetration

ESO activities during this period support the maneuver force's attack on the enemy forward edge and first-echelon positions. Priorities shift as the OPFOR achieves success, penetrating the enemy defense and developing the attack against the second-echelon positions. If required, ESO activities target the enemy brigade reserves.

Signals reconnaissance. As the OPFOR defeats the first echelon and creates a penetration, it attempts to determine the enemy's response, especially by his brigade and division reserves. Units in the second-echelon defensive positions are monitored as the OPFOR approaches.

Combat engineer units, especially those with obstacle-building missions, are identified and located. Chemical defense units may be a priority, if the enemy has the option of employing chemical weapons in an attempt to halt the penetration.

Signals reconnaissance priorities include—

- Second-echelon brigade and battalion command nets.
- Brigade and division maneuver reserve command nets.
- Antitank nets.
- Combat engineer command nets.
- Chemical defense nets.
- NBC-related weapon system nets.

Electronic jamming. Jamming during the assault and penetration focuses on the enemy's first-echelon companies and battalions, disrupting them to prevent a coordinated defense. Also targeted are brigade nets linking the battalions and parent units and any net used for coordination between the first and second echelons, such as the division command or administrative nets. Any links employed to coordinate fires in support of the defense are jammed as required.

Jamming targets include—

- First-echelon company and battalion command nets.
- Brigade command nets.
- Artillery battery and battalion FDC and command nets.
- Command links between brigade and division reserves and parent units.

Exploitation

During the exploitation, the OPFOR may commit the second echelon and, if necessary, repel counterattacks by the enemy divisional reserves. ESO activities primarily focus on disrupting enemy forces, such as reserves and attack air assets, capable of halting the OPFOR's advance.

Signals reconnaissance. As the OPFOR maneuvers through the first-echelon defenses, it monitors enemy reserves and second-echelon forces for the response to the penetration. It also continues to monitor bypassed first-echelon forces, in order to identify those enemy elements capable of reconstituting or reorganizing and counterattacking. The OPFOR typically tasks signals reconnaissance assets of follow-on forces with this mission, relieving the first-echelon division's assets of this responsibility.

Priority targets include—

- Second-echelon and reserve force command nets.
- Precision weapon-related nets.
- Antitank nets.
- Attack helicopter nets.
- NBC-related nets.

Electronic jamming. Jamming activities during the exploitation continue to target those maneuver and fire support units providing active resistance. The OPFOR heavily targets reporting links between reserve and second-echelon maneuver units and their reconnaissance patrols, as well as their command nets once committed.

All enemy maneuver and fire support units that may influence the OPFOR's commitment of the second echelon are jammed. Air defense units are jammed, supporting the use of OPFOR attack helicopters and fixed-wing attack aircraft as they target enemy reserves. FACs and aviation command nets are jammed, as required.

Specific jamming priorities include—

- Command nets of units in contact with the OPFOR first echelon.
- Division second-echelon and reserve command nets.
- Artillery battery FDC and command nets.
- Air defense target acquisition and command nets.
- FAC links and attack air command nets.

Physical Destruction

Physical destruction measures conducted during the offense focus on destroying critical components of the enemy force responsible for coordinating the defense. C^2 nodes and target acquisition sensors are a major part of the fire plan during an offensive action. Priority targets include—

- Battalion, brigade, and division CPs.
- Area distribution system communications centers and nodes.
- Artillery FDCs.
- FACs.
- Weapon system-related target acquisition sensors.
- Jammers and SIGINT systems.

The OPFOR employs all division-level fire support assets to target enemy control. Mortars, cannon artillery, and direct fire systems are the primary means of destruction. Once the OPFOR closes with the enemy, aviation support from the parent organization is not typically employed, except in the case where a high-value target, such as a CP, is identified and located in the enemy division rear area.

Physical destruction activities are integrated with jamming to maximize their effects. Specific missions are carefully timed and coordinated with the actions of the supported tank or mechanized infantry units. When successful, the enemy defense is fractured and, in place of a coordinated response to the OPFOR, the enemy fights a number of separate actions with insufficient fire support.

SUPPORT TO THE DEFENSE

OPFOR planners develop a detailed defensive IW plan with the primary goal of ensuring that friendly forces are capable of stopping and defeating an enemy attack, with sufficient forces surviving to enable a rapid transition to the offense. Specific objectives include: misleading the enemy concerning the OPFOR's force structure, defensive orientation, and intentions; delaying and fragmenting the enemy attack; and ensuring maximum survivability of friendly high-value assets and combat power.

To achieve these objectives, the OPFOR conducts a variety of activities that can—

- Disrupt or destroy enemy C^2 nodes and links.
- Provide for uninterrupted control of friendly forces.
- Ensure survivability through extensive use of signature-reducing measures.
- Conceal the identities and locations of critical assets such as combined arms and antitank reserves, artillery assets, and CPs.
- Portray false force dispositions and strengths.
- Portray false levels of preparation, readiness, and morale.

During the defense, the OPFOR gives particular attention to protective measures aimed at reducing the enemy's ability to target and engage OPFOR systems with precision munitions. Knowing that the enemy cannot attack what reconnaissance and target acquisition systems do not find, the OPFOR employs a variety of deception and camouflage, cover, and concealment techniques. These range from the most simple and inexpensive methods to hide from observation to the most modern multispectral signature-reducing technology.

Deception

Although the OPFOR views the defense as temporary in nature, it develops a deception plan to support it. The extent and complexity of the deception depends on the amount of time available for planning and preparation. While deception in the defense is typically less sophisticated than that in the march or offense, a defense out of contact allows for more effective and complete planning of deception activities, versus that during a defense indirect contact.

While creating the picture of the battlefield the OPFOR wants the enemy to perceive, deception planners have two primary objectives. The first is to cause the enemy to commit his forces and attack in a manner that favors the OPFOR's defensive plan. Specifically, the intent is to have the enemy attack and penetrate the defense at a location of the OPFOR's choosing, where the OPFOR has created a lethal antitank defense and can counterattack to destroy the enemy main force.

The second objective, and the focus of deception activities when time is limited, is to minimize friendly-force signatures. This limits detection and destruction by enemy attack.

False Deployment

The OPFOR attempts to deny the enemy the ability to accurately identify its defensive force dispositions and intentions. Knowing it cannot totally hide its forces, it tries to blur the boundaries and compositions of the defending forces, while providing indications of false units and targets. The enemy cannot easily identify weaknesses when he is unable to locate actual unit defensive positions, flanks, and forward edges.

Actions are also taken to hide the exact composition and deployment of forces. Specific activities include—

- Establishing false defensive positions and engineer obstacles, supported by dummy vehicles.
- Establishing security zones and forward positions to conceal the actual forward edge of friendly defensive positions.
- Concealing unit movement and occupation of defensive positions.
- Creating false units such as combined arms and antitank reserves, second-echelon forces, and associated activity.
- Creating false high-value assets such as artillery and rocket systems, tanks, and CPs.

By providing the appearance of second-echelon units and reserves in false locations, the OPFOR attempts to coerce the enemy into attacking into areas most advantageous to the OPFOR. When the deception is successful, the enemy attacks the defense where the OPFOR can take maximum advantage of terrain and the creation of fire sacks. False heat and acoustic signatures, dummy and actual vehicles, and corner reflectors, supported by false radio traffic, all contribute to the appearance of a main line of defense where in fact none exists. Depending on the terrain, false units may be created forward of the actual defense, causing the enemy to commit his attack earlier than he should and be drawn into fire sacks. Alternatively, the actual units could be forward of the false, providing surprise and lethal fires before the enemy is prepared. As with other deception measures, the false units must be reasonably consistent with doctrinal norms.

The movement of small tactical units of company strength in the OPFOR rear can be difficult for the enemy to identify. However, the movement of larger-size forces, such as the division reserve, is easily detected and must be protected. Deception measures employed by tactical units during the march may be used by units maneuvering during the defense, when time permits.

Sufficient engineer support is critical to the success of any defensive deception plan. Units in the main effort receive the priority, to include the allocation of additional assets from army- or corps-level engineer units. However, engineers do not begin work supporting deception until they have completed all measures required for camouflage, cover, and concealment.

Signature Reduction

Signature reduction of OPFOR units in the defense is critical to the success of any deception plan. Minimizing the thermal, radar, acoustic, and electronic signatures of combat vehicles and supporting systems is critical to ensuring deception of the enemy and, of course, enhancing survivability.

The OPFOR extensively uses a variety of signature-reduction materials and procedures that provide protection from sensors and target acquisition systems operating across the electromagnetic spectrum. For further detail, see the immediately following Protection and Security Measures section.

Protection and Security Measures

Reconnaissance activities focus on identifying enemy main forces and their objectives, primarily the location of the planned attack and penetration. Winning the counterreconnaissance battle is very important, since it can limit what information the enemy is able to collect and use in planning his attack.

The OPFOR dedicates extensive effort to employing camouflage, cover, and concealment to protect its defensive positions and high-value assets. All units are responsible for providing protective measures for themselves, with support from engineer units. The OPFOR employs a variety of signature-reducing or -altering materials and systems, to include IR- and radar-absorbing camouflage nets and paints.

In the defense, the OPFOR emphasizes radio silence and alternate communications methods such as landline and couriers. Rigid adherence to information security procedures and limiting radio transmissions to the minimum required can complicate the enemy's attempts to identify defensive positions and structure.

Electromagnetic Spectrum Operations

ESO activities conducted in support of the defense focus on identifying and disrupting the enemy maneuver C^2 networks, disrupting control links associated with enemy fire support and tactical aviation assets, and identifying sensor and target acquisition systems. As in the offense, specific targets are assigned a priority based on the expected impact of their disruption, as well as the time and location on the battlefield.[2]

Security Zone

The OPFOR conducts activities in the security zone to help shape the coming battle, both through fires and EC. In support, the division's reconnaissance and EC battalion receives intelligence from the parent army or corps concerning the projected enemy force's structure, composition, and intentions. This is especially critical for the signals reconnaissance effort, due to the relatively short range of the tactical systems employed by the division.

Signals reconnaissance. When able to establish a defense out of contact, the OPFOR may choose to deploy assets of the signals reconnaissance company of the reconnaissance and EC battalion forward within the security zone. These systems deploy along a baseline that best allows intercept and DF in the projected area through which the enemy main effort must travel. When possible, the assets deploy to presurveyed positions. It is extremely critical to select sites with access routes concealed from enemy observation.

Deploying vulnerable electronic systems forward is a risk the commander may assume to gain a tactical advantage. This deployment does allow the short-ranged tactical systems to collect on targets they would otherwise be unable to reach from positions within the main defense.

As the enemy forces approach, the OPFOR targets specific types of units for identification and locating, to include—

- All reconnaissance units and systems, both ground-based and airborne.
- Command links and CPs of leading maneuver units (though typically most are still out of range).
- Engineer units, especially obstacle-clearing and crossing assets.
- Fire support and aviation nets, especially FACs and forward observers (FOs).
- Jammers.

[2] For additional detail, see Chapter 13, Electronic Combat.

Reconnaissance and engineer activities are high priorities for detection and locating, since they are excellent indicators of enemy intentions. The enemy moves obstacle-clearing equipment and river-crossing systems, such as pontoon bridges, into the areas where he expects to pass the main effort, and in the case of rivers, where he plans to cross. The actions of reconnaissance assets, particularly ground reconnaissance patrols, similarly indicate likely intentions of the enemy main effort. Jammers are always a high-priority target, due to their potential effect on C^2. Due to their range from the OPFOR, they typically are not actively jamming at this point. However, intercept, DF, and analysis of jamming unit communications can provide information for the later identification and destruction of the jammers.

If the OPFOR is limited to creating a covering zone while in direct contact, it may still deploy signals reconnaissance assets within it. However, the commander must weigh the risk of placing high-value reconnaissance systems closer to enemy forces than normal, versus the expected intelligence gains.

Electronic jamming. The OPFOR conducts electronic jamming from the security zone, though limited in scope. Because jammers are also limited in number, it dedicates them to the defense's main effort. Their presence would therefore provide an indicator to the enemy of where the OPFOR has positioned its main effort.

There are a number of circumstances where jamming is appropriate, and at times, critical. These include—

- Jamming of maneuver and fire support nets in support of withdrawing forces.
- Jamming C^2 nets associated with NBC and precision weapons.
- Jamming reconnaissance reporting nets.
- Jamming as part of a deception plan.

While there are other times jamming may be employed, the commander must consider the potential gain against the risk of detection.

The OPFOR takes advantage of the time prior to an enemy attack to emplace expendable jammers, primarily by hand. These jammers can disrupt enemy communications nets as they approach the main defensive zone, allowing the systems of the reconnaissance and EC battalion's jamming company to remain silent and undetected. When used in conjunction with terrain, such as at natural chokepoints, mountain passes, or valleys, they can achieve significant results in light of their short range and low power. The OPFOR also uses them to support a deception plan, without risking expensive vehicle-based systems.

Main Defense

Once enemy forces close with the defending units, ESO activities primarily are focused on identifying and locating enemy maneuver and fire support assets engaged in his main effort, as well as any assets directly supporting them. ESO activities are most intense in the main defensive zone.

Signals reconnaissance. The signals reconnaissance assets of the division primarily are tasked with identifying and locating the enemy's main effort maneuver and fire support elements, as well as those support units dedicated to supporting the main effort.

The focus at this time is on providing targeting information to either the jamming company or a lethal fires element, as well as details on enemy intentions.

Targeting priorities for intercept and DF include—

- Maneuver battalion and brigade nets.
- Artillery nets.
- FAC and attack helicopter nets.
- Air defense nets.
- Communications jammers and SIGINT systems.
- Engineer nets.

As command elements of these enemy units, such as CPs, FDCs, and communications nodes are identified and located, the coordinates are passed to the division staff for confirmation and targeting by fires.

Other targets are identified for later disruption, in conjunction with specific OPFOR activity. The OPFOR attempts to identify the enemy's unit boundaries and flanks, if it has not done so earlier, for exploitation during a counterattack or once it resumes the offense.

Primary targets for the radar intercept and DF assets are the enemy's battlefield surveillance radars, countermortar and counterbattery radars, and air defense radars. In particular, detection of the enemy's battlefield surveillance radars provides a key indication of his main effort, as well as a general location of the forward edge of the enemy's forces.

Electronic jamming. Jamming priorities are similar to those for signals reconnaissance. Maneuver units are jammed in order to disrupt coordination between and within units, especially when enemy units are achieving varying degrees of success. Reporting links between reconnaissance and engineer elements and the supported maneuver units are attacked as they attempt to exploit OPFOR weaknesses, if found.

Just prior to and concurrent with OPFOR attack helicopter strikes in the target area, the OPFOR begins to jam enemy air and NBC warning nets identified earlier. By exercising patience in disrupting the enemy's air defense-related communications, it does not allow the enemy the time to react before it conducts the strikes.

While limited in number, artillery-delivered expendable jammers (EXJAMs) may be employed here. EXJAMs are especially useful in those areas where support is not available from the division's more powerful vehicle-mounted jammers, such as off the main effort where the enemy conducts an unexpected attack. Proximity fuze jammers deployed to protect high-value assets are active, since the high-value assets are within indirect fire range from enemy artillery.

Counterattack

Signals reconnaissance and jamming priorities are generally similar to those in the main defensive zone, with a few exceptions. Of particular importance are identifying and disrupting those command, fire support, and reconnaissance nets that link the penetrating enemy force with his main body. Artillery and aviation nets are jammed, in order to prevent attacks coordinated with the penetrating force.

As the OPFOR reserve or second-echelon force maneuvers to counterattack, early and accurate identification of any enemy recognition and response is critical. Enemy airborne and ground reconnaissance reporting links and sensors, and long-range fire assets are high-priority targets, though the OPFOR must rely on operational-level support for much of the targeting capabilities required.

NBC- and precision weapon-related nets are a high priority for the OPFOR to identify during any enemy penetration. The OPFOR expects the enemy to heavily employ precision weapons, and may even employ chemical munitions to prevent the total loss of his exposed force and closure of the penetration.

Withdrawal

Division-level signals reconnaissance and jamming assets support the withdrawal of division units, when possible. Because of their high value to the division commander, these assets normally do not deploy in positions that expose them to capture or destruction. Rather, they deploy to reasonably secure terrain available off the route of withdrawal. Primary targets are enemy reconnaissance reporting links and fire support nets, in order to prevent or minimize attacks or fire strikes on the withdrawing force.

Army- or corps-level signals reconnaissance and jamming assets may support the division's (or brigade's) withdrawal, depending on the nature of the withdrawal and its vulnerability. Less likely, though possible, is support provided by flanking units.

Physical Destruction

During the defense, IW-related destruction measures focus on destroying enemy assets critical to the control of the attack. As in the offense, indirect fire, ground, and air attack all contribute to the effort. Specific targets vary based upon location and time, but typical high-priority targets include—

- Precision weapons systems.
- C^2 nodes and facilities.
- Artillery, tactical aviation, and air defense systems.
- Reserves.
- Reconnaissance, surveillance, and target acquisition systems.

Special emphasis is given to destruction of enemy reconnaissance and target acquisition capabilities prior to the attack on OPFOR defensive positions. Once the attack begins, the OPFOR heavily targets enemy C^2 nodes responsible for the planning and conduct of the attack, along with supporting communications.

Typically, destruction of C^2 nodes prior to the attack may allow the enemy time to reconstitute his control, whereas targeting them once forces are committed to the attack can cause a far greater disruptive effect.

Chapter 13
Electronic Combat

The OPFOR plans and integrates a broad variety of actions to achieve an information advantage at critical times and locations on the battlefield. Achieving this advantage depends on the successful use of communications and sensor systems supporting command and control (C^2) and the decision-making process. Just as dependable communications contribute to effective C^2, the loss of communications results in the loss of control over one's forces. This loss, in the OPFOR's view, ultimately ends in defeat. The OPFOR therefore seeks to control the electromagnetic spectrum by denying its use to the enemy during combat actions, while retaining its own capabilities.

To this end, the OPFOR has developed systems and techniques to degrade the C^2 assets and processes of enemy forces. It has also taken measures to provide secure, dependable communications, information collection, and information processing for its own forces. The OPFOR has combined these capabilities with detailed, integrated planning to form the doctrine of ***electronic combat*** (EC).

EC CONCEPT

EC consists of the use of all means of manipulation of electronic emissions throughout the electromagnetic spectrum. These means constitute the five components of EC: signals reconnaissance, electronic jamming, electronic protection measures (EPM), electronic counterreconnaissance, and destruction. (See the EC Components section in this chapter for further detail.) The primary goals of EC are to—

- Disorganize and disrupt the enemy decision-making process.
- Disrupt or destroy enemy C^2 systems.
- Degrade enemy sensor systems.
- Protect OPFOR information systems.

Ensure accurate and timely information collection.

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EC is a significant, if not the primary, contributor to the conduct of information warfare (IW) during combat operations. EC is the main activity supporting electromagnetic spectrum operations and destruction, and significantly contributes to protection and security measures, and deception.[1] Achieving the most effective results depends on the proper selection of targets, and the successful integration of EC actions with combat activities at the appropriate time and place.

Integration and Planning

Detailed planning and careful integration are critical to the overall success of EC. The OPFOR planning process stresses close and continuous coordination among the staff members, particularly the EC, reconnaissance, fire support, and operations planners. This ensures the supported combat units receive massed jamming and other resources at the critical times and places. It also ensures a more complete interruption of enemy control through the combination of jamming, fires, and deception activities.

The OPFOR does not have the resources required to completely disrupt or deny enemy forces of their means of control for extended periods of time. It also recognizes the importance of exploiting enemy communications for their intelligence value until a time when their disruption can most influence the course of action.

If destruction is not feasible at that critical time, another form of disruption is employed, such as jamming. Even a few minutes of disruption, if properly timed, can be immensely valuable.

In order to ensure the efficiency and timeliness of EC strikes[2], the OPFOR has developed models that estimate critical times in the enemy decision-making process. These critical times are based upon the time required to complete four primary steps of that process—

- Collection and reporting of data.
- Evaluation and decision.
- Issuance of orders and preparation.
- Conduct of action.

Disrupting any one of these steps can result in the enemy's inability to complete all steps in the time required to accomplish the mission. For example, the destruction of reconnaissance sensors may deny the timely collection and reporting of data required to plan a mission within a given timeframe.

Another example is the jamming of enemy command nets during an OPFOR counterattack. This can prevent issuance of the orders and guidance required for a coordinated response.

[1] The EC components may be seen as *actions* which support the attainment of IW *objectives* (elements).

[2] EC strikes are offensive actions targeting the enemy decision-making process, primarily jamming and fires directed against C^2 nodes and links, as well as sensors.

Target Priorities

The OPFOR assigns enemy C^2 nodes, communications facilities, nets, and sensors a targeting priority. It bases the priority on the expected impact on the battle of disrupting or destroying a particular target at a given time. It selects targets with the intention of disrupting them either by physical destruction or by jamming. Although specific EC target priorities vary depending on the command level, and change with the combat situation, they generally are as follows:

- NBC delivery means.
- Precision weapon systems.
- Command posts (CPs) and C^2 centers.
- Conventional artillery, tactical aviation, and air defense systems.
- Reconnaissance sensors
- Engaged maneuver units.
- Reserves.
- Point targets that jeopardize advancing forces.
- Logistics centers.

Division-Level EC Focus

EC activities conducted at the tactical level are designed to support the division commander's objectives. While the division may conduct some activities in support of operational-level EC requirements, the division commander is the primary source for requirements levied on the division's assets.

Effective EC activities rely on collecting accurate and timely information. At the tactical level, collection efforts focus on two relatively simple goals: identifying the enemy's intentions in order to shape his behavior, and locating his high-value assets in order to disrupt or destroy them.

The commander's reconnaissance and target acquisition systems are tasked with providing the information required to achieve these goals. Detailed information on the enemy's electronic order of battle, equipment types and characteristics, and emissions parameters are provided by operational- and strategic-level organizations to tactical signals reconnaissance units through intelligence channels.

ASSETS

The OPFOR has organized its dedicated EC equipment and capabilities at the tactical level within reconnaissance and EC units organic to each division and separate brigade. The units are equipped with modern signals reconnaissance and jamming systems mounted on tracked or wheeled vehicles.

The OPFOR continues to develop and acquire modern electronic systems to exploit and disrupt enemy communications and sensors. This includes the use of off-the-shelf hardware, primarily at the operational and strategic levels. Driving OPFOR acquisition strategy is the increasing availability on the commercial market of electronic systems such as cellular phones, mobile satellite terminals, and encryption systems, along with advanced signal modulation techniques. These new technologies have greatly complicated OPFOR collection and jamming efforts.

Also critical to the OPFOR's acquisition of high-technology EC systems is its ability to both train with and maintain the systems it acquires. Great quantities of extremely capable advanced systems are commercially available all over the world. However, the OPFOR considers its own technological and educational infrastructure when choosing new systems for the military. Current tactical-level EC systems are primarily designed to target traditional, single-channel communications systems. The OPFOR relies primarily on a combination of technology and tactics to counter those modern systems (such as frequency hoppers) already deployed. Due to their cost and complexity, the OPFOR has deployed those systems capable of exploiting and disrupting advanced systems at the national level.

Division

Each OPFOR mechanized infantry and tank division has a number of active and passive EC techniques it may employ. Divisions can jam high-priority enemy communications links by ground-based and expendable jammers (both artillery-delivered and hand-emplaced). It can disrupt enemy information collection efforts by providing false or misleading information, such as through the employment of dummy communications nets and radar corner reflectors. Even the whole range of direct and indirect fire weapons contribute to the effort, by physically destroying select high-value enemy C^2-related assets.

Reconnaissance and EC Battalion

The vast majority of capabilities and equipment supporting tactical-level EC are found within the division-level reconnaissance and EC battalion. While there are a number of units that either possess equipment or conduct activities supporting EC objectives, this is the only dedicated, division-level EC unit.

In addition to the ground reconnaissance units, the reconnaissance and EC battalion also includes a signals reconnaissance company, a jamming company, and in high-priority units, a remotely-piloted vehicle (RPV) squadron. Currently deployed tactical RPVs carry photographic or video camera payloads.

The ***signals reconnaissance company*** is equipped with a combination of communications and radar intercept and direction-finding (DF) systems. The radio intercept and DF platoon has a mix of HF, VHF, and UHF intercept and DF systems. Deployed on a baseline near the forward edge, these systems target enemy tactical ground-based and airborne emitters of interest to the commander.

The signals reconnaissance assets of the radar intercept and DF platoon typically deploy with the communications intercept systems, and target tactical ground-based battlefield surveillance and artillery countermortar/counterbattery radars.

The ***jamming company*** is likewise composed of a mix of capabilities. Two platoons are equipped with HF and VHF jammers targeting enemy tactical communications. These platoons are supported by a radio intercept and DF platoon, which provides target identification and locating. The company also includes a fuze jamming platoon, equipped with systems designed to disrupt the operation of proximity-fuzed munitions.

EC Staff and Reporting

The reconnaissance and EC battalion commander exercises overall responsibility for the conduct of EC activities by the battalion. He typically locates his headquarters with or near the division chief of reconnaissance to facilitate coordination and tasking. Along with a small staff, the battalion commander provides guidance to the division staff on the reconnaissance and EC battalion's EC asset employment and tasking, while overseeing the collection and jamming efforts supporting the division commander's objectives. He also assists in the preparation of the reconnaissance plan and the intelligence portion of the division's combat order.

The signals reconnaissance and jamming companies operate nets for internal command and coordination, and maintain stations on the battalion command net. They also establish communications with each other to ensure the signals reconnaissance assets provide the required target information.

A dedicated link between the signals reconnaissance company baseline and the battalion staff ensures responsive tasking and rapid reporting. The battalion headquarters typically locates near the division chief of reconnaissance. This ensures a timely and secure flow of information between the division's information collectors and users.

Separate Brigades

Each separate mechanized infantry and tank brigade has a jamming platoon, part of the brigade's reconnaissance and EC company. This platoon is equipped with a limited number of radio intercept and DF systems, HF and VHF jammers, and proximity fuze jammers. The OPFOR has provided this capability to separate brigades, while not to divisional brigades, primarily because there is no parent division to provide EC support when required. One of the primary missions of a separate brigade is to conduct independent, longer-range missions where the accompanying EC support is necessary.

EC COMPONENTS

The OPFOR developed a mix of active and passive measures aimed at disrupting the enemy's decision-making and control processes. The following sections address tactical OPFOR capabilities in each of the five components of EC.

Signals Reconnaissance

Essential to the success of the individual components, and to the overall EC effort, is the collection of accurate and timely information. OPFOR reconnaissance attempts to develop an accurate picture of the enemy's intentions and capabilities. In addition to EC-dedicated systems, all reconnaissance, surveillance, and target acquisition assets at each level feed the information-collection and analysis process supporting EC. Signals reconnaissance provides the primary means of identifying and locating targets of specific interest to the EC effort. Other sensors, especially ground reconnaissance troops, provide valuable confirmation of targets.

Identifying and locating enemy electronic emissions and control nodes, and understanding their nature and use are key to countering and exploiting them. The OPFOR employs signals reconnaissance as the means used in this collection and analysis. Signals reconnaissance is the mission of—

- Dedicated signals reconnaissance units from the separate brigade through army group levels.
- Signals reconnaissance assets of the Ground Forces' tactical- and operational-level jamming units.
- Airborne signals reconnaissance assets of the Air Force.

These assets collect information on the enemy's composition and intentions, and provide locations on the emitters through DF. At the division level and below, however, the OPFOR has deployed only ground-based systems. While higher echelons may provide airborne signals reconnaissance support, it is typically only for the duration and in support of a specific mission or objective.

The OPFOR expects to identify targets not only by DF, but also through signals analysis. For the latter, it plans to exploit lax enemy communications security and poor electronic counter-countermeasures. Specialists perform technical analysis to identify high-priority targets. Based on the information gathered (and in accordance with the EC plan), the OPFOR targets emitters for destruction, jamming, signals exploitation, deception, or a combination of these. Because signals reconnaissance systems only locate electronic *emitters*, not necessarily *units*, the OPFOR attempts to identify enemy electronic deception efforts by using other reconnaissance means for confirmation.

The OPFOR has the ground-based capability to intercept enemy ground-based emitters within the following distances from the forward edge of friendly troops:

- Artillery ground radar—about 25 km.
- VHF communications—about 40 km.
- HF groundwave—about 80 km.
- HF skywave—unlimited.

These ranges are greatly extended when targeting airborne emitters. For example, VHF and UHF radios used by fixed- and rotary-wing aircraft can be intercepted several hundred kilometers from the intercept site.

The fielding of communications systems employing spread-spectrum[3] (SS) modulation techniques greatly complicates OPFOR signals reconnaissance efforts. Even when not coupled with encryption systems, these systems provide a significant electronic counter-countermeasures (ECCM) capability, with the potential for truly low probability of intercept and increased resistance to jamming. The OPFOR has developed a high-technology response designed to intercept and locate these radios. However, these systems remain limited in number and are used to support national- and limited operational-level tasking. The OPFOR does possess basic wideband receivers that it can use to identify the presence of SS signals and their systems' operating band. The OPFOR provides these receivers to signals reconnaissance units expected to be targeting enemy forces equipped with SS-capable communications systems. Once the signals reconnaissance unit identifies the general "hop set", or frequency band within which the frequency-hopping radios are operating, the jammers can then develop a jamming scheme able to disrupt these advanced radios to some degree.

Direction Finding

The OPFOR uses DF to locate transmitting enemy communications and radar emitters to ranges approximating those for intercept. DF results can—

- Provide approximate locations of enemy electronic emitters.
- Provide locations that, when integrated with intercept, terrain analysis, or other reconnaissance means, have sufficient accuracy to target with artillery fires.
- Develop a "picture" of the battlefield to reveal enemy unit locations and intentions.

The OPFOR is able to evaluate information from DF results quickly. With the exception of jammers and radars, however, DF results are normally not accurate enough to conduct indirect fire missions based only on those results. The locations of communications systems require further confirmation by secondary sources. Targets that are time-sensitive and considered a serious threat receive priority and are candidates for immediate engagement.

Due to the length of transmission, the peculiarity of their signal characteristics, and high power output, the OPFOR can easily identify and locate jammers, allowing for attack by indirect fire. Because of a radar's unique signal parameters, DF can also locate radars with greater precision than it can for communications emitters, often within 50 to 200 m.

Older systems in the OPFOR inventory required the enemy transmitter to emit for at least 25 seconds in order for the targeting sequence to continue even after emissions cease. The newest systems, deployed to high-priority units, are capable of locating enemy transmitters within a few seconds.

[3] Spread spectrum modulation signals "spread" the signal's energy over a wider frequency band than traditional signals, by a variety of methods. One method is to "hop" the transmitted signal from one frequency to another, up to several hundred times per second.

Targets

Signals reconnaissance priorities vary during offensive and defensive combat, according to the phase of battle. As a part of the total reconnaissance plan, EC collection efforts focus on identifying those C^2 nodes and nets, and sensors, whose exploitation or disruption at a specific time and place the EC plan requires.

Communications intercept and DF priorities include—

- NBC-related nets.
- Precision weapon-related nets.
- Electronic warfare (EW) nets and jammers.
- Maneuver unit CPs and command nets.
- Reconnaissance reporting nets.
- Fire support nets and CPs.
- Air defense nets and CPs.
- Forward air controller (FAC) nets.
- Engineer nets.
- Transportation, logistics, and maintenance nets.

In addition to the maneuver and fire support units, which are always a priority, the OPFOR places great emphasis on identifying and exploiting the communications of support units. Communications and behaviors of such units often provide critical information on enemy plans and intentions. For example, knowing the location of the enemy's high-value river-crossing assets, or their direction of movement, is a key indicator of the area of an intended crossing.

Radar intercept and DF priorities include—

- Battlefield surveillance radars.
- Countermortar and counterbattery radars.
- Air defense target acquisition and fire control radars.
- Radar jammers.

Electronic Jamming

Electronic jamming is the primary nonlethal disruption component of EC. Assets of the reconnaissance and EC battalion's jamming company jam, at critical times, specific enemy C^2 and weapon system voice and data communications that lethal fires can not disrupt (due to the unavailability of assets or being out of range). The division may also receive ground-based and fixed- or rotary-wing jamming support, in addition to its organic systems.

Jamming secure voice and data communications may force the enemy to transmit in the clear, which allows exploitation of combat information. Jamming can also aid in DF by forcing the enemy to transmit longer, allowing time for tip-off and multiple fixes. When not dedicated to a jamming mission, jammers may assist in signals reconnaissance.

Jammers may also support EPM by providing a jamming "shield" to protect OPFOR communications from enemy EW efforts. To accomplish this, jammers transmit on those frequencies the OPFOR wishes to use. Due to considerations of signal geometry and strength, the jammers do not affect OPFOR communications, but do affect the enemy's signals reconnaissance receivers.

The jammers deployed by the OPFOR are capable of jamming AM and FM communications using barrage, sweep, or spot noise jamming techniques. When providing support at the tactical level, airborne and ground-based radar jammers employ the same techniques, as well as pulse jamming of command guidance systems.

When facing an enemy employing frequency-hopping radios, the OPFOR can employ jamming procedures that allow the jammers to disrupt the radios to a limited degree. One method is to "stack" the jamming signals within the operating bandwidth of the radios, to ensure a set percentage of the radios' bandwidth is always jammed. Because the frequency-hopping radios' transmissions revisit these jammed frequencies (identified by the signals reconnaissance elements employing wideband receivers), the partial-band jamming results in a partial loss of transmission.

While not necessarily a problem for voice communications, this type of jamming is effective when directed against data communications. This can have a significant impact on those systems and missions relying on data transmissions, such as artillery fire missions, as well as forces employing digital communications to pass orders, maps, etc.

The OPFOR can supplement the communications jamming capability of its tactical forces with assets allocated from the parent army or corps. These may include a considerable number of ground-based HF, VHF, and UHF jammers, ground-based radar jammers, and airborne communications and radar jamming platforms.

Effectiveness

A number of technical factors govern jamming effectiveness. These factors include—

- Target link distance (distance between the enemy transmitter and receiver).
- The distance between the jammer and the enemy receiver.
- Radio line-of-sight (LOS) between the jammer and the targeted receiver.
- Antenna polarization.
- Effective radiated power of the jammer and the enemy transmitter.
- Weather, terrain, and vegetation.

Radios utilizing SS modulations reduce the impact of conventional jammers. The effectiveness of jamming against these radios varies, depending upon the type of jamming employed. Options include narrow-, partial-, or full-band jamming.

Targets

Jamming targets, as with signals reconnaissance, vary with the tactical situation. The following are general guidelines for initial priorities:

- NBC-related communications nets.
- Precision weapon-related nets.
- Fire support nets.
- Maneuver unit nets.
- Reconnaissance reporting nets.
- Air defense-related communications nets.
- FAC nets.

OPFOR EC planners select targets based upon guidance received from the army-level EC staff. They conduct close and continuous coordination with the staffs of the chief of reconnaissance and the chief of signal troops. EC planners give particular attention to minimizing or preventing the unintentional jamming of friendly electronic systems.

Expendable Jammers

The OPFOR employs several types of hand-emplaced and artillery delivered expendable jammers (exjams). These exjams provide an inexpensive and simple, yet effective compliment to the reconnaissance and EC battalion's vehicle-mounted jammers. The mission and time available determine which specific exjam is employed.

Exjams provide a number of benefits above other jamming systems. Their flexibility of emplacement allows them to be rapidly placed where and when needed. Whereas vehicle-mounted systems are a high priority for destruction by the enemy, the enemy can not detect exjams until the enemy is already mingled with them. They can disrupt part or all of the tactical, VHF radio spectrum. Given their relatively short effective jamming range, they do not normally interfere with friendly communications.

Due to the nature of exjam jamming, the enemy may not even be aware of his communications being disrupted. Elements of an enemy unit within the jamming range of active exjams are not able to communicate with each other, while elements outside the jamming range can still hear the jammed communicators attempting to establish communications.

EC planners develop and allocate exjam missions to the appropriate unit for emplacement. Offensive or defensive plans integrate specific missions to optimize their effect. Artillery-delivered exjams, considered as special munitions, are provided to the firing unit only when tasked with emplacing them.

Electronic Protection Measures

EPM are any active or passive procedures to protect the friendly use of electronic systems. OPFOR commanders try to enforce a high level of EPM consciousness in their subordinates and equipment operators.

The OPFOR objective for EPM is the satisfactory operation of its electronic equipment in the face of enemy disruption efforts. EPM are the responsibility of every soldier who uses or supervises the use of radios, radars, or other electronic emitters.

The OPFOR achieves its EPM objectives through strict enforcement of signals security, equipment redundancy, system design, operator skill, and alternate methods of communication. It places emphasis on individual and organizational field-expedient techniques. Operator EPM training occurs at all organizational levels. The OPFOR practices major moves while in conditions of radio silence or even total electronic silence. Its use of repetitive tactical movement drills during training lessens its dependence on extensive radio orders in the attack.

The OPFOR employs alternate communications means, such as wire, visual methods (such as flags or flares), messengers, and manual encryption. The OPFOR is also expanding its employment of secure communications devices. It practices false positioning of different types of emitters and establishes dummy nets for deception purposes. The OPFOR may protect its communications from enemy EW by using a jamming screen.

EPM includes vigorously targeting enemy EW signals reconnaissance and jamming assets. To ensure OPFOR tactical units are able to maintain effective communications, enemy EW systems, and jammers in particular, are one of the highest priorities for identification and locating through DF. Once located, their subsequent destruction receives immediate tasking within the fire support chain.

Electronic Counterreconnaissance

The OPFOR attempts to limit the enemy's use of the electromagnetic spectrum to gather critical intelligence information required to accurately determine OPFOR unit strengths, composition, capabilities, and intentions. The goal is to disrupt the enemy's control process by either denying critical information, or by feeding false information into the enemy's information systems.

All enemy sensor types are potential targets for deception operations supporting the counterreconnaissance effort, not just signals reconnaissance systems. Other targeted sensors include radars such as battlefield surveillance and target acquisition radars, and all forms of thermal and optical sensors. False radio nets, dummy CPs, deception jammers, and even radar corner reflectors all contribute to providing a false or misleading picture of OPFOR capabilities and intentions. The OPFOR targets both ground-based and airborne sensors.

Destruction

Integral to the OPFOR's EC doctrine, physical destruction is the preferred method of disrupting the enemy's decision-making process. Compared with other methods of disruption, physical destruction provides the longest-lasting effects, because the enemy must reconstitute destroyed or damaged C^2 nodes and sensors.

The effects of jamming last only as long as the jamming does, or until the enemy employs some form of EPM, such as changing frequency or increasing signal power levels. Deception activities, while providing potentially the greatest disruptive results, are the most difficult to successfully carry out. Often, only well after the outcome of an operation are the effects of deception activities known.

The OPFOR may target all enemy C^2 assets and information-collection systems for destruction. When possible, certain specific targets are always destroyed. High-priority targets include C^2 nodes such as CPs and supporting communications centers, air defense radars, and EW (especially jammers).

The OPFOR conducts physical destruction attacks using any available means. ***Indirect fire*** assets, such as mortars, tube artillery, and multiple rocket launchers (MRLs), are especially useful for destroying targets that move quickly and often, and after the OPFOR has confirmed the target's location by multiple sources. As targets of opportunity, ground forces may destroy EC targets by ***direct fire***. Units that have penetrated enemy forces, and special-purpose, airborne, or heliborne forces in particular, may attempt to destroy C^2 nodes in the enemy rear. Units operating as raiding or enveloping detachments are tasked specifically with the destruction of enemy C^2 capabilities. The OPFOR may also attack using ***fixed-*** and ***rotary-wing aircraft***. Aircraft are more likely to target C^2 assets deeper in the enemy area, typically operational-level targets.

EC SUPPORT TO DECEPTION

The OPFOR plans deception activities to support all combat actions. It seeks to confuse the enemy to the extent that the enemy is unable to distinguish between legitimate and false targets, units, activities, and future intentions. Inserting false or misleading information at any point in the enemy decision-making process can lead to increased survivability and the inability to appropriately respond to OPFOR tactical actions. Manipulation of the electromagnetic spectrum is critical to successful deception activities, as the OPFOR responds to the challenge posed by advances in enemy C^2 systems and sensors.

The OPFOR always employs more than one type of deception simultaneously for maximum effectiveness. In this multidisciplined, multispectral approach, no aspect lends itself more to use of deception than interference with enemy electronic systems, especially communications. The purpose of electronic deception is to cause misinterpretations of origin and intent, disruptions, and delays. Electronic deception is normally part of a comprehensive deception plan. This ensures that what the enemy collects electronically agrees with, or at least does not refute, the indicators presented by other deception means (such as false positions, thermal signatures, dummy vehicles).

Electronic deception takes the form of manipulative, simulative, or imitative deception. The OPFOR may use one or all of these types of electronic deception in its deception activities.

Manipulative Electronic Deception

The OPFOR uses manipulative electronic deception to counter enemy jamming, signals reconnaissance, and target acquisition efforts by altering the electromagnetic profile of friendly forces. Specialists modify the technical characteristics and profiles of emitters that could provide an accurate picture of friendly intentions. The objective is to have enemy analysts accept the profile or information as valid and therefore arrive at an erroneous conclusion concerning friendly activities and intentions.

Simulative Electronic Deception

Simulative electronic deception seeks to mislead the enemy as to the actual composition, deployment, and capabilities of the friendly force. The OPFOR may use controlled breaches of security to add credence to its simulative electronic deception activities. There are a number of techniques the OPFOR uses.

With ***unit simulation***, the OPFOR establishes a network of radio and radar emitters to emulate those emitters and activities found in the specific type unit or activity. The OPFOR may reference the false unit designator in communications traffic and may use false unit callsigns.

With ***capability simulation***, the OPFOR projects an electronic signature of new or differing equipment to mislead the enemy into believing that a new capability is in use on the battlefield. To add realism and improve the effectiveness of the deception, the OPFOR may make references to "new" equipment designators on other or related communications nets.

To provide a ***false unit location,*** the OPFOR projects an electronic signature of a unit from a false location while suppressing the signature from the actual location. Radio operators may make references to false map locations near the false unit location, such as hill numbers, a road junction, or a river. This would be in accordance with a script as part of the deception.

Imitative Electronic Deception

Imitative electronic deception injects false or misleading information into enemy communications and radar networks. The communications imitator gains entry as a bona fide member of the enemy communications system and maintains that role until he passes the desired false information to the enemy.

The OPFOR exercises extreme care in entering the enemy communications system because each emitter produces its own signature. Most techniques require extensive technical support and specially trained operators.

Noncommunications Deception

The OPFOR is continuing the development and fielding of dedicated tactical noncommunications means of deception. It simulates troop movements by such means as use of civilian vehicles to portray movement to radar, and marching refugees to portray movement of troops in the rear. Simple, inexpensive radar corner reflectors provide masking by approximating the radar cross sections of military targets such as bridges, tanks, aircraft, and even navigational reference points. Corner reflectors can be quite effective when used in conjunction with other EC systems, such as ground-based air defense jammers.

BATTLE INTEGRATION (EXAMPLE)

EC activities are most effective when fully integrated with the maneuver plan and fires. The following plan, which identifies specific signals reconnaissance and jamming tasks, relates these specific taskings to the OPFOR's combat objectives at a particular time and location on the battlefield.

This plan is only representative. Specific targeting priorities would vary, depending on the commander's guidance and objectives, and OPFOR and enemy capabilities. Like any other plan, it is subject to immediate modification as the combat situation develops. The EC planners do consistently follow basic guidelines. One is to never disrupt (by jamming or physical destruction) enemy C^2 assets that are actively providing critically needed reconnaissance information. Inadvertently jamming or destroying a lucrative information source can cause the loss of further or expected information. Avoiding this requires continuous and close coordination among all staff members contributing to EC planning. It is also necessary to consider what the EC actions tell the enemy about OPFOR intentions. For example, the OPFOR typically does not jam tactical command nets before engaging the enemy maneuver units, but concurrently, so as to prevent a coordinated response. Therefore, EC actions should occur only at the time when the enemy is not capable of using such knowledge to prevent or disrupt OPFOR plans.

While not listed, enemy EW systems (especially jammers) are always a high priority for intercept and DF, due to their ability to negatively impact OPFOR activities. Also, jamming directed against artillery, air defense, and aviation nets is always a high priority when the enemy is actively employing these systems against the OPFOR.

The following EC actions are coordinated with the phases of fire in the offense. This provides a logical connection between the EC, maneuver, and fire support activities.

Phase I, fire support for the movement forward, is typically employed during an attack from the march, to cover a unit's movement from an assembly area more than 20 km from the forward edge of the enemy defense, or to cover a follow-on force's movement forward before commitment. The goal of EC activities during this phase is to disrupt enemy systems that could interfere with the advancing columns, as well as prepare for future combat actions through collection of critical information.

The OPFOR targets a majority of enemy systems during this phase with operational-level assets. This is due primarily to the distances between many of the targets and the OPFOR EC systems, as well as the type of EC systems employed. However, when within range, the division's EC assets will similarly target the enemy.

Jamming priorities during this phase include—

- Long-range artillery and MRL nets.
- Surface-to-surface missile nets.
- Fixed- and rotary-wing attack aircraft nets.
- Airborne surveillance and target acquisition radars and reporting links.
- Reconnaissance reporting nets.

Intercept and DF targeting priorities include—

- Defending maneuver unit CPs and nets.
- Tactical ground reconnaissance reporting nets.
- Short-range artillery nets.
- FAC nets.
- Combat engineer nets.
- Air defense nets.

During this phase the OPFOR is attempting to complete identification of the locations and nature of the enemy defensive disposition. Knowledge of reconnaissance reporting nets of the defending unit's reconnaissance patrols can allow for the rapid and accurate jamming of these nets once the OPFOR commits to the attack and begins its advance toward the enemy defense. For the same reasons, artillery and FAC nets are high priorities for intercept and DF. The composition and disposition of combat engineer assets provide key indicators of how and where the enemy expects to conduct his main defensive effort, or its weakest link.

During **Phase II**, artillery preparation for the attack, the OPFOR attempts to neutralize or destroy the defending enemy forces, with the goal of preventing the enemy from coordinating a coherent response to the attack. Phase II fires are employed during the attack, a counterattack, or prior to the commitment of second-echelon or reserve forces.

Jamming priorities include—

- Artillery nets.
- Reconnaissance reporting nets.
- Air defense target acquisition, control, and warning nets.
- Fixed- and rotary-wing attack aircraft nets.
- FAC nets.

Jamming activities are very intense in this phase. The OPFOR heavily targets reconnaissance reporting nets, to minimize what the enemy's first-echelon defending forces know concerning the approaching force's composition and intentions. Artillery and fixed- and rotary-wing aviation nets are disrupted, to minimize OPFOR attrition. Also jammed are air defense and FAC nets, depending on the air activity conducted on both sides.

Intercept and DF priorities during this phase include—

- Defending maneuver unit CPs and nets.
- Maneuver reserve nets.
- Antitank nets.
- FAC nets.

Collection efforts continue to focus on identifying exactly how the enemy has deployed his defenses. Having identified company defensive positions and strongpoints of the first-echelon battalions and the overall disposition of the first-echelon brigades, the OPFOR attempts to identify the enemy's second echelon. It also attempts to identify the composition and location of reserves the enemy can use to block a penetration or to counterattack. Due to the distances involved, the OPFOR division may receive assistance from army-level signals reconnaissance assets.

Phase III, fire support of the attack, continues until the OPFOR has defeated the defending first-echelon battalions. EC objectives exploit the disruption caused during phase II, and further target the defending maneuver battalion C^2 and fire support assets.

Jamming priorities in Phase III include—

- Maneuver battalion and company nets.
- Artillery nets.
- Antitank nets.
- Air defense nets.
- FAC nets.

Jamming in this phase now focuses on the enemy's company and battalion command nets, in order to prevent a coordinated defense. In addition to these nets, the OPFOR targets brigade nets linking the battalions and parent units and any net used for coordination between the first and second echelons.

Intercept and DF priorities include—

- Division second-echelon nets.
- Division maneuver reserve nets.
- Antitank nets.
- Combat engineer nets.
- Chemical defense nets.

As the OPFOR defeats the first echelon and creates a penetration, it attempts to determine exactly what the enemy intends to do with his reserves. Combat engineer assets, especially minelaying and obstacle-building, are located prior to commitment. Chemical defense units may be a high priority at this time, if the enemy has the option of employing chemical weapons in an attempt to halt the penetration.

During **Phase IV**, fire accompaniment to depth of the enemy defense, the OPFOR continues to attack enemy maneuver and fire support assets attempting to halt the OPFOR advance. It also directs fires against enemy reserves deep in the rear area. EC activities particularly focus on disrupting those enemy reserves or second-echelon forces capable of resisting the OPFOR.

Jamming priorities include—

- Maneuver forces in contact with the OPFOR.
- Second-echelon and reserve force nets.
- Artillery nets.
- FAC nets.
- Air defense nets.

Jamming activities during this phase continue to target those maneuver and fire support units in contact with the OPFOR. Reporting links between reserve and second-echelon maneuver units and their reconnaissance patrols are heavily jammed, as are their command nets once the OPFOR engages them. Enemy maneuver and fire support units that may influence the OPFOR's commitment of the second echelon are heavily targeted. The OPFOR supports fixed- and rotary-wing attack aircraft employed to defeat enemy reserves with jamming of air defense unit communications. FAC nets are targeted to disrupt enemy air strikes.

Intercept and DF priorities include—

- Second-echelon and reserve force nets.
- Bypassed first-echelon force nets.
- Precision weapon-related nets.
- Antitank unit nets.
- Combat engineer nets.
- NBC-related nets.

As the OPFOR maneuvers through the first-echelon defenses, it monitors enemy reserves and second-echelon forces for any response to the penetration. The OPFOR also continues to monitor bypassed first-echelon forces, in order to identify forces capable of reconstituting or reorganizing and counterattacking. Follow-on forces tasked to clean up bypassed enemy units typically receive this mission. The OPFOR monitors all units with NBC-related munitions, since the enemy may require their use at this time to prevent a total envelopment and destruction of the defending force.

EC DEPLOYMENT (EXAMPLES)

The manner in which the OPFOR deploys its EC assets depends on a number of factors, to include the availability and capabilities of EC systems, the threat, and terrain in the areas of OPFOR *and* enemy deployment, and specific tasking. The following examples illustrate these considerations, and are only representative of the types of deployment the OPFOR uses.

Figure 13-1 illustrates a deployment of the ***radio intercept and DF*** platoon (equipped with an older, wheel-mounted 10-system set) of the signals reconnaissance company during an offensive. The intercept and DF baseline may deploy over the width of the division attack zone, ranging from 15 km to 25 km. However, the overriding principal when selecting sites is the requirement for good LOS into the primary area of interest. The reconnaissance and EC battalion commander coordinates with the division chief of reconnaissance to ensure continuous coverage of the most critical sections of the battlefield. It is not necessary to deploy immediately behind the division's strike sector, nor precisely parallel with the forward edge or any other geometrical limitation.

The baseline's distance from the forward edge is determined by the terrain and the level of threat. The distance is normally within 2 to 7 km from the forward edge. Another consideration for determining this distance is the relationship between the distance from the targeted enemy emitters and the width of the baseline. Generally speaking, the most accurate locating of emitters is accomplished at distances approximating the width of the DF baseline.

As seen in Figure 13-1, the OPFOR usually selects sites along ridges or atop mountains and hills. Higher altitudes provide for increased ranges of LOS from the intercept systems to their potential targets. EC systems have unique visual signatures, however, so the military crest is the optimum location. This area, located on the reverse or forward slope of a hill or ridge just below the topographical crest, allows maximum observation of the target area while minimizing exposure to enemy observation and fire. Only the receiving antenna (or transmitting antenna, in the case of a jammer) requires the LOS; so the OPFOR can deploy a system well below the crest while placing the antenna above the crest.

The platoon leader selects alternate positions for the sites that have LOS along the avenues of approach that must be covered, in both the offensive and defense. This enables the assets to leapfrog forward (or rearward), ensuring at least partial coverage of the enemy.

Another consideration when selecting a location is the site's accessibility. When possible, the site should be accessible from a route not in direct view by the enemy. More importantly, when leaving a site due to an approaching threat, two or more routes should be available to depart the area.

Deployment in the defense is very similar. Depending on the nature and level of the enemy threat, the site locations may be several kilometers farther behind the forward edge. Initially, many division (and army or corps) assets may locate within the security zone, behind the security-zone forces in their initial positions. The depth to which the OPFOR deploys these assets depends on the terrain and disposition of forces in the security zone. As security-zone forces fall back to their successive positions, signals reconnaissance assets fall back to previously reconnoitered positions offering good LOS. If deployed within the main defensive zone, assets take up position behinds the first-echelon battalions of the first-echelon brigades. They choose terrain offering good LOS and reposition frequently to avoid enemy EW activities and subsequent destructive fires.

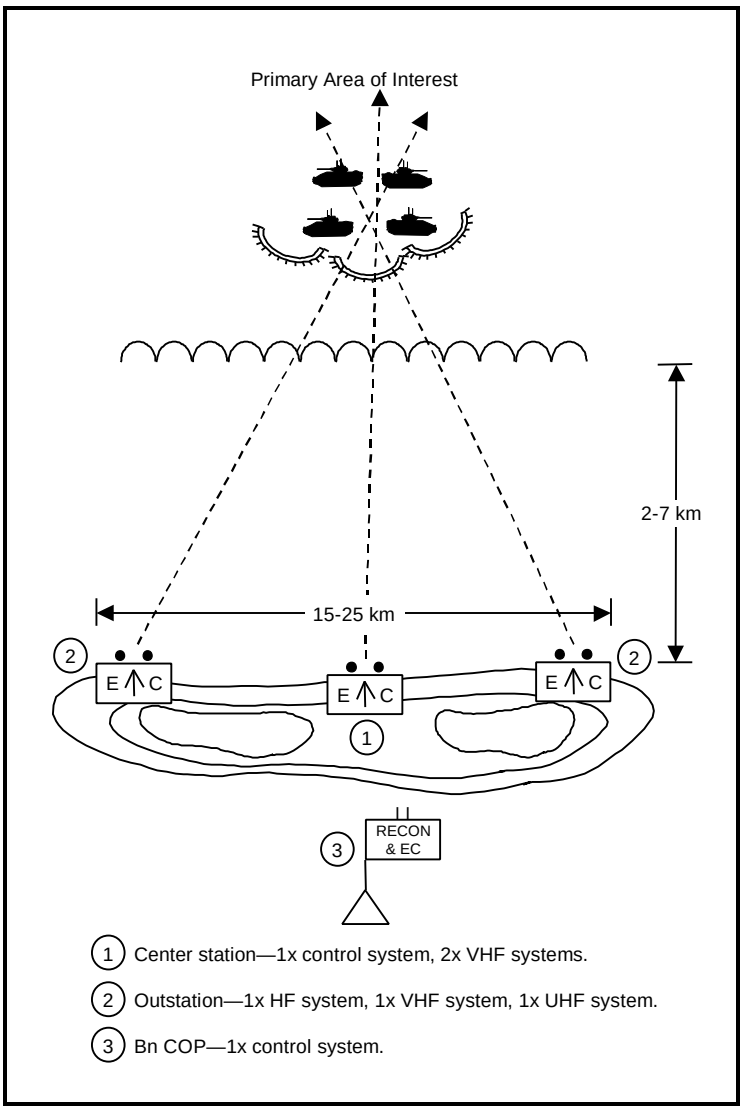


Figure 13-1. Radio intercept and DF platoon deployment (example).

A typical deployment of the ***radar intercept and DF platoon*** is shown in Figure 13-2. Site selection and deployment guidance is the same as for the radio intercept and DF systems.

Figure 13-3 illustrates a deployment of the reconnaissance and EC battalion's ***jamming company*****.** Site selection and deployment guidance is the same as for the assets of the signals reconnaissance company, with a few exceptions.

Division-level jammers normally support the division's main effort, deploying over the width of the division strike sector (4 to 12 km). In the defense, jamming assets deploy where they can best orient on those areas projected to be the enemy's main attack.

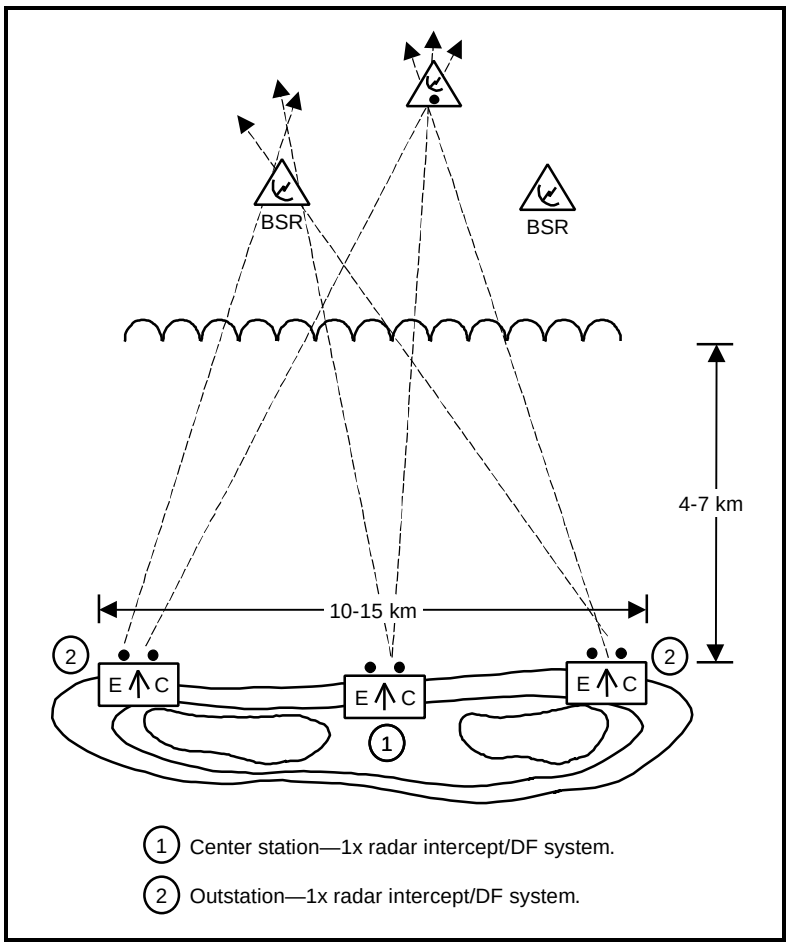


Figure 13-2. Radar intercept and DF platoon deployment (example).

One or more intercept and DF systems organic to the jamming company deploy to a location within one km of each jammer site. These systems provide target identification and locating for the jammers, but do not normally conduct independent search missions for targets of interest. OPFOR signals reconnaissance units normally provide jamming units with the initial target information.

The intercept systems provide target information to the jammers via landline. The intercept systems deploy remotely to minimize interference from the jammers' high-powered transmissions, as well as reduce the risk of destruction if jammers are targeted by indirect fire.

In addition to their visual appearance, jammers have very unique electronic signatures due to their signal characteristics and high power. These signatures are relatively easy to detect and locate by enemy signals reconnaissance assets. Highly susceptible to damage or destruction, the majority of ground-based jammers must deploy within the range of indirect fire weapons. Taken together, these factors dictate the OPFOR must thoroughly plan and execute jammer deployment for their survival.

Jammers must be mobile to both survive and maintain favorable transmission paths against enemy emitters that are moving as the battle progresses. A fluid, high-tempo battle requires the jammers to displace frequently. The OPFOR preselects primary and alternate sites for each phase of the operation. These sites must—

- Be accessible and concealed from enemy direct fire weapons.
- Provide for continuity of mission.
- Facilitate electronic massing of several jammers against priority targets.
- Facilitate communications.

The proximity fuze jammers deploy to protect high-value assets. In this figure, they deploy to protect the division forward and main CPs, and the division's MRL battalion.

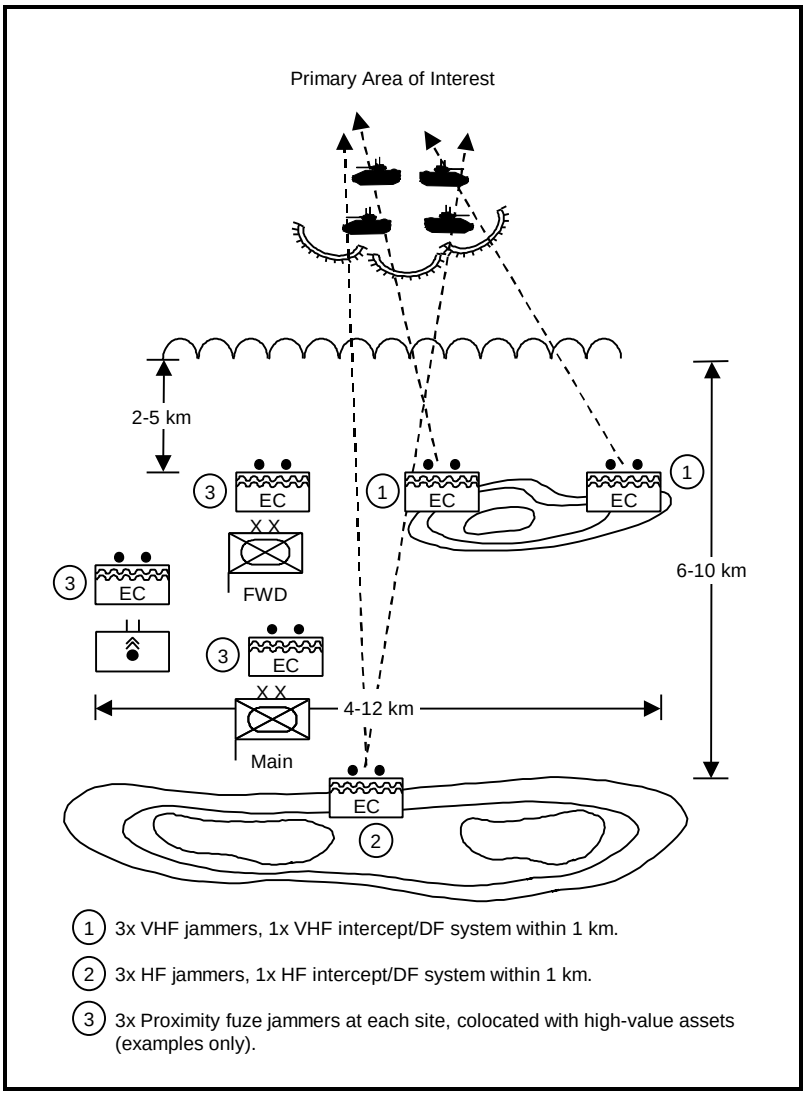


Figure 13-3. Jamming company deployment (example).

Figure 13-4 provides one employment example of the jamming platoon of a separate mechanized infantry (or tank) brigade's reconnaissance and EC company. In this case, the brigade is conducting a delaying action

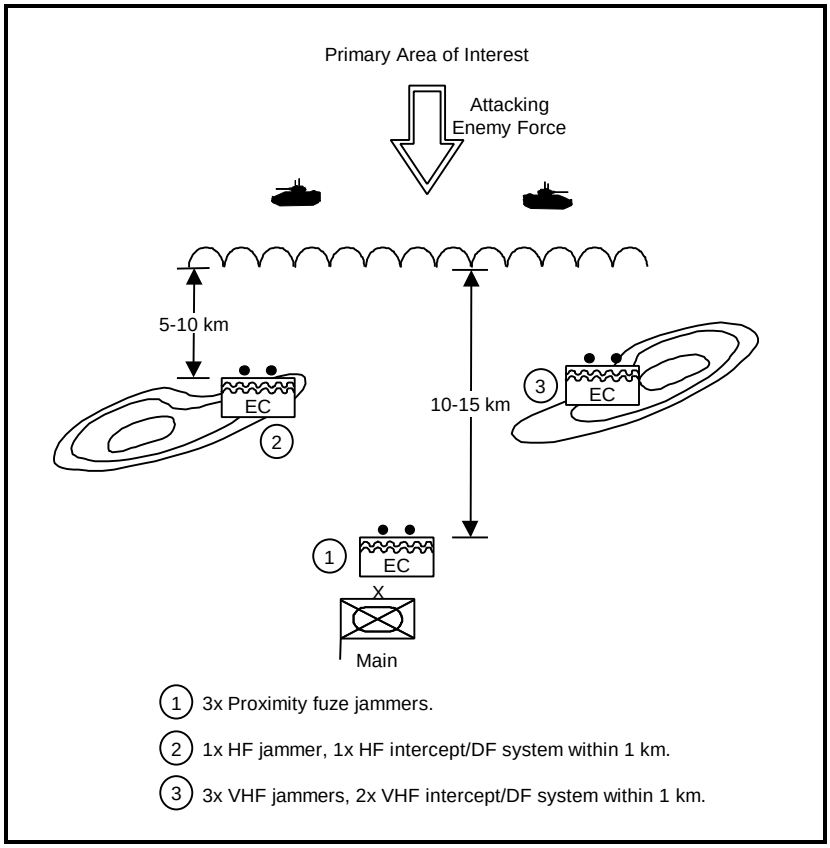


Figure 13-4. Jamming platoon deployment (example) in the defense (brigade delaying action).

Again, the basic site selection and deployment guidance is the same as for the other examples. The terrain and threat level continue to be primary considerations in determining site locations. The distances from the forward edge are increased to allow for system setup and teardown while attempting to remain out of direct fire range.

Figure 13-5 depicts an example of expendable jammers. The exact number of exjams employed depends on the type selected and the required level of interference. In this example, the OPFOR emplaced exjams within a chokepoint, filling the gap between two hills (or any other nontraversable terrain features). If the OPFOR emplaces the exjams here, the enemy force located within the jamming area is unable to receive information from the reconnaissance patrol deployed forward, nor can it effectively communicate with the rest of the main body or supporting fire support assets. Because the OPFOR may remotely activate the exjams (as well as set by timer), it is possible to disrupt a specific enemy force. Other potential targets in this situation could be engineers preparing to breach an obstacle, FACs and forward observers, and artillery or antitank units waiting for fire missions or calls for support.

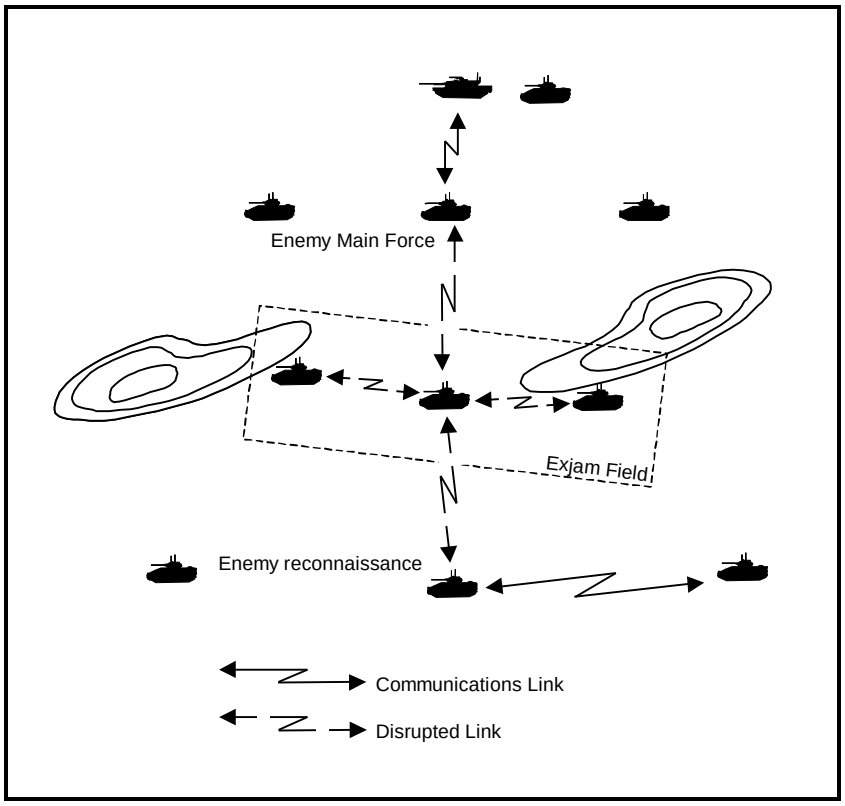


Figure 13-5. Exjam emplacement (example).

Chapter 14
NBC and Smoke Support

The use of nuclear, biological, and chemical (NBC) weapons can have an enormous impact on the battlefield. Therefore, the OPFOR classifies NBC weapons as weapons of mass destruction.[1] When referring to the capability of specific systems, it distinguishes between conventional weapons and NBC weapons.

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[1] NBC weapons are a subset of ***weapons of mass destruction (WMD)***. WMD are weapons or devices intended for or capable of causing a high order of physical destruction or mass casualties (death or serious bodily injury to a significant number of people). They exclude the delivery means where such means is a separable and divisible part of the weapon. The casualty-producing elements of WMD can continue inflicting casualties and exert powerful psychological effects on the enemy's morale for some time after delivery. Existing types of WMD include chemical, biological, and nuclear weapons. However, technological advances are making it possible to develop WMD based on qualitatively new principles, such as infrasonic (acoustic), radiological (enhanced-radiation), or particle-beam weapons. In addition, some conventional weapons, such as precision weapons or fuel-air explosives, can also take on the properties of WMD.

In response to foreign developments, the OPFOR maintains a capability to conduct chemical, nuclear, and possibly biological warfare. It might use NBC weapons either to deter aggression or as a response to an enemy attack. However, it would prefer to avoid the use of NBC weapons by either side—especially nuclear and biological weapons.

Both nuclear and biological weapons characteristically produce lethal effects over much larger areas than do chemical weapons. Because their effects are difficult to localize, biological weapons can be difficult to employ in combat without affecting friendly forces; in addition, their effects on the enemy can be difficult to predict. In contrast, the effects of chemical weapons use are more predictable and thus more readily integrated into plans. Unlike nuclear or biological weapons, chemical agents can be used to affect limited areas of the battlefield.

Because chemical employment is more likely than nuclear or biological, this chapter begins by focusing on OPFOR chemical capabilities. This includes the offensive and defensive use of chemical weapons, as well as NBC (primarily chemical) protection. The OPFOR chemical troops also have tasks outside the realm of chemical defense. These include the use of smoke and flame equipment. Because the OPFOR may also have some nuclear and biological capabilities, these also deserve mention, regardless of the low probability of their employment.

PREPAREDNESS

Due to the proliferation of NBC weapons, the OPFOR must be prepared for their use, even though the probability is low. The OPFOR must anticipate such use by its enemies, particularly the use of chemical weapons. The best solution to this threat is to locate and destroy the enemy's NBC weapons before he can use them against OPFOR troops. In case this fails and it is necessary to continue combat despite the presence of contaminants, the OPFOR has developed and fielded a wide range of NBC detection and warning devices, individual and collective protection equipment, and decontamination equipment.

Multiple Options

Tactical commanders have multiple options for the employment of forces with or without the use of NBC weapons. Many of the same delivery means available for NBC weapons can also be used to deliver precision weapons, which can often achieve desired effects without the stigma associated with NBC weapons. Most OPFOR artillery is capable of delivering chemical munitions, and most systems 152-mm and larger are capable of firing nuclear rounds.

Influence on Correlation of Forces

In past wars, the primary means of changing the correlation of forces (COF) in a particular sector was by a slow process of providing more troops and equipment. Now NBC weapons can bring a sudden change of great magnitude to the COF. Their use can change the COF on any axis of advance throughout the entire depth of the battlefield. This constitutes both a threat and an opportunity for commanders and strongly reinforces the OPFOR policy to preempt enemy use of NBC weapons.

OPFOR planning and preparation for combat always assumes the possibility of enemy use of nuclear weapons. On the modern battlefield, precision weapons possess destructive power approaching that of low-yield nuclear weapons. In response to this precision-weapon threat, the OPFOR emphasizes mobility and disperses its forces in a way that would also decrease the effects of a nuclear weapon on them. The detection and destruction of enemy nuclear and precision weapons and delivery systems is a top priority.

CHEMICAL

The OPFOR has the capability to conduct offensive and defensive chemical warfare and continues to improve its chemical warfare capabilities. The OPFOR believes an army using chemical weapons must be prepared to fight in the environment it creates. Therefore, the OPFOR views chemical defense as part of a viable offensive chemical warfare capability. The OPFOR is equipped with individual and collective protection and decontamination equipment and has confidence in its effectiveness.

Agent Effects

One way of classifying chemical agents is by the effects they have on humans. Thus, there are two major types, each with subcategories. ***Lethal*** agents, categorized by how they attack and kill personnel, include nerve, blood, blister, and choking agents. ***Nonlethal*** agents include incapacitants and irritants. Figure 14-1 lists characteristic effects of example chemical agents on personnel.

Nerve Agents

Nerve agents are fast-acting. Practically odorless and colorless, they attack the body's nervous system, causing convulsions and eventually death. Nerve agents are further classified as either G- or V-agents. At low concentrations, the GB series incapacitates; it kills if inhaled or absorbed through the skin. The rate of action is very rapid if inhaled, but slower if absorbed through the skin. V-agents produce similar effects, but are quicker-acting and more persistent than G-agents.

Blood Agents

Blood agents block the body’s oxygen transferal mechanisms, leading to death by suffocation. A common blood agent is hydrogen cyanide (AC). It kills quickly and dissipates rapidly.

Blister Agents

Blister agents, such as mustard (H) or lewisite (L) and combinations of these two compounds, can disable or kill after contact with the skin, being inhaled into the lungs, or being ingested. Contact with the skin can cause painful blisters, and eye contact can cause blindness. These agents are especially lethal when inhaled.

Type Agent	Symbol/Name	Symptoms	Effects	Rate of Action
Nerve	G Series GB/Sarin GD/Soman (VR 55)	Difficult breathing, sweating, drooling, nausea, vomiting convulsions, and dim or blurred vision.	At low concentrations, incapacitates; kills if inhaled or absorbed through the skin.	Very rapid by inhalation; slower through skin (5-10 minutes).
	V Agent	Same as above.	Incapacitates; kills if contaminated skin is not decontaminated rapidly.	Delayed through skin; more rapid through eyes.
Blood	AC/Hydrogen cyanide	Rapid breathing, convulsions, coma, and death.	Incapacitates; kills if high concentration is inhaled.	Rapid.
Blister	HD/Mustard HN/Nitrogen Mustard L/Lewisite HL/Mustard and Lewisite CX/Phosgene Oxime	Mustard; nitrogen mustard—no early symptoms. Lewisite and mustard-searing of eyes and stinging of skin. Phosgene oxime—powerful irritation of eyes, nose, and skin.	Blisters skin and respiratory tract; can cause temporary blindness. Some agents sting and form welts on skin.	Blister delayed hours to days; eye effects more rapid.
Choking	CG/Phosgene DP/Diphosgene	Eye and throat irritation, fatigue, tears, coughing, chest tightness, nausea, vomiting.	Damages the lungs.	Delayed, variable.
Incapacitant	BZ/3-Quinuclidinyl-benzilate	Slowing of mental and physical activity; disorientation and sleep.	Temporarily incapacitates.	30-60 minutes.
Irritant	DA/Diphenylchloroarsine DM/Adamsite CN/Chloroacetophenone CS/O-Chlorobenzylidene-malononitrile PS/Chloropicrin	Causes tears, irritates skin and respiratory tract.	Incapacitates, nonlethal.	Very rapid.

Figure 14-1. Effects of example chemical agents.

Choking Agents

Choking agents, such as phosgene (CG) and diphosgene (DP) block respiration by damaging the breathing mechanism, which can be fatal. As with blood agents, this type is nonpersistent, and poisoning comes through inhalation. Signs and symptoms of toxicity may be delayed up to 24 hours.

Incapacitants

Incapacitants include psychochemical agents and paralyzants. These agents can disrupt a victim's mental and physical capabilities. The victim may not lose consciousness, and the effects usually wear off without leaving permanent physical injuries.

Irritants

Irritants, also known as riot-control agents, cause a strong burning sensation in the eyes, mouth, skin, and respiratory tract. The effects of these agents, the best known being tear gas (CS), are also temporary. Victims recover completely without having any serious aftereffects.

Agent Persistency

Chemical agents are also classified according to their persistency. Persistency is the length of time an agent remains effective in the target area after dissemination. The two basic classifications are as persistent or nonpersistent.

Persistent nerve agents can retain their disabling or lethal characteristics from days to weeks, depending on environmental conditions. This category includes V-agents, thickened G-agents, and the blister agent mustard. Persistent agents produce either immediate or delayed casualties. Immediate casualties occur when the soldier inhales a chemical vapor. Delayed casualties occur when the chemical agent is absorbed through the skin. Persistent agents may be used to—

- Contaminate rear area supply depots or materiel.
- Block avenues of approach.
- Neutralize personnel defending a strongpoint.
- Protect flanks.
- Degrade an enemy unit’s efficiency.

Aside from producing mass casualties initially, persistent agents can produce a steady rate of attrition and have a devastating effect on morale. They can seriously degrade the performance of personnel in protective clothing or impose delays for decontamination.

Nonpersistent agents generally last a shorter period of time than persistent agents, depending on the weather conditions. For example, the nerve agent sarin (GB) forms clouds that dissipate within minutes after dissemination. However, some liquid GB could remain in chemical shell or bomb craters for periods of time varying from hours to days, depending on weather conditions and type of munition. Because of this continuing but not readily discernible threat from exposure to low concentrations of the vapor, GB can also be highly effective in harassing roles.

Rounds fired sporadically may compel enemy troops to wear protective masks and clothing for prolonged periods. Such measures can reduce morale and degrade performance as a result of fatigue, heat, stress, discomfort, and decreased perception.

The use of a nonpersistent agent at a critical moment in a battle can produce casualties or force enemy troops into a higher level of individual protective measures. With proper timing and distance, the OPFOR can employ nonpersistent agents and then have its maneuver units advance into or occupy an enemy position without having to decontaminate the area or don protective gear.

Delivery Means

Virtually all OPFOR indirect fire weapons can deliver chemical agents. Delivery means can include mortars, howitzers, multiple rocket launchers (MRLs), short-range ballistic missiles (SRBMs), and aerial bombs or spray. Figure 14-2 shows the types of agents suitable for delivery by some typical delivery systems.

Chemical munitions are fitted with long or short bursters, according to the agent properties and the intended effect. A munition filled with the nerve agent sarin (GB) and fitted with a long burster releases the agent as a vapor or fine aerosol. This creates and immediate inhalation hazard with some of the fragmentation effect of a conventional munition. A 152-mm howitzer battalion firing GB rounds for one minute could effect an area of 650 by 450 m. When firing a chemical mission, the OPFOR generally employs at least a battalion of cannon artillery or a battery of MRLs.

Delivery System	Agent Type			
	Blood	Blister	Nonpersistent Nerve	Persistent Nerve
122-mm Howitzer		X	X	
130-mm Gun			X	X
152-mm Howitzer		X	X	
155-mm Howitzer		X	X	
122-mm Rocket	X		X	X
140-mm Rocket			X	
220-mm Rocket			X	X
300-mm Rocket			X	X
SRBM				X
Aerial Bomb 100 kg		X		
Aerial Bomb 250 kg			X	X
Aerial Spray		X		

Figure 14-2. Chemical agents and delivery systems.

A blister or persistent nerve agent-filled munition with a short burster is used to contaminate terrain or equipment. The short burster disperses the agent in droplets or as a coarse aerosol, creating a skin hazard. The agent evaporates more slowly, and its effects remain on target longer.

Either fixed- or rotary-wing aircraft can deliver chemicals by air. They use low-level and contour flight profiles during these missions. Unarmed helicopters can perform these missions, possibly escorted by armed helicopters or attack aircraft. For example, a medium transport helicopter configured for chemical missions can include a 750- to 1,000-liter dispensing system.

Planning for helicopter chemical missions must include a minimum of 3 hours for disarming the aircraft and then installing the chemical dispenser. The helicopter approaches the target area at reduced speed, flying only a few meters above ground level (AGL). Figure 14-3 shows a typical helicopter profile for dispensing chemical agents.

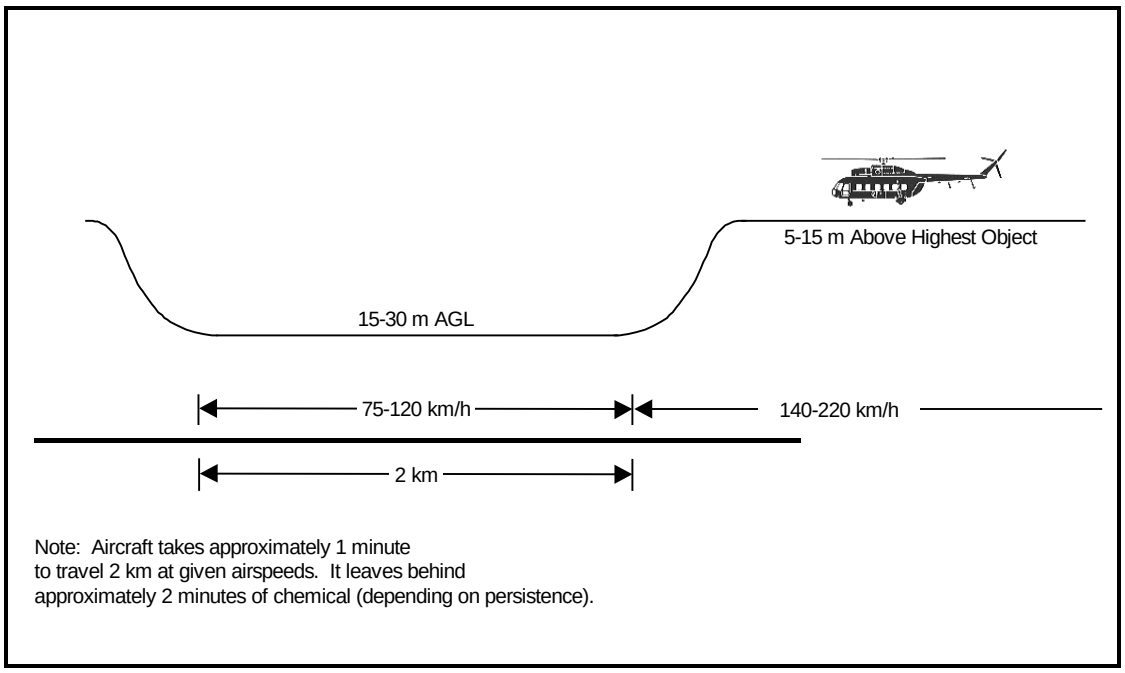


Figure 14-3. Typical helicopter profile for dispensing chemical agents.

Employment and Targeting

Initially, the decision to use chemical weapons is made at the same level as for nuclear weapons. After a decision for nuclear use, commanders can employ chemical weapons to complement nuclear weapons. However, chemical use does not depend on the initiation of nuclear warfare. At all levels of command, a chemical weapons plan is part of the fire support plan. If the Supreme High Command authorizes the use of chemical weapons, commanders can employ them freely, as the situation demands.

It is possible that the OPFOR would use chemical weapons early in a combat action or from its onset. It would prefer not to use chemical weapons within the boundaries of the State. However, it would contaminate its own soil if necessary in order to preserve the State.

At brigade and division level, the chief of chemical troops works with the commander and the chief of artillery to plan chemical strikes. This planning must consider the nature of the target, the weather, and the available agents and delivery systems. Specific targeting would depend on the offensive or defensive situation. However, Figure 14-4 outlines some general planning considerations for the use of persistent and nonpersistent chemical agents.

Area or Target	Agent Type
Forward Battle Positions	Nonpersistent
Area Denial	Persistent
Enemy Rear Area	Persistent

Figure 14-4. Employment considerations of chemical munitions.

Offensive

The basic OPFOR principle of chemical warfare is to achieve surprise. To achieve this, the OPFOR could direct chemical attacks principally against enemy positions in the forward battle area just prior to launching a ground attack. It would use persistent agents to protect the flanks of its advancing units and nonpersistent agents on selected targets across the front of its attack. Ideally, these nonpersistent agents would be dissipating just as the attacking OPFOR units enter the chemical strike area. This would force the enemy to fight in a chemical posture while the OPFOR does not.

Simultaneously with strikes across the front, the OPFOR could use chemical strikes throughout the depth of the enemy defenses. It would use persistent agents on areas it does not plan to enter and nonpersistent agents where it does. The OPFOR combines these chemical strikes combine with other forms of conventional attack to neutralize the enemy's nuclear capability, command and control (C^2), and aviation. Subsequent chemical attacks could target logistics facilities.

Nonpersistent agents are suitable for use against targets on axes the OPFOR intends to exploit. While possibly used against deep targets, their most likely role is to prepare the way for an assault by maneuver units, especially when enemy positions are not known in detail. Possible targets for nonpersistent agents include—

- Enemy strongpoints that the OPFOR plans to attack.
- Supporting positions in areas the attacking OPFOR may wish to cross (to degrade enemy performance and inhibit his maneuver temporarily, but not deny the area to eventual OPFOR maneuver).
- Headquarters and communications centers (for harassment).
- Reserves, enemy troops preparing defensive positions, or artillery firing positions (for harassment).
- Key points along enemy rear area lines of communication (to disrupt resupply and reinforcement, while keeping those points intact for subsequent use by the OPFOR).
- Civilian population centers (to create panic and a flood of refugees).

It is common to mix chemical rounds with high-explosive (HE) rounds in order to achieve chemical surprise.

Persistent agents are suitable against targets the OPFOR cannot destroy by conventional or precision weapons. This can be because a target is too large or located with insufficient accuracy for attack by other than an area weapon. Persistent agents can neutralize such targets without a pinpoint strike.

Tactical targets for persistent agents could include—

- NBC delivery means and their supply structure.
- Airfields the OPFOR does not intend to use immediately.
- Headquarters and communications centers (for neutralization).
- Artillery and air defense units (probably in conjunction with HE).
- Defiles (to restrict enemy maneuver or impose a penalty for their use).
- Possible assembly areas for enemy counterattack forces.
- Bypassed enemy units (especially those posing a threat to the flanks or rear of attacking forces).

Defensive

When the enemy is preparing to attack, the OPFOR can use chemical strikes to disrupt activity in his assembly areas, limit his ability to maneuver into axes favorable to the attack, or deny routes of advance for his reserves. Once the enemy attack begins, the use of chemical agents can impede an attacking enemy force, destroying the momentum of the attack by causing attacking troops to adopt protective measures. Persistent chemical agents can deny the enemy use of certain terrain and canalize attacking forces.

NBC PROTECTION

The OPFOR's ability to protect itself against NBC weapons and fight in contaminated environments is at least the equal to that of any force in the world, including U.S. forces. OPFOR planners readily admit that casualties would be considerable in any future war involving the use of NBC weapons. However, they believe that the timely use of active and passive measures can significantly reduce a combat unit's vulnerability. These measures include, but are not limited to, protective equipment, correct employment of reconnaissance assets, and expeditious decontamination.

Assets

The OPFOR expects all troop branches of the ground forces to perform some NBC protection-related activities. All branches have a responsibility for chemical reconnaissance and at least partial decontamination without specialist support. However, it is the specialized chemical troops who have primary responsibility for ensuring that combat units function as capably as possible in an NBC environment.

Chemical Troops

Chemical troops, like engineer and signal troops, are a vital element of combat support. They provide trained specialists for chemical defense units and for units of other arms. Chemical troops and chemical defense units are responsible for nuclear and biological, as well as chemical, protection and reconnaissance measures.

Basic tasks chemical troops can accomplish in support of combat troops include—

- Reconnoitering known or likely areas of NBC contamination.
- Warning troops of the presence of NBC contamination.
- Monitoring changes in the degree of contamination.
- Monitoring the NBC contamination of personnel, weapons, and equipment.
- Performing decontamination activities.
- Providing trained troops to handle chemical munitions.

They perform special NBC reconnaissance in addition to regular ground reconnaissance efforts described in Chapter 6. Although combat troops can perform partial decontamination, they can continue combat actions for only a limited time without complete decontamination by chemical troops.

Chemical troops have a wide variety of dependable equipment that, for the most part, is in good supply. Items of equipment for individual or collective protection are adequate to protect soldiers from contamination for hours, days, or longer, depending on the nature and concentration of the contaminant. Antidotes provide protection from the effects of agents. Agent detector kits and automatic alarms are available in adequate quantities and are capable of detecting all standard agents. Decontamination equipment is also widely available.

Maneuver Divisions and Brigades

At division and brigade level, the staff includes a chief of chemical troops with the following responsibilities:

- Directing chemical and radiological reconnaissance.
- Analyzing the results of NBC reconnaissance.
- Arranging unit decontamination.
- Providing subordinate units with protective equipment and keeping it in working order.
- Monitoring the NBC situation.

The chief of chemical troops advises the commander on NBC matters. However, the commander has overall responsibility for unit NBC protection.

Maneuver divisions have a chemical defense battalion, separate brigades have a company, and divisional brigades have a platoon. The reconnaissance and decontamination elements of these chemical defense units are rarely employed as whole units. Rather, tactical commanders divide their chemical defense assets among their various subordinate units, attaching them in a direct support role. Similarly, selected divisions or separate brigades—usually on the main axis of an army group, army, or corps—may receive some chemical defense reinforcement from the operational level.[2]

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[2] Armies and corps have a chemical defense battalion. Armies may also have a separate decontamination battalion. Army groups have either a chemical defense brigade or separate battalions of the same types that normally comprise such a brigade. Army group, army, and corps units must deal with the threat to rear areas and provide chemical defense reserves. Operational-level commanders may keep these NBC reconnaissance and decontamination units under centralized control or allocate them to provide additional support to selected maneuver divisions or brigades, normally on the main axis.

Maneuver Battalions and Companies

No chemical defense units are organic to maneuver battalions or companies. Each tank and mechanized infantry company (TC and MIC) has an NBC noncommissioned officer heading a small team of extra-duty NBC specialists. Company- and battalion-level NBC specialists are capable of checking unit NBC equipment and conducting NBC training. They also help decontaminate equipment and perform limited NBC reconnaissance when NBC support is unavailable from brigade level.

Combat Support and Combat Service Support Units

Artillery and surface-to-air missile (SAM) regiments have organic chemical defense platoons. Medical units have some decontamination equipment. Engineer troops also perform NBC-related functions such as purifying water, decontaminating roads, and building bypasses.

Individual Protection

Basic personal protective measures begin with NBC protective equipment. When used correctly, this equipment enables troops to continue combat actions on contaminated terrain.

Troops put on their protective masks and suits the instant an NBC attack occurs. Troop units receive alerts of such attacks by radio, wire, or verbal warning or command. Sirens and signal flares or rockets can also be used. Upon hearing or seeing the alert signal, company commanders and platoon and squad leaders immediately command troops to don protective masks; if this is not sufficient protection and collective protection is unavailable, they command troops to don the entire individual protective gear. The same actions would occur when a unit encounters warning flags used by chemical reconnaissance units to mark contaminated areas.

Troops remove their individual protective equipment only with the permission of the next-higher commander. For troops that have been exposed to persistent chemical agents, this probably occurs after the troops and their equipment are no longer in a contaminated area and have undergone complete decontamination. For nonpersistent chemical agents, partial decontamination and natural evaporation may be enough.

Collective Protection

The OPFOR also uses collective protection systems, such as shelters and combat vehicles equipped with filter and ventilation systems. When riding in NBC-protected combat vehicles, personnel do not need to wear individual protective gear. One drawback of collective protection systems is that personnel exiting a shelter or vehicle cannot return until they completely decontaminate or remove their protective clothing.

Reconnaissance

Chemical defense personnel assigned to reconnaissance elements of chemical defense units perform NBC reconnaissance. This involves two general types of activity: NBC observation posts and NBC reconnaissance patrols. Such posts and patrols may reinforce any maneuver unit (down to company level), reconnaissance and security elements, forward detachments, or movement support detachments.

Under the guidance of the brigade chief of chemical troops, NBC instructors in maneuver battalions and other units subordinate to the brigade train additional combat, combat support, and combat service support troops for NBC observation and reconnaissance missions. Medical personnel also have instruments to check casualties for NBC contamination.

NBC Observation Posts

A maneuver battalion or higher commander normally designates an NBC observation post to locate near his forward command post (CP) or command observation post (COP). Although specially trained combat troops can man an NBC observation post, it normally is manned by a chemical reconnaissance squad of two to four chemical defense specialists. In some cases, it might comprise an entire chemical reconnaissance platoon. More likely, a brigade commander would keep one squad from that platoon to man the NBC observation post near his forward CP. The functions of NBC observation posts are to—

- Detect NBC contamination.
- Determine radiation levels and types of toxic substances.
- Monitor the drift of radioactive clouds.
- Report NBC information and meteorological data to higher headquarters.
- Give a general alarm to threatened troops.

When stationary, an NBC observation post is normally in a camouflaged trench or a dug-in NBC reconnaissance vehicle. During movement, it moves in its own vehicle close to the combat unit commander. The observers immediately activate NBC detection devices after an enemy overflight, missile burst, or artillery shelling.

When chemical troops are not available, virtually every company- or battery-size combat, combat support, and combat service support unit can establish its own NBC observation post using its own troops trained as observers. This post is normally near the unit’s COP. Particularly in the defense, a brigade could have over 40 such observers and observation posts deployed.

NBC Reconnaissance Patrols

In any type of combat, NBC reconnaissance patrols are always in the supported unit's first echelon. At least one chemical reconnaissance squad would normally reinforce the division's reconnaissance and electronic combat battalion. Despite this squad's name, its mission includes nuclear and biological, as well as chemical, reconnaissance.

An NBC reconnaissance patrol attached to a maneuver, reconnaissance, or security element receives instructions from that unit's commander. That commander tells the NBC reconnaissance patrol leader of any specific areas to reconnoiter, the time for doing so, and the procedures for reporting the results. A patrol may also receive reconnaissance assignments from the brigade or division chief of chemical troops.

When operating in NBC reconnaissance patrols, chemical defense personnel travel in reconnaissance vehicles specially equipped with NBC detection and warning devices. Before a patrol begins its mission, its personnel check their individual NBC protection equipment and detection instruments. They also examine the NBC and communications equipment located on their reconnaissance vehicle.

As a patrol performs its mission, a designated crewman observes the readings of the onboard NBC survey meters. Upon discovering radioactive or chemical contamination, the patrol determines the size and boundaries of the contaminated area and the radiation level or type of toxic substance present. The patrol leader then plots contaminated areas on his map, reports by radio to his commander, and orders his patrol to mark the contaminated area. The patrol designates bypass routes around contaminated areas or finds routes (with the lowest levels of contamination) through the area.

The OPFOR can also use helicopters to perform NBC reconnaissance. Helicopters equipped with chemical and radiological area survey instruments are particularly useful for performing reconnaissance of areas with extremely high contamination levels.

NBC Detection and Warning Reports

The OPFOR transmits NBC detection and warning information over communications channels in a parallel form using both the command net and the air defense and NBC warning communications net. Detection reports may also go through the ground reconnaissance reporting chain.

Upon detection of contamination, an NBC observer or NBC reconnaissance patrol sent out by a chemical defense unit commander normally transmits an ***NBC detection report*** to that commander. The chemical defense unit commander transmits the report to the chief of chemical troops of the supported maneuver division or brigade. (At brigade level, the commander of the chemical defense company *is* the brigade chief of chemical troops.) The chief of chemical troops informs the maneuver commander of the NBC detection report. At this point, the NBC detection report changes to an ***NBC warning report***. For example, the maneuver brigade commander disseminates an NBC warning report via the brigade command net to all subordinate unit commanders, and via the division command net to the division commander and commanders of other brigades. The brigade chief of chemical troops disseminates the NBC warning report to all the brigade's units over the air defense and NBC warning communications net. He would also inform the division chief of chemical troops. The desired goal is to rapidly disseminate NBC warning reports as soon as possible.

There are situations where the NBC observer or reconnaissance patrol may use a different reporting channel to report NBC detection. For example, the NBC observer (whether from the chemical troops or another branch) may be attached to a regular ground reconnaissance or march security element. In that case, he would pass the detection report to whichever commander dispatched that element. Thus, reporting could be through reconnaissance or maneuver unit reporting channels.

NBC reconnaissance elements are often attached to maneuver units, sometimes becoming part of independent reconnaissance patrols. If the NBC reinforcements have their own special NBC reconnaissance vehicles and associated radios, they can send NBC detection reports back to their parent chemical defense unit or chief of chemical troops. However, they would always inform the supported maneuver unit commander or reconnaissance patrol leader. The reconnaissance patrol leader, in turn, would transmit the information via reconnaissance reporting channels to his parent reconnaissance unit commander and possibly by skip-echelon communications to the chief of reconnaissance at brigade or division level. The reconnaissance unit commander or chief of reconnaissance would then ensure that the chief of chemical troops at his level receives the NBC detection report and takes appropriate action.

A maneuver battalion (particularly one acting independently as an advance guard or forward detachment) may receive chemical troops attached from the brigade chemical defense company. The battalion would typically use these chemical reinforcements as part of a platoon-size combat reconnaissance patrol (CRP), which is the forward-most march security element.

An NBC observer in a CRP (upon detection of contamination) would transmit an NBC detection report to the CRP leader. The CRP leader would use the battalion command net to transmit the report to the maneuver battalion commander who sent out the CRP. Using the brigade command net, the maneuver battalion commander would inform the maneuver brigade commander of the NBC detection report. The brigade commander would consult with his chief of chemical troops. Based on the finding of the chief of chemical troops, both he and the brigade commander could then disseminate the NBC warning report using their respective communications nets.

The brigade chief of chemical troops may issue an advance NBC warning based on the predicted development of an NBC situation. NBC protective measures would change or be rescinded based on subsequent NBC reconnaissance reports. Changes in the NBC protective measures are disseminated by the maneuver brigade commander and the brigade chief of chemical troops using their respective communications nets.

Decontamination

The OPFOR distinguishes between two types of decontamination of personnel and equipment: partial and complete. It tries to perform one or both as soon after exposure as possible. It also conducts decontamination of terrain and movement routes.

Partial Decontamination

OPFOR doctrine dictates that a combat unit should conduct a partial decontamination with organic equipment no later than one hour after exposure to contamination. This entails a halt while troops decontaminate themselves and their clothing, individual weapons, crew-served weapons, and vehicles. When forced to conduct partial decontamination in the contaminated area, personnel remain in NBC protective gear. Following the completion of partial decontamination, the unit resumes its mission.

Complete Decontamination

The commander of a maneuver unit directs complete decontamination when the unit has already completed its mission but is still in battle formation. This type of decontamination involves the decontamination of the entire surface of a contaminated piece of equipment. This usually requires special decontamination stations established by decontamination units. Under some circumstances, however, it may be accomplished by troops using individual decontamination kits.

Chemical defense troops usually perform complete decontamination of maneuver units. As with chemical reconnaissance elements, decontamination units of chemical defense companies and battalions can operate either as a whole or in smaller elements. However, decontamination units are more likely to remain intact. The decontamination company of a chemical defense battalion may function independently. It may be separated from the rest of the battalion by as much as 20 km to decontaminate elements of a maneuver battalion or brigade.

Decontamination units deploy to uncontaminated areas where contaminated units are located. They set up near movement routes or establish centrally located decontamination points to serve several troop units. Before deploying his equipment, the commander of a decontamination unit dispatches a reconnaissance group to select a favorable site, mark areas for setting up the equipment, and mark entry and exit routes.

Site selection depends on local features such as nearby roads, cross-country routes, and sources of uncontaminated water. Another selection criteria is the availability of camouflage, cover, and concealment. If natural concealment is insufficient, smokescreening of the site can provide camouflage. After decontamination stations are set up, the decontamination unit commander establishes security. The supported unit can also assign personnel to assist in providing security for the site.

Terrain and Route Decontamination

Decontamination of maneuver routes is necessary if OPFOR units cannot safely bypass or cross the contaminated routes. The first priorities for decontamination are routes (cross-country and roads) on the primary axes of advance. The OPFOR decontaminates terrain by either removing or covering the contaminated soil or by spraying liquid decontaminate with specially designed decontamination vehicles.

For radiological decontamination, engineer earthmoving equipment can remove the contaminated top layer of soil. An alternative is to cover the area with uncontaminated materials (soil, wood, or other surfacing materials). Similarly, one means of decontamination and disinfection of chemical and biological agents would be to remove a 3- to 4-cm layer of contaminated ground.

Another means of chemical or biological decontamination is the use of terrain decontamination vehicles. These truck-mounted systems can decontaminate or disinfect an area 5 m wide and 500 m long with a single load of decontamination solvent. After decontaminating a route or area, chemical defense troops must decontaminate or disinfect their own equipment.

For terrain sector decontamination, chemical defense units equipped with decontamination trucks assemble near the contaminated area. When decontaminating or disinfecting sectors of terrain, they divide the sector into strips. The vehicles move on parallel axes using an echelon-right or echelon-left formation with the lead vehicle downwind from the others. Individual vehicles move at a distance of 30 to 50 m behind one another, but to the left or right just far enough that the covered strips slightly overlap. See Figure 14-5.

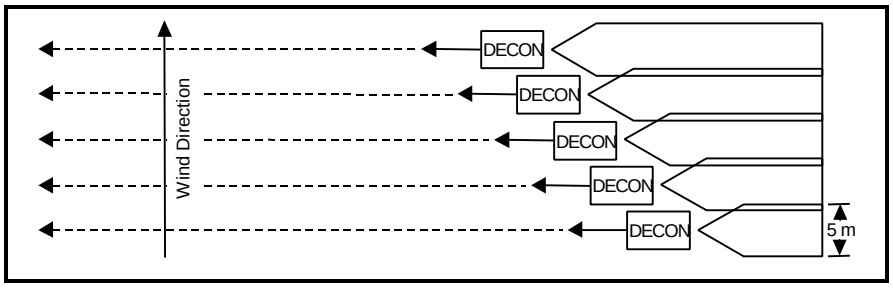


Figure 14-5. Decontamination trucks using echelon-left formation.

For road decontamination, the decontamination vehicles form a column, with each vehicle assigned a sector of road. If the road is more than 5 m wide, then two or three vehicles form an echelon-right or echelon-left formation (as used in terrain sector decontamination). Jet engine-type decontamination vehicles are useful for decontaminating hard-surface roads or runways.

Recovery Activities

Commanders at all levels plan for restoring units that fall victim to NBC strikes. This plan includes—

- Restoring C^2.
- Reconnoitering the target area.
- Locating and rescuing casualties.
- Decontaminating personnel and equipment.
- Evacuating casualties.
- Evacuating weapons and combat equipment.
- Repairing vehicles.
- Clearing obstructions.
- Extinguishing fires.

To perform these tasks, the maneuver unit commander forms a recovery detachment.

Depending on the situation and availability of forces, recovery detachments either come from organic units or from the reserves of a higher headquarters. If formed from organic units, recovery detachments generally are formed from the maneuver unit's second echelon or combined arms reserve (CAR). Regardless of origin, they include chemical reconnaissance and decontamination assets, engineers, medical and vehicle-repair personnel, and infantry troops (for labor and security).

NBC reconnaissance patrols normally reach the area of destruction first, to establish the nature and extent of contamination. Priority for decontamination and recovery help goes to personnel and equipment easily returned to combat.

The recovery detachment commander selects locations for setting up a medical point, NBC contamination station, damaged vehicle collection point, and an area for reconstituting units. He also designates routes to and from the area, for reinforcement and evacuation. He then reports to his next-higher commander on the situation and the measures taken. Meanwhile, engineers assigned to the detachment clear rubble, extinguish fires, rescue personnel, and build temporary roads.

The final step consists of reconstituting units and equipping them with weapons and combat vehicles. While the recovery detachment performs its mission, unaffected elements from a maneuver unit's second echelon or CAR provide security against any further enemy activity.

Tactics

The OPFOR believes the best way to protect against NBC weapons is to destroy delivery systems, which are always a high-priority targets. Other tactical responses to the threat include—

- **Dispersion**. (Concentrations must last for as short a time as possible.)
- **Speed of advance**. (If the advance generates enough momentum, this can make enemy targeting difficult and keep enemy systems on the move.)
- **Concealment**. (Camouflage and deception complicate enemy targeting efforts.)
- **Continuous contact**. (The enemy cannot attack with NBC weapons as long as friendly and enemy forces are intermingled.)

A maneuver unit commander receives much of his initial information regarding the NBC situation in combat orders issued by a higher unit. He supplements this information with intelligence acquired by his own reconnaissance assets. Based on his estimate, the commander issues instructions to his subordinates. These instructions include—

- Missions for attached and organic NBC reconnaissance elements.
- Signals to be used for warning of the enemy NBC attack.
- Special measures to be taken while crossing contaminated terrain.
- Designated units responsible for decontamination and recovery work in the event of enemy NBC attack.

March

Before conducting a march, the commander issues his march order, in which he designates—

- Units assigned to conduct NBC reconnaissance.
- Units or personnel assigned as NBC observers.
- Signals used to warn of NBC attack or contaminated areas.
- Recovery procedures following an NBC attack.

When moving forward with maneuver forces, NBC reconnaissance patrols march several kilometers ahead of the main body (as a rule, about 30 to 40 minutes ahead). They communicate with the commander of the supported reconnaissance element or maneuver unit by radio. If NBC reconnaissance patrols need to cover only one route, they divide it into 1- to 2-km segments and reconnoiter it in leapfrog fashion. When performing NBC reconnaissance of multiple routes, one patrol covers each route. The patrol may operate as part of a forward security element or CRP, or can move along a separate route.

Reinforcements for a maneuver battalion that acts as a brigade's advance guard normally include at least one chemical reconnaissance squad. Specially trained members of that battalion may also conduct NBC reconnaissance. The battalion COP establishes an NBC observation post, and each of its companies posts an NBC observer.

NBC observers may be located with the supported unit's forward CP or COP in the main body of the march column. They also may be with flank or rear security elements or with logistics elements. The primary responsibility of these observers is to detect contamination along the march route and in adjacent terrain and promptly warn the march column. They turn on their NBC detection equipment periodically, but leave it on continuously when approaching areas of probable contamination. When the column halts in a rest area, NBC observers organize observation posts.

Offense

If a force occupies an assembly area before initiating an attack, it disperses personnel and equipment to ensure maximum protection against enemy NBC weapons. Commanders notify subordinates of NBC warning signals and the measures to be taken under NBC attack. They also develop contingency plans governing the restoration of control, reconstitution of combat units, and evacuation of personnel and equipment.

When the supported unit is moving forward to attack, an NBC reconnaissance patrol can precede it by several kilometers, in order to provide sufficient warning of contamination. NBC observers would remain near the supported unit's CP or COP.

When organizing for a meeting battle, the chemical reconnaissance squad reinforcing the advance guard battalion normally travels with the battalion's main body, behind the battalion

headquarters and engineer reinforcements. On detection of the enemy or on arrival at lines of probable encounter with the enemy, NBC observers may be assigned to CRPs.

If a defending enemy force conducts a withdrawal, attacking units commence a pursuit. Close contact during pursuit restricts a withdrawing enemy's use of NBC weapons due to the proximity of his own troops.

Defense

NBC reconnaissance elements of a brigade in the defense communicate by wire networks with the chief of chemical troops located at the brigade main CP. The main NBC tasks in the defense include—

- Reconnaissance in the battalion defensive areas and on deployment lines for counterattacks.
- Decontamination of fortifications and individual terrain sectors.

All company strongpoints post NBC observers with chemical and radiation detectors.

Before supported units occupy defensive positions, chemical reconnaissance squads survey the area and mark any contaminated sectors. Company and battalion COPs assign NBC observers. For reliable protection, NBC observation posts of two to four observers are established throughout a defensive position at a ratio of one post for each 2 to 3 km of defensive frontage.

During bad weather, commanders normally set up additional NBC observation posts. Observers periodically switch on their NBC detection instruments and report as prescribed in the commander's combat order.

In each artillery battery, a member of one gun crew usually has received special training for NBC observation in the firing position. Observers are usually posted on the flank of the firing position, upwind from the guns. When the battery changes firing positions, these same soldiers often form NBC reconnaissance patrols.

If a defending force is the target of an NBC attack, its attached chemical reconnaissance squads determine the type and intensity of contamination and mark contaminated sectors. The supported unit conducts partial decontamination, administers first aid, and reestablishes a defensive structure.

SMOKE

The OPFOR plans to employ smoke extensively to make it difficult for the enemy to conduct observation, determine the true disposition of troops, and fire at targets (including precision weapon strikes). The smoke agents used may be either neutral or toxic. The presence of toxic smoke options may cause the enemy to use his chemical protection systems even if the OPFOR is using only neutral smoke.

Organization

A typical army has a smoke battalion with three smoke companies; it can also have a smoke company as part of its chemical defense battalion.[3] In either case, the smoke company has three smoke-generating trucks. The army can allocate one or more of these smoke companies to support a subordinate division. In cases where a division is subordinate to a corps (or an army that does not have a smoke battalion), the division could have a smoke company as part of its own chemical defense battalion.

Agents

Neutral smoke agents are liquid agents, pyrotechnic mixtures, or phosphorus agents with no toxic characteristics. Toxic smokes (commonly referred to as combination smoke) degrade electro-optical (EO) devices in the visual and near-infrared (near-IR) wavebands; they also can debilitate an unmasked soldier by inducing watering of the eyes, vomiting, or itching.

Obscurants may be broadly classified as—

- Petroleum smokes (fog and diesel fuel).
- Hexachloroethane (HCE), hexachlorobenzene (HCB), and aluminum-magnesium alloy smokes.
- Phosphorus smokes.
- Metallic (including brass) smokes.
- Colored signal smokes.

Some of these smokes contain toxic compounds and known or suspected carcinogens. A prolonged exposure to obscurants in heavy concentrations can have toxic effects. For example, the toxic effect of exposure to fog oil particles is uncertain and, as is true of all smokes, depends heavily upon dose, time, and frequency of exposure.

The OPFOR can use a number of different smoke agents together. For instance, obscurants such as fog oil block portions of the electromagnetic spectrum more fully when seeded with chaff. The vast quantities of white phosphorus (WP) on the battlefield also suggest that random mixtures of this agent with other obscurants (both manmade and natural) could occur, by chance or design.

The OPFOR is capable of employing obscurants effective in the visible through far-IR wavebands and portions of the millimeter waveband. These obscurants are commonly referred to as multispectral smoke. Figure 14-6 shows the various regions of the electromagnetic spectrum that different types of obscurants can block and the types of EO systems that operate in those spectral regions.

[3] An army group typically has a smoke battalion, either as part of its chemical defense brigade or as a separate battalion.

Spectral Region	Electro-Optical System	Type of Obscurant
Ultraviolet 1nm-0.4μm	Developmental Sensors and Weapon Systems	Developmental Obscurants
Visible 0.4μm-0.7μm	Viewers: -Daylight Sights -Naked Eye -Camera Lens -Binoculars/Standard Optics -Battlefield TV -MCLOS ATGM Beacons -Night Sights	All
Near-IR 0.7μm-4.00μm	Viewers: -SACLOS ATGM Trackers Night Sights (Image Intensifiers, IR, and Thermal) -Low-light-level TV/CCD	All
	Sensors: -Laser Designators -Laser Rangefinders	All
Mid-IR 4.00μm-10μm	Viewers: Passive Thermal Sights	WP, PWP, RP, Dust, Type III IR Obscurant
Far-IR 10μm-100μm	Sensors: -Thermal Imagers -Terminal Homing Missiles	WP, PWP, RP, Dust, Type III IR Obscurant
Millimeter Wave and Lower Frequency 300GHz-30GHz	Radar Communication Systems Sensors	WP and PWP (Instantaneous Interruption Only), Multispectral Obscurants and Other Develop-mental Obscurants

Figure 14-6. Electro-optical systems defeated by obscurants.

Delivery Systems

The OPFOR has ample equipment for smoke dissemination. Its munitions and equipment include—

- Smoke grenades.
- Vehicle engine exhaust smoke systems (VEESS).
- Smoke barrels, drums, and pots.
- Large-area smoke generators (ground and air).
- Mortar, artillery, and rocket smoke rounds.
- Spray tanks (ground and air).

Although not designed for this purpose, some decontamination vehicles with chemical defense units can also generate smoke.

Grenades

Smoke grenades can provide small-area smokescreens and fill gaps in the smokescreens produced by large-area smoke-generating devices. They can also provide signaling smoke and simulate burning vehicles in decoy smokescreens. The OPFOR has equipped many of its combat vehicles with smoke grenade launchers (dispensers) for the purpose of screening the vehicle from direct observation. Red phosphorus (RP) and other synthetic compounds are used as fillers in smoke grenades.

Armored Fighting Vehicles

All armored fighting vehicles can generate smoke with their exhaust systems. A platoon using VEESS can produce a screen that covers a battalion frontage for 4 to 6 minutes.

In addition, some armored fighting vehicles have forward-firing smoke grenade dispensers. These dispensers can produce a multispectral screen out to more than 300 m ahead of the vehicles. This involves more than a simple self-protection capability. Launching grenades to that distance gives vehicles room to maneuver behind smoke that can screen their advance, lateral movements, or movements between defensive positions. With favorable conditions, the vehicles could advance distances of 300 m or more behind the line of smoke before emerging to engage enemy positions.

Barrels, Drums, and Pots

Smoke barrels drums and pots are a primary source of smoke to support combat. When smoke units are unavailable, engineers set them out. They can create small- and large-area obscuring clouds on or in front of friendly positions or screen semifixed and fixed installations. Smoke barrels, drums, and pots contain a solid obscuring agent that can be ignited by electric ignition systems, percussion igniters, or friction fuzes.

To estimate the number of smoke pots required to maintain an ***area*** smokescreen for a particular battle, the OPFOR uses the following formula:

$$N = \frac{AT}{LWD}$$

Where—

N = Number of smoke pots required.
A = Area of smokescreen (in km^2).
T = Time to maintain smokescreen (in minutes).
L = Length of impenetrable smokescreen from one pot (in meters).
W = Width of smoke cloud at the end of screen from one pot (in meters).
D = Duration of smoke from one pot (in minutes).

The available light and meteorological conditions affect **N**. **N** may be reduced by 30 to 40 percent at night and increased by up to 50 percent if the wind is gusty or has a velocity greater than 5 meters per second (m/s). **N** may also be increased by 10 to 15 percent for safety.

To estimate the number of smoke pots required to establish a smokescreen on a ***line*** for a particular length of time, the OPFOR uses the following formula:

$$N_{total} = 1.1 \times (N_{norm} \times L \times T)$$

Where—

N_{total} = Approximate number of total smoke pots required.
N_{norm} = Normal expenditure rate of that type of smoke pot per km for one hour of smoke.
L = Length of the smoke line (in km).
T = Time for which the smokescreen is required (in hours).

For example, the requirement might be to lay a smokescreen on a 1,500-m line for a total burn time of 6 minutes in moderate meteorological conditions with a tail wind. To begin the calculation, one would look up the norm for a particular type of smoke pot under those particular conditions in a table such as Figure 14-7. Applying the above formula, the calculation for this example would be—

1.1 x (800 smoke pots/km/hr x 1.5 km x 0.10 hours) = 132 smoke pots total.

Wind Direction	Meteorological Conditions		
	Favorable	Moderate	Unfavorable
Flanking	300	400	600
Oblique	500	600	900
Head or Tail	600	800	1200
Norms assume a spacing of 20-25 m between smoke pots in a line.			

Figure 14-7. Example of norms for number of smoke pots required to screen 1 km frontage for 1 hour.

Large-Area Smoke Generators

The OPFOR can deliver smoke from either ground or aerial platforms. Chemical units may use two types of smoke generators: spray and oil.

Spray smoke generators (in various sizes and models) consist of a steel container with one or more orifices. The necessary operating pressure either is supplied from accompanying compressed-air bottles or is chemically produced. Proper operation of such equipment requires constant pressure in the compressed-air bottles and thorough maintenance of the equipment after use. Depending on the size of the orifice and the amount of obscuring agent consumed per minute, a typical spray smoke generator can produce a smoke cloud for 5 to 30 minutes. The main feature of spray smoke generators is their ability to generate a large smoke cloud in a few minutes.

The other type of smoke generator is the oil smoke generator. This type, sometimes called "thermomechanical," is mounted on smoke-generator trucks. The burner's fuel oil and the obscurant-producing oil are introduced into the generator through appropriate piping and metering valves. A blower provides air for fuel-oil combustion. The obscurant oil immediately evaporates, producing an obscuring cloud that, together with the products of combustion of the burner fuel oil, provides the smokescreen. The obscuring cloud can be seeded with various types of particles (including metallic) to attenuate the far-IR and radar regions of the electromagnetic spectrum.

Artillery

Artillery (including mortars) can deliver various types of smoke rounds. Seven to 10 percent of all artillery fire may be smoke rounds. These are mostly WP and plasticized white phosphorus (PWP), which have a moderate degrading effect on thermal imagers and a major one on lasers. Figure 14-8 shows ammunition expenditures required for various types of artillery to produce a 1-km smokescreen for 15 minutes. On a smaller scale, Figure 14-9 shows the number of mortar smoke rounds required to maintain a 100-m smokescreen for 1 minute.

Weapon	Wind Direction					
	Head or Tail		Oblique (45%)		Flank	
	Number of Tubes	Number of Rounds	Number of Tubes	Number of Rounds	Number of Tubes	Number of Rounds
82-mm Mortar	12	900	8-12	750	8	600
120-mm Mortar	8	450	8	350	4	250
122-mm Howitzer	8	300	8	220	4	150
152-mm Howitzer	13-14	200	10	150	6-7	100

Notes:
1. Assuming the wind speed is 3-5 m/s.
2. If the wind speed is 6-7 m/s, multiply the ammunition consumption by 1.5.
3. An artillery battery of 6-8 pieces, regardless of caliber, can produce a smokescreen of—
   - Over a 500- to 700-m frontage with a crosswind.
   - Over a 150- to 200-m frontage with head or tail wind.

   If a frontage exceeds these dimensions, divide it among the batteries.
4. When there is a layer of snow over 20 cm deep, multiply the ammunition consumption by a factor of 1.5 to 2.

Figure 14-8. Munition expenditure norms for producing a 1-km smokescreen for 15 minutes.

Wind Direction	Mortar Caliber	
	82-mm	120-mm
Head or Tail	6	3
Flanking	4	2

Figure 14-9. Number of mortar smoke rounds necessary to maintain a smokescreen on a 100 m frontage for 1 minute

Aircraft

The OPFOR employs smoke bombs or pots dropped by either fixed- or rotary-wing aircraft. Some aircraft have spray attachments.

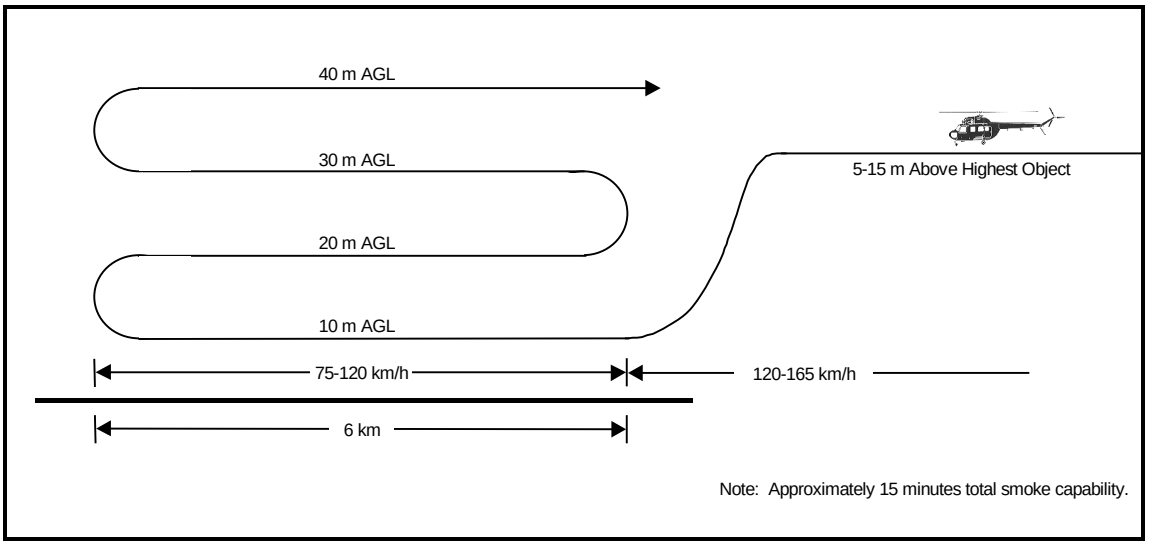


Figure 14-10. Typical helicopter smoke-laying profile.

Light utility helicopters can deliver blinding or camouflage smoke for a maneuver unit. During smoke missions, the pilot operates both the aircraft and the smoke-generating equipment. Weight limitations do not allow for additional personnel or armament. Planners need to allow 6 hours for preparing aircraft for smoke missions. Figure 14-10 shows a typical helicopter smoke-laying profile. This profile is representative of blinding smoke of a 6-km enemy frontage.

Types of Smokescreens

The OPFOR recognizes three types of smokescreens: blinding, camouflage, and decoy. Classification of each type as frontal, oblique, or flank depends on the screen's placement. Smokescreens are either stationary or mobile, depending on prevailing winds and the dispensing means. Each basic type can serve a different tactical purpose. However, simultaneous use of all types is possible.

Blinding

Blinding smokescreens can mask friendly forces from enemy gunners, observation posts, and target-acquisition systems. They can restrict the enemy's ability to engage the OPFOR effectively. Delivery of WP and PWP is possible using MRLs, artillery, mortars, fixed-wing aircraft, or helicopters. The OPFOR lays blinding smoke directly in front of enemy positions, particularly those of antitank weapons and observation posts. Blinding smoke can reduce a soldier's ability to acquire targets by a factor of 10, and its use can reduce casualties significantly.[4]

[4] When OPFOR delivers blinding smoke on an enemy position, the ability of its own artillery to fire for effect against that target is four to five times less effective than when smoke is not present.

Blinding smokescreens are part of the artillery preparation for an attack and the fires in support of the attack. Likely targets are enemy defensive positions, rear assembly areas, counter-attacking forces, fire support positions, and subsequent mission lines. The screening properties of a blinding smokescreen can combine with dust, HE combustion effects, and the incendiary effects of phosphorus. This can create an environment in which fear and confusion add to the measured effectiveness of the smoke.

Camouflage

The OPFOR uses camouflage smoke to cover maneuver, to conceal unit locations, and to hide the nature and direction of attacks. It uses camouflage smokescreens on or to the front of friendly troops.[5] These screens are normally effective up to the point where forces deploy into battle formation. The number, size, and location of camouflage smokescreens vary depending on terrain, weather, and tactics. Camouflage smoke can also cover concentration and assembly areas, approaches of attacking forces from the depth, or withdrawals. Smokescreens can also cover a wide surface area around fixed installations or mobile units that do not move for extended periods. (See detail on Area Smokescreens below.) Establishing camouflage smokescreens normally requires a combination of smoke grenades, smoke barrels, smoke pots, vehicles mounting smoke-generating devices, and aircraft.

Two smoke-generator vehicles can lay a smokescreen sufficient to cover a battalion advancing to the attack. For larger smokescreens, the OPFOR divides the line into segments and assigns two vehicles to each segment. Depending on the wind, the two vehicles may start at the center of a line and travel in opposite directions along that line; they may also travel in the same direction or remain stationary. Doctrinally, camouflage smokescreens should cover an area at least five times the width of the attacking unit's frontage.

The threat of enemy helicopter-mounted antitank guided missile (ATGM) systems concerns the OPFOR. Consequently, its doctrine calls for advancing forces to move as close behind the smokescreen as possible. The higher the smokescreen, the higher an enemy helicopter must go to observe troop movement behind it, and the more vulnerable the helicopter is to ground-based air defense weapons. There is considerable observation-free maneuver space behind a screen of this height. Conversely, when smoke pots provide a screen only 5 to 10 m high, this screen masks against ground observation but leaves the force vulnerable to helicopters “hugging the deck” and popping up to shoot.

The protection camouflage smoke produces interacts as a ***protective*** smoke. Just as smokescreens can degrade enemy night-vision sights, the protective smoke can shield friendly EO devices from potentially harmful laser radiation. This protective effect is greater with a darker smoke cloud because of the better absorption capability of that cloud. Protective smokescreens are also a good means of reducing the effects of thermal radiation from nuclear explosions. Protective smokescreen is useful in front of, around, or on top of friendly positions.

[5] When artillery fires from smoke-concealed positions at targets outside the smoke, its fire is 10 times less effective than when smoke is not present.

Decoy

The OPFOR can use decoy smokescreens to deceive an enemy about the location of its forces and the probable direction of attack. If the enemy fires into the decoy smoke, the OPFOR can pinpoint the enemy firing systems and adjust its fire plan for the true attack. The site and location of decoy screens depend on the type of combat action, time available, terrain, and weather conditions. One use of decoy smoke is to screen simultaneously several possible crossing sites at a water obstacle. This makes it difficult for the enemy to determine which site(s) are actually being used.

Decoy smoke can be used in conjunction with other deception measures. If the enemy fires into the decoy screen, the OPFOR can ignite fires and black smoke devices to simulate burning vehicles or equipment. Other disinformation may include loudspeakers that simulate the sound of tanks and other combat vehicles.

Signaling Smoke

Aside from smokescreens, the OPFOR also uses colored smoke for signal purposes. Smoke can mark enemy positions or, occasionally, friendly positions or movement routes for the information of supporting aircraft or artillery. By prearrangement, colored smoke may—

- Identify friendly units.
- Identify targets.
- Control the commencing and lifting of artillery, mortar, and small-arms fire.
- Coordinate fire and maneuver of combat arms units engaged in local assault operations.

Meteorological Influences

Local meteorological conditions greatly affect smoke employment. The C^2 of troops maneuvering in smoke is extremely difficult. This is true even when commanders have planned the use of smoke, conducted reconnaissance, and prepared their troops. When weather conditions are ignored, smoke unexpectedly covering friendly forces can lead to disorientation, loss of C^2, and tactical disaster. Therefore, the OPFOR conducts careful analysis of weather conditions during the planning process.

The conditions that most affect smoke employment are wind and lower atmospheric stability in conjunction with temperature, relative humidity, and precipitation. Meteorological conditions affecting smokescreen employment are categorized as favorable, average, and unfavorable:

- **Favorable conditions.** Wind velocity, 3 to 5 m/s; wind stable in direction and velocity; no air convection; high humidity.
- **Average conditions.** Wind velocity, 1.5 to 3 m/s; and 5 to 8 m/s, wind stable in direction and velocity; no air convection; 50 to 80 percent humidity.
- **Unfavorable conditions.** Wind velocity, below 1.5 m/s and over 8 m/s; wind gusty or unstable; strong convection currents; heavy rain; low humidity.

Wind Direction

The OPFOR designates wind direction relative to the enemy as: head (from the enemy), tail (toward the enemy), flanking (directly across the enemy), and oblique (about 45 degrees to the enemy). A flanking wind is usually the most favorable since it requires the least amount of obscurant to effectively screen the enemy's vision. An oblique wind requires proportionally greater smoke expenditure to achieve the same screening results. (The greater the angle toward the enemy, the greater the obscurant requirements.) A tail wind is favorable only when delivering a blinding smokescreen onto the enemy. A head wind is never favorable and often forces cancellation of smokescreening. Figure 14-11 illustrates the effects of wind on smoke ammunition expenditure.

Weapon	Head Winds (m/s)		Flanking Winds (m/s)			
	Up to 5	Over 5	Up to 2	3-5	6- 7	Over 7
	Required Rounds		Required Rounds			
82-mm Mortar	108-180	162-270	N/A	72-120	108-180	144-220
120-mm Mortar	54-90	81-135	N/A	36-60	54-90	72-120
122-mm Howitzer	36-60	54-90	N/A	18-30	27-45	36-60

Figure 14-11. Wind effects on ammunition expenditure norms for producing a smokescreen on a frontage of 120- to 200-m for 15 minutes.

Wind Velocity

Smoke resource expenditure is also directly proportional to wind velocity. Wind velocities above 8 m/s and below 1.5 m/s are unfavorable. A strong wind (over 8 m/s) rapidly dissipates a smokescreen. A weak wind (under 1.5 m/s) does not ensure reliable smoke cover because it is unstable with respect to direction and can disappear suddenly.

Atmospheric Stability

Lower atmospheric stability also have a great effect on smokescreening. The OPFOR recognizes three categories of atmospheric stability: inversion, isotherm, and convection.

Inversion exists when the lower layers of the air are cooler than the upper layers. This condition usually occurs at night or in the early morning when there is a cloudless sky. During this time, the different layers of air do not intermix, and thus the smoke tends to drift along the Earth's surface.

An isotherm exists when the air temperature is the same at the Earth's surface as it is it is in the upper atmospheric layers. This usually occurs during inclement weather or when there is very little cloud formation and the wind speed exceeds 2 to 3 m/s.

In the case of convection, the lower atmospheric layers are warmer than the upper layers, causing an intensive intermixing of the air by vertical air movements. These conditions normally occur on cloudless days about 2.5 hours after sunrise and in the evenings prior to 2 hours before sunset. Under these conditions a smoke cloud quickly dissipates. However, convection can be useful if an obscuring "blanket" is required instead of the normal obscuring "curtain".

The OPFOR uses "blankets," known as area smokescreens, in the rear area to screen such things as fixed installations, river-crossing sites, and assembly areas from aerial attack and reconnaissance. See the section on Area Smokescreens later in this chapter.

Water Vapor

Water vapor in the air is important in the formation of hygroscopic obscurants (agents that readily absorb and retain moisture). As a result, high relative humidity improves the effectiveness of these obscurants. For example, to obtain an equivalent screening effect, almost twice as much phosphorus must be used at 30 percent relative humidity as at 100 percent.

Heavy rain and hail are the only types of precipitation that are unfavorable for smoke employment. Falling raindrops increase air turbulence, which in turn may cause the obscuring cloud to disperse more rapidly.

Terrain

Mixed terrain dissipates smokescreens.[6] High ground, ravines, and depressions facilitate more rapid smoke dissipation. When encountering a large forest, a smokescreen moves over the top of it and only partially flows into it. This significantly dissipates the cloud, which then settles in the forest. Clumps of bushes also impede and dissipate clouds. Local winds that tend to blow through valleys, along the ridges of high hills, and through city streets lead to more rapid cloud dissipation.

On large rivers, light winds tend to dissipate the cloud along the riverbed, especially if the banks are steep. Once the wind reaches a distance of 100 m or more beyond a forest, high structure, or a large water obstacle, the cloud's stability and direction are restored. Individual manmade structures and small rural population areas do not affect the movement of a cloud.

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[6] ***Mixed terrain*** describes a mixture of hills and valleys, clear and wooded terrain. An example of an area where mixed terrain predominates is Western Europe. ***Close terrain*** describes terrain that is mountainous or covered with dense vegetation, and that is not easily trafficable by armored vehicles. Examples of close terrain are jungles, large swamps or marshes, and mountainous regions**.** ***Open terrain*** is flat, with sparse vegetation, and is readily trafficable by armored vehicles. Examples of open terrain are deserts and steppes.

Area Smokescreens

Area smokescreens can cover wide surface areas occupied by fixed or semifixed facilities, or by mobile facilities or units that must remain in one location for extended periods. Screens set down on a broad frontage can also cover maneuver forces. The OPFOR uses area smokescreens to counter enemy precision weapons and deep strikes.

The means of generating area smokescreens can be either supporting chemical units or the use of smoke pots, barrels, grenades, and VEESS. As the situation dictates, the objects screened by area smokescreens can include—

- Troop concentrations and assembly areas.
- CPs.
- Radar sites.
- Bridges and river-crossing sites.

The OPFOR can also screen air avenues of approach to such locations. It tries to eliminate reference points that could aid enemy aviation in targeting a screened location. To create an effective smokescreen against air attacks, the OPFOR must establish an effective air attack and NBC warning communications network so that it a smokescreen can be generated in time to degrade reconnaissance and targeting devices on incoming aircraft. Reliable communications and continuous coordination between units using smoke and the forward air warning and air defense posts is essential.

The OPFOR follows the following basic principles for generating area smokescreens:

- Screening should include not only the object but also surrounding terrain or manmade features so as to deny the enemy reference points.
- The protected installation should not be in the center of the screen.
- The smoke release points must not disclose the outer contours of the screened object.
- Screening must be initiated early enough to allow the area to be blanketed by the time of the attack.
- If possible, decoy smokescreens should be used.
- For larger objects (such as airfields and troop concentrations), the screen should be at least twice as large as the object.
- For smaller objects (such as depots, small crossing points, and radar sites), the screen should be at least 15 times as large as the object.

Depending on terrain, smoke release points are set up within a checkerboard pattern, in a ring (circle), or in a mix of the two patterns that covers the area to be screened.

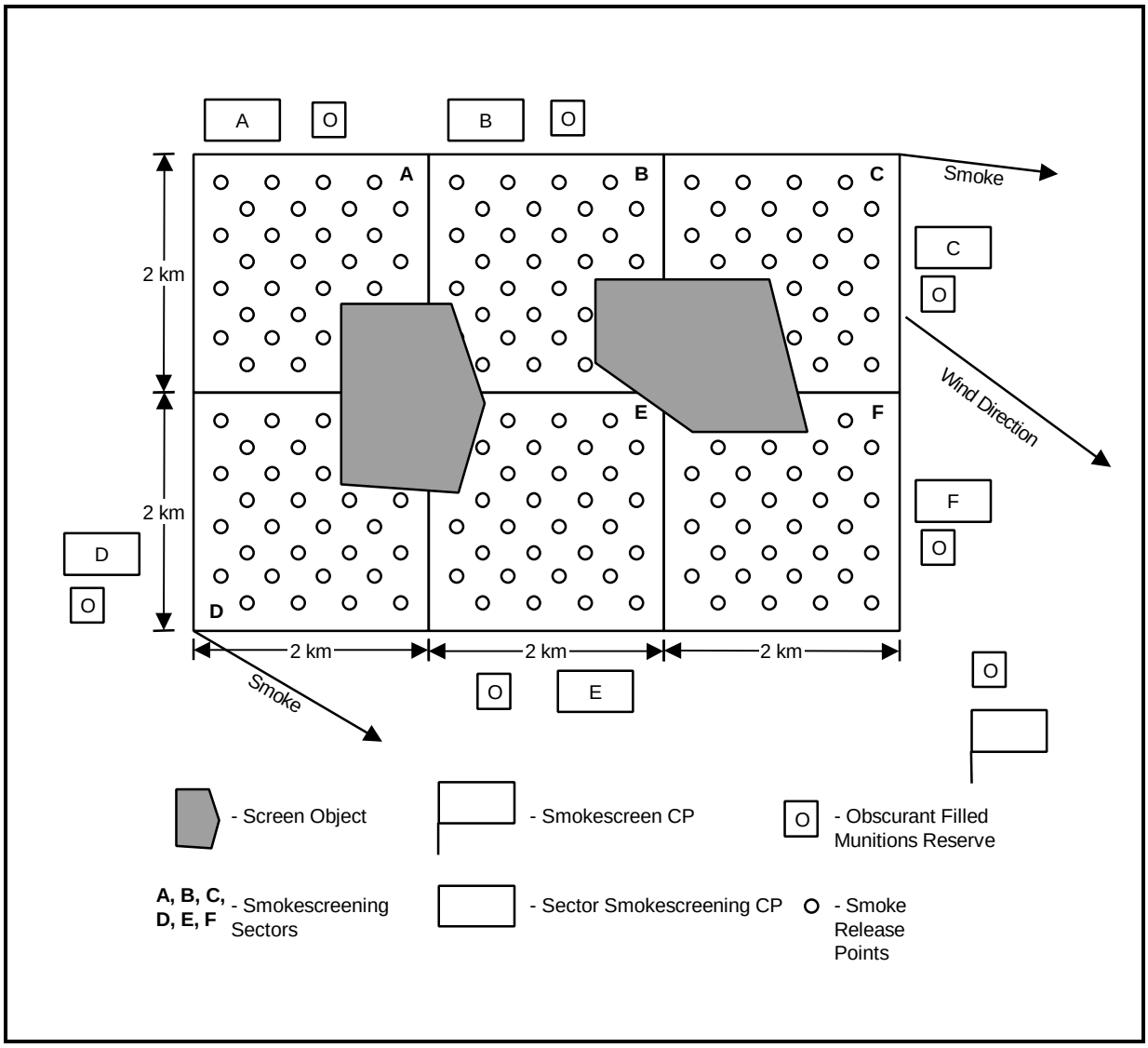


Figure 14-12. Checkerboard area smokescreen.

Checkerboard Area Smokescreen

A checkerboard pattern is a rectangle that is divided into 4-km^2 squares with smoke release points distributed evenly within each square (Figure 14-12). This pattern is useful if the terrain is contoured or covered with buildings, trees, or other obstructions that prevent the precise distribution of smoke points.

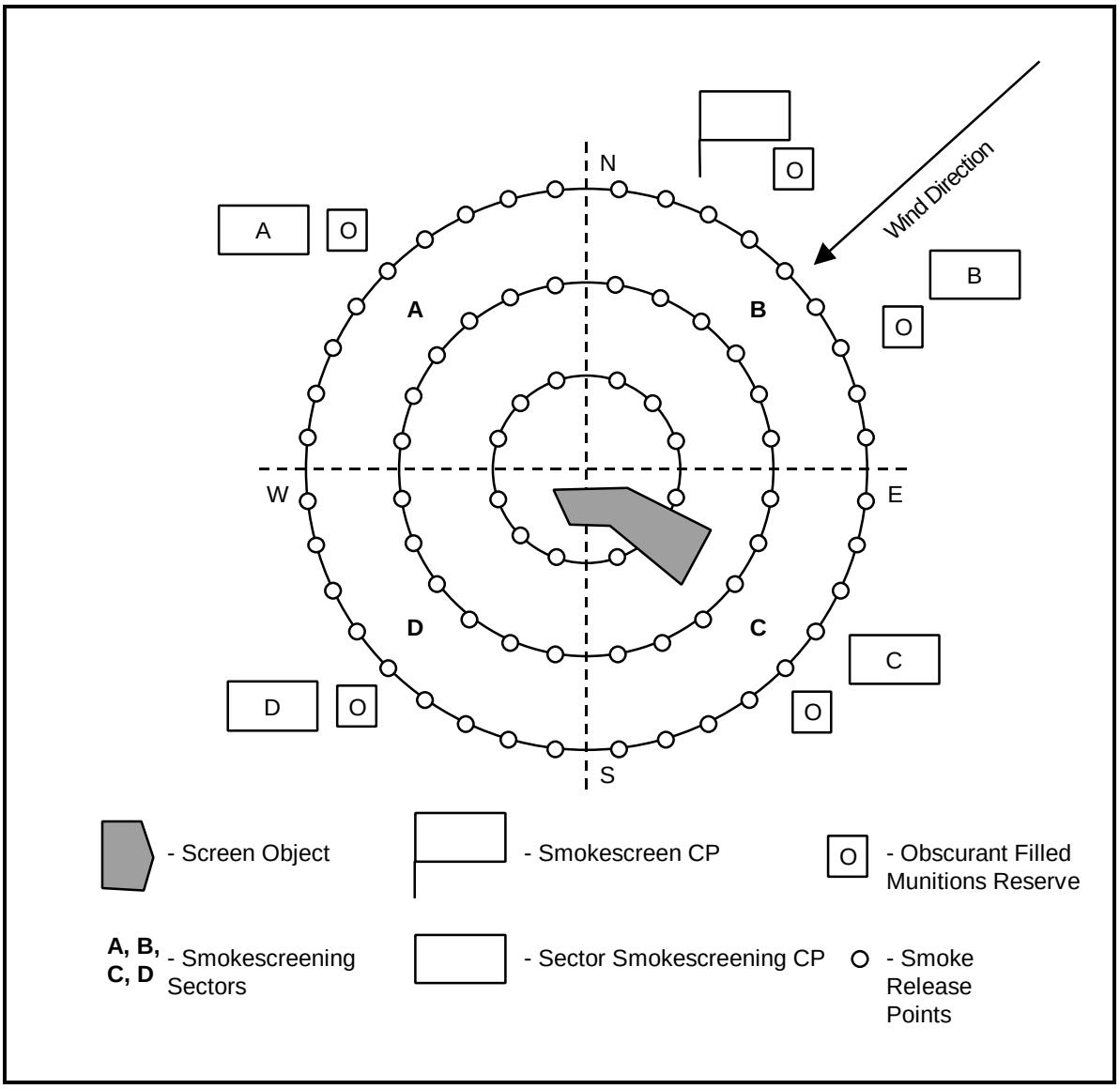


Figure 14-13. Ring area smokescreen.

Ring Area Smokescreen

A circle or set of concentric rings of smoke release points works well on relatively flat, featureless terrain (Figure 14-13). Generally, the distance between the target and the first obscurant-generation ring is 100 to 250 m. The distance between smoke release points within each ring varies between 20 and 100 m, depending on the obscurant device being used and the meteorological conditions.

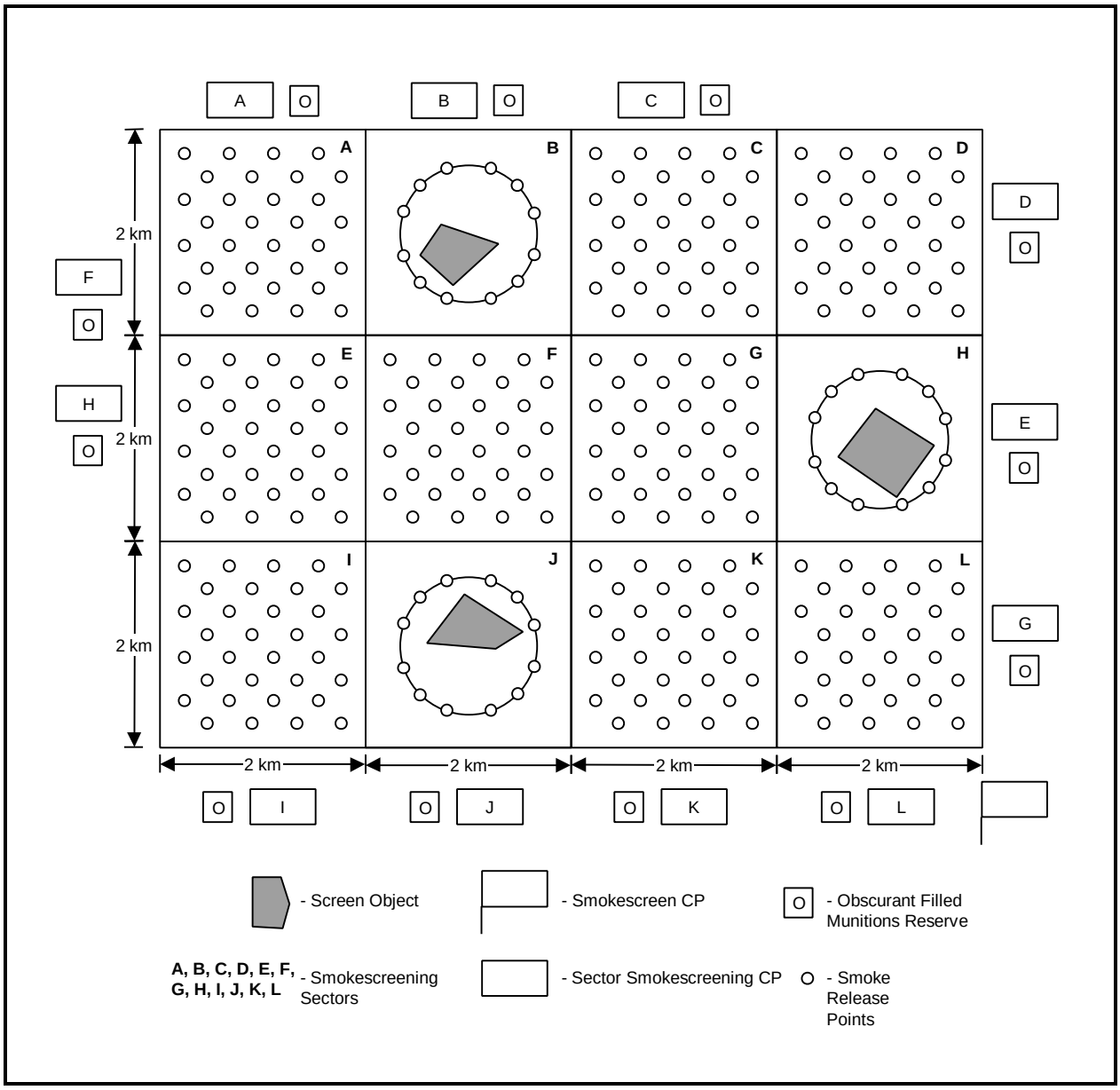


Figure 14-14. Mixed area smokescreen.

Mixed Area Smokescreen

The OPFOR uses checkerboard area smokescreens and ring area smokescreens together when objects 3 to 4 km apart must be screened simultaneously. The rings of smoke-generation lines are placed around each object to be screened, and these rings are placed within the squares of a checkerboard. See Figure 14-14 for an example of a mixed area smokescreen.

Tactical Smokescreen Employment

The use of smoke is an important part of tactical camouflage, concealment, and deception efforts. The OPFOR can use smokescreens to blind or deceive enemy forces and to conceal friendly forces from observation and targeting. Smoke can screen units near the forward edge, as well as those in rear areas, from direct fire, reconnaissance, and air attack. It has applications in the march, offense, and defense. Smoke is very effective in screening water-obstacle crossings. It also has specific applications at night. Figure 14-15 shows tactical options for employing smoke and other obscurants.

Source	Placement			Uses			
	On Friendly	Between	On Enemy	Blinding	Camouflage	Decoy	Signaling
Smoke Grenade	X	X		X	X	X	X
Smoke Generator	X	X			X	X	
Smoke Pot	X	X			X	X	X
VEESS	X				X	X	
Vehicle Dust	X				X	X	
Helicopter	X	X	X		X	X	
Mortar/ Artillery Smoke		X	X	X	X	X	X
Rocket		X	X	X			
Aerial Bomb		X	X	X			
Aircraft Spray	X	X	X	X	X	X	
Mortar/ Artillery HE Dust		X	X	X			

Figure 14-15. Tactical employment of smoke and other obscurants from various sources.

Offense

The OPFOR emphasizes the use of smoke during the offense to help reduce friendly battle losses. However, it understands that smoke may hinder its own C^2, battlefield observation, and target engagement capabilities. In addition, the enemy may take advantage of OPFOR smoke-screens to shield his own maneuvers or to carry out a surprise attack. Thus, a smokescreen is successful when the OPFOR attackers are able to maintain their assigned axis of advance and retain sight of the objective. To prevent the smoke from interfering with friendly maneuver, OPFOR commanders coordinate the planned location and duration of the smoke-generation lines or points with the scheme of maneuver.

Smoke pots, artillery, mortars, and aircraft are the primary means of smoke dissemination in the offense. Artillery and aircraft are used to spread screening smoke throughout the tactical depth of the enemy's defense. They are also useful in screening the flanks of attacking units.

The OPFOR can place smoke on enemy firing positions and observation posts before and during an attack. Smoke has uses during any of the three types of offensive action: the attack against a defending enemy, the meeting battle, and the pursuit.

Attack against a defending enemy. The OPFOR uses camouflage, blinding, and decoy smokescreens to conceal the direction and time of attack. Smoke may be used during the preparatory, support of the attack, and accompaniment phases of fire support. See Chapter 7 for more detail on the phases of fire support.

In an ***attack from the march***, a camouflage smokescreen is typically used during the preparatory fire phase to conceal combat formations that are advancing and maneuvering toward the enemy's line of defense. With a tail wind, the attacking unit can generate enough smoke to adequately screen its front and then advance behind the screen as it blows toward the enemy. The example in Figure 14-16 shows a reinforced mechanized infantry battalion (MIBN) advancing from a wooded area in platoon formations with a flanking wind. Such a battalion may use its VEESS-equipped tanks and IFVs and smoke grenades in an attack from the march against an enemy strongpoint. After turning on their VEESS, the tanks and IFVs advance toward the enemy's forward defensive position while firing on visible targets. Dismounted infantrymen equipped with smoke grenades follow on foot behind the extended line of tanks and IFVs. As gaps develop in the smokescreen, the infantrymen approach and throw smoke grenades. Infantrymen can also fire incendiary smoke charges from a variant of the encapsulated flamethrower out to a range of up to 1 km.

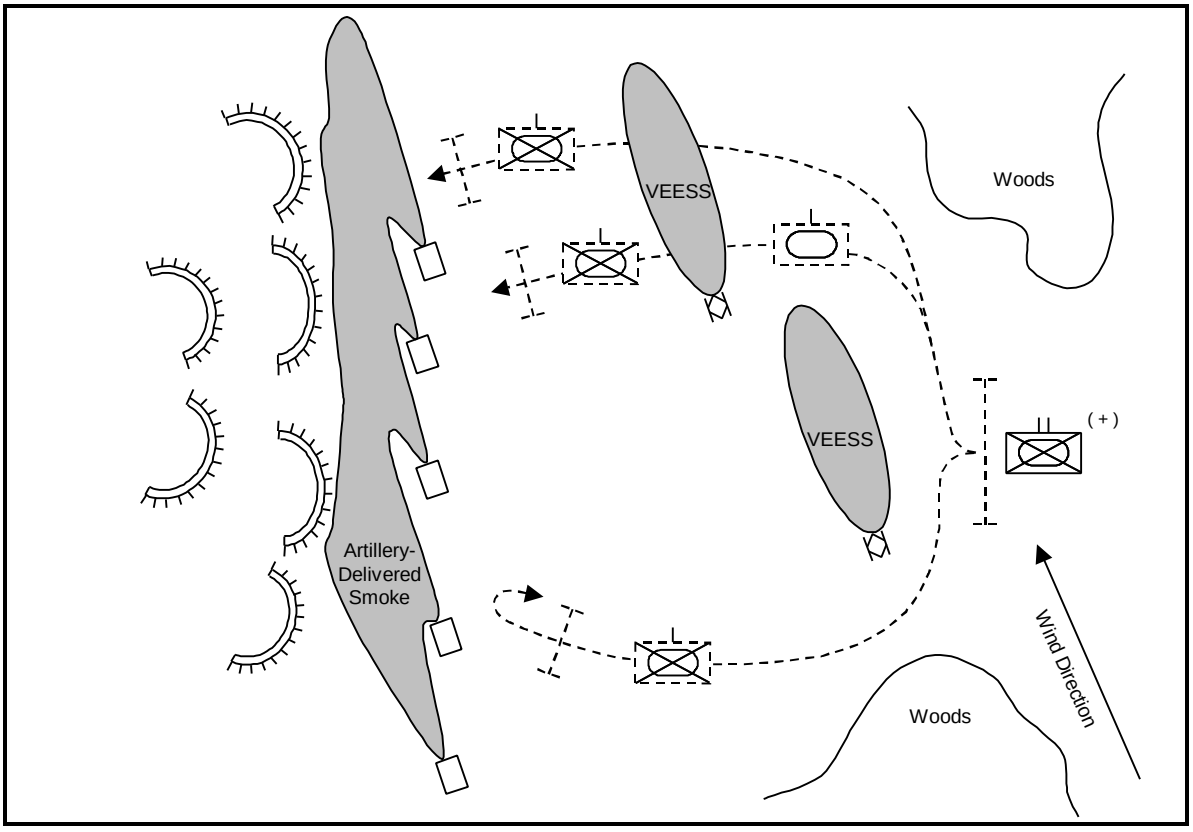


Figure 14-16. Smoke in the attack from the march (example).

During an ***attack from positions in direct contact***, a commander usually has more opportunity to plan and prepare for a coordinated smokescreen than in an attack from the march. Just as with the attack from the march, a camouflage smokescreen is typically used to prevent observation of advancing troop columns. As the advancing force nears the rear of friendly units already in contact with the enemy, the units in contact may set up a camouflage smokescreen using smoke pots and VEESS of forward-deployed armored vehicles. In addition, artillery can deliver blinding smoke on enemy defensive positions while the attacking force negotiates minefields in front of them. Figure 14-17 shows an example of smoke employment during such an attack.

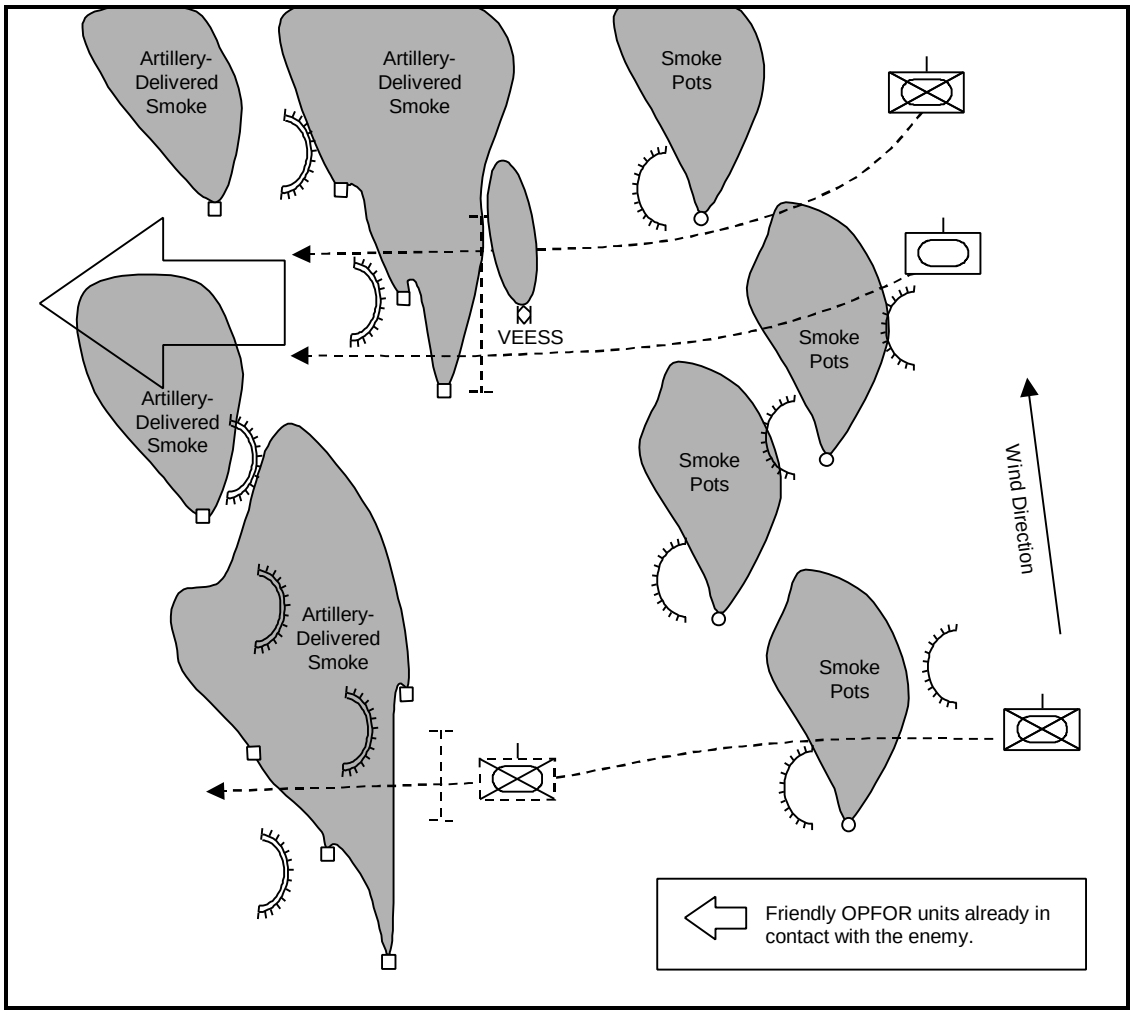


Figure 14-17. Smoke in the attack from positions in direct contact (example).

Meeting battle. Because they are spontaneous and fluid, meeting battles offer the OPFOR the least opportunity to carefully plan and execute the use of smoke. Because of the constantly changing conditions, the use of smoke is often planned and executed after the battle has begun.

A good example of the use of smoke during a meeting battle involves an MIBN using two camouflage and one decoy smokescreen. (See Figure 14-18.) In this example, a reinforced MIBN is attacking toward the enemy's left flank (as viewed by the OPFOR). It is camouflaging that attack with a smokescreen laid by tanks from a reinforcing TC using the tanks' VEESS. The tanks move at 100-m intervals to create a continuous smoke cloud. The distance was calculated on the basis of meteorological conditions and the fact that a smokescreen can extend 300 to 400 m from a VEESS and still remain impenetrable to vision. Meanwhile, an MIC facing the enemy's right flank lays a decoy smokescreen to divert the enemy's attention from the real attack. The company on the left flank lays smoke pots along a 1,500-m line at intervals of 20 to 25 m for a total burning time of 6 minutes. The company divides the work among its three mechanized infantry platoons, with each responsible for laying pots along 500 m of the line.

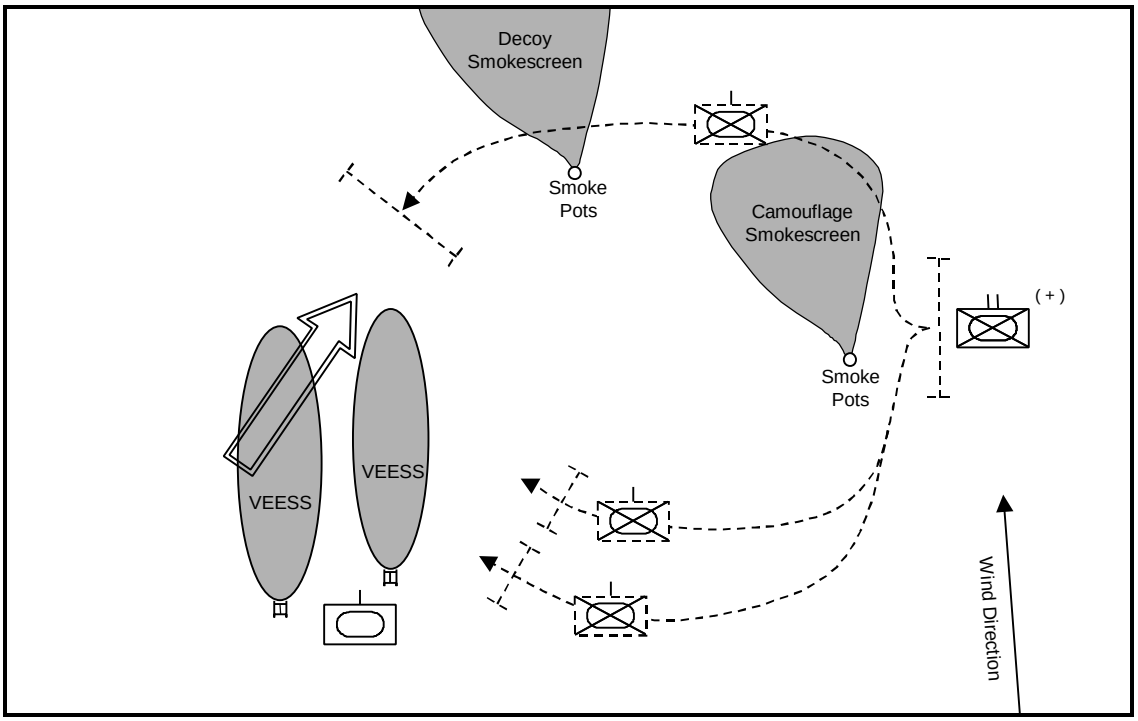


Figure 14-18. Smoke in a meeting battle (example).

Another example of smoke employment in a meeting battle could be the simultaneous use of frontal camouflage and blinding smokescreens during an enemy counterattack. Following an artillery strike against the enemy advancing for a counterattack, artillery would deliver blinding smoke directly in front of the advancing enemy and camouflage smoke in front of the advancing MIBN. As soon as the blinding smokescreen on the enemy dissipates, the battalion's ATGMs and reinforcing tanks would open fire on the enemy.

Pursuit. The OPFOR may use both blinding and camouflaging smokescreens during the pursuit of a retreating enemy. To protect against possible enemy counterattacks on the flanks, OPFOR artillery may fire camouflage screens there, as well as in front of pursuing units. Helicopters are also extremely useful for this purpose.

Defense

In the defense, the OPFOR may use of smokescreens for—

- Camouflaging the maneuver of friendly units.
- Concealing engineer activities from enemy observation.
- Screening replacements of first-echelon units under conditions of good visibility.
- Camouflaging the approach of friendly units for a counterattack.
- Screening the movements of defending units between strongpoints.
- Flank and maneuver security.
- Misleading the enemy on the disposition of reserves and planned counterattack directions.

Because a completely obscured environment tends to aid the attacker more than the defender, an OPFOR defense uses smoke to minimize the enemy's vision while allowing the defenders a fairly clear view of the enemy's location. Smoke from artillery and mortar shells is the most effective means of blinding an advancing enemy while keeping friendly forces out of the obscured area. The OPFOR would use VEESS, smoke pots, and smoke grenades only to assume the defense while in contact with the enemy, to change positions, or to begin a withdrawal from contact.

Figure 14-19 shows an example of an MIBN using smoke devices in the defense to disrupt and subsequently defeat the attacking enemy. In this example, the battalion's forward elements lay smoke along three smoke-generation lines, the first two using smoke pots and the final one using VEESS. The smoke from those lines disrupts the enemy advance and creates a favorable situation for the defending battalion to launch a counterattack from the flank.

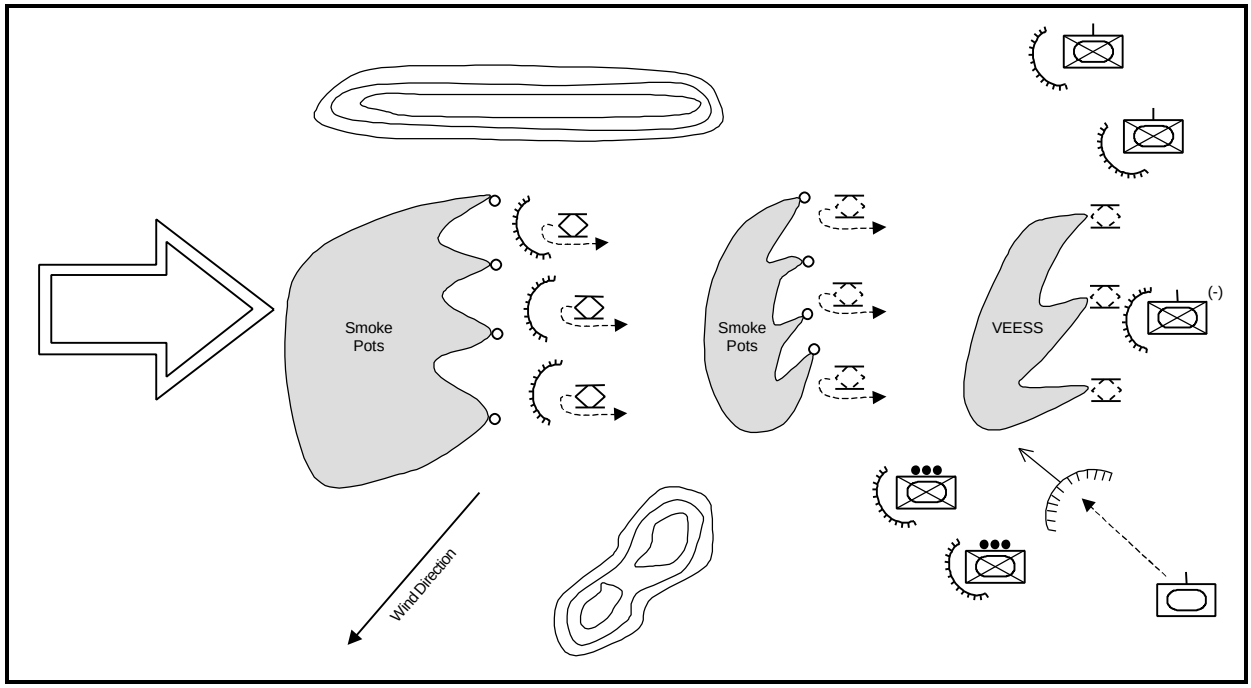


Figure 14-19. Smoke in the defense (example).

Water-Obstacle Crossing

Because of their vulnerability to air attack and direct fires, successful water obstacle crossings require smokescreens for concealment. The OPFOR can place 2 to 3 hours' worth of screening smoke along a wide frontage to cover units conducting water-obstacle crossings. It may also place floating pots and barrels in the water. It distinguishes between opposed crossings at the forward edge and unopposed crossings, particularly in rear areas.

For opposed crossings, OPFOR doctrine emphasizes using all three types of smokescreens (blinding, camouflage, and decoy). An opposed crossing requires greater planning and preparation than a crossing in the rear area. First, unfavorable meteorological conditions are more difficult to overcome. Friendly forces must have a tail wind or at least a flanking wind in order for smoke generators and smoke pots on the near bank to screen the crossing area. If the OPFOR faces a head wind, only artillery or aircraft can deliver a blinding smokescreen against enemy positions on the opposite bank. Whenever possible, the OPFOR prefers to lay smoke on both sides of the river. The use of decoy smoke at one or more other likely crossing sites can deceive the enemy as to the actual crossing location. Figure 14-20 shows an example of a reinforced MIBN using smoke delivered by several means to cover friendly forces and deceive and blind enemy forces.

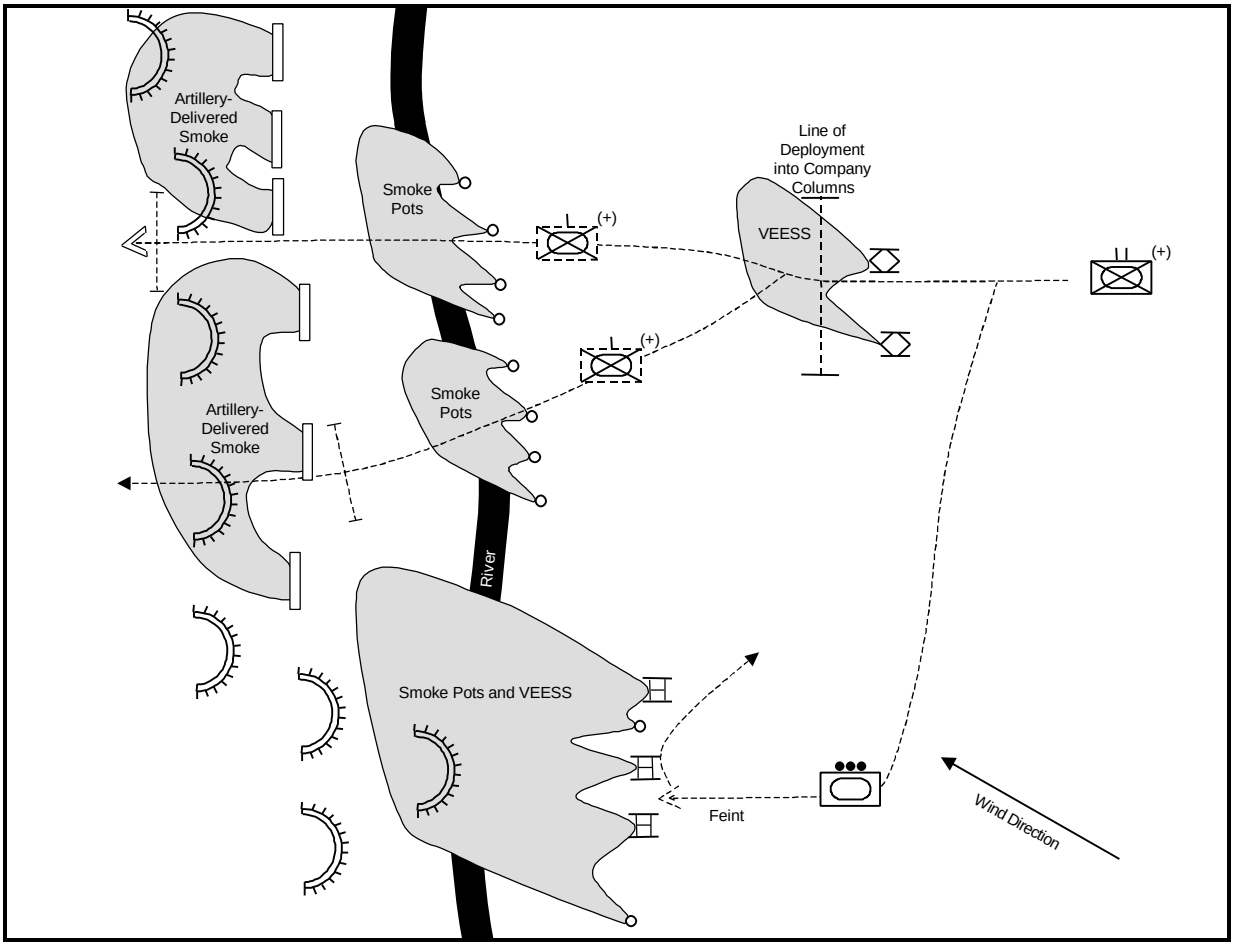


Figure 14-20. Smoke in the river crossing (example).

Water-obstacle crossings in rear areas may be crucial for supporting tactical and operational missions. Therefore, they also require the use of smokescreens for concealment whenever feasible. As with smoke use near the forward edge, it is important to establish at least one or two decoy smokescreens for every actual crossing site, because a smoke cloud in the rear attracts the attention of enemy reconnaissance. Area smokescreens are best for covering crossing sites and surrounding terrain.

Combat at Night

At night, the OPFOR can conceal its forces from enemy active and passive night–vision and thermal imaging devices by using smoke and other obscurants that are effective in the visible through far-IR portions of the electromagnetic spectrum. The OPFOR uses smoke in three ways to counter various types of enemy EO sensors:

- For active night-vision devices, blind with smoke.
- For passive night-vision devices, blind with illumination or combined use of illuminating and smoke projectiles.
- For thermal imaging devices, camouflage friendly troops with smoke and illuminate enemy targets (to benefit friendly night-vision devices) at the same time.

In essence, the OPFOR uses smoke when it cannot quickly destroy or neutralize the enemy EO devices, or when the enemy has created high levels of illumination within his defense. However, it can also use smoke in conjunction with its own illumination.

In night combat, the OPFOR can use smoke to help illuminate enemy vehicles and other targets. The most effective method is to use smoke in conjunction with illuminating rounds to silhouette enemy vehicles and other targets. An MIBN can use this method by firing mortar smoke rounds to burst 50 to 100 m beyond the targets, interspersed with illuminating rounds aimed just beyond the screen. This creates a broad, bright background.

A more elaborate version of the latter method involves the use of artillery-delivered smoke and illuminating rounds. The OPFOR can use smoke and other obscurants to blind the enemy's night-vision equipment. Image intensifiers can be blinded by obscurants and forced to shut down by flares or the flash of artillery shells. In the defense, therefore, OPFOR artillery could use rolling barrier fire on advancing enemy forces, alternating blinding smoke with illuminating rounds to blind enemy forces while simultaneously illuminating them for targeting. See Figure 14-21 for an example of this technique.

FLAMETHROWERS

The OPFOR uses two basic types of flamethrowers. One type fires pressurized liquid fuel, while the other fires a rocket-propelled, encapsulated warhead. The first type is found only in specialized flamethrower units belonging to the chemical troops. It comes in light, man-portable models, as well as heavy models that are usually cart-mounted. The second, encapsulated type is found not only in such flamethrower units, but also in maneuver units. It is easily carried and fired by one soldier. Either type of flamethrower can be very effective in reducing strongpoints and in built-up areas.

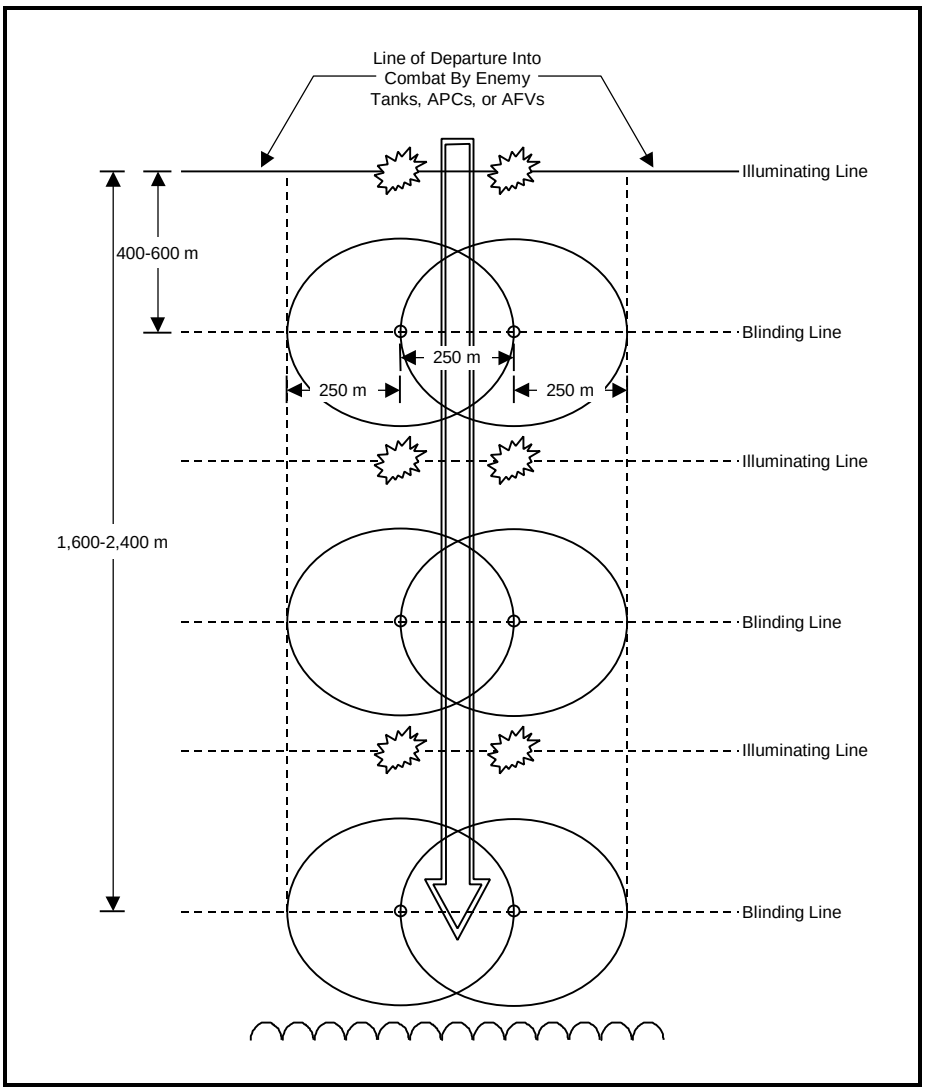


Figure 14-21. Example of alternating blinding smoke and illuminating lines against the enemy at night.

Any soldier can use an encapsulated flamethrower with minimal instructions. This type of flamethrower serves as a multirole infantry weapon and may have a warhead containing either napalm, smoke, or a thermobaric explosive. The thermobaric warhead has an explosive power equal to that of a 122-mm artillery round; thus, infantrymen often refer to it as "pocket artillery." It also serves as an extremely effective countersniper weapon.

Within maneuver units, the OPFOR issues encapsulated flamethrowers more along the lines of ammunition rather than as weapons; therefore, the basis of issue may vary. The OPFOR usually issues one encapsulated flamethrower to each mechanized infantry squad (one per IFV or APC). The tactical employment is the same regardless of whether the operator is an infantryman or comes from a flamethrower battalion.

Unit Allocation

Except for the encapsulated flamethrowers issued as squad-level ammunition, other flame support to tactical units comes from flamethrower units organic to the operational level. An army or corps can have a flamethrower battalion (encapsulated) consisting of three companies armed with the same types of encapsulated systems found at the tactical level. Alternatively, the army or corps could have a flamethrower battalion consisting of two light flamethrower companies and one heavy flamethrower company. An army group can have a flamethrower tank battalion.

Either type of flamethrower battalion at army or corps level supports the tactical battle by augmenting the firepower of maneuver units. A flamethrower battalion may reinforce the infantry units of a division expected to fight on the army or corps main axis, or on an axis along or near major population centers. These flamethrowers often reinforce an MIBN task-organized as an assault detachment. The reinforcement depends on the nature of fortifications, the depth of the enemy defensive position, and possibly the number of assault detachments organized in the division's units. For example, the attachment may be—

- A flamethrower company (81 encapsulated or 72 light infantry flamethrowers) to a MIBR.
- A flamethrower platoon (27 encapsulated or 36 light infantry flamethrowers) to an MIBN.
- A flamethrower squad (9 encapsulated or 12 light infantry flamethrowers) to an MIC.

Heavy flamethrower companies (16 cart-mounted heavy flamethrowers each) typically reinforce antitank units of a maneuver division in the defense.

The army group commander may have a flamethrower tank battalion (31 flamethrower tanks) that he can decentralize as appropriate. Depending on the situation, he may choose to allocate this battalion, or its individual companies, to armies, corps, or divisions. The receiving commanders can then further allocate the flamethrower tank companies (10 flamethrower tanks each) to reinforce tank or mechanized infantry brigades.

Offense

In the offense, flamethrower operators generally follow the last elements of an attacking force and operate in pairs or teams, together with an infantry platoon or squad. The OPFOR uses flamethrowers against the following targets:

- Heavily fortified defensive positions.
- Caves and other positions to which access is difficult.
- Suspicious positions in forests.
- Other defensive facilities.

Encapsulated flamethrowers are more effective against targets in confined spaces than they are against targets in the open. Units supported by such weapons as well as those supported by the shorter-ranged light infantry flamethrowers can destroy enemy personnel in permanent defensive emplacements and fortifications, buildings, and vehicles. These flamethrowers are effective in assisting maneuver units breaking through forward and intermediate defensive positions and capturing major population centers or fortified enemy defensive areas. Heavy, cart-mounted flamethrowers have little utility in the offense due to their lack of mobility.

Tank-mounted flamethrowers are primarily offensive weapons. They may be attached (individually, by platoons, or by companies) to mechanized infantry and tank units. As they approach enemy strongpoints, they are covered by suppressive fire from mortars and artillery and use terrain or smoke as camouflage. Before reaching their effective range of 200 m, these vehicles may fire streams of burning napalm to intimidate the defenders. When reaching their effective range, they fire into strongpoints to rout or kill the defenders. In a mounted or dismounted infantry attack, one or more of these vehicles spearhead the attack, possibly in conjunction with conventional tanks attached to the same unit.

In an attack from the march, attached flamethrower units (squad or platoon) move to the assault line of the supported infantry units. The flamethrower operators dismount and attack along with infantry platoons. The maneuver commander may keep flamethrower elements in reserve. While in reserve, they advance to within 1,500 to 2,000 m of the enemy while waiting for orders from the maneuver commander.

If the enemy puts up stiff resistance at a defensive line (or it is necessary to seize permanent fortifications, buildings, or fortified areas), the flamethrower operators advance to the assault line. At least two flamethrower operators attack each target. They advance under the cover of supporting fire and smoke, to engage the emplacements, destroy enemy personnel, and pave the way for supported maneuver units to destroy the enemy.

When supporting a dismounted attack, flamethrower elements advance in the supported unit's battle formation. Lateral intervals are usually with up to 100 m between pairs of encapsulated flamethrower operators, or 40 to 50 m between operators armed with light infantry flamethrowers. Operators may fire either on command from the maneuver commander or at will. Those using conventional light infantry flamethrowers have to move to within 50 to 70 m to ensure accuracy, since this type of flamethrower has three bursts before reloading is required at a supply point. The employment of encapsulated flamethrowers, with their much greater range (up to 800 m), is limited only by the number of encapsulated flamethrowers each team carries.

Defense

Light, encapsulated, and heavy flamethrowers can be used effectively in the defense. The OPFOR divides the light and encapsulated flamethrower units into teams or sections and attaches them to maneuver units, possibly down to squad level. Their primary missions are to secure the flanks of the defensive positions and to ambush enemy troops that have broken through friendly defenses.

Flamethrower units also deploy in pairs to company and platoon strongpoints or to other places designated by the maneuver commander. The flamethrower operators fire at will once the attacking infantry and tanks move within range. Heavy flamethrowers are also allocated to antitank units of a maneuver division in the defense.

Smoke and Thermobaric Rounds

The OPFOR tries to use flame weapons in conjunction with smoke to create a tactical advantage. For example, a flamethrower squad attached to an assault group could use encapsulated flamethrowers with thermobaric and smoke warheads to attack a reinforced bunker. The flamethrower squad first blinds the enemy by firing smoke rounds and then engages him with thermobaric warheads. At least three smoke rounds are fired in a spread pattern. Under average conditions, a smoke warhead can create a smokescreen 55 to 90 m long. If the wind is from the flanks, the operators aim the smoke warheads 20 to 40 m off-target into the wind. If the wind is blowing toward the enemy, they aim at a point 30 to 40 m in front of the bunker. Then the operators move forward in pairs and fire thermobaric warheads as soon as a firing port in the bunker is visible through the smoke.

NUCLEAR

The OPFOR prefers to avoid nuclear warfare. It believes a war is most likely to start with a phase of nonnuclear combat and emphasizes the destruction of as much as possible of the enemy's nuclear capability during this phase. To accomplish this, it uses conventional air and missile attacks; airborne, heliborne, and special-purpose forces; and rapid, deep penetrations by ground forces. The OPFOR hopes these attacks can deny the enemy a credible nuclear option. If the use of nuclear weapons becomes necessary, the OPFOR intends to preempt any enemy escalation to nuclear combat with its own massed nuclear strike against enemy air, nuclear, C^2, and ground forces targets.

Dispersal and Rapid Concentration

The availability of nuclear strikes, as well as precision weapons and the longer ranges of conventional artillery, reduces the requirement for massed artillery formations. In addition, improved troop mobility permits both the rapid concentration and quick dispersal essential to the survival of tank and mechanized infantry units on a nuclear-threatened battlefield.

In this context, the OPFOR believes that the "quality" of mass must compensate for the reduced quantity formerly provided by concentrations of troops and equipment. This quality takes the form of intense strikes with conventional air and artillery, precision weapons, and possibly NBC weapons.

Since the enemy too is under nuclear threat, he must also disperse his own formations, which can make him more vulnerable to penetration by an attacking force. However, the OPFOR realizes that enemy troops are also highly mobile and capable of rapidly concentrating to protect a threatened sector. Therefore, it considers surprise and timing of attacks to be extremely critical in order to complicate enemy targeting and deny him time to use his mobility.

Transition to Nuclear

Even when nuclear weapons are not used at the outset of a conflict, OPFOR commanders deploy troops based on the assumption that a nuclear-capable enemy might strike with nuclear weapons at any moment. The OPFOR continuously updates its own plans for nuclear employment, although it prefers to avoid nuclear warfare. As long as it achieves its objectives and there are no indications that the enemy is going to use nuclear weapons, the OPFOR would likely not use them either. However, it could attempt to preempt enemy nuclear use with an initial, in-depth, theater nuclear strike. Otherwise, any OPFOR decision to employ nuclear weapons would have to be made early in the conflict, so that sufficient forces and combat power would remain to follow up and exploit the gains of nuclear employment.

Planning

Although the opening stages of combat are likely to be conventional, OPFOR planning focuses on the necessity of—

- Countering enemy employment of nuclear weapons.
- Maintaining the initiative and momentum.
- Maintaining fire superiority over the enemy (preempting his strike, if necessary).

Fire plans for divisions and higher levels include contingencies for nuclear strikes. However, the decision to initiate tactical nuclear warfare is made at the highest level of the State government.

In deliberately planned combat actions, the OPFOR plans potential nuclear fires in detail. A main attack would probably receive the highest percentage of weapons; however, the OPFOR may also reserve weapons for other large, important targets.

In more fluid situations (such as meeting battles, exploitation, and pursuit), the commander may keep some nuclear weapons systems at high readiness to fire on targets of opportunity. Nuclear allocations vary with the strength of the enemy defense and the scheme of maneuver. As closely as safety and circumstances permit, maneuver forces follow up on strikes near the line of contact.

Types of Strikes

The OPFOR categorizes nuclear strikes as either massed or individual. The category depends on the number of targets hit and the quantity of nuclear munitions used.

A ***massed*** nuclear strike employs multiple nuclear munitions simultaneously or over a short time interval. The goal is to destroy a single large enemy troop grouping, or several troop groupings, as well as other important targets. An ***individual*** nuclear strike may hit a single target or group of targets with a single nuclear munition.

Targeting

OPFOR targeting analysts work on the assumption of high reliability of nuclear delivery means, relying on one device per target. If a target is considered to require more than one nuclear device, coverage is overlapping. The suitability of targets is determined by their priority category, missions, the current tactical situation, and the nuclear weapons available.

Offensive Nuclear Employment

Once the Supreme High Command releases nuclear weapons, two principles govern their use: mass and surprise. The OPFOR plans to conduct an initial nuclear strike suddenly and in coordination with nonnuclear fires. Initial nuclear strike objectives are to destroy the enemy's main combat formations, C^2 systems, nuclear and precision weapons, thereby isolating the battlefield.

Nuclear strikes that target and destroy the enemy's forward defenses are, in effect, the main attack. Other fire support means support secondary or supporting attacks. The OPFOR plans a high-speed air and ground offensive to exploit the nuclear strike.

If the enemy continues to offer organized resistance, the OPFOR might employ subsequent nuclear strikes to reinitiate the offensive. Nuclear strikes can eliminate the threat of a counterattack and clear resistance from the opposite bank in a water obstacle crossing. Once in pursuit, the OPFOR plans nuclear strikes on chokepoints where retreating enemy forces present lucrative targets.

Defensive Nuclear Employment

A drastic change in COF is the primary goal when the OPFOR employs nuclear weapons in the defense. Primary uses in the defense are to—

- Destroy enemy nuclear and precision weapons and delivery means.
- Destroy main attacking groups.
- Conduct counterpreparations.
- Eliminate penetrations.
- Support counterattacks.
- Deny areas to the enemy.

If nuclear weapons degrade an enemy attack, the defender could gain the opportunity to switch quickly to an offensive role

BIOLOGICAL

Biological weapons consist of pathogenic microbes, microorganism toxins, and bioregulating compounds. Depending on the specific type, these weapons can incapacitate or kill people or animals and destroy plants, food supplies, or materiel. The type of target being attacked determines the choice of agent and dissemination system. Biological weapons are extremely potent and provide wide-area coverage. Some biological agents are extremely persistent, retaining their capabilities to infect for days, weeks, or longer.

Agents

Biological warfare agents include three basic categories: pathogens, toxins, and bioregulators. Figure 14-22 provides some example agents in each category.

Pathogens	Toxins	Bioregulators
Anthrax Cholera Plague Smallpox Tularemia Influenza Fevers	Mycotoxins Venoms Shell fish Botulinum Ricin	Neurotransmitters Hormones Enzymes

Figure 14-22. Examples of biological warfare agents.

Pathogens cause diseases such as anthrax, cholera, plague, smallpox, tularemia, or various types of fever. These weapons would be used against targets such as food supplies, port facilities, and population centers to create panic and disrupt mobilization plans.

Toxins are produced by pathogens and also by snakes, spiders, sea creatures, and plants. Toxins are faster acting and more stable than live pathogens. Most toxins are easily produced through genetic engineering. Toxins produce casualties rapidly and can be used against tactical and operational targets.

Bioregulators are chemical compounds that are essential for the normal psychological and physiological functions. A wide variety of bioregulators are normally present in the human body in extremely minute concentrations. These low-molecular-weight compounds, usually peptides (made up of amino acids), include neurotransmitters, hormones, and enzymes. These compounds can produce a wide range of harmful effects if introduced into the body at higher than normal concentrations or if they have been altered.

Psychological effects could include exaggerated fear and pain. In addition, bioregulators can cause severe physiological effects such as rapid unconsciousness and, depending on such factors as dose and route of administration, can also be lethal. Unlike pathogens, which take hours or days to act, bioregulators could act in only minutes. The small peptides, having fewer than 12 amino-acid groups, are most amenable to military application.

Examples of bioregulators are insulin (a pancreatic protein hormone that is essential for the metabolism of carbohydrates) and enkephalin (either of two pentapeptides with opiate and analgesic activity that occur naturally in the brain and have a marked affinity for opiate receptors).

Agent Effects

Another way to categorize biological warfare agents is by their effects. The four categories and effects of biological agents are shown in Figure 14-23.

Agent Type	Agent Effects
Antipersonnel	Microorganisms or toxins that cause disease or death
Antiplant	Living microorganisms that cause disease or death
Antianimal	Agents that can be used to incapacitate or destroy domestic animals through disease, or used to limit wool, hide, or fur production.
Antimateriel	Agents used to deteriorate critical materiel needed for the war effort such as leather, canvas, high-grade rocket fuels, or electronics.

Figure 14-23. Effects of biological agents.

Delivery Means

It is possible to disseminate biological agents in a number of ways. Generally, the objective of biological weapons is to expose enemy forces to an agent in the form of a suspended cloud of very fine biological agent particles. Those between 1 and 10 micrometers (μm) in diameter are the most effective because, once inhaled, particles of this size tend to lodge deep in the lungs close to vulnerable body tissues and the bloodstream. Dissemination through aerosols, either as droplets from liquid suspensions or by small particles from dry powders, is by far the most efficient method.

There are two basic types of biological munitions: point-source bomblets delivered directly on targets and line-source tanks that release the agent upwind from the target. Within each category, there can be multiple shapes and configurations. Military systems, as well as unconventional means, can deliver agents.

Point-Source

Point-source dissemination involves on-target attacks using forms of fuzed munitions that explosively disseminate or spray the biological agent at or near the ground. The delivery means include ballistic and cruise missile warheads, fixed- and rotary-wing aircraft, and cannon and rocket artillery.

Line-Source

Line-source dissemination involves off-target (upwind) attacks using agent disseminators moved along paths perpendicular to the wind direction. The means of delivery may be fixed- and rotary-wing aircraft, unmanned aerial vehicles, cruise missiles, boats, submersibles, or ground vehicles. Such attacks also can be made using multiple detonation or spray munitions emplaced at or near ground level upwind from the target and triggered remotely or by timing devices.

Unconventional

Special-purpose forces or civilian sympathizers can deliver biological weapons. Unconventional dissemination means include commercially available or specially designed sprayers or other forms of aerosol generators mounted in automobiles, trucks, or boats. Backpack and "suitcase" devices also can be used to effectively disseminate biological agent aerosols.

Devices resembling insecticide spray cans can be used to introduce an agent into heating, ventilating, and air conditioning systems. Drinking water can be contaminated by means of high-pressure agent injectors attached to plumbing system components. Another way to disseminate infectious agents is by the use of insects, rodents, or other arthropod vectors.

Targets

Probable targets for biological warfare pathogen attack are nuclear delivery units, airfields, rear area logistics facilities, and C^2 centers. The OPFOR may also target biological weapons against rear area targets such as food supplies, water sources, troop concentrations, convoys, and urban and rural population centers rather than against frontline forces.

The use of biological agents against rear area targets can disrupt and degrade mobilization plans as well as the subsequent conduct of a war. This type of targeting can also reduce the likelihood that friendly forces would become infected.

Biological weapons can take some time (days, weeks, or months—depending on the agent) to achieve their full effect. To allow these agents sufficient time to take effect, the OPFOR may deliver biological agents in advance of a planned attack, using clandestine means such as special-purpose forces or civilian sympathizers. The prolonged incubation period makes it difficult to track down the initial location and circumstances of contamination.

Chapter 15
Logistics

Logistics is the process of planning and executing the sustainment of forces in support of military actions. In its larger sense, it includes the development, acquisition, storage, movement, distribution, and evacuation of equipment and other materiel. At the tactical level, it focuses on the traditional combat service support functions of supply, maintenance, and medical support.

Logistics support is an integral factor in maintaining overall combat capability. Maneuver and fire support assets are combat-capable only as long as they receive the necessary ammunition, fuel, and other combat materiel required to sustain combat activity and only as long as their weapons and equipment are kept in operating condition.

These tasks present a challenge in modern combat, where there is not always a clearly defined frontline or a relatively secure rear area. Combat can spread over a deep and wide area. Within such an area, combat actions and attrition may not occur evenly or predictably. There may be areas of intense battles and local destruction, while other secondary or defensive sectors have much lighter logistics demands. This requires a flexible logistics system designed to continue to sustain forces throughout conflict, adapting as conditions change.

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CONCEPTS AND PRINCIPLES

Logistics support must complement the force structure and sustain combat actions. The logistics elements must be ready to provide full support at the start of combat and be capable of rapid movement to keep pace with maneuver forces. A greater quantity of logistics support is concentrated on the combat force assigned the principal mission in a given operation or battle. This support falls into three main categories and follows a series of guiding principles.

Categories of Logistics Support

OPFOR doctrine divides logistics support into three principal functions: materiel, technical, and medical support. Other functions include veterinary, housing, and financial support and field stores. Interwoven among these categories is a functional transportation system.

Materiel support includes the storage, transportation, and supply of ammunition, fuel, spare parts, food, clothing, water, and other consumable items. For each category, designated supply points receive, store, account for, and issue their separate types of materiel. For more detail, see the Materiel Support section of this chapter.

Technical support refers to the maintenance and repair of equipment and weapons, as well as other specialized measures associated with preparing equipment and weapon systems for employment. The supply of major end items—such as tanks and artillery—is a technical support function. For more detail, see the Technical Support section of this chapter.

Medical support, of course, includes measures required for the evacuation and treatment of casualties, and for the prevention of disease. It also includes medical measures pertaining to NBC protection and distribution of medical supplies. For more detail, see the Medical Support section of this chapter.

Principles

OPFOR logistics concepts emphasize centralization and planning at the highest level possible. This relieves lower units of the responsibility to maintain a large organic logistics organization. The following paragraphs detail the primary principles of logistics support.

Centralized Planning

A careful study of the missions of the total force allows planners to program and measure logistics requirements. This requires concurrent operational, tactical, and logistics planning. Each level of command is responsible for the timely and complete provision of logistics support to subordinate units from available assets. The commander allocates these assets to support the mission of his units, shifts resources according to the combat situation, and retains some emergency reserves to meet unexpected contingencies.

The bulk of supplies and transport resources are concentrated at army group and army levels. This centralization of logistics resources contributes to operational and tactical flexibility. It enables operational-level commanders to concentrate support where it is needed most, if necessary switching axes rapidly to take advantage of unexpected opportunities. They can quickly strip resources from stalled divisions and reallocate them to units making better progress. Centralization of resources at the operational level frees divisions and brigades of an unnecessarily large logistics tail, making it easier for them to engage in high-speed maneuver battles.

Tailoring Logistics Units

Tailoring allows allocation of logistics resources to the combat elements most essential to the success of the mission. This enables commanders to assign priorities for logistics support. Subordinate units receive assets according to the importance of their mission, the nature of the terrain, and the level of fighting anticipated. Commanders not only can reallocate their own resources in line with changes in the situation. They can also can take resources from one of their subordinates and give them to another subordinate if the situation warrants.

Supply Priorities

The OPFOR places primary emphasis on maintaining the supply of ammunition, fuel, and weapons. Its logistics system typically operates on the following sequence of priorities:

- Ammunition of all types.
- Petroleum, oils, and lubricants (POL).
- Spare parts and technical supplies (for equipment maintenance and repair).
- Rations, clothing, and medical supplies.

These priorities can change with the combat situation. For example, during an attack, the principal demand is for ammunition. On the other hand, a unit conducting a pursuit or advancing rapidly with no opposition has a greater need for POL than for ammunition. Nonessential supplies may not be delivered if it reduces the ability to provide essential combat supplies. Ammunition and fuel resupply can comprise 80 percent or more of total transportation requirements. Rations may be considered nonessential, for instance, when units can obtain them by foraging.

Delivery Forward

The concept governing resupply is not demand-pull, but supply-push. Subordinate commanders receive resources in accordance with priorities established at the higher level. It is the responsibility of higher headquarters to keep their subordinates supplied. They use their own organic transportation assets to deliver supplies and services directly to subordinate units. For example, an army headquarters uses its own trucks to deliver supplies to its subordinate divisions or separate brigades. This philosophy ensures economy in the use of both stocks and transport, while maintaining the commander's intent. The concentration of the bulk of transport assets at higher levels is the basis of the forward delivery system.

In emergencies, supply delivery can bypass one level. For example, army group transport may deliver directly to divisions, or army to brigades. A division may deliver supplies directly to subordinate battalions, or a brigade to subordinate companies. This skip-echelon delivery can save time and eliminate unnecessary transloading.

There are variations to this general principle of delivery forward. The supply-push system does not prevent a subordinate unit from using its own assets to obtain supplies from higher headquarters in a critical situation. When the higher headquarters places priority on delivering forward to units in the main effort, other units may have to use their own transport to collect from higher level. As a basic principle, however, each level must keep its subordinates supplied.

Forward and Mobile Materiel Stocks

The OPFOR establishes supply bases as far forward as possible. Mobile materiel stocks are kept uploaded on vehicles of transportation elements of units at various levels, and also with weapons and combat vehicles. As units consume these supplies, transport vehicles move forward more stocks to replace them. This helps ensure a continuous flow of supplies from the central logistics level, through bases in the rear areas at the operational and higher tactical levels, down to deployed tactical combat units.

Forward Medical and Maintenance Support Elements

Medical, equipment recovery, and repair facilities are also located as far forward as possible and in the areas of greatest need. In the offense, the OPFOR expects them to keep up with the advance. Divisional assets move into areas where battles have occurred and set to work. Then they move on to the next battle area and start again, with army and army group resources following as fast as possible. The emphasis is on the quick return of lightly wounded personnel and repairable equipment to combat elements. Personnel and equipment requiring additional attention are evacuated to the next-level facility. In the defense, however, normal practice is to evacuate most casualties, if there is little likelihood of shifting to offensive action in the near future.

Mobile Support

The mobility of logistics elements must match that of combat formations. From army to battalion, materiel support and servicing facilities operate from wheeled vehicles. Even some of the army group assets are mobile. Critical supplies such as ammunition are boxed and uploaded on support and combat vehicles. From army down to company or battery level, mobile materiel stocks are carried on vehicles and occasionally by air. These measures are designed to support all types of combat, including a continuous, rapid offensive.

Standardization of Equipment

The system of equipment standardization is both extensive and effective. The OPFOR generally employs homogeneous unit sets of equipment at least within a brigade, regiment, or battalion. Also, many armored vehicles and truck chassis serve as the basis for various artillery, air defense, and engineer systems. Extensive standardization has reduced the volume of repair parts and improved the OPFOR's ability to repair forward through cannibalization.

Complete Use of Transportation

Logistics planners base their estimates on the use of all movement resources available. The logistics system uses rail transport as far forward as possible to move supplies to depots at army group or possibly army level. Other transportation assets, primarily trucks, move supplies from that point forward. Standard cargo trucks can sometimes carry fuel (in bladders or cans) and can also carry wounded when returning to the rear. Even tactical combat vehicles can move additional POL and ammunition stocks, particularly in the preparation phase before offensive action. In an emergency or when a maneuver unit is operating independent of the main force, air resupply may provide support.

Use of All Possible Resources

The supply priorities discussed above may require the use of enemy materiel. OPFOR troops can forage for food in local areas and use captured stocks of food, ammunition, and equipment. Since fuel is particularly valuable, the fuel supply service has special pumps for exploiting filling stations. Due to the low priority of rations, foraging may well provide most of the troops' food after a few days of combat. However, the OPFOR generally uses captured fuel and food only after testing by mobile laboratories.

COMMAND AND CONTROL

Primary logistics responsibilities are divided among the deputy commanders for the rear and armament, and the various functional and branch chiefs. (See Figure 15-1.) These officials organize the work of logistics on the basis of the commander's battle plan and instructions, as well as instructions from corresponding deputy commanders and chiefs at higher levels. Therefore, close coordination is a necessity, both within a given level of command and with counterparts at higher and lower levels.

At each level of command down to maneuver battalion, the ***deputy commander for the rear*** has overall responsibility for logistics planning and the coordination and supervision of the logistics support effort. Therefore, he also bears the title of ***chief of logistics***. This officer is directly subordinate to maneuver commander at his level, but also subordinate in a special sense to the deputy commander for the rear at the next-higher level. He is personally responsible for most aspects of materiel and medical support and transportation, and for establishing supply bases. However, he has functional chiefs directly subordinate to him, who handle the various types of support. He is also responsible for rear area security.

At brigade level and above, the deputy commander for the rear coordinates with the ***branch chiefs*** of engineers, signal, and chemical troops, who, in turn, are responsible for the supply of specialized equipment of their respective branches. These branch chiefs are not subordinate to the deputy commander for the rear. However, they do coordinate their transportation requirements with him.

Level	Person Responsible	Area of Responsibility
Division and Brigade	Deputy Commander for the Rear	Overall logistics, supply actions, transportation
	Chief of POL Supply	POL supply
	Chief of Food Supply	Food supply
	Chief of Clothing and Equipment Supply	Supply of clothing and other expendables
	Chief of Motor Transport Service	Transport of supplies
	Chief of Medical Service	Medical support
	Deputy Commander for Armament	Maintenance and repair of vehicles and equipment
	Chief of Armored Vehicle Services	Armored vehicles
	Chief of Motor Vehicle Services	General-purpose, wheeled, motor transport vehicles
	Chief of Missile and Artillery Armament Services	Missiles and artillery; ammunition of all types
	Branch Chiefs	Maintenance and repair of branch-specific equipment
	Chief of Engineers	Engineer equipment
	Chief of Signal Troops	Communications equipment
	Chief of Chemical Troops	NBC defense equipment
Battalion	Deputy Commander for the Rear	Overall logistics, supply actions
	Deputy Commander for Armament	Maintenance and repair of tracked and wheeled vehicles; missiles and artillery; and engineer equipment
	Signal Platoon Leader	Maintenance and repair of communications equipment
	NBC Instructor	Maintenance and repair of NBC defense equipment
	Physician's Assistant	Medical
MIC	First Sergeant	Supply actions
	Logistics Officer	Maintenance and repair
	Medical Corpsman	Medical
TC	Senior NCO in the Company	Supply, maintenance, and repair

Figure 15-1. Responsibilities of key logistics personnel.

At the same levels, the ***deputy commander for armament*** coordinates with the deputy commander for the rear. He has overall responsibility for the requisition, supply, storage, maintenance, evacuation, and repair of armored vehicles, other motor vehicles, missiles, artillery, and ammunition. He has functional chiefs directly subordinate to him, who handle each of these areas.

At brigade level and above, ***branch chiefs*** of engineers, signal, and chemical troops handle these functions for their respective branches. At levels where there is no branch chief on the staff, the senior unit commander of the particular branch handles these responsibilities. For more detail on the duties of these key personnel, see the Technical Support section of this chapter.

One of the key functional chiefs under the deputy commander for armament, at brigade level and above, is the ***chief of missile and artillery armament services***, who is responsible for all ammunition depots, including stockage and distribution. He coordinates closely with the deputy commander for the rear, who controls transportation assets, and the chief of artillery, who estimates ammunition requirements based on combat missions and norms. These relationships and responsibilities exist at each level of command from army group down to maneuver brigade.

Each tactical commander is responsible for requesting sufficient ammunition supplies to support subordinate units. Because of the ammunition supply functions of the chief of missile and artillery armaments, see both the Materiel Support and Technical Support sections of this chapter for more detail on his duties.

Division and Brigade

The division or brigade commander has overall responsibility for his unit's logistics. His two principal assistants are the deputy commander for the rear and the deputy commander for armament. Technical advice is also available to the commander from the various branch chiefs. The division or brigade chief of staff accomplishes staff coordination. However, the deputy commander for the rear provides detailed supervision and coordination of the division's logistics activities.

Deputy Commander for the Rear

The deputy commander for the rear heads the non-equipment logistics system. He controls resupply activities, including the procurement and distribution of POL, rations, and other quartermaster stores. He supervises the work of the chiefs of POL supply, food supply, motor transport services, and clothing and equipment supply, as well as the chief of medical service. These chiefs report directly to him, rather than to the chief of staff.

A ***dual chain of reporting*** exists within the command structure. The division deputy commander for the rear plans, oversees, and controls the logistics activities of the division. He is subordinate to the division commander; yet he also works closely with the army or corps deputy commander for the rear. The brigade deputy commander for the rear has a similar relationship with his division-level counterpart. The same type of dual chain also exists for the subordinate chiefs of supply and services subordinate to him. Thus, for example, the brigade chief of POL supply or chief of medical service works closely with his counterpart at division level. These vertical channels run all the way up to the Ministry of Defense (MOD).

The division (brigade) deputy commander for the rear plans the transport and delivery of materiel (except missiles that are delivered on special transport vehicles) in accordance with—

- The commander's decision.
- The unit mission.
- Guidance from the deputy commander for the rear at the next-higher level.
- Needs of materiel and actual supplies at the division (brigade).
- The requirements of the branch chiefs.
- The deployment and condition of motor transport units.

The deputy commander for the rear coordinates logistics support and commands the rear command post (CP). Assisted by the rear staff, he prepares logistics plans and orders. He communicates directly with the division or brigade commander and chief of staff and also with his counterparts at higher and lower levels. He is responsible for managing the order, receipt, transportation, and distribution of supplies to sustain the division or brigade in battle. Those responsibilities make him the hub of the logistics support effort and a key figure at the rear CP. He is essentially the "installation commander" for the rear area, since he supervises and coordinates all activities there. He exercises this coordinating role most directly through his control of transportation. He also supervises communications, movement, security, and damage control within the rear area.

At ***division*** level, the mobile logistics base is headed by a logistics officer, assisted by branch depot chiefs, and subordinate to the deputy commander for the rear. The division rear area also contains small depots and maintenance facilities belonging to the branch chiefs and assets controlled by the deputy commander for armament. The deputy commander for the rear has no direct authority over the officers in charge of those elements or the conduct of their technical support activities. However, he is responsible for rear area organization and assigns locations in the rear area. When the rear is to move to a new location, he organizes the march, assigns units their places in the march column, chooses the march routes, orders the various elements to occupy certain terrain in the new area he has chosen, and establishes all security measures.

The ***brigade*** deputy commander for the rear organizes and controls brigade supply points. He is responsible for all supply actions but, at this level, has no branch depot chiefs to assist him. The senior physician is the brigade's chief of medical service; he sets up and supervises the brigade medical point, but does not command it.

The division (brigade) deputy commander for the rear organizes a ***rear area reconnaissance*** carried out by assets of logistics units. The main tasks of this reconnaissance are to—

- Identify and select suitable deployment areas for logistics units, landing areas for helicopters, supply and evacuation routes, and sources of water.
- Determine requirements of forces and equipment needed for making improvements.
- Determine the protective, concealing, screening, and masking properties of the terrain.
- Determine the availability of local resources and their possible use for logistics support of units.

Deputy Commander for Armament

The deputy commander for armament is responsible for the technical condition, repair, and replacement of armaments and related combat equipment, technical equipment, and instruments. He is responsible to the commander for the serviceability and maintenance of equipment in the division or brigade. This includes responsibility for direct support maintenance of both tracked and wheeled vehicles, for procurement of repair parts, and for vehicle replacement. During combat, he organizes and supervises the recovery, repair, evacuation, and replacement of disabled vehicles and equipment.

As with the deputy commander for the rear, the deputy commander for armament has assistants who specialize in certain areas of technical support. He supervises the work of the chiefs of armored vehicle services, motor vehicle services, and missile and artillery armament services. These functional chiefs share the rear CP with him and report directly to him, rather than to the chief of staff. However, these chiefs, and the deputy commander for armaments himself, also have special channels for reporting and coordinating with their counterparts at higher and lower levels of command. Again, these vertical channels run all the way up to the MOD.

Under the guidance of the deputy commander for armament, the ***chief or armored vehicle services*** is responsible for technical support of armored vehicles, including tanks, IFVs, and APCs. Thus, he organizes and supervises the maintenance, repair, and recovery of such equipment.

The ***chief of motor vehicle services*** does the same for general-purpose, wheeled, motor transport vehicles. His responsibilities include technical support of soft-skinned vehicles used in medical and materiel support functions falling under the deputy commander for the rear.

The ***chief of missile and artillery armament services*** reports directly to the division or brigade deputy commander for armament. He has detailed responsibility for the condition, repair, and replacement for missile and artillery armaments and for resupply of ammunition of all types. Thus, the chief of artillery and the chief of air defense closely monitor his actions and coordinate with him on their requirements for technical support and ammunition. However, he is also responsible for antitank guided missiles (ATGMs) and infantry weapons and ammunition (small arms).

The ***division*** deputy commander for armaments organizes and controls the division recovery, repair, and replacement system. He controls the division maintenance battalion and oversees maintenance throughout the division. During combat, he keeps the division commander informed on the status of the division's equipment.

The ***brigade*** deputy commander for armament is responsible for the maintenance, repair, and evacuation of brigade vehicles. He controls these activities from his technical observation post (TOP). He establishes and directs the activities of the brigade repair point and the repair and evacuation groups (REGs). The chief of missile and artillery armament services is responsible for supplying brigade elements with all types of munitions.

Branch Chiefs

Other than the various chiefs of supply and services subordinate to the deputy commanders for the rear and armament, there are the branch chiefs of various combat and supporting arms who are directly subordinate to the chief of staff. Of the latter, the chiefs of engineers, signal, and chemical troops have responsibilities for supply, storage, repair, and maintenance of specialized, branch-specific equipment and materiel.

These branch chiefs coordinate measures for technical support (maintenance, repair, and evacuation) with the division or brigade deputy commander for armament. They coordinate with the deputy commander for the rear in questions of medical and materiel support. They also coordinate with the latter on the deployment and movement of subordinate units in the rear area and their protection, security, and defense.

The chief of staff has direct responsibility for the coordination of logistics. However, since he cannot devote a large portion of time to detailed logistics coordination, the bulk of the logistics burden falls on the deputy commanders for the rear and armament and the branch chiefs. Unlike the other key logistics players, the branch chiefs are not in the rear CP. The chief of staff holds each branch chief responsible for consolidating and forwarding logistics requests pertaining to his branch to the deputy commander for the rear, who ensures that they receive the required supplies.

Rear Command Post

The rear CP of a division or brigade controls the rear area and any materiel support, technical support, or medical support units located there. This CP is located in the main part of the division or brigade rear area. It is manned by the deputy commanders for the rear and for armament, with their staffs, known collectively as the rear staff. The deputy commander for the rear is in charge of the rear CP.

The rear CP manages the materiel, technical, and medical support of the division or brigade and its subordinate units. The division rear CP interacts closely with the brigades' rear CPs to ensure that combat capabilities are sustained. A rear CP can assume temporary control of the division or brigade if the main CP is destroyed.

Battalion

The battalion commander is responsible for the condition and security of the battalion's weapons, combat vehicles, and other equipment, as well as ammunition, fuel, and other materiel supplies. The battalion chief of staff coordinates logistics requirements, assisted by the battalion deputy commanders for the rear and armament. These staff officers coordinate requirements from company commanders and other battalion subordinates.

The supply and service platoon leader is responsible for receipt, storage, and delivery of supplies to companies. He deploys and oversees battalion ammunition, POL, and ration supply points. His maintenance section handles routine repairs on tracked and wheeled vehicles. The signal platoon leader is responsible for maintenance of repair of communications equipment. The battalion NBC instructor does the same for NBC defense equipment. The battalion physician's assistant is chief of the medical section and is directly responsible for organizing medical support in the battalion. This includes gathering and evacuating wounded personnel from the companies and the battlefield.

During battle, the battalion commander and his deputy commanders for the rear and armament monitor consumption of ammunition, fuel, and food and their timely delivery to subordinate units. The commander reports the supply status to the brigade commander (or his deputy commanders for the rear and armament) and submits requests for replenishing subordinate units with supplies, as necessary.

For example, a mechanized infantry battalion (MIBN) reinforced with a tank company (TC) and an artillery battery in the attack consolidates on a line. Shortly thereafter, the battalion commander receives the order of advance and his logistics instructions. After analyzing his mission and the situation, the commander issues his own combat order and gives logistics instructions. Battalion transport is to deliver materiel supplies from the brigade depots to the mechanized infantry companies (MICs) and mortar battery. In addition, two vehicles from the mortar battery are used to move ammunition. Deliveries to the attached TC and the artillery battery are made on the instructions of their respective unit commanders. By a designated time, the stocks of ammunition, POL, rations, spare parts, medical supplies, and other materiel in the subordinate units are to be replenished to prescribed levels, and maintenance of weapons and combat equipment carried out.

The MIBN's chief of staff, the deputy commander for the rear, the deputy commander for armament, and the battalion's physician's assistant keep in contact with the companies and the mortar battery. They issue relevant instructions to logistics units and monitoring their execution.

Company

The company commander is responsible for organization of his logistics. In an MIC, the logistics officer is responsible for organization of company-level maintenance. The company first sergeant is responsible for accountability and maintenance of the unit's weapons, ammunition, fuel, food, and other supplies. In a TC, a senior NCO serves as first sergeant and is responsible for logistics. The company commander (or his medical corpsman in an MIC) coordinates with the battalion physician's assistant on medical matters.

During battle, the company commander monitors consumption of ammunition, fuel, and food and their timely delivery to subordinate units. With input from his first sergeant (or senior NCO) and platoon leaders, he reports to the battalion commander (or his deputy commanders for the rear and armament) on the status of supplies. He also submits requests for replenishing subordinate units with necessary supplies.

Plans and Orders

Although the deputy commander for the rear does not exercise direct control over technical support, he is the principal logistics planner and coordinator, and his directives and decisions guide the execution of the logistics plan in all its aspects.

The rear staff consists of the deputy commanders for the rear and armament and their staffs. It formulates the logistics plan based of the commander's decision and instructions and on instructions from senior logistics authorities.

Planning Procedure

When sufficient time is available, the division or brigade deputy commander for the rear goes to the division or brigade (main or forward) CP and receives combat orders from the chief of staff or commander. Then he returns to the rear CP and works out a time and movement schedule, informs subordinate unit deputy commanders for the rear of the situation, and issues preliminary instructions (warning order). Then he calls a conference with his chiefs of supply and services, as well as the ammunition officer (subordinate to the chief of missile and artillery armament services under the deputy commander for armament). At this conference, he explains the tasks of the rear, evaluates the state of the rear, and prepares his proposals for logistics support to the upcoming combat action. He returns to the brigade or division CP and presents his proposals and draft orders for the endorsing signature of the commander. Then he returns to the rear CP and works out the final details of his logistics plan, checking the allocation of tasks and organizing supervision. He goes over his detailed plan with his chiefs of supply and services and ammunition officer and with the brigade or division chief of staff, and makes a final confirmatory report to the brigade or division commander.

When time is limited, the deputy commander for the rear can use a parallel planning procedure. Accompanied by his chief of POL supply and the ammunition officer, he attends a combat briefing with maneuver unit commanders. While the latter are preparing their combat plans, he rapidly works out proposals for logistics support with the help of the POL and ammunition specialists. Thus, he issues his proposals for support of the brigade or division at the same time as the subordinate maneuver commanders issue theirs. When the brigade or division commander has approved this proposal, he issues copies to the maneuver commanders. This means that the latter can brief their logistics units with the deputy commander for the rear's logistics orders at the same time they issue combat orders to their subordinate maneuver commanders. Thus, the logistics planning is completed at the same time as the maneuver unit's overall planning for the battle instead of after it. Then the deputy commander for the rear returns to the rear CP to brief his remaining subordinates and issue orders to them.

Logistics Plan

The deputy commanders for the rear and armament and their staffs prepare the logistics plan. They formulate it jointly with the overall battle plan, of which it is an integral part. With the rest of the battle plan, it requires approval by the next-higher level of command. The logistics plan indicates—

- The basic missions and composition of the logistics elements, their initial dispositions, and their subsequent deployment (relocation times and routes).
- Supply and evacuation routes and measures for their repair and construction.
- Stockage levels.
- The amount of materiel to be provided to units and the organization of its delivery.
- Anticipated equipment losses and casualties
- The organization of medical support.
- Boundary lines between rear areas of adjacent units.
- The organization of communications.
- Measures for rear area security and defense.
- The organization of command and control (C^2) of logistics elements.

It often includes a plan for restoring combat effectiveness, which sets out measures needed to reconstitute the combat capabilities of attrited units, a process that would require heavy participation by logistics elements.

The logistics plan is signed by the chief of staff and the division (brigade) deputy commander for the rear and approved by the division (brigade) commander. The branch chiefs (for engineers, signal, and chemical defense troops) directly subordinate to the division (brigade) chief of staff perform the necessary calculations within their respective areas of responsibility and enter the necessary data into the plan.

The commander and his deputy commanders for the rear and armament can modify the logistics plan and sometimes change it radically as battles progress and new situations arise. To the extent possible, commanders and staffs consider likely variants to the plan in advance, though they recognize that major unanticipated changes are a condition of war.

Technical Support Plan

The division (brigade) deputy commander for armament prepares the division (brigade) technical support plan, with the assistance of the branch chiefs. He coordinates this plan with the division (brigade) deputy commander for the rear. The division (brigade) chief of staff and deputy commander for the rear sign the plan and present it to the division (brigade) commander for his approval. The plan includes—

- Tasks of technical support.
- Deployment areas and method of movement of technical support assets.
- Organization of the support of units with munitions, personal and combat equipment, spare parts, and other military technical materials.
- The expected consumption of munitions and the distance supported units should travel during a day's battle.
- Time and place for maintenance, repair, and evacuation of vehicles and equipment and their return to the combat formation.
- Measures for protection, security, defense, and control of technical support assets.

The branch chiefs directly subordinate to the chief of staff perform the necessary calculations and prepare the portion of the plan that deals with technical support within their respective areas of responsibility.

Orders

The basis of the organization of logistics is the decision of the division (brigade) commander. In his combat order and directives, the commander normally provides the following information to his logistics planners:

- The missions of maneuver units and the axes for concentration of their main effort.
- The area for deployment of the division (brigade) rear and the axes for its redeployment.
- Deadlines for creation and quantity of supplies for units and the sequence of delivery.
- The expected consumption of ammunition and POL during the battle, based on established norms.
- Method and time for topping off vehicles with fuel.
- Supply and evacuation routes, deadlines for their improvement, and the forces and equipment assigned to the effort.
- Method of medical aid to the sick and wounded and their evacuation.
- Measures for the security and defense of the rear area and the time of their readiness.
- Location of the rear CP.

Logistics tasks are issued to the ones who will carry them out in the form of a logistics order or directive.

To supplement the combat order, the division or brigade deputy commander for the rear and his staff write a separate order for logistics. This order organizes the rear area and specifies—

- General deployment areas of units located in the rear area.
- Routes of movement for logistics elements, supply routes, and supply points.
- Allocations of ammunition, POL, and rations.
- Sequence and time of resupply.
- Measures for rear area security.
- Location of the rear CP.

The division or brigade commander approves the order. Orders and directives of the deputy commander for the rear in questions of logistics support are binding for all branch chiefs and unit commanders.

ASSETS

Fully mobile, streamlined logistics elements support tactical units with ammunition, POL, and rations to ensure continuous combat capability. Supply elements deliver materials to the rear of combat elements deployed on the forward edge. Medical and repair elements also locate as far forward as possible. Figure 15-2 shows the typical locations of tactical logistics elements in the offense and defense. Figures 15-3 and 15-4 show examples of deployment of these elements at brigade level and below.

Maneuver Unit	Logistics Element	Distance from Forward Edge	
		In Offense	In Defense
Division	Supply Depot (Ammo, POL, Rations)	25-30 km	35-50 km
	Repair Point (Tanks, Tracked Vehicles)	20-40 km	35-60 km
	Repair Point (Artillery, Small Arms)	20-40 km	35-60 km
	Repair Point (Wheeled Motor Vehicles)	10-15 km	up to 20 km
	Damaged Vehicle Collection Point (DVCP)	20-40 km	35-50 km
	Medical Point	10-15 km	up to 20 km
Brigade	Ammunition Supply Point	10-15 km	10-20 km
	POL Supply Point	10-15 km	10-20 km
	Ration Supply Point	10-15 km	10-20 km
	Repair Point	up to 15 km	up to 20 km
	Technical Observation Post (TOP)	up to 8 km	up to 10 km
	Repair and Evacuation Group (REG)	up to 8 km	up to 10 km
	Damaged Vehicle Collection Point (DVCP)	5-7 km	6-10 km
	Medical Point	5-7 km	6-10 km
Battalion	Ammunition Supply Point	3-4 km	2-3 km
	POL Supply Point	3-4 km	2-5 km
	Ration Supply Point	3-5 km	2-5 km
	Technical Observation Post (TOP)	1-2 km	up to 4 km
	Repair and Evacuation Group (REG)	1-2 km	up to 4 km
	Medical Point	1.5-3 km	1.5-3 km
Company	Ammunition Supply Point	—	100-150 m*
	Ration Supply Point	—	up to 1 km
	Medical Point	—	50-100 m*
*The distance can be up to 1 km, but these closer positions are preferable if there is sufficient cover.			

Figure 15-2. Locations of tactical logistics elements.

Logistics units deploy within assigned areas, dispersed and using camouflage measures and the protective characteristics of the terrain. They generally provide their own security and defense in these areas. According to need, however, the supported maneuver commander may detach additional forces and equipment for their defense.

Material and medical support units redeploy as necessary to provide uninterrupted supply of materials of all types, timely medical aid for the wounded and sick of supported units. Most maintenance and repair elements at the tactical level are mobile, in order to keep pace with supported units.

Division

Logistics units deploy, conduct their activities, and redeploy within the division's zone of combat action. In the defense, the army or corps logistics order may assign a first-echelon division a rear area delimited by boundaries to the left, right, and rear, and from the front by the deployment line of logistics elements of the first-echelon brigades. From the forward edge of the defense, the depth of the division rear area may be as much as 50 km.

The division logistics base is headed by a logistics officer, assisted by branch depot chiefs, and subordinate to the deputy commander for the rear (chief of logistics). This logistics base is usually 25 to 30 km from the forward edge in the offense, and up to 50 km in the defense. Trucks from the division's materiel support battalion deliver supplies from depots to maneuver brigades and battalions. The materiel support battalion also includes a mobile field bakery. Maintenance operations are the responsibility of the deputy commander for armament. A medical battalion is also organic to the division.

Brigade

At brigade level, supplies are loaded on vehicles to maintain equal mobility with combat elements. The brigade deputy commander for the rear (chief of logistics) is responsible for all supply actions and at this level has no branch depot chiefs to assist him. Maintenance functions are the responsibility of the deputy commander for armament. Located up to 20 km from the forward edge, brigade logistics elements directly supply subordinate battalions, and when required, can also supply line companies.

Battalion

At battalion level, all logistics support is self-contained in a supply and service platoon that combines materiel, technical, and medical support functions into a single unit. This platoon includes a motor transport section, a mess section, a maintenance section, and a medical section. The motor transport section has vehicles for transporting cargo and POL. The battalion maintains prescribed norms of supply for all types of materiel, with resupply provided directly by brigade or division logistics elements. This relatively small, but well-tailored "tail" within the battalion gives the combat units greater independence. No formal logistics organization exists below battalion level.

In the march, logistics elements advance behind the second echelon or combined arms reserve (CAR); food vehicles and field kitchens may sometimes proceed as part of the brigade's rear.

In the offense, the supply and service platoon normally follows close behind the battalion's combat forces in a way that ensures the attackers' continuous materiel, technical, and medical support. The battalion's REG, and medical point move and deploy close behind the combat formations of the first-echelon companies. The battalion TOP follows the combat formation at a distance at which it can keep vehicles on the battlefield in view. The remaining logistics elements advance under cover of the second echelon or CAR. Figure 15-3 shows an example of typical deployment of battalion and brigade logistics elements in the offense.

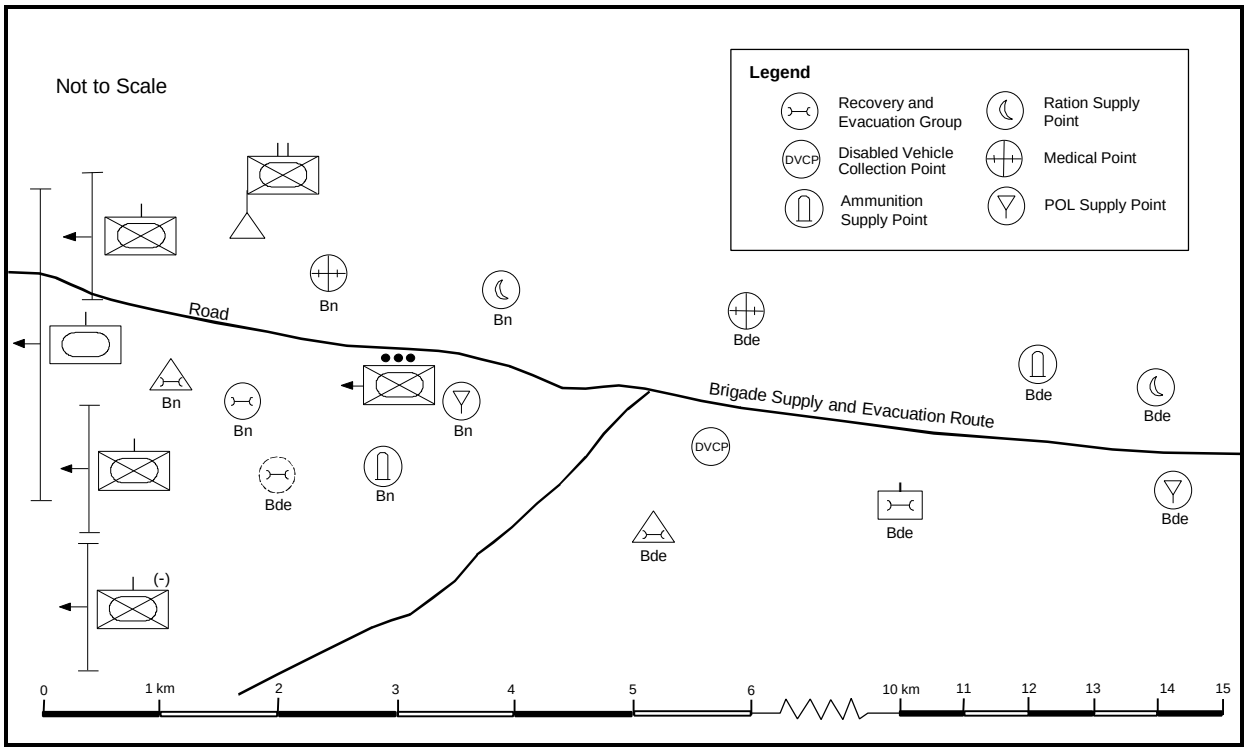


Figure 15-3. Battalion and brigade logistics elements in the offense (example).

In the defense, logistics elements in the first echelon are distributed behind the forward edge. Those in the second echelon or CAR are colocated with second-echelon or CAR forces. Figure 15-4 shows an example of typical deployment of battalion and brigade logistics elements in the defense.

Company

At company level, there is no organic supply and service element to provide specialized materiel or technical support. An MIC has a medical corpsman, and each mechanized infantry squad has a rifleman/medic. In the defense, there may be a company medical point, and the parent battalion may establish company ammunition and ration supply points.

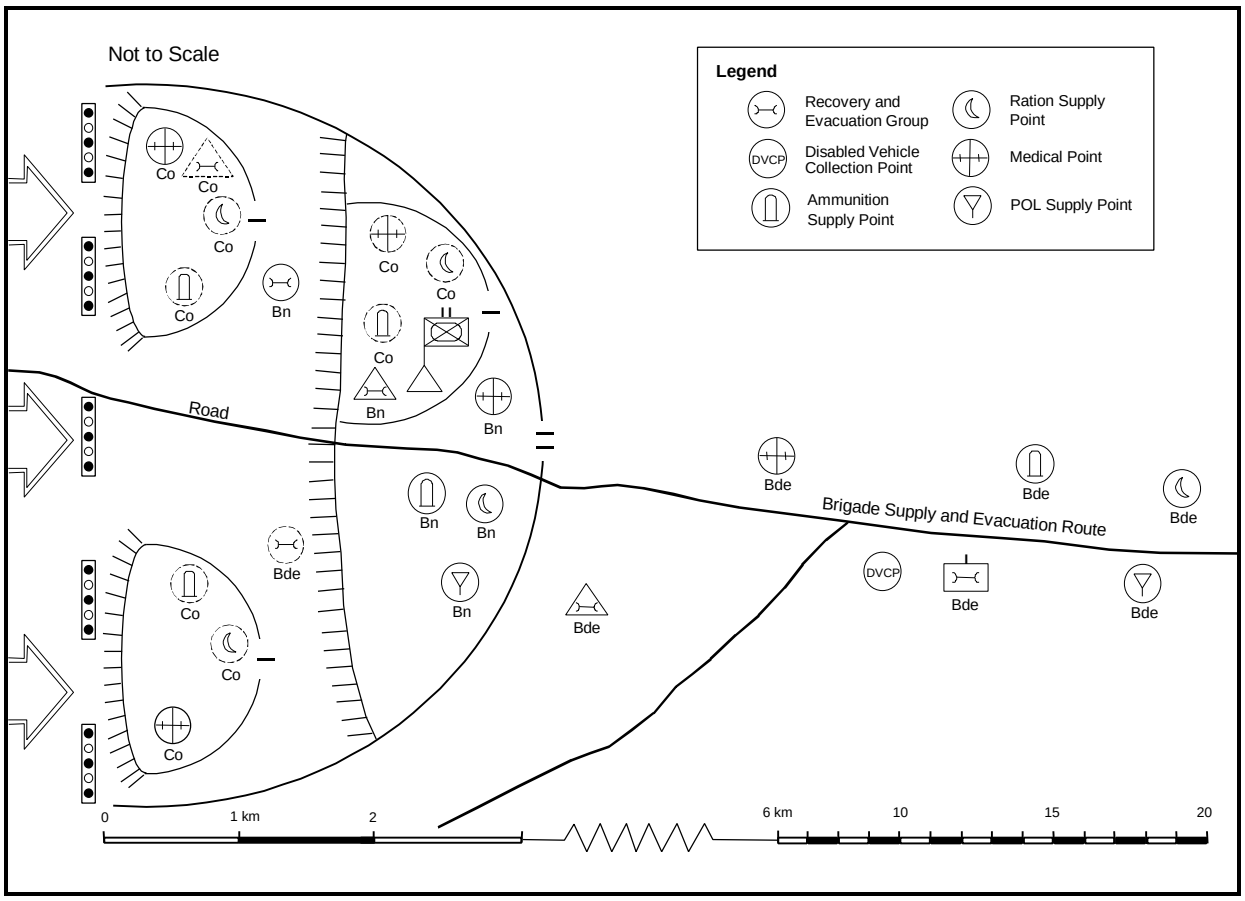


Figure 15-4. Battalion and brigade logistics elements in the defense (example).

MATERIEL SUPPORT

The goal of materiel support is to provide timely and complete support for units in the form of all types of armaments, combat equipment, other equipment; missiles, munitions, fuel, food, and personal gear; medical, engineer, signal, and chemical supplies, as well as water. This involves creation of necessary stocks of materiel supplies, their proper breakdown, and delivery to the units, as well as continuous resupply to compensate for consumption and losses.

The division (brigade) deputy for the rear organizes materiel support carried out by the material support units and services directly subordinate to him. The deputy commander for armament and the branch chiefs organize materiel support carried out by the technical support and other services. These officers and their subordinates carry out materiel support according to the plan and orders of the higher headquarters. The basis of these plans and orders is the collective logistics reports and requirements of the units based on the actual supply status and consumption. In determining the materiel needs for the battle, planners also take into account the established consumption norms and norms for stockage levels of necessary supplies to be maintained before the battle and replenished after the end of the battle. The materiel that the division, brigade, battalion, company, or battery actually receives is the level of its materiel support.

Supply Norms

Essentially, all materiel support assets, from battalion level to the MOD, are part of one system. When planning and coordinating division logistics allocations, the division deputy commander for the rear requisitions and allocates supplies according to guidance from the division commander and pre-established norms. Standard tables of logistics norms, based on experience and estimated expenditure rates, indicate the amount and type of supplies required by a division to perform a particular type of combat action. Like his counterparts at higher and lower levels, the division deputy commander for the rear refers to these tables when planning for a combat action. Then he must ensure that centralized planning provides adequate amounts of supplies, properly distributed to support the action. Thus, deputy commanders for the rear at all levels coordinate requirements from a common point of reference.

Standard Units of Issue

To simplify logistics planning and to standardize ordering and issuing procedures, the OPFOR divides the major classes of materiel supplies into specific quantities or distribution lots. These quantities are called *units of fire* (UOFs) for ammunition, *refills* for fuel, *daily rations* for food, and *sets* for spare parts and accessories. Once a standardized norm has prescribed a specific quantity as the unit of issue, planners no longer need to refer the quantity itself, and all future references are given in multiples of the unit of issue.

Logistics calculations with these standard units of issue normally involve the weight of the unit of issue in metric tons, since this is a key parameter for transport planning. For certain computations, volume is also computed. These figures can then be used for planning transport and storage in connection with similar sets of weights and volumes of standardized units of issue of ammunition, POL, rations, and other sets of combat equipment.

Materiel Reserves and Mobile Stocks

The OPFOR has established norms for the amounts of materiel reserves to be created and maintained at various levels of command. These norms may be expressed in terms of standard units of issue (see Figure 15-5) or days of supply (see Figure 15-6). In tactical units, and even at army or corps level, most of these reserves are in the form of mobile materiel stocks kept uploaded on vehicles. These stockage levels do not necessarily take up the entire motor transport capability at a given level of command. For example, the transport assets of a maneuver division's organic artillery regiment may be capable of carrying more than three times the one UOF that is the minimal norm for artillery ammunition in a division. At the army group level, not all materiel reserves are on vehicles.

Minimum stockage. Figure 15-5 reflects the norms for minimum stockages of materiel reserves in terms of UOFs of ammunition for every weapon, refills of fuel for every vehicle, and daily rations of food for every person subordinate to each level of command. Mission requirements often exceed these minimal reserves.

To meet these requirements or to replenish depleted reserves of subordinates, higher-level organizations use their own transport to deliver supplies downward. These supplies must come either from the supplying unit's own reserves or those of the next-higher level. The actual requirements vary according to the subordinate unit's mission, the type of combat activity, and the enemy situation. Therefore, the actual distribution of materiel to a particular unit's subordinates is not uniform.

When tactical situations and special problems affect a unit's logistics requirements, the unit commander and his deputy commander for the rear generally resolve the problem by reallocating resources. Thus, there is no fundamental conflict between the unit's requirements and the assets allocated to it by higher headquarters.

Level of Command	**Ammunition (UOF)**				**Fuel (Refills)**		**Food (Daily Rations)**
	Small Arms	Artillery & Mortars	Tanks	Air Defense	Gas	Diesel	
In Units	0.80	0.80	1.50	1.50	1.30	1.65	11
Division Transport	0.20	0.20	0.75	0.50	0.40	0.75	2
Division Total	**1.00**	**1.00**	**2.25**	**2.00**	**1.70**	**2.40**	**13**
Army/Corps Transport	0.15	0.30	0.40	0.50	0.45	0.70	2
Army/Corps Total	**1.15**	**1.30**	**2.65**	**2.50**	**2.15**	**3.10**	**15**
Army Group Transport	0.22	0.45	0.60	0.70	0.60	1.00	3-4
Army Group Rear Base	0.78	1.50	2.00	2.55	2.30	3.50	10
Army Group Total	**2.15**	**3.25**	**5.25**	**5.75**	**5.05**	**7.60**	**28-29**

Figure 15-5. Norms for materiel reserves at various levels of command (in standard units of issue).

Days of supply. Figure 15-6 shows the norms for the materiel stocks in terms of days of supply maintained at various levels of command. The actual stock levels authorized can vary according to the importance of unit's mission within the higher commander's plan.

A division typically goes to war with 3 to 5 days of supplies, depending on the intensity of combat, as mobile materiel stocks on vehicles. This includes all types of supply: ammunition, POL, spare parts, and rations. Keeping mobile stocks uploaded on vehicles helps ensure—

- Ready availability.
- Ability to weather an interruption of supply flow or an unanticipated increase in consumption rates.
- Ability to accompany combat units and provide replenishment during highly mobile combat actions.
- Possession of an emergency reserve.
- Security through dispersion.

Level of Command	Days of Supply
Company/Battery	0.5
Battalion Transport	0.5-1.0
Brigade Transport	1.0-2.0
Division Transport	1.0-1.5
Division Total	**3.0-5.0**
Army	2.0
Army Total	**5.0-7.0**
Army Group Transport	3.0-4.0
Army Group Rear Base	4.0
Army Group Total	**12.0-15.0**

Figure 15-6. Norms for days of supply at various levels of command.

Mobile stocks. The OPFOR maintains a portion of all material in mobile stocks to provide an uninterrupted supply to units. Divisions and brigades create and maintain mobile materiel stocks of all types of ammunition, POL, spare parts, rations, and other supplies at standard levels specified in norms. They store and transport these supplies on division (brigade and battalion) transport vehicles, and also with weapons and combat vehicles. A portion may be with transportation elements of units down to company or battery level. In the case of small arms ammunition and rations, part of these stocks may be in the immediate possession of personnel. Maintenance and medical units also carry mobile stocks of spare parts and medical supplies.

It is considered essential to maintain mobile stock levels at or near the norm for as long as possible in all units. The intent is for these stocks to provide the troops with means to subsist and conduct combat in the event of a breakdown in supply. Interdiction, enemy counterattacks, or even the rapid pace of combat can interfere with or even cut the supply lines. When this happens, units can continue combat action by eating into their mobile stocks until the higher headquarters can resume its logistics support.

As units consume supplies from mobile stocks, the higher headquarters replenishes them to the established levels as quickly as possible. Army may be resupplied daily, divisions up to twice a day, and brigades and below probably daily. Whenever a unit's stocks are consumed, however, early resupply must be carried out to bring them back up to the normative level. Better yet, the division and its subordinates leave their own reserves untouched, if the parent army can deliver the required supplies in advance. The aim is to keep divisional stocks intact for as long as possible.

Emergency reserves. At all levels, mobile stocks of ammunition and fuel are divided into the consumption allocation and an untouchable supply. The latter, known as an ***emergency reserve***, can be up to 30 percent of the total. Only the higher commander can authorize the use of the emergency reserve. For example, a battalion has an emergency reserve that it can use only with the specific concurrence of the brigade commander. In emergency cases when delay is not possible, it can do so with concurrence of the battalion commander, who must then report on the situation to the brigade commander.

Supplementary reserves. Based on the situation and the type of combat activity, the higher headquarters may authorize higher stockage in excess of the normative requirements in a subordinate unit. When this occurs, the subordinate may be able to accommodate the additional supplies on its own transport, as increased mobile stocks. When the additional allowance exceeds the receiving unit's transport capability, the higher unit may deliver all or part of these supplementary reserves to the subordinate at a time and place where the receiving unit can use them or will have space to transport them. Another option is to allocate additional transport assets to the receiving unit.

For example, an artillery battalion might have 1.0 UOF of ammunition and 0.8 refills of diesel fuel on hand at the time it receives a mission. The mission requires the expenditure of 3.5 UOFs for the day: 1.1 for fire preparation, 1.5 for fire support, and 0.9 for fire accompaniment of the attack. The combat order specifies the time and place for this battalion to receive an additional 2.5 UOFs of ammunition required for the mission and 0.85 refills of fuel needed to bring the unit up to the reserve norm. Thus, the battalion should have the necessary ammunition and fuel to carry out the mission, including mobile stocks for phases involving movement.

Allocation and resupply. The deputy commanders for the rear and armament at each level receive reports every 12 hours on the status of ammunition and POL in subordinate units and every 24 hours on other materiel.[1] The logistics planners compile these reports to determine requirements for resupply. Then they determine the status of supplies in mobile stocks or depots at their own unit level and below. Finally, they compare that total with the quantity required for upcoming missions and forward to their higher-level counterparts a request for the difference. The higher-level planners must deal with this request based on—

- The extent of the requesting unit's depletion.
- The priority of the requesting unit in relation to other subordinate units.
- The amount of materiel the planner has in his own mobile stocks or depots.
- The amount he can expect to receive from his next-higher headquarters.
- The deployment and condition of motor transport units.

Subordinates conducting the main effort for the senior commander normally receive a higher proportion of the senior commander's materiel reserves. Especially in the offense, the first priority for materiel allocation and resupply normally goes to the subordinates that are achieving the greatest success.

Ammunition

In terms of complexity and weight to be moved, ammunition supply, particularly artillery ammunition, is normally the greatest concern for OPFOR logisticians. It may amount to over half the total tonnage—depending, of course, on the type of combat and the degree of resistance. Getting the right number of the right caliber and type of rounds to the right place at the right time is a challenging task. It involves not only accumulating the necessary amount of ammunition, but also moving it.

[1] Each artillery commander sends a report every 12 hours on ammunition status via artillery channels to the next higher level.

Artillery ammunition is the major category in terms of bulk. Tank ammunition normally requires between half and one-third of the transport assets required for artillery. Small arms and air defense ammunition, mines, explosives, and other ammunition have weight requirements almost infinitesimal compared with that of artillery and tank ammunition combined.

Planning

At brigade level and above, ammunition supply is the responsibility of the ammunition officer on the staff of the chief of missile and artillery armament services, who in turn is under the deputy commander for armament. The ammunition officer or his staff calculates expected usage of all types of ammunition. He orders appropriate amounts by type and keeps a running account of the amounts on hand in units and in depot stocks. The deputy commander for the rear (chief of logistics) integrates the ammunition order into his supply transport plan. He allocates transportation assets to move ammunition between depots and user units. Materiel support units under the control of the deputy commander for the rear are responsible for transporting the ammunition.

In preparation for battle and during combat, unit commanders assess their requirements for ammunition, compare that with the ammunition on hand, and determine how much additional ammunition they need. At battalion level and above, there is a deputy commander for armament to assist in consolidating these requirements, passing them up the logistics chain of command, and distributing the resulting allocations of ammunition according to requirements and the commander's priorities.

At brigade and above, the chief of artillery and chief of air defense calculate their branch-specific requirements and pass them to the chief of missile and artillery armament services or his ammunition officer. The chief of missile and artillery armament services then designates ammunition depots to supply the ammunition and coordinates its delivery with the deputy commander for the rear and the recipient units. See Figures 15-2, 15-3, and 15-4 for information on locations of ammunition supply points and depots in the offense or defense.

Unit of Fire

To facilitate logistics planning and standardize ordering and issuing procedures, planners at all levels use a common unit of measure called ***units of fire (UOFs)***. These standard accounting units provide them a shorthand method that simplifies calculations dealing with the supply, allocation, and expenditure of large amounts of ammunition. They can express stockage levels, requests for resupply, and mission allocations in these simplified, but readily understandable terms. They express such gross calculations in terms of organizational UOFs, which are multiples of the UOF established by norm for the weapons within a particular organization. For more information and examples of the use of this methodology, see Chapter 7, Artillery Support.

Weapon UOF. The basis for this methodology is the ***weapon UOF***. This is a fixed quantity, expressed in number of rounds, of ammunition of a particular type associated with a weapon or combat vehicle that uses that type of ammunition. The weapon UOF serves as the standard unit of issue for a single weapon (such as a rifle, machinegun, grenade launcher, ATGM, SAM, antiaircraft gun, mortar, or artillery piece) or for a combat vehicle (such as an IFV, APC, or tank). However, that does not mean that the system always receives one UOF. This rather arbitrary number may or may not be related to the ammunition-carrying capacity of the weapon or vehicle or associated means of transport.[2] It is not an authorized allowance or a daily expenditure rate.

Directives from the MOD establish the number of rounds in a particular weapon UOF based on tactical employment, technical characteristics, and combat experience. Once the MOD has established such a norm, it rarely has reason to change it. Depending on the type of weapon involved, the number of rounds can vary from 4 rounds for a manpack ATGM to 2,500 rounds for a machinegun. Except for some of the smaller UOFs, the numbers are generally multiples of 10 or 100, chosen for ease in carrying out certain planning calculations.

Weapon Caliber and Type	Number of Rounds in UOF
82-mm Mortars	120
120-mm Mortars	80
122-mm Howitzers	80
130-mm Guns	70
152-mm Guns/Howitzers	60
160-mm Mortars	60
203-mm Guns	40
240-mm Mortars	40

Figure 15-7. Units of fire of Frag-HE ammunition for selected artillery weapons.

The examples of artillery UOFs in Figure 15-7 are for fragmentation high-explosive (Frag-HE) rounds only.[3] These examples show that, for artillery ammunition, the number of rounds per UOF generally decreases as the caliber of the round increases. This decrease is not necessarily due to the relative weight and volume of the rounds. Rather, the number chosen for the norm seems to correspond somewhat to relative effectiveness of the different-caliber Frag-HE rounds against certain targets, although not in direct proportion. However, this relationship does not hold true for UOFs of other types of weapons in relation to artillery weapons.

Artillery systems seem to have the greatest variety of types of rounds for a given caliber system, including many special-purpose types. Therefore, it is unlikely that a UOF for a particular artillery weapon, by caliber, would contain more than one type of round. Normally, ammunition supply points issue Frag-HE shells for artillery. The basic UOF does not include special rounds, such as smoke, illuminating, concrete-piercing, incendiary, leaflet, or laser-guided projectiles.

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[2] The OPFOR uses the term ***combat load*** for the number and types of rounds carried on board a system or its prime mover. In some cases, the combat load also includes rounds carried on organic transport vehicles in the firing unit.

[3] Other types of rounds for the same artillery weapons may come in their own UOFs (possibly differing in number of rounds from the UOF for Frag-HE), in sets of rounds, or by individual rounds. Units must put in special requests for special rounds, and they receive their allocations of such rounds in separate lots.

For tank ammunition, where the mix of rounds required would depend on the mission, a mix of round types within a UOF is also unlikely. Thus, for example, a tank battalion (TBN) could receive some UOFs of high-explosive (HE) rounds and some separate UOFs of high-explosive antitank (HEAT) rounds. Personnel at the TBN's ammunition supply point would unpack and sort both lots and load tanks with some rounds out of each, based on expected mission requirements.

For some other types of weapons, however, there are cases where a single UOF can contain a standard mix of rounds of different ammunition types for the same weapon or weapon system. For example, ammunition for a particular caliber of antiaircraft gun might come in belts with a standard mix of HE and armor-piercing rounds.

For artillery ammunition, the number of rounds in a UOF depends on the ammunition itself, rather than the specific system that fires it. For example, the weapon UOF for 152-mm Frag-HE ammunition is always 60 rounds regardless of the specific model of system, whether it is a gun or a howitzer, or whether it is self-propelled or towed.

For weapons other than artillery, there may be different-size UOFs for the same type and caliber of round when fired from a different weapon. For example, there can be different UOFs when an IFV and an attack helicopter can fire the same round. Such differences could also occur when a rifle and a machinegun use a common small-arms round.

Organizational UOF. To further facilitate calculations, planners aggregate the UOFs of individual weapons into an overall UOF for the unit to which those weapons belong. An ***organizational UOF*** relates to the total quantity of ammunition for all weapons in a given unit that use a particular type of ammunition. This quantity represents the weapon UOF multiplied by the total number of weapons in the unit that use this ammunition (by caliber and type). The same unit would also have organizational UOFs of various sizes for all the other ammunition types expected to be used by the total number of weapons of all types present in that unit.

For example, a battery of six 120-mm mortars would have a battery UOF of 480 Frag-HE rounds (6 x 80). An MIBN with one such battery would also have a battalion UOF of 480 rounds for that type of ammunition. A mechanized infantry brigade (MIBR) with three MIBNs would have a brigade UOF of 1,440 Frag-HE rounds (3 x 480) for its 120-mm mortars.

Artillery planners use organizational UOFs for requesting ammunition and allocating it to subordinates. At brigade level and above, combat orders and fire plans often specify the expected ammunition expenditure in organizational UOFs or fractions of UOFs for a particular battle or phase of battle. However, fire plans for artillery battalions and batteries normally convert the UOFs back into rounds.

Logisticians, on the other hand, are more likely to convert organizational UOFs into the number of metric tons to be moved or held in mobile stocks. Their calculations normally involve the weight of the UOF, including packaging, since this is a key factor for transport planning. They use organizational UOFs to determine ammunition stockage and transportation requirements at various levels in the logistics chain.

In the most general sense, a division UOF would amount to a standard package of ammunition for all the types of weapons found in a division. If historical norms show that a division would need 3 UOFs a day for its part in a particular type of operation, the army would start planning to move forward 3 sets of everything a division needs, in order to replenish the division's stocks as they are depleted.

The organizational UOF starts out as a gross calculation at the highest levels, where logisticians would not be concerned with which particular system fires a particular round. At some point, ammunition gets broken down into what goes to a rifle and what goes to a machinegun of the same caliber, but it does not originally come that way. When it gets down to where ammunition is delivered to the users, usually at a battalion- or company-level ammunition supply point, then it gets divided up into smaller quantities according to specific user requirements.

Multiples or fractions of organizational UOFs are the means of expressing ammunition stockage levels, actual expenditures, and requirements for resupply. The same terms are used to define mission allocations.

Mission allocation. A ***mission allocation*** is the actual number of rounds (expressed in organizational UOFs) allocated to a unit for mission accomplishment. It is a multiple (or fraction) of the organizational UOF allocated to a particular unit based on its mission and the enemy situation. This mission allocation includes the amount of ammunition carried by the unit (combat load) and transported by unit trains; it may also include some ammunition to be delivered from mobile stocks or depots at the next higher headquarters.

Planners assign subordinates a mission allocation for weapons before each major battle or phase of battle. The number of UOFs allocated varies with the unit's mission, the enemy situation, and the availability of ammunition. During a particular combat action, different units, even of the same type, having different missions could receive different multiples or fractions of the organizational UOF as their mission allocation.

If various munition types are available or required for a particular mission, the mission allocation would specify how many UOFs of each type are allocated. For example, an artillery regiment might have 2.0 organizational UOFs of Frag-HE rounds for its artillery weapons, 0.5 UOF for its small arms, and 1.5 UOFs for its air defense weapons. A reinforced MIBN in the attack might have 2.0 UOFs for its organic mortars and attached artillery, but 1.0 UOF for its IFVs and attached tanks, 1.5 UOFs for manpack ATGMs, 0.6 UOF for small arms, and 2.0 UOFs for its air defense weapons.

Division

Within a division, the officers with responsibility in specific areas consolidate all ammunition requirements. The division chief of artillery, the chief of missile and artillery armament services, and the deputy commander for armament have varying degrees of responsibility for artillery and individual (small arms) weapons, plus ammunition resupply of weapons. For example, the division ammunition officer, on the staff of the chief of missile and artillery armament services, consolidates the requests for machinegun ammunition for all the brigades and presents a consolidated requisition to the deputy commander for the rear. The deputy commander for the rear ensures that needs are fulfilled.

Requirements. For simple planning purposes, each division transports enough ammunition (and other supplies) to sustain it for 3 to 5 days of normal combat. This load is divided between the firing units and the brigade and divisional materiel transport units. The quantities involved are a very rough estimate based on expenditure norms for an "average" battle against an "average" enemy. These estimates, by their very nature, are very approximate. They are "grossed out" for an average for each phase as part of an approximate overall requirement for a 12- to 15-day operation. This very rough estimate gives only a general idea of the scale of the logistics effort needed.

The exact requirements would vary considerably depending on the exact structure of the division (with reinforcements), the nature of the enemy defense or attack, the terrain, and the degree of surprise. Once these conditions are known, planners would work out the requirements in greater detail according to standard calculations and norms to determine how much ammunition a division should expend by each weapon type over a given period of time for a given type of combat. In the offense, ammunition expenditure rates are highest during the preparation and support of the attack phases. Rates generally fall as artillery advances into the depth of the enemy position.

However, these standard criteria are still for planning purposes only, and there is no way to predict actual ammunition expenditure. In combat, ammunition is replenished according to need. Thus, a division commander may disagree with his ammunition allocation for cause, provided that the disagreement is of a manageable order of magnitude. For example, a division commander may request a 5-percent increase in rifle ammunition, but not a 200-percent increase.

A division concentrates ammunition support on main axes. It accomplishes this through central control, coordination, and integration of transportation assets into the logistics plan, and by tasking army group and army with major resupply requirements.

Delivery. In anticipation of a particular action (such as artillery preparation for the attack against a defending enemy), the division's chief of artillery computes the number of UOFs to be expended, and has this additional ammunition transported forward prior to the commencement of firing. To facilitate the movement of this ammunition, ammunition transfer points normally are established for each division or brigade artillery group (DAG or BRAG). Under normal circumstances, an artillery battalion can send its ammunition vehicles to this point to pick up ammunition and deliver it to the firing units. However, artillery battalion transport usually can carry only the mobile stocks. When required, division or artillery regiment/brigade transport can deliver ammunition directly to the battalion.

About 50 percent of the trucks, 67 percent of the trailers, and 60 percent of the total payload capacity of the general-purpose transport vehicles in a division are typically dedicated to ammunition transport. This includes the ammunition transport vehicles in mechanized infantry, tank, and artillery units within the division. The number of vehicles varies with the type of unit being resupplied, because the OPFOR wants each combat unit to transport an established amount of ammunition in terms of UOFs. Weights and volumes of the different types of ammunition required by different combat units result in varying transport vehicle requirements.

Supplementary reserves. Sometimes, artillery planners are not able to determine the expected ammunition expenditure in detail until shortly before an offensive or defensive action. Furthermore, they amend the fire plan during the course of combat. They may prepare two alternative variants of the fire plan (for the preparation and support of the attack phases), which could have widely differing ammunition requirements. Expenditure during these phases often exceeds the mobile stocks, and any increased requirements are bound to exceed mobile stocks. This makes it necessary to create supplementary reserves.

The establishment of supplementary reserves is crucial for phases of combat where ammunition expenditure is particularly intensive, such as—

- The penetration of strong, well-prepared defense.
- The commitment of a second echelon or CAR.
- The repelling of a divisional or brigade counterattack.

On these occasions, units can fire off their total expendable ammunition (mobile stocks, except for an emergency reserve) very quickly. Thus, in anticipation of or at the very start of these phases of battle, it is important to deliver additional ammunition.

In order to maintain mobile stocks on the transport of lower-level units, skip-echelon resupply is practiced wherever possible. Thus, for instance, army group materiel support elements, where they can, bypass the army rear and deliver directly to division, or army transport may deliver a supplementary reserve of ammunition for an artillery preparation to the division's artillery regiment or even on the battalion or battery firing positions. This procedure speeds up the operation of the system by avoiding time-consuming transloading.

Ideally, there is time for army transport to deliver ammunition to division artillery regiments before the attack. This can create a supplementary reserve (for the preparation) and allow the division to preserve its own mobile stocks intact. In the event of a more hurried attack, divisional transport may deliver the rounds direct to the firing positions (preserving the regiment's mobile stocks) and be resupplied from army later.

When the supplementary reserves exceed the transport capacity of the receiving unit, one possibility is for the delivering transport to offload ammunition at the primary and alternate firing positions. This method can be used for towed cannon units or for any unit when the ammunition will be consumed prior to departure (such as during the preparation). Thus, when the guns have completed their mission and move, they can do so with full mobile stocks and do not need additional deliveries at this hectic time.

However, ammunition stockpiled at an artillery firing position may have to be left there when the guns move, because artillery battalion transport usually can carry only the mobile stocks. In this case, the battalion should request brigade transport from the ammunition supply point, but that may not be available. Therefore, it is advisable to allocate more vehicles to artillery units in support of an attack in order to cover this eventuality.

To the maximum extent practical, the ammunition remains loaded on transport vehicles in order to keep it mobile. The threat of enemy counterfire, particularly with precision weapons, has made it inadvisable to create large ammunition stockpiles at artillery firing positions by stacking them on the ground. To avoid transloading or stockpiling ammunition on the ground, the drivers from the delivering materiel support unit can drop off loaded trucks and trailers and return to the ammunition supply point with empty trucks and trailers. Another possibility is for the transport assets of the delivering unit to remain attached to the receiving unit in order to keep supplementary reserves mobile.

Brigade

As with the division, the officers with responsibility in specific areas consolidate all ammunition requirements. For example, the ammunition officer on the staff of an MIBR's chief of missile and artillery armaments collects the brigade's machinegun ammunition requirements and forwards them to his counterpart at division.

As a rule, division or army transport delivers ammunition to the brigade ammunition supply point, and brigade transport moves it from there to the firing positions. The division or army may deliver it directly to the firing positions if the tactical situation permits, thus avoiding unnecessary transloading. On occasion, however, the artillery battalion transport returns to the brigade ammunition supply point to collect ammunition.

Shells are delivered to the firing positions fully prepared and armed, but packed in batches. Planners must allow time for their unpacking from pallets, sorting, degreasing, and stacking. Thus, plans for ammunition delivery start as soon as artillery reconnaissance patrols identify firing positions, and delivery begins when these positions are confirmed, if this can be done safely and without jeopardy to security. Ideally, it should be completed an hour before the guns are due to fire.

When a brigade receives additional artillery battalions attached from division to form a BRAG, this can create a burden for brigade supply assets. For example, the brigade chief of missile and artillery armament services may learn from the brigade commander's order that the battle plan calls for the commitment of the brigade's second echelon—an MIBN supported by two artillery battalions. From the artillery commander, he learns that the fire plan calls for the expected expenditure of 0.3 UOF on fire assaults, 0.2 UOF on fire concentrations, and a further 0.1 to 0.2 UOF on targets of opportunity before taking up subsequent positions. A quick calculation shows the requirement for delivery of 0.6 to 0.7 UOF in order to maintain mobile stocks. He determines that brigade transport can deliver 0.5 UOF and issues orders for that amount. Brigade transport moves the 0.5 UOF of ammunition from the brigade ammunition supply point to the firing positions and offloads it. This creates a supplementary reserve with the guns (stockpiled and not movable by the artillery unit transport). The brigade transport trucks return to the ammunition supply point and could deliver the remaining 0.1 to 0.2 UOF required, if time permits.

If the brigade is fortunate, it receives additional ammunition transport from the materiel support company of the artillery regiment or brigade that provided the extra artillery battalions for the BRAG. This dedicated transport may enable the brigade to keep all the required ammunition mobile, rather than offloading it.

Battalion

Battalion commanders determine the sites for battalion ammunition supply points and inform their subordinate companies (or batteries). They also inform the brigade's deputy commander for the rear of these locations for deliveries by brigade transport. During movement forward, brigade transport may deliver ammunition to a designated line or site before the battalion arrives there.

In preparation for offensive action, the brigade tries to bring battalion ammunition up to its authorized norms for stockage levels and may create supplementary reserves. The battalion transfers all stocks not needed for combat to the rear for evacuation by brigade resources. During the course of the attack, the battalion may receive ammunition resupply when it reaches a designated line, possibly after completing its immediate or subsequent mission.

In an MIBN in the offense, for example, one company commander might report to the battalion commander that his unit needs 0.6 UOF for small arms, 0.5 UOF for an IFV, and 0.7 UOF of hand grenades. The battalion commander or deputy commander for the rear would then instruct the chief of the battalion ammunition supply point to comply with the company commander's request. Later during the course of the battle, the battalion ammunition supply point might receive additional mortar ammunition. Then the chief of the ammunition supply point would dispatch a truckload of ammunition to the mortar battery and order the remaining ammunition to be reloaded onto battalion transport.

Resupply of artillery in forward detachments and advance guards can be difficult. Therefore, a battalion in this role can be allocated additional trucks and trailers filled with extra ammunition as a supplementary reserve.

Company

Before the start of combat, brigade transport delivers supplies, including ammunition, directly to the companies. In the course of combat, brigade and battalion transport can bring ammunition directly to the companies in their battle formations.

In the defense, a battalion often sets up ammunition supply points in subordinate companies. When established, such a point may be at the rear of the company strongpoint, up to 1 km from the forward edge. However, it can be as close as 100 to 150 m if there is sufficient cover. It may deliver ammunition to tank and IFV/APC firing positions. After the subordinates repel an enemy attack, the battalion immediately replenishes their ammunition supplies.

Petroleum, Oils, and Lubricants

Fuels and lubricants are second only to ammunition in resupply priority. During some situations, such as a pursuit, POL becomes the number one supply priority. Fuel may constitute over 50 percent by weight of all supplies moved during an offensive action.

Refills

Computation of fuel requirements is based on ***refills***. A unit's refill is the total requirement for all vehicles in the unit. For tracked vehicles, one refill is that amount carried aboard in internal fuel tanks. For wheeled vehicles, one refill is equivalent to the fuel required for a 500-km range. A division typically starts with 3 refills, one in the vehicles themselves, one in brigade-level, and one in division-level transport.

Supply and Distribution

Supplies of POL are moved in bulk, mainly by rail and pipeline, from the strategic rear into the army group rear area and by road, rail. From there, they move by pipeline into the army rear area, where depots are established (or where existing depots are replenished). In the army rear, the materiel is sorted and either dispatched to division and below by trucks or dispersed in tactical depots for the replenishment of reinforcements (or second-echelon forces) before their commitment to battle. Occasionally, tactical pipelines may deliver fuel as far forward as division rear areas. Armies can establish forward bases near division rear boundaries when the distance between army depots and first-echelon divisions exceeds 100 km.

Army, division, or brigade POL trucks may deliver fuel to battalion POL supply points or directly to vehicles. (See Figures 15-2, 15-3, and 15-4 for information on locations of POL supply points and depots in the offense or defense.) Units on the move refuel their vehicles during rest halts, probably from POL trucks and trailers. Wheeled vehicles may refuel from cans carried on board.

If there is a shortage of specialized POL trucks and trailers, then general-purpose, close-sided cargo trucks are adapted for the transportation of bulk portable collapsible containers and portable steel containers. Using cargo trucks for fuel transport permits the OPFOR to transport POL products without having to rely on the availability of standard POL trucks. These cargo trucks can often carry greater volumes of fuel than standard POL trucks, because a larger percentage of the payload capacity is devoted to fuel rather than tank structures and pumping equipment.

At times of great crisis, fuel can be delivered by helicopter in barrels or rubber reservoirs, slung in nets underneath. Delivery to bridgeheads, where towing fuel in drums and reservoirs across the water obstacle is impractical, can be accomplished in this way, although the helicopter survival rate may not be high.

Division and Brigade

Divisions carry a 3- to 5-day mobile stock of fuel. Mechanized infantry and tank divisions usually carry sufficient reserves to refuel their units twice. In brigades, the chief of POL supply—subordinate to the brigade deputy commander for the rear—forwards POL requests to his division-level counterpart through the rear staff.

Divisions and brigades have a large inventory of POL trucks designed for short-term storage and transport of fuel. These trucks often tow POL trailers of equal or near-equal capacity. Units can also use drums and cans for supply.

At division level, replenishment depots are set up at convenient road junctions, but supplies are kept on the vehicles when possible. POL can be dumped in rubber reservoirs, although this is not as widespread at division level as it is at army level. This depot is under the command of the division chief of POL supply. Usually, division supply points are well dispersed.

Battalion and Company

At battalion level, the supply and service platoon leader is responsible for receipt, storage, and delivery of supplies to companies. He deploys and oversees the battalion POL supply point.

The OPFOR has established several sizes of field refueling points to expedite refueling in the field. They vary according to the required usage determined for that point. One type is a self-contained system capable of refueling 20 or 30 combat vehicles (tanks, IFVs, or APCs) simultaneously. This system is carried in either a trailer or a truck traveling with the POL truck in the unit column. An MIBN or TBN commander can simultaneously refuel all the combat vehicles in two first-echelon companies (possibly with reinforcing tanks or IFVs) and send them on while the third company is refueling.

In the forward area, refueling can occur in three ways. The combat vehicles can go to a forward (brigade or division) POL supply point; POL trucks and trailers can take the fuel directly to the combat vehicles in battle formations; or a combination of both methods can be used. To reduce demand, vehicles carry as much extra fuel as possible in spare drums (jettisoned in action) or external cans mounted on the vehicles.

Rations

Rations are another major consumable commodity transported within a division, along with ammunition and POL. However, ammunition and fuel resupply can comprise 80 percent or more of total transportation requirements, and even spare parts typically have a higher priority than food. Thus, rations often fall into the category of nonessential supplies, and transport units may not deliver food if it reduces their ability to provide essential combat supplies. This is particularly the case when units can obtain food by foraging.

Daily Rations

Logistics planners determine food requirements according to a ***daily ration*** issued per individual, based on three meals per man per day. The daily ration per soldier multiplied by the number of soldiers in a given unit equals a daily ration for that unit. Staff planners at the MOD develop norms for a day's supply of rations, based primarily on expenditure of energy for caloric requirements of personnel. Basic ration norms determine the amount of food products issued to feed one man for a 24-hour period. Dry rations are issued on the basis of 1 kg per man per day, while fresh rations are based on 2 kg per man per day.

In addition to the basic norms, there are supplemental norms that determine the amount of rations to be issued in excess of the basic ration norms under special conditions. They are based on conditions under which the men are serving or the nature of their service.

Supply and Distribution

Food service equipment reflects the great emphasis on battlefield mobility. Highly mobile field kitchens and bakeries can keep up with the tank and mechanized infantry units they support. (See Figures 15-2, 15-3, and 15-4 for information on locations of ration supply points in the offense or defense.) A variety of trailer-, truck-, and track-mounted kitchens are used to prepare field rations.

The common characteristic of these kitchens is that they can all cook and warm foods while moving. Even single-axle field kitchen trailers have sealed cooking chambers and covered food preparation areas that offer protection for the food against dirt, dust, and possible NBC contamination while moving through the battlefield. The truck-mounted field kitchens also offer a protected work area for the cooks.

Division and Brigade

A division normally maintains uploaded ration stocks sufficient for 5 to 6 days: 3 days' rations at battalion, 2 at brigade, and 1 or 2 at division level. As with POL, exploitation of local, civilian resources may supplement food supplies to a considerable degree. At all levels down through brigade, the chief of food supply under the deputy commander for the rear is responsible for the receipt, storage, and delivery of rations to subordinates.

Battalion and Company

At battalion level, the supply and service platoon leader is responsible. He deploys and oversees the battalion ration supply point. The battalion ration supply point delivers meals to subordinate units. In the defense, the battalion can also establish company ration supply points. Even in the offense, however, a TC or an artillery battery attached to an MIBN would normally receive meals from the ration supply points of their respective parent units. Reinforcements of platoon or squad size receive rations from the battalion or company they reinforce.

When a company ration supply point is established, the battalion supply and service platoon sends a truck- or trailer-mounted field kitchen to the company's defensive strongpoint. There it is met by a guide who directs it to the selected point, usually near the rearmost defensive position in the strongpoint. The company first sergeant organizes the issue of food by bearers assigned from the platoons. An attached artillery battery, as a rule, receives rations from the artillery battalion's ration supply point. Other reinforcements are normally fed together with company personnel.

Clothing

At all levels down through brigade, there is a chief of clothing and equipment supply under the deputy commander for the rear. However, clothing supply has a very low priority during combat, except perhaps for cases of NBC contamination. Soldiers receive military clothing at the time of induction. Supplementary clothing, including field clothing, is issued after they have arrived at their unit. Subsequent reissues occur at specified intervals and come from the division depot.

Water Supply

Engineers, in cooperation with the medical service, plan water supply in the field. When time permits, they draw up a water supply plan, which includes a survey, a water supply chart, and a work schedule. The survey, based on terrain study and engineer reconnaissance, establishes the location of existing water resources in the expected zone of action. The water supply chart indicates which wells or springs to use, where to dig new wells, and how to deploy water supply points. The work schedule designates water supply points and the soldiers assigned to them. The schedule also shows daily water requirements, transportation requirements for hauling the water, and equipment for handling it. For areas where water sources are few or widely scattered, the planners compute the difference between daily requirements and the expected local supply to determine the amount of transportation needed. Then, they must coordinate with the unit's deputy commander for the rear to arrange for transport.

Consumption Norms

As with other types of supplies, the OPFOR has established consumption norms for water. The normal rate of water consumption per person is about 8 liters per day in cold weather, 10 liters per day in moderate climate, or 15 liters per day in hot climate. This includes water for drinking (2.5 to 4 liters), plus food preparation, mess kit hygiene, and personal hygiene. Under restricted water conditions, a reduced daily allowance may eliminate use of water except for drinking and cooking. This reduced allowance can be about 3 liters per day (for no more than 5 days) in moderate climate or 5 liters per day (for no more than 3 days) in hot climate.

Thus, a division with about 15,000 men could require about 150,000 to 225,000 liters per day just for personal consumption. Sanitation requirements (such as showers and waste disposal) for such a division could be up to another 675,000 liters per day (45 liters per person).

Vehicles also require water for topping off vehicle coolant. They may receive this water during refueling or from portable reserves, as necessary. On the average, a wheeled vehicle requires about 1.5 liters per day, and a tracked vehicle about 8 liters.

A battalion medical point can require a daily water supply of 300 to 500 liters when dealing with wounded and sick during battle. Water requirements for equipment decontamination tasks range from half a liter for cleaning an assault rifle with a damp cloth to 600 to 1,000 liters to decontaminate a vehicle with a water jet. Decontamination using standard decontamination trucks and trailers can require about 70 liters for a wheeled vehicle, 100 liters for a tracked vehicle, or 40 to 60 liters for an artillery piece.

Supply and Distribution

Water supply points are one of the main elements for the system of supplying water to the forces. A brigade almost always has a water supply point, even if it has to rely on imported water. A mechanized infantry, tank, or artillery battalion or a logistics unit can set up a water supply point. Units unable to establish water supply points can have water distribution points that rely on transportation of water from higher levels. Even at the lowest levels, units carry portable water reserves for use until replenishment is available.

Water supply point. A water supply point is a prepared location with a water source, equipped for the organized supply of water to units. The extraction, purification (if required), storage, and distribution of water occur there. As a rule, it is set up at a source of underground water (well or spring) and sometimes sources of surface water (river, lake, or pond).

Water distribution point. When a unit has no water source within its deployment or assembly area, it establishes a water distribution point. The senior commander's water supply point supplies water for transport to the water distribution points of organic and attached units.

Transportation. The delivery of water from the brigade water supply point to the battalion water distribution point takes place in accordance with the instructions and means available to the brigade deputy commander for the rear. The delivery from the battalion water distribution point to the using unit is carried out in accordance with the instructions of the battalion chief of staff or deputy commander for the rear. It uses transport available in the battalion and assigned transport. Depending on the distance of unit deployment areas from the water supply point, units can be supplied with water by the use of standard or readily available vehicular and manual containers, including canisters, thermoses, and canteens.

Portable water reserves. Units on the move carry with them portable water reserves in all available containers and vehicles. Aside from personal canteens and other small containers, the unit can use mobile field kitchens or water trucks and trailers to carry water. The unit most often must replenish these reserves from a water supply point or distribution point established by the senior commander, unless the unit locates its own water source.

Preparation for Combat

Organic engineer units or other soldiers under the direction of the local commander set up water supply points during preparation for a march or battle. These points are at the source of water with prepared access routes.

During highly mobile combat, the time for setting up water supply points is very limited. Therefore, the main effort should concentrate on the use of sources such as existing wells, springs, and even water hydrants of existing water networks. Units should take surface water from rivers, lakes, and ponds only when there are no other sources. Especially in territory abandoned by the enemy, the use of water for drinking and food preparation from any sources is allowed only after its inspection by representatives of the medical service.

Engineers. In dry regions, when water is deep underground, or when the source is very contaminated, engineer units are the ones responsible for setting up the water supply point. The combined arms commander may assign a combat arms unit to assist the engineer unit.

Engineer units, assisted by combat arms personnel, prepare water supply points when drilling and purification are required. They can establish water supply points using tube wells in unit positions (wide spots in fighting and communication trenches in the defense). They erect one or two storage tanks in individual trench recesses near the tube wells. They can establish water supply points using small, excavated wells in unit deployment and assembly areas or deep in defensive areas. They also set up tanks for storage of water reserves at water distribution points.

When setting up a water supply point, engineers prepare the site itself, an access road to it, and a place to store water reserves (if necessary). They carry out measures to camouflage the source and protect it from weapons. They also create a zone of sanitary protection in a radius of up to 100 m from the water source and allocate units to service and guard the point.

Battalions. The type and number of water supply points in an MIBN, TBN, or artillery battalion depends on the type of combat and the state of water supply in the area. Given plentiful water sources at a significant distance from the enemy, there may be a water supply point at battalion level and one in each company or battery. In dry terrain, a battalion may have only one water supply point in its deployment or assembly area, with water distribution points in each company. For a battalion or battalion subordinate deployed in an area with no water sources (or only deep underground sources), the battalion or subordinate units would have water distribution points supplied with water from the senior commander's water supply point.

The battalion water supply point usually is near the battalion ration supply point. This water supply point supplies the water distribution points of organic and attached units, including the battalion medical point.

Within a battalion, the platoon leader of the ***supply and service platoon*** organizes water supply of subordinate units, based on the commander's decision. Depending on the nature of the terrain and the state of water supply in the area, he uses information from engineer reconnaissance to identify suitable sites for water supply points in the battalion and determines the most expedient use of the standard water supply equipment available to the battalion.

The supply and service platoon, or any other platoon, reinforced by an engineer squad, can set up a water supply point at a spring or existing well in one hour. The same platoon and reinforcing engineer squad can prepare a water supply point by creating a shaft well in 10 hours in average conditions (shallow underground water). Such a platoon can also set up a water supply point at a surface source of water. After equipping the water supply point, the platoon leader organizes its maintenance. This includes servicing the area and access route, manning observation posts and traffic control checkpoints, and providing security of the water supply point.

When a battalion occupies a defensive area or an assembly area for an attack, each subordinate MIC, TC, or artillery battery can independently establish a simple water supply point (at springs or existing wells requiring little or no purification). After equipping the point, company/battery personnel carefully camouflage it and set up a guard.

During Combat

In the short time available during battle or on the march, the primary tasks of water supply are advance reconnaissance and detection of water sources, the creation of a water supply and reserves in subordinate units, and the transportation of water from the senior commander's water supply points. However, if these normal sources are not available, engineers are well prepared to drill for water or operate mobile water purification plants.

March. Before the start of a march, an MIBN can have a portable reserve of potable water of up to 8 cubic meters, which is 1 to 1.5 times its daily requirement. As the unit consumes this reserve during the march, it is replenished from reconnoitered and equipped water supply points, existing shaft wells, and other checked sources or water located on the march route or near it. When possible, halt areas include water supply points for replenishing portable water reserves.

Offense. During the offense, the unit commander first uses the portable water reserves. Replenishment of these supplies comes from water supply points created by the senior commander or from water distribution points created in the subordinate units. Replenishment most often occurs at positions or phase lines where the units have completed their combat missions.

Defense. In defensive battle, a water supply point is usually established in the battalion defensive area and possibly in company strongpoints. These points can be in widened trenches or communication trenches where excavating a small well can access a shallow water table. The supply and service platoon and other units fill mobile field kitchens and other portable containers with water from the well to create portable water reserves. Subordinate units usually replenish their water reserves from the senior commander's water supply points.

Transportation

At all levels of command, the deputy commander for the rear is responsible for the movement of supplies to troop units and for the evacuation of casualties and damaged equipment. At the strategic level, the OPFOR transportation services include traffic management, railroad operations, railroad maintenance and construction, highway construction and maintenance, highway regulation, and operation of all transport modes including pipelines.[4]

[4] Railroad troops, administered by the Central Military Transportation Directorate of the MOD, are responsible for the construction, maintenance, and operation of railways in a given theater. This directorate plans and supervises military movements by rail and water. Air movements are coordinated with Military Transport Aviation for long-range lifts and with air transport units at army group level for tactical lifts. Movement via the inland waterways is coordinated with the appropriate agency of the civilian Ministry of Transportation.

An army group receives its supplies from national storage depots or, in some cases, directly from the industrial production line or import source. Bulk supplies move by rail and pipeline and also by road from the strategic rear into the operational rear, where army groups and armies establish or replenish large depots. Army groups and armies send fuel into the tactical rear by POL trucks and trailers or occasionally by pipeline. Alternatively, they can hold it in fuel depots to replenish their second-echelon or CAR forces before committing them.

The army group delivers the items directly to army depots. In turn, army delivers supplies to supported divisions or separate brigades, and the divisions deliver to their brigades. Whenever possible, transport may bypass intermediate levels of command to deliver items directly to the user.

Rail Transport

Where available, railroads are the principal means of transporting military hardware for the initial stages of an operation. During combat, the military rail transport staff of the army group deputy commander for the rear plans and directs rail shipments and movements. An army group often locates its logistics bases near large rail centers. The chief of rail transport at army group level is responsible for dispatch of supplies from rail stations to army logistics bases.

Motor Transport

Motor transport becomes essential as supplies are moved forward from railheads to field depots and combat units. After the relocation of supplies from the strategic rear, the OPFOR distributes them within army groups primarily by truck. Within an army group, the heaviest truck transport requirements are above division.

Under the control of the deputy commander for the rear at each level, motor transport resources are centralized for operational and tactical employment, especially in the pre-offensive buildup period and for resupply of advancing columns. This centralized control facilitates the diversion of motor transport assets of second-echelon forces to support those units engaged in the main effort when necessary.

Assets. Extensive use of motor transport begins at army group level. The primary means of delivery below army or corps level is by truck. Transport units are organic to tactical ground forces from division to battalion levels. The normal sizes of the units are as follows:

- Army group, army, or corps: materiel support brigade.
- Division or separate brigade: materiel support battalion.
- Divisional brigade: materiel support company.
- Battalion: motor transport section in the supply and service platoon.

The priority given to the movement of ammunition and POL is reflected by the two ammunition transport companies and two POL transport companies, but only one general cargo transport company, in the material support battalion at division or separate brigade level. In a divisional brigade, the materiel support company has three ammunition and general cargo transport platoons and one POL transport platoon. In most battalion-level supply and service platoons, the cargo trucks slightly outnumber the POL trucks.

The trucks at division and brigade level have all-wheel drive, giving them an off-road capability that is well suited for frontline ammunition delivery. The POL transport companies and platoons have the POL version of the same basic medium trucks used in ammunition and cargo transport units. The POL version typically has a 5,000-liter tank and can tow a trailer with a 4,200-liter tank.[5]

A materiel support battalion also has a cargo transport company. Its normal mission is to deliver items of supply other than ammunition and bulk fuel. Because of the high priority of ammunition supply, however, these general-purpose trucks might also transport ammunition, if necessary. If POL becomes a high priority, they can also carry fuel containers.

Delivery patterns. As a general principle, motor transport units can make supply deliveries down two steps in the chain of command at a time. That is, army group motor transport would be responsible for delivering supplies from army group depots to subordinate armies or corps, and in some cases to divisions. Similarly, army or corps vehicles can deliver not only to the division rear, but also to the brigade rear when the battle permits. The trucks of a divisional material support battalion's motor transport units usually carry materiel down to the divisional maneuver brigades, but can also deliver directly to battalions and, in the case of artillery, often directly to the guns. Trucks from brigade materiel support companies transport supplies down to maneuver and artillery battalions, or perhaps to maneuver companies or artillery batteries.

With or without the "skip-echelon" aspect, the basic principle is for higher units to support lower units through organic transportation means and materiel resources. However, exceptions to this general rule are certainly possible. There are a number of situations in which army or corps motor transport would travel to army group units to pick up materiel or even assist in the relocation of army group logistics assets. Divisions or brigades serving as a second echelon or CAR, and units of specialized engineer, signal, and chemical troops, usually draw their supplies with their own vehicles. Nevertheless, the rule is most often "delivery and support forward," with logistics assets from higher levels directly supporting lower levels or augmenting them through the attachment of resources.

Second-echelon unit logistics elements can support first-echelon units. This practice increases the transport capability for logistics support to the first-echelon brigades and divisions. Logistics bases can be located deeper in the army group or army rear areas. This placement reduces congestion in the main combat area, but requires long lines of communication that could be likely targets for enemy air interdiction strikes.

Being highly mobile, divisions do not create dumps and stockpiles, but maintain mobile stocks as far forward as possible. They set up division supply points at convenient road junctions, as close as possible to the ongoing battle but well dispersed. Critical ammunition and POL supplies remain uploaded on vehicles whenever possible, ready to be sent forward as required. The replenishment depots are under the command of the appropriate branch chief or a functional chief subordinate to the division deputy commander for the rear.

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[5] For airborne units and other units with lower POL requirements, another possible combination is a 4,000-liter POL truck towing a 1,200-liter POL trailer.

If necessary, the division (brigade) motor transport vehicles may travel to the material support unit of the higher-level headquarters to receive supplies. Sometimes, the motor transport assets of the division (brigade) may deliver the material directly to a subordinate brigade (battalion). Ammunition and POL are often supplied by division and brigade transport down to the combat vehicles and into firing positions of artillery and antiaircraft gun units. The same is true of missiles that do not require special transport vehicles.

Some transport units are dedicated to the ammunition transport mission, such as the two ammunition transport companies in the division materiel support battalion. Trucks not dedicated to ammunition transport may carry supplies such as rations, construction materials, and POL products not carried in specialized POL vehicles. Each truck can tow a trailer of nearly equal capacity.

A major strength of OPFOR transport is the great quantity and extensive use of trailers. Loaded trailers are pulled forward to fighting units and exchanged for empty trailers. The empty trailers are returned to rear logistics bases for reloading. In this manner, fighting units maintain maximum quantities of critical supplies such as ammunition and fuel.

To keep stocks mobile, and to avoid transloading or stockpiling ammunition on the ground, drivers from materiel support units can drop off loaded trucks and trailers and return to the ammunition supply point with empty trucks and trailers. Empty vehicles that are returning after delivery of supplies can be used for the evacuation of the wounded and sick, as well as removal of damaged armaments, personal gear, and combat hardware that is to be evacuated.

Supply and evacuation routes. Within their areas of responsibility, divisions and brigades establish and improve supply and evacuation routes, using the network of military roads. Routes are usually as follows:

- Divisional routes: from the division's materiel support battalion deployment area to the deployment areas of the brigades' materiel support companies, artillery battalion firing position areas (or battery firing positions) of the DAG (and perhaps BRAGs), and the brigades' medical points.
- Brigade routes: from the brigade's materiel support company deployment area to the deployment areas of battalion-level supply and service platoons, firing position areas (or firing positions) of the BRAG and artillery attached to maneuver battalions, and battalion medical points.

The division (brigade) deputy commander for the rear, together with the division (brigade) chief of engineers, is responsible for the improvement of supply and evacuation routes and their maintenance in passable condition.

Road service units at army group and army levels are subordinate to the Chief of the Main Motor Transport Directorate under the Chief of Logistics at MOD level. Employed on an area basis, these units are responsible for the upkeep of supply and evacuation routes. At division and brigade levels, organic engineer elements perform road maintenance. Movement is controlled by traffic regulator elements at all levels of command.

Air Transport

The highest percentages of supply movement to and within an army group is by rail and motor transport, respectively. Aerial supply and resupply is subject to priorities established by the Supreme High Command, which controls Military Transport Aviation at the strategic level, and by the army group commander, who controls army group aviation assets. Army aviation has some medium helicopters that could transport supplies on a small scale. However, the role of any of these assets in supply and resupply depends on the urgency of need.

Generally, air resupply may be available on a small or moderate scale, only when other methods have failed, when extreme speed is essential, or when high-priority cargo is involved. Air transport may be the only means of getting supplies to units, such as forward detachments, conducting missions independently from the main forces. As another example, air transport may deliver materiel (especially missiles, ammunition, and fuel) to the forces conducting a pursuit, due to the rapid tempo. Examples of high-priority cargo would be precision munitions. Commanders may use helicopters for high-speed delivery of such munitions to selected firing units.

If a unit is to receive materiel by air transport, its deputy commander for the rear organizes the improvement of landing strips or areas for the receipt of the loads, or supplies may be dropped by parachute. He further organizes the unloading of aircraft or helicopters, collection of any airdropped materials, and their delivery to the units. He also can arrange the evacuation of the sick and wounded by the returning flights.

TECHNICAL SUPPORT

Technical support is the process of providing military units with major end items such as combat equipment, weapons, ammunition, and spare parts. It includes the maintenance (including preventive maintenance) of such systems in constant readiness for combat, ensuring their high level of effectiveness. It also involves arranging for the timely evacuation and prompt repair of such major end items, when damaged or disabled, and returning them to service.

Staff Responsibilities

Technical support is the major logistics function that does not fall under the direct control of the deputy commander for the rear at various levels. It begins at the highest level in the main directorates of the MOD; at the tactical level, deputy commanders for armament control this function. Under their direction, and in accordance with their plans, units under the various functional and branch chiefs carry out technical support. For more information on the responsibilities of these key personnel, see the Command and Control section of this chapter.

Deputy Commander for Armament

The division (brigade) deputy commander for armament has directly subordinate to him chiefs of armored vehicle services, motor vehicle services, and missile and artillery armament services. These chiefs plan, organize, and supervise technical support based on his directives, the technical support plan (part of logistics plan), and orders from higher command.

Each chief assumes full responsibility for implementing technical support measures within his own functional area. Collectively, they must—

- Keep a constant count of the number and condition of the armaments, combat vehicles, and other equipment and munitions at units and in storage.
- Inform the deputy commander for armament of the actual count, necessity for resupply (due to consumption and losses) of armaments, vehicles, and munitions.
- Organize the maintenance and repair of armaments and vehicles.
- Control subordinate technical support units and technical support of other units, within their respective functional areas.

For more detail on the technical support plan, see Plans and Orders under Command and Control earlier in this chapter.

The division (brigade) deputy commander for armament is the main organizer of the technical support. Through the functional chiefs subordinate to him, he is responsible for the technical support for missiles, artillery weapons, tanks, and trucks. He coordinates the efforts of other branches and rear support elements for repair of armaments and equipment. He organizes technical reconnaissance and the repair and evacuation of all types of armaments, vehicles, and equipment. He checks regularly the status of technical support and is ready at any time to prepare a recommendation for the commander on its organization and implementation. His directives or orders on questions of technical support are binding for the branch chiefs and for the unit commanders.

Branch Chiefs

Branch chiefs are directly subordinate to the division (brigade) commander or chief of staff. Based on the technical support plan and orders of the corresponding branch chiefs of the higher command, they organize and are responsible for technical support of their branches. They are responsible to inform the commander or chief of staff in a timely manner about the actual situation of the armaments and vehicles, organize equipment repairs evacuation, and munitions resupply; control the activity of subordinate units during the implementation of the technical support.

Branch chiefs coordinate technical support measures with the division (brigade) deputy commander for armament in questions of technical care, repair and evacuation. They coordinate with the deputy division (brigade) commander for the rear in questions of resupply of armaments, vehicles, munitions, and spare parts, deployment and redeployment of subordinate units in the rear area, their protection, security, and defense and use of supply and evacuation routes.

Subcategories

Technical support is performed by category of military equipment. At division and brigade level, each major category of equipment is the responsibility of one of the chiefs of services under the deputy commander for armament or the appropriate branch chief. Thus, the subcategories include artillery technical support, armored vehicle technical support, and motor vehicle technical support. There is also the category of technical support to other logistics (materiel support and medical) elements falling under the deputy commander for the rear. The specialized supporting arms of engineers, chemical, and signal troops perform technical support on their own branch-specific equipment.

Artillery Technical Support

The chief of missile and artillery armament services is responsible for artillery technical support. In the context of requisition and supply, the term *artillery* includes more than just artillery (air defense, antitank, and field artillery) weapons with ammunition and firing-related instruments. It also includes various other associated instruments, radars, and vehicles that are not part of the artillery systems proper. In an even larger sense, it encompasses small arms, grenade launchers, and individual and multiple rocket launchers with their ammunition and associated instruments. Artillery technical support further includes mobile artillery maintenance and repair shops; handling equipment at depots and supply points; and special tools, spare parts, accessories, and supplies.

Artillery technical support includes these basic measures:

- Organization of receipt and issue (resupply) to units of missile and artillery armaments (SAM and ATGM systems; artillery, air defense, mortar, tank, and infantry armaments; associated fire control instruments and radars; artillery reconnaissance, topographical, and other equipment), as well as ammunition and spare parts.
- Creation of mobile stocks of ammunition in established quantities and their resupply as necessary due to their expenditure and losses in the course of battle.
- Technical preparation of armaments and ammunition for combat use and organization of training personnel in their use.
- Maintenance of the reliable functioning of armaments, providing continuous and timely maintenance and repair.
- Evacuation of damaged or defective armaments and equipment.
- Conduct of systematic inspections of the operation and technical condition of armaments and equipment in units.
- Support of armament and equipment with spare parts, components, instruments, expendable materials, technological equipment, and manuals needed for their operation and repair.
- C^2 of artillery technical support assets.

Armored Vehicle Technical Support

The chief of armored vehicle services is responsible for supplying troops with armored combat vehicles and equipment. He also organizes the maintenance, repair, and recovery of such equipment.

Armored vehicle technical support is the aggregate of measures for maintaining armored vehicles in good working order and ready for combat employment. It includes the following measures:

- Resupply of units with armored vehicles, preparing them for use, and ensuring their reliable operation during combat.
- Preparation of technical support units for the maintenance and repair of armored vehicles.
- Organization of the timely and continuous support of troops and maintenance and repair units with spare parts and other supplies.

- Prompt and timely servicing, maintenance, repair, and recovery of damaged and unserviceable armored vehicles, and their rapid return to service.
- Conduct of measures to prevent damage and extend service life of vehicles.
- Training of personnel to operate armored vehicles properly.
- Firm and continuous C^2 of armored vehicle technical support assets.

Motor Vehicle Technical Support

The chief of motor vehicle services organizes motor vehicle technical support on the basis of the commander's battle plan and instructions of the next-higher chief of motor vehicle services. Manpower and assets subordinate to the chief of motor vehicle services, as well as vehicle crews and battalion-level maintenance personnel, perform this type of technical support.

Motor vehicle technical support is the aggregate of measures for providing units with motor transport vehicles and maintaining them in a continuous state of combat readiness. It includes the following measures:

- Resupply of troops with vehicles and spare parts.
- Preparation of vehicles for use and ensuring their reliable operation during combat.
- Timely maintenance, repair, and evacuation of damaged and defective vehicles.
- Training of troops in the handling of vehicles.
- Firm and continuous C^2 of motor vehicle technical support assets.

Technical Support of the Rear

A special category of technical support applies to vehicles and other equipment involved in materiel support and medical support. The chief of motor transport services and chief of medical service under the deputy commander for the rear have some maintenance and repair assets in the materiel support and medical units under their control. However, they must coordinate with the chief of motor vehicle services, under the deputy commander for armament, for additional vehicle-related technical support.

Technical support of the rear includes the following measures:

- Servicing and maintenance of equipment dedicated to other logistics functions such as cargo transport, POL transport and refueling, medical support, and meal preparation.
- Organization of technically correct use, care, maintenance (storage), repairs, and evacuation.

The purpose is to ensure that such equipment is in good working order and in constant readiness for use.

Engineer Technical Support

The chief of engineers is responsible for engineer technical support. It includes the following measures:

- Support (resupply) of troops with engineer munitions (such as mines), equipment, and materials.
- Maintenance of engineer equipment in good working condition and constant readiness for use in battle.
- Organization of proper use and ensurance of reliable operation.
- Prompt collection, evacuation, and repair of damaged (defective) engineer equipment and materials and their rapid return to the troops.
- Training of troops in the use of engineer equipment.
- C^2 of engineer technical support assets.

Chemical Technical Support

The chief of chemical troops is responsible for chemical technical support. It includes the following measures:

- Support (resupply) of troops with chemical (NBC defense or smoke) equipment.
- Organization of training in the use of chemical and protective equipment and its maintenance in good working condition and constant readiness for combat use.
- Organization of its proper use and ensurance of reliable operation.
- Timely collection, evacuation, and repair of damaged equipment of the chemical troops and NBC protective equipment and its rapid return to the troops.
- C^2 of chemical technical support assets.

Technical Support of Communications and Automated Control Systems

The chief of signal troops is responsible for technical support of communications and automated control systems. This type of technical support includes the following measures:

- Timely support (resupply) of troops with communications equipment and the organization of training in its use.
- Maintenance of communications equipment in complete and good working condition and in constant readiness for use.
- Execution of the prescribed work, maintenance, and inspection of equipment.
- Organization of the evacuation of damaged or defective equipment and its return to the troops.
- C^2 of communications technical support assets.

Major End Items

Procurement and supply of major end items are the responsibility of the main directorates under the Deputy Minister for Armament in the MOD. The Main Armor Directorate is responsible for development, procurement, repair, and maintenance of tanks, IFVs, and APCs; it maintains centrally-subordinated depots holding stocks of such vehicles and spare parts for them.

The Main Motor Vehicle Directorate has similar responsibilities for vehicles other than tanks and other armored combat vehicles. Arsenals and depots of the Main Missile and Artillery Directorate maintain central stocks of ammunition, small arms, artillery, and associated equipment and components. Major end items of branch-specific equipment in specialized (engineer, signal, or chemical) units are the responsibility of the various branch chiefs, who maintain their own depots. The MOD-level Chief of Logistics oversees and coordinates the distribution of central stocks from these and other depots and arsenals that constitute the Reserve of the Supreme High Command.

The OPFOR does not have a resupply procedure for major end items while a unit is engaged tactically. In practice, new equipment is introduced into units only during long marches, periods of preparation, or during pauses between phases of combat. It is very rare for fresh equipment to be fed into units at any level of command during the actual course of the battle. With few exceptions, the only reliable sources of "reinforcement" with major items of equipment during combat are from damaged equipment returned to action after repair on the battlefield or at the operational level. When attrition reaches a certain level, the unit in combat usually is replaced by another unit or becomes part of a composite unit. For additional informatin see the section on Force Restoration later in this chapter.

Branch Maintenance Responsibilities

Maintenance and repair facilities in the field are provided for the following types of equipment:

- Artillery and ordnance.
- Tracked vehicles.
- Wheeled vehicles.
- Engineer equipment.
- Signal equipment.
- Chemical equipment.

Service for these items is provided by a network of fixed and mobile repair facilities that extend repair capabilities forward into the battle area.

The chief of missile and artillery armament services at brigade and above is responsible for the maintenance of small arms, automatic weapons, mortars, artillery, and missiles. Mechanized infantry and tank brigades usually have two or three armorers to perform light repair on small arms and some automatic weapons. Armorers in artillery regiments can do routine maintenance on artillery pieces as well as on small arms.

At division level, routine-to-medium repairs to artillery are made in the ordnance maintenance company of the maintenance battalion. The brigade-level maintenance company has a weapon and ordnance repair platoon. Within those same organizations, the tracked vehicle repair companies or platoon, respectively, may perform some repairs on self-propelled artillery. Artillery repairs at brigade and division consist primarily of replacing parts from available stocks.

In the signal company found at brigade level, the operators repair signal equipment, when possible. Radio, telephone, and radar units generally have some testing equipment and spare parts for routine repairs. Medium communication repairs are done at division level. Signal repair units perform major repairs at army level and higher. Engineer and chemical equipment maintenance and repair are accomplished in the same manner as signal equipment at division and higher levels.

Vehicle Repair and Maintenance

Mobile repair points fix repairable equipment and return it to action as soon as possible. This is the only way to replace equipment end items during combat. Damaged equipment is not repaired in the field if it requires more than a few hours work.

Repairs

The OPFOR classifies vehicle repairs as routine, medium, or major. These categories relate to the severity of damage and the time required for repair.

Routine. Routine (light) repairs do not involve disassembling of major components. These are quick repairs that involve changing a damaged or worn-out component, making technical adjustments, light welding, or simple mechanical work. Such faults are repaired more or less where the equipment breaks down.

Division- or brigade-level mobile repair points, battalion- or company-level maintenance personnel, or even vehicle crews themselves can perform routine repairs. Repair points at these levels do not operate from a permanent base, but are constantly on the move to keep up with the supported units. The maximum time spent on routine repairs should be about 3 hours.

Medium. Medium repairs involve replacement or overhaul of at least two major assemblies, components, or modules and servicing of the remaining working parts. Division- or army-level mobile repair points can perform this category of maintenance. The maximum time for medium repairs is about 9 hours.

Major. Major (heavy) repairs involve overhaul or complete disassembly of a piece of equipment. This is the most extensive category of maintenance and possibly can be performed at army and army group levels.

The most seriously damaged vehicles may require evacuation to factories for rebuild or cannibalization. For the more common ground force weapon systems, it is unlikely that such heavy repair would occur during the course of a battle or operation.

Maintenance

The OPFOR also uses periodic checks of equipment known as maintenance services. These services are performed at usual intervals on most OPFOR equipment. Examples of a maintenance services for a tank could be—

- **Routine inspection.** Conducted before tank movement as a preoperational check and takes 40 minutes.
- **Preventive maintenance service number 1.** Conducted after tank movement and at 100- to 150-km intervals during a long road march. This service takes between 9 to 12 hours.
- **Preventive maintenance service number 2.** A 6- to 7-hour thorough inspection performed every 1,000 km.
- **Preventive maintenance service number 3.** A 9- to 12-hour comprehensive inspection of all vehicle systems performed every 2,000 km.

Recovery, Repair, and Evacuation During Combat

Technical support includes recovering, repairing, and evacuating equipment. The division's (or brigade's) deputy commander for armament is responsible for these tasks during combat. Technical support units deploy and move within the division zone (brigade sector) of activity in accordance with the battle plan, the technical support plan, and the orders of the division (brigade) deputy commander for armament and branch chiefs. The division (brigade) chief of staff and deputy commander for the rear approve their locations within the rear area. They deploy and disperse within the assigned areas and use camouflage, cover, and concealment. During battle, they relocate according to the situation so as not to interrupt the continuous technical support of units. They normally provide their own security and defense, although the combined arms commander may attach combat arms units to assist them, if necessary. See Figures 15-2, 15-3, and 15-4 for information on locations of technical support elements in the offense or defense.

Layered Support

The organization of maintenance and repair services follows the principle of layering by level of command. The higher the unit level, the farther rearward the unit repair and maintenance facilities are deployed and the more complex the level of services rendered. Nevertheless, the goal is to service lightly damaged vehicles as far forward as possible. This limits the number of damaged vehicles that have to be evacuated to the rear.

Forward positioning of maintenance and recovery elements provides effective support for the high tempo of combat actions. Repair units move near the scene of combat rather than waiting for damaged equipment to be evacuated to them. However, lower-level units have a limited maintenance capability and depend on higher-level maintenance units to provide direct and backup support. For example, a brigade in the offense collects its damaged vehicles and does what light repairs it can before continuing the advance. A division works in a similar fashion, leaving unfinished work to army. The bulk of repair resources are based at army level and are assigned to key axes.

The division of labor and the organization of repair and maintenance units stresses flexibility. Depending on the combat situation, some lower-level repair and maintenance facilities may be engaged more in evacuation and recovery than actual repairs, while some units at army and army group level may spend more time on light than serious repairs. Even though lower-level repair units are assigned to a combat unit, mobile repair detachments belonging to army are dispatched to combat units requiring extra support.

Technical Reconnaissance

The deputy commander for armament organizes technical reconnaissance. At brigade and battalion level, the technical observation posts (TOPs) and repair and evacuation groups (REGs) carry it out. The goal of technical reconnaissance is to determine in a timely manner the locations of damaged and mechanically defective equipment, and determine the nature of the damage. (Sometimes, the vehicle is merely stuck.) At division and brigade level, this reconnaissance determines the locations for damaged vehicle collection points (DVCPs) and mobile repair points.

Repair Versus Evacuation

Repair and evacuation of damaged vehicles, although organizationally related, are distinct functions. Particularly at division level and above, these units function separately but in conjunction with one another. At lower levels, the REGs can sometimes repair damaged vehicles on the spot. In other cases, they must first recover the vehicles and then send or tow them to a concealed position for repair or evaluation. Those vehicles that the REGs cannot repair at or near the place where they were put out of action, they try to move to a DVCP or other points along designated supply and evacuation routes, to await servicing by a mobile repair point. This frees the REGs to move forward in support of continuing combat actions. Repair can occur at a DVCP by the mobile repair point of the same unit whose REG recovered the vehicle or that of the next-higher unit.

If repair is not possible at the DVCP, the next step is evacuation. If evacuation by lower to higher levels of command is not possible, the lower-level unit can leave the damaged vehicle at a DVCP for the attention of the next-higher unit. If the higher-level repair element cannot repair the item, that unit's assets are responsible for the evacuation, if possible, to the next-higher level. A major goal of the evacuation process is to clear damaged equipment from avenues of approach of follow-on combat units.

Repair Priorities. Vehicles, armaments, and equipment are repaired according to the situation, current mission, type of damage, time available, and the repair units deployed in the area. The first priority is to repair those items that are the most important for mission accomplishment by the supported unit and those that can be repaired and returned to the troops in the shortest time. Missile launchers and air defense systems, radars for missile guidance, and C^2 vehicles are usually repaired without regard to their place in the waiting line.

Evacuation Priorities. The first priority for evacuation is the equipment that is under threat of being captured or destroyed by the enemy. Next are missile launchers, C^2 vehicles, armaments, and other equipment that require only the smallest types of repair.

Company

The only maintenance conducted at company level is driver and crew preventive maintenance and routine inspections. The logistics officer in an MIC carries immediate spares to assist quick repairs. He refers other repairs to battalion. The battalion deputy commander for armament can establish a company TOP if the company battle area is beyond observation range of the main battalion TOP.

Battalion

The maintenance section of the battalion supply and service platoon contains a maintenance van (workshop) and mechanics who can make routine repairs on tracked and wheeled vehicles. In combat, this repair workshop can be reinforced with a vehicle recovery section to form a REG.

The battalion deputy commander for armament establishes and heads the battalion TOP. Making skillful use of terrain features, he locates it at a position from which it can keep vehicles on the battlefield in view. This location is behind the combat formations of the first-echelon companies, and normally near the battalion COP. The TOP maintains constant communications with the COP, combat vehicle commanders, the REG (from battalion and/or brigade), and the brigade deputy commander for armament.

The purpose of the TOP is to monitor the battlefield for damage, to assist crews, and to call repair and recovery units forward. It is composed of several vehicle operators, one or more mechanics, a medic, battalion NBC personnel, and at least one combat engineer. The entire group is mounted in an armored vehicle with radios and night-vision devices.

From his TOP, the battalion deputy commander for armament maintains radio contact with the battalion commander and recovery and repair elements. He issues relevant orders to these units and monitors their execution. He also keeps in contact with the maneuver companies (and the mortar battery in an MIBN). He identifies damaged equipment, assesses the nature and extent of damage, and determines the status of the crew of an out-of-service vehicle. Then he initiates action to recover the vehicle and accomplish repairs. He directs the battalion or brigade REG to the point of damage.

A battalion REG, if formed, is located behind the first-echelon companies. It repairs a damaged vehicle on site or evacuates it to a concealed repair and evacuation site nearby. However, this REG normally attempts only routine repairs that can return the vehicle or weapon to battle within one hour. It drags other damaged equipment off the movement routes and leaves them for the brigade to repair. In the defense, damaged vehicles with serviceable weapons capable of fighting are left in the battalion combat formation and are recovered only by permission of the battalion commander.

Brigade

A separate mechanized infantry or tank brigade has the same type of maintenance battalion as a division. In a divisional brigade, the maintenance company performs routine and some medium repair functions. This company has platoons for wheeled-vehicle repair, tracked-vehicle repair, weapon and ordnance repair, recovery, and special maintenance. The IFV-equipped brigades can also have a mobile repair platoon.

In either type of brigade, the commander of the brigade's maintenance unit is also the brigade deputy commander for armament. He uses the various elements of his unit to form one or more mobile repair points and may form REGs to provide support to subordinate battalions.

A brigade can organize up to three REGs. These brigade-level REGs may be used to support a specific battalion if required. Division or higher level can provide more REGs. Each REG usually consists of an armored recovery vehicle (ARV), one or two maintenance (workshop) vans, and a truck with spare parts.

The brigade deputy commander for armament is responsible for planning and directing all vehicle repair and recovery activities. This includes establishing a brigade TOP, one to three REGs, a brigade repair point, and a DVCP. The TOP serves as a mobile CP for the deputy commander for armament. From there, he controls the evacuation and repair of brigade vehicles that are damaged during combat and are beyond the capability of battalion repair teams. He monitors the brigade command net in the TOP.

From his TOP, the brigade deputy commander for armament identifies and assesses damaged equipment. When an armored vehicle becomes disabled and cannot be repaired at battalion level, the brigade TOP dispatches a REG to the site. The REG is designed to provide support to frontline units by performing on-the-spot repairs. REG repair priorities are based on the required repair time, with equipment requiring the least time for repairs being completed first. If the REG cannot repair a disabled vehicle, its ARV tows the vehicle back to the brigade DVCP. The highest priority is clearing vehicles from routes.

REGs also accompany units on the march. They can recover mired vehicles, assist river crossings, help driver-mechanics do routine repairs, and evacuate severely combat-damaged vehicles to DVCPs.

Once recovery vehicles assemble the damaged equipment at the DVCP, the brigade repair point moves to that location. There, it classifies the casualties and does as many light repairs as it can before it must follow the combat elements to the next area of battle. Normally, it attempts repairs that could enable the equipment to rejoin the brigade combat formation in 3 hours or less. The brigade repair point leaves vehicles damaged beyond its repair capability (or the time available to it) at the DVCP, for attention by division assets. The DVCP becomes a holding area for damaged vehicles prior to their repair by division or evacuation by division to a higher-echelon facility.

Division

The division's maintenance battalion moves forward and sets up its own DVCPs and mobile repair points. This battalion is composed of two tracked-vehicle maintenance companies, a wheeled-vehicle maintenance company, an ordnance maintenance company, a recovery platoon, a special maintenance platoon, and a supply and service platoon. Within the companies and platoons, there are maintenance vans, supply trucks, and recovery vehicles. These units are capable of performing both routine and medium repairs. However, the division differs from brigades in being more likely to establish separate repair points specializing in artillery, trucks, armored vehicles, and light equipment.

The division deploys major repair resources onto the axes with the greatest collection of damaged equipment. The task of battalion- and brigade-level REGs is to recover vehicles to DVCPs. Division-level mobile repair points move to the vicinity of these brigade collection points.

There, the division repair points first tend to light repairs left undone by the brigade, in order to return those vehicles to service as quickly as possible. In the unlikely event they complete these routine repairs before they must move on, they would then begin work on medium repairs. Having completed all routine and medium repairs possible within the limits of time and spares available to it, the mobile repair point moves on to the next DVCP, leaving behind the more severely damaged vehicles for army-level repair points.

The maximum time spent on routine repairs at division level should be about 3 hours. The maximum time for medium repairs, if attempted at this level, is about 9 hours. However, even divisional repair points can expect to move two or three times a day if the advance is very swift. Therefore, most medium repairs, requiring 3 hours or more, are left for the army.

The division evacuates vehicles or equipment damaged beyond the repair capacity of the brigade or the division's own repair points to the division's DVCP. If the division is unable to repair the damaged item there, it is evacuated to either army or army group for necessary maintenance. The higher-level unit's transportation assets accomplish the evacuation.

Support from Operational Level

An army or army group usually establishes repair workshops on a branch-specific basis. There can be workshops dedicated to the repair of armored vehicles, artillery, electronic equipment, engineer equipment, and so on. These specialized repair facilities equate to the function of specialized field hospitals in medical support. Such workshops often deploy in division rear areas and specialize in repair of equipment or components.

For example, a mobile tank component repair shop consists of several specialized workshops mounted in vehicles. Behind the advancing armies (or divisions), one or two of these shops would seek out the areas where most damaged and unrepaired vehicles had been collected in DVCPs. Teams from each repair shop would then seek to remove and repair major components of the damaged vehicles, such as engines, and then do one of the following:

- Use cannibalized and repaired components to reconstruct entire tanks for redeployment.
- Send components and assemblies, such as repaired engines, forward as spares and replacements for army (or division) repair points to use.

Within the army's area of responsibility, army- and army group-level maintenance units deploy to locations convenient for the various DVCPs that divisions establish. They perform as many repairs as possible before the momentum of the advance demands their forward displacement. Armies have their maintenance capabilities augmented by army group as required. Army units can provide mobile repair detachments for forward commitment if necessary.

Army-level recovery and repair units attached to first-echelon divisions operate in the division zone. As a general rule, during a modern high-speed offensive operation, an army deploys almost all its repair facilities at division level. These assets maintain the viability of brigades and divisions in the same way as the maintenance units of those brigades and divisions. The advantage of maintaining repair and maintenance facilities under army control is that these effectively become reserves for easy deployment and redeployment to wherever they are most needed on the battlefield.

MEDICAL SUPPORT

The goal of medical support is maintaining the combat capability of the troops. It provides timely medical aid for the wounded and sick so that they can return to their units as fast as possible. The two principal missions of medical support in combat are the evacuation and treatment of casualties, and the prevention of disease on the battlefield. It includes medical measures for the protection of personnel against the effects of NBC weapons and treatment of NBC casualties. It also includes medical supply.

The emphasis on high-speed offensive action and defensive maneuver calls for a highly mobile medical support system. Its component units must be capable of frequent movement with a minimum loss of efficiency. Repeated forward redeployment of medical units and continuous rearward evacuation of casualties demand close coordination between medical levels and medical and combat commanders. See Figures 15-2, 15-3, and 15-4 for information on locations of medical support elements in the offense or defense.

A dual chain of command responds to the needs of combat units and also allows close coordination between medical levels for the treatment and evacuation of casualties. Each command level from company to army group has organic medical support units or personnel. At each level, medical elements are subordinate to both the combat unit commander and the next higher level of the medical service. For example, the battalion physician's assistant is subordinate to both the battalion commander and the brigade senior physician.

Medical Doctrine

OPFOR medical doctrine divides the range of medical treatment into three general categories. The first category of procedures includes only mandatory lifesaving measures. The second category includes procedures to prevent severe complications of wounds or injuries. The final category of treatment includes procedures possible to accomplish only when there is a low casualty load and reduced enemy activity. However, there are also some types of medical assistance short of actual "treatment."

Categories of Medical Assistance

The OPFOR defines five classes of medical assistance: first aid, premedical treatment, preliminary medical treatment, full medical treatment, and specialized medical treatment. Medical assistance is provided to the wounded and sick as follows:

First aid. First aid is administered on the spot by the casualty himself, a fellow soldier, or the company medical staff. This occurs at the location where individuals were wounded or in the closest cover. The first source of first aid is by the soldiers themselves (in the order self-help, then mutual help). Further first aid can come from stretcher-bearers, riflemen/medics, or the company medical corpsman. It can also come from members of higher medical units attached for rescue work in the areas of highest casualties. It is limited to commonsense techniques to prevent further pain or injury to the wounded soldier.

Premedical assistance. Premedical (medic) assistance is given by the company medical staff or at the battalion medical point. It may continue at the clearing/sorting station of the brigade medical point. It is restricted to dressing or redressing wounds, improving splints, checking the application of tourniquets, or the administration of chemical antidotes.

Preliminary medical treatment. Preliminary medical treatment is not normally given until the patient reaches the brigade medical point. It is classified as to urgency as *immediate* (when the life of the patient is at stake) or *delayed* (when further treatment can be postponed without undue risk to the patient).

Full medical treatment. Preliminary medical treatment is expert assistance rendered when the patient reaches the division medical point or specialized hospitals further to the rear. The category is once again subdivided with reference to urgency: *immediate* (to save the patient's life), *urgent* (when delay is undesirable), and *nonurgent* (when delay would not be detrimental to health).

Specialized medical treatment. Specialized medical treatment and care is given by specialists in hospitals specially designed for the purpose. These hospitals, at army level and above, are the lowest level capable of performing major surgery.

Multistage Evacuation

A basic principle of medical support is multistage evacuation with minimum treatment at each level. From company through army group, each level has specific responsibilities for the care of the sick and wounded. As casualties move through the combat evacuation system, medical personnel at each level make effective use of medical facilities by repeated sorting of the wounded (triage). Medical personnel treat the lightly wounded who can be returned to combat and those casualties who would not survive further evacuation without immediate medical attention.

The policy is to treat as many casualties as possible and practicable at each stage of the medical evacuation chain. The further to the rear a casualty is sent for treatment, the more difficult it becomes to reintegrate him into a combat unit once he has recovered. Those healed in rear hospital facilities usually do not return to their original parent unit, but become part of units being restored. Therefore, medical units at each level generally treat only those casualties whom they can heal and return to battle at that level. They give emergency aid to save life at every stage, but give therapeutic treatment at any stage only to those expected to recover in a usefully short period of time. Such casualties receive priority treatment, because this can make the greatest contribution to restoring the combat effectiveness of the unit.

The higher-level chief of medical service organizes the evacuation of the wounded and sick of the subordinate level. Assigned units evacuate the wounded and sick to the nearest medical point, usually with their own medical transport vehicles, but sometimes with attached, specially-equipped standard transport vehicles. In cases of emergency, the division (brigade) commander may order the evacuation of wounded and sick in combat vehicles. If the division (brigade) is receiving supplies by air transport, the deputy commander for the rear organizes the evacuation of sick and wounded by the returning flights.

Combat medical doctrine stresses the timely return of recuperated sick and wounded to their units. At each stage of evacuation, medical personnel detain and accommodate those casualties whose expected recovery period falls within prescribed limits. The emphasis on minimal treatment at the lower levels requires the rapid movement of casualties through the evacuation system. Helicopters can evacuate wounded directly from the battlefield to the specialized field hospitals at army level. Only casualties whose prognoses indicate extended recovery periods reach an army group or home country hospital.

Medical Supply

Medical supplies have the lowest priority for supply (ammunition and POL having the highest). Therefore, they are distributed via medical channels. There is no separate supply organization, but higher units are responsible for supplying lower units.

The chief of medical service at each level from the MOD down to brigade is responsible for the medical supply of subordinate units. Units at all levels submit requests for medical supplies upward through their chief of medical service to his counterpart at the next higher level. At army level, the chief of medical service receives and evaluates these requests and orders distribution from the army medical depot. All supplies are distributed solely through medical channels.

Company

Company medical personnel make up the immediate battlefield support. Their primary concerns are locating and collecting casualties and providing first aid before evacuation to the brigade medical point. Battlefield care consists of emergency first aid by fellow soldiers or unit medical corpsmen with limited supplies. Walking wounded make their own way to company medical points.

Assets

Each company (or battery) normally has one medical corpsman. The parent battalion may attach a physician's assistant to the company when heavy casualties are anticipated, but this is not normal practice. The company commander or platoon leaders, with the assistance of the medical corpsman, select and train enlisted personnel to serve as orderlies or stretcher-bearers. There are normally two from each platoon, but in exceptionally rough terrain, this number may increase to four. In mechanized infantry platoons (MIPs), one rifleman in the platoon headquarters is also trained as a medic.

Company medical personnel accompany the combat units in a combat vehicle (IFV or APC) or other available transport. If separate medical transport is not available, the company medical corpsman accompanies the command element. The MIP's rifleman/medic rides in one of the squad vehicles. The soldiers trained as orderlies travel with their squads or crews. If the brigade senior physician has allocated additional personnel and evacuation transport to a battalion, the battalion commander may in turn augment company medical personnel and transport.

Company Medical Corpsman

Duties of the company medical corpsman includes monitoring personal hygiene, inspecting the company area for health hazards, and supervising sanitary and anti-epidemic measures. He also instructs the troops in first aid and the use of their individual medical equipment.

Prior to combat, the company commander informs the medical corpsman of the unit's mission or objectives during an upcoming action. The battalion physician's assistant informs the corpsman of the location of the battalion and brigade medical points and arrangements for the evacuation of the wounded.

During combat, the corpsman has first aid supplies and stretchers available. He provides limited first aid and directs his orderlies in the removal of casualties from the battlefield. If an MIC fights the battle mounted in its IFVs or APCs, medical personnel administer first aid in the combat vehicles, using the first aid kit located there. OPFOR practice restricts the level of medical aid received at this stage of treatment to the application of field dressings and splints, the administration of analgesics and drugs for the treatment of NBC casualties, the placing of gas masks on disabled wounded, and the provision of artificial respiration.

Company Medical Point

In the defense, a company can set up a company medical point. When established, this point may be at the rear of the company strongpoint, up to 1 km from the forward edge. However, it can be as close as 50 to 100 m if there is sufficient cover.

Evacuation

Before a combat action, the battalion physician's assistant informs the company medical corpsman of arrangements for the evacuation of the wounded. This information includes the location of casualty collection points and the coordination of available medical evacuation transport. Selection and establishment of specific locations for casualty collection points is the responsibility of the corpsman. He selects sites along the battalion medical point's route of advance. The corpsman must also know the location of the battalion and brigade medical points and of secure routes to those locations.

When the company suffers casualties, it is the job of the medical corpsman and his assistants to find the wounded and arrange their evacuation to casualty collection points in suitable areas of dead ground and to administer first aid. When company medical personnel accompany their units in combat vehicles, they move the wounded from the vehicles at the casualty collection points. These points must be off vehicle routes and well marked, to avoid accidents and facilitate recovery. In a fast-moving battle, the corpsman keeps in radio contact with the company commander and platoon leaders in order to be aware of the casualty situation and not to be left behind when the company advances.

Battalion

In combat, the battalion medical staff assists in searching for wounded and giving basic first aid on the battlefield. It organizes evacuation to the battalion medical point and gives only first aid and premedical assistance to the wounded prior to evacuation to the brigade medical point.

Assets

The battalion's supply and service platoon includes a medical section. A physician's assistant, a medical corpsman, an orderly, and an ambulance driver from this section form the nucleus of the battalion medical point. Depending on the number of additional medical transport vehicles assigned, several driver and orderly teams also may serve the battalion.

Battalion Physician's Assistant

The battalion physician's assistant serves as the chief of the battalion medical point. He organizes and supervises battlefield medical support in the battalion. His job is to direct the company medical staff, organize evacuation from company to battalion, run the battalion medical point, and arrange medical supplies to the company and battalion medical points. He is ultimately responsible for all hygiene and sanitation in the battalion and for giving first aid training to the men.

Besides monitoring the health conditions in the battalion, the physician's assistant directs ambulance teams in the evacuation of wounded from company-level casualty collection points to the battalion medical point. In some cases, he directs evacuation from the company collection points all the way to the brigade-level medical point. He also receives current information on the combat situation and provides assessments of the situation to the battalion chief of staff and the brigade senior physician (chief of medical service).

Battalion Medical Corpsman

The battalion medical corpsman's duties are demanding. He provides medical treatment to the wounded and supervises the orderlies at the battalion medical point. He also participates in medical reconnaissance for the battalion, assists in removing the wounded from the battlefield, and monitors radiation levels at the battalion medical point. He directs decontamination, carries out anti-epidemic measures, and distributes supplies under the physician assistant's direction.

Battalion Medical Point

The battalion medical point is headed by a physician's assistant. When deployed, it serves as little more than a temporary holding area where casualties are assembled to await evacuation. The medical personnel at battalion are not trained to give major medical treatment. As the wounded arrive, the physician's assistant and corpsman first determine the presence and extent of injuries and check for NBC contamination. They isolate any NBC casualties and prepare them for separate evacuation. They check and renew field dressings; administer antibiotics, analgesics, and NBC antidotes; and prepare the wounded for evacuation by brigade transport. Casualties should remain at battalion for less than one hour.

Normally, the battalion medical point is within 1.5 to 3 km of the frontline. The precise location depends on the terrain and the nature of enemy action. However, it generally remains near the REG; this allows the use of partially disabled vehicles in the evacuation of wounded personnel.

March. In the march, the personnel of the battalion medical point follow immediately behind the combat units. Battalion and company medical personnel conduct medical reconnaissance independently or join the reconnaissance patrols dispatched by the battalion commander. These troops report evidence of NBC contamination, incidents of epidemic disease, and the locations of possibly contaminated foodstuffs to the battalion chief of staff and the brigade senior physician.

Offense. In the offense, the battalion medical point moves with the supported units in a way that ensures the attackers' continuous medical support. Making skillful use of terrain features, the medical point follows behind the first echelon at a distance of 1 to 1.5 km. This normally puts the medical point about 1.5 to 3 km behind the forward edge. The physician's assistant keeps in contact with the companies (and the mortar battery in an MIBN), issuing relevant instructions to medical personnel and monitoring their execution.

Defense. In a defensive posture, the battalion medical point deploys immediately to the rear of its battalion. This is normally within 1.5 to 3 km of the forward edge of the defense.

Evacuation

Battalion medical personnel collect casualties from the companies and provide minimum treatment before evacuation to the brigade medical point. Casualties remain at the battalion medical point for a very short time. Doctrinally, vehicles from the brigade medical point are supposed to evacuate patients from battalion level within an hour.

The brigade senior physician is responsible for informing the battalion physician's assistant of casualty evacuation arrangements. It is up to the battalion physician's assistant to plan the movement and location of the battalion medical point in the imminent battle. Casualties may be taken either to the battalion medical point or directly to the brigade medical point if possible. If the battalion medical points become overloaded, the division senior physician may also order a brigade medical point to conduct direct evacuation.

Brigade

Brigade is the lowest level to which physicians are routinely assigned. At brigade medical points, the seriously wounded are examined and provisionally treated by a physician. However, the division senior physician determines the extent of medical care to be provided at the brigade level. Depending on conditions, the level of care can range from minimum treatment (bandaging, ensuring respiration, and administering antibiotics, antitoxins, and analgesics) to the limit of minor surgical intervention.

Assets

A separate brigade can have the same type of medical battalion as a division, or it may have only a single medical company, which is a slightly expanded version of the medical company of a medical battalion. Therefore, its medical support capabilities equal or approach those of a division. The following discussion describes medical support of a divisional brigade with a medical platoon.

In a divisional mechanized infantry or tank brigade (or in a division's self-propelled artillery regiment), the medical platoon contains the following elements:

- A treatment section.
- A collection (and evacuation) section.
- An administrative and disposition section.
- A supply and service section.

The treatment section includes a disinfection/decontamination area and an isolation area. Elements of the brigade's NBC decontamination unit help complete NBC treatments. Some medical platoons have two collection (and evacuation) sections.

Brigade Senior Physician

The brigade senior physician serves as the administrative medical officer for the brigade. Like his counterpart at division level, he serves as chief of medical service on the staff of the brigade deputy commander for the rear. He is responsible for the provision of medical services and supplies to the entire brigade. Although he is commander of the medical platoon, he usually does not command the brigade medical point, nor does he practice as a physician at the medical point. The chief of the medical point is another physician subordinate directly to the brigade senior physician.

Brigade Medical Point

In a divisional brigade, the brigade medical point has a platoon of doctors, nurses, and corpsmen for professional examination, treatment, and sorting. This medical point should be able to provide the following services:

- Reception, quartering, and registration of sick and wounded; completion of preliminary medical reports for casualties who receive preliminary medical treatment.
- NBC monitoring and partial decontamination of the sick and wounded.
- Medical sorting, provision of medical treatment to the wounded, and preparation of casualties for evacuation.
- Treatment of minor wounds and ailments requiring up to 5 days for recovery.
- Short-term isolation of patients with contagious diseases.
- Self-sufficiency in providing food and services to incoming sick and wounded.

The brigade senior physician must select a site for the medical point that affords maximum protection and camouflage and has access to a water supply. When deploying in the field, the brigade medical point uses any suitable building or bunkers in the area chosen. If none are available, it uses its organic medical tents. It has sufficient practical equipment that it is completely self-contained and not dependent on other brigade logistics units for support.

Usually, the initial position of the brigade medical point is within 3 to 5 km of active combat formations. It should be possible for casualties to arrive in no more than 4 hours after sustaining injury. It should be operational 30 to 40 minutes after arriving on site. The receiving and sorting element should be ready for casualties within 15 minutes of arrival.

The chief of the medical point is a physician subordinate to the brigade senior physician. He directs and participates in the medical treatment of casualties. There are two additional officers, a junior physician and a dentist. Additional medical personnel assigned to the brigade medical point include a pharmacist, two physicians' assistants, medical corpsmen (one of whom is responsible for decontamination), orderlies, and ambulance drivers. Walking wounded and personnel detached from the brigade normally provide assistance in running the medical point.

The job of one or two men (from the administration and disposition section) in the receiving and sorting area is to organize the unloading of arriving ambulances and other evacuation vehicles. They check arrivals for NBC contamination, isolate those with contagious or contamination ailments, and dispatch the others to reception or evacuation.

A doctor (possibly the chief of the medical point) or physician's assistant carries out further sorting in the reception tent. As the he receives casualties who have passed through the sorting point, he divides them into four categories:

- Those who require immediate medical attention at the brigade medical point.
- Those who are to be evacuated to the next medical echelon with little or no treatment.
- Those who are lightly wounded who will remain at the medical point and return to duty within 3 to 5 days.
- Those for whom medical treatment is futile.

Offense. In the offense, the brigade medical point follows the advance combat elements and is normally within 5 to 7 km of the forward edge. It receives the casualties from battalion level within 4 hours of injury. The extent of medical care provided depends on the combat situation and the casualty rate.

Defense. In the defense, the brigade medical point is normally about 6 to 10 km from the forward edge. Its primary mission is sorting and evacuation.

Evacuation

It is at brigade level that the casualty can first receive complex medical treatment. However, the time available and the guidance of the division senior physician determine the extent of treatment here. Then, the casualty may be sent either to the divisional medical point or directly to specialized hospitals at army level. Thus, the process of sorting casualties for the appropriate treatment and evacuation is especially important at this point.

Division vehicles evacuate patients from the brigade medical point. Casualties requiring general medical or surgical treatment would be evacuated to the division medical point, while those in need of specialized surgery or treatment would go, if possible, directly to army-level specialized hospitals.

Division

The primary combat mission of the division's medical battalion is the deployment and operation of the division medical point. Before reaching this level, casualties receive only the most basic medical treatment. Even at division level, limited personnel and facilities permit performance of only minor surgical operations. Any major operations must be deferred until the casualty reaches an army-level mobile field hospital.

Assets

The division medical battalion contains the following elements:

- A medical company.
- A collection and evacuation company.
- A disinfection and decontamination company.
- A supply and service platoon.

A separate brigade can have the same type of medical battalion as a division, or it may have only a company.

Division Senior Physician

As with the brigade physician, the division senior physician occupies an administrative post. He assumes responsibility for the overall supervision of division medical support and serves as chief of medical service on the staff of the deputy commander for the rear. Unlike his brigade-level counterpart, however, he does not command the medical battalion. His immediate subordinate, the chief of the division medical point, commands that battalion.

Division Medical Point

The division medical battalion operates a division medical point. That battalion's medical company forms the core of the medical point. It contains at least three surgeons, a therapist, and a dentist. Personnel of the collection and evacuation company augment both brigade and battalion collection efforts. Its three aidman platoons (four ambulance teams each) have the mission of evacuating casualties from the brigade to the division level. Personnel and vehicles from these platoons may assist in battlefield casualty collection and evacuation.

The medical company's disinfection and decontamination platoon supervises the treatment of casualties with infectious diseases and monitors the NBC environment. The supply and service platoon has the responsibility for receipt, storage, distribution, and replenishment of medical supplies for the division and subordinate medical units.

The division medical point normally deploys along the main supply and evacuation route and uses existing structures when possible. Full deployment requires about 2 to 3 hours. This medical point is designed to handle up to 500 casualties per 24-hour period, with the ability to receive up to 200 casualties per hour for short periods. Doctrinally, casualties should reach the division medical point from the battlefield within 12 to 18 hours.

Offense. During the offense, the division medical point maintains close contact with advancing combat units. It typically deploys approximately 10 to 15 km from the forward edge. If the offense is successful, it must move forward with the supported maneuver force and set up operations at a new site. However, it may leave some personnel and equipment behind to provide care for nontransportable wounded and casualties that continue to arrive at the previous site. The division senior physician coordinates with the army chief of medical service to arrange redirection of the casualty flow to the medical point of a second-echelon division or to an independent medical detachment from army level.

Defense. In a defensive situation, the division medical point deploys up to 20 km from the forward edge of the defense. It can accommodate up to 60 patients at a time, in tented wards.

Evacuation

The staff and facilities at division level allow a broader range of medical attention, should the casualty rate and battlefield conditions permit. As a rule, only those wounded requiring a convalescence of no more than 10 to 15 days remain at the division medical point. However, the majority of the wounded receive only minimal treatment at division and are evacuated further.

At division level, the sorting physician must consider the severity and the nature of a casualty's injuries when assigning him for evacuation to one of several specialized mobile field hospitals at the army level. Fixed- and rotary-wing aircraft are also available for evacuation of high-priority casualties.

Medical Reinforcements from Army

Just as with maintenance and repair of vehicles and weapons, the OPFOR moves medical battalions to the area of greatest casualties. Particularly in a penetration of a prepared enemy defense, a division's medical battalion may not be able to handle the heavy casualty load. Therefore, the parent army can augment each first-echelon division with one or two independent medical detachments, each organized like a divisional medical battalion.

These detachments operate within the division zone. They can supplement the division effort and ease the problem created by frequent moves of the division's medical battalion. In the offense, these medical units can leapfrog forward, moving every 2 days on the average, if the rate of advance warrants.

FORCE RESTORATION

OPFOR commanders are sensitive to personnel loss rates. Units may maintain strength by piecemeal replacement of casualties during combat, particularly when lightly wounded personnel and damaged equipment can return to parent units quickly. However, too high a level of casualties over a short time span (for example, 35 percent within 48 hours) can be such a shock to the system that the whole unit becomes combat ineffective. Commanders prefer to replace units before they reach the danger point and reorganize them—

- As smaller organizations.
- Combine them with others.
- Reconstitute them with personnel returning from hospitals and repaired equipment.

Personnel replacement procedures encompass four levels: individual, incremental, composite unit, and whole unit. Requirements can necessitate any or all of the above procedures. The type of combat action and the tactical situation determine which option or combination of options commanders and staffs would select and implement.

Individual Replacements

The OPFOR uses this system in both peacetime and wartime. It appears to be most applicable in the officer, some NCO, and specialist assignments. The sources of replacement personnel are school graduates, reserve assignments, medical returnees, and normal reassignments.

Incremental Replacements

This system replaces entire small units such as weapon crews, squads, and platoons. Replacements can come from training units or from follow-on (second-echelon or reserve) forces. Timely replacement of ineffective units in the first echelon is vital to maintaining momentum.

Composite Unit Formations

When continuity of the mission is of paramount importance, commanders may form composite units from other units reduced by combat operations. Once casualties are sufficient to threaten total loss of combat effectiveness, the commander can reorganize subordinate units by consolidating them to form a smaller number of combat-effective units. For units that have already lost combat effectiveness, the commander may have to withdraw the heavily attrited units in order to reconstitute them as composite units. Composite units may be constituted up to division level.

For example, a TBN commander could use this method to restore combat capability to two attrited companies. In this example, 13 of the 20 tanks in the two companies have suffered damage, with personnel losses of about 50 percent. The battalion deputy commander for armament sends the battalion REG to recover and repair vehicles on the spot. The battalion commander can also send rescue and recovery teams from the undamaged company to aid the attrited companies. Together, they succeed in repairing quickly 6 of the 13 damaged tanks.

After evaluating adjusted figures on losses, the battalion commander decides to redistribute personnel among his three companies. He then combines the repaired tanks with undamaged tanks of both attrited companies to form a composite TC. He assigns reduced crews to the undamaged and repaired tanks. By this method, he restores combat capability, but leaves the battalion with only two companies, one with 13 tanks and the other with its original 10 tanks. Another option would have been to distribute personnel and operable tanks as evenly as possible among both attrited companies to form reduced-strength companies of 6 and 7 tanks each, thus retaining a three-company structure.

Whole-Unit Replacement

Sometimes entire units may have to be replaced. Within this concept, the OPFOR can bring entire units forward from second-echelon or reserve forces to replace first-echelon forces rendered ineffective. This can involve entire divisions, corps, or even armies.

Passage of large units through other forces to forward positions is a complex operation that requires detailed planning and effective control. Therefore, the most common use of this method is the replacement of companies, battalions, or brigades from the resources available in the parent unit's second echelon or CAR. For example, a TBN could replace one of its first-echelon companies that has become combat-ineffective with a company from its second echelon. Resources held at higher levels can also be available for use in a whole-unit replacement role.