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Reference

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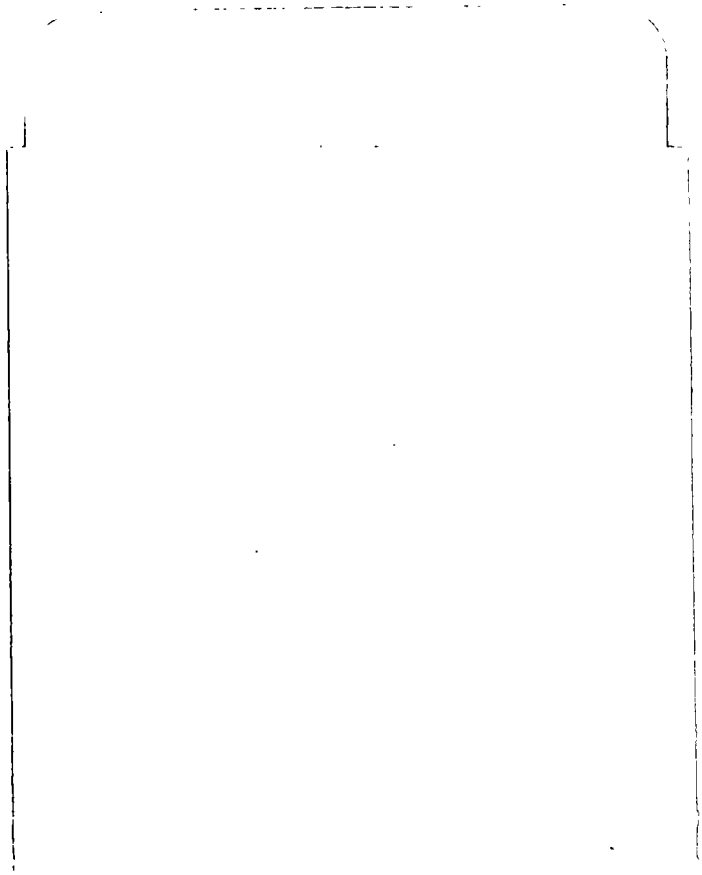
FIELD MANUAL

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NONDIVISIONAL ENGINEER COMBAT UNITS

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NONDIVISIONAL ENGINEER COMBAT UNITS

		Paragraph	Page
CHAPTER 1.	MISSION AND ORGANIZATION		
Section I.	Introduction	1-1, 1-2	1-1
II.	Mission and role	1-3—1-5	1-1
CHAPTER 2.	INTELLIGENCE, RECONNAISSANCE, AND SECURITY (STANAG 2096)		
Section I.	Intelligence and reconnaissance	2-1—2-6	2-1
II.	Security	2-7—2-13	2-2
CHAPTER 3.	DOCTRINE FOR EMPLOYMENT OF NON-DIVISIONAL ENGINEER COMBAT UNITS		
Section I.	Introduction	3-1—3-3	3-1
II.	Employment of army and corps engineer combat brigades and engineer combat groups	3-4—3-13	3-2
III.	Employment of the airborne engineer combat brigade and the airborne engineer combat group	3-14—3-16	3-7
CHAPTER 4.	OPERATIONS (STANAG 2123)		
Section I.	Nondivisional engineer combat units in the offense	4-1—4-3	4-1
II.	Nondivisional engineer combat units in the defense	4-4, 4-5	4-2
III.	Nondivisional engineer combat units in the retrograde	4-6, 4-7	4-3
IV.	River-crossing operations	4-8—4-10	4-4
V.	Ship-to-shore and shore-to-shore operations	4-11, 4-12	4-5
VI.	Airborne and airmobile operations	4-13, 4-14	4-5
VII.	Assault on fortified areas	4-15—4-20	4-6
VIII.	Barrier and denial operations	4-21, 4-22	4-7
IX.	Nuclear weapons and atomic demolition munitions employment	4-23, 4-24	4-7
X.	Stability operations	4-25—4-33	4-8
XI.	Reorganization for ground combat	4-34, 4-35	4-11
XII.	Employment of unit weapons against aircraft	4-36—4-39	4-16
XIII.	Riverine operations	4-40, 4-41	4-17
CHAPTER 5.	COMBAT SERVICE SUPPORT IN THE COMBAT ZONE (SOLOG 125)		
Section I.	Engineer construction and installation support	5-1—5-6	5-1
II.	Supply and service support	5-7—5-16	5-4
CHAPTER 6.	HEADQUARTERS AND HEADQUARTERS COMPANY, ENGINEER COMBAT BRIGADE, ARMY, CORPS, OR AIRBORNE CORPS	6-1—6-8	6-1
7.	HEADQUARTERS AND HEADQUARTERS COMPANY, ENGINEER COMBAT GROUP OR HEADQUARTERS AND HEADQUARTERS COMPANY, AIRBORNE ENGINEER COMBAT GROUP	7-1—7-8	7-1

* This manual supersedes FM 5-142, 29 April 1969.

		Paragraph	Page
8.	ENGINEER COMBAT BATTALION, ARMY OR CORPS		
Section I.	General	8–1—8–8	8–1
II.	Headquarters and headquarters company, engineer combat battalion, army or corps	8–9—8–13	8–4
III.	Engineer combat company, engineer combat battalion, army or corps	8–14—8–19	8–6
CHAPTER 9.	ENGINEER COMBAT BATTALION, AIRBORNE		
Section I.	General	9–1—9–8	9–1
II.	Headquarters and headquarters company, engineer combat battalion, airborne	9–9—9–13	9–4
III.	Engineer equipment and maintenance company, engineer combat battalion, airborne	9–14—9–18	9–6
IV.	Engineer combat company, engineer combat battalion, airborne	9–19—9–23	9–9
CHAPTER 10.	ENGINEER FLOAT BRIDGE COMPANY AND ENGINEER ASSAULT BRIDGE COMPANY, MOBILE (ARMY OR CORPS)		
Section I.	Engineer float bridge company	10–1—10–9	10–1
II.	Engineer assault bridge company, mobile (army or corps)	10–10—10–18	10–4
CHAPTER 11.	ENGINEER PANEL BRIDGE COMPANY	11–1—11–8	11–1
12.	ENGINEER LIGHT EQUIPMENT COMPANY AND ENGINEER LIGHT EQUIPMENT COMPANY, AIRBORNE		
Section I.	Engineer light equipment company	12–1—12–9	12–1
II.	Engineer light equipment company, airborne	12–10—12–17	12–4
CHAPTER 13.	ENGINEER DUMP TRUCK COMPANY	13–1—13–8	13–1
14.	ENGINEER LAND CLEARING COMPANY	14–1—14–8	14–1
15.	ENGINEER COMPANIES, SEPARATE BRIGADES		
Section I.	Types and missions	15–1, 15–2	15–1
II.	Engineer company, separate infantry brigade, separate armored brigade, or separate infantry brigade (mechanized)	15–3—15–9	15–1
III.	Engineer company, separate light infantry brigade	15–10—15–16	15–5
IV.	Engineer company, separate airborne brigade	15–17—15–23	15–7
APPENDIX A.	REFERENCES		A–1
B.	ENGINEER COMBAT SUPPORT TEAMS		B–1
C.	FUNCTIONS OF THE ENGINEER STAFFS OF HEADQUARTERS AND HEADQUARTERS COMPANIES, NONDIVISIONAL ENGINEER COMBAT UNITS		C–1
D.	CHARACTERISTICS OF RADIO EQUIPMENT		D–1
E.	MINIMUM POTABILITY STANDARDS FOR FIELD WATER SUPPLY		E–1
INDEX			Index–1

CHAPTER 1

MISSION AND ORGANIZATION

Section I. INTRODUCTION

1-1. Purpose and Scope

a. This manual provides guidance in the employment and operations of nondivisional engineer combat units. It is designed for combat engineer commanders and staffs and for commanders and staffs whose organizations receive nondivisional engineer combat support. This manual outlines the organization of the engineer combat brigade, army, corps, or airborne corps; the engineer combat group; the airborne engineer combat group; as well as subordinate nondivisional engineer combat units which provide an integrated flexible means of effective nondivisional engineer support. In addition, the organization and capabilities of the engineer companies, separate brigades, are discussed relative to their employment as organic units of the separate brigade base.

b. The contents of this manual, unless otherwise specified, apply to—

(1) General war, including consideration of employment of nuclear munitions and chemical and radiological agents; and protection from nuclear munitions and chemical, biological and radiological agents.

(2) Limited war.

(3) Cold war, to include stability operations.

c. This manual is in consonance with the following international standardization agreements, which are identified by type of agreement and number at the beginning of each appropriate chapter in the manual:

Title	*NATO STANAG*	*CENTO STANAG*	*SETO SEASTAG*	*ABCA SOLOG*
Minimum Potability Standards for Field Water Supply	----	----	----	125
Reporting Engineer Information in the Field ------	2096	2096	2096	----
Non-Nuclear Demolition Target Folder ----------	2123	----	----	----

1-2. Recommended Changes

Users of this manual are encouraged to submit recommendations to improve its clarity or accuracy. Comments should be keyed to the specific page, paragraph, and line of the text in which the change is recommended. Reasons will be provided for each comment to insure understanding and complete evaluation. Comments should be prepared using DA Form 2028 (Recommended Changes to Publications) and forwarded direct to Commanding Officer, U.S. Army Combat Developments Command Engineer Agency, Fort Belvoir, Virginia 22060. Orginators of proposed changes which would constitute a significant modification of approved Army doctrine may send an information copy, through command channels, to the Commanding General, U.S. Army Combat Developments Command, Fort Belvoir, Virginia 22060 to facilitate review and followup.

Section II. MISSION AND ROLE

1-3. Mission

Nondivisional engineer combat units support combat operations and provide supported units with engineer special staff assistance. Missions for which nondivisional engineers are particularly suited include—

a. Support of river-crossing operations, including aids to amphibious and deep fording vehicles and the provision of additional crossing means such as assault boats, ferries, and fixed and floating bridges.

b. Barriers and denial operations including reconnaissance and technical advice and assist-

ance in the construction of obstacles requiring engineer skills and special equipment.

c. Construction, repair, and maintenance of routes including roads, bridges, cableways, and tramways.

d. Installation, major repair, and recovery of military pipelines and pipeline facilities when augmented by engineer pipeline construction support units.

e. Demolitions including atomic demolition munitions.

f. Engineer support in the conduct of amphibious operations.

g. Advice and assistance to units in the construction of field fortifications and protective shelters.

h. Participation in the assault of fortified positions by breaching obstacles, marking and maintaining cleared lanes, and the neutralization or destruction of enemy emplacements by demolition and other means.

i. Continuous engineer reconnaissance of land routes and obstructions to friendly movement.

j. Siting and operation of water points for the production of potable water.

k. Reconnaissance, construction, rehabilitation, repair, and maintenance of air landing facilities in the combat zone.

l. Advice and assistance to the command highway traffic headquarters in matters concerning road and bridge reconnaissance, load-carrying capacity of routes, the availability of engineer troops to maintain the road net, and preparation and posting of permanent road signs and markers.

m. Engineer support of airmobile and airborne operations.

n. Limited CBR decontamination support for small key areas.

o. Advisory assistance to include training of host country (HC) military and paramilitary forces and civilian agencies in internal defense and internal development operations.

p. Construction and/or repair of port facilities to support combat operations on an expedient basis when augmented by port construction units.

q. Construction and placement of deceptive devices and technical assistance in camouflage operations.

r. Land clearing operations.

s. Engineer support of riverine operations.

1-4. Role

a. Nondivisional engineer combat units provide engineer combat support for army, corps, airborne corps, and independent task force operations within the combat zone. Nondivisional engineer combat units work closely with divisional engineer units in support of combat operations by accomplishing tasks which exceed, either by number or by nature, the capabilities of divisional engineer battalions.

b. The number and type of nondivisional engineer combat units required by the army, corps, airborne corps, or independent task force are determined by the overall mission, the operational environment, and the nature and magnitude of engineer work to be performed. Advance planning and centralized control are necessary to insure that engineers are used to accomplish those tasks essential to the success of the overall mission rather than expending engineer effort on less critical assignments.

c. Nondivisional engineer combat units may be employed as separate units in internal defense and internal development operations. These units may be organized into task forces to perform work requiring their particular engineer skills, to advise military engineer units of the host country, or to participate in military civic action projects.

d. Nondivisional engineer combat units can fight as infantry when required. The combat capability of these engineer units is significantly less than that of infantry units of comparable size because of the lack of organic supporting weapons, communication equipment, and medical personnel. When employed as infantry, nondivisional engineer combat units are more effective in the defense than in the offense.

1-5. Dual Role of the Engineer Combat Brigade Commanders

The command of the army engineer combat brigade serves as both the brigade commander and army engineer. In like manner, the commander of each of the corps engineer combat brigades serves as both the brigade commander and the corps engineer.

CHAPTER 2

INTELLIGENCE, RECONNAISSANCE, AND SECURITY (STANAG 2096)

Section I. INTELLIGENCE AND RECONNAISSANCE

2–1. General

The planning and conduct of operations by a commander depends to a great extent upon reliable intelligence. The information affecting the nondivisional engineer combat unit is of two types. First, for the security of engineer operations, intelligence of the tactical dispositions, strength, and capabilities of the enemy is essential. Second, engineer operations require a great deal of technical data regarding terrain, routes of communication, weather, engineer materials and equipment, structures, and water sources within the area of operations. This engineer information, when evaluated and interpreted, is termed engineer intelligence (FM 5–30).

2–2. Responsibility for Intelligence

Each commander is responsible for the collection of information within his command and for its dissemination to subordinate units, higher headquarters, and adjacent units. Although a commander is occasionally directed to obtain specific intelligence, he is never relieved from the responsibility of gathering and reporting all pertinent information. The collection of information necessitates special training at all echelons of command. Intelligence training encompasses instruction in the type of information required and the mechanics of collection and reporting; such training is designed to indoctrinate each individual with his responsibility to collect and report all pertinent information without specific instructions on a continuous basis.

2–3. Sources of Engineer Information

Intelligence is derived from many sources and is disseminated usually in periodic intelligence reports, summaries, maps, overlays, permanent record imagery, and special intelligence studies. A great deal of information is collected by subordinate units and from liaison with adjacent headquarters. In internal defense and internal development operations, information and intelligence are available from the host country (HC) armed forces and paramilitary forces, police, and civilians, as well as from U.S. military sources.

2–4. Engineer Reconnaissance

General engineer reconnaissance provides engineer information of a broad nature within the operational area and is concerned with locating and evaluating those items such as construction material, resources, and terrain features which have engineer implications. General reconnaissance missions may be assigned on a zone, area, or route basis. *Special engineer reconnaissance*, on the other hand, obtains more detailed information regarding a specific engineer task; normally, such reconnaissance follows and supports general engineer reconnaissance. Special reconnaissance missions may be assigned on either an area or route reconnaissance basis (FM 5–36). Engineer reconnaissance in remote and/or unsecure areas must be accomplished by attaining engineer reconnaissance personnel to tactical units engaging in operations in these areas. Detailed procedures for reporting engineer information in the field are contained in FM 5–36.

2–5. Personal Reconnaissance by Commanders

The reconnaissance activities thus far described in this section are for the purpose of supplying information to the command as a whole. It should not be assumed, however, that such reconnaissance is a substitute for personal reconnaissance by the unit commander. Each commander personally reconnoiters the area of operations as fully as time and conditions allow. Personal observation enables the commander to achieve a more complete understanding of the operational area and the contemplated engineering requirements. Personal reconnaissance should be planned and purposeful; a commander often designates subordinate commanders, staff officers, or project officers to accompany and assist him in his reconnaissance.

2–6. Air Reconnaissance

Reconnaissance by air has a great advantage in the speed with which large areas can be surveyed and the ease with which otherwise inaccessible areas can be reached. However, engineer intelligence based on aerial observation alone is incomplete and inadequate in providing data required for normal engineer planning. The information obtained by aerial reconnaissance must be corroborated on the ground or by aerial imagery to confirm significant data. Typical missions employing air reconnaissance are—

a. Reconnaissance of routes, railroads, inland and coastal waterways, bridges, and river-crossing sites.

b. Reconnaissance of barrier lines, minefields, and roadblocks.

c. Locating and estimating quantities of engineer construction materials.

d. Checking terrain maps for accuracy, sketching local areas, and taking photographs.

e. Locating water points, bivouac areas, and sites for the construction of air landing facilities.

f. Locating beach and underwater obstacles.

g. Locating forest fires.

h. Reconnoitering sites for use of ADM and obtaining target data.

Section II. SECURITY

2–7. Measures

a. Each commander is responsible for the security of his command. Security measures embrace all means of preventing enemy observation of the unit's activities. Security encompasses both active and passive measures to prevent surprise, minimize casualties, and repulse attack, as well as to protect classified defense information from unauthorized disclosure.

b. The degree of security provided must be evaluated carefully to prevent undue diversion of construction manpower. Engineers often operate in areas in which considerable security is afforded by other friendly troops.

c. Air attack is a constant possibility. Organic weapons (rifles and machineguns) can provide some protection against low flying aircraft. Employment of such weapons in an air defense role should be restricted to retaliatory (self-defense) fires. For slow attack speeds, the techniques contained in FM 23–65 should be used. For fast aircraft, all weapons deliver the maximum rate of fire well in front of the attacking aircraft and cause it to fly through the highest possible volume of fire. Employment of weapons in this role is governed by unit SOP (see also para 4–36 through 4–39).

d. Security measures are demanding and complex in internal defense operations and require extensive coordination with host country civil police and other governmental authorities. For further discussion, see FM 31–16, FM 31–22, and FM 31–73.

e. Detailed information concerning security of defense information may be obtained from—

(1) AR 604–5 (Clearance of Personnel for Access to Classified Defense Information).

(2) AR 604–10 (Military Personnel Security Program).

(3) AR 380–5 (Safeguarding Defense Information).

(4) AR 380–55 (Safeguarding Defense Information in Movement of Persons and Things).

(5) Army Intelligence (Counterintelligence) Units.

(6) ASA Units.

2–8. Security of the March

a. On the march, security of the front is afforded by an advance guard. The mission of the advance guard is to secure the uninterrupted advance of the main body, to protect the main body against surprise, to facilitate the advance by removal of obstacles and minor road and bridge repair, and to cover the deployment of the main body. The strength of the advance guard varies with the size of the command and the nature of the resistance to be expected. For an engineer battalion, the advance guard normally does not exceed one company and for a company, one platoon. Distances between elements in the march column depend upon the terrain, visibility, speed of movement, and enemy threat.

b. Security against attack from the rear is obtained by a rear guard organized similarly to the advance guard but disposed to the rear of the main body.

c. Flank security is provided by continuous surveillance, often by air, along both sides of the route of march. If parallel routes exist, patrols may be dispatched to afford flank security.

d. A column on the road, particularly a motorized column, is vulnerable to attack by enemy

aircraft. When movements are made in daylight, the distances between vehicles are increased to the maximum permitted by the capability of commanders to maintain march control and mutual support of elements within the column. During all road marches procedures for detecting and countering enemy aircraft are implemented in accordance with established SOP.

e. Nondivisional engineer combat units may require additional security forces to prevent ambush during movement to and from worksites in internal defense operations. See FM 31–16 and FM 31–22 for convoy security and counterambush procedures.

2–9. Security in Bivouac

Security of the bivouac area is accomplished by the security guard. The composition of the security guard varies for each situation. Generally it consists of security detachments called outposts, sentinels, visiting patrols, and a reserve. Each outpost is assigned a segment of the area to be defended. Sentinels should be placed forward at no greater distance than within rifle-support of the outpost. When observation is limited or when outposts are widely separated, visiting patrols may be used to operate between outposts and sentinels. The reserve element is located with the main body for rapid deployment in the event an outpost is penetrated by the enemy. Communications are maintained between all elements of the security guard and the main body. A battalion in bivouac may require as much as one company as outpost; and a company, one platoon; but these requirements are dependent on the tactical situation. Automatic weapons are positioned to maximize their air and ground capability. Small arms fire is used to supplement the fire from automatic weapons against attacking enemy aircraft. Antitank weapons are positioned to cover the probable approaches for enemy armored vehicles. Roadblocks, wire, and minefields are valuable protective measures and are used when the time and labor involved in placing and removing them is commensurate with the tactical situation. Means of rapid communication between the outpost system and the main body are necessary to insure timely warning. In an internal defense and internal development environment, security of bivouac sites takes on added significance and may be complicated by the presence of host country civilian and military personnel in or near the bivouac sites.

2–10. Security at Worksites

a. Security detachments are posted to cover the approaches to worksites thereby preventing surprise. Engineer troops of the work party keep their weapons close at hand and are prepared to assembly and deploy to preplanned defensive positions quickly on warning.

b. As protection against air attack, vehicles and equipment are dispersed and concealed when not in use. Provision is made for warning by vehicle horn, gong, siren, or other means. When the alarm is given, troops disperse and take cover in their defensive positions. If air attack ensues, the provisions of paragraph 2–7*c* apply. Observers must be well trained in the identification of aircraft and must be cautioned not to interrupt the work by sounding the alarm for aircraft which are not likely to attack (i.e., friendly, high, distant) unless enemy detection of the position is a factor.

c. Isolated worksite security requirements are increased for engineer units engaged in internal defense and internal development operations. Engineer personnel engaged in military civic action projects in populated areas are particularly subject to terrorist-type activities. See paragraphs 4–25 through 4–33, for further discussion.

2–11. Communications Security

a. Due to the wide dispersion of engineer units, heavy reliance is placed on the use of radio communications. The enemy has the capability to derive valuable information from the intercept and analysis of such communications. While information concerning individual engineer unit operations may not be classified or revealing, the enemy can compile many such items of information and thereby discover indications of friendly plans and operations. For example, interception and direction-finding of transmitters associated with a bridge company moving toward a river can alert the enemy to expect a river-crossing operation. Even on secured circuits, changes in the volume of traffic can indicate an impending operation.

b. The threat described above can be alleviated through strict disciplinary compliance with established communications security practices and procedures. Communications security is the protection resulting from all measures to deny unauthorized persons information of value which might be derived from the possession and study of telecommunications, or to mislead unauthorized persons in their interpretations of the results

of such possession and study. Communications security consists of: Crypto security; emission security; transmission security; and physical security of COMSEC materials and information.

c. For further details on communication security, see FM 32–5.

2–12. Rear Area Security

a. Nondivisional engineer combat units are employed primarily on tasks requiring combat engineering skills and special combat engineer equipment in furtherance of the mission of tactical units and are committed as infantry only in emergencies. Such commitment, when considered by the responsible commander, is weighted against the current and future requirements for engineer work. When committed, however, nondivisional engineer combat units are relieved as soon as possible after the cessation of the emergency or upon relief by tactical units.

b. In rear areas, and in the absence of infantry or armor, nondivisional engineer combat units may be the only units or, at least, the largest and best equipped units trained in ground combat. Engineer units, therefore, may be assigned a rear area security mission that may also provide the authority to integrate other troops into the defense plan and designate the rear area defense commander upon implementation of the security plan.

c. As the extent of the area, the composition of the troops within the area, the combat support mission, available communications, and the nature and probability of attack differ, the number and disposition of troops required on security alert cannot be standardized. The threat may vary from harassment by irregular forces to coordinated airborne or night infiltration attacks. Furthermore, the danger of air attack and chemical, biological, or nuclear attack cannot be neglected. As required, other troops are incorporated into the defense plan according to their capabilities; each unit receiving a definite mission. Combat service support troops operating installations in the area usually are not assigned a defense sector; but, if necessary, they may be given defensive positions which are occupied after the alarm is given. Unless required on the defense perimeter, units operating installations normally are charged with providing local security of their own installations and with the static defense thereof.

d. Personnel must react to an air attack as outlined in the unit SOP. When active measures are used, all weapons are employed. A detailed discussion on the active and passive air defense measures can be found in FM 44–1.

e. In internal defense and internal development operations, nondivisional engineer combat units may be dependent on the supported unit(s) for security; however, they may be required to participate in the overall static defense of the site when collocated with the supported unit at relatively isolated outposts, camps, defended hamlets, or similar installations. These conditions require that engineer units engage actively in the overall defense in order to insure their own safety.

2–13. Rear Area Damage Control

a. Rear area damage control is a form of passive defense and consists of the measures taken prior to, during, and after a mass destruction attack or a natural disaster.

b. Heavy and light rescue teams to provide after-disaster assistance normally are furnished by nondivisional engineer combat units since they are the units most likely to have the required dozers, cranes, air compressors and other heavy equipment. By using squads as a nucleus, the teams can be increased to a platoon, company, battalion, or larger-size rescue team if the situation dictates. These teams enter the disaster area and move heavy loads, clear routes of communications of rubble and debris, fight fires, and perform other work necessary to rescue personnel (for further details, see FM 5–1).

CHAPTER 3

DOCTRINE FOR EMPLOYMENT OF NONDIVISIONAL ENGINEER COMBAT UNITS

Section I. INTRODUCTION

3–1. General

Success in combat is the goal toward which engineer support is primarily aimed. Combat operations require careful, detailed planning within the time available. The tactical commander insures that the actions of all subordinate units are coordinated and contribute to the accomplishment of the overall mission. The engineer commander must keep abreast of current tactical doctrine as well as advancements in military engineering in order to provide sound advice on the employment of combat engineers.

3–2. Operations in Special Environments

Operations in desert areas, northern areas, riverine areas, mountainous regions, jungles, urban areas, and forests require special considerations; and engineer techniques must be adapted to meet the peculiarities of the operational environment. Each tactical situation requires individual consideration by the engineer commander and staff. Engineers receive guidance in special tactical and regional operations from appropriate field manuals (app A).

3–3. Terminology

In the ensuing discussion, the following terms are frequently used to describe the organization and employment of engineer units:

a. Type Field Army. A fixed organization is not prescribed for the field army. As presented in this text, however, the assumed organization of the type field army is three corps each consisting of four divisions.

b. Nondivisional Engineer Combat Units. Nondivisional engineer combat units are those engineer units habitually found in the combat zone providing engineer support to all elements of the field army. Specifically, they are those units described in chapters 6 through 15.

c. Other Nondivisional Engineer Units.

(1) *Engineer camouflage company.* In addition to the units mentioned in chapters 6 through 15, the engineer camouflage company, TOE 5–97, is also located in the corps rear area and normally is assigned on the basis of one per corps with attachment to an engineer combat brigade. The mission of the engineer camouflage company is to—

(*a*) Plan, supervise and inspect camouflage installation including deceptive devices.

(*b*) To supervise and inspect camouflage discipline and training. See FM 5–20 and related manuals for details on camouflage.

(2) *Engineer topographic units.* The army engineer topographic battalion and the corps engineer topographic company are also located in the combat zone. They are under the command and control of the engineer combat brigades.

(*a*) The army engineer topographic battalion is assigned to the army combat brigade. It has the mission of providing engineer surveys, maps, map substitutes, and related technical information and materials as required for an army in the field.

(*b*) A corps engineer topographic company is assigned to each of the corps engineer combat brigades. It has the mission of providing topographic maps, overprinted maps and topographic intelligence, and artillery and topographic survey data in support of a corps of a field army.

(*c*) For further details on engineer topographic units, see FM 5–146.

d. Engineer Companies, Separate Brigades. The various separate engineer companies, organic to the separate brigades are discussed in chapter 15. Although these units are considered nondivisional engineer combat units they function for the separate brigade much as the division engineer battalion functions for the division.

e. Status of Units. (See FM 5–1 for further discussion.)

(1) *Assignment.* The placement of a unit in

a command under which it normally functions is termed assignment. In addition, a unit may be further assigned to a subordinate command.

(2) *Attachment.* Attachment is the temporary placement of a unit under a command other than its parent or assigned unit. Subject to the limitations imposed by the attachment order, the commander of the unit receiving the attachment exercises the same degree of command control thereover that he does over units and persons organic to his command.

f. Types of Support.

(1) *General support.* General support is that support which is given to the supported force as a whole and not to any particular subdivision thereof.

(2) *Direct support.* Direct support is support provided by a unit not attached or under command of the supported unit, but required to give priority to the support required by that unit. The engineer unit placed in direct support is responsive to the requests of the supported unit but remains under the command of its parent unit.

g. Types of Work Assignment. Within the framework of the status and type of support, a unit may be given work to accomplish on an area or task basis or a combination of both.

(1) *Task assignment.* Task assignment is the assignment of a specific project or projects to be accomplished by a unit.

(2) *Area assignment.* Area assignment is the designation of responsibility to a unit for general engineer work within a specified geographic area.

h. Types of Construction.

(1) *Vertical construction.* Vertical construction refers to tasks or projects primarily concerned with the erection of buildings and similar structures with little earthwork requirement.

(2) *Horizontal construction.* Horizontal construction refers to projects or tasks such as roads and airfields involving primarily earthwork and earthmoving equipment.

i. TOE Terminology. Current tables may be modified by inclusion of an augmentation, by organization under reduced level, by organization as a type B unit, and by modification table of organization and equipment (MTOE). Major commanders are MTOE proponents. All MTOE actions must be submitted to DA for approval (AR 310–31). An MTOE is specific only for individual TOE units of a command as compared to a TOE which is applicable to all like TOE units Army-wide. The TOE shows units organized at three strength levels: At level 1, full or 100 percent; at level 2, operational capability is decreased to about 90 percent of level 1; at level 3, operational capability is decreased to 80 percent of level 1.

Section II. EMPLOYMENT OF ARMY AND CORPS ENGINEER COMBAT BRIGADES AND ENGINEER COMBAT GROUPS

3–4. Army or Corps Engineer Combat Brigades

a. The largest engineer command organizations assigned to a field army are the engineer combat brigades, army or corps. Normally, one engineer combat brigade, army (referred to hereinafter as the army engineer combat brigade) is assigned to each field army and one engineer combat brigade, corps (referred to hereinafter as the corps engineer combat brigade is assigned to each of the corps of a field army (fig. 3–1). These brigades are used to command and control large-scale operations of nondivisional engineer combat units in the combat zone. The types and number of engineer units assigned or attached to a brigade determines its capability.

b. The army and corps engineer combat brigades are flexible organizations. They consist of a fixed headquarters and headquarters company (chap 6) to which engineer combat groups and other units are assigned and attached. Normally two to three engineer combat groups comprise an engineer combat brigade. In addition, an engineer topographic battalion, army, is assigned or attached to the army engineer combat brigade while a corps engineer topographic company and an engineer camouflage company are assigned or attached to the corps engineer combat brigade. Both the army and corps engineer combat brigades may also have variety of service teams from the TOE 500-series to provide personnel, legal, medical, communications, and specialized engineering services, where requirements exceed organic capabilities.

c. The army or corps engineer combat brigades perform the following missions:

(1) Command and control assigned and attached units and coordinate their activities.

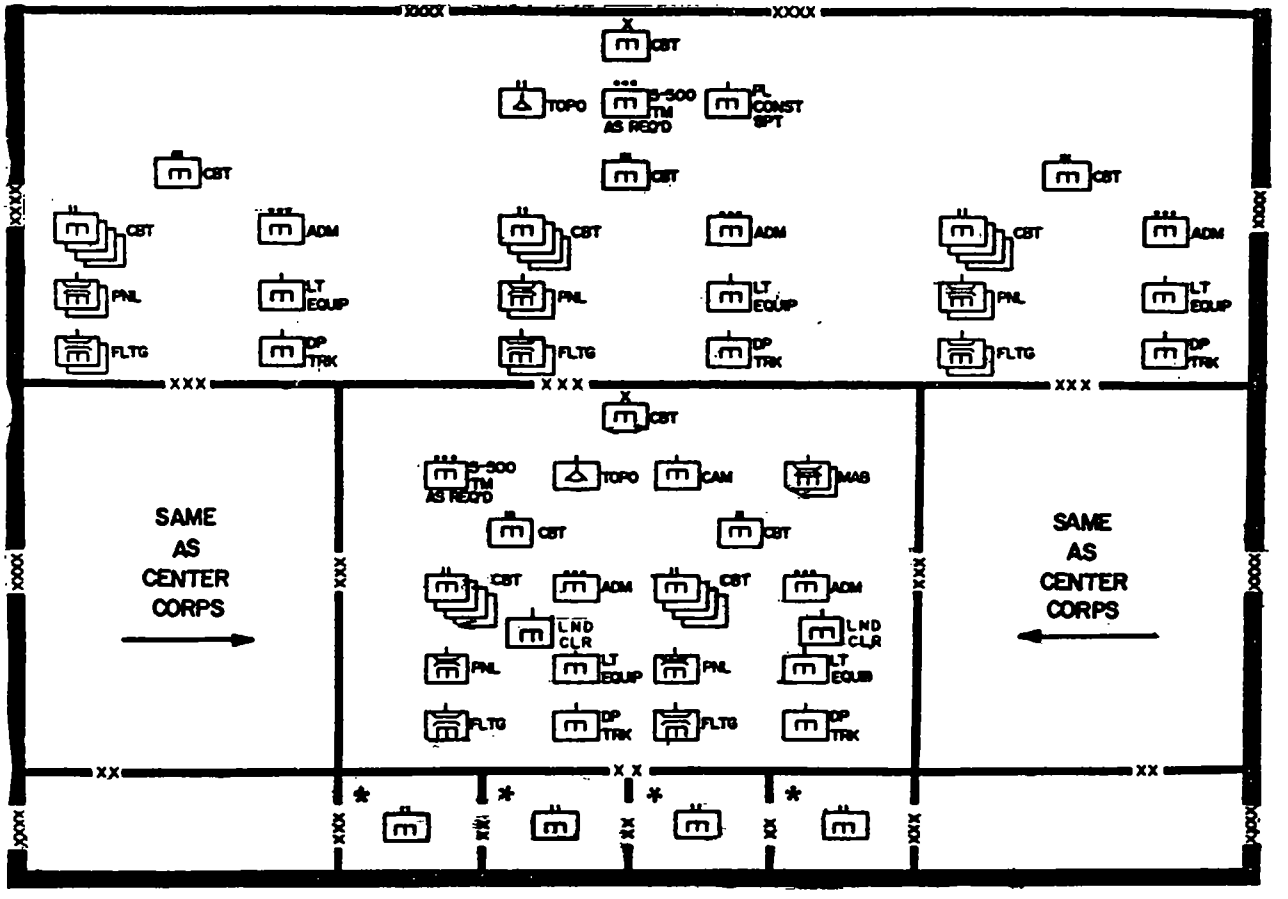


Figure 3-1. Typical allocation of nondivisional engineer combat units to a type field army of 12 divisions.

(2) Provide the army or corps headquarters with an engineer staff section.

3-5. Brigade Employment

a. Army Engineer Combat Brigade. The army engineer combat brigade provides general engineer combat and construction support for the field army to include elements of the field army support command (FASCOM) located in the field army service area. Elements of the army engineer combat brigade operate from the army rear boundary forward into the corps area on both an area and task assignment basis; operations forward of the corps rear boundary, however, are coordinated with the corps commander through the corps engineer. Occasionally, an army engineer combat brigade may also be attached to and operate as a part of an independent task force.

b. Corps Engineer Combat Brigade. A corps engineer combat brigade operating in each corps provides the command, control, and staff necessary for coordinated engineer support. The corps engineer combat brigade provides general engineer combat support and construction support for combat, combat support, and combat service support units within the corps area. In addition, elements of this brigade usually operate in direct support of the divisions and within the area of the forward divisions on a task or area assignment basis.

c. Employment in Internal Defense and Internal Development Operations. In internal defense and internal development operations, an engineer combat brigade (army or corps) may be attached to and operate as part of a Mission, MAAG, or Military Assistance Command. Subordinate units may be placed in general or direct support of divisions, brigades, battalions, or specific political subdivisions such as provinces, villages, defended hamlets, and military installations. Engineer units may be required to operate

independently for extended periods of time in support of small military internal defense and internal development organizations.

3-6. Engineer Combat Groups

a. The major nondivisional engineer combat units assigned or attached to the engineer combat brigades are the engineer combat groups. Whether assigned or attached to an army engineer combat brigade (and referred to as an army engineer combat group) or to a corps engineer combat brigade (and referred to as a corps engineer combat group) both groups are identical. The types and number of engineer units assigned or attached to an engineer combat group determine its capabilities.

b. Like the engineer combat brigade, the engineer combat group is a flexible organization consisting of fixed headquarters and headquarters company (chap 7) to which other engineer units are assigned or attached in accordance with the overall mission, type and amount of engineer support required, and the engineer units available. The following nondivisional engineer combat units may be attached to an engineer combat group:

(1) Engineer combat battalion (army or corps) (chap 8).

(2) Engineer float bridge company (chap 10).

(3) Engineer mobile assault bridge company (chap 10).

(4) Engineer panel bridge company (chap 11).

(5) Engineer light equipment company (chap 12).

(6) Engineer dump truck company (chap 13).

(7) Engineer land clearing company (chap 14).

c. A typical engineer combat group consists of four army or corps engineer combat battalions and one each engineer light equipment, dump truck, float bridge, and panel bridge companies. The mission of the engineer combat group is to command and control these units and coordinate their activities.

3-7. Group Employment

The engineer combat group normally operates as part of an army or corps engineer combat brigade although it may operate directly under army, corps, or an independent task force. At corps, the engineer combat group usually operates from the corps rear boundary forward into the divisional area, primarily on an area assignment basis. Routine support is coordinated by the engineer combat group or corps engineer combat brigade headquarters with the supported divisions. The entire engineer combat group or some of its units occasionally may be placed in direct support of or even attached to a division. In a direct support role or upon attachment, the supporting battalion or group commander coordinates with the division commander through the division engineer. At army, the engineer combat group generally operates from the army rear boundary forward into the corps area and renders primarily general support on either an area or task assignment basis. Coordination is conducted primarily between the army engineer combat brigade and the corps engineer combat brigade headquarters.

3-8. Coordination and Liaison

a. The commander of the army engineer brigade also serves as the army engineer and is represented at army headquarters by an assistant army engineer who also supervises the army engineer section. In similar manner, the commander of the corps engineer combat brigade also serves as the corps engineer and is represented at corps headquarters by an assistant corps engineer who supervises the corps engineer section. The engineer staff sections function as an integral part of the army or corps headquarters. The assistant army or corps engineer, in addition to representing the brigade commander, performs duties relating to engineer staff planning and assistance. Within the army area, the engineer combat brigade commander controls and coordinates all engineer combat support and construction activities. Coordination with the various corps is accomplished through the corps engineers and assistant corps engineers at corps headquarters. In the corps area, the commander of the corps engineer combat brigade controls and coordinates all nondivisional engineer combat support and construction activities. Corps engineer combat brigade elements operating forward into divisional areas on a task or area assignment coordinate major activities with the division engineer through their engineer combat group headquarters. When attached to or in direct support of a division, they coordinate with the division engineer.

b. The establishment of liaison with the supported unit is essential for successful engineer operations. Liaison is the responsibility of both parties; however, liaison personnel are furnished by the supporting unit to the supported unit. Usually, the engineer combat battalion of the

engineer combat group, when placed in direct support of a division, maintains a liaison officer at the office of the assistant division engineer. The supporting engineer unit commander makes whatever arrangements are necessary to assure adequate liaison.

c. Coordination and liaison are of particular importance in internal defense and internal development operations, especially when engineer units are engaged simultaneously in civil-military action projects and support of tactical operations. Since both military and civilian agencies are deeply involved in all aspects of internal defense and internal development operations, engineer combat units must insure that their support of tactical operations, civil-military action, and other operations are fully coordinated.

3-9. Engineers in the Corps Area

a. In general, work accomplished by engineer units of the corps engineer combat brigade has a greater capability for sustained use than that of division engineer units whose first concern is expediency. The corps engineer combat brigade or its engineer combat groups provide general support for the corps by assigning a variety of missions to subordinate units. For example, some elements of an engineer combat group of the corps engineer combat brigade may be designated to perform all engineer work in a specific area; other elements of this group may be placed in direct support of a division; and the remaining elements may be assigned specific tasks in the forward division areas or corps rear area.

b. The area of responsibility normally assigned to the corps engineer combat brigade in general support includes the rear areas of the forward divisions as well as the corps area. In turn, areas of responsibility may be assigned to each of the engineer combat groups of the corps engineer combat brigade by dividing the corps area laterally or longitudinally depending upon the particular situation. The assignment of areas to engineer combat battalions within the engineer combat groups may also be made by boundaries generally perpendicular to the front or by boundaries parallel to the front. Placing the engineer combat battalions abreast allows better control and places each battalion in a position where it can take over work in the support area of the tactical echelon to its front. On the other hand, placing engineer combat battalions in column so that they can be leapfrogged forward permits employment of one unit in the same area for the maximum length of time. The following factors are considered in assigning areas to units for engineer work:

(1) The overall mission and tactical situation.

(2) The military route network to include route congestion.

(3) The amount of engineer work required in the designated area.

(4) Enemy interference.

(5) Communication and control.

(6) The strength and type of engineer units available to include the amount and condition of heavy engineer equipment.

c. The number of nondivisional engineer units placed in direct support of a committed division varies; however, it is normal practice to place at least one engineer combat battalion in direct support of each committed division. In some situations an entire engineer combat group may be placed in direct support of a division for a period of time or for a specific operation.

d. Units of the engineer combat group usually are attached to armored and mechanized divisions due to the great distances these divisions normally operate from the remainder of the corps. In such instances, attachment is necessary because it is impractical for the parent unit commander to exercise effective control, support, and supervision.

e. When a nondivisional engineer combat battalion is attached to an armored or mechanized division, especially during exploitation and/or pursuit operations, effort should be made to provide this unit with armored personnel carriers (APC) since greater cross-country mobility is required to properly support such operations.

3-10. Engineers in the Army Area

a. Mission. Units of the army engineer combat brigade support corps operations in a manner similar to that of the units of the corps engineer combat brigade in support of divisions; that is, they assume responsibility for engineer tasks well forward in the corps areas. At division and corps level, the emphasis of engineer effort is placed on the support of combat operations. At army level, support to elements of the field army support command (FASCOM) within the army service area and development of more permanent facilities receive more consideration.

b. Methods of Employment.

(1) Generally, area assignment missions are given to engineer units of the army engineer com-

bat brigade. However, task assignments or a combination of both types of missions may be employed.

(2) Normally, one engineer combat group of the army engineer combat brigade is placed in support of each corps. This group is assigned an area and is responsible for general engineer work throughout the area. The engineer combat group in turn, generally divides its area of responsibility among the attached engineer combat battalions and assigns them appropriate missions therein.

(3) In internal defense and internal development operations, area or task assignment to subordinats units often corresponds with political subdivisions such as regions, provinces, districts, or villages.

3–11. Engineer Planning

a. The army or corps engineer combat brigades or the engineer combat groups do not bivouac or more as a unit in tactical operations. Moreover, such large engineer organizations seldom are employed on a single project. Rather, engineer support normally is rendered by assigning component tasks of the overall mission to subordinate units. Exceptions to this general rule are operations calling for close coordination such as infantry combat, preparation of area defensive positions, and river crossings wherein an entire engineer combat group may be employed.

b. The successful execution and timely completion of engineer tasks require thorough planning. Such planning reduces the delay caused by unforeseen difficulties and provides for the orderly completion of the work in the alloted time. The engineer commander gathers reliable information, carefully estimates his requirements, and fits his resources to meet the task. All predictable factors are considered; the executions of the task is visualized from start to finish; and planning is conducted concurrently at successive command echelons.

c. Detailed planning normally is accomplished by the unit directly responsible for the task. Planning is progressively less detailed at higher command levels. For example, when a battalion is assigned an engineer mission, engineer planning is sufficiently detailed to insure that work assignments, equipment, and material are adequate for the task and within the battalion's capabilities. Specific details are not issued to the engineer company to which the work is assigned. However, the company may receive guidance on the best methods to accomplish the mission, including details, drawings, and guidance to insure timely and efficient completion of the work. The company commander is permitted to make his own plans, exercise his initiative, and feel a sense of responsibility for the results of his unit's work. Moreover, if two or more units are working together on a single mission, coordination places limitations on the discretion of subordinate commanders and may require the development of detailed plans and closer supervision by higher command echelons.

d. Planning is not terminated with the completion of a particular mission or phase of an operation but is continuous. As the job progresses, plans are reviewed and revised as new factors develop. Planning envisions, whenever possible, future developments; and alternate plans are prepared to meet likely contingencies.

3–12. Communications

a. Adequate communications are necessary for successful engineer operations. Rapid change in the operational environment similarly affects combat engineer support. Engineer tasks normally are of immediate and critical importance, and the wide dispersion of engineer brigade and group elements makes a rapid and responsive communications system mandatory to provide the command and control required by the commander and his staff. Nondivisional engineer units are equipped with both radio (app D) and wire communications equipment.

b. Engineer combat group headquarters operate within the engineer combat brigade communications net in accordance with the signal operating instructions (SOI) published by the brigade. All units attached to an engineer combat group normally operate within the group communications net which is controlled by the group communications section. Moreover, an engineer unit in direct support of a tactical unit requires copies of the supported unit's SOI to facilitate communications. In an internal defense environment, engineer units operating in support of host country armed and paramilitary forces or political subdivisions often are required to operate in the supported unit's radio nets for security as well as for command and control purposes.

c. Due to wide dispersion of engineer units, the organic capability of the engineer combat brigade and group normally is not sufficient to satisfy all communication requirements. Because of the critical need for reliable communications,

headquarters elements of the engineer combat brigades, groups, and subordinate battalions are located so far as possible in close proximity to area signal centers (FM 24–1). The corps or army signal officer can provide the locations of area signal centers which are capable of providing the required signal support to engineer units.

3–13. Training

a. Purpose. The increased dispersion and frequent displacement of units in a nuclear or CBR envoronment and internal defense and internal development operations requires initiative, ingenuity, and a high degree of technical proficiency on the part of engineers at all echelons. Training insures efficiency in management and utilization of equipment, personnel, and available resources and is conducted under the provisions of ATP 5–25.

b. Responsibility. The commanders of units attached to the engineer combat group are responsible to the group commander for the training of their units.

c. Training Materials. Fundamental training doctrines and principles are outlined in FM 21–5; and specific techniques of military instruction are given in FM 21–6. Special training instructions are published in training circulars, subject schedules, and periodic training directives. Available training films, filmstrips, and visual training aids are used whenever applicable.

Section III. EMPLOYMENT OF THE AIRBORNE ENGINEER COMBAT BRIGADE AND THE AIRBORNE ENGINEER COMBAT GROUP

3–14. Airborne Engineer Combat Brigade

a. The largest engineer command organization assigned to an airborne corps is the airborne engineer combat brigade. The brigade is used to command and control nondivisional engineer combat units within an airhead.

b. The airborne engineer combat brigade is a flexible organization. It consists of a fixed headquarters and headquarters company (chap 6) to which airborne engineer combat groups and other units are assigned or attached. Normally two to three airborne engineer combat groups comprise an airborne engineer combat brigade.

c. The airborne engineer combat brigade performs the following missions:

(1) It commands and controls assigned and attached units and coordinates their activities.

(2) It provides the airborne corps with an engineer staff section.

3–15. Employment

The airborne engineer combat brigade normally is assigned to an airborne corps and is employed during airborne operations of corps size. The personnel and equipment of the headquarters and headquarters company, airborne engineer combat brigade are capable of being airlanded or airdropped. This brigade, in support of the divisions of the corps, is responsible for the improvement of landing areas (drop, extraction, and landing zones) originally constructed by the airborne engineer battalions of the divisions, and for the construction of any additional landing areas required by the forces during the exploitation of the airborne or airmobile operations. Additionally, this brigade performs the other combat engineer support tasks required by the divisions of the airborne corps in the ground combat phase of the assault. Thus, once airlanded or airdropped, it performs in similar manner to the army and corps engineer combat brigades discussed in paragraphs 3–4 through 3–13.

3–16. Airborne Engineer Combat Groups

a. The major nondivisional engineer combat units assigned or attached to the airborne engineer combat brigade are the airborne engineer combat groups. The types and number of engineer units assigned or attached to an airborne engineer combat group determine its capabilities.

b. Like the airborne engineer combat brigade, the airborne engineer combat group is a flexible organization. It has a fixed headquarters and headquarters company (chap 7) to which other engineer units are assigned or attached in accordance with the overall mission, type and amount of engineer support required, and the engineer units available for the air assault. The following nondivisional engineer combat units are attached to an airborne engineer combat group:

(1) Engineer combat battalion, airborne (chap 9).

(2) Engineer light equipment company, airborne (chap 12).

(3) Engineer combat battalion, army or corps (when the units listed in (1) above are not available).

c. A typical airborne engineer combat group consists of two to four airborne engineer combat battalions and an airborne engineer light equipment company.

CHAPTER 4

OPERATIONS

(STANAG 2123)

Section I. NONDIVISIONAL ENGINEER COMBAT UNITS IN THE OFFENSE

4-1. General

The operations of nondivisional engineer combat units in all phases of offensive operations include—

a. Engineer reconnaissance.

b. Construction, repair, and maintenance of roads, routes, and trails for troop movement, supply, and evacuation.

c. Preparation and maintenance of fords and crossing points for amphibious, deep and shallow fording vehicles.

d. Construction of fixed and floating bridges and bypasses, and provision of additional crossing means, such as assault boats, ferries, cableways, and tramways.

e. Reinforcement of flank and rear security by preparation of obstacles.

f. Breaching, neutralizing, or destroying all types of obstacles that hinder movement of the supported forces.

g. Construction of forward air landing facilities.

h. Engagement in infantry type combat.

i. Establishment and operation of water points for the production of potable water.

j. Riverine Operations.

4-2. Corps Engineer Support

Nondivisional engineer combat units of the corps engineer combat brigade, prior to the outset of the attack, take over the divisional engineer battalions' responsibilities in the divisional rear areas as a part of the corps engineer combat brigades' general support mission. This is accomplished by engineer combat battalions of the corps engineer combat group located in the corps area immediately behind the division rear boundary. These battalions normally are employed on routine area and task assignments working forward into the division area to an informal boundary, known as the engineer work line, which is established by common agreement by the corps engineer combat group commander and the divisional engineers. They also participate in the accomplishment of specific missions in the forward areas regardless of the engineer work line. As the attack advances, the corps engineer combat group progressively extends its boundary forward to relieve the divisional engineer battalions.

4-3. Army Engineer Support

a. The operations of nondivisional engineer combat units of the army engineer combat brigade in support of a corps offensive closely parallel the operations of a corps engineer combat group in support of a division. Upon receipt of orders from the army engineer to support a corps, the commander of the army engineer combat group makes personal contact with the corps engineer to arrange the details of support and required liaison. Contact between the corps engineer combat brigade and the army engineer combat group is maintained by a group liaison officer supplemented by frequent command visits. Generally, an army engineer combat group supporting a corps is assigned an area of responsibility in the corps area which permits corps nondivisional engineer combat units to concentrate their efforts in support of the attacking divisions.

b. Supporting missions which the army engineer combat group may be called upon to perform in support of a corps are—

(1) Maintenance of routes of communication.

(2) Replacement of tactical bridges with more durable structures.

(3) Clearance of minefields and other obstacles.

(4) Construction of air landing facilities.

(5) Assistance in corps river-crossing operations.

(6) Establishment and operation of water points for the production of potable water.

(7) Installation of assault military pipelines.

c. In addition to the above tasks, engineers in the field are often required to produce construction material; units of the army engineer combat brigade may establish and operate the following installations:

(1) Sawmills, to include the forestry portion of lumber production such as selection of trees to be cut, felling, and movement to the sawmill when augmented by the forestry team of TOE 5–500-series.

(2) Quarries and sand and gravel pits when augmented by teams of the TOE 5–500-series.

(3) Utilities to include operation and maintenance of water, sewage disposal, and electric power systems when augmented by teams of the TOE 5–500-series.

d. Those units of the army engineer combat brigade not directly assisting the attacking corps continue to perform engineer missions within the army service area such as maintenance and improvement of routes of communication and the support of FASCOM units.

Section II. NONDIVISIONAL ENGINEER COMBAT UNITS IN THE DEFENSE

4–4. General

a. In the defense, maneuver units prevent, resist, repulse, or destroy an enemy attack. The purpose of the defense is to gain time pending the development of more favorable conditions for undertaking the offensive; to economize forces in one area and thus concentrate superior forces for decisive offensive action elsewhere; to destroy or trap a hostile force; to reduce the enemy capacity for offensive action; or to deny the enemy entry into an area.

b. There are two basic types of defense, the *mobile* defense and the *area* defense.

(1) The *mobile* defense employs a combination of offensive, defensive, and delaying actions with the ultimate success of the defense depending upon offensive action. The primary objective of the mobile defense is the destruction of the attacking enemy force. In the mobile defense, minimum forces are deployed as fixing forces in the forward defensive area to detect, disorganize, and delay the attacking enemy and to provide time and space for action of the reserve. The bulk of the combat power of the command is deployed as a counterattack force which employs the principles of offensive combat to destroy the enemy at the most favorable time and place.

(2) In the *area* defense, emphasis is placed on retention of specific terrain and offensive and defensive actions are directed at stopping the enemy forward of the forward defensive area or ejecting him if he penetrates this area. The bulk of the combat power of the command is committed to defense of the forward defensive area. Reserves are employed to add depth to the defense, to block or destroy enemy penetrations, to counterattack and restore the defensive position, or to reinforce threatened forces.

(3) In many instances, the type of defense employed incorporates features of both the mobile and area defensive concepts.

4–5. Employment of Nondivisional Engineer Combat Units in the Defense

a. Engineer operations in the defense consist mainly of supporting other troops in organizing the ground. This is a process of strengthening positions by clearing fields of fire, entrenching, constructing weapons emplacements, shelters, and barrier installation to include minefields, ADM targeting, and other obstacles. In general, tactical units are responsible for organization of the ground and construction of defensive works in their assigned area. In the accomplishment of this mission, nondivisional engineer combat units provide plans, equipment, supervision, technical assistance, and advice.

b. Divisional engineers generally receive additional assistance from units of the corps engineer combat brigade in constructing extensive fortifications and barrer systems. Support is extended in a similar manner as in the offensive. Other tasks on which elements of the corps engineer combat brigade may be employed are maintenance of routes, operating water points in the corps rear, installation of fixed and floating bridges, earthmoving projects, preparation of flank and blocking positions, participation in installing assigned portions of the barrier system and participation in denial operations according to the corps denial plan.

c. The covering force for a corps defensive position is designated by the corps commander. The covering force usually has organic engineers, but these may be supplemented by units of the corps engineer combat brigade. Units or elements of the

corps engineer combat brigade normally are attached to the force since the distance generally is too great for effective centralized engineer control. The nondivisional engineer elements operate under direction of the staff engineer of the covering force. Although the operations of the covering force follow standard tactics, the maintenance of routes takes on added significance. The maintenance of routes both for supply and rapid withdrawal is the responsibility of the covering force engineer, who, it turn, may assign much or all of this work to the attached engineer element. Coordination between engineer and tactical commanders of obstacle execution such as bridge demolitions, road craters and abatis is of critical importance.

d. Preparation of defensive positions in rear areas are discussed in (1) through (3) below.

(1) *General.* In general, corps and army engineer combat groups may be called upon to prepare defensive positions and barriers in rear areas. These are positions to which forward troops may fall back and eventually defend.

(*a*) A fully prepared position requires a great deal of hand labor. The engineer combat group commander estimates his requirements and requests additional troops and civilian labor when required. Reinforcing labor is controlled and supervised by engineer troops.

(*b*) Work assignments for the engineer combat battalions of the engineer combat group for the preparation of large defensive positions are made on an area basis.

(2) *Priority of work.* The engineer combat group commander keeps in mind that a position may be occupied before completion. For this reason, the work which is most crucial to the defense of the position is undertaken first. A typical priority of work is shown below; all attempts should be made, however, to carry out work concurrently.

(*a*) Constructing positions for nuclear delivery means.

(*b*) Clearing fields of fire and objects that restrict observation.

(*c*) Preparing barrier traces by installing minefields and other obstacles.

(*d*) Improving routes of supply, evacuation, and movement of reserves.

(*e*) Preparing positions for nonnuclear artillery delivery means.

(*f*) Preparing individual shelters and crew-served weapons emplacements.

(*g*) Preparing secondary demolitions and obstacles.

(3) *Layout of position.* The general nature of the defensive position is prescribed by the corps or army commander. If the identity of units designated to occupy the position is available, liaison personnel from the supported unit are requested to provide planning assistance. In the event identity of occupying combat units are not known, army or corps staff officers may be assigned to assist in planning and organizing the position.

e. In internal defense and internal development operations nondivisional engineer combat units may be called upon to prepare village defenses, construct outposts, bases, and other types of military and civilian installations peculiar to internal defense and internal development operations. See paragraphs 4–25 through 4–33 for further discussion.

Section III. NONDIVISIONAL ENGINEER COMBAT UNITS IN THE RETROGRADE

4–6. General

In a retrograde operation, which is the movement of a force to the rear or away from the enemy, the principal responsibility of nondivisional engineer combat units is to keep routes of withdrawal open. These routes usually are those already in use and, thereby, often require only minor maintenance. However, once the enemy suspects that a retrograde operation is underway, he will attempt to damage routes of communication to prevent timely displacement of friendly forces. Prompt repair of routes may prove to be a major engineer task, necessitating the establishment of additional and alternate routes.

4–7. Nondivisional Engineer Support

a. Nondivisional engineer combat units of the corps engineer combat brigade deny to the enemy, installations, supplies, and structures which are not needed by friendly forces as indicated in corps denial plan. Bridges and defiles are prepared for demolition. A small engineer party is left at the demolition site to provide security and to fire the charge, if so directed in the demolition order. If the targets are turned over to another commander, the security party rejoins its parent unit. Minefields are laid and other obstacles are constructed. Divisional engineers close gaps and lanes once all friendly troops have been withdrawn. Designated rear defensive

positions and barriers are prepared whenever possible before the arrival of combat elements. The preparation and execution of demolitions and the creation of minefields follow and are in accordance with the corps barrier plan.

b. To support nondivisional engineer units of the corps engineer combat brigade, nondivisional engineer combat units of the army engineer combat brigade maintain routes and bridges, prepare and execute demolitions, prepare delaying positions, and establish minefields and other obstacles as directed.

Section IV. RIVER-CROSSING OPERATIONS

4–8. General

Hasty and deliberate river crossings are special tactical operations whose success is not predicated on the seizure of bridges intact. A rapid aggressive advance to the river, however, may permit the capture of crossing means before their destruction. Units should be prepared to take maximum advantage of such opportunities. See FM 31–60 for further discussion.

a. A hasty crossing is a planned, river-crossing operation which is characterized by speed, surprise, and the minimum loss of momentum by assault forces. It is, therefore, less vulnerable to nuclear attack than a deliberate crossing. Fire support and crossing means are made available to assault force commanders before arrival at the river.

b. A deliberate crossing is conducted for any of the following reasons: As a resumption of the offensive at the riverline; when a hasty crossing is not feasible because of the difficulty of the obstacle or the strength of enemy defenses; or as a result of an unsuccessful hasty crossing. A deliberate river crossing in the face of the enemy is frequently a corps operation. In a corps crossing, the corps commander directs tactical operations and the corps engineer directs the employment of corps nondivisional engineer combat units not placed under the control of the assaulting divisions. Planning for the operation begins well in advance including the employment of smoke for screening purposes. Based on reconnaissance, maps, and permanent record imagery, a corps tactical plan is developed prescribing division zones of action and the priority of crossing for division and corps troops. The selection of sites for heavy fixed and floating bridges to cross armor, artillery, and corps reserves is included in the corps plan. One or more divisions are designated to make the assault crossing.

4–9. Engineer Group Assignments

a. Engineer Capabilities. With the exception of the airborne and airmobile divisional engineer battalions, division engineer battalions have an organic bridge company equipped with Class 60 bridge components and six AVLB (the four launchers supply limited simultaneous bridge erection to four sites). This capability permits the construction of flat bridges, rafts, trestle bridges, and fixed short spans in support of the assaulting elements. Divisional engineer battalions may be equipped with mobile assault bridging equipment, or may be equipped with M4T6 or Class 60 bridging. Normally, each battalion so equipped can erect 148 meters of mobile assault amphibious bridging or four self-propelled Class 60 ferries or various combinations of bridges and ferries. Extensive crossing operations require additional support from corps or army in the form of fixed, floating, and assault bridging equipment with accompanying engineer units. In a deliberate river crossing, therefore, one corps engineer combat group normally is placed in direct support of each assault division. Other corps engineer combat group missions in support of river crossings involve general engineer work such as maintenance of routes of communication. Army engineer combat groups are assigned tasks in support of corps engineer combat groups and operate well forward into the corps areas.

b. Direct Support. When an engineer combat group is in direct support of a division in a deliberate crossing, the group commander coordinates with the division commander and his staff, through the division engineer. The division commander develops his tactical plan of which the engineer plan for the employment of the divisional engineer battalion and the engineer combat group is an essential part. Reconnaissance of crossing sites and approaches are made; and in coordination with the division engineer, the engineer combat group commander aids in planning the allocation of engineer tasks and equipment. The division engineer controls engineer tasks in the division area through close coordination with nondivisional engineer combat units. His knowledge of the procedures and capabilities of the divisional units makes him the engineer who can best recommend the location, employment, and strength of the engineer support.

4–10. Conduct of a River-Crossing Operation

a. Coordination of Engineer Effort. The divisional engineer battalions have the mission of engineer support to the tactical assault units. Initially, this task includes engineer assistance to amphibious, and deep fording vehicles entering and leaving the water. Later, this task may be assumed entirely by attached or supporting nondivisional engineer combat units while divisional engineer units direct their support toward the assault elements on the far shore. Nondivisional engineer combat units furnish the bulk of the major crossing means such as float bridges and ferries. Normally, the division commander initiates the construction of tactical ferries while the corps commander initiates tactical bridging. The divisional river and gap-crossing capability usually is conserved so as to be available in support of the assault elements on the far shore. To insure full utilization of engineer capabilities, divisional and nondivisional engineer combat units are assigned consecutive tasks in the crossing.

b. Unit Association. The preservation of unit integrity and unit association is particularly desirable for a river-crossing operation. The engineer combat company of the divisional engineer battalion which usually supports a specific brigade is employed, if practicable, with that brigade. Additionally, the elements of the corps engineer combat group usually associated with a particular division are employed with that division. When operating against insurgents in underdeveloped areas, river crossings are often conducted by small independent task forces. Since such a crossing usually is under the control of the commander of the force making the crossing, nondivisional engineer combat units may be attached to provide support.

c. Nuclear-Chemical-Biological Employment. Commanders of units planning to cross a river must carefully evaluate the vulnerability to enemy nuclear, chemical, and biological (CB) attack and consider various courses of action for likely contingencies during the operation. River-crossing operations require forces and tactics designed to survive enemy nuclear strikes and to capitalize on supporting friendly nuclear fires and CB agents. Speed is necessary to exploit nuclear and CB support and effect crossings before the enemy can react.

Section V. SHIP-TO-SHORE AND SHORE-TO-SHORE OPERATIONS

4–11. Engineer Amphibious Units

Engineer amphibious units may support tactical forces in shore-to-shore and ship-to-shore operations by providing engineer shore and amphibious assault personnel and specialized equipment. An extensive communication system and amphibious vehicles facilitate broad front crossings in the face of enemy nuclear capabilities. Engineer amphibious units are equipped with amphibious tracked landing vehicles (LVT). The landing vehicle, tracked, personnel (LVTP5) is used to move personnel, weapons, equipment, and supplies across a water barrier. The landing vehicle tracked, engineer (LVTE) is a special purpose amphibious vehicle used for obstacle breaching. After landing, the LVT is capable of providing inland mobility to the assault elements. Troop composition and equipment is dependent on tactical and logistical considerations. Officers assigned to engineer amphibious units advise and assist landing force commanders in planning and preparatory activities; prepare and coordinate the beach development plans; and command shore parties.

4–12. Nondivisional Engineer Combat Units

Nondivisional engineer combat units normally are attached to the shore party and provide engineer combat and construction support for an amphibious operation. For additional details see FM 5–144.

Section VI. AIRBORNE AND AIRMOBILE OPERATIONS

4–13. Airborne Operations

a. During the assault phase of an airborne operation, an essential task of the airborne divisional engineer combat battalion is to improve air landing areas (FM 5–136). Since the airborne divisional engineer combat battalion has a limited airfield construction capability, augmentation is required. In the case of an airborne operation of division size, elements of the airborne engineer combat group, such as the airborne engineer light equipment company, may be attached for the assault landing.

b. When landing facilities have been developed so that aircraft can be landed on a con-

tinuous basis, the remainder of the airborne engineer combat group is airlifted to the airhead. In addition to the specialized operations required for an airborne operation, the airborne engineer combat group also supports the airborne corps by performing the missions described for the army or corps engineer combat group.

c. For an airborne operation of corps size, the corps is supported by an airborne engineer combat brigade.

4-14. Airmobile Operations

Airmobile divisional engineer combat battalions can be airlanded into the combat area by helicopter. When the requirement for engineer support exceeds the capability of airmobile engineers, nondivisional engineer combat units (airmobile equipped) are provided by higher command echelons. The additional engineer support may take the form of bridging, obstacles emplacement, ADM employment, and similar engineering tasks; usually, this support consists of additional units and equipment to assist in the construction of landing areas. Such support may be critical if there is a requirement for landing USAF cargo aircraft. Nondivisional engineer combat units normally are placed in support of an airmobile force; however, these units may be attached when the mission requires close command and control.

Section VII. ASSAULT ON FORTIFIED AREAS

4-15. Principles

The general tactics in assaulting a fortified position are similar to those in routine offense operations. The assault phase, however, is more complex because of barriers and obstacles defended by fire and the natural advantages of defensive terrain chosen by the enemy. These difficulties are overcome by combat superiority, thorough training and preparation, special troops and equipment, and by an attack initially on a narrow front (FM 31-50).

4-16. Phases of the Assault

The assault on a foritfied area is characterized by four phases which often overlap—

a. Reduction of the hostile outpost system and developing the attack.

b. Penetration of the enemy's forward edge of the battle area (FEBA).

c. Extension of the gap laterally by isolating and reducing flank emplacements.

d. Movement of mobile reserves through the gap to complete the reduction of remaining fortifications and exploit the attack.

4-17. Engineer Missions

a. During the attack, the principal engineer mission is to assist in breaching the larger obstacles which protect the main fortified position. Reduction of enemy resistance within emplacements and the breaching of minor obstacles are assigned to specially organized and equipped assault teams which lead the attack.

b. After the penetration of a fortified line, engineers construct, improve, and maintain routes through the gap, and demolish emplacements as required.

4-18. Disposition of Engineer Elements

a. To insure close cooperation, engineer and other assault elements operate as a team, particularly in the initial phases of the assault. For this reason the required engineer elements are attached to the assaulting teams. In the event divisional engineer units cannot furnish all the necessary engineer support needed in the assault, units of the corps engineer combat group may be attached for the assault. Attachment ordinarily ceases when the main obstacles and positions have been breached and passed.

b. Except for attached elements, engineer combat battalions of the corps engineer combat group function in direct support of divisional engineer combat units. In this capacity, gaps through obstacles are widened, routes are improved and maintained, and minefields are breached. Nondivisional engineer combat units work as far forward as possible permitting divisional engineer combat units to accompany the assault elements.

4-19. Reconnaissance and Planning

a. In preparation for the assault, close study is given to the obstacles and minefields which may be encountered and the terrain and routes through the fortified area. Information is collected by ground reconnaissance supplemented by aerial photographic imagery. Reconnaissance patrols may be required to gain information which cannot be determined by distant observation. The intelligence effort is aimed at uncovering routes through obstacles which are easiest to clear and subject to the least hostile fire. Reconnaissance must be carefully planned and coordinated; reconnaissance parties receive ex-

plicit instructions on the conduct of each mission.

b. The strength, equipment, and organization of engineer clearing parties are based on all information available. A clearing party usually is divided into smaller teams, for example—

(1) A leading team to clear boobytraps and antipersonnel mines.

(2) A team to breach the obstacles.

(3) A team to mark the gap and the routes between gaps in successive obstacles.

(4) A team to furnish replacements for casualties or reinforcement.

(5) A team to provide local security.

4–20. Rehearsals

Thorough training and rehearsals are desirable before an assault on a fortified area. Training in the techniques of overcoming obstacles is stressed. Assault teams composed of infantry, engineer, armor, and artillery elements working in close coordination are formed early in the preparatory phase. These teams rehearse together on replicas of enemy fortifications which are located on terrain similar to that of the contemplated assault area. Sand tables and similar training devices are also useful in preparation for the attack.

Section VIII. BARRIER AND DENIAL OPERATIONS

4–21. Barriers

a. General. Barriers contribute materially to the conduct of the defense by gaining time and economizing forces. Natural terrain obstacles are supplemented by minefields (FM 20–32), obstacles created by atomic demolition munitions, persistent effect chemical agents, and other artificial obstacles (FM 31–10). They are covered by fire, organized in depth, and protected on their flanks. Barriers may be employed in the defense to—

(1) Stop or delay enemy advance toward the front or flanks.

(2) Delay or limit movement of penetrating or enveloping forces.

(3) Canalize enemy movement into areas where he can be defeated, destroyed, or contained.

(4) Separate attacking echelons.

b. Responsibility and Employment of Nondivisional Engineer Combat Units.

(1) Normally each tactical unit is responsible for the construction of the obstacles or part of a barrier system which lies within its area. Engineer support provided by nondivisional engineer combat units consists of technical advice, construction of portions of the barrier system, and preparation and execution of specified demolitions. For NATO forces nonnuclear demolition target folders should be prepared in accordance with STANAG 2123.

(2) Nondivisional engineer combat units usually are assigned responsibility for the siting and construction of obstacles which—

(*a*) Require technical skills and special equipment.

(*b*) Benefit the command as a whole.

(*c*) Lie outside the divisions' area of responsibility.

(3) In the division areas, all work is coordinated with the division commander usually through the division engineer.

4–22. Denial Operations

a. Denial operations are designed to prevent or hinder the enemy's use of installations, materiel, or terrain. Damage and destruction may be accomplished by fire, conventional and nuclear demolition, flooding, sinking, mechanical force, and chemical or radiological contamination. Such operations are not limited to engineers; however, both divisional and nondivisional engineer combat units are concerned with the more technical aspects of denial operations. For more detailed information, see FM 5–25 and FM 31–10.

b. Adequate command and control of denial operations is essential. The extent of denial operations varies from inflicting only minor damage to complete destruction. The degree and the detail of destruction are dependent upon future operational plans and political and humanitarian considerations.

Section IX. NUCLEAR WEAPONS AND ATOMIC DEMOLITION MUNITIONS EMPLOYMENT

4–23. General

If the use of nuclear weapons or atomic demolition munitions (ADM) is contemplated, the engineer combat brigade commander, acting in the

capacity of staff engineer, participates in preliminary conferences in which methods of carrying out the tactical commander's plan are discussed. Targets and delivery means are considered; and the engineer, when appropriate, presents recommendations for retention or elimination of specific nuclear targets. The engineer is particularly concerned with the effects of nuclear employment on terrain such as cratering, tree blowdown, radiological contamination, and the influence of these effects on the overall tactical plan and engineering requirements. He may assist in the analysis of likely targets and propose employment of atomic demolition munitions in accordance with the recommendations discussed in FM 5–26.

4–24. Engineer Responsibility

When the commander decides to employ atomic demolition munitions, the engineer recommends the unit to execute the mission. Normally, the mission is assigned to the division responsible for the area in which the demolition sites are located. Except for the airborne and airmobile divisions which require augmentation, ADM missions may be accomplished by the division with its organic capability; however, if the number of targets warrant it, the engineer recommends attachments of additional ADM teams to the division. If the demolition site is not in the division area, the engineer recommends the control arrangements appropriate for the circumstances and designates the emplacing and firing unit. The executing unit may be a major tactical organization such as a brigade or an armored cavalry regiment. In areas not under the control of an appropriate tactical commander, an engineer combat group may be designated the executing unit by the releasing commander. In situations which require direct control of the demolition by the commander, the engineer may recommend formation of a demolition task force and designate the engineer elements of the task force (FM 31–10). Unless the mission has been assigned to a unit which has an organic ADM capability the engineer is also responsible for providing ADM teams and required additional engineer support. The capability of the engineer brigade to support multiple ADM operations is dependent upon the number of ADM teams (TOE 5–570) which have been attached to the brigade (app B). Since the engineer has special staff responsibility for the employment of barriers and the erection and reduction of obstacles, he is the officer who prepares the atomic demolition plan under the supervision of the army or corps operations officer and through whom all matters concerning ADM are coordinated.

Section X. STABILITY OPERATIONS

4–25. General

a. Stability operations involve military, political, economic, and psychological actions taken to defeat subversive insurgency. The employment of nondivisional engineer combat units in limited and general war, as previously discussed, is applicable to internal defense and internal development operations when modified to fit the special requirements of the operational environment and nature of the insurgent threat.

b. The ultimate objective in combating insurgency is to eliminate its causes and prevent its recurrence. Nondivisional engineer combat units may be required to support stability operations over vast areas; engineer planning, therefore, must anticipate the accompanying difficulties including command and control and combat service support of such operations. Most important is the complete integration of engineer operations into the overall stability operations effort. Nondivisional engineer combat units may support U.S. MAAG; Missions; Military Assistance Commands (MAC); or U.S. and HC armed forces, paramilitary forces, and civilian agencies. Support may encompass participation in tactical operations; assistance to HC and U.S. forces in military civic action; provision of mobile training teams (MTT) in an advisory role to HC armed and paramilitary forces and civilian agencies; conduct of independent operations as part of the overall internal defense effort; and participation in intelligence and psychological operations. Augmentations from the Engineer TOE 5–500-series, Psychological TOE 33–500-series, and Civil Affairs Organizations TOE 41–500-series may be required to provide a greater capability to perform these missions.

c. For an additional discussion of engineer units in internal defense and internal development operations, see FM 31–22 and TM 5–227. For general guidance in internal defense and internal development operations, see FM 30–31, FM 31–21, FM 31–73, FM 41–10, FM 100–5 and FM 100–20.

4–26. Stability Operational Environment

a. Many factors contribute to making a sta-

bility operational environment different from that encountered in limited or general warfare. For example—

(1) The guerrilla attempts to select terrain which offers him an advantage by limiting the mobility of conventional forces.

(2) Forces usually are dispersed over an extremely wide area, and operations are oriented toward control of the population rather than the establishment of a front.

(3) The adversary generally is elusive, hard to identify, highly trained in the techniques of guerilla warfare, and well motivated.

(4) Gaining and maintaining the active support of the population is decisive in determining the outcome of the conflict. The activities of military units are thus directed toward obtaining the organized support of the population, and each operation, whether tactical, logistical, or civil-military, must be evaluated for its probable impact on the population. Engineer units frequently devote significant effort to civic projects in addition to their normal combat support tasks.

b. The requirement to win the support of the people is continuous in internal defense and internal development operations; in this respect, the application of military power must be highly selective to avoid alienating the local population through needless destruction of property and suffering of civilian casualties.

c. All engineer commanders are responsible for the security of their commands. In internal defense and internal development operations, security considerations are increased, particularly at isolated worksites and during troop movements. Nondivisional engineer combat units often require protection by other tactical forces to preclude security requirements from hampering the timely completion of engineer missions.

(1) All surface movement including travel by craft on inland waterways, is subject to ambush. The organization of convoys and degree of protection required depends on the actual or potential capabilities of the insurgents in the area through which the convoy will travel; all movements are treated as tactical. Nondivisional engineer combat units must be properly trained in counterambush techniques to insure a high probability of survival. See FM 31–16, FM 31–22, and the FM 7-series for detailed discussion of counterambush measures.

(2) A nondivisional engineer combat unit in a stationary position achieves perimeter protection by using its own troops or by arranging for security forces from U.S. and HC armed forces or HC paramilitary and police units.

4–27. Organization

Although unit integrity should be preserved whenever possible, nondivisional engineer combat units may be organized provisionally into task forces, depending upon the particular engineering skills and equipment required. Nondivisional engineer combat units may be attached to or placed in direct support of U.S. and HC tactical forces when the support requirements exceed the capabilities of engineer units organic to the forces. Direct support is desirable since it permits flexibility in meeting engineer requirements; however, the mission and location of the supported unit may make attachment necessary.

4–28. Tactical Operations

a. The requirements for engineer support in internal defense and internal development operations are great and varied. Nondivisional engineer combat units should expect and be prepared to furnish increased support and assistance in such fields as potable water production, route maintenance, airfield and helipad construction, bridging, and construction of field fortifications. Nondivisional engineer combat units may require augmentation teams from the TOE 5–500-series to provide additional engineering skills.

b. When supporting tactical operations, engineer companies, platoons, and squads often operate independently of their parent unit thereby increasing the requirement at lower command echelons for independent decision, initiative, and technical knowledge as well as additional liaison and supervisory personnel.

c. Since nondivisional engineer combat units often support tactical forces in isolated locations, they may be required to actively engage in the defense of the village, outpost, camp, or installation in which they are quartered. Additionally, they may be designated as reserves or to protect the installation while the main defense force is away (para 4–34 and 4–35). Moreover, in such locations resupply of these engineer units may be difficult, calling for special stockages of repair parts, tools, and expendable materials.

4–29. Advisory Assistance

a. Nondivisional engineer combat units may provide advisory assistance to include the provision of specialized MTT for training HC armed or paramilitary forces in branch or branch im-

material subjects. These operations may include extending support to the United States Agency for International Development (USAID), the United States Information Service (USIS), and other U.S. civilian program in the host country.

b. The wide range of skills and experience found in nondivisional engineer combat units also provide a source of trained personnel which may be used to advise and train HC civil government personnel. Nondivisional engineer combat units may be required to provide part or full-time engineer advisors to civilian agencies at the province, district, city, or village levels.

4–30. Civil-Military Operations

a. Civil-military operations (CMO) is a command responsibility at all levels and encompasses any activity of a command which embraces the relationship between the military and civil population. All military units possess a capability to conduct civil-military operations. In the case of engineer units, the capability is great; therefore, they may be assigned a primary role of civil-military operations and may be organized specifically for this mission.

b. Nondivisional engineer combat units support that portion of the civil-military operations program which requires assistance and planning in the construction of facilities for use and benefit of the civil population. Typically, civil-military operations places emphasis on less sophisticated construction projects such as village dispensaries, schools, and farm-to-market roads thereby making its impact felt immediately at the small community level. Nondivisional engineer combat units are suited by their organization, equipment, and skills to undertake such tasks; however, the local civilian population must participate in the accomplishment of projects in order to gain knowledge and experience in performing similar tasks in the future. Nondivisional engineer combat units support civil-military operations by providing teams to advise and assist during the progress of work. Both divisional and nondivisional engineer combat units are capable of supporting many civil-military operations missions; however, when technical assistance beyond their capabilities is required, engineer construction units or TOE 5–500-series augmentation teams may be employed. Additionally, maximum utilization of host country engineer units should be encouraged in order to conserve and provide wider use of U.S. Army engineer unit capabilities.

c. Typical civil-military projects in which nondivisional engineer combat units participate are—

(1) Construction of medical, educational, governmental, recreational, and community facilities which are nonsectarian and nonprofit.

(2) Rehabilitation of public utilities such as powerplants and water production facilities.

(3) Development and rehabilitation of transportation facilities to include roads, bridges, airfields, and navigable waterways.

(4) Assistance in the development of natural resources such as timber building materials, fuels, and agriculture.

(5) See TM 5–227, FM 31–22, and FM 41–10 for additional tasks and doctrine concerning civil-military operations and the civil-military operation aspects of civil affairs.

d. Civil-military operation projects are easily criticized by the insurgent propagandist if unacceptable to the needs of the community or not completed. On the other hand, a carefully planned civil-military operation program, properly publicized and coordinated to meet national internal defense and internal development goals, can create a favorable atmosphere and assist in developing a firm and stable government. Civil-military operation projects should be capable of future reproduction with local skills, tools, and equipment.

4–31. Psychological Operations (PSYOP)

Psychological operations conducted as part of the overall internal defense and internal development program encompass those political, military, economic, and ideological actions planned and conducted to create in neutral or hostile groups the emotions, attitudes, or behavior to support the achievement of national objectives.

a. PSYOP conducted or supported by engineer combat units must be integrated with and extended to U.S. and HC civilian/military information and PSYOP programs.

b. PSYOP can be of particular usefulness to nondivisional engineer combat units engaged in military civic action projects. A PSYOP campaign should be conducted before, during, and after the completion of a project. Requests for PSYOP assistance are forwarded to higher headquarters (FM 33–1 and FM 33–5).

c. Psychological operations are an essential element of engineer operations in which civilians or their property may become involved.

4–32. Intelligence Operations

Intelligence plays vital role in combating insur-

gency. Adequate and timely intelligence is vital to the overall internal defense and internal development operation. U.S. engineer personnel are in excellent positions to collect information, particularly from close and frequent contact with the civilian populace. Conversely, U.S. personnel must be careful not to reveal classified defense information. For detailed discussion, procedures, and role of intelligence in internal defense and internal development operations see FM 30-31, FM 31-22 and FM 41-10.

4-33. Internal Control Operations

Nondivisional engineer units' participation in internal control operations may range from very minor operational support to complete control or conduct of these operations in their own base areas. See FM 31-22 and FM 41-10 for a detailed discussion of internal control operations.

Section XI. REORGANIZATION FOR GROUND COMBAT

4-34. General

a. Nondivisional engineer combat units are trained to fight as infantry. In addition to providing security while in bivouac, on the march, or at work nondivisional engineer combat units may be assigned an infantry mission. These units usually are committed as infantry when the need for fighting strength is more important to the accomplishment of the overall mission than the corresponding loss of engineer support.

b. The basic training of combat engineers parallels that of infantry; however, engineers receive considerable less tactical instructions. The nondivisional engineer combat unit, compared with an infantry unit of equivalent size, is further limited by lack of supporting weapons, communications, and fewer medical personnel. To compensate for its lesser firepower, the nondivisional engineer combat unit normally is assigned a smaller frontage than a similar size infantry unit; and provisions are made for fire support and fire control personnel. Nondivisional engineer combat units committed to internal defense and internal development operations may be required to fight as infantry more often than in conventional or nuclear war and must frequently rehearse reorganization for ground combat to insure automatic response.

c. Typical situations in which a commander may commit engineers to ground combat are—

(1) An overextended defensive front.

(2) A sudden enemy penetration or envelopment.

(3) An enemy airborne landing, airmobile operation, or organized attack by guerrilla forces.

(4) The relief or reinforcement of an engaged unit.

4-35. Preparation for Combat

Engineer personnel are trained in both offensive and defensive infantry tactics; however, because of organization and equipment, engineer combat units are more suited for the defense. Time is needed for an engineer unit to prepare adequately for coordinated ground combat. Personnel and equipment not required for infantry combat are moved to a secure area. The engineer commander prepares his unit for combat following similar procedures outlined for the infantry commander (FM 7-series).

a. Engineer Combat Group. Although the engineer combat group may be employed as a separate force in an infantry role, it is attached usually to a division or comparable task force in the area in which committed. The group, less its separate companies, is deployed in defensive positions, normally in an area where a coordinated enemy attack is unlikely. The group is organized into a combat (forward) and a rear echelon. The rear echelon includes the separate companies of the group and a group equipment pool consisting of equipment not required for close combat.

b. Engineer Combat Battalions (Army or Corps).

(1) The engineer combat battalion is organized into command and control, maneuver, combat support, and combat service support elements. Personnel for the evacuation and security of equipment not required in combat are also designated. The battalion is thus divided into combat (forward) and rear echelons.

(*a*) The combat echelon consists of personnel who actually engage in combat or who provide command, control, combat support, and combat service support. Vehicles are included in the combat echelon for communication, supply, and tactical movement.

(*b*) The rear echelon consists of personnel and equipment not needed for combat and includes heavy vehicles and powered engineer equipment. The number of personnel assigned to the rear echelon is the minimum necessary to maintain mobility, to provide for local security,

and to perform essential administrative and maintenance functions. The rear echelon is commanded by the senior officer present and is located behind the FEBA, normally beyond the range of enemy light artillery.

(2) When the battalion is committed to combat, engineer operations usually are suspended. In some situations certain engineer activities such as the operation of water points, engineer reconnaissance, and emergency maintenance of routes may be necessary and performed by personnel of the rear echelon. Occasionally, an entire company of the engineer combat battalion may be withheld from combat to execute engineer missions.

c. Engineer Combat Company.

(1) The engineer combat company or platoon, when engaged in ground combat organizes its combat elements according to the principled outlines for the engineer combat battalion. In an internal defense and internal development operation an engineer unit located in an isolated area may find it impractical to organize a rear echelon. Under such circumstances survival of the unit is paramount, and all personnel must participate in defending against insurgent attacks. Those personnel normally included in the rear echelon may be organized to protect the unit headquarters, to provide defensive fire support or to form all or part of the installation reserves. Engineer units operating in such situations provide themselves with additional crew-served weapons upon approval of appropriate commander.

(2) An engineer combat platoon in the defense should not be assigned more than 250 meters of the FEBA. In all cases, engineer companies should be issued additional communication equipment and automatic weapons. Indirect fire support, including a forward observer should be authorized by higher authorities and additional medical personnel should be provided. In some instances, engineer units may be required to fight offensive or defensive actions with only organic weapons and equipment.

d. Organization. Because of the variety of circumstances which affect the organization of an engineer unit for infantry combat, it is impractical to prescribe an organizational plan applicable to all. Each commander, taking into consideration the characteristics of his unit, establishes as part of the unit SOP a plan for combat reorganization (FM 5-1). Figures 4-1, 4-2, 4-3, 4-4, and 4-5 provide guides by which the engineer commander may prepare his unit for infantry combat.

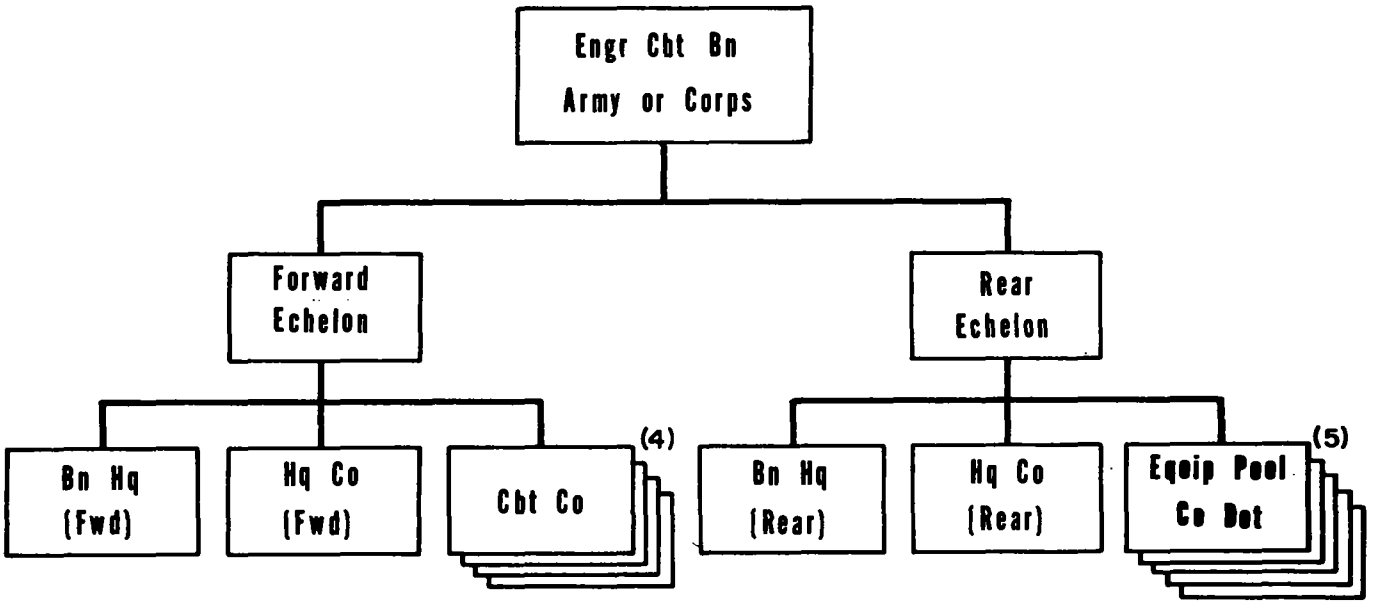


Figure 4-1. Suggested internal changes of an engineer combat battalion, army or corps, for a ground combat mission.

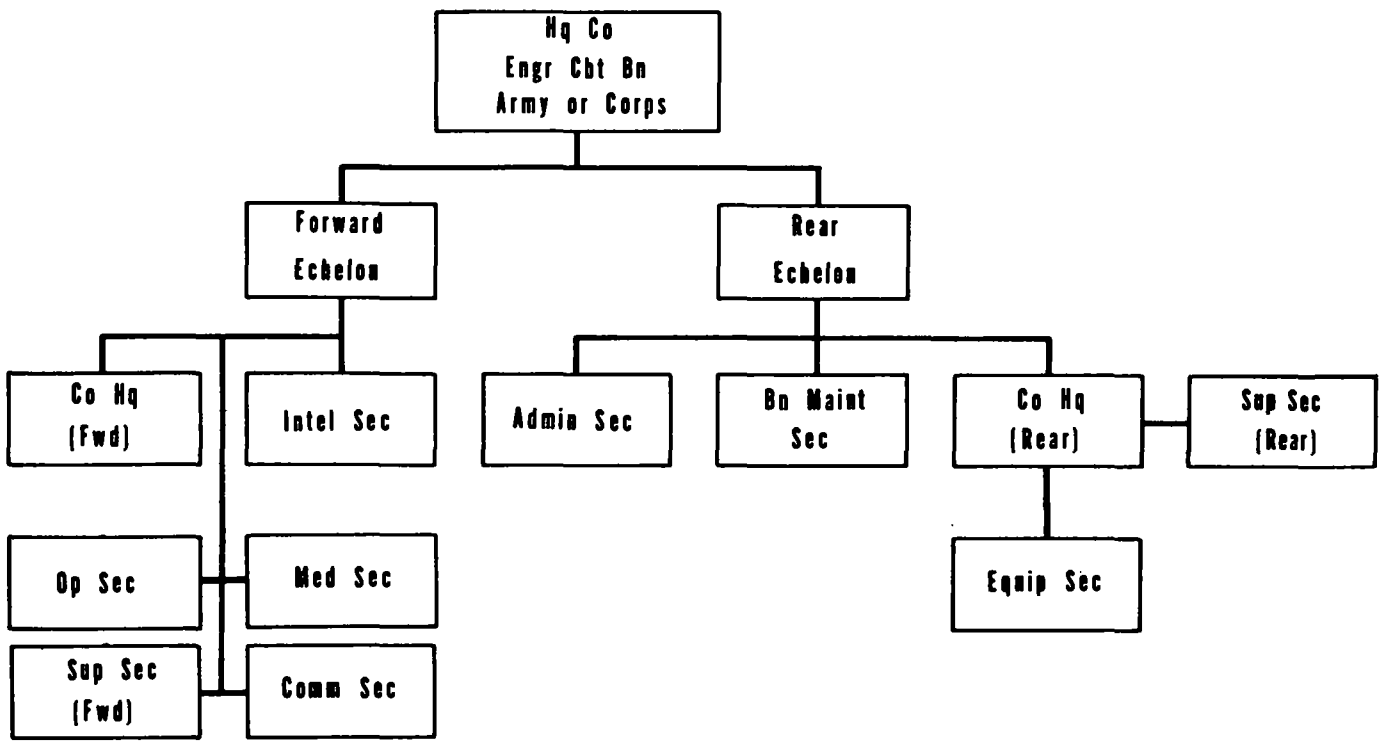


Figure 4–2. Suggested internal changes of headquarters company, engineer combat battalion, army or corps, for a ground combat mission.

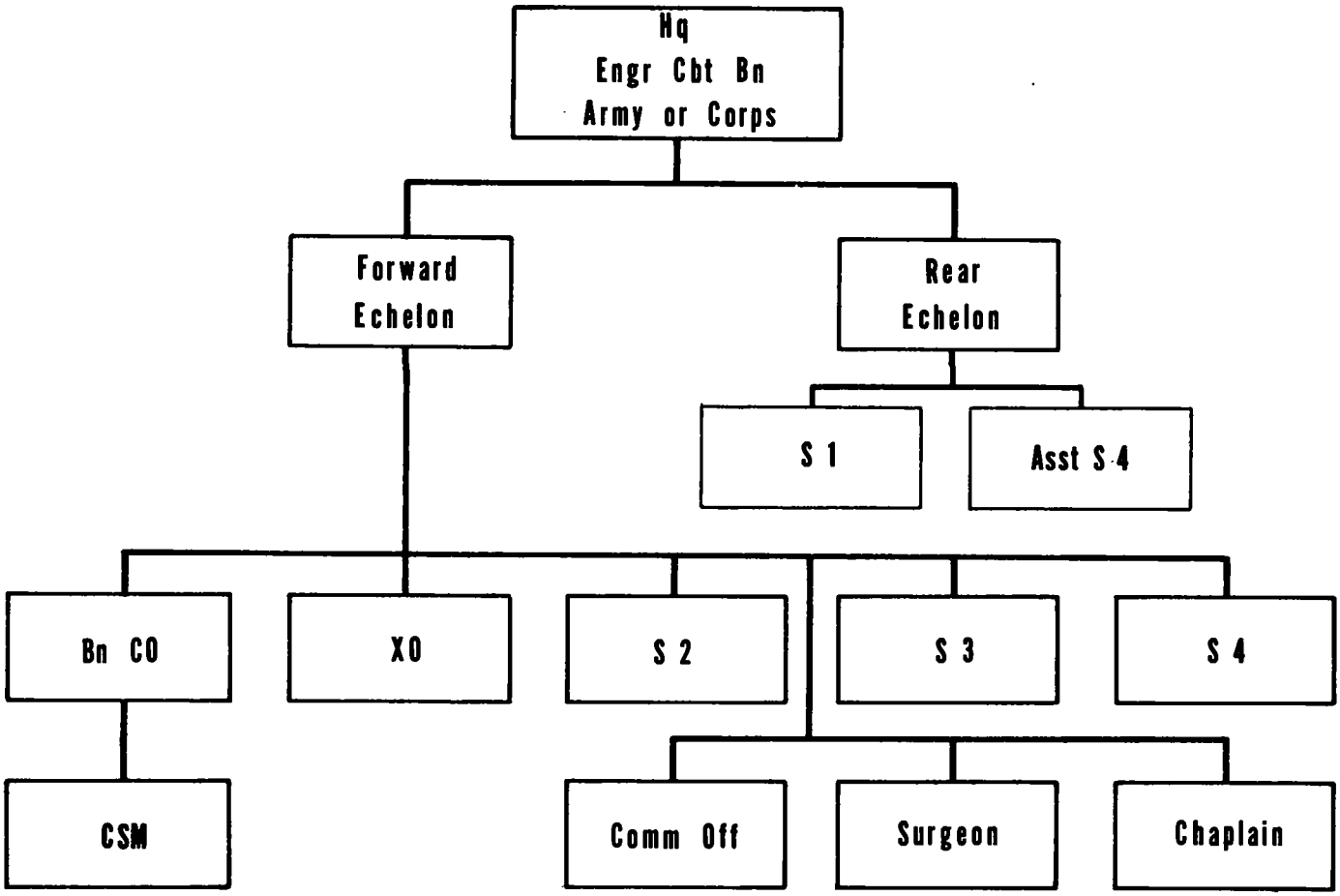


Figure 4–3. Suggested internal changes of battalion headquarters, engineer combat battalion, army or corps, for a ground combat mission.

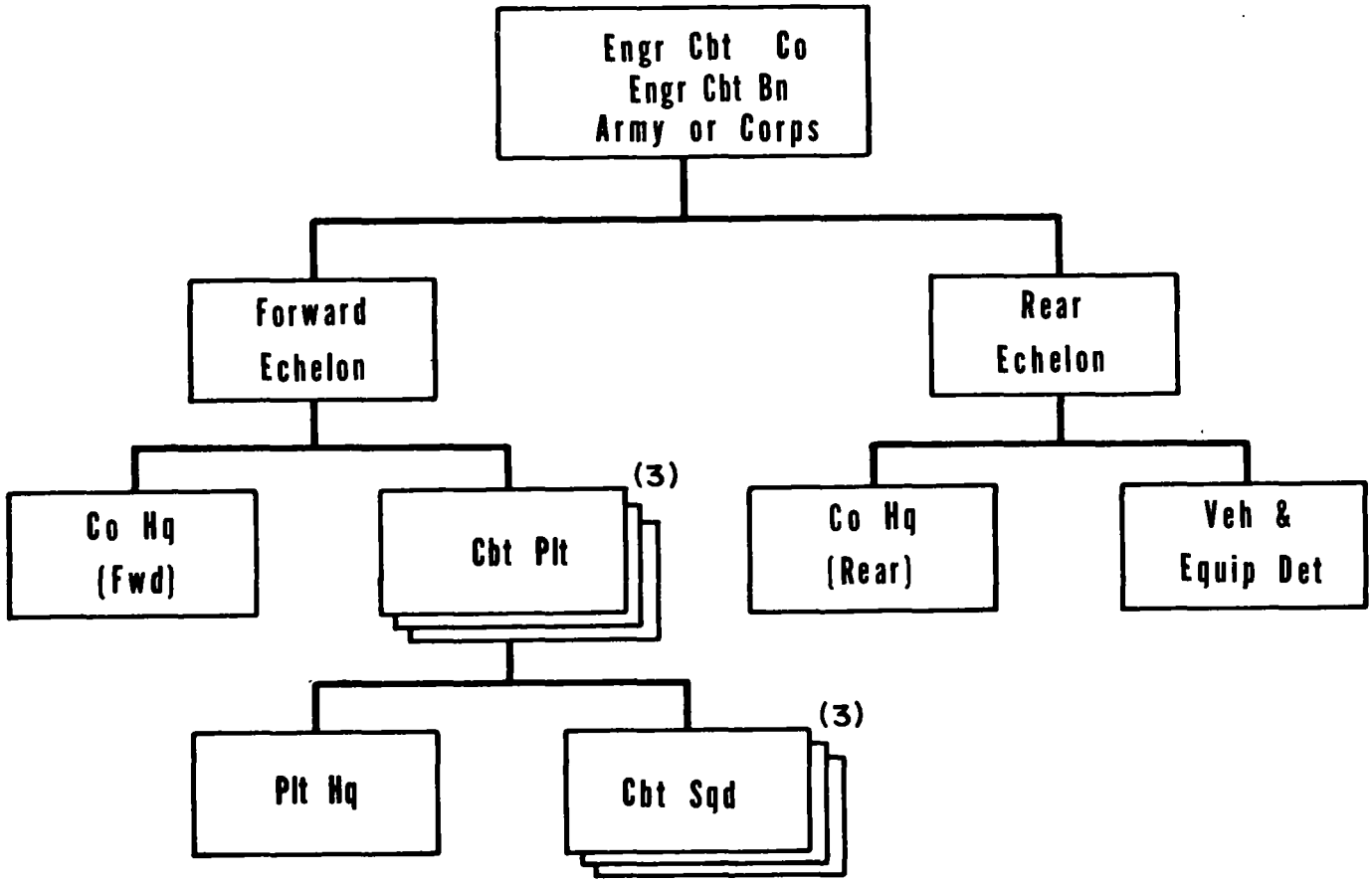
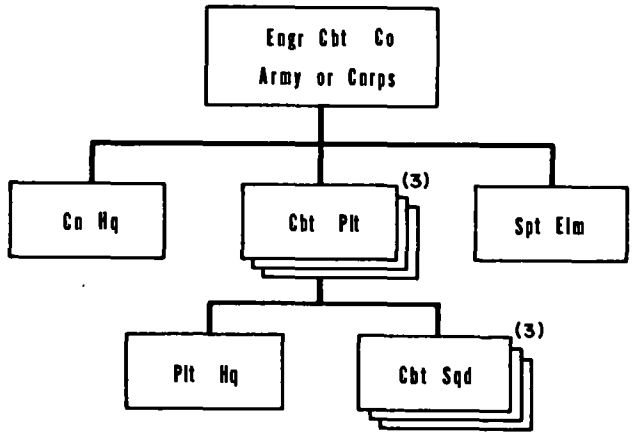


Figure 4–4. Suggested internal changes of an engineer combat company, army or corps, for a ground combat mission.



*Those personnel that normally make up the rear echelon.

Figure 4–5. Suggested internal changes of an engineer combat company, army or corps, for a ground combat mission in an internal defense operation.

Section XII. EMPLOYMENT OF UNIT WEAPONS AGAINST AIRCRAFT

4–36. General

The low altitude air threat which may face nondivisional engineer combat units may be partially countered by aggressive use of the large volume of fire which unit organic weapons (rifles and machineguns) can place against this threat. Large volumes of fire from nonair defense weapons have proven capable of destroying both high and low speed aircraft or disrupting their attack. Use of unit weapons in this role must be balanced against the requirement to prevent disclosure of positions.

4–37. Rules of Engagement

In the absence of orders to the contrary, individual weapon operators will engage attacking aircraft; engagement of all other hostile aircraft will be on orders issued through the unit chain of command and will be supervised by unit leaders. Nothing in this rule is to be taken as requiring actions prejudicial to accomplishment of the primary mission of the unit.

4–38. Techniques

The following techniques should maximize the destructive and/or deterrent effect against aircraft. Aircraft may be divided into two categories—low speed and high speed. Low speed aircraft include helicopters and liaison, reconnaissance, and observation fixed wing propeller aircraft. High speed aircraft include all other propeller aircraft and all jet fixed wing aircraft. This distinction will result in simplified engagement procedures.

a. Engagement of Low Speed Aircraft. In accordance with the rules of engagement, engage low speed enemy aircraft with aimed fire, employing the maximum weapon rate of fire. Aerial gunnery techniques generally applicable to all arms and automatic weapons are presented in FM 23–65.

b. Engagement of High Speed Aircraft. In accordance with the rules of engagement, engage high speed enemy aircraft with maximum fire aimed to intercept the aircraft flightpath to force it to fly through the highest possible volume of fire. This technique is not unaimed "barrage" fire, but requires a degree of aimed fire. It does not, however, call for careful estimation of aircraft speed and required lead.

c. Use of Tracer Ammunition. This type of cartridge is intended for use with other types to show the gunner, by its trace, the path of the bullets, thus assisting in correcting aim. Automatic weapons should utilize the highest practical proportion of tracer ammunition for this purpose and to enhance the deterrent or disruptive effect. Tracer ammunition will also reveal friendly positions to the enemy. Limited use of tracer ammunition should be considered if engagement is desired without totally fixing friendly positions.

d. Massed Fire. Units should employ a massed fire technique when using small arms and automatic weapons in an air defense role.

4–39. Standing Operating Procedures

Battalion and company SOP should cover, but not be limited to, the following items relevant to engagement of aircraft with nonair defense weapons:

a. Applicability. (Operators of designated weapons.)

b. Relation to Primary Mission. (Primary mission is never prejudiced.)

c. Relation to Passive Air Defense. (The necessity for aggressively engaging hostile aircraft is balanced with the requirement to place in proper perspective the tactic of withholding fire to preclude disclosure of position.)

d. Authority to Engage. (The authority to engage attacking aircraft delegated to individual weapons operators and to engage all other hostile aircraft on orders through unit chain of command, subject to the rules of engagement and rules for witholding fire, and local theater SOP.)

e. Rules of Engagement. (Normally self-defense only against all attacking aircraft and those positively identified enemy aircraft which pose a threat to the unit.)

f. Rules for Withholding Fire. (When ordered. When not positive that aircraft are actually attacking or otherwise hostile. When friendly aircraft or troops are endangered.)

g. Firing Techniques. (Lead and superelevation. Massed fire. Maximum rate of fire. Maximum use of tracer ammunition.)

h. Unit Training Requirements. (Motivation and discipline. Gunnery. Aircraft recognition.)

Section XIII. RIVERINE OPERATIONS

4–40. General

Riverine operations are joint operations with the coordinated and integrated efforts of the participating forces directed toward a common objective. In a riverine environment lines of communications are restricted; frequent obstacles are encountered; rafts, boats, and temporary bridges are required; and storage space is limited. Engineer support is essential to riverine forces employed in a riverine environment. Nondivisional engineer units assigned to these riverine forces conduct these operations with limited reliance on prepared material or heavy equipment support.

4–41. Engineer Support

Engineer support in riverine operations normally is under centralized control. As units disperse and support requirements increase, decentralization of engineer activities becomes necessary. Engineer support includes construction of roads, bridges, ferries, storage facilities, shelters, drainage systems, helicopter landing sites, boat landing sites on river banks; barriers and obstacles; installation and removal of mines; and other services such as detection and destruction of enemy munition; production of potable water, map and map substitutes, reconnaissance and geographic intelligence reports (FM 31–75, FM 100–5 and FM 7–30).

CHAPTER 5

COMBAT SERVICE IN THE COMBAT ZONE (SOLOG 125)

Section I. ENGINEER CONSTRUCTION AND INSTALLATION SUPPORT

5-1. Command Relation

a. Higher Commands. The engineer combat brigades are commanded by the corps or army to which they are assigned. The brigade commanders are both commanders and staff officers on the staff of the headquarters to which assigned, and in this dual role are responsible for staff planning and execution of engineer combat, construction, and tropgraphic support to their respective forces. In the staff role, the engineer combat brigade commander provides advice and assistance to the FASCOM. In the operational role, the engineer combat brigades accomplish approved construction projects for the FASCOM.

b. Parallel Commands. The engineer combat brigades maintain close coordination with other commands on operational matters to assure responsible mutual support.

c. Other Commands. The field army engineer (commander of the army engineer combat brigade) coordinates with the ACofS, services, theater army support command (TASCOM), and with the commander of the engineer command, TASCOM, on matters of construction and topographic support to the field army. This is to insure that field army engineer operations reflect theater policies and programs, and to permit a ready response to combat zone requirements of TASCOM, such as intersectional pipelines, railroads, and inland waterways.

5-2. Construction

a. General. Nondivisional engineer combat units construct, maintain, and repair roads, fords, culverts, fixed and floating bridges, pipeline systems, obstacles, aircraft landing facilities, command posts, supply installations, and shelters. This engineer support is rendered to all elements of the field army including the field army support command (FASCOM). Because transportation, materials, equipment, and manpower usually are limited, only essential tasks are undertaken and simple designs are employed to conserve time and materials. For essential tasks that are too extensive, complex, or time consuming to warrant use of nondivisional engineer combat units, assistance on a mission basis is obtained from engineer construction units under the control of the engineer command, TASCOM. Consideration must be given to the following:

(1) The ground mobility of a field army is influenced by the number and condition of the routes over which it must move. The existing road network rarely is adequate for the intense traffic and heavy loads of a modern army and must be widened, improved, and constantly maintained. Engineer units usually are employed on route construction and repair more than on any other category of work.

(2) Route improvements and repairs are accomplished rapidly, making the best use of local resources. The route must be able to withstand hard usage, and plans must allow for expansion and improvement of the route as well as accommodation of immediate needs. Roadwork is progressive in character. Hasty repair of existing roads and installation of temporary bridges necessary for the passage of combat elements are followed by improvement and new construction successively more deliberate and permanent. The work is complicated by factors not present in civil construction. For example, construction cannot await good weather or ideal materials nor interrupt traffic. Moreover, worksites are often subject to fire from enemy artillery, air, or ground troops.

(3) An army or corps engineer combat battalion is, in most cases, delegated responsibility for the road net in an assigned area. Orders designate the maintenance of existing routes and new routes; but in the early stages orders do not prescribe materials, design, or methods. The engineer combat battalion commander insures that routes in his area accommodate military traffic

without delay. Work on the route network, however, is not complete with initial repairs or improvements. When portions of the network are damaged, repairs are prompt. The engineer combat battalion commander is informed continuously about the condition of the route network so that he can quickly adjust the assignment of equipment, materials, and labor to critical points. Frequently, tentative battalion areas are anticipated by the direction and rate of movement of friendly forces. The battalion prepares plans based on information gained from friendly units, reconnaissance, and aerial photographic imagery. For further discussion of reconnaissance, design, construction, and maintenance of military roads, see FM 5–36 and TM 5–330.

b. Bridges.

(1) Tactical bridging is one of the most important tasks of the nondivisional engineer combat units. The army or corps engineer combat battalion must be well trained in the erection of the equipage of the engineer bridge companies and in the construction of other types of bridges, including expedient bridges.

(2) Tactical bridge equipage is replaced as soon as possible with semipermanent fixed bridges, fills, or culverts. Army or corps engineer combat battalions frequently replace bridges. Since the tactical bridge remains in place until its substitute is ready and since this equipage usually is urgently needed in other locations, this work is critical. The bridge company may assist in dismantling the bridge and removing it from the site, but an engineer combat battalion normally is responsible for this work.

(3) In an internal defense and internal development operational environment, provisions are made to provide backup tactical bridging for critical fixed bridges which are damaged or destroyed by insurgent forces.

(4) For further discussion of bridges, see FM 5–34, FM 31–60, TM 5–210, TM 5–216, and TM 5–312.

c. General Construction.

(1) Nondivisional engineer combat units may be called upon to build structures, such as storage and supply facilities, and to construct aircraft landing facilities. Structures conform, whenever possible, to the standard plans contained in TM 5–302. Layout and site drawings, when necessary, may be provided by the S3 of the engineer combat brigade or group but frequently are left to the discretion of the battalion commander. The army or corps engineer combat battalion requisitions the material and any special equipment needed. The engineer combat brigade or group S4 arranges in advance for battalion credit at the appropriate supply point or depot.

(2) The army or corps engineer combat battalion commander has considerable latitude in drawing up the details of repairs and alterations to existing structures, and he normally allows similar latitude to his company commanders by issuing mission type orders. Complete plans or portions or plans are used when applicable. If the user of the structure is available, he is consulted; but the project officer does not provide unnecessary additions and refinements which drain material and manpower.

(3) It is not the intent in any portion of this manual to leave the impression that sound principles of construction are sacrificed for the sake of expediency. In any construction project requiring a great deal of excavation and where the tactical situation permits, engineer drawings are consulted, if available, to determine whether underground pipelines, water and sewage lines, telephone cables, or electrical powerlines are buried in the area. If portions of damaged bridges are used and it is intended to span a damaged section with a panel bridge, effort is made to determine the design and strength of the section not damaged. When a nondivisional engineer combat unit builds any structure, such as a bridge, POL storage facility, hospital, depot, or airfield, as-built drawings are made and filed with the engineer combat group or engineer combat brigade and the corps and army engineer sections. These plans are extremely important if the construction includes underground utilities. When time does not permit the preparation of as-built drawings, signs are prepared and placed over areas of buried utilities indicating their location.

(4) Military civic action projects must be coordinated with local government agencies which can provide much information. When supporting military civic actions, maximum use is made of locally procured materials (when their consumption for this purpose will not compete with civilian requirements and when such consumption will improve the local economy in accordance with the national internal defense and internal development plan).

5–3. Construction Requirements

Exclusive of the engineer support provided for the tactical forces of the field army, engineer combat brigades may be required to accomplish

any or all of the following tasks for the FASCOM:

a. Construction or rehabilitation of facilities for administrative use, such as headquarters buildings, troop camps, and similar installations.

b. Rehabilitation or new construction of facilities for hospitals and other medical purposes.

c. Construction of heliports at hospitals and major headquarters for medical and command use. These are exclusive of similar installations constructed for tactical purposes and for use in general support.

d. Construction of protective shelters for FASCOM headquarters, and at support brigade headquarters, to minimize interruptions to combat service support activities resulting from enemy attack.

e. Construction of prisoner of war collecting points in corps and army areas for the temporary quartering of PW, and in the case of the field army, construction of a military stockade for military prisoners.

f. Construction of hardstands for the storage of all classes of supply and materials, with, in some cases, covered storage provided under canvas. The latter is erected by using units. In some cases, rehabilitation of existing structures will serve for this purpose.

g. Extension of pipelines and bulk storage for POL into the field army service area with construction forward of the field army rear boundary accomplished by units of the army or corps engineer combat brigades, augmented by engineer pipeline construction support companies.

h. Construction of hardstands for ammunition storage.

i. Construction of open shop hardstands for maintenance facilities. (Covered shops will be in rehabilitated structures or under canvas.)

j. Construction of access roads serving FASCOM installations.

5-4. Procedures and Policies

Construction Support. The provision of construction support to the FASCOM is accomplished by engineer combat units in the same manner as such support is provided to other units. The corps and army engineer brigades routinely operate in accordance with the engineer support plans based on policies and priorities established by the force commander at each echelon. Such plans incorporate both combat support and support to FASCOM with engineer effort identified and allocated, and completion dates established.

a. The FASCOM in preparing the administrative annex to the field army operations plan identifies construction support requirements by time, phase, type, and location. These are extracted by the army engineer for planning purposes and incorporated in the engineer annex to the operations plan. In the staffing process, the field army engineer maintains close coordination with the ACofS, services, FASCOM, to insure that all construction requirements are included and that the necessary engineer effort is available. In implementing field army operations plans, corps engineers establish similar liaison with the corps support brigades of the FASCOM.

b. In addition to execution of construction support plans, engineer brigade commanders normally assign subordinate engineer combat groups areas of responsibility for general support. Within these areas, the responsible engineer units have priority tasks assigned. They are also on call for work required to restore damaged facilities to operating condition, and to undertake construction projects within the scope of their general support mission at the request of users in the area. Where there are conflicts between unprogramed construction requested and assigned priorities, resolution is at the lowest command level possible, with the tactical commander having final decision.

c. Construction or rehabilitation standards are as austere as possible while meeting the operational requirement. Maximum use is made of locally procured, salvaged, and engineer produced construction materials in order to reduce logistic effort to the maximum.

d. From the standpoint of skills required, it is anticipated that the routine construction of FASCOM supply, maintenance, and service installations, with associated access roads and support facilities, will seldom exceed the skills available to the engineer combat units assigned to corps and army. (This does not mean that there will always be enough engineers to accomplish all desired tasks.) However, in the army service area there may be occasions where tasks are assigned requiring the special skills and heavy construction equipment resources found in engineer construction units. In these instances, arrangements are made between the field army commander and the theater army support command commander

for attachment of the required units from the engineer command, TASCOM. The attached units normally are further attached to the army engineer brigade for command and control during their location in the combat zone, reverting to TASCOM control upon completion of the task.

5–5. Water Processing and Purification

a. Planning the production of potable water for supported units is an important function of the engineer combat brigade and group. The water processing and purification capability of the engineer combat group is provided by the army or corps engineer combat battalions. The group S4 plans water point operation, provides staff supervision of potable water activities, and initiates orders for water point reconnaissance. Detailed reconnaissance is performed by an army or corps engineer combat battalion acting either under engineer combat group orders or on its own initiative.

b. Usually when the army or corps engineer combat battalion installs an advanced water point, one water point in the rear is closed or turned over to a water processing and purification team of another unit. In a rapidly moving situation, it is best not to commit all five teams of these battalions simultaneously.

c. A water point team is not entirely self-sufficient. Access roads and required clearing or grading must be provided by other engineers. If traffic control is necessary, the assistance of military police is requested through the engineer combat group headquarters. The security of the water point must be assured and normally is provided by the unit to which the team is attached. Water points are frequently at a distance from the bulk of the army or corps engineer combat battalion. In such cases, the water point team may be attached to a nearby engineer combat company; the company commander thereby assumes responsibility for the support of the water point and personnel including construction, security, and subsistence (TM 5–700). Effort should be made to locate the water point with other logistic service units, such as shower and laundry units, for mutual security and support.

d. In the absence of orders to the contrary, water points serve all units requesting water. Users provide their own containers and transportation for water. When requirements for water exceed the transport capability of the user, combat service support units deliver water from the water point to the consumer. Control of water consumption is a function of command, and the army or corps engineer combat battalions enforce limitation of water as directed by higher authority.

e. For details on the minimum potability standards agreed upon by members of the ABCA Armies, see appendix E. Appendix E is a reprint of SOLOG Agreement 125 which prescribes minimum potability standards for a safe emergency water supply intended for human consumption under field conditions.

5–6. Installation Support

Engineer installation support consisting of engineer repairs and utilities, firefighting and real estate services for the field army is a responsibility of the FASCOM. This support is accomplished by engineer cellular teams of the TOE 5–500-series that are assigned to and under the command and control of the FASCOM. Composition of these teams varies in accordance with the operational environment, mission requirement, and with the type of facility required. Facilities housing major headquarters and hospitals are type installations where installation support is most necessary. For details see FM 54–3 and FM 54–4.

Section II. SUPPLY AND SERVICE SUPPORT

5–7. Supply and Service for Nondivisional Engineer Combat Units

a. General. Supply and service support for the nondivisional units of the field army is obtained from the support brigades and Army-wide service organizations of the FASCOM (FM 54–3 and FM 54–4). Nondivisional engineer combat units obtain the combat supply and service support discussed in paragraphs 5–7 through 5–16, from the various organizations of the FASCOM. Each of the separate engineer companies and each army or corps engineer combat battalion establishes supply accounts with supporting supply agencies. The engineer combat brigade S4 and group S4 enter into supply channels only under exceptional circumstances to assist and expedite the receipt of supplies and to establish priorities.

b. Support Brigades. The corps and army support brigades of FASCOM, through their subordinate units, provide the following supply and service support to nondivisional engineer combat units:

(1) *Supply.* Classes I through X.

(2) *Services.*

(*a*) Bath and clothing exchange.

(*b*) Laundry and renovation.

(*c*) Decontamination.

(*d*) Bakery.

(*e*) DS and GS maintenance support and technical assistance service less that service provided by the medical brigade.

(*f*) Labor service.

(*g*) Graves registration.

(*h*) Clothing sales.

(3) *Army-wide services.* Army-wide services organizations of the FASCOM provide medical, military police, transportation, and civil affairs support to units of the field army. The FASCOM medical and transportation brigades and, when attached, a civil affairs brigade provide Army-wide services to nondivisional engineer combat units. These brigades provide medical, transportation and movement, and civil affairs services in all corps areas and in the field army service area. The military police brigade provides Army-wide services for prisoners-of-war and for the confinement of military prisoners. Additionally, the medical brigade provides medical supply (Class VIII) and maintenance in the corps area and the field army service area.

5–8. Supply and Service Company

One of the units of the support brigades of particular interest to nondivisional engineer combat units is the supply and service company, direct support, of a supply and service battalion. The mission of this company includes the receipt, storage, processing and issue of all classes of supply, less classes V, VIII, IX, X and those associated with communications security equipment; marine and rail peculiar-type equipment; and items peculiar to airdrop equipment. This unit also provides laundry, graves registration, bath and clothing exchange, textile renovation service; and fresh baked bread.

5–9. Topographic Supplies

To consolidate topographic supplies at one location instead of throughout the several support groups of FASCOM, Team BR of TOE 29–500 (Topographic Supply Detachment) is attached to a general supply general support company, of a supply and service battalion, assigned to an army support group. This detachment lends the added capability to the support group of providing topographic repair parts, supplies and equipment for the field army.

5–10. Maintenance Support

Maintenance support beyond the capability of engineer units is provided by DS battalions of the support groups of the corps and army support brigades. DS maintenance units accomplish repair of equipment on a repair and return-to user basis. Additionally, elements of the DS maintenance battalions serve as the source of customer supply for organizational repair parts (FM 29–20).

5–11. Ammunition Service

Ammunition service is provided to nondivisional engineer combat units by subordinate units of the ammunition group of the FASCOM. Engineer units receive direct support ammunition service from the conventional and special DS ammunition companies of the DS ammunition battalions. General support will be furnished by the conventional and special GS ammunition companies of the DS/GS ammunition battalions. These companies operate conventional or special ammunition supply points on an area basis. Engineer units pick up their required ammunition from designated ammunition supply point(s). Ammunition service is described in detail in FM 54–8, FM 9–6 and FM 9–6–1.

5–12. Medical Support

The medical brigade of FASCOM provides health services to nondivisional engineer combat units and all other units of the field army. The medical brigade provides patient evacuation; care and hospitalization for all classes of patients; preventive medicine report; dental services; veterinary service; medical supply and medical equipment maintenance; optometric service; and health services on an area support basis as required. For details see FM 8–16–1.

5–13. Military Police Services

The military police brigade provides military police services for the field army services area and functionalized support for the handling of prisoners-of-war, civilian internees, and U.S. military prisoners on an Army-wide basis. Operations of this brigade are covered in FM 19–4. The mission of the military police brigade is to provide the following functions:

a. Traffic control.

b. Handling prisoners-of-war and civilian internees.

c. Maintenance and discipline, law and order.

d. Crime prevention and investigation.

e. Confinement of U.S. military prisoners.

f. Physical security of critical and sensitive movements.

g. Physical security of installations, facilities, and property.

h. Circulation control of individuals.

i. Assistance in rear area protection.

j. Selection, training, organization, equipment, and employment of indigenous paramilitary and military police personnel.

5–14. Transportation Services

The transportation brigade provides transportation services in the field army area. When necessary, it can also augment the organic transportation units assigned to the corps support brigade to provide increased capabilities at that level (FM 55–9). The transportation brigade provides—

a. Long-haul motor transportation and, as required, local delivery of personnel and cargo.

(1) Backup support for movements originating in a corps support brigade area.

(2) In a corps support command organization, the motor transport service includes the provision of transport for port clearance operations when a corps operates independently.

b. Airlift capability for select cargo, personnel replacements, medical evacuation, and unscheduled or emergency missions.

c. Terminal services as required.

d. Transportation for airdrop of personnel and material if Air Force units are attached.

e. Army airline of communications for necessary support of units when resupply by surface means is not feasible.

5–15. Civil Affairs Support

The civil affairs brigade of the FASCOM provides civil affairs support to the field army, as necessary, to insure successful completion of the required military operations. Command support is provided by civil affairs units or elements which travel with given commands and support them wherever they operate; area support is provided by civil affairs units which operate in a given geographical area to support whatever units enter that area. Nondivisional combat engineer units requiring civil affairs support obtain this support from the civil affairs units of the FASCOM. For further details see FM 41–10.

5–16. Personnel Services

a. Personnel Administration. Personnel and administrative support, employing automatic data processing equipment, is centralized at the support brigade level to provide services on an area basis for corps, field army, and FASCOM troops. The personnel and administration battalion of the support brigade provides personnel, morale, and administrative support directly to all nondivisional units assigned or attached to the corps or field army. The personnel and administration battalion provides information on personnel or administrative matters on a scheduled basis or, as requested, to units served. The battalion acts on personnel and administrative requests received from units assigned to the field army or corps and support brigade as prescribed by policy of the particular headquarters to which the requesting unit is assigned, for details see FM 12–2. Battalions and separate companies, whether assigned as corps or support brigade troop units, process personnel management actions such as administrative boards, separations or releases, and recommendations for awards These actions are sent directly to the personnel services company of the personnel and administration battalion for action. The support brigade personnel service company takes action based on personnel policies established by the supported headquarters.

b. Postal Services. Army post offices which are elements of the personnel and administrative battalion are under the command and control of each support brigade, FASCOM, to which assigned. These postal units provide complete postal service on an area basis to elements, including nondivisional engineer combat units, located in their assigned area of responsibility.

c. Special Services. Special services units are also part of the personnel and administrative battalion and are assigned to the support brigades, FASCOM. These units provide supervision, training, and assistance to supported personnel, including nondivisional engineer combat units, in conducting motion picture showings, crafts programs, film library service, sports programs, and live entertainment programs on an area basis.

d. Replacements. Replacements for nondivisional engineer combat units are obtained from the replacement units located in the combat zone. Although assigned or attached to FASCOM these replacement units are under the operational control of the field army. Units of the field army, including nondivisional engineer combat units, requisition individual replacements, as required, by TOE line number.

CHAPTER 6

HEADQUARTERS AND HEADQUARTERS COMPANY, ENGINEER COMBAT BRIGADE, ARMY, CORPS, OR AIRBORNE CORPS

6–1. Mission

The mission of the headquarters and headquarters company, engineer combat brigade, army, corps, or airborne corps, is to command assigned and attached units and coordinate the combat engineer activities within the appropriate command and when designated as a—

a. Headquarters and headquarters company, engineer combat brigade, army, to provide an engineer staff section for a field army.

b. Headquarters and headquarters company, engineer combat brigade, corps, to provide an engineer staff section for a corps of a field army or for an independent corps.

c. Headquarters and headquarters company, engineer combat brigade, airborne corps, to provide an engineer staff section for an airborne corps.

6–2. Assignment

Headquarters and headquarters company, engineer combat brigade normally is assigned as follows:

a. Field Army. One headquarters and headquarters company, engineer combat brigade, army, per field army.

b. Corps. One headquarters and headquarters company, engineer combat brigade, corps, per each corps of a field army.

c. Independent Corps. One headquarters and headquarters company, engineer combat brigade, (army or corps), per independent corps.

d. Airborne Corps. One headquarters and headquarters company, engineer combat brigade, airborne corps, per airborne corps.

6–3. Capabilities

a. Level 1. At TOE Level 1, this unit provides—

(1) Staff planning and operational supervision of all assigned and attached units.

(2) Plans and supervises operations pertaining to topographic and terrain intelligence.

(3) The engineer staff to an army or corps headquarters as appropriate.

(4) Supervision and coordination of the planning for the preparation and firing of atomic demolitions munitions (ADM).

(5) Rotary wing aircraft to facilitate the command, control, and coordination of engineer combat activities.

(6) Engineer staff representatives to the tactical operations center (TOC) on a 24-hour basis.

(7) When organized as a headquarters and headquarters company, engineer combat brigade, airborne, the assigned personnel are parachute qualified and the unit may be landed by parachute.

b. Levels 2 and 3. The Levels 2 and 3 columns adapt the TOE for reduced operational capabilities in decrements of 10 percent, to approximately 90 percent for Level 2, and 80 percent for Level 3.

c. Type B Unit. This unit is not adaptable to a Type B organization.

d. Combat Capabilities. Individuals of this unit can engage in effective, coordinated defense of the unit's area or installations.

e. Support. This unit is dependent upon other supporting army or corps elements for personnel, legal, and medical services, and for communications facilities when requirements exceed organic capabilities. When supported by a TOE 5–540 it can provide overall mapping and engineer intelligence planning, as well as the control, coordination, and supervision of topographic suppot to the field army.

6–4. Allocation, Category, and Mobility

a. Allocation. This unit normally is allocated on the basis of one per field army, one per each

corps of a field army, one per independent corps, and one per airborne corps.

b. Category. This unit is designated as a Category II unit (AR 310–25).

c. Mobility. This unit is approximately 53 percent mobile in organic transportation. It is 100 percent air transportable in medium assault aircraft.

6–5. Organization

Headquarters and headquarters company, engineer combat brigade, may be organized for assignment to a field army, a corps of a field army, an independent corps, or an airborne corps. It is organized under TOE 5–101 (fig 6–1). Whether organized as an army, corps, or airborne corps unit, the organization is identical except that when organized for assignment to a field army, the operations and staff engineer sections are larger, and when organized for assignment to an airborne corps, all personnel are parachute qualified. Normally, these units command and control from two to three engineer combat groups or airborne engineer combat groups and other attached units. The company consists of two elements—

a. Brigade Headquarters.

(1) Brigade commander (also army, corps, or airborne corps engineer).
(2) Deputy brigade commander.
(3) Executive officer.
(4) Adjutant (S1).
(5) S2.
(6) S3.
(7) S4.
(8) Chemical staff officer.
(9) Communications officer.
(10) Engineer equipment officer.
(11) Aide-de-camp.
(12) Sergeant major.

b. Headquarters Company. Headquarters company consists of a company headquarters and the personnel of the following operating sections of the brigade (see app C for duties of the staff sections):

(1) Administrative section.
(2) Operations section.
(3) Intelligence section.
(4) Supply and maintenance section.
(5) Communications section.
(6) Aviation section.
(7) Staff engineer section (physically located at army, corps, or airborne corps headquarters); the staff engineer section is supervised by the assistant army (or corps or airborne corps) engineer who represents the brigade commander at army (or corps or airborne corps) headquarters.

6–6. Major Items of Equipment

As the headquarters and headquarters company, engineer combat brigade, army, corps, or airborne corps, is essentially a command and control unit, it has a minimum of organic major items. It has 1/4-, 3/4-, and 2 1/2-ton trucks; 1.5-, 3-, and 15-kw generators; three helicopters; drafting and surveying sets and equipment; organizational maintenance tool kits; housekeeping equipment; and other equipment necessary for command and control. Armament consists of rifles, pistols, and a 40-mm grenade launcher.

6–7. Employment

See paragraphs 3–4 through 3–16.

6–8. Communications

Type brigade headquarters radio and wire communications are shown in figures 6–2 and 6–3.

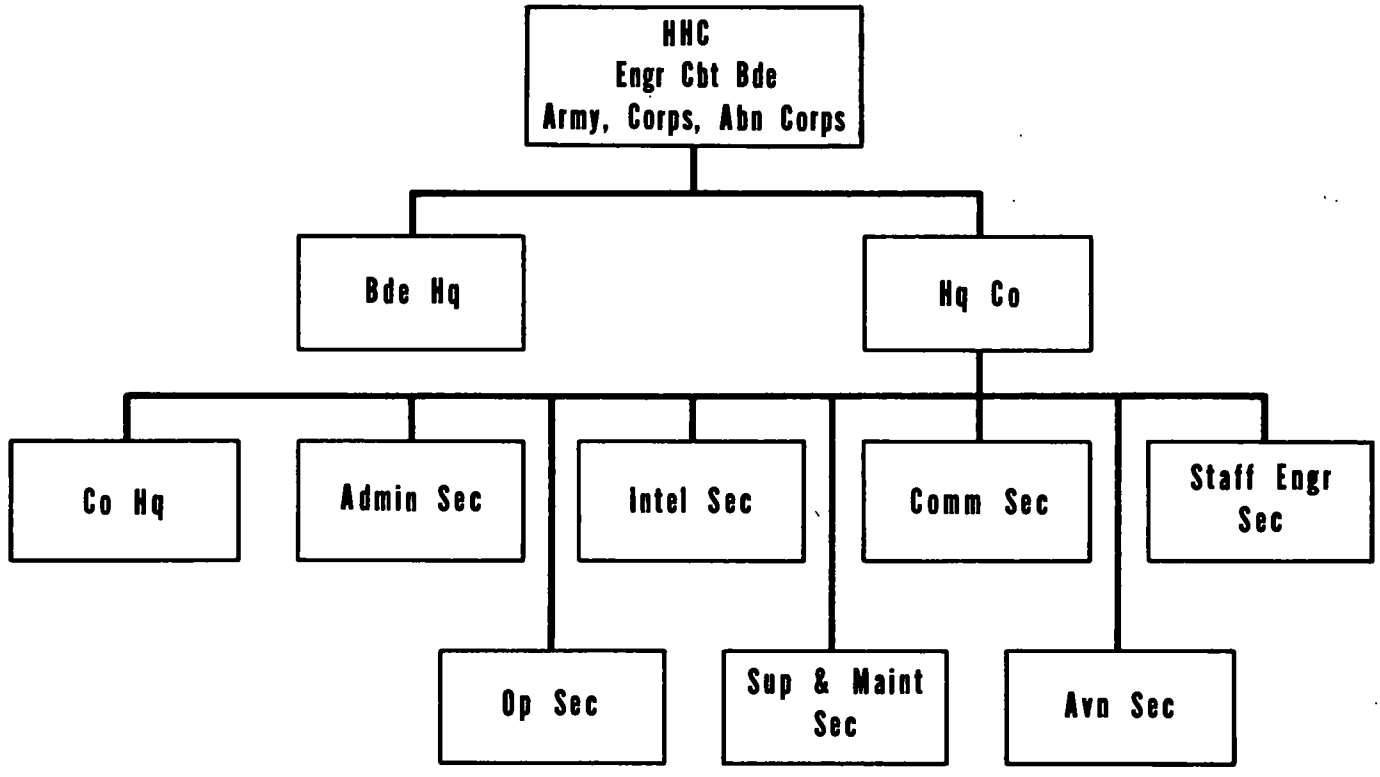
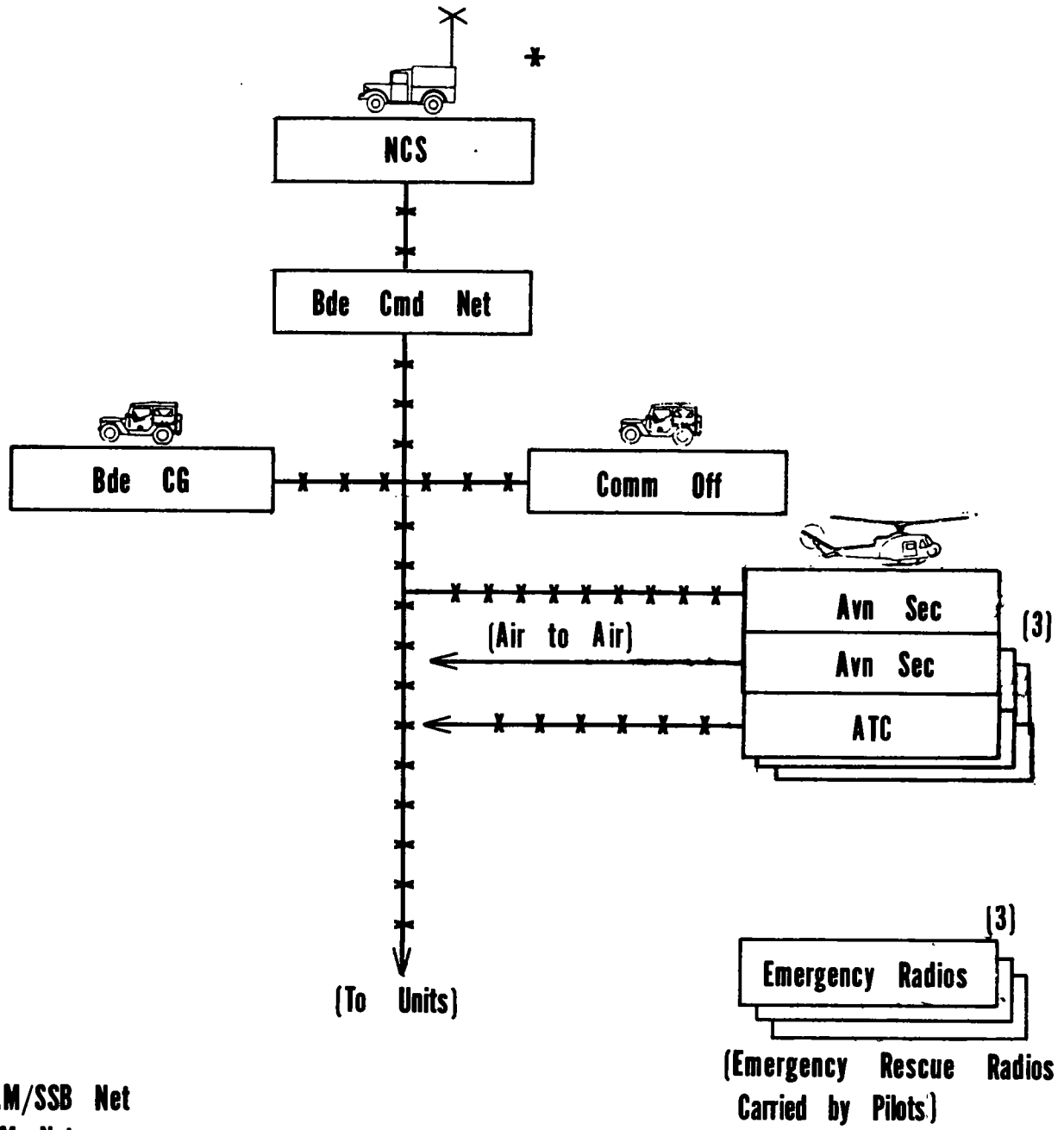


Figure 6-1. Organization chart, headquarters and headquarters company, engineer combat brigade, army, corps, or airborne corps.



See Appendix "D"

* Army or corps engineer combat brigades obtain additional communications facilities from army or corps signal units, including radio communications equipment to net with army or corps headquarters. When the separate companies are attached directly to the brigades, an FM capability is required by the brigades in order to net with the net control stations of these attached separate companies.

Figure 6-2. Type radio net, headquarters and headquarters company, engineer combat brigade, army, corps, or airborne corps.

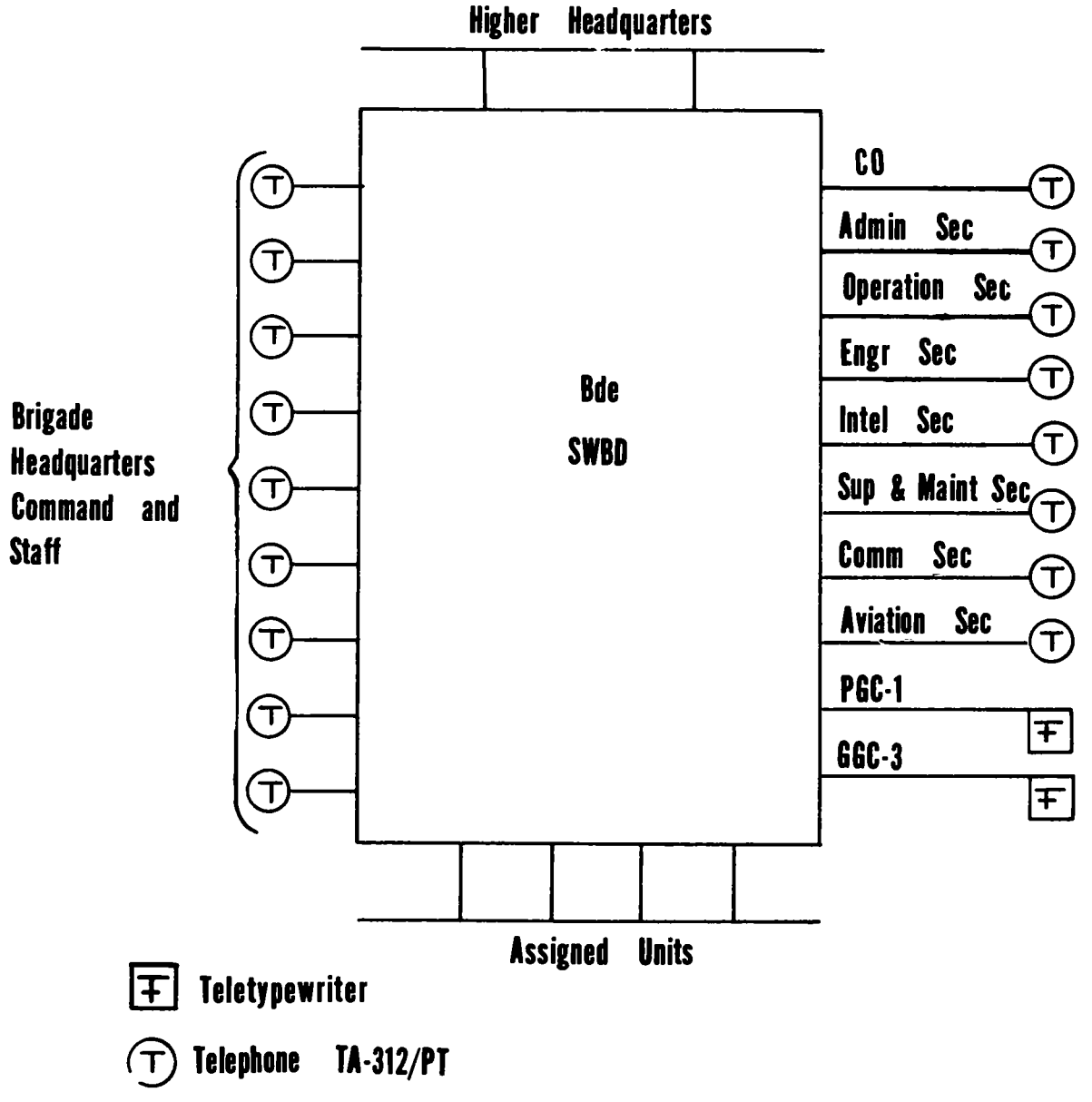


Figure 6-3. Type wire net, headquarters and headquarters company, engineer combat brigade, army, or airborne corps.

CHAPTER 7

HEADQUARTERS AND HEADQUARTERS COMPANY, ENGINEER COMBAT GROUP OR HEADQUARTERS AND HEADQUARTERS COMPANY, AIRBORNE ENGINEER COMBAT GROUP

7–1. Mission

The mission of the headquarters and headquarters company, engineer combat group or headquarters and headquarters company, airborne engineer combat group is to—

a. Command assigned and attached units.

b. Plan and coordinate the operations of a group which may consist of engineer combat or construction battalions and other assigned or attached units engaged in engineer support activities.

7–2. Assignment

a. Headquarters and headquarters company, engineer combat group normally is assigned as follows:

(1) *Field army.* Three per field army with attachment to the army engineer combat brigade assigned to the field army.

(2) *Corps.* Two per each corps of a field army with attachment to the corps engineer combat brigade assigned to the corps.

(3) *Independent corps.* Three per independent corps with attachment to the engineer combat brigade assigned to the corps.

b. Headquarters and headquarters company, airborne engineer combat group normally is assigned on the basis of two to three per airborne corps with attachment to the airborne engineer combat brigade assigned to the airborne corps.

7–3. Capabilities

a. Level 1. At TOE Level 1 this unit provides—

(1) Staff planning and supervision of operations of assigned and attached units.

(2) Engineer reconnaissance by air and ground means; supervision of engineer intelligence collection activities; evaluation and dissemination of engineer intelligence.

(3) Rotary wing aircraft for support of reconnaissance and combat support activities for the group.

(4) Planning for employment of ADM and conventional demolitions.

(5) Supervision and assistance in administration, supply, to include resupply of ADM, mess, and maintenance matters of assigned and attached units.

(6) A group message center and supervision of the group communications operations.

(7) Supervision of unit medical service within the group.

(8) When organized as a headquarters and headquarters company, airborne engineer combat group, the assigned personnel are parachute qualified and the unit may be landed by parachute.

b. Levels 2 and 3. The Levels 2 and 3 columns adapt the TOE for reduced operational capabilities in decrements of 10 percent, to approximately 90 percent for Level 2, and 80 percent for Level 3.

c. Type B Unit. This unit is not adaptable to a Type B organization.

d. Combat Capabilities. Individuals of this unit, except chaplain and surgeon, can engage in effective, coordinated defense of the unit's area or installations.

7–4. Allocation, Category, and Mobility

a. Allocation. This unit normally is allocated on the basis of one per four to seven engineer battalions.

b. Category. This unit is designated as a Category II unit, (AR 310–25).

c. Mobility. This unit is 100 percent mobile in organic transportation and 100 percent air transportable in medium transport aircraft.

7–5. Organization

Headquarters and headquarters company, engineer combat group, is organized for assignment to a field army, corps of a field army, or independent corps. Headquarters and headquarters company, airborne engineer combat group, is organized for assignment to an airborne corps with attachment to an airborne engineer combat brigade. Organization is under TOE 5–52 (fig. 7–1). The ground and airborne version are identical in organization and equipment, but personnel of the airborne unit are parachute qualified. Normally these units command and control three to five army or corps engineer combat battalions or airborne engineer combat battalions. The company consists of two elements—

a. Group Headquarters.

(1) Group commander.
(2) Executive officer.
(3) Adjutant (S1).
(4) S2.
(5) S3.
(6) S4.
(7) Chaplain.
(8) Surgeon.
(9) Engineer equipment officer.
(10) Communications officer.
(11) Liaison officer.
(12) Sergeant major.

b. Headquarters Company. Headquarters company consists of a company headquarters and the personnel of the following operating sections of the group (see app C for duties of the staff section):

(1) Administrative section.
(2) Operations section.
(3) Intelligence section.
(4) Maintenance section.
(5) Supply section.
(6) Communications section.
(7) Aviation section.

7–6. Major Items of Equipment

As the headquarters and headquarters company, engineer clmbat group and the headquarters and headquarters company, airborne engineer combat group, are essentially command and control units, they have a minimum of organic major items. Equipment for both versions of the company is the same. Each has 1/4-, 3/4-, and 2 1/2-ton trucks; 1.5-, 3-, and 10-kw generators; two helicopters; drafting and surveying sets and equipment; organizational maintenance toolkits; housekeeping equipment; and other equipment necessary for command and control. Armament consists of individual weapons.

7–7. Employment

See paragraphs 3–4 through 3–13 for employment of the headquarters and headquarters company, engineer combat group. See paragraphs 3–14 through 3–16 for employment of headquarters and headquarters company, airborne engineer combat group.

7–8. Communications

Type group headquarters radio and wire communications are shown in figures 7–2 and 7–3.

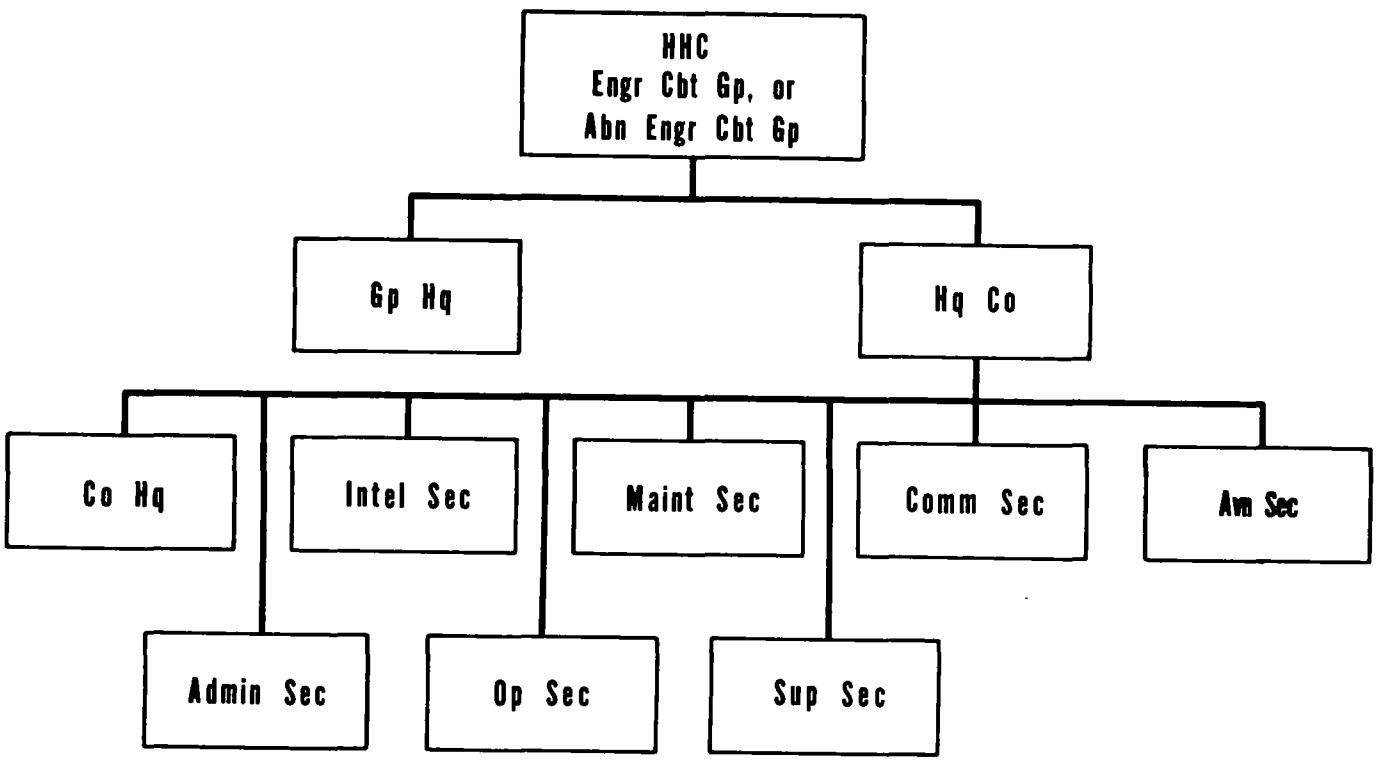


Figure 7–1. Organization chart, headquarters and headquarters company, engineer combat group or headquarters and headquarters company, airborne engineer combat group.

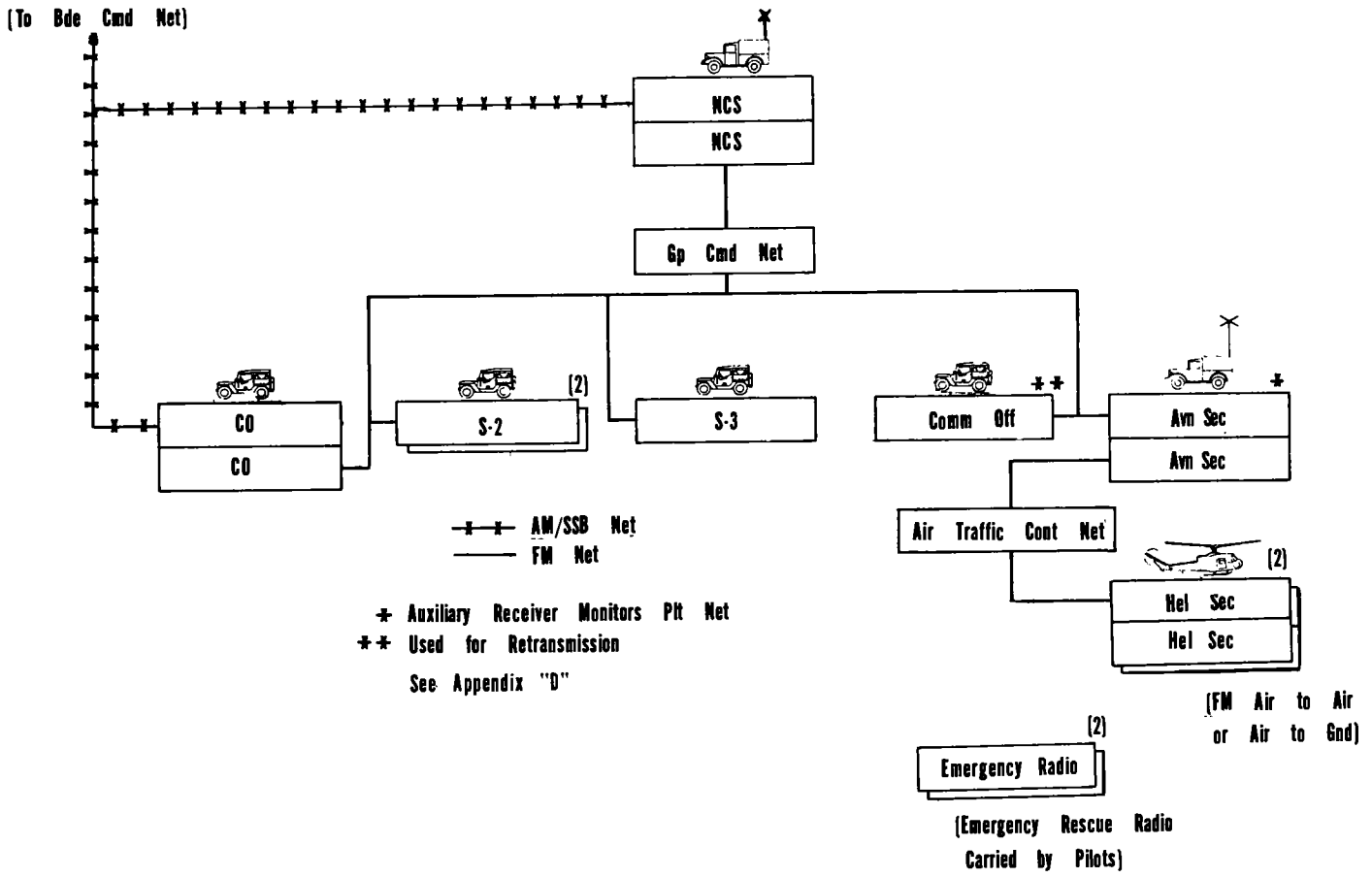


Figure 7-2. Type radio set, headquarters and headquarters company, engineer combat group or headquarters and headquarters company, airborne engineer combat group.

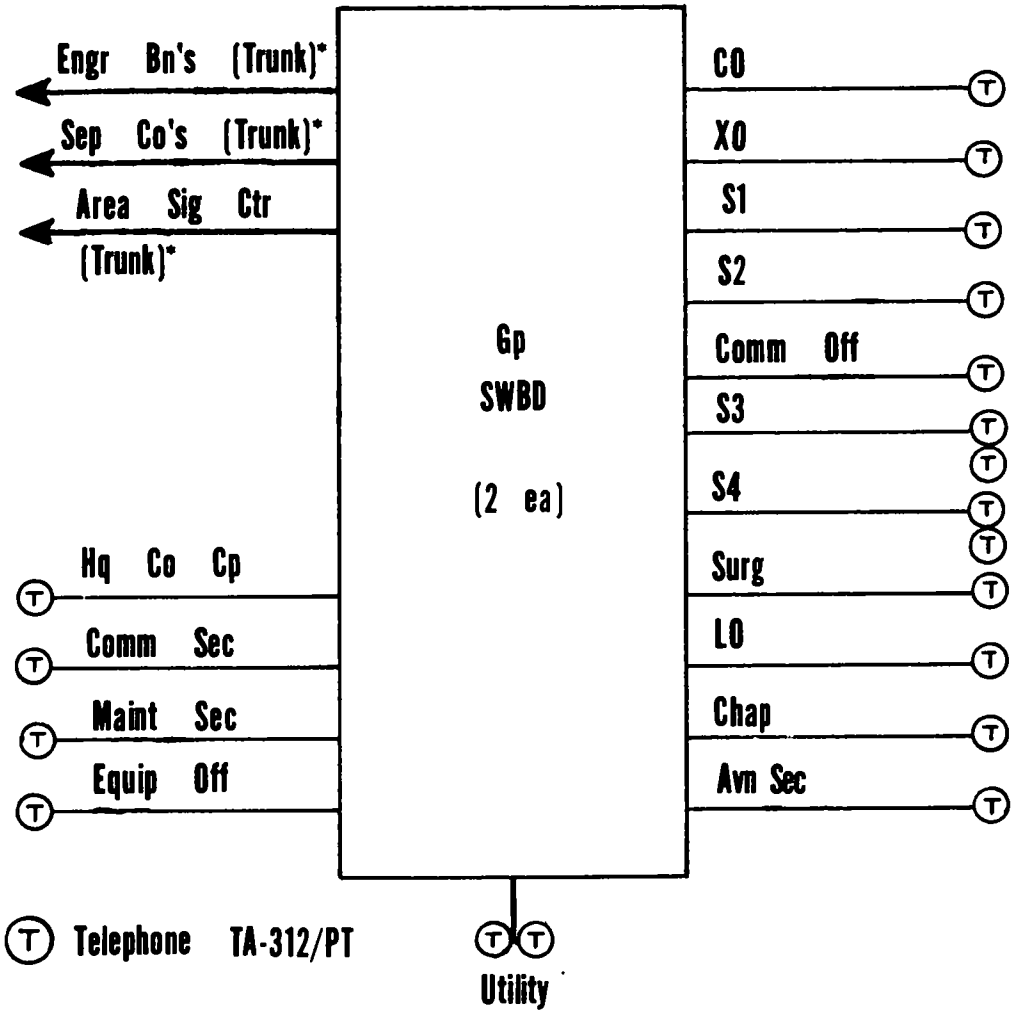


Figure 7–3. Type wire net, headquarters and headquarters company, engineer combat group or headquarters and headquarters company, airborne engineer combat group.

CHAPTER 8

ENGINEER COMBAT BATTALION, ARMY OR CORPS

Section I. GENERAL

8–1. Mission

The mission of the army or corps engineer combat battalion is tc—

a. Increase the combat effectiveness of corps and army by means of engineer combat support and general engineer work.

b. Reinforce divisional engineer units when required.

c. Perform infantry combat missions when required.

8–2. Assignment

The army or corps engineer combat battalion is assigned to a corps or army with normal attachment to an engineer combat group.

8–3. Capabilities

a. Level 1. At TOE Level 1 this unit provides—

(1) Engineer staff planning and supervision for organic and attached engineer troops.

(2) Engineer reconnaissance and the production of engineer intelligence.

(3) Construction, repair and maintenance of roads, fords, bridges, culverts, landing strips, heliports, command posts, supply installations, buildings, structures and related facilities.

(4) Planning and preparation of sites, and supervision of TOE 5–570 ADM teams in the execution and firing of atomic demolition munitions (ADM) on a mission basis.

(5) Preparation and removal of obstacles to include minefields.

(6) Installation and operation of field potable water supply facilities.

(7) Construction and placement of deceptive devices and technical assistance in camouflage operations.

(8) Site preparation for air defense artillery units.

(9) Construction of defensive installations.

(10) Engagement in river-crossing operations, to include assault crossing of troops and construction of tactical rafts and bridges.

(11) Participation in amphibious operations as part of the shore party to perform engineer tasks.

(12) Participation in the assault of fortified positions.

(13) A unit to undertake and carry out an infantry combat mission when required.

b. Levels 2 and 3. The Levels 2 and 3 columns adapt this TOE for reduced operational capabilities, in decrements of 10 percent, to approximately 90 percent for Level 2, and 80 percent for Level 3.

c. Type B Organization. The battalion and its organic units are not adaptable to a Type B organization.

d. Combat Capabilities. Individuals of this organization, except medical personnel, can engage in effective, coordinated defense of the unit's area or installation.

8–4. Allocation, Category, and Mobility

a. Allocation.

(1) In a type field army consisting of three corps with each corps consisting of four divisions, the allocation of army or corps engineer combat battalions is as follows:

(*a*) Field army—12.

(*b*) Corps—8.

(*c*) Total—36.

(2) For a type independent corps consisting of three divisions, 10 army corps engineer combat battalions are allocated.

b. Category. This unit is designated as a Category I unit (AR 310–25).

c. Mobility. This unit is 100 percent mobile in organic transportation. It is 100 percent air transportable in heavy transport aircraft.

8–5. Organization

The army or corps engineer combat battalion is

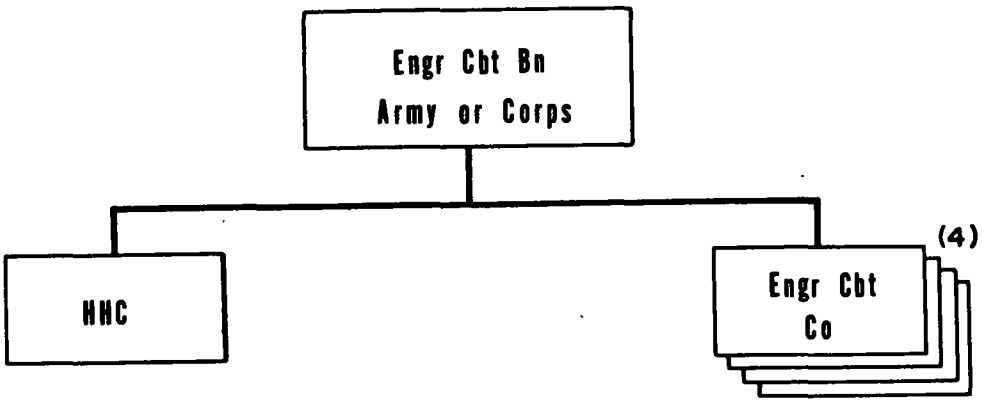


Figure 8-1. Organization chart, engineer combat battalion, army or corps.

organized under TOE 5-35 and consists of a headquarters and headquarters company and four engineer combat companies (fig 8-1).

8-6. Major Items of Equipment

Major items of equipment organic to each of the companies organic to the battalion are discussed briefly in paragraphs 8-9 through 8-19.

8-7. Employment

The success of military engineering operations in the field army depends to a large extent upon the ability of the army engineer to move his units anywhere in the army area to support these operations. Although units are referred to as corps or army troops, these terms are used mainly to identify the higher headquarters to which the unit is assigned or attached and is not a limitation on the area in which a unit works; however, corps engineer effort normally is reinforced by elements of the army engineer combat brigade rather than laterally from adjacent corps. An engineer combat battalion attached to a corps may find itself in the field army service area because of a change in boundary.

a. Task or Area Assignments.

(1) The engineer combat group commander normally assigns an engineer combat battalion to an area with responsibility for all engineer operations within that area. Assignment of tasks to subordinate units is directed by the battalion commander.

(2) When the situation warrants, an army or corps engineer combat battalion may be assigned specific tasks instead of an area-type mission.

(3) The capabilities of the army or corps engineer combat battalion may be augmented by the attachment of engineer equipment from the light equipment company and of trucks from the engineer dump truck company.

(4) In a tactical bridging mission, the army or corps engineer bridge unit delivers the bridge to the site and provides technical advice, assistance, and additional erection equipment for the installation of the bridge. The bridge is actually installed or erected by the army or corps engineer combat battalion.

b. Corps Area. Normally, one engineer combat battalion is placed in direct support of each committed division. The direct support engineer battalion performs engineer tasks requested by the division. If the corps engineer combat battalion does not have the capability to accomplish the mission, the battalion commander requests additional support from the corps engineer combat group.

c. Army Area. Army engineer combat battalions support each corps by performing engineer work on an area basis within the corps area up to the forward engineer work line. However, specific tasks designated by the army engineer may be accomplished forward of the engineer work line. This division of work, including the location of the forward engineer work line, is agreed upon informally between the corps engineers and the army engineer.

d. Atomic Demolition Teams. To provide nondivisional engineer combat units with the capability of atomic demolition employment within the field army area and to augment divisional engineer combat units, ADM teams can be attached in accordance with the type, magnitude, and number of ADM targets. For a discussion

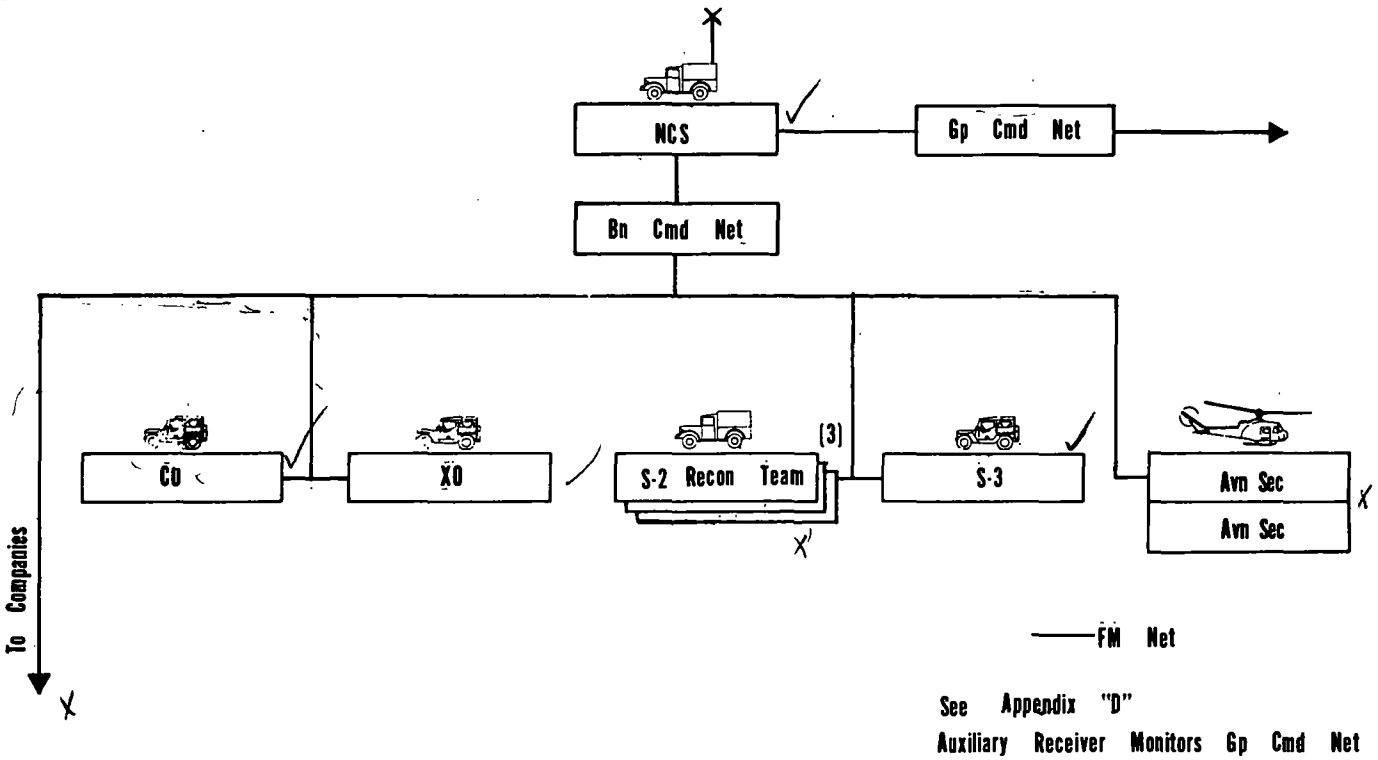


Figure 8–2. Type radio net, engineer combat battalion, army or corps.

of the employment of these teams see FM 5–26; for a description of their composition see appendix B.

8–8. Communications

Type battalion headquarters radio and wire communications nets are shown in figures 8–2 and 8–3.

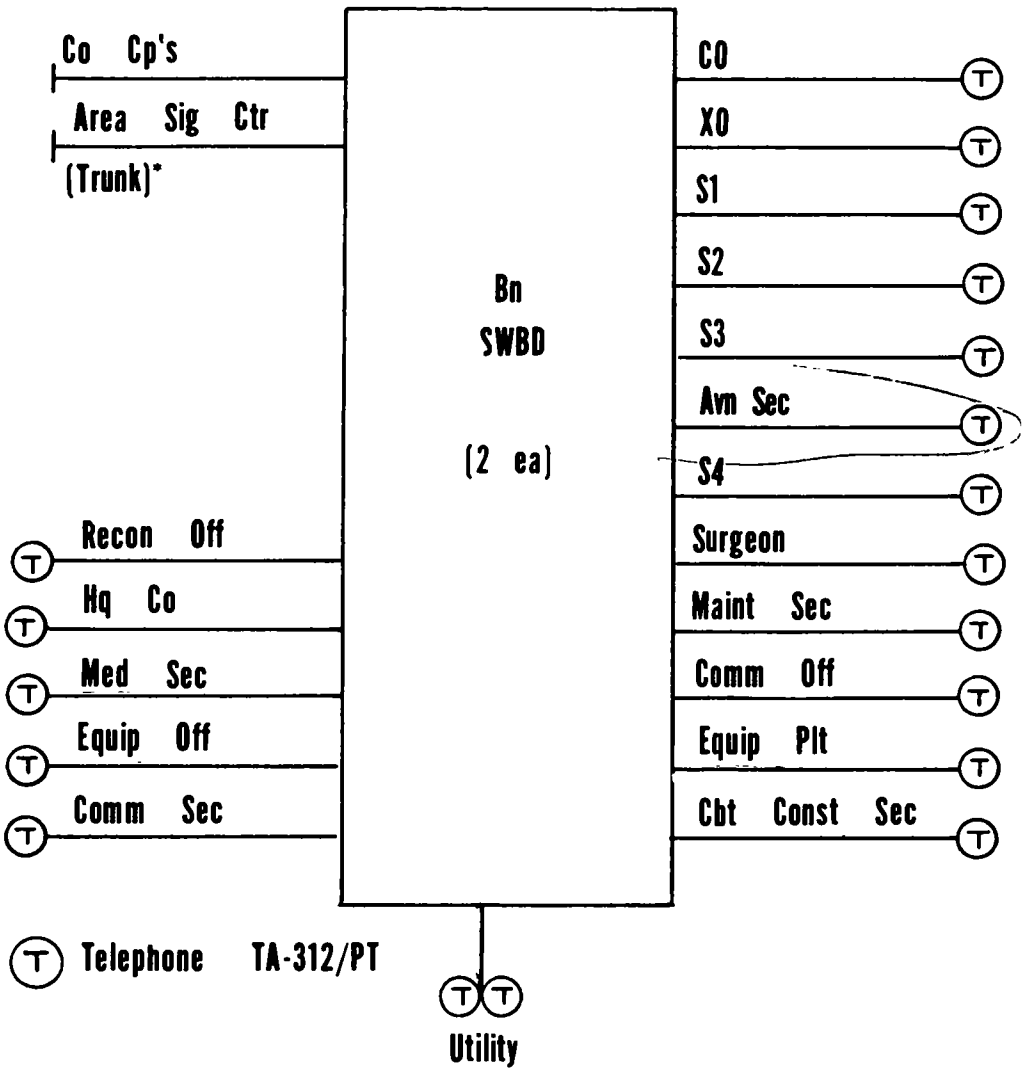


Figure 8–3. Type wire net, engineer combat battalion, army or corps.

Section II. HEADQUARTERS AND HEADQUARTERS COMPANY ENGINEER COMBAT BATTALION, ARMY OR CORPS

8–9. Mission

The mission of the headquarters and headquarters company organic to the army or corps engineer combat battalion is to—

a. Provide command and staff for the engineer combat battalion, army or corps.

b. Provide an alternate CP, administration, operations control, communications, reconnaissance and engineer intelligence, supply, organizational maintenance support, supplemental engineer construction and ordnance equipment, and medical service for the battalion. Provide for the production and supply of potable water for the corps or army, and provide for combat support by the planning and preparation for employment and the firing of atomic demolition munitions (ADM).

c. Undertake infantry combat missions when required.

8–10. Capabilities

a. Level 1. At TOE Level 1 this unit provides—

(1) Command, staff planning, and supervision of battalion operations, including attached engineer troops.

(2) Engineer reconnaissance and intelligence service for the engineer battalion and the army or corps.

(3) Limited atomic demolition munitions (ADM) support to the army or corps by planning for employment of ADM. Full support, including the firing, is provided when augmented by TOE 5–570 ADM teams as required (app B).

(4) Water purification and supply with up to five water points.

(5) Organizational maintenance and repair support for equipment of the battalion.

(6) Supplemental construction equipment for subordinate units as well as a vertical construction reinforcement capability.

(7) Battalion administration and supply service.

(8) Unit level medical service to include emergency medical treatment and evacuation, operation of a battalion aid station, supervision of sanitation and furnishing company aid men.

(9) Rotary wing aircraft for support of reconnaissance and combat support activities for the battalion.

(10) Radio and wire communications for the battalion.

b. Levels 2 and 3. The Levels 2 and 3 columns adapt this TOE for reduced operational capabilities, in decrements of 10 percent, to approximately 90 percent for Level 2, and 80 percent for Level 3.

8–11. Organization

Headquarters and headquarters company, army or corps engineer combat battalion, is organized under TOE 5–36 (fig 8–4) and consists of two elements—

a. Battalion Headquarters. Battalion headquarters consists of—

(1) Battalion commander.
(2) Executive officer.
(3) Adjutant (S1).
(4) S2.
(5) S3.
(6) S4.
(7) Battalion surgeon.
(8) Chaplain.
(9) Engineer equipment officer.
(10) Communication officer.
(11) Sergeant major.

b. Headquarters Company. Headquarters company consists of a company headquarters and the personnel of the following sections (see app C for duties of the staff sections):

(1) Administrative section.
(2) Intelligence section.
(3) Operations section.
(4) Supply section.
(5) Aviation section.
(6) Communications section.
(7) Battalion maintenance section.
(8) Equipment section.
(9) Battalion medical section.
(10) Combat construction section. (This section provides a pool of specialized personnel with construction skills not found in the line companies. The section includes electricians, plumbers, sheetmetal workers, sign painters, generator operators and welders. It functions under the operational control of the battalion Operations Officer (S3) and is employed on an "as required" basis, either in whole or in part, to support the operations of the battalion or of a particular line company of the battalion. This section provides the battalion with an increased vertical construction capability.)

8–12. Major Items of Equipment

Major items of equipment for headquarters and headquarters company include necessary housekeeping equipment; 1/4-, 3/4-, 2 1/2-, and 5-ton trucks; truck-mounted water purification sets; 5- and 10-ton truck-tractors and trailers; a water trailer; two helicopters fuel servicing tank trucks; 2 1/2-cubic yard, wheeled scoop loaders; 3/4-cubic yard, wheelmounted cranes; road graders; shop repair trucks and trailers; a 16-cubic-foot concrete mixer; a 250-CFM compressor outfit; tractor-dozers; welding sets; 1.5-, 3-, and 10-kw generators; 3-man reconnaissance boats; a medium wrecker; and drafting and surveying sets and medical equipment. Armament consists of rifles, pistols, light and cal. 50 machineguns, 40-mm grenade launchers, and the light antitank weapons (LAW).

8–13. Employment

Headquarters and headquarters company, army or corps engineer combat battalion, is employed in the support of battalion operations of either battalion or company size. It provides the staff and planning for the battalion and specialized engineer personnel and equipment support to the four organic engineer combat companies which are the operating elements of the battalion.

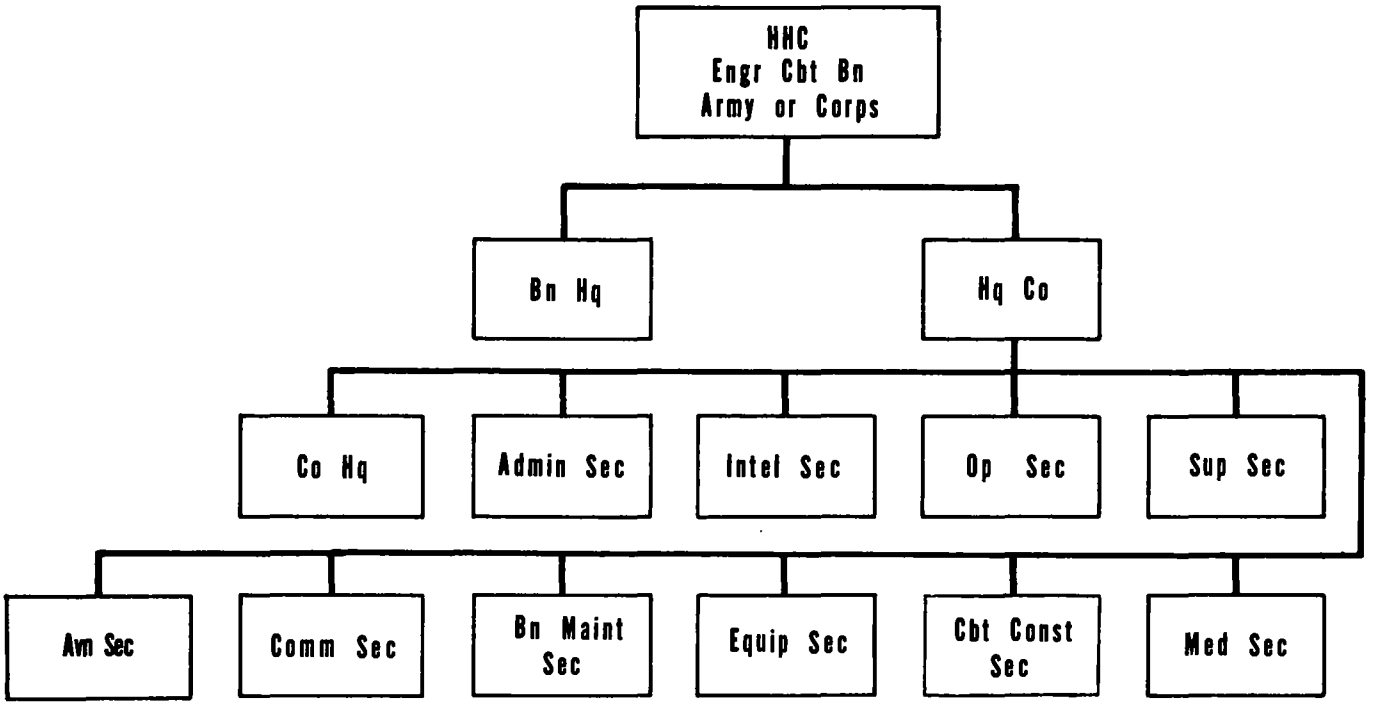


Figure 8–4. Organization chart, headquarters and headquarters company, engineer combat battalion, army or corps.

Section III. ENGINEER COMBAT COMPANY, ENGINEER COMBAT BATTALION, ARMY OR CORPS

8–14. Mission

The mission of the engineer combat company, four of which are organic to each army or corps engineer combat battalion, is to increase the combat effectiveness of the army or corps engineer combat battalion by providing engineer combat support for the field Army and to undertake and carry out combat missions when required.

8–15. Capabilities

a. Level 1. At TOE Level 1 this unit provides—

(1) Combat engineer tasks and, when reinforced with additional heavy equipment, can execute more complex engineer work.

(2) Site preparation and assists attached cellular-type atomic demolition munition (ADM) teams in the execution and firing of ADM.

(3) Construction, repair and maintenance of combat roads, fords, culverts, landing strips, heliports, and field command posts and supply installations.

(4) Preparation and removal of obstacles, to include minefields.

(5) Construction and placement of deceptive devices.

(6) Preparation of sites for air defense artillery units.

(7) Construction of defensive installations.

(8) Assistance in river-crossing operations, to include assault crossing of troops and construction of tactical raft and bridges.

b. Levels 2 and 3. The Levels 2 and 3 columns adapt this TOE for reduced operational capabilities, in decrements of 10 percent, to approximately 90 percent for Level 2, and 80 percent for Level 3.

8–16. Organization

The engineer combat company, army or corps engineer combat battalion, is organized under TOE 5–37 and is the major organic element of the engineer battalion (fig 8–5). It consists of the following elements:

a. Company Headquarters. Company headquarters provides the necessary personnel and facilities by which the company commander exercises command, control, and coordination of the unit's activities. Mess, supply, and organizational maintenance personnel are included within the headquarters. Communications personnel and equipment provide communications with

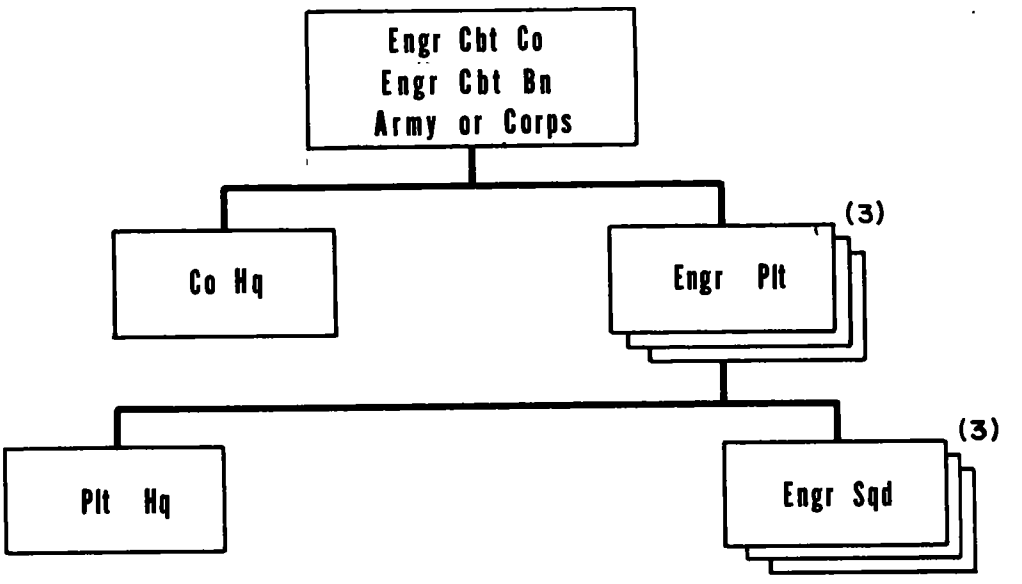


Figure 8–5. Organization chart, engineer combat company, engineer combat battalion, army or corps.

battalion headquarters, supported units, and organic platoons. Construction equipment and operators from the company headquarters support the organic platoons.

b. Engineer Platoon. Three engineer platoons, each consisting of three engineer squads, constitute the operational elements of the company. Under direction of platoon headquarters, the squads are the basic work elements of the company. Each squad is equipped with tools, demolition equipment, and transportation. Normally they are employed under platoon control and perform specific tasks of combat engineer support including demolition, pioneering, and combat missions.

8–17. Major Items of Equipment

Major items of equipment for the engineer combat company include: 1/4-, 3/4-, 2 1/2-, and 5-ton trucks; 10-ton truck-tractors and trailers; a 1 1/2-ton water trailer; 2 1/2-cubic yard, wheeled scoop loaders; tractor-dozers; gasoline driven chain saws; 1.5- and 3-kw generators; 3-man reconnaissance boats; a cutting and welding set; mine detecting sets; automotive, carpenter, electrician, general use, and pioneer kits; demolition sets and portable electric tools. Armament consists of rifles, pistols, machineguns, 40-mm grenade launchers, and the LAW.

8–18. Employment

a. The commander of the corps or army engineer combat battalion assigns specific tasks or areas of responsibility for special or general engineer work to each of the four organic engineer combat companies of the battalion as determined by the tactical situation. The company can perform limited engineer missions with organic equipment, operators, and maintenance personnel from the battalion headquarters company and separate units such as the engineer light equipment company.

b. The company may be attached to or placed in direct support of tactical units which do not have organic engineer units, or it may reinforce divisional engineer units. This unit is similar in organization to the divisional engineer company and, therefore, may be used to replace a divisional unit when necessary.

8–19. Communications

Type radio and wire communications nets for the engineer combat company are shown in figures 8–6 and 8–7.

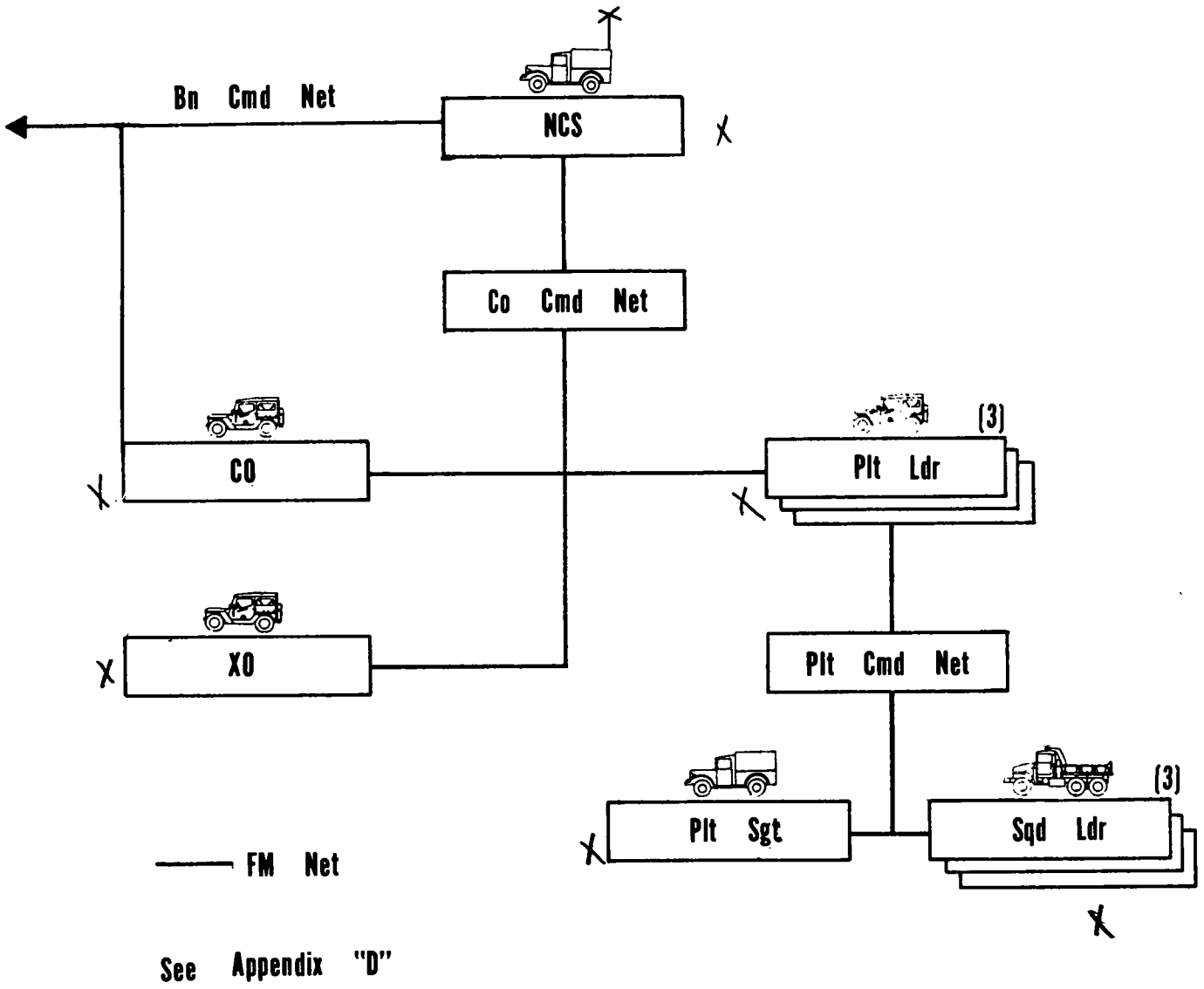


Figure 8-6. Type radio net, engineer combat company, engineer combat battalion, army or corps.

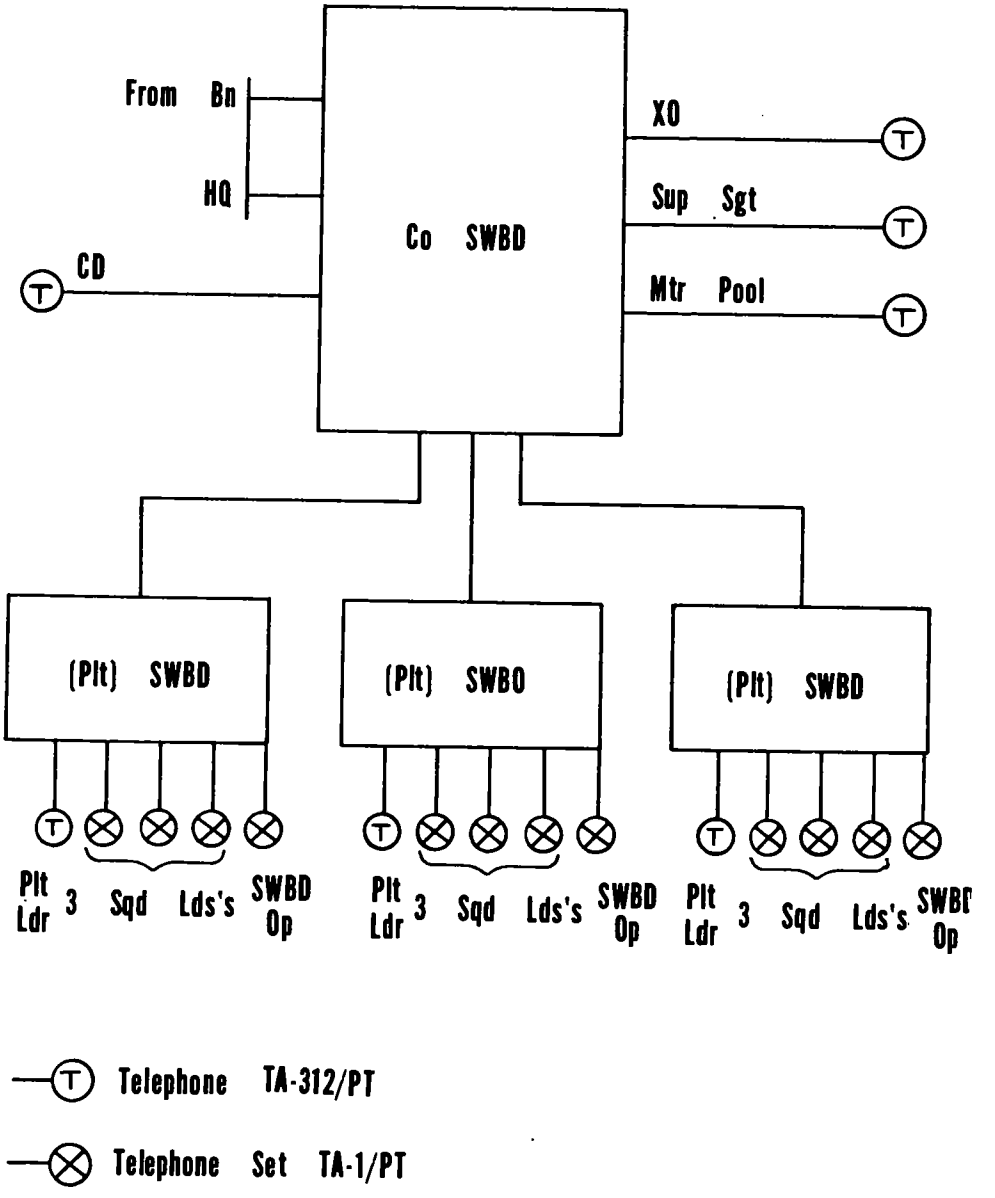


Figure 8–7. Type wire net, engineer combat company, engineer combat battalion, army or corps.

CHAPTER 9

ENGINEER COMBAT BATTALION, AIRBORNE

Section I. GENERAL

9-1. Mission

The mission of the airborne engineer combat battalion is to—

a. Increase the combat effectiveness of joint task force or tactical air force operations by constructing theater of operations airfields; accomplishing expedient major repairs or modification of existing facilities; and by performing general combat engineer construction tasks to support air operations.

b. Provide engineer support to divisional engineer airborne battalions engaged in combat construction activities.

9-2. Assignment

The airborne engineer combat battalion can be assigned to—

a. The U.S. Continental Army Command (CONARC) or to a theater army for attachment to a major tactical air force.

b. The army element of a joint task force.

c. An airborne corps.

9-3. Capabilities

a. Level 1. At TOE Level 1 this unit provides—

(1) A staff to plan the engineer missions in support of the United States Air Force Strike (USAFSTRIKE), the army element of a joint task force, or U.S. Army airborne operations.

(2) Engineer reconnaissance for the selection, design, and construction of air landing zones and other facilities.

(3) A capability to simultaneously construct two medium lift forward area airfields in approximately 72 hours or two support area tactical airfields in approximately 264 hours, where a low degree of difficulty exists.

(4) Airfield construction by earth-clearing operations; addition of soil-stabilizing or waterproofing agents and dust palliatives; and installation of landing mats, membranes, and portable airfield lighting devices.

(5) A capability for accomplishing expedient repairs or modifications to existing airbase facilities.

(6) A capability to perform expedient repairs to bomb-damaged runways.

(7) A capability for limited bituminous patching of pavement.

(8) A capability for vertical construction to include installation of power generation and distribution facilities, and the installation and temporary operation of fly-by-extraction and arresting equipment.

(9) Personnel and equipment for the purification and supply of potable water.

(10) Direct support maintenance on organic engineer and ordnance equipment.

(11) Personnel for two shift operation.

b. Levels 2 and 3. The Levels 2 and 3 columns adapt this TOE for reduced capabilities in decrements of 10 percent, to approximately 90 percent for Level 2, and 80 percent for Level 3.

c. Type B Organization. This unit is not adaptable to a Type B organization.

d. Combat Capabilities. Individuals of this organization, except medical personnel and the chaplain can engage in effective, coordinated defense of the unit's area or installation.

e. Support Required. This unit is dependent on other organizations for—

(1) Parachute packing and maintenance teams.

(2) Communications support from Air Force elements when operating in isolated areas.

(3) Local area security during the construction phase of assigned missions.

(4) Reinforcements from conventional construction units when complex construction standards are required.

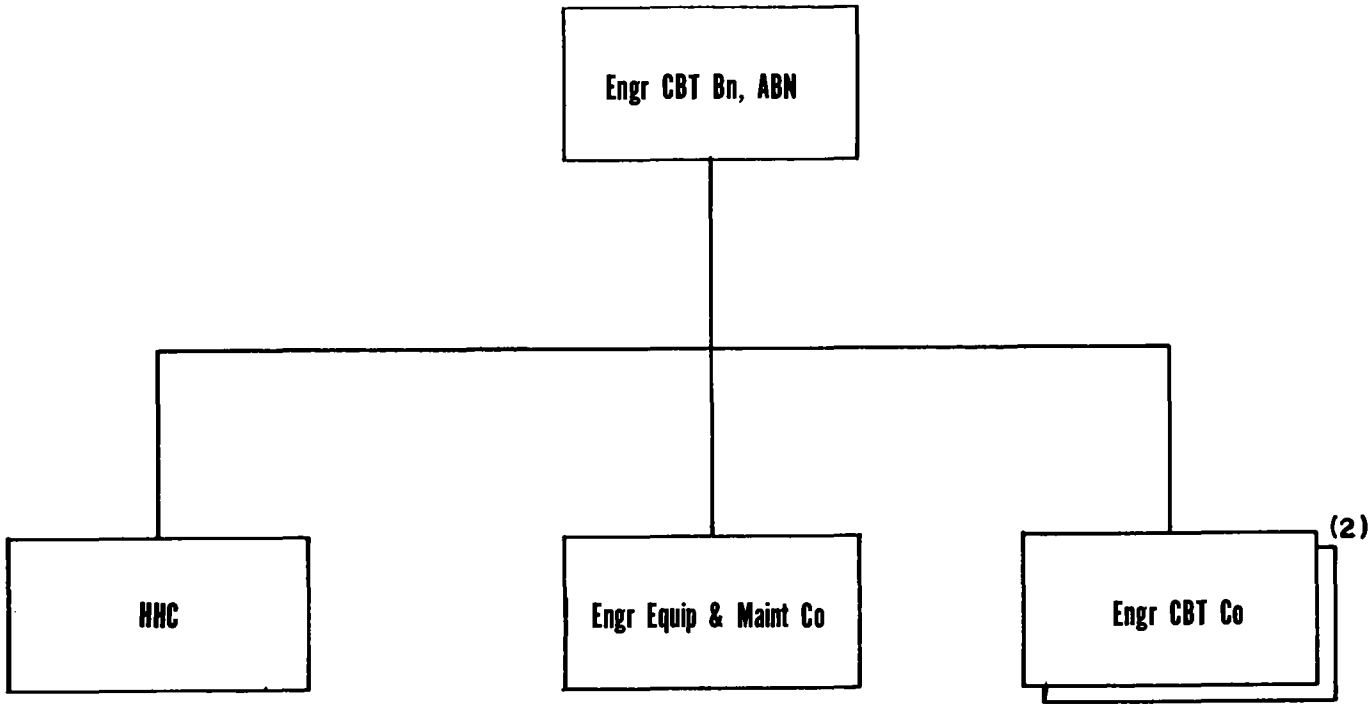


Figure 9–1. Organization chart, engineer combat battalion airborne.

9–4. Allocation, Category, and Mobility

a. Allocation. This unit normally is allocated as required for the support of tactical Air Force or Army airmobile or airborne operations.

b. Category. This unit is designated as a Category I unit (AR 310–25).

c. Mobility.

(1) *Ground.* The airborne engineer combat battalion is 100 percent mobile with organic transportation.

(2) *Air.* The battalion is 100 percent air transportable in Air Force medium transport aircraft with the exception of the following:

(*a*) Truck, dump, 5-ton.

(*b*) Truck, wrecker, 5-ton.

9–5. Organization

The airborne engineer combat battalion is organized under TOE 5–195 and consists of a headquarters and headquarters company, an engineer equipment and maintenance company, and two engineer combat companies (fig 9–1).

9–6. Major Items of Equipment

Major items of equipment organic to each of the four companies of the battalion are discussed briefly in paragraphs 9–12, 9–16 and 9–21.

9–7. Employment

a. The airborne engineer combat battalion is designed to meet requirements for an army airborne engineer unit with readily air transportable equipment that can construct, expand, rehabilitate, or repair runways, taxiways, and aircraft parking areas. As such, it can appropriately be referred to as a nondivisional airfield construction oriented organization. The battalion can perform engineer combat support tasks and when employed in this role its operations are similar to the operations of the army or corps engineer combat battalion.

b. The airborne engineer combat battalion normally will be employed in a role that will increase the effectiveness of air operations. It will be used primarily to provide airbases for air force tactical and airlift aircraft in a combat zone type of environment and normally will support joint task force, tactical air command, and airborne or airmobile operations.

9–8. Communications

Type battalions headquarters radio and wire communications nets are shown in figures 9–2 and 9–3.

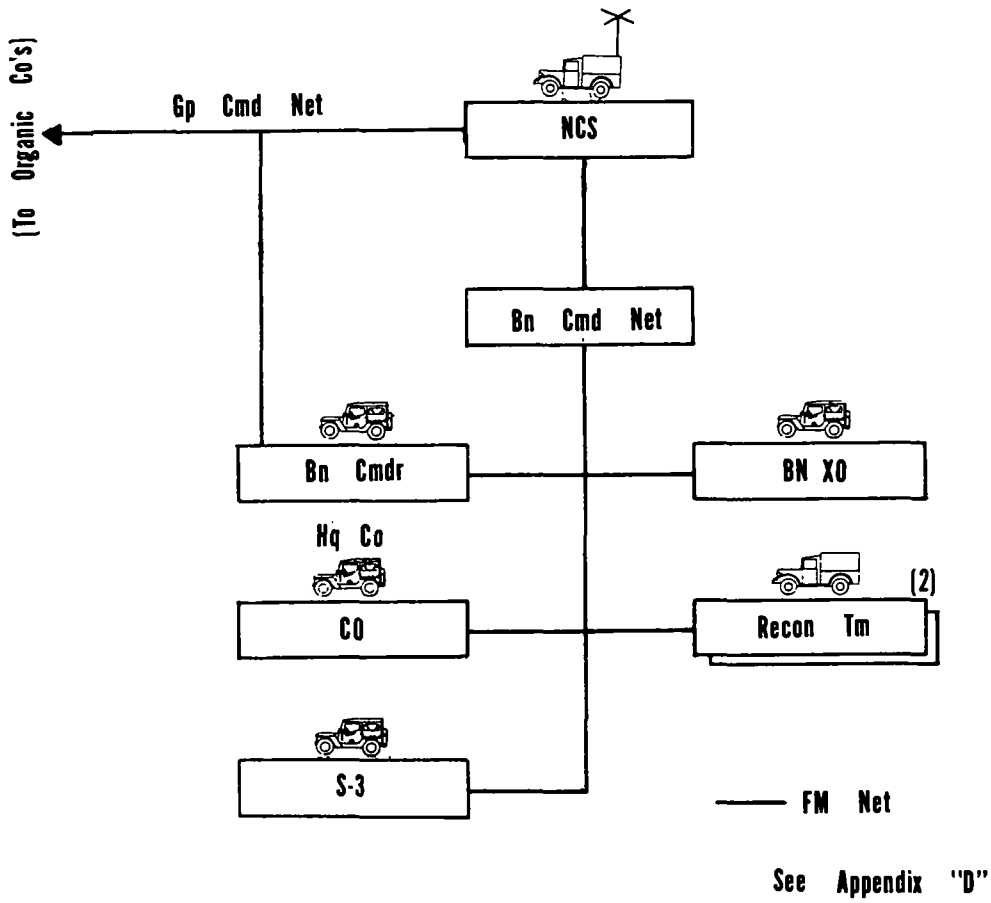


Figure 9-2. Type radio net, engineer combat battalion, airborne.

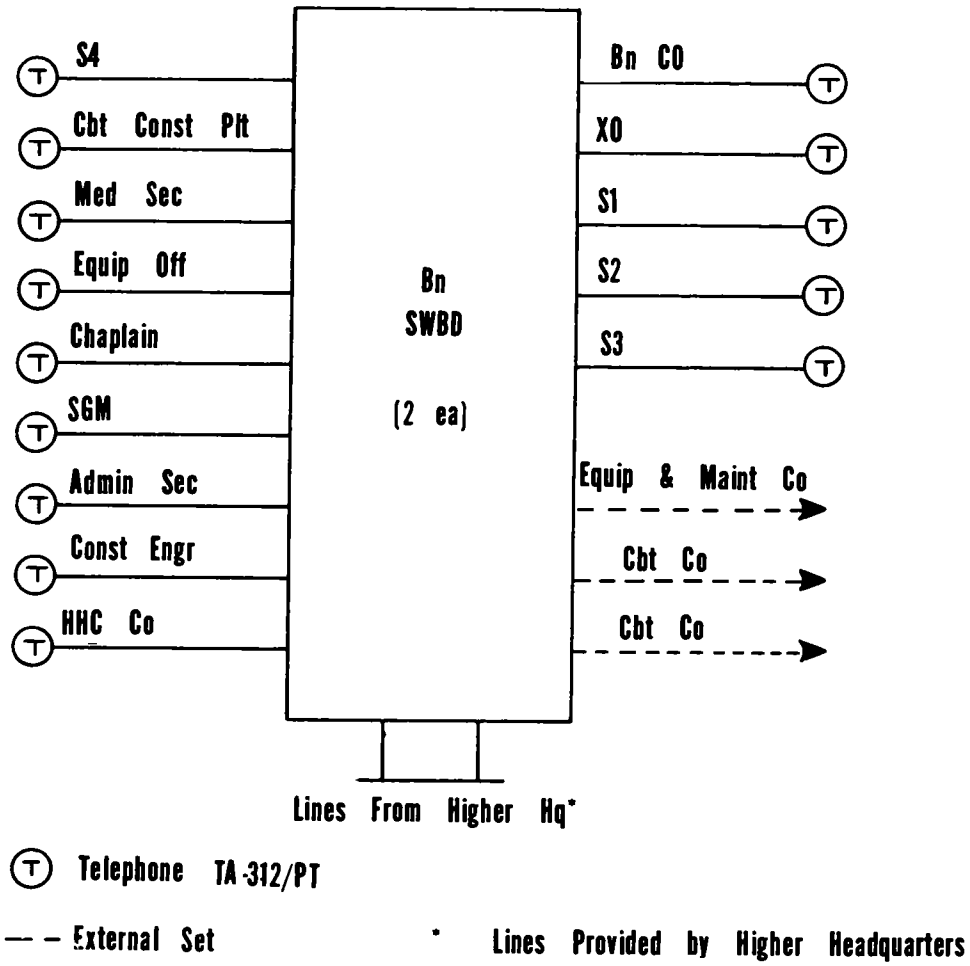


Figure 9–3. Type wire net, engineer combat battalion airborne.

Section II. HEADQUARTERS AND HEADQUARTERS COMPANY, ENGINEER COMBAT BATTALION, AIRBORNE

9–9. Mission

The mission of headquarters and headquarters company, engineer combat battalion, airborne is to provide the command and staff, administration, supply, communications, and medical services for the engineer combat battalion airborne; a staff to provide engineer construction planning for the supported command; and specialized construction equipment support.

9–10. Capabilities

a. Level 1. At TOE Level 1, this unit provides—

(1) A staff to plan the engineer strike missions in support of the United States Air Force Strike (USAFSTRIKE), the army element of a joint task force, or U.S. Army airborne operations.

(2) Engineer reconnaissance to aid in the selection and to support the design, and construction of airlanding zones and other facilities.

(3) Specialized skills to support the vertical construction mission of the battalion, to include support for the installation of power generation and distribution facilities and support for the installation of fly-by extraction and arresting equipment.

(4) Battalion level supervision for the construction of runways, taxiways, aprons, installation of portable runway lighting devices; limited patching of bituminous pavement, expedient repairs to bomb-damaged runways, expedient major repairs or modifications to existing airbase facilities, land clearing, installation of landing mats, membranes, dust palliatives, and waterproofing or soil stabilizing agents.

(5) Personnel and equipment for the purification and supply of potable water.

(6) Organizational maintenance of organic equipment.

(7) Battalion administration and supply services.

(8) Unit level medical service to include emergency medical treatment and evacuation, operation of a battalion aid station, supervision of sanitation and furnishing company aid men.

(9) Capability of being parachute delivered.

b. Levels 2 and 3. Levels 2 and 3 columns adapt this TOE for reduced operational capabilities in decrements of 10 percent to approximately 90 percent for Level 2, and 80 percent for Level 3.

9–11. Organization

Headquarters and headquarters company is organic to the airborne engineer combat battalion and is organized under TOE 5–196 (fig 9–4). It consists of two elements—

a. Battalion Headquarters. Battalion headquarters consists of—

(1) Battalion commander.
(2) Executive officer.
(3) Adjutant (S1).
(4) Intelligence officer (S2).
(5) Operations officer (S3).
(6) Supply officer (S4).
(7) Engineer equipment officer.
(8) Communications officer.
(9) Surgeon.
(10) Chaplain.
(11) Sergeant major.

b. Headquarters Company. Headquarters company consists of a company headquarters, the personnel of the following operating sections of the battalion (see app C for duties of the staff sections), and a combat construction platoon discussed in *c* below:

(1) Administrative section.
(2) Operations section.
(3) Intelligence section.
(4) Supply section.
(5) Communications section.
(6) Medical section.

c. Combat Construction Platoon.

(1) The combat construction platoon provides a pool of specialized personnel with construction skills not found in the line companies. The platoon includes carpenters, electricians, plumbers, sheetmetal workers, riggers, welders, and an arrester mechanic. It functions under

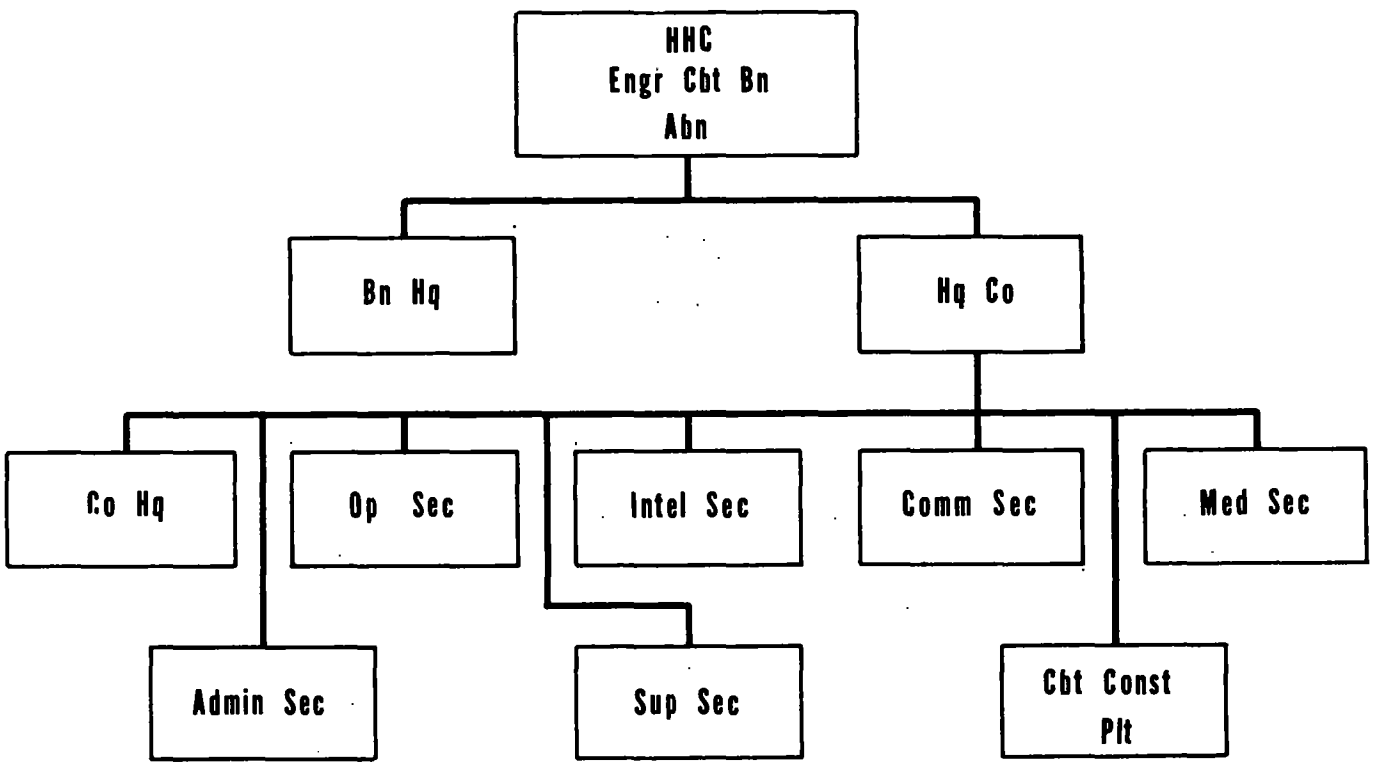


Figure 9–4. Organization chart, headquarters and headquarters company, engineer combat battalion, airborne.

the operational control of the battalion operations officer (S3) and is employed on an as required basis, either in total or in part, to support the operations of the battalion or of a particular line company of the battalion. This platoon is included in the TOE for five main purposes. It provides skilled personnel and the necessary tools for—

(*a*) The erection of portable hangars and shelters required as a part of the airbase support facilities.

(*b*) Accomplishing expedient major repairs or modifications to existing airbase facilities.

(*c*) The temporary maintenance of airbase facilities until the battalion is relieved by the air force or by another engineer unit.

(*d*) The installation, temporary operation, and maintenance of aircraft arresting equipment.

(*e*) The limited installation and operation of power generators and distribution facilities.

(2) The S3, assisted by the operations section, controls the disposition and resources of the construction platoon. To gain maximum participation and production on vertical construction projects construction platoon personnel may be augmented by combat platoon personnel in approximately a 1:10 ratio respectively. The personnel of the construction platoon act as technical supervisors or advisors to combat construction specialists and pioneers.

9–12. Major Items of Equipment

Major items of equipment for headquarters and headquarters company include necessary housekeeping equipment; 1/4-, 3/4-, and 2 1/2-ton trucks; trailer-mounted water purification sets; drafting, surveying, and soil testing sets; communications equipment, rigging, pipefitter, electrician, carpenter, automotive, welding, and sheetmetal sets 1 1/2-, 3-, 5-, and 10-kw generators; and medical equipment. Armamant consists of rifles, pistols, the LAW and light machineguns.

9–13. Employment

Headquarters and headquarters company is employed in the support of battalion operations of either battalion or company size. Its mission is the same in either case.

Section III. ENGINEER EQUIPMENT AND MAINTENANCE COMPANY, ENGINEER COMBAT BATTALION, AIRBORNE

9–14. Mission

The mission of the engineer equipment and maintenance company is to reinforce the construction capabilities of the engineer combat battalion, airborne by providing air transportable engineer construction equipment with operators, and to enhance the overall capability of the battalion by performing battalion level organizational maintenance for all equipment, and direct support maintenance for construction equipment and wheeled vehicles organic to the battalion.

9–15. Capabilities

a. Level 1. At TOE Level 1, this unit provides—

(1) Battalion level organizational maintenance and direct support maintenance of construction equipment and wheeled vehicles organic to the engineer combat battalion, airborne.

(2) Contact maintenance teams for job site repair of organic equipment.

(3) Repair parts support commensurate with the organization's direct support maintenance mission.

(4) Machine shop facilities.

(5) Equipment support for two shift operation.

(6) Equipment for earthmoving, and concrete and asphalt repair.

b. Levels 2 and 3. The Levels 2 and 3 columns adapt the table for reduced operational capabilities, in decrements of 10 percent to approximately 90 percent for Level 2, and 80 percent for Level 3.

c. This unit is not adaptable to a type B organization.

d. Individuals of this organization can engage in effective, coordinated defense of the unit's area or installation.

e. Basis of Allocation. One per engineer combat battalion, airborne, TOE 5–195.

f. Category. This unit is designated a Category I unit (AR 310–25).

g. Mobility. One hundred percent mobile by organic transportation. This unit is air transportable in medium transport aircraft, with the exception of the 5-ton dump trucks and wrecker.

9–16. Organization

The engineer equipment and maintenance company is organic to the airborne engineer combat battalion and is organized under TOE 5–197 (fig 9–5). It consists of the following elements:

a. Company Headquarters. The company headquarters section is the command and control element of the engineer equipment and maintenance company. The section includes personnel and equipment to provide the administrative, mess, supply, and communications services to support company operations.

b. Two Light Equipment Platoons. Two identical light equipment platoons are organic to the engineer equipment and maintenance company. Each platoon is designed to provide an air droppable engineer equipment element capable of performing the initial earthmoving operations associated with the construction of a minimum criteria landing zone. The provision of shift leaders and two operators for each item of engineer equipment allows the platoon to function on a two-shift basis with adequate supervision and operators. The organic equipment is capable of supporting the construction effort with tractors, scrapers, graders, loaders, and dump trucks. Its capability is further enhanced by the availability of a sheepsfoot roller, a vibrator compactor, three collapsible water distributors, a pneumatic tool and compressor outfit, and a portable gas-driven rock drill.

c. Heavy Equipment Platoon. One heavy equipment platoon is organic to the engineer equipment and maintenance company. The platoon is designed to enhance and complement the construction equipment capability of each light equipment platoon. With the exception of the mixer operator, this platoon also has two operators per item of equipment. The platoon sergeant and his assistant must function as shift leaders when shift supervision is required and organizational maintenance assistance must be secured from the maintenance platoon. The heavy equipment platoon offers a greater variety of equipment that is generally larger and heavier. Approximately 46 percent of its motorized vehicles and equipment is not presently air droppable. The platoon equipment includes four collapsible water distributors; one sheepsfoot roller; two 13-wheel pneumatic tire rollers; one vibratory compactor; one concrete mixer; one aggregate spreader; two bitumen heating kettles; two wheel mounted, 7-ton, 1/2-cubic yard, crane-shovels; one 15-ton jaw crusher; two tractor dozers; two

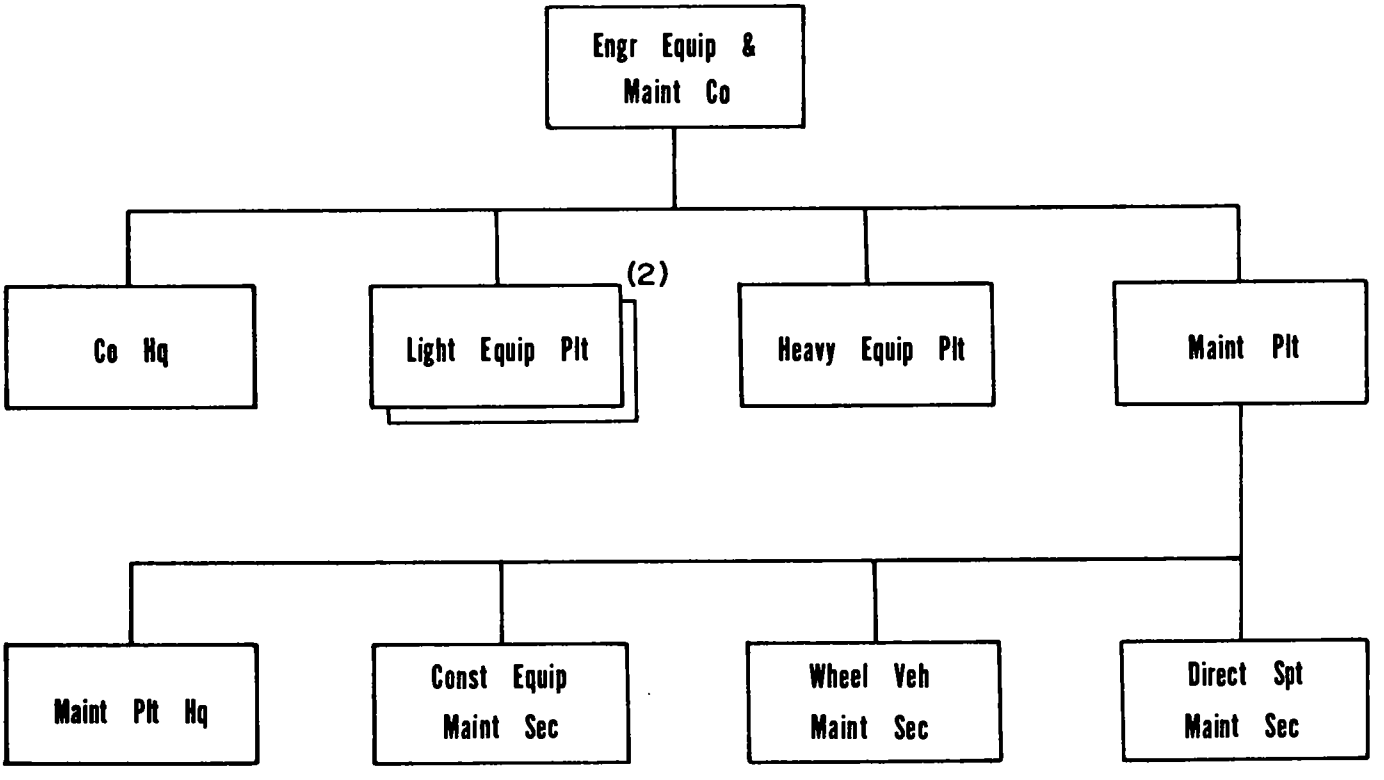


Figure 9–5. Organization chart, engineer equipment and maintenance company, engineer combat battalion, airborne.

2 1/2-cubic yard scoop loaders; and ten 5-ton dump trucks.

d. Maintenance Platoon. The maintenance platoon of the engineer equipment and maintenance company performs an organizational maintenance service for the company and direct support (DS) maintenance service for the battalion. It is equipped with contact maintenance trucks, a field maintenance machine shop, a wrecker, welding sets, and miscellaneous mechanic tools. The contact maintenance teams will repair, weld, and replace component parts on the job site to the limit of its repair parts supply and toolset capability.

9–17. Employment

Under the supervision of the company commander the engineer equipment and maintenance company provides construction equipment support and organization and direct support maintenance support for the airborne engineer combat battalion. The two light equipment platoons are allocated on a basis of one per engineer combat company. When required, these platoons will be attached either in total or in part, to the combat companies to support their operations. The light equipment platoon is designed to accompany the combat companies in the initial stages of an operation. The heavy equipment platoon serves as a backup equipment pool and normally will remain in the assembly area during the initial stages of an operation. However, the heavy equipment platoon can be committed, either in total or in part, during the initial stages when the job site or sites can be reached by ground movement or when early air landings can be accomplished on an existing but partially damaged airfield. Maximum equipment utilization in early phases usually will result in earlier mission completions. The maintenance platoon must assure that all battalion equipment is in

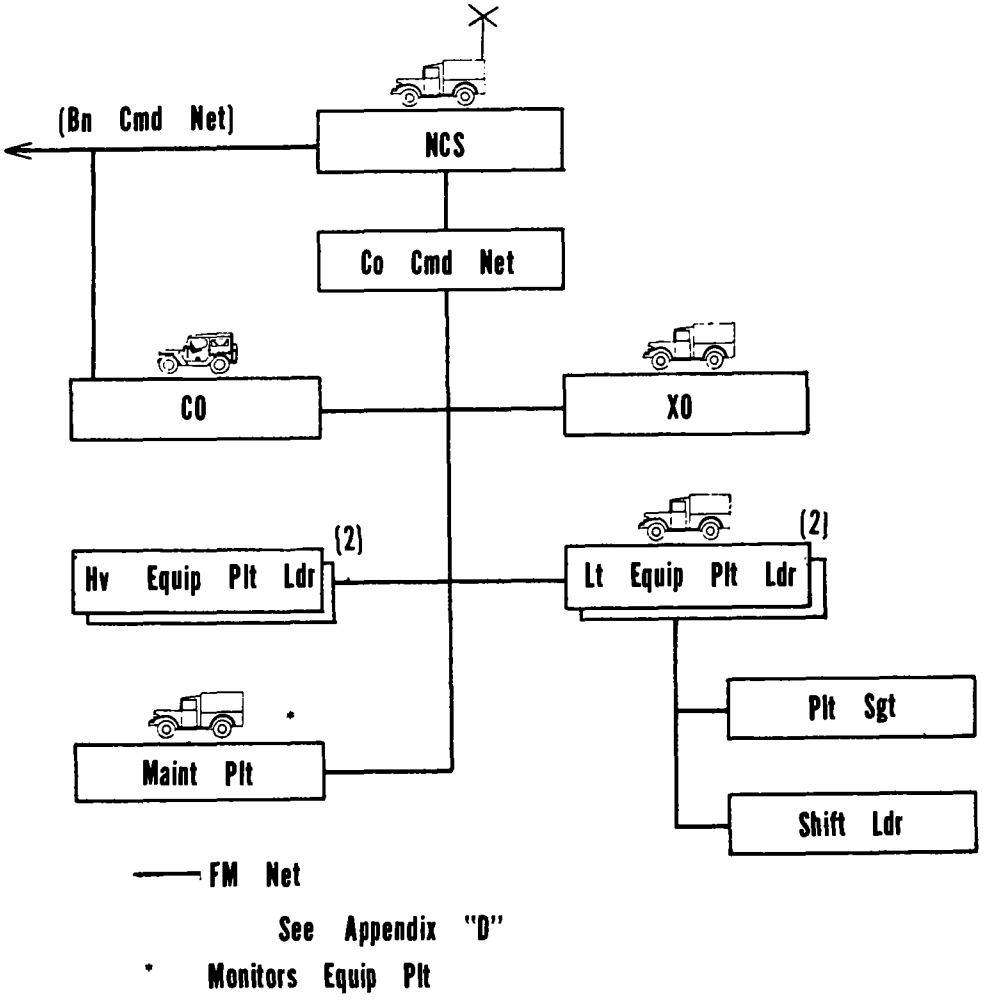


Figure 9–6. Type radio net, engineer equipment and maintenance company, engineer combat battalion, airborne.

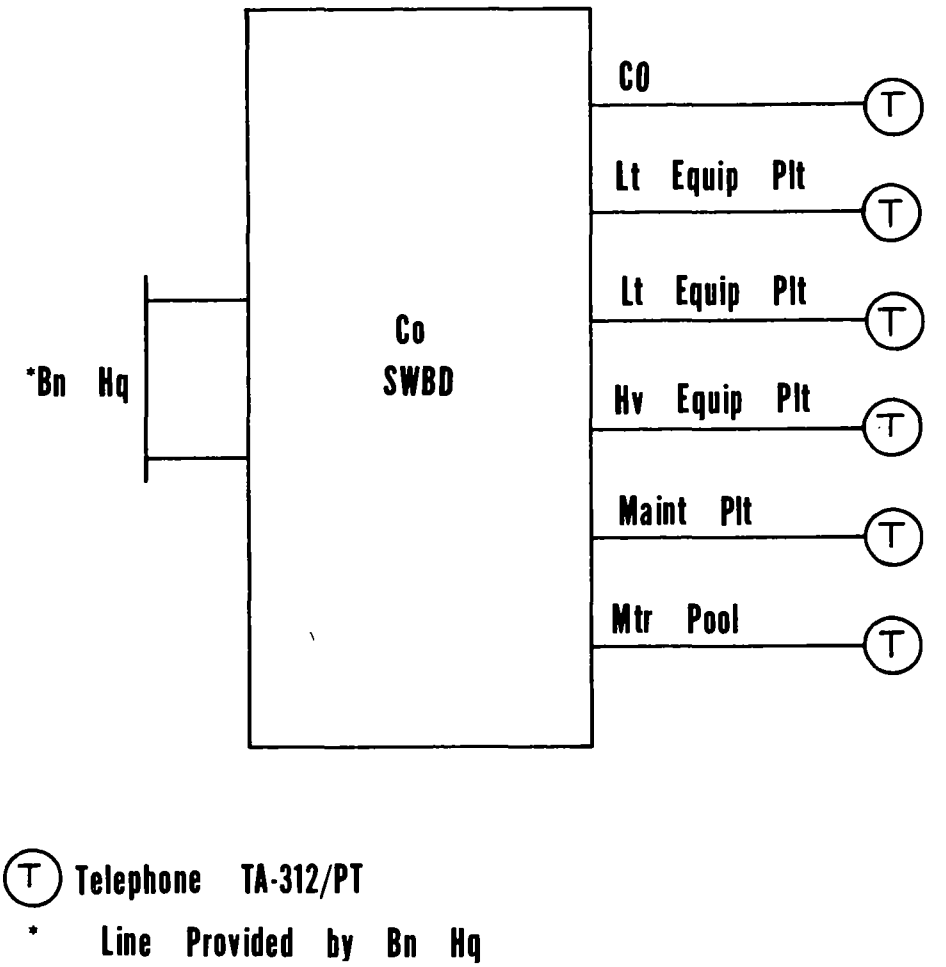


Figure 9–7. Type wire net, engineer equipment and maintenance company, engineer combat battalion, airborne.

peak operational condition prior to delivery to the worksite. All maintenance, including scheduled maintenance, must be up-to-date at the start of a mission. Elements of the maintenance platoon are landed with the lead units in an operation to repair mission-essential equipment damaged in dropping and to perform other required maintenance.

9–18. Communications

Type radio and wire communications nets for the engineer equipment and maintenance company are shown in figures 9–6 and 9–7.

Section IV. ENGINEER COMBAT COMPANY, ENGINEER COMBAT BATTALION, AIRBORNE

9–19. Mission

The mission of the airborne engineer combat company is to provide an operating component of the engineer combat battalion, airborne to perform general engineer work facilitating and contributing to the combat construction effort of the battalion in support of USSTRICOM, USAFSTRIKE or other engineer support operations of forces as directed.

9–20. Capabilities

a. Level 1. At TOE Level 1 this unit provides—

(1) Combat and general construction tasks and when reinforced with additional heavy engineer equipment and skills, can execute more complex engineer work to include—

(*a*) Erection of portable hangars and other portable buildings and structures.

(*b*) Installation of runway lighting devices.

(*c*) Installation of arresting equipment and provision of personnel to operate and maintain the equipment.

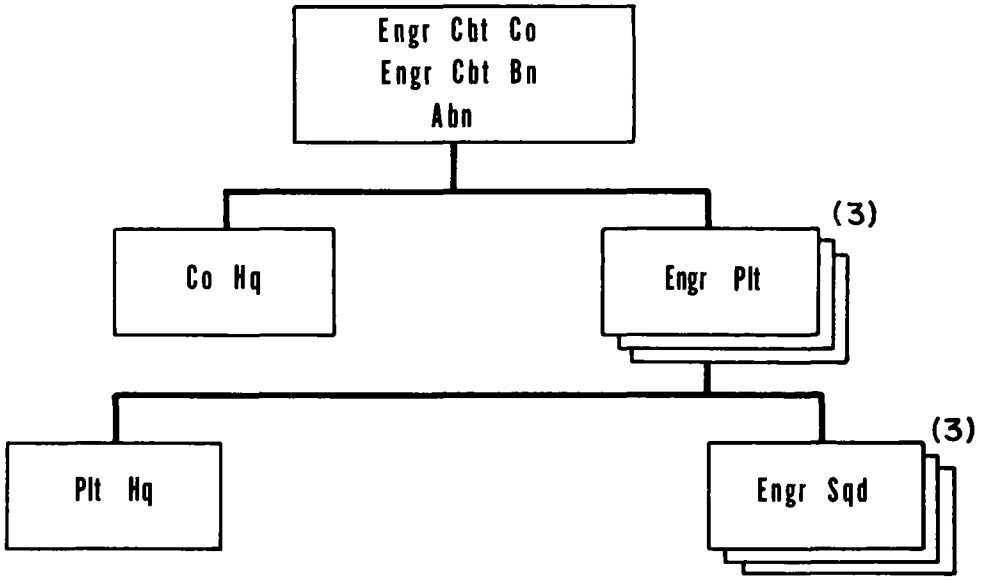


Figure 9–8. Organization chart, engineer combat company, engineer combat battalion, airborne.

(*d*) Installation and temporary operation of fly-by-extraction equipment.

(2) Expedient repairs to bomb-damaged runways.

(3) Organizational maintenance on organic equipment.

(4) Capability of being parachuted or air delivered to worksites without modification of equipment.

(5) Operation on a two-shift basis.

b. Levels 2 and 3. The Levels 2 and 3 columns adapt this TOE for reduced capabilities in decrements of 10 percent to approximately 90 percent for Level 2, and 80 percent for Level 3.

9–21. Organization

The engineer combat company, two of which are organic to each airborne engineer combat battalion, is organized under TOE 5–198 (fig 9–8). It consists of the following elements:

a. Company Headquarters. Company headquarters of the engineer combat company is the command and control element of the company and is organized along conventional lines. It provides the personnel and facilities by which the company commander exercises command, control, and supervision to accomplish assigned mission activities. It also provides the administrative, mess, supply, communications, and organizational maintenance services for the company as well as maintaining a small engineer construction equipment pool to support the combat efforts of the organic platoons.

b. Three Engineer Combat Platoons. Three identical engineer platoons are organic to the engineer combat company. Each platoon primarily provides manpower resources but it also contains a scoop loader, an electric tool outfit, four dump trucks, a portable rock drill, a chain saw, carpenter and pioneer toolsets, and an airfield cone penetrometer. The engineer combat platoon has—

(1) *A platoon headquarters.* The platoon headquarters functions as the command and control element of the platoon. Most of the engineer equipment organic to the platoon is contained in the platoon headquarters.

(2) *Three engineer squads.* The engineer squad is the smallest controlled working element of the engineer combat company. It contains the combat engineer personnel with pioneer, combat construction, and demolition skills. The engineer squad leader assisted by the assistant squad leader supervises and controls the activities of the squad. The organic 2 1/2-ton dump truck assigned to each squad provides mobility.

9–22. Employment

The engineer combat company is the basic operating component of the battalion. Its organization consisting of command, support services, manpower resources, and organic but limited equipment provides the means for accomplishing battalion missions. The engineer combat company is augmented by equipment from the equipment company as required. The combat

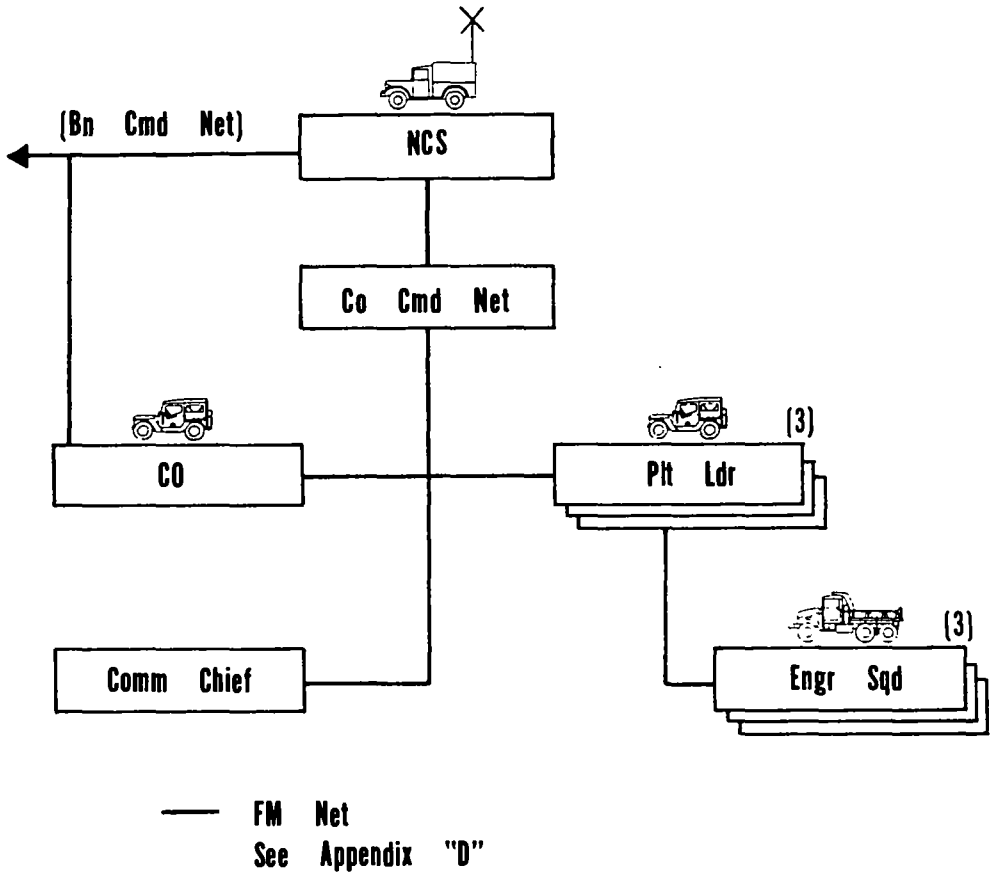


Figure 9-9. Type radio net, engineer combat company, engineer combat battalion, airborne.

company can operate independently and is able to construct a forward operating base when properly augmented with construction equipment. When called upon to repair or modify an existing airbase facility, it usually will assign the mission to a platoon if the platoon can accomplish the task within a stated period of time. Battalion headquarters will reinforce the combat construction platoon when the mission requires skills and tools organic to that platoon.

9-23. Communications

Type radio and wire communication nets for the engineer combat company are shown if figures 9-9 and 9-10.

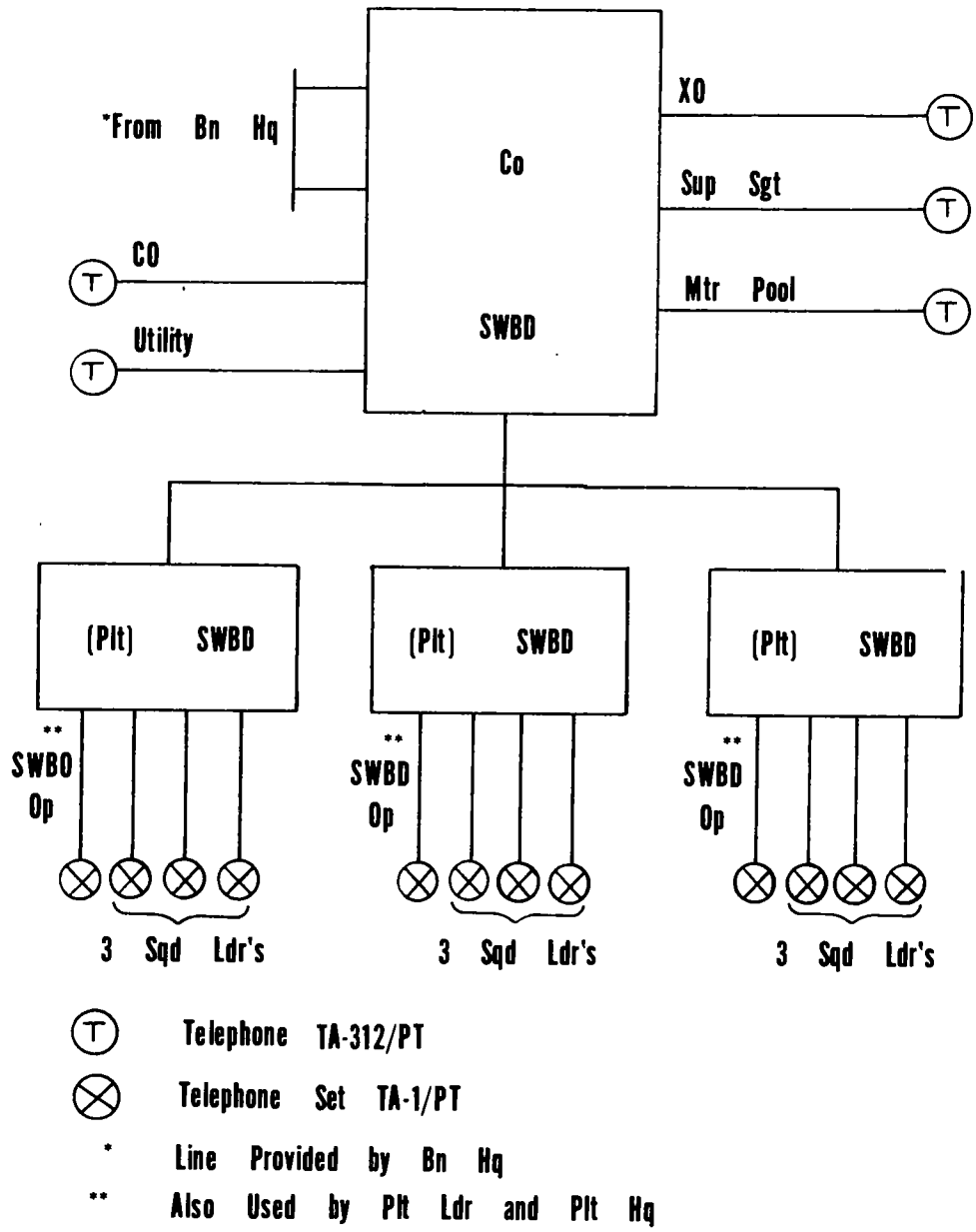


Figure 9–10. Type wire net, engineer combat company, engineer combat battalion, airborne.

CHAPTER 10

ENGINEER FLOAT BRIDGE COMPANY AND ENGINEER ASSAULT BRIDGE COMPANY, MOBILE (ARMY OR CORPS)

Section I. ENGINEER FLOAT BRIDGE COMPANY

10–1. Mission

The mission of the engineer float bridge company is to—

a. Provide technical personnel and equipment to load, maintain, transport, and supervise erection of tactical stream-crossing equipage.

b. Provide general cargo hauling in emergencies by immobilizing bridge loads.

10–2. Assignment

The engineer float bridge company normally is assigned to a field Army or corps with reassignment or attachment to an engineer combat group.

10–3. Capabilities

a. Level 1. At TOE Level 1 the engineer float bridge company provides—

(1) Approximately 700 feet (213 meters) of bridge or five 4-float and five 5-float rafts or combinations of bridges and rafts when issued the M4T6 bridge.

(2) Approximately 670 feet (204 meters) of 60-ton floating bridge, or five rafts of varying capacities when issued the Class 60 bridge.

(3) One light bridge approximately 250 feet (76 meters) long, with a maximum capacity of Class 16, or a number of shorter bridges of similar capacity; or six Class 12 ferries.

(4) Light stream-crossing equipage, consisting of assault boats and a footbridge, in support of tactical river-crossing operations.

(5) Technical supervision to assist other engineer units in bridge construction.

(6) Emergency construction of bridges of rafts with organic personnel at a reduced rate.

(7) Five-ton and 2 1/2-ton vehicles for cargo hauling by immobilizing bridging.

(8) Two reconnaissance teams for selection of bridge sites, marking and assistance in river-crossing operations, to include underwater reconnaissance, rigging, repair, demolitions, and installation of antidebris and antimine booms.

b. Levels 2 and 3. The Levels 2 and 3 columns adapt this TOE for reduced operational capabilities, in decrements of 10 percent, to approximately 90 percent for Level 2, and 80 percent for Level 3.

c. Type B Unit. This unit is not adaptable to Type B organization.

d. Combat Capabilities. Individuals of this organization can engage in effective, coordinated defense of the unit's area or installation.

10–4. Allocation, Category, and Mobility

a. Allocation. This unit normally is allocated on the basis of 12 to 15 per field army (three or more to field army and three or more to each of the three corps of a field army.)

b. Category. This unit is designated as a Category II unit (AR 310–25).

c. Mobility. This unit is 100 percent mobile in organic transportation.

10–5. Organization

The engineer float bridge company is a separate company and is organized under TOE 5–78. It consists of a company headquarters, an equip- and maintenance platoon, five floating bridge platoons, and a support platoon (fig 10–1). The functions of these company elements are discussed briefly in *a* through *d* below.

a. Company Headquarters. The company headquarters of the engineer float bridge company provides command, administration, mess, supply, and communication support for the company. The company headquarters normally is employed intact to accomplish its support mission. However, it is possible for elements of the headquarters to support independent platoon operations for a short period of time.

b. Equipment and Maintenance Platoon. The equipment and maintenance platoon provides

heavy equipment and operators in support of the company bridge platoons. The platoon also performs organizational maintenance and repairs within its repair parts authorization. The platoon normally is employed as a unit; repairs, whenever possible, are accomplished at the worksite. Elements of the platoon occasionally may be attached to the bridge platoons for assistance in the erection of bridges and rafts. The equipment and maintenance platoon—

(1) Performs, directs, and supervises organizational maintenance, repair, and inspection of the company's vehicles and equipment.

(2) Provides technical assistance for the bridge platoons in the employment of organic equipment.

(3) Provides heavy equipment to assist in bridge erection.

(4) Trains subordinate elements in the operation and organizational maintenance of engineer equipment.

c. Float Bridge Platoons. The float bridge platoon, five of which are organic to the company, is the basic operational unit of the engineer float bridge company. Each of the float bridge platoons is organized into a platoon headquarters and two bridge sections. The platoon may be detached from the company for independent operations. The float bridge platoon is capable of—

(1) Loading, transporting, and maintaining one set of float bridge which provides a bridge approximately 46 meters in length or two rafts capable of carrying divisional loads.

(2) Providing technical advice and assistance to engineer units in the erection of float bridges or rafts.

d. Support Platoon. The support platoon provides light stream-crossing equipage for the assault phase of tactical river-crossing operations. The platoon consists of a platoon headquarters, two raft section, and an assault equipment section. The support platoon is capable of—

(1) Providing six light tactical rafts which may be converted into a floating bridge, assault boats, and one aluminum footbridge.

(2) Providing technical advice and assistance to engineer units responsible for the erection of the footbridge and light tactical rafts.

10–6. Major Items of Equipment

The major items of equipment of the engineer float bridge company include five sets of either the Class 60 M4T6 floating bridge, five bridge erection sets; 10 bridge erection boats; 5-ton bridge trucks; 3-man reconnaissance boats;

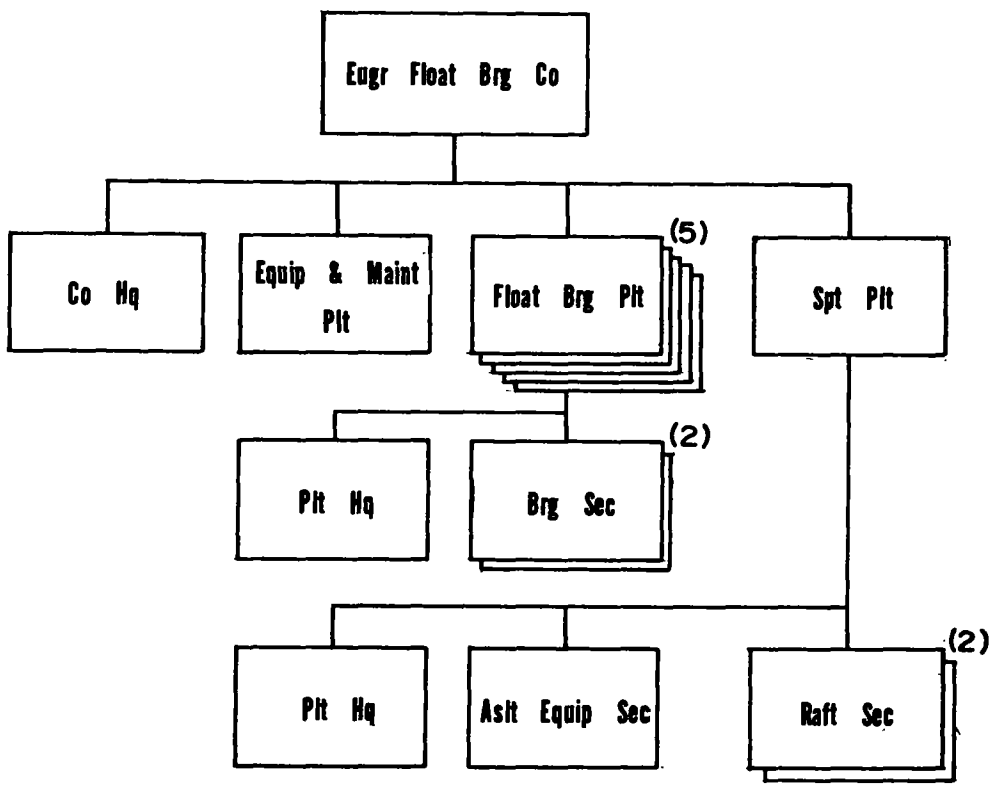


Figure 10–1. Organization chart, engineer float bridge company.

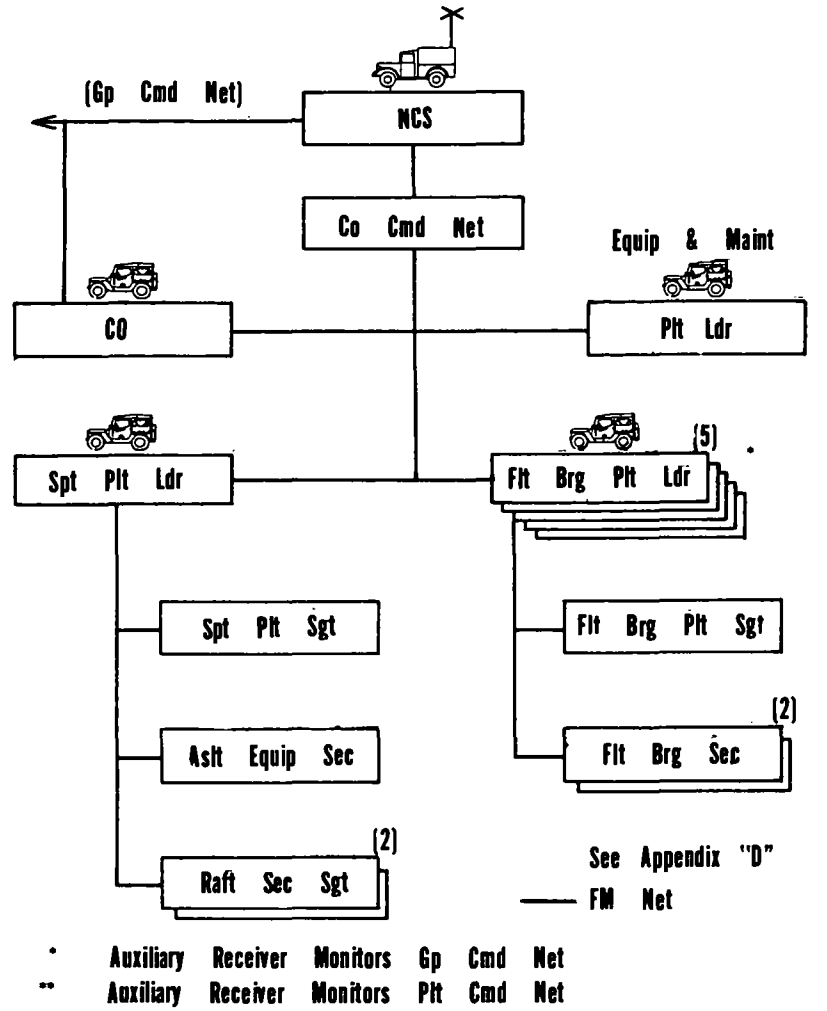


Figure 10–2. Type radio net, engineer float bridge company.

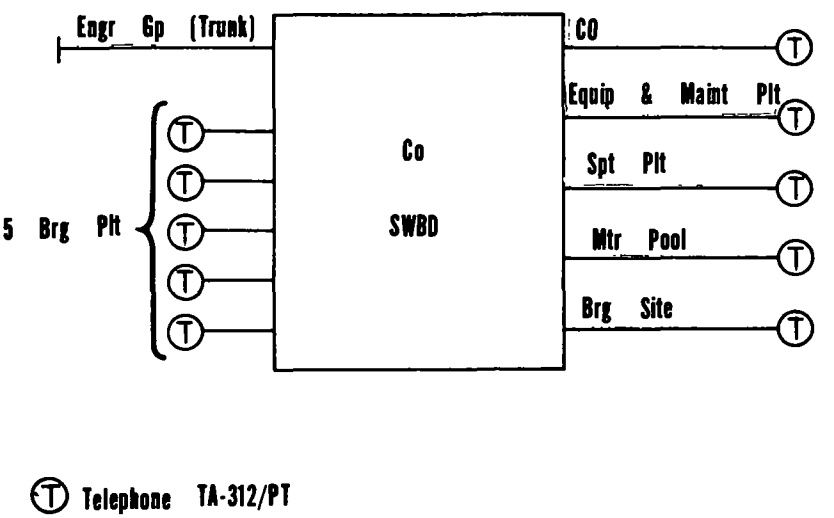


Figure 10–3. Type wire net, engineer float bridge company.

SCUBA equipment for underwater operations; 2 1/2-ton cargo trucks; 1 1/2-ton trailers; six sets of light tactical rafts; six raft conversion sets; 25-horsepower outboard motors; a medium wrecker; fuel tank trucks; 20-ton, wheel-mounted, rough terrain crane shovels; a tractor dozer; 1.5-kw and 3-kw generators; compressors; and maintenance and equipment repair sets and equipment.

10–7. Employment

a. Normally, bridging is installed by elements of an army or corps engineer combat battalion in support of division or corps operations. The float bridge company transports the equipage to the crossing site provides technical advice and assistance, and furnishes additional erection equipment and operators. When the river-crossing is a division operation, float bridge units may be attached to the division engineer combat battalion or to the engineer combat battalion (army or corps) which is in direct support of the division. When the river crossing is a corps operation, some of the engineer effort may be kept directly under corps control if early use of bridges and rafts by other major units is contemplated. Normally, the division commander executing an assault crossing controls all necessary crossing means to assure the success of his operation (FM 31–60). When control is retained by corps, the engineer effort is directed by the corps engineer combat brigade headquarters through the engineer combat groups.

b. Additional bridging, when required, is transported by the company from the supply activity to the worksite. Transport capability is provided by off-loading organic bridging either at the construction site or at a forward bridge park.

c. The company is trained to install its own bridge and rafts and may be called upon to do so when other engineer combat units are not available. However, tactical operations usually require completion of bridges in less time than can be achieved by the limited manpower and erection equipment of the company alone.

d. The company may be required to maintain installed bridges and furnish bridge guards to help control traffic and prevent damage to the bridges.

e. The company also disassembles the bridge or rafts, makes necessary repairs, and transports the equipage to future crossing sites.

f. When the company is employed on a general cargo-hauling mission, consideration must be given to resultant loss of bridging capability. Under ideal conditions and using two cranes, the bridging can be reloaded in approximately 24 hours.

g. Technical information concerning the erection of floating bridges is contained in TM 5–210.

10–8. Communications

Radio facilities are provided for communication between elements of the company and between the company and higher headquarters (fig 10–2). Telephone facilities are provided when required, for communication between the company elements and higher headquarters (fig 10–3).

10–9. Administration and Supply

The company, working closely with the group administrative section, prepares its own report and files. When the company is located near the group headquarters, personnel records and files may be located and maintained at group headquarters by the company personnel clerk working under the supervision of the group adjutant. The company requisitions, stores, and issues its authorized supplies, equipment, and repair parts. Separate supply accounts are maintained with supporting supply activities.

Section II. ENGINEER ASSAULT BRIDGE COMPANY, MOBILE

10–10. Mission

The mission of the army or corps engineer mobile assault bridge company is to—

a. Provide personnel and equipment to transport, erect and maintain mobile assault stream-crossing equipment in support of assault river-crossing operations.

b. Accomplish nontactical bridging or ferrying missions if required.

10–11. Assignment

The Army or corps engineer mobile assault bridge company normally is assigned to a field army or corps with attachment to an engineer combat group.

10–12. Capabilities

a. Level 1. At TOE Level 1 this unit provides—

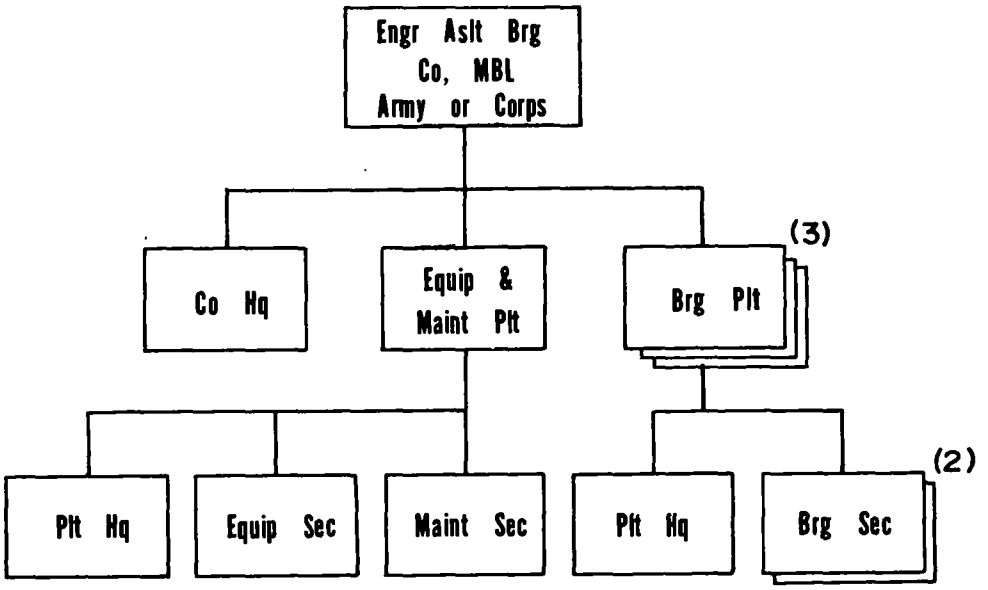


Figure 10–4. Organization chart, engineer assault bridge company, mobile.

(1) From organic equipment, can erect various combinations of floating bridges or ferries to include—

(*a*) One 698-foot (212 meters) Class 60 bridge.

(*b*) Two 386-foot (117 meters) Class 60 bridges.

(*c*) Three 282-foot (85 meters) Class 60 bridges.

(*d*) Six 178-foot (54 meters) Class 60 ferries.

(2) Engineer reconnaissance for site selection, routes, and underwater reconnaissance in conjunction with the erection of tactical bridging.

(3) The capability of replacing mobile float assault bridge elements of destroyed divisional bridge company (TOE 5–148). Supplements the capability of the divisional bridge company for assault crossings.

(4) Organizational maintenance on organic equipment and direct support maintenance on mobile assault bridge equipment.

(5) Up to 400 feet (122 meters) of assault trackway for crossing wheeled and rubber-padded tracked vehicles over marshes and other low-bearing soils.

b. Level 2 and 3. The Level 2 and 3 columns adapt this TOE for reduced operational capabilities, in decrements of 10 percent, to approximately 90 percent for Level 2, and 80 percent for Level 3.

c. Type B Unit. This unit is not adaptable to a Type B organization.

d. Combat Capabilities. Individuals of this organization can engage in effective, coordinated, defense of the units area or installation.

e. Support Required. This unit depends on appropriate units in the area for medical, dental, personnel and finance services.

10–13. Allocation, Category, and Mobility

a. Allocation. The unit normally is allocated on the basis of two per corps of a field army.

b. Category. This unit is designated as a Category I unit (AR 310–25).

c. Mobility. This unit is 100 percent mobile with organic transportation.

10–14. Organization

The army or corps engineer mobile assault bridge company is a separate company and is organized under TOE 5–64 (fig 10–4). It consists of a company headquarters, an equipment and maintenance platoon, and three bridge platoons. The functions of these company elements are discussed briefly in *a* through *c* below.

a. Company Headquarters. The company headquarters of the army or corps engineer mobile assault bridge provides the command, administration, mess, supply, and communications elements of the company. Included also in the company headquarters are a bridge sergeant who assists the company executive officer in main-

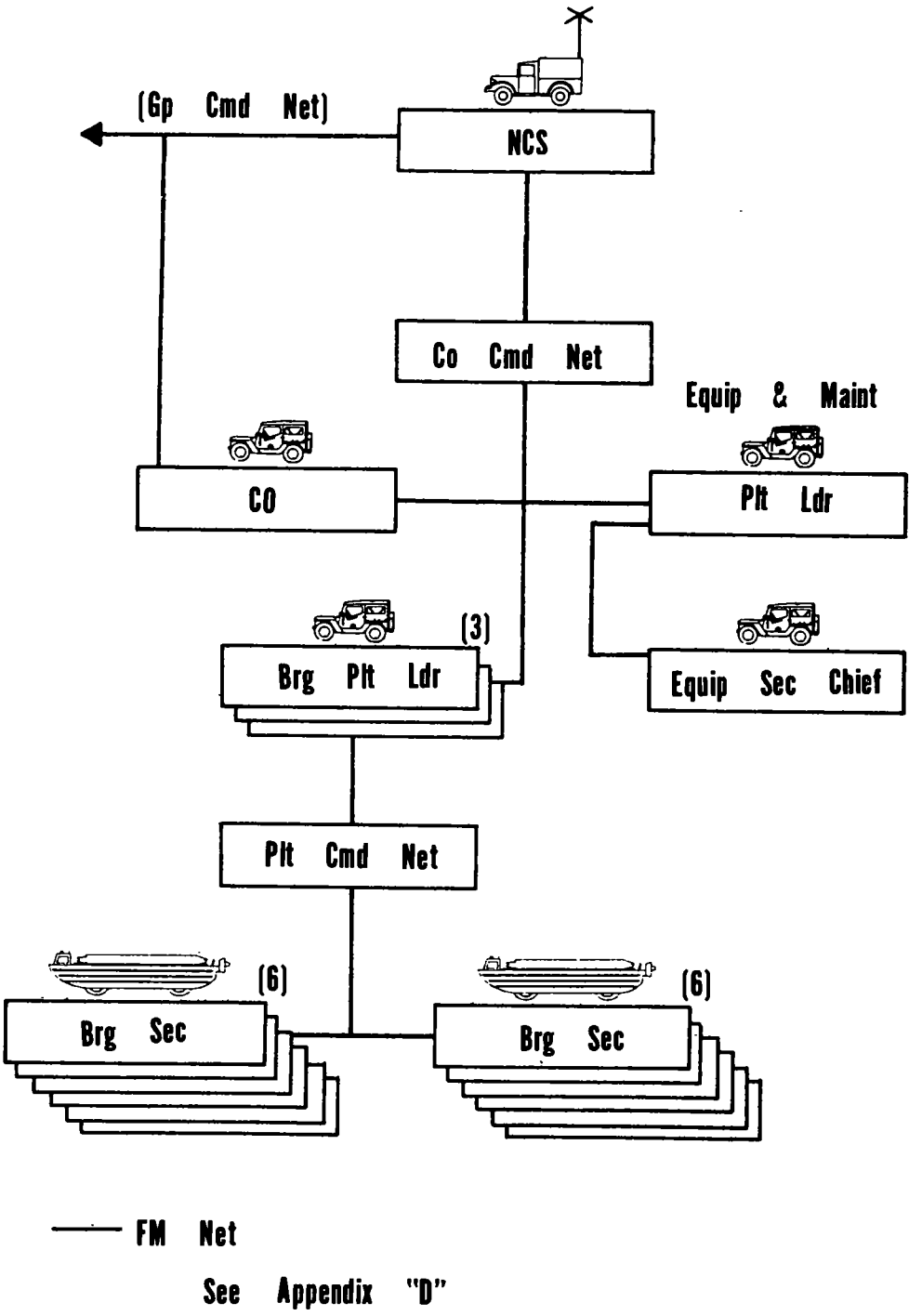


Figure 10–5. Type radio net, engineer bridge company, mobile.

taining liaison with supported units; and an engineer reconnaissance sergeant and specialist who are qualified in the use of self-contained underwater breathing apparatus (SCUBA) and in underwater reconnaissance and demolition.

b. Equipment and Maintenance Platoon. The equipment and maintenance platoon consists of a platoon headquarters, and equipment section and a maintenance section. The platoon provides limited bridge site preparation and the personnel and equipment to perform organizational maintenance and repair on organic equipment.

c. Three Bridge Platoons. Each of the three bridge platoons consists of a platoon headquar-

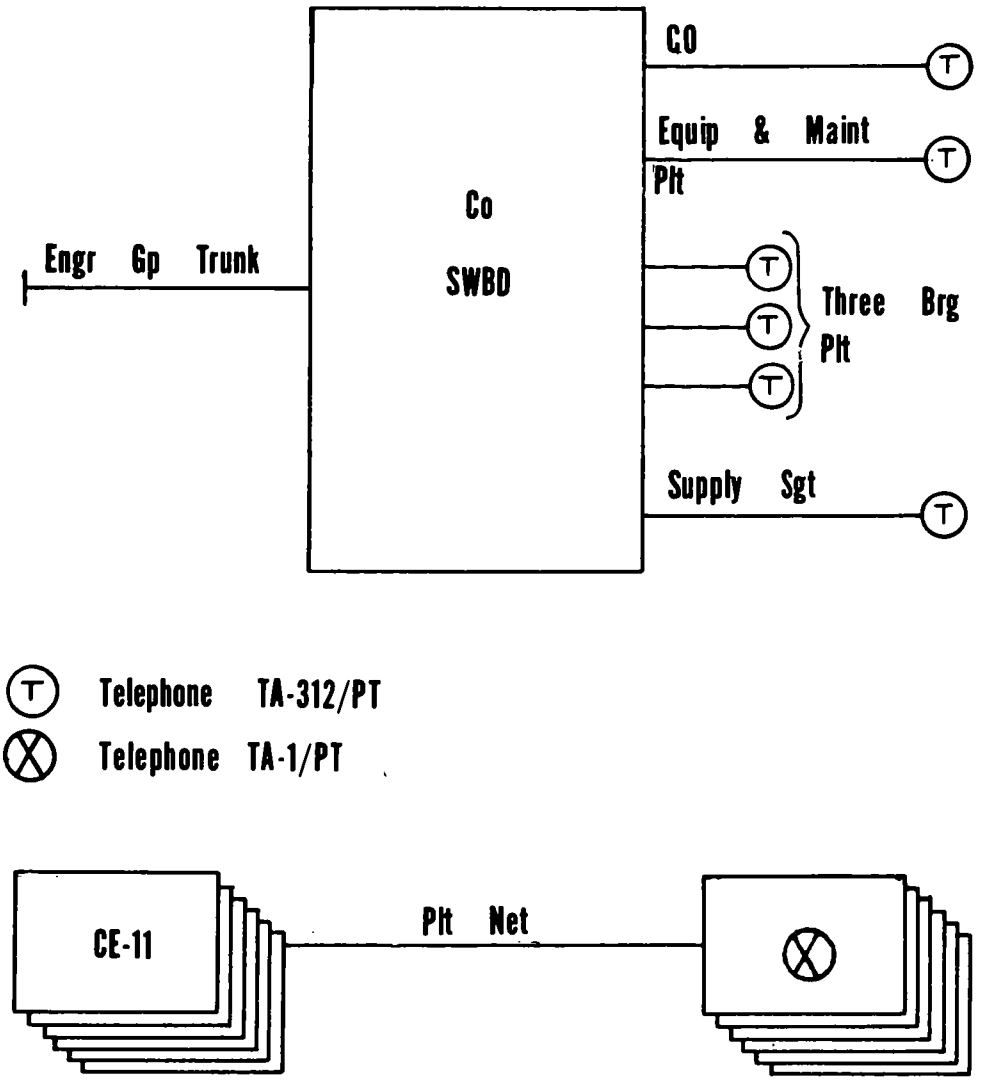


Figure 10–6. Type wire net, engineer assault bridge company, mobile.

ters and two bridge sections. Each section has four interior units and two end units of the mobile floating assault bridge (U.S. equipment).

10–15. Major Items of Equipment

The major items of equipment for the army or corps engineer mobile assault bridge company include 24 interior bay and 12 end bay amphibious mobile floating assault bridge-ferry units (effective length of interior bay unit is 26 feet, effective length of the end bay unit is 37 feet); 2 1/2-ton cargo trucks; a scoop loader; a 20-ton, wheel-mounted, rough terrain, craneshovel; a tractor-dozer; 5-ton bridge trucks; a fuel tank truck; 1.5-kw generators; 19- and 27-foot bridge erection boats; a compressor, SCUBA equipment for underwater operations; and maintenance and repair sets and equipment.

10–16. Employment

a. The main characteristic of the army or corps engineer mobile floating bridge company, as compared to the engineer float bridge company, is the speed with which it can respond to bridge or ferry requirements because of its organic and versatile amphibious bridging equipage. While the company may be employed in a manner similar to that of the engineer float bridge company, the normal method of its employment is to reinforce the bridging capability of the divisional engineer combat battalions of the infantry, mechanized infantry, and armored divisions.

b. The company requires a minimum of support in bridging, ferrying, or rafting operations. It normally performs all operations necessary to emplace, maintain, and remove the MAB. Sup-

port from other engineer troops may be required where access roads or approaches require construction or improvement.

10–17. Communications

The company radio and wire net diagrams are shown in figures 10–5 and 10–6, respectively.

10–18. Administration and Supply

Administration and supply procedures are similar in nature to those outlined for the engineer float bridge company (para 10–9).

CHAPTER 11

ENGINEER PANEL BRIDGE COMPANY

11–1. Mission

The mission of the engineer panel bridge company is to—

a. Provide personnel and equipment to load, transport, maintain and advise on erection of panel bridging equipage.

b. Provide dump trucks for earthmoving and general hauling when required by immobilizing bridge loads.

11–2. Assignment

The engineer panel bridge company may be assigned to a field army, corps, or independent corps with normal attachment to an engineer combat group.

11–3. Capabilities

a. Level 1. At TOE Level 1 this unit provides—

(1) One panel (Bailey) bridge set with sufficient components for the erection of the following bridges:

(*a*) Two 80-foot (24 meters) double truss, single story, or

(*b*) One 160-foot (48 meters) double truss, single story, or

(*c*) One 130-foot (39 meters) double truss, double story.

(2) Technical supervision to assist other engineer units in bridge construction.

(3) Emergency construction of bridges with organic personnel at a reduced rate.

(4) Five-ton dump trucks for earthmoving and general cargo hauling with a 145-ton capacity per lift when bridging is immobilized.

b. Levels 2 and 3. The Levels 2 and 3 columns adapt this TOE for reduced operational capabilities, in decrements of 10 percent, to approximately 90 percent for Level 2, and 80 percent for Level 3.

c. Type B Unit. This unit is adaptable to a Type B organization. When so organized, its capabilities depend upon the proficiency of the indigenous personnel assigned to it.

d. Combat Capabilities. Individuals of this organization can engage in effective, coordinated defense of the units area or installation.

11–4. Allocation, Category, and Mobility

a. Allocation. This unit normally is allocated on the basis of one per engineer combat group.

b. Category. This unit is designated as a Category II unit (AR 310–25).

c. Mobility. This unit is 100 percent mobile in organic transportation.

11–5. Organization

The engineer panel bridge company is a separate company and is organized under TOE 5–77. It consists of a company headquarters, an equipment and maintenance platoon, and two bridge platoons (fig. 11–1). The functions of the company headquarters and other company elements are discussed briefly in *a* through *c* below.

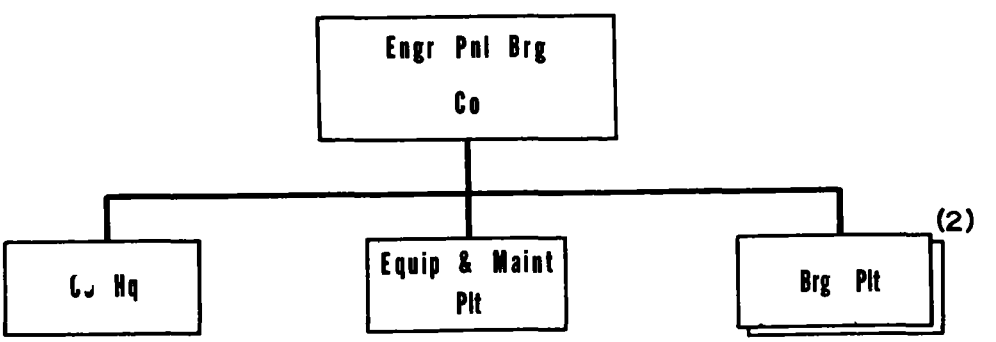


Figure 11–1. Organization chart, engineer panel bridge company.

a. Company Headquarters. Company headquarters provides the command, administration, mess, supply, and communication for the company.

b. Equipment and Maintenance Platoon. The platoon provides supplemental equipment, maintains the authorized repair parts, and performs the organizational maintenance on organic equipment.

c. Two Bridge Platoons. The two bridge platoons are identical. The bridge platoon is the basic operational unit of the panel bridge company. The platoon normally is employed with the rest of the company but may participate in independent platoon operations. The bridge platoon loads, transports, and maintains one-half of the panel bridge set (24 meters) authorized the company and provides technical advice and assistance in the erection of the panel bridge.

11–6. Major Items of Equipment

In addition to the panel bridge set, the major items of equipment of the panel bridge company include 5-ton dump trucks to transport the bridge set, a medium wrecker, a tractor, cranes, trailers, and maintenance and repair sets. Armament consists of rifles, machineguns, pistols and grenade launchers.

11–7. Employment

a. The company transports the bridging to the crossing site and furnishes bridge specialists and supervisors to assist in its erection. Normally, the equipment provided by the company is erected by elements of the supported engineer organizations.

b. Additional bridging beyond the organic authorization is transported by the company from the supply facility.

c. The company is trained to erect its own bridging and may be called upon to do so when other engineer combat troops are not available. However, the tactical situation usually requires completion of the bridge in less time than can be achieved by the limited manpower of the company alone.

d. The company may be required to furnish bridge guards and maintain erected bridging.

e. The company normally procures a new load of bridging from a bridge park as its organic bridging is emplaced. Other companies in the rear may later disassemble the bridge and return its components to depot stock.

f. When the situation warrants, the company may be directed to unload its bridging and utilize the dump trucks for hauling bulk construction materials or cargo. When possible, the bridge should be off-loaded by bays to expedite reloading. The company operates most effectively in support of a combat battalion by the assignment of mission-type tasks rather than by attachment. The company has sufficient supervisors and equipment for a hauling operation, and it can be further augmented with equipment and operators from the light equipment company. The company can be given a mission of operating a borrow pit and delivering base course materials where needed. Three to 6 hours should be allowed for reloading bridging under ideal conditions.

11–8. Communications

Radio facilities are provided for operation of internal communications and for communicating with higher headquarters and supported units (fig 11–2). Standard field telephone and wire equipment is furnished to provide wire communications between the company and higher headquarters and between the company and the bridge platoons (fig 11–3).

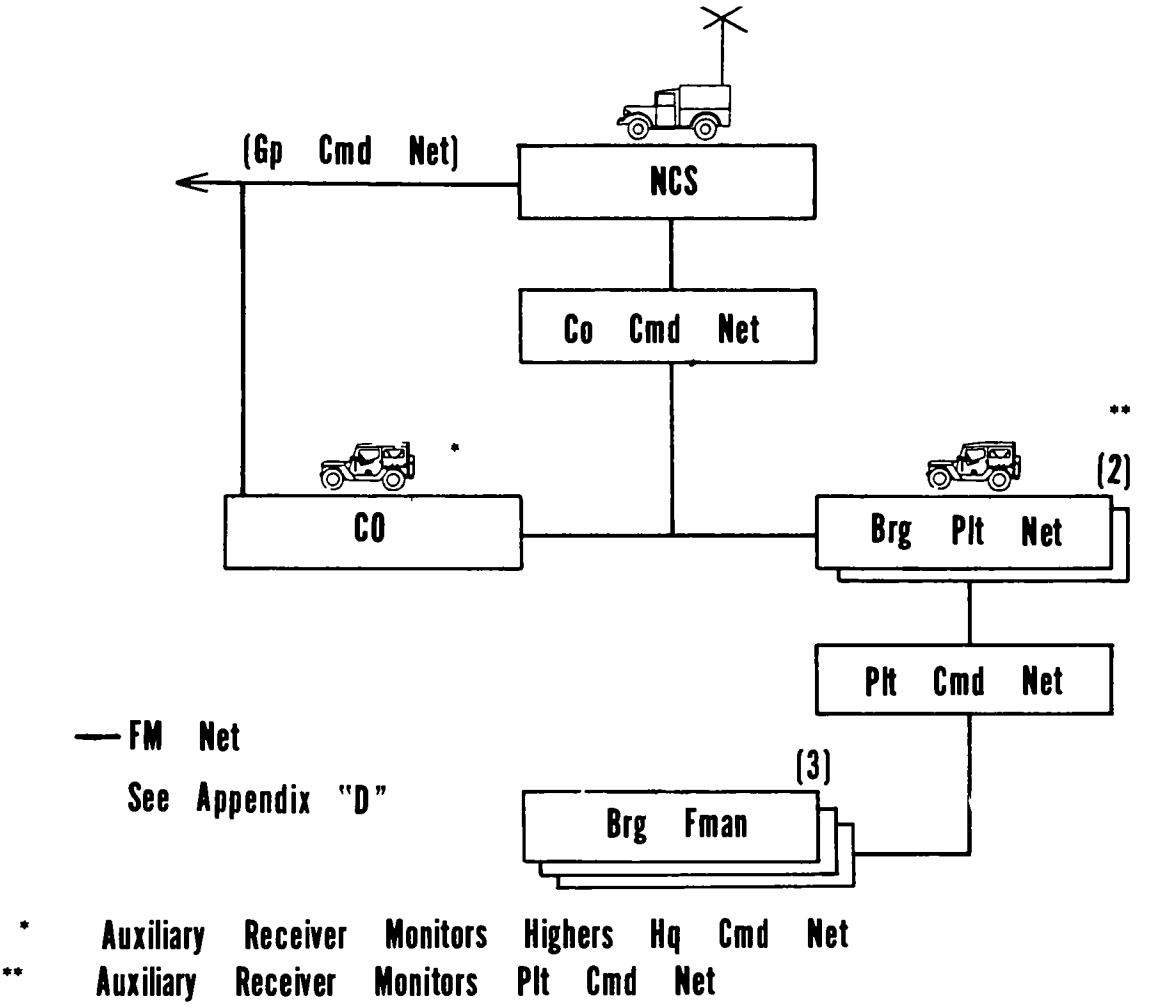


Figure 11–2. Type radio net, engineer panel bridge company.

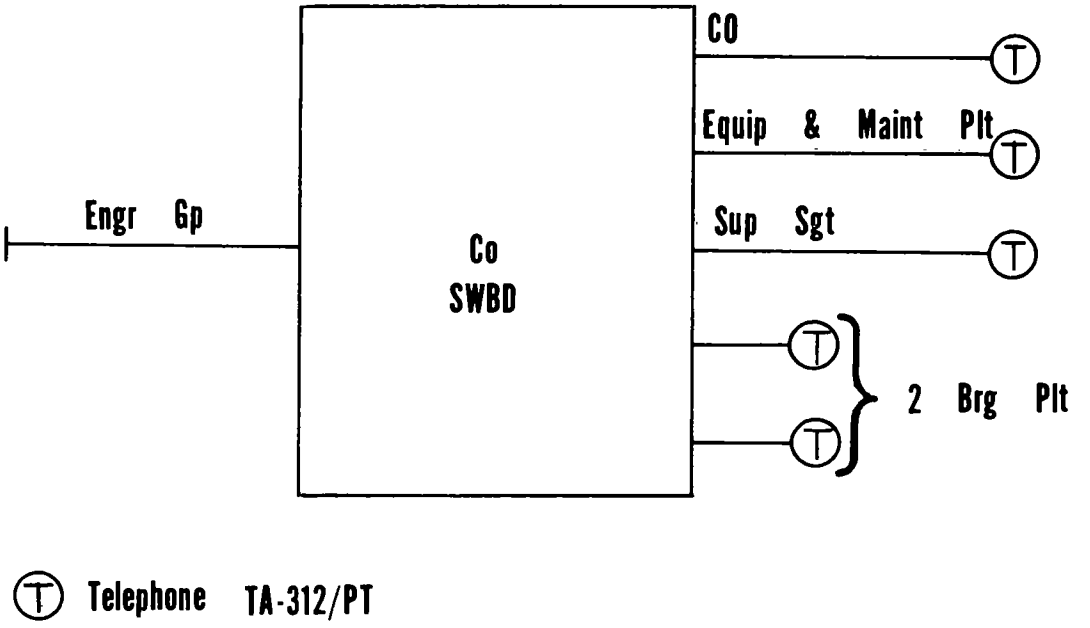


Figure 11–3. Type wire net, engineer panel bridge company.

CHAPTER 12

ENGINEER LIGHT EQUIPMENT COMPANY AND ENGINEER LIGHT EQUIPMENT COMPANY, AIRBORNE

Section I. ENGINEER LIGHT EQUIPMENT COMPANY

12–1. Mission

The mission of the engineer light equipment company is to support engineer combat operations with manned engineer equipment.

12–2. Assignment

The engineer light equipment company normally is assigned to a field army or corps with attachment to an engineer combat group.

12–3. Capabilities

a. Level 1. At TOE Level 1 the engineer light equipment company provides—

(1) Construction equipment support for from one to three engineer combat battalions engaged in general engineer combat construction operations.

(2) Construction equipment support for divisional engineer battalion when required.

(3) Two shift operation of selected items of equipment.

(4) Organizational maintenance on organic equipment. (When geographic, operational or combat requirements necessitate, direct support maintenance of engineer equipment will be provided by the attachment of a maintenance direct support cellular team.)

(5) A capability of transporting 75 cubic yards of bulk material per trip, on a single shift basis, when not conducting quarrying operations.

b. Levels 2 and 3. The Levels 2 and 3 columns adapt this TOE for reduced operational capabilities, in decrements of 10 percent, to approximately 90 percent for Level 2, and 80 percent for Level 3.

c. Type B Unit. This unit is not adaptable to a Type B organization.

d. Combat Capabilities. Individuals of this organization can engage in effective, coordinated defense of the unit's area or installation.

12–4. Allocation, Category, and Mobility

a. Allocation. This unit normally is allocated on the basis of one per engineer combat group.

b. Category. This unit is designated as a Category II unit (AR 310–25).

c. Mobility. This unit is 100 percent mobile in organic transportation.

12–5. Organization

The engineer light equipment company is a separate company and is organized under TOE 5–58. It consists of a company headquarters, three equipment platoons, an equipment support platoon, and a maintenance platoon (fig 12–1). The functions of the company headquarters and other company elements are discussed briefly in *a* through *d* below.

a. Company Headquarters. Company headquarters provides the command, administration, mess, supply, and communication elements.

b. Three Equipment Platoons. The platoons are identical. Each platoon is organized and equipped to support an engineer combat battalion and is composed of—

(1) *Platoon headquarters.* Platoon headquarters provides the coordination and supervision for the platoon operations.

(2) *Transport and equipment section.* This section provides digging, ditching, hauling, and lighting equipment in support of the earthmoving section.

(3) *Earthmoving section.* This section provides excavating, grading, and compaction equipment in support of construction tasks.

c. Equipment Support Platoon. The equipment support platoon supports construction tasks with specialized equipment when required.

(1) *Platoon headquarters.* Platoon headquarters provides the coordination and supervision for the platoon operations.

(2) *Equipment support section.* This section provides additional and more specialized equipment such as piledrivers and concrete mixers in support of construction operations.

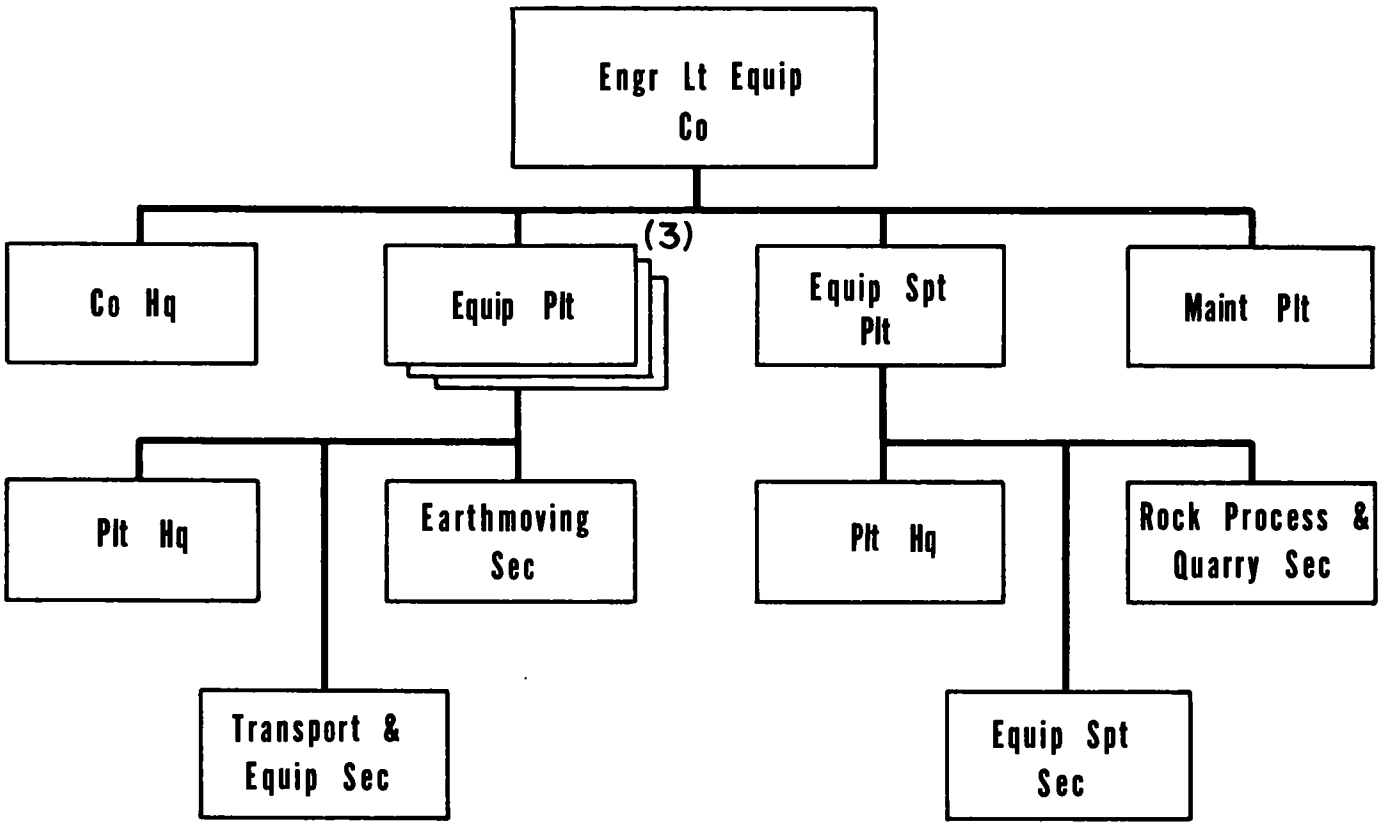


Figure 12–1. Orgonization chart, engineer light equipment company.

(3) *Rock processing and quarry section.* This section provides equipment and personnel to drill, blast, crush, and screen rock at the rate of 25 cubic yards per hour.

d. Maintenance Platoon. The maintenance platoon provides personnel and equipment to perform organizational maintenance and repair to organic equipment.

12–6. Major Items of Equipment

The major items of equipment include 20-ton, wheel-mounted, rough terrain, cranes; ditching machines; 5-kw generator; compressors; a crane-shovel (with attachments); 5-ton dump trucks; motorized road graders; scoop loaders; 18-cubic yard scrapers; sheepsfoot rollers; tractor-dozers; a bituminous heating kettles; a piledriver; concrete mixers; a 25-cubic yard crushing and screening plant; quarry equipment; and maintenance and repair sets and equipment. Armament consists of rifles, pistols, the LAW, and machine-guns.

12–7. Employment

a. Under the direction of the engineer combat group the light equipment company attaches equipment with operators and maintenance personnel to the engineer combat battalion for specific tasks. Specialized equipment such as the crushing and screening plant usually is placed in general support of the engineer combat group. When practical, complete elements such as sections or platoons are provided to supported units to insure continued command and control by company officers and noncommissioned officers. The supported unit is responsible for worksite supervision and operational control; the officers and noncommissioned officers of the engineer light equipment company serve as advisors and supervisors as directed by the supported unit commander. The supported unit also provides messing facilities and security for personnel and equipment at the job site.

b. The company can also support a divisional engineer battalion; however, this will reduce proportionally the capability for support of the engineer combat battalions of the engineer combat group.

c. In an emergency situation, the engineer light equipment company may be assigned a specific task or mission requiring equipment only; however, augmentation of personnel to provide an engineer planning and staff capability is

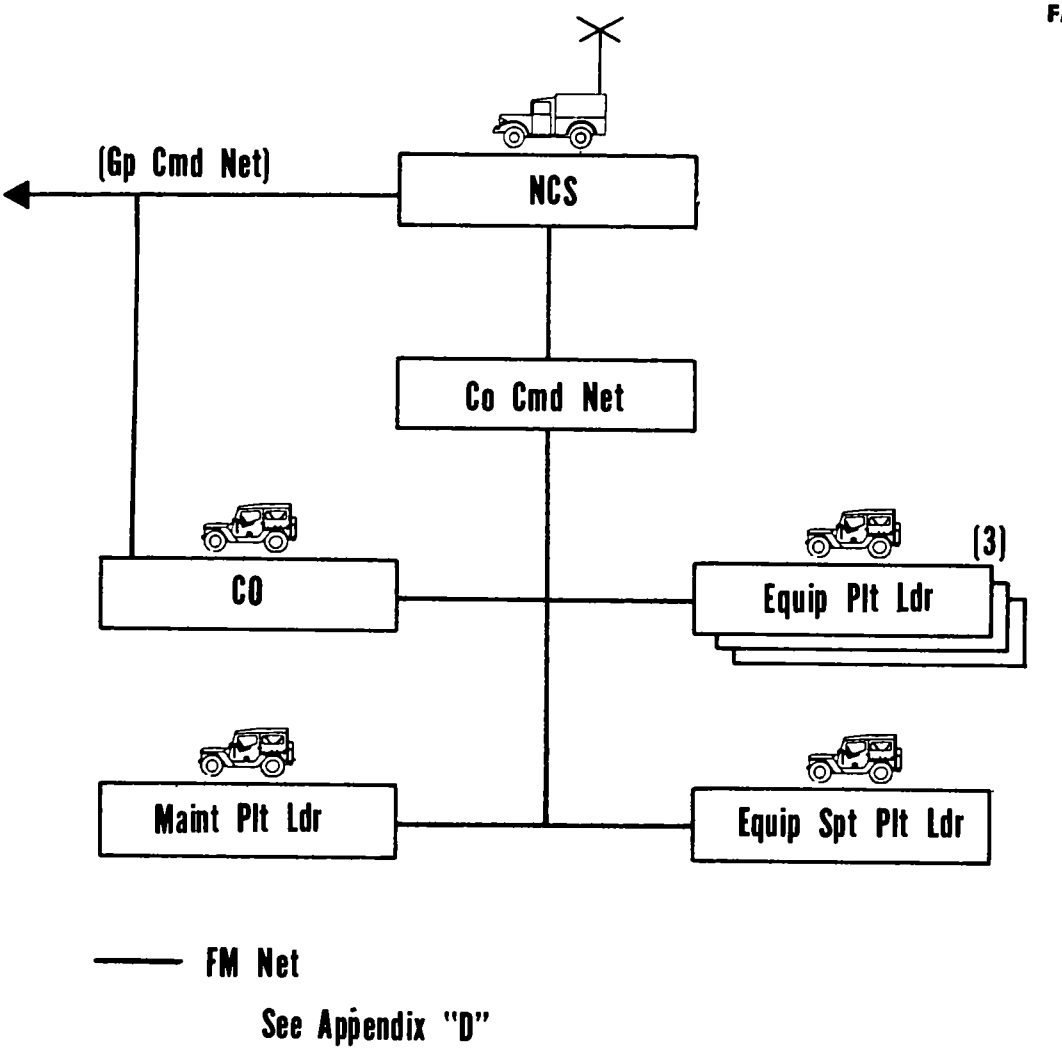


Figure 12–2. Type radio net, engineer light equipment company.

necessary. Moreover, the company does not have the capacity for supervising construction tasks requiring troop labor since all personnel are directly engaged in the operation or maintenance of equipment.

12–8. Communications

Radio and wire communication equipment is provided for command and control as shown in figures 12–2 and 12–3.

12–9. Administration and Supply

Administration and supply procedures are similar in nature to those outlined for the engineer float bridge company (para 10–9).

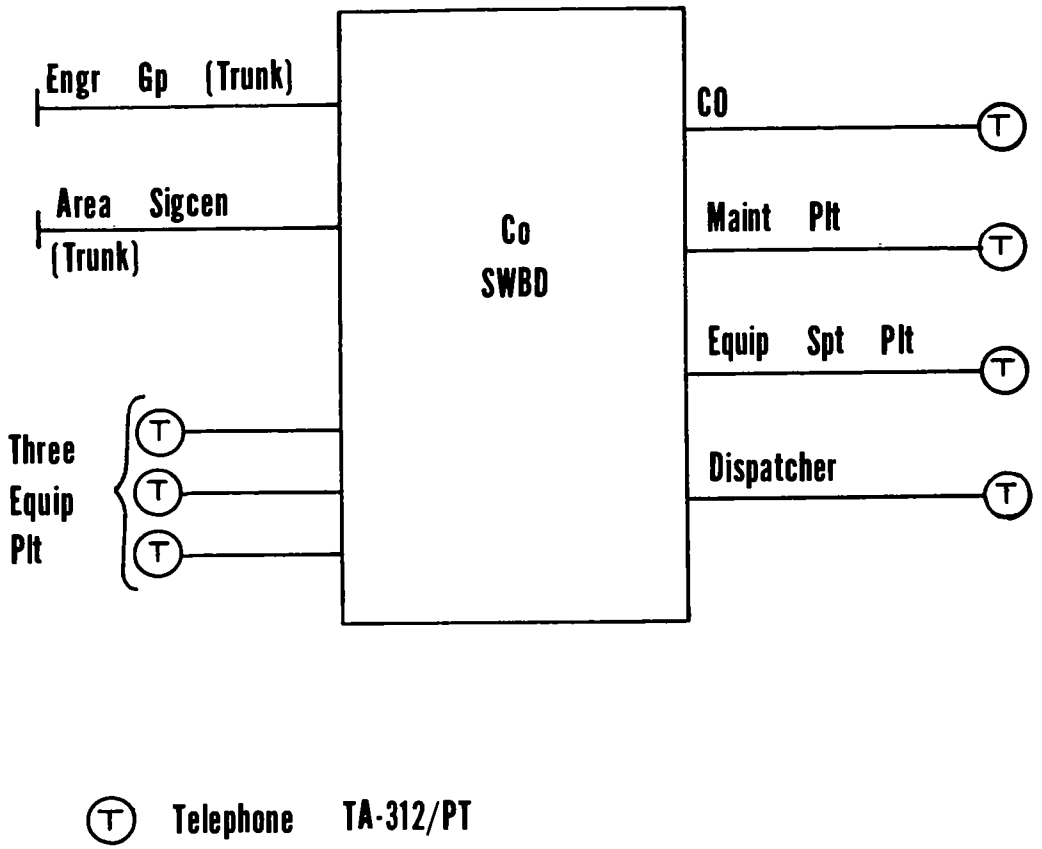


Figure 12–3. Type wire net, engineer light equipment company.

Section II. ENGINEER LIGHT EQUIPMENT COMPANY, AIRBORNE

12–10. Mission

The mission of the airborne engineer light equipment company is to support airborne engineer combat operations with manned engineer construction equipment.

12–11. Assignment

The airborne engineer light equipment company normally is assigned to an airborne corps with attachment to an airborne engineer combat group.

12–12. Capabilities

a. Level 1. At TOE Level 1 the airborne engineer light equipment company provides—

(1) Construction equipment support for one airborne engineer combat group in an airborne operation.

(2) Construction equipment support for an airborne division engineer battalion in the development of an airhead.

(3) A dump truck capability of 125 cubic yards or equivalent tonnage per lift.

(4) Two-shift operation of all engineer construction equipment.

b. Levels 2 and 3. The Levels 2 and 3 columns adapt this TOE for reduced operational capabilities, in decrements of 10 percent, to approximately 90 percent for Level 2, and 80 percent for Level 3.

c. Airborne Capabilities. The airborne engineer light equipment company may be landed by parachute and all types of medium assault aircraft.

d. Type B Unit. This unit is not adaptable to a Type B organization.

e. Combat Capabilities. Individuals of this organization can engage in effective, coordinated defense of the unit's area or installation.

12–13. Allocation, Category, and Mobility

a. Allocation. This unit normally is allocated on the basis of one per airborne corps.

b. Category. This unit is designated a Category II unit (AR 310–25).

c. Mobility. This unit is 100 percent mobile in organic transportation. It is 100 percent air transportable in medium assault type aircraft.

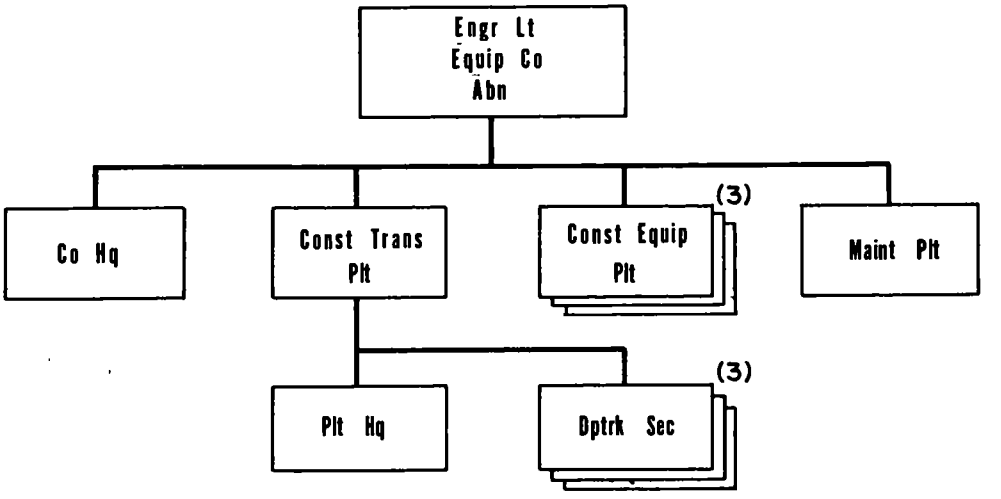


Figure 12-4. Organization chart, engineer light equipment company, airborne.

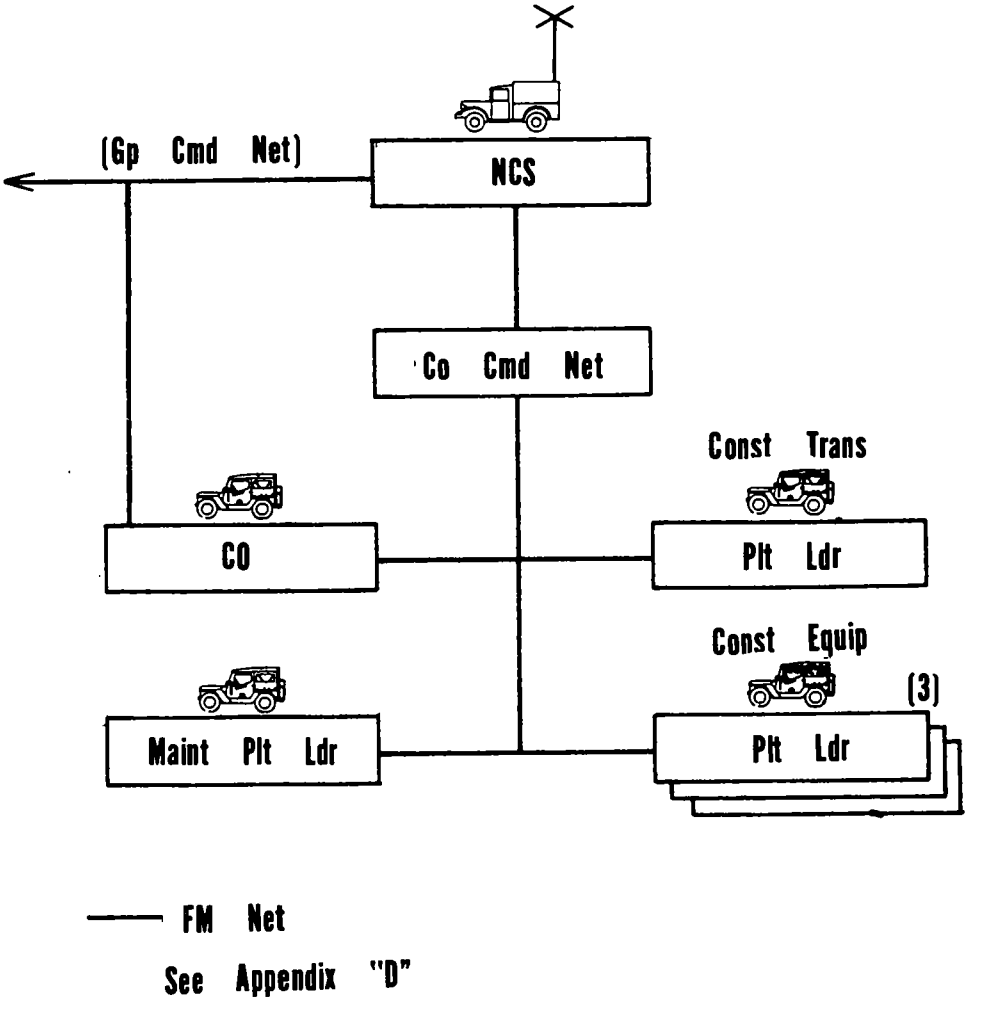


Figure 12-5. Type radio net, engineer light equipment company, airborne.

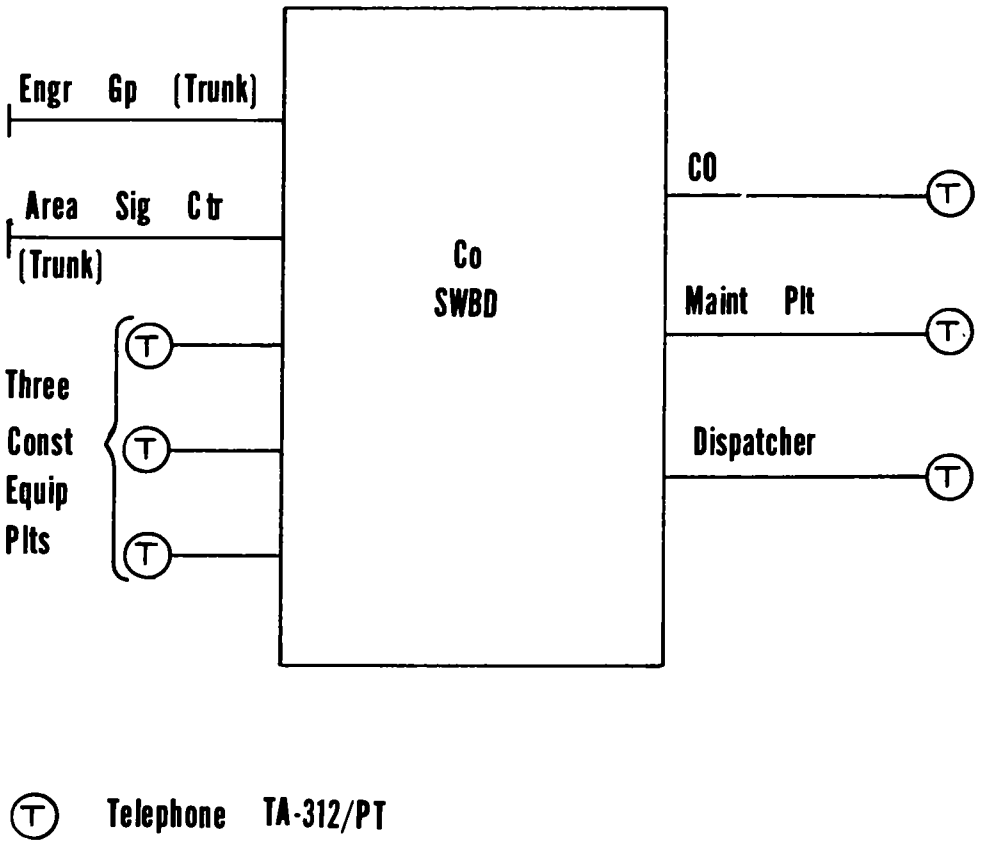


Figure 12–6. Type wire net, engineer light equipment company, airborne.

12–14. Organization

The airborne engineer light equipment company is a separate company and is organized under TOE 5–54. It consists of a company headquarters, three construction equipment platoons, a construction transport platoon, and a maintenance platoon (fig 12–4). The functions of the company headquarters and other company elements are discussed briefly in *a* through *d* below.

a. Company Headquarters. Company headquarters provides the command, administration, mess, supply, and communication elements.

b. Three Construction Equipment Platoons. The platoons are identical. Each platoon is organized and equipped to support an engineer combat battalion. They operate in similar manner to the equipment platoons in the engineer light equipment company (para 12–5*b*).

c. Construction Transport Platoon. This platoon consists of a headquarters and three dump truck sections. It has a total of 30 dump trucks and thus provides supported units with an earth-moving capability.

d. Maintenance Platoon. The maintenance platoon provides personnel and equipment to perform organizational maintenance and repair of organic equipment.

12–15. Major Items of Equipment

The major items of equipment of the airborne engineer light equipment company include 2 1/2- and 5-ton dump trucks; 7 1/2-ton, wheel-mounted, crane shovels; 1 1/2- and 5-kw generators; motorized road graders; scoop loaders; 7 1/2-cubic yard scrapers; sheepsfoot rollers penumatic tire rollwes; tractor-dozers; water distributors; tagline crane shovels; and maintenance and repair sets and equipment.

12–16. Employment

a. The airborne engineer light equipment company normally participates in airborne operations by supporting an airborne engineer combat group. In smaller airborne operations, where an airborne engineer combat group is not required, the airborne engineer light equipment company may be attached directly to the divisional airborne engineer combat battalion or to the separate airborne engineer combat company to provide combat engineer support. The airborne engineer light equipment company was developed primarily to provide construction support in the development

and expansion of airheads. All individuals of this unit are parachute qualified. Thus the personnel and portions of the unit's equipment may be landed in the airhead by parachute with the remaining equipment transported to the airhead in medium assault aircraft.

b. When attached to an airborne engineer combat group, the airborne engineer light equipment company may be directed to attach equipment with operators and maintenance personnel to the airborne engineer combat battalions which are a part of the group. When practical, complete elements of the unit such as sections or platoons are provided to supported units to insure continued command and control by the company's officer and noncommissioned officers. The supported unit is responsible for worksite supervision and operational control; additionally, the officers and the noncommissioned officers of the airborne engineer light equipment company serve as advisors and supervisors as directed by the supported unit commander. The supported unit also provides messing facilities and security for personnel and equipment at the job site.

12–17. Communications

Radio and wire communications equipment is provided for command and control as shown in figures 12–5 and 12–6, respectively.

CHAPTER 13

ENGINEER DUMP TRUCK COMPANY

13–1. Mission

The mission of the engineer dump truck company is to operate dump trucks for the movement of bulk materials in support of other engineer units.

13–2. Assignment

The engineer dump truck company may be assigned to—

a. A field army or corps with reassignment or attachment to an engineer combat group.

b. A theater army support command (TASCOM) with reassignment or attachment to an engineer construction group.

13–3. Capabilities

a. Level 1. At TOE Level 1, this unit provides—

(1) Hauling capacity for 240 cubic yards (struck load) to 312 cubic yards (heaped load) of bulk materials (gravel, earth fill, crushed stone, etc.) per trip.

(2) Hauling capacity for 240 short tons (cross-country) to 480 short tons (improved roads) of supplies and materials per trip.

Note. The amount of materials that the unit can haul in one day will depend on the weather conditions, distance of haul, type of haul route, types of cargo or haul material, loading-unloading facilities and skill of operators.

b. Levels 2 and 3. The Levels 2 and 3 columns adapt this TOE for reduced operational capabilities, in decrements of 10 percent, to approximately 90 percent for Level 2, and 80 percent for Level 3.

c. Type B Unit. This unit is adaptable to a Type B organization. When so organized, its capabilities depend upon the proficiency of the indigenous personnel assigned to the unit.

d. Combat Capabilities. Individuals of this organization can engage in effective, coordinated defense of the unit's area or installation.

13–4. Allocation, Category, and Mobility.

a. Allocation. This unit normally is allocated on the basis of one per engineer combat group or engineer construction group.

b. Category. This unit is designated as a Category II unit (AR 310–25).

c. Mobility. This unit is 100 percent mobile in organic transportation.

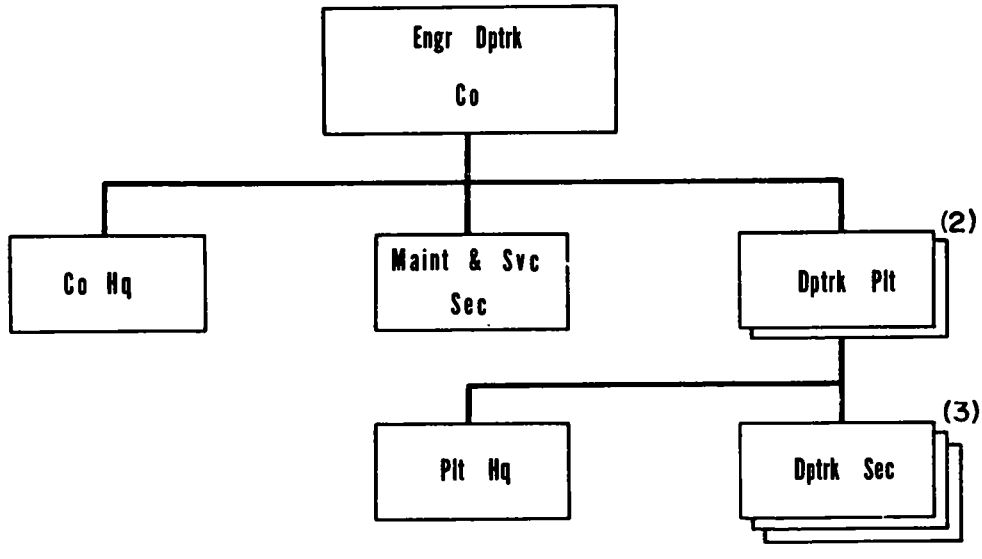


Figure 13–1. Organization chart, engineer dump truck company.

13–5. Organization

The engineer dump truck is a separate company and is organized under TOE 5–124. It consists of a company headquarters, a maintenance and service section, and two identical dump truck platoons (fig 13–1). The functions of the company headquarters and other company elements are discussed briefly below.

a. Company Headquarters. Company headquarters provides the command, administration, mess, supply, and communication element.

b. Maintenance and Service Section. The maintenance and service section provides organizational maintenance for the organic vehicles and has the responsibility for refueling the dump trucks of the platoons.

c. Two Dump Truck Platoons. Each platoon is composed of a headquarters and three identical dump truck sections. These platoons are the operational elements of the company.

13–6. Major Items of Equipment

The major items of equipment of the engineer dump truck company include forty eight 5-ton dump trucks, a fuel servicing tank truck, a medium wrecker, a trailer-mounted arc welder, a trailer-mounted lubricator, and organizational maintenance sets for vehicle maintenance.

13–7. Employment

a. The engineer dump truck company usually is attached to or placed in support of an engineer unit engaged in the construction or repair of roads, railroads, aircraft landing facilities, field fortifications, or other tasks requiring the movement of large quantities of bulk materials. The supported unit normally is responsible for loading the trucks. When subordinate units of the dump truck company are attached to another unit, company headquarters remains with the larger elements at a central location to permit servicing of the equipment. If significant distances are involved and subordinate units are widely separated, a portion of the company service section may reinforce the maintenance capabilities of the supported unit. When vehicles and personnel are attached to another unit, that unit is responsible for the proper operation and maintenance of the vehicles. The company operates most effectively on mission-type assignments under the control of its own commander.

b. Employment of dump trucks should be based upon approximately 75 percent of the organic vehicles being available at a given time. This permits the company to schedule the required periodic maintenance and minor repair.

13–8. Communications

The dump truck company provides radio communication between the higher headquarters, and the dump truck platoons, It provides telephone communication between the company headquarters and the service section and between the company headquarters and each of the dump truck platoons. Figure 13–2 shows the radio net and figure 13–3 shows the wire net.

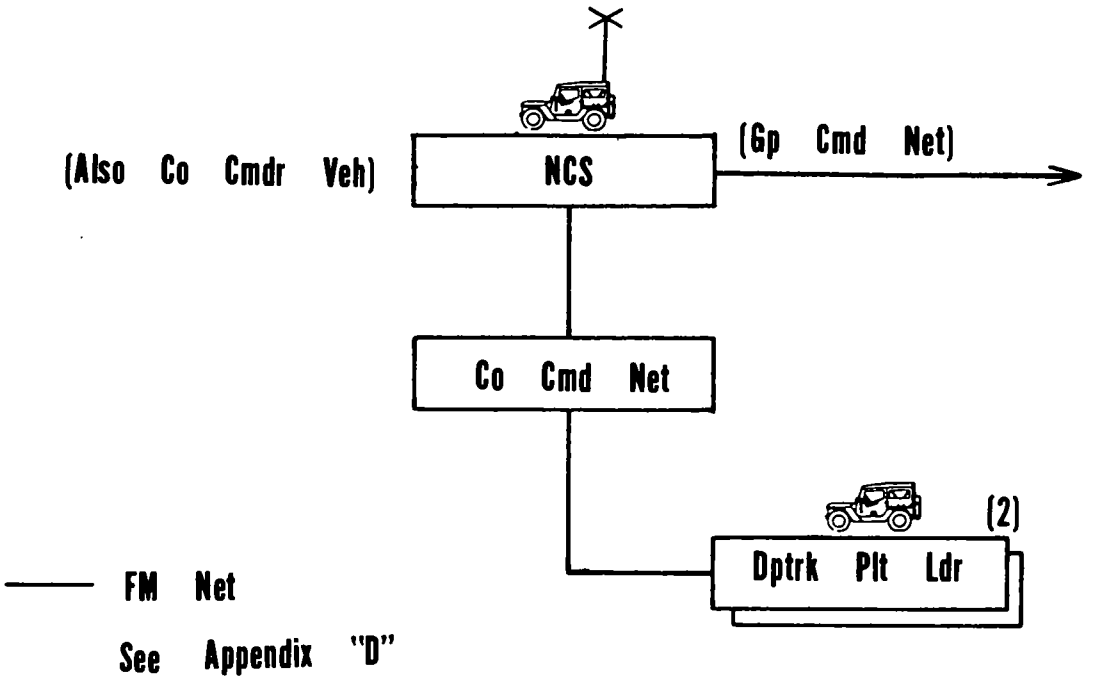


Figure 13–2. Type radio net, engineer dump truck company.

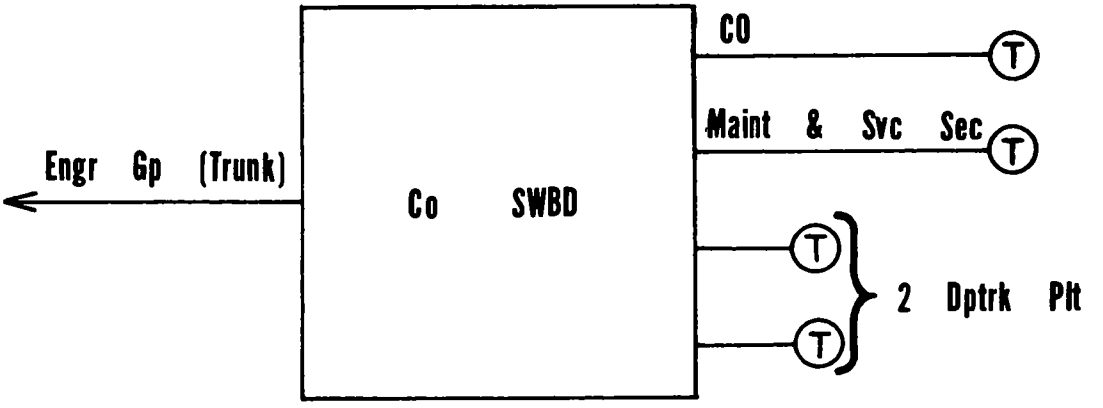


Figure 13–3. Type wire net, engineer dump truck company.

CHAPTER 14

ENGINEER LAND CLEARING COMPANY

14–1. Mission

The mission of the engineer land clearing company is to—

a. Destroy or clear extensive dense vegetation in critical areas for the purpose of denying their use by the enemy as bases of operation, supply bases, marshalling areas, ambush sites, and cover and concealment.

b. Clear dense vegetation from areas adjacent to friendly installations for the purpose of improving security by providing observation and fields of fire and to reduce ambush probability along land lines of communications.

14–2. Assignment

The engineer land clearing company normally is assigned to a field army or corps with further assignment to an engineer combat brigade or attachment to an engineer combat group.

14–3. Capabilities

a. Level 1. At TOE Level 1, this unit provides—

(1) Thirty medium tracked tractors for mounting up to 30 treedozer blades or combinations of bulldozer and treedozer blades.

(2) Chain-clearing technique in areas covered by widely spaced trees of uniform size with no major tap roots, and for clearing underbush from narrow wet gullies.

(3) Heavy disc harrows for clearing areas of small (2 to 3 inch) trees and underbrush, and for regrowth control.

(4) Two shifts of tractor operators for continuous land clearing operations during daylight hours.

(5) Command, control, and coordination for company, platoon, or section size land clearing operations.

(6) Technical advice on land clearing operations.

(7) Organizational maintenance for all equipment organic to the company.

(8) Direct support (DS) maintenance and maintains a mission load of repair parts for the following mission essential items organic to the company:

(*a*) Chain saws.
(*b*) Compressors.
(*c*) Grinding machines.
(*d*) Harrows.
(*e*) Tracked tractors and attachments.

(9) Earth-moving support to augment division or corps and army engineer combat battalions when not engaged in land clearing operations.

b. Levels 2 and 3. The Levels 2 and 3 columns adapt this TOE for reduced operational capabilities, in decrements of 10 percent, to approximately 90 percent for Level 2, and 80 percent for Level 3.

c. Type B Unit. This unit is not adaptable to a Type B organization.

d. Combat Capabilities. Individuals of this unit, except medical personnel, can engage in effective, coordinated defense of the unit's area or installation. This unit is dependent upon the supported tactical element for work site security.

14–4. Allocation, Category and Mobility

a. Allocation. This unit normally is allocated to provide land clearing support for corps or field army.

b. Category. This unit is designated a Category II unit (AR 310–25).

c. Mobility.

(1) For the purpose of tactical movement, this unit is approximately 30 percent mobile in organic vehicles.

(2) This unit is approximately 60 percent mobile in organic vehicles when utilizing 2 lifts in administrative movement.

(3) Additional special purpose vehicles are required for displacement of organic equipment.

(*a*) Truck tractor, 10-ton and semitrailer, low bed, 25-ton, 22 each for 1 lift tactical movement.

(*b*) Truck tractor, 10-ton and semitrailer, low bed, 25-ton, 6 each for 2 lift administrative movement.

14–5. Organization

The engineer land clearing company is designed as a separate self-supporting company under TOE 5–87T. It consists of a company headquarters, transportation and maintenance platoon, and three identical land clearing platoons. The functions of the company elements are discussed briefly below.

a. Company Headquarters. This element includes the personnel and equipment to carry out the functions of command, communications, mess, supply (excluding repair parts), personnel administration and emergency medical treatment.

b. Transportation and Maintenance Platoon.

(1) *Platoon headquarters.* This element includes the personnel and equipment to carry out the functions of maintenance planning, scheduling and supervision, repair parts supply, fuel distribution and transportation of heavy land clearing equipment.

(2) *Organizational maintenance section.* This section includes the personnel, tools, and equipment required to accomplish organizational maintenance, to include on-site maintenance service for all organic wheel and track vehicles, power generation equipment and engineer equipment.

(3) *Engineer direct support maintenance section.* This section includes the personnel, tools, and equipment required to perform direct support maintenance, to include on-site repair, for the following organic mission essential equipment chain saws, compressors, grinding machines, disc harrows, tracked tractors and their attachments.

c. Three Land Clearing Platoons. The platoons are identical. Each platoon is composed of—

(1) *Platoon headquarters.* Each platoon headquarters includes the personnel and equipment required to control, coordinate, and support the land clearing operations of 2 land clearing sections.

(2) *Lane clearing sections.* Each section includes the personnel and equipment required for supervision and continuous daylight operation of five land clearing tractors and support items such as disk harrows, chain saws, hand tools and demolitions.

14–6. Major Items of Equipment

The major items of equipment of the engineer land clearing company include 30 medium tracked tractors and treedozers, 12 full-tracked 6-ton cargo carriers, disc harrows, chain saws, compressors, welding shop, generators, and various cargo and utility trucks.

14–7. Employment

a. The engineer land clearing company is a specialized unit specifically designed to level and clear dense vegetation from critical areas in support of tactical operations.

b. Normally, the land clearing company will be employed in those areas of the world where the terrain is covered with vast tropical or subtropical rain forest. Thus, the anticipated operational environment will be a predominately hot and humid climate with frequent heavy rainfall

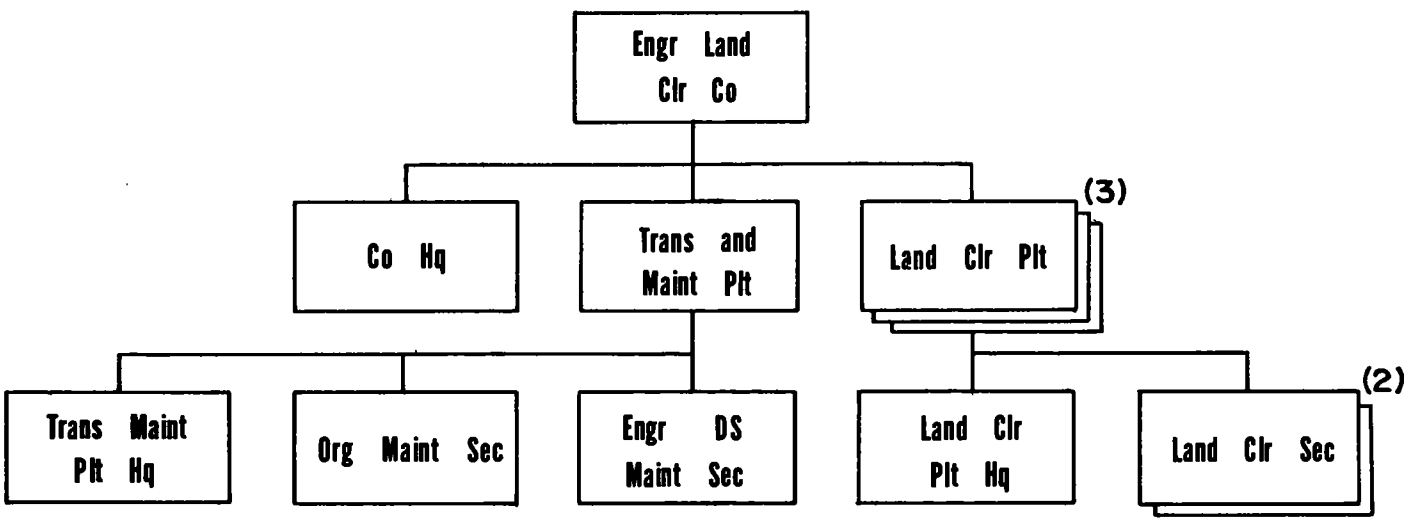


Figure 14–1. Organization chart, engineer land clearing company.

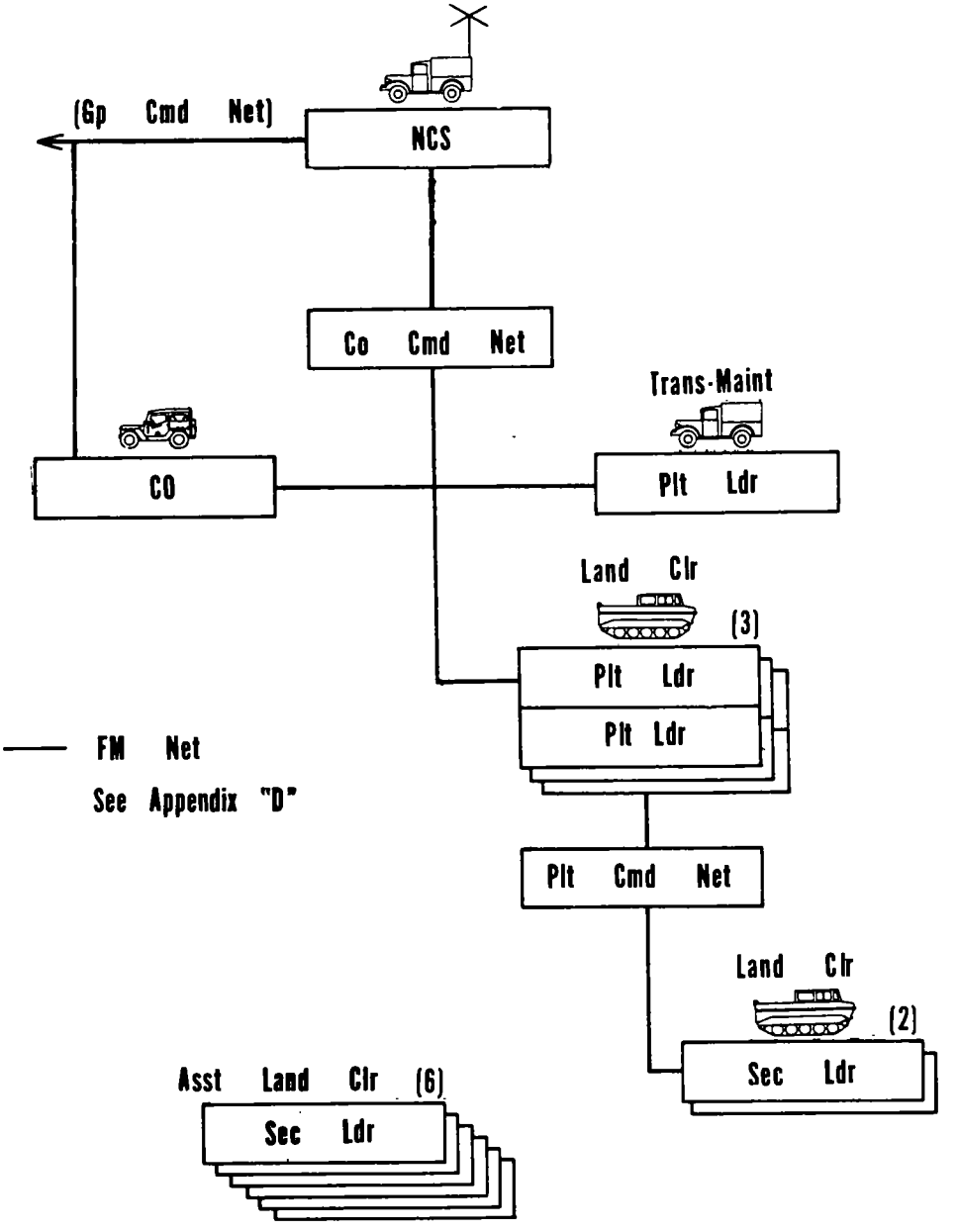


Figure 14–2. Type radio net, engineer land clearing company.

resulting in poor cross-country mobility, particularly restricting wheel vehicle travel.

c. The company may be employed to accomplish a variety of land clearing operations to include large area clearing missions requiring the total company effort (30 tractors), missions requiring platoon size effort (10 tractors), and missions requiring effort of a single section (5 tractors).

d. This unit is dependent upon the supported tactical unit for security in a tactical area of operation. Details concerning the organization

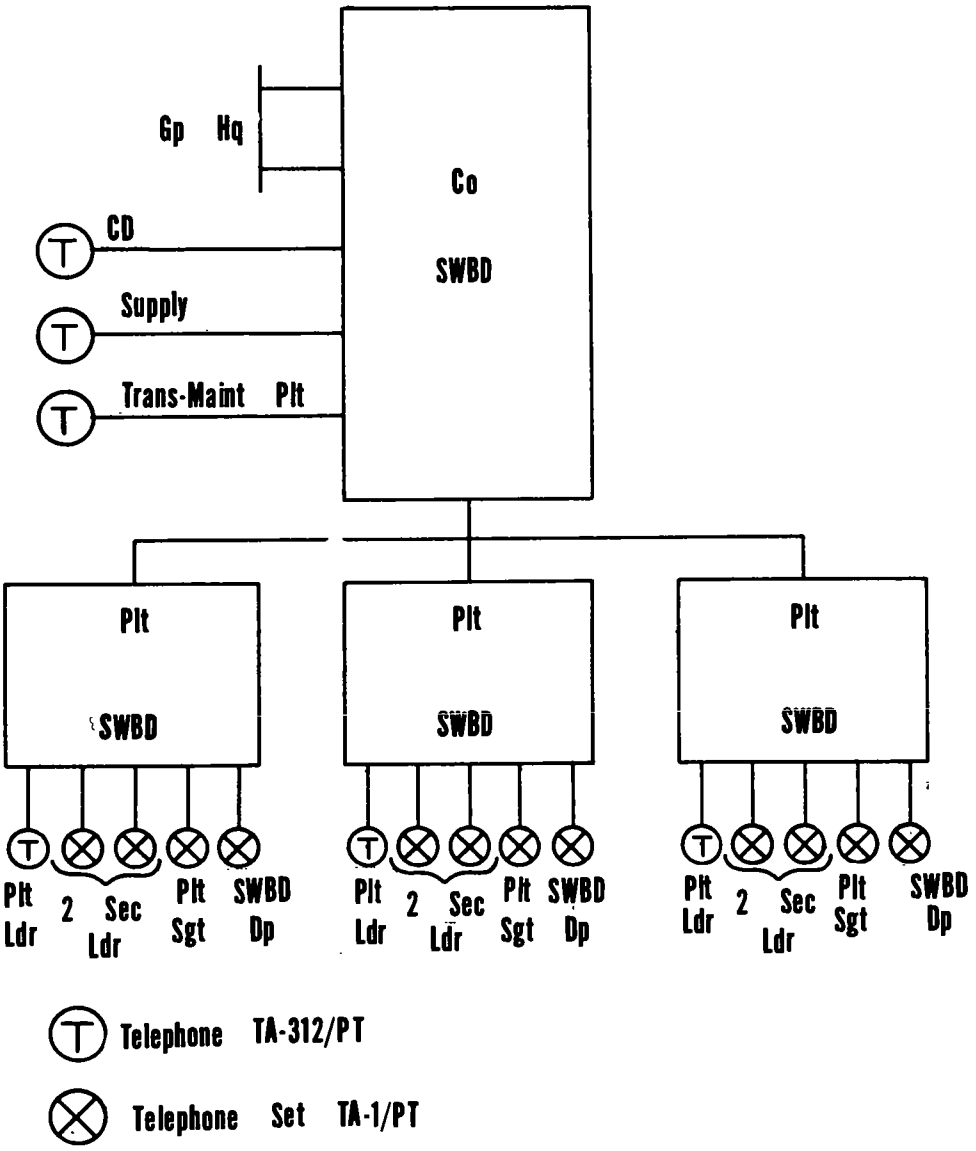


Figure 14–3. Type wire net, engineer land clearing company.

and equipment of the engineer land clearing company are contained in TOE 5–87T. Details concerning the techniques employed in land clearing operations are contained in TM 5–330 and TM 5–331A.

14–8. Communications

Radio and wire communications equipment is provided for command and control as shown in figures 14–2 and 14–3.

CHAPTER 15

ENGINEER COMPANIES, SEPARATE BRIGADES

Section I. TYPES AND MISSIONS

15–1. General

a. There are five separate engineer companies organic to the five separate tactical brigades as follows:

Separate brigade	*Organic engineer company*
Separate Infantry Brigade (TOE 7–100).	Engineer Company, Separate Infantry Brigade (TOE 5–107) (para 15–3—15–9).
Separate Infantry Brigade Mechanized (TOE 37–100).	Engineer Company, Separate Infantry Brigade (Mechanized, TOE 5–127) (para 15–3—15–9).
Separate Armored Brigade (TOE 17–100).	Engineer Company, Separate Armored Brigade (TOE 5–127) (para 15–3—15–9).
Separate Light Infantry Brigade (TOE 77–100).	Engineer Company, Separate Light Infantry Brigade (TOE 5–207) (para 15–10—15–16).
Separate Airborne Brigade (TOE 57–100).	Engineer Company, Separate Airborne Brigade (TOE 5–137) (para 15–17—15–23).

b. Of the above, the engineer company, separate infantry brigade (mechanized) and the engineer company, separate armored brigade, organized under the same TOE (5–127), and the engineer company, separate armored brigade, organized under the same TOE (5–127), and the engineer company, separate infantry brigade (TOE 5–107), are identical in organization, personnel, and equipment with one exception. The operating squads and the command section of the armored and mechanized infantry units are equipped with armored personnel carriers (APC) while the operating squads and the command section of the infantry company are equipped with wheeled vehicles.

15–2. Missions

The missions of the five separate engineer companies organic to the five separate tactical brigades are identical. Their missions are—

a. To increase the combat effectiveness of the separate infantry, infantry (mechanized), armored, light infantry, or airborne brigade by means of engineer combat support and general engineer work.

b. To undertake and carry out limited infantry combat missions when required.

Section II. ENGINEER COMPANY, SEPARATE INFANTRY BRIGADE, SEPARATE ARMORED BRIGADE, OR SEPARATE INFANTRY BRIGADE (MECHANIZED)

15–3. General

The engineer companies, separate infantry, infantry (mechanized), and armored brigade, are discussed together because of their similarity in organization, operations, and capabilities. Essentially they perform the same tasks for the separate brigades that the divisional engineer combat battalion performs for the division.

15–4. Capabilities

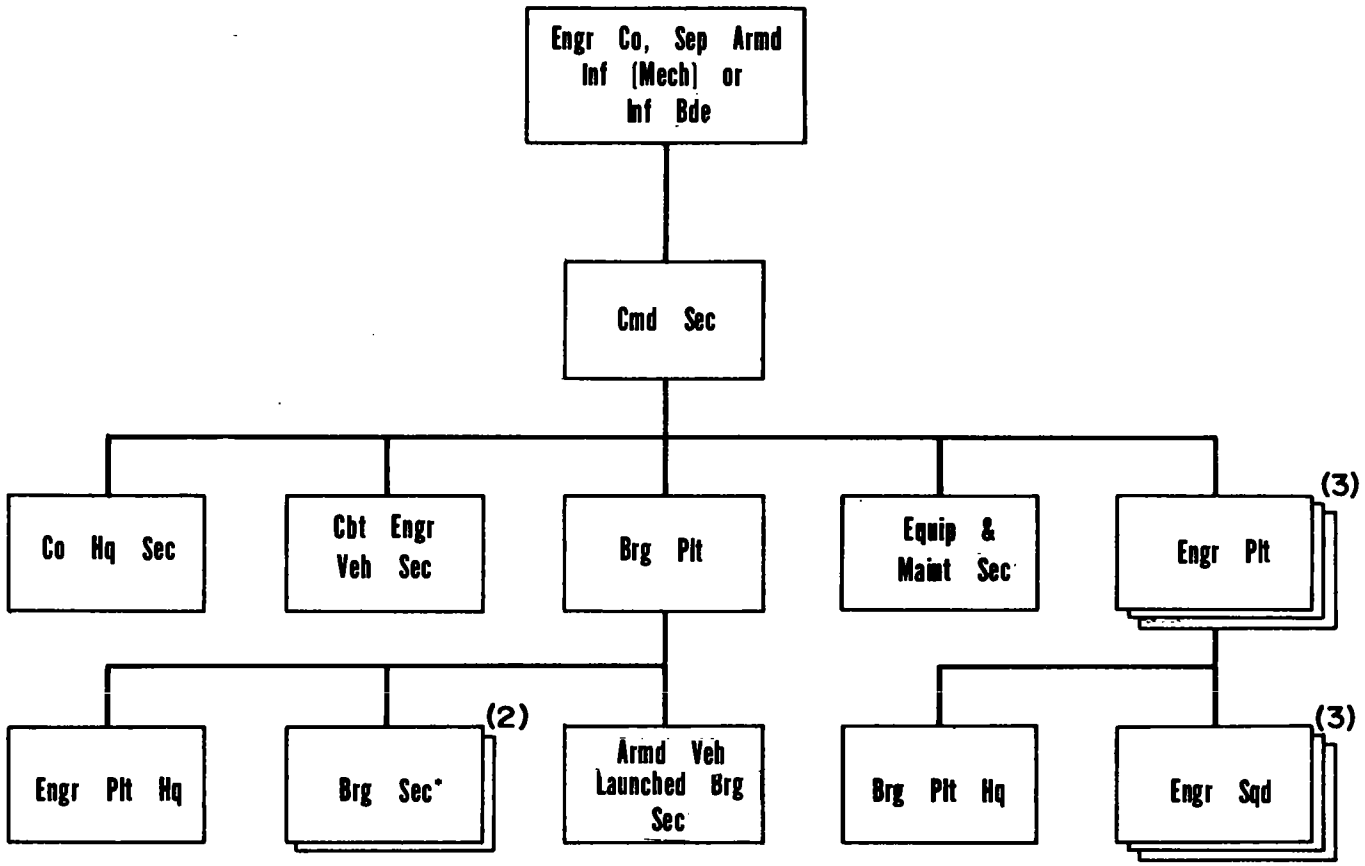
a. Level 1. At TOE Level 1, these units provide—

(1) Engineer staff planning and supervision for organic and attached engineer troops.

(2) Capability to accomplish engineer combat tasks, and when reinforced with additional heavy equipment, can execute more complex engineer works.

(3) Engineer reconnaissance and engineer intelligence for the brigade.

(4) Atomic Demolition Munitions (ADM) support when reinforced with TOE 5–570 ADM teams.



*When equipped with the MAB, this section is designated as the Heavy Raft Section. When equipped with the M4T6 or Class 60 bridging equipment, this section is designated as the bridge section.

Figure 15-1. Organization chart, engineer company, separate infantry, or brigade.

(5) Armored vehicle launched Class 60 bridging equipment to span wet and dry gaps 60 feet (18 meters) or less in width, for two simultaneous separate crossings. (A total of three such bridges are available.)

(6) A limited unit capability for infantry combat when required.

(7) When equipped with mobile assault bridging equipment, provide equipment to erect two Class 60 self-propelled ferries or 282 feet (85 meters) of Class 60 floating bridge.

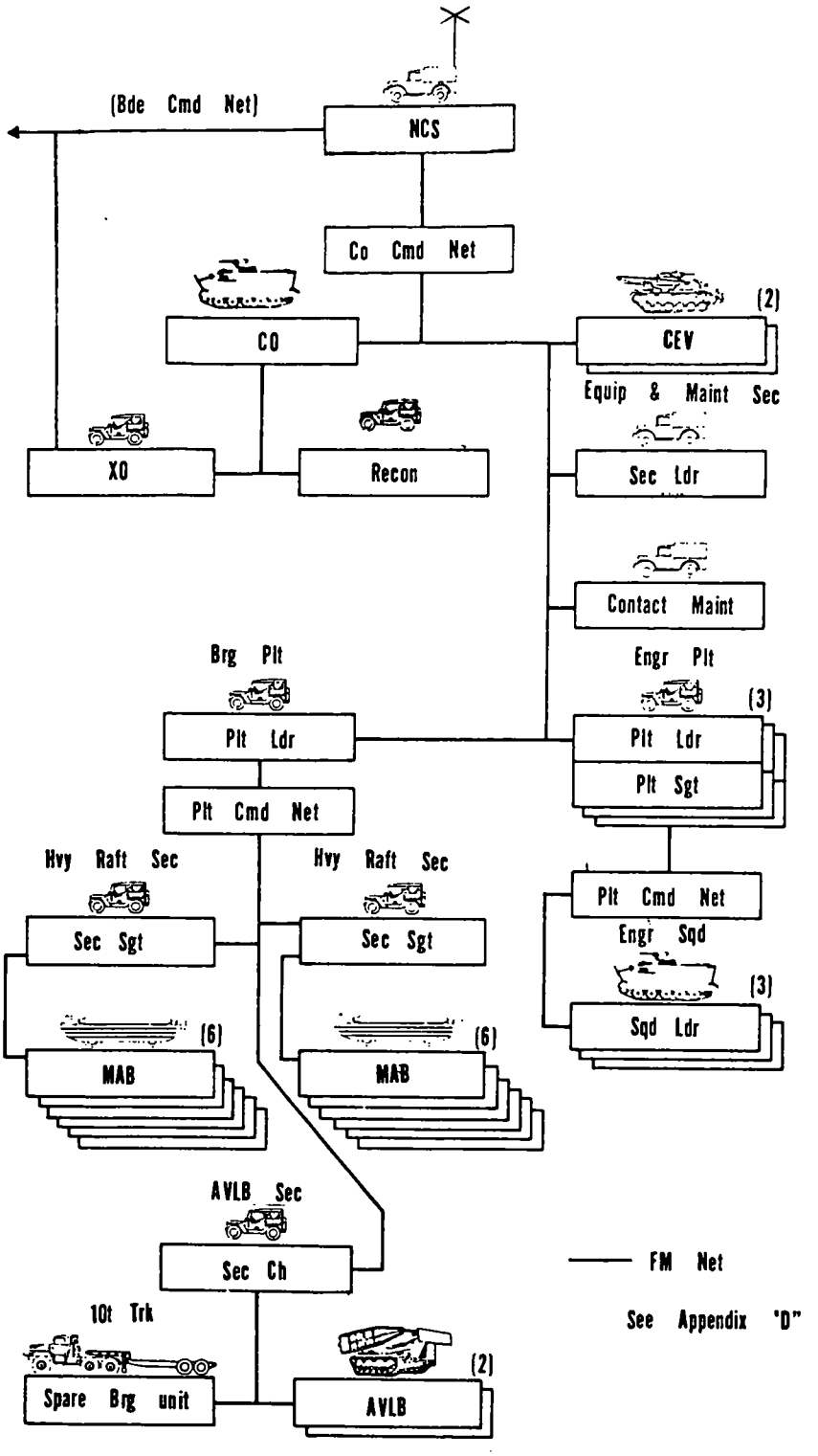
(8) Equipped with M4T6 or Class 60 bridging equipment—

(*a*) When issued the M4T6 bridge, provide 280 feet (85 meters) of 50-ton floating bridge, or four 50-ton rafts. Bridge components may be used to construct short fixed spans.

(*b*) When issued the Class 60 bridge, provide 270 feet (82 meters) of 60-ton floating bridge or two 45-ton 4-float rafts, or two 60-ton five-float rafts, and/or a combination of bridge and rafts. Bridge components may be used to construct short fixed spans.

(9) Light stream-crossing equipage to support an infantry company in a river crossing when amphibious vehicles cannot be used, are not available, or river conditions preclude the use of mobile amphibious bridge or ferry vehicles. Equipment includes—

(*a*) Assault boats (9) and reconnaissance



NOTE:
Shown above is a type communication diagram for the engineer company, seperate infantry, armored, or infantry (mechanized) brigade when equipped with the MAB. When these units are equipped with the Class 60 or M4T6 bridge instead of the MAB, six 5-ton bridge trucks equipped with radio are authorized instead of the 12 MAB vehicles equipped with radio in the bridge platoon.

Figure 15-2. Type radio net, engineer company, separate infantry, or infantry (mechanized) brigade.

boats (6) to carry one infantry company by waterborne assault.

(*b*) Light tactical bridge equipage to provide the following options:

1. One Class 12 ferry, or;

2. One Class 12 bridge 44 feet (13 meters) long, or;

3. Four pontons powered by outboard motors for use in assault crossings.

b. Levels 2 and 3. The Levels 2 and 3 columns adapt this TOE for reduced operational capabilities, in decrements of 10 percent, to approximately 90 percent for Level 2, and 80 percent for Level 3.

c. Type B Unit. These units are not adaptable to a Type B organization.

d. Support. These units are dependent upon headquarters and headquarters company, separate infantry brigade, separate infantry brigade (mechanized), or separate armored brigade for unit level medical support, and the administration company, TOE 12–177, for personnel and religious services.

15–5. Organization

The organization for these three types of engineer companies is identical (fig 15–1).

a. Command Section. The command section includes the company commander and personnel to assist him in providing the brigade commander with limited engineer staff service and engineer reconnaissance. The command section of the engineer company, separate infantry (mechanized) or armored brigade is equipped with an armored personnel carrier and a 1/4-ton truck while that of the engineer company, separate infantry brigade is equipped with a 1/4- and 3/4-ton truck.

b. Company Headquarters Section. The company headquarters section provides administrative, logistical, and communications support for the company. This section also provides two water points for support of the brigade.

c. Combat Engineer Vehicle Section. This section consists of two combat engineer vehicles (CEV) and the necessary personnel to operate them. It provides support to the brigade for reduction and breaching of obstacles and fortifications.

d. Equipment and Maintenance Section. This section provides organizational maintenance and repair for the automotive and construction equipment organic to the company. It also supports engineer work with construction equipment and operators as required.

e. Bridge Platoon. The bridge platoon (or heavy raft platoon) may be equipped with one of three types of float bridging; M4T6, Class 60, or the mobile assault bridge. When equipped with M4T6 or Class 60 bridge, the platoon is organized with two bridge sections. When equipped with the mobile assault bridging equipment (MAB), the platoon is organized with two heavy raft sections. Additionally, both versions have a bridge platoon headquarters and an armored vehicle launched bridge (AVLB) section.

f. Engineer Combat Platoon. The engineer combat platoons (3) perform in a manner similar to the engineer platoons in the divisional engineer combat battalion. In the platoons of the engineer company of the separate armored and mechanized brigades, the squads are provided with armored personnel carriers instead of dump trucks.

15–6. Major Items of Equipment

Major items of equipment for these companies, in addition to bridging equipment, include a wheeled, rough terrain, 3/4-yard, crane-shovel; 1.5-, 3-, and 10-kw generators; 2 1/2-cubic yard scoop loaders; tractor-dozers; truck-mounted, water purification sets; 250 CFM pneumatic tool and compressor outfits; 5-ton stake trucks (when equipped with M4T6 or Class 60 bridging); a grader; 1/4-, 3/4-, 2 1/2-, and 5-ton utility and dump trucks and trailers: two Class 30 assault trackway outfits; a medium wrecker; a water trailer; a truck-mounted contact maintenance shop; bridge erection and pneumatic boats; combat engineer vehicles; and organizational maintenance repair kits. Armament consists of light machineguns, rifles, pistols, 40-mm grenade launchers, and the LAW.

15–7. Employment

The engineer company supports the separate brigade in similar manner to that of the engineer companies of the divisional engineer combat battalions in their support of the divisional brigades (FM 5–135). The brigade commander, acting on the recommendations of the brigade engineer (an engineer major, of the brigade headquarters staff), assigns the company specific tasks or areas of responsibility for engineer support. Normally, an engineer platoon is placed in direct support of each maneuver battalion. The platoons may be augmented by support from the company

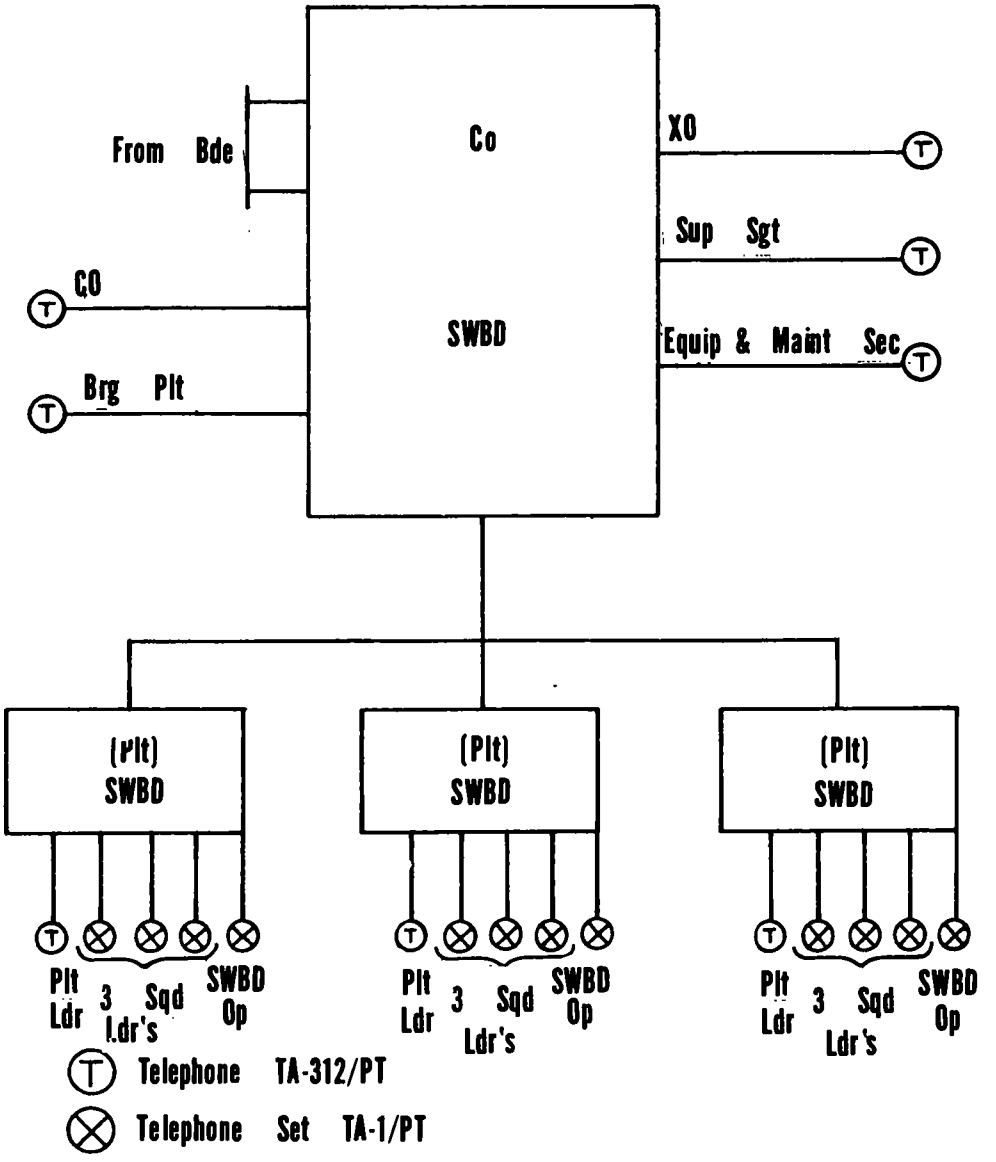


Figure 15–3. Type wire net, engineer company, separate infantry, armored, or infantry (mechanized) brigade.

in the form of bridging, combat engineer vehicles, and construction equipment with operators.

15–8. Communications

Type radio and wire communications nets for the engineer company, separate infantry, infantry (mechanized) or armored brigade are shown in figures 15–2 and 15–3.

15–9. Allocation, Category, and Mobility

a. Allocation. These units are organic to the separate brigades.

b. Category. These units are designated as Category I units (AR 310–25).

c. Mobility. These units are 100 percent mobile in organic transportation.

Section III. ENGINEER COMPANY, SEPARATE LIGHT INFANTRY BRIGADE

15–10. General

The engineer company, separate light infantry brigade, differs in organization and capabilities from the three separate companies discussed previously in paragraph 15–5. Designed as an organic unit of the separate light infantry brigade,

this company with its three engineer platoons, can support three maneuver battalions of the brigade. However, as it has no bridge equipage, this unit must depend on other engineer bridge units when bridging is required.

15–11. Capabilities

a. Level 1. At TOE Level 1 this unit provides—

(1) Engineer staff planning for organic and for organic and attached engineer troops in conjunction with the brigade engineer section.

(2) Engineer reconnaissance and engineer intelligence for the brigade.

(3) Construction, maintenance and repair of roads, bridges, fords, and culverts to facilitate the movement of the brigade.

(4) General construction works including construction of assault landing strips.

(5) Atomic demolitions munitions (ADM) support, when reinforced with appropriate ADM teams from TOE 5–570, engineer combat support teams.

(6) Personnel and equipment for the purification and supply of potable water.

b. Levels 2 and 3. The Levels 2 and 3 columns adapt this TOE for reduced operational capabilities, in decrements of 10 percent, to approximately 90 percent for Level 2, and 80 percent for Level 3.

c. Type B Unit. This unit is not adaptable to a Type B organization.

d. Support. This unit is dependent upon Headquarters and Headquarters company, separate light infantry brigade, for unit level medical support and the administration company, TOE 12–197, for personnel administration services.

15–12. Organization

The engineer company, separate light infantry brigade, is organized under TOE 5–207 (fig 15–4) as follows:

a. Company Headquarters. The company headquarters provides command and control; and administrative, logistical, and communications support for the company. It also has one truck-mounted, water purification set for the support of the brigade.

b. Equipment and Maintenance Section. The equipment and maintenance section provides organizational maintenance and repair for the engineer and ordnance equipment organic to the company. It also supports engineer work with construction equipment and operators as required.

c. Engineer Platoon. The engineer platoons (3) perform in a manner similar to the engineer platoons in the divisional engineer combat battalion. Normally one engineer platoon supports one maneuver battalion of the infantry brigade.

15–13. Major Items of Equipment

Major items of equipment for the company include road graders; tractor dozers; 1.5-, 3-, and

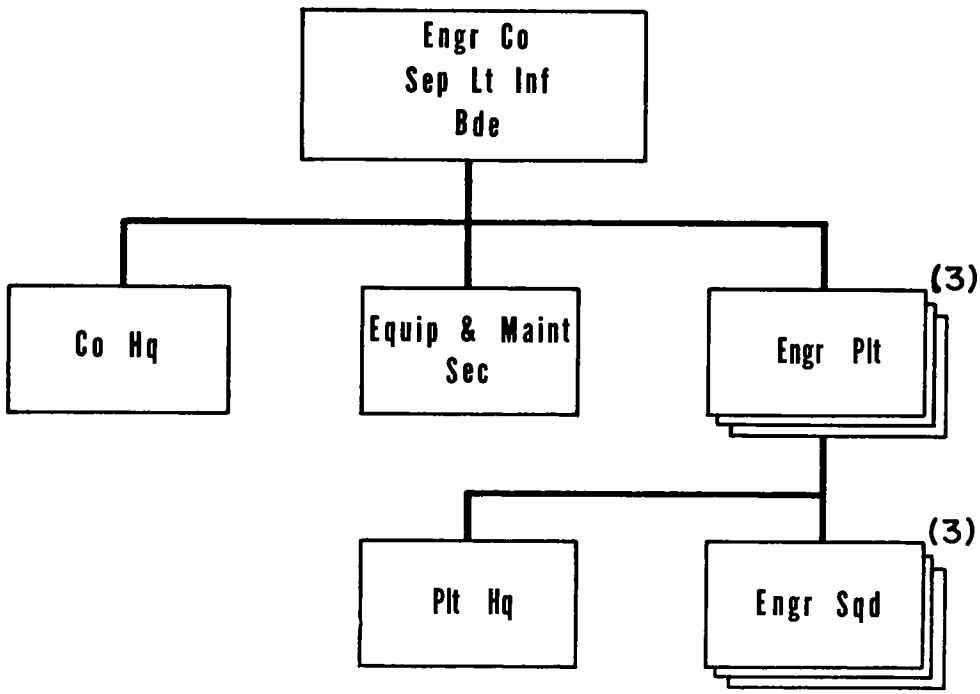


Figure 15–4. Organization chart, engineer company, separate light infantry brigade.

10-kw generators; a truck-mounted, water purification set; 1/4- and 3/4-ton utility trucks and trailers; 2 1/2-ton dump and cargo trucks and trailers; a water trailer; scoop loaders; gasoline driven, chain saws; water pump; drafting and surveying sets and equipment; a portable, electric tool outfit; and a contact maintenance truck. Armament consists of rifles, pistols, light machineguns and grenade and the LAW.

15–14. Employment

The company supports the light infantry brigade in a manner described for the companies discussed in paragraph 15–7. The primary differences between this company and the separate engineer companies of the armored, infantry, and infantry mechanized brigade are the lack of bridge equipage and the lesser number of personnel and equipment.

15–15. Allocation, Category, and Mobility

a. Allocation. This unit is organic to the separate light infantry brigade.

b. Category. This unit is designated as a Category I unit (AR 310–25).

c. Mobility. This unit is 100 percent mobile by organic transportation. Ninety percent air transportable by medium transport aircraft.

15–16. Communications

Type radio and wire communications nets for the engineer company, separate light infantry brigade are shown in figures 15–5 and 15–6.

Section IV. ENGINEER COMPANY, SEPARATE AIRBORNE BRIGADE

15–17. General

The engineer company, separate airborne brigade, is a light engineer combat company designed to increase the combat effectiveness of the separate airborne brigade. The company is 100 percent air transportable and air droppable. It has no river-crossing capability however and is dependent on other engineer units for this capability when it is required.

15–18. Capabilities

a. Level 1. At TOE Level 1 this unit provides—

(1) Engineer planning for organic and attached engineer troops.

(2) Engineer reconnaissance and engineer intelligence for the brigade.

(3) Limited construction, maintenance and repair of roads, bridges, fords, and culverts to facilitate the movement of the brigade.

(4) Limited general construction works including construction of assault landing strips.

(5) Atomic demolition munition (ADM) support when reinforced with ADM teams from TOE 5–570.

(6) Personnel and equipment for the purification and supply of potable water for the brigade.

(7) Close engineer combat support by personnel and equipment landed by parachute and aircraft, and when required, execution of infantry combat missions.

b. Levels 2 and 3. The Levels 2 and 3 columns adapt this TOE for reduced operational capabilities, in decrements of 10 percent, to approximately 90 percent for Level 2, and 80 percent for Level 3.

c. Type B Unit. This unit is not adaptable to a Type B organization.

d. Reinforcement. When brigade structure includes four maneuver battalions, a fourth platoon must be provided on the basis of one engineer platoon per regularly assigned maneuver battalion.

e. Support. This unit is dependent upon the administrative company, separate airborne brigade, for personnel and administrative services (TOE 12–167), and brigade headquarters for unit level medical services.

15–19. Organization

The engineer company, separate airborne brigade, is organized under TOE 5–137 (fig 15–7) as follows:

a. Company Headquarters. The company headquarters provides command and control; and administrative, logistical, and communications support for the company. It also has one portable, water purification set for the support of the brigade.

b. Equipment and Maintenance Section. The equipment and maintenance section provides organizational maintenance and repair for the engineer and ordnance equipment organic to the company. It also supports engineer work with construction equipment and operators.

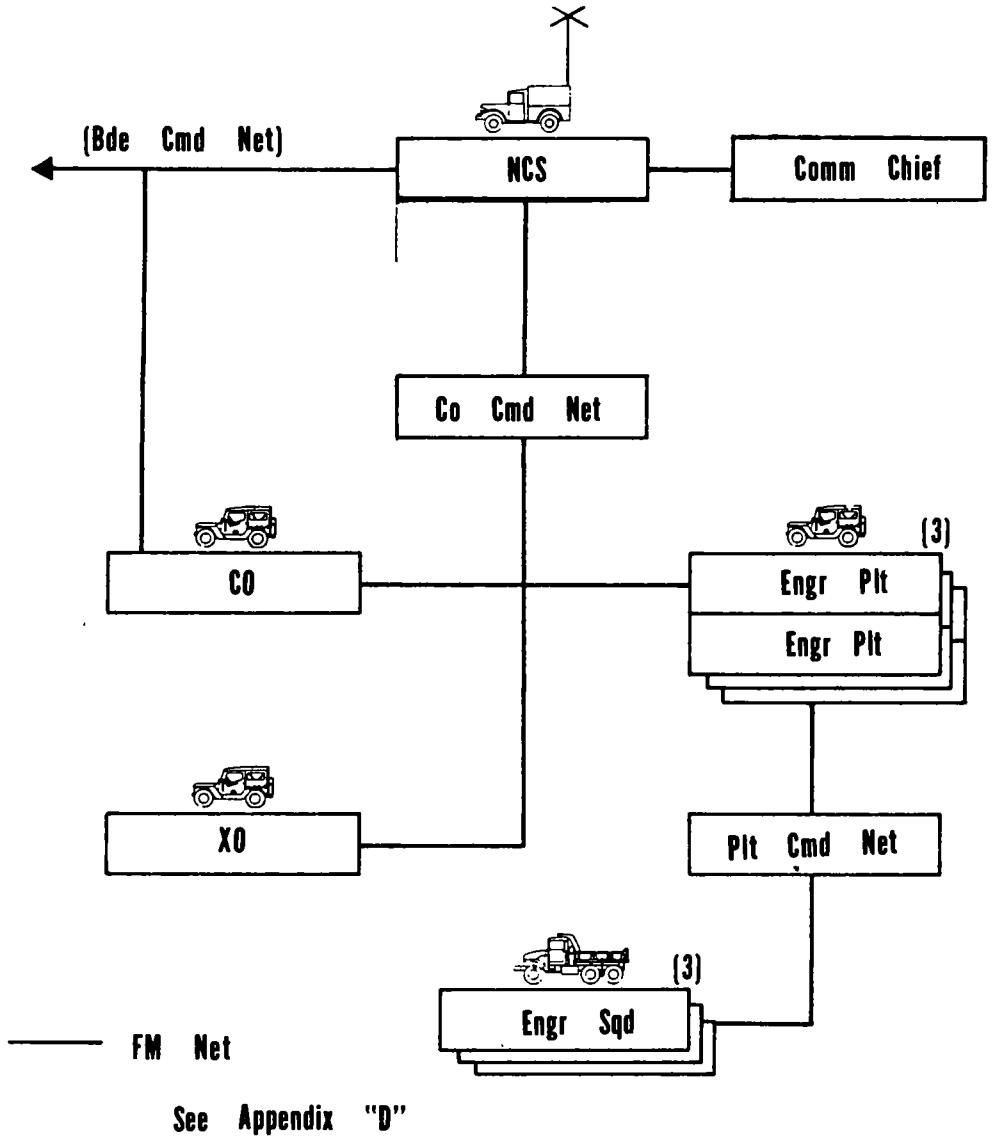


Figure 15–5. Type radio net, engineer company, separate light infantry brigade.

c. Engineer Platoon. The engineer platoons (3) perform in a manner similar to the engineer platoons of the airborne divisional engineer battalion. Normally one engineer platoon supports one maneuver battalion of the brigade.

15–20. Major Items of Equipment

Major items of equipment for the company include 3-man reconnaissance boats; 1.5- and 3-kw generators; road graders; a scoop loader; gasoline driven, chain saws; a portable, electric tool outfit; tractor-dozers; 1/4- and 3/4-ton trucks and trailers; 2 1/2-ton dump and cargo trucks and trailers; a chain hoist; water pumps; demolition sets; a portable, water purification set; and organizational maintenance and repair sets and equipment. Armaments consist of rifles, pistols, light machineguns, grenade launchers, and the LAW.

15–21. Employment

Normally, each of the three platoons of the engineer company supports one of the three maneuver battalions of the airborne brigade. When more than three maneuver battalions are assigned to the brigade, an additional platoon must be added to the engineer company for every additional maneuver battalion assigned. The platoons provide all necessary engineer support for the maneuver battalions and are supported with heavy

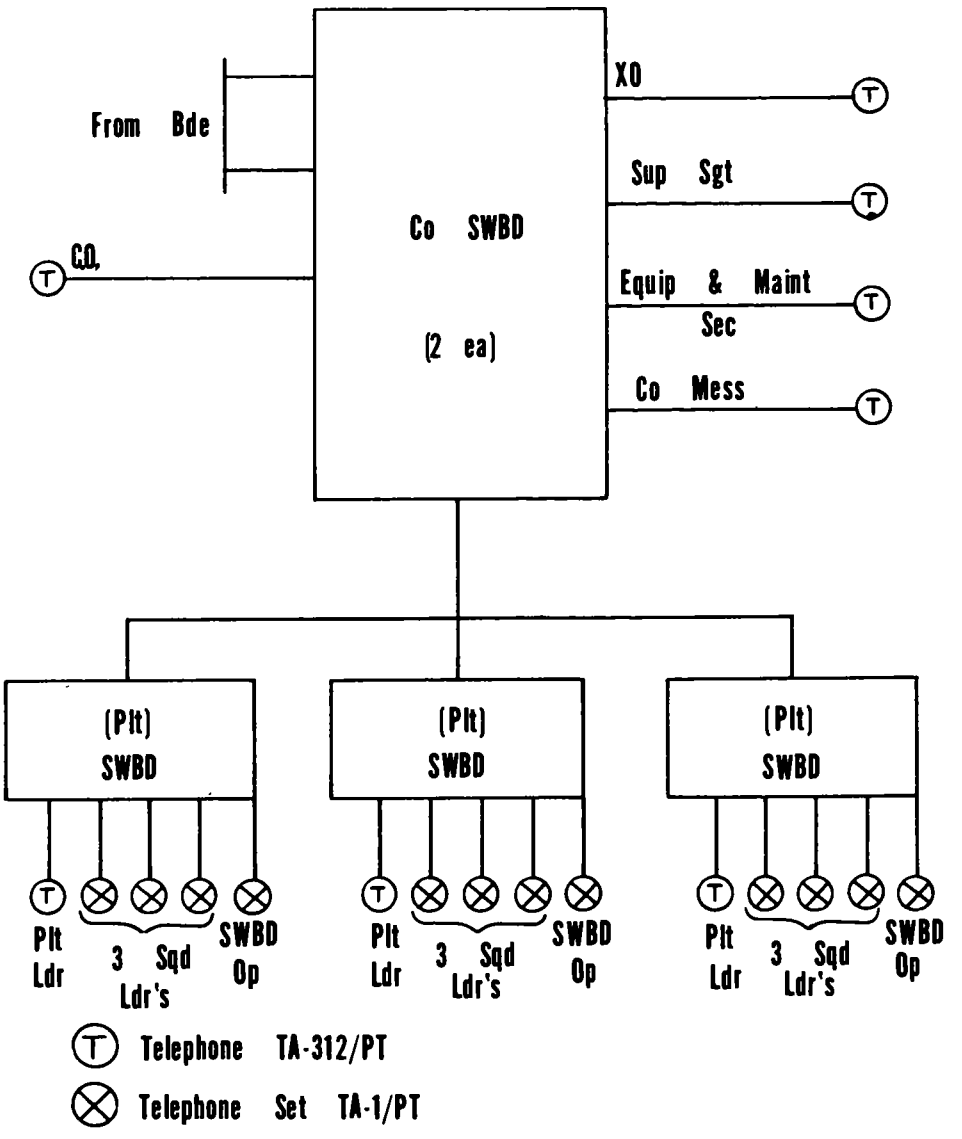


Figure 15–6. Type wire net, engineer company, separate light infantry brigade.

construction equipment by the company headquarters.

15–22. Allocation, Category, and Mobility

a. Allocation. This unit is organic to the separate airborne brigade.

b. Category. This unit is designated as a Category I unit. (AR 310–25).

c. Mobility.

(1) This unit is 100 percent mobile in organic transportation.

(2) This unit is 100 percent air transportable in medium transport aircraft.

(3) Air droppable.

15–23. Communications

Type radio and wire communications nets for the engineer company, separate airborne brigade are shown in figures 15–8 and 15–9.

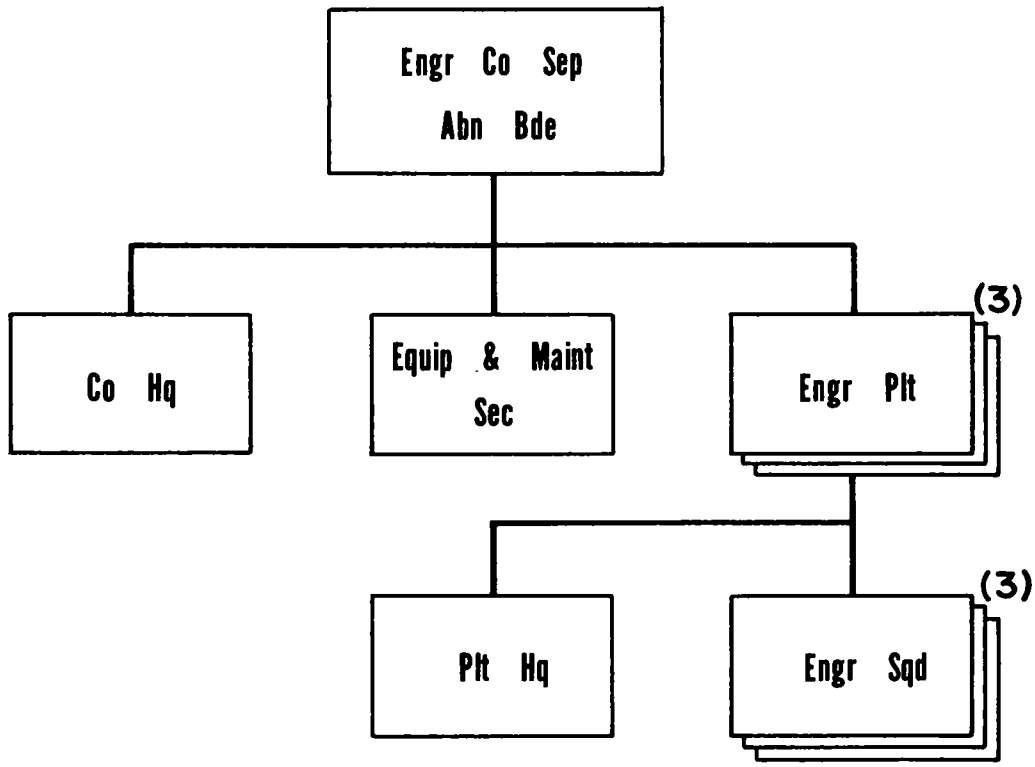


Figure 15–7. Organization chart, engineer company, separate airborne brigade.

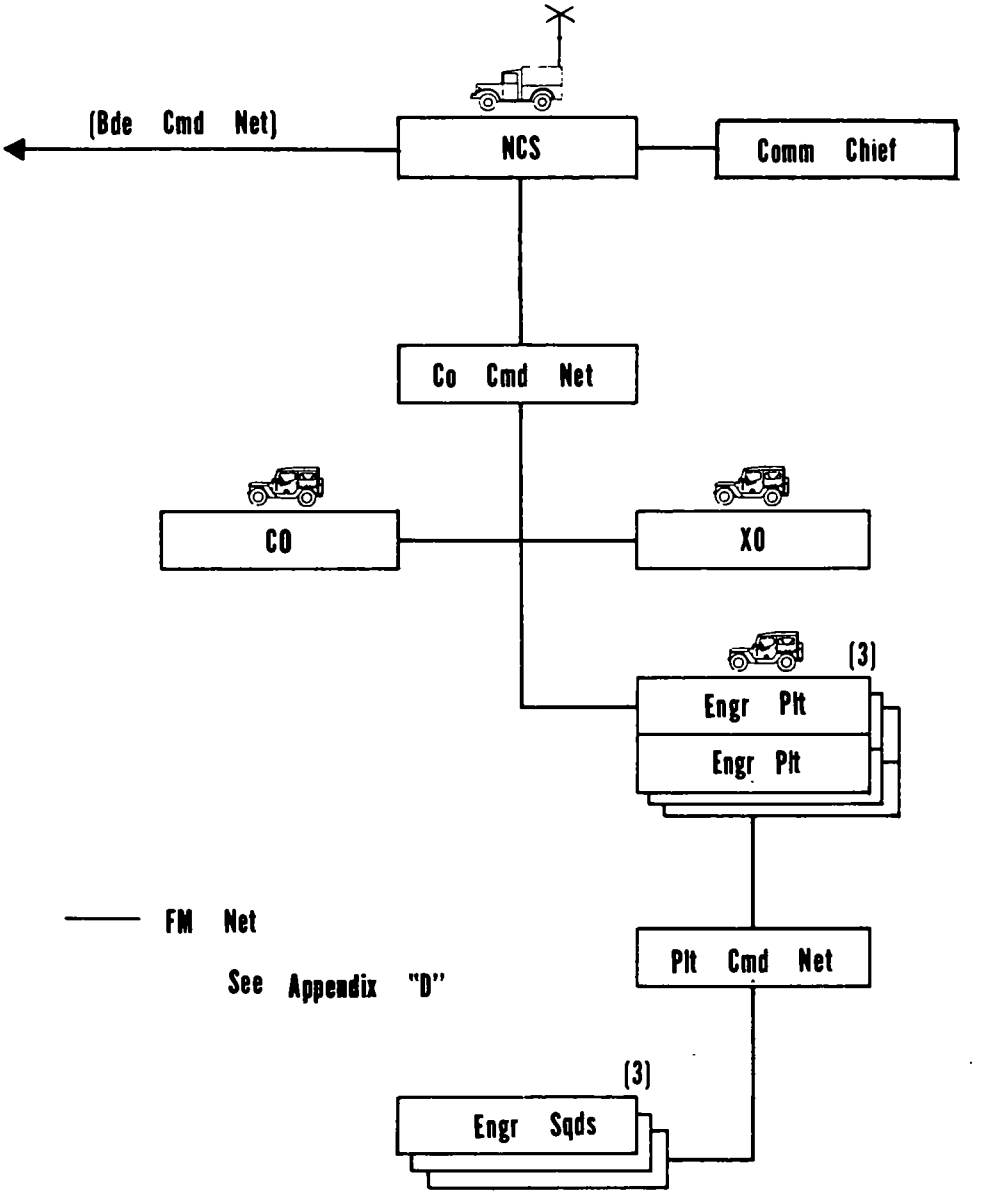


Figure 15–8. Type radio net, engineer company, separate airborne brigade.

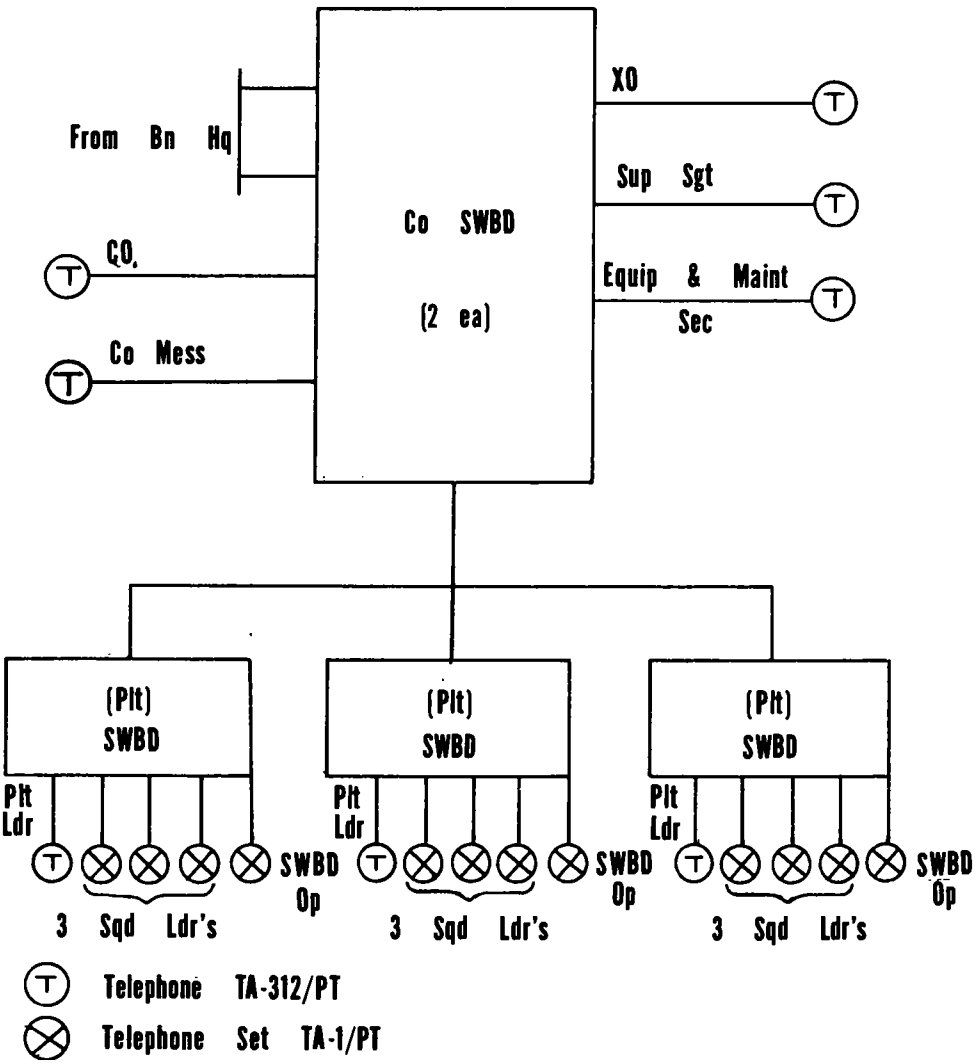


Figure 15–9. Type wire net, engineer company, separate airborne brigade.

APPENDIX A

REFERENCES

A–1. Army Regulations (AR)

310–25	Dictionary of United States Army Terms
310–31	Management System for Tables of Organization and Equipment
310–50	Authorized Abbreviations and Brevity Codes
611–101	Manual of Commissioned Officer Military Occupational Specialties
611–201	Enlisted Military Occupational Specialties
750–8	Command Maintenance Management Inspections (CMMI)

A–2. Field Manuals (FM)

5–1	Engineer Troop Organizations and Operations
5–20	Camouflage
5–25	Explosives and Demolitions
5–26	Employment of Atomic Demolitions Munitions (ADM)
5–30	Engineer Intelligence
5–34	Engineer Field Data
5–36	Route Reconnaissance and Classification
5–135	Engineer Battalion, Armored, Infantry, and Infantry (Mechanized) Division
5–136	Engineer Battalions Airborne and Airmobile Divisions
5–144	Engineer Amphibious Units
5–146	Engineer Topographic Units
5–162	Engineer Construction and Construction—Support Units
7–30	The Infantry Brigades
9–6	Ammunition Service in the Theater of Operations
9–6–1 (TEST)	Ammunition Service in the Theater of Operation, TASTA–70
12–2	Adjutant General Support in Theaters of Operations
19–4	Military Police Support, Theater of Operations
20–32	Landmine Warfare
21–5	Military Training Management
21–6	Techniques of Military Instruction
23–65	Browning Machinegun Caliber .50, Heavy Barrel, M2
24–1	Tactical Communications Doctrine
30–10	Terrain Intelligence
30–31	Stability Operations—Intelligence
31–10	Denial Operations and Barriers
31–16	Counterguerrilla Operations
31–21	Special Forces Operations—U.S. Army Doctrine
31–22	U.S. Army Counterinsurgency Forces
31–50	Combat in Fortified and Built-Up Areas
31–60	River-Crossing Operations
31–73	Advisor Handbook for Stability Operations
31–75	Riverine Operations
(C)32–5	Signal Security (SIGSEC) (U)

33–1	Psychological Operations—U.S. Army Doctrine
33–5	Psychological Operations—Techniques and Procedures
41–10	Civil Affairs Operations
44–1	U.S. Army Air Defense Artillery Employment
54–3	The Field Army Support Command
54–4	The Support Brigade
54–8 (Test)	The Administrative Support, Theater Army, (TASTA–70).
55–9	Transportation Services and the Transportation Brigade in the Field Army
100–5	Operations of Army Forces in the Field
(C) 100–20	Field Service Regulations—Internal Defense and Development (IDAD) (U)
101–5	Staff Officers Field Manual—Staff Organization and Procedure

A–3. Technical Manuals (TM)

5–210	Military Floating Bridge Equipment
5–216	Armored Vehicle Launched Bridge
5–227	Design and Techniques for Military Civil Action
5–277	Bailey Bridge
5–302	Construction in the Theater of Operations
5–312	Military Fixed Bridges
5–330	Planning and Design of Roads, Airbases, and Heliports in the Theater of Operations
5–331A	Utilization of Engineer Construction Equipment: Volume A Earthmoving, Compaction, Grading, and Ditching Equipment
5–700	Field Water Supply

A–4. Army Training Tests (ATT)

5–25	Engineer Combat Units

A–5. Army Training Program (ATP)

5–25	Engineer Combat Units

A–6. Tables of Organizations and Equipment (TOE)

5–35	Engineer Combat Battalion, Army or Corps
5–36	Headquarters and Headquarters Company, Engineer Combat Battalion, Army or Corps
5–37	Engineer Combat Company, Army or Corps
5–52	Headquarters and Headquarters Company, Engineer Combat Group or Headquarters and Headquarters Company, Airborne Engineer Combat Group
5–54	Engineer Light Equipment Company, or Engineer Light Equipment Company, Airborne
5–58	Engineer Light Equipment Company
5–64	Engineer Assault Bridge Company, Mobile
5–77	Engineer Panel Bridge Company
5–78	Engineer Float Bridge Company
5–87T	Engineer Land Clearing Company
5–97	Engineer Camouflage Company

5-101	Headquarters and Headquarters Company, Engineer Combat Brigade, Army, Corps, or Airborne Corps
5-107	Engineer Company, Separate Infantry Brigade
5-124	Engineer Dump Truck Company
5-127	Engineer Company, Separate Armored Brigade or Engineer Company, Separate Infantry Brigade or Engineer Company, Separate Infantry Brigade (Mechanized)
5-137	Engineer Company, Separate Airborne Brigade
5-195	Engineer Combat Battalion, Airborne
5-196	Headquarters and Headquarters Company, Engineer Combat Battalion, Airborne
5-197	Engineer Equipment and Maintenance Company, Engineer Combat Battalion, Airborne
5-198	Engineer Combat Company, Engineer Combat Battalion, Airborne
5-207	Engineer Company, Separate Light Infantry Brigade
5-540	Engineer Topographic and Intelligence Teams
5-570	Engineer Combat Support Teams
12-167	Administration Company, Separate Airborne Brigade
12-197	Administration Company, Separate Light Infantry Brigade

APPENDIX B

ENGINEER COMBAT SUPPORT TEAMS
(Extract from TOE 5–570)

B–1. Mission
The mission of the atomic demolitions munitions (ADM) teams is to provide combat support to the Army (including friendly nonnuclear powers) as required.

B–2. Assignment
Teams may be attached or assigned to U.S. or friendly military units, or may be organized into an engineer composite combat support unit to provide for engineer atomic demolition munitions support under varying conditions.

B–3. Capabilities
a. Individual team capabilities are described below. Capabilities of an engineer composite unit comprised of these teams will vary with the number and types of teams used.

b. These teams must be furnished mess, organizational maintenance, supply, administrative, and personnel services by support unit or by appropriate TOE 29–500 and 29–600-series teams.

c. These teams are not adaptable to reduced strength or to a Type B organization.

d. Individuals of these teams can engage in effective, coordinated defense of the team's area or installation.

B–4. Basis of Allocation
These teams are allocated as demanded by the atomic demolition munitions requirements of the supported unit.

B–5. Category
These teams have been designated Category II units (AR 310–25).

B–6. Mobility
These teams are 100 percent mobile in organic transportation.

B–7. Detailed Breakdown of Teams
a. Team MA, Atomic Demolition Munitions Platoon Headquarters Separate.

(1) *Capability.* At TOE Level 1, this unit provides—

(*a*) Command and administrative control of from two to six atomic demolition munitions teams.

(*b*) Supported unit with technical liaison, advisory and limited planning services for the employment of atomic demolition munitions.

(*c*) Command for subordinate teams in the employment and firing of ADM.

(*d*) Coordination of supply and resupply of ADM prescribed load.

(2) *Category.* This unit is designated a Category II unit, (AR 310–25).

(3) *Strength.* This team is composed of 1 officer and 4 enlisted men.

(4) *Basis of allocation.* One team per two to six ADM squads.

b. Team MB, Atomic Demolition Munitions-Liaison.

(1) *Capability.* At TOE Level 1, this unit provides—

(*a*) An atomic demolition munitions liaison officer to the headquarters of supported U.S. and allied units not otherwise authorized an ADM qualified officer.

(*b*) Technical knowledge, advisory and limited planning services to the unit to which assigned.

(*c*) Liaison between the headquarters to which assigned and supporting ADM teams for employment of ADM.

(2) *Category.* This unit is designated a Category II unit, (AR 310–25).

(3) *Strength.* This team is composed of one officer and one enlisted man.

(4) *Basis of allocation.* One team per head-

quarters assigned an ADM mission not otherwise authorized an ADM qualified officer.

c. Team MC, Atomic Demolitions Munitions Squad.

(1) *Capability.* At TOE Level 1, this unit provides—assemblage, preparation for firing, detonates on order, or, if necessary, recovers, disassembles, or destroys atomic demolition munitions (ADM).

Note. Requires support by the unit to which attached for ADM storage, transport, security, site preparation and team administration.

(2) *Cateogry.* This unit is designated a Category II unit, (AR 310–25).

(3) *Strength.* This team is composed of five enlisted men.

(4) *Basis of allocation.* One or more teams to provide ADM capability to the engineer combat battalion, Army, other U.S. Army combat units, task forces, or allied non-U.S. forces, and as required to increase the ADM capability of the divisional engineer battalion.

APPENDIX C

FUNCTIONS OF THE ENGINEER STAFFS OF HEADQUARTERS AND HEADQUARTERS COMPANIES NONDIVISIONAL ENGINEER COMBAT UNITS

C–1. Headquarters and Headquarters Company

Each nondivisional engineer combat unit of battalion size or larger includes a headquarters and headquarters company. This company provides the staff elements and the necessary personnel required to perform the operational planning, coordination, and supervision for assigned or attached engineer units in the accomplishment of engineer units in the accomplishment of engineer missions in support of army, corps, or division operations.

C–2. Organization

The headquarters and headquarters company of these units is organized as follows:

a. Headquarters. Headquarters consists of the command and major staff officers (para 6–5*a*, 7–5*a*, 8–11*a*, and 9–11*a*). The staff is guided by the desires of the commander and as generally outlined in FM 101–5, FM 5–1, and AR 611–101. Information pertinent to the duties of enlisted members of the various staff sections is discussed in AR 611–201.

b. Company Headquarters. This element provides the command, administration, mess, supply, and organizational maintenance (less aircraft maintenance) for the headquarters company of the brigade and group. In the battalion, maintenance is performed by the battalion maintenance section. The personnel assigned to this company are organized into staff sections and operate under the supervision of the appropriate headquarters staff officer. The cmmpany commander, however, is responsible for unit training and performs the duties of headquarters commandant.

c. Administrative (S1) Section. Performs the administrative functions of the headquarters. It exercises staff supervision and inspects the administrative activities of subordinate units as required. Advises the commander and subordinate units on administrative matter.

d. Intelligence (S2) Section. Collects, evaluates, and disseminates intelligence information with emphasis on engineer aspects; performs terrain analysis; photographs engineer projects, operations, and reconnaissance activities; and assists and advises the commander and subordinate units on matters relating to intelligence and counterintelligence.

e. Operations (S3) Section. Prepares operations plans, orders, and directives for dissemination to subordinate units for the accomplishment of assigned missions; supervises, plans, controls, and coordinates combat and combat support missions to include atomic demolition munitions employment. It prepares estimates of material, equipment, and manpower requirements as well as organizational and training requirements. In the case of the engineer brigade, close coordination with the engineer section at army or corps is maintained.

f. Supply and Maintenance Section. This section is found only in the brigade. Responsibilities of the personnel in this section are to inspect, supervise, and coordinate the brigade supply and maintenance activities and advise the brigade commander on matter pertaining thereto.

g. Supply Section (Group and Battalion). Plans and coordinates requirements for and procurement of supplies, equipment, and construction materials; assists and advises the commander and subordinate units on matters pertaining to supply. The group supply section normally is not considered part of the supply channel for subordinate units. The battalion supply section has the additional mission of providing personnel and equipment to operate five water supply points.

h. Maintenance Section.

(1) The group maintenance section assists the commander in the accomplishment of his maintenance responsibilities as outlined in AR 750–8. It is further responsible for supervision

of the records and maintenance of engineer and ordnance equipment allocated within the group.

(2) The battalion maintenance section performs organizational maintenance for headquarters and headquarters company and assists subordinate units in the performance of organizational maintenance for vehicles and engineer equipment. It also assists and advises the battalion and unit commanders on the technical aspects of the operation and maintenance of equipment.

i. Communications Section. Plans and coordinates communications activities within the headquarters; operates the headquarters communications for internal headquarters communications and to terminate telephone circuits provided by the nearest area signal center for communication to higher, adjacent, and subordinate units; and assists and advises the commander and subordinate units on matters pertaining to communications. The brigade communications center contains organic equipment to establish a single sideband voice radio net to subordinate groups. The army radio and cable battalion or the corps signal battalion provides a radio teletypewriter team to operate in the army or corps command net. Organic telephone equipment is provided for internal command post communications and to terminate telephone circuits provided by the nearest area signal center for communications to higher, adjacent, and subordinate headquarters.

j. Brigade Aviation Section. Operates and maintains the authorized aircraft.

k. Group Aviation Platoon. This platoon provides the personnel and equipment required to support the group combat and combat support missions. Engineer units in the group, upon request, utilize the aircraft to assist in command, control, liaison, communications, administration, supply, air reconnaissance, lifting ADM teams and ADM, radiological survey, and lifting small engineer work parties into otherwise inaccessible areas.

l. Army or Corps Engineer Section.

(1) This section is organic to the headquarters company of the engineer brigade only. It operates under the supervision of the assistant (army or corps) engineer and represents the brigade commander (who is also the army or corps engineer) at army or corps headquarters and assists in executing his staff responsibilities at that level.

(2) In situations where there are too few nondivisional engineer units to justify the formation of an engineer brigade, only the army or corps engineer section is activated in order to provide the army or corps headquarters with an engineer staff and the senior engineer officer becomes the army or corps engineer. On activation, this section must be augmented to provide the necessary intelligence, maintenance, supply, and construction personnel.

m. Equipment Section (Organic to Army or Corps Engineer Combat Battalion Only). This section provides operating personnel and supplemental engineer equipment to increase the combat construction capability of the battalion. Operators with equipment such as crane shovels, motorized road graders, and concrete mixers are dispatched to the engineer companies from this section as directed by the engineer equipment officer in coordination with the operations officer.

n. Combat Construction Section/Platoon (Organic to Army or Corps Engineer Combat Battalion and to the Airborne Engineer Combat Battalion). When authorized, this section (platoon in the airborne engineer combat battalion) provides a pool of specialized personnel with construction skills not found in the combat companies of the battalion. The section includes electricians, carpenters, plumbers, sheetmetal worker, masons, heating and ventilating specialist, utilities forman, and an engineering officer. The section provides these skilled personnel, as required, to assist in minor construction projects and minor repair and utilities work in hospitals, depots, and higher headquarters.

o. Medical Section (Organic to Army and Corps Engineer Combat Battalion and Airborne Engineer Combat Battalion Only). Provides the necessary personnel and equipment for the operation of the battalion medical facilities to include the aid station, evacuation of the sick and wounded, and medical support for the engineer combat companies by the attachment of aidmen as needed. The section maintains the medical records of all assigned personnel. The medical section may be augmented by TOE 8–500 teams to provide additional skills, when required.

p. Civil Affairs Operations Section. When supporting internal defense and internal development operations, civil affairs teams may be attached or assigned from the TOE 41–500-series. This section may operate as a separate staff section or under staff supervision of the operations officer depending on the scope of its activities and desires of the commander. If no civil affairs

personnel are assigned or attached, the civil affairs function is assumed by the operations officer.

q. Psychological Operations Section. When supporting internal defense and internal development operations, psychological operations teams may be attached or assigned from the TOE 33–500-series. This section may operate as a separate staff section or under staff supervision of the operations officer depending on the scope of its activities and desires of the commander. If no psychological operations personnel are assigned or attached, the psychological operations function is assumed by the operations officer.

APPENDIX D

CHARACTERISTICS OF RADIO EQUIPMENT

Type	Planning distance	Frequency range	Type of service	Remarks
AN/GRR-5	N/A	1.5–18 MHz	AM	Receiving set, radio, employed throughout combat zone. Used to receive warning broadcasts.
AN/GRC-106	80 km	2–29.999 MHz	SSB AM CW	Command net. Used by engineer units down to company headquarters.
AN/ARC-102	Line-of-sight	2–29.999 MHz	SSB AM CW	Installed in army medium and heavy aircraft for air-ground communications.
AN/PRC-25	5–8 km	30–75.95 MHz	FM	Portable transistorized set. Used at squad level or for utility set for dismounted operations.
AN/PRC-77	5–8 km	30–75.95 MHz	FM	Portable transistorized set. Used at squad level or for utility set for dismounted operations.
AN/VRC-46	25–32 km	30–75.95 MHz	FM	Single receiver/transmitter, RT-524/VRC. Used at company and platoon level when working in one net only. Also used by battalion and higher staff.
AN/VRC-47	25–32 km	30–75.95 MHz	FM	Single receiver/transmitter, RT-524/VRC auxiliary receiver, R-442/VRC. Used at company and higher level to monitor one net while working in another.
AN/VRC-49	20 mi (32 km) Stationary 15 mi (24 km) Moving	30–75.95 MHz	FM	Has two receiver/transmitters, (2 ea RT-524/VRC) and is thus capable of operating in two nets. Used by engineer units in the combat zone as a radio relay.
AN/VRC-53	5–8 km	30–75.95 MHz	FM	Vehicular version of radio set AN/ PRC-25. Used in units when short range vehicle radio is required.
AN/VRC-64	5–8 km	30–75.95 MHz	FM	Vehicular version of radio set AN/PRC-77. Used in units when short range vehicle radio is required.
AN/GRC-125	5–8 km	30–75.95 MHz	FM	Combination vehicular-man pack version of radio set AN/PRC-25. Employed in company and battalion.
AN-GRC-160	5–8 km	30–75.95 MHz	FM	Combination vehicular-man pack version of radio set AN/PRC-77.
AN/URC-10	34.5 mi (55.5 km) Line-or-sight	240–260 MHz	AM CW	Subminiaturized, UHF emergency rescue radio set. Carried on person of aircraft member or in survival kit.
AN/VRC-24	30 mi (48 km) for aircraft at 1,000 ft elevation; 100 mi (160.9 km) at 10,000 ft	225–399.9 MHz	AM	Employed throughout the combat zone to communicate with aircraft in close support of ground operations.
AN/ARC-51	30 mi (48 km) Line-of-sight Air-to-ground For aircraft at 1,000 ft altitude	225–399.9 MHz (Can monitor one channel at 243 MHz)	AM	An AM radio providing two-way radio-telephone voice communication links between aircraft, air-to-ground, and ground-to-ground stations.
AN/ARC-54	32 mi (54 km) Line-of-sight For aircraft at 1,000 ft altitude	30–69.95 MHz	FM	Installed in army aircraft for communication links between aircraft and ground stations.

APPENDIX E

MINIMUM POTABILITY STANDARDS FOR FIELD WATER SUPPLY

SOLOG AGREEMENT 125

UNITED STATES—UNITED KINGDOM—CANADIAN—
AUSTRALIAN ARMIES

NON-MATERIEL STANDARDIZATION PROGRAM
TITLE OF AGREEMENT

MINIMUM POTABILITY STANDARDS
FOR FIELD WATER SUPPLY

DETAILS OF AGREEMENT

1. The Armies of the United States, United Kingdom, Canada, and Australia agree to accept the criteria and standards set forth herein as the minimum potability standards for a safe emergency water supply intended for human consumption under field conditions.
2. Criteria
   a. Short term field water consumption is consumption for 0–7 days.
   b. Long term field water consumption is consumption for periods in excess of 7 days.
   c. Total daily consumption per man is considered to be 5 liters (app 1 imperial gallon or 5 U.S. quarts). Under environmental conditions where water consumption substantial exceeds 5 liters per day, the tolerance levels should be proportionately reduced by the commander upon recommendation of his surgeon.
   d. At the individual level the only standards that can be applied are the bacteriological standard and the short term physical standard.
   e. At the unit level short term standards only can be applied.
   f. At brigade, combat group or equivalent and rearward levels the short term standards apply for 0–7 days. Beyond this time frame, the long term standards apply.
   g. Where one of the armies is unable to meet the standards prescribed herein, the other armies participating in the agreement will be notified.
3. Source
   The water supply shall be obtained from the best available source and shall be rendered safe by acceptable treatment methods.
4. Bacteriological Standards
   a. Coliform Count
      The most probable number of the coliform group of bacteria shall be less than 1.0 per 100 ml of water. (Short and long term.)
   b. Analysis
      The method and analysis for coliform bacteria shall be that customary for the cognizant nation.
   c. Pollution
      The presence of the coliform bacteria, including all organisms of the Coli-Aerogenes group, shall be considered as indicating water pollution, other than biological agents.

5. Physical Standards
   a. Turbidity
      For short term consumption water shall be reasonably clear. For long term consumption, the turbidity of water shall not exceed 5.0 mgms per liter (silica scale).
   b. Taste and Odor
      For short term consumption, water should be reasonably free from taste or odor due to hydrogen sulphide, phenols, or other chemical substances.
      For long term consumption, water should be free from taste or odor due to such substances both before and after disinfection.
6. Chemical Standards
   The methods of analysis for the following substances shall be as specified by cognizant nation:
   a. Substances for which water must be analyzed as a routine requirement.
      (1) Short Term Standards
      The maximum limits listed below are mandatory for emergency water supply for a period not exceeding seven days. (Asterisked standards are interim pending completion of more exacting studies.)

Arsenic (As)	2.0	mgm/1
Cyanides (incl Cyanogen Chloride)	20.0	mgm/1
Mustard (Sulphur & Nitrogen)	2.0	mgm/1*
Nerve Agent (GA)	0.1	mgm/1*
(GB)	0.05	mgm/1*
(VX)	0.005	mgm/1*

      (2) Long Term Standards
      The limits listed below are preferable in water to be used continuously in excess of 7 days.
      (Asterisked standards are interim pending completion of more exacting studies.)

Arsenic	0.2		mgm/1
Cyanides (incl Cyanogen Chloride)	2.0		mgm/1
Mustard (Sulphur & Nitrogen)	2.0		mgm/1*
Nerve Agent (GA)	0.1		mgm/1*
(GB)	0.05		mgm/1*
(VX)	0.005		mgm/1*
Chloride (Cl)	600.0	or	mgm/1
Magnesium (Mg)	150.0		mgm/1
Sulphates (SO_4)	400.0		mgm/1
Color	50		units
Total Solids	1500.0		mgm/1

7. Radiological Standards (Gross Fission Products)
   a. For short term consumption, no absolute numerical standard is recommended or considered necessary. This is based on the conclusion that, if the external radiation hazard permits occupancy of the water point, the water is suitable for consumption during occupancy not exceeding the 1-week period.
   b. For long term consumption, available information does not permit the establishment of a practical standard.

INDEX

	Paragraph	Page
ADM. (*See* Atomic demolition munitions.)		
Airborne engineer combat brigade:		
Employment	3-15	3-7
General	3-14	3-7
Airborne engineer combat groups	3-16	3-7
Airborne operations	4-13	4-5
Airmobile operations	4-14	4-6
Air reconnaissance	2-6	2-2
Ammunition support	5-11	5-5
Area assignment	3-3*g*(2)	3-2
Assault on fortified areas:		
Engineer missions	4-17	4-6
Phases of the assault	4-16	4-6
Principles	4-15	4-6
Reconnaissance and planning	4-19	4-6
Rehearsals	4-20	4-7
Atomic demolition munitions:		
Engineer responsibility	4-24	4-8
General	4-23	4-7
Teams:		
MA	App B	B-1
MB	App B	B-1
MC	App B	B-1
Barriers	4-21	4-7
Civil affairs:		
Operations	4-30	4-10
Support	5-15	5-6
Combat service support in the combat zone	Chap 5	5-1
Communications:		
Characteristics of radio equipment	App D	D-1
General	3-12	3-6
Construction:		
Bridges	5-2*b*	5-2
General	5-2*a*	5-1
Policies and procedures	5-4	5-3
Requirements	5-3	5-2
Defense:		
Employment	4-5	4-2
General	4-4	4-2
Denial operation	4-22	4-7
Direct support	3-3*f*(2)	3-2
Employment of unit weapons against aircraft:		
General	4-36	4-16
Rules of engagement	4-37	4-16
Standing operating procedure	4-39	4-16
Techniques	4-38	4-16
Engineer assault bridge company mobile; army or corps:		
Allocation	10-13*a*	10-5
Assignment	10-11	10-4
Capabilities	10-12	10-4
Category	10-13*b*	10-5
Communications	10-17	10-8
Employment	10-16	10-7
Major items of equipment	10-15	10-7
Missions	10-10	10-4
Mobility	10-13*c*	10-4
Organization	10-14	10-4
Engineer combat battalion airborne:		
Allocation	9-4*a*	9-2
Assignment	9-2	9-1
Capabilities	9-3	9-1
Category	9-4*b*	9-2
Communications	9-8	9-2
Employment	9-7	9-2
Equipment	9-6	9-2
Mission	9-1	9-1
Mobility	9-4*c*	9-2
Organization	9-5	9-2
Engineer combat battalion; army or corps:		
Allocation	8-4*a*	8-1
Assignment	8-2	8-1
Capabilities	8-3	8-1
Category	8-4*b*	8-1
Communications	8-8	8-3
Employment	8-7	8-2
Major items of equipment	8-6	8-2
Missions	8-1	8-1
Mobility	8-4*c*	8-1
Organization	8-5	8-1
Engineer combat brigade, army, corps, or airborne corps. (*See* Headquarters and headquarters company, engineer combat brigade, army, corps, or airborne corps.)		
Engineer combat company, engineer battalion, army or corps:		
Capabilities	8-15	8-6
Communications	8-19	8-7
Employment	8-18	8-7
Major items of equipment	8-17	8-7
Mission	8-14	8-6
Organization	8-16	8-6
Engineer combat company engineer combat battalion; airborne:		
Capabilities	9-20	9-9

	Paragraph	Page
Employment	9-22	9-10
Mission	9-19	9-9
Organization	9-21	9-10
Engineer combat group or Engineer combat group, Airborne (*See* also, Headquarters and headquarters company, engineer combat group or headquarters and headquarters company, airborne engineer combat group):		
Capabilities	15-18	15-7
Communications	15-23	15-9
Employment	15-21	15-8
General	15-17	15-7
Major items of equipment	15-20	15-8
Mission	15-2	15-1
Organization	15-19	15-7
Engineer company, separate infantry brigade, separate armored brigade or separate infantry, brigade (mechanized):		
Capabilities	15-4	15-1
Communications	15-8	15-5
Employment	15-7	15-4
General	15-3	15-1
Major items of equipment	15-6	15-4
Mission	15-2	15-1
Organization	15-5	15-4
Engineer company, separate light infantry brigade:		
Capabilities	15-11	15-6
Communications	15-16	15-7
Employment	15-14	15-7
General	15-10	15-5
Major items of equipment	15-13	15-6
Mission	15-2	15-1
Organization	15-12	15-6
Engineeer dump truck company:		
Assignment	13-2	13-1
Capabilities	13-3	13-1
Communications	13-8	13-2
Employment	13-7	13-2
Major items of equipment	13-6	13-2
Mission	13-1	13-1
Organization	13-5	13-2
Engineer equipment and maintenance company, engineer combat battalion, airborne:		
Capabilities	9-15	9-6
Communications	9-18	9-9
Employment	9-17	9-8
Mission	9-14	9-6
Organization	9-16	9-7
Engineer float bridge company:		
Assignment	10-2	10-1
Capabilities	10-3	10-1
Communications	10-8	10-4
Employment	10-7	10-4
Major items of equipment	10-6	10-2
Mission	10-1	10-1
Organization	10-5	10-1
Engineer information	2-3	2-1
Engineer land clearing company:		
Allocation, category and mobility	14-4	14-1
Assignment	14-2	14-1
Capabilities	14-3	14-1
Communications	14-8	14-4
Employment	14-7	14-2
Major items of equipment	14-6	14-2
Mission	14-1	14-1
Organization	14-5	14-2
Engineer light equipment company, airborne:		
Assignment	12-11	12-4
Capabilities	12-12	12-4
Communications	12-17	12-7
Employment	12-16	12-6
Major items of equipment	12-15	12-6
Mission	12-10	12-4
Organization	12-14	12-6
Engineer light equipment company:		
Assignment	12-2	12-1
Capabilities	12-3	12-1
Communications	12-8	12-3
Employment	12-7	12-2
Major items of equipment	12-6	12-2
Mission	12-1	12-1
Organization	12-5	12-1
Engineer panel bridge company:		
Assignment	11-2	11-1
Capabilities	11-3	11-1
Communications	11-8	11-2
Employment	11-7	11-2
Major items of equipment	11-6	11-2
Mission	11-1	11-1
Organization	11-5	11-2
Engineer planning	3-11	3-6
Engineer reconnaissance	2-4	2-1
Engineers in the army area	3-10	3-5
Engineer in the corps area	3-9	3-5
General support	3-3*f*(1)	3-2
Headquarters and headquarters company, engineer combat battalion; airborne:		
Capabilities	9-10	9-4
Major items of equipment	9-12	9-6
Mission	9-9	9-4
Organization	9-11	9-5
Headquarters and headquarters company, engineer combat battalion, army or corps:		
Capabilities	8-10	8-4
Employment	8-13	8-5
Major items of equipment	8-12	8-5
Mission	8-9	8-4
Organization	8-11	8-5
Headquarters and headquarters company, engineer combat brigade, army, or airborne corps:		
Allocation	6-4*a*	6-1

	Paragraph	Page
Assignment	6–2	6–1
Capabilities	6–3	6–1
Category	6–4*b*	6–2
Communications	6–8	6–2
Employment	3–5	3–3
Liaison	3–8	3–4
Major items of equipment	6–6	6–2
Mission	6–1	6–1
Mobility	6–4*c*	6–2
Organization	6–5	6–2
Headquarters and headquarters company, engineer combat group or airborne engineer combat group:		
Allocation	7–4	7–1
Assignment	7–2	7–1
Capabilities	7–3	7–1
Category	7–4	7–1
Communications	7–8	7–2
Employment	3–7	3–4
Major items of equipment	7–6	7–2
Mission	7–1	7–1
Mobility	7–4	7–1
Organization	7–5	7–2
Horizontal construction	3–3*h*(2)	3–2
Installation support	5–6	5–4
Intelligence responsibility	2–2	2–1
Internal defense and internal development operations:		
Environment	4–26	4–8
General	4–25	4–8
Tactical operations	4–28	4–9
Maintenance support	5–10	5–5
Medical support	5–12	5–5
Military police services	5–13	5–5
Mission of nondivisional engineer combat units	1–3	1–1
Offense:		
Army engineer support	4–3	4–1
Corps engineer support	4–2	4–1
General	4–1	4–1
Operations in special environments	3–2	3–1
Personnel administration	5–15*a*	5–6
Postal services	5–15*b*	5–6
Psychological operations	4–31	4–16
Radio equipment, characteristics	App D	D–1
Rear area:		
Damage control	2–13	2–4
Security	2–12	2–4
Replacements	5–15*d*	5–6
Retrograde:		
Employment	4–7	4–3
General	4–6	4–3
River-crossing operations:		
Conduct	4–10	4–5
Engineer group assignments	4–9	4–4
General	4–8	4–4
Role of nondivisional engineer combat units	1–4	1–2
Riverine operations	4–40, 4–41	4–17
Security:		
At worksites	2–10	2–3
In bivouac	2–9	2–3
Measures	2–7	2–2
Of the march	2–8	2–2
Ship-to-shore and shore-to-shore	4–11	4–5
Special services	5–15*c*	4–6
Staff sections, functions of:		
Administrative (S1) section	App C	C–1
Army or corps engineer section	App C	C–1
Brigade aviation section	App C	C–1
Civil affairs section	App C	C–1
Combat construction section	App C	C–1
Communications section	App C	C–1
Company headquarters	App C	C–1
Equipment section	App C	C–1
Group aviation platoon	App C	C–1
Headquarters	App C	C–1
Intelligence (S2) section	App C	C–1
Maintenance section	App C	C–1
Medical section	App C	C–1
Operations (S3) section	App C	C–1
Psychological operations section	App C	C–1
Supply and maintenance section	App C	C–1
Supply and service support	5–7—5–15	5–4—5–6
Supply section	App C	C–1
Task assignment	3–3*g*(1)	3–2
Terminology	3–3	3–1
Topographic supplies	5–9	5–5
Transportation services	5–14	5–6
Vertical construction	3–3*h*(1)	3–2
Water processing and purification	5–5	5–4
Water supply, minimum potability standards for field water supply	App E	E–1

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