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GERMAN ARMORED TRAFFIC CONTROL DURING THE RUSSIAN CAMPAIGN

DEPARTMENT OF THE ARMY JUNE 1952

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FOREWORD

This pamphlet was prepared for the Historical Division, EUCOM, by a group of former German generals and general staff officers. All of the contributing authors saw considerable service on the Eastern Front during World War II. The principal author, Brig. Gen. Hermann Burkhart Wueller-Hillebrand, served as aide to the Chief of the Army General Staff before assuming command of an armored regiment on the Russian front. Successively appointed chief of staff of a panzer corps and a panzer army, he saw action in the Ukraine, Poland, and East Prussia. One of the associate authors, Brig. Gen. Oskar Munzel, commanded a tank battalion and an armored regiment during the early phase of the Russian campaign. In 1943 General Munzel was assigned as instructor at the German armored school at Wuensdorf, and subsequently became commandant of the one at Bergen-Fallingsbostel. Returning to the Russian front toward the end of the war, he led a panzer brigade and served as deputy commander of a panzer division.

The reader is reminded that all publications in the GERMAN REPORT SERIES were written from the German point of view, and that the procedures of the German Army normally differed widely from those of the U. S. Army. In the case of "German Armored Traffice Control During the Russian Campaign," however, it is interesting to note the similarity of German principles and doctrine to our own.

Final editing of this pamphlet was done in the Foreign Studies Branch, Special Studies Division, Office of the Chief of Military History. The draft translation of the original German text was first revised and then reorganized in the interest of brevity, clarity, and pertinence. In this process every effort was made to retain the point of view, the expressions, and even the prejudices of the authors.

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CHAPTER 1

INTRODUCTION

In World War II, the German Army doctrine on march and traffic control was firmly established and set forth in a field manual. The manual treated the subject in the broadest terms and was supplemented from time to time by pamphlets based on more current wartime experience. Unfortunately no copies of these publications were available to the authors when this study was written, and much of the source material had to be drawn purely from memory.

In view of the rapid strides made in the development of mechanized warfare, and in deference to specific experience acquired during operations in various theaters of war, the German manual avoided giving detailed directions and confined itself to such conventional principles as applied equally to all arms and services. It was then left to the discretion of each arm and service to prepare and issue such additional publications as were deemed necessary. One pamphlet, entitled "The March of Motorized Troops" and published by the German Armored School in the fall of 1941, was used as a reference source for this study. However, it too deals with the problem in a rather sketchy and somewhat less than detailed manner. In actual practice during the course of the war the troops adapted traffic control to the various terrain, weather, and road conditions found in the different theaters of operations. In the following pages an effort has been made to describe and develop those principles that were proved valid and worthy of application during combat operations in Russia.

Although in the course of the recent war German armored and motorized infantry divisions frequently had to be employed as ordinary infantry divisions, especially in the wide expanse of the Soviet Union, the tactical examples described herein will not be concerned with the standard infantry division or foot soldier as such. Instead, this study confines itself to traffic control of armor and the armored division.

CHAPTER 2

ROADS AND TRAFFIC CONDITIONS OF EUROPEAN RUSSIA

The topography of European Russia differs greatly from that of Central and Western Europe. This is particularly true of the roads which, with very few exceptions, were totally inadequate for armored traffic at the outbreak of World War II. At the time of writing it appears doubtful whether any appreciable improvement in the condition of Russian roads can be anticipated in the foreseeable future.

When examining the roads and general traffic conditions of southern Russia, some very pronounced characteristics and peculiarities are manifested almost at once. For obvious reasons, they exert adverse effects on military transportation and movement.

During World War II hard-surface roads were a rarity in Russia. Occasionally one found a hard-surface road leading out of a city or larger town, but only to see it end abruptly. The German maps of western Russia were often quite misleading. They sometimes indicated hard-surface roads or stretches of road that in reality were either nonexistent or, at best, only partially completed. In the Ukraine, for example, there was hardly a paved through-road running north and south. The actual road net there consisted primarily of unimproved roads that were used by vehicular traffic of every description. These roads were seldom delimited by ditches, and consequently drainage was poor. Leading from town to town, the roads were created by the elements, by continual use, and by natural contours of the terrain. As a result, it was not unusual to find these primitive paths leading in irregular patterns and roundabout directions from one locality to another. The close kinship to nature of the inhabitants and their inclination toward the more Asiatic tendencies are clearly brought to light in this connection. Here is a people whose very existence depends upon its innate ability to devise improvisations. Occasionally roads became as wide as fifty or even a hundred yards, depending on the extent to which road conditions forced traffic to use the outer reaches of the road bed. Along such stretches it was sometimes possible to move as many as three or four columns abreast for considerable distances. Invariably, however, bridges or other traffic bottlenecks were eventually encountered, thus restricting road space and requiring enforcement of stringent traffic control.

In the southern parts of Russia, particularly in the Ukraine, the soil also has a direct influence on road conditions and traffic. Fertile black soil which is both rich and loamy predominates in this section of the country. The almost complete absence of forests causes the top soil to dry and harden very quickly, a process which is further abetted by low humidity and lack of rain during the summer. During the war, columns of motor vehicles packed and leveled these loamy surfaces so rapidly that they actually gave the appearance of asphalt roads and frequently permitted speeds of from 35 to 45 miles per hour. However, a few minutes after it starts to rain the top layer softens and roads become sloppy and soapy. By moving cross-country through adjacent wheat fields, where the stalks offer added traction, vehicles can occasionally continue to move. For a while it may even be possible to stay on the roads, but not without exerting heavy strain on the motors. Eventually the smooth road surface is churned up to such a degree that it becomes virtually impassable to the vehicles that follow. The seasoned driver who had experienced these road and weather conditions in the Ukraine invariably stopped his vehicle as soon as it began to rain and waited for the roads to dry. During summer rains, local commanders frequently erected barriers at the exits of towns to restrict traffic and thus keep the roads intact. Traffic control personnel for its part directed all traffic to halt during rainy weather.

In the autumn, with the advent of the rainy season, motorized traffic was halted completely except on the very limited number of paved highways. This is the muddy period which ushers in winter with its heavy snows and severe cold. Near the Black Sea, in the extreme southern part of European Russia, periods of thaw sometimes occur even during the winter and create conditions similar to those of the muddy season.

To meet and overcome the difficulties brought about by the combination of weather and road conditions during the muddy period, field expedients must be employed by both commanders and troops. In the fall of 1941, for example, a German corps in the Ukraine encountered the muddy season for the first time. All movement of motorized vehicles was forced to halt for weeks and the entire supply system bogged down. To alleviate the situation, a railroad line within the corps zone, which had not as yet been used, was converted into an improvised road for motorized traffic. The spaces between the ties were filled in and sections of rail were removed at entrance and exit points. The vehicles moved along this roadway by straddling one track—one set of wheels or tracks riding between the rails and the other set on the outside. To be sure, the rough and bumpy ride over the railroad ties re-

sulted in considerable vehicular wear and tear, but the improvisation offered the corps a roadway with a firm foundation over which motorized traffic could move reasonably well, even during the worst periods of the muddy season.

In contrast to the Ukraine, the Russian territory north of the Pripyat Marshes consists predominately of sandy soil interspersed with numerous forests, marshes, and lakes. Although muddy road conditions are especially prevalent in that region, improvements can be more easily accomplished by constructing corduroy roads, using the lumber which is readily available.

The road conditions described in the foregoing paragraphs refer only to the areas held by Russia before 1939. To this day the roads of the former Austro-Hungarian territories of Galicia and of Poland compare favorably with the roads of Central and Western Europe. Moreover, during the course of the war the Germans built a number of hard-surface highways from west to east extending up to, and in some instances even somewhat beyond, the Dnepr River.

In the former Baltic States the road net also proved to be better suited for military traffic. In over-all density, in width, and in firmness of subgrade they were equal to German roads built before World War I. Not only were these roads usually delimited by ditches, but they also offered other structural improvements.

Yet another deficiency which had a detrimental effect on military operations in European Russia was the almost complete absence of solidly constructed bridges. The Germans found in their place wooden bridges or, more often, only fords across the smaller streams and brooks. The wooden structures were easily destroyed, and detailed charting information regarding the fords as a rule was not readily available. Assurance of the successful movement of heavy vehicles, therefore, must always presuppose either thorough advance route reconnaissance or the possession of adequate maps including full information about bridges and other river-crossing facilities.

Finally, the limited number of cities throughout the southern part of European Russia is another unfavorable factor confronting an invader. Large centers of urban civilization with their normal conveniences and technical installations such as factories and workshops are few and widely dispersed. The majority of the populace lives in primitive villages and settlements.

CHAPTER 3

ORGANIZATION OF TRAFFIC CONTROL ELEMENTS

Section I. GENERAL PRINCIPLES

March and traffic regulations constitute elements of operational control. The responsibility for regulating traffic and controlling marches rests specifically with the tactical commander. The commanding general of an armored division thus must exercise this vital command function. March and traffic regulation must be flexible. If it were governed by rigidly standardized rules, the execution of tactical decisions might suffer. For this reason traffic control units are directly subordinated to the tactical commander. By the same token, the regulation of tactical movements takes precedence over the control of rear area and supply traffic.

In the German Army the regulations governing march discipline and traffic control were set forth in directives which permitted the tactical commanders to follow certain standing operating procedures in planning and executing the movement of troops and supplies. Pertinent orders and instructions covering march discipline and traffic control were promulgated in the operation orders; by orders pertaining specifically to march and traffic control when warranted by critical conditions; and through specific verbal or written orders issued directly to the traffic control elements.

When planning troop and supply movements, unit commanders have to carefully calculate all space and time requirements in order to prevent possible congestion and disruption. It is the responsibility of command agencies to assist their subordinate units in executing march movements. This can best be accomplished through the issuance of appropriate orders, by the dissemination of concise reconnaissance reports, and by the proper assignment and employment of traffic control units.

While traffic regulation is the planning phase for the efficient use of roads and available overland transportation facilities and equipment, it is traffic control that applies and enforces the established rules of road and traffic regulations.

Section II. THE MILITARY POLICE DETACHMENT

Within the German armored division the military police detachment was the only specially trained organic unit for traffic control. At the outbreak of World War II this detachment consisted of approximately fifty officers and men. Most of its personnel were

recruited from the traffic squads of the civilian police force and assigned to military police duty with the Army. During the course of the war it became necessary to train other qualified personnel to reinforce the military police units.

The military police detachment formed the backbone of all the diverse elements that ultimately constituted the whole of the divisional traffic control organization. As a rule, the major portion of the MP detachment came under the jurisdiction of the division operations officer, while only a small segment was permanently assigned to the supply staff section. Those elements that operated under the former, performed the following primary traffic control functions:

1. Post signs and mark routes.
2. Control traffic at key points and reroute local traffic in emergencies or when specific units are to be quickly diverted because of a change in the tactical situation.
3. Control traffic at the division command post.
4. Supervise all movements to the rear along designated routes such as barrier and straggler lines.

The elements permanently operating under the division supply staff section normally performed the following traffic control functions:

1. Post signs, mark routes, and direct traffic along the division supply roads.
2. Control traffic at division supply installations to prevent congestion at ammunition, fuel, and ration distributing points.
3. Direct traffic at division rear echelon headquarters.

In addition to traffic control the MP detachment performed many other police functions within the division. Some of its personnel were organized into patrols to maintain law and order during off-duty hours, while others were assigned to guard prisoners at division enclosures. The entire detachment was therefore seldom available for traffic control during tactical movements. When the detachment was at full strength and completely available, a maximum of from twelve to fifteen traffic control posts could be established. However, for reasons of sickness, losses, furloughs, or T/O vacancies, usually no more than six to eight control posts could be established in actual practice. A traffic control post was normally composed of four MP's and one messenger and was equipped with two light personnel carriers and one motorcycle. In unusual situations or under extremely critical circumstances traffic control elements of a military police battalion from a higher headquarters were sometimes placed at the disposal of an armored division in platoon or company strength for limited periods or within specific areas.

Since the traffic control personnel within the detachment was

usually below strength, its employment had to be carefully planned. Some personnel always had to be held in reserve to cope with unexpected emergency situations. Although the divisional MP detachments proved capable of performing all the tasks demanded of them during the earlier operations, it became necessary to reorganize them considerably soon after the start of the Russian campaign.

Whereas heretofore the MP detachment had been equipped with light personnel carriers and motorcycles (with and without sidecars), it became necessary to issue half-tracked motorcycles, armored personnel carriers, and highly maneuverable trucks to ensure greater mobility and protection. Automatic weapons quickly proved their merit in Russia, and military police were soon armed exclusively with submachine guns. Cold rations had to be issued because the far-flung employment of the MP units usually precluded the preparation of hot meals. Maps had to be issued to the military police detachments so that the divisional units could be given directional information at the various traffic control posts. A great amount of painting and sign-making equipment also had to be furnished to the detachment. Finally, military police troops had to be identified by conspicuous chest insignia bearing the bold inscription "Military Police."

Section III. MARCH DISCIPLINE

March discipline, or the internal management of a march column, may be defined as the enforcement and observance of the rules governing a unit on the march. Among the fundamental rules of march discipline are those involving formations, distances, speeds, and the correct procedures for passing, maintaining contact, and scheduling halts. Thus, military traffic is controlled by march discipline, which is the responsibility of the individual unit or column commander, and by external traffic control, which is the primary function of military police personnel.

To supplement the activities of the organic traffic control elements, during World War II, the German troops themselves had to enforce strict march discipline. March units in combat had to post their own guides at highway intersections and road forks until the tail of the column had passed, whereupon they were responsible for erecting signs and markers for march elements which had fallen behind. Effective road marking became increasingly important during the course of operations since it often minimized the need of keeping guides on duty for extended periods. This supplementary traffic control personnel should not be confused with the regular military police traffic details. The former were not specially trained troops, but were messengers

and other line soldiers chosen arbitrarily from each march unit for this temporary assignment.

Section IV. TRAFFIC REGULATION AND CONTROL OFFICER—TRACO

In many instances—during retrograde movements and especially in connection with river crossings—it proved expedient to select a suitable field or company grade officer from the division replacement pool and designate him as special traffic control officer. This officer came to be known as the staff officer for march supervision *(Stabsoffizier fuer Marschueberwachung)*, and was commonly referred to as *"Stomue"* or *"Stoma."* It was his responsibility to co-ordinate all matters pertaining to highway traffic regulation at the division operations staff section. [*Ed:* No exact equivalent for this position exists in the U. S. Army division organization, since supervision and co-ordination of agencies concerned with traffic planning and execution are functions of G–4. For this purpose a portion of the G–4 staff section of each U. S. armored division is organized into a traffic headquarters. Where tactical movements are involved, liaison is maintained between G–4 and G–3. However, since this position appears to have been a major assignment within the German armored division, especially during the Russian campaign, and for the sake of clarity and uniformity, this officer will be designated as the "Traffic Regulation and Control Officer" or by the abbreviation "TRACO."]

At the beginning of the Russian campaign the assignment of such an officer gradually became the rule rather than the exception. The realization, by German field commanders, of the importance and ever increasing scope of traffic regulation and control led to the creation of a permanent, separate subsection within each division staff. Thus, what began as an emergency improvisation soon became an established staff position throughout the Russian theater. The special staff section for highway traffic control was directly subordinated to the division operations officer and was commonly referred to as G–3/TRACO. It was usually headed by an energetic officer who, because of age or physical limitations, was no longer fit for combat duty.

The TRACO was briefed as to the over-all tactical plans and was given full authority from division headquarters to handle traffic control as he saw fit. He was therefore able to adjust the standing operating procedures to the rapidly changing situations without undue delay. In addition to the regular traffic control elements of the organic MP detachment, the TRACO was assisted by additional motorcycle messengers from the division motorcycle platoon, by interpreters, and, in some instances, by qualified personnel from the supply services or from the regimental reserves.

When such personnel were assigned to traffic control duties, they had the same privileges and responsibilities as the regular military police forces.

The TRACO often had a number of other units under his temporary jurisdiction since in many instances he assumed responsibility for the improvement and maintenance of the road net within his area. Personnel required for these purposes were generally drawn from the service units since combat troops were not assigned to such duty except in emergencies. Among the various types of troops which came under the temporary jurisdiction of the TRACO were signal troops, scouting parties and security patrols of armored reconnaissance battalions, engineer forces, vehicle recovery sections, medical personnel, labor details of the division supply officer, special field kitchens to feed civilian labor details, and extra trucks and sleighs of the service units. Any and all of these units were allotted after consultation between the TRACO and the appropriate unit commander. After these auxiliary units were selected, they were assigned traffic functions pursuant to division orders. However, their actual distribution remained the sole responsibility of the TRACO.

Until German operations against Russia began, armored traffic control was based upon established doctrines which, in some instances, had been modified by experience gained from operations during the first part of World War II. In European Russia, however, the great distances, poor roads, uncertain weather, faulty maps, wide dispersal of units in often partisan-infested areas, as well as the troops' limited knowledge of the Russian language, necessitated drastic changes in the normal traffic control procedures. When the lessons—often learned through trial and error—were correctly evaluated and effectively put into practice, they gradually led to improvements in traffic control.

CHAPTER 4

DISPOSITION OF TRAFFIC CONTROL ELEMENTS

Complete information regarding the tactical situation and future plans is a necessary prerequisite to the formulation of traffic plans. Particular attention must be given to those aspects that directly influence the traffic control operations. Probable future action must also be considered in order to insure that traffic plans are sufficiently comprehensive and flexible to cope with sudden or unexpected changes in the situation.

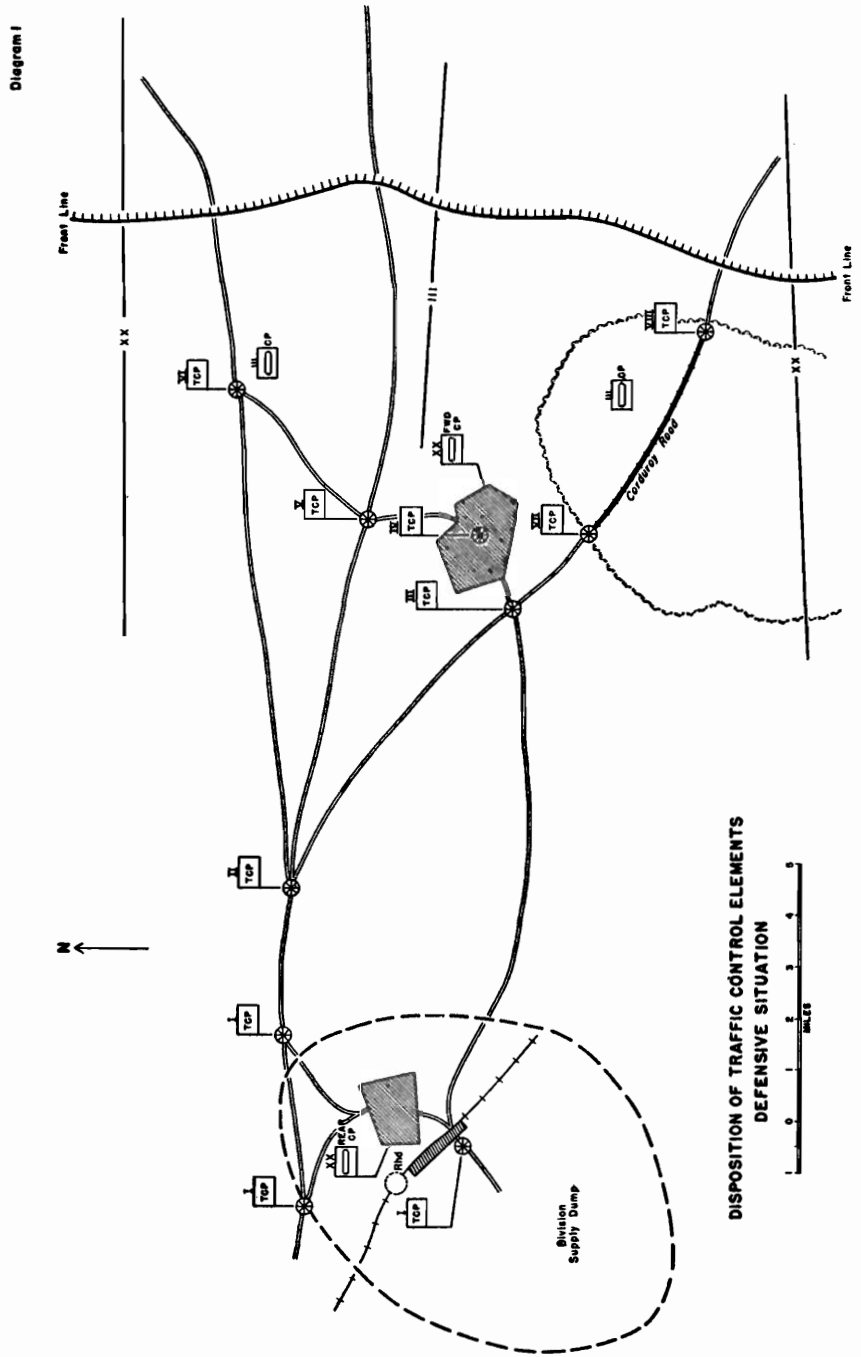
Traffic control methods and procedures assume entirely different forms during defensive action than they do in the course of an attack. Not only do the duties of the traffic control post personnel vary, but the distribution of the auxiliary service elements attached to traffic units is likewise directly influenced by the existing situation. It is true that more numerous and diverse supporting units are usually assigned to traffic functions in offensive action than in static situations. More emphasis must be placed upon efficient armored traffic control during a war of movement, for it is then that the high mobility of armored divisions assumes its most vital significance.

Section I. DEFENSIVE SITUATION

The TRACO in the German armored division was responsible for preparing those portions of the division operation orders that pertained specifically to traffic control. Whenever practicable, an overlay type map was produced and appended as an annex to the order. While the written orders spelled out the traffic control mission and assigned the necessary personnel, the accompanying map showed the existing or projected physical disposition of the division including its boundaries, command posts, main lines of resistance, and major traffic arteries. As a rule, the most essential traffic control posts were sketched in and indicated numerically. (Diagram 1)

For the purpose of the assumed defensive situation described here, the portion of the division operation orders pertaining to traffic control might have read as follows:

> The TRACO will assume responsibility for traffic control, route marking, road maintenance, and vehicle recovery service within the division sector as far forward as regimental command posts.
>
> The military police detachment (motorized), a labor company of the supply services, recovery elements from the motor


Diagram I
Front Line
XX
III
Front Line
XX
Corduroy Road
TCP
CP
Rhd
Division Supply Dump
N
DISPOSITION OF TRAFFIC CONTROL ELEMENTS
DEFENSIVE SITUATION
MILES

maintenance units, and signal facilities from the signal battalion are assigned to traffic control duties.

After publication of such orders, the units that were assigned to traffic control promptly reported to the TRACO, who then committed them accordingly. Their varied activities had to be constantly supervised since the traffic mission could be successfully carried out only if all movements proceeded smoothly despite obstacles which were inevitably encountered, especially during the muddy period. Command responsibility within each traffic post and control area had to be clearly defined. It usually proved to be most advantageous to place all personnel of a single post under the command of the senior military police noncommissioned officer.

The actual composition of the various traffic control posts differed according to the primary missions. Traffic Control Post II, for example, was manned by a team of MP's who operated in shifts, plus details from the labor company. The personnel assigned to this road junction had to mark the roads that branched out from there. It was essential that one MP be constantly posted to direct traffic. The TRACO ordered the labor forces to maintain and repair the roads from the junction midway to the adjoining posts—III, V, VI, and I—in close co-operation with the labor complement of those posts. Recovery equipment had to be held in readiness at all times to remove and evacuate disabled vehicles within the control area. Each post had to have ready access to the division telephone trunk line. In that way the post could be easily reached and was also able to maintain telephone communications with the other traffic control elements. It was thus a relatively simple matter to initiate one-way traffic between Posts II and V for priority movements of reserve units or in the event that road conditions became extremely poor. To limit the use of specific roads to one-way traffic often proved an effective measure in Russia, especially during the muddy season.

The main function of Posts VII and VIII, located on the fringes of a forest and near the front, respectively, was not so much traffic control as such, but rather the repair and maintenance of the road that traversed the forest and sustained the regiment employed on the right. Therefore, except for several MP's and some communications personnel, these posts were primarily composed of labor details and recovery vehicles.

In such situations the experienced German soldier resorted to the immediate construction of corduroy roads since only in this manner was it possible to keep motorized forces moving along otherwise impassable forest roads. The building of a corduroy road usually required great effort and always proved to be time consuming. Had the area under construction not been situated

so close to the front, it would have been expedient to employ indigenous labor from near-by localities. During the course of the war, Russian civilians would avail themselves of such opportunities because they were thus assured hot meals which were prepared in especially provided field kitchens. Since most corduroy roads were narrow, the establishment of one-way traffic was often mandatory. Shunting and passing was possible only at clearly marked points located well in advance along both sides of the road at about 500-yard intervals.

Since Posts IV, V, VI, and VII also constituted the division barrier or straggler line during critical periods, military police stationed at Post VII, acting in strict accordance with current division orders, had to maintain close watch over all unauthorized retrograde movements.

Similar traffic control methods are generally applicable to stabilized situations and periods of relative quiet, except for minor deviations to offset seasonal influences. Under such circumstances even armored divisions can adhere to standard traffic control procedures because there is usually sufficient time for their application. When on the defensive and during temporary lulls in the fighting, it is rarely advisable to wait for full clarification of the situation before establishing the entire traffic control system. In static situations at least the framework of the ultimate traffic control organization must be set up just as rapidly as during a war of movement. The initial organization may frequently consist merely of military police personnel, while auxiliary forces that may eventually be required can be gradually integrated as and when the need arises. The permanent location of the various control posts may be altered after more thorough reconnaissance is conducted. However, the basic traffic circulation plan must always be clearly defined well in advance. The timing and effective execution of the plan will depend upon the resourcefulness of the TRACO and the efficiency of his men, who must be fully cognizant of the vital role of traffic control.

Section II. OFFENSIVE SITUATION

When an armored division engages in offensive operations, the disposition of its traffic control elements assumes a different aspect from that used during defensive employment. The situation in a defensive action normally remains static, whereas in an attack it is usually fluid. Therefore, when armored forces attack, a high degree of mobility is not only desirable but essential to the success of the undertaking. By the same token, traffic control assumes proportionally greater significance.

The following situation of an armored division during a winter advance was devised in an effort to touch upon as many diverse

Diagram 2

XX
XX
B
B
B
B
A
A
A
III TCP (R)
III TCP (L)(R)
III TCP (R)(R)
II TCP
III TCP (R)
I TCP (R)
N
DISPOSITION OF TRAFFIC CONTROL ELEMENTS
OFFENSIVE SITUATION
(R) RECOVERY EQUIPMENT
(L) LABOR DETAIL
(S) SNOWPLOW
(H) HEATED SHELTER
MILES

traffic control problems and methods as possible.

The division boundary lines for reconnaissance, security, and combat missions, as well as the two west-east roads within the division zone are shown on Diagram 2. Both roads were clearly marked by previously prepared permanent signs and additional markers were erected wherever needed by special road-marking details. The marking devices sometimes included the abbreviated name of the combat commander, the divisional symbol with right and left indication, or simply previously designated letters, as in this situation. Eventually, the better of the two routes was to be converted into the division main supply road. Thus, the extensive road improvement and marking operations would serve an additional purpose.

At the beginning of the march most of the MP personnel were assigned as far forward as possible and integrated with the advance guard of the two combat commands. Frequently MP elements were placed still farther to the front of the column with the advance detachments or, sometimes, even with the combat patrols. In this manner the traffic control elements, which often operated in conjunction with road maintenance details, were in position when the advance guard reserve moved out. Therefore, by the time the mass of the column approached, MP's were able to direct traffic at key intersections, greatly facilitating movement and averting delays. The posts established at specific intervals were not only charged with traffic control functions, but were also responsible for road maintenance and vehicle recovery. Radio was the preferred means of communication between the various traffic posts because it was dependable and substantially reduced the wire load. In the event of contact with the enemy, the troop commander could divert specific units more rapidly by radio, which provided instantaneous two-way communication.

In winter medical personnel were sometimes attached to the traffic control posts to establish and maintain heated shelters which temporarily housed the wounded awaiting evacuation to the rear. Snowplows also had to be readily available because heavy snowdrifts would hamper motorized columns.

While a division was on the move, it was not always possible to prepare and distribute appropriate strip maps simultaneously with the march orders. Frequently there was just enough time to make hasty notations upon the maps issued to the march unit commanders and MP post personnel. Time limitations were often such that all operations connected with the movement were executed according to specific verbal orders. However, when time permitted, operation orders with pertinent paragraphs for march and traffic control, based upon recommendations of the TRACO,

were prepared and distributed.

For the purpose of this assumed example, such special paragraphs might have read about as follows:

> TRACO will mark both march routes in the prescribed manner: the right "A," the left "B." Traffic directing personnel will be assigned and posted well in advance of the march columns to assure the smooth and uninterrupted flow of movement in conjunction with the supporting auxiliary elements attached to traffic control.
>
> Close co-operation between TRACO and division engineer officer will be essential. The latter is solely responsible for the detailing of necessary engineer personnel to the advance guard of both march columns.
>
> Road "A" will be prepared for ultimate use as the main supply route.
>
> The motorized military police detachment, radio sections of the signal battalion, recovery vehicles of the motor maintenance units, medical personnel, and snowplows from the rear echelon are assigned directly to the TRACO to assist in carrying out the traffic control mission.

Upon issuance, these orders were immediately put into effect. The TRACO assumed personal command at Traffic Control Post I, where the various march units were to be joined into their respective march serials and columns. In co-operation with his subordinate unit commanders, he organized and assigned his forces in accordance with the anticipated requirements of both routes.

Since the advance was conducted along two roads, traffic control responsibility had to be divided. The TRACO personally directed the movements along the more important route, while he deputized the MP detachment commander to take charge of the secondary road. It was rarely possible for the TRACO to exercise personal supervision over the entire movement along two separate routes since uninterrupted and efficient communications between the two roads, though ideally essential, seldom existed during the Russian campaign.

During the movement the TRACO and the MP detachment commander, together with their respective control elements, were located with the advance guard of the two columns. In that manner they could establish and organize the various control posts as they went along. The study of maps and personal observations made en route formed the basis for a traffic control system that met all requirements. The various posts were assigned and organized according to prevailing situations. The TRACO assigned recovery equipment to the control posts as required by road conditions. He could order the installation of heated shelters along sparsely popu-

lated stretches and allocate his radio equipment to areas where a change in march direction was most likely to occur.

Control Post I was located at a road fork near the entrance to a village and was primarily responsible for traffic direction at that point. A two-way radio was installed there and a heated shelter established in the near-by settlement. The recovery equipment assigned to this post patrolled the road between Posts I and II, while the stretch between Posts II and III was the responsibility of the recovery section at Post III.

A sufficient number of motorcycle MP's had to be available at Post I so that, in conjunction with personnel from the adjacent posts, they could continuously patrol the entire road stretch. These roving MP's had to maintain an even flow of traffic and were responsible for the immediate removal of all obstructions. Since they were always aware of the location of recovery equipment, they could easily and quickly dispatch prime movers and wreckers to trouble spots.

The existence of Post XIII was justified only because of the necessity of employing a road maintenance detail at that point, for it was anticipated that the unimproved dirt road along this sector would soon become completely impassable under the heavy traffic load. As there was no need for them, neither military police nor radio equipment were assigned to this post. With the approval of the division engineer officer, engineer troops were temporarily placed at the disposal of the TRACO, who in turn assigned them to the MP detachment commander for acutal employment on the road. Every effort had to be made to return these engineers as quickly as possible to the combat elements to which they belonged. They were usually replaced by additional service troops or by indigenous labor details, which were drafted in emergencies.

It should be stressed again that armored traffic control in European Russia was one large-scale improvisation, and that each unit developed and adapted variations in methods and techniques on the basis of its own experience. In many instances, for example, the task of road maintenance became the sole responsibility of the division engineer officer. However, there were some commanders who felt that the engineer officer should not be burdened with such duties, and that both he and his troops should remain free to devote their main effort to more vital combat missions. Furthermore, actual experience often proved conclusively that service troops can soon become quite proficient in road maintenance work, provided they are convinced of its necessity. In the German Army it became standard practice to assign the same service units to road maintenance details over and over again whenever practicable. In

that manner, and in a relatively short time, the troops became more and more adept and virtually engineers in their own right.

The speed with which a panzer division could move, especially in Russia, depended directly upon the effectiveness of its traffic control elements. No less important were the activities of the supporting engineer or labor, recover, and signal units. Whatever the methods or techniques may have been, the success or failure of the operation was always the determining factor. The penetrating force and momentum of a motorized division depended to a large degree upon the mobility of all its elements. Not only can efficient traffic control methods provide this mobility, they can also greatly reduce casualties within the division itself and among those units in whose support the division may be committed.

CHAPTER 5

MARCH AND ROUTE RECONNAISSANCE

The availability and the advance distribution of maps and charts showing the nature and condition of roads and highways are essential to efficient movement planning, march conduct, and traffic control. It is vital that accurate and complete maps be issued to column commanders and traffic control personnel. As an expedient in combat, higher command echelons may prepare and issue supplementary strip maps indicating current road conditions.

During World War II the German maps of European Russia generally proved to be inadequate for the purposes of mobile divisions. Maps showing road widths and surfaces, bridge capacities, and the condition of potential traffic bottlenecks—such as defiles, steep inclines, and major intersections—were seldom available.

In view of the inadequacy and shortage of maps, advance route reconnaissance by military police and march reconnaissance conducted by individual elements during the course of the march assumed proportionately greater importance. To what extent reconnaissance parties are to be employed before a march, depends upon the quantity and quality of traffic intelligence already available to the unit or next higher headquarters. Since road conditions are frequently influenced by recent constructions and demolitions, as well as by seasonal weather changes, actual field reconnaissance during a march is also necessary to check the validity of previously reported facts and to secure data not otherwise available.

To prevent traffic hazards and difficulties from developing, great care must be exercised to anticipate emergencies. When potential traffic bottlenecks are identified well in advance of the march columns, preventative control measures may often be taken in time to avert critical situations. Familiarity with the road net and its prevailing condition permits advance planning of suitable alternate routes in cases of emergency.

Timely advance route reconnaissance was frequently neglected by both commanders and troops during the early phases of the German invasion of Russia. The fact that German troops were accustomed to more favorable road and weather conditions in other theaters of operation probably contributed to this initial laxity. That mobile warfare and the movement of armor in European Russian could be conducted successfully only after thorough advance reconnaissance was one of the first lessons the Germans

had to learn.

During the summer of 1941 the 1st Panzer Division had been alerted to launch an attack in the area south of Kiev. After heavy, sustained fighting, two German armies, the Seventeenth and Sixth, had succeeded in throwing the Russians back across the Dnepr River. However, the enemy still held bridgeheads on the west bank of the river at Kremenchug, Cherkassy, Kanev, and Kiev. Meanwhile, a weak German tactical group had been fighting due east of Cherkassy in an unsuccessful attempt to reduce the small enemy bridgehead near that city. (Map 2) To overcome this situation, the 1st Panzer Division was diverted and ordered to move rapidly into the Cherkassy area to eliminate this bridgehead.

On 25 July, after reorganizing its units, the division was formed into five march serials and began its advance from Mironovka via Korsun and Moshny to Cherkassy. Elements of the division reconnaissance battalion, comprising March Serial A, reached the northern outskirts of Svidovok, approximately six miles northwest of Cherkassy. About 1100 they reported that the northern section of the town was held by strong Russian forces, and that the column had lost almost 50 percent in men and matériel from mines, air attacks, and antitank weapons, and from artillery fire from emplacements on the east bank of the Dnepr. Enemy prisoners, captured maps, and statements of local civilians confirmed the suspicion that a strong partisan band was concentrated in the wooded, swampy region around Russkaya Polyana, and that the partisans were maintaining contact with the enemy forces that were holding the Cherkassy bridgehead. The division command post was located in Korsun when this report was received.

Meanwhile, March Serial B, consisting of tanks, had reached Moshny. It reported that the bridge due east of the town had been destroyed and that, because of the steep embankment, the heavy vehicles were unable to cross the stream. The use of a ford was also precluded because heavy thunder showers had softened the approach roads, making them impassable. The remaining march serials—not including the trains—had meanwhile executed their respective movements according to the previously established march schedule. Thus, they were strung out along the Boguslav–Moshny road and offered an inviting target to enemy aircraft. Had advance route reconnaissance been properly conducted, considerable confusion and time-consuming rerouting of the division could have been avoided, to say nothing of the manpower and equipment that could have been saved.

This is what happened:

Toward 1200, division headquarters by radio ordered all march serials to halt the march in the direction of Moshny and await recall orders from the TRACO for rerouting via Gorodishche,

Imeni Lenina, and Smela to Belozerye. March Serial A, the reconnaissance battalion, had to remain at Svidovok to tie down the enemy forces there, and was not to fall back on Moshny except under severest Russian pressure. March Serial B was to turn around and proceed to the intersection ten miles east of Korsun, from where, upon receipt of radio orders, it was to resume the march in the new direction about 1500.

The TRACO was charged with the organization and execution of the rerouting operation. The division MP detachment was placed under his direct command and was broken down into seven traffic control posts, each consisting of five men who had two light personnel carriers and one motorcycle at their disposal. (Map 2) This was the maximum number of control posts that could be established since the detachment was organized according to 1941 tables of organization. No radio equipment was available for issuance to the various control posts, and the motorcycle messengers were the only means of communication. When conditions permitted, the radio facilities of the march serials were used by the traffic control personnel.

The division command post was temporarily located in Gorodishche, where the TRACO also established his central traffic regulation headquarters. The latter was staffed by one officer and five enlisted men, equipped with two light personnel carriers and two motorcycles.

The TRACO issued the following instructions to the individual traffic control posts:

Post 1

March Serial C will move out upon receipt of radio orders about 1400 and is to be guided to Gorodishche along the Kanev–Gorodishche road. The intersection will, meanwhile, be blocked to all other traffic.

About 1600 March Serial B, upon receipt of radio orders, is to proceed behind Serial C and is to be conducted to Gorodishche along the Kanev–Gorodishche road. During this movement only limited traffic is to be permitted from south to north.

Post 2

About 1230 March Serial D is to be conducted from the southeast exit of Korsun to Gorodishche along the Korsun–Gorodishche road. This road is to be closed to vehicles of other march units.

March Serial E will be called by radio and is to proceed behind Serial D, probably beginning at approximately 1700.

Post 3

This post will control the flow of traffic within Korsun in close co-ordination with the commanders of March Serials D and E.

Posts 4 and 5

These posts will guide march serials through Gorodishche according to the following schedule:

March Serial D from 1300, while blocking north-south traffic.

March Serial C from about 1400, while blocking east-west traffic.

March Serial B from approximately 1630, while blocking east-west traffic.

March Serial E from about 1800, while blocking north-south traffic.

Post 6

Personnel of this post will reconnoiter the road leading southeast from Gorodishche, as well as the bridge directly east of the town, and report their findings at once. After 1630 they will direct and guide all march serials through the intersection southeast of Imeni Lenina, while blocking the roads leading south and southwest from the intersection.

Post 7

This post will reconnoiter traffic facilities within Smela and guide march serials through the town and northeastward via Belozerye. Then, it will plainly mark the route through the town with divisional road signs and post control personnel near all potential traffic bottlenecks by 1500.

The projected time schedule for rerouting the division could not be fully adhered to. Toward 1330, Post 6 reported that the bridge near the eastern outskirts of Gorodishche was demolished. This meant that a ford had to be found as an alternate crossing point. The lead column, Serial D, was therefore unable to continue the march from Gorodishche until 1430. As a result, the tail march serial failed to arrive in Smela until late in the evening, and the division—except for patrols—could not be committed against the Cherkassy bridgehead until the following day, 26 July.

From a purely tactical point of view, it was primarily the neglect of thorough route reconnaissance that led to the initial ill-fated advance via Moshny. The division had to be completely rerouted, a time-consuming operation which delayed its planned commitment by a whole day. Since March Serial A, the reconnaissance battalion, after having sustained heavy losses, had to remain at Svidovok and maintain contact with the enemy there, the division was at least temporarily deprived of some of its striking power. Fortunately, the speed with which the traffic control system was reorganized and the complete absence of enemy air activity over the alternate route of advance partially compensated for the disadvantages of the rerouting process.

CHAPTER 6

EFFECT OF SEASONS ON TRAFFIC CONTROL

The seasonal changes encountered during the German operations in western Russia confronted the traffic elements of the divisional MP detachments with tasks which, on the surface at least, appeared to be far removed from their primary function of traffic control. However, upon closer examination, it was soon discovered that the additional duties were integral parts of the whole traffic mission. That mission, within an armored division, is to provide for an expeditious and uninterrupted flow of troops and supplies, and to ensure orderly and efficient evacuation of casualties, prisoners, refugees, and matériel in conformity with current tactical and administrative plans.

Even the most efficient traffic control system proved inadequate during military operations in European Russian because traffic itself—the actual troop and supply movements—was always hampered and very often brought to a temporary standstill by unfavorable road and weather conditions. As a result, the traffic control elements were forced to perform many extra functions in order to accomplish their mission successfully.

During the summer months, movements of armor proceeded with relative smoothness, and the normal complement of traffic control elements of the MP detachment usually could cope with most of the traffic problems. In most instances it was merely necessary to strengthen the traffic control units in proportion to the distances involved. At times, however, considerable difficulty was faced when a series of downpours would suddenly convert the loamy soil of the Ukraine into impassable quagmires.

With the advent of autumn and during the winter months that followed, entirely different conditions prevailed. The great difficulties which German armor experienced in the Ukraine during the muddy period are vividly illustrated by the following tactical example.

After making a Dnepr crossing near Kremenchug, the adjoining wings of the German Seventeenth and Sixth Armies were engaged in seesaw fighting with the Russian defenders and, by mid-October 1941, had advanced into the area directly west of Kharkov. The Russian attempts to evacuate all industrial plant facilities from the threatened Kharkov region appeared to be the main reason for the exceptionally stiff resistance encountered by the German forces. It therefore became necessary to reinforce the army bound-

ary so that this vital region could be seized as quickly as possible.

At that time the 2d Panzer Division was located in a rest area west of Poltava, where it had received personnel replacements and replenished its supplies. On the evening of 15 October the division was ordered to break camp and move out at once. The division's march objective was the Staraya Vodolaga–Minkovka–Novaya Vodolaga area, about eighty miles away, where the division was scheduled to arrive on 16 October. (Map 3)

The muddy period had set in on 13 October and vehicular traffic along the roads in the Kharkov–Poltava area became increasingly difficult. At many points normal movement was impossible unless special measures could be devised. A fine drizzle started to fall again during the night of 15–16 October.

Organized into five march serials, not including the supply services, the division began to move out from the east gate of Poltava at 0800 on 16 October, in an effort to reach its destination via Staritskovka, Voynovka, Kolomak, and Valki. Since other divisions already in line had been using this same route as their main supply road, advance reconnaissance was deemed unnecessary.

Upon reaching the town of Voynovka toward 1000, March Serial A radioed back to the division command post at Poltava that the route of march beyond Voynovka was impassable since deep mud covered the entire road for extensive stretches. Moreover, the message went on, numerous disabled vehicles, abandoned by other units, were blocking traffic and their drivers stated that similar road conditions prevailed all the way to Kolomak, and even beyond.

Division headquarters therefore ordered the column to halt immediately and, after consulting Seventeenth Army, directed the rerouting of the march from Staritskovka via Karlovka, Krasnograd, Krestishche, and Stanichnyy to Novoya Vodolaga. Those march serials that were still located within their assembly areas were ordered to wait for revised radio orders. March Serial A was instructed to turn about, reach the east entrance of Staritskovka by 1400, and then proceed as the tail march column upon receipt of appropriate orders.

The TRACO was charged with over-all traffic control and supervision of the rerouting operation. For this purpose the division MP detachment, two recovery platoons (each equipped with three prime movers), the motorized division engineer battalion, and one radio section were placed at his disposal.

The alternate route of march was divided into five sections or traffic control areas. Where engineer troops and prime movers were assigned to road repair and maintenance, the entire section was placed under the command of the senior engineer officer. Each

section was manned by a traffic control post consisting of four to six MP's with one light personnel carrier for every two or three men. A motorcycle messenger was the only means of communication within each section since sufficient radio equipment was not available. After studying his maps and consulting the engineer battalion commander, the TRACO organized his forces and issued orders and instructions.

Section I, covering the stretch of road from Poltava (exclusive) to Staritskovka (inclusive) was under the supervision of Post 1. The only available radio section was set up east of Poltava. The MP personnel were to recall March Serials C, D, and E from the eastern exit of Poltava and control their movement while blocking the road to all other vehicles. In Poltava proper, Seventeenth Army MP's were charged with traffic control. Roving MP's of Post 1 were to regulate traffic in Staritskovka and guide the march serials to Karlovka. All passing traffic had to be curtailed and oncoming vehicles were to be halted whenever necessary. According to the march schedule, Serial A was to be located at the eastern entrance of Staritskovka after 1400 and was to wait there until explicit orders to proceed were transmitted to the column by radio.

Section II, covering the route from Staritskovka (exclusive) to Karlovka (inclusive) was under the jurisdiction of Post 2. The MP personnel assigned to this control area had to regulate traffic along the extremely poor stretch of road directly east of Votni. Two engineer platoons were responsible for improving and maintaining the road, with the assistance of local civilian labor. A prime mover was to tow stalled vehicles through impassable road sections and remove disabled vehicles that had been abandoned by preceding units.

Section III extended from Karlovka (exclusive) to Krasnograd (inclusive) and was under the jurisdiction of Posts 3 and 4. Military police of Post 3 were to regulate traffic along the poor road stretches directly east of Karlovka and midway between Krasnograd and Karlovka, especially at the river crossings. Post 4 personnel were to be employed in Krasnograd to determine through-traffic facilities, mark roads leading toward Kharkov via Krestishche, and regulate the flow of traffic within the town.

Section IV covered the stretch from Krasnograd (exclusive) to Krestishche (inclusive) and was patrolled by personnel of Post 5. This MP complement had to regulate the traffic along the poor stretch of road due south of Krestishche, while the engineers and recovery elements performed duties similar to those of Section II.

Section V extended from Krestishche (exclusive) to Novaya Vodolaga (inclusive) and was the responsibility of Posts 6 and 7. In addition to performing their regular functions, the traffic

elements in this control area had to regulate the flow of traffic along the difficult road stretches midway between Stanichnyy and Krestishche, directly northeast of Stanichnyy, and at the northeast exit of Novaya Vodolaga.

At 1400, 16 October, the TRACO and his central traffic regulation headquarters were located in Krasnograd, to which town all radio and other messages concerning traffic had to be directed.

As scheduled, the columns began to move out of Staritskovka at approximately 1230. During the course of the march many delays were encountered. Although the first column, March Serial B, reached the assembly area during the evening of 16 October, the last column, March Serial A, did not arrive at its destination until the morning of 17 October. The excessive demands which this march made on both men and equipment resulted in losses of close to 25 percent. Therefore, only elements of the division could be committed against the enemy on 17 October, and these lacked sufficient striking power to achieve success.

The foregoing example demonstrates that marches of armored forces during the muddy season in the Ukraine demanded a precise computation of time requirements; otherwise, the effective execution of tactical plans and decisions became impossible. To cope with the unfavorable road and weather conditions it is imperative that the troops be specially trained in march discipline and traffic control. German experience conclusively substantiated the fact that the integration of traffic control personnel with technical service troops, such as engineers and vehicle recovery units, was of vital importance during operations in European Russia, especially when confronted by the added hazards of the muddy period.

While German armored traffic control elements were faced with a number of unforeseen problems in their first encounter with the muddy season, even greater difficulties awaited them during the severe winter that followed.

As a result of the autumn muddy period of 1941, movements in the northern zone of Army Group South came to a standstill after the Germans reached the Donets River. Farther south, near the Black Sea, German attacks had been successful and all indications pointed to their early resumption. At the beginning of December 1941, the 3d Panzer Division—which had been out of action in a rest area near Kharkov—was alerted and ordered to prepare for a march on Taganrog. There it was to participate in the Caucasus operation, the objective of which was the seizure and immediate exploitation of the Maykop oil fields.

In voicing his objection to this forced march over so great a distance, the division commander expressed the fear that con-

siderable losses would be incurred because of the heavy snows. In reply, he was told that there was no alternative—the railroads could not be used because of the shortage of broad-gauge rolling stock. At the same time, he was given every assurance that the division would be completely rehabilitated upon arrival in the Taganrog area. To supplement the organic vehicles, Sixth Army—under whose command the division then stood—made available a number of closed freight cars, with a total capacity of 300 tons. Unfortunately, these cars could be used only along the stretch from Kharkov to Lozovaya because railroad facilities and bridges beyond that point had been destroyed. (Map 4A)

Thereupon, the division began to make all necessary preparations for the movement. Road maps were requisitioned. Telephone inquiries with Seventeenth Army in Lozovaya revealed that only small stretches of the route between Kharkov and Lozovaya were blanketed with snow. However, no concise reports were available about road conditions farther south. During the day the temperature had dropped considerably and was recorded at −2° F.

The average daily rate of march was set at approximately sixty miles, and the division was scheduled to move out at 0900, 16 December. A total of eight march serials was to be formed, including the divisional rear services. On 16 December March Serial A was to reach the area around Artelnoye, while Serials F, G, and H were to proceed to the Lyubotin–Dergachi–Kharkov region.

The division command post was located in Merefa, and the central traffic regulation headquarters of the TRACO, including radio facilities, was established in Artelnoye, the first day's march objective, about seventy miles from the point of departure. The lead column was to reach the Grishino area on the following day, 17 December.

The division MP detachment was placed under the command of the TRACO who, in turn, formed traffic control posts, each consisting of four MP's and one motorcycle messenger.

For the first march day, Post 1 was assigned to the control area from Kharkov (exclusive) to Merefa (inclusive); Post 2 from Merefa (exclusive) to the road fork south of Taranovka (inclusive); Post 3 from the road fork south of Taranovka (exclusive) to Artelnoye (inclusive). For the second day Post 4 was employed in the section from Artelnoye (exclusive) to Lozovaya (inclusive); Post 5 from Lozovaya (exclusive) to the intersection about five miles northwest of Dobrovolye (inclusive); Post 6 from the intersection (exclusive) to Grishino (inclusive). The remaining MP's were meanwhile held in reserve at central traffic headquarters in Artelnoye.

Beginning at 0900 on 15 December, the MP personnel were to reconnoiter their respective stretches of road and report back to

Artelnoye, by 2000, the prevailing road conditions.

As dusk approached, about 1600, the TRACO, with his radio section and several traffic control elements, reached the town of Mironovka and sent the following radio message to division headquarters:

> Extremely severe snowdrifts encountered along the road from directly north of Taranovka to Mironovka. Two thirds of the vehicles have broken down. Snowplows and recovery equipment are urgently needed. Will attempt to reach Lozovaya on 16 December.

Although Seventeenth Army had previously assured the division that this route was passable, road conditions had meanwhile deteriorated considerably because of heavy snowfalls. The Germans were soon to learn that this was not an unusual occurrence during the Russian winter.

After having received this message and again consulting with Seventeenth Army, division headquarters issued the following revised orders:

1. The movement of 3d Panzer Division will be postponed until 0900, 17 December.

2. The daily march objectives of Serial A have been redesignated as Artelnoye for 17 December and Grishino for 18 December. A day of rest is scheduled for 19 December. The march schedule for the other serials will be adjusted accordingly.

3. The engineer battalion, two recovery platoons, and three radio sections are to be placed at the disposal of the TRACO. These units will be employed to avoid breakdowns along the difficult stretch of road from Kharkov (exclusive) to Grishino (inclusive). Civilian labor details will be employed to improve the road whenever possible. The above-mentioned elements will move out from the south gate of Kharkov at 0900 on 16 December and proceed to Taranovka, where they will receive further specfic orders from the TRACO.

4. The 1st and 2d Medium Maintenance Companies will depart from Kharkov at the same time and proceed to Lozovaya and Grishino respectively. Both companies should be in operation by 19 December. (Map 4C)

When the engineer, recovery, and radio units arrived in Taranovka on 16 December, the TRACO issued the following additional orders:

1. For the execution of the march by 3d Panzer Division, the route from Kharkov (exclusive) to Grishino (inclusive) is to be divided into eight sections effective 0900, 17 December. Military police traffic control posts will be assigned to each of these control areas, while engineer units and prime movers

are to be attached according to the specific requirements of the respective road stretches. (Map 4B)

2. Sections I through IV and VI through VIII are to be occupied beginning at 0830, on 17 and 18 December respectively, so that the movement of the various march serials can proceed smoothly and without interruption. Military police from Seventeenth Army will assume responsibility for traffic control in Section V, while under the temporary command of the division TRACO.

3. Within each section local civilian labor should be drafted from the surrounding localities and employed to help maintain the road.

The time gained by the postponement of the march was used to good advantage. It was possible to improve most of the road so that, by the evening of 16 December, it became reasonably trafficable up to Section IV. However, by the morning of 17 December large portions of the road were once again covered with snowdrifts. The only effective remedy would have been to erect slat snow fences during the evening of 16 December, but the lack of lumber made this impossible. As a result on 17 December, the first day of march, many traffic jams developed, and by nightfall only about half of the first march serial had reached its destination near Artelnoye. Traffic was tied up, especially in Section II, as vehicles bunched up on the open road. The continual snowfall and a temperature of −22° F. caused numerous technical failures. The over-all efficiency of the vehicles was drastically reduced because during this first winter the motor fuel still lacked the required cold resistance that eventually was attained as the campaign against Russia progressed. The movement of the division continued as planned on 18 December, the second march day. However, it was not possible to close up within each march serial until 19 December, the scheduled day of rest. The delays were the direct result of mechanical failure and the extreme weather conditions; consequently, the traffic control elements and attached auxiliary personnel had to be employed around-the-clock for a period of three days.

On the morning of 19 December, the day of rest, just as instructions for the resumption of the march were about to be issued, the 3d Panzer Division received new orders. The division was relieved from Sixth Army control and assigned to Seventeenth Army, whose orders directed that the division proceed at once to the vicinity west of Slavyansk. It seems that this change in orders had become necessary since, according to intercepted radio messages which were confirmed by statements of enemy deserters, a major Russian attack in the Izyum sector appeared imminent.

The original intention to move the main body of the division along the shortest route from Lozovaya via Barvenkovo had to be abandoned because Seventeenth Army reports described the roads leading in that direction as impassable. As for railroad transportation, only the 300 tons of equipment already loaded could be moved as far as Barvenkovo, provided the necessary locomotives could be made available.

After consulting Seventeenth Army road maps, division headquarters issued orders for the continuation of the march via Grishino to Petrovka, and from there northward via Druzhkovka and Kramatorskaya to Slavyansk. From Slavyansk the march columns were to swing westward toward Barvenkovo. The road from Druzhkovka to Slavyansk was firm and wide. No major obstacles could be foreseen, except for several steep grades and the temporary bridge near Slavyansk. (Map 4C)

Through 20 December all traffic control posts, except Post 1, had to remain within their respective sections. Therefore, the new route of march had to be divided into additional control areas, which were designated IX, X, XI, and XII. The commanding officer of the division MP detachment was placed in direct command of march and traffic control within these newly created sections.

Since personnel of Post 1 were no longer needed in Section I, they were to be employed at the temporary bridge near Slavyansk. During the afternoon of 19 December three additional prime movers from the army motor pool at Druzhkovka and one of the infantry companies from March Serial A were assigned to Sections IX, X, and XI. These troops, together with some indigenous labor forces, were employed all along the road in an effort to make it trafficable by the following day.

Thus, by the evening of 21 December the 3d Panzer Division reached its destination in the vicinity of Barvenkovo and became available for employment. During that winter march over a distance of approximately 230 miles, about 30 percent of the vehicles had either broken down completely or were in dire need of repair. As this was the first winter of the German campaign in Russia, the troops had not yet become accustomed and hardened to such severe weather conditions. Nevertheless, by the third march day the personnel, on their own initiative, had devised improvisations which accelerated the speed of the movement, reduced the number of breakdowns, and greatly facilitated march and traffic control.

CHAPTER 7

CENTRALIZED TRAFFIC CONTROL DURING RIVER CROSSINGS

Unit commanders are responsible for traffic control during river crossings. Thus, when a crossing is to be conducted within the boundaries of an armored division, the command staff of the division makes preparations and issues the necessary march and traffic orders to march unit commanders and traffic control elements. In accordance with the availability of bridge facilities and equipment and depending upon maximum load capacities, division orders will assign the various march units to their respective crossing sites. In addition, these orders will establish the time schedule and march sequence for the crossing. They will also designate the elements that initially are to remain behind, the types and weights of the vehicles to be used, the concentration and dispersal areas on the bank of departure, and the holding areas, barrier lines, and assembly areas on the bank of arrival.

In the vicinity of the crossing site and on the actual crossing facilities, the responsibility for traffic control usually rests with the senior engineer officer, who is commonly referred to as the bridge commander. It is sometimes expedient to provide the bridge commander with additional MP elements to direct traffic at the crossing points and on the bridges. The bridge commander, however, must be vested with full command authority. His mission and responsibility must be clearly defined and set forth in appropriate orders.

On each river bank suitable holding areas and barrier lines should be established to control traffic and sluice columns to their respective crossing points on the shore of departure, and to regulate, guide, and absorb the march elements coming off the crossing facilities on the far side.

The first barrier line on the near side of the river should be located approximately three to five miles from the crossing point. Prior to the crossing, this line may be passed only by those forces and vehicles which are actually needed for tactical employment during the river crossing operations—artillery, antiaircraft artillery, and antitank guns to provide support and protective fire along the river bank. All other march elements must be guided into their respective dispersal areas before they reach the first barrier line. Even single vehicles of higher command echelons should not be permitted to pass this regulating point unless specifically authorized by the local commander. When traffic becomes

congested and ceases to flow smoothly after the crossings have started, the columns then located at this barrier line should be redirected to their dispersal areas to await further orders for resuming the crossings as soon as conditions permit.

The second barrier line on the near side should be located about one half to one mile from the crossing point. This line may be passed only by the crossing elements in the sequence prescribed in the march order and upon the call of the control officer stationed at the crossing site. If the terrain conditions and enemy situation permit, it will usually be most advantageous to reconnoiter special approach roads from the second barrier line to each crossing or bridge site. Care must be exercised that such roads be located safely out of range of effective enemy artillery. In any event, these roads should be clearly marked and improved wherever necessary.

When establishing telephone communications at river crossings, the requirements of traffic control must be taken into consideration. It sometimes may even be necessary to give priority to all telephone messages pertaining to traffic control. This may simply be done by prefixing all such messages with prearranged code signals within designated areas or for specific periods of time. During especially critical situations the receipt of radio messages dealing with traffic control should always be acknowledged by an immediate reply. The development of a special radio net for the exclusive purpose of traffic control is, of course, ideal, but in the German Army it was the exception rather than the rule. For such extravagance the available radio equipment was usually much too scarce. Whenever practicable, alternative and dissimilar systems of communication should be available between the second barrier line and the various crossing points to insure against total disruption if one of them is put out of service.

At the beginning of a river crossing operation the main effort of traffic control is concentrated upon the shore of departure. This is especially true while the march elements are still in their assembly areas. After the initial crossing has begun, the emphasis shifts to the actual crossing sites and bridge points. There it remains until all bridge construction has been completed and crossing traffic is fully under way and flowing uninterruptedly. The main traffic control effort then gradually shifts again and, once approximately one third of the vehicles have crossed, it will definitely lie on the far shore of the river. In view of this rapidly changing main effort, great care should be exercised when committing the limited number of traffic control personnel. Here, too, reserve control elements will usually have to be employed.

On the far river bank all efforts must be bent toward the immediate clearing of the bridges and other crossing facilities.

To this end, control personnel must apply stern measures and act swiftly at the slightest impasse. Collecting points and assembly areas should be reconnoitered, designated, and clearly marked according to the air-ground situation, the terrain, and the depth of the bridgehead. March units or elements thereof frequently cross the river at separate points and different times, depending upon the weight, type, and drive of their vehicles. After crossing, it is therefore imperative that the elements of march serials be quickly reassembled in predesignated areas where they will await further orders from their commanders.

The terrain on the far shore often rises sharply. Mine fields and other obstacles are frequently encountered. Prime movers and recovery parties should therefore be available to the traffic control personnel. No halts should be made on the far side of the river until the collecting points or assembly areas have been reached. In the event of exceptional occurrences, such as direct hits on vehicles or broken axles, the road should be cleared at once of all debris and disabled equipment blocking or delaying the flow of traffic. Here, particularly, the motto should always be "Forward!"

Similar traffic control principles also apply during withdrawals across a river. It is an important command responsibility to take timely measures to provide and establish as many crossing facilities as possible and prepare them for traffic at the earliest moment. Fleeing civilians and all elements no longer needed for immediate tactical purposes, such as trains and air force ground organizations, should be evacuated as soon as practicable. It will thus be possible to avoid traffic congestions which might otherwise create critical situations, especially in the event of enemy air attacks or long-range artillery fire against the crossing sites. If the withdrawal is conducted under close enemy pursuit, it will be the final task of the traffic control elements to destroy all road signs and markers before they themselves cross the river behind the last vehicles of the tail march serial.

After crossing, vehicles should not halt until the first barrier line—one half to one mile from the river—has been cleared. This does not apply to tanks, antitank guns, artillery pieces, antiaircraft guns, or other combat vehicles needed for the defense of the river line, or to the engineer vehicles employed at and near the crossing points. The second barrier line on the far side—about two to four miles from the river bank—must be cleared as quickly as possible by all nonorganic elements of the armored division, except those that may have been attached for specific purposes. All organic and attached units must be halted between the first and second barrier lines. From there they should be

immediately directed into clearly marked collecting and assembly areas in order to prevent a disorganized scramble to the rear. If it can be avoided, the various units and march elements should not be reassembled into march serials along the limited road space adjacent to the river since traffic jams of the most serious nature are likely to develop.

A large-scale withdrawal across a major river barrier occurred as an aftermath of Operation ZITADELLE, the German summer offensive of July 1943. After this attack had failed, the Russians launched a powerful counteroffensive in August, forcing the Germans to abandon the entire Donets front and retreat westward to the Dnepr. The retrograde movement had to be executed gradually in the northern sector of Army Group South so that the southern salient, extending far to the east, could successfully disengage itself and withdraw systematically without sustaining excessive losses. The ferocity of the fighting in all sectors clearly indicated that the Russians intended to break through the German front at several points.

The crossing of the Dnepr, which in this area reaches a width of from 2,500 to 3,500 feet, was expected to present the greatest difficulties during the retrograde movement. The sectors of First and Fourth Panzer Armies and Eighth Army each contained but one bridge site that was intact. The construction of additional bridges would have required at least two months. Motor ferries would be of some assistance but could not possibly solve the problem involving the crossing of entire armies. Thus there remained no other alternative but to form a special traffic control organization and hold it responsible for maintaining an even and uninterrupted flow of traffic across the river.

The crossing operations described herein confine themselves to the Eighth Army sector. (Map 5) During the evening of 20 September the armored and motorized infantry divisions that had been facing the Russians along Defense Line A were ordered to withdraw behind a secondary defense line, where infantry divisions had prepared outpost positions. The mechanized divisions that were thus withdrawn from the line were to be the first to cross the river. After reaching the west bank of the river near Kremenchug, they were to be employed immediately in the defense of the river line which heretofore had been held only by weak forces. (See Department of the Army Pamphlet No. 20–201, "Military Improvisations During the Russian Campaign," pp. 82, ff.)

A 24-ton capacity wooden bridge with a five-yard roadway and bypass points, and a single-track railroad bridge—both at Kremenchug—and motor ferries of 12-ton capacity—at Koloberda,

Cherkassy, and Kanev—were the only Dnepr crossing facilities that existed within the Eighth Army sector.

Before 20 September the crossing facilities at Kremenchug had been used to the limit of their capacity to move all types of supplies to the rear, by both rail and road. Contrary to expectations, these operations had not been completed by the 20th. In addition, fleeing remnants of German divisions were streaming across the river in an effort to reorganize and rehabilitate their shattered forces in the area west of Kirovograd. Large numbers of vehicles of every description, therefore, had accumulated on the eastern bank of the river, especially at the approaches to the crossing points at Kremenchug.

It became necessary to appoint a general officer as special traffic commander at the Kremenchug bridge. His central traffic regulation headquarters was established on the western bank of the Dnepr in Kryukov, a suburb of Kremenchug. Subordinated to the traffic commander were two road commanders and the commanding officer of a flak brigade which was composed of two heavy battalions, two medium battalions, and two light companies.

The missions of the road commanders and the composition and strength of their forces were as follows:

Road Commander East

Mission

1. Sluice columns and regulate movements along the approach routes toward Barrier Lines A, B, C, D, and E. (Map 5, Insert A) Organize and hold the march columns in readiness for the river crossing. Give priority to ambulances and other vehicles with special permits, and filter them through. Block all side roads.

2. Direct and guide march columns from the various barrier lines within the holding areas to the proper bridge sites upon call from central traffic regulation headquarters. Segregate tanks and other tracked vehicles and divert them across the railroad bridge. Scheduled railroad traffic was to retain priority in the use of the bridge. Supervise attached maintenance and recovery elements in repairing or evacuating disabled vehicles in order to permit traffic to flow without undue interruption.

3. Regulate and control the movement of ambulances and recovery vehicles in the opposite direction at two-hour intervals for periods of ten minutes. (Map 5, Insert B)

4. Direct the maintenance and repair of bridges, particularly after air attacks. For this purpose a bridge commander was to be designated and labor details were to be attached as needed.

5. Enforce and maintain a speed limit of twelve miles per hour at all times.

Complement and Strength

Staff of Road Commander East	25 men
Staff of the bridge commander	25 men
Staff of the railroad transportation commander	10 men
Two military police detachments	100 men
One special emergency platoon to prevent panic	50 men
One recovery platoon	30 men
One maintenance platoon, including personnel at gasoline distributing point	40 men
One ambulance platoon, including medical officers	40 men
Two engineer companies	300 men
One telephone platoon and one radio section	40 men
Total	660 men

Road Commander West

Mission

1. Direct and guide all elements moving from east to west to designated assembly areas on the west bank of the river. Avoid all traffic stoppages until columns have cleared Barrier Lines 1, 2, 3, and 4.

2. Organize and hold all return traffic at the barrier lines and direct these vehicles to the bridges when called to cross.

3. Regulate and filter eastbound traffic to and across the bridge every two hours for a ten-minute period in co-ordination with Road Commander East.

Complement and Strength

Staff of Road Commander West	25 men
One military police detachment	50 men
One special emergency platoon to prevent panic	50 men
One recovery platoon	30 men
One maintenance platoon, including personnel at gasoline distributing point	40 men
One ambulance platoon, including medical officers	40 men
One telephone platoon and one radio section	40 men
Total	275 men

Although this improvised traffic control unit had a total strength of nearly 1,000 men, the personnel had to be employed practically without interruption.

The actual withdrawal of six panzer and eight motorized infantry divisions, plus corps and army supply troops, from Defense Line A beyond Defense Line B, and their ultimate crossing of the Dnepr was executed in the following manner:

From 0600, 20 September to 0600, 21 September

Various march columns consisting of supply convoys and straggler elements lined the approach routes within the holding areas. These columns had to be recalled and reversed in order to clear the roads and barrier lines for those divisions which had priority for the river crossing.

From 0600, 21 September to 0600, 22 September

Two panzer and four motorized infantry divisions, as well as supply columns almost equivalent to another motorized infantry division, lined the approach routes within the holding areas up to the Barrier Lines A through E. The estimated time length of each divisional march column was six hours. This was calculated on the premise that none of the divisions would be at full strength, though they would inevitably absorb numerous stray nondivisional vehicles along the way. Since the divisions were organized in close-column formation and some traffic had to move in the opposite direction periodically, the schedule was arranged accordingly.

Four of the seven march columns lining the approaches to the bridges crossed the river, three columns remaining on the east bank until the following day.

From 0600, 22 September to 0600, 23 September

Four panzer and four motorized infantry divisions, as well as supply columns almost equaling an additional motorized infantry division, stretched out along the approach routes of the holding areas behind the barrier lines. The nine march columns and the three remaining from the previous day made a total of twelve march columns. The bridges could provide passage for four of these columns and periodic traffic in the opposite direction during the course of the day, leaving a total of eight march columns on the east bank.

From 0600, 23 September to 0600, 24 September

Four march columns moved across the bridges leaving four columns on the east bank.

From 0600, 24 September to 0600, 25 September

The four remaining march columns crossed the bridges.

Thus, it took four full days to move the equivalent of sixteen mechanized divisions across the two bridges. An operation of this magnitude naturally resulted in huge concentrations of vehicles at the barrier lines and along the approach routes within the holding areas. Had these columns been permitted to proceed

one behind the other, they would have strung out well beyond Defense Line B. The divisions were therefore closed up tightly from the very beginning and formed into columns—three abreast—as they reached the barrier lines. This procedure was relatively effective but had two distinct disadvantages. It not only offered a most remunerative target to enemy aircraft but also rendered march supervision and traffic control much more difficult. Since the natural instinct of the troops was to "get across the river come what may," the march and traffic control elements were confronted with situations that could have easily gotten out of hand and lead to panic.

An operation on so vast a scale did not proceed entirely without the application of harsh disciplinary measures. While the crossings were in progress all traffic control personnel had to be employed around the clock. Severe demands were made upon senior commanders and traffic control officers. Many unexpected events occurred and had to be dealt with summarily in order not to upset the over-all schedule of evacuation. For example, on the morning of 22 September the column commander of some thirty tank transport trailers and prime movers reported to the traffic commander in Kryukov. He had orders—issued with the concurrence of the corps commander at Defense Line B—to recover and evacuate about twenty-five "Tiger" tanks which, because of technical failures, had been abandoned by their crews. Since no previous provision had been made to conduct these large and heavy trailers across the bridge in the opposite direction, westbound traffic had to be temporarily curtailed. However, such unavoidable delays were usually compensated for during the course of the day.

A great deal of the credit for the success of the crossing operation must go to the enemy. As had so often been the case during the German campaign in the East, the Russians reduced the impetus of their attacks before reaching their objectives. The Germans, therefore, were able to hold the outpost positions forward of Defense Line B until the evening of 24 September, and the vehicles that had collected on the east bank of the Dnepr near Kremenchug were spared effective enemy artillery fire. Russian aircraft attacked the actual crossing sites only once during the entire withdrawal, and even this attack proved ineffective since the six participating bombers were driven off by concentrated antiaircraft fire. Why the Russians did not choose to exploit their opportunities more fully goes beyond the scope of this study. By failing to intervene more forcefully, however, they contributed greatly to the successful withdrawal of the German Eighth Army across the Dnepr, which was achieved with comparatively minor losses.

German experience showed that centralized traffic control assumes particular importance during river crossings involving armored forces. In planning for such operations, the following points deserve special attention:

1. Defensive forces to protect the crossing sites and engineer elements to maintain the crossing facilities should be available in sufficient strength, at the right time, and at the right place.

2. The steady flow of traffic must not be interrupted by traffic jams of any sort. Traffic congestion, especially at the crossing sites, is an easy and a remunerative target for enemy aircraft and artillery, and should be avoided at all cost.

3. Only those vehicles of weights below the maximum capacity of individual bridges and other crossing facilities should be permitted to approach the crossing sites.

4. Messenger vehicles must be able to move freely in both directions at all times.

5. It should always be possible to evacuate casualties, if necessary even against crossing traffic.

6. When a river crossing is to be forced during an attack, the initial crossings should be restricted to those combat and support elements that are essential to the rapid seizure and build-up of the bridgehead on the far shore. The follow-up forces that remain behind must be well dispersed and camouflaged.

CHAPTER 8

CONCLUSIONS

From the vast German experience gained during combat operations in Russia, the basic principles of march and traffic control as they apply to armored divisions may be summarized as follows:

1. When employed with foresight, well conceived, and skillfully executed, traffic control is of decisive importance to the speedy and proper commitment of armor and vital to the continued progress of any military operation.

2. Regulations can prescribe conventional methods for the conduct of traffic control, but cannot provide specific directions for all conceivable contingencies.

3. However well planned and efficiently enforced, traffic control methods may fail when march discipline is lacking and when orientation and training are insufficient or faulty.

4. The traffic control functions can be greatly facilitated when carefully considered march and traffic orders are prepared and issued before movements. No matter how efficient a traffic control organization may be, it cannot be expected to compensate for neglect or errors of judgment on the part of responsible commanders.

Whether or not the traffic regulation and control methods applied in armored operations meet with success or failure, usually depends upon the correct evaluation of three major factors: space, road conditions, and time.

Using traditional Russian strategy, the Soviet command lured the Germans eastward by fighting only delaying actions. Like all previous invaders, the Germans were led to underestimate the distance and time involved in an invasion of Russia. For the attacker, the space to be occupied becomes greater and supply lines are quickly overextended. This in turn leads to the ever-mounting consumption of matériel and, simultaneously, demands larger forces to efficiently execute armored movements.

Road conditions in Russia make thorough advance route reconnaissance imperative for any movement, large or small. When such reconnaissance is not made, every movement meets with delay since most of the maps are unreliable and the condition of the roads may be transformed literally over night by a sudden change in the weather.

The correct calculation of time requirements for the movement of armor is most essential, particularly at higher command echelons. Of what value can the best tactical decisions be, if the

time computations for their execution have been inaccurately calculated? In all probability armor will always be faced with the problems the Germans encountered during World War II. Even though modern armored divisions will undoubtedly be better equipped, proper measures will have to be taken to make sufficient personnel available for march and traffic control. In future military operations both troops and supplies may be largely transported by air. Therefore, the time needed to make railroads operational—often considerable because of destroyed facilities or the necessity of converting trackage—can be discounted to a certain degree. However, ground marches will still be necessary and widely employed.

That the military police detachment of the German armored divisions did not have sufficient manpower or equipment has been amply demonstrated. In actual practice the number of available MP's was even lower than the prescribed T/O strength. In most instances miscellaneous personnel from other units had to be attached, a method which at best was only an improvisation.

Military police should be completely mobile and equipped with ultra high frequency radio transceivers, one set to each vehicle in the detachment. Only in this manner can a commander get a clear picture of the progress of the movement and issue orders that can be carried out promptly. The T/O strength of a divisional MP detachment is directly related to the number of radios available and to the extent that these are used within the command. The more extensive the use of radio communications, the less the need for traffic control personnel. Bearing this point in mind, a strength of from sixty to eighty men for each divisional MP detachment is indicated.

The detachment commander must be vested with absolute command authority. This is not only true in combat but also in periods of peacetime training and during maneuvers. Intersections, traffic-restricting defiles, bridges, and the inevitable disorder normally created when march serials from various units pass through a town simultaneously, will cause confusion and result in an unnecessary loss of time. These conditions can be alleviated only by a central authority that must be empowered to make decisions and issue orders without consideration of rank or position. Such special staff positions as the TRACO and the road commander usually would not be necessary if the military police detachment were provided with a sufficient number of qualified officers. These assignments would then be needed only when more than one MP detachment is employed in a given situation or when various elements from different arms and services are attached.

Great care must be given to the selection of military police

personnel. The military police detachment should be composed of men who are in excellent health, fit, of impressive stature, who can withstand physical hardships and can fulfill their difficult duties without direct supervision. Each man must be able to exert his authority forcefully and yet have consideration and understanding for the problems and hardships of the drivers and troops. The ability to devise and apply improvisations and to think in terms of the armored division as a whole must be inherent or gained through proper training methods.

One of the major additional functions is the accurate and thorough marking of the road net. This proved to be especially important in Russia since it helped to reduce the number of traffic control posts and minimize the hazards created by the faulty maps. The proper distribution of the best maps available, as well as constant practice in map reading, is vital to efficient march and traffic control.

During march movements of German armor in the Soviet Union, situations arose that required the application of special control measures in order to reach desired objectives. Marches could be successfully executed and effectively controlled only when such measures were planned well in advance of the movement. When road reconnaissance was conducted at the right time, correctly evaluated, and rapidly disseminated, the proper employment and disposition of the supporting traffic control elements, including recovery sections, fuel distributing points, repair facilities, and engineer units, could be accomplished with greater success.

Unless special engineer forces improve roads and bridges before armored divisions are moved, the operation will bog down altogether or, at best, loss of time and matériel will be considerable. The Germans usually found it necessary to draft civilian labor details to assist the engineers in some of this work. When treated well and supervised properly, this imposed no undue hardship on the Russian people, especially since they had always been accustomed to rendering such services to their own government, even in peacetime. There was always the danger that roads and airfields might be mined by partisan bands or demolition squads since the Russians were known to be past masters in the art of mine laying. Engineer units frequently had to be employed to clear certain indispensable roads ahead of the marching columns. Whenever this was neglected, burned-out tanks and trucks soon created traffic obstructions and bottlenecks.

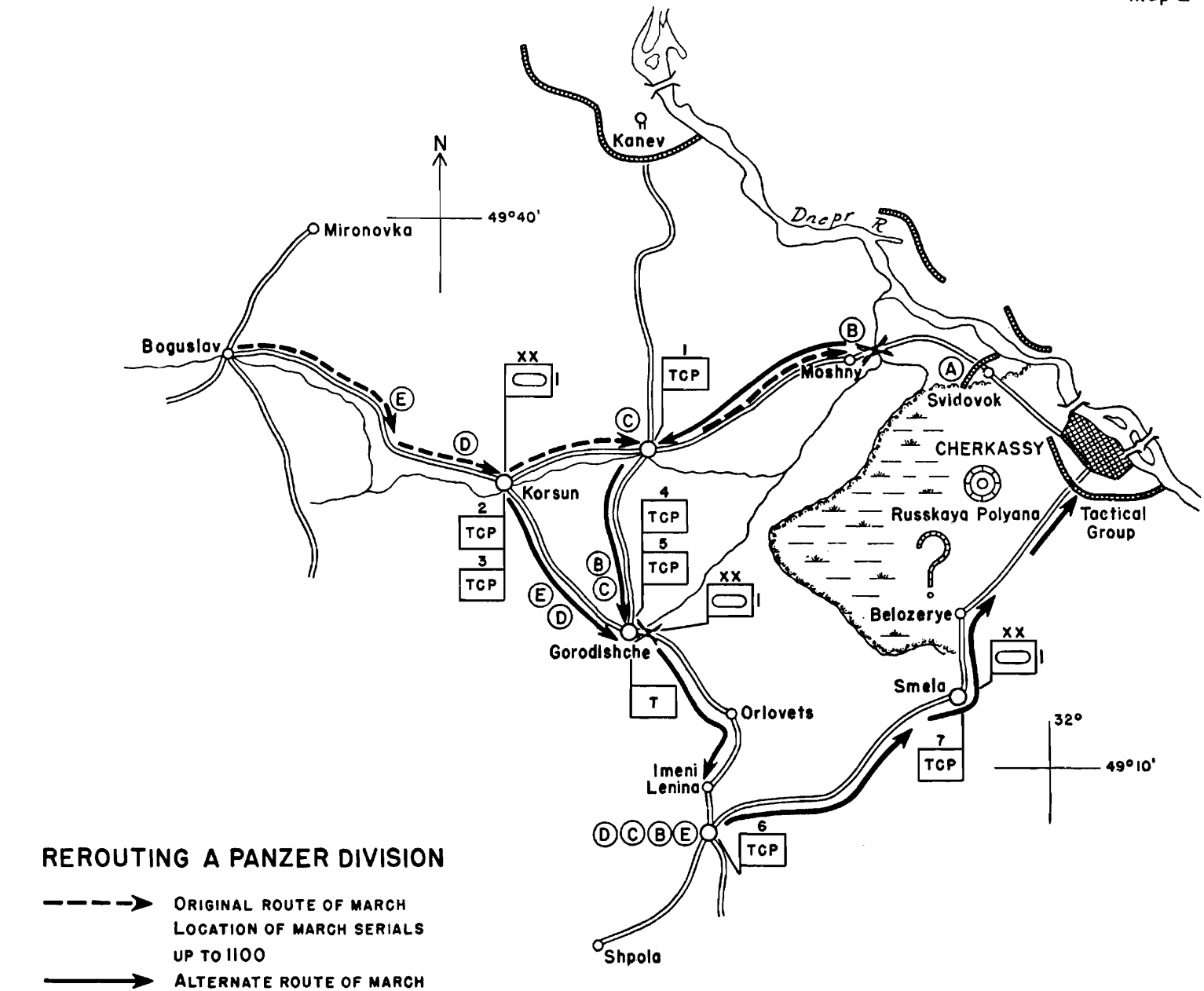
The responsibility of higher headquarters to assist and facilitate the movements of subordinate troop units by every means at their disposal must be emphasized. Army headquarters could come to the aid of the armored division by supplying reconnais-

sance data and assigning road construction details. Since army, as the higher tactical headquarters, normally planned divisional movements, the pertinent information and necessary support could usually be provided well in advance.

The vital importance of properly organized and executed march and traffic control is apparent from German experiences during World War II. It seems obvious that traffic control in an armored division is the sole responsibility of the unit commander and his operations officer. Naturally, neither can be expected to personally direct these functions since at the time of movement both are concerned with plans for the tactical commitment of the unit once its march objective has been reached. They can merely order what is to be done. The actual execution of the traffic plan is the function of the march and traffic control elements.


MAP I
GENERAL REFERENCE MAP
100 50 0 100 200
MILES
FINLAND
LAKE LADOGA
LENINGRAD
BALTIC SEA
Narva
ESTONIA
LAKE PEIPUS
Volkhov R
LAKE ILMEN
Volga R
LATVIA
LITHUANIA
MOSCOW
Vyazma
Niemen R
EAST PRUSSIA
Orsha
Smolensk
Minsk
U. S. S. R.
Niemen R
Orel
PRIPYAT MARSHES
POLAND
Pripyat R
Kursk
Voronezh
Sula R
Belgorod
Lvov
KIEV
Dnepr R
Lubny
Mirgorod
Lyubotin
Kharkov
Merefa
Konev
Cherkassy
Poltava
Chuguyev
Gorodishcheo
Krasnograd
Izyum
Smela
Kremenchug
Donets R
Stalingrad
Volga R
Aleksandriya
Lozovaya
Slavyansk
Kirovograd
Pavlograd
CARPATHIAN MTS
Don R
Taganrog
Rostov
SEA OF AZOV
Kerch
CRIMEA
ROMANIA
Maykop
Sevastopol
BLACK SEA

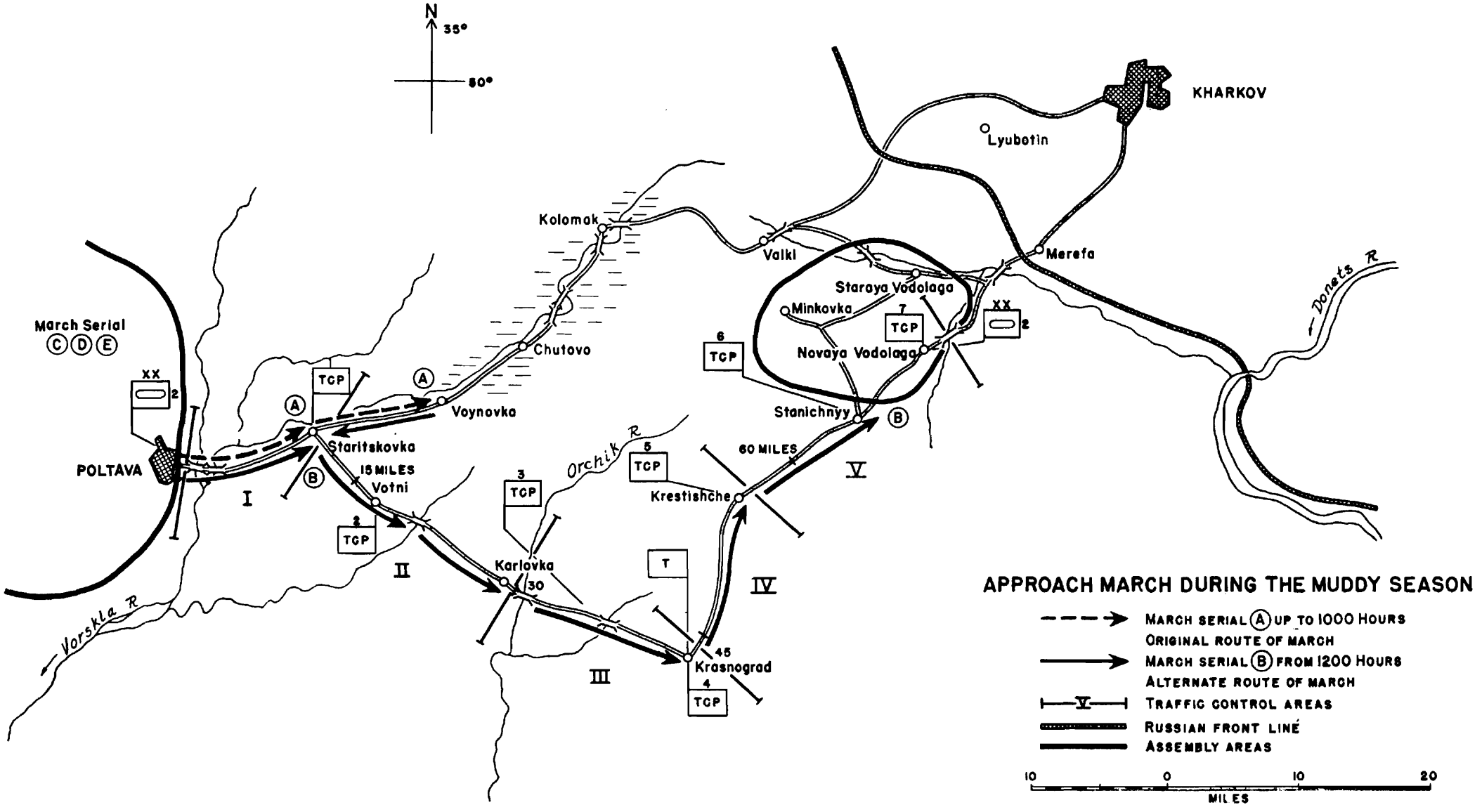
Map 2



REROUTING A PANZER DIVISION

- ORIGINAL ROUTE OF MARCH
  LOCATION OF MARCH SERIALS UP TO 1100
- ALTERNATE ROUTE OF MARCH FROM 1230
- RUSSIAN FRONT LINES
- PARTISAN HELD AREA (DEFINITE)
- PARTISAN HELD AREA (PROBABLE)

10 0 10 20
MILES


N
35°
50°
KHARKOV
Lyubotin
Kolomak
Valki
Merefa
Staraya Vodolaga
Minkovka
Novaya Vodolaga
Donets R
March Serial
C D E
XX
2
POLTAVA
TCP
A
B
Chutovo
Voynovka
Staritskovka
15 MILES
Votni
I
II
III
IV
V
Orchik R
Karlovka
30
Krestishche
60 MILES
Stanichnyy
Krasnograd
45
T
Vorskla R
APPROACH MARCH DURING THE MUDDY SEASON
MARCH SERIAL (A) UP TO 1000 HOURS
ORIGINAL ROUTE OF MARCH
MARCH SERIAL (B) FROM 1200 HOURS
ALTERNATE ROUTE OF MARCH
TRAFFIC CONTROL AREAS
RUSSIAN FRONT LINE
ASSEMBLY AREAS
10 0 10 20
MILES

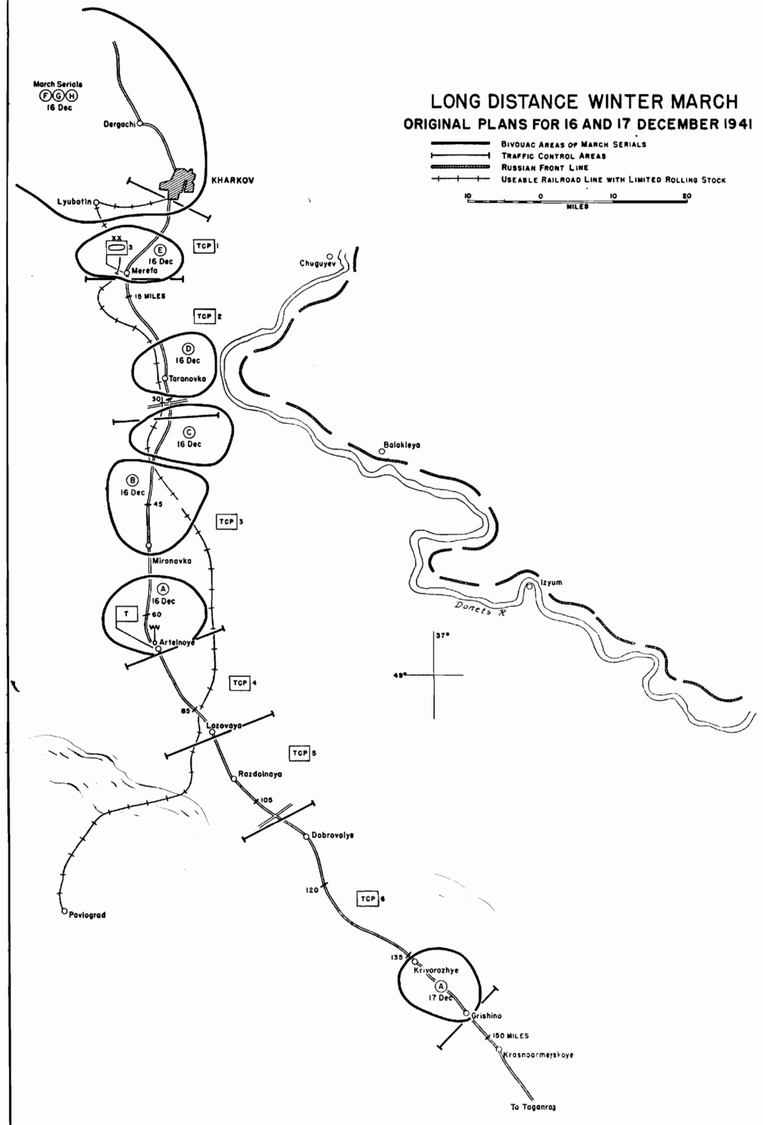
Map 4A

LONG DISTANCE WINTER MARCH

ORIGINAL PLANS FOR 16 AND 17 DECEMBER 1941

BIVOUAC AREAS OF MARCH SERIALS
TRAFFIC CONTROL AREAS
RUSSIAN FRONT LINE
USEABLE RAILROAD LINE WITH LIMITED ROLLING STOCK

10 0 10 20
MILES

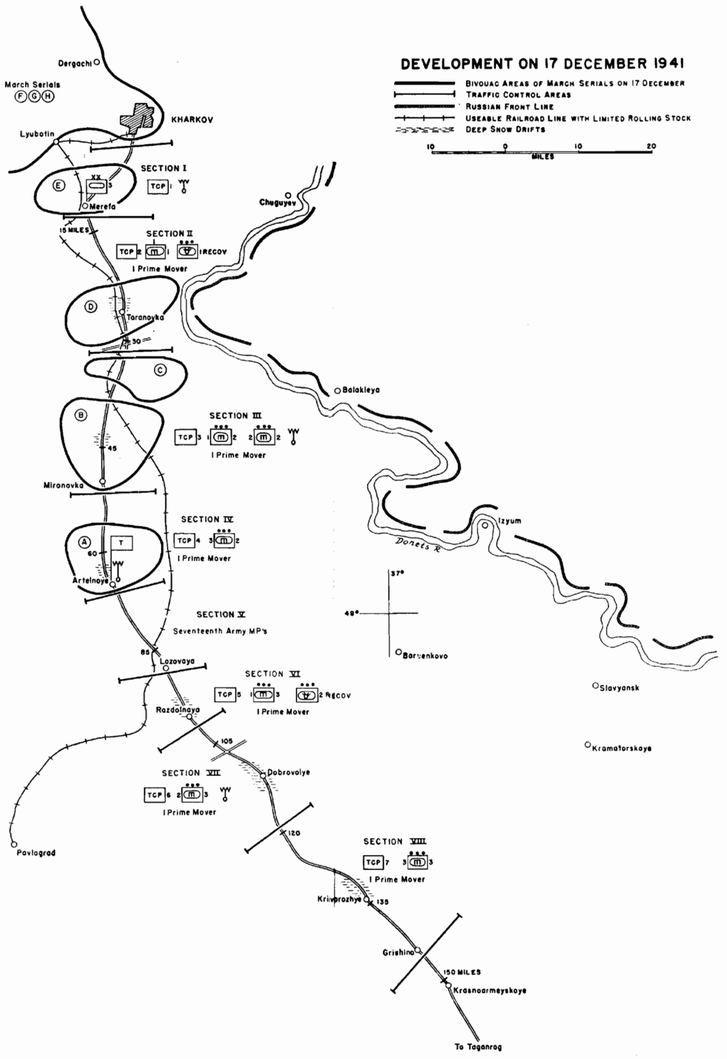


Map 4B

DEVELOPMENT ON 17 DECEMBER 1941

BIVOUAC AREAS OF MARCH SERIALS ON 17 DECEMBER
TRAFFIC CONTROL AREAS
RUSSIAN FRONT LINE
USEABLE RAILROAD LINE WITH LIMITED ROLLING STOCK
DEEP SNOW DRIFTS

10 0 10 20
MILES

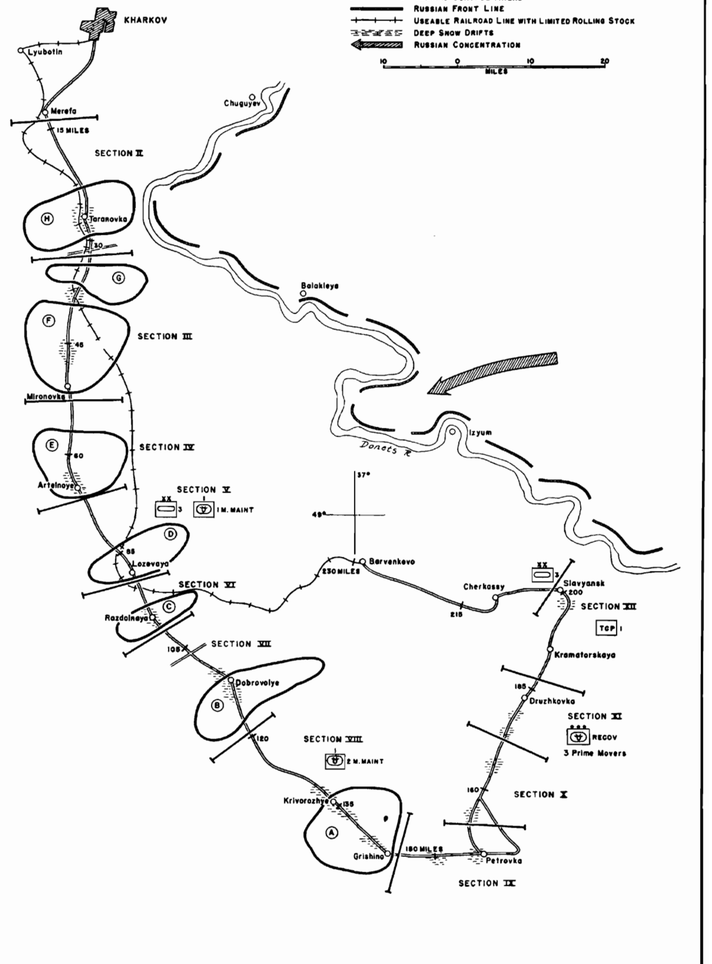


Map 4C

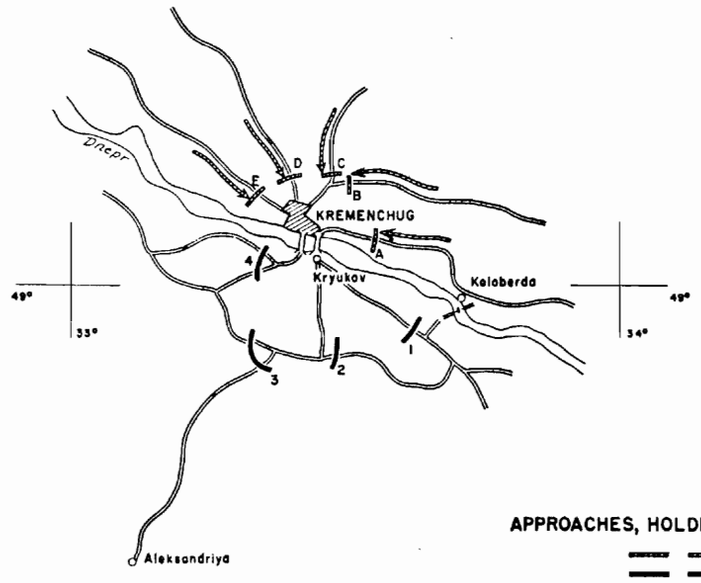
SITUATION AT 1200, 19 DECEMBER 1941

BIVOUAC AREAS ON 19 DECEMBER
TRAFFIC CONTROL AREAS
RUSSIAN FRONT LINE
USEABLE RAILROAD LINE WITH LIMITED ROLLING STOCK
DEEP SNOW DRIFTS
RUSSIAN CONCENTRATION

10 0 10 20
MILES



Insert A

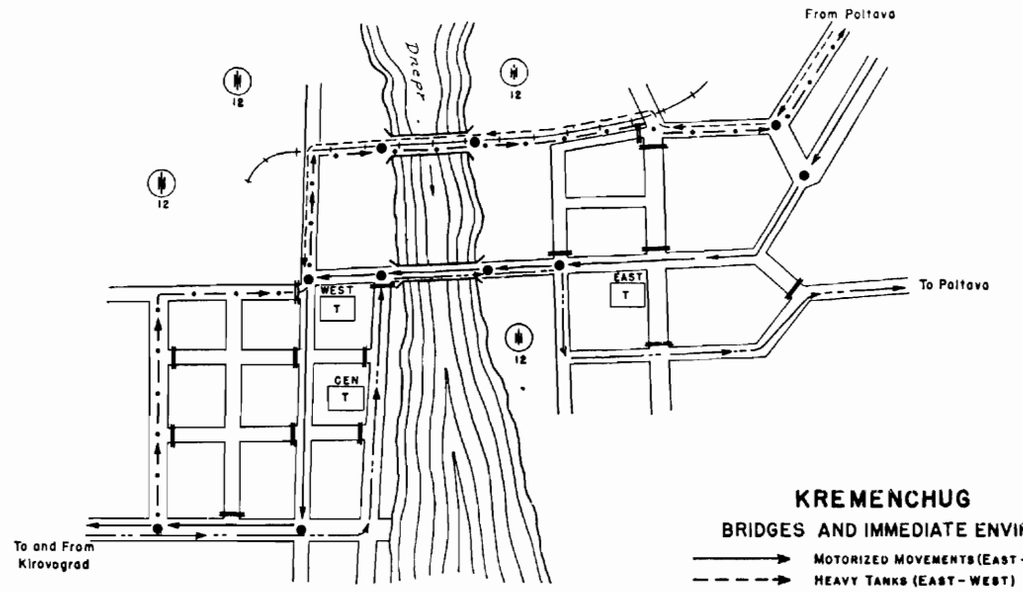


APPROACHES, HOLDING AREAS, AND BARRIER LINES

BARRIER LINES A-E
BARRIER LINES 1-4

5 0 5 10 15 20 25 30
MILES

Insert B

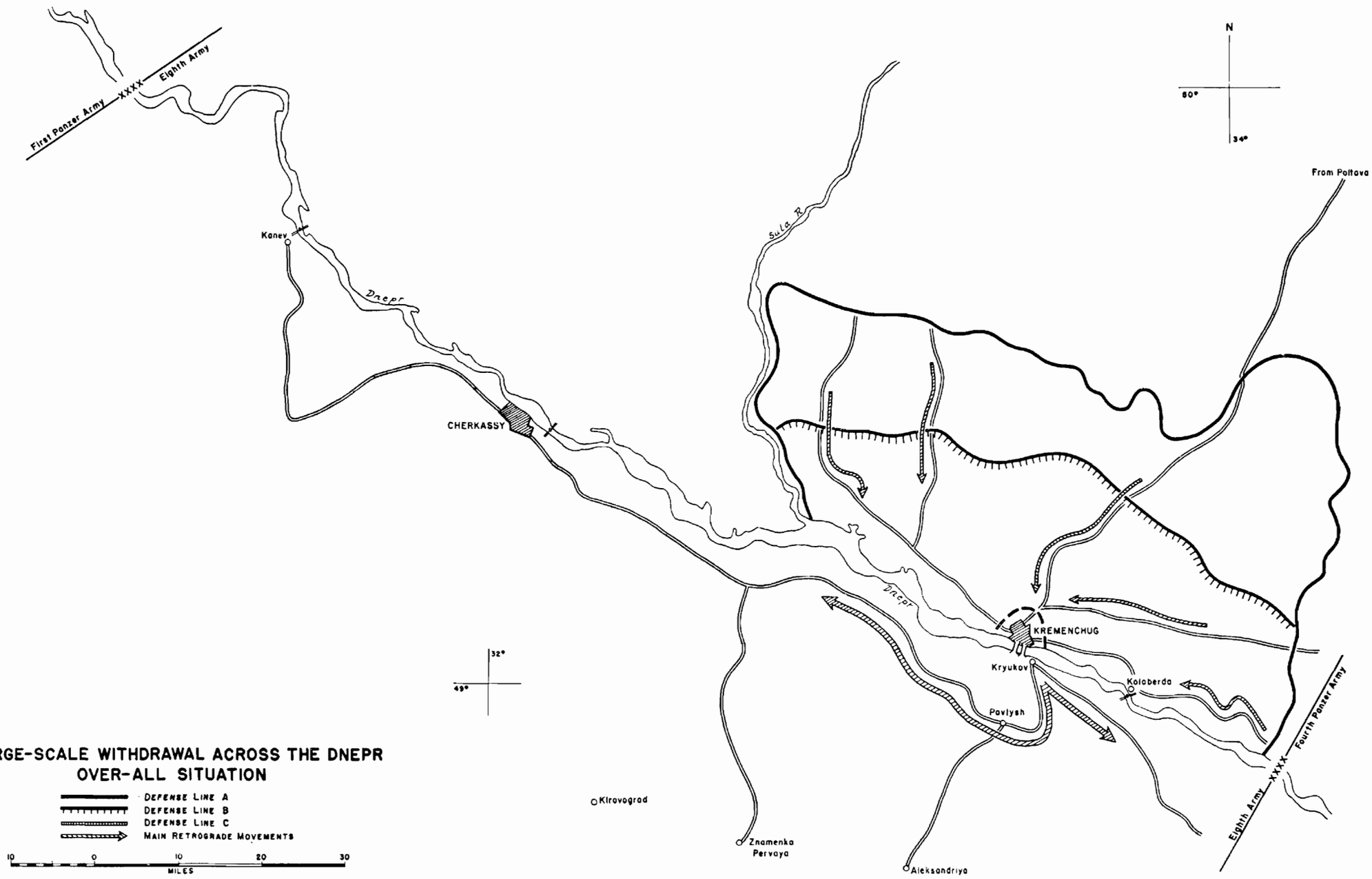


KREMENCHUG

BRIDGES AND IMMEDIATE ENVIRONS

MOTORIZED MOVEMENTS (EAST-WEST)
HEAVY TANKS (EAST-WEST)
MOTORIZED MOVEMENTS (WEST-EAST)
HEAVY VEHICLES (WEST-EAST)
ROAD BARRIERS
TRAFFIC CONTROL POSTS

Map 5



LARGE-SCALE WITHDRAWAL ACROSS THE DNEPR
OVER-ALL SITUATION

DEFENSE LINE A
DEFENSE LINE B
DEFENSE LINE C
MAIN RETROGRADE MOVEMENTS

10 0 10 20 30
MILES