FM 5-135

DEPARTMENT OF THE ARMY FIELD MANUAL

ENGINEER BATTALION ARMORED MECHANIZED AND INFANTRY DIVISIONS

HEADQUARTERS, DEPARTMENT OF THE ARMY
NOVEMBER 1961

FIELD MANUAL
No. 5–135

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D.C., *30 November 1961*

ENGINEER BATTALION ARMORED, MECHANIZED AND INFANTRY DIVISIONS

PART ONE
INTRODUCTION
CHAPTER 1
PURPOSE AND SCOPE

1. Purpose

a. This manual is a guide for the battalion commander, his staff, company commanders, platoon leaders, platoon sergeants, and squad leaders in the organization and operations of the divisional engineer battalion organic to the infantry division, mechanized division, and armored division.

b. It also contains information for the commander and staff officers of the armored, infantry, and mechanized divisions on the tactical employment of the division engineers.

c. Users of this manual are encouraged to submit recommended changes or comments to improve the manual. Comments should be keyed to the specific page, paragraph, and line of the text in which change is recommended. Reasons should be provided for each comment to insure understanding and complete evaluation. Comments should be forwarded directly to Commandant, USA Engineer School, Fort Belvoir, Va.

2. Scope

a. This manual covers the organization, missions, capabilities, training, employment, and operations of the divisional engineer battalions and their components.

b. It discusses the employment of major items of equipment of the battalions.

c. Duties of the battalion commanders and their staffs also are discussed. Duties of other personnel are not discussed unless they vary from the duties listed in AR 611–101 for officers, AR 611–112 for warrant officers, and AR 611–201 for enlisted men.

d. The discussions of missions, organization, personnel, and equipment are based on the latest issues of tables of organization and equipment (TOE's) at the time the manual was written. All references to TOE's list the basic numbers. Department of the Army Pam 310–7 should be consulted for latest suffixes to the basic numbers.

e. The material presented herein is applicable, without modification, to nuclear and nonnuclear warfare.

CHAPTER 2

ARMY DIVISIONS

3. Primary Mission

The primary mission of the division is the destruction of enemy military forces and the seizure or domination of critical land areas and their populations and resources.

4. Collateral Missions

In addition to its basic combat mission, the division may be employed to accomplish—

a. A show of force.
b. Truce enforcement.
c. International police action.
d. Encouragement of faltering government.
e. Legal occupation.
f. Restoration or order.
g. Protection of personnel and property.
h. Assistance to civil defense efforts.

5. Organization

a. The division consists of a relatively fixed command, staff, and combat and administrative support structure to which are added combat battalions (infantry, mechanized infantry, and/or tank) in proportion and numbers appropriate to the division's mission and its anticipated operational environment. Determination of the types, numbers, and propor-

tions of combat battalions in a particular division is called "tailoring." Making this determination before deploying a division to a particular area of operations is called "strategic tailoring." The transfer of units by higher field commanders from one division to another, or the augmentation of a division from nondivisional sources to meet specific needs, or the streamlining of a division by detaching some of its elements or equipment, is "external tactical tailoring." Grouping appropriate elements of the division under its three brigade and other control headquarters in numbers, types, and proportion appropriate to each brigade or other control units specific mission is "internal tactical tailoring," and is referred to, in this manual, as organization of the division for combat.

b. A division is designated as infantry, mechanized, or armored, depending upon the numbers and types of combat battalions assigned when it is strategically tailored.

c. The divisions are organized with a common division base consisting of the division headquarters and headquarters company, three brigade headquarters and headquarters companies, the division artillery, the support command, aviation, engineer, and signal battalions, an armored cavalry squadron, and a military police company. Some modifications of the administrative support capabilities of the division support command may be required to meet the varying supply and maintenance requirements of differing combinations of combat battalions. Further, items or combat support equipment will vary, depending on the type division; for example, certain items of equipment in the engineer company

in the infantry division differ from those of an identical company in the armored and mechanized divisions.

d. The purpose of tailoring is to give the division and its subordinate units the capability to perform specific missions in an anticipated operational environment. Examples of divisions tailored as infantry, mechanized, and armored are shown in figures 1, 2, and 3.

e. Within the division, the three brigade headquarters are the command elements which form the nuclei around which the combat and combat support elements of the division are organized to perform specific missions. The brigade consists of a relatively fixed command and staff structure to which combat, combat support, and administrative support elements are attached or placed in support.

f. The division support command consists of a relatively fixed command and staff structure and functionalized administrative support units appropriate to support the division. Support elements are capable of fragmentation in order that functional support units may be detached to the brigades.

g. Since the organization, strength, and equipment of the division are based upon its contemplated mission and the operational environment, its capabilities and limitations will depend upon the manner in which it has been strategically, or externally tactically tailored. The lists of capabilities and limitations which follow are guides to the conditions under which the variously tailored divisions might be employed. All divisions are capable of employment under conditions of nuclear or nonnuclear warfare.

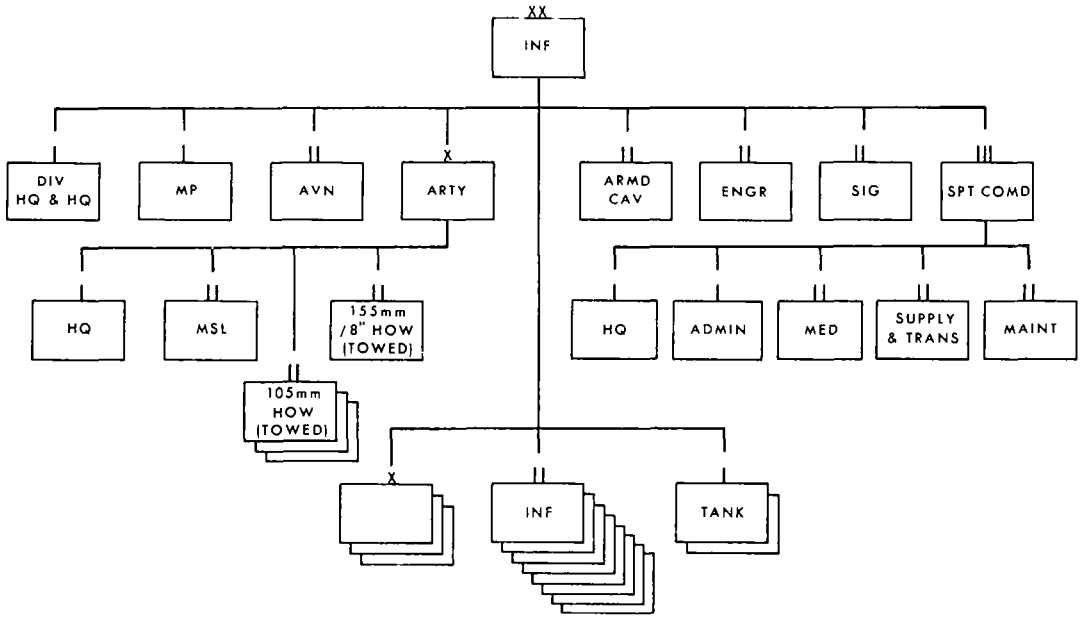


Figure 1. Infantry division.

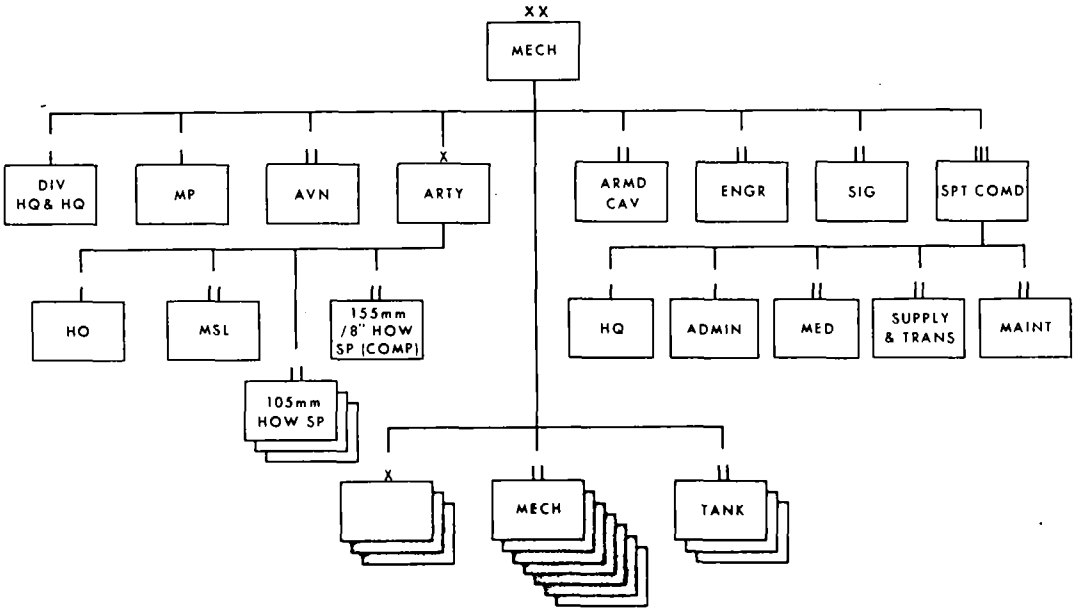


Figure 2. Mechanized division.

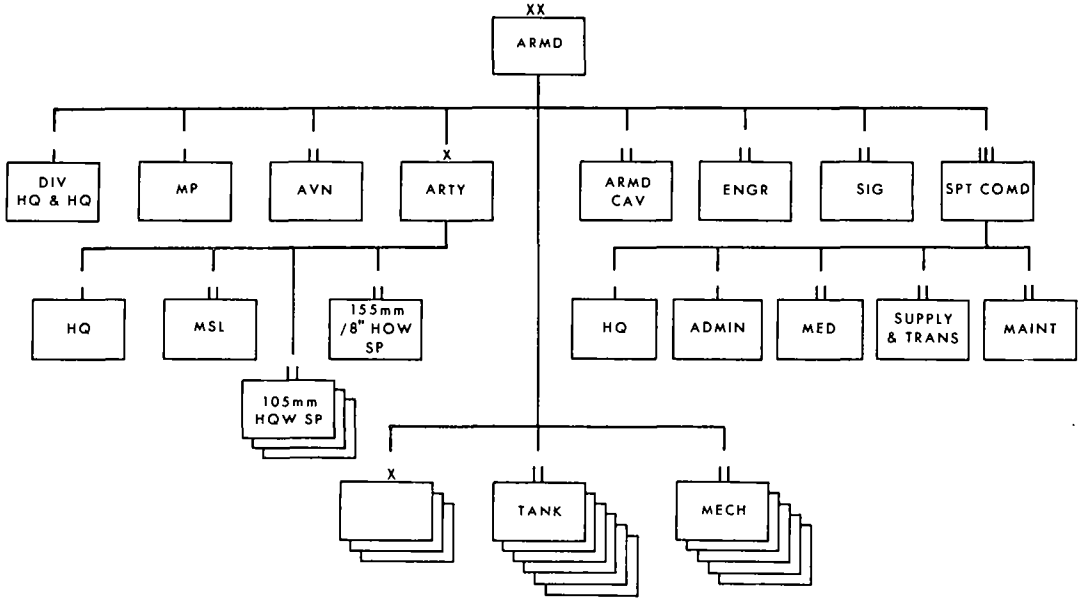


Figure 3. Armored division.

6. Capabilities and Limitations of the Infantry Division

A division tailored as an infantry division (fig. 1) has the following capabilities and limitations:

a. Capabilities.

(1) Sustained combat against similarly, or less well, equipped ground forces.
(2) Ground operations in difficult weather and terrain.
(3) Army airmobile operations.
(4) As a part of a joint force, amphibious operations.
(5) As a part of a joint force, airborne operations.
(6) Control and administration of additional combat battalions.
(7) Control of enemy populations.
(8) Restoration of order.
(9) Operations with severely austere logistical support.

b. Limitations.

(1) Limited vehicular mobility.
(2) Limited protection against tanks.
(3) Limited protection against artillery and nuclear effects.

7. Capabilities and Limitations of the Mechanized Division

A division tailored as a mechanized division (fig. 2) has the following capabilities and limitations:

a. Capabilities.

(1) Sustained combat against most types of ground forces.
(2) Rapid movement.

(3) Wide dispersal.
(4) Rapid, deep penetration.
(5) Rapid pursuit.
(6) Exploitation of successes, including effects of nuclear, nonnuclear and chemical fires.
(7) Covering force operations.
(8) Mobile defense.
(9) Mobile counterattack over difficult terrain.
(10) As a part of a joint force, amphibious operations.
(11) Relatively good protection against nuclear and artillery effects.
(12) Adaptability to army airmobile operations.
(13) Control and administration of additional combat battalions.
(14) Adaptability to employment in joint airborne operations.

b. Limitations.

(1) Loss of much of its striking power, its ground mobility, and for all practical purposes, its capability to fight as a mechanized infantry division when employed in airmobile operations.
(2) Restricted vehicular mobility in jungle, dense forest, untrafficable and steeply rugged terrain, and over water obstacles.
(3) Considerable logistic support required in order to maintain its mobility and striking power. This includes rail or highway transport of track vehicles for long administrative moves.
(4) Limited protection against armor.

8. Capabilities and Limitations of the Armored Division

A division tailored as an armored division (fig. 3) has the following capabilities and limitations:

a. Capabilities.

(1) Sustained combat operations against any type of opposing ground forces.
(2) Wide dispersal.
(3) Rapid movement.
(4) Optimum protection against antitnak, artillery, and nuclear effects.
(5) Rapid, deep penetration.
(6) Rapid pursuit.
(7) Exploitation of successes, including effects of nuclear, nonnuclear, and chemical fires.
(8) Covering force operations.
(9) Mobile defense.
(10) Mobile counterattack force.
(11) Mobile maneuvering force.
(12) As a part of a joint force, amphibious operations.
(13) Control and administration of additional combat battalions.

b. Limitations.

(1) Not airtransportable.
(2) Restricted mobility in jungle, dense forest, untrafficable and steeply rugged terrain, and over water obstacles.
(3) Heavy logistical support required. This includes rail or highway transport of track vehicles for long administrative moves.

9. Organization for Combat

a. The Army division has no fixed organization for combat. It is employed as a flexible force of

combined arms. The field army or corps commander may tailor the division by grouping any desired combination of combat maneuver battalions. The division can absorb additional combat, combat support, and administrative support units required by a specific mission. Brigades are tailored to fit the mission and situation. Supporting elements may be attached to brigade or placed in support as appropriate. The organization for combat is modified as required during operations. Battalions and companies may be employed as pure units or cross-attached to form tank/infantry teams.

b. There are six control headquarters in the division. These are division headquarters, division artillery headquarters, support command, and three brigade headquarters. During tactical operations, five major tactical groupings normally are employed—division troops, support command, and the three brigades. Additional tactical groupings may be organized when suitable control headquarters are attached to the division; for example, an attached armored cavalry regiment, or by using organic units, such as the armored cavalry squadron, in an independent or semi-independent role.

c. The division commander makes the normal analysis of factors contained in the estimate of the situation. In addition, he analyzes each factor to decide what grouping of armor, infantry (all types), armored cavalry units, engineer, artillery, aviation, signal, and administrative support units within each brigade will best accomplish the division mission. Specifically, he seeks to determine whether the situation requires that the brigade be organized with

a preponderance of one particular type of unit, or whether the proportion of armor to infantry should be approximately the same in each brigade.

d. Division troops include those headquarters and combat and combat support troops not in support of the brigades or the support command. Normally, when organizing the division for combat, the division artillery headquarters is under division control and a part of division troops.

e. Details on the organization and operations of the support command are contained in FM 54–2.

f. Particular considerations in division organization for combat in offensive, defensive, and retrograde operations are discussed in FM 61–100.

g. The brigade is a tailored command. Combat and combat support elements are grouped as required to fit the assigned tactical mission and the area of operations. These units may be employed as pure units or organized into combined arms forces consisting of tanks and infantry, supported by artillery and engineers. The combined arms force formed with a combat maneuver battalion headquarters and one or more organic or attached companies is called a battalion task force and operates under the brigade commander.

h. There is no definite rule to determine the size and composition of a battalion task force. The brigade commander attaches, or places in support, units of the proper type and number to carry out the assigned mission. The combat maneuver battalion commander normally will organize his battalion task force for combat by cross-attachment of platoons of his organic or attached maneuver companies to form company teams.

i. A company team is a tactical grouping of units under one company commander formed for a specific operation or mission. The company team consists of a complete company with one or more nonorganic units attached, or a company minus one or more organic units with one or more nonorganic units attached.

CHAPTER 3

DIVISIONAL ENGINEER BATTALION

10. Organization

The infantry division engineer battalion is organized under TOE 5–155 and the mechanized and armored division engineer battalions are both organized under TOE 5–145. All three consist of a headquarters and headquarters company, four identical engineer companies minus one engineer company, reduced strength and one bridge company (fig. 4).

11. Mission

a. To increase the combat effectiveness of the division by means of general and specialized engineer work.

b. To undertake and carry out combat missions when required.

12. Capabilities and Limitations

The divisional engineer battalion has the following capabilities and limitations:

a. Capabilities.

(1) Engineer staff planning for the division.

(2) Supervision of organic and attached engineer troops.

(3) Construction, repair, and maintenance of roads, bridges, fords, and culverts.

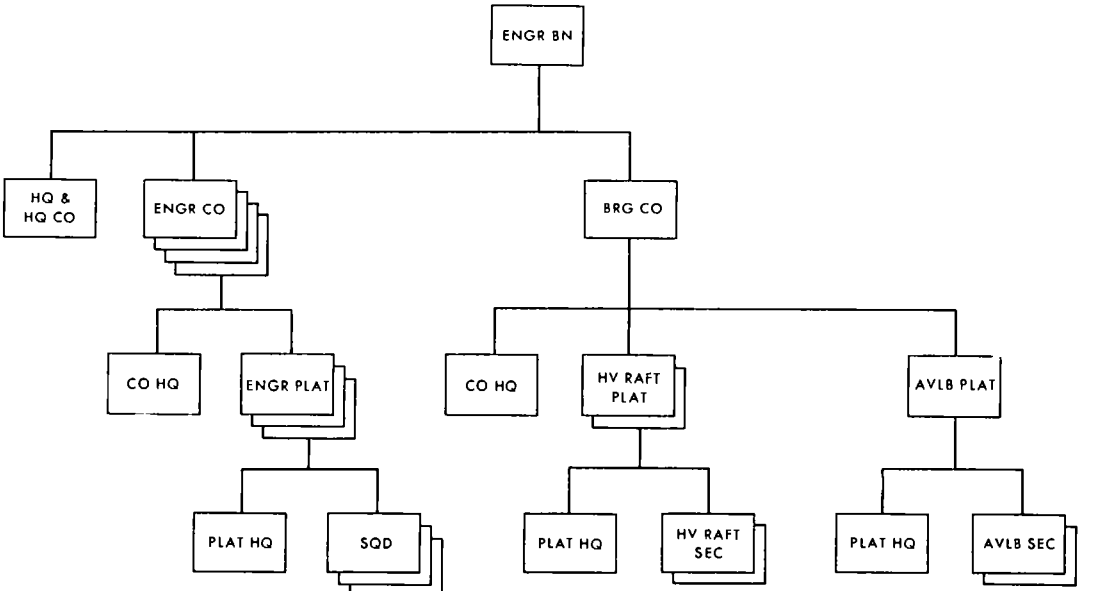


Figure 4. Organizational chart, divisional engineer battalion.

(4) Support of hasty stream crossing operations with boats, rafts, and bridges; coordination of organic and attached engineer troops in support of deliberate stream crossings.
(5) Bridging for passage of short gaps.
(6) Assistance in the emplacement and removal of obstacles, including mines and booby-traps.
(7) Preparation and execution of demolitions, including employment of nuclear demolitions.
(8) Performance of engineer reconnaissance and intelligence missions.
(9) General construction, including construction of air landing facilities.
(10) Water purification and supply.
(11) Assistance in the assault of fortified positions and demolitions of obstacles.
(12) Technical assistance to other troops of the division in construction of obstacles, fortifications, emplacements, camouflage, deception devices, and other engineer matters, including recommendations for employment of engineer troops. Construction of these facilities when required.
(13) Organizational maintenance repair service for equipment organic to the battalion.
(14) Exploiting locally available sources of materials for construction, fortifications, and camouflage.
(15) Engagement in combat-type missions when required.

b. Limitations.

(1) Requires additional general support in the way of engineer equipment or engineer units from the next higher command echelon to perform missions which are beyond the capabilities of the battalion.

(2) Requires continued aircraft support for engineer reconnaisance, rapid movement of critical materials, displacement of special teams, and assistance in control.

(3) For combat missions requires area fire weapons (mortar and artillery support) and time to reorganize for combat. Also requires additional communication personnel and equipment to get into the division air request net for tactical air support.

13. Equipment

The divisional engineer battalion contains the weapons, construction equipment, handtools, power-tools, bridging, and other specialized equipment that will enable it to accomplish day-to-day engineer missions in support of the division. In situations where the battalion lacks the means to provide the engineer support required by the division, the next higher command echelon must provide additional equipment or additional engineer units to accomplish the mission. The applicable TOE's should be consulted to determine the amount and types of equipment authorized in the various units of the battalions. Frequently, a theater commander or other major commander authorizes additions to or

deletions from the organizations under his command; therefore, the equipment may vary from command to command. The battalion contains the following major items of equipment, as listed in the appropriate TOE's:

a. Armored vehicle launched bridges (AVLB) and launchers.

b. Assault boats.

c. Basic utility trailer, 2½-ton.

d. Carpenter and pioneer toolkits.

e. Chain saws.

f. Combat engineer vehicles.

g. Crane shovels.

h. Contact second echelon maintenance vehicles.

i. Demolition equipment sets.

j. Electric tool sets.

k. Five-ton trucks, dump.

l. Five-ton truck tractors.

m. Fuel trucks, 1,200 gallon.

n. Light tactical rafts.

o. Medium tractors with angledozers.

p. Mine detectors.

q. Minefield marking sets.

r. Mobile assault bridge vehicles.

s. Personnel carriers (mechanized and armored divisions only).

t. Pneumatic tool and compressor outfits.

u. Road graders.

v. Scoop loaders.

w. Tank recovery vehicles.

x. Twenty-five-ton, low-bed semitrailers.

y. Water purification sets.

14. Employment

a. The engineer battalion is a self-contained unit designed to provide engineer combat support in the forward portion of the battle area. It has the ability to overcome a great variety of obstacles to the movement of the division and hence contributes to the mobility of the division and its capability to maneuver in offensive action. In defense, retrograde, or denial operations, it has the capability to materially impede the progress of enemy ground operations by blocking critical avenues of approach of enemy ground combat vehicles.

b. The engineer battalion operates as part of division troops. Its companies are placed in support of or attached to the brigades and combat elements of the division. The headquarters company and the bridge company contain engineer construction equipment and stream crossing equipment with operators and specialists to supplement appropriately the engineer companies for specific tasks.

c. Engineer companies may be normally associated with particular brigades so as to increase operational efficiency. The company performs the unit engineer function of tactical engineer staff planning and execution of the engineer missions in this role. Continuous liaison is maintained by the company to the brigade for this purpose.

d. When supporting a brigade, the engineer company is employed under centralized control of the engineer battalion. An engineer company may be attached to a brigade for specific operations or when centralized battalion control is impracticable. Platoons are placed in support of battalion or task force operations for specific missions.

e. Engineer teams of less than platoon size normally are attached to combat elements. This is necessary when specific tasks require close command control. In the offensive, such tasks may consist of bridging, assault breaching, or demolitions. In defense or retrograde, the execution of barrier demolitions and the employment of ADM may require mission type attachment.

f. Engineer troops engage in limited combat incident to accomplishment of their normal missions. Early relief of engineer elements is made by other combat elements to permit continuation of engineer missions. When exigencies of the situation require deliberate engagement of the engineer battalion in an infantry mission, it will be done only with division command authority. It is desirable to preserve unit integrity.

g. When the armored cavalry squadron or task organizations are committed on separate missions, an appropriate engineer element is attached to the force. Attached engineers should be mounted in vehicles similar in type to those of the supported force to insure the same tactical mobility.

h. In airmobile operations, as in airborne operations, the amount of engineer effort required should be considered and planned for. Engineer support may be required at loading areas and access routes thereto. The extent of engineer effort that is or will be required at landing/drop zones also must be considered when organizing airmobile task forces so that sufficient engineers and engineer equipment are provided.

i. When the requirement for engineer support within the division exceeds the capability of the divi-

sional engineer battalion, additional engineer support must be provided by the next higher echelon of command.

(1) The additional engineer support to the division may range from reinforcement of the combat engineer strength to the provision of such support as bridging, road construction, debris removal, erection of barriers, mapping and other engineer intelligence, survey, camouflage, and deception.

(2) Nondivisional engineer units normally are placed in support of the division. However, engineer units are attached when their missions necessitate close command control in execution. Hasty river crossing missions, barrier demolition tasks, or use of ADM are examples of such situations. All engineer combat support provided to the division is coordinated by the division engineer.

15. Mobility

The divisional engineer battalion is 100 percent mobile with organic transportation. It is 90 percent air transportable in 50,000 pound lift aircraft in Phase III of an airborne operation.

PART TWO
ORGANIZATION
CHAPTER 4
BATTALION HEADQUARTERS

16. Organization

The engineer battalion headquarters is organized from the personnel and equipment authorized for that purpose in the headquarters and headquarters company. TOE 5–156 and TOE 5–146 authorize equipment and personnel necessary to provide for a battalion command section, a division engineer section, and a battalion staff section in the divisional engineer battalion of the infantry division, and the mechanized and armored divisions. Figure 5 shows the command and staff relationship of the battalion.

17. Mission and Capabilities

The battalion headquarters has the mission and the capability of—

a. Performing engineer staff planning for organic and attached engineer troops and supervising these troops.

b. Providing technical advice on engineering matters to supported organizations.

c. Conducting engineer reconnaissance, including special ADM reconnaissance, and intelligence for the division.

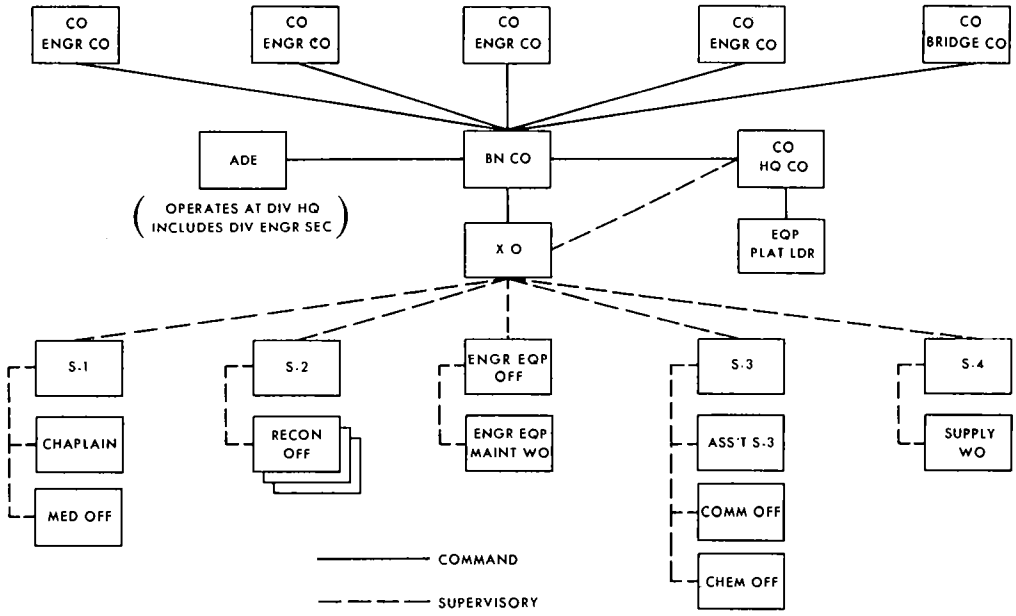


Figure 5. Command and staff relationship.

d. Furnishing organizational maintenance and repair service for equipment organic to the battalion.

e. Providing potable water for the division.

f. Undertaking and carrying out combat missions when required.

18. Responsibilities of Commander

The battalion commander has two separate responsibilities. He is the commanding officer of the divisional engineer battalion, and he is the division engineer on the division special staff. He must organize his staff so that its members can help him carry out both responsibilities, and all staff functions are efficiently coordinated.

a. As battalion commander, he—

(1) Directs, controls, and supervises the activities of all organic and attached engineer troops and their equipment in the performance of the battalion mission to provide combat support as enumerated in paragraph 12.

(2) Is responsible for the preparation of battalion policies, plans, and orders, including the battalion standing operating procedure (SOP).

(3) Visits and inspects his troops and supervises their activities.

(4) Makes personal reconnaissance.

(5) Directs liaison activities of battalion personnel and performs personal liaison as required.

b. As division engineer (special staff), he—

(1) Advises the commander and staff on engineer matters.

(2) Is responsible for the preparation of appropriate annexes to division operations and administrative orders.
(3) Makes plans and recommendations pertaining to requirements for, and employment of, engineer troops.
(4) Provides engineer staff planning and supervision for organic and attached engineer troops.
(5) Coordinates requirements for engineer equipment and supplies.
(6) Assists in barrier and denial operations. This assistance includes advising the operations officer concerning implementation; supervising the technical aspects of employment; preparing plans and orders; and as appropriate, assisting in the location and construction of obstacles (including atomic demolition munitions) which require special skills and equipment.
(7) Supervises the engineer operations pertaining to classification of roads and bridges, the preparation and posting of permanent signs for route marking and traffic control on temporary and permanent routes.
(8) Makes recommendations for the preparation of fortifications and camouflage.
(9) Prepares plans for construction and placement of deceptive devices.
(10) Makes recommendations on river-crossing operations.
(11) Makes recommendations on map coverage and engineer intelligence.

(12) Is responsible for collecting, evaluating, and disseminating information on enemy engineer material and activities.

(13) Is responsible for engineer reconnaissance and for preparing terrain analyses; advises the division commander and staff on the effects of the terrain on division operations.

(14) Supervises, within the limits prescribed by the division commander, engineer and camouflage activities of divisional units.

(15) Designates the emplacing and firing unit when the division commander has decided to employ ADM; coordinates on supply; and coordinates on moving equipment, materials, and personnel to support the mission. He furnishes the commander technical information on the quantity, type, and yield of weapons; height or depth of burst; emplacement site; on-call detonation or time of burst; troop and safety precautions; special equipment needed; and anticipated results.

19. Assistant Division Engineer (ADE)

As the principal engineer representative at the division command post, the assistant division engineer relieves the division engineer of many of his routine duties at division headquarters. In accordance with the policies of the division engineer, the ADE—

a. Advises the division commander and division staff on engineer matters.

b. Maintains communication and liaison with the engineer battalion, corps engineer section, and army

engineer section and insures timely flow of engineer information.

c. Keeps the division engineer informed on division staff actions and planning responsibilities.

d. In conjunction with the battalion S2, S3, and S4, prepares engineer annexes and portions of the division operations and administrative orders and plans.

20. Executive Officer

The executive officer is normally second in command. In accordance with the policies of the battalion commander, he—

a. Assists the commander in exercising his command functions.

b. Supervises and coordinates the activities of the battalion staff.

c. Coordinates all liaison activities.

21. Adjutant (S1)

The adjutant handles the battalion administrative matters. Specifically, he—

a. Consolidates and forwards information on the assignment, promotion, transfer, retirement, and discharge of personnel.

b. Processes awards of decorations, citations, commendations, and other honors.

c. Processes applications for leave.

d. Maintains current information on military justice matters.

e. Maintains current information on strength, casualties, prisoners of war, and other statistics.

f. Makes arrangements for receiving, processing, assigning, and quartering replacements.

g. Lays out the command post and establishes routine procedures affecting its operation.

h. Makes recommendations on the shelter, command, and administration of quartering areas.

i. Operates the battalion postal service.

j. Supervises the collection and evacuation of prisoners of war.

k. Maintains the battalion journal.

l. Is responsible for the publication and authentication of all orders and instructions of the commander except combat orders and certain technical instructions.

m. Supervises athletics, entertainment, and other morale building activities when no other officer is designated for these duties.

n. Is responsible for the education functions of the battalion.

o. Maintains close liaison with the division administration company of the division support command on all personnel matters through the personnel and staff NCO of the battalion administrative section.

22. Intelligence Officer (S2)

The intelligence officer directs the activities of the intelligence section and furnishes the battalion commander detailed information on which to base his advice to the division commander. He—

a. Collects, evaluates, and disseminates engineer information.

b. Keeps the S2 situation and radiological maps and the S2 journal.

c. Trains others in intelligence work.

d. Collects and distributes intelligence data under

the supervision of the division G2, in accordance with the policies of the division commander.

e. Conducts, with the assistance of three reconnaissance officers, continual reconnaissance throughout the division sector during combat operations.

f. Prepares, in conjunction with the S3, engineer recommendations for division main supply routes (MSR's), other routes, and traffic circulation.

g. Coordinates with S3 and S4 on security measures for the movement and storage of ADM in the battalion.

h. Coordinates activities of the section with the operations section.

i. Procures maps and distributes them within the battalion.

23. Operations Officer (S3)

As supervisor of the operations section, the operations officer—

a. Plans battalion training and assists in its supervision.

b. Allocates engineer troops and construction equipment to various tasks.

c. Prepares battalion operations orders.

d. Arranges details for movement of the battalion under tactical and nontactical conditions.

e. Prepares plans for accomplishing engineer tasks.

f. Recommends security measures for battalion headquarters.

g. Keeps the engineer operations situation map.

h. Prepares tactical and technical reports as the battalion commander directs.

i. Assists the division staff in nuclear target analysis and selection.

j. Assists in preparing recommendations on traffic circulation within the division.

k. Plans for the use of ADM and coordinates with S2 on security and S4 on movement and storage of ADM in the battalion.

l. Coordinates activities of the companies with supporting units.

24. Supply Officer (S4)

The supply officer plans and coordinates requirements for engineer maintenance and supply activities in the battalion. He coordinates with S2, S3, subordinate commanders, and the supply and transportation battalion of the division support command on all supply matters. The S4 normally will procure all classes of supply (except medical) for the battalion through the supply and transportation battalion, which provides and operates division distributing points for class I, III, and fast moving class II and IV supplies in the brigade trains and in the division support areas. The S4—

a. Supervises the supply section of the battalion and is responsible for its functioning.

b. Coordinates and supervises procurement of all classes of supplies (except medical) for the battalion.

c. Supervises water supply to the division.

d. In coordination with the S2 and S3, studies and collects information on the general supply situation, including data on local resources.

e. Coordinates with S2 and S3 on movements of ADM from special ammunition supply points (SASPs), during subsequent moves, and while stored under battalion responsibility.

f. Recommends allocation of nonorganic transportation within the battalion.

g. Supervises procurement of repair parts supply as needed by the battalion. These repair parts and the third echelon maintenance support for all equipment of the battalion (except medical and cryptographic) are furnished by the maintenance battalion of the division support command. The S4 ascertains the battalion requirements for repair parts and third echelon maintenance from the engineer equipment officer and the communication officer.

h. Coordinates salvage and evacuation operations of battalion equipment with the maintenance battalion of the division support command.

i. Supervises and inspects food service activities.

j. Advises the battalion commander and subordinate units on matters pertaining to supply and food service.

25. Communication Officer

The communication officer supervises the communication section; and, as staff officer, he supervises all communication activities within the battalion. He also—

a. Supervises the organizational maintenance of all signal equipment in the battalion.

b. Advises the battalion commander on signal communication techniques.

c. Makes plans and recommendations for the engineer communication system and establishes, operates, and maintains the system.

d. Supervises technical training of communication personnel in the battalion and supervises and

instructs communication center personnel in the functions of a message center.

e. Gives technical assistance to S4 on supply of signal communication materials for the battalion.

f. Makes recommendations for the initial and successive locations of the battalion command post (CP) if the locations are not prescribed by higher authority.

26. Chaplain

The chaplain is adviser to the battalion commander and staff on all matters pertaining to religion, welfare, and morale in the command. He—

a. Conducts religious services, including funerals.

b. Corresponds with relatives of deceased personnel.

c. Coordinates the religious work of various welfare societies.

d. Prepares reports on religion and morale activities of the command.

e. Prepares estimates of funds for religious activities which are not specifically charged to other agencies of the command.

27. Battalion Surgeon

The battalion surgeon supervises the medical services of the battalion. He serves as adviser to the battalion commander and staff on matters affecting the health of the command and the sanitation of the battalion area. In addition to his special staff duties, he directs the activities of the battalion medical detachment. Specifically, the battalion surgeon—

a. Instructs battalion personnel in personal

hygiene, military sanitation (FM 21–10), and first aid.

b. Makes medical and sanitary inspections, including inspections of water points.

c. Establishes and operates the battalion aid station and dispensary.

d. Requisitions medical equipment and supplies for the battalion through the division medical battalion in the division support command.

e. Prepares the battalion medical plan.

f. Supervises the collection and evacuation of wounded, the maintenance of radiological exposure records, the preparation of casualty lists, and the preparation of other records pertaining to the medical service.

28. Engineer Equipment Officer (EEO)

The EEO advises the commander, staff, and subordinate commanders within the battalion on the technical aspects of vehicle and equipment operations and maintenance. Specifically, he—

a. Coordinates and supervises the battalion vehicle and equipment maintenance program.

b. In coordination with S3, directs training for drivers, mechanics, and operators.

c. Keeps S3 and S4 continually informed of the status of vehicles and equipment.

d. Assists the engineer equipment maintenance officer, the equipment platoon leader, and equipment supervisory personnel of the companies as required.

29. Other Special Staff Officers

Other officers may have special staff responsibilities in that they advise the commander on

matters related to the employment of their units.

a. Chemical Officer. The chemical officer, located in the battalion S3 section, is the battalion commander's adviser on all aspects of chemical, biological, and radiological operations. As such he advises the commander and staff in the evaluation of enemy CBR organization, weapons, equipment, tactics, and techniques. Specifically, he—

(1) Advises on the effects of enemy and friendly CBR weapons, area and duration of effects, target selection, and munitions requirements for toxic, flame, and smoke weapons.
(2) In coordination with S3, is responsible for the organization and training of individuals and units in CBR operations. This includes training of company CBR survey teams and monitoring teams.
(3) Is responsible for coordination of CBR surveys and maintenance of radiological and chemical contamination maps.
(4) Interprets CBR information and advises the commander and staff and appropriate higher headquarters on these matters.
(5) Supervises the technical training and operational implementation of CBR measures.
(6) Provides technical advice and staff supervision over field methods of decontamination and impregnation, issue, installation, and maintenance of CBR equipment in the battalion.
(7) Advises the commander and staff on the utilization of CBR trained personnel.
(8) Prepares the battalion CBR SOP.
(9) Prepares radiological fallout predictions.

(10) Disseminates the Fallout Prediction Message and the Effective Wind Message to subordinate units.
(11) Prepares recommendations for the integration of persistent chemical agents in minefield and barrier plans.
(12) Recommends CBR reconnaissance of routes and areas.
(13) Assists in the preparation of records and reports regarding CBR casualties.
(14) Maintains records of radiation dosage status of subordinate units.
(15) Monitors the requisitioning and distribution of CBR equipment and supplies.

b. Bridge Company Commander. The bridge company commander advises the battalion commander on the proper utilization, capabilities, and limitations of assault bridging.

c. Liaison Officers and Commanders of Attached Units. The liaison officers and commanders of attached units advise the battalion commander on the capabilities of their units.

d. Sergeant Major. The sergeant major is the senior noncommissioned officer assigned the divisional engineer battalion. He functions under the direction of the battalion commander. As senior NCO, he is expected to make on-the-spot corrections and decisions, accordingly, and he maintains a direct liaison with all unit first sergeants and staff section sergeants within the battalion. He evaluates and makes recommendations on the overall discipline of the enlisted personnel of the battalion with emphasis on the conduct and discipline of the noncommissioned officers. When directed, he actively

assists in the investigation of any charges involving noncommissioned officers and functions as a member of any board pertaining to noncommissioned officers. The sergeant major monitors all battalion formations and drill periods. He orients all incoming enlisted personnel in the history and traditions of the battalion. He supervises the unit noncommissioned officers' mess and should be a member of the unit fund and character guidance councils.

30. Operation

The battalion commander organizes and locates his headquarters in a manner best suited for carrying out his staff and command functions.

a. Location. In addition to other considerations, the headquarters is located to facilitate communication with the main division command post, subordinate units, the support command, and other supporting engineer units. Frequently, the situation or the disposition of the division will dictate the organization and operation of the headquarters in one, two, or three echelons. Fragmentation of the headquarters to the extent that effective operation is impaired must be avoided.

b. Echelons.

(1) The headquarters may be organized as illustrated in figure 5 when it is to operate from one location (par. 16).

(2) Figures 6 and 7 illustrate the organization and location of the headquarters for operation in two and three echelons. The battalion commander may organize his headquarters into two echelons when frequent moves are anticipated, for reasons

ENGR BN, FORWARD	ENGR BN, REAR
BN COMD BN XO ADE (AT DIV MAIN CP) S1 S2 S3 SMAJ RCN OFF CHEM OFF COMM OFF ENGR EQP OFF BN SURG HO CO COMD *BRG CO COMD	S4 (RESPONSIBLE TO BN COMD FOR OPERATION OF BN, REAR) ENGR EQP MAINT OFF COMM NCO HQ CO XO *EQP PLAT LDR CHAPLAIN

* These personnel remain with their units except when needed at the CP.

NOTE: The battalion forward command post (CP) is located near the division main CP. The battalion, rear, is in the division support command area. All personnel and equipment which are not required for the operation of the forward echelon are placed with the rear echelon.

Figure 6. Organization of battalion headquarters in two echelons.

ENGR BN COMD GP	ENGR BN, FORWARD	ENGR BN, REAR
BN COMD ADE (AT DIV CP) S2 ASS'T S-3 COMM OFF RCN OFF BRG CO PLAT LDR	BN XO S1 S3 CHEM OFF SMAJ COMM NCO HQ CO XO BRG CO COMD ENGR EOP OFF BN SURG	S4 HQ CO COMD ENGR EQP MAINT OFF EQP PLAT LDR CHAPLAIN

Figure 7. Organization of battalion headquarters in three echelons.

of dispersion, to improve communications and control, or to stay in close touch with an operation such as a river crossing. In any of these situations, the commander keeps in the forward echelon the staff officers and other personnel he needs to assist him in fulfilling his command and staff responsibilities. In a fast-moving situation, the battalion commander may be operating with the division commander and his command group. In such a situation, the division engineer organizes the entire headquarters into three echelons to facilitate control and movement.

c. Layout. The battalion headquarters or command post (CP) is laid out to facilitate security, dispersion, concealment, movement to and from the area, and movement within the area. Figure 8 illustrates a command post layout when the CP is in one echelon. The assistant division engineer (ADE) is located at the division main command post.

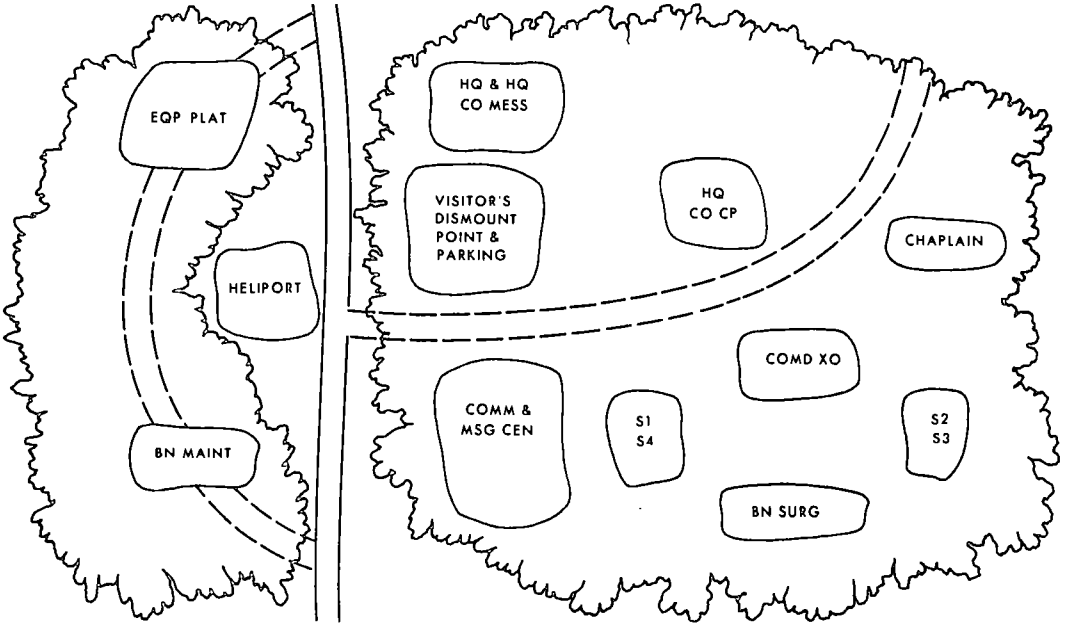


Figure 8. Battalion command post layout—one echelon.

CHAPTER 5

HEADQUARTERS COMPANY

31. Organization

The headquarters company of the divisional engineer battalion (infantry) is organized under TOE 5–156; that of the engineer battalion of the mechanized division and the armored division is organized under TOE 5–146. The subordinate elements of the three companies are identical (fig. 9). The company is composed of the officers and the enlisted men who are assigned to the battalion staff sections, the company headquarters, and the equipment platoon.

32. Mission

a. The headquarters company has the mission of providing administration, communications, reconnaissance, maintenance support, supply, medical service, and supplemental engineer equipment for the battalion, and engineer technical support for the division. Further, the company undertakes and carries out combat missions when required. The company commander, with the aid of his personnel in the company headquarters, is responsible for the feeding, clothing, conduct, administration, and certain training of the personnel assigned to the company. Personnel assigned to the staff sections of the battalion headquarters work under the control of the

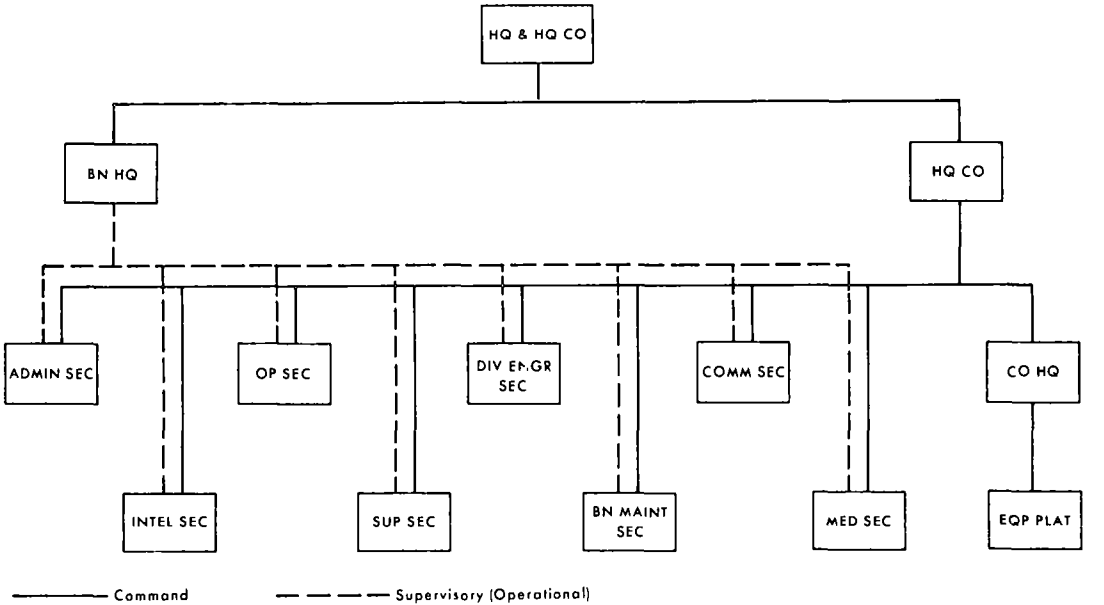


Figure 9. Headquarters and headquarters company, divisional engineer battalion.

respective staff officers who are responsible for training their staff sections.

b. Headquarters company also operates an equipment pool which is located in the equipment platoon. The battalion maintenanee section performs second echelon maintenanee on all ordnance and engineer equipment in headquarters company.

c. The equipment platoon eontains general engineer equipment sueh as dozers, cranes, graders, dump trueks, and a compressor. The platoon furnishes equipment, with operators, to the lettered companies and the bridge company to perform engineer tasks. The platoon can accomplish independent tasks when these tasks are routine and only require engineer equipment.

33. Capabilities

The headquarters company is eapable of the following:

a. Furnishing supplemental eonstruetion equipment and operators to elements of the battalion.

b. Furnishing teehnieal engineer adviee to the division.

c. Providing personnel for battalion staff seetions to perform the tasks outlined in paragraph 17.

d. Providing seeurity for the battalion headquarters eommand post.

e. Assisting in emplaeing and removing obstaeles, including mines and boobytraps.

f. Performing eombat missions when required.

34. Equipment

In addition to the equipment of the equipment platoon mentioned in paragraph 32*c*, the headquar-

ters company furnishes the following major items of equipment to the appropriate staff sections of the battalion:

a. Communications equipment.

b. Water purification equipment.

c. Limited mobile repair and maintenance equipment.

d. Tank and vehicle recovery equipment.

e. Survey equipment.

f. Individual and crew-served weapons.

35. Employment

The headquarters company provides the operating personnel for the various staff sections of the battalion headquarters. In addition to providing command of personnel in the company, it also provides administrative services such as mess, supply, and quarters for all personnel of headquarters and headquarters company and attached elements. The company supports all assigned missions and tasks of the battalion to the fullest extent of its capabilities and in the priority established by the battalion commander. Close liaison among the staff sections and supported elements must be maintained by the company commander and his key personnel.

CHAPTER 6

ENGINEER COMPANY, DIVISIONAL ENGINEER BATTALION

36. Organization

The engineer company is the basic operating component of the divisional engineer battalion. The engineer company of the infantry division engineer battalion is organized under TOE 5–157 and the engineer company of the mechanized and armored division engineer battalion is organized under TOE 5–147. Each is organized into a company headquarters and three identical engineer platoons, each platoon consisting of a platoon headquarters and three engineer squads (fig. 4). Because of the difference in the mobility of the infantry division as compared to the mechanized and armored division, there are some minor differences in equipment and personnel of the engineer companies.

37. Mission

a. The engineer company is equipped and trained to fulfill its mission of increasing the combat effectiveness of major subordinate combat formations by means of general and special engineer work. It performs the tactical engineer staff planning, supervision, and execution of the engineer combat support mission at brigade or task force level. This company

also undertakes and carries out combat missions when required.

b. The platoon is the main operational component of the engineer company. It performs pioneering and combat missions when operating as a major work element of the company. It also is capable of providing the engineer support normally required by a battalion task force when provisions are made to provide equipment support from the parent company or battalion.

c. The squad is the basic operating and working unit of the platoon. It consists of specialists in combat construction and demolition, including pioneers who are trained to assist in accomplishing combat engineer tasks. In the mechanized and armored divisional engineer battalions, the squad personnel and organic equipment are mounted in an armored personnel carrier, giving the squad cross-country mobility. In the infantry division engineer battalion, the squad personnel and organic equipment are mounted in dump trucks.

38. Capabilities

The engineer company is capable of the following:

a. Performing combat engineer tasks, including repair and maintenance of roads, bridges, ferries, fords, and culverts. When augmented with additional engineer heavy equipment, it can execute more complex tasks such as construction of roads and air-landing facilities.

b. Assisting in emplacing and removing obstacles, including mines and boobytraps.

c. Preparing and executing demolitions, including employment of atomic demolition munitions (ADM).

d. Assisting other troops in construction and em-

placement of fortifications, camouflage, and deceptive devices.

e. Assisting in assault of fortified positions.

f. Conducting engineer reconnaissance.

g. Providing technical advice to supported organizations on engineer matters. This includes recommendations for employment of engineer troops.

39. Equipment

The major items of equipment in each company are as indicated in table I.

40. Employment

a. The engineer company with organic equipment is designed to provide combat engineer support to the brigades or task forces in execution of combat operations. It is reinforced with general or special engineer equipment from the headquarters company or bridge company when necessary to increase the effectiveness of the support rendered.

b. The company normally is employed as a unit in supporting operations but may be attached to major subordinate combat formations for separate operations. One reinforced engineer company normally supports each committed brigade or task force.

c. The engineer company supporting an attacking combat formation should be disposed well forward in the tactical column in order that it may be made immediately available for essential engineer tasks. A typical disposition would be the engineer platoons, with assault bridging, marching immediately to the rear of the leading companies in the task force. The company minus would be located in the vicinity of the brigade or task force command post (CP). The

Table I. Company Equipment

Element	Item	Inf type engr co	Mech or armored type engr co
Co HQ	Armored personnel carriers		X
	Combat engineer vehicles	X	X
	Gasoline tanker		X
	Pneumatic tool and air compressor, tlr mtd.	X	X
	Radios, AN/GRR-5, AN/GRC-19	X and VRC-15, 18.	X and VRC-13, 16.
	Tractor w/angledozer blade	X	X
	Trucks, cargo, 2½-ton	X	X
	Truck, dump, 5-ton	X	X
Plat HQ	Chain saw		X
	Electric pioneer tool outfit	X	X
	Radios	AN/VRC-10, AN/PRC-10.	AN/VRC-8, AN/PRC-8.
	Scooploader	X	X
	Truck, dump, 5-ton	X	X

Each sqd	Armored personnel carrier		X
	Carpenters tool kit	X	X
	Chain saw	X	
	Pioneer tool kit	X	X
	Radio	AN/PRC–10	AN/PRC–8.
	Truck, dump, 5-ton	X	

company commander of the engineer company supporting a combat formation acts as unit engineer on the staff of the force commander.

d. Each of the three platoons of the company is capable of performing combat engineer support including earthmoving, demolition, pioneering, and combat. The platoon capability for support of armored operations is built around the armored vehicles. When reinforced with an assault bridge and a combat engineer vehicle, the platoon is capable of supporting armored task organizations under fire. When reinforced with an angledozer, graders, dump trucks, and an air compressor, the platoon can support defensive operations or perform general engineer work.

e. The platoon usually is employed as a part of the company; but it may be given a mission in direct support of a task force. The platoon leader of the supporting engineer platoon is the engineer staff officer for the supported task force. He advises the task force commander on the employment of the platoon.

f. Because of the limited capability of the squad, it usually is employed as a working component of the platoon. There are times, however, when the squad may be given an independent mission.

CHAPTER 7

ENGINEER BRIDGE COMPANY, DIVISIONAL ENGINEER BATTALION

41. Organization

The bridge company of the divisional engineer battalion is organized under TOE 5–148 and is organic to the armored division engineer battalion, mechanized division engineer battalion, TOE 5–145; and the infantry division engineer battalion, TOE 5–155. It is organized into a company headquarters, and armored vehicle launched bridge platoon, and two identical heavy raft platoons (fig. 4).

42. Mission

The mission of the divisional engineer bridge company is to—

a. Increase the effectiveness of division engineer companies by providing technical personnel and equipment to load, maintain, transport, erect, and operate tactical assault stream crossing equipment.

b. Engage in nontactical independent bridging or ferry missions when required in operation of its organic equipage.

c. Undertake and carry out limited combat missions when required.

43. Capabilities

a. The company has the following capabilities:

(1) Providing equipment to erect class 60 bridges or rafts in the following combinations:

(*a*) One 144 meter mobile assault bridge (MAB) (fig. 10), or

(*b*) Two 72 meter mobile assault bridges, or

(*c*) Four 48 meter mobile assault rafts (fig. 11).

Figure 10. M48 tanks crossing on MAB.

(2) Providing armored vehicular launched bridging (AVLB) capable of crossing class 60 loads over wet or dry gaps up to approximately 18 meters in width for separate assault crossings (fig. 12).

(3) Providing light stream crossing equipage to support an infantry battalion in a river

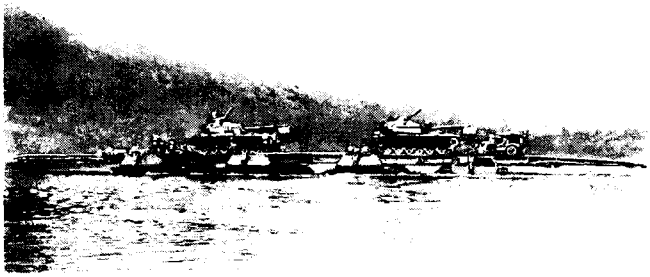


Figure 11. Four-unit MAB raft.

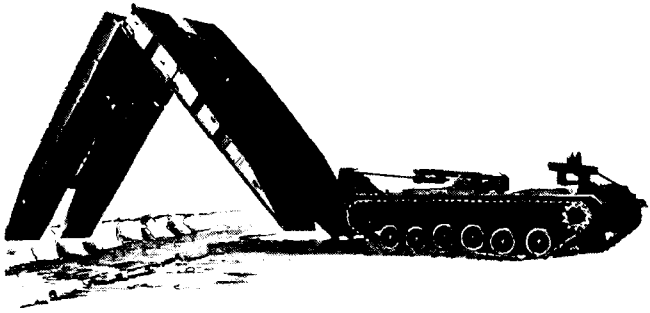


Figure 12. AVLB being erected.

crossing when amphibian vehicles cannot be used with the following capabilities:

(*a*) Eighteen assault boats to cross one infantry company and its individual equipment by waterborne assault.

(*b*) Light tactical raft sets (figs. 13 and 14) to provide the following options:

1. Two 4 ponton/3 bay raft of class 12 in currents up to 2½ meters/second, or

2. One floating bridge, class 11 in currents up to 2½ meters/second, 28 meters in length, or

3. Eight pontons powered by outboard motors to be used as storm boats for powered assault boat operations to cross infantry companies.

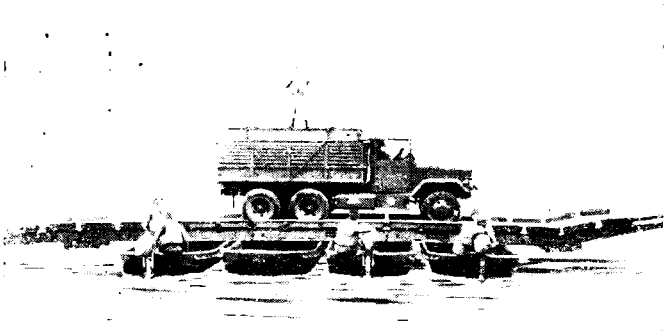


Figure 13. Light tactical raft.

(4) Providing technical supervision or assistance to the supported organization in the utilization of its organic equipment.

(5) Providing organizational maintenance for organic vehicles and engineer equipment.

(6) Defending its installations and sites against hostile ground attacks to a limited extent.

b. Company headquarters provides command, administration, mess, supply, and organizational maintenance. It also provides communications with

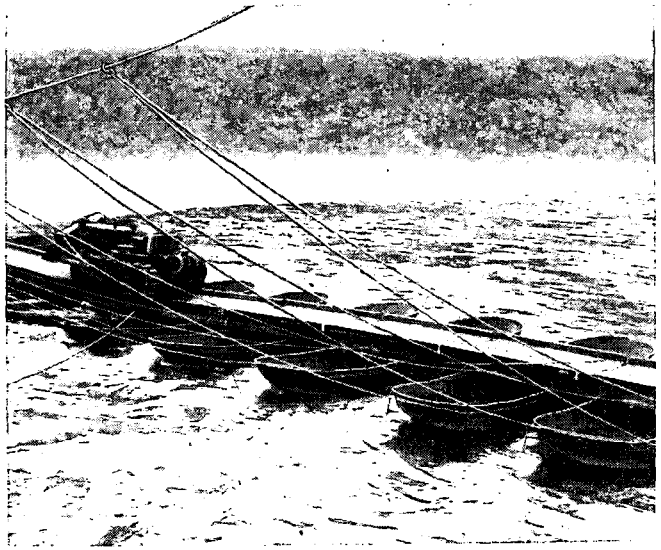


Figure 14. Light tactical bridge.

the engineer battalion, supported engineer companies, and organic platoons. The two light tactical raft sets are located in company headquarters.

c. Armored vehicle launched bridge platoon consists of a platoon headquarters and two AVLB sections. Total capability is four launchers and six 18 meter class 60 bridges. This platoon provides necessary personnel to man and operate four AVLBs.

d. The two heavy raft platoons are identical, each consisting of a platoon headquarters and two heavy raft sections of six mobile assault bridge units. Two vehicles of each section are ramp vehicles and four are bridge vehicles. Each platoon has the capability of placing two class 60 rafts into operation or two class 60, 48 meter floating bridges. These

MAB units are highly mobile, have an operating range of 563 kilometers and are capable of 64 kilometers per-hour road speeds. They are capable of negotiating soft terrain and 50 percent slopes and under suitable bank conditions, they can enter or leave the water without assistance.

e. The bridge company is 100 percent mobile in organic transportation.

44. Equipment

a. The bridge company contains the major items of equipment listed below.

(1) Amphibious bridge and ramp vehicles.
(2) Armored vehicle launched bridges and launchers.
(3) Assault boats.
(4) Crane shovel, truck mounted.
(5) Gasoline tanker.
(6) Light tactical raft/bridge sections.
(7) Outboard motors.
(8) Radios.
(9) Semitrailers, 60-ton, 25-ton.
(10) Five-ton bridge trucks.
(11) Ten-ton truck tractors.

b. If required by the situation, the bridge company may be equipped with the M4T6 floating bridge or the class 60 floating bridge and can be organized to maintain and transport three float bridge sets of either type.

(1) When equipped with the M4T6, the bridge company provides one of the following:
(*a*) One 130-meter float bridge (class 50).
(*b*) Three 43-meter float bridges (class 50).
(*c*) Six rafts (class 50).

(*d*) Fixed spans of various lengths and classes (TM 5–210).

(2) When equipped with the class 60 bridge, the company has approximately the same capabilities as stated in (1) above.

45. Employment

a. Engineer Bridge Company. The engineer bridge company is designed to provide armored vehicle launched bridges, mobile assault bridge equipage, and light assault equipage to engineer lettered companies in support of brigade or task force operations. Attachment of platoons or sections of these platoons to lettered engineer companies of the engineer battalion is the normal method of operation and employment. However, each situation requires particular tailoring to provide for varied stream and gap crossing problems.

b. Normal Employment of the AVLB. The armored vehicle launched bridge is employed primarily in assault crossings of short gaps by combined arms teams, but because of its mobility, low unit weight, and minimum personnel requirements, it may be used effectively in other ways. It is particularly suitable for spanning streams, antitank ditches, craters, canals, partially blown bridges, and similar obstaeles which normally would slow the momentum of attack. The AVLB may be placed over existing bridges or portions of existing bridges to increase the load-carrying capacity of these bridges. In instances where the flank of friendly forces is on a narrow stream or defile, the assault bridge may be used in making a flanking movement.

c. Special Employment of the AVLB.

(1) In rear areas, requirements occasionally arise for short-span bridging. The assault bridge can readily be employed in these situations because of its mobility and speed of erection compared to conventional bridging.

(2) In retrograde movements, assault bridging can be used in place of conventional bridging which has been destroyed or removed. The assault bridge cannot be removed without exposing personnel to small arms fire. If time permits, in retrograde movements, preparation of the launching site will facilitate recovery of the bridge.

d. Recovery of the AVLB. The AVLB should be left in place across the gap only as long as it is needed. The bridge may be left in place to permit the crossing of units following the assault elements, or to provide routes for subsequent logistical or other tactical movement. In this event, a new assembled assault bridge from the AVLB platoon is brought forward and placed on the launcher. The launcher then moves to rejoin the supported assault unit. Assault bridging which has been left in place becomes the responsibility of corps or army engineers. The decision on whether the assault bridge is left in place rests with the crossing force commander, who normally coordinates with the division commander and the division engineer. The division engineer arranges transfer of responsibility with appropriate engineer units. Resupply of AVLBs to both the engineer battalion and the tank battalions is the responsibility of the division support command.

e. Command Responsibility for AVLB. Immediate command responsibility for assault bridging equipment and operating personnel provided by the AVLB platoon of the bridge company normally will be that of the commander of the engineer unit providing support for the brigade or task force commander. The force commander will have the command responsibility of when and where to use the AVLB, but the company commander of the supporting engineer company must be ready to advise the force commander so that he can make his decision, knowing the capabilities and limitations of the AVLB, for a given situation.

f. Employment of the Mobile Assault Bridge (MAB). The MAB is employed to enhance the movement of elements of the division by providing mobile bridging equipment in support of assault crossings. The MAB is a self-contained amphibian class 60 bridge designed to facilitate rapid river crossings. The units utilized in the construction of the bridge or rafts are as follows:

(1) The amphibian bridge vehicle (fig. 15) carries 8 meters of deck, which is folded for road travel. On entering the water, the deck section is rotated 90°, widened to 4 meters, and the center portion of the deck is hydraulically lowered into position, filling the deck completely. The unit is then connected to the next unit.

(2) The amphibian ramp vehicle carries the ramp, which is 8 meters long. Upon entering the water, the ramp section is rotated 90° and connected to a bridge unit. The center portion of the ramp is filled with

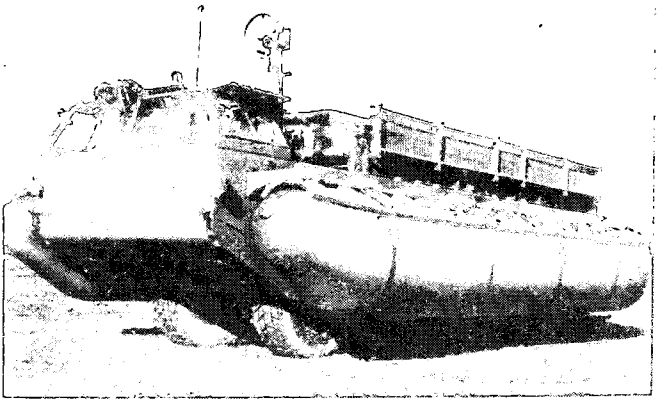


Figure 15. Amphibian bridge vehicle.

panels that are attached by means of hinges. The ramp is then hydraulically lifted and the ramp vehicle unit is removed.

g. Normal Employment. Heavy raft platoons or sections may be attached to engineer companies supporting the brigades. The bridge company is employed as a unit directly under battalion control only in the construction of a major floating bridge.

h. Personnel Duties. Personnel in the bridge company conduct engineer bridge reconnaissance and help the bridge company commander prepare plans for the employment of the company. When the bridge company is used to construct a single bridge, the company commander directs and supervises the construction.

PART THREE
OPERATIONS
CHAPTER 8
OFFENSIVE OPERATIONS

Section I. INTRODUCTION

46. The Engineers in the Offense

a. This chapter provides guidance for employment of the divisional engineer battalion, its organic units, and attached units in support of offensive combat. The engineer battalions organic to the infantry, mechanized, and armored divisions operate in like fashion, modified by the nature and activities of the combat forces of which they are a part. Engineer units are placed in direct support of or attached to brigades or task forces in the offense. Attachment is used when centralized control of the engineer effort at battalion level is not practicable. If early commitment of the reserve is anticipated, appropriate engineer support must be provided.

b. Because of the varied combinations within each division of tank-heavy, infantry-heavy, or balanced brigades, elements of the engineer battalion must likewise be further tailored to best support each brigade or task force dependent on the mission, actual or potential obstacles, and composition of the combat

formation. For example, the engineer battalion may be required to furnish and support an engineer company tailored to complement a tank-heavy brigade and, at the same time, furnish and support an engineer company tailored for an infantry-heavy brigade.

c. The purpose of the offense is to destroy the enemy's armed forces, to impose the commander's will on the enemy, or to seize territory to further operations against the enemy. An offensive operation may take the form of an envelopment (including turning movement), penetration, or exploitation (including pursuit). Regardless of the form of maneuver, an offensive operation has three main phases—advance to contact, development, and attack. This chapter deals with the engineer mission and employment in these phases.

d. Offensive operations are characterized by swift maneuver, violent assault, and rapid exploitation. Upon seizing the objective, a minimum force consolidates gains while the bulk of the attacking forces disperses rapidly. Offensive operations in a nonnuclear conflict differ from those in nuclear war only in regard to the combat power. A principal consideration in nonnuclear warfare is the fact that it can suddenly become nuclear. Hence, regardless of whether or not the situation is nuclear, any concentration of troops and material which offers an attractive target is undertaken only as a calculated risk.

47. Engineer Effort, Assistance, and Control

a. Economy of Engineer Effort. There are seldom enough engineer troops available to accomplish all the pioneer work necessary to assist the advance of the

combat arms and their supporting elements. To insure that maximum engineer effort is available for significant tasks which require engineer skills and equipment, troops of combat arms and services participate as required in such pioneer tasks as—

(1) Expedients for stream crossings.
(2) Control of fires in forested or built-up areas.
(3) Preparation of protective obstacles and deception devices.
(4) Minefield laying and breaching.
(5) Expedient road and culvert repair.
(6) Execution of camouflage projects.
(7) Reduction of obstacles.

b. Typical Engineer Tasks. The division engineer recommends the disposition of engineer troops for each operation. Such disposition normally is made by assigning engineers specific tasks such as—

(1) Conducting engineer reconnaissance.
(2) Locating, marking, and removing mines.
(3) Constructing advance air landing facilities (fig. 16) for troop movements, supply, and evacuation.
(4) Opening and improving roads, trails, bridges, and fords for troop movement, supply, and evacuation.
(5) Assisting in preparation of traffic circulation plans.
(6) Assisting in flank security through the use of demolitions, minefields, and obstacles.
(7) Assisting forward movement of the combat arms and supporting elements by repairing roads, removing obstacles, and helping them cross gaps, streams, rivers, and passage through defiles.

Figure 16. Advance air landing facility constructed by engineers

(8) Providing engineer intelligence data.

(9) Supplying potable water.

c. Assistance to Division Engineers. When the divisional engineer battalion is unable to perform all the engineer tasks required in an offensive operation, the division commander, upon recommendation from the division engineer, requests assistance from corps or army. At the beginning of the attack, a corps engineer combat group may assume some of the division engineer battalion's responsibilities in the division rear area, progressively extending its work line forward to relieve the divisional battalion. An engineer combat battalion from a corps engineer combat group may be attached to a division for a river crossing operation, returning to the control of its parent

unit at the conclusion of the operation. In a major attack, the corps engineer combat group may designate one or more of its combat battalions as direct support battalions, operating with the division and often in the same areas as elements of the divisional engineer battalion. Such units remain under group control. Except for special operations it normally is desirable for corps engineer units, under parent unit control, to support the division on an area basis. Boundaries between the divisional and corps engineer units are established informally to denote the forward working limit of the supporting engineer unit. Such working limits eliminate unnecessary concentration of nondivisional troops in forward areas. Specific missions forward of a working limit, such as bridge or road construction and maintenance, are made on a task basis. The size of the engineer elements attached or supporting is governed by the anticipated strength necessary to reduce obstacles and to support the advance of the assaulting forces. When necessary, nondivisional engineers may be further attached to brigades. Regardless of the seniority of supporting engineer unit commanders, the commander of the divisional engineer battalion remains the division engineer and directs the engineer work in the division area through liaison with the supporting units or through recommendations to the division commander.

d. Control. To assist the mobility of the attacking force efficiently and effectively, it is essential that the engineers be in close contact with the committed units. Proximity enables them to anticipate the needs of the attacking troops, and to have the maximum engineer support available for meeting those

needs promptly. The division engineer recommends the disposition of engineer troops and equipment for all phases of the offensive operation and recommends appropriate changes in disposition as changes are indicated. Liaison between supporting and supported units and between adjacent units during the attack assures cooperation and coordination among all units participating in the operation. It is the responsibility of the supporting unit to establish and maintain liaison with the supported organization. Liaison between adjacent units is established as directed by the senior commander—usually each unit is charged with maintaining liaison with the unit to the right. The assistant division engineer is the chief liaison agent between the engineer battalion and division headquarters. Liaison functions between the supporting engineer company and a brigade are performed by personnel designated by the company commander. The liaison officer, usually the company executive officer, is familiar with the capabilities and operations of both units and keeps himself informed on all plans and operations to give reliable and up-to-date information and advice to both commanders. If a further breakdown of engineer elements is necessary, liaison is established with their supported organizations.

Section II. ADVANCE, DEVELOPMENT AND ATTACK

48. Advance to Contact

a. Disposition of Engineer Troops. The division, as a general rule, does not conduct offensive operations alone, but participates as part of a larger

force. In participating in offensive operations, small infantry, mechanized, or armored units will be required to conduct an advance to contact or an attack. The division engineer recommends disposition of available engineer troops and equipment for all phases of the advance and attack (figs. 17 and 18) based

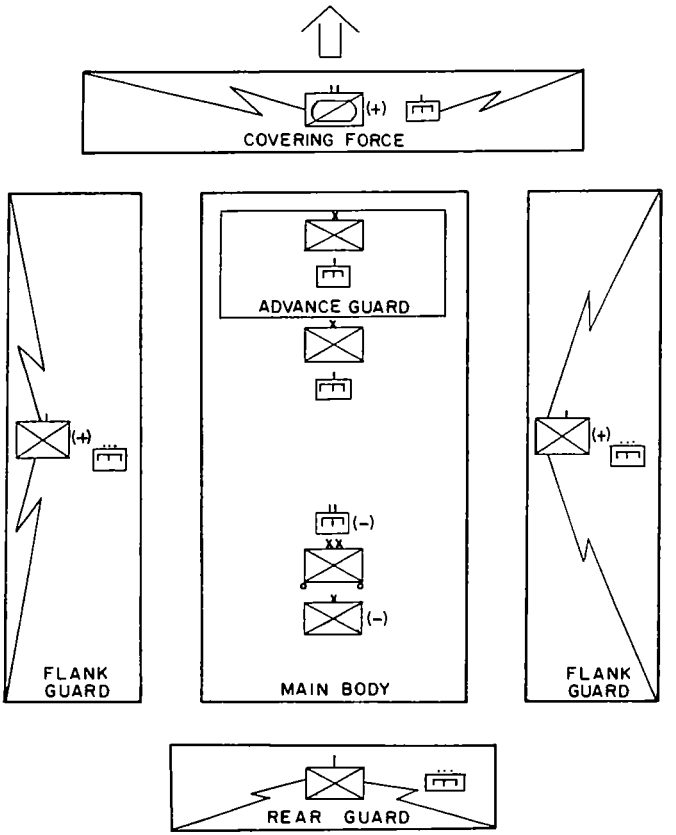


Figure 17. Engineer battalion disposition for advance to contact.

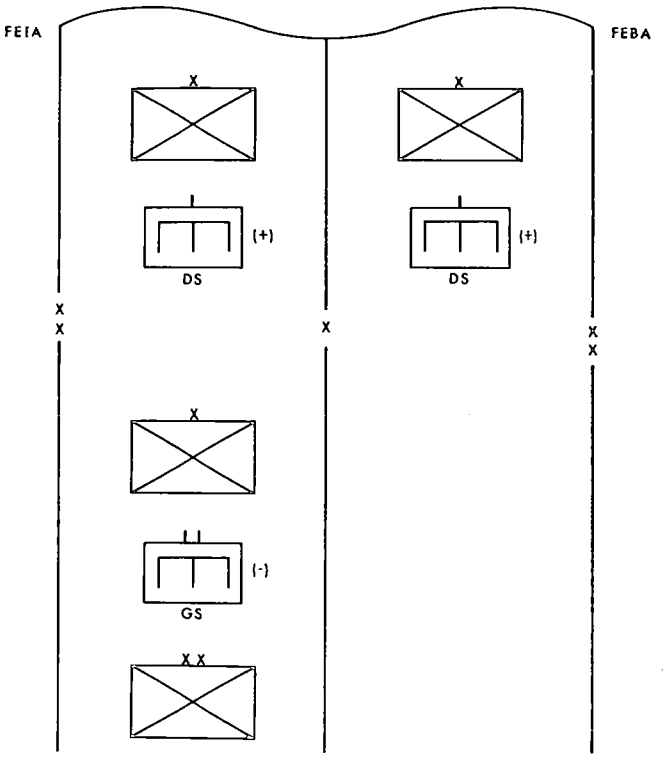


Figure 18. Engineer battalion disposition in the attack.

on the scheme of maneuver announeed by the division commander. He recommends appropriate changes in disposition as the need arises. Engineers may be used in the advance guard and in the flank and rear security forces as well as in the main body. If the engineer battalion is unable to perform all the engineer work required, the division commander may request reinforeement. In this case, additional engi-

neer units are placed in support of the divisional engineer battalion by corps or army.

b. Specific Engineer Duties. When a brigade advances to contact, speed is essential. Maximum use of existing road nets and avenues of approach is emphasized. Early seizure of critical terrain is also important. Nuclear fires, including atomic demolition munitions (ADM), an engineer responsibility, may be employed to provide added security by blocking enemy avenues of approach, Other engineer duties in the advance include conducting reconnaissance; opening and improving roads, trails, and bridges for troop movement, supply, and evacuation; reducing obstacles; assisting in the passage of defiles; and constructing bypasses (fig. 19) over small streams and ditches.

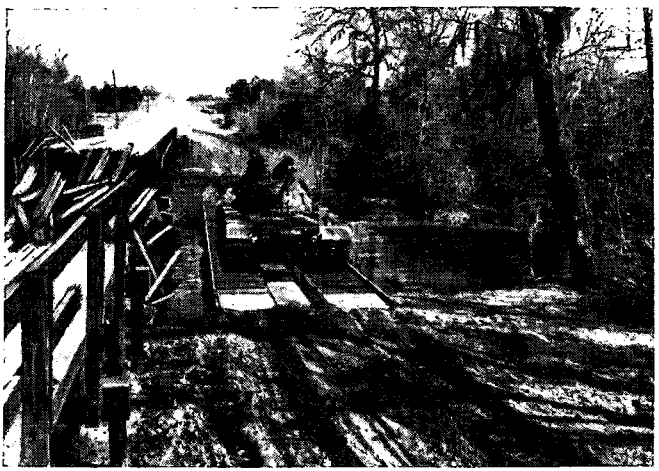


Figure 19. Hastily installed bypass.

c. Reconnaissance During the Advance to Contact. Engineer reconnaissance during the advance is performed initially by reconnaissance teams from battalion headquarters. These teams provide the division engineer with early, reliable engineer intelligence in the area over which the division is to advance. Routes of advance are thoroughly examined for serviceability, type, condition, location of critical points, alternate routes, mines, and condition and types of bridges. This reconnaissance will enable the teams to make an estimate of engineer work to be done and of engineer materials available. This on-the-ground reconnaissance must be supplemented by air reconnaissance, map and serial photograph studies, and study of reconnaissance from other elements of the command. It is essential that this reconnaissance be made prior to the movement, since the information gained provides a basis for the estimate of engineer troops, supplies, and equipment necessary to support the operation and for the selection of routes and the formation of traffic circulation plans. Engineer reconnaissance elements from an engineer company may accompany the advance party of each leading brigade to provide the unit engineer with timely warning of engineer requirements to the front. Terrain which appears favorable to the advance is closely examined, especially for possible enemy use of mines, obstacles, and defending weapons.

49. Engineers in the Development and the Attack

The duties of the engineers in the development period and the attack resemble those in the advance: assisting the movement of combat forces and sup-

porting troops by clearing obstacles, barriers, and fortifications; assisting the troops protecting the flanks by creating obstacles on avenues of approach to the flanks; and performing routine engineer tasks, to include supply of potable water and technical assistance in regard to camouflage and combat deception measures. As the attack develops, however, new demands for engineer support arise. Reconnaissance is required both before and during the attack, especially of the main supply route and other routes of advance, and of enemy obstacles and barriers. Specialized assistance from engineers may be needed to pass, breach, or remove obstacles, assault fortified positions; establish flank protection; or organize captured ground against counterattacks. Upon gaining control of an area, the construction of rudimentary advance landing facilities for the division's aircraft will be required. Site selection for these landing facilities is of vital importance to the engineer commander, as he must evaluate each potential site in the light of anticipated engineer effort, materials, and construction-time requirements. Water supply points must be established over a wide area because of the dispersion of the attacking units. These water points are just as mobile as the unit they are supporting, and when possible are located in the vicinity of the supported unit's class 1 distribution point. Routes of advance for combat troops and essential supplies are established and maintained.

50. Engineers in Covering Force

a. Covering Forces. A division moving to contact may be preceded by a self-furnished covering force

operating directly under divisional control. If the division is operating as part of a larger element, the covering force is frequently furnished and controlled by higher headquarters. Missions assigned to a covering force are broad in nature and may include developing the enemy situation, attacking to destroy enemy resistance, seizing and holding critical terrain, or containing large enemy units. Engineer support in a covering force should be located well forward and contain engineer reconnaissance teams to aid the movement of armor, artillery, and the essential infantry support. When a brigade is operating as the division covering force, it usually has an engineer company and an assault bridge element attached. Obstacles which cannot be bypassed are breached or surmounted. The type of obstacles, the time, and the equipment available determine the method employed. Breaching usually involves removal or destruction by demolition. Supporting calls for bridging or ramps. The width and number of passages through an obstacle, whether it is a complex barrier or a minefield, are determined by the capability of the supporting engineer element. The location of the passage(s) is determined by the tactical plan, terrain, enemy position, and the extent of the obstacles. Road gaps which cannot be bypassed are hastily repaired or bridged. The engineers are armed with their individual and crew-served weapons to resist enemy interference while conducting these tasks.

b. Advance Guard. Behind the covering force the main force advances. Each column is preceded by its own advance guard which furnishes protection from ground observation and surprise from the front,

and furnishes the time and space necessary to enable the main body to deploy for combat. Each advance guard column is supported by engineer troops and reconnaissance elements, the commander of whom functions as the unit engineer of the advance guard commander. During the advance of a brigade, a company from the engineer battalion normally forms a part of the advance guard. When these engineers are on foot, they are supported by mounted engineer troops with tools and equipment, following by bounds, or they are equipped with standard mechanical clearing equipment compatible with the advance of foot troops. The point engineers normally have mine detectors and probes. They search for and mark or open a lane through an enemy minefield. (The complete clearing is undertaken after the combat units have moved on and there is no urgency.) Within their capabilities, they remove all obstacles which have been left or partially breached by the covering force. Removal or breaching of complex obstacles may require additional engineer troops and equipment which are moved forward from the support or reserve. The point engineers maintain contact with the advance guard engineers and relay information concerning the required forward engineer tasks. The remainder of the engineers with the advance guard, with tools, transportation, and equipment, move with the support or reserve, and leave work parties at vital points where the need for engineer assistance exists or is anticipated. These parties rejoin their units on completing their tasks. The advance guard engineers may thus be depleted at the end of the march, and it may be necessary to renew their strength by substituting new units from

the engineers with the main body. When the main force is not preceded by a covering force, the advance guard normally is stronger, with a corresponding increase in the strength of the engineer support.

c. Flank and Rear Security Forces. Flank and rear security forces protect the main body from ground observation and surprise attack. These forces must be sufficiently strong to defeat minor resistance or to delay strong enemy attacks on the flanks or rear long enough to permit deployment of the main body. Engineers support the flank and rear security forces by being prepared to assist in the blocking of avenues of approach through the creation of obstacles such as craters, contaminated areas, minefields, demolished bridges, tree blowdown, and floods.

d. Main Body. The main body is the bulk of the advancing force's combat power. It is immediately available to attack the main enemy force and seize the objective. The remainder of the supporting engineer troops is so positioned in the advancing columns of the main body as to permit maximum flexibility and communication with the security elements. They are available for employment during the advance to reinforce or replace the advance guard engineers or the flank and rear guard engineers.

Section III. RIVER CROSSINGS

51. Basic Considerations

a. Methods of Crossing. When the area through which the division is attacking contains an unford-

able river, plans must include provisions to cross without loss of mementum or significant concentration on either bank. The river is approached at maximum speed on a broad front. All existing bridges in the zone of advance are objectives and every attempt should be made to seize these intact. However, the division plan for crossing the river is not predicated on the seizure of bridges intact. If bridges cannot be seized intact, hasty crossings are made on a wide front capitalizing on organic assault bridging, amphibian characteristics of armored carriers, organic airlift capability, nuclear fires, chemical munitions, and improvised means. Particularly under nuclear conditions, the hasty crossing offers the greatest advantages and should be sought whenever possible. The deliberate crossing is conducted when a hasty crossing has failed, when a hasty crossing is infeasible because of the difficulty of the obstacle or the strength of enemy defenses, or when an offensive is resumed at a river line. The success of either type crossing will depend on the thoroughness of prior planning and the commander's application of sound tactical principles.

b. Purpose and Responsibilities. The immediate purpose of a river-crossing operation is to move the assault units across as rapidly and economically as possible so that they may continue their attack to destroy the enemy or to seize an assigned objective which will protect the crossing of the remainder of the units. A river crossing is the tactical commander's responsibility, but the division engineer plans continually for the support of division river crossings in the offensive. For major crossings, the division must be supported by corps and army

troops, and the division engineer must make his requirements for support known as early as possible to the corps engineer. In establishing those requirements, the division engineer must maintain close liaison with G3 on plans, exploit all sources of intelligence to determine what may be needed, and perform constant reconnaissance to specifically determine his requirements. Engineer tasks in the crossing include guiding the assault echelon from the holding area to the crossing site, operating assault boats, assembling and operating rafts, assembling and maintaining footbridges and heavy vehicular bridges, removing mines, constructing approach roads, and preparing armored personnel carrier (APC) entrances and exist. Plans for crossing a stream over which the enemy has destroyed all bridges must consider the strength with which the enemy holds the opposite bank and the characteristics of the river. If airdropped or air-landed forces are included in a river-crossing operation, timing of their portion of the operation must be coordinated with timing of the assault forces crossing the river.

52. Hasty River Crossings

A hasty river crossing must be boldly executed to gain surprise, to prevent the organization or strengthening of defenses, and if possible to seize an existing bridge or other crossing means. Detailed reconnaissance and planning are secondary to speed. Advanced elements are crossed by any means available. The one overriding consideration is that the momentum of the advance of the division be maintained. Frequently, aggressive action will result in

the capture of a bridge before the enemy has destroyed it. At other times a damaged bridge can be repaired but in most cases, military bridging or rafts will be necessary to cross tanks, equipment, and supplies. The armored personnel carrier, because of its amphibian capability (fig. 20), is used to move supplies and personnel across the river where there are no bridges. These vehicles also may be used to supplement the carrying capacity of bridges and rafts for taking high-priority items across or or for other special purposes. Hasty crossings must be anticipated, and all available river-crossing equipment must be well forward and used promptly. When the opportunity for such a crossing presents itself to an advance force, supporting engineer troops assist in the immediate crossing and exploitation. The divisional engineer battalion constructs bridges

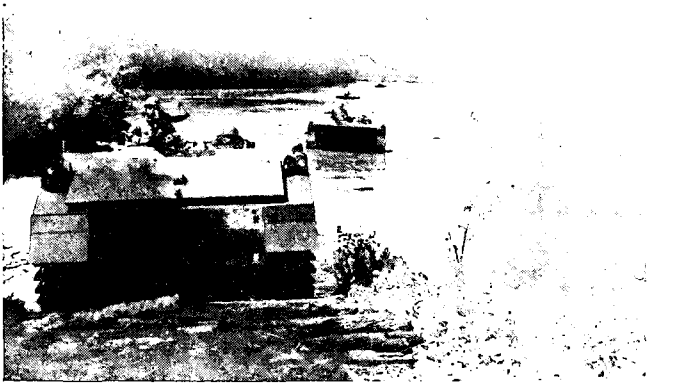


Figure 20. Armored personnel carriers.

and other necessary crossing means as soon as possible, to cross additional divisional troops that are rushed forward to expand the initial successes.

53. Deliberate River Crossing

A deliberate river crossing is necessary if the opposite bank is strongly held or if the natural obstacle is technically difficult. Detailed planning, extensive logistical preparation, and air and ground superiority are required. Overall planning and coordination are performed by corps or higher commands. The division normally conducts a deliberate river crossing utilizing their engineers in the assault phase. The division engineers have the primary mission of engineer support to the assault units during the assault phase to the far shore by breaching obstacles, preparing entrances and exits for amphibian personnel carriers. The engineer battalions of the divisions not committed in a deliberate crossing are normally held out to provide engineer support when the divisions are committed on the far shore. Attached or supporting corps and army engineers usually are responsible for constructing rafts and bridges. Normally before the assault, they are assisted by elements of the committed division's engineers in such tasks as performing preliminary work on bridge approaches or access roads, and breaching obstacles. Seldom, if ever, will the equipment of the divisional bridge company be employed in the deliberate river crossing. Elements of the equipment platoon and bridge company usually are attached to the engineer companies supporting the assaulting forces for use in establishing the bridgehead and for use in support operations on and beyond the far shore. Extensive

operations require backup support from corps or army in the form of additional engineer units with fixed, floating, and assault bridging equipment. FM 31–60 discusses in greater detail the employment and duties of the engineers in river-crossing operations.

54. Crossing Means

Every available crossing means is used to cross the maximum number of troops and equipment in the shortest time. The armored personnel carrier and the helicopter are two important means of getting personnel and supplies across the river. When necessary, the divisional engineer battalion constructs rafts, mobile assault or float bridges, and expedient bridges. These are used to cross tanks, additional personnel, ammunition, heavy weapons, equipment, and necessary vehicles to support the bridgehead. Mobile assault bridging will be replaced by a floating bridge as soon as possible to permit the divisional bridge company to retrieve the MAB and continue to support the division. If the bridge company is equipped with the M4T6 or class 60 floating bridge, the bridging is normally left in place, and the divisional bridge company immediately obtains replacement bridging from the nearest engineer supply source. Although done infrequently, the floating bridging may be disassembled by one of the engineer companies or the bridge company and reloaded on the bridge trucks, which return to the supported organization for the next bridging operation. For a detailed discussion of general river-crossing equipment, see TM 5–210 and FM 31–60. The specific river-crossing equipment organic to the divisional engineer battalion is discussed in paragraphs 43 and 44.

55. Desirable River-Crossing Characteristics

The following desirable characteristics are sought in river-crossing operations:

a. Raft Site. Raft sites normally are located downstream from bridge sites. They should be close to existing roads at points where the current is moderate and where banks can accommodate two or more rafts without landing stages.

b. Floating-Bridge Sites. Floating-bridge sites should have the following characteristics:

(1) Short, easily constructed approach roads to existing road nets on both sides.
(2) Moderate current.
(3) Firm stream banks that can support abutments.
(4) For floating bridges of the M4T6 type, assembly areas where floats may be inflated and launched. Pontons usually are launched downstream from the bridge site. When tributary streams exist, it may be desirable to float pontons to the bridge from launching sites on the tributary.
(5) For the mobile assault bridge, areas where vehicles can be converted from highway travel condition to water entry configuration.
(6) Turnarounds for vehicles at unloading points.
(7) Small variations in water level. Allowances must be made for changes in water level and velocity of current caused by floods and tides, particularly for their effect on the required anchorage.

c. Amphibian Vehicle Sites. The use of amphibian vehicles depends on the availability of suitable entrances and exits to and from the river and the presence of stream currents (not exceeding 8 kilometers per hour). Amphibian vehicles require crossing sites of a gentle gradient and with a firm bottom for entering or leaving the water. The landing places must be wide enough to allow amphibian vehicles to land even though subjected to the lateral force of the stream current. Engineer support must be made available to reconnoiter, locate, and improve or construct amphibian vehicle crossing sites.

56. Traffic Control

Traffic control includes planning, scheduling, and directing surface vehicles, personnel, and equipment in their use of routes and of staging and holding areas during all phases of the crossing. Initially, traffic control is a staff responsibility of G3 and is closely coordinated with G4, the provost marshal, the signal officer, the division engineer, and corps engineer liaison personnel. An engineer element exerts technical control at an engineer regulating point to insure proper use of the river-crossing means, to include—

a. Examination of vehicles to detect improper loading with respect to technique, weight, or dimensions.

b. Recommendation for rerouting or halting of certain traffic when technical difficulties make one or more of the crossing means inoperable, or curtail its carrying capacity.

c. Assistance to the traffic control headquarters in maintaining maximum safe traffic density.

d. Provision of the correct classification of each crossing means to the traffic control headquarters.

e. Prevention of congestion at the crossing sites.

57. Gap Crossing

a. Types of Gaps. Gaps frequently found in the combat zone consist of antitank ditches, road craters, streams, canals, washouts, ravines, marshy ground, railroad cuts, and other similar obstacles.

b. Gap Crossing Equipment. The armored vehicle launched bridges are used to cross short gaps in a minimum of time and with minimum exposure of bridging personnel to enemy fire. They are crew-served, highly mobile, and capable of quick erection (fig. 12) so that the crossing of forward combat elements may be made rapidly. Rapid placement of bridging by the armored vehicle launched bridge launchers helps maintain the momentum of attack. This bridging may also be utilized in emergencies to span gaps up to 18 meters on main supply routes to save time, troops, and bridge resupply tonnages that would be required for fixed bridging. Components of the light tactical raft set can be used to provide fixed bridging capable of crossing vehicles, troops, and equipment over short gaps. Fixed bridging constructed from the components of the M4T6 or the class 60 bridge sets may be used to cross gaps of various widths. See TM 5-210 for types and classes.

58. Passage of Defiles

a. Identification of Defiles. A defile is any terrain feature, natural or artificial, which tends to constrict the passage of troops. Therefore a mountain pass, a gap through a minefield, a river-crossing site, a

bridge, or an area between two radiated areas are all defiles.

b. Preparation for Passage. The reconnaissance must include consideration of all possible routes. Planning for an alternate route is essential. Major engineer effort required to prepare a defile for passage should be conducted preferably at night or under conditions of low visibility. All movement to the defile target area must be very rigidly controlled by traffic control points or by a coordinator separate and distinct from the target area coordinator. Traffic control points must insure that the flow of vehicles is maintained constant, without halts or grouping directly into the defile target area or into the designated dispersed holding areas on a scheduled plan. Units must plan in advance to move directly into the attack position upon clearance of the defile target area. Since an obvious defile is a prime enemy target, deception will serve to hide the real intentions and insure successful passage.

c. Passage Procedure. Rapid passage of a defile is the best defense against annihilation. Where relatively high speed is not feasible, perfectly timed traffic control which insures no large gaps, no halts, and optumum use of the route will achieve the same purpose. Increased spacing between march elements will serve to make the target offered to the enemy less lucrative, but such a procedure slows the advance and prolongs the concentration of combat strength and the prompt commitment of exploiting forces. In most tactical situations the speed of advance is paramount, consistent with not offering the enemy a truly profitable target.

d. Control. Traffic control must be absolute. One

individual with intimate knowledge of the defile and its approaches must be designated by the commander as the defile target area coordinator and made completely responsible for planning and regulating its passage. This individual is preferably the G3 who has paramount interest, although the commander may designate the Engineer or his Military Police Officer upon occasion. One of the coordinator's primary functions is to insure continually that the defile target area is maintained devoid of all unessential personnel and equipment. Regardless of the individual so designated, competent assistants (preferably trained MP's) must be posted at all critical points to insure the uninterrupted flow of traffic. Route locations which may cause accidents or halt traffic must be predetermined and wreckers positioned to clear the routes in any emergency (fig. 21). Detailed guidance for passage of defiles is contained in FM 5–29.

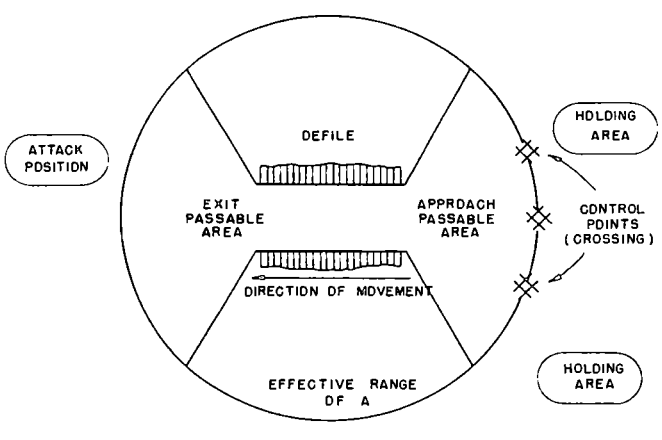


Figure 21. Defile target area.

Section IV. FORTIFIED POSITIONS

59. The Assault of Fortified Positions

a. Characteristics. A fortified area is one containing numerous defensive works and localities, usually consisting of concrete, steel, or permanent field fortifications. The localities and works usually are disposed in great depth and width and in such a manner as to be mutually supporting. Contaminated areas may be used in conjunction with these defensive works. Such fortifications constitute one of the most formidable obstacles that advancing troops may encounter. Whenever possible, fortified positions are contained by minimum forces while the main force continues the advance to seize more distance and decisive objectives. Reduction of a fortified area may include a siege or an attack from the rear. Detailed characteristics of fortified areas and techniques of combat in them are contained in FM 31–50.

b. Engineer Support. The engineer support in an assault of a fortified position is fundamentally an application of the same techniques used for breaching any obstacle of magnitude. In this instance, however, it is used in conjunction with a reinforced infantry platoon as the basic assault unit. During the attack, the principal mission of the engineers is the breaching of the outer and larger obstacles which protect the main fortified position. Specially organized and equipped infantry squads are charged with the reduction of weapons emplacements, bunkers, and pillboxes, and the clearing of close-in and minor obstacles. Close coordination is essential between those engineers breaching the line of obstacles and those infantry squads reducing the fortifications.

After the fortified line has been breached, the primary engineer task is then the creation and maintenance of routes to and through the gaps, with a secondary mission of destroying, by demolition, the captured forts or pillboxes. As the assaulting troops break through or envelop the enemy position, engineers overcome the remaining enemy rear area obstacles. Immediate exploitation of success is imperative. If the position is organized in depth, the attack or new attack, constituted by another combined arms team, must proceed to the second line of fortifications as soon as possible. The same techniques are used in reducing a second line as in the case of the first line.

c. Reconnaissance. Before the attack begins, a preliminary engineer study is made of the terrain, bridges, routes of communication, and artificial obstacles such as minefields, tank traps, and emplacements. The techniques of attack and the requirements for engineer breaching personnel, supplies, and subsequent reconstruction are dependent on this study. Information for the study may come from various sources, of which ground reconnaissance is the most satisfactory. For areas beyond the reach of ground reconnaissance parties, information must come from aerial photographs and other sources. Ground reconnaissance before the attack should, if possible, cover obstacles in front and on the flanks of the enemy position. Minefields are reconnoitered to determine their boundaries, the type of mines, the presence of gaps in the field and whether and how they are marked, possible detour and approaches, and the location of defending weapons and contaminated areas. The reconnaissance parties seek to determine the positions of the obstacles which are

best adapted for clearing operations, either because of their weakness or because they are not well covered by fire. Normally, reconnaissance is done by the troops who are to breach the obstacles. Parties are given definite routes and areas; carefully instructed in their duties; and, when possible, rehearsed. Personnel are briefed on all information which has already been obtained.

d. Methods. When reducing field fortifications by the use of explosives, the techniques employed are essentially the same as those employed in the reduction of concrete walls. ADM may be used to reduce a fortification, if its extent warrants it. The resulting contamination, however, must be eliminated, or materially reduced, if friendly forces are to occupy or pass through the area. Combat engineer vehicles (fig. 22), because of their armor pro-

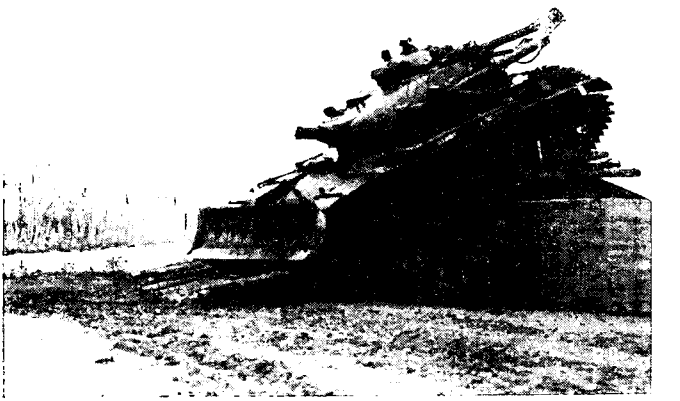


Figure 22. Combat engineer vehicle passing over obstacle on self-emplaced crossing expedient.

tection, mobility under fire, and special accessories, are used to great advantage against fortified positions. Bulldozers are effective in the surmounting or bridging of obstacles, and the rapid construction and maintenance of routes into and through the gaps. Other engineer equipment is used to clear rubble and debris resulting from the explosive demolition of permanent fortifications. If all captured fortifications must be made unusable, bulldozers can bulldoze earth into the entrances of the captured fortifications as a substitute for demolishing them.

e. Organization for Work. The strength, organization, equipment, and means of transportation for each clearing party are carefully planned, on the basis of the party's mission and the nature of the obstacles. Parties may be organized to clear obstacles in front of the enemy position at the beginning of the attack; to clear obstacles encountered within the enemy position as the attack progresses; or to dispose of obstacles already passed by the leading elements. The engineers who accompany infantry are moved as far forward as practicable in their own transportation; and the combat engineer vehicle is employed to assist in reduction of positions. Clearing parties normally are organized into task groups. When the obstacle to be breached is formidable and complete information about it is available, the task groups may be highly specialized, each having been instructed in detail and rehearsed in the performance of its precise duties. However, a flexible grouping is needed to deal with obstacles encountered after the attack begins and on which

there is little or no advance information. A grouping of this type might be used for the following tasks:

(1) Preceding the breaching personnel to clear antipersonnel mines.
(2) Breaching or otherwise neutralizing an obstacle.
(3) Marking boundaries after the breakthrough.
(4) Providing local security.
(5) Laying smokescreens to cover operations of the group.
(6) Standing by as a contingent to replace or reinforce, as casualties are normally heavy in such operations.

60. Special Considerations

Special considerations in the attack of a fortified area are as follows:

a. A primary purpose of a fortified area is to cause the attacker to mass and present a profitable nuclear target. All commanders must recognize this danger.

b. Nuclear and chemical weapons facilitate the destruction and neutralization of fortified areas. Surface and subsurface nuclear bursts can create gaps in the fortified area or isolate sections of it.

c. Detailed intelligence is required upon which to base training, rehearsals, and plans.

d. The area selected for penetration must be isolated. Nuclear fires are particularly well suited to this task. Smoke isolates individual strongpoints from the observed fires of other fortifications. Indirect fire weapons destroy camouflage, neutralize and destroy enemy field fortifications and artillery fire on enemy counterattacks, and screen the movement of assault troops.

e. Reserves follow closely behind the assault echelon to exploit the penetration, maintain the continuity of the attack, or defend critical areas against counterattack.

f. Airborne forces may be used in conjunction with other attacks of the fortified area principally to block the movement of large general reserves and to attack the fortifications from the rear.

g. Unless required for use by the attacker, captured enemy armament and fortifications are moved or destroyed to prevent their use if recaptured.

Section V. INTELLIGENCE

61. Reconnaissance and Counterreconnaissance

a. Prior to the Advance. The collection of engineer intelligence is a mandatory requirement for all engineer elements in an offensive operation. It is as continuous and detailed as conditions permit and is performed prior to the advance, during the advance, and during the attack. Initially, reconnaissance teams from battalion headquarters provide the division engineer with early and reliable intelligence of the area over which the division will advance. They lay particular emphasis on the condition of the proposed routes of advance, alternate routes, enemy obstacles, local resources, possible water supply points and favorable terrain conditions. This on-the-ground reconnaissance is supplemented by intelligence gained from air reconnaissance, maps, photographs, and other collection agencies. The combined intelligence aids the division engineer in estimating the required engineer materials; preparing plans and

work estimates; and developing, in cooperation with other agencies, traffic circulation plans.

b. During the Advance. Engineer reconnaissance continues during the advance. Engineer reconnaissance elements from the supporting units accompany the advance guard of the leading brigades to provide the main body with advance notice of engineer requirements at the front. All engineer troops with the advance columns collect and *report* pertinent engineer intelligence.

c. During the Attack. During the attack, the reconnaissance teams from engineer battalion headquarters continue their general reconnaissance, closely following the forward engineer companies. They pay special attention to the routes of advance. When necessary, personal reconnaissance is made by the commander. Engineer companies attached to, or in support of, brigades make continuous reconnaissance of routes of advance, particularly the main supply route, obstacles, mines, potential water supply points, and sources of engineer materials in their assigned areas. Special reconnaissance missions are assigned by the battalion S2. On the basis of this reconnaissance information, engineer operational plans are made and means are provided to assist in maintaining the momentum of the attack.

d. Counterreconnaissance. Reconnaissance and counterreconnaissance cannot be readily separated. Counterreconnaissance activities also provide reconnaissance information. Engineers executing reconnaissance missions may be employed simultaneously on counterreconnaissance. However, the order to the engineers must state which mission has priority. In an engineer force of sufficient size, a part of the

force may be assigned each task. Counterreconnaissance operations are measures taken to prevent or reduce the effectiveness of hostile observation of a force, area, or place and are supplemented by counterintelligence measures. Counterreconnaissance becomes more difficult as dispersion of units increases.

62. Intelligence

Intelligence, mapping, geodetic, and related data are particularly essential during an offensive operation, and result in an acceleration of associated intelligence and topographic activities. Often the advance will be into relatively unfamiliar territory, necessitating rapid up-dating of existing maps; utilization of captured enemy maps; substitution of up-to-date aerial photomaps until topographic maps are available; and rapid establishment or reestablishment of survey ground control. In meeting these intelligence needs, the battalion commander has three basic intelligence responsibilities: to division; to technical channels; and to the battalion and its subordinate and supporting units. The battalion intelligence officer (S2) assists the commander in these responsibilities.

a. Responsibility to Division. The division engineer furnishes timely intelligence information to the division on terrain; minefields and obstacles; effects of weather; effects of nuclear detonation on the terrain; enemy fortifications; enemy engineer troops, their capabilities, equipment, materiel, and techniques; routes of communication; and sources of usable engineer supplies and equipment. He works closely with the G2 in the preparation of the intelli-

gence estimates and the intelligenee annexes (FM 30–5). Spot reports on enemy engineer materiel should be disseminated through the G2 to the units of the division as quickly as possible. The division engineer assists the G3 in the preparation of the operation orders on matters pertaining to engineer intelligence, such as in the engineer and barrier annexes.

b. Technical Channel Responsibilities. Engineer technical channel responsibilities involve the principles of design and operation, nomenclature, physical characteristics, performance, operational capabilities, and limitations of foreign material and facilities used by or for the support of military forces. In a broader sense, these responsibilities may also embrace the manufacture, storage, installation, maintenance, and operating aspects of foreign materiel and facilities, including the effects of weather, terrain, and military action thereon; and, the nature, organization, and activities of foreign military engineer organizations having functions similar to those in the United States Army. For further information, see FM 30–16. The duties of the division engineer relative to his engineer technical channel responsibilities are to—

(1) Supervise all phases of this intelligence activity within the division.

(2) Know the technical aspects of foreign materiel for which the engineer has primary responsibility.

(3) Collect, examine, and report on captured engineer materiel and documents to include possible tactical capabilities, limitations, counterweapons, and countertactics.

(4) Implement and operate the system of evacuation of captured engineer materiel.
(5) Coordinate with other services on exploitation of materiel of interest to more than one of the technical services.
(6) Forward reports on processing of materiel and information derived therefrom through engineer intelligence and technical channels.
(7) Provide, within the engineer field of interest, information for the instruction of troops on foreign materiel to include recognition, characteristics, use, and interchangeability with United States or allied equipment.

c. Responsibility to the Battalion. The division engineer as the battalion commander, and assisted by the battalion S2, directs the intelligence activities of the battalion (FM 5-30). These activities are: disseminating all intelligence information to subordinate and supporting units; preparing terrain analysis and studies for use of the battalion; and supervising intelligence training.

63. Timing

Engineer intelligence must be placed in the hands of those agencies (troop commanders or staff sections) which need it, in time to permit them to make practical use of it in their planning and operations. Disseminating agencies must allow both for time of physical transmission and for time to clear intermediate headquarters before the item of intelligence reaches the ultimate user. This is especially important in the case of dissemination downward; it is

also important, in a fast-moving situation, with respect to dissemination in any direction. In urgent cases, partial or fragmentary reports may be sent; summaries may be sent by wire or radio, in advance of a complete report; or incompletely processed intelligence may be disseminated, with a precautionary note incorporated into the text of the report.

64. Sources of Engineer Information

a. The division engineer obtains engineer information in three ways: by the study of documents, to include the interpretation of photographs; from reconnaissance agencies; and by interrogation of individuals. More specifically, the sources are as listed below. Of those listed, photographs will probably be the primary source of engineer information.

(1) Aerial and ground reconnaissance.
(2) Aerial and ground photographs.
(3) Maps.
(4) Prisoners of war.
(5) Refugees.
(6) Local civilians.
(7) Captured enemy materiel.
(8) Captured enemy installations.
(9) Captured enemy documents.
(10) Other documents, including texts, periodicals, and technical papers.
(11) Intelligence publications (including terrain and weather studies).
(12) Allied forces.
(13) Units in contact.
(14) Higher headquarters.

b. These sources are available to, and used by, the engineers of commands at all levels, but in vary-

ing proportions. At divisional level, ground and short-range aerial reconnaissance and reports from other frontline troops are of vital importance. Such sources, supplemented by data from local intelligence sources such as prisoner-of-war statements, bring up to date the available intelligence on terrain and enemy installations. In a fast-moving situation, these may be the only sources of such intelligence.

65. Terrain and Weather Studies

a. The most effective employment of military forces requires consideration of weather and terrain from the start of a plan through its final execution. Accurate interpretation of the effects of weather and terrain not only increases the probability of success in operations, but also helps determine probable enemy courses of action. The study of the area of operations aims to determine the effect of the terrain and weather upon the mission and upon the capabilities of the enemy. This determination is based on the key terrain features within the area and the best avenues of approach to them. The study frequently assists in eliminating those enemy capabilities not favored by the conditions of terrain and weather. For detailed information on terrain intelligence, see FM 30–10.

b. A terrain analysis is an evaluation of a piece of terrain in the light of the following five military aspects:

(1) Key terrain features.
(2) Observation and fields of fire.
(3) Cover and concealment.
(4) Obstacles.
(5) Avenues of approach.

c. All commanders must make a constant, never-ending study of the weather and terrain in their area of operations. Normally, the intelligence officer conveys his information of the weather and terrain to his commander by means of the intelligence estimate. The intelligence estimate is incorporated in the commander's estimate of the situation.

d. The engineer, under the staff supervision of G2, is responsible for the production and maintenance of terrain studies based on technical analysis. These studies are either basic or interpretive. Basic studies emphasize the natural factors such as relief and drainage, vegetation, and soils. Analysis of these result in interpretative studies which indicate the terrain's suitability for military operations, such as its trafficability. Engineer terrain studies generally take the form of overprinted maps or overlays on which the various terrain characteristics are emphasized. This graphic description of terrain may, however, be supplemented by verbal summary. Typical studies include: relief (plastic relief and layer tinting); cross-country movement; vegetation; routes of communication; drainage; surface materials; cover and fields of fire; and concealment and observation.

e. Weather forecasts originate at corps or higher headquarters and are disseminated through intelligence channels. Weather forecasts covering periods ranging from less than 12 hours to more than 3 days can be obtained. In some instances, studies of the climate may be of use.

f. Weather and climate exert significant effects on personnel, equipment, and supplies: various aspects of terrain such as soil trafficability and width of streams; on manmade features; and on the activities

of tactical forces. The most important weather elements and some of their effects on military operations are—

(1) *Precipitation.* Precipitation materially affects trafficability and the extent of water obstacles. It restricts visibility and reduces the efficiency of listening posts and sound ranging equipment.

(2) *Fog.* Fog affects visibility and concealment from ground and aerial observation. Poor visibility may favor the attacker by enabling him to close with the enemy unobserved. Good visibility normally favors the defender by allowing him to observe the approach of the attacker.

(3) *Temperature.* Temperature affects the operating efficiency of both personnel and equipment. Alternate freezing and thawing affects trafficability and the extent of water obstacles.

(4) *Wind.* Wind affects airborne operations, the use of CBR, the accuracy of artillery fire, the drying of wet ground, and the degree of cold at which humans can survive.

(5) *Cloud cover.* Cloud cover limits air operations. This usually works to the disadvantage of the force having air superiority. It also acts as a reflector when searchlights are used for battlefield illumination at night.

(6) *Light data.* Light data includes time of sunrise, sunset, moonrise, moonset, and periods of civil, nautical, and astronomical twilight. Nautical twilight is useful for

military operations by providing a specific time for the start of military operations.

(7) *Effects of weather on ADM employment.* ADM (atomic demolition munitions) employment is basically the detonation of a surface or subsurface atomic explosion. An ADM would not be employed when friendly troops might, because of an unfavorable wind, be affected by radioactive fallout or residual radiation.

Section VI. SECURITY

66. Basic Considerations

The division engineer battalion commander is responsible for the security of his battalion and all its units, regardless of the security furnished by the division. However, in determining the security measures for the battalion, the commander takes into consideration the security measures of the division. If the division has a strong security force, the battalion commander does not establish a large security element.

a. Definition. Security embraces all measures taken by a command to protect itself from espionage, observation, sabotage, annoyance, or surprise. It may be active or passive. Active security involves firepower and the use of troops. Passive security includes observation, cover, dispersion, camouflage, and the use of obstacles. The division engineer battalion commander employs a combination of the two.

b. Provision. Security detachments are required in all situations. Their mission is to protect against

surprise attack and observation by enemy ground and air forces and to maintain freedom of action for the commander by gaining the time required to make proper disposition of personnel and equipment. Since security forces lessen the strength of the companies, they are kept to the minimum strength necessary to accomplish their missions. They should be mobile; and they should have an efficient warning system, including observers and means of communication, to give prompt notice of any enemy threat from the ground or the air.

67. Security During Movement

All movement in the combat zone is governed by strict security regulations, with special attention to the possibility of air attack. Distance between vehicles is greater than in rear areas. Panel sets are kept in readiness for instant use to avoid attack by friendly aircraft. The divisional engineer battalion must be well trained in passive defense against air attack. When there is a possibility of ground attack, as in a fluid situation or when guerrillas are operating in the region, tactical plans are made by the battalion commander and subordinate commanders to meet the attack. A system of observers and signals is established. Individual weapons and ammunition are kept in the hands of the troops. Machineguns are manned, and rocket launchers are dispersed throughout the column. Tactical considerations, rather than administrative considerations, govern the conduct of the march. During a night march, the importance of route reconnaissance and the proper use of road guides and markers increases. An engineer company moving on an inde-

pendent mission provides its own security. It requires security for the front (advance guards), for the rear (rear guards), for the flanks (flank patrols), during halts (march outposts) and against attacks from the air. Engineer units usually move by motor. When they do, their security detachments are also motorized. The engineer company commander provides all-around security when there is danger of contact with the enemy. The security techniques which he employs depend on the company mission, terrain, time of day, and expected enemy actions.

a. Frontal Security.

(1) Security in front is provided by an advance guard. For the battalion, its strength usually does not exceed a company; for a company, a platoon; and for a platoon, a motor patrol of one or two vehicles.

(2) The mission of the advance guard is to prevent unnecessary delay of the main body, to protect it from surprise, and to limit enemy observation from the front. An advance guard accomplished its mission by searching the terrain to the front and on each side of the line of march and by overcoming hostile resistance that is contacted. When contact with the enemy is made, the advance guard will attack aggressively to overcome resistance within its capabilities. If the enemy force is too large for the advance guard to attack, the advance guard will cover the deployment of the main body by maintaining pressure against the enemy.

(3) A company acting as the advance guard for the battalion sends forward a platoon as the

advance party. This platoon, in turn, sends forward a squad as a point. The remainder of the company constitutes the advance guard minus.

(4) In the smaller units, such as the company and platoon, the advance guard usually consists of a point and an advance party.

(*a*) The point is the leading element in the movement. It protects the column from enemy surprise. When the point encounters the enemy, it employs rapid fire and maneuver against the enemy force. It maintains contact with the enemy until the advance party has time to deploy.

(*b*) The advance party provides support for the point in the event that the point fails to eliminate the enemy. The advance party takes aggressive action against the enemy and tries to overcome the force so that movement of the main body is not delayed or halted. If the advance party fails to eliminate the enemy force, it maintains contact with it until the advance guard minus can be committed.

(*c*) The advance guard minus maintains contact with the advance party and should always be prepared to assist the advance party in moving against the enemy force. If the advance guard minus is unable to reduce enemy resistance, it immobilizes the enemy by fire and maneuver until the arrival of the main body.

(5) Distances between the point and the advance party, between the advance party and advance guard minus, and between the advance guard minus and the main body vary according to the speed of movement and the terrain. These distances are great enough to allow each succeeding element to deploy without serious interference from the enemy when contact is made. However, these distances are not so great as to prevent each element from rapidly assisting the element in front of it. At high speed, distances are increased; at low speed, they are decreased. Vehicles are spaced at distances of from 50 to 200 meters in order to provide protection against air attack and to maintain uniform speed.

b. Rear Security.

(1) Rear guards are used to protect the rear of a column advancing toward the enemy if an attack or harassing action from the rear is deemed within the enemy capabilities, or to protect the rear of a column marching away from the enemy.

(2) A company should adopt a formation similar to that of the advance guard in the reverse order of march. The distances between elements of the rear guard vary with the situation, the terrain, and the visibility. They correspond generally to the distance between elements of the advance guard. When the column halts, the rear guard dismounts and forms a march outpost.

(3) When an enemy pursuit is close, elements

of the rear guard delay the enemy to permit the next preceding unit to make suitable dispositions. Fire is opened at long range. Usually, elements do not move toward the enemy to reinforce a lower element. The larger element occupies a delaying position to cover the withdrawal of the smaller element. The element in contact with the enemy then withdraws under the protective fires of the element occupying the delaying position. The rate of movement is coordinated with the main body.

(4) The rear point stops to fire only when enemy action threatens to interfere with the march. The rear point is not reinforced by other troops. When the rear point withdraws, it uses a route that does not mask the fire of the rear party.

c. Flank Security. In open terrain, flank security may be sufficiently assured by speed of movement and constant observation to the flanks. This usually will not suffice, however, in heavily wooded, rolling, or mountainous terrain, or where the menace of guerrilla operations exists. Continuous flank patrolling is possible only where a parallel route exists (a condition not usually enjoyed by units of company size), but effective employment can be made of small flank patrols sent out to side roads, commanding ground, and points of observation. Flank security detachments usually are not strong enough to effectively delay the enemy. Their mission is to give early warning of enemy activity; hence, they must be equipped with adequate communication facilities.

d. Motorized Security Patrols. The motorized security patrol is used for reconnaissance and all types of security operations and particularly as the point of an advance or rear guard. Motorized patrols are limited in effectiveness by the fact that they are roadbound and easily ambushed and captured or destroyed. Therefore, at least two vehicles plus any other vehicles required for messengers are required. An engineer company moving alone has enough vehicles, weapons, and men to use more than one vehicle in either its advance or rear security patrol.

68. Security at Halt and in Assembly Area

a. Outpost System. Whenever an engineer unit is at a temporary halt during a march or is in the assembly area, it provides its own security. It does this by establishing an outpost system. The outpost's duty is to secure the main body against close observation and surprise by the enemy. It is so organized and disposed that it can deal with a minor enemy threat without disturbing the main body or forcing it to take action, and in case of a major threat, it can at least hold off the enemy until the main body can make preparations for action. The composition of the outpost varies for each situation. The outpost system consists of sentinels, outposts, and visiting patrols. Larger units will find it necessary to employ all of the components of the outpost system. Smaller units generally combine two of these components. Communication is established between all elements of the outpost system and the main body. If the enemy penetrates any portion of the outpost system, the main body takes measures

to protect itself. The measures provide for personnel who form a support or reserve force which counters the enemy penetration. All other personnel take action to secure the unit's immediate area. Interior guards, designated from elements of the main body, continue to carry out their duties within their assigned area. The engineer unit commander, if possible, halts in an area where there are few or no civilians. If this is impossible, all personnel are warned to keep civilians, including children, away from the area or not to allow them to enter until they are screened.

b. Battalion Outpost. An engineer unit seldom goes into the assembly area as a battalion size unit, but when it does, it posts outpost to provide security. Ordinarily, responsibility for these outposts is assigned to specific units occupying designated portions of the battalion perimeter.

c. Company and Platoon Outposts. An engineer company operating alone occupies a perimeter for security. Local security is provided by the platoons occupying the perimeter and establishing outpost systems in front of their positions.

69. Convoy Security Detachments

Lone vehicles and convoys not capable of providing their own security are grouped and escorted through danger areas by armed security detachments. These detachments are specially organized and trained to protect convoys from hostile guerrilla actions and they may contain elements of armor, infantry, and engineers. The size and composition of a detachment vary with the topography, the capabilities of hostile guerrilla forces, and the size and composition

of the convoy. Traffic through known danger area normally is controlled by traffic control stations. The engineer element is placed well forward in the column to perform such engineer tasks as minor bridge and road repair, obstacle removal, and detection and removal of mines.

70. Unescorted Convoy Operations

When the divisional engineer battalion is not escorted through a danger area by a convoy security detachment, it organizes its own convoy security. Part of the available troops are placed well forward in the convoy and a strong detachment is placed in vehicles that follow the main body. Radio contact is established between the two groups if possible. Speed is essential. Defiles are traversed at high speed. Sharp curves, steep grades, or other areas where low speed is necessary, are reconnoitered by foot troops. At the first indication of ambush, while the convoy is in motion, leading vehicles increase their speed if the road appears clear. In this effort to run through the ambush area, they go as fast as it is safe to drive. Drivers or assistant drivers of vehicles disabled by enemy fire or mines seek to direct their vehicles to the sides or off the roads so as not to block rear vehicles. Troops from vehicles stopped in the ambush area dismount and return fire, using all weapons. Troops from vehicles breaking through the ambush dismount and attack back against a flank of the ambush position. The rear guard of the convoy, upon learning that the main body has been ambushed, dismounts and attacks forward against the other flank of the ambush position. If the enemy allows the main convoy to pass

through and then ambushes the rear guard, troops from the main body return and relieve the rear guard by an attack against the flank of the ambush position.

71. Security at Worksites

a. The amount of security the engineer commander furnishes at the worksite depends on the engineer mission, guerrilla activity in the area, the terrain, and the nearness of the enemy. For larger tasks, such as the engineer battalion constructing a road, the division usually provides the security forces. For smaller tasks, such as a company or platoon constructing a bridge, the officer or noncommissioned officer in charge of the construction project provides security with personnel from his unit when security forces are not provided by the supported unit.

b. In forward areas of the combat zone, the principal types of enemy action which the working parties take security measures against are dismounted patrols, motor or mechanized raids and air attacks. Near the rear of the zone, there is less danger of enemy ground action, except guerrilla attacks. Air, nuclear, and chemical attacks may occur anywhere in a theater.

c. Enemy ground action usually can be guarded against by careful observation and by small security detachments covering probable avenues of approach. These may be supplemented by readily removable roadblocks, portable wire obstacles, and mines. The engineer officer or noncommissioned officer in charge of the worksite withdraws as few men as possible from work to use for security. However, working parties are always prepared for possible

ground raids. They keep their weapons close at hand; and they are trained to assemble, with their weapons, under cover when they receive the warning.

d. The engineer officer or noncommissioned officer in charge of working parties prepares for security against air attack by training the parties in warning, concealment, dispersion, and fire. He trains the men to identify friendly and enemy aircraft. He posts guards at points of vantage; and he disperses and conceals equipment and vehicles which are not being used. He makes maximum use of the combat engineer vehicles and the personnel carriers, with their vehicular-mounted weapons, to provide the security. When the size of the party and the size of the jobs justify it, the officer or noncommissioned officer in charge of the worksite has machineguns emplaced so that they can be manned and used against low-flying aircraft. For protection against air attack on a major rear-area project, the engineer officer requests air defense artillery through channels.

e. Local security for ADM operations is that protection which secures an area of ADM operations against concerted and organized hostile efforts that could affect the success of the mission. When hostile forces are present, local security will be required at least in the area within small arms range of the munition. Local security is normally provided by the local tactical commander. The local tactical commander is also responsible for the activities of the engineer firing party. These activities include preparation of the emplacement site and its immediate security (to include minefields and other obstacles when required), pickup and en route security when required and emplacement of the munition. The

engineer firing party will SAFE or DETONATE the munition when directed to do so by the local tactical commander. While the engineer firing party is performing its tasks, the local tactical commander provides the local security of the emplacement site (during emplacement), communication facilities, and routes of withdrawal. The local tactical commander will coordinate with the force commander within whose area the mission is being conducted on the matter of warning and evacuating friendly forces and civilians.

72. Security Against Guerrilla Forces

Guerrilla bands usually employ offensive tactics characterized by surprise, mobility, deception, and decentralized operations (FM 31–15). The division engineer battalion commander insures that all engineer units are briefed on the fighting techniques of suspected guerrilla forces. The precautions and countermeasures which the engineer units use against guerrillas vary with the nature of the threat. At halts, and in assembly areas, guards are posted at all times including periods of rest and recreation. Groups of local inhabitants of any considerable size are not allowed near the assembly area. Local civilians are subjected to rigid security checks before they are allowed to work in engineer installations such as maintenance shops. Working parties observe security precautions while they are working, resting, and eating, and when they are going to and from the jobs. When a party leaves a task to return to camp, it takes with it all tools, transportation, and readily removable equipment. A party returning to an incompleted task is alert for ambushes and booby-

traps, and it gives special attention to the security of arms, ammunition, and other equipment of value to the guerrillas.

73. Security Against Chemical and Biological Agents

a. Chemical Warfare. The division engineer battalion commander is responsible for the security of the battalion and its components against chemical attacks. He establishes a warning service, provides individual gas masks, and arranges for decontaminating equipment and supplies. Sentries are posted upwind to provide warning service, and men work with gas masks close at hand. Noncommissioned officers, using simple procedures and instruments available to the engineer unit, locate and mark contaminated areas after an attack.

b. Biological Warfare. The engineer battalion commander is responsible for protection of personnel of the battalion from the effects of biological attack. Definite information of the employment of biological warfare will probably be disseminated from division headquarters, but all echelons must be alert to the danger and must promptly report the incidence of unusual diseases. The best local defense against biological warfare is strict enforcement of all preventive medicine measures.

74. Security Against Nuclear Weapons

Nuclear warfare increases the amount of engineer effort required in most operations. It also increases the importance of camouflage. The increased distances between units created by nuclear-defense dispersion will increase the employment of barriers. Distances between units necessitate strict enforce-

ment of security measures. The best protection for individuals is to dig in. Field fortifications and shelters built according to present design, with added emphasis on overhead cover, provide good protection against other than direct hits and near misses. In addition to the measures available to the individual, the engineer commander must initiate collective defensive measures. Items considered under this heading include alarm systems, unit equipment used for protection or detection, unit decontamination system and evacuation procedures. Tactical protection is concerned with the measures which the commander employs to minimize the effects of nuclear explosions. Within the limits of his assigned mission, he will rely on maneuver, reconnaissance, and intelligence. Whereas the individual soldier seeks to make his foxhole as secure as possible during his stay in an area, the unit commander must realize that through maneuver he may minimize the vulnerability of his unit to a nuclear attack.

CHAPTER 9
DEFENSIVE OPERATIONS

Section I. INTRODUCTION

75. Purpose and Types of Defense

a. Purpose. Defense is a basic form of combat in which the purpose is to prevent, resist, repulse, or destroy an enemy attack. The defense is undertaken to develop more favorable conditions for subsequent offensive operations, to deny entrance of the enemy into an area, to reduce enemy combat capability with minimum losses, to trap and destroy hostile forces, or to serve as an economy of force measure. The fundamental forms of defense are the mobile defense and the area defense. These two forms of defense lie at opposite ends of the scale in conducting defensive operations. Often the most suitable form of defense for a given situation will be some variation of either the mobile or area defense, incorporating elements of each. The defensive pattern established is that which best meets the requirements of the particular situation after consideration of the sources available.

b. Mobile Defense. In the mobile defense, minimum forces are employed in the forward area

and a powerful mobile striking force is held in the rear. The forward elements serve to warn of impending enemy approach, to disorganize and delay the enemy as much as possible, and to canalize the attacking forces into areas suitable for counterattack by the striking force. The power of the division is concentrated in the reserve or striking force which is employed in offensive counteraction to destroy the enemy at the most favorable time and place. Mobility equal or superior to that of the enemy is essential for all elements of the defensive force. The defender must retain sufficient freedom of action to permit decision as to the time and place for the counterattack. The mobile defense is primarily oriented toward the destruction of attacking enemy forces. Figure 23 depicts a typical disposition of a divisional engineer battalion in a mobile defense.

c. Area Defense. In the area defense, primary emphasis is placed on the retention of specific terrain, and reliance is placed on forces deployed on position with supporting fires to stop and repulse the attacker. Sufficient forces are disposed in the forward area to dominate the terrain being defended. A reserve is employed to block and destroy the enemy if possible, to eliminate penetrations if they occur, or to reinforce threatened forces. Therefore, as contrasted with the mobile defense, the forward defense area normally has a higher priority for forces than does the reserve. Figure 24 depicts a typical disposition of a divisional engineer battalion in an area defense.

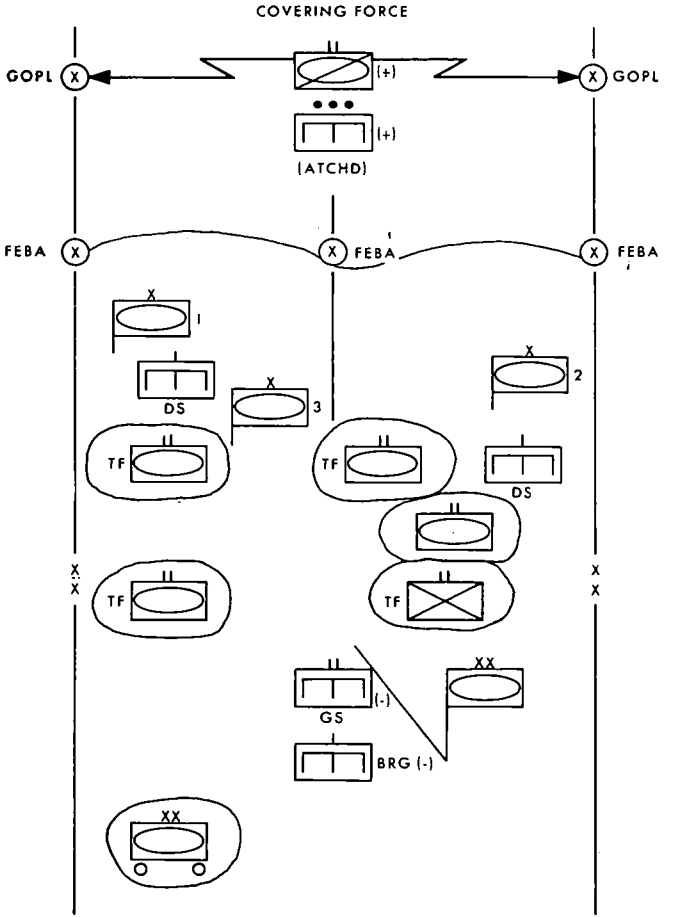


Figure 23. Typical disposition of a divisional engineer battalion in a mobile defense.

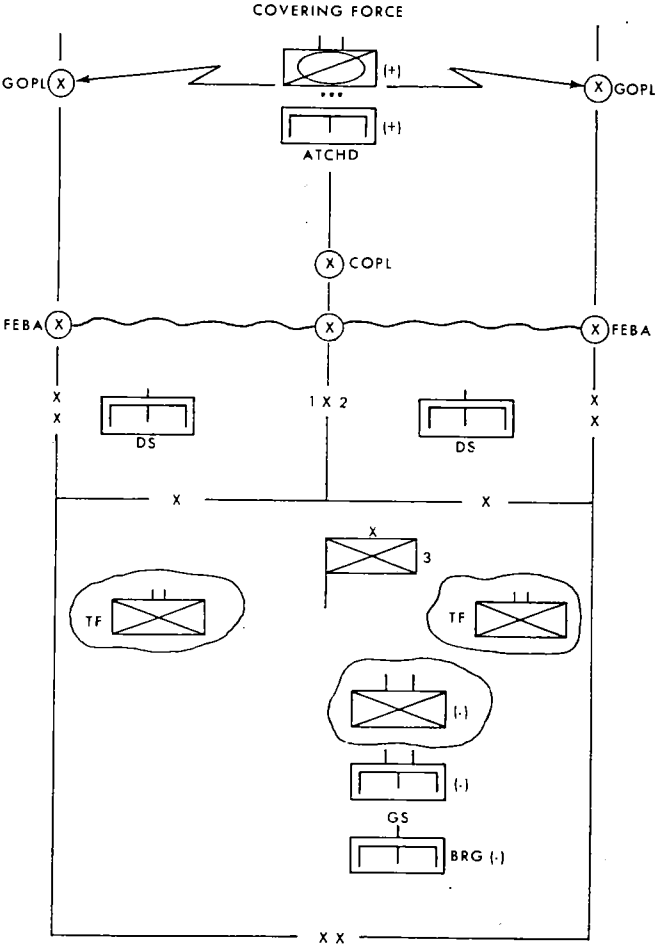


Figure 24. Typical disposition of a divisional engineer battalion in an area defense.

76. Disposition of Engineer Support

Defense, regardless of type, consists of three echelons—the security force, the forward defense area force, and the reserve or striking force.

a. Security Force. The security force is in the zone which begins at the forward edge of the battle area and extends to whatever distance to the front security elements are employed. Forces in the security zone furnish information on the enemy; delay, deceive, and disrupt him as much as possible; and provide a counter reconnaissance screen. Such forces may have the mission of locating and developing nuclear targets. Forces operation in the security zone may include elements provided by higher echelons such as aerial surveillance and corps covering force; division general outpost, or covering force, and division aerial surveillance; and combat outposts and patrols from units located in the division forward defensive area. Since all elements of the division general outpost or covering force are usually under a single command, the supporting engineers are usually attached. There is no prescribed organization for the general outpost or covering force, though it is generally a balanced combined arms force having an engineer company attached. The engineer company commander advises the general outpost or covering force commander on engineer work and assigns missions and areas of responsibility to his platoons. Each platoon with an area assignment is responsible for keeping open the main withdrawal route within its area, and it prepares the obstacles along that route. Each platoon is also responsible for preparation and execution of obstacles

on the lateral roads within its respective area. If two engineer companies should be attached to the security force, the battalion executive or other designated officer would be sent forward as the engineer to coordinate the engineer effort of the two companies and attached elements from headquarters company, the bridge company, and any other engineers. On the combat outpost line (COPL), engineers have approximately the same mission as is the case with the GOPL, though on a smaller scale. Engineer tasks would generally include: preparation and execution of conventional demolitions and atomic demolition munitions; preparation of obstacles; and pioneer construction tasks.

b. Forward Defense Area Force. This force constitutes the forward defense area which extends rearward from the forward edge of the battle area (FEBA) to include that area organized by the forward committed units. The composition of forces in the forward area depends on the form of defense employed, but there is usually one engineer company in direct support of or attached to each committed brigade. The remaining engineer companies are in general support of the division and have a second mission of supporting other task forces on order. The forces located in the forward defense area in the mobile type defense are the minimum necessary to carry out the fixing force mission of disrupting, delaying, and canalizing the enemy into areas suitable for counterattack by the reserve. These forward elements must be provided with long range fire support and a degree of mobility equal or superior to that of the enemy. When the defense is based on the retention of key terrain, as is the area defense,

the bulk of the combat forces are normally used to organize the forward defense area. The battle area consists of a number of defense areas disposed irregularly in width and depth. Each of these defense areas is organized for all-round defense with foxholes, obstacles, and weapons emplacements. A brigade commander assigned an area to defend, makes plans with the help of his unit engineer, for the organization of his battle area. His plans are based on the overall defensive plan of the division, on thorough reconnaissance, and on the troops and weapons available. Outposts, strong points, and alternate positions are planned. The troops who are to occupy these positions do most of the work in preparing them, but are aided by the engineers. Special emphasis is placed on the correct use of terrain, natural concealment, obstacles, observation and fields of fire, and avenues of approach.

c. Reserve or Striking Force. The reserve or striking force consists of those uncommitted forces held under division control. It is the principal means by which the commander influences the defensive battle and regains the initiative. The combat power of the reserve consists of fire and maneuver elements including nuclear fires. In the mobile defense the reserve or striking force is the decisive element of the defense. It is organized as strongly as possible and has the primary mission of counterattacking at the opportune time and place to destroy the enemy. In the area defense, the reserve normally is not as large as in the mobile defense; however, it is given as much strength as possible consistent with the requirement for heavy forces in the forward defense area. The reserve may

be used to eliminate penetrations, to block, or to reinforce threatened areas. The engineer support for the reserve is usually provided by engineer companies placed in direct support or attached prior to or upon its commitment. In the mobile defense, the reserve force must be given priority of engineer support because of the mission of the force.

d. Primary Combat Support Missions in the Defense. The primary combat support missions of the division engineers in the defense are to increase the defensive capabilities of combat troops in organizing the ground and preparing defensive positions, and to assist the movement of reserves or striking force in counterattacks. Engineers prepare important demolitions, give technical advice to other troops on laying minefields and themselves lay certain minefields, and prepare and maintain routes for movement of supplies and evacuation. Obstacles are used extensively in the defense. Time permitting, the defensive capabilities of the ground are augmented by artificial obstacles and improvement of natural obstacles until a barrier system has been created, through which the enemy cannot penetrate without a costly expenditure of men and materials. The installation of obstacles is the responsibility of the area or sector commander; however, the commander may call upon engineers to supervise the construction and, if necessary, to perform the construction. For prescribed types of fortifications, see FM 5–15. The division engineer assists in the formulation of the overall barrier plan and its implementation. When authorized, atomic demolition munitions (ADM) may be used to deny specific areas and strengthen the position. Engineer per-

sonnel are responsible for preparing the emplacement site, installing the ADM, and providing immediate security for the site.

Section II. ENGINEER RESPONSIBILITIES IN THE DEFENSE

77. Security

The security measures taken in a defensive operation are essentially the application of the basic principles of maintaining security under any conditions (pars. 66–74).

78. Reconnaissance

a. As in the offense, engineer reconnaissance in the defense is continuous and detailed and is initiated immediately upon the decision to occupy a position. Great emphasis is placed on the preparation of terrain studies, routes of communication for counterattack forces, obstacles and demolition sites, and natural cover.

b. In an area defense the engineer battalion reconnaissance teams search the area in detail and report all items of engineer interest. These become the basis for barrier and obstacle plans; routes of supply, evacuation, and withdrawal; and denial operations plans.

c. In the defense, engineer reconnaissance is carried out in conjunction with the counterattack plans under the directions of the unit engineer, with or without personnel from the battalion reconnaissance section.

d. A divisional defensive location is often on familiar terrain and information on the area is avail-

able in corps or army. The division engineer is responsible for the collection and utilization of this available intelligence.

79. Barriers and Obstacles

a. Barrier and obstacle planning is developed concurrently with other plans, and can be planned and executed by all echelons of commands. Extensive strategic or major tactical barrier systems, however, are directed by corps or higher. G3 has general staff responsibility for the tactical employment of barriers and obstacles, but the division engineer has the special staff responsibility for their planning. The division engineer prepares terrain and barrier studies for G2, and advises G3 as to means and extent of augmenting natural obstacles. He plans and supervises the technical aspects of barrier employment and prepares the barrier annex to the operation plan or order, under the direction of G3. Division barrier and obstacle planning is usually supplemented by detailed planning of tactical obstacles at the brigade level.

b. The construction of obstacles for close defense is the responsibility of the unit commander involved, and may be integrated with a barrier plan of division or higher echelon. Normally, each combat unit is responsible for the construction of the obstacles or that part of a barrier system which lies within its area. These obstacles normally are defended by infantry or armored units.

c. Engineers furnish assistance to the combat units in the form of effort, advice, and technical supervision. They have the responsibility for the siting and construction of obstacles when one or

more of the following conditions exists: special skills and equipment are required; flanks and rear are exposed, the command as a whole will benefit from the effort, the obstacles must be prepared before the position-occupying troops arrive, or the construction lies beyond the responsibility of a particular subordinate unit.

d. In the defense, detailed coordination is necessary to assure that installation of obstacles and barriers will not interfere with the freedom of maneuver of defensive forces. Time permitting, the natural defensive characteristics of the terrain are improved and augmented by artificial obstacles until a barrier zone has resulted which the enemy cannot penetrate without a costly loss. A method of erecting an obstacle in ordinary terrain is by demolition of bridges over unfordable streams. Bridges are prepared for demolition and destroyed, on order, to prevent them from falling intact into enemy hands. All "prepared" bridges must be adequately guarded to prevent enemy interference with the explosive. Roadblocks on main road nets in locations difficult to bypass, such as heavy woods, steep sidehill slopes, or swamps, are also satisfactory obstacles.

e. In a mobile defense, obstacles and barriers are employed to delay or canalize the enemy. They must be carefully coordinated, however, because of the necessity for freedom of movement of the maneuvering forces in a counterattack. Gaps and lanes must be available for friendly tanks and infantry to move forward or backward or to adjacent areas for battle positions.

f. Mines are used as an obstacle, or as a supporting obstacle in a system. The integration of chemical

mines in the system produces contamination which makes breaching operations more difficult and time consuming. Extensive use of mines, however, poses a logistical burden. Such use should be limited to relatively static or economy-of-force defensive situations required by concurrent offensive operations.

80. Denial Operations

A denial operation is a defensive measure designed to deny the enemy the use of material objects, facilities, and geographical areas. Denial operations involve the removal, damaging, or destruction of objects, or the denial of ground through the use of mines, flooding, chemical agents, or demolitions. A theater or theater army denial policy is normally the basis for detailed denial planning in the combat zone. It is a command responsibility, with authority usually delegated to subordinate commanders to effect denials as a normal activity within their areas, subject to the limitations and directives published by higher headquarters. The general and special staff responsibilities are the same for denial operations plans as for barrier plans. In the division, denial operations are normally incorporated in the barrier plan. The divisional engineer battalion is exceptionally well suited and equipped to supervise and execute such denials. All troops, however, participate in certain aspects of denial operations, including the destruction of organic equipment and supplies, procedures for which normally are included in the unit's SOP.

a. Items Denied the Enemy. All possible military supplies and equipment are evacuated. According to the conventions of war, medical supplies will not

be destroyed intentionally but all else which cannot be evacuated is destroyed. The division and the engineer battalion are interested mostly in the denial of such items as military equipment and installations, military supplies, communication facilities (railroads and rolling stock, airstrips, bridges, highways, signal communication items), and public utilities (powerplants, reservoirs, and port and dock facilities).

b. Denial by Removal. Evacuation of material is as much a part of denial operations as destruction. Evacuation must be started early and conducted in accordance with prepared priority lists. Every available means of transportation must be used to capacity, to save as many supplies and as much equipment as possible.

c. Denial by Destruction. All possible methods of destruction are used. The most common are fire, flooding or drenching, mechanical methods (such as breaking with a sledge hammer or cutting with an oxyacetylene torch), and explosives (FM 5–25), including ADM, contamination, and projectiles (small arms, artillery, and bombs). So that destruction may be executed at the desired time, personnel to destroy each item must be designated in advance; supplies necessary for the destruction must be estimated and assembled at convenient locations; circumstances under which the destruction is to take place must be definitely prescribed; and, if orders for destruction are to be issued, the means of transmission must be provided.

d. Atomic Demolition Munitions. Atomic demolition munitions may be used in denial operations. Normally, the officer responsible for the execution of an atomic demolition mission will be the demoli-

tion guard commander. However, the responsibility may fall to the commander of the ADM firing party. The commander of the ADM firing party must be highly trained in all aspects of the ADM operations that are the responsibility of engineer personnel. He directs all operations at the emplacement site, takes emergency action in the event of a change of mission or misfire, and detonates the ADM on order from higher headquarters. Engineer personnel prepare the emplacement site under the direction of the ADM firing party commander. This preparation may include providing appropriate access roads, installing antitank and antipersonnel minefields or other obstacles when ordered, camouflaging the area to avoid disclosure of the operations, providing immediate security, and providing communication facilities. Engineer personnel install the ADM in the emplacement and complete all preparation of the munition and site. Detailed information on the employment of atomic demolition munitions is contained in FM 5–26.

81. Field Fortifications

a. The defense is built around a series of organized and occupied tactical positions which are selected for their natural defensive strength, their contribution to the mission, and the degree of observation they allow. These natural positions are strengthened by field fortifications, always considering the fire plan and the scheme of maneuver. Well planned and constructed fortifications should provide the desired degree of protection, and also bring the enemy under a maximum volume of effective fire as early as possible. Precautions are taken to conceal

from the enemy the location of principal defensive elements. Camouflage and the preparation of dummy and decoy positions normally proceed concurrently with the other work. Plans normally consider construction by phases, meaning that the protective construction proceeds from the minimum to the ultimate.

b. The siting and construction of field fortifications for the protection of troops are the responsiblity of the individual unit commander involved. The staff engineer assists by preparing plans and orders and conducting technical inspections. Engineer responsibilities are primarily technical. The supervisory engineer personnel, however, are familiar with the tactical considerations affecting the organization of the ground. This allows them to give valuable technical assistance and advice. The staff engineer is responsible for the production of terrain intelligence studies from which the fortifications are planned and developed. The engineer's primary responsibilities in the construction of field fortifications are to—

(1) Supply locally available field fortification materials and handtools.
(2) Furnish technical advice and assistance.
(3) Accomplish large-scale excavation and backfilling.
(4) Increase the effectiveness of extensive emplacements through the creation of protective obstacles.

c. Construction priority of weapons emplacements, command posts, and other shelters provides for efficient use of available time, personnel, tools, and materials. It insures that maximum value is derived

from the time and labor already expended, if the area is attacked before construction is completed. Local materials and expedient construction are used to the maximum to reduce logistical requirements. Construction work to strengthen the position is continued during the entire period of occupancy. For prescribed types of fortifications, see FM 5–15.

82. Camouflage

The basic principles of camouflage in an offensive operation are followed in a static or defensive situation (FM 5–20). The responsibility for camouflage rests on the commander. However, all troops must be aware of the principles and construction techniques of camouflage. Technical advice and assistance is the responsibility of the engineers. The division engineer, under the general staff supervision of the division G2, normally is responsible for camouflage planning, in coordination with the operations and supply sections. In a fast moving offensive situation, it is doubtful if time will allow extensive artificial camouflage measures, but engineers can advise and assist other troops in making use of natural terrain features which aid camouflage and concealment.

83. Engineer Work in the Division Rear Area

In addition to barriers in depth, from the general outpost through the committed brigade area, blocking positions are prepared in the rear of the brigade area. These blocking positions are planned by the division commander and prepared by the maneuver battalions not on line, assisted by the engineers. Positions are selected and organized to prevent

major penetrations from securing lightly held or exposed flanks. The positions are occupied by elements of the division reserve. Full advantage is taken of natural terrain features. Positions are prepared for all-round defense. Emphasis is placed on defense against armored attack and possible nuclear strikes. Engineers play an important role in the preparation of rear area defense and in the construction of alternate positions. Engineers in the rear area normally are in general support and perform all types of engineer work. Typical assignments for engineer troops located in the rear area include—

a. Road and Bridge Maintenance (Construction and Repair). In the division rear area, there will be a continual buildup and replenishment of supplies and equipment. This results in an added amount of traffic on the road network. Since all defensive operations are dependent upon the mobility of units and supplies, it is of great importance that the roads and bridges be kept open at all times.

b. Command Posts. With the concept of increased dispersion, division and brigade command posts will face the problem of avoiding presenting profitable targets for enemy nuclear weapons. All emplacements must be dispersed, concealed, and sufficiently dug in to prevent excessive damage from nuclear attack. The necessity for alternate command posts for division as well as brigade headquarters will also increase the workload of the engineers appreciably.

c. Division Artillery Positions. Additional engineer assistance will be required to provide assistance in preparation of artillery positions for rapid and distant displacement of artillery units.

d. Water and Water Points. Operating water points and supplying water are the responsibility of the engineer battalion S4, but the engineer companies will assist in site preparation. This will include clearing, construction of access roads, and necessary leveling and excavation to make the sites suitable for planned installation.

e. Mine Removal. If the defense is to be undertaken in an area previously occupied by the enemy, minefields will have been breached. As the buildup of the area increases, it may be necessary for engineer units to enter these mined areas and remove or destroy the mines still in place.

f. Prisoner-of-War Stockades. The military police will be responsible for escorting prisoners to the rear. The engineers will be called upon to construct inclosures to contain these prisoners.

g. Air Landing Facilities. It will be necessary to prepare landing facilities for helicopters and light aircraft (TM 5–250 and TM 5–251). These landing areas will be of pioneer type construction. The work will consist primarily of clearing a large enough area to receive the aircraft, and doing limited leveling and excavation to make the ground trafficable for the aircraft. Examples of this type of work include the clearing of brush, trees, or telephone lines from the sides of a road so the road can be used as a landing strip, and the filling of craters or removal of vegetation from an area of sufficient size to allow helicopter landings.

h. Preparation of Installations. Preparation of the support command installations in the division rear area may require a large portion of the engineer effort. The areas in which it is decided to locate the

necessary installations will include emplacements for signal communication equipment and supplies. They also will include areas to be used by the medical battalion to receive mass casualties resulting from nuclear bursts. The supply and transportation battalion and the maintenance battalion area will probably also require preparation. In many cases the terrain may provide much of the necessary cover and concealment. When it does not, the engineers will make recommendations regarding the location of the installation and may assist in improving the location.

Section III. DEFENSE AGAINST NUCLEAR ATTACK

84. Engineer Effort

Division headquarters will control the engineer effort in defense against nuclear attacks. A great part of engineer work will be the measures taken to reduce the vulnerability of friendly forces to the attack and to facilitate their recovery after the attack. These measures include duplication, dispersion, deception, camouflage, and protective construction before a nuclear attack. They include reconstruction and assistance in decontamination and area damage control measures after the attack. The engineer effort expended on each task should be determined by the environment, the military importance of the installation or facility, the threat, and the active defense effort by other arms. The commander should weigh these measures in deciding on the employment of the engineer units. Nuclear defense, which includes radiological defense, is defined as the protective measures taken to minimize casualties and materiel damage from nuclear blast and thermal and

radiation effects. It is interpreted to include measures such as—

a. Training and distribution of personnel with special reference to radiological specialists.

b. Preparation and maintenance of fixed and portable structures and equipment.

c. Teaching defense techniques and procedures, including use of detecting equipment; protection or removal of exposed personnel; and decontamination of personnel, equipment, structures, or terrain.

85. Command Responsibilities

The nuclear defense training of the organization and of the individuals in the organization and the protection of the unit against nuclear weapons effect are basic responsibilities of the command. Some aspects which may be expected to require consideration by unit commanders are discussed in FM's 21–40, 21–41, and 21–48 and in TC 101–1.

86. Before-Burst Operations

The division engineer is responsible for construction of installations required for radiological defense. He consults with the battalion chemical officer concerning optimum protection to be gained through special types of construction, the location of new shelters, and special command posts. Additional before-burst tasks include the following, as time permits:

a. Survey of battalion area for suitable shelters and sheltered locations.

b. Disperse unit personnel, equipment, and supplies consistent with operational practicability.

c. Cover essential equipment and supplies with

canvas or other material for protection against contamination.

d. Select alternate sites for water points to utilize, where possible, underground sources.

e. Organize unit medical, rescue, and evacuation teams for the battalion.

f. Select and prepare, in bridging operations, an alternate bridge site for each bridge needed.

g. Organize a radiological defense warning system for the battalion.

h. Prepare a radiological defense SOP based on that of the next higher headquarters for the battalion.

87. After-Burst Operations

The engineer mission in case of a nuclear attack is expected to be essentially the same as for other types of attack, but to be complicated in practice by the destructive effects of nuclear weapons and the additional hazards of residual radiation. Engineer units will have a part in a variety of operations. Rescue squads will be organized and equipped to remove casualties, render first aid, and salvage damaged materials. Labor and equipment squads will be organized and equipped to clear debris, search for casualties, assist in decontamination, and evacuate materials. The removal of victims from the wreckage of collapsed buildings will often be a task requiring structural knowledge and engineering judgment. After the burst, engineers may be required to—

a. Perform first aid, rescue, and evacuation tasks.

b. Prepare personnel and equipment decontamination stations.

c. Make and post signs for unsafe areas.

d. Decontaminate essential areas or evacuate to safe areas.

e. Fight fires.

f. Clear debris and tree blowdown from essential routes to facilitate relief, supply and evacuation.

g. Remove or cover radioactive particles in contaminated areas.

h. Assist in the extrication of units or elements trapped by blowdown, rubble, and fire which have resulted from nuclear explosions.

i. Produce potable water.

j. Perform other special and general engineer tasks as required.

Section IV. ENGINEER RESPONSIBILITIES IN RETROGRADE MOVEMENTS

88. Retrograde Movements

Retrograde operations are planned movements to the rear or away from the enemy, and are classified as withdrawals, delaying actions, and retirements. Within a division in contact with the enemy, a combination of these types of action may be conducted simultaneously or in sequence as one form develops into another. Retrograde operations may be forced by the enemy action or may be made voluntarily. In either event, such an action must be approved by the higher commander. A well planned and organized retrograde, aggressively executed, provides opportunities for inflicting heavy damage to enemy troops and material. In the conduct of the retrograde, the division will employ a combination of offensive, defensive, and delaying tactics supported by nuclear weapons. Because

of their inherent characteristics of tactical mobility and extensive communications, the armored and mechanized divisions can cover a wider front in the retrograde than the infantry or airborne divisions. Retrograde movements are covered by mobile forces of combined arms, which delay and deceive the enemy and prevent interference with the execution of the plan. Contact with the enemy is maintained by these covering forces, who force the enemy to fight or maneuver for the ground that is vacated.

89. Purpose

Retrograde movements are conducted to accomplish one or more of the following:

a. To harass, exhaust, inflict punishment upon, resist, and delay the enemy.

b. To draw the enemy into an unfavorable situation.

c. To permit the employment of all or a portion of the command elsewhere.

d. To avoid combat under undesirable conditions.

e. To gain time and avoid fighting a decisive engagement.

f. To disengage from battle.

g. To conform to movements of other friendly troops.

90. Engineer Responsibilities

During retrograde movements, engineers play a vital role in delaying the advance of the enemy and in providing adequate withdrawal routes. Proper coordination and execution of engineer tasks in retrograde movements normally require the attachment of engineer elements to the covering

force. The leading elements of the retiring friendly troops must be kept moving to their destination, and the routes must be kept open and clear to allow successive elements to reach their destination. Engineers near the end of the retiring column destroy bridges and culverts, block roads, lay mines, destroy stores, and demolish railways and rolling stock in implementing the demolition plan. The time available and instructions of higher headquarters determine the degree of destruction and the number of obstacles constructed. Major obstacles must receive priority, since their construction leads to the greatest difficulty for the enemy. The engineers work closely with the other elements of the covering force, preparing successive delaying positions and obstacles for the delaying forces, while moving to the rear in leapfrog fashion.

91. Demolition Plan

a. Introduction. One of the most important functions of the engineers will be professional advice and assistance in the overall formulation and implementation of the demolitions plan. Demolitions and barriers are used by the retrograde force commander to delay the enemy or canalize him into areas where he can be destroyed with nuclear or nonnuclear weapons. Well-planned and widespread use of barriers and demolitions (to include chemical munitions) assist in gaining time and in avoiding close pursuit. Demolition plans are coordinated with higher headquarters to prevent interference with future operations. The demolition plan is prepared as an annex to the operation order (plan). Subsurface or surface atomic demolition munitions

may be employed to create craters and contaminated areas which will slow or impede the enemy's advance. The employment of such weapons will be reported to the higher commander.

b. Details of Plan. Detailed plans are prepared for demolitions along enemy avenues of approach and those routes which lead into the division zone. Particular attention is given to the destruction of bridges and tunnels. Demolitions are placed in defiles and on routes traversing natural and artificial obstacles. (See app. IV for detailed instructions to the demolition guard and the demolition party.) Demolition plans include—

(1) Provisions for placing and firing the necessary demolitions.
(2) Adequate guards to prevent premature firing of charges or seizure by enemy infiltrators.
(3) Fixed responsibility for the destruction of bridges.
(4) Schedule for destroying bridges no longer needed by our forces.
(5) Covering by fire, to include nuclear fire, those obstacles created by demolition.

c. Bridge Destruction. The destruction of bridges is of major importance to the retrograde force commander. Care is exercised to insure that bridges are not blown prematurely or that they are not seized intact by the enemy. To accomplish this, responsibility for blowing bridges within his zone is delegated to the tactical commander. A demolitions firing party and a demolition guard are designated for each bridge. The guard commander has the authority to destroy the bridge, subject to conditions established

by the higher commander. A list of all units that are to use the bridge is furnished the guard commander when his unit has cleared. After the main body has crossed, the majority of the bridges in the zone are destroyed. Certain predesignated bridges are left for use by security elements. The demolition guard commander is responsible for destroying the bridge to prevent its capture by the enemy but will do so only in accordance with the provisions of the demolition plan.

92. Withdrawal

This is an operation by which all or part of a deployed force disengages from the enemy to initiate some other action. Withdrawals can be executed either by day or by night. Night withdrawals are favored over daylight withdrawals because they normally preserve freedom of action and facilitate deception. A daylight withdrawal under direct enemy pressure is avoided, if possible, because observed enemy fires may result in heavy casualties and loss of freedom of action. The commander ordering a withdrawal designates the location to which the troops will move and the action to be taken after the withdrawal. Withdrawals normally are followed by a defense on another position, a delaying action, or a retirement.

93. Delaying Action

a. Execution. This is an operation which trades space for time while inflicting punishment on the enemy without becoming decisively engaged in combat. Delaying action usually is employed by covering forces and other security detachments. It is

executed most effectively by highly mobile troops (motorized, mechanized, or air transported) supported by armor, tactical aviation, or nuclear fires. The effective use of obstacles, covered by fire, strongly reinforces the delaying capability. Delaying forces must offer a continued threat of strong opposition to force the enemy to deploy and maneuver. A brigade may conduct a delaying action independently or as a part of a larger delaying force. The echelons of a brigade delaying position are similar to those used in the area defense, that is, the security echelon, the forward defense area, and the reserve.

b. Nuclear Warfare. Delaying actions assume increased importance in nuclear warfare. Dispersed formations, emphasis on flexibility of action, reliance on heavy fires, and movement to inflict maximum casualties on the enemy while avoiding close combat are all characteristics of a delaying action. Thus, a unit in a delaying action may be organized like a forward brigade in defense when the division is conducting a mobile defense.

c. Methods of Conducting Delaying Actions.

(1) Delay on a single position.
(2) Delay on successive positions.
(3) Delay by alternating forces on successive positions.
(4) Limited offensive action or spoiling attacks to throw the enemy off balance.
(5) A combination of any of the above, using nuclear or nonnuclear fires.

d. Successive Positions. Within the scope of the mission and based on available time and space, the commander determines the duration of the resistance to be made on each successive delaying position.

The number of successive positions to be occupied depends on total space available for delay, the terrain characteristics, the enemy situation, and the available delay time as stated in the mission. The successive positions should be far enough apart so that the enemy is forced to displace his artillery for each assault.

e. Characteristics of a Good Delaying Position.

(1) Good observation and long-range fields of fire.
(2) Covered routes of withdrawal.
(3) Obstacles to the front and flank.
(4) Cover and concealment on the position.
(5) A series of parallel ridges across the axis of hostile advance.

f. Conduct of the Delaying Action. As the enemy approaches the delaying position, he is taken under fire at extreme ranges. Every effort is made to inflict casualties on the enemy to force him to mass for an assault. Nuclear strikes are used against the resulting massed targets. The commander of the delaying force must decide, if it appears that his position is going to be overrun, whether to execute a daylight withdrawal to the next rearward position or to attempt to wait for nightfall. During the course of withdrawal, special details execute demolitions (including ADM), activate minefields, and prepare other obstacles as time and materials permit.

94. Retirement

a. Introduction. A retirement is a retrograde movement in which a force withdraws without direct enemy pressure to avoid an engagement under existing conditions. A retirement may be made to

put extended distance between the defender and the enemy, to reduce friendly supporting distance, to occupy more favorable terrain, to conform to disposition of a higher command, or to permit employment in another sector. A withdrawal may precede a retirement. In a withdrawal, the movement becomes a retirement after the main force has broken contact with the enemy and march columns have been formed. A brigade usually executes a retirement as part of a larger force. When it is on an independent mission, it retires in compliance with specific instructions or after completing its mission.

b. Security. Strong mobile advance, rear, and flank guards are required in a retirement. The rear guard is the principal security of each column. Its composition and size depend on the size and imminence of enemy attack. Should the enemy make contact, the rear guard employs delaying action tactics. Air reconnaissance is used to maintain surveillance of leading hostile elements. Combat aviation aids in delaying the pursuing enemy. Artillery air observers are prepared to place long-range fires, including nuclear fires, on enemy forces. The use of army aircraft facilitates column control. Control of radio traffic is strictly enforced, particularly during the initial stages, to preserve secrecy.

c. Conduct of the Retirement. At the designated time, elements of the brigade move into dispersed assembly areas and form rapidly into march columns to begin retirement. Forced marches are often employed to place maximum distance between the enemy and the retiring force. Long marches at night are common.

CHAPTER 10

ENGINEER REORGANIZATION FOR COMBAT

95. Introduction

The divisional engineer battalion, or any element thereof, engages in combat operations when—

a. The enemy prevents access to the unit's job site.

b. The enemy attempts to drive the engineer unit from a job site.

c. The enemy prevents delivery of supplies.

d. Enemy action requires the unit to provide its own security while on the march or in an assembly area.

e. Enemy action forces a combat role. This may develop in several ways as shown below:

(1) The unit commander is forced into a combat role in order to save the unit.

(2) Enemy action forces the unit to fight in order that the higher command might accomplish its mission.

(3) The major commander has no alternative than to commit the engineer unit because of a desperate situation.

96. Contingency Planning

An engineer battalion usually has its lettered companies committed to the brigades as well as

having the bridge company and elements of headquarters company's equipment platoon distributed in piecemeal fashion to the lettered companies. The remainder of the "operational" elements of the battalion also are committed throughout the division area in general support of the division. Consequently, it is difficult, if not impossible, to plan for the physical reorganization of the battalion for combat as a unit. The battalion and each company plans for such a contingency, as well as plans for commitment as separate elements attached to the supported force upon order. These contingency plans are established in the battalion and company standing operation procedure (SOP) and are kept current based on the unit's current and anticipated mission and actual status. Coordination is effected by the battalion and each company with the next higher headquarters and the supported force.

97. Employment

If it becomes necessary to employ the engineer battalion or its elements in a combat role, the unit must be prepared to accept this mission with the minimum amount of delay. Engineer units should be committed as a unit. This allows the commander to preserve unit integrity. The major force commander is responsible for the decision to commit engineer units to a combat role. He will commit the engineer unit *only* after careful consideration, because the commitment will preclude engineer support to the force. Some of the situations where an engineer unit may be committed to this role are: an overextended defensive area; a sudden enemy penetration or envelopment; an enemy airdrop or an organized guerrilla

activity in a rear area; or a need to relieve a combat force that must be committed to a more decisive combat role elsewhere. The following factors are considered before a decision is made to commit the engineer battalion to combat:

a. The seriousness of the situation—will the enemy force be able to affect the command seriously if the engineer unit is not committed?

b. The loss of engineer support—can the command afford the temporary loss of engineer support?

c. Strength of the engineer unit—does the engineer unit have enough personnel to be effectively employed?

d. Support to the engineer unit—will the mission be of an offensive or defensive nature, and what fire and logistical support can the engineer unit expect to receive from adjacent and higher units in carrying out its mission? It is necessary to realize the major differences that exist between an infantry company and an engineer company regarding strength and weapons.

98. Types of Missions

The type of mission that an engineer unit will receive in a combat role will be limited. An engineer unit has less combat effectiveness than an infantry unit of similar size because its equipment and available supporting weapons are fewer, and its infantry combat training is not as extensive. To compensate in part for these disadvantages, an engineer unit is assigned a smaller frontage than an infantry unit of corresponding size. Additional firepower and fire support must be furnished by the force commander.

An engineer unit may receive an offensive or defensive mission.

a. Offensive. The divisional engineer battalion might receive a mission to aid other combat forces to take a large objective which is vital to the overall operation, or to destroy an enemy stronghold in the division sector, such as a small bypassed enemy unit—but this type of commitment is rare.

b. Defensive. The defensive type mission is the one most commonly assigned to division engineer units. The major force commander should allow time for the engineer unit to prepare for this mission. Time is needed to coordinate the proper type of support and to move nonessential personnel and equipment to a rear area where they will not be captured or destroyed by the enemy force. When ample warning time is available to the engineer commander, he prepares his unit for battle in the same way as any other combat force commander.

99. Preparation for Combat

Preparation of the engineer battalion for a combat role is normally limited to headquarters company and the engineer companies. The bridge company usually is not committed to this type of role. It remains intact, subject to call by the division engineer, for assignment to division engineer missions. When modified for combat, the engineer company is capable of furnishing command, combat, and crew-served-weapons elements. Normal organization is changed to provide effective use and control of crew-served-weapons, for security of equipment not needed for combat, and for the special requirements of command, communication, and supply in combat. The

extent of modification for combat varies with the size of the unit, the time available, and the mission. When engineers are deliberately committed to a combat role, there usually is time to make the necessary initial changes before meeting the enemy. The battalion, headquarters company, and the engineer companies are organized into forward and rear echelons as shown in figures 25, 26, and 27, respectively. The forward echelon consists of sections and units to include personnel and equipment to accomplish the combat mission. The rear echelon includes all of the equipment and personnel not

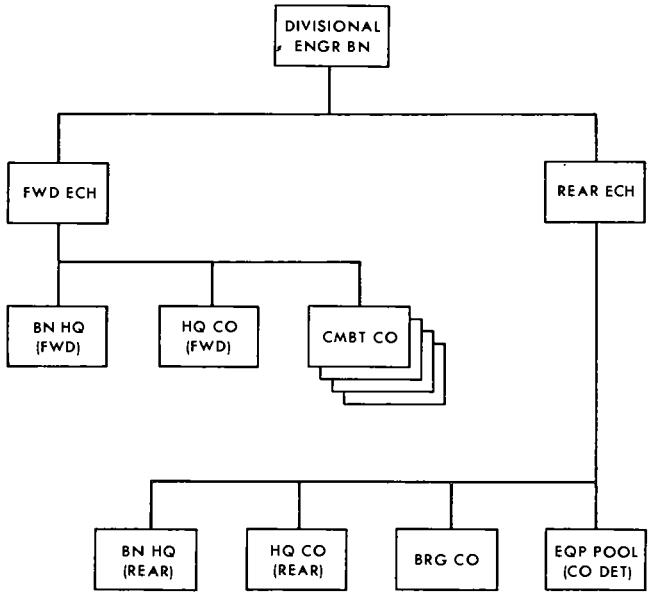


Figure 25. Divisional engineer battalion reorganized for combat.

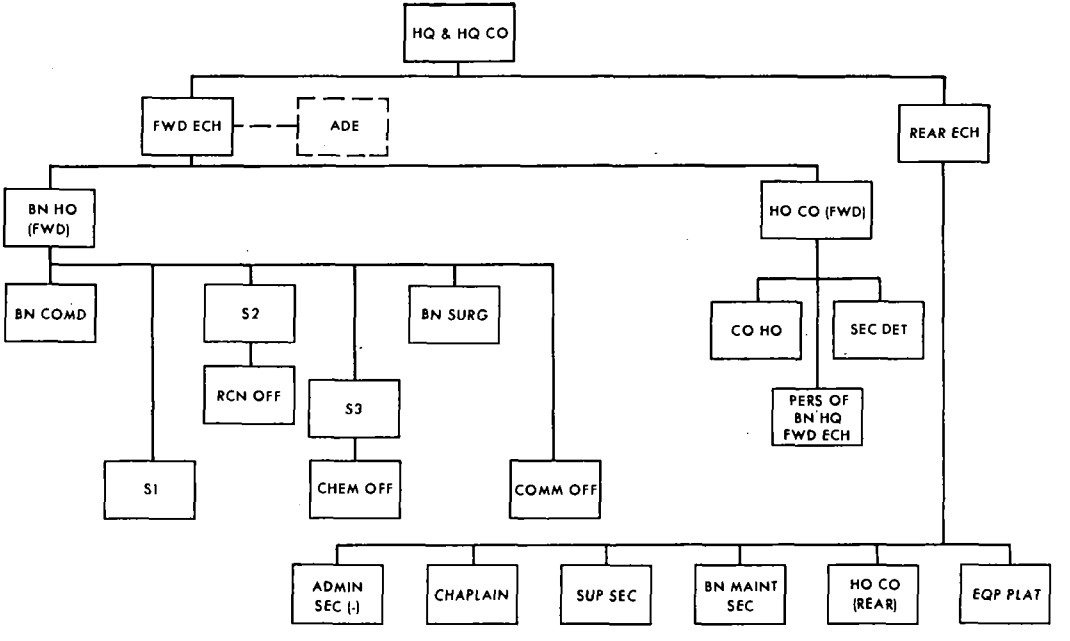


Figure 26. Headquarters and headquarters company reorganized for combat.

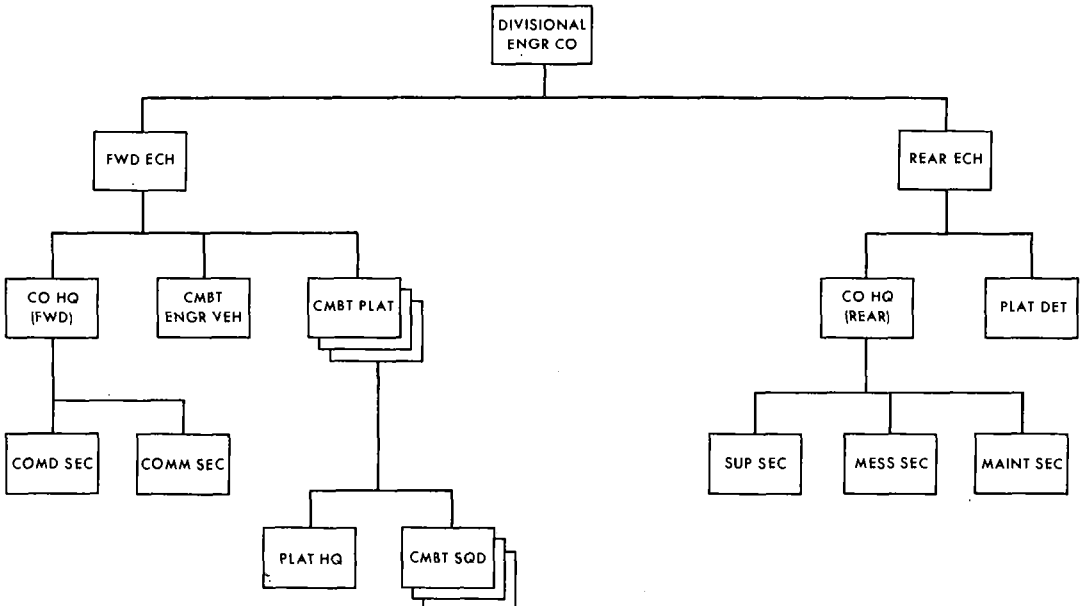


Figure 27. Divisional engineer company reorganized for combat.

directly essential to the mission. Overhead personnel and such items as nonessential vehicles and heavy equipment move to a rear area designated by the commander. The number of personnel assigned is the minimum necessary to maintain the mobility of the rear echelon, provide for its local security, and perform essential support functions.

100. Fire Support and Communications

Effectiveness of engineer units in a combat role is increased with additional firepower furnished by other units within the division. Fire support is best provided when the engineer battalion is attached to the supported force and is employed as a part of that organization. The force commander is then responsible for furnishing supporting fires. Forward observers from artillery and mortar units join the engineer units in the same manner they would an infantry unit. If the battalion is committed as a unit, the combat engineer vehicles from the companies can be grouped to provide antitank protection, or to be employed as directed by the battalion commander. One of the reconnaissance officers can be appointed leader of this force. The engineer unit enters the radio net of the organization to which attached. The use of prearranged signals is coordinated. In static situations, wire communication may be established. In addition, the use of messengers and sound and visual signals is necessary. Whenever possible, supporting artillery units should continue their wire net down to each deployed engineer company.

101. Suggested Guide for Reorganization for Combat

Commitment of an engineer unit to a prolonged combat role is not spontaneous. A definite contingency plan, a part of the unit's SOP, must be established which will enable the unit to move efficiently from the normal engineer role to a combat role. It would be impossible to establish a definite combat plan for all engineer units. Each unit has its own characteristics, and each unit has progressed to a state of efficiency peculiar to itself. Because of this, only guidance can be suggested which an engineer commander can follow in preparing for a combat role. The following is a suggested guide for reorganizing for combat:

a. Division Engineer Battalion (fig. 25).

(1) *Forward echelon.* The forward echelon of battalion headquarters is under the immediate control of the battalion commander. It operates the battalion command post, providing the staff agencies necessary for the conduct of tactical operations.

(2) *Rear echelon.* Members and equipment of the battalion staff sections which are not required for the combat mission become part of the rear echelon. The battalion rear echelon is commanded by the senior officer present, usually the S4 officer.

b. Headquarters and Headquarters Company (fig. 26).

(1) *Forward echelon.* The forward echelon of headquarters company consists of the personnel and equipment of battalion head-

quarters neeessary to establish, operate, and defend the battalion command post. It is commanded by the eompany commander.

(2) *Rear echelon.* The rear echelon is eomposed of personnel and equipment not required in the forward echelon. Available personnel and equipment of the eompany may be detaehed and used by the division engineer on engineer tasks elsewhere.

c. Engineer Companies (fig. 27).

(1) *Forward echelon.* Personnel and equipment to aeeomplish the combat mission are formed into a forward eehelon. Engineer companies are modified so that each will have a headquarters and three eombat platoons and, if desired, a combat engineer vehiele striking force.

(2) *Rear echelon.* The rear echelon ineludes all personnel and equipment not directly essential to the combat role. It moves to a rear area designated by the commander; however, it normally is grouped with the battalion rear echelon. The mission of the rear echelon is to support the company's operation and to provide its own security

d. Bridge Company. The bridge eompany normally is not committed in a eombat role. When the battalion is committed, the bridge company normally moves to the rear and beeomes a part of the battalion rear echelon. It assists in providing part of the security element for that area. The division engineer may assign some essential engineer tasks to the bridge company.

102. Assistance to Division Engineers

When a division organizes its own defensive position, the engineer battalion will require and normally receive assistance from corps. The corps engineer combat group may assume certain road work and the supply of water in the rear areas; emergency installation of standard equipment bridges to replace damaged or destroyed bridges in the division area; earthmoving operations; specialized camouflage tasks; and the preparation of obstacles and positions for the rear flanks or blocking positions. Also, technical specialists not available to the division engineer may be provided by higher engineer commands. If a need is anticipated, and the situation permits, a defensive position may be completed by corps or army before the arrival of the occupying troops, in which instance civilian labor is often used to the maximum.

CHAPTER 11

COMMUNICATIONS

103. Introduction

a. To keep pace with the situation and to provide the maximum utilization of the engineer battalion in accomplishing its mission, the commander, his staff, and the companies make maximum use of their signal system.

b. The division signal battalion employs the area communication system concept to meet the requirements for signal communication within the division. Under this concept, area signal centers are established throughout the division area of operation to support the dispersed elements of the division. The signal centers are interconnected by multichannel radio relay and, when the situation permits, by field cable, in such configuration as to provide alternate routes between any two points in the system. Area signal centers in the division area communications system are located with or near the major division elements, such as brigade headquarters, division artillery, and division main CP. The basic system is extended to other uses by field wire or by FM radio/wire integration links.

c. The area signal centers provide points of entry into the system for the supported headquarters, units, and installations to facilitate their use of trunk lines and channels in the system. For instance, if a

company commander of an engineer company attached to a brigade has an immediate request for specialized equipment he may enter the area signal center supporting the brigade, by either FM radio or telephone, and transmit his request to the engineer battalion.

104. Responsibilities

a. Communication is a function of command. Each commander is responsible for the establishment, operation, and maintenance, within his capabilities, of the communication system of his command. Effective communication is essential to the control of the battalion and its elements. The battalion utilizes a combination of radio, wire, visual, sound, and messenger communication to provide as many multiple means of transmitting messages as conditions permit.

b. Effective communication is a result of the joint effort of units concerned, even though one of those units has primary responsibility for establishing and maintaining communication with another. In the event of a communication failure, units concerned take immediate action to locate and eliminate the trouble and continue such action until contact is regained.

c. Headquarters company includes a communications section which is directed by a communications chief. The section operates under the immediate supervision of the communications officer who is a member of the battalion staff. The communications section provides the following services:

(1) Supervises the operation of the battalion communication system.

(2) Installs wire line to companies and staff sections when time and situation permit.
(3) Operates, when required, the battalion message center and switchboard, and provides messenger service.
(4) Operates panel displays and message pickup facilities.
(5) Operates the battalion command net (AM) and the battalion commander's net (FM).
(6) Monitors the division air warning/broadcast net (AM) and the division CG/command net (FM). It also operates in the division command/operations net (RATT).
(7) Provides second-echelon maintenance on communication equipment of headquarters company, and assists the companies in performance of their second-echelon maintenance.
(8) Provides facilities for encrypting messages.

d. The engineer company commander is responsible for the installation, operation, and maintenance of the communication system and for its efficient functioning as part of the battalion's or supported unit's system. He insures that his subordinates are properly trained and utilized to assist him in the execution of his communication responsibilities. The communications chief is the principal assistant to the company commander in communication matters. The headquarters platoon of the company is authorized sufficient personnel to perform the following tasks:

(1) Providing second-echelon maintenance on communication equipment of the company.

(2) Supervising the operation of the company communication system.
(3) Installing wire lines to platoons when time and situation permit.
(4) Operating the company message center and switchboard.
(5) Operating the company net (FM) and operating within the engineer battalion's command net (AM). Monitoring either the engineer battalion commander's net (FM) or the supported organization's commander's net (FM). Also monitoring the division air warning/broadcast net (AM).

105. Wire Communication

a. Wire communication is used whenever practicable. However, the widely dispersed operations of the engineer battalion preclude extensive use of organic wire for communication between elements of the battalion other than through the use of the area signal centers. Typical wire nets for the battalion are shown in figures 28 and 29.

b. The battalion communications section installs local telephones required for the operation of the battalion headquarters.

c. Engineer companies enter the wire system of the supported organization. They make full use of the area communication system for communication with the engineer battalion headquarters to coordinate the flow of materials, supplies, pass information, and related problems during operations. Wire communication is provided at worksites as required to improve the efficiency of the project and to coordinate the

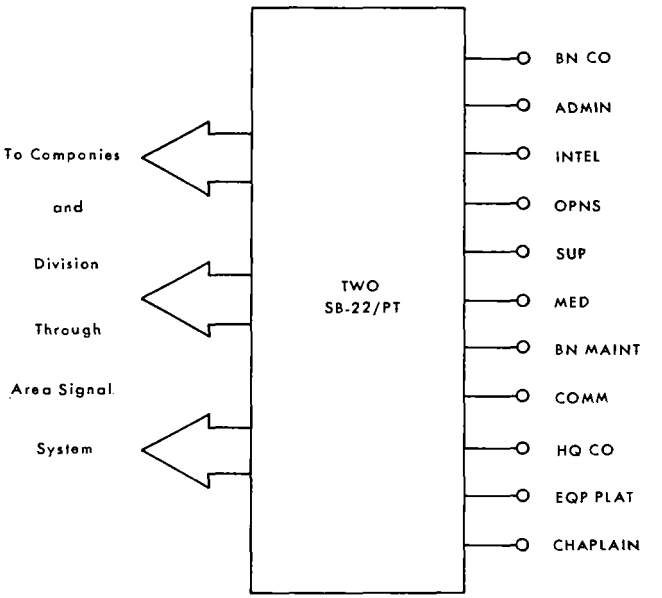
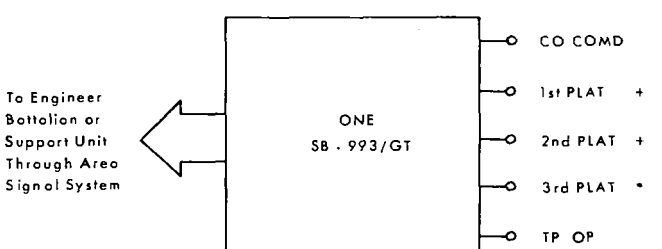


Figure 28. Typical wire net for divisional engineer battalion.



* AVLB Platoon in Bridge Company

\+ Heavy Raft Platoons

Figure 29. Typical wire net for divisional engineer company or bridge company.

operations of work parties. Units use wire communication to control traffic through minefields and barriers and on construction projects.

106. Radio Communication

Radio nets within the battalion are provided primarily for internal organization communication and for communication between operating elements of the battalion and organizations which they are supporting. Additional radio equipment is provided for air warning systems and communication with echelons above battalion.

107. Division Nets

a. Division Command/Operations Net (AM-RATT). This net provides radio-teletype communication between division headquarters and all major subordinate units including the engineer battalion. The communications section of headquarters company operates an AN/GRC 46 in this net.

b. Division CG/Command Net (FM-Voice). This net is intended primarily for communication between the division commander and staff and the commanders of all immediate subordinate units. The division engineer and the battalion communications section will operate within this net and the operations officer and the assistant division engineer officer will monitor this net.

c. Division Warning/Broadcast Net (AM-Voice). This net broadcasts air alerts, CBR attack warning, radiological safety data, nuclear strike warnings, fallout warnings, and similar information of an urgent

operational nature which applies to the division as a whole, or to major divisional elements, which need not be handled through command channels, and for which no immediate receipt or reply is required. Battalion headquarters and all companies monitor this net by the use of their AN/GRR–5.

108. Battalion Nets

a. Engineer Battalion Command Net (AM). Internal communication for the engineer battalion is provided by the battalion command net (AM) for maintaining contact between elements of the battalion, over the extended ranges expected during normal operations. Command, operational, intelligence, and logistical traffic are carried on this AM net, which constitutes the primary communication system for the battalion (fig. 30), by either voice or continuous wave (CW) as required.

b. Engineer Battalion Commander's Command Net (FM-Voice). Personnel who operate in this net are shown in figure 31. This net is primarily for the use of the battalion commander for command and control of the subordinate elements of the battalion. When its range permits, it replaces the traffic on the AM command net and provides the commander with a voice link with each of the companies. During the period a company is supporting another organization, the company commander and the company headquarters FM radio normally monitor this net, and operate in the supported organization's commander's command net (FM). The engineer battalion commander can maintain contact with the detached companies through the battalion command net AM.

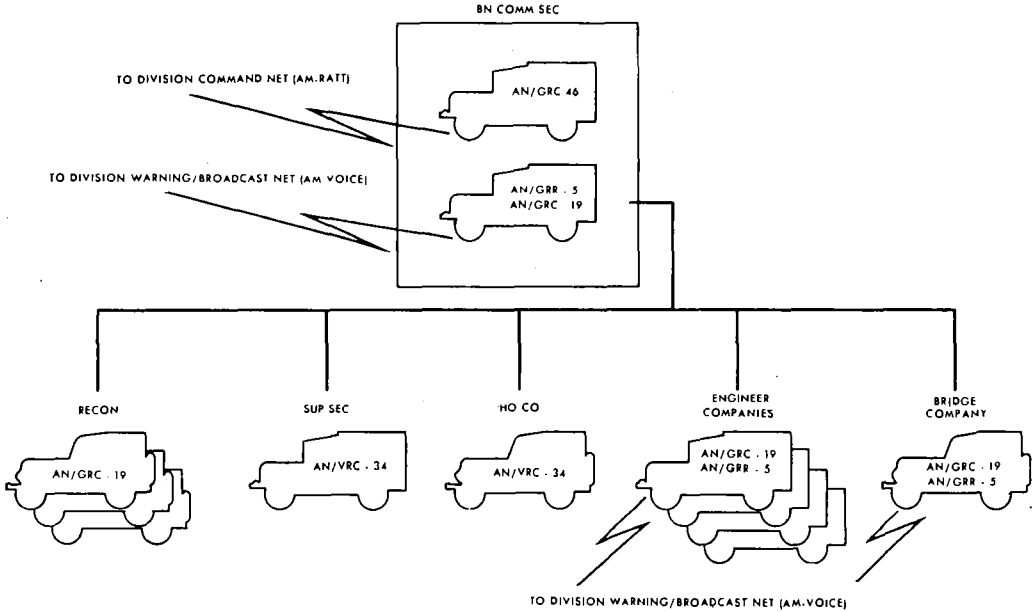


Figure 30. Divisional engineer battalion command net (AM).

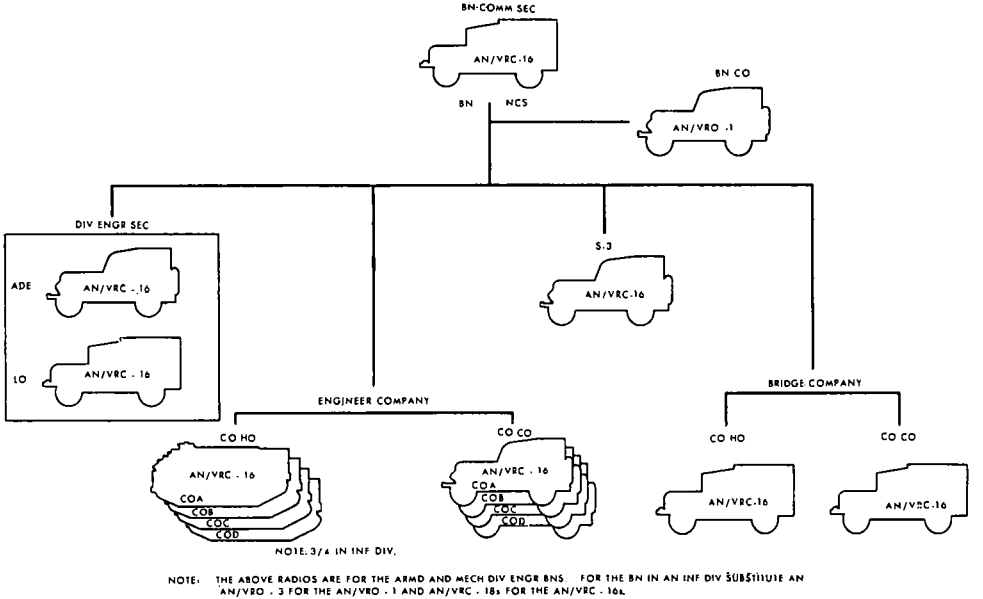


Figure 81. Divisional engineer battalion commander's command net (FM-voice).

109. Company Nets

a. The engineer companies and bridge company employ communication equipment designed to facilitate engineer employment while in support of division operations. Organic equipment provides FM radios for internal command and control and for contact with the supported organization, plus an AM radio for maintaining contact with the engineer battalion headquarters (figs. 32, 33, and 34).

b. The communications section of the company headquarters acts as the net control station (NCS) for the company command net FM. It also maintains contact with the engineer battalion on the AM set and monitors the division warning net with the AN/GRR–5. The FM radio set provides two receivers and one transmitter. Normally, one receiver and the transmitter will be used to control the company command net. The other receiver will be used to monitor the engineer battalion commander's command net or if the company is in a support role, it will monitor the supported organization's commander's command net. The transmitter frequency will be switched as required to transmit in the appropriate net.

c. The company commander's FM radio has the same capability as the one in company headquarters and is utilized in the same manner. By doing so, he maintains contact with his subordinate elements on the company command net to facilitate support and coordination, and he monitors the engineer battalion or the supported organization commander's command net to coordinate assigned missions.

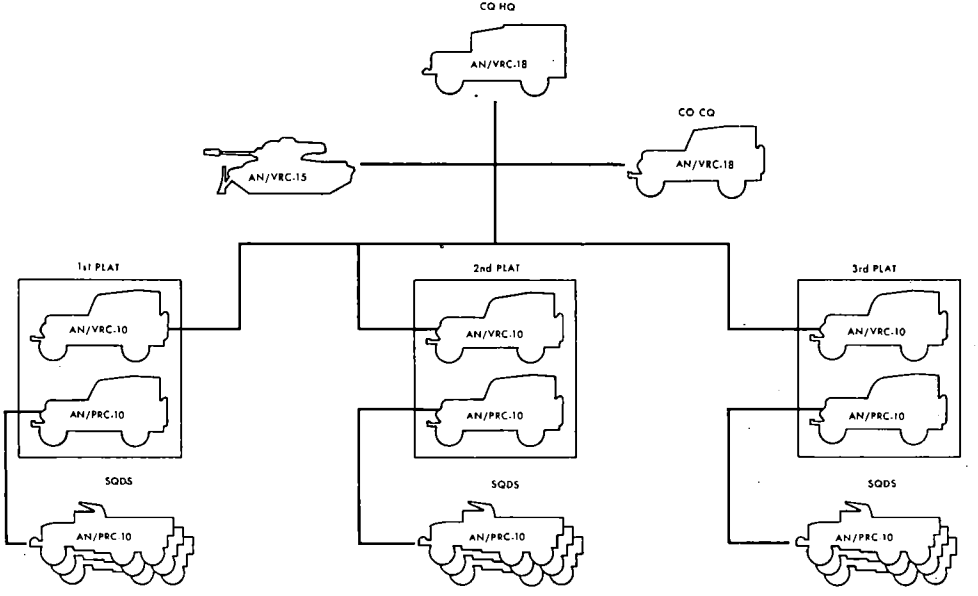


Figure 32. Company command net engineer infantry division engineer battalion.

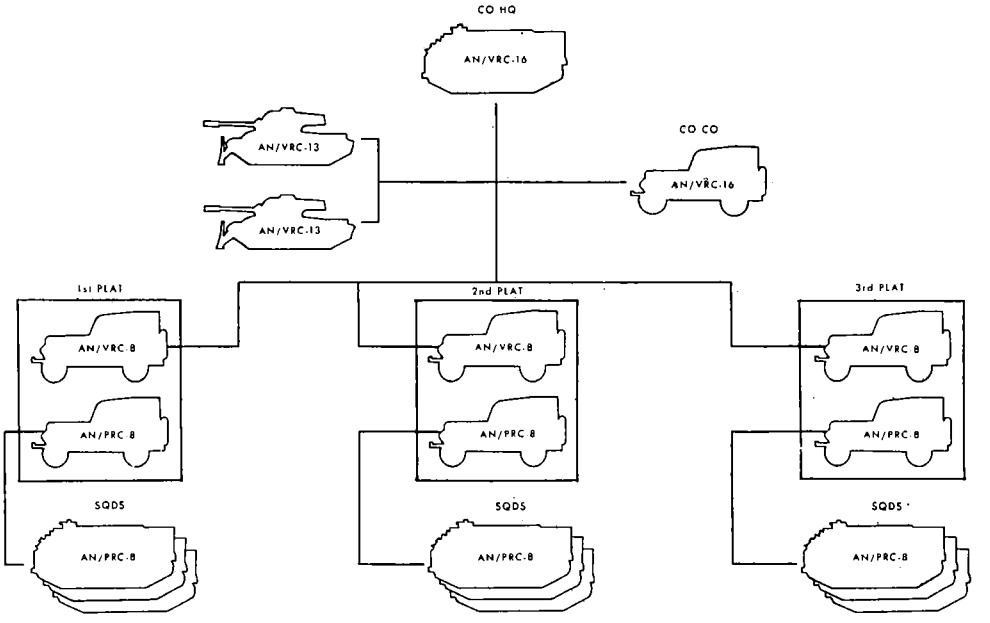
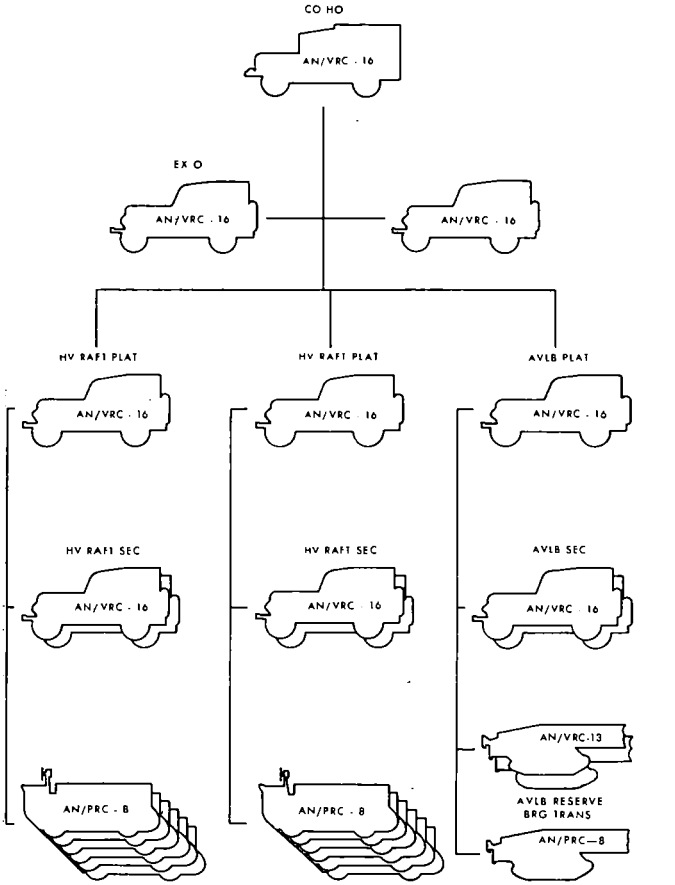


Figure 33. Company command net engineer company armored and mechanized division.



NOTE; IN THE INFANTRY DIVISION THE FOLLOWING SUBSTITUTIONS WILL BE MADE FOR RADIOS IN THE ABOVE CHART;

AN/VRC—18 FOR AN/VRC—16
AN/VRC—15 FOR AN/VRC— 13
AN/PRC—10 FOR AN/PRC—8

Figure 34. Company command net bridge company, infantry, mechanized and armored division engineer battalion.

d. The platoon communication capabilities are as follows:

(1) The platoon leaders of the engineer companies have the capability of operating in two nets. One of these nets will be the company command net or if the platoon is in a support role, the supported organization commander's command net. The other net will be the platoon's net.

(2) In the bridge company the platoon leaders' radios have the same capability as the company commander's and will be employed in the same manner.

e. The combat engineer vehicles of the engineer companies and the armored vehicle launched bridge launchers of the bridge company will operate in their respective units' net, except when in a support role, at which time they will operate in the supported unit's net.

110. Communication with Supporting Engineer Units

Nondivisional engineer combat units of the engineer combat groups employ standard AM radios for their primary means of radio communication. A supporting engineer unit normally establishes and maintains communication with the supported divisional engineer battalion. This communication is established through either the division or corps area communication system, depending on the location of the supporting unit's headquarters or if feasible, the unit will operate in the divisional engineer battalion command net (AM).

CHAPTER 12

ADMINISTRATION, SUPPLY, AND MAINTENANCE

111. Introduction

This chapter covers the method by which the divisional engineer battalion receives its administrative services and logistical support within the division. Additionally, it covers the administrative, logistical, and maintenance areas of responsibility within the battalion as well as the battalion's responsibility to the division for supply of potable water. The procedures described herein are intended as a guide and are subject to modification by appropriate regulations, directives, and policies of higher headquarters.

a. Division Support Command. The army division has, as a major subordinate unit, a division support command which is organized on a functional basis. It provides the following logistical support to all elements of the division: supply, transportation of supply (less class V), third echelon field maintenance (except cryptographic and electrical accounting equipment), medical service, and miscellaneous services. The division support command is an operational command directly under the division commander. For details of the employment of the division support command, see FM 54–2. Detailed functions and procedures pertaining to subordinate

units of the division support command are covered in separate field manuals (app. 1).

b. Division Administration Company. The division administration company, organic to the division support command, provides the necessary personnel and administrative services to sustain the division. This includes replacement support and a centralized personnel service for all units assigned and attached to the division. A division rear echelon is established by the administration company. The company contains those special staff sections which normally remain with the division rear echelon. The officer in charge of the division rear echelon, normally the division AG, is designated by the commanding general. The company operates under the general staff supervision of the division G1. For details of the employment of the administration company, see FM 12-11.

112. Administration

a. Administrative Responsibilities. Administrative responsibilities within the battalion include maintenance of unit strength; submission of reports; provision of morale and personnel services; discipline, law, and order; civil affairs; and collection and evacuation of the dead and of prisoners of war.

b. Maintenance of Unit Strength. Based on vacancies existing in the companies, the battalion adjutant forwards personnel requisitions to the division adjutant general. Receipt and processing of these individual and unit replacements into the battalion is supervised and coordinated by the adjutant. In the interest of morale and efficiency, replacements are retained in the division replace-

ment section for the shortest practicable time, about 3 days. They are moved to the battalion under battalion escort, using either organic unit or division transportation. Here they receive further indoctrination in the history, traditions, mission, and current situation of the battalion. Replacements are then moved to their assigned companies.

c. Submission of Reports. The companies informally furnish the battalion adjutant with necessary information for the company morning report, the personnel daily summary report, and, when required, a casualty and loss report. This information is relayed to the division administrative company through the S1 section. The personnel staff NCO in the S1 section of battalion maintains close liaison with the division administration company on these and other personnel matters. The battalion adjutant keeps the commander informed concerning personnel policies of higher headquarters and advises him on matters of personnel, morale, discipline, and esprit de corps within the battalion.

d. Morale and Personnel Services. The company commander is responsible for the morale and welfare of members of the company. He insures that leave and rest quotas are equitably allocated and that these quotas are filled when conditions permit. Emergency leaves are processed expeditiously in accordance with regulations and policies. He insures that all personnel are familiar with awards and decorations policies and that draft recommendations are promptly forwarded to battalion for preparation in final form. He insures that the pay and allotment of his men is correct, that mail is promptly delivered and properly handled (AR 65–75), and that services

such as legal assistance, welfare, army exchange, special services, and chaplain's assistance are made available and are properly utilized. The battalion adjutant assists the company commander in the foregoing responsibilities and insures the overall efficient operation of these services throughout the battalion.

e. Discipline, Law, and Order. The company commander is responsible for all matters pertaining to discipline, law, and order within the company. When appropriate, he exercises jurisdiction under article 15, UCMJ, or prefers charges. Charge sheets and allied papers normally are prepared by clerks of the battalion S1 section from information furnished by the company commander. The battalion commander exercises summary and special court-martial jurisdiction. He insures the appointment of court-martial boards for prompt disposition of cases occurring within the organization and for the efficient administrative processing of charges and proceedings. The battalion adjutant maintains statistics on all absences-without-leave, stragglers, rewards and punishments, court-martial actions, and other matters reflecting the status of discipline, law, and order within the command. He maintains records to insure that corrective action is taken when required.

f. Civil Affairs. The battalion S3 coordinates the activities of any civil affairs teams attached to or operating with the battalion. In the event no such teams are available, the S3 normally performs their functions. In either case, the S3 must be thoroughly familiar with policies and directives of higher headquarters concerning civil affairs operations. The primary mission of civil affairs during combat is to

assist military operations by providing civilian labor, local supplies, buildings, public utilities, and control of refugees. The company commander executes such civil affairs responsibilities as may be delegated by higher headquarters. He also insures that the utilization of civilians by his unit conforms to directives of higher headquarters.

g. Collection and Evacuation of the Dead. The company commander is responsible for collecting, identifying, and evacuating the dead, and for safeguarding their personal effects, while in the area of his control. The dead are identified as early and as fully as possible. Deceased personnel normally are evacuated to the battalion or supported organization's recovery and disposition point on available transportation. Personal effects are not removed from the body. Isolated burials are resorted to only as an emergency measure. When isolated burials are authorized, they are fully documented and reported promptly through graves registration channels. Details of graves registration service are covered in FM 10–63, and FM 101–5.

h. Collection and Evacuation of Prisoners of War. The company commander is responsible for the proper handling of prisoners of war in accordance with the Geneva Convention of 1949 and for their evacuation to battalion headquarters or to headquarters of the supported organization. The adjutant prepares and supervises the execution of plans for the collection and evacuation of prisoners of war. He must be careful to insure that these plans conform to the directives of higher headquarters and that they are sufficiently comprehensive. He coordinates with S2 for estimates on prisoners

anticipated and facilities for any interrogation desired, and with S3 for necessary guards for prisoners while they are being evacuated. He coordinates with S4 for transportation to evacuate prisoners of war and with the battalion surgeon for evacuation of wounded prisoners.

113. Supply Functions

The principal functions of the battalion in supply are those of procurement and evacuation. The battalion draws supplies from sources outside and makes distribution within the battalion. It also takes excess or unserviceable supplies from subordinate units and disposes of them through prescribed channels. The property responsibilities of the commanders are identical with those of commanders at all echelons. These command responsibilities are to insure that all property pertaining to the command is adequately administered, safeguarded, accounted for, and used.

114. Supply Responsibilities

a. Battalion Commander. The battalion commander carries out his supply responsibilities through the functions of his supply staff officer (S4). The battalion commander discharges his responsibilities by insuring that commanders of subordinate units properly conduct supply functions within their commands. He checks on the efficiency of supply operations through frequent personal inspections and by reports of inspections turned in by his S4. Immediate action to correct supply problems or discrepancies found as a result of inspections is the responsibility of the commander. He must insure that his staff accomplishes proper corrective action.

b. Battalion Supply Officer (S4). The battalion supply officer (S4) is responsible for closely supervising the supply activities of all subordinate units. He will maintain informal accountability for all military property in the possession of these units. The S4's operations support the tactical plan and are based upon the orders of higher headquarters. He coordinates with the other staff sections of the battalion, the S4 or G4 of the next higher headquarters and all supply establishments which are his sources of supply. He also coordinates and establishes liaison with all maintenance agencies which relate to the maintenance status of the battalion. The primary functions of the S4 include—

(1) Supervising the battalion supply section of headquarters company.
(2) Maintaining liaison with installation supply and maintenance activities.
(3) Training supply personnel.
(4) Providing guidance to unit commanders on problems concerning supply.
(5) Informing the battalion commander on the status of supply operations within all elements of the command.
(6) Establishing and maintaining the property books and property records for the battalion and its elements. Duties of the property book officer are normally assigned to the supply warrant officer and include—
   (*a*) Maintaining battalion and installation property books.
   (*b*) Maintaining a transaction register to reflect all supply actions initiated by the battalion.

(*c*) Initiating all supply requisitions and turn-ins.

(*d*) Preparing adjustment transactions as required.

(*e*) Maintaining a file of vouchers to support property book and transaction register entries.

c. Company Commander. The company commander is responsible for the supply and administration of the company and any attached elements. He makes timely requests for supplies and distributes them. The company commander is assisted in these duties by the company officers, the first sergeant, the mess steward, the supply sergeant, and the motor sergeant. The specific responsibilities of a company commander in connection with property administration are quite extensive. He must—

(1) Have in his possession, in serviceable condition, all items authorized his company.

(2) Determine by frequent inspection that all prescribed items of authorized equipment in the possession of officers or enlisted men are on hand and serviceable.

(3) Insure that all personnel, both officer and enlisted, are instructed in the proper methods of use, care, and maintenance of property, and that the instructions are followed.

(4) Maintain individual clothing records, and such other records as are necessary to assure that the status of the property for which he is responsible is accurately reflected at all times.

(5) Obtain acceptable vouchers to cover loss,

damage, or destruction to property for which he is responsible, and process these vouchers in accordance with appropriate regulations.

(6) Upon transfer of property responsibility to his successor, take joint inventory, and initiate action to adjust discrepancies.

(7) Where desired, designate one or more authorized representatives to receipt for property in his name. The representative may be any member of his command, commissioned, warrant, or enlisted. The fact, however, that property is receipted for by a representative of the commander does not in any way reduce his own responsibility for that property.

(8) Assume responsibility for all government property under his control, whether receipted for or not.

d. Platoon Leader. The platoon leader is responsible for the equipment organic to his platoon. This equipment is issued to him on hand-receipt from the battalion S4. He inspects the platoon to see that it is properly equipped and that any shortages are replaced. In combat, he sees that the platoon is fed, and supplies and materials are replenished. He informs the company commander of any discrepancies and also reports them to the battalion S4. He checks on the timely delivery of replacement items.

115. Supply Procedures

a. Map Supply. Distribution of maps is accomplished by the supply and transportation battalion

in aeeordanee with priorities of allocations made by the G2, after eoordination with the engineer battalion S2 and G3. Quantities are based on army tables of map allowanees. The engineer battalion S2 proeures and distributes maps for the battalion.

b. Class I Supply. The battalion S4 forwards the battalion's requirements for elass I supplies to the supply and transportation battalion. Normally, rations are delivered to the supply and transportation battalion, whieh breaks the bulk supplies into unit lots. Depending on whether or not unit or supply point distribution is in effect, the supply and transportation battalion delivers rations to the engineer battalion area or the engineer battalion uses its organie transportation to piek up the rations at the preseribed elass I distributing point. In either case, the battalion S4 breaks down and distributes rations to the eompany kitehens. When eompanies are in support of brigades and time and distanee make this method of supply infeasible, the battalion S4 and the eompany eommander eoneerned make appropriate arrangements with the division support eommander and the S4 of the supported brigade.

c. Class II and IV Supply. Class II supplies of all end items of supply of the various technieal services with the exception of medical, are handled by the supply and transportation battalion. Medieal supplies are handled by the medical battalion. Class IV supply is aecomplished in generally the same manner as class II. Engineer fortifieation materials normally are delivered by the army supply points supporting the division and are earried as far forward as possible without transshipment. The

battalion S4 forwards the battalion requirements directly to the appropriate support battalion. Fast moving class II supplies are forwarded directly to the army supply points or depots to the division class II distributing point in the division support area or, where appropriate, directly to the battalion or company. Major items of equipment are delivered as requested by the division support command. Unit distribution of fast moving class II items directly to the battalion or to elements of the supply and transportation battalion operating with the brigade trains is desirable. Normally, a combination of unit and supply point distribution will be employed. Chemical Corps items normally are distributed by a chemical combat support platoon attached to the supply and transportation battalion. When such a platoon is not attached, these items are distributed through the supply and transportation battalion.

d. Class III Supply. The battalion S4 submits a daily status report to the supply and transportation battalion, indicating the quantity of POL on hand and the estimated requirements for the ensuing 24-hour period. Class III may be delivered to the engineer battalion area by tankers of the supply and transportation battalion, or the engineer battalion may use its organic tankers to draw vehicle fuel from the class III distributing points which are established normally by the supply and transportation battalion in the division support and brigade trains areas. Individual vehicles moving to the rear on other tasks habitually replenish their fuel at division mobile filling stations.

e. Class V Supply. Requisitions (transportation orders) for class V are prepared by the battalion S4

and are presented at the division ammunition office for authentication by the division ammunition officer (DAO) who normally is located at the administrative support operations center (ADSOC). He may be located at the army ASP. Class V normally is supplied through supply point distribution. The battalion does not carry a reserve of class V. The only ammunition held in the battalion is in the company basic loads.

f. Supply of Nuclear Weapons. Nuclear weapons supply procedures are described in FM 101–31 and in FM 9–5.

116. Water Supply

a. Water Supply Teams. The division engineer battalion has five water supply teams, with five water purification sets. It has enough transportation and water supply specialists and helpers to operate the sets independently in establishing the water supply points required by the division. One team is in support of each brigade, one is in support of the support command, and one is kept in reserve. Whether sent to a specific location or attached to an engineer company, the team operates alone. The location of the team determines how it gets its rations. It may be attached to an adjacent unit for rations; rations may be delivered to it by the engineer company or by battalion headquarters company; or the team may prepare its own food on small cooking units.

b. Water Supply Points. With the water purification sets, the battalion water supply teams establish the water supply points (fig. 35) required by the division. Each unit of the division draws water

from the point nearest it. Normally, a team establishes a water supply point in the brigade trains area. Water point locations are reported by the supporting engineer company commander to the brigade and to the engineer battalion headquarters.

Figure 35. Water point in operation.

c. Sources of Water. Water usually is obtained from local sources, using water supply equipment organic to the engineer battalion. When a source of water is not available in the division area, the division engineer has the staff responsibility of obtaining water elsewhere and stocking it at division water supply points. In this case, the engineer water supply teams operate water storage and supply points.

d. Operation of Water Supply Points. The tactical situation and the sources of water normally dictate the location and hours of operation of water supply points. Road nets, parking areas, and concealment

are slightly less important considerations. Normally, units are permitted to draw water at any time the water point is in operation. If water supply is limited or the demand excessive, units may be permitted to draw water only at scheduled times. Units should draw water as soon as practicable after the opening of the water point, as the water equipment must be dismantled in time to accompany the force which it is supporting.

117. Maintenance

a. Organizational Maintenance. To take care of its organizational maintenance responsibilities, the division engineer battalion has a battalion maintenance section. This section performs second echelon maintenance for all the companies of the battalion and is under the control of the maintenance officer. The maintenance officer checks incoming repair work to see if first echelon maintenance has been performed and to determine the amount of repair work needed. He also checks the completed work to be sure that the equipment is in operating condition before it is released from the shop. Another responsibility of the maintenance officer is to give technical help to all company motor pool personnel.

b. Third Echelon Maintenance. The maintenance battalion of the support command performs for the division the inspection of organizational maintenance, repair parts supply, and third echelon repair for all ordnance and engineer equipment. Normally, one forward support company is placed in support of each brigade and operates in proximity to the brigade trains. The main support company, located in the division support area, supports divisional

units in that area. The battalion maintenance section requisitions repair parts from the support company supporting it. The basis of requisition will be to replenish its prescribed load of repair parts.

c. Evacuation of Damaged Material. Units of the battalion are responsible for initial battlefield recovery of damaged equipment. Large items such as cranes or other vehicles may be evacuated to the brigade axis of evacuation or to division salvage collecting points. Small items are evacuated to the salvage collecting points.

CHAPTER 13

TRAINING

118. Battalion Training

a. Introduction. The objective of training in the divisional engineer battalion is to develop operating techniques that will enable the battalion to function efficiently when integrated with other units of the division, to achieve the ultimate objective of the military: success in battle. It should be kept in mind that training never ceases. It is continuous before battle, during battle, and after battle. This chapter outlines the progressive training, from the basic combat and advanced individual training, through the unit training phase. As a general guide, subject to modification imposed by division training directives, training follows the Army Training Programs (ATP's) provided by the Department of the Army. The training is conducted to develop the battalion's proficiency to perform its missions in a specified period of time. The foundation of this success is a thorough knowledge by every man of the principles of his job, how to apply them, and how to work with others in a team. The ideal unit is well disciplined, thoroughly grounded in its mission, high in morale, and able to act promptly as a team. From the outset, each member of the battalion must be taught to expect nuclear warfare and to be prepared to function under nuclear conditions.

Throughout this training, emphasis should be placed upon rapid movement and efficient communications.

b. Military Training. AR 350–1 sets forth the broad training policies and general guidance for all commanders charged with supervising or conducting military training in the Army.

c. Responsibility.

(1) *Battalion commander.* The battalion commander is responsible for training the battalion to perform its primary mission. He plans, directs, conducts, and supervises the training of the battalion. He specifies the training which is to be conducted, within the outline provided by the directives and policies of division headquarters; assigns responsibility for the conduct of the training; insures that the battalion's performance and proficiency standards are in line with the standards of the Department of the Army; and procures and controls the use of training facilities, aids, and equipment. He issues the training memorandums necessary to implement his training mission.

(2) *Operations officer (S3).* The battalion operations and training officer (S3) prepares a training program and makes recommendations concerning training to the battalion commander. He also establishes battalion-level schools for officers, noncommissioned officers, and specialists. Members of the battalion staff assist the battalion commander in the planning and supervision

of training which pertains to their specialized functions.

(3) *Company commander.* The company commander is responsible for training his company in accordance with battalion memorandums and policies. Each company commander constantly supervises training of his organization. Administrative work is planned to have a minimum adverse effects on the training mission.

119. Training Phases

a. Introduction. The training to be conducted and the time to be devoted to training during each of the four phases of training are prescribed in ATP's and subject schedules. Individual and unit proficiency are tested at various stages of the training cycle by the use of army training tests. A unit normally starts the ATP cycle as soon as it is activated. It may repeat all or any part of this training at any time that it is judged to have fallen below the level of adequate operational proficiency, or when the turnover of personnel makes retraining of a major portion of the unit necessary. Closely tied in to all engineer training is progressive instruction in combat principles, applied particularly in conjunction with security on the march, in assembly areas, and at worksites. Infantry methods and formations, prescribed in FM's 7–10, 7–40, 17–20, and 21–5, should be used as guides; but they must be adapted to engineer strength, armament, and organizations.

b. Army Training Program (ATP). The provisions of the ATP normally are followed in detail, but at times it becomes necessary for a commander to

make modifications so as to conform to conditions of the training situation, or to facilitate the achievement of the training objective. A general breakdown showing the total time to be devoted to each subject in a 44- or 48-hour week is given in the ATP. This is the minimum training week. Night operations and field exercises ordinarily require much more time. Variables which affect training time and methods are—

(1) Specific battalion mission.
(2) Present training status of the battalion.
(3) Personnel situation.
(4) Time available for training.
(5) Weather.
(6) Training areas and facilities.
(7) Status of equipment.

c. Phase of Training. For convenient reference and to indicate definite stages of progress, the following training phases are used: basic combat, advanced individual, basic unit, advanced unit, field exercise and maneuver, and operational readiness.

120. Basic Combat Training Phase

The objective of the basic combat training phase is to train the enlisted man in basic military subjects and the fundamentals of basic infantry combat. In this phase, the recruit is taught how to adapt himself to army life and learn to live, work with, and understand his fellow soldier. When this phase is completed, he understands why he is to fight; and his physical condition is good enough to enable him to fight effectively. He understands and is able to apply, under simulated or actual combat conditions, the principles of concealment and camouflage, cover,

and movement, and is able to provide individual protective actions against aircraft, armor, and dismounted ground attacks. Further, he is able to participate as a member of a patrol or act as an individual scout or observer. He has qualified with his basic weapon, the rifle, and has fired for familiarization other weapons, including grenades.

121. Advanced Individual Training Phase

Here the basic soldier improves his basic military skills and becomes branch qualified. The engineer soldier, for example, receives more training in combat tactics and learns the technical skills which qualify him in his military occupational specialty (MOS), such as combat construction specialist, demolition specialist, or water-supply specialist. The training in this phase consists of general training and specialist training, which are interwoven throughout the entire advanced individual phase.

a. General Training. The objectives of general training are to train the enlisted man in engineer and additional military subjects which will insure that he is fully capable of performing the basic duties of an engineer soldier in the unit to which assigned; to insure that the enlisted man is able to use and maintain in good repair engineer tools and equipment essential to unit operations; and to insure that the enlisted man is capable of working or fighting for extended periods under adverse conditions. To be more specific, the engineer soldier is able to—

(1) Understand nomenclature of engineer tools, equipment, materials, and tasks.

(2) Use engineer hand and power tools and equipment sets of the squad and platoon with efficiency, safety, and keeps them in good repair.
(3) Perform individual tasks of clearing, grubbing, lashing, rigging, rough carpentry, barbed wire erection, demolition, placing and removal of mines and boobytraps, lifting and carrying of heavy loads, and assembly of elements of fixed and floating bridges.
(4) Recognize and report engineer information and correctly locate information on maps and aerial photographs.
(5) Participate in the attack course and combat in cities.
(6) Dig a foxhole of sufficient depth and design to withstand the crushing effect of a tank passing over it or in the near vicinity.
(7) Maintain physical condition to march long distances and arrive at destination in condition to perform engineer missions or participate in combat.

b. Specialist Training. Specialist training prepares personnel to perform the duties of their particular MOS's. For instance, a water-supply specialist will receive training in the characteristics of water and the operation of the diatomite filter, while a clerk-typist will be taught typing and administrative procedures. In our highly specialized army, practically every soldier has a more or less complex specialty. Most of these specialists can be trained in the unit, but some have to be sent to specialist schools. Since these schools sometimes

last longer than the advanced individual phase, this specialist training at times extends into the unit training phase; these specialists often have to make up the general training which they missed while they were at school during the unit training phase. Personnel who complete specialist training before the beginning of the basic unit subphase should be given additional on-the-job training.

122. Unit Training Phase

After the untrained fillers have become skilled' they are taught to coordinate their efforts toward the accomplishment of the unit's missions. This phase consists of the basic and advanced unit subphases. Most training throughout these phases is operational—the troops learn by doing.

a. Basic. The basic unit subphase trains the individually skilled soldiers to function progressively as members of squads, sections, platoons, and companies.

b. Advanced. During the advanced unit subphase, companies are trained to function together as an integral part of a battalion; the battalion is trained to operate as a divisional engineer battalion. Combined arms training is achieved by progressively integrating the training of units of varying arms and services throughout these two subphases. For example, each of the companies of the divisional engineer battalion trains with a division brigade, and perhaps one or more artillery battalions, during this phase. Elements of the bridge company and equipment platoon are employed with the line companies. The command, staff, and administrative sections

throughout the battalion receive practical and intensive training in their respective fields.

123. Field Exercise and Maneuver Phase

This phase provides for the training of large units on the ground under simulated combat conditions. These maneuvers include many types of units, to insure maximum combined arms training. For instance, in the advanced unit subphase the engineer line company has trained with its parent division engineer battalion and with a division brigade. During this phase, the entire battalion will work in general support of its parent division, and possibly, will be working in conjunction with engineer combat groups which have been placed in support of the division.

124. Operational Readiness Training

a. Introduction. There is no formal training program for this phase of training. The objectives of operational readiness training are contained in AR 350–1. Entry of units into the operational readiness phase will be as determined by major commanders.

b. Concurrent Training. To make training more realistic and effective, arbitrary boundaries between training phases must be avoided. Each subject is related to other subjects, and all subjects are integrated into the team mission. This entails, to some degree, conducting basic and advanced individual, specialist, and unit training concurrently. Reviews of basic subjects are incorporated regularly in the progressive training phases. In many technical

exercises, tactical requirements are included, such as providing security for bridge construction projects, and protecting working parties and obstacles from both ground and air attack. Throughout all phases of training, and particularly during unit training and field exercise, initiative and a sense of responsibility must be developed in officers, noncommissioned officers, and others who show potential leadership ability. Members of the battalion are instilled with the importance of making decisions in situations which are not covered by specific orders. Each commander includes leadership exercises in all training phases, particularly during periods of tactical and technical training. Command is decentralized, and interference with subordinate commanders is kept to a minimum. Additional training for staff officers and other key personnel may be received in special schools conducted by battalion or higher headquarters.

c. Training of Other Arms and Services. The engineer battalion is sometimes called upon to conduct a demonstration of mine laying, mine clearing, or bridge construction for nonengineer troops of the division. Such demonstrations are usually staged by squads or platoons. The battalion frequently furnishes individual instructors in engineer subjects for the training of other troops. Subjects taught include mine warfare, use of explosives, camouflage, rigging, field fortifications, and bridge and road building expedients. Instructors are usually selected from the officers or key noncommissioned officers of the line companies.

125. Training References

The following reference materials are essential for effective training in the division engineer battalion:

a. The current issues of TOE's 5–145, 5–146, 5–147, 5–148, 5–155, 5–156, and 5–157.

b. Army training programs 5–145, 5–148, and 5–155.

c. Field manuals 5–20, 5–25, 5–26, 5–30, 5–34, 5–36, 7–10, 7–40, 17–1, 17–15, 17–20, 17–30, 17–36, 17–50, 17–70, 17–100, 20–32, 21–5, 21–6, 21–10, 21–30, 21–40, 21–41, 21–48, 21–60, 22–5, 24–18, 24–20, 30–5, 30–10, 30–16, 31–10, 31–15, 31–60, and 101–31.

d. Technical manuals 5–210, 5–220, 5–251, 5–505, 5–4610–204–12, 9–1910, 9–1946, 9–2810, and 21–300.

APPENDIX I

REFERENCES

1. Department of the Army Pamphlets (DA Pam)

20–21	The Army School Catalog.
108–1	Index of Army Motion Pictures, Film Strips, Slides, and Phono Recordings.
320–5 (When published)	Glossary of Terms Employed consistently throughout ROAD Training Literature.
310	Series pertaining to administration, training, maintenance, and supply.
750–1	Preventive Maintenance Guide for Commanders.

2. Army Regulations and Special Regulations (AR)

30–11	Food Program.
65–75	Unit Mail Services.
55–203	Movements of Nuclear Weapons Major Assemblies and Nuclear Components (U).
220–60	Battalions, Brigades, Squadrons: General Provisions.
220–70	Companies; General Provisions.
220–346	Journals and Journal Files.
320–5	Dictionary of United States Army Terms.

320–50	Authorized Abbreviations and Brevity Codes.
335–50	Strength Accountability.
350–1	Army Training Policies.
380–5	Safeguarding Defense Information.
611–201	Manual of Enlisted Military Occupational Specialties.
611–202	Manual of Enlisted Military Occupational Specialties (U).
700–38	Unsatisfactory Equipment Report.
711–16	Installation Stock Control and Supply Procedures.
735–35	Property Accountability—Supply Procedures for TOE Units, Organizations, and non-TOE Activities.
750–8	Command Maintenance Inspections.
611–112	Warrant Officer Personnel Military Occupational Specialties.
611–101	Commissioned Officer Personnel Military Occupational Specialties.

3. Field Manuals (FM)

1–15	Aviation Battalion, Infantry, Airborne, Mechanized, and Armored Divisions.
3–5	Chemical, Biological, and Radiological (CBR) Operations.
3–50	Chemical Smoke Generator Battalion and Chemical Smoke Generator Company.
5–1	Engineer Troop Organizations and Operations.
5–15	Field Fortifications.

5–20	Camouflage, Basic Principles and Field Camouflage.
5–22	Camouflage Materials.
5–23	Field Decoy Installations.
5–25	Explosives and Demolitions.
5–26	Employment of Atomic Demolition Munition (U).
5–29	Passage of Mass Obstacles.
5–30	Engineer Intelligence.
5–31	Use and Installations of Boobytraps.
5–34	Engineer Field Data.
5–35	Engineer's Reference and Logistical Data.
5–36	Route Reconnaissance and Classification.
5–132	Infantry Division Engineers.
5–134	Armored Division Engineer Battalion.
5–136	Airborne Division Engineer Battalion.
5–142	Nondivisional Engineer Combat Units.
5–144 (When published)	Engineer Amphibious Support Command.
6–20–1	Field Artillery Tactics.
6–20–2	Field Artillery Techniques.
7–11	Rifle Company, Infantry, Airborne Infantry, and Mechanized Infantry Battalion.
7–15	Infantry, Airborne Infantry, and Mechanized Infantry Rifle Platoons and Squads.

7–21	Headquarters and Headquarters Company, Infantry Division Battle Group.
7–40	Infantry and Airborne Division Battle Groups.
8–15	Division Medical Service, Infantry, Airborne, Mechanized, and Armored Divisions.
9–5	Ordnance Ammunition Service.
9–30	Maintenance Battalion, Infantry, Airborne, Mechanized, and Armored Divisions.
10–33	Air Equipment Support Company.
10–50	Supply and Transport Battalion, Infantry, Airborne, Mechanized, and Armored Divisions.
10–63	Handling of Deceased Personnel in Theater of Operations.
11–50	Signal Battalion, Infantry, Mechanized, and Armored Divisions.
11–57	Signal Battalion, Airborne Division.
12–11	Administration Company, Infantry, Airborne, Mechanized, and Armored Divisions.
17–1	Armor Operations.
17–15	Tank Units, Platoon Company, and Battalion.
17–30	Armored Division Brigade.
17–36	Armored Cavalry Units, Platoon, Troop, and Squadron.
17–50	Armor Logistics.
17–95	The Armored Cavalry Regiment.
20–32	Land Mine Warfare.
20–33	Ground Flame Warfare.

20–60	Battlefield Illumination.
21–5	Military Training.
21–6	Techniques of Military Instruction.
21–10	Military Sanitation.
21–11	First Aid for Soldiers.
21–15	Care and Use of Individual Clothing and Equipment.
21–18	Foot Marches.
21–26	Map Reading.
21–30	Military Symbols.
21–31	Topographic Symbols.
21–40	Small Unit Procedures in Nuclear, Biological, and Chemical Warfare.
21–41	Soldier's Handbook for Nuclear, Biological, and Chemical Warfare.
21–48	Training Exercises and Integrated Training in Chemical, Biological, and Nuclear Warfare.
21–60	Visual Signals.
21–75	Combat Training of the Individual Soldier and Patrolling.
21–76	Survival.
21–77	Evasion and Escape.
21–150	Hand-to-Hand Combat.
22–5	Drills and Ceremonies.
22–100	Military Leadership.
23–5	U.S. Rifle Caliber .30, M1.
23–8	U.S. Rifle, 7.62-mm, M14.
23–25	Bayonet.
23–30	Grenades and Pyrotechnics.
23–32	3.5-inch Rocket Launcher.
23–35	Pistols and Revolvers.
23–67	Machinegun 7.62-mm, M60.
24–18	Field Radio Techniques.

24–20	Field Wire and Field Cable Techniques.
25–10	Motor Transportation, Operations.
27–10	The Law of Land Warfare.
30–5	Combat Intelligence.
30–10	Terrain Intelligence.
30–16	Technical Intelligence.
31–10	Barriers and Denial Operations.
31–15	Operations Against Resistance Forces.
31–21	Guerrilla Warfare and Special Forces Operations.
31–25	Desert Operations.
31–30	Jungle Operations.
31–35 (When published)	Techniques for the Control of Gaps.
31–50	Combat in Fortified Areas and Towns.
31–60	River Crossing Operations.
31–70	Basic Cold Weather Manual.
31–71	Northern Operations.
31–72	Mountain Operations.
44–1	Air Defense Artillery Employment.
44–1A	Air Defense Artillery Employment (U).
52–10	Corps and Army Support of Divisions.
54–2	Division Logistics and the Support Command.
57–10	Joint Airborne Operations.
57–30	Airborne Operations.
57–35	Airmobile Operations.
61–10	Command and Control Techniques.
61–24	Division Communications.

61–30	Brigades in Semi-Independent Operations.
61–100	The Division.
100–5	Field Service Regulations—Operations.
100–10	Field Service Regulations—Administration.
101–1	The GI Manual.
101–5	Staff Officers' Field Manual; Staff Organization and Procedure.
101–10	Staff Officers' Field Manual; Technical and Logistical Data.
101–31	Staff Officers' Field Manual; Nuclear Weapons Employment (U).

4. Technical Manuals (TM)

5–210	Military Floating Bridge Equipment.
5–220	Passage of Obstacles Other Than Minefields.
5–232	Elements of Surveying.
5–233	Construction Surveying.
5–234	Topographic Surveying.
5–235	Special Surveying.
5–236	Surveying Tables and Graphs.
5–248	Foreign Maps.
5–250	Roads and Airfields.
5–251	Army Airfields and Heliports.
5–252	Use of Road and Airfield Construction Equipment.
5–260	Principles of Bridging.
5–277	Panel Bridge, Bailey Type, M2.
5–285	Semipermanent Highway Steel Bridges, 30-, 60-, and 90-Foot Spans.

5–283	Semipermanent Highway and Railway Trestle Bridges.
5–295	Military Water Supply.
5–302	Construction in the Theater of Operations.
5–461	Engineer Handtools.
5–505	Maintenance of Engineer Equipment.
5–541	Control of Soils in Military Construction.
5–545	Geology and its Military Applications.
5–725	Rigging.
5–4610–204–12	Operator and Organizational Maintenance Manual—Water Purification Unit, Van Type Body Mounted, Electric Driven, AC 115 and 208 Volt, Single and 3 Phase, 60 Cycle, 1/70 to 2 HP, 1500 GPH (Met-pro Model 1500–2600) FSN 4610–649–8386.
9–1100	Inspection of Ordnance Materiel in the Hands of Troops.
9–1870–1	Care and Maintenance of Pneumatic Tires.
9–2810	Preventive Maintenance—Tactical Motor Vehicles.
10–405	Army Mess Operations.
21–300	Driver Training and Selection (Wheeled Vehicles).
57–210	Air Movement of Troops and Equipment.

5. Training Circulars (TC)

3–10	Defense Against V-Agents.
5–2	Employment of Mobile Assault Bridging.
5–9	Infrared Night Vision and Detection Equipment and its Application.
8–1	Training in Emergency Medical Care.
101–1	Prediction of Fallout and Radiological Monitoring and Survey.
101–2	Tactical Operations Centers.

6. Army Training Programs (ATP)

5–25	Engineer Combat Units.

APPENDIX II

RECOMMENDED OUTLINE FOR AN SOP

Standing Operating Procedure—Divisional Engineer Battalion

Hq, Engr Bn (_____ Div)
APO _____, U.S. Army
1 July 19 ____

Section I. INTRODUCTION

1. APPLICATION (to operations, relation to prior SOP's, lower units to conform).
2. PURPOSE
3. REFERENCES (AR's, SR's, FM's, and TM's) —Annex A.
4. RESPONSIBILITY FOR SOP (preparation, changes and revisions).
5. EFFECTIVE DATE

Section II. COMMAND, STAFF, AND LIAISON

6. ORGANIZATION
   a. Normal.
   b. Special Internal Attachments and Organization.
   c. Normal and Special External Attachment and Support (brigades, task forces, etc.).
7. COMMAND POSTS
   a. Normal Location (in relation to next higher headquarters).

b. Reporting Change of Location (coordinates and time).

c. Forward CP's.

(1) When (situation for which required).

(2) How (organized).

(3) Personnel and equipment.

8. STAFF DUTIES

a. Duties That Are Special or Additional to Those in FM's 5–135 and 101–5.

b. Duties of Such Other Important Special Staff Officers as the Commander Desires To Prescribe (paragraph for each).

9. LIAISON (FM's 5–135 and 101–5)

a. Duties of Liaison Officers.

b. Responsibilities of Liaison (with next higher, lower, and adjacent units).

Section III. ADMINISTRATION

10. GENERAL (Channels) (FM 100–10)

11. REPORTS

a. Routine.

b. Special.

c. Information Concerning Submission of Reports.

Annex B.

(1) Title and reports control symbol.

(2) Form of report.

(3) Date due.

(4) Number of copies.

(5) Negative report required or permissible.

12. PROMOTIONS (policies)

a. Officer (AR's and SR's in 140- and 605-series).

b. Enlisted (AR 624–200).
c. Battlefield.

13. COURTS-MARTIAL (MCM, US 1951)
    a. Local Jurisdiction.
    b. Procedure for Submitting Charges.
14. MAIL (AR 340–15, 341–10, and 341–50)
    a. Handling Official Mail.
    b. Handling Personal Mail.
15. LEAVES AND PASSES (AR's 630–5, 630–10, 639–20).
    a. Policy of Command (frequency, conduct, VD policies, etc.).
    b. Authority To Grant.
16. JOURNALS AND HISTORY (AR's 220–345, 220–346, SR 600–730–5).
    a. Responsibility for Unit Journal and History.
    b. Maintenance of Staff-Section Journals.
17. DISTRIBUTION OF MILITARY PUBLICATIONS (AR 310–1).
18. HANDLING PRISONERS OF WAR (DA Pam 20–151).
    a. Reference to FM 27–10.
    b. Special Instruction for Capturing Units.
19. AWARDS AND DECORATIONS (AR's 220–105 and 762–5–1).
    a. Channels.
    b. Forms.
    c. Presentations.
20. ORDERS (FM 101–5)
    a. Combat Orders.
    b. Memoranda of Combat Orders to S3.
21. BILLETS AND ASSEMBLY AREAS
    a. Billeting Policies (occupation and vacating).
    b. Billeting Party (organization and duties).

Section IV. RECONAISSANCE, INTELLIGENCE, AND COUNTERINTELLIGENCE

22. RECONNAISSANCE
    a. Reconnaissance a Continuing Function.
    b. Essential Elements of Engineer Information.
23. ENGINEER INTELLIGENCE (FM 5-30)
    a. Evaluation.
    b. Preparation of Reports.
    c. Dissemination.
24. COMBAT INTELLIGENCE (FM 30-5)
    a. Definition of "Spot Report."
    b. "Spot Reports" Required.
        (1) Initial contact with enemy.
        (2) Marked changes in enemy disposition or situation.
        (3) Attack by enemy ground, aircraft, or airborne forces.
        (4) New units identified.
        (5) Enemy strength, composition, and movement.
        (6) Location of enemy installations.
        (7) Use of chemicals or new weapons.
        (8) New enemy materials or equipment.
25. COUNTERINTELLIGENCE
    a. Mail Censorship.
    b. Blackout Discipline.
    c. Extent of Information Given, if Captured.
    d. Signs and Countersigns.
    e. Destruction of Classified Material.
    f. Civilian Control.

g. Secrecy Discipline.
h. Information to Press Representatives.

Section V. OPERATIONS

26. ORDERS (FM 101–5)
a. Fragmentary Orders.
b. Written Orders.
c. Use of Overlays, Tables, and Charts.
27. SECURITY—Annex C
a. Responsibilities of Battalion in Rear Area.
b. Responsibilities of Unit Commander.
28. COMBAT
a. Reorganization for Combat. Annex D.
b. Responsibility for Contact.
c. Coordination of Request for Fire Support and Tactical Air Support.
d. Spot Reports.
e. Situation Reports.
f. Minefields.
g. CBR and Nuclear Warfare. Annex E.
(1) Defensive.
(2) Offensive.
h. Smoke.
(1) Request for use.
(2) Coordination.
i. Defense Against Air Attack.
j. Employment of ADM. Annex F.
k. Bomb and Shell Disposal.
29. MOVEMENT
a. General.
(1) What constitutes a convoy.

(2) Required road clearanees.
(3) Requests for augmented transportation.
(4) Loading plan. Annex G.

b. General Responsibilities.

(1) S–1.
(a) Coordination with civil and military police.
(b) Commands quartering party.

(2) S–2.
(a) Security of bivouac and halt areas.
(b) Reconnaissanee of route.
(e) Posting of road guides.

(3) S–3.
(a) Warning order.
(b) Movement order.
(c) Selects routes.
(d) Arranges for road clearanees.

(4) S–4.
(a) Arranges for augmented transportation.
(b) Responsible for traffic planning.

(5) Engineer equipment officer.
Responsible for maintenanee.

(6) Company commander.
(a) Prepares company loading plan.
(b) Furnishes S–3 with lists of vehieles, equipment, and materials.
(c) Conducts neeessary training for movement.
(d) Policies area.

c. Motor Movement. Annex H.
d. Rail Movement. Annex I.
e. Alert Plans.
(1) Unit plans.
(2) Alert rosters.

Section VI. LOGISTICS

30. CLASS I SUPPLY
a. Ration Pickup.
b. Daily Ration Return and Ration Cycle.
c. Reserve Rations Carried.
(1) By unit.
(2) By individual.
d. Responsibility for Attached Units.
31. WATER SUPPLY
a. Authorized Sources.
b. Purification by Expedient Methods.
c. Water Economy.
32. CLASS II AND CLASS IV SUPPLY
a. Requisition Days for Various Services.
b. Pickup Procedure.
c. Salvage Turn-in Procedure.
d. Droppage by "Battle Loss Certificate."
e. Basic Loads. Annex J.
33. CLASS III SUPPLY
a. Method of Supply.
b. Fuel Sources.
34. CLASS V SUPPLY
a. Method of Requisitioning.
b. Forms Used and Certificates Required.

c. Basic Load. Annex J.

d. Salvage.

35. MAINTENANCE OF VEHICLES AND EQUIPMENT (TM's 5–505, 9–2810, and 38–660–1).

a. First and Second Echelon Maintenance.

b. Maintenance Officer's Responsibilities.

c. Forms Used.

d. Priorities.

36. REPAIR PARTS

a. Method of Requisitioning Engineer and Ordnance.

b. Maintenance of Stock Levels.

c. Inspections for Maintenance and Stock Levels.

d. Parts and Equipment Records.

37. EVACUATION OF VEHICLES AND EQUIPMENT.

a. Division Support Command.

b. Maintenance Battalion.

38. EVACUATION AND HOSPITALIZATION—Annex K.

Section VII. COMMUNICATION

39. COMMUNICATION BETWEEN UNITS

a. Radio (FM 24–18). Annex L.

b. Wire (FM 24–20). Annex M.

c. Responsibility for Installation.

d. Visual (FM 21–60).

40. COMMUNICATION PROCEDURES

a. Division Communications (FM 61–24).

b. Radiotelephone Voice Procedure (FM's 24–18 and 24–20).

c. Signal Security.

d. Citation of SOI and SSI of Higher Headquarters.

41. MAINTENANCE RESPONSIBILITIES OF COMMUNICATION OFFICER (FM's 100–11, 17–50, and 17–70).

GREEN
Lt Col

Annex: A—References (omitted)
B—Reports (omitted)
C—Security
D—Reorganization for Combat
E—CBR and Nuclear Warfare
F—Employment of ADM
G—Loading Plan (omitted)
H—Motor Movement
I—Rail Movement
J—Basic Loads (omitted)
K—Evacuation and Hospitalization (omitted).
L—Radio Communication Nets (omitted)
M—Wire Communication Nets (omitted)

OFFICIAL
/s/Black
BLACK
Adj

APPENDIX III

EXAMPLES OF ENGINEER ANNEXES TO A DIVISION OPERATION PLAN

EXAMPLE 1. ENGINEER ANNEX TO A DIVISION OPERATION PLAN

(Not a Copy of Any Known Plan.)

(Classification)

(No change from verbal orders except paragraph 1b(3).)

Copy No. 5
4th Division
TOWNVILLE (XU2484)
AGGRESSORLAND
251500 Jul 19 ____
AR 6543

Annex D (Engineer) to Operation Plan STORM

References: Maps, AGGRESSORLAND, 1:50,000, TOWNVILLE, FARMVILLE, DELTA, revised May 19 _____.

1. SITUATION

a. Enemy forces. Annex A (Intelligence) to OPLAN STORM.

(Classification)

(Classification)

b. Friendly forces.

(1) Annex B (Operations Overlay) to OPLAN STORM.

(2) Appendix 1 (Barrier Plan) to Annex B (Operations Overlay) to OPLAN STORM.

(3) Corps Arty furnishes AD protection to engineer equipment parks, bridge and ferry sites in zone.

(4) Corps engineer assumes responsibility for division engineer area and task assignments at effective time and date of execution of OPORD 13.

c. Attachments and detachments.

121st Engr Bn (C) attached effective 260400 July 19 ____.

d. Assumptions.

(1) Par. 1d OPLAN STORM.

(2) Terrain will initially require utilization of AVLB. During Phase 2 stream crossings will require rafting and float bridge equipment.

2. MISSION

Organic and attached engineer units support operation by breaching obstacles and minefields, maintaining roads in zone, and constructing bridges over streams and dry gaps.

(Classification)

(Classification)

3. EXECUTION

a. Concept of operations.

(1) Paragraph 3a, OPLAN STORM.

(2) Organic engineer units will provide support to committed brigades with priority of support to __, __ brigades. Organic Bn (____) and attached Engr Bn (C) will provide general support on area basis, prepared to provide direct support to _____ brigade when committed.

b. 4th Engr Bn.

(1) Attach one Engr Co reinforced with one platoon and one Sec AVLB of bridge Co to _____ brigade.

(2) Attach one Engr Co reinforced with two Sec AVLB to _____ brigade.

(3) Bn (____): GS.

(4) Be prepared to attaeh one Engr Co reinforced with heavy raft platoon of bridge Co to _____ brigade on order.

(5) Be prepared to establish a minimum of three WSP east of NARROW River.

c. 121st Engr Bn (C).

(1) Operate 3 WSP in zone.

(2) Maintain Div MSR.

(3) Be prepared to assist in eonstruction of floating and/or fixed bridges on order.

(Classification)

(Classification)

(4) Be prepared to construct roadblocks east of DELTA (XY4188) on order.

d. Coordinating instructions.

(1) WSP will be leapfrogged to insure continuous water supply.

(2) Direct liaison authorized between 4th Div Engr and 1st and 2nd Div Engr.

(3) After opening bridges across NARROW River, maintain two rafts in operation at each bridge site for return traffic until 261800 Jul 19__.

(4) This plan effective for planning on receipt, becomes OPORD 13 for execution on Div order.

4. ADMINISTRATION AND LOGISTICS

a. ADMINO 5 remains in effect, except paragraph 1b.

b. App 1—Allocation of Engr C1 I, II, and IV, Equip and Sup.

c. Location of Engr Equip parks as follows:

(1) No. 1—Vic HIGH RIDGE (VT2439).

(2) No. 2—LOW KNOB (ST2324).

(3) No. 3—FLAT LAND (TT2556).

5. COMMAND AND SIGNAL

a. Annex H (Signal) to OPLAN STORM; Index 9, SOI.

b. CP's:

(1) 4th Engr Bn (____ Div), TOWN (AB4087).

(2) Other CP's report location.

(Classification)

(Classification)

c. Axis of signal communications. TOWN (AB4087)--VILLAGE (EF6389)--CITY (IT7843).

Acknowledge.

FLEXO
Maj Gen

Appendixes: Appendix 1—Allocation of Engr C1 I, II, and IV Equip and Sup (omitted)

Distribution: A

OFFICIAL:

/s/ Price
PRICE
G3

(Classification)

EXAMPLE 2. BARRIER ANNEX TO A DIVISION OPERATION PLAN

(Not a Copy of Any Known Plan.)

(Classification)

(No change from verbal orders.)
Copy No. 3
4th Division
BOBS (RC4098),
AGGRESSORLAND
181945 Feb 19--
AR 6767

Annex F (Barrier Plan) to Operation Plan LANCE

Task Organization: Annex A, Task Organization, to OPLAN LANCE.

References: Maps, AGGRESSORLAND, 1:100,000, ROTHEN, Edition 5; AGGRESSORLAND, 1:500,000, MERGEN, Edition 2.

1. SITUATION
   a. Enemy forces. Annex A (Intelligence) to OPLAN LANCE.
   b. Friendly forces.
      (1) Paragraph 1*b*, OPLAN LANCE.
      (2) 11th Engr Gp (C) supports 4th Div with one Float Bridge Company on order.

(Classification)

(Classification)

c. Attachments and detachments.
111th Engr Bn (C) attached effective 181945 Feb 19__.

d. Assumptions.
(1) Paragraph 1d, OPLAN LANCE.
(2) Forward units will have a minimum of 24 hours to prepare barrier before receiving enemy pressure.

2. MISSION

Division, acting as corps covering force, executes barrier system and extends corps barrier in sector to disorganize, deceive, and delay the enemy in front of the GOPL, and to force concentration of enemy forces in the valleys of the UMP and WACH Rivers if RED River is crossed.

3. EXECUTION

a. Concept of operations.
(1) Paragraph 3a, OPLAN LANCE.
(2) Barrier system east of RED River designed to disorganize, deceive and delay the enemy; barrier system west of RED River designed to force concentration of enemy forces in the valleys of the UMP and WACH Rivers.

(Classification)

(Classification)

b. _____ Brigade.

Barrier	Priority	Target date for completion	Remarks
BAL River.	1	191945	Demolish all bridges on BAL River; crater, demolish, and mine with both AT and APers mines the approaches through ridge MESSEL (EF4810)—BRON(GH5107).
E_____	1	191945	Crater and mine defile at ALT (H14598) with AT and APers mines.
FK_____	2	211800	Mine saddle from WEIGER (BL4000) to Jung (BC4007) with AT mines only.
HL_____	3	211800	Mine ridge UTTING (EF4299) to RJ at EF425990 with AT mines only.

(Classification)

(Classification)

c. _____ Brigade.

Barrier	Priority	Target date for completion	Remarks
AB_____	1	200200	Mine entrance to UMP River Valley with both AT and APers mines; improve RED River banks to form effective obstacles; demolish bridges over RED River on Div order.
BD_____	2	210600	Prepare wire obstacles and mine ridge with AT mines; be prepared to reinforce with APers mines.
AE_____	3	211800	Mine UMP River Valley with both AT and APers mines.

(Classification)

(Classification)

d. _____ Brigade.

Barrier	Priority	Target date for completion	Remarks
BC_____	1	191945	Improve RED River banks to form effective obstacle and mine with both AT and APers mines; demolish all bridges over RED River on Div order.
DG_____	2	210600	Prepare wire obstacles and mine ridges D to G with AT mines only initially; be prepared to reinforce with APers mines.
GI_____	3	211800	Mine WACH Valley with both AT and APers mines.

(Classification)

(Classification)

e. 4th Engr Bn (_____ Div).

Barrier	Priority	Target date for completion	Remarks
JK_____	1	201945	Mine ridge with AT mines only initially; be prepared to reinforce with APers mines on order.
EJ_____	1	201945	Prepare for demolition all bridges over UMP River; mine with both AT and APers mines.
IM_____	2	211800	Prepare for demolition all bridges over WACH; mine with both AT and APers mines.

f. 111th Engr Bn (C).

Barrier	Priority	Target date for completion	Remarks
KLM_____	1	201945	Mine ridge with AT mines only initially; be prepared to reinforce with APers mines on order.
IM_____	2	211800	Prepare for demolition all bridges over WACH; mine with both AT and APers mines.

(Classification)

(Classification)

g. Coordinating instructions.

(1) Brigades will prepare additional barriers forward of GOPL which block high speed avenues of approach and lateral barriers between adjacent brigades.

(2) Brigades coordinate extent of and location of lanes and gaps with adjacent corps. Direct liaison is authorized.

(3) Provisions will be made to cover barriers with heavy weapons fire; small-arms fire coverage wherever possible.

(4) Gaps and lanes in minefields will remain open until ordered closed by Div Hq or until threat of capture by the enemy.

(5) Demolitions, including bridges and cratering of routes, executed only on order Div Hq or on brigade order if threat of capture by the enemy is imminent.

(6) Appendix 1, Barrier Overlay.

(7) Appendix 2, Minefield Location Plan.

(8) Appendix 3, Obstacles and Demolitions Plan.

(9) This barrier plan not taken forward of brigade CP.

(10) This plan effective for planning on receipt becomes OPORD 25 on Div order.

(Classification)

(Classification)

4. ADMINISTRATION AND LOGISTICS

a. ADMINO 18 continues in effect except paragraph 1b.

b. AT and APers mines, demolitions, and napalm available ASP 182100 Feb 19 ____.

c. Minefield marking materials, wire, and fortifications materials available Sup Pt 182100 Feb 19 ____.

5. COMMAND AND SIGNAL

a. Signal. Index 3, SOI.

b. Reports.

(1) Minefields. Report intended location, extent, estimated time of completion, type and density of mines; follow with standard minefield laying report including sketches.

(2) Other obstacles and demolitions. Report location, type, extent, and estimated time of completion.

Acknowledge.

FLEXO
Maj Gen

(Classification)

(Classification)

Appendixes: 1—Barrier Overlay (omitted)
2—Minefield Location Plan (omitted)
3—Obstacles and Demolitions Plan (omitted)
4—Allotment of C1 I, IV, and V Equipment and Supply (omitted).

Distribution: A
2d Corps
3d Corps

OFFICIAL:
/s/ Price
PRICE
G3

(Classification)

ANNEX C (SECURITY) TO SOP, HQ,_____
ENGINEER BATTALION,____DIVISION

1. GENERAL SECURITY

Policy and Responsibilities (FM 26–5 and AR's 245–15 and 380–5).

2. SECURITY DURING MOVEMENT

a. Air Guards.
b. Manning of Vehicular Weapons.
c. Camouflage During Halts.
d. Advance, Flank, and Rear Guards.
e. Action in Case of Attack.
    (1) Air.
    (2) Mechanized.
    (3) Nuclear, biological, and chemical.

3. SECURITY IN ASSEMBLY AREA (FM's 5–15, 5–20, 5–31, 61–100, and 31–21).

a. Camouflage.
b. Mines and Boobytraps.
c. Placement of Weapons.
    (1) Air attack.
    (2) Mechanized.
    (3) Nuclear, biological, and chemical.
d. Joint Security.
e. Security Plans.
f. Sentry Posts and Outposts.

4. REAR-AREA OBSERVATION (FM's 7–10 and 7–40).

a. Formation of Rear-Area Observation Groups.
b. Selection of Rear-Area Observation Posts.
c. Twenty-Four-Hour Manning Posts.
d. Observation of Rear Areas When Required.
e. Communications for Observation Posts.

5. SECURITY OF WORKING PARTIES
   a. Responsibility.
   b. Camouflage of Equipment.
   c. Combat Readiness.
6. SECURITY WARNING SIGNALS
   a. Air Attack.
   b. Airborne Attack.
   c. Mechanized Attack.
   d. Nuclear, Biological, and Chemical Attack.
7. FIRE SAFETY AND FIREFIGHTING (AR 420–90)
   a. Plan (general).
   b. Fire Personnel and Duties.
   c. Safety Rules (motor pools, kitchens, and so forth).
8. ALERT PLANS
   a. Unit Plans.
   b. Alert Roster.

ANNEX D (REORGANIZATION FOR COMBAT) TO SOP, HQ, _____
ENGINEER BATTALION, DIVISION

1. GENERAL
   a. Requirement.
   b. Prior Approval of the Battalion Commander.
2. DESIGNATION OF FORWARD ECHELON
   a. Personnel.
   b. Equipment.
3. DESIGNATION OF REAR ECHELON
   a. Personnel.
   b. Equipment.
4. SUPPLY
   a. Ammunition.
   b. Unit Trains.
5. COMMUNICATION
6. MEDICAL EVACUATION (FM's 61–100, and 8–35)
7. STATEMENT OF EFFECT ON REGULAR MISSION

ANNEX E (CBR AND NUCLEAR WARFARE) TO SOP, HQ, _____ ENGINEER BATTALION, _____ DIVISION

1. GENERAL
   a. Purpose.
   b. Subordinate Units To Issue SOP's To Conform.
2. REFERENCES
   a. FM 21–40 (other pertinent doctrinal sources).
   b. Division Training Directive No. _____.
   c. Orders, SOP's and Annexes.
3. ORGANIZATION
   a. Command Staff Structure.
   b. Specialists.
4. RESPONSIBILITIES
   a. Individual.
   b. Company Commanders.
      (1) Plans.
      (2) Proficiency of unit personnel.
      (3) Safeguarding and processing of captured enemy CBR personnel and equipment.
      (4) Unit CBR equipment.
      (5) First and second echelon decontamination.
   c. Large-Scale Decontamination (see Engineer Annex, Div SOP No. _____).
5. DISPERSION
   Guide to Minimum Distance Maintained Between Various Type Sections.

6. CBR ALARMS
   a. General Alarm. Attack Considered Imminent.
   b. Actual Attack.
   c. All Clear.
7. PROCEDURE IN CASE OF CBR OR NUCLEAR ATTACK
   a. Action Prior to Attack.
   b. Action During Attack.
      (1) Protective equipment.
      (2) Cover and movement.
      (3) Unit protective measures.
      (4) Coordination between higher, lower, and adjacent units.
   c. Action After Attack.
      (1) All-clear signal.
      (2) Continuation of mission.
      (3) Resupply of protective equipment and material.
      (4) Marking and reporting of contaminated areas.
      (5) Decontamination.
8. PROTECTION
   a. Individual.
   b. Unit.
   c. Tactical.
9. SUPPLY
   a. Emergency Requisitions.
   b. Authorized Levels of CBR Equipment.
10. TRAINING
   See Division Training Directive No. .....

ANNEX F (EMPLOYMENT OF ADM) TO SOP, HQ, ------- ENGINEER BATTALION ------- DIVISION

SUBJECT: Standing Operating Procedure for ADM Missions

1. GENERAL

a. This SOP is based on (list SOP, directives or policies of higher headquarters).

b. It is coordinated with (list applicable administrative and operational SOP, staff channels and sections responsible for planning, handling, storing, and security of ADM).

2. AUTHORITY TO EMPLOY (List headquarters with authority to order employment and methods of maintaining command control.)

3. ADMINISTRATION AND SUPPLY

a. Responsibilities.

(1) For preparation and periodic review of the SOP.

(2) For requisitioning of all pertinent publications.

(3) For posting of changes in technical publications.

b. Reading List. (Refer to publication which includes all FM's, TM's, Ordnance Technical Information Letters, etc., deemed necessary for ADM delivery personnel to scan, read or study and frequency of review.)

c. Publications Requisitioning Procedure.

d. Unsatisfactory Reports (UR) (TM 39-5-8).

(1) Preparation and study of proposals.

(2) Submission and review procedures.

(3) UR file.

e. Records and Reports.
   (1) Reports to higher headquarters.
   (2) Required tests and maintenance records:
      (a) Weapon Summary Sheet.
      (b) Weapon Log Books.
      (c) Inspection Record Card (IRC).
      (d) Equipment Maintenance Record (EMR).
      (e) Load Test Results.
      (f) Partial Storage Monitoring (PSM).
      (g) Schedule for Storage Inspections (SI) and Storage Monitoring (SM).
   (3) Instructions on Post Strike Reports to include Target, GZ, JOB, time of detonation, and results (crater, RD).

f. Supply.
   (1) Authority (TOE, TA, TD, EMR, etc.).
   (2) Equipment lists. (Refer to appropriate –12P, –34P/2, –35P manual or parts lists.) (Do not attempt to list here.)
   (3) Requisition procedure (including local requirements).
   (4) Property accountability (including local requirements).

4. SECURITY

a. Statement of Policy.
   (1) Importance.
   (2) Possible consequences of violations.
   (3) Responsibilities.

b. Document Control Procedure.

c. Training Item Control.

d. Classified Study Procedure.

e. Clearances. An annex or appendix should include the clearance of officers and their enlisted men.

f. Access List. An annex or appendix should include the current access list to the exclusion area.

5. SAFETY

a. General Safety Procedures.

(1) A statement allowing no deviation from the standard checklist as prepared by battalion, division, or army, dependent on theater policy.

(2) Applicable safety requirements deemed necessary, such as preventive maintenance, driver training, preoperation checks, etc.

b. Electrical Safety Requirements (if desired).

c. Explosive Safety Requirements (TM 39–20–1).

d. Nuclear Safety Requirements (TM 39–20–3).

e. Placement Equipment Load Tests and Records of Tests.

6. TRANSPORTATION

a. Convoy Composition. Allow for three or four different types of composition. Do not attempt to standardize beyond minimum requirements.

b. Courier Officer.

(1) Clearance.

(2) Responsibility.

c. Convoy Officer (ranking man).

(1) Clearance.

(2) Responsibilities.

(3) May also be courier officer under most conditions (check with higher headquarters).

d. Drivers.

Responsibilities.

e. Guards.

(1) Escort guards (access to equipment).

(a) Clearance—equal to the classification of the equipment carried.

(b) Responsibility.

(2) Convoy guards (no access to equipment).

(a) Clearance—no special clearance required.

(b) Responsibility.

(c) Local security (infantry, armor, etc.).

(d) Standby reserve force.

(e) Radio requirements (communication).

(f) Air transport.

7. EMERGENCY DESTRUCTION OR DISPOSAL

a. Chain of Command (who can authorize destruction or disposal).

b. List of Materials Required for Destruction.

c. Priority of Destruction or Disposal.

d. Procedures.

(1) Nuclear components.

(2) Nonnuclear components.

8. STORAGE AND MAINTENANCE

a. Permanent Storage Requirements. In garrison-peacetime. Designate security clearance of personnel, guards, warning devices, barriers, communications with officer or NCO of guard, alternate

communication means, floodlighting, alternate power source, fire precaution and protection.

b. Temporary Storage Requirements.

(1) Physical storage.

(2) Security requirements (see also under security).

c. Schedule for Storage Inspection (SI) and Storage Monitoring (SM)—Ordnance Responsibility.

d. Schedule for Partial Storage Monitoring (PSM)—Unit Responsibility.

9. TRAINING

a. Classified Training Requirements—ADM training should be conducted each week in the following type breakdown:

(1) Prefire procedures.
(All engineer units with missions will have the necessary training items.)

(2) Field wire installation.

(3) Formal instruction (manual study, UR preparation, review of new material).

(4) Support training.

(a) Convoy procedure.

(b) Site preparation.

(c) Team organization.

(d) Review of the SOP.

b. Training Records.

c. Testing Procedure (written, performance, IG, and/or ATT).

d. Security Training.

10. ORGANIZATION FOR ADM MISSIONS

NOTE. This paragraph outlines a suggested organization of the ADM firing party for the conduct of an ADM mission. Missions in support of allied forces will

require modifications, particularly when the delivery unit is unable to provide all the personnel required for a normal firing party. For example, it may be necessary to utilize allied personnel on the support team.

a. Team Leaders (indicated by position rather than name: example: CO, XO, Plat Ldr, Plat Sgt, Sqd Ldr, etc.).

(1) ADM firing party commander.
(2) OIC or NCOIC of the firing team.
(3) OIC or NCOIC of the support team.
(4) OIC or NCOIC of the security team.

b. Composition and Duties.

(1) Prefiring team.
  (a) Pickup of ADM equipment (an annex or appendix may be inserted listing personnel currently on the SASP access list and/or signature card file).
  (b) Transportation (paragraph 6, this annex to SOP, outlines transportation procedures).
  (c) Prefire procedures (an annex or appendix should be inserted which contains the prefire checklists).
  (d) Remote command fire procedures.
(2) Support team (dependent on type of mission).
  (a) Pickup and transportation of all support material (mines, camouflage, tentage, etc.).
  (b) Initial preparation of the emplacement site (installation, mines, wire booby-traps, etc.).

(c) Field wire command link installation (an annex or appendix should be inserted which contains the field wire installation checklist).

(d) Remote command site(s) preparation.

(3) Security team (dependent on terrain, tactical situation, etc.).

(a) Provide escort guards during the transportation phase.

(b) Establish emplacement site immediate security prior to the arrival of the munition.

(c) Provide immediate security detail at the completed emplacement site until prearranged departure time.

(d) Provide immediate security detail at the command site until after detonation.

(4) Demolition Guard (see Appendix IV).

11. ACCIDENT AND INCIDENT PLANS

NOTE. This paragraph will cover such contingencies as accidents or delays, to include explosions, nuclear contamination, misfire, malfunction, and damage.

ANNEX H (MOTOR MOVEMENT) TO SOP HQ, _____ ENGINEER BATTALION, _____ DIVISION

1. GENERAL (FM 25–10, AR 55–355, and division SOP and march orders).
   a. Preparation of Vehicles.
   b. Motor Marches.
      (1) Strip maps.
      (2) Route reconnaissance.
      (3) Messing and refueling.
      (4) Night marches.
      (5) Composition of march units and serials.
      (6) Distances to be maintained.
      (7) Speeds and rate of march.
      (8) Posting of traffic guards during halts.
   c. Conduct of Personnel During Movement.
   d. Maintenance on Marches and Movements.
2. VEHICLE AND EQUIPMENT REGULATIONS
   a. Motor Pool (AR's 700–2300–1 and 58–5).
      (1) Dispatch.
      (2) Service.
      (3) Maintenance.
   b. Regulations for Administrative Vehicles.

ANNEX I (RAIL MOVEMENT) TO SOP, HQ, -------- ENGINEER BATTALION, ------ DIVISION

1. ACTION BY S1
   Troop Lists.
2. ACTION BY S2
   a. Railroad Reconnaissance Report.
   b. Security.
3. ACTION BY S3
   a. Determine Rolling-Stock Requirements.
   b. Coordinate Loading Plans.
   c. Prepare Loading Schedule and Designate Areas.
4. ACTION BY S4
   a. Initiate Transportation Requests.
   b. Troop and Guard Mess.
   c. Procurement of Blocking Materiel and Dunnage.
   d. Prepare Shipping Documents.
   e. Movement policy.
   f. Designation of movement control personnel.

APPENDIX IV

ORDERS TO THE DEMOLITION GUARD COMMANDER AND ORDERS TO THE DEMOLITION FIRING PARTY

1. Three commanders are normally concerned with the execution of a demolition—

a. The military authority who has overall responsibility, i.e. the officer empowered to order the firing of the demolition (referred to hereafter as "The Authorized Commander").

b. The commander of the demolition guard.

c. The commander of the demolition firing party.

2. Each authorized commander will—

a. Determine the requirement and allot responsibility for a Demolition Guard.

b. Establish a clear cut channel whereby the order to fire the demolition is transmitted from himself to the commander of the Demolition Guard.

c. Insure that this channel is known and understood by all concerned.

d. Insure a positive, secure means for transmitting the order to fire.

e. Specify whether the Demolition Guard Commander is authorized to order the firing of the demolition on his own initiative if the enemy is in the act of capturing it.

3. Where a demolition is to be prepared which is important to the operational plan, the authorized

commander will normally appoint a demolition guard, the commander of which will be responsible for—

a. Insuring if so ordered that the demolition is not captured intact by the enemy, and,

b. Giving to the Firing Party Commander the orders for changing the state of readiness of the demolition and the firing orders.

4. The following forms will be used for the Orders to the Commander of a Demolition Guard and the Commander of a Demolition Firing Party whenever time and conditions permit. After all parts of these forms have been completed by the appropriate authority the forms will be issued to the commanders of the Demolition Guard and the Demolition Firing Party and will be retained by them until the demolition has been completed.

5. The contents and paragraph numbers of the forms issued by each authority will conform exactly to the following examples.

6. To facilitate the use of these forms, it is recommended that general instructions be included in appropriate unit Standing Operating Procedures.

Serial No._____ Security Classification_____

ORDERS TO THE DEMOLITION GUARD COMMANDER

NOTES: 1. This form will be completed and signed before it is handed to the Commander of the Demolition Guard.
2. In completing the form, all spaces must either be filled in or lined out.
3. The officer empowered to order the firing of the demolition is referred to throughout as the "Authorized Commander".

From _____ To _____

PART I—PRELIMINARY INSTRUCTIONS

1. *a.* Description of target _____
   b. Location:
   Map Name and Scale_____
   Sheet No. _____
   Grid Reference _____
   c. Codeword or codesign (if any) of demolition target _____
2. The Authorized Commander is_____
_____
(give appointment only). If this officer should delegate his authority, you will be notified by one of the methods shown in paragraph 4, below.
3. The DEMOLITION FIRING PARTY has been/will be provided by _____
4. All messages, including any codewords or codesign (if any) used in these orders will be passed to you by:

a. Normal command wireless net, or
b. Special liaison officer with communications direct to the Authorized Commander, or
c. Telephone by the Authorized Commander, or
d. The Authorized Commander personally, or
e. ----------

(Delete those NOT applicable)

NOTE: All orders sent by message will be prefixed by the codeword or codesign (if any) at paragraph 1*c*, and all such messages must be acknowledged.

PART II—CHANGING STATES OF READINESS

5. The demolition will be prepared initially to the State of Readiness ---------- by ---------- hours on ---------- (date).

6. On arrival at the demolition site, you will ascertain from the commander of the demolition firing party the estimated time required to change from State "1" (SAFE) to State "2" (ARMED). You will insure that this information is passed to the Authorized Commander and is acknowledged.

7. Changes in the State of Readiness from State "1" (SAFE) to State "2" (ARMED) or from State "2" to State "1", will be made only when so ordered by the Authorized Commander. However, the demolition may be ARMED in order to accomplish emergency firing when you are authorized to fire it on your own initiative.

8. A record of the changes in the State of Readiness will be entered by you in the table below, and on

the firing orders in possession of the commander of the demolition firing party.

State of Readiness ordered "1" (SAFE) or "2" (ARMED)	Time and date change to be completed	Authority	Time and date of receipt of order

Note: If the order is transmitted by an officer in person, his signature and designation will be obtained in the column headed "Authority".

9. You will report completion of all changes in the State of Readiness to the Authorized Commander by the quickest means.

PART III—ORDERS FOR FIRING THE DEMOLITION

10. The order for firing the demolition will be passed to you by the Authorized Commander.

11. On receipt of this order you will immediately pass it to the commander of the demolition firing party on his demolition orders form ("Orders of the Demolition Firing Party").

12. After the demolition has been fired you will report the results immediately to the Authorized Commander.

13. In the event of a misfire or only partially successful demolition you will give the firing party protection until such time as it has completed the demolition and report again after it has been completed.

PART IV—EMERGENCY FIRING ORDERS

NOTES: 1. One subparagraph of paragraph 14 must be deleted.

2. The order given herein can only be altered by the issue of a new form, or, in emergency by the appropriate order (or codeword if used) in Part V.

14. *a.* You will order the firing of the demolition only upon the order of the Authorized Commander.

OR

b. If the enemy is in the act of capturing the target you will order the firing of the demolition on your own initiative.

PART V—CODEWORDS (IF USED)

	Action to be taken	Codeword (if used)
a.	Change State of Readiness from "1" to "2" (see par. 7)	
b.	Change State of Readiness from "2" to "1" (see par. 7)	
c.	Fire the demolition (see par. 10)	
d.	Paragraph 14*a* is now cancelled. You are now authorized to fire the demolition if the enemy is in the act of capturing it.	
e.	Paragraph 14*b* is now cancelled. You will order the firing of the demolition only upon the order of the Authorized Commander.	
f.	Special authentication instructions, if any.	

Signature of offieer issuing these orders_____
Name (printed in capital letters)_____
Rank_____Appointment_____
Time of issue ___hours, _____(date).

PART VII—DUTIES OF THE COMMANDER OF THE DEMOLITION GUARD

15. You are responsible for—

a. Command of the demolition guard and the demolition firing party.

b. The safety of the demolition from enemy attack or sabotage.

c. Control of traffie and refugees.

d. Giving the orders to the demolition firing party in writing to change the state of readiness.

e. Giving the order to the demolition firing party in writing to fire the demolition.

f. After the demolition, reporting on its effectiveness to the Authorized Commander.

g. Keeping the Authorized Commander informed of the operational situation at the demolition site.

16. You will aequaint yourself with the orders issued to the Commander of the Demolition Firing Party and with the instructions given by him.

17. The Demolition Guard will be so disposed as to insure at all times complete all-round protection of the demolition against all types of attack or threat.

18. The Commander of the Demolition Firing Party is in technieal eontrol of the demolition. You will agree with him the site of your HQ and of the firing point. These should be together whenever practicable. When siting them you must give weight to

the technieal requirements of being able to view the demolition and have good aeeess to it from the firing point.

19. You will nominate your deputy forthwith and eompile a seniority roster. You will insure that each man knows his plaee in the roster, understands his duties and knows where to find this form if you become a casualty or are unavoidably absent. The seniority roster must be made known to the Commander of the Demolition Firing Party.

20. Once the state of readiness "2 ARMED" has been ordered, either you or your deputy must always be at your HQ so that orders can be passed on immediately to the Commander of the Demolition Firing Party.

SECURITY CLASSIFICATION

ORDERS TO THE COMMANDER, DEMOLITION FIRING PARTY	SERIAL NO.

NOTES: Parts I, II and III will be completed and signed before this form is handed to the commander of the Demolition Firing Party. Pars. 4 and 5 can only be altered by the authority issuing these orders. In such cases a new form will be issued and the old one destroyed.

FROM:	TO:

DA FORM 2050–R, 1 Nov. 57 Security Classification

SECURITY CLASSIFICATION

PART 1—ORDERS FOR PREPARING AND CHARGING THE DEMOLITION TARGET

1a. DESCRIPTION

b. LOCATION			c. CODE WORD of DEMOLITION TARGET (if any).
MAP NAME AND SCALE	SHEET NO.	GRID REFERENCE	

d. ATTACHED PHOTOGRAPHS AND SPECIAL TECHNICAL INSTRUCTIONS

2. THE DEMOLITION GUARD IS BEING PROVIDED BY (Unit)

3. YOU WILL PREPARE AND CHARGE THE DEMOLITION TARGET TO THE STATE OF READINESS BY HOURS ON (date)
ANY CHANGES MAY ONLY BE MADE ON THE ORDER OF THE ISSUING AUTHORITY, OR BY THE OFFICER DESIGNATED IN PAR. 4d AND WILL BE RECORDED BELOW.

State of readiness ordered "1 (SAFE)" or "2 (ARMED)"	Time and data change to be completed	Authority	Time and date of receipt of order

NOTE: All orders received by message will be verified by the code word at par. 1c. If the order is transmitted by an officer in person, his signature and designation will be obtained in the column headed "Authority."

PART II—ORDERS FOR FIRING

NOTE: The officer issuing these orders will strike out the subpar of pars. 4 and 5 which are not applicable. When there is a demolition guard subpar. 4d will always be used, and par. 5 will always be struck out.

4a. YOU WILL FIRE THE DEMOLITION AS SOON AS YOU HAVE PREPARED IT.
b. YOU WILL FIRE THE DEMOLITION AT HOURS ON (date).
c. YOU WILL FIRE THE DEMOLITION ON RECEIPT OF THE CODE WORD.
d. YOU WILL FIRE THE DEMOLITION WHEN THE OFFICER WHOSE DESIGNATION IS HAS SIGNED PAR. 6 BELOW.

EMERGENCY FIRING ORDERS (ONLY applicable when there is NO demolition guard)

SECURITY CLASSIFICATION

5. YOU WILL NOT FIRE THE DEMOLITION IN ANY CIRCUMSTANCES EXCEPT AS ORDERED IN PAR. 4 ABOVE.

OR

YOU WILL FIRE THE DEMOLITION ON YOUR OWN INITIATIVE IF THE ENEMY IS IN THE ACT OF CAPTURING IT.

PART III—ORDERS FOR REPORTING

6. AFTER FIRING THE DEMOLITION YOU WILL IMMEDIATELY REPORT RESULTS TO THE OFFICER WHO ORDERED YOU TO FIRE. IN THE EVENT OF A PARTIAL FAILURE YOU WILL WARN HIM AND IMMEDIATELY CARRY OUT THE WORK NECESSARY TO COMPLETE THE DEMOLITION.

7. FINALLY YOU WILL IMMEDIATELY REPORT THE RESULTS TO YOUR UNIT COMMANDING OFFICER (see par. 13).

SIGNATURE OF OFFICER ISSUING THESE ORDERS	NAME (In capitals)	TIME OF ISSUE	DATE OF ISSUE
	DESIGNATION		

PART IV—ORDER TO FIRE

8. BEING EMPOWERED TO DO SO I ORDER YOU TO FIRE NOW THE DEMOLITION DESCRIBED IN PAR. 1.

SIGNATURE	NAME (In capitals)	TIME	DATE
	DESIGNATION		

PART V—GENERAL INSTRUCTIONS (READ THESE INSTRUCTIONS CAREFULLY)

9. YOU ARE IN TECHNICAL CHARGE OF THE PREPARATION, CHARGING AND FIRING OF THE DEMOLITION TARGET DESCRIBED. YOU WILL NOMINATE YOUR DEPUTY FORTHWITH, AND COMPILE A SENIORITY ROSTER OF YOUR PARTY. YOU WILL INSURE THAT EACH MAN KNOWS HIS PLACE IN THE ROSTER, UNDERSTANDS THESE INSTRUCTIONS, AND KNOWS WHERE TO FIND THIS FORM IF YOU ARE HIT OR UNAVOIDABLY ABSENT. YOU WILL CONSULT WITH THE COMMANDER OF THE DEMOLITION GUARD ON THE SITING OF THE FIRING POINT.
10. YOU MUST UNDERSTAND THAT THE COMMANDER OF THE DEMOLITION GUARD (where there is one) IS RESPONSIBLE FOR:
    a. OPERATIONAL COMMAND OF ALL TROOPS AT THE DEMOLITION SITE. (You are therefore under his command.)
    b. PREVENTING THE CAPTURE OF THE DEMOLITION SITE, OR INTERFERENCE BY THE ENEMY WITH DEMOLITION PREPARATIONS.
    c. CONTROLLING ALL TRAFFIC AND REFUGEES.
    d. GIVING YOU THE ORDER TO CHANGE THE STATE OF READINESS FROM "1 (SAFE)" to "2 (ARMED)" OR BACK TO "1 (SAFE)" AGAIN. YOU WILL INFORM HIM OF THE TIME REQUIRED FOR SUCH A CHANGE.
    e. PASSING TO YOU THE ACTUAL ORDER TO FIRE.

11. WHEN THERE IS NO DEMOLITION GUARD AND YOU ARE INSTRUCTED IN PAR. 4 TO ACCEPT THE ORDER TO FIRE FROM SOME PARTICULAR OFFICER, IT IS IMPORTANT THAT YOU ARE ABLE TO IDENTIFY HIM.
12. IF YOU GET ORDERS TO FIRE OTHER THAN THOSE LAID DOWN IN PAR. 4 YOU SHOULD REFER THEM TO THE DEMOLITION GUARD COMMANDER OR IF THERE IS NO DEMOLITION GUARD COMMANDER, TO YOUR IMMEDIATE SUPERVISOR. IF YOU CANNOT DO THIS, YOU WILL ONLY DEPART FROM YOUR WRITTEN INSTRUCTIONS WHEN YOU ARE SATISFIED AS TO THE IDENTITY AND OVER-RIDING AUTHORITY OF WHOEVER GIVES YOU THESE NEW ORDERS, AND YOU WILL GET HIS SIGNATURE IN PAR. 8 WHENEVER POSSIBLE.
13. THE REPORT TO YOUR UNIT COMMANDING OFFICER, AS CALLED FOR IN PAR. 7 SHOULD CONTAIN THE FOLLOWING INFORMATION (where applicable):
    a. IDENTIFICATION REFERENCE OF DEMOLITION.
    b. MAP REFERENCE.
    c. TIME AND DATE WHEN DEMOLITION WAS FIRED.
    d. EXTENT OF DAMAGE ACCOMPLISHED INCLUDING:
       ESTIMATED WIDTH OF GAP
       NUMBERS OF SPANS DOWN } IN THE CASE OF A BRIDGE
       SIZE AND LOCATION OF CRATERS IN A ROAD OR RUNWAY
       MINES LAID
    e. SKETCH SHOWING EFFECT OF DEMOLITION

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BY ORDER OF THE SECRETARY OF THE ARMY:

G. H. DECKER,
General, United States Army,
Chief of Staff.

Official:

J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

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NG: State AG (3); units—same as Active Army except allowance is one copy to each unit.
USAR: Same as Active Army except allowance is one copy to each unit.
For explanation of abbreviations used, see AR 320-50.

U.S. GOVERNMENT PRINTING OFFICE: 1961