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FM 5-5

DEPARTMENT OF THE ARMY FIELD MANUAL

REGIMENTAL  
ENGINEER TROOP  
UNITS  
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DEPARTMENT OF THE ARMY

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## ENGINEER TROOP UNITS

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\*This manual supersedes FM 5-5, 11 October 1943, including C 1, 31 March 1944; C 2, 10 May 1944; C 3, 5 July 1944; C 4, 18 November 1944; C 5, 28 December 1944; and C 6, 21 January 1948; and TC 7, 21 February 1952.

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# **CHAPTER 1**

## **INTRODUCTION**

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### **1. Scope**

This manual contains brief descriptions of all engineer troop units in the United States Army, including SCARWAF (Special Category Army Units with Air Force) units.

### **2. Categories of Engineer Units**

With respect to function, engineer troop units fall into seven categories, as follows:

Divisional units

Combat support units

Construction units

Topographic units

Maintenance and supply units

Units assigned to the United States Air Force

The Engineer Service Organization

The manual includes a preliminary chapter dealing with engineering troops in a theater, followed by chapters for each of the above seven categories.

### **3. Content of Manual**

Each individual unit (or closely associated group of units) is assigned a section in the appropriate chapter, giving the following information—

*Mission.* Briefly stated.

*Assignment.* States to what command the unit is normally assigned.

*Capabilities.* States the different types of work which the unit can perform.

*Organization.* Gives the sub-units into which the unit is divided, and their functions.

*Employment.* States how the unit may be employed.

*Description of Equipment.* Lists, by categories, the major items of equipment, including armament.

*Signal Communications.* States briefly what communications can be established by the organic equipment of the unit, and the assistance given by higher authority.

#### **4. Related Manuals**

FM 5-6, contains the basic doctrine for the conduct and control of the operations of these units in a theater, including command and staff supervision. Other manuals of the "5" series describe in detail the operating techniques of the various units.

## CHAPTER 2

### ENGINEER TROOP UNITS IN A THEATER

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#### Section I. MISSIONS

##### 5. Basic Mission

The primary mission of engineer troop units in a theater of operations is to increase the combat power of our forces by construction or destruction that facilitates our movements and operations, or that impedes the enemy's. Engineers give technical assistance to other arms in construction of protective works, in camouflage, and by supply and maintenance of certain equipment and materials. They are tactically trained and engage in combat as infantry when directed.

##### 6. Specific Missions

In more detail, their missions include—

*a. Obstacles.* The placing of obstacles to enemy movements and the removal or passage of obstacles placed by the enemy.

*b. Routes of Communication.* The construction, rehabilitation and maintenance of roads and bridges, the construction, rehabilitation, and major maintenance of military railroads, and the maintenance of inland waterways.

*c. Terminal Facilities.* The construction, rehabilitation, and major maintenance of ports and airbases.

*d. Demolitions.* The preparation and execution, by explosives and other means, of all types of demolitions, including roads, railroads, bridges, structures, obstacles, fortifications, equipment, etc.

*e. Construction.* All types of general construction, such as cantonments, depots, warehouses, hospitals, etc., with their water, sewage, and power.

*f. Maps.* The preparation, reproduction, storage, and issue of maps and map substitutes.

*g. Defensive Organization.* Technical assistance, and certain specialized construction, in connection with the layout and preparation of defensive positions and the installation of camouflage.

*h. Water Supply.*

*i. Engineer Supply and Maintenance.* The supply and maintenance of certain engineer equipment and materials.

*j. Combat Support.* Specialized activities in various phases of combat (attack, defense, withdrawal, amphibious landings, etc.) ; combat as infantry, when directed.

*k. Unit Activities.* Their own administration, supply, maintenance, security, and training.

## **7. Functional Categories**

Engineer troop units fall into seven *functional* categories, according to the nature of their basic mission—

*a. Divisional units*, which are organic elements of infantry, armored, and airborne divisions, respectively.

- b. Combat support units, which work in direct contact and cooperation with tactical units of other arms engaged in combat.
- c. Construction units.
- d. Topographic units.
- e. Maintenance and supply units.
- f. Engineer units with the Air Force.
- g. The engineer service organization.

## **Section II. ASSIGNMENTS**

### **8. Organization of a Theater of Operations**

- a. The theater of operations is that part of a theater of war necessary for tactical purposes pursuant to an assigned mission, and for the operations of lines of communication. It is normally divided into a combat zone and a communications zone.
- b. The combat zone is that part of the theater of operations required for the conduct of operations by the field armies or equivalent which compose the combat force of the theater commander. It is normally divided into army areas. The rearward part of a typical army area is the army service area; the forward part is further divided into corps areas. Similarly, each corps area normally has a rearward part known as the corps rear area, and a forward part divided into divisional areas.
- c. In a theater having a number of armies, there may be an intermediate echelon of command known as the army group; each such group being composed of two or more armies, and its commander reporting directly to the theater army commander. An army group commander's authority is of course coextensive with the fields of authority of the armies under his

command. Normally, however, he does not assume any territorial responsibility (unless for the immediate area occupied by his headquarters), nor is there an "army group service area."

*d.* The communications zone is subdivided as the situation demands. The fully organized zone of a large theater will probably be divided, from rear to front, into base, intermediate, and advance sections.

*e.* An area command is a type of organization, with specific missions, whose limits of authority and responsibility are defined in terms of the territory assigned to it. Examples of area commands are metropolitan areas and activities in sections of the communications zone not directly concerned with the support of the combat forces, such as rest areas. However, the commander of a combat unit (army, corps, division, etc.) is not, in *this* sense, an "area commander," even though, at any given stage of the operations, there is a specific area within which his command operates.

## **9. Assignments of Engineer Units**

*a.* The command under which a troop unit normally functions is said to be its "assigned" command.

*b.* Engineer troop units in a theater may be assigned to the theater headquarters; to an army, a corps, or a division; to the communications zone, or to any further assignment as required. In addition to such basic assignment, they may be further assigned. Thus, a unit assigned to communications zone may be further assigned to a section thereof; a unit assigned to army may be further assigned or at-

tached to an engineer combat group functioning under army.

c. Frequently an engineer troop unit is not under a higher engineer troop commander. Such a unit reports to the commander of the tactical or area command to which it is assigned. Normally such a unit will function under the supervision of the commanders. In practice, most commanders place such a unit under the operational control of their staff engineer.

## **10. Attachment and Support**

In addition to *assignment*, there are two other somewhat similar relationships which a unit may bear to another command: (1) attachment, (2) support.

a. *Attached Units.* An attached unit or detachment is temporarily under a command other than its assigned command. It may be attached for some specified purpose, such as duty, rations, supply, or administration; but unless limited by one or more of the foregoing or similar qualifications, attachment implies that the command to which it is attached has full responsibility for the unit's supply, administration, training, and operations (see AR 220-5). An engineer unit is not to be attached when its mission can be accomplished in a supporting role.

b. *In Support.* An engineer unit placed in support of another unit renders technical and tactical assistance to that unit, but is not under its command. The supported unit therefore has no responsibilities toward the supporting engineer unit. Requests of the supported unit are given a high priority, but are co-

ordinated by the unit engineer, who is cognizant of the mission of the command as a whole.

## **11. Assignment of Units According to Functional Categories**

As regards the assignment of the categories of units listed in paragraph 7; divisional units are assigned to the divisions of which they are an organic part. Combat support units are either corps or army units, except the shore battalion, which is an element of a larger organization (the amphibious support regiment) that may also operate either under a task force or under direct theater control. Combat support units often work closely with divisions and divisional engineer units. Construction, topographic, maintenance, and supply units may be either corps, army, or communications zone. For the attachment of units of the engineer service organization (Teams) see chapter 9.

## **12. Assignment Under Special Circumstances**

Certain units normally assigned to an army may be assigned to a lesser unit—for example, an independent corps, a task force, or an amphibious force—which, for the time being, is performing functions analogous to those of an army. Similarly, units normally assigned to communications zone may be assigned to an army, or equivalent, at a stage of operations when a communications zone has not been organized.

## **Section III. ORGANIZATION**

### **13. Organization and Equipment Tables**

*a. Definition.* An organization and equipment table (commonly abbreviated to T/O & E) is a Department of the Army publication prescribing the normal mission, organizational structure, and personnel and equipment<sup>1</sup> authorizations for a military unit. This manual lists the T/O & E's for each unit discussed.

*b. Types.*

- (1) A fixed T/O & E prescribes the standard composition of the unit's personnel and equipment.
- (2) A cellular T/O & E prescribes the personnel and personnel and equipment of separate teams, each organized for some specific function, and which can be combined with each other or with some other unit.
- (3) A flexible T/O & E provides alternative columnar organizations. Most commonly it deals with a headquarters element, to which may be assigned or attached a varying number or nature of operating units.

*c. Supplemental Publications.* Supplemental to T/O & E's are tables of distribution (T/D), tables of allowances (T/A), tables of clothing and individual equipment (T/A 21), and, on occasion, equipment modification lists (EML).

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<sup>1</sup> Certain types of equipment are listed in tables of allowances (T/A) rather than T/O & E.

## **14. Augmentation**

In certain cases, the T/O & E of a unit may include an increase in personnel and/or equipment, applicable in case of some increase in the unit's normal mission or workload which is not Army-wide in scope. Augmentation of a unit requires specific authorization.

## **15. Reductions**

a. If a unit is to be utilized at a strength less than that required for the performance of its normal function on a sustained basis in an active theater of operations, the nature and extent of the authorized reductions is set forth in the reduced strength (RS) column of the T/O & E.

b. A reduction may be horizontal, or vertical, or both. A horizontal reduction involves the deletion of selected individual personnel (for example, personnel needing relatively little specialist training) and individual items of equipment (for example, combat replacement equipment, equipment authorized for use by individuals who have been deleted, etc.). A vertical reduction is the deletion of one or more entire components (for example, a complete platoon from a company).

c. Reductions in authorized strength are more common in the zone of the interior than in a theater. They require specific authorization.

## **16. Mobility**

The mobility of a unit is measured by the extent to which it can move its organic personnel and equipment with its organic transportation. A fully mobile unit can complete such a movement in one

trip. A semi-mobile unit can complete it only by a shuttling operation. A fixed unit is one which has only a minimum of administrative vehicles, and can move only by the use of additional transportation from some other source.

## **17. Armament**

*a.* With respect to armament, troop units fall into three categories—

- (1) *Category I.* Those units whose mission includes the seizing and holding of ground, in addition to that of destroying the enemy, and their corresponding headquarters and service companies, together with those units whose mission includes destruction of the enemy in support of, or assistance to, the ground-gaining troops by fire or other tactical support. These units habitually operate in the forward portion of the active combat area. Type units of the category are the Infantry Rifle Company, the Infantry Battalion Headquarters Company, Field Artillery firing batteries, and the Engineer Combat Company.
- (2) *Category II.* Those units whose mission includes support and assistance of a non-tactical nature to category I units in the forward active portion of the combat area. They are habitually found forward of the army rear boundary and are normally assigned to division, corps, or army. Type units in this category include such units as the Division Quartermaster Company, the Corps Signal Battalion, and the Ordnance

Medium Automotive Maintenance Company.

- (3) *Category III.* Those units whose mission includes service and operations in support of a combat area and the operating agencies of a communication zone. These units are normally found in the communication zone or along the lines of communication leading thereto, to include the continental United States. Units in this category include such units as the Ordnance Base Automotive Maintenance Battalion, the Engineer Construction Company, and the Military Police Company, Post, Camp, or Station.

b. The armament authorized a unit by its T/O & E varies, depending on the categories it belongs to.

## 18. Medical Service

a. The three types of divisional engineer battalion (see ch. 3), the engineer combat battalion, army (see ch. 4), and the engineer aviation battalion (see ch. 8), have organic medical detachments as shown by their T/O & E's. These are adequate, under normal theater conditions, to furnish medical service for all personnel of the battalions.

b. However, engineer units which are normally located in the rear of a corps rear boundary (that is, in an army service area or the communications zone of a theater), or which operate near a higher headquarters having medical facilities, are not authorized medical detachments.

c. Engineer units which do not have organic medical service obtain such service—

- (1) From appropriate cells or teams of the medical service organization, T/O & E 8-500. These units are similar, in principle, to those of the engineer service organization discussed in chapter 9.
- (2) Alternatively, from other T/O & E or T/D medical installations or units.
  - d. With respect to the engineer shore battalion (see ch. 4), which may operate in contact with the enemy and has no medical detachment, it should be noted that the amphibious support regiment, of which it is a part, does have such a detachment.

## **19. Types of Organization**

Engineer troop units in a theater fall into the following organizational types—

- a. The separate company.
- b. The battalion.
- c. The group.
- d. The brigade.
- e. The dredge crew.
- f. The team.

## **20. The Separate Company**

a. Units of this type are not organic to a battalion. They may operate independently of any higher engineer troop command. More commonly, however, they are assigned or attached to an engineer group or equivalent organization.

b. The normal organization of a company is into a company headquarters and two or more platoons.

- (1) The platoons are typically the operating elements of the company. They may all be identical (as in the ponton bridge com-

pany), or all different (as in the corps topographic company), or a combination (as in the light equipment company). A platoon may be divided into two or more sections or squads, or may not be divided at all.

- (2) Company headquarters contains the supervisory and housekeeping overhead. It may also contain one or more sections, or equivalent, which support the operating elements by specialized services; for example, by maintaining equipment, furnishing special equipment to supplement that assigned to operating platoons, or other means.

c. The following engineer companies are of the separate company category—

- Panel bridge company.
- Float bridge company.
- Ponton bridge company.
- Light equipment company.
- Camouflage company.
- Heavy equipment company.
- Dump truck company.
- Port construction company.
- Pipeline company.
- Topographic company, corps.
- Aerial photo reproduction company.
- Base Survey company.<sup>2</sup>
- Base photomapping company.<sup>2</sup>
- Base reproduction company.<sup>2</sup>
- Base map depot company.<sup>2</sup>
- Field maintenance company.

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<sup>2</sup> It is, however, unusual for this unit to operate independently, its normal assignment being to a base topographic battalion.

Depot maintenance company.  
Supply point company.  
Depot company.  
Parts depot company.  
Forestry company.  
Water supply company.

## **21. The Battalion**

- a. A fully organized battalion consists of a headquarters, a headquarters and service company, two or more operating companies, and sometimes a medical detachment (see par. 18).
- b. Battalion headquarters includes the battalion commander, executive officer, and staff sections which perform the usual S1, S2, S3, and S4 functions. It may also contain additional sections handling reconnaissance, communications, etc.
- c. The headquarters and service company has its own headquarters, and also has administrative and housekeeping responsibility for the enlisted personnel of battalion headquarters. In addition, it may contain one or more platoons which support or supplement the operating companies by specialized services.
- d. The operating companies are organized along the same general lines as described in paragraph 20. They may all be identical (as in the divisional and army combat battalions), or all different (as in the army topographic battalion), or a combination (as in the armored engineer battalion).
- e. The following are the fully organized engineer battalions—
  - Combat battalion, divisional.
  - Armored battalion.

Airborne battalion.  
Combat battalion, army.  
Construction battalion.  
Topographic battalion, army.  
Aviation battalion.

f. In addition, there are "flexible" battalions, whose tables of organization provide only for headquarters and the headquarters company or detachment. Two or more companies, of the separate type, are temporarily assigned or attached to this headquarters to form a functioning battalion, their number and type depending on the situation. The following battalions are of this type<sup>3</sup>—

Camouflage battalion.  
Base topographic battalion.  
Depot battalion.

g. Even when an engineer battalion's normal organization is fully specified in its T/O & E, it may be augmented by the temporary assignment or attachment of other engineer units. Thus, for the erection of panel bridging, an engineer panel bridge company may be attached to a divisional combat battalion; the company transporting the bridge and supervising its erection, the battalion erecting it.

## 22. The Group

a. Units of this type have an organized headquarters and headquarters company, and function by the assignment or attachment thereto of other units to form an operating team. They thus resemble the "flexible" battalions described above. They are, how-

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<sup>3</sup> Battalion headquarters team AD of the engineer service organization (see ch. 9) can be considered as being of this type.

ever, at regimental level as regards size and scope of operations, and may contain several battalions, several separate companies, and other elements.

*b.* The headquarters and headquarters company of a group are organized on the same principles as in the case of a battalion, but in general with fewer "service" components. They all contain communications sections.

*c.* The following are the engineer groups—

Combat group.

Construction group.

Maintenance and supply group.

Aviation group.

### **23. Higher Engineer Commands**

In addition to engineer units organic to divisions and corps, there are many units assigned to field armies and to the communication zone of an active theater, the bulk of which will normally be organized into groups, as explained above. A single area command may have several engineer groups. These may all be placed under the direct control of the area commander, their work being supervised by his staff engineer; such is the normal situation in an army service area. An alternative is a larger command grouping of engineer troops known as the brigade.

*a. The Engineer Brigade.* This is a large flexible engineer construction command, operating in the communications zone of a theater. It has a regularly organized headquarters and headquarters company, to which other units are assigned or attached. The principal components are construction groups, most

commonly three in number. Other categories of engineer units may be added, including maintenance and supply, topographic, and camouflage.

*b. The Engineer Aviation Brigade.* See paragraph 325.

*c. Higher Headquarters.* There is no engineer headquarters, having troop command functions, which is at a higher level than the brigade.<sup>4</sup> If several brigades are present in a communications zone or section thereof, they must be coordinated by the appropriate staff engineer of the area commander.

## **24. Dredge Crews**

The improvement and maintenance of ports and waterways in a theater may call for floating dredges of either the cutterhead or the seagoing hopper type. While these may be available fully manned, from civilian sources, it has been found desirable to organize dredge crews as engineer troop units. There are five types of crews, organized to handle two different sizes of cutterhead dredge and three different sizes of hopper dredge. A crew is somewhat smaller than the ordinary engineer company, and its internal organization does not strictly follow the conventional army pattern. A dredge crew would normally be assigned or attached to an engineer group or to some other construction command.

## **25. The Team**

*a. Engineer teams* are units belonging to a category entitled "the engineer service organization."

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<sup>4</sup> An engineer troop command agency, to be known as a "force" at the next level above the brigade, has been considered and may come into existence.

This organization does not exist in the usual sense of the word as an actual operating or administrative entity. "Engineer service organization" is merely a collective term used to identify a number of specialized cellular units that differ widely in makeup but have certain characteristics in common. Their chief distinguishing characteristic is the fact that each team consists primarily of specialists in some particular line and has little or no "housekeeping" overhead. Housekeeping services must be provided by the command to which the team is attached.

*b.* Certain teams of the "composite service organization," which resembles the "engineer service organization," may also be attached to engineer troop units.

## **CHAPTER 3**

### **DIVISIONAL ENGINEER UNITS**

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#### **Section I. GENERAL**

##### **26. Types of Divisional Engineer Units**

The striking force of our Army is built around three types of division, each having an organic engineer battalion—

Infantry division—Engineer combat battalion, divisional.

Armored division—Armored engineer battalion.

Airborne division—Airborne engineer battalion.

##### **27. Common Features**

These three types of engineer battalion have many common features.

a. Each has the basic mission of increasing the combat effectiveness of its division by engineering work that will permit the division to live, move, and fight more effectively, and will impede the enemy's activities.

b. In discharging this basic mission, the battalion may be called on to do almost any category of engineer work, with special emphasis on providing and maintaining routes of communication and advance, placing and removing obstacles, executing demolitions, supplying water, and undertaking miscellaneous construction.

*c.* Being trained and equipped for a wide variety of work, it is correspondingly limited in the volume and complexity of work which it can do, and needs assistance from corps or army sources to handle unusual loads.

*d.* Its operations are characterized by speed, simplicity of design, ingenuity, and improvisation. Roads and structures which it builds are in general temporary.

*e.* The organization of the three types of battalion is generally similar: battalion headquarters, a headquarters and service company, operating companies (four, five, and three respectively) and a medical detachment; the operating companies being organized into platoons and squads or sections.

*f.* *The value of a divisional engineer battalion and its components turns largely on team-work.* The battalion's effectiveness, operating as a unit, exceeds the combined effectiveness of its companies when they are operating independently. The same is true with respect to the company, the platoon, and the squad. This statement must be qualified in certain cases; for example, as regards the companies of an armored battalion. It is none the less a sound basic principle for any officer to bear in mind, when deciding or recommending how to use engineer troops.

*g.* Divisional engineer battalions are combat troops in the full sense of the word, often working under heavy fire, and are armed and trained correspondingly. Because of their lack of organic and supporting weapons, such as mortars, heavy machine guns, and recoilless rifles, as well as supporting regimental tanks and heavy mortars, these engineer bat-

talions when reorganized to fight as infantry do not have the combat effectiveness of a similar infantry force.

## **28. Unlike Features**

However, the three types of divisional battalion have certain differences, determined by the nature of their respective divisions. They can best be compared by considering the combat battalion, divisional, as the norm.

## **29. Armored Engineer Battalion**

*a.* The armored division is a fast-moving offensive unit with heavy equipment. It does not normally occupy a territorial sector of the front. It operates normally by more or less independent combat commands. It is vulnerable to air attack, and in especial danger if immobilized by an impassable obstacle.

*b.* The organization, training, and equipment of its engineer battalion, as compared with those of the combat battalion, divisional, reflect these peculiarities. The armored engineer battalion's training emphasizes decentralization of operations, and the vital importance of keeping the armor moving. It has more bridging equipment than the infantry divisional battalion, slightly more heavy construction equipment, more radio facilities, and less heavy transportation. It has a bridge company in addition to the four armored companies. In active operations its armored companies, reconnaissance teams, and detachments of the bridge company are normally attached to combat commands. The platoons, with a bridge section attached, may support reinforced battalions or combat teams.

### **30. Airborne Engineer Battalion**

*a.* The airborne division is organized and trained for the specialized task of capturing and occupying an area deep in enemy territory. The initial movement to this area is by air, which restricts the weight of equipment and supplies carried. Having occupied its objective, the division may expect to be out of ground contact with supporting troops for a considerable period, during which it is liable to enemy attack from any direction.

*b.* The organization, training, and equipment of the airborne engineer battalion reflect these peculiarities. It has one less lettered company than the engineer combat battalion, divisional. Its engineer equipment is lighter, and on the first air-lift of an offensive operation only so much is taken as is needed for the assault phase. On the other hand, its lettered companies have somewhat more armament. The battalion's training emphasizes swift reorganization after the initial landing, and an immediate concentration on the establishment of perimeter defense, the clearing of enemy obstacles, and the maintenance and improvement of the airstrip. As organization of the position proceeds, and especially after ground contact with friendly troops is established, the battalion's functions approximate more closely those of its infantry divisional prototype.

## **Section II. THE UNIT ENGINEER**

### **31. Definition**

The term "unit engineer" designates the engineer officer acting as the engineer special staff officer of a command.

## **32. Command**

- a.* The unit engineer at army, corps, and division level has a dual function as a staff officer and a troop commander. He commands all organic engineer troops and other troops attached to his command.
- b.* Nondivisional engineer units may be attached to a division. Regardless of the grade or seniority of the commander of such attached troops, the organic engineer battalion commander remains the division engineer. Nondivisional troops of battalion size or less may be further attached to the organic battalion, in which case they function as similar units of the organic battalion.

## **33. Association of Units**

- a.* In divisions, team spirit is best developed by the habitual association of a specific engineer unit with the same combat unit. Normally, a specific company of the engineer unit should work with a specific infantry regiment of an infantry or airborne division. In the armored division each combat command is tailored to meet the needs of a particular situation, with different numbers of different types of subordinate units. Hence, any one of the four armored engineer companies can be attached to any of the combat commands. Habitual association is therefore often impracticable, but limited application is made of the principle. The company commander of the engineer company is the unit engineer of the task force, combat team, or combat command.

- b.* Similarly, a specific platoon of the engineer company may work with a specific battalion of the infantry or airborne regiment, and the platoon leader

will be the unit engineer. In these cases the duties of the unit engineer are highly informal, and may consist of offering technical advice to the infantry commander. The informality of these duties does not lessen their importance.

c. In important operations, or when more than one engineer company is attached to a task force, the division engineer should have a senior officer of his staff designated as the unit engineer of the task force. This permits the engineer company commanders to concentrate on their engineer tasks.

### **34. Engineer Staffs**

In divisional or lower units, the division engineer is the only unit engineer having a staff. Other unit engineers rarely meet problems requiring staff assistance, and in such cases the divisional engineer staff can usually furnish the required assistance by liaison. Engineer supply and maintenance support is usually from the parent engineer battalion. Other operating requirements are coordinated with the staff of the command to which the engineer unit is attached.

### **35. Methods of Operation**

a. Maximum efficiency on engineer work is obtained when the engineer battalion functions as a unit under the control of the division engineer. An engineer company is usually placed in direct support of each infantry regiment in the line, and the remainder of the battalion is used in general support. In extended armored operations, an engineer company is normally attached to each committed combat command.

*b.* Engineer units attached to combat arms units should revert to their parent unit as soon as practicable. Engineers are not attached to a combat arm unit in reserve. These policies not only permit maximum utilization of engineer effort, but are essential if engineer supplies and equipment maintenance are to be effectively furnished engineer units over extended periods of operation.

### **36. Duties of a Unit Engineer**

*a.* The unit engineer is responsible for the execution of the duties prescribed for engineers appropriate to the level of his command.

*b.* He has the following specific duties—

- (1) Advising the force commander and his staff on engineer matters.
- (2) Preparing plans for the employment of engineer troops under his command, including recommendations for their support of other units.
- (3) Determining requirements for engineer equipment and supplies, and taking proper steps to insure procurement. Supply responsibilities of an engineer combat commander are normally limited to his own unit.
- (4) Directing the required engineer tasks to facilitate the accomplishment of the mission of the force.
- (5) Conducting engineer reconnaissance.
- (6) Providing local security for his own unit if this is not provided by supported troops, and being prepared in an emergency to fight as infantry.

### **Section III. ENGINEER COMBAT BATTALION, DIVISIONAL**

#### **37. Mission**

The mission of the engineer combat battalion, divisional, is to increase the combat effectiveness of the infantry division by means of general engineer work.

#### **38. Assignment**

The battalion is organic to the infantry division, T/O & E 7.

#### **39. Capabilities**

a. The battalion is trained and equipped to provide engineer support for the infantry division as follows:

- (1) Engineer staff planning and supervision, including attached engineer troops.
- (2) Engineer reconnaissance.
- (3) Construction, repair, and maintenance of roads, fords, culverts, fixed or floating bridges, ferries, obstacles (including mine fields), landing strips, command posts, shelters, and defensive installations.
- (4) Demolition and removal of obstacles, including mine fields.
- (5) Providing engineer personnel and equipment for assault stream crossings.
- (6) Providing engineer supply service, including water points.
- (7) Fighting as infantry in emergency.
- (8) Providing medical service to battalion to include emergency medical treatment, operation of a battalion aid station, evacuation of casualties if practicable, and supervision of sanitation.

b. The battalion is entirely mobile, using organic transportation. If it is necessary to air transport the battalion, substantial substitutions must be made for heavy equipment which cannot be loaded in aircraft.

#### **40. Organization**

a. The battalion is organized under T/O & E 5-15. It consists of a headquarters, headquarters and service company (T/O & E 5-16), four identical engineer combat companies, divisional (T/O & E 5-17), and a medical detachment (T/O & E 5-15) (see fig. 1).

b. Battalion headquarters includes—

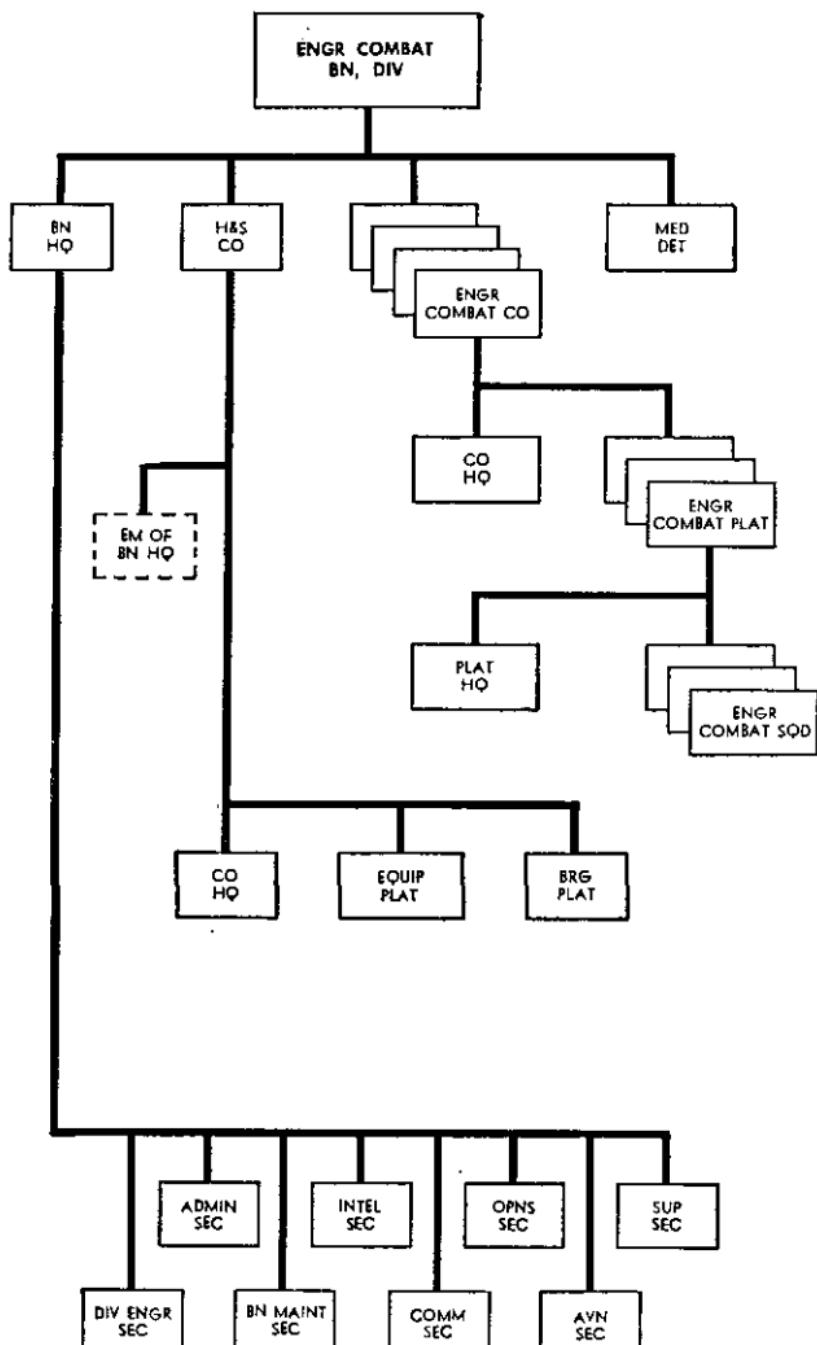
- (1) Administrative, intelligence, operations, and supply sections, performing the normal S1, S2, S3, and S4 duties. The supply section contains elements dealing with division engineer supply, battalion supply, and water supply (to the division).
- (2) A division engineer section, pertaining to the battalion commander in his alternate capacity of divisional staff officer.
- (3) A communications section, a battalion maintenance section, and an aviation section.

c. Headquarters and service company includes—

- (1) Company headquarters.
- (2) A bridge platoon and an equipment platoon.
- (3) The enlisted personnel of battalion headquarters.

d. Each engineer combat company, divisional, includes—

- (1) A company headquarters.
- (2) Three identical combat platoons, each of which consists of a platoon headquarters and three identical combat squads.



*Figure 1. Organization of engineer combat battalion, divisional.*

## **41. Employment**

- a.* Normally all elements of the battalion operate under the direct supervision of the battalion commander. Elements may be placed in support of other units in the division.
- b.* When adequate engineer assistance cannot be rendered by direct support under the supervision of the engineer battalion commander, elements from the battalion may be attached to other units in the division. This condition usually exists only when physical separation and inadequate communications prevent efficient centralized control. For example, in the formation of a regimental combat team, the necessary engineer elements (usually an engineer combat company, reinforced) should be attached to the infantry regiment. For any operation where attachment of an engineer element is considered essential, the size of the engineer element must be determined by full consideration of all available information on engineer work to be done. Attachment of small elements of the battalion to nonengineer units should be avoided, as it is not an economical employment of the battalion.
- c.* The engineer combat battalion, divisional, may be given an infantry mission in an emergency. In such a case, the division engineer must advise the division commander as to the effect which the stoppage of engineer work will have on the overall mission of the division.
- d.* When the requirement for engineer work within the division exceeds the capability of the divisional battalion, additional engineer support is provided from corps engineer units.

## **42. Description of Equipment**

*a. Tool and Equipment Sets.* Operating squads and platoons have sets of pioneer and carpenter tools and demolition equipment for use of individual combat engineers. A supplementary equipment set, including special purpose tools, construction supplies, and explosives, is carried by headquarters and service company.

*b. Minefield Equipment.* Mine detectors and minefield marking equipment, together with a basic load of antitank and antipersonnel mines, are carried by the battalion.

*c. Construction Equipment.*

(1) The battalion heavy construction equipment includes truck-mounted air compressors, truck-mounted crane-shovels, crawler tractors with dozer, road graders, and trailer-mounted electric welding equipment.

(2) Each company has truck-mounted air compressor equipment and crawler-type tractors. Its equipment is augmented from headquarters and service company as required by tasks assigned.

*d. Stream-Crossing Equipment.* The bridge platoon is equipped with and transports 216 feet of treadway bridging capable of supporting divisional loads. This is a fixed set of widened steel treadway bridge to cross short gaps. The bridging is transported primarily on heavy military bridging trucks. The platoon is also equipped with assault boats, outboard motors, and infantry support raft sets No. 1.

*e. Material Hauling Equipment.* The battalion has dump trucks for movement of road building and

repair materials and other class IV engineer supplies. One is assigned to each operating squad of a platoon for the transport of the men and squad tool sets. Utility pole-type (inf. raft) trailers and pole-type (bolster) trailers are provided for hauling lumber and heavy timbers. The semitrailers used for transporting crawler type tractors may also be used for hauling class IV engineer supplies.

*f. Water Purification Equipment.* The battalion supply section has sufficient water purification equipment sets to furnish water for an infantry division.

*g. Armament.* The armament of the battalion consists of caliber .50 and caliber .30 machineguns, caliber .45 submachineguns, 3.5-inch rocket launchers, rifles, carbines, and pistols.

*h. Detailed Lists of Equipment.* See T/O & E 5-15.

### **43. Communications**

Radio facilities are provided for operation of internal platoon, company, and battalion command nets and for communication with division headquarters. Sound-powered telephones are provided combat companies for work project control. Standard field telephones and switchboards furnish wire communications between battalion headquarters sections, and with the companies when centralized. Higher headquarters installs wire to the battalion switchboard.

## **Section IV. ARMORED ENGINEER BATTALION**

### **44. Mission**

The mission of the armored engineer battalion is to facilitate movement of the armored division, and to increase its combat effectiveness by means of general engineer work. It may fight as infantry when required.

### **45. Assignment**

The battalion is organic to the armored division, T/O & E 17.

### **46. Capabilities**

*a.* The battalion furnishes engineer support for the armored division in normal operations. It is trained and equipped to—

- (1) Coordinate engineer staff planning and supervise the work of all divisional and attached engineer units.
- (2) Perform engineer and tactical reconnaissance.
- (3) Construct, repair, and maintain roads, fords, ferries, fixed or floating bridges, obstacles, landing strips, command posts, shelters, and defensive installations.
- (4) Assist the movement of armor over limited stretches of difficult terrain, and provide passage through artificial and natural obstacles.
- (5) Execute demolition; place and remove obstacles, including minefields.
- (6) Furnish engineer personnel and equipment for assault stream crossings and assault of fortifications.

(7) Provide engineer supply service for the division, and establish and operate water supply points.

b. The battalion is completely mobile using organic transportation. In order to air transport the battalion, substantial equipment substitutions must be made for heavy equipment.

#### **47. Organization**

a. The battalion is organized under T/O & E 5-215. It consists of a headquarters, headquarters and service company (T/O & E 5-216), four identical armored engineer companies (T/O & E 5-217), a bridge company (T/O & E 5-218), and a medical detachment (T/O & E 5-215) (see fig. 2).

b. Battalion headquarters include—

(1) Administrative, intelligence, operations, and supply sections, performing the normal S1, S2, S3, and S4 duties. The supply section contains elements dealing with divisional engineer supply, battalion supply, and divisional water supply.

(2) A division engineer section, pertaining to the battalion commander in his alternate capacity of divisional staff officer.

(3) A communications section, a battalion maintenance section, and an aviation section.

c. Headquarters and service company includes—

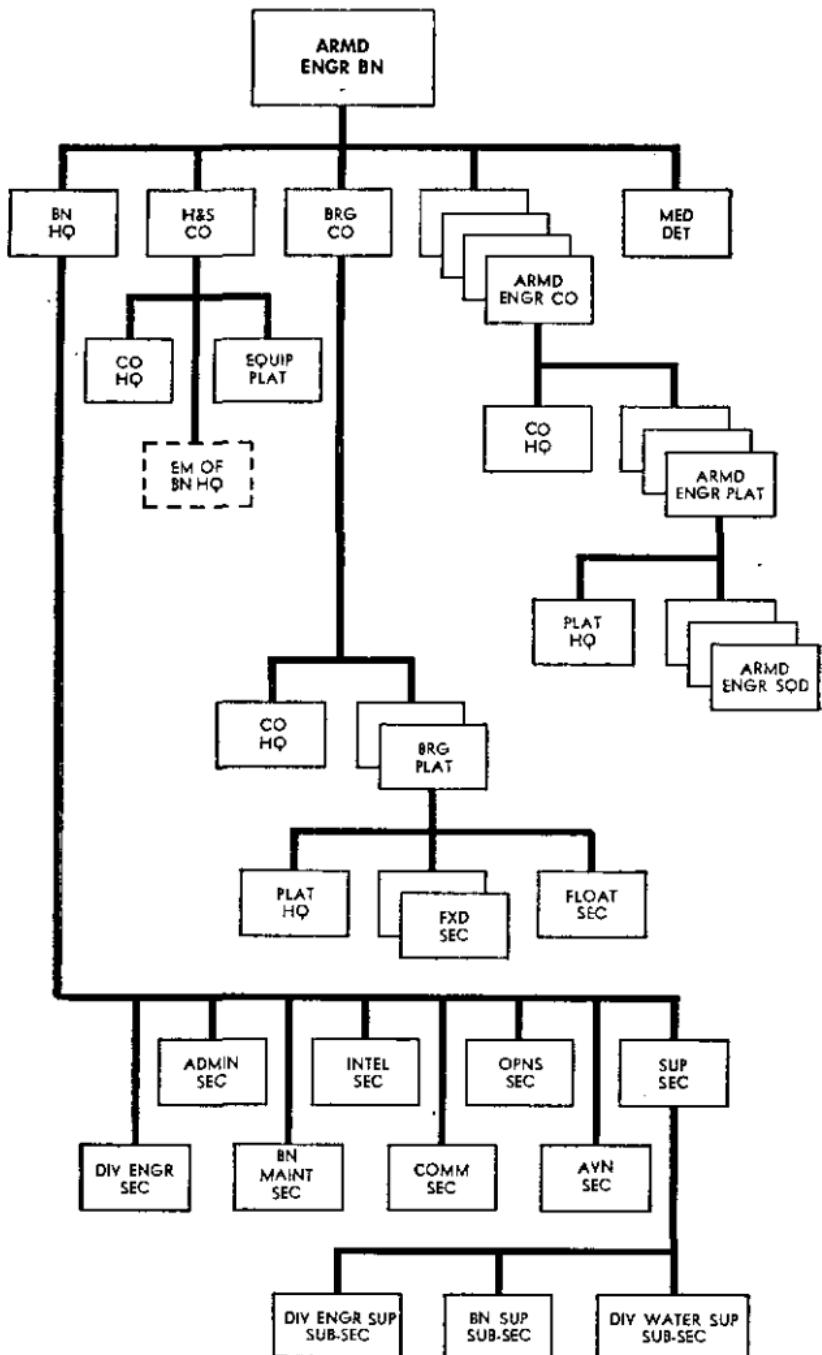
(1) Company headquarters.

(2) An equipment platoon.

(3) The enlisted personnel of battalion headquarters.

d. Each armored engineer company includes—

(1) Company headquarters.



*Figure 2. Organization of armored engineer battalion.*

- (2) Three identical armored engineer platoons, each containing platoon headquarters and three identical armored engineer squads.
- 3. The bridge company includes—
  - (1) Company headquarters.
  - (2) Two identical bridge platoons, each containing platoon headquarters, a float section, and two identical fixed sections.

## **48. Employment**

*a.* The armored division is organized to provide maximum flexibility in the formation of combined arms teams. Engineer units will normally be attached to the combat commands in offensive situations, and may be further placed in direct support of reinforced battalions.

*b.* The division engineer employs the battalion, less detached units, in general support of the combat operations. When two or more companies are attached to a combat command, the division engineer may assign his executive or S3 as the staff engineer for that command.

*c.* Armored engineers are normally required to complete only such road and bridge work as is essential to the initial passage of the elements of their division. Nondivisional engineer units from corps assume responsibility for further construction and maintenance.

*d.* Armored engineers may be relieved of engineer tasks and given an infantry mission in an emergency. In such a case, the staff unit engineer must advise his commander as to the effect which the stoppage of engineer work will have on the mission of the higher unit.

## **49. Description of Equipment**

*a. Tool and Equipment Sets.* Operating squads and platoons have sets of pioneer and carpenter tools, and demolition equipment, for use of individual armored engineers. A supplementary equipment set, armored engineer battalion, including special purpose tools, supplies, and explosives, is carried by headquarters and service company.

*b. Minefield Equipment.* Mine detectors and minefield marking equipment, together with a basic load of antitank and antipersonnel mines, are carried by the battalion.

*c. Construction Equipment.*

- (1) The battalion heavy construction equipment includes truck-mounted air compressors, truck-mounted crane-shovels, motorized road graders, crawler tractors, and trailer-mounted electric welding equipment.
- (2) Each armored engineer company contains truck-mounted air compressor equipment, crawler-type tractors, and dump trucks, and is augmented by equipment from headquarters and service company as required by tasks assigned.

*d. Stream-Crossing Equipment.* The bridge company is equipped with, and transports, 576 feet of bridging capable of supporting divisional loads. This is two sets (each of 288 feet) of the widened steel treadway bridge, which is used to construct fixed and floating bridges, rafts, or combinations thereof. The bridging is transported on heavy military bridging trucks and bolster-body trucks and trailers. Each bridge platoon carries a bridge erec-

tion boat to assist in erection of the bridge, and assault boats with outboard motors.

*e. Armored Vehicles.* Each armored engineer company has armored personnel carriers.

*f. Material Hauling Equipment.* Dump trucks are provided for movement of road building and repair materials and other Class IV engineer supplies. Pole-type trailers are available for hauling lumber and heavy timber, although six normally carry assault boats. Semitrailers, used for transporting crawler-type tractors, may when necessary be used for hauling class IV engineer supplies.

*g. Water Purification Equipment.* The battalion supply section is provided with sufficient water purification sets to furnish water for an armored division.

*h. Armament.* The armament of the battalion consists of caliber .50 and caliber .30 machineguns, caliber .45 submachineguns, 3.5-inch rocket launchers, rifles, carbines, and pistols. Each armored company has six personnel carriers.

*i. Detailed Lists of Equipment.* See T/O & E 5-215.

## **50. Communications**

Radio and limited wire facilities are provided for the operation of internal platoon, company, and battalion command nets, and for communication with combat command and division headquarters. Radio is the principal means of communication, and vehicles are radio equipped except those provided for material hauling. Use of telephones will be largely limited to short periods of nontactical activity.

## **Section V. AIRBORNE ENGINEER BATTALION**

### **51. Mission**

The mission of the airborne engineer battalion is to increase the combat effectiveness of the airborne division by means of general engineer work. It may fight as infantry when required.

### **52. Assignment**

The battalion is organic to the airborne division, T/O & E 57A.

### **53. Capabilities**

- a. The battalion is trained and equipped to—
  - (1) Perform staff planning of engineer operations within the division, including that required for the operations of attached engineer troops.
  - (2) Conduct engineer reconnaissance.
  - (3) Construct, repair, and maintain roads, fords, culverts, bridges, obstacles (including mine fields), landing strips, command posts, shelters, and defensive installations.
  - (4) Execute demolitions; place and remove obstacles, including minefields.
  - (5) Provide engineer supply service for the division, including the establishment and operation of water points.
  - (6) Land by parachute and aircraft, less certain mission items of heavy equipment.
- b. The battalion is entirely mobile.

### **54. Organization**

- a. The battalion is organized under T/O & E 5-225A. It consists of headquarters, headquarters

and service company (T/O & E 5-226A), three identical airborne engineer companies (T/O & E 5-227A) and a medical detachment (T/O & E 5-225A) (see fig. 3).

*b.* Battalion headquarters includes—

- (1) A personnel and administrative section, an operations and intelligence section, and a supply section, performing among them the normal S1, S2, S3, and S4 duties.
- (2) A communications section, a maintenance section, and an aviation section.

*c.* Headquarters and service company includes—

- (1) Company headquarters.
- (2) A bridge platoon.
- (3) An equipment platoon.
- (4) Enlisted personnel of battalion headquarters.

*d.* Each airborne engineer company includes—

- (1) Company headquarters.
- (2) Three identical engineer platoons, each composed of platoon headquarters and three identical engineer squads.

## **55. Employment**

*a.* During the initial assault phase of an airborne operation, an airborne engineer company is habitually attached to a regimental combat team, and may be further attached so that a platoon is with each battalion combat team. Dispositions depend upon the drop and landing zones available, and the divisional mission. About three-fourths of the engineer troops are qualified parachutists; the remainder may be transported by assault aircraft carrying engineer equipment and supplies.

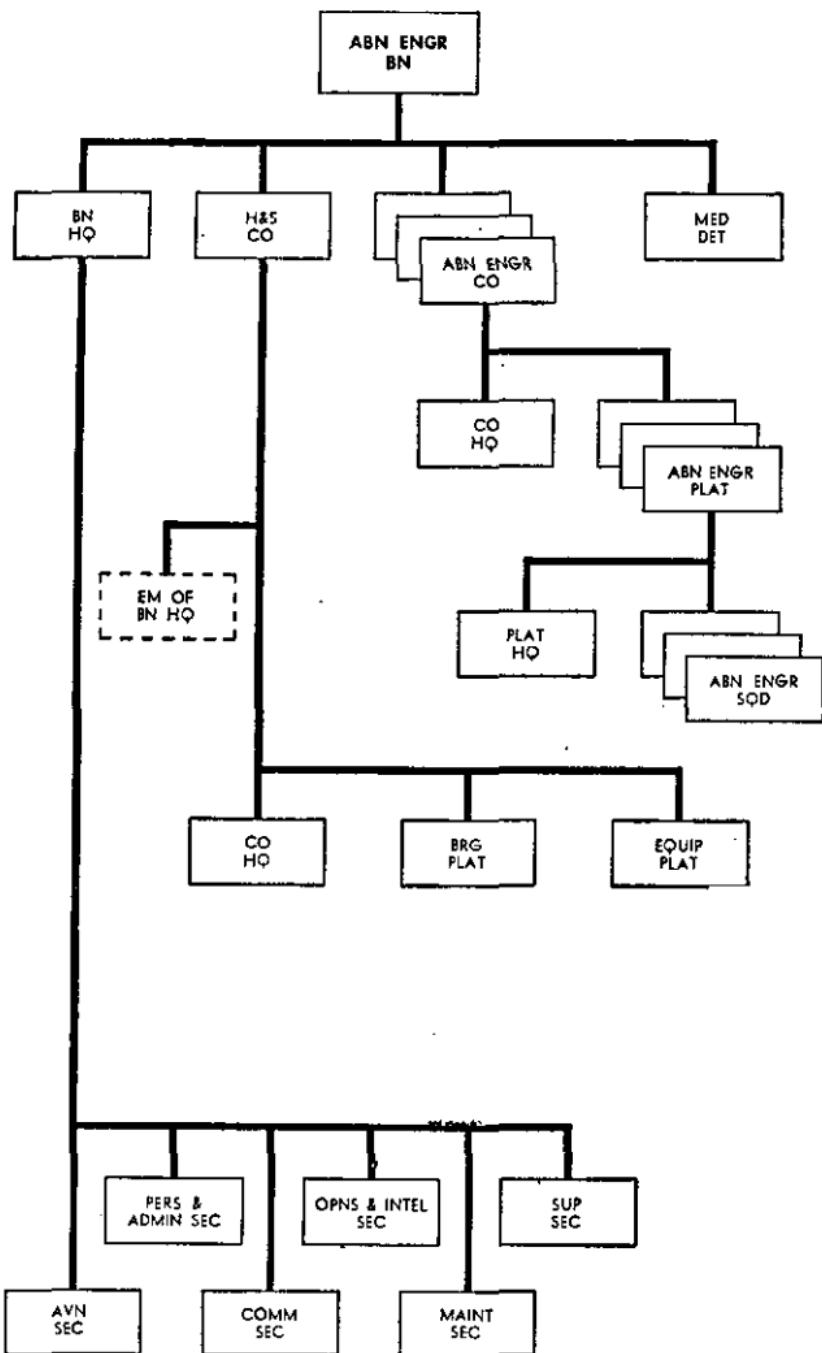


Figure 3. Organization of airborne engineer battalion.

*b.* At the time that the division resumes command of the combat teams, the attached engineers revert to the control of the engineer battalion, unless unusual terrain or other abnormal circumstances require continuing the attachment of some of them.

*c.* Ground operations of the battalion are similar to those of the infantry divisional battalion, with the following exceptions—

- (1) Supporting corps engineer troops may not be available in the airhead.
- (2) Some of the engineer heavy equipment may not be transportable to the airhead.
- (3) Engineer supplies must either be carried to the airhead or be locally available. No engineer supply troops are normally available initially.
- (4) A high priority must be given to the erection of obstacles on the airhead perimeter.
- (5) Landing zones may require rapid improvement to permit adequate buildup of forces and logistical support for the operation.
- (6) The bridge platoon and some administrative personnel may not be brought into the airhead, remaining instead with the division followup or rear echelon.
- (7) Since there are only three airborne companies, the reserve available to the division engineer is limited.

## **56. Description of Equipment**

*a. Tool and Equipment Sets.* Operating squads and platoons have sets of pioneer and carpenter tools and demolition equipment for use of individual airborne engineers. A supplementary equipment set,

including special purpose tools, construction supplies, and explosives, is carried by headquarters and service company.

*b. Minefield Equipment.* Mine detectors and minefield marking equipment, together with a basic load of antitank and antipersonnel mines, are carried by the battalion.

*c. Construction Equipment.*

- (1) The battalion heavy construction equipment includes truck-mounted air compressors, truck-mounted crane-shovels, motorized road graders, crawler-type tractors, and trailer-mounted air compressor equipment.
- (2) Each airborne engineer company contains track-mounted air compressor and light crawler-type tractor equipment, and is augmented by equipment from headquarters and service company as required by tasks assigned.

*d. Stream-Crossing Equipment.* The bridge platoon is equipped with and transports 230 feet of fixed bridging capable of supporting division loads. This is one set of aluminum deck balk bridge which is used to erect fixed bridges on the steel trestles provided with the set or some other intermediate support, or on abutments only. Bridges up to a total cumulative length of 230 feet may be erected with the span length between individual supports varying from 23 feet to 45 feet depending on the load class. The bridge is transported primarily on heavy military bridging trucks, is air transportable, and requires no power equipment for assembly other than compressors for the inflation of the pneumatic floats.

The platoon is also equipped with assault boats, outboard motors, and infantry support raft sets.

*e. Materials Hauling Equipment.* The battalion has dump trucks for movement of road building and repair materials, and other Class IV engineer supplies. Utility pole-type (inf. raft) trailers and pole-type (bolster) trailers are provided for hauling lumber and heavy timbers. The trailers and semitrailers, used for transporting heavy equipment, may be used for moving Class IV engineer supplies when necessary.

*f. Water Purification Equipment.* The battalion supply section has sufficient water purification equipment to furnish water for an airborne division.

*g. Armament.* The armament of the battalion consists of caliber .50 and caliber .30 machineguns, caliber .45 submachineguns, 3.5-inch rocket launchers, rifles, carbines, and pistols.

*h. Detailed Lists of Equipment.* See T/O & E 5-225A.

## **57. Communications**

Radio facilities are provided for operation of internal platoon, company, and battalion command nets and for communication with division headquarters. Sound powered telephones are provided combat companies for work project control. Standard field telephones and switchboards furnish wire communications between battalion headquarters sections, with the companies, and to higher headquarters.

## **CHAPTER 4**

### **ENGINEER COMBAT SUPPORT UNITS**

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#### **Section I. GENERAL**

##### **58. Combat Support Units**

*a.* The term "combat support unit" is applied to engineer units which are not organic to combat divisions, but work closely with them in direct support of combat operations. They are—

- Engineer combat battalion, army
- Engineer light equipment company
- Engineer panel bridge company
- Engineer float bridge company
- Engineer ponton bridge company
- Engineer combat group
- Engineer camouflage company
- Engineer shore battalion

*b.* The engineer dump truck company (see ch. 5), although classified as a "construction unit," may also be used in direct combat support, as a component of an engineer combat group.

##### **59. Engineer Combat Battalion, Army**

The engineer combat battalion, army, is an army unit rather similar to the engineer combat battalion, divisional. It performs general engineering work, either in corps or army service areas, or in divisional areas to supplement the activities of divisional units.

As compared with the divisional battalion, it has one less combat company, somewhat less construction and material hauling equipment, a smaller complement of supporting weapons in headquarters and service company, and no organic bridging equipment.

## **60. Engineer Light Equipment Company**

The engineer light equipment company is an army unit which stores, maintains, transports, and operates a pool of road-building, earthmoving, quarrying, and other types of construction equipment. Its mission is to assist in construction work directly connected with tactical operations, supplementing the equipment of divisional and other engineer units.

## **61. Bridge Companies**

There are three types of bridge companies: Panel, float, and ponton. These normally operate under the direct control of the corps or army engineer combat group and maintain, store, load, transport, and supervise the erection of their respective types of bridging. They are commonly used to augment divisional units in combat operations.

## **62. Engineer Combat Group**

Each of the foregoing units is administratively self-contained, mobile, and capable of operating individually (with the qualification that the unassisted bridge companies have not enough personnel for the rapid erection of their bridging, and normally confine themselves to supervising its erection). However, in a major tactical operation, a number of combat support units may need to work together on a joint task in support of combat forces. They can best be coordinated by placing them under a single engi-

neer commander and headquarters. The agency created for this purpose is the engineer combat group. Its headquarters and headquarters and service company are a regularly organized unit. The group is built up by the assignment or attachment thereto of a number of other engineer units of the "combat support" category, the backbone of the group being army combat battalions. The number and nature of these units depends on the situation; it may be varied for different operations or in the course of the same operations.

### **63. Engineer Camouflage Company**

The engineer camouflage company is trained and equipped to plan, supervise, and inspect camouflage activities. It normally operates directly under the command of the army engineer.

### **64. Engineer Shore Battalion**

The engineer shore battalion is one of the components of the amphibious support regiment, which in turn is a component of the amphibious support brigade. The brigade is a branch immaterial unit, and includes signal, medical, quartermaster, and ordnance units, and an engineer field maintenance company in addition to three amphibious support regiments. The shore battalion performs certain duties in connection with an amphibious landing on hostile shores and the occupation and development of the beach-head. The brigade of which it forms a part is normally assigned, during active operations, to the task force or other organization making the landing.

## **Section II. ENGINEER COMBAT BATTALION, ARMY**

### **65. Mission**

The mission of the engineer combat battalion, army, is to increase the combat effectiveness of corps and army by means of general engineer work, and to reinforce divisional engineers when required.

### **66. Assignment**

The battalion is normally assigned to army, with reassignment or attachment to an engineer combat group.

### **67. Capabilities**

- a.** The battalion is trained and equipped to—
  - (1) Provide engineer staff planning and supervise battalion operations.
  - (2) Perform engineer reconnaissance.
  - (3) Construct, maintain, and repair roads, fords, culverts, fixed or floating bridges, obstacles (including minefields), landing strips, command posts, supply installations, hospitals, shelters, and defensive installations.
  - (4) Execute demolitions, and construct or remove obstacles, including minefields.
  - (5) Install and operate field water-supply facilities.
  - (6) Operate quarries, sawmills, and utilities.
  - (7) Fight as infantry in an emergency.
- b.** The battalion is completely mobile, using organic transportation. If it must be air transported, substantial substitutions must be made for heavy equipment which cannot be loaded in current aircraft.

## **68. Organization**

- a.* The battalion is organized under T/O & E 5-35A. It consists of a headquarters, headquarters and service company (T/O & E 5-36A), three identical engineer combat companies, army (T/O & E 5-37A), and a medical detachment (T/O & E 5-35A).
- b.* Battalion headquarters includes—
  - (1) Administrative, intelligence, operations, and supply sections, performing the normal S1, S2, S3, and S4 duties.
  - (2) A communications section, a maintenance section, and an aviation section, whose functions are indicated by their titles.
- c.* Headquarters and service company includes—
  - (1) Company headquarters.
  - (2) An equipment platoon.
  - (3) The enlisted personnel of battalion headquarters.
- d.* Each combat company includes—
  - (1) A company headquarters.
  - (2) Three identical engineer combat platoons, each of which consists of a platoon headquarters and three identical engineer combat squads.

## **69. Employment**

- a.* The group commander normally assigns an army combat battalion to a given area, with responsibility for all engineer operations within that area, including construction work, route maintenance, and water supply. Tasks within the area are apportioned by the battalion commander.
- b.* When the magnitude of specific tasks warrants,

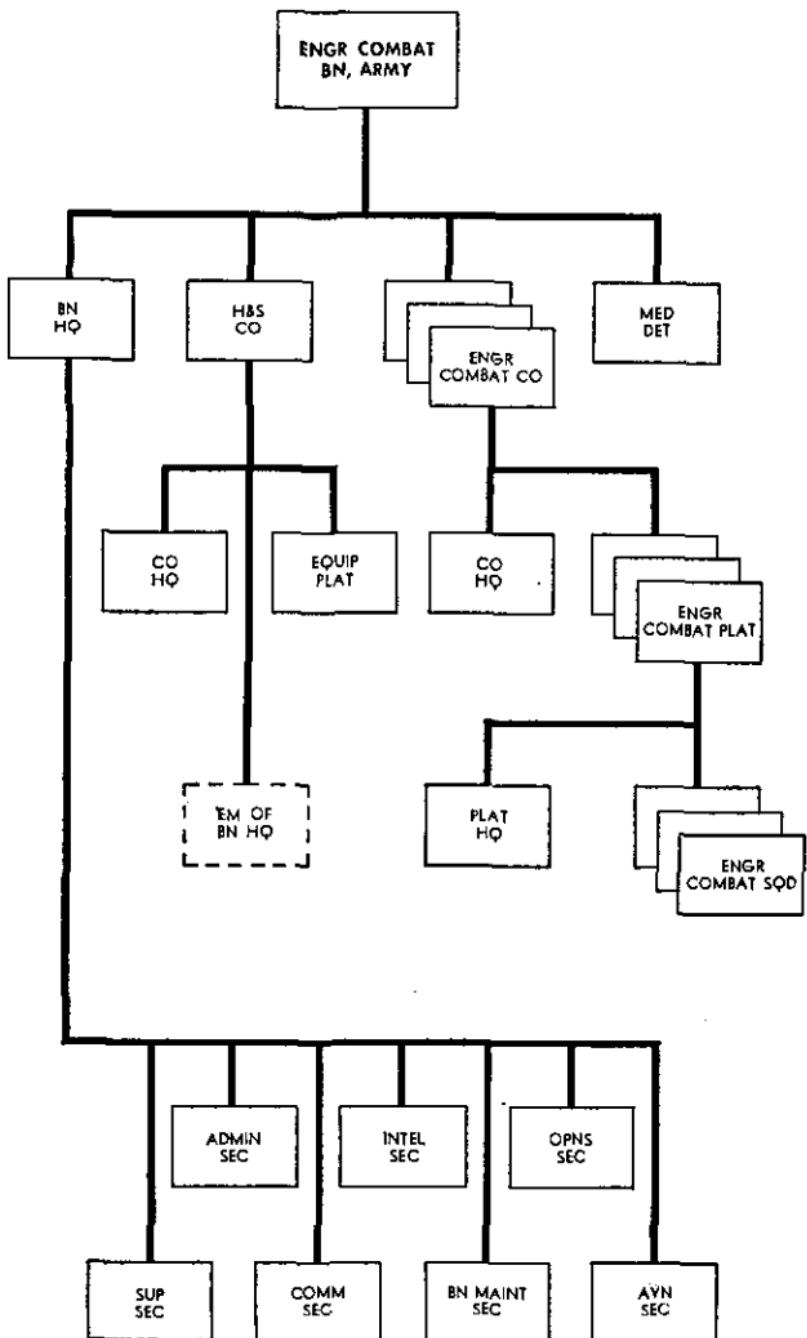


Figure 4. Organization of engineer combat battalion, Army.

a combat battalion may be assigned these tasks in lieu of area tasks.

c. When the group places a combat battalion in direct support of a division, the tasks to be performed are established by liaison with the division engineer. The latter does not exercise any command or operational control over the army combat battalion, but all reasonable requests which he may make are executed by the battalion without reference to group headquarters, unless they are in conflict with group policies or orders.

d. If an army combat battalion is attached to a division without further subattachment, orders are received only from the division commander. Close liaison, however, is maintained with the division engineer, to insure coordination of effort.

e. The construction capabilities of the battalion can be augmented by the attachment of engineer equipment with operators from the light equipment company, and of trucks with drivers from the dump truck company. Servicing and maintenance of the attached equipment is normally performed by the battalion unless the parent company is bivouacked in the same area. Equipment and vehicles needing extensive organizational maintenance should be returned to their parent company when practicable.

f. For erection of equipment bridging, the appropriate bridge unit of the group normally delivers the bridge to the site, and the army combat battalion erects it, obtaining any needed technical guidance from the bridge unit. When the operation cannot be readily controlled by group, the bridge unit may be attached to the combat battalion.

*g.* Normally one engineer combat battalion; army, can support one division in the line. The type corps of four divisions has six such battalions, permitting two of the latter to be used for work in the rear area of corps, or on tasks of great magnitude.

## **70. Description of Equipment**

*a. Tool and Equipment Sets.* Operating squads and platoons have sets of pioneer and carpenter tools and demolition equipment for use of individual combat engineers. A supplementary equipment set, including special purpose tools, construction supplies, and explosives, is carried by headquarters and service company.

*b. Minefield Equipment.* Mine detectors and minefield marking equipment, together with a basic load of antitank and antipersonnel mines, are carried by the battalion.

### *c. Construction Equipment.*

(1) The battalion heavy construction equipment includes truck-mounted air compressors, truck-mounted craneshoels, motorized road graders, crawler tractors, and trailer-mounted electric welding equipment.

(2) Each company has truck-mounted air compressor equipment and crawler-type tractors. Its organic equipment is augmented from headquarters and service company as may be required by the tasks assigned.

*d. Material Hauling Equipment.* The battalion has dump trucks for movement of road building and repair materials and other class IV engineer supplies. One is assigned to each operating squad of a platoon

for transporting the men and the squad tool sets. Pole type trailers are provided for hauling lumber and heavy timbers. The front load trailers, used for transporting heavy construction equipment, may also be used for moving class IV engineer supplies.

*e. Water Purification Equipment.* The battalion supply section has sufficient water purification equipment to furnish water for an infantry division.

*f. Armament.* The armament of the battalion consists of caliber .50 and caliber .30 machineguns, caliber .45 submachineguns, 3.5-inch rocket launchers, rifles, carbines, and pistols.

*g. Detailed Lists of Equipment.* See T/O & E 5-35A.

## **71. Communications**

Radio facilities are provided for operation of internal platoon, company, and battalion command nets, and for communication with group headquarters. Sound-powered telephones are provided combat companies for work project control. Standard field telephones and switchboards furnish wire communications between battalion headquarters section and the companies, and to group headquarters.

## **Section III. ENGINEER LIGHT EQUIPMENT COMPANY**

### **72. Mission**

The mission of the engineer light equipment company is to maintain and operate a concentration of construction equipment in support of engineer combat units.

### **73. Assignment**

The company is normally assigned to army, with further assignment or attachment to an engineer combat group.

### **74. Capabilities**

- a. The company is equipped and trained to—
  - (1) Operate in support of three combat battalions, army, engaged in general engineer work.
  - (2) Provide additional engineer support, when required, for divisional engineer battalions.
  - (3) Provide two-shift operation for its own construction equipment.

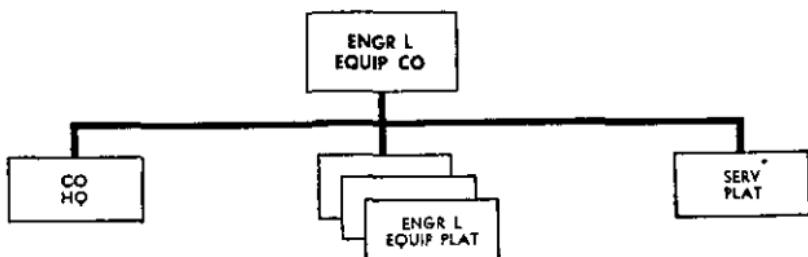
b. The company is semi-mobile, using organic transportation.

### **75. Organization**

The company is organized under T/O & E 5-367. It consists of a company headquarters, three identical equipment platoons; and a service platoon (see fig. 5).

### **76. Employment**

- a. Normally either an equipment platoon, or specific items of equipment with operators, is attached



*Figure 5. Organization of engineer light equipment company.*

to one of the engineer combat battalions, army, of the engineer combat group, to augment its construction capabilities. In a major construction effort, the entire light equipment company may be attached, particularly when the bulk of its equipment is required on one battalion project. The company may be required to operate a quarry for the common use of all engineer battalions with which it is associated. Other than this, its operations will in general be on an "attached" status.

b. During the period that company equipment and personnel are attached to a battalion, that battalion is responsible for the proper use and maintenance of the equipment and for the administration and well-being of the personnel. However, the light equipment company officers, by liaison, insure that their personnel and equipment are receiving proper treatment. When it is apparent that the attachment to a battalion of a large portion of the equipment will continue for some time, the light equipment company commander may attach some of his maintenance personnel to the battalion; or alternatively, may arrange for return of the equipment for periodic organizational maintenance, depending upon the geographic dispersion.

c. Attachment of the company, or elements thereof, to a divisional engineer battalion is infrequent and usually of short duration. In case of such an attachment, the same principles apply as set forth above, except that distances usually require all maintenance of attached equipment to be performed by the battalion.

## **77. Description of Equipment**

*a. Tool and Equipment Sets.* Blacksmith, welding, lighting, and shop equipment are provided for the maintenance operations of the service platoon.

*b. Construction Equipment.* The construction equipment carried by the company provides either additional equipment similar to that in the engineer combat battalions which the company serves, or equipment of types which the battalions do not possess and which supplement their organic equipment to increase their capabilities.

- (1) Equipment similar to engineer combat battalion equipment includes truck-mounted air compressors, motorized road graders, truck-mounted crane-shovels and crawler tractors.
- (2) Equipment, not in combat battalion, which increases the battalion's earth-moving capabilities includes tractor-drawn towed scrapers, tractor-drawn towed graders, crawler-mounted crane-shovels, skid-mounted earth augers, sheepfoot rollers, and tractor-drawn rooters.
- (3) Equipment, not in a combat battalion, which gives the battalion new capabilities in construction work, includes:
  - (a) Quarry equipment. One quarry equipment set provides drilling equipment for quarries; one crushing and screening plant can process either rock or sand-gravel pit output.
  - (b) Surfacing equipment. Surfacing equipment is chiefly for the maintenance of high

type roads. It includes a truck-mounted water distributor equipment, tandem rollers, asphalt kettles, and a concrete mixer.

- (c) Trailer-mounted woodworking equipment has electric circular saws with generator, for milling small-sized dimension lumber.

c. *Use of Vehicles.* The vehicles in the company are primarily prime movers for trailers, but in an emergency can be used for hauling engineer class IV supplies.

d. *Armament.* The armament of the company consists of caliber .50 machineguns, caliber .45 sub-machineguns, 3.5-inch rocket launchers, rifles, and carbines.

e. *Detailed Lists of Equipment.* See T/O & E 5-367.

## **78. Communications**

Radio is provided each platoon and company headquarters for administrative purposes when dispersed. One additional radio in company headquarters permits participation in the engineer combat group command net. Field telephones are provided for use when wire is laid to the company. Detached platoons or lesser elements may be furnished telephone service by the unit to which attached.

## **Section IV. ENGINEER PANEL BRIDGE COMPANY**

### **79. Mission**

The mission of the engineer panel bridge company is to provide technical personnel and equipment to load, transport, maintain, and supervise the erection

of panel bridging. It may fight as infantry when required.

### **80. Assignment**

The company is normally assigned to an army or separate corps, with further assignment or attachment to an engineer combat group.

### **81. Capabilities**

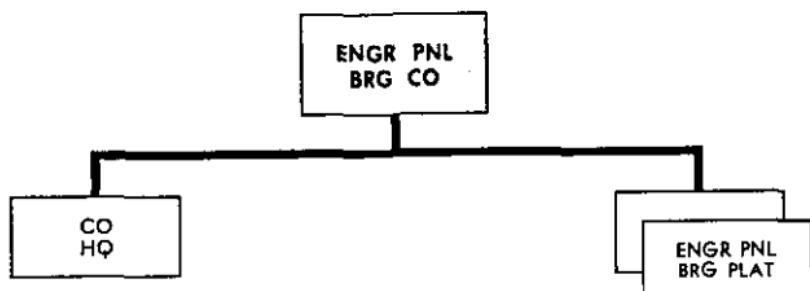
*a.* The company can—

- (1) Load and transport two 80-foot double-single M-2 panel bridges, or one 130-foot double-double M-2 panel bridge.
- (2) Provide technical supervision for erection, and in an emergency erect bridges with organic personnel.

*b.* The company is entirely mobile, using organic transportation.

### **82. Organization**

The company is organized under T/O & E 5-137A. It consists of a company headquarters and two identical bridge platoons (see fig. 6).



*Figure 6. Organization of engineer panel bridge company.*

### **83. Employment**

- a.* Normally the equipment provided by the company is erected by elements of an engineer combat battalion. The company transports the bridging to the site of the crossing, and furnishes bridge specialists and supervisors to assist in its erection. For a large bridging operation, the entire project, including provision and preparation of the approach road net, is normally directed by an engineer combat group. The company may also be attached to an engineer combat battalion.
- b.* Additional bridging beyond the organic equipment of the company, when required, is transported by the company from an engineer supply point or depot.
- c.* The company is trained to erect its own bridging, and may be called upon to do so in an emergency. However, the tactical situation usually requires completion of the bridge in a shorter time than can be achieved by the limited manpower of the company alone.
- d.* The company may be required to furnish bridge guards and to maintain erected bridging.
- e.* The company normally procures a new load of bridging as its organic load is used in operations. Other companies in the rear may later disassemble the bridge and return its components to depot stock.
- f.* When the situation warrants, the group commander may direct the company to unload its bridging and utilize the dump trucks for hauling bulk construction materials.

## **84. Description of Equipment**

*a. Standard Bridge Set.* The company is equipped with one bridge, fixed, steel, panel, Bailey type, M-2. The standard bridge set provides one double-double unit 130 feet in length, with a capacity of class 40 loads. For the crossing of class 50 loads, the bridge set provides one 120-foot double-double span or two 80-foot double-single spans. The bridge is a through type truss structure, the roadway being carried between two main girders and having a maximum width of 12 feet 6 inches.

*b. Additional Bridging.* By procuring additional bridging from depots, longer and higher capacity bridges can be erected. The bridge is normally erected as a class 60 bridge, and may be a through truss, deck type, simple span, continuous or broken multispan, or cantilever bridge. Intermediate supports may be assembled using components of the M-2 panel bridge. The bridge may also be erected on barges as a floating panel bridge or may be used as a through truss or deck type truss railroad bridge.

*c. Vehicles.* The bridge set is transported in standard dump trucks and cargo trucks. Additional dump trucks transport erection equipment and repair parts.

*d. Other Equipment.* The company is authorized carpenter and welding equipment for the maintenance and repair of the equipage. Truck-mounted crane-shovels and a crawler tractor with bulldozer are provided for erection and limited site preparation.

*e. Armament.* The armament of the company consists of caliber .50 machineguns, caliber .45 subma-

chineguns, 3.5-inch rocket launchers, rifles, and carbines.

*f. Detailed Lists of Equipment.* See T/O & E 5-137 A.

## **85. Communications**

Radio and telephone communication equipment is provided for control during erection of the bridge, for control of traffic on the bridge, and for participation in the engineer combat group-command net.

## **Section V. ENGINEER FLOAT BRIDGE COMPANY**

### **86. Mission**

The engineer float bridge company provides personnel and equipment to load, transport, maintain, and supervise the erection of tactical stream-crossing equipment. It may fight as infantry when required.

### **87. Assignment**

The company is normally assigned to an army or separate corps, and is further assigned or attached to an engineer combat group.

### **88. Capabilities**

*a.* The company loads and transports the following stream-crossing equipment—

- (1) 600 feet of tactical floating bridging, using pneumatic floats, capable of supporting present divisional loads.
- (2) Light stream crossing equipment for support of infantry assault crossings.

*b.* The company furnishes technical supervision to assist other engineer units in bridge construction. In

an emergency it constructs bridges or rafts with organic personnel at a reduced rate.

c. The company is entirely mobile, using organic transportation.

## 89. Organization

a. The company is organized under T/O & E 5-138A. It consists of a headquarters, an equipment and maintenance platoon, two identical floating bridge platoons, and a support platoon (see fig. 7).

b. The support platoon includes a platoon headquarters, two identical raft sections, and an assault equipment section.

## 90. Employment

a. Normally the bridging is installed by elements of an engineer combat battalion in support of divisional or corps operations. The float bridge company transports the bridging to the site of the crossing, and furnishes bridge specialists and supervisors, and additional equipment with operators, to assist the battalion in the installation. For a crossing under divisional control, a float bridge platoon may be attached to the divisional engineer battalion. In a

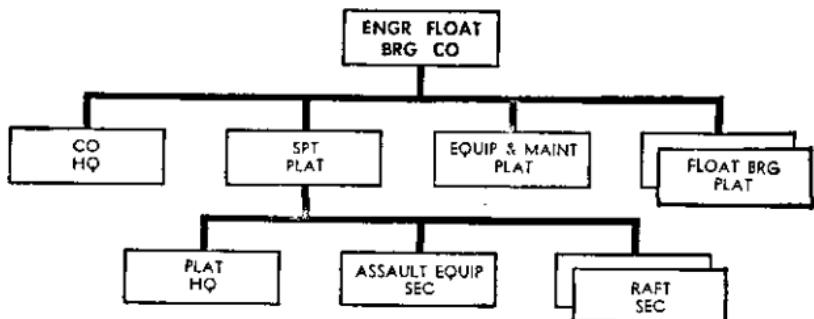


Figure 7. Organization of engineer float bridge company.

deliberate river-crossing operation, the entire project including provision of the approach road net, would be directed by the corps engineer, normally through an engineer combat group.

b. Additional bridging, when required, is transported by the company from an engineer supply point or depot.

c. The company is trained to install its own bridging, and may be called upon to do so in an emergency. However, the tactical situation usually requires completion of the bridge in a shorter time than can be achieved by the limited manpower and erection equipment of the company, and construction by a combat engineer unit is preferred.

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

e. The company also disassembles the bridge, makes necessary repairs, and transports the bridging to the site of the next crossing.

## **91. Description of Equipment**

### *a. Float Bridge Platoon Equipment.*

(1) Each of the two float bridge platoons is authorized one-half of the standard bridge set.

The class 60 floating bridge set may be used for heavy floating bridges and rafts, fixed bridges, or combinations of the three. Enough approach ramp equipment is provided to permit erection of two bridges whose combined floating length does not exceed 600 feet. The deck consists of two deck tread panels and one deck filler panel with curbs spaced at 162 inches from inside face of curb to inside face of curb. The

floating spans are supported on pneumatic floats. For fixed spans, intermediate trestles are provided.

- (2) The class 60 floating bridge carries class 60 loads safely in currents up to 5 feet per second. At 8 feet per second (now the standard current velocity at which bridges are rated) the bridge can carry loads up to class 50 for normal crossings. A partial reinforced five float raft is capable of sustaining class 60 loads in current velocities up to 9 feet per second. Fixed spans up to 32 feet in length will support class 60 loads for a normal crossing.
- (3) The bridge is transported on heavy military bridging trucks. The trestles are carried on bolster-body trucks and trailers.

*b. Bridge Erection Equipment (in Equipment and Maintenance Platoon).* Erection equipment carried by the equipment and maintenance platoon includes bridge erection boats, truck-mounted air compressors, truck-mounted crane-shovels, and a crawler tractor with angledozer.

*c. Equipment in Support Platoon.* Equipment for assault crossings provided by the support platoon includes assault boats and a foot bridge (472 feet 6 inches). The platoon also furnishes equipment for infantry support rafts with outboard motors. This equipment may alternatively be used to construct expedient bridges, using assault boats as pontons.

*d. Armament.* The armament of the company consists of caliber .50 machineguns, caliber .45 sub-machineguns, 3.5-inch rocket launchers, carbines, and rifles.

*e. Detailed Lists of Equipment.* See T/O & E 5-138A.

## **92. Communications**

Radio and telephone communication equipment is provided for control during the erection of the bridge, for control of traffic on the bridge, and for participation in the engineer combat group command net.

# **Section VI. ENGINEER PONTON BRIDGE COMPANY**

## **93. Mission**

The mission of the engineer ponton bridge company is to provide personnel and equipment to load, transport, maintain, and supervise the installation of heavy tactical floating bridging and rafts.

## **94. Assignment**

The company is normally assigned to an army or corps, and is further assigned or attached to an engineer combat group.

## **95. Capabilities**

*a.* The company can load and transport approximately 600 feet of bridging with its organic vehicles. Its bridging is capable of supporting present army loads, and can be installed under tactical conditions.

*b.* The company provides technical supervision for installation, and in an emergency can install the bridging or construct rafts with its own personnel, at a reduced rate of speed.

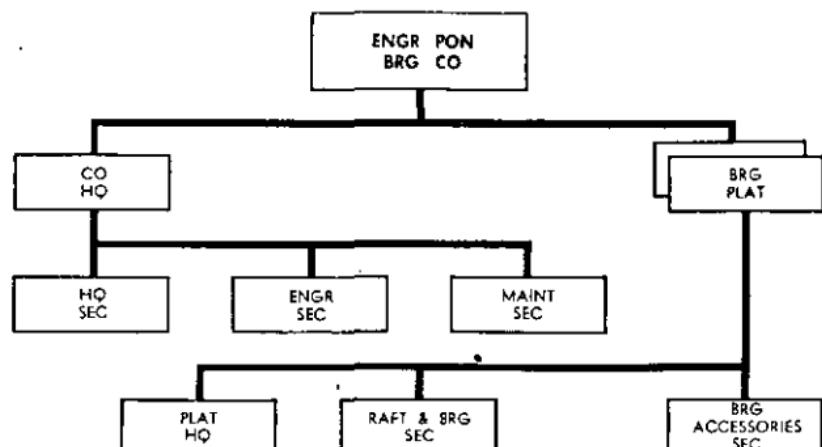
*c.* The company is entirely mobile, using organic transportation.

## **96. Organization**

- a. The company is organized under T/O & E 5-139. It consists of a company headquarters and two identical bridge platoons (see Fig. 8).
- b. Company headquarters includes a headquarters section, an engineer section, and a maintenance section.
- c. Each bridge platoon includes a platoon headquarters, a raft and bridge section, and a bridge accessories section.

## **97. Employment**

- a. Normally the bridging is installed by elements of an engineer combat battalion. The ponton bridge company transports it to the site of the crossing, and furnishes bridge specialists and supervisors, and additional equipment with operators, to assist the battalion in the task. For a large bridging operation, the entire project, including provision of the approach road net, would be directed by an engi-



*Figure 8. Organization of engineer ponton bridge company.*

neer combat group. The ponton bridge company may also be attached to an engineer combat battalion.

b. Additional bridging, when required, is transported by the company from an engineer supply point or depot.

c. The company is trained to install its own bridging, and may be called upon to do so in an emergency. However, the tactical situation usually requires completion of the bridge in a shorter time than can be achieved by the limited manpower of the company, and installation by a combat battalion or similar unit is preferred.

d. The company may be required to furnish bridge guards and to maintain bridges. The company also disassembles the bridge, makes necessary repairs, and transports the bridging to the site of the next crossing.

## **98. Description of Equipment**

### *a. Bridge Floating, M-4*

(1) The company is authorized one bridge, floating, M-4. This equipment can be used for floating bridges, fixed bridges, rafts, or combinations thereof. The deck is made of alhimuminum alloy and is 166½ inches wide between curbs. The floating spans are supported on aluminum alloy pontons. For fixed spans, intermediate trestles are provided.

(2) The bridge has a safe capacity of class 50 loads in currents up to 7 feet per second, and for class 35 loads in currents up to 9 feet per second. When fully reinforced, it will carry safely class 70 loads in currents

up to 9 feet per second. A raft constructed of six pontons will carry safely a class 75 load in currents up to 7 feet per second.

*b. Equipment Sets, Shop, and Erection Equipment.* The company is authorized carpenter and welding equipment, and a motorized general purpose shop, for the maintenance and repair of the equipage. Truck-mounted crane-shovels, a truck-mounted air compressor, and a crawler tractor with dozer are provided for erection and limited site preparation.

*c. Armament.* The armament of the company consists of caliber .50 and caliber .30 machineguns, caliber .45 submachineguns, 3.5-inch rocket launchers, rifles, and carbines.

*d. Detailed Lists of Equipment.* See T/O & E 5-139.

## **99. Communications**

Radio and telephone communication equipment is provided for control during the erection of the bridge, for control of traffic on the bridge, and for participation in the engineer combat group net.

## **Section VII. ENGINEER COMBAT GROUP**

### **100. Mission**

*a. Engineer Combat Group.* To perform, for corps or army, large-scale coordinated engineer operations of a combat support nature, within a specified area or field of responsibility.

*b. Headquarters and Headquarters Company, Engineer Combat Group.* To exercise tactical, technical, and administrative command over the assigned or attached engineer units which compose the group.

## **101. Assignment**

The group is normally assigned to army or corps.

## **102. Capabilities**

*a. The Group.* Its capabilities depend on the number and type of its component units.

*b. Headquarters and Headquarters Company.* It is trained and equipped to—

- (1) Provide staff planning for, and supervision of, the operations of assigned or attached troops.
- (2) Perform engineer reconnaissance.
- (3) Supervise and assist in administrative and supply matters of its subordinate units.
- (4) Operate a group communications system.
- (5) Supervise medical service and sanitation within the group.

*c. Mobility.* The headquarters and headquarters company is completely mobile, using organic transportation. It is air-transportable in standard aircraft.

## **103. Organization**

*a.* The group is a flexible organization which, beside its headquarters and headquarters company, consists of a varying number of administratively self-sufficient battalions and companies. A typical group in a corps may consist of three engineer combat battalions, a dump truck company, a light equipment company, a panel bridge company, and a float bridge company. A typical group in an army service area may have, in addition to the foregoing, two ponton bridge companies. These type groups may be varied as the situation demands, provided that the command

capability of group headquarters is not exceeded. A reasonable upper limit of that capability may be taken roughly as four or five battalions plus several separate companies, or a total strength of about 4,500 men.

*b.* For detailed organization of the component units see elsewhere in this manual.

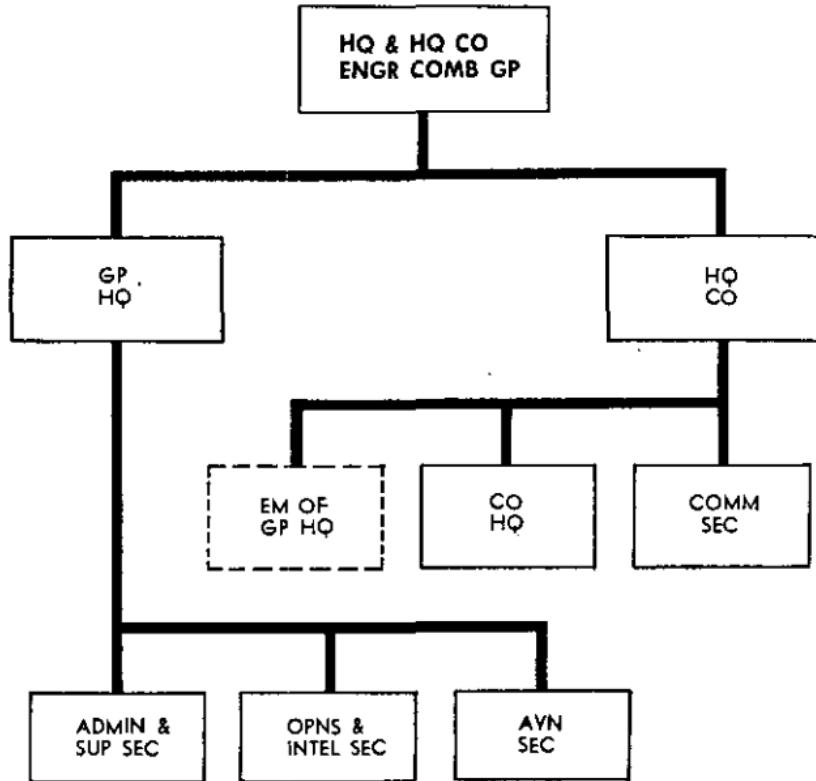
*c.* The component units are normally assigned to the group. They may, instead, be attached for short periods, but attachments should be terminated as soon as possible.

*d.* The headquarters and headquarters company is organized under T/O & E 5-192A (see fig. 9). It consists of—

- (1) Group headquarters, composed of an administrative and supply section, an intelligence and operations section, and an aviation section.
- (2) Headquarters company, composed of a company headquarters, a communications section, and the enlisted personnel of group headquarters.

#### **104. Employment**

*a.* The group provides an area control headquarters for combat support units (army combat battalions, bridge companies, etc.) serving a corps or army within a specified area of responsibility. Within that area, the group is responsible for all construction and combat support missions, which may include both large projects and a great number of minor ones. The group may also, or alternatively, be made responsible for the engineer portions of a



*Figure 9. Organization of headquarters and headquarters company, engineer combat group.*

major tactical operation of a specialized character, such as the assault and passage of a defended river line or fortified area.

b. Normal allocation is two groups per type corps and two or three additional per type field army. A group assigned to a corps is rarely attached to lower headquarters except for an unusual concentration of engineer effort. Units of a corps group are usually placed in support of divisions. They may, however, be attached to a division for a special operation.

c. By informal agreement and liaison with a division, a group assigned to a corps may take over re-

sponsibility for work for a specified distance forward of the division rear boundary, to relieve the divisional engineer of rear area work.

*d.* In a deliberate river crossing, the corps commander normally is the tactical commander, and the corps engineer combat group may be responsible for the technical crossing plan and execution. Divisional engineers execute the initial assault crossings and accompany their divisions forward.

*e.* A combat group assigned to an army may be attached to a corps which is making the major effort; or to a corps whose river crossing capabilities need augmentation.

*f.* Combat groups operating in an army service area are primarily used for the maintenance of routes of communication. They replace divisional and corps bridges with heavier bridging to carry army loads, and replace equipment bridges with fixed timber or steel structures when practicable. In emergencies they may be utilized for infantry combat against raids, paratroop action, guerillas, or partisans.

## **105. Description of Equipment**

*a.* For the equipment of the component units of the group, see elsewhere in this manual.

*b.* The equipment of headquarters and headquarters company is largely individual or for housekeeping and local security. There are fixed wing aircraft for inspection, reconnaissance, and liaison. There are limited drafting and reproduction facilities. For other activities needing special equipment or skills, the company must call on some component

of the group. Armament consists of caliber .50 machineguns, caliber .45 submachineguns, 3.5-inch rocket launchers, rifles, carbines, and pistols.

### **106. Communications**

Radio equipment is provided to permit the group headquarters to form a command net of its battalions and separate companies, to join the net of its higher headquarters, and to monitor the antiaircraft warning net. A large telephone central is provided for intra-group wire communications, since all components of a typical group have telephones. One teletypewriter set is provided for use to higher or adjacent headquarters; no subordinate units in the group are authorized teletypewriters.

## **Section VIII. ENGINEER CAMOUFLAGE BATTALION**

### **107. Mission**

*a. Engineer Camouflage Battalion.* To plan, supervise, and inspect camouflage work, discipline, and training, including the use of deception devices.

*b. Headquarters and Headquarters Detachment.* To provide an administrative and command headquarters for a flexible battalion having the above mission.

### **108. Assignment**

Normally to communications zone, but may be assigned to army.

### **109. Capabilities**

*a. The Battalion.* Its capabilities depend on the number of its component units.

*b. Headquarters and Headquarters Detachment.*  
It can—

- (1) Provide command and staff and supplemental technical skills and equipment for the battalion.
- (2) Provide personnel and equipment for fabricating and maintaining camouflage and deception devices.
- (3) Supply camouflage materials to attached or assigned units.
- (4) Perform organizational maintenance of vehicles and equipment.
- (5) Mess and motor maintenance will be provided by one of the companies.

*c. The battalion and its component units are about 85 percent mobile.*

## **110. Organization**

*a. The battalion is a flexible organization which, beside its headquarters and headquarters detachment, consists of a varying number of assigned or attached camouflaged companies (see fig. 10).*

*b. Headquarters and headquarters detachment is organized under T/O & E 5-96A. It includes a battalion headquarters section, an administration section, an operations section, a battalion maintenance and supply section, and a factory section.*

*c. The camouflage company is organized under T/O & E 5-97A. It includes company headquarters and four identical camouflage platoons. Three to five companies are normally assigned or attached per camouflage battalion and one company per field army.*

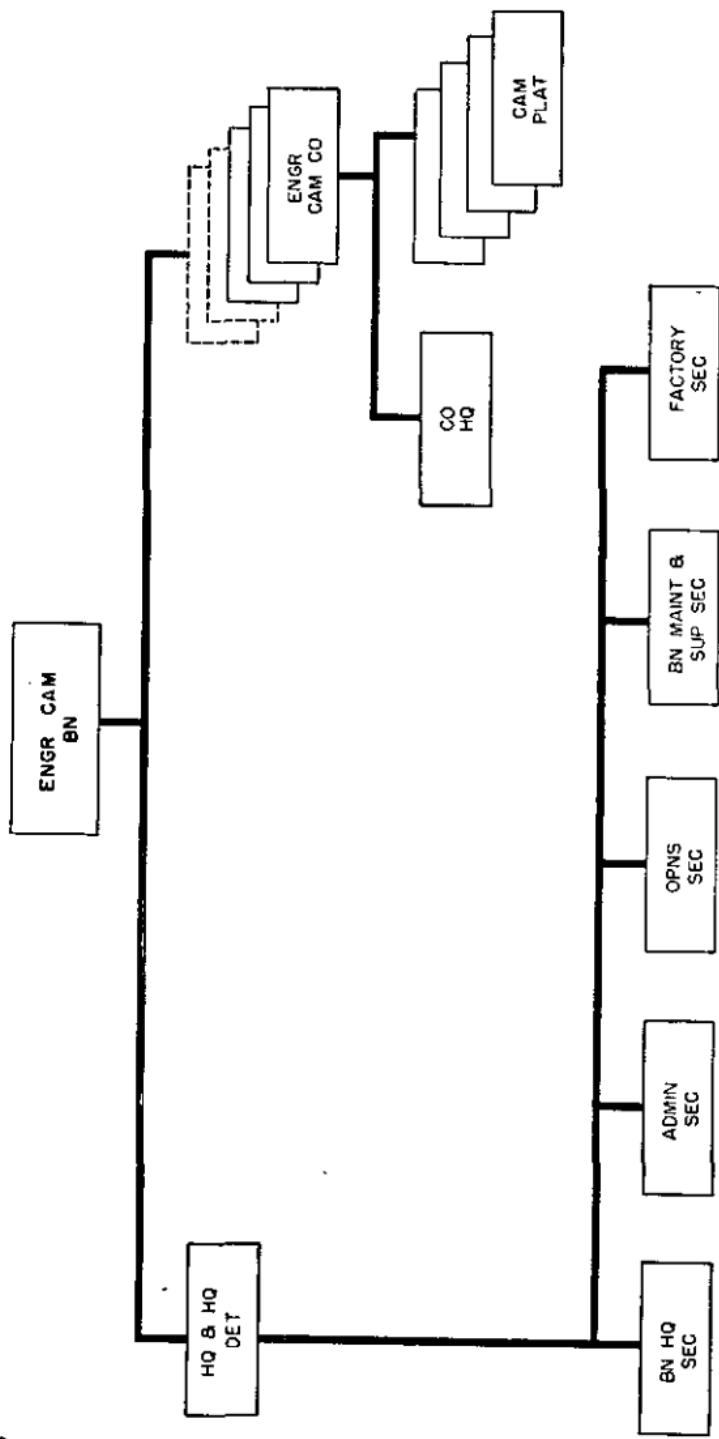


Figure 10. Organization of engineer camouflage battalion.

## **111. Employment**

- a.* In a battalion assigned to the communications zone, each camouflage company may be designated to support some specific unit or installation, or to support all units in a specified area. Camouflage companies can function independently of battalion headquarters.
- b.* The factory section of headquarters and headquarters detachment can staff and operate a small plant for the manufacture of special camouflage material, or alternatively can supervise a large group of civilian workers when there are facilities and a demand for the mass production of camouflage supplies.
- c.* Any camouflage unit commander may be designated as the special staff camouflage officer of the command to which his unit is attached. It is more common, however, for such a unit commander to act as a technical adviser to the unit engineer.
- d.* Units of a camouflage battalion do not have the manpower needed to install large camouflage projects. They can construct small, highly specialized installations, and can also supervise the work of troop units and indigenous labor units on larger ones. The latter is often the most profitable use to which these specialized troops can be put.

## **112. Description of Equipment**

- a.* Each platoon of a camouflage company has sets of carpenter and sketching equipment, and a small air compressor for inflating pneumatic deception devices.
- b.* The company has a larger carpenter and sign

painting, tinsmith, drafting, and canvas worker's equipment, a truck-mounted air compressor with spray painting equipment and other accessories, and a camouflage company equipment set. The latter contains nets, erection tools, garnishing materials, paints, and spray paint machines.

*c.* Headquarters and headquarters detachment has blacksmith, canvas worker, carpenter and tinsmith sets, drafting and reproduction equipment, sign painting equipment, and a truck-mounted compressor with accessories, including a pneumatic paint sprayer.

*d.* The armament of the battalion is limited to caliber .45 submachineguns, rifles, and carbines.

*e.* For detailed lists of equipment—

- (1) See T/O & E 5-96A, Headquarters and Headquarters Detachment, Engineer Camouflage Battalion.
- (2) See T/O & E 5-97A, Engineer Camouflage Company.

### **113. Communications**

No communications equipment is provided for either the battalion or the companies. Since these units are habitually associated with some command headquarters, use can be made of existing communication channels of such commands.

## **Section IX. ENGINEER SHORE BATTALION**

### **114. Mission**

The mission of the engineer shore battalion is to perform engineer shore party functions in support of Army forces, in a joint amphibious operation and in

shore-to-shore operations, and to provide combat support by defense of the beach support area. It may fight as infantry when required.

### **115. Assignment**

The battalion is organic to the amphibious support regiment, which is organic to the amphibious support brigade.

### **116. Capabilities**

- a. The battalion is trained and equipped to—
  - (1) Perform, when reinforced with attached units, shore party work during a joint amphibious operation in support of one infantry division (reinforced).
  - (2) Perform shore party work during a shore-to-shore assault operation in support of one regimental combat team.
  - (3) Perform general engineer work on the improvement and expansion of a beach support area.
  - (4) Fight as infantry with attached units if any, in defense of the beach support area.

b. The battalion is 35 percent mobile by land, using organic transportation. It has no organic water transportation.

### **117. Organization**

- a. The battalion is organized under T/O & E 5-525A. It consists of a headquarters, headquarters and service company (T/O & E 5-526A), and three identical engineer shore companies (T/O & E 5-527A) (see fig. 11).

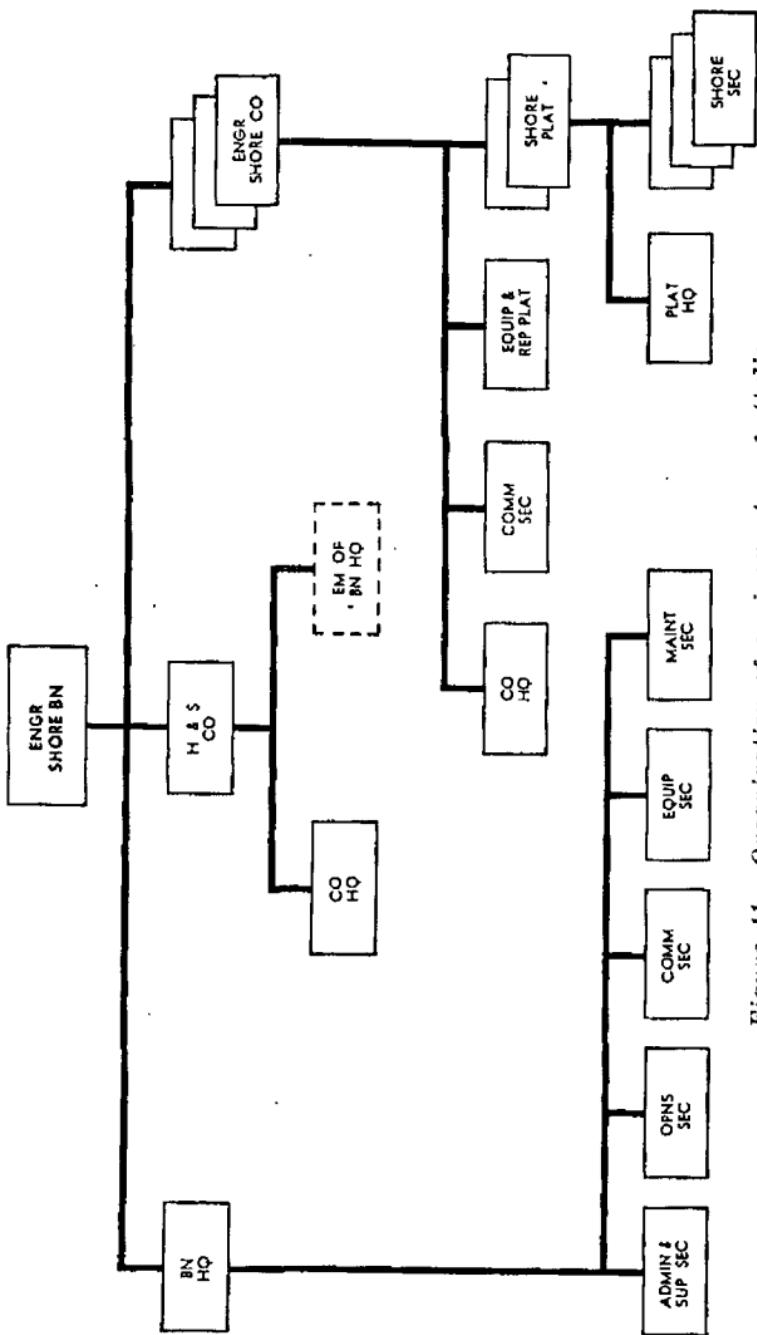


Figure 11. Organization of engineer shore battalion.

*b.* Battalion headquarters includes—

- (1) An administration and supply section.
- (2) An operations section, which also performs any necessary intelligence work.
- (3) Communications, equipment, and maintenance sections.

*c.* Headquarters and service company includes company headquarters and the enlisted personnel of battalion headquarters.

*d.* Each engineer shore company includes—

- (1) Company headquarters.
- (2) A communications section.
- (3) An equipment and repair platoon.
- (4) Two identical shore platoons, each containing platoon headquarters and three identical shore sections.

## **118. Employment**

*a.* The normal employment of the battalion is under the direct command of the regiment of which it is an organic part.

*b.* While the battalion's primary duties are combat engineering and engineer construction and supply in the organization of a beach support area, especially roads and hard standings, water supply, and general construction, the battalion may be called on to do any sort of shore party work for which it is equipped, including unloading, stevedoring, and fighting as infantry.

*c.* The battalion's capabilities may be augmented by attached Transportation Corps units such as the (DUKW) company, truck battalion, and port battalion; by Quartermaster service companies; and by labor from other sources, such as local civilians.

*d.* Experience has shown that the battalion's organic equipment may need to be augmented for certain amphibious operations.

## **119. Description of Equipment**

*a. Tool and Equipment Sets.* Operating platoons have sets of carpenter, demolition, and pioneer tools and equipment.

*b. Minefield Equipment.* A basic load of antitank and antipersonnel mines are carried by the battalion.

*c. Construction Equipment.*

- (1) The battalion heavy construction equipment includes truck-mounted air compressors, crawler crane-shovels, truck-mounted crane-shovels, motorized road graders, towed road graders, pile-driver hammers, and sheepsfoot roller and rooter equipment.
- (2) Each shore company has truck-mounted air compressors, crane-shovels, one pile-driver hammer, and road scraper equipment, and is augmented by equipment from the equipment section of headquarters and service company as required by tasks assigned.

*d. Material Hauling Equipment.* The battalion has dump trucks for the movement of road-building and similar bulky materials, including Class IV engineer supplies. Headquarters and service company has wrecker equipment. Tractor-trucks are provided for operations in heavy sand or similar conditions. Each shore company has amphibious trucks.

*e. Water Purification Equipment.* The battalion supply section has sufficient water purification equip-

ment to furnish water to the shore party and supported troops.

*f. Armament.* The armament of the battalion consists of caliber .50 and caliber .30 machineguns, caliber .45 submachineguns, 3.5-inch rocket launchers, rifles, carbines, and pistols.

*g. Detailed Lists of Equipment.* See T/O & E 5-525A.

## **120. Communications**

Radio facilities are provided for operation of internal company and battalion command nets and for communication with regimental and brigade headquarters. Standard field telephones and switchboards furnish wire communications within battalion headquarters and to the companies.

## **CHAPTER 5**

# **ENGINEER CONSTRUCTION UNITS**

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### **Section I. GENERAL**

#### **121. Service Support Units**

Engineer construction units belong to a more general category termed "service support units." (Topographic units, and maintenance and supply units, discussed in chapters 6 and 7, are also of this category.) They differ from the combat support units discussed in chapter 4 in the following respects—

- a. They support the combat forces indirectly, by construction and allied activities in the rearward areas, rather than by working in direct contact with them as do combat support units.
- b. All of them may on occasion operate in the communications zone, and some of them operate there only, having no normal missions in corps or army service areas.
- c. In general they have lighter armament, less mobility, more specialized technical equipment, and less elaborate communications equipment than do combat support units.

#### **122. Construction Units**

The engineer construction units are—

Engineer construction battalion

Engineer heavy equipment company

Engineer dump truck company  
Engineer pipeline company  
Engineer port construction company  
Engineer dredge crews  
Engineer construction group  
Engineer brigade

### **123. Operating Units Functioning Throughout the Theater**

*a.* The construction battalion is organized along the general lines of the engineer combat battalion, army, with a headquarters, headquarters and service company, and three construction companies. It has, however, less armament than a combat battalion, and a larger amount and variety of construction equipment. It can operate independently on general construction work, although it is normally a part of a construction group. It is analogous to the army combat battalion in the "combat support" category.

*b.* The heavy equipment company and the dump truck company store, maintain, transport, and operate pools of heavy construction equipment and of dump trucks, respectively. Their personnel operate this equipment in support on construction battalions or other units. They are analogous to the light equipment company in the "combat support" category.

*c.* The pipeline company builds and repairs petroleum unloading and storage facilities and pipelines, and can operate and maintain the pipelines when built.

*d.* All these units may function either in the combat zone or the communications zone, though the pipeline company is normally in the latter.

## **124. Operating Units Peculiar to the Communications Zone**

These include the port construction company,<sup>1</sup> whose mission is indicated by its name, and the dredging crews. The mission of the latter is to provide and maintain navigable channels at ports and inland waterways in the theater. There are five types of crew, depending on the type and size of the dredge they operate.

## **125. Supervisory Units**

*a.* The great volume of engineer construction work in the army service areas and communication zone of an active theater requires numerous construction units of the above types, together with other service units, engineer teams, civilian and PW labor, etc. Coordination and supervision of these, at higher than battalion or separate company level, can best be accomplished by an engineer commander and headquarters. There are two such supervisory units, the engineer construction group and the engineer brigade.

*b.* The construction group is analogous to the combat group in the "combat support" category. It has an organized headquarters and headquarters company, to which are assigned or attached construction units of the number and type required for the mission, the most important being construction battalion. Construction groups are found in both the combat zone and the communications zone.

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<sup>1</sup> In the initial phases of an amphibious operation, a port construction company might be assigned to the army or task force conducting the operation.

c. The engineer brigade is a similar command organization at the next higher level. Besides its headquarters and headquarters company, it is composed essentially of construction groups, but it may also have other categories of engineer troops. It is found only in the communications zone.

#### **126. Teams**

(See ch. 9.)

A number of the teams of the engineer service organization may be attached to one or another construction unit, including dump truck companies, pipeline companies, construction battalions, groups, and brigades. Teams *GB* and *GE* may be attached to any one of several construction units.

### **Section II. ENGINEER CONSTRUCTION BATTALION**

#### **127. Mission**

The mission of the engineer construction battalion is to construct, rehabilitate, and maintain military routes of communication and facilities, except signal communication facilities and minor maintenance of railroads, and to perform related engineering work, in the communications zone and the rear areas of the combat zone.

#### **128. Assignment**

The battalion is assigned to an army or to communications zone as required, normally with further assignment to an engineer construction group.

#### **129. Capabilities**

a. The battalion is trained and equipped to perform heavy engineer construction work of a general

nature, including earth-moving, steel and timber construction, and the installation of utilities. It can perform other more specialized work in the absence of specific engineer units trained for that purpose, with somewhat less efficiency.

*b.* In normal employment the battalion can—

- (1) Construct and reconstruct cantonments, depots, hospitals, and utilities installations.
- (2) Construct and maintain roads and nontactical bridges.
- (3) Construct deliberate field fortifications.

*c.* The battalion can construct wharves and other waterfront facilities, but with less efficiency than an engineer port construction unit. On large projects it normally works with port construction companies.

*d.* If provided with special tools and equipment contained in a supplementary equipment set, the battalion can construct, or perform the major rehabilitation of, railway facilities and bridges.

*e.* The battalion can construct or rehabilitate air bases, but less efficiently than an engineer aviation battalion.

*f.* If furnished its augmentation personnel and equipment, the battalion can construct bituminous surfacing.

*g.* The battalion is semimobile.

### **130. Organization**

*a.* The battalion is organized under T/O & E 5-315A. It consists of a headquarters, headquarters and service company (T/O & E 5-316A), and three identical engineer construction companies (T/O & E 5-317A) (see fig. 12).

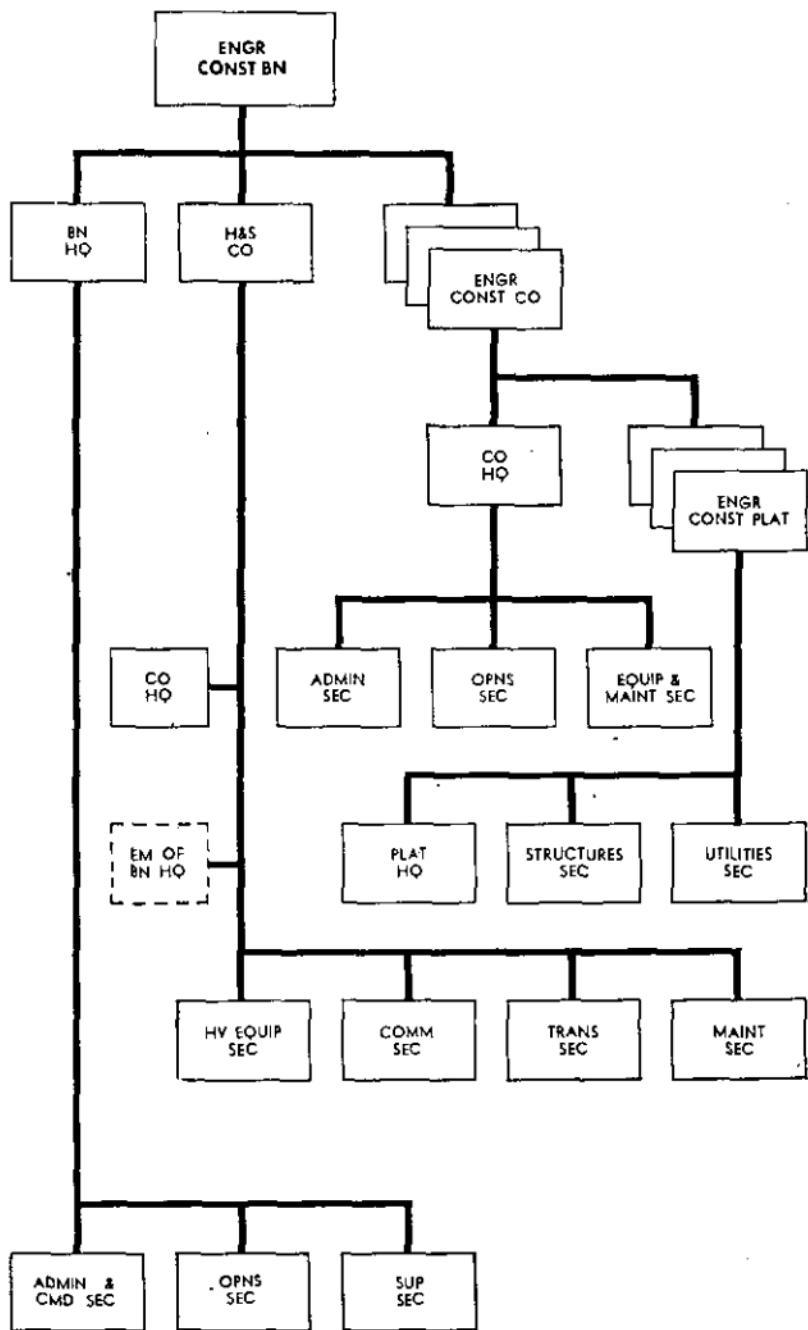


Figure 12. Organization of engineer construction battalion.

- b. Battalion headquarters includes an administrative and command section, an operations section, and a supply section.
  - c. Headquarters and service company includes—
    - (1) Company headquarters.
    - (2) A communications section, a transportation section, a heavy equipment section, and a maintenance section.
  - d. Each engineer construction company includes—
    - (1) Company headquarters, containing an administration section, an operations section, and an equipment and maintenance section.
    - (2) Three identical construction platoons, each containing platoon headquarters, a structures section, and a utilities section.

### **131. Employment**

a. The battalion may be employed either independently or as an element of an engineer construction group. It is designed to function as a unit under the direct supervision of the battalion commander. However, the lettered companies may be detached for specific missions. Generally, the battalion performs engineer work requiring skilled personnel and heavy engineer equipment. It designs and constructs permanent or semipermanent facilities beyond the capabilities of engineer combat units. It may be assigned all construction work in a given area, or given a specific large task.

b. The battalion is organized and trained to operate all its heavy construction equipment for two 10-hour shifts daily.

c. The construction capabilities of the battalion can be augmented by the attachment of heavy engi-

neer equipment, with operators, from a heavy equipment company, and of trucks with drivers from a dump truck company. Servicing and maintenance of the attached equipment is performed by the battalion, unless the parent company is bivouacked in the same area. For organizational maintenance, on the other hand, attached equipment and vehicles should be returned to the parent company when practicable.

*d. Prior to employment in airborne operations, the battalion should be re-equipped and given time to train with the new equipment and to develop operational skill in air movement procedures.*

### **132. Description of Equipment**

*a. Company Equipment for Construction Work.* For general construction, each company has platoon carpenter and pioneer sets and rigging sets, a trailer-mounted woodworking set, and an electric circular saw. Floodlights and a generator are provided for night operations.

*b. Company Equipment for Utilities Work.* For utilities work, each company has a blacksmith set, oxyacetylene and electric welding equipment, and pipefitting, sheet-metal, and tinsmith sets.

*c. Company Heavy Equipment.* Company heavy equipment includes crawler tractors with bulldozers, a towed scraper, and truck-mounted air compressors.

*d. Mine Detectors.* Mine detectors are provided.

*e. Equipment in Headquarters and Service Company.* Headquarters and service company has a pool of construction tools and equipment, and sets of canvas-workers, drafting, sign painting, and surveying equipment. Supplementary equipment sets provide

a stock of hand tools and expendable supplies. There are also crawler tractors with bulldozers, large towed scrapers, sheepsfoot rollers, and a towed rooter. For quarry operations there is a crushing and screening plant and a quarry equipment set containing drilling tools. For surfacing, there are tandem and three-wheel rollers, a water distributor, an asphalt kettle, and concrete mixing equipment. Crawler and truck-mounted crane shovels with attachments are included, and one heavy pneumatic pile driver hammer is provided for heavy-duty pile construction. An earth auger, a large air compressor, and motorized road graders are available.

*f. Mobile Shops.* Mobile shops, including one emergency repair shop for job site repairs, permit maintenance of all battalion equipment not requiring major repair or overhaul. Mobile lubricators permit the servicing of equipment on the job.

*g. Vehicles Available for Hauling.* The battalion has dump trucks for materiel hauling. In addition, there are cargo trucks which can be used for general hauling. Semitrailers are normally used for transporting heavy equipment, but are also available for hauling class IV engineer supplies.

*h. Water Purification Equipment.* The battalion supply section has sufficient water purification equipment to furnish drinking water for the battalion, with a limited surplus for other nearby troops.

*i. Armament.* The armament of the battalion consists of caliber .50 and caliber .30 machineguns, 3.5-inch rocket launchers, rifles, carbines, and pistols.

*j. Detailed Lists of Equipment.* See T/O & E 5-315A.

### **133. Communications**

Radio and telephone equipment are provided for communications within the battalion and with attached units. One teletypewriter is provided for communicating with construction group headquarters.

### **134. Teams**

*Team GA : Dump Truck*, of the engineer service organization, may be attached to a company of the construction battalion, as an alternative to its more normal attachment to a dump truck company.

## **Section III. ENGINEER HEAVY EQUIPMENT COMPANY**

### **135. Mission**

The mission of the engineer heavy equipment company is the operation and maintenance of a concentration of heavy construction equipment in support of other engineer construction units.

### **136. Assignment**

The company is assigned to army or communications zone, normally with further assignment or attachment to an engineer construction group.

### **137. Capabilities**

*a. The company is trained and equipped to--*

- (1) Operate in support of one engineer group engaged in construction work involving a considerable amount of earth work, grading, and surfacing operations.
- (2) Operate as a unit with a specific earth-moving or surface mission.

- (3) Furnish direct support to other units by temporary attachment of equipment and personnel thereto.
- (4) Provide quarrying, crushing, and screening equipment, and basic operators, with a capacity of 50 tons of crushed rock per hour.
- (5) Provide a balanced set of equipment, and basic operators, for bituminous surface treatment of roads and hardstands.
- (6) Perform organizational maintenance on unit equipment, and partial field maintenance (50 percent) on organic heavy engineer equipment.

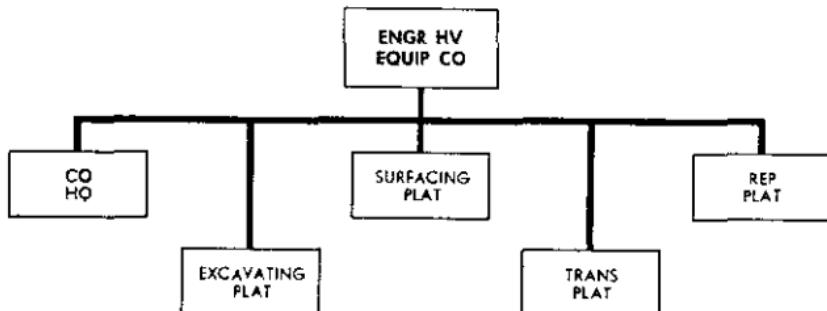
b. The company is 50 percent mobile.

### **138. Organization**

The company is organized under T/O & E 5-328A. It consists of a company headquarters, an excavating platoon, a surfacing platoon, a transportation platoon, and a repair platoon (see fig. 13).

### **139. Employment**

a. Normally the surfacing platoon or the excavating platoon, augmented as required by dump



*Figure 13. Organization of engineer heavy equipment company.*

trucks from the transportation platoon, is attached to, or placed in support of, a construction battalion having a task which requires such reinforcement. When the job schedule permits, such an attached or supporting platoon should be given a specific task by the battalion, since the platoons have their own supervisory personnel.

b. When more than one battalion must be augmented, or the augmentation required is small, individual items of equipment, normally with two shifts of operators, may be attached.

c. During the period of such attachment, the battalion is responsible for the proper use and maintenance of the equipment, and for the administration and well-being of the personnel. However, the heavy equipment company officers, by liaison, insure that their personnel and equipment are receiving proper treatment. When it is clear that the attachment of a large part of the company's equipment to a battalion will continue for some time, the company commander may attach part of his repair platoon to the same battalion, or alternatively may arrange for the return of equipment for required periodic maintenance, depending upon the geographic dispersion.

d. It will be seen from the foregoing that the more common mission of the heavy equipment company is to assist one or more construction battalions (normally, battalions operating under a group headquarters to which the company is also attached) by the loan of equipment and skilled personnel. However, on occasion the company may be given direct responsibility for certain types of construction work. For example, if one of the missions of a construction

group is a short-haul earth-moving task forming part of an airfield or depot project; but if, for the time being, the group and its battalions also have, as a primary mission, some different task such as large-scale design or survey work; then the heavy construction company, as a unit, may be assigned the earth-moving task.

#### **140. Description of Equipment**

*a. Repair Platoon.* Blacksmith, canvas working, welding, and motorized shop equipment are provided for the maintenance work of the repair platoon. Trailer-mounted lubricators and an emergency repair shop permit servicing and minor repairs on the job.

*b. Excavating Platoon.* The equipment of this platoon includes crawler-type crane-shovels; truck-mounted crane-shovels; booms, clamshell and dragline buckets, shovels, and pile-driving equipment for use with the foregoing; crawler tractors with angle-dozer, crawler tractors with bulldozer, and wheeled tractors; motorized road grader; ladder-type crawler ditching machines; cable operated road rooters, and cable operated road scrapers.

*c. Surfacing Platoon.* The surfacing platoon has equipment for bituminous surfacing, including a car heater, an asphalt pump, a storage trailer, and distributors. Asphalt kettles are available for patching. For preparing the subgrade the platoon has tandem, three-wheel, and towed sheepfoot rollers, rubber-tired utility tractors for mowers and sweepers, water distributors, and motorized graders. Crushing and screening plants, and a quarry set containing drilling equipment, furnish aggregate. When

authorized, the platoon has a two-unit asphalt mixing plant for making asphaltic concrete.

*d. Transportation Platoon.* The transportation platoon has dump trucks, truck tractors with semi-trailers, and truck tractors with heavy trailers. While the primary function of this platoon is the transportation of the heavy equipment, it can be used for materials hauling when so required.

*e. Armament.* Armament is limited to carbines and rifles.

*f. Detailed Lists of Equipment.* See T/O & E 5-328A.

#### **141. Communications**

Limited telephone equipment is provided for company operations.

### **Section IV. ENGINEER DUMP TRUCK COMPANY**

#### **142. Mission**

The mission of the engineer dump truck company is the operation of dump trucks for movement of bulk materials in support of other engineering units.

#### **143. Assignment**

The company is assigned to army or communications zone, normally with further assignment or attachment to an engineer combat group or construction group or an engineer brigade.

#### **144. Capabilities**

*a.* The company can move 240 yards per trip of bulk material such as gravel, dirt, or crushed stone. The amount that it can move in a day depends on

such factors as weather, length of haul, condition of roads, nature of materials, and loading facilities.

b. The company is completely mobile.

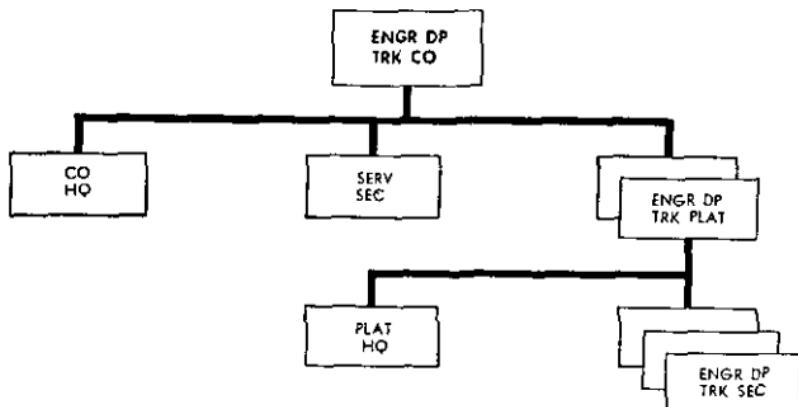
#### **145. Organization**

a. The company is organized under T/O & E 5-324A. It consists of a company headquarters, a service section, and two identical dump truck platoons (see fig. 14).

b. Each dump truck platoon includes a platoon headquarters and three identical dump truck sections.

#### **146. Employment**

a. The company is habitually attached to, or placed in support of, another engineer unit, most commonly an engineer combat battalion or construction battalion, either as a company or by platoons or sections. When sub-units are so attached, company headquarters remains with the larger detachment, or at a central location to permit servicing of equipment.



*Figure 14. Organization of engineer dump truck company.*

*b.* Operations by support are preferable, as personnel administration and vehicle maintenance can be most effectively conducted by the company on that basis.

*c.* When vehicles and personnel are attached to another unit, that unit is responsible for the proper operation and maintenance of the vehicles, and for the administration and well-being of the personnel. Officers of the dump truck company, by liaison, insure that their personnel and equipment are receiving proper treatment. A portion of the service section may be attached to reinforce the maintenance capabilities of the unit to which the trucks are attached.

*d.* Employment of dump trucks should be based upon about 80 percent of the vehicles being in use at any given time. This permits the company to schedule the required periodic maintenance inspections and repair.

#### **147. Description of Equipment**

*a.* The company, in addition to its dump trucks, has a gasoline tank truck, a heavy wrecker, and a trailer-mounted lubricator.

*b.* The company also has housekeeping equipment, and organizational maintenance sets for vehicle maintenance.

*c.* Armament is limited to carbines and rifles.

*d.* See T/O & E 5-324A for detailed lists of equipment.

#### **148. Communications**

Telephones are provided for communications when wire is laid to the company by the unit with which it is associated.

## **149. Teams**

*Team GA: Dump Truck*, of the engineer service organization, may be attached to a dump truck company whose mission requires an augmentation of its organic equipment and personnel. Such attachment increases the carrying capacity of the company by about 20 percent.

## **150. Engineer Dump Truck Company (Type B)**

This unit is organized under T/O & E 5-324B. It differs from the ordinary company, described above, in that, except for a limited number of supervisory and administrative personnel, it consists of indigenous personnel obtained in the theater of operations. The latter category includes drivers, mechanics, interpreters, etc. The T/O & E is a guide to the organization of indigenous labor for such duty but must be modified to reflect local conditions of employment. As the task is drawn, the unit has a greater strength (including indigenous personnel) than does the company organized under T/O & E 5-324A and the equipment differs in a number of details but the capacity for work is the same. The strength shown in the table may be exceeded, with respect to indigenous labor, by not over 25 percent. Issue of arms and individual equipment to non-military personnel require approval of the theater Army commander or D/A.

## **Section V. ENGINEER PIPELINE COMPANY**

### **151. Mission**

The mission of the engineer pipeline company is the construction and rehabilitation of petroleum un-

loading and bulk storage facilities and pipeline systems, and the operation and maintenance of petroleum pipeline systems.

### **152. Assignment**

The company is normally assigned to theater headquarters, and further assigned or attached to an engineer construction group or brigade.

### **153. Capabilities**

*a.* The company can—

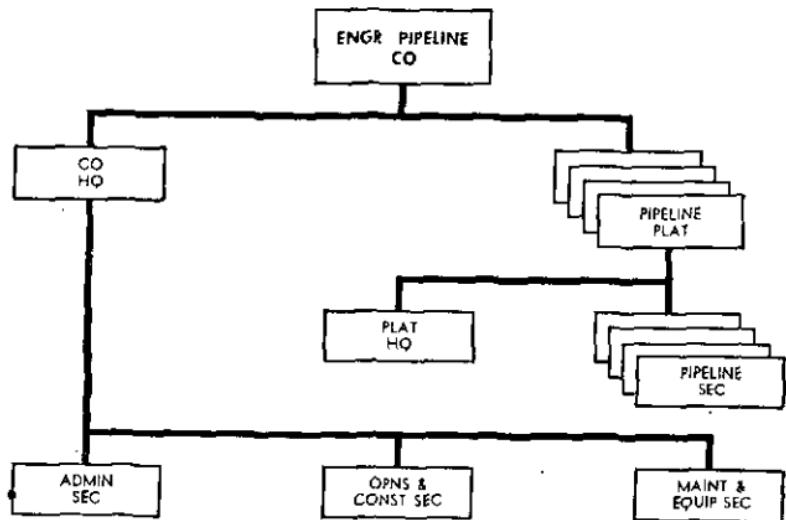
- (1) Construct a petroleum pipeline system with 16 pumping stations, maintain it, and operate it on a 24-hour basis.
- (2) Install tanker unloading facilities, including submarine pipelines, at ports and beachheads.
- (3) Erect bolted steel storage tanks, and make major repairs thereon.
- (4) Furnish technical supervision for other units engaged in the construction or rehabilitation of bulk petroleum storage facilities and pipelines.

*b.* While the company is capable of laying out and constructing military pipelines, or rehabilitating existing ones, it must be supplemented by other construction troops if the work must be done in a short time or involves major structures or earth-moving operations.

*c.* The unit is about 80 percent mobile.

### **154. Organization**

*a.* The company is organized under T/O & E 5-327. It consists of a company headquarters and four identical pipeline platoons (see fig. 15).



*Figure 15. Organization of engineer pipeline company.*

b. Company headquarters includes an administrative section, an operations and construction section, and a maintenance and equipment section.

c. Each pipeline platoon includes a platoon headquarters and four identical pipeline sections.

### **155. Employment**

.a. As the company can both build and operate pipelines, it may be employed on either task, or on both at once. Pipeline platoons can lay pipes with their own personnel and equipment under normal conditions. They use the operations and construction section and equipment from company headquarters for special sites where the pipe must be supported, or where auxiliary structures and facilities are to be erected. After construction is finished, the company can perform all major pipeline maintenance and improvement of installations.

*b.* In an army area, the pipeline is laid from the advance section of the communications zone to the pipeheads required by the army.

*c.* In a mobile situation, construction, operation, and maintenance work on pipelines is likely to be concurrent.

*d.* In general, the route of a pipeline is determined at theater or army level, with temporary branch lines to army pipeheads selected by the army quartermaster.

*e.* Personnel are provided for 24-hour operation and maintenance of pipelines. For construction, however, the company is capable only of one-shift or limited two-shift work.

*f.* Operation and routine maintenance of unloading and bulk storage facilities are not a part of the company's duties, but a function of the Quartermaster Corps.

*g.* If a pipeline project must be completed in an unusually short time, or if it involves major construction or large-scale earth-moving, the pipeline company must be supplemented by other construction troops.

## **156. Description of Equipment**

*a. Equipment Sets.* The company has carpenter, pioneer, pipefitting, and rigging sets for pipeline construction. There are also blacksmith, tinsmith, welding, and automotive mechanics' sets, and a general purpose shop set, for maintenance of vehicles and of pipeline equipment, and survey equipment for pipeline construction surveys.

*b. Special Equipment.* Special truck body sets are provided for conversion of cargo trucks into special vehicles suitable for handling pipeline supplies. A

gasoline storage tank safety equipment set provides test equipment and protective clothing for personnel who clean storage tanks. Floodlighting equipment is available for night construction, emergency repair, or the illumination of sensitive areas for protection against sabotage. Small field ranges and water purification equipment are provided so that a pipeline section can have its own mess as needed: for example, if operating a stretch of pipeline at an isolated location.

*c. Heavy Equipment.* There are truck-mounted air compressors, and crawler tractors with bulldozers and truck-mounted crane-shovel, for construction operations.

*d. Armament.* Armament is restricted to carbines and rifles.

*e. Detailed Lists of Equipment.* See T/O & E 5-327.

## **157. Communications**

Communications for the operation of the pipeline, and all ties to other headquarters (usually radio and telephone), are provided by the Signal Corps as directed by the headquarters planning the pipeline service. A small amount of organic telephone equipment is provided for construction operations.

## **158. Teams**

*a. Team GC : Pipeline Operating,* of the engineer service organization, may be attached to a pipeline company which has an operation and maintenance mission and needs augmentation. The team can operate and maintain up to 50 miles of pipeline and three pumping stations.

*b.* Alternatively, such a team may operate independently on a similar mission not requiring a full pipeline company.

*c.* It is anticipated that the pipeline operating teams will be used to operate the pipelines when the pipeline companies move forward to construct more line. These teams will be augmented by maintenance teams.

## **Section VI. ENGINEER PORT CONSTRUCTION COMPANY**

### **159. Mission**

The mission of the engineer port construction company is the performance of engineering work involved in the provision of waterfront facilities at a port.

### **160. Assignment**

The company is normally assigned to an engineer construction group operating in the communications zone. On occasion it may operate in an army area.

### **161. Capabilities**

The company is trained and equipped to—

*a.* Perform specialized tasks in the construction and rehabilitation of port facilities, inland waterways, and facilities pertaining thereto, operating in conjunction with other engineer units.

*b.* Perform organizational maintenance of all organic equipment and partial field maintenance (50 percent) of organic engineer equipment.

### **162. Organization**

*a.* The company is organized under T/O & E

5-329A. It consists of company headquarters, two identical construction platoons, and a service platoon (see fig. 16).

- b. Company headquarters includes—
  - (1) A headquarters section.
  - (2) An operations and engineer section.
  - (3) A supply section.
  - (4) A diver section.
- c. Each construction platoon includes—
  - (1) Platoon headquarters.
  - (2) A construction section.
  - (3) An equipment section.
- d. The service platoon includes—
  - (1) A headquarters section.
  - (2) An equipment and transportation section.
  - (3) A shop section.

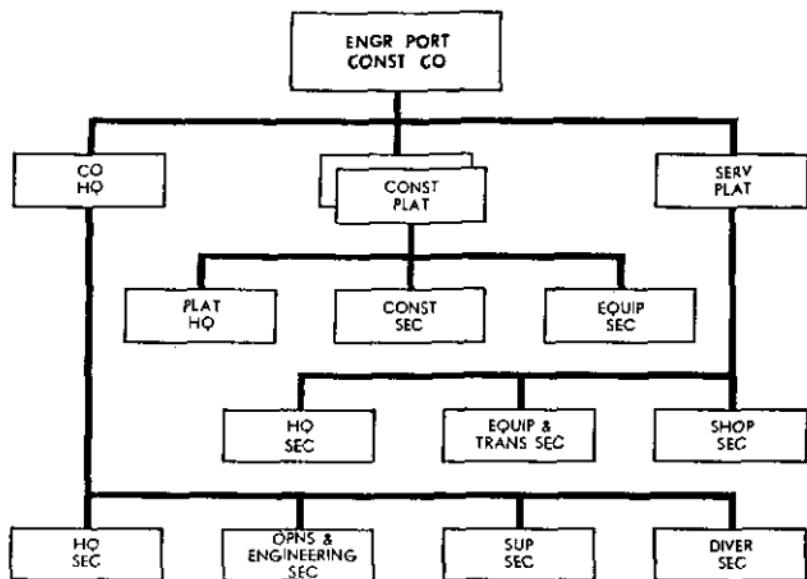


Figure 16. Organization of engineer port construction company.

### **163. Employment**

- a. A large ocean or inland waterway port has a wide variety of facilities. The activities of the engineer port construction company are typically confined to the construction or major repair of structures on or immediately adjacent to the waterfront, such as piers, quays, slips, locks, dry-docks, jetties, transit sheds, waterfront storage and repair facilities, cargo-hauling machinery and facilities, transportation facilities serving the waterfront (railroad tracks and yards, highways, and parking areas), etc.
- b. For very large-scale port work, or work involving heavier or more specialized equipment than is organic to the company, it may need to be supplemented by other engineer construction units or by civilian labor. For sub-aqueous excavation beyond the capacity or range of action of the company's dragline equipment, it must rely on floating dredges (either civilian or manned by engineer dredge crew units).
- c. The company's activities are normally in a base section of the communications zone, although on occasion, especially with respect to an inland waterway, it may work at more advance localities, even within the service area of a field army. It normally operates as one element of a large-scale coordinated construction operation, under an engineer construction group or brigade.
- d. The company does not normally undertake routine maintenance or minor repairs of port facilities.

### **164. Description of Equipment**

- a. Each construction platoon has air compressors

with accessories; crane-shovel equipment (truck-mounted and crawler-type) with attachments for handling dragline and clamshell excavation, pile driving, and other work; hydraulic jacks; a diesel-driven double drum hoist; centrifugal pumps, crawler-type tractor and a truck tractor equipment; chain and circular saws with accessories; carpenter, floodlighting, canvas working, demolition, blacksmith, tinsmith, jetting, pioneer, pipefitting, rigging, oxyacetylene welding, and electric arc welding equipment.

b. The service platoon has air compressors with accessories; light crane-shovels with dragline and bucket attachments; a skid-mounted 15-KW generator set; a diesel driven double drum hoist; crawler-type tractors; trailer mounted concrete mixers; motorized equipment for a general purpose repair shop; and sets of blacksmith, pipefitting, tinsmith, oxyacetylene welding, and electric arc welding equipment.

c. The company has rectangular steel pontons and curved end steel pontons, which can be assembled into barges or lighters of various sizes. (A common assembly is a barge 4 rectangular units wide and 12 units long in addition to end units.) The pontons are equally divided between the construction platoon, the equipment and transportation section, and the shop section. Propelling units are provided.

d. Company headquarters has sets of shallow and deep water diving equipment; sets of oxyacetylene underwater cutting equipment; and sets of drafting, electric lighting, reproduction, sign painting, sketching, and surveying equipment.

e. Armament is limited to carbines and rifles.

## 165. Communications

The company has radio facilities for communication between headquarters and the construction platoons, and for participation in the group net. It has a switchboard and telephones for communication within company headquarters and with the three platoons. Trunk service must be provided by higher authority.

# Section VII. ENGINEER DREDGE CREWS: GENERAL

## 166. General

a. Operations in an oversea theater may involve the excavation, deepening, and maintenance of channels over ocean bars, within harbors and inland waterways, and leading to water terminals. Such work is commonly done by floating dredges of various types. The four types most commonly used in civilian practice, in the United States, are the cutter-head dredge (alternatively called the hydraulic suction dredge), the dipper dredge, the bucket dredge, and the seagoing hopper dredge. Another type, more commonly found in foreign countries, is the ladder dredge.

b. The need for dredges in a theater might be met by using locally owned ones on a contract basis, or by sending dredges with civilian crews from the continental United States. As an alternative, troop units may be organized to operate them. T/O & E's exist for five types of crews—

Engineer dredge crew, 20-inch nonself-propelled

diesel powered cutterhead type pipeline dredge.

Engineer dredge crew, 24-inch nonself-propelled steam turbine powered cutterhead type pipeline dredge.

Engineer dredge crew, seagoing hopper diesel electric powered dredge, 700-cubic yard.

Engineer dredge crew, seagoing hopper diesel electric powered dredge, 1,400-cubic yard.

Engineer dredge crew, seagoing hopper diesel electric powered dredge, 2,700-cubic yard.

### **167. Special Nature of the Units**

These troop units, their T/O & E's, and their equipment have certain special features.

a. The engineer equipment is "nonstandard." A great deal of special equipment, including floating plant, is needed in conjunction with the dredges, especially the cutter dredges. This is not specifically listed in the T/O & E's.

b. The provision of the dredges and equipment, and of the personnel as well, would probably be accomplished by inducting into military service the civilian crews of some of the dredges which are used by the Corps of Engineers in time of peace for navigation improvements; giving them basic military training; and sending them to the theater with the dredges and auxiliary equipment they have been used to operating. The T/O & E's of the five crews are "written around" certain specified existing dredges.

c. In large port developments, dipper or bucket dredges may be needed in addition to the above cut-

ter and seagoing hopper types. It might be advisable, in their case also, to utilize existing Government dredges and induct the civilian crews into military service. There are no T/O & E's providing for such crews. However, in view of the way in which such units are recruited, trained, and equipped (*b* above), this is unimportant, since a new T/O & E for any type of dredge unit can be prepared without delay, by basing it on the actual crew and equipment to be used.

### **168. Cutterhead Dredges, General**

*a.* A cutterhead dredge is a rectangular barge, not self-propelled, containing living quarters for the crew, fuel and supplies, and the operating machinery. At its bow it has a ladder carrying the cutterhead, which can be lowered into contact with the material to be dredged. A pipeline leads from the cutterhead, via the ladder, to a pump in the hold of the dredge, and thence to the stern of the dredge. From that point it is continued by a "floating line" made of sections of pipe, mounted on pontoons, which may be connected together to form a pipeline of any desired length. The dredge operates by swinging to and fro across the width of the channel to be dredged, and at the same time stepping itself forward. As it swings, the rotating cutterhead macerates the bottom material with which it is in contact. This material, mixed with water, is pumped through the dredge and the floating line. If the dump is under water, the material is discharged at the end of the floating line. If it is on land, the floating line is led to shore and connected to the necessary length of

shore pipe, through which the material passes to the dump.

*b.* The cutterhead dredge is a very efficient machine for excavating a channel in sand, gravel, clay, etc., in a reasonably sheltered locality. It cannot handle rock or large boulders, nor can it operate in a confined space.

*c.* For further details see TM 5-360.

### **169. Seagoing Hopper Dredges, General**

*a.* A seagoing hopper dredge is an ocean-going vessel, self-propelled. On each side of the hull is a pivoted pipe or drag,<sup>2</sup> terminating in a shoe, which can be lowered to the bottom and dragged along behind the dredges. A pipe runs through the drag to the pump and thence to the hopper, which is a bin built into the hull, having gates at the bottom and an overflow. When operating, the vessel moves slowly along the channel to be dredged. The layer of bottom material in contact with the shoe, mixed with water, is sucked through the pipe and delivered to the hopper, surplus water escaping by the overflow. When an optimum load has been obtained, the drag is raised and the vessel cruises to the dump and deposits its load.

*b.* The hopper dredge can operate in unsheltered water, such as a bar at the mouth of a harbor. It can handle only reasonably soft material. Since it must move over the area to be dredged, it requires a certain minimum initial depth of channel.

*c.* For further details see TM 5-360.

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<sup>2</sup> In some models the drag is on one side only.

## **Section VIII. ENGINEER DREDGE CREWS CUTTERHEAD TYPE**

**A. ENGINEER DREDGE CREW, 20-INCH NONSELF - PROPELLED DIESEL POWERED CUTTERHEAD TYPE PIPELINE DREDGE**

### **170. Mission**

The mission of this crew is to provide technically qualified personnel for the operation and maintenance of an engineer 20-inch nonself-propelled diesel powered cutterhead type pipeline dredge used in dredging rivers, harbors, or channels.

### **171. Assignment**

The unit is normally assigned to theater of operations headquarters.

### **172. Capabilities**

*a.* The dredge assigned to the unit can excavate subaqueous materials, other than rock or very hard materials, in reasonably sheltered water, over a range of depths varying from about 18 feet to about 50 feet, and pump it for distances up to several thousand feet. If the dump is beyond the economical limit of the dredge's pumping machinery, one or more booster pumps may be inserted in the pipeline. The bottom width of channel which the dredge is to cut should not be less than about 100 feet, to give swinging room; and a greater width than about 300 feet cannot be cut on a single operation.

*b.* Under ideal conditions (quiet water, good weather, good material, short pipeline, water dump,

etc.) the dredge may excavate as much as 1200 cubic yards<sup>3</sup> per hour of operating time. Such a figure is seldom attained. The hourly output may be reduced to a fraction of this by less favorable conditions such as hard material, long pipelines, a land dump at a high elevation, bad weather, etc. The monthly or long-term output is also affected by such factors as breakages of the cutterhead due to striking hard obstructions, lost time while changing location, and time out for mechanical overhaul.

c. The unit cannot dredge rock or very hard material, though its ability in this line can be increased by using a specially constructed cutterhead. It cannot operate in cramped quarters, or too close to subaqueous structures, such as piers, which might be damaged by contact with the cutterhead.

d. The crew is adequate for 3-shift protection. Continuous operation on this basis, however, will lower mechanical efficiency.

### **173. Organization**

The organization of the crew resembles that customary in civilian practice. The commissioned officers are the master of the vessel (unit commander), the chief engineer, his first and second assistants, the first mate and the chief electrician. Under the chief engineer are the engine-room crew and the technicians who operate and service auxiliary equipment. The first mate is in charge of administration, mess, supply, general police, and the maintenance and upkeep of non-mechanical elements of the dredge. He also supervises and administers the attached shore

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<sup>3</sup> Measured by before-and-after surveys of the excavated channel.

crew. The assistant mate, leverman, a warrant officer, is in direct charge of the mechanical operation of the dredging apparatus (raising and lowering the ladder, operating the spuds and swinging engines, etc.). The foreman, ponton pipeline, is in charge of the floating line and shore pipe, including the preparation of land dumps.

#### **174. Description of Equipment**

*a.* In general, the dredge is as described in paragraph 168. The term "20-inch" refers to the diameter of the discharge pipe. A diameter of 20 inches corresponds to a dredge of moderate size and capacity.

#### **175. Employment**

*a.* The normal employment of the dredge crew is as one element of a construction group or engineer brigade engaged in developing, expanding, or maintaining a port or navigable waterway, in the communications zone. It is a specialized unit requiring elaborate and expensive auxiliary apparatus and shore facilities.

*b.* The unit can be used to dredge and maintain navigable channels in harbors, rivers, and estuaries; to dredge anchorages and turning basins; and to make fills to convert shallow or marshy areas along shore into firm land for the expansion of port or other facilities, for airplane runways, etc.

#### **176. Communications**

The dredge is normally equipped with radio.

**B. ENGINEER DREDGE CREW, 24-INCH  
NONSELF-PROPELLED STEAM TURBINE  
POWERED CUTTERHEAD TYPE PIPE-  
LINE DREDGE**

**177. Description**

This unit is similar to the 20-inch unit just discussed, except as follows:

- a. The dredge is larger, having a discharge pipe of 24-inch diameter and can dig within a depth range of 38 to 65 feet.
- b. The prime mover is of the type indicated in the title.
- c. The personnel are slightly different, corresponding to the type of machinery installed.

**Section IX. ENGINEER DREDGE CREWS, SEAGOING  
HOPPER TYPE**

**A. ENGINEER DREDGE CREW, SEAGOING  
HOPPER DIESEL ELECTRIC POWERED  
DREDGE, 700-CUBIC YARD**

**178. Mission**

The mission of this crew is to provide technically qualified personnel for the operation and maintenance of an engineer seagoing hopper diesel electric powered dredge, 700-cubic yard capacity, used in dredging rivers, harbors, or channels.

**179. Assignment**

The unit is normally assigned to theater of operations headquarters.

## **180. Capabilities**

*a.* The dredge assigned to the unit can excavate reasonably soft subaqueous materials in open and unsheltered water, such as a wide estuary or harbor mouth. Using a special device which reduces its capacity and operating draft, and given calm water and a short cut, it can dredge in water as shallow as 12 feet or slightly less. Under ordinary conditions and operating at full capacity, the minimum depth should be not less than 15 feet, somewhat more in rough water. Maximum depth, using a long drag, is about 45 feet.

*b.* With good material, good weather, moderate depths, a long straight cut, and a conveniently located dump, such a dredge can remove about 300,000 yards per month on a 3-shift basis. Unfavorable conditions may reduce the output to a fraction of this.

*c.* The dredge is ineffective against hard material. It is seaworthy under any conditions, but cannot operate effectively in very rough weather.

## **181. Organization**

The statements in paragraph 173 apply to this crew, with minor variations due to mechanical differences.

## **182. Description of Equipment**

*a.* In general, the equipment is as described in paragraph 169. A 700-yard hopper dredge is a small, light-draft type, designed to provide channels over bars or shoals in water too shallow to float a large dredge. As stated above, it has a device (auxiliary

gate) which permits it to work in quite shallow water by sacrificing capacity. It can dredge even shallower stretches by working at high tide only.

b. The dredge is powered by a diesel plant operating an electric generator. This activates the motors which drive the ship and the pump, raise and lower the drag, open and close the bin gates, etc.

c. The dredge needs certain auxiliary equipment, including survey boats and an operating base.

### **183. Employment**

a. The normal employment of the unit is as one element of an engineer brigade or construction group engaged in developing or maintaining a seaport in the communications zone. It is a specialized unit requiring adequate shore facilities.

b. The dredge can be used to dredge and maintain navigable channels in exposed locations, such as entrance bars, open estuaries, and large unsheltered harbors. It is likely to be less efficient than a cutter dredge in localities where either can be used, but it can operate in open water where the cutter type cannot.

c. The unit is especially effective in situations where a deep channel is not needed or for medium-draft maintenance work where the rate of shoaling is not great. If a deep channel is desired in a location which is naturally shallow, the dredge may be employed to dig a pilot channel deep enough to allow the use of a larger and more powerful hopper dredge. It is thus valuable for initial port developments in a theater not having large modern ports.

#### **184. Communications**

The dredge has a radio installation adequate for ship-to-shore communication.

#### **B. ENGINEER DREDGE CREW, SEAGOING HOPPER DIESEL ELECTRIC POWERED DREDGE, 1,400-CUBIC YARD**

#### **185. Description**

This differs from the 700-yard unit in the following respects—

- a. The dredge draws 23 feet when dredging and the least depth in which it can safely operate is somewhat greater.
- b. Due to its greater bin capacity, it can dredge about 65 percent more material per unit of time.
- c. The crew is a little larger.

#### **C. ENGINEER DREDGE CREW, SEAGOING HOPPER DIESEL ELECTRIC POWERED DREDGE, 2,700-CUBIC YARD**

#### **186. Description**

This unit operates a still larger hopper dredge. It can operate in slightly shallower water than the 1,400-cubic yard type. Its cruising speed is less.

### **Section X. ENGINEER CONSTRUCTION GROUP**

#### **187. Mission**

- a. *Engineer Construction Group.* To perform, for army or the communications zone, large scale coordinated engineer construction operations and allied activities, within a specified area or field of responsibility.

*b. Headquarters and Headquarters Company, Engineer Construction Group.* To plan and coordinate the operations of a group comprising engineer construction battalions and other assigned or attached units engaged in construction of facilities other than those for signal communication, to include command of assigned or attached units, and supervision of their administration.

### **188. Assignment**

The group may be assigned to army or communications zone; in the latter case it is normally further assigned to an engineer brigade.

### **189. Capabilities**

*a. The Group.* Its capabilities depend on the number and type of its component units.

*b. Headquarters and Headquarters Company.* Provides command, control, staff planning, supervision and administration of from two to four engineer construction battalions, and up to 2,000 additional assigned or attached engineer troops. Planning and supervising construction or rehabilitation of roads, railways, buildings, bridges, utilities, installations, airbases, petroleum pipelines, and storage facilities with special training; and major port facilities when augmented by port construction specialists. Preparation of progress reports, project plans, and designs. Project assignment to subordinate units, and allocation of troops, construction materials, and equipment to group projects. Consolidation of overall requirements and coordination of supply of equipment and materials for group projects.

*c. Mobility.*

- (1) Headquarters and headquarters company is entirely mobile, using organic transportation.
- (2) For the mobility of component units, see elsewhere in this manual.

**190. Organization**

*a.* The construction group is a flexible organization which, besides its headquarters and headquarters company, consists of a varying number of administratively self-sufficient units. A typical group may consist of three engineer construction battalions, one or more engineer dump truck companies, and an engineer heavy equipment company. However, such a type group may be varied as the situation demands, provided that the command capability of group headquarters is not exceeded. A reasonable upper limit of that capability may be taken as a construction force with a total strength of 4,500 men, more or less, composed principally of construction battalions or equivalent.

*b.* As examples of the manner in which the group's components may be varied—

- (1) In an area where there is a plentiful supply of skilled civilian or PW labor, the number of construction battalions in the group may be reduced.
- (2) A group having a port construction or reconstruction mission may be reinforced by one or more port construction companies.
- (3) A group having responsible charge of a pipeline and tank-farm construction proj-

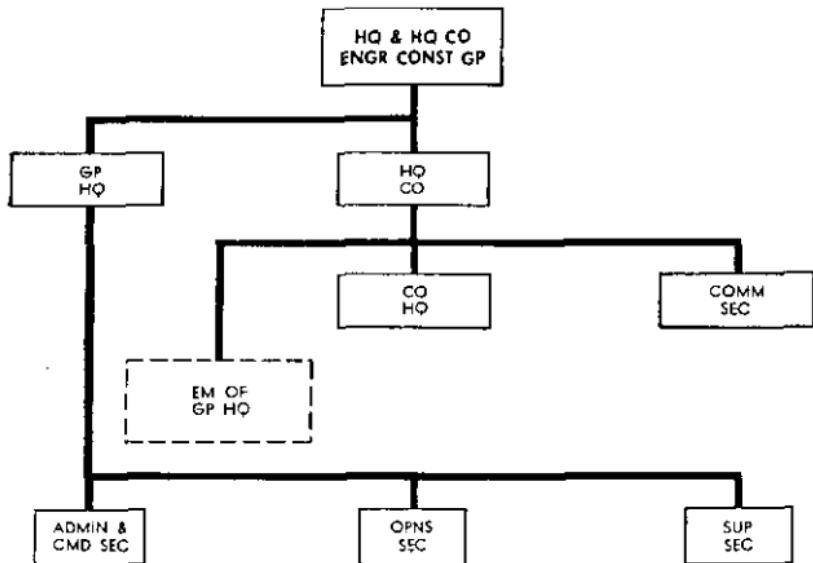
ect may be reinforced by one or more engineer pipeline companies.

c. For detailed organization of the component units of a group, see elsewhere in this manual.

d. The component units are normally assigned to the group. They may, instead, be attached; but attachments should be terminated as soon as possible.

e. The headquarters and headquarters company is organized under T/O & E 5-312A (see fig. 17). It consists of—

- (1) The group headquarters, including an administrative and command section, operations, and supply section, performing the usual S1, S2-3, and S4 duties.
- (2) The headquarters company, composed of a company headquarters, a communications



*Figure 17. Organization of headquarters and headquarters company, engineer construction group.*

section, and the enlisted personnel of group headquarters.

*f.* Medical service for the group headquarters company and its assigned units is provided on an area basis by medical installations or units.

### **191. Employment**

*a.* Normal allocation is on the basis of two or three groups per field army, and in the communications zone four groups per engineer brigade.

*b.* A group assigned to a field army is not normally further assigned or attached, but works in the army service area directly under the army engineer. Tasks assigned to a group are usually large construction projects such as cantonments, depots, hospitals, heavy fixed bridges (including railroad bridges), etc.

*c.* A group assigned to the communications zone may be further assigned to an engineer brigade. In a section of the communications zone where the group is the largest engineer troop unit, the group commander may also be the section engineer or may function directly under the section engineer if one is designated.

*d.* Components of groups should be assigned and remain stable whenever practicable.

### **192. Description of Equipment**

*a.* For the equipment of the component units of a group, see elsewhere in this manual.

*b.* The equipment of headquarters and headquarters company is largely individual or for housekeeping, local security, and engineer control. The latter include drafting and reproduction facilities,

reference texts, and laboratory sets for testing soils, concrete, and asphalt. Armament is limited to pistols, carbines and rifles.

c. Requirements for air reconnaissance are met from T/O & E 29-500A.

### **193. Communications**

Group communications include wire and a limited amount of radio. One teletypewriter is provided for use with construction battalions and higher headquarters. Field telephones and a large telephone switchboard provide all other communication facilities.

### **194. Teams**

Any of the following teams of the engineer service organization may be attached direct to an engineer construction group—

a. *Team HA: Headquarters Port Construction*, may be attached to a group engaged on a major port project, to provide skilled planning and supervisory personnel. It normally operates at group headquarters.

b. *Team HB: Diving*, may be attached under the same conditions. It may operate directly under group headquarters, or may be further attached to a port construction company. The team can augment the organic diving force of such a company by about 60 percent.

c. *Team HC: Welding*, may be attached to a group having a heavy welding load. Its employment within the group depends on the situation.

d. *Team GB: Rock Crusher*, or *Team GE: Well*

*Drilling*, may be attached to a group needing augmentation in these lines.

## Section XI. ENGINEER BRIGADE

### 195. Mission

*a. Engineer Brigade.* To perform within the communications zone, large scale coordinated engineer construction operations and allied activities beyond the capacity of a single engineer construction group, within a specified area or field of responsibility; including the establishment of bases and lines of communication.

*b. Headquarters and Headquarters Company, Engineer Brigade.* To command; to perform operational planning and supervision; and to coordinate activities of engineer construction groups, and other assigned or attached units engaged in construction and related work.

### 196. Assignment .

The brigade is normally assigned to the communications zone or a separate task force. It may be assigned to army or higher headquarters, especially during the planning and initial stages of an operation requiring considerable engineering effort.

### 197. Capabilities

*a. The Brigade.* Its capabilities depend on the number and type of its component units.

*b. Headquarters and Headquarters Company.* It is trained and equipped—

- (1) To command and supervise a force composed of engineer units totaling 15,000 to 20,000 men.

- (2) To plan and direct the engineer effort in establishing bases and lines of communication.
- (3) To review brigade supply requirements and supervise the procurement and allocation of equipment and materials.
- (4) To supervise subordinate units' administration including mess, supply, organizational maintenance, personnel requirements, allocation of replacements, promotions, awards, and decorations and the administration of military justice. Brigade furnishes direct administrative assistance to its separate companies or detachments which are not attached to groups or battalions.
- (5) To prepare brigade operational plans, project plans, designs, and construction directives for facilities required at military bases; allocation of troops, materials, and equipment to projects; and undertake the direction and technical supervision of units engaged on brigade construction projects.
- (6) On occasion, to serve as control headquarters for a separate task force for a major construction project with a minimum of additional technical personnel.

## **198. Organization**

*a.* The brigade is a flexible organization which, beside its headquarters and headquarters company, consists of a varying number of operating units. A typical brigade may include two to four construction groups, a maintenance and supply group, and some other miscellaneous engineer troops. The composi-

tion of the construction groups, as well as their number, are determined by the situation. The assignment or attachment of units is limited by the requirement that the command capability of brigade headquarters (between 15,000 and 20,000 men approximately) be not exceeded.

b. For detailed organization of the component units, see elsewhere in this manual.

c. The headquarters and headquarters company is organized under T/O & E 5-301A (see fig. 18). It consists of brigade headquarters and headquarters company.

(1) Brigade headquarters includes administrative, operations, and supply sections, performing the usual G1, G3 and G4 duties, and an engineering and plans section.

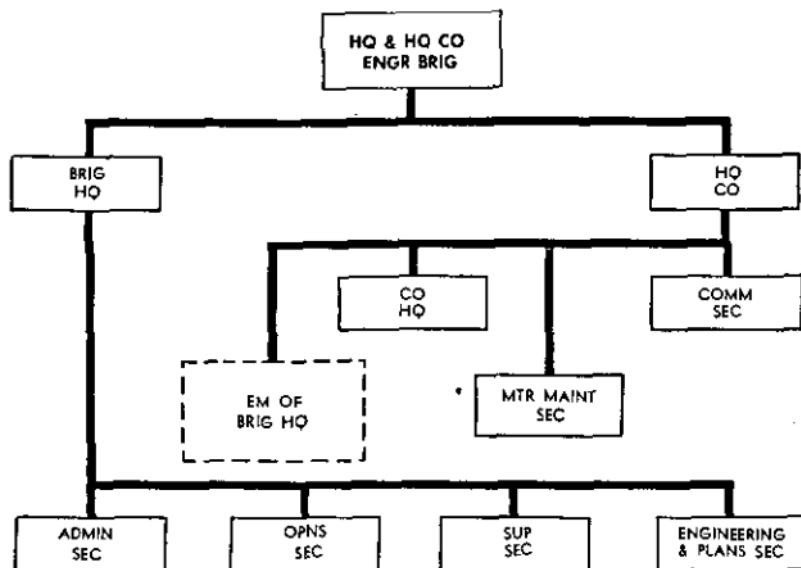


Figure 18. Organization of headquarters and headquarters company, engineer brigade.

- (2) Headquarters company includes company headquarters, a communications section, a motor maintenance section, and the enlisted personnel of brigade headquarters.

### **199. Employment**

- a. The engineer brigade finds its field in a situation where coordinated construction activities are required beyond the scope of a single engineer construction group, and where direct command of construction troops by an engineer headquarters is desirable. This situation commonly occurs in a communications zone supporting a large and active field force.
- b. Two engineer brigades of three construction groups each are appropriate for a communications zone having one section only; for a single large section of a multi-section communications zone; or to operate within the zone as an intersectional construction service. For a smaller section of a communications zone—or for a large section during the latter stages of an operation, when most construction requirements have been met—a single brigade may be adequate.

- c. If a brigade includes all the engineer troops in a communications zone section or equivalent command, the brigade commander normally has the additional function of staff engineer of the command.

### **200. Description of Equipment**

- a. For the equipment of the component units of the brigade, see elsewhere in this manual.
- b. The equipment of headquarters and headquarters company is largely individual or for housekeeping, local security, and engineer control. The latter

include surveying, drafting and reproduction facilities, reference texts, and laboratory sets for testing soils, concrete, and asphalt. Armament is restricted to carbines, rifles, and pistols.

## **201. Communications**

Brigade headquarters has a central office and telephone equipment for the headquarters sections, and a teletypewriter for communication with subordinate construction groups and with adjacent and higher headquarters. Otherwise, signal communications must be provided by the command to which the brigade is assigned. Signal units may be assigned to the brigade for this purpose.

## **202. Teams**

The following teams of the engineer service organization may be attached to an engineer brigade—

*a. Team GG: Water Purification*, may be attached if the brigade has a large water supply problem. The team, with certain augmentation, can operate a central purifying system serving up to 60,000 persons; and, with further augmentations, can operate a municipal system serving up to 200,000 persons.

*b. Team HJ: Power Plant Operating*, may be attached on a normal basis of four teams per brigade. Each team can operate a plant containing up to three diesel-driven electric generators of up to 11,500 kilowatts each.

*c. Team IA: Survey*, may be attached to handle survey work needed by brigade headquarters for general planning and supervision. The team has the technical personnel for one field party, equipped to handle reconnaissance, plane table work, leveling, precise traversing or triangulation.

## **CHAPTER 6**

### **ENGINEER TOPOGRAPHIC UNITS**

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#### **Section I. GENERAL**

##### **203. Theater Mapping Programs**

*a.* Modern war demands a great number and variety of maps, for use at all levels in the theater of operations. Normally, at the beginning of a campaign, the Army Map Service will have available a certain number of maps, charts, map substitutes, and basic data such as ground control, pertaining to the theater. These will be made available to the theater commander upon request. They must be supplemented by extensive topographic work in the field.

*b.* Accordingly, every theater will have an overall program of photographic, mapping, and charting work. The theater commander is responsible for its preparation and execution.

*c.* Available to him, for this purpose, are a number of engineer topographic units. They are assigned or attached to tactical or territorial commands. Their missions are set, in some cases by the headquarters to which they are assigned, and in others by theater headquarters, by means of orders and directives sent through command and technical channels.

##### **204. Activities Included in Map Program**

A comprehensive mapping program, using modern equipment, includes the following basic activities—

- a. Surveying, to establish the controls which are the skeleton of a map.
- b. Photomapping, to fill in the details of the map.<sup>1</sup>
- c. Reproducing the maps in quantity.
- d. Storing and issuing the maps.

## **205. Assignment of Activities to Units**

It is possible, by using suitable personnel and equipment, either to concentrate all these activities in a single operating unit or to divide them among several units, depending on the volume, accuracy, and specialized character of the output desired.

## **206. Engineer Topographic Units**

- a. The engineer topographic units are—
  - Engineer topographic company, corps.
  - Engineer topographic battalion, army.
  - Engineer aerial photo reproduction company.
  - Engineer base topographic battalion: the normal components of which are an engineer base survey company, an engineer base photomapping company, an engineer base reproduction company, and an engineer base map depot company. These units provide topographic services at corps, army, army group, and communications zone and theater levels.

## **207. Topographic Missions of the Various Units**

- a. The corps topographic company can do surveying, photomapping, and reproduction, and can store a limited stock of maps.
- b. The army topographic battalion goes a step farther in specialization, having a platoon (in head-

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<sup>1</sup> This can of course be done by ground topography instead of by photomapping, and often is.

quarters company) for surveying, a company for photomapping, and a company for the reproduction, storage, and issue of maps.

c. The specialized mission of the aerial photo-reproduction company is indicated by its name.

d. The base topographic units are still more specialized, a company being provided for each of the four basic activities. Each such company can operate independently. Normally, however, two or more are grouped under the base topographic battalion, a flexible unit to which companies are assigned as the situation demands.

e. The base topographic units normally operate at army group, communications zone, and theater levels.

## **208. Other Missions**

Topographic units perform a wide variety of work besides the actual making, reproducing, and issue of maps, as will be seen below.

## **209. Teams**

A number of the teams of the engineer service organization (see ch. 9) may be attached to a base topographic battalion, or to one or another of the companies which normally function as elements of such a battalion.

## **Section II. ENGINEER TOPOGRAPHIC COMPANY, CORPS**

### **210. Mission**

The mission of the engineer topographic company, corps, is to provide maps and survey information in

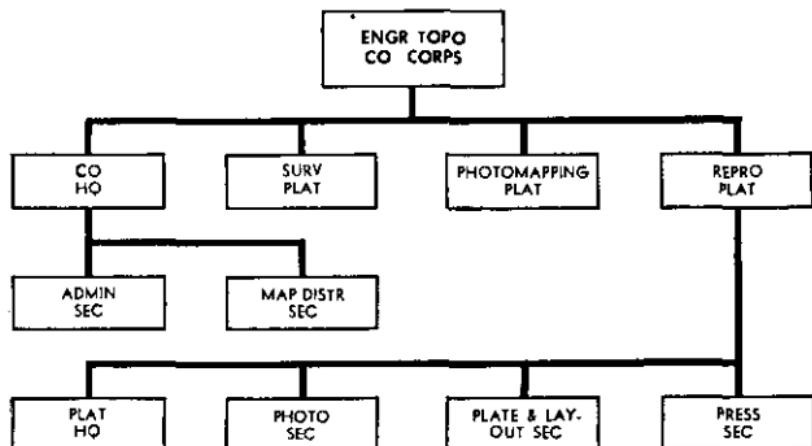
support of corps operations. It may fight as infantry when required.

## **211. Capabilities**

- a. The company is trained and equipped to—
  - (1) Prepare sketches, drawings, maps, and map substitutes.
  - (2) Reproduce existing maps and other intelligence material.
  - (3) Distribute maps and similar material.
  - (4) Accomplish surveys as required for topographic mapping, and furnish geodetic control for the use of artillery.
- b. The company is ninety-two percent mobile.

## **212. Organization**

- a. The company is organized under T/O & E 5-167A. It consists of a company headquarters, a survey platoon, a photomapping platoon, and a reproduction platoon (see fig. 19).



*Figure 19. Organization of engineer topographic company, corps.*

*b.* Company headquarters includes an administrative section and a map distribution section.

*c.* The reproduction platoon includes platoon headquarters, a press section, a photographic section, and a plate and layout section. The press section is organized for 2-shift operation.

### **213. Employment**

*a.* Normal allocation is one company per type corps, the company functioning directly under the corps engineer. It executes topographic and reproduction missions given the corps engineer within the policies established by the corps G2.

*b.* The company's participation in the theater mapping program is limited, because of the technical limitations of its equipment.

*c.* When the topographic requirements of a corps are beyond the company's capabilities, the army topographic battalion assists.

*d.* Among the principal tasks given a corps topographic company are—

- (1) Distribution of maps to corps units under G2 plans.
- (2) Revision of existing maps.
- (3) Preparation and reproduction of overprinted maps or overlays for corps operations.
- (4) Preparation of mosaics from recent aerial photography.
- (5) Extension of the survey control net for the artillery.
- (6) Establishment of geodetic control for radar site locations.

- (7) Establishment of ground survey control for topographic use.
- (8) Reproduction or binding of special intelligence publications.
- (9) Preparation of provisional maps and photomaps from aerial photography.

## **214. Equipment**

*a.* The equipment of the company is limited by the need for complete mobility, which restricts it to van-mounted reproduction equipment and simple photomapping equipment.

*b.* Company headquarters, besides its normal housekeeping equipment, has limited carpenter, pioneer and pipefitting sets. Tool sets, including a light machine repair kit, are provided for organizational maintenance. Water supply equipment provides water for press and photographic processes.

*c.* The survey platoon has equipment for plane-table work and for leveling by both instrumental and barometric methods, and has one-second theodolites for traverse and triangulation.

*d.* The photomapping platoon has stereocomparographs for map compilation, drafting equipment, a photoangulator, and both vertical and oblique sketchmasters.

*e.* The reproduction platoon has van-type trucks, which among them carry presses; copy camera, photographic processing, and plate processing equipment. All equipment is electrically operated from portable generators.

*f.* Armament consists of caliber .50 machineguns, caliber .45 submachineguns, rifles, carbines, and pistols.

*g.* See T/O & E 5-167A for detailed lists of equipment.

## **215. Communications**

Radios are provided for the control of survey parties. Limited telephone equipment is available for intra-company use. Corps signal units normally provide all external communications.

# **Section III. ENGINEER TOPOGRAPHIC BATTALION, ARMY**

## **216. Mission**

The mission of the engineer topographic battalion, army, is to provide maps and engineer survey information as required for an army in the field. It may fight as in infantry when required.

## **217. Assignment**

The normal assignment is one battalion per army.

## **218. Capabilities**

- a.* The battalion is trained and equipped to—
  - (1) Prepare maps, photomaps, sketches, drawings, and related material.
  - (2) Reproduce new and existing maps and other intelligence material.
  - (3) Store and distribute maps and similar material required by army troops and corps.
  - (4) Perform topographic surveys, and provide survey information required by an army in the field.
  - (5) Prepare engineer intelligence reports as directed.
- b.* The battalion is 75 percent mobile.

## **219. Organization**

- a.* The battalion is organized under T/O & E 5-55A. It consists of a headquarters, headquarters and service company (T/O & E 5-56A), an engineer map reproduction and distribution company, army (T/O & E 5-57A), and an engineer photomapping company, army (T/O & E 5-59A) (see fig. 20).
- b.* Battalion headquarters includes personnel and administrative section, an intelligence section, an operations section, and a supply section, performing the normal S1, S2, S3, and S4 duties.
- c.* Headquarters and service company includes—
  - (1) Company headquarters.
  - (2) A maintenance section and a survey platoon, the latter composed of platoon headquarters and four identical field parties.
  - (3) The enlisted personnel of battalion headquarters.
- d.* The engineer map reproduction and distribution company, army, includes—
  - (1) Company headquarters.
  - (2) A reproduction platoon, composed of platoon headquarters, a press section, a photographic section, and a plate and layout section.
  - (3) A map distribution platoon.
- e.* The engineer photomapping company, army, includes—
  - (1) Company headquarters.
  - (2) An operations section.
  - (3) Two identical photomapping platoons, each

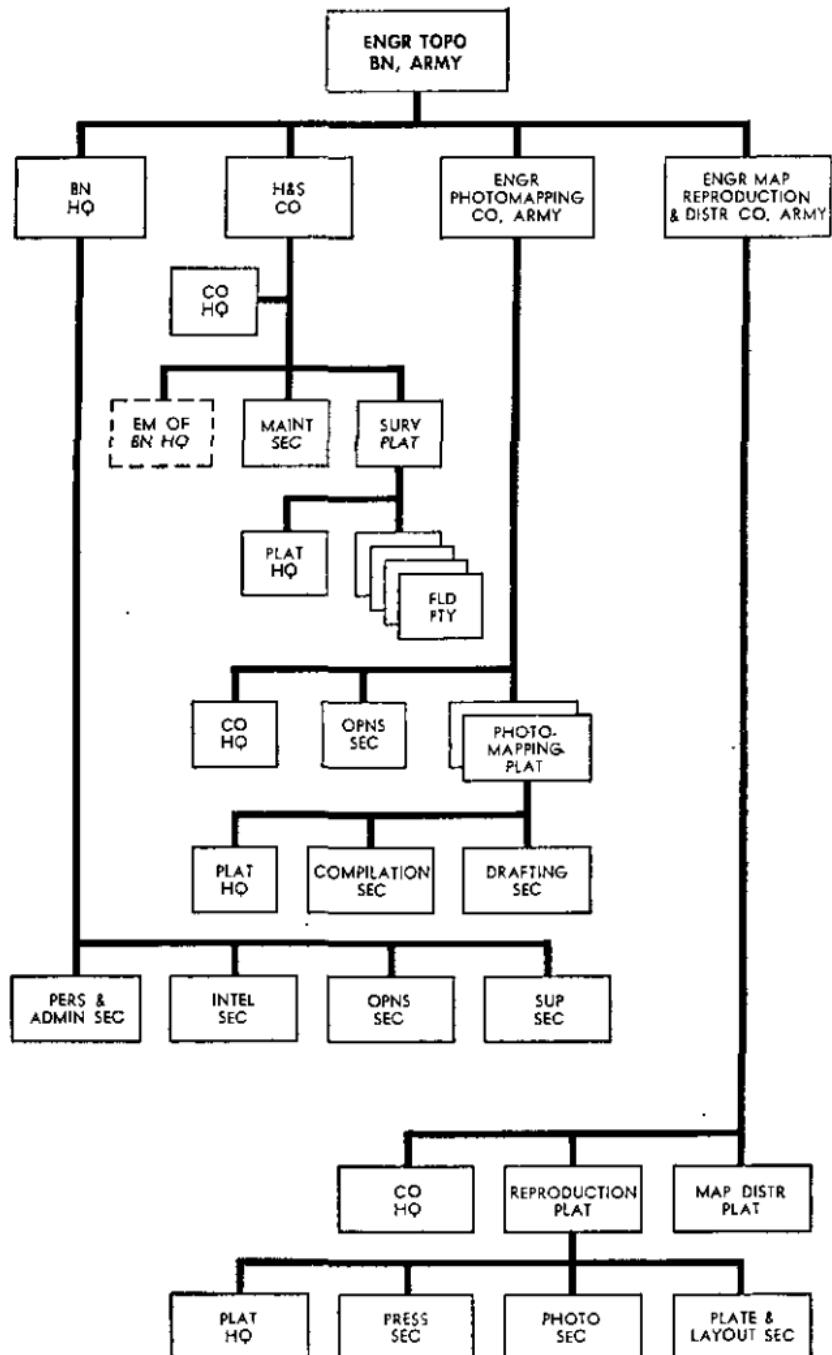


Figure 20. Engineer topographic battalion, army.

composed of platoon headquarters, a compilation section, and a drafting section.

## **220. Employment**

- a. The battalion is assigned to army directly under the army engineer. It normally operates in one locality near army headquarters. This assures convenient liaison with army G2 in the matter of map requirements and map distribution from the army map depot, and with the tactical air force for the coordination of photomapping activities.
- b. Elements of the battalion may be attached to a corps operating on a special mission. The battalion may furnish supplementary survey personnel for engineer combat units, or in special situations may itself be reinforced with detachments from other topographic units. However, the normal method of topographic reinforcement is to relieve a lower unit of missions or portions of missions, rather than to attach additional personnel or equipment.
- c. The battalion may be used to establish horizontal and vertical survey control within the army area, and to extend this control forward for pickup by corps engineer topographic companies and the artillery. The battalion reproduces photomaps, maps of limited areas, overlays, and sketches, and revises and reproduces existing maps. The photomapping company can also compile original maps and map substitutes. The battalion can lay controlled mosaics, but its organic equipment is best adapted to the production of photomaps from individual photographs or uncontrolled mosaics.

## **221. Description of Equipment**

- a.* The battalion has equipment sufficient for administration, mess, and organizational supply and maintenance.
- b.* Equipment is provided for surveying and triangulation, photomapping, stereocomparagraph operation, computing, drafting, map layout, photography, and reproduction. The reproduction equipment is mounted in van-type trucks. It includes process camera, laboratory, supply map layout, photographic, plate grainer, plate process, and press equipment. There are enough trucks for normal map distribution.
- c.* The photomapping company has van-type trucks for mobile map-compilation and drafting rooms.
- d.* Armament of the battalion consists of caliber .50 machineguns, caliber .45 submachineguns, 3.5-inch rocket launchers, pistols, carbines, and rifles.
- e.* See T/O & E 5-55A for detailed lists of equipment.

## **222. Communications**

Communications equipment includes a switchboard, telephones, and wire for internal communications. Trunk service must be furnished by army from army communications facilities. There is a radio receiver for receipt of precise time signals for astronomical determinations.

## **223. Teams**

*Teams IE, Map Depot Platoon* of the engineer service organization may be attached to an army topographic battalion, on a basis of up to three teams

per battalion, if the latter is called on to establish forward map depots. One team can operate such a depot.

#### **Section IV. ENGINEER AERIAL PHOTO REPRODUCTION COMPANY**

##### **224. Mission**

The mission of the engineer aerial photo reproduction company is to reproduce, identify, and prepare for distribution prints of aerial reconnaissance photographs.

##### **225. Assignment**

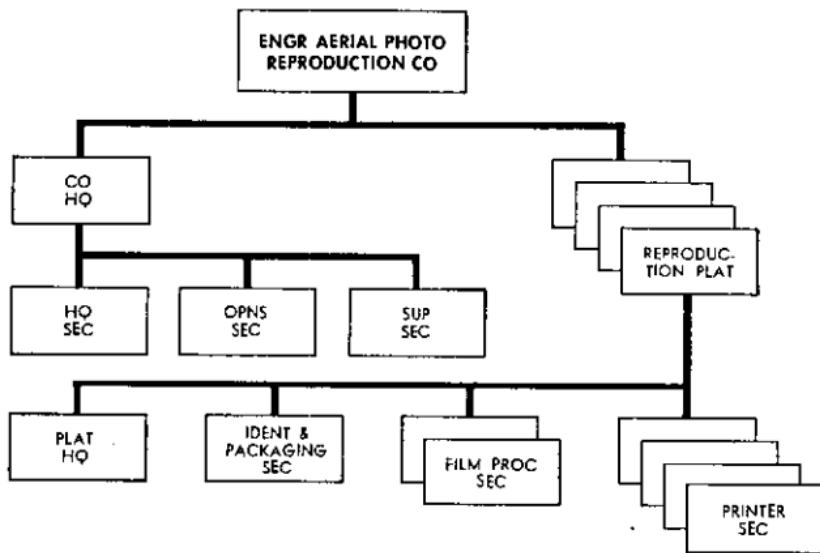
Assignment is normally to army or army group, to function with air force units in a joint air photo center.

##### **226. Capabilities**

- a. The company is trained and equipped to—
  - (1) Reproduce, identify, and package prints of aerial photographs for intelligence purposes and for use as supplements. The company is capable of processing 25,000 prints in one operational period of 10 hours.
  - (2) Provide administration, messing, and maintenance for attached army photointerpretation units.
- b. The company is completely mobile, using organic transportation.

##### **227. Organization**

- a. The company is organized under T/O & E 5-54. It consists of company headquarters and four identical reproduction platoons (see fig. 21).



*Figure 21. Organization of engineer aerial photo reproduction company.*

*b.* Company headquarters includes a headquarters section, an operations section, and a supply section.

- (1) The headquarters section contains personnel and equipment for command, administration, mess, and organization maintenance of the company.
- (2) The operations section contains supervisory personnel and van-loaded drafting equipment.
- (3) The supply section contains personnel and equipment for general and technical supply and for water distillation, purification, and distribution to the four reproduction platoons.

*c.* Each reproduction platoon consists of a platoon headquarters, an identification and packaging section, two film processing sections, and four printer sections.

- (1) Platoon headquarters contains supervisory personnel and operators for generator and electric lighting equipment.
- (2) The identification and packaging section includes photoidentifiers, draftsmen, and packaging personnel, with van-loaded equipment.
- (3) Each film processing section includes personnel and van-loading equipment for film processing.
- (4) Each printer section includes process photographers and van-loaded equipment.

## **228. Employment**

*a.* The company, together with a photointerpretation detachment, signal messenger service and corps artillery liaison officers, comprises the army component at a joint air photo center. The company is organized to function at a reconnaissance airfield with the air force reconnaissance technical squadron. Continuous shift operation may be organized. Operational control of army components at the joint air photo center is exercised by the army group or field army G2 air officer, through the senior ground liaison officer at the airfield. All phases of photointerpretation for the army may be performed in the center.

*b.* The company edits, for reproduction, developed film which covers missions requested by the ground forces; produces the desired quantity of aerial photographs for army units, after receiving negatives from the reconnaissance technical squadron; packages aerial photographs for delivery to ground force units; and renders administrative support to all army personnel at the reconnaissance airfield.

*c.* Delivery of aerial photographs is normally through the signal corps light aviation and vehicular distribution facilities. Under certain circumstances, the air force may deliver to ground units.

### **229. Description of Equipment**

*a.* The company has vehicles and equipment for administration, mess, supply, and organizational maintenance.

*b.* The supply section includes trailer-mounted water distillation equipment, water purification equipment, and water tank truck.

*c.* The four platoon headquarters have a total of four generator sets and electric lighting equipment sets.

*d.* The company has shop van trucks for the topographic laboratory equipment of the headquarters section, the drafting equipment of the operations section, the equipment sets of the identification and packaging sections, the film processing equipment of the film processing sections, and the continuous tone ammonia process (diazotype) production equipment sets of the printer sections.

*e.* Armament includes caliber .50 machine-guns, 3.5-inch rocket launchers, carbines, and rifles.

*f.* See T/O & E 5-54 for detailed lists of equipment.

### **230. Communications**

Communications equipment includes telephones and wire for intracompany operations. The company is connected to the telephone system providing communication from the reconnaissance airfield to army headquarters and other installations.

## **Section V. ENGINEER BASE TOPOGRAPHIC BATTALION**

### **231. Mission**

The mission of the engineer base topographic battalion is to compile, reproduce, and distribute military maps.

### **232. Assignment**

The battalion is normally assigned to theater headquarters. It operates in the communications zone.

### **233. Capabilities**

*a.* The battalion is a flexible organization. It includes a headquarters and headquarters company, together with two or more engineer base topographic units of company size; which category includes the engineer base survey company, the engineer base photomapping company, the engineer base map reproduction company, and the engineer base map depot company.

*b.* Headquarters and headquarters company are trained and equipped to—

- (1) Provide administrative, operational, and technical control for a battalion thus organized.
- (2) Prepare battalion operational plans, project plans, and progress reports.
- (3) Supervise the administration of subordinate units.

*c.* The capabilities of the battalion as a whole depend on the number and nature of the units assigned or attached to it. If it contains all four of the types of company listed above, it can undertake, on a large scale, all forms of engineer surveying, mapping, and

map reproduction required in a theater of operations.

*d.* The engineer base survey company is trained and equipped to—

- (1) Augment and support the organic topographic surveying capacity of one or more field armies in a theater of operations, a communications zone, or the zone of the interior.
- (2) Perform geodetic surveys of second and third order precisions, including leveling and establishment of base lines.
- (3) Perform topographic surveys, using conventional field methods.
- (4) Provide necessary control data for the compilation of new, or the revision of existing, topographic maps by stereophotogrammetric methods.
- (5) Accomplish work, with each of its nine survey sections, at the following rate per month: for second order surveying, 60 miles of traverse, 130 miles of levels, establishment of 40 triangulation stations; for third order surveying, 70 miles of traverse, 130 miles of levels, establishment of 48 triangulation stations.
- (6) Perform final office computations for the foregoing.
- (7) Perform organizational and partial field maintenance of surveying equipment.

*e.* The engineer base photomapping company is trained and equipped to—

- (1) Compile new maps from aerial photography, using stereophotogrammetric instruments.

- (2) Prepare controlled mosaics of aerial photographs.
- (3) Accomplish color separation drafting of all map compilations.
- (4) Perform organizational and partial field maintenance on photomapping equipment.

f. The engineer base reproduction company is trained and equipped to reproduce, in quantity, maps, charts, overlays, etc., in black and white or multi-color.

g. The engineer base map depot company is trained and equipped to—

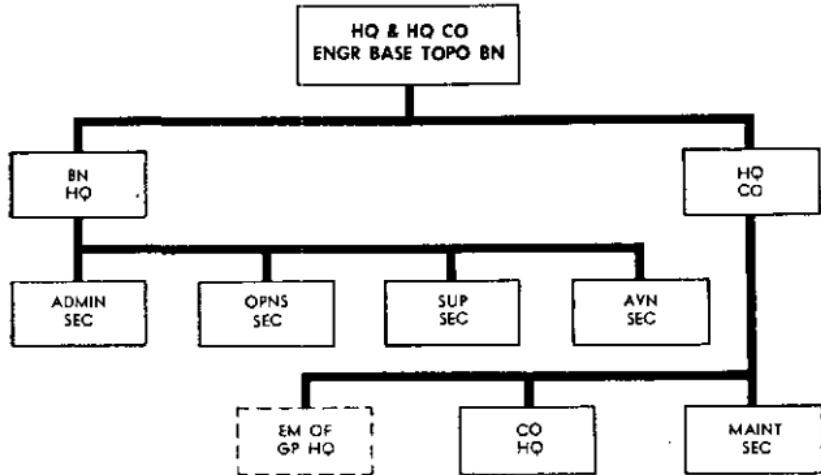
- (1) Provide map stockage sufficient for two field armies.
- (2) Handle up to 5,000,000 maps per month.
- (3) Receive, classify, and store maps and related material.
- (4) Package and prepare maps and related materials for shipment to forward depots.

## **234. Organization**

a. For the battalion as a whole, see paragraph 233.

b. Headquarters and headquarters company is organized under T/O & E 5-346 (see fig. 22). It consists of—

- (1) Battalion headquarters, composed of administrative, operations, and supply sections, performing the usual S1, S2, S3, and S4 duties, and an aircraft section. (S2 duties are performed by the operations section.)
- (2) The headquarters company, composed of company headquarters, a maintenance sec-



*Figure 22. Organization of headquarters and headquarters company, engineer base topographic battalion.*

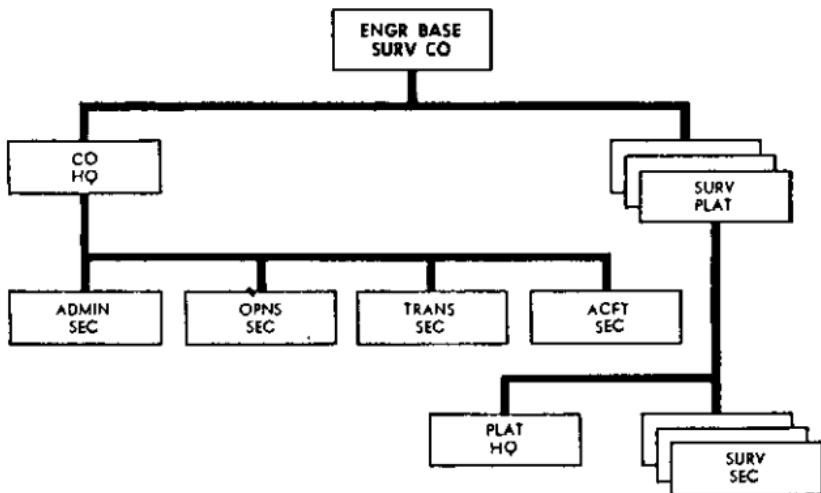
tion, and the enlisted personnel of battalion headquarters.

c. The engineer base survey company is organized under T/O & E 5-348A (see fig. 23). It consists of—

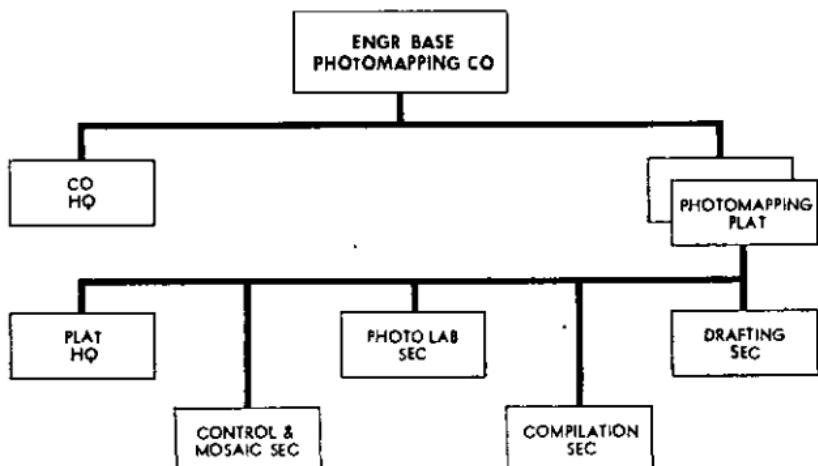
- (1) Company headquarters, which includes an administrative section, an operations section, a transportation section, and an aircraft section.
- (2) Three identical survey platoons, each including a platoon headquarters and three identical survey sections.

d. The engineer base photomapping company is organized under T/O & E 5-349A (see fig. 24). It consists of—

- (1) Company headquarters.
- (2) Two identical photomapping platoons, each of which includes platoon headquarters, a control and mosaic section, a photo labora-



*Figure 23. Organization of engineer base survey company.*

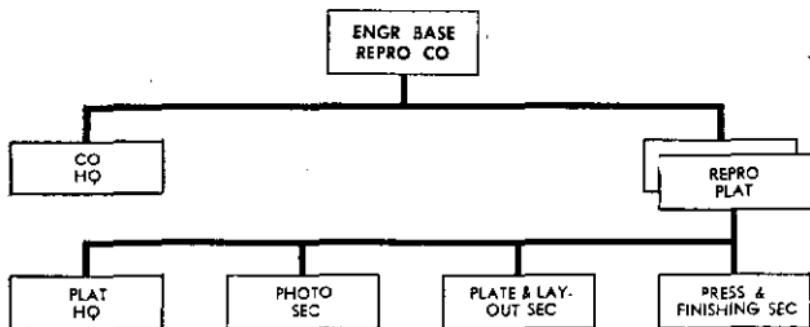


*Figure 24. Organization of engineer base photomapping company.*

tory section, a compilation section, and a drafting section.

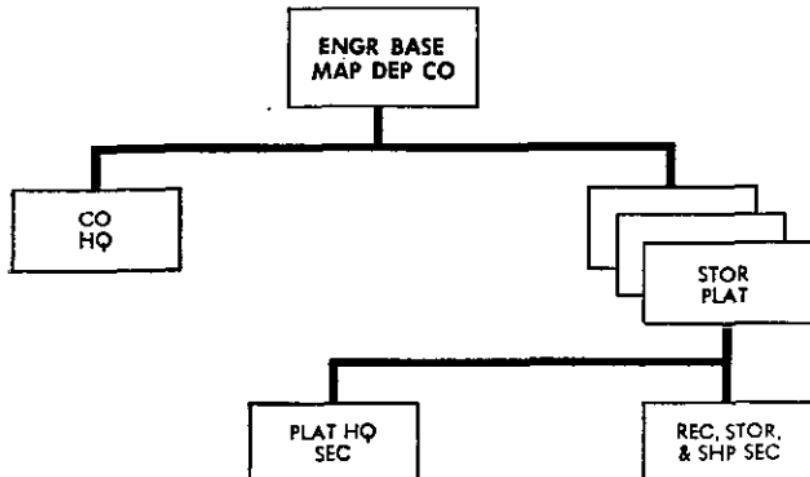
- e. The engineer base reproduction company is organized under T/O & E 5-347A (see fig. 25). It consists of—

- (1) Company headquarters.
- (2) Two identical reproduction platoons, each of which includes platoon headquarters, a photo section, a plate and layout section, and a press and finishing section.



*Figure 25. Organization of engineer base reproduction company.*

f. The engineer base map depot company is organized under T/O & E 5-344 (see fig. 26). It consists of—



*Figure 26. Organization of engineer base map depot company.*

- (1) Company headquarters.
- (2) Three identical storage platoons, each of which includes a platoon headquarters section and a receiving, storage and shipping section.

### **235. Employment**

*a.* The battalion ordinarily operates under the theater engineer, working on general theater projects which require the preparation of many maps of permanent character or the revision and quantity reproduction of existing maps.

*b.* Among the tasks which may be assigned to a base topographic battalion, depending on the number and nature of its component units are—

- (1) Undertaking surveys as directed by the theater engineer, including the establishment or recovery of horizontal and vertical control; location and identification of picture-point control photomapping; ground reconnaissance to identify or verify features on aerial photographs; etc.
- (2) Production of maps by photogrammetric methods, including use of the stereocomparagraph and multiplex equipment.
- (3) Reproduction of maps, photomaps, etc.
- (4) Operation of base and advanced theater map depots.

*c.* The component units, other than headquarters and headquarters company, are normally assigned to the battalion. Each of them may operate independently. However, independent operation is normally confined to the base survey company.

*d.* The operations of the battalion, with its full complement of companies, are equivalent to those of a good-sized industrial plant. Due to the size and complexity of its equipment, the variety and delicacy of its technical work, and the volume of map storage involved, it is difficult to move, and requires special housing. Where practicable, it should be housed in some large permanent structure already existing in the theater.

### **236. Description of Equipment**

*a. Equipment in Headquarters and Headquarters Company.* The equipment of headquarters and headquarters company is chiefly individual or for house-keeping and general security. There are limited facilities for drafting and reproduction and for the study of maps and photographs. Armament is limited to carbines, rifles, and pistols. For detailed lists of equipment see T/O & E 5-346.

*b. Equipment in Engineer Base Survey Company.* Company headquarters has some computing, drafting, and electric lighting equipment, and facilities for sign painting and the repair of instruments. It also has equipment for precise leveling and the establishment of precise base lines. Each survey platoon has equipment for the establishment of astronomic position, for precise traversing, for ordinary traversing and leveling, and for triangulation. The latter includes triangulation towers, trailers for transporting them, and tools and accessories for erection, operation, and demounting. Armament is limited to carbines, rifles, and pistols. For detailed lists of equipment see T/O & E 5-348A.

*c. Equipment in Engineer Base Photomapping Company.* The company is equipped with multiplex stereoscopic plotting instruments, and with the necessary plotting booths, drafting equipment, and repair facilities accessory thereto. Armament is limited to rifles and carbines. For detailed lists of equipment see T/O & E 5-349A.

*d. Equipment in Engineer Base Reproduction Company.* Company headquarters has lithographic reproduction equipment, and portable skid-mounted motor-generators for power and lighting. Each reproduction platoon has a set of drafting equipment and limited equipment repair facilities. Armament is limited to carbines. For detailed lists of equipment see T/O & E 5-347A.

*e. Equipment in Engineer Base Map Depot Company.* The company has map distribution equipment sets, mechanical handling equipment for maps, and general mechanics and organizational maintenance tool sets. Armament is limited to rifles and carbines. For detailed lists of equipment see T/O & E 5-344.

### **237. Communications**

*a.* Radio communication is provided for the aircraft sections of battalion headquarters and of the engineer base survey company. Each survey platoon of the engineer base survey company is provided radio receiver equipment for the receipt of time signals.

*b.* Except for the equipment described in *a* above there is no organic communications equipment provided and the battalion is dependent on higher authority for communications.

## **238. Teams**

The following teams of engineer service organization may be attached to a base topographic battalion or its component companies—

- a. *Team 1F: Relief Map Making*, may be attached to a battalion whose mission includes such work. The team can make and reproduce terrain models of a wide range of scales.
- b. *Team 1B: Survey Platoon*, may be attached to a base survey company which requires some augmentation but not so much as to call for assignment of a second such company. The team's technical personnel and equipment are roughly the equivalent of one of the three survey platoons of a base survey company, though it lacks some of the supplementary personnel of such a platoon.
- c. *Team 1C: Photomapping Platoon*, may be attached to a base photomapping company under analogous circumstances. It is about equivalent to one of the two photomapping platoons of the company.
- d. *Team 1D: Map Reproduction Platoon*, may be attached to a base map reproduction company under analogous circumstances. It is about equivalent to one of the two reproduction platoons of the company.

## **CHAPTER 7**

# **ENGINEER MAINTENANCE AND SUPPLY UNITS**

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### **Section I. GENERAL**

#### **239. Use of the Term "Maintenance"**

In this chapter the term "maintenance" refers to the maintenance of engineer equipment organic to or assigned to engineer or other troop units. Another and different engineer maintenance problem is that of maintaining structures and fixed installations constructed by engineers, and for whose continued and efficient functioning they are responsible; for example, the utilities of a semipermanent post, camp, or station.

#### **240. Maintenance of Engineer Equipment in Troop Units**

A wide variety of engineer equipment and supplies is found in the hands of both engineer and non-engineer troops in a theater of operations. This equipment ranges from compasses to bulldozers. In actual service this equipment will be subjected to hard and often inexpert usage. The consequence is a continuing maintenance problem. Its solution involves three categories of maintenance: organizational, field, and depot.

## **241. Engineer Supply**

Engineer supply is also a complex and constantly growing problem, having a dual nature—

- a.* Supply of certain engineer materials and equipment to other units in the theater, to include maps, replacement items and repair parts.
- b.* Supply of engineer materials and equipment to engineer units.

The latter is the more difficult, since among other things it involves enormous tonnages of construction materials.

## **242. Maintenance and Supply Units**

Engineer units of the divisional, combat support, construction, topographic, and SCARWAF categories all have certain unit responsibilities with respect to engineer supply, and to maintenance of their own equipment. Beyond the limits of their capacity in these fields, the responsibility falls on a group of engineer units known collectively as "maintenance and supply units."<sup>1</sup> They are—

- Engineer field maintenance company.
- Engineer depot maintenance company.
- Engineer supply point company.
- Engineer depot company.
- Engineer parts depot company.
- Engineer depot battalion.
- Engineer water supply company.
- Engineer forestry company.
- Engineer maintenance and supply group.

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<sup>1</sup> The maintenance and supply units of course have the same responsibility, with respect to *their own* organizational maintenance and supply, as do the other categories of engineer troops units.

### **243. Operating Maintenance Units**

*a.* The engineer field maintenance company furnishes direct maintenance and repair parts support, in corps or army service area or the communications zone, to the engineer troops and to non-engineer units using engineer equipment.

*b.* The depot maintenance company operates normally in support of a number of field maintenance companies. It does not, however, have a repair parts supply mission, as to the engineer field maintenance companies.

### **244. Operating Supply Units**

Of the five engineer units of this category, two are concerned with general and equipment supply, one with parts supply, and two with specialized supply.

*a.* The depot company operates an engineer depot in army area or communications zone, handling general supply and the supply of equipment.

*b.* The supply point company performs a similar service on a smaller scale and in closer contact with supported troops. It is, in effect, an advanced sub-depot.

*c.* The parts depot company functions at depot level.

*d.* The functions of the water supply and forestry companies are indicated by their titles.

### **245. Supervisory Units**

While any of the above companies can operate independently, they are more usually grouped under some higher engineer headquarters. Two such are provided, the engineer depot battalion and the engineer maintenance and supply group, each consisting

of a regularly organized headquarters and headquarters company (or detachment), to which units are assigned or attached as the situation demands.

*a.* The depot battalion is composed of supply units responsible for the receipt, storage, and issue of engineer supplies.

*b.* The maintenance and supply group, at the next higher level, is normally composed of both maintenance units and supply units, including depot battalions.

#### **246. Interrelation of the Foregoing Units**

The missions and functions listed above result in the following relations among engineer supply and maintenance units, in a fully developed type theater—

*a.* Divisional and corps units receive engineer field maintenance service and repair parts from field maintenance companies in corps or army area; general engineer supplies from engineer supply point companies similarly located; engineer equipment from one or more engineer depots (normally operated by an engineer depot company augmented by an engineer equipment supply team, team DC of the engineer service organization), located either in army service area or the communications zone.

*b.* Units in the army service area and the communications zone obtain engineer maintenance and repair parts from field maintenance companies. Both general engineer supply and engineer equipment, however, come from engineer depots or general depots.

*c.* With respect to engineer depot maintenance (as distinguished from field maintenance), such service, for all units needing it, is ultimately given by engi-

neer depot maintenance companies. These, however, do not deal with the users, but through the field maintenance companies.

*d.* The above-mentioned supply point and field maintenance companies are themselves supported, respectively, by engineer depot companies and engineer depot maintenance companies, operating at engineer depot. (Depot companies are found in both army service area and communications zone; depot maintenance companies, only in the latter.) At such depots, also, are located engineer parts depot companies, which support—

- (1) Field maintenance companies for issue to users.
- (2) Depot maintenance companies for their own repair operations.

*e.* Command and staff coordination of the foregoing is normally furnished by appropriate engineer depot battalion or maintenance and supply group headquarters.

## **247. Teams**

A number of the teams of the engineer service organization (see ch. 9) may be attached to one or another engineer unit of the maintenance and supply category, including depot companies and battalions, field and depot maintenance companies, parts depot companies, forestry and water supply companies, and maintenance and supply groups.

## **Section II. ENGINEER FIELD MAINTENANCE COMPANY**

### **248. Mission**

The mission of the engineer field maintenance company is to provide field maintenance of engineer equipment in supported units, and to furnish parts to supported units for organizational maintenance. It may fight as infantry when required.

### **249. Assignment**

The company is assigned to field army, communications zone or air force. It may be reassigned to corps. It is organic to the amphibious support brigade (T/O & E 20-300).

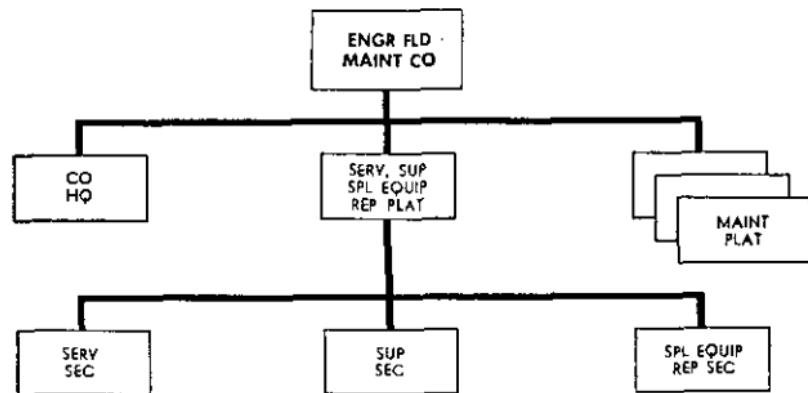
### **250. Capabilities**

- a. The company is trained and equipped to—
  - (1) Provide field maintenance support for about 1,500 major items of engineer equipment. (The term "major item" includes equipment such as 1½ kw generators and larger items.)
  - (2) Perform limited evacuation of damaged engineer equipment.
  - (3) Receive, store, and issue repair parts for the maintenance activities of supported units and for use of organic maintenance platoons.
  - (4) Assemble statistical data pertaining to engineer equipment population and distribution, repair parts usage experience, and maintenance operations in supported units.
  - (5) Inspect, as directed, maintenance activities and repair parts stock levels of supported organizations.

b. The company is semimobile. Normally it opens shop at a new location before closing out at the old location, its equipment and personnel being moved by shuttle.

## 251. Organization

a. The company is organized under T/O & E 5-157. It consists of a company headquarters; a service, supply, and special equipment repair platoon; and three identical maintenance platoons (see fig. 27).



*Figure 27. Organization of engineer field maintenance company.*

b. Company headquarters contains command, supervisory, administrative, mess, and communications personnel.

c. The service, supply and special equipment repair platoon contains—

- (1) A service section with personnel and equipment to reinforce the maintenance platoons.
- (2) A supply section to receive, store, issue, and maintain records of repair parts.

- (3) A special equipment repair section with personnel and equipment to repair engineer optical, electrical, infrared, and other special devices.
- d. Each maintenance platoon contains personnel and equipment to provide for field maintenance of all types of engineer equipment, except as in c(3) above, either in company shops or on the job site.

## **252. Employment**

- a. The company provides engineer field maintenance for a type corps of four divisions, or for a force containing an equivalent amount of engineer equipment.
- b. A company assigned to corps functions directly under the corps engineer, and establishes its shops forward as centrally as possible to the units supported. It replenishes its repair parts by drawing from an engineer parts depot in the army service area or the advance section of the communications zone. The issue of critical parts is controlled by the army engineer through the engineer maintenance and supply group.
- c. Reinforced maintenance platoons may be attached to commands smaller than corps, with some loss of reinforcement contained in the company organization.

- d. In an army service area or the communications zone, two or more engineer field maintenance companies are assigned to an engineer maintenance and supply group. They are given area responsibilities for the support of army or communications zone units, with work load and operation similar to that of a field maintenance company assigned to a corps.

## **253. Description of Equipment**

*a.* Items of equipment are as follows:

- (1) There is a motorized general purpose repair shop, with a trailer-mounted welding equipment set, and a tool set (emergency repair shop) in each of the three maintenance platoons.
- (2) The service, supply, and special equipment repair platoon contains—
  - (a) In the service section : One truck-mounted crane-shovel with attachments, one motorized heavy machine, one motorized small tool repair shop, one motorized tool and bench shop, one medium wrecker, and skid mounted 15 kilowatt generator sets for shop power.
  - (b) In the supply section : Van semitrailers for repair parts stocks, tractor trucks, and a low bed semitrailer.
  - (c) In the special equipment repair section : One motorized electrical repair shop.

*b.* Company armament, when the company is operating in an army area, includes caliber .50 machine-guns, caliber .45 submachineguns, 3.5-inch rocket launchers, rifles, pistols, and carbines. When operating in the communications zone, armament may be limited to carbines and rifles.

*c.* See T/O & E 5-157 for detailed lists of equipment.

## **254. Communications**

Company communications equipment includes switchboard, telephones, and wire, for internal tele-

phone service. This wire system must be tied into the telephone net of higher headquarters.

### **255. Teams**

The following teams of the engineer service organization (see ch. 9) may be attached to a field maintenance company—

*a. Team EB: Field Maintenance*, may be attached if the company requires augmentation on account of an unusually heavy maintenance load of normal character. The team's capacity, measured in terms of quantity of supported equipment, is about one-fourth that of the company.

*b. Team EC: Special Equipment Maintenance*, may be attached if the company must serve units having a high concentration of special equipment. The team specializes in the maintenance of such items as sniperscopes, mine detectors, odographs, searchlights, precision instruments, etc.

*c.* It may be noted that *Team EB* may also be attached direct to a task force which requires engineer maintenance support equivalent to less than a platoon of an engineer maintenance company. *Team EA* (also called "field maintenance," but a smaller organization than *Team EB*) is habitually given a similar mission. *Team EB* may likewise be combined with *Team ED: Parts Supply*.

## **Section III. ENGINEER DEPOT MAINTENANCE COMPANY**

### **256. Mission**

The mission of the engineer depot maintenance company is to perform depot maintenance of engineer equipment.

## **257. Assignment**

The company is normally assigned to the communications zone, with further assignment to a maintenance and supply group.

## **258. Capabilities**

*a.* The company is trained and equipped to—

- (1) Support four to six engineer field maintenance companies, or the equivalent in equipment population.
- (2) Repair engineer equipment which requires major overhaul or the complete rebuild of parts, subassemblies, and assemblies.
- (3) Reclaim parts and assemblies, for use in company maintenance operations and for return to parts depot stock.

*b.* The company has 10 percent mobility, using organizational transportation.

## **259. Organization**

*a.* The company is organized under T/O & E 5-278. It consists of company headquarters, a shop service and supply platoon, a construction equipment rebuild platoon, and a special equipment rebuild platoon (see fig. 28).

*b.* The shop service and supply platoon includes—

- (1) Platoon headquarters.
- (2) A shop service section.
- (3) A supply section.
- (4) A machine-shop section.
- (5) A welding and fabrication section.

*c.* The construction equipment rebuild platoon includes—

- (1) Platoon headquarters.

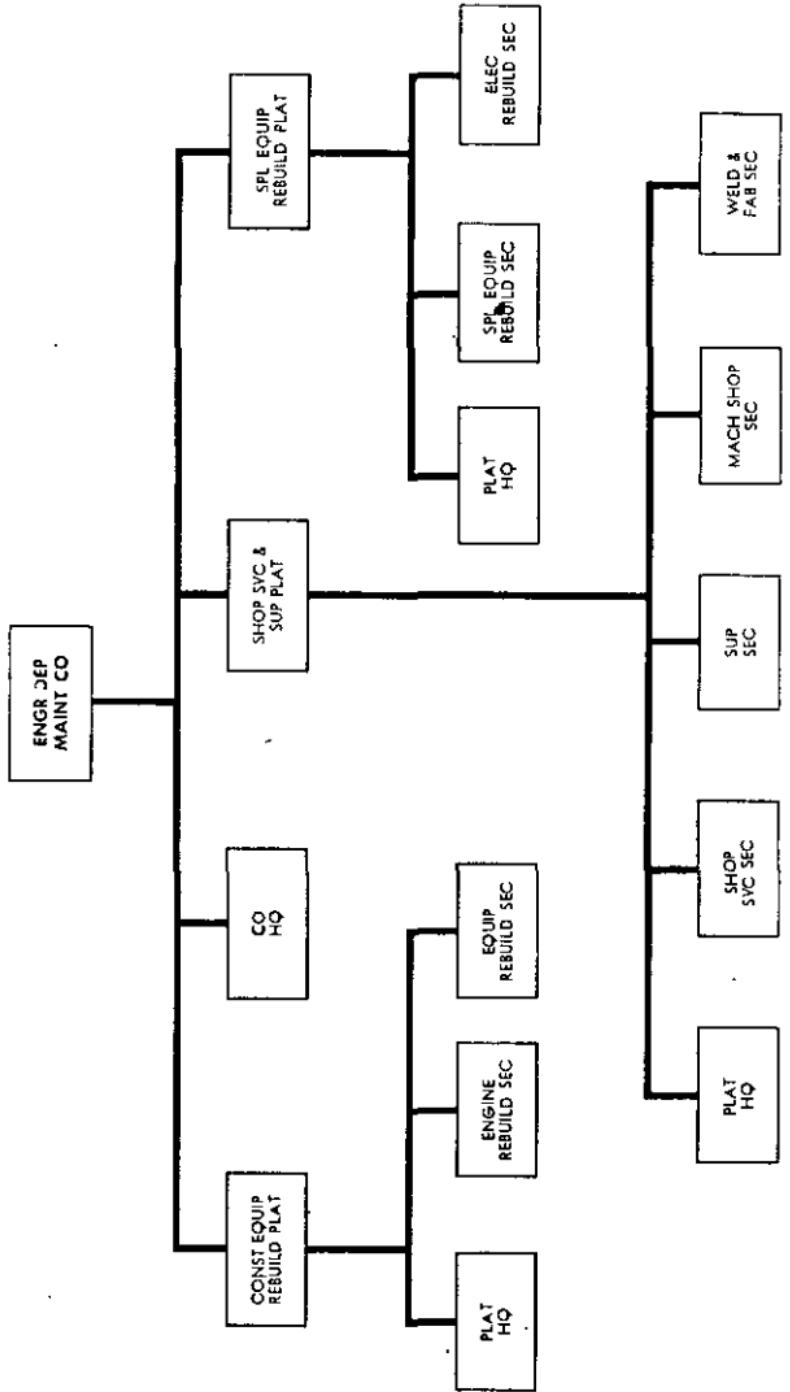


Figure 28. Organization of engineer depot maintenance company.

- (2) An engine rebuild section.
  - (3) An equipment rebuild section.
- d. The special equipment rebuild platoon includes—
- (1) Platoon headquarters.
  - (2) A special equipment rebuild section.
  - (3) An electrical rebuild section.

## **260. Employment**

- a. One depot maintenance company in the communications zone per engineer maintenance and supply group is the normal allocation.
- b. The depot maintenance company accomplishes repairs beyond the scope of a field maintenance company.
- c. Complete items of equipment, after being repaired, are turned over to the designated engineer depot, and become items of issue.
- d. Repaired assemblies and repair parts are turned over to the designated engineer parts depot company; except that the depot maintenance company may retain a limited stock of parts or assemblies for which it has a constant demand. The depot maintenance company, in turn, looks to the parts depot company as a source of supply for parts and assemblies.

## **261. Description of Equipment**

- a. The shop service and supply platoon has a crane shovel with boom, a wheel-mounted steam cleaning unit, a trailer-mounted lubricator, pipefitting equipment, metallizing equipment, trailer-mounted wood working equipment, sign-painting equipment, pneumatic plant repair equipment, welding equipment,

and base maintenance shop equipment of the following categories; forging, heavy tool room, and machine shop. It also has certain Ordnance tool sets. A low bed semitrailer and a heavy trailer are provided.

*b.* The construction equipment rebuild platoon has a trailer-mounted lubricator, tool sets for caterpillar tractor, outboard motor, diesel equipment, auto fuel, and electrical system repair; and base maintenance shop equipment for general repair and the repair of motors.

*c.* The special equipment rebuild platoon has equipment for electrical repair, light machine repair, instrument repair, and the repair of multiplex equipment. It also has certain Signal Corps equipment, for use in testing and repairing electrical apparatus.

*d.* Armament is limited to carbines and rifles.

*e.* See T/O & E 5-278 for detailed lists of equipment.

## **262. Communications**

The company has no organic radio or wire communications equipment.

## **263. Teams**

The following teams of the engineer service organization (see ch. 9) may be attached to a depot maintenance company—

*a. Team ED: Parts.* (See also par. 287 *b.*)

*b. Team HK: Foundry,* when foundry service is required of the company.

## **Section IV. ENGINEER SUPPLY POINT COMPANY**

### **264. Mission**

The mission of the engineer supply point company is to operate engineer supply points in corps and army areas. It may fight as infantry when required.

### **265. Assignment**

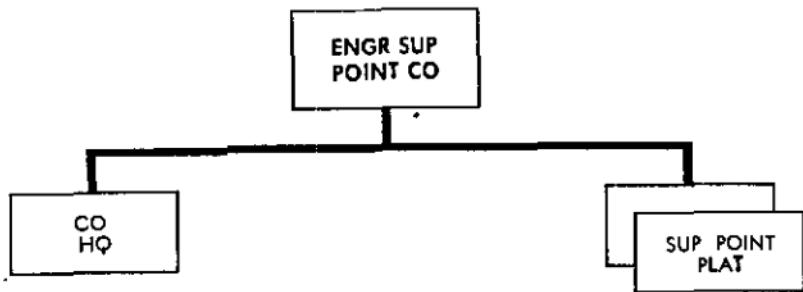
The normal assignment of the company is to army or independent corps, with further attachment or assignment either to a depot battalion or direct to a maintenance and supply group.

### **266. Capabilities**

- a. The company is trained and equipped to—
  - (1) Receive, store, and issue engineer supplies (normally class IV).
  - (2) Maintain records of items within its jurisdiction.
  - (3) Supervise military or civilian labor in supply point operations.
  - (4) Provide internal security for the supply point.
- b. The company is semimobile, using organic transportation.

### **267. Organization**

- a. The engineer supply point company is organized under T/O & E 5-48A. It consists of a company headquarters and two identical supply point platoons (see fig. 29).



*Figure 29. Organization of engineer supply point company.*

*b.* Company headquarters contains command, administrative, mess, supply, and supervisory personnel, and heavy equipment operators.

*c.* Each supply point platoon contains personnel for operating supply points, either as a part of a single coordinated company activity or on a detached status. (An example of the latter is the provision for continuing issues at an old supply point, while a new point is being stocked to support a forward movement of the units served.)

## **268. Employment**

*a.* A supply point company with an army is normally reassigned to an engineer maintenance and supply group. The army engineer, through the group, controls the issue of critical items of engineer supplies and equipment.

*b.* The company normally operates engineer supply points forward of, or just in rear of, the corps rear boundary. These supply points are small advanced engineer depots. In a stabilized situation the company may support more than one corps. It receives equipment and supplies from the army engi-

neer depot company supporting it or from engineer depots of the communications zone. Issue is to divisions and to corps troops, subject to credits or limitations on critical items or items in short supply, established by corps or army engineers.

*c.* Company headquarters exercises stock control, to include reports of status of stocks when called for by higher echelons for planning purposes.

*d.* The supply point platoons perform the physical details of storage operations. They include the provision of labor foremen to supervise any military and civilian labor that may be required to reinforce the company.

### **269. Description of Equipment**

*a.* The company has vehicles and equipment for its own administration. For materials handling, company headquarters has crane-shovels (tractor-mounted and truck-mounted), crawler tractor with dozer, and a truck tractor which services as prime mover for one low bed semitrailer. Each of the two supply point platoons has dump trucks for material hauling within the supply point.

*b.* Armament is limited to carbines and rifles.

*c.* See T/O & E 5-48A for detailed lists of equipment.

### **270. Communications**

The communications equipment of the company consists of telephones and wire. Trunk telephone service must be provided from army communications facilities.

## **Section V. ENGINEER DEPOT COMPANY**

### **271. Mission**

The mission of the engineer depot company is to operate an engineer depot for the receipt, storage, and issue of engineer general supplies and equipment.

### **272. Assignment**

The company is assigned to army or communications zone. Normally it is further attached or assigned to an engineer depot battalion, but it may operate as a separate company.

### **273. Capabilities**

a. When labor personnel are furnished by T/O & E 10-67, or other labor sources, depending upon workloads imposed by varying stock levels, this unit is capable of—

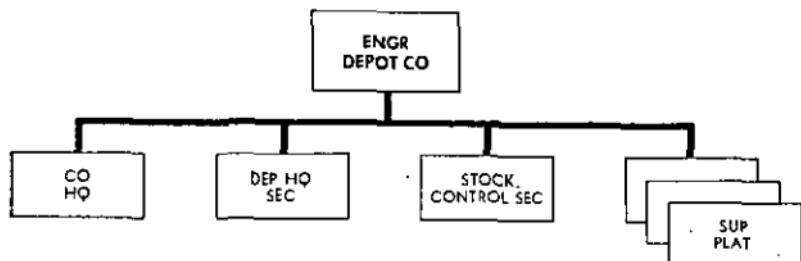
- (1) Receipt, storage, and issue of engineer general supplies and equipment in depot operations in support of an army, an air force, or a communications zone installation.
- (2) Maintenance of stock records, locator systems, bin identification system, voucher registers, and other necessary stock accounting records.
- (3) Preparation of stock status reports, tonnage reports, and other special reports as required or directed.
- (4) Preparation of replenishment requisitions to maintain established stock levels.
- (5) Establishment and adjustment of stock levels under battalion or group supervision.

(6) Provision of unit personnel administration, mess, supply, and maintenance for the headquarters and headquarters detachment, engineer depot battalion, when attached.

b. The company is 35 percent mobile.

#### **274. Organization**

a. The company is organized under T/O & E 5-267. It consists of a company headquarters, a depot headquarters section, a stock control section, and three identical supply platoons (see fig. 30).



*Figure 30. Organization of engineer depot company.*

b. Company headquarters contains personnel and equipment for command, administration, mess, company supply, and organizational maintenance.

c. The depot headquarters section contains personnel and equipment for depot supervision and communications.

d. The stock control section is a clerical section for maintaining stock records, stock locator systems, and shipping records, and for the preparation of replenishment requisitions and reports as required.

e. The supply platoons contain personnel and heavy equipment for the physical operation of the depot, including receipt and issue, heavy material handling, packing, processing, and stock checking.

## **275. Employment**

- a.* The company is assigned to army or communications zone. When assigned to an army the company normally operates under an engineer maintenance and supply group; when assigned to a communications zone it normally operates under an engineer depot battalion.
- b.* When assigned to army, the company establishes an army engineer depot in the army service area. It may be temporarily divided, to permit the continued operation and eventual closing out of one depot, while a new depot is being set up and stocked to support the forward movement of the army.
- c.* The company issues general engineer supplies from its depot to the engineer supply point companies which it supports, and which in turn support the corps and division troops of the field army. It also makes retail issue of general engineer supplies and engineer equipment to army units. Equipment supply for corps and division troops may go direct from the communications zone to engineer supply point companies located near corps rear boundaries, instead of passing through the depot company.
- d.* Company transportation is sufficient only for administration and material handling within the depot. Transportation required for the movement of engineer supplies to or from the depot, or for displacement of the depot, must come from other sources.
- e.* The company may be reinforced with general military or civilian labor. Preparation of open or covered storage area requires assistance of other engineer units.

## **276. Description of Equipment**

- a.* The company has equipment and vehicles for administration, mess, supply, and organizational maintenance.
- b.* The depot headquarters section has limited drafting and duplicating equipment, one teletypeewriter for receipt of requisitions by wire, and one computing machine.
- c.* The heavy materials handling equipment of the company is divided equally among the three supply platoons, and includes truck-mounted crane shovels with attachments; tractor trucks, stake and platform trucks, and low bed semitrailers; truck-mounted crane shovels with accessories; electric lighting, pioneer, and rigging equipment.
- d.* Armament, when the company is operating in an army area, consists of caliber .50 machineguns, caliber .45 submachineguns, 3.5-inch rocket launchers, rifles, and carbines. When operating in the communications zone, it may be limited to carbines and rifles.
- e.* See T/O & E 5-267 for detailed lists of equipment.

## **277. Communications**

Communications include one teletypewriter for the receipt of requisitions by wire, and a switchboard, telephones, and wire for internal communication. Trunk telephone service must be provided by the engineer depot battalion or from higher communications facilities.

## **278. Teams**

The following teams of the engineer service organization may be attached to a depot company—

*a. Team BA: General Supply*, may be attached if the company requires augmentation due to an unusually heavy supply load of normal character. The team can handle engineer class II and class IV supplies for up to 35,000 troops.

*b. Team BB: Depot Operating*, may be attached if a greater augmentation is required than Team BA can provide. It is more than twice the size of Team BA, has additional types of specialists, and can operate an engineer general supply depot for up to 90,000 troops.

*c. Team BC: Equipment Supply*, may be attached to augment an engineer depot company. The team can handle engineer equipment supply for up to 35,000 troops, including assembly, initial conditioning, inspection, and minor repairs while in storage.

*d.* It may be noted that the above three teams have alternative assignments. Any of them may be attached direct to a task force; Team BC may be attached to an engineer depot battalion; and either Team BC or Team BA may be combined with Team BB, Depot Operating. The varied uses of these teams are a good illustration of the flexibility of the engineer service organization and its component cellular units.

## **279. Engineer Depot Company (Type B)**

This unit is organized under T/O & E 5-267B. It differs from the ordinary company, described above, in that, except for a limited number of supervisory and administrative personnel, it consists of indigenous personnel obtained in the theater of operations. See also paragraph 150, the remarks in which apply in general here also.

## **Section VI. ENGINEER PARTS DEPOT COMPANY**

### **280. Mission**

The mission of the engineer parts depot company is to operate a repair parts depot to support the maintenance of engineer equipment by receiving, storing, issuing, and shipping engineer repair parts.

### **281. Assignment**

The company may be assigned to an army or the communications zone. Normally it is further assigned to a maintenance and supply group.

### **282. Capabilities**

a. The company is trained and equipped to—

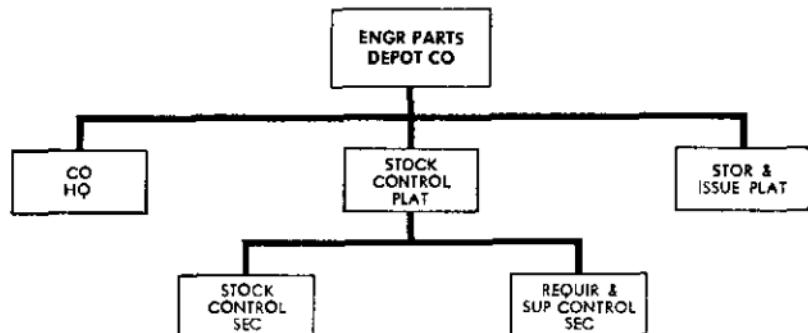
- (1) Provide engineer equipment repair parts support as follows: in an army, for four to six engineer field maintenance companies; in the communications zone, for four or five engineer field maintenance companies plus one engineer depot maintenance company. At full strength, the company can support about 9,000 items of engineer equipment, and can handle about 1,035 tons of repair parts per month.
- (2) Provide bulk replenishment parts support for engineer field maintenance companies and other units authorized to stock and distribute parts to engineer equipment users.
- (3) Provide retail parts support for engineer depot maintenance companies and other designated units which are not directly supported by engineer field maintenance companies.

- (4) Perform depot stock control and supply control functions for engineer repair parts.
- (5) Inspect parts stock levels of supported units to insure the maintenance of realistic stock levels.
- (6) Assemble statistical data pertaining to engineer equipment population and distribution, repair parts usage experience, and other pertinent operations data.
- (7) Provide organizational maintenance for organic equipment.

b. The company is 20 percent mobile, using organic transportation.

### **283. Organization**

The company is organized under T/O & E 5-279A. It consists of company headquarters, a storage and issue platoon, and a stock control platoon, the latter being divided into a stock control section and a requirements and supply control section (see fig. 31).



*Figure 31. Organization of engineer parts depot company.*

### **284. Employment**

a. The company may operate either in the army service area or in the communications zone. In

either case it can furnish engineer repair parts support to a type field army or equivalent demand.

*b.* The company's normal method of issue to its supported units is through the field maintenance companies which furnish maintenance support to those same units. However, it issues direct to any unit not thus supported. It also issues direct to any depot maintenance company or companies which it has been designated to support.

*c.* For the handling of repair parts and assemblies after rehabilitation by an engineer depot maintenance company, see paragraph 260*d*.

*d.* Certain limited stocks of repair parts must be kept on hand by all units, for organizational maintenance. Similarly, both field and depot maintenance companies must stock certain parts. If these stocks of parts, forward of a parts depot company, become too small, maintenance may be unduly slowed down; on the other hand, if they become too large, an undue proportion of available parts will go into "hoards," thus creating a shortage. The latter is the more common situation and the greater danger, since all units tend to hoard repair parts, and some units will fail to care for, or to keep accurate track of, the parts which they hoard. An important function of a parts depot company is to restrain these tendencies by periodic inspections of supported units, under policies and instructions from higher authority.

## **285. Description of Equipment**

*a.* The company has equipment for storing and handling large amounts of repair parts, including crane shovels with booms, gravity conveyors, warehouse trailers, and low bed semitrailers with prime

movers. It also has sets of pioneer, rigging, and sign-painting equipment, and certain special Ordnance tool sets.

*b.* Armament, when the company is operating in an army area, consists of caliber .50 machineguns, caliber .45 submachineguns, 3.5-inch rocket launchers, rifles, carbines. When operating in the communications zone, it may be limited to carbines and rifles.

*c.* See T/O & E 5-279A for detailed lists of equipment.

## **286. Communications**

Communications equipment consists of switchboard, telephones, and wire for internal service. There is also a teletypewriter set. The company must look to army or communications zone authorities for external telephone service.

## **287. Teams**

*a. Team ED:* Parts, of the engineer service organization, may be attached to a parts depot company to augment its capacity. The team can provide parts support for up to 500 major items of engineer equipment.

*b.* This team may alternatively be assigned to a task force or a depot maintenance company, or combined with team EB on an appropriate mission.

# **Section VII. ENGINEER DEPOT BATTALION**

## **288. Mission**

*a. Engineer Depot Battalion.* To perform co-ordinated operations connected with the receipt, stor-

age, and issue of engineer supplies and equipment in a communications zone.

*b. Headquarters and Headquarters Detachment, Engineer Depot Battalion.* To provide an administrative and command headquarters to supervise the operations of a flexible battalion composed of engineer units engaged in receipt, storage, and issue of engineer supplies and equipment in a communications zone.

### **289. Assignment**

To a communications zone, normally with further assignment to an engineer maintenance and supply group. On occasion it may operate in an army area.

### **290. Capabilities**

*a. The Battalion.* Its capabilities depend on the number and type of its component units.

*b. Headquarters and Headquarters Detachment.* It is capable of providing—

- (1) Supervision of operations of two or more engineer depot companies, four or more engineer equipment supply teams BC, and attached labor service companies or equivalent.
- (2) Planning of training and operations, and allotment of tasks, equipment, and facilities to subordinate units.
- (3) Supervision, coordination, and inspection of the administration and supply operations of battalion units.
- (4) Determination of transportation requirements and coordination of shipping and transport facilities.

(5) Provision of battalion supply, and operation of unit vehicles for the battalion.

## 291. Organization

a. The battalion is a flexible organization which, beside its headquarters and headquarters detachment, consists of a varying number of administratively self-sufficient units. There should be two or more companies and four or more engineer equipment supply teams to justify their assignment to a battalion.

b. For detailed organization of the component units, see elsewhere in this manual.

c. The component units may be either assigned or attached to the battalion.

d. The headquarters and headquarters detachment is organized under T/O & E 5-266A (see fig. 32). It consists of battalion headquarters and the detachment, the latter including—

(1) A detachment headquarters.

(2) A battalion administration and supply section.

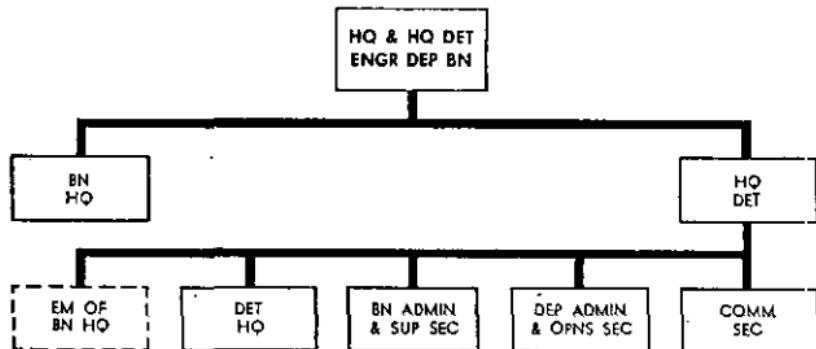


Figure 32. Organization of headquarters and headquarters detachment, engineer depot battalion.

- (3) A depot administration and operations section, to provide planning and supervision for storage operations of the battalion units, including reconnaissance for and layout of new installations, planning of movements, arrangements for transportation, procurement of labor, stock control supervision, and inspection of operations.
- (4) A communications section, for communication with attached units.

## **292. Employment**

The battalion is assigned to a communications zone, under operational control of the engineer of the command. It is normally further assigned to an engineer maintenance and supply group. For purposes of stock control, the physical location of the headquarters and headquarters detachment is normally near a component engineer depot company, to which the detachment may attach itself for mess and organizational maintenance.

## **293. Description of Equipment**

- a. For the equipment of the component units, see appropriate parts of this manual.
- b. The equipment of headquarters and headquarters detachment, other than for housekeeping and local security, is largely for machine computing, with some drafting and reproduction facilities. A teletypewriter set is provided. Armament is limited to carbines, rifles, and pistols.

## **294. Communications**

Communications equipment consists of switchboard, telephones, and wire for internal service and

service to engineer depot companies. Army communications facilities will be required for truck service and for telephone service to distant engineer supply point companies.

### **295. Teams**

*Team BC: Equipment Supply*, of the engineer service organization (see ch. 9) may be attached to a depot battalion.

## **Section VIII. ENGINEERS WATER SUPPLY COMPANY**

### **296. Mission**

The mission of the engineer water supply company is to produce and distribute potable water in the field. It may fight as infantry when required.

### **297. Assignment**

The assignment of the company is to army, communications zone or similar headquarters, normally with further assignment to a maintenance and supply group.

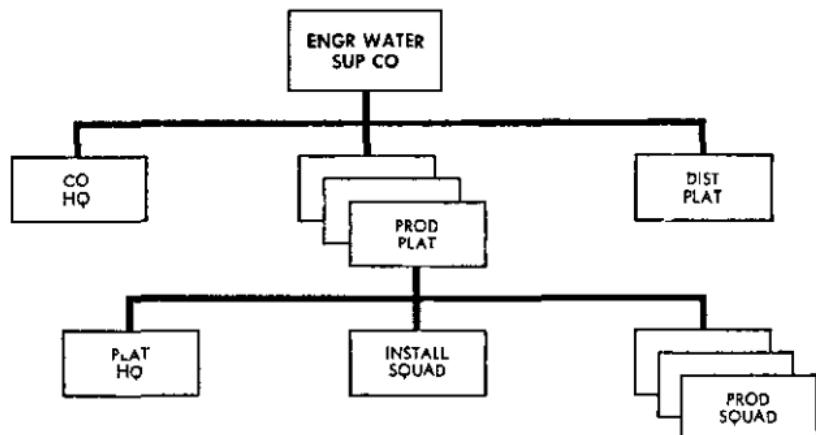
### **298. Capabilities**

- a. The company is trained and equipped to—
  - (1) Install and operate nine separate water purification installations.
  - (2) Purify and supply approximately 27,000 gallons per hour of potable water.
  - (3) Transport water from source, with organic tank trucks and semitrailers totaling 18,000 gallons capacity.
  - (4) Perform reconnaissance of water sources, and plan and organize the location and layout of water supply installations.

- (5) To a limited extent, rehabilitate and operate civilian water supply facilities in territory under military control.
- b. The company is completely mobile, using organic transportation.

### **299. Organization**

- a. The company is organized under T/O & E 5-67. It consists of a company headquarters, a distribution platoon, and three identical production platoons (see fig. 33).



*Figure 33. Organization of engineer water supply company.*

- b. Company headquarters provides command, administration, mess, supply, and organizational maintenance for the company.
- c. The distribution platoon provides transportation of water from source to water distribution points or to using agencies.
- d. Each production platoon includes—

- (1) A platoon headquarters, for water point reconnaissance and the supervision of installation and production.
- (2) An installation squad.
- (3) Three production squads, each with water purification equipment and transportation to operate one water point, and equipment to mess separately when necessary.

### **300. Employment**

- a. The company augments the water supply provided by general engineer units. Its production squads operate dispersed water points for troops in areas not served by such units. In a forward moving situation, the company may relieve general engineer units at existing water points.
- b. The normal basis of requisition at a water point is the presentation, by the consuming unit, of an empty water container or tank. Distribution by organic tank trucks and semitrailers is from source to water distribution points more convenient to the using agencies, and to hospitals, bakeries, prisoner of war inclosures, and other installations requiring water beyond the hauling capacity of their organic transportation.
- c. The company may install hypochlorination units in existing gravity pipelines or pumping systems served from a clear source, to treat water chemically for military use, or for civilian use to prevent epidemics.
- d. The company provides local security for its own working parties. It may also provide local security for water supply installations not protected by other

troops. Production squads maintain traffic and camouflage control at water supply installations.

### **301. Description of Equipment**

*a.* The equipment of the company includes portable diatomite water purification equipment sets with water quality control sets; hypochlorination units; pumps; supplementary equipment sets; and pipefitting equipment sets. Water distribution equipment includes water tank trucks, and semitrailer-mounted water tanks with tractor trucks for prime movers.

*b.* Armament, when the company is operating in an army area, includes caliber .50 machineguns, caliber .45 submachineguns, 3.5-inch rocket launchers, rifles, and carbines.

*c.* See T/O & E 5-67 for detailed lists of equipment.

### **302. Communications**

Communications equipment is limited to one telephone for company headquarters, which must be tied into the switchboard of higher headquarters.

### **303. Teams**

The following teams of the engineer service organization may be attached to a water supply company—

*a. Team GF: Water Purification*, may be attached if the company must meet an exceptionally heavy demand. Its purification capacity is equivalent to that of one of the nine production squads of the company.

*b. Team GH: Water Transport*, may be attached if the company needs augmentation in this field. The

team's equipment can carry up to 4,500 gallons of water at a time.

c. *Team GF*, may also operate independently in a situation where the full capacity of a water supply company is not needed.

## **Section IX. ENGINEER FORESTRY COMPANY**

### **304. Mission**

The mission of the engineer forestry company is to conduct logging and sawing operations for the production of rough lumber, timbers, and piling, and to operate a lumber yard.

### **305. Assignment**

The company is normally assigned to communications zone, with further assignment to an engineer maintenance and supply group.

### **306. Capabilities**

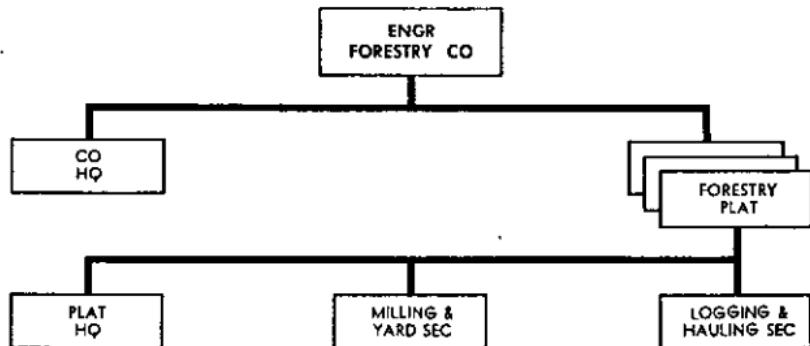
a. The company is organized and equipped to—

- (1) Support, under normal conditions, the rough lumber and timber requirements of about 20,000 construction troops.
- (2) Operate a lumber yard, to include grading, classifying, stacking, and issuing lumber.
- (3) Maintain records of stock on hand.
- (4) Produce around 10,000 to 15,000 board feet of rough lumber and timbers per day per forestry platoon.

b. The company is about 40 percent mobile, using organic equipment.

### **307. Organization**

a. The company is organized under T/O & E 5-387. It consists of company headquarters and three identical engineer forestry platoons (see fig. 34).



*Figure 34. Organization of engineer forestry company.*

b. Each platoon includes—

- (1) Platoon headquarters.
- (2) A milling and yard section.
- (3) A logging and hauling section.

### **308. Employment**

a. The company is utilized to reduce or eliminate the importation of lumber into the theater, from the zone of the interior or other outside sources, by exploiting local forest resources. The number and location of forestry companies in a theater therefore depends primarily on the nature and extent of available forests, and secondarily on the demand. The latter may vary widely with respect to both volume and nature. Thus, extensive port development may make heavy demands for piling; railroad construction, for ties and heavy lumber; depot and housing

construction, for light milled lumber; a stabilized defensive line, for heavy timbers; etc.

*b.* The company is ordinarily one of the elements of a maintenance and supply group. Three companies in a group are sufficient, on a rough average, to furnish support in the communications zone for a type field army, or to meet equivalent lumber demand from communications zone agencies. However, as explained in the preceding subparagraph, the figure will vary widely.

*c.* While a forestry company normally operates within the communications zone, the location of standing timber may cause it to operate in an army service area.

*d.* Each of the company's three forestry platoons can exploit completely a separate area of forest; the milling and yard section being based centrally, and the logging and hauling section operating in adjacent stands of timber. Alternatively, a central milling and yard area can be established for the entire company.

### **309. Description of Equipment**

*a.* Each logging and hauling section is equipped with a crawler-mounted logging arch, an air compressor with accessories, and power driven saws of various types. It also has trucks and tractor trucks, a crawler-type tractor, a low bed semitrailer, and a special type trailer.

*b.* Each milling and yard section has a portable gasoline-driven sawmill, crawler-type crane shovel equipment with accessories, and floodlighting equipment.

c. Company headquarters has blacksmith and carpenter equipment.

d. Armament is limited to carbines and rifles.

e. See T/O & E 5-387 for detailed lists of equipment.

### **310. Communications**

Communications equipment of the company consists of telephones and wire, with which company headquarters can communicate with the platoons if distances are not too great. Trunk service must be provided by higher authority.

### **311. Teams**

a. *Team GD: Forestry*, of the engineer service organization may be attached to a forestry company which needs augmentation. The team can conduct both logging and sawmill operations. Its capacity per day, in rough lumber or timber piling, is equivalent to that of one of the three forestry platoons of the company.

b. This team may also operate independently in a situation where the employment of a complete forestry company is not warranted.

### **312. Engineer Forestry Company (Type B)**

This unit is organized under T/O & E-5-387B. It differs from the ordinary company, described above, in that, except for a limited number of supervisory and administrative personnel, it consists of indigenous personnel obtained in the theater of operations. See also paragraph 150, the remarks in which apply in general here also.

## **Section X. ENGINEER MAINTENANCE AND SUPPLY GROUP**

### **313. Mission**

*a. Engineer Maintenance and Supply Group.* To perform, for army or the communications zone, large-scale coordinated maintenance and supply work, including the receipt, storage, and issue of engineer supplies and equipment, and the maintenance, evacuation, reclamation, and salvage of engineer equipment.

*b. Headquarters and Headquarters Company, Engineer Maintenance and Supply Group.* To provide an administrative and command headquarters to supervise the operations of a flexible group, composed of engineer maintenance and supply personnel, and of non-engineer service units and personnel engaged in the above-listed activities.

### **314. Assignment**

The group may be assigned to army or to the communications zone. In the latter case it may be further assigned to an engineer brigade.

### **315. Capabilities**

*a. The Group.* Its capabilities depend on the number and type of its component units.

*b. Headquarters and Headquarters Company.* It is trained and equipped to—

- (1) Command a group composed of engineer maintenance and supply units, or equivalent, totaling 2,500 to 5,000 men.
- (2) Hire, administer, supervise, and control up to 5,000 indigenous laborers or prisoners of war.

- (3) Plan, coordinate, inspect, and supervise group operations, to include: selecting sites for engineer maintenance and supply installations; coordinating the transportation activities of the group; analyzing the demands for labor, warehousing, and equipment and repair facilities, and seeing that they are met; and coordinating engineer evacuation, reclamation, and salvage activities.
- (4) Assist higher headquarters in supply and maintenance planning to meet operational requirements.
- (5) Perform fiscal and procurement activities in connection with group operations.
- (6) Implement the policies and procedures prescribed by higher authority with respect to: stock control of engineer general supplies, equipment and repair parts, as determined by operational demands; critical item lists; stock availability; and the stock status reports of subordinate agencies thereon; and the replacement of equipment, taking into account repair capabilities and requirements.
- (7) Prepare and submit replenishment requisitions for critical items and stock shortages.
- (8) Maintain statistical control of the group's supply and maintenance activities by consolidating and analyzing statistical data thereon.
- (9) Maintain a record and reporting system pertaining to engineer supplies, equipment, and maintenance work within the group.

- (10) Supervise unit administration within subordinate units, and give administrative assistance to any such units which are not part of a battalion.

### **316. Organization**

*a.* The group is a flexible organization which, beside its headquarters and headquarters company, consists of a number of more or less administratively self-sufficient units. Its composition varies according to the situation, provided that the command capability of group headquarters, as given in paragraph 315*b*, is not exceeded.

*b.* The troop unit components of a maintenance and supply group may include all of the lesser maintenance and supply units described in this manual, except that depot maintenance companies and forestry companies are normally assigned only to a group in the communications zone, and supply point companies only to a group assigned to army. Fire fighting teams from T/O & E 5-500A and a dump truck company are normally assigned to a group assigned to army.

*c.* For detailed organization of the component units of a group, see elsewhere in this manual.

*d.* As a supplement to, or substitute for, organized troop units, either civilian labor or prisoners of war may be made available to the group or to components thereof.

*e.* The headquarters and headquarters company of the group is organized under T/O & E 5-262 (see fig. 35). It consists of—

(1) Group headquarters, including: a control branch; an administrative section with a

communications branch; and an operations section having a civilian and prisoner of war branch, a supply branch, and a maintenance and parts branch.

- (2) Headquarters company, including the company headquarters section and the enlisted personnel of group headquarters.

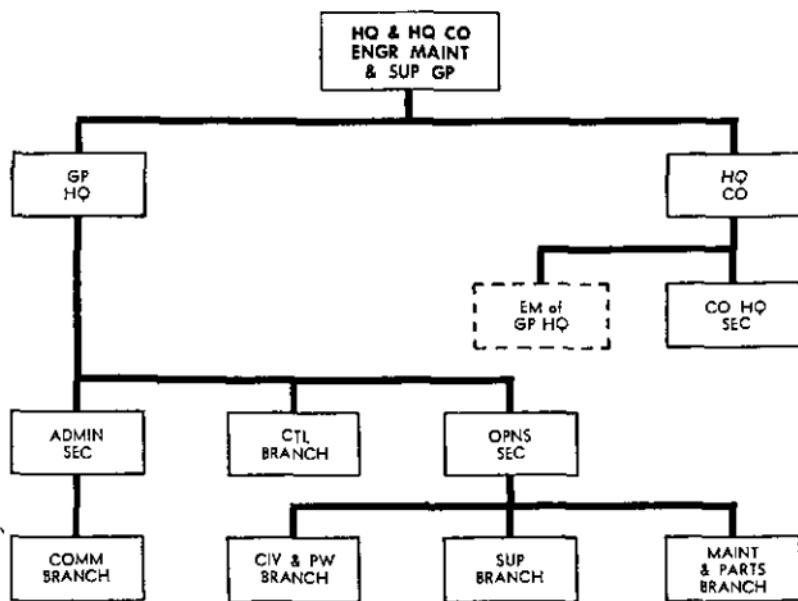


Figure 35. Organization of headquarters and headquarters company, engineer maintenance and supply group.

- f. Medical service for the group headquarters company and its assigned units is provided on an area basis by medical installations or units.

### 317. Employment

- a. A group assigned to an army is not normally further assigned or attached, but works in the army service area directly under the army engineer. A

group assigned to the communications zone may be further assigned to an engineer brigade.

b. In a section of the communications zone where the group is the largest engineer troop unit, the group commander may also be the section engineer, or may function directly under the section engineer if one has been designated.

c. The detailed activities of a maintenance and supply group will vary considerably under different conditions and in different parts of a theater. Its composition varies correspondingly. For example—

- (1) A group near a base port would probably have, as its primary mission, the reception of large volumes of supplies and equipment from the zone of the interior, and their identification, processing, and forwarding to forward depots, to keep the ports and the base section clear of congestion. Maintenance and repair of theater equipment in this area would be relatively less important. The group would therefore be composed, preponderantly of depot companies, parts depot companies, and possibly equipment supply teams; maintenance units and water supply units being added to the extent necessary.
- (2) A group in a forward area of the communications zone would need to lay greater stress on equipment maintenance (most of which is accomplished in such forward areas) and less on the processing of supplies. It would also, however, handle large volumes of sup-

plies in filler depots and going forward to army depots and supply points, and would issue to local units. Such a group would be strong in field and depot maintenance companies and parts depot companies, and would also have depot companies, and water supply companies if needed.

- (3) A group in an army service area would have, as its primary mission, the furnishing of engineer supplies and equipment, and the provision of field maintenance and repair parts, to divisions, corps troops, and army troops. It would therefore be strong in field maintenance companies, and in supply point companies and (probably) depot companies. It would not normally have depot maintenance companies.

*d.* The assignment of a forestry company to a group is determined primarily by the location of stands of timber.

*e.* Components of groups are assigned, and remain stable, whenever practicable.

### **318. Description of Equipment**

*a.* For the equipment of the component units of a group, see elsewhere in this manual.

*b.* The equipment of headquarters and headquarters company is largely individual or for housekeeping, local security, and engineer control. The latter includes sketching, drafting, and reproduction facilities and reference texts. Armament includes rifles, pistols, and carbines.

### **319. Communications**

Group communications are exclusively by wire. One teletypewriter is provided for use with depot and parts depot companies and higher headquarters.

### **320. Teams**

*a.* Any of the following teams of the engineer service organization may be attached direct to a group: *Team GI, Gas Generating, Team GJ, Carbon Dioxide Generating, Team HC, Welding.*<sup>2</sup> Firefighting teams may be located at large engineer depots or supply points.

*b.* For the attachment of teams to the components of a group, see elsewhere in this chapter.

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<sup>2</sup> A welding team so attached would probably be further attached, by group headquarters, to a subordinate maintenance unit or agency having a heavy welding load.

## CHAPTER 8

# ENGINEER UNITS WITH THE AIR FORCE

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### Section I. GENERAL

#### **321. "SCARWAF" and "ARWAF" Units**

There are two categories of engineer troop units which work under Air Force control: SCARWAF (Special Category Army Units with Air Force), and ARWAF (Army Units with Air Force). It may be added that other services besides the Corps of Engineers have such units.

#### **322. Characteristics of "SCARWAF" Units**

SCARWAF units have the following characteristics—

- a. They differ in organization, equipment, and training from other engineer units.
- b. They are activated, manned, and initially trained by the Army to meet Air Force requirements. On completion of training the units are assigned to the Air Force, which assumes responsibility for them. Replacements are trained by the Army and furnished the Air Force on requisition. Personnel of SCARWAF units are chargeable to Air Force troop authorization.
- c. They are under Air Force command.<sup>1</sup> The Air

<sup>1</sup>On occasion, engineer SCARWAF units might be directly attached to an amphibious or other task force, in which case they would of course be under the force commander, whether Army, Navy, or Air Force.

Force has ultimate control of the construction of airfields and related facilities, including the assignment of missions, designation of priorities, design and facilities, direction of airfield defense, and decisions as to evacuations and demolitions. Air Force control is normally exercised within the framework of the aviation engineer force.<sup>2</sup> That command may be represented, on the staff of the Air Force commander, by the "staff air installation officer"; or alternatively, the commanding general of the aviation engineer force may himself occupy this staff position. Personnel management policies are prescribed by the Air Force. The Air Force can transfer personnel from one SCARWAF unit to another. However, engineer personnel will not be transferred into, or assigned to, engineer units with the Air Force, without the consent of the Department of the Army. Court-martial jurisdiction is normally with the Department of the Army, but may be assigned to the Air Force when circumstances warrant.

*d.* The Army provides the equipment and supplies for their activation and initial training. Most of the equipment, however, will in the ordinary case belong to the Army training center where this occurs, and a SCARWAF unit, after initial training, will take with it only certain items of individual and housekeeping equipment. After the unit has come under Air Force jurisdiction, the Air Force is responsible for all equipment and supplies, including the initial issue to complete the unit's organic equipment. The Army provides depot maintenance. On occa-

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<sup>2</sup> Or whatever may be the senior engineer command under the Air Force in question.

sion, also, SCARWAF units must call on the Army for direct logistic support (for example, if building an airfield at a point where Air Force support is impracticable).

*e.* They may operate in any part of a theater where the Air Force commander has a legitimate mission for them, without regard to divisional, corps, army, or communications zone boundaries.

*f.* The Army must take careful account of such units in computing its logistic and depot maintenance demands, and in planning its area defenses.

### **323. Characteristics of "ARWAF" Units**

ARWAF units differ from SCARWAF units in the following respects—

*a.* They are not unique in organization, training, or equipment, but are ordinary engineer units such as are normally under Army control.

*b.* They are attached to the Air Force, not assigned.

*c.* Whereas SCARWAF engineer units are a normal component of a theater air force, ARWAF units are attached only when a special need exists. For example, if the depot support requirements of the assigned SCARWAF engineer units, in some part of a theater, cannot be met by the Air Force or by Army units operating in the area, an engineer maintenance and supply group may be attached to the theater air force, as an ARWAF unit, to meet the deficiency.

### **324. "SCARWAF" Engineer Units**

*a.* The following are SCARWAF engineer units organized under T/O & E, Department of the Army—

Engineer aviation battalion.

Engineer aviation group.

In addition there is an engineer aviation brigade, which is at the next command level above the engineer aviation group, and whose major components are two or more such groups. It is currently organized under Air Force T/D's. Preparation and issue of a T/O & E is currently under consideration. No further reference is made to this unit herein.

b. The aviation battalion is equipped for all-round engineer activities, but with special emphasis on airfield construction, which is its most important mission. Its normal construction equipment largely exceeds that of the ordinary engineer combat or construction battalion, and can be augmented to meet exceptional work loads.

c. The group and brigade are command agencies at successive levels above the battalion.

### **325. "ARWAF" Engineer Units**

These units, as such, are not dealt with in this manual, being identical with other engineer units which are described in their appropriate chapters. Among those more commonly in this category are maintenance and supply units, dump truck companies, and camouflage units.

## **Section II. ENGINEER AVIATION BATTALION**

### **326. Mission**

The mission of the engineer aviation battalion is to construct and rehabilitate airfields, roads, utilities, buildings, structures, and other ground theater of operations type facilities required exclusively to sup-

port the operations of the Air Force or to defend the construction sites.

### **327. Assignment**

The battalion is normally assigned to an engineer aviation group.

### **328. Capabilities**

*a.* The battalion is trained and equipped to—

- (1) Accomplish the mission outlined in paragraph 326.
- (2) Perform field maintenance for its organic engineer equipment and organic ordnance general purpose vehicles.
- (3) Conduct sustained operations on a two-shift basis if the battalion is at full strength, and on a one-shift basis if at reduced strength.
- (4) Accomplish large scale concrete or bituminous runway construction and quarry operation, when augmentation is authorized.
- (5) Reorganize itself functionally, by companies, for certain types of large scale construction jobs.

*b.* The battalion is not completely mobile. While there are adequate facilities for the transportation of all personnel by motor, three of four shuttle movements are required to move all the equipment.

### **329. Organization**

*a.* The battalion is organized under T/O & E 5-415A. It consists of a headquarters and headquarters and service company (T/O & E 5-416A), three identical engineer aviation companies (T/O & E 5-417A), and a medical detachment (T/O & E 5-415A) (see fig. 36).

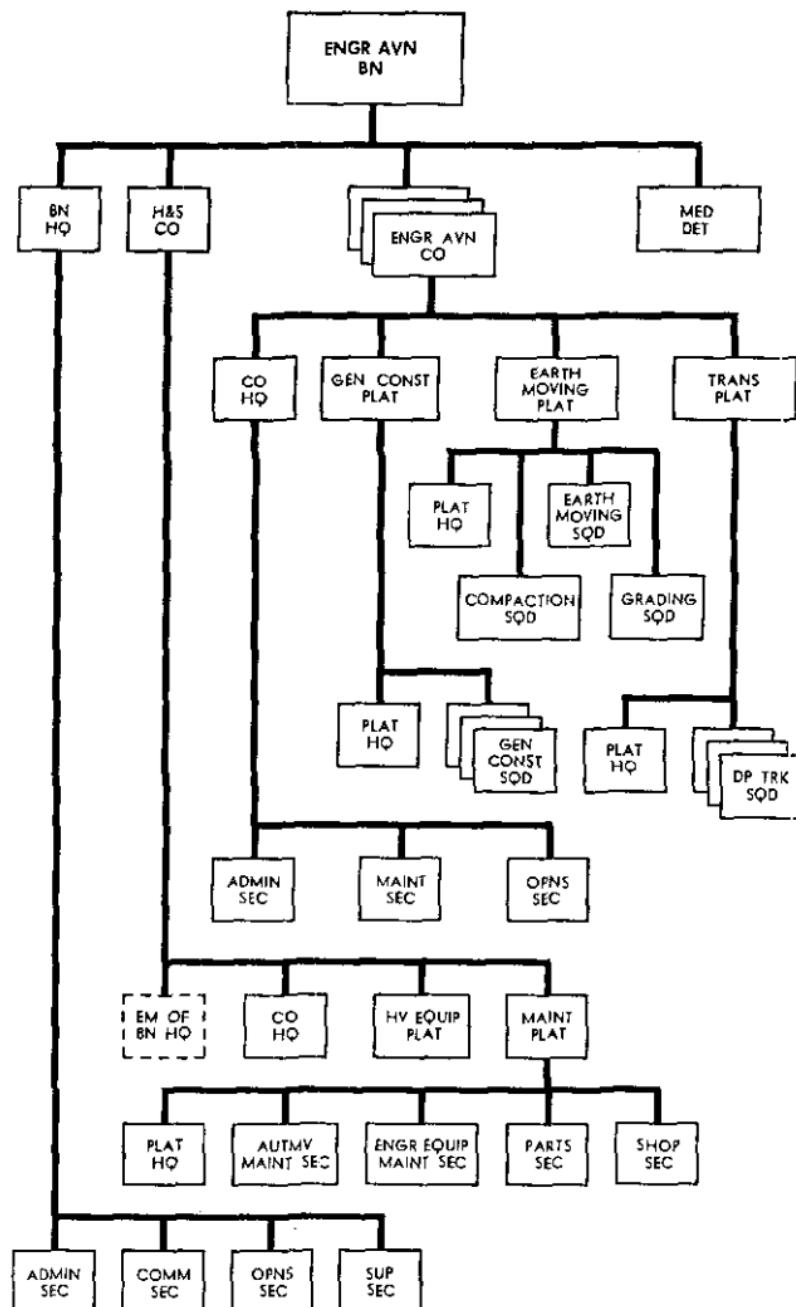


Figure 36. Organization of engineer aviation battalion.

- b. Battalion headquarters includes administrative, communications, operations, and supply sections.
  - c. The headquarters and service company includes—
    - (1) Company headquarters.
    - (2) A maintenance platoon, containing platoon headquarters, an automotive maintenance section, an engineer equipment maintenance section, a parts section, and a shop section.
    - (3) A heavy equipment platoon.
    - (4) Enlisted personnel of battalion headquarters.
  - d. Each engineer aviation company includes—
    - (1) Company headquarters, composed of an administrative, a maintenance, and an operations section.
    - (2) A general construction platoon, composed of platoon headquarters and three identical general construction squads.
    - (3) An earth-moving platoon, composed of platoon headquarters, an earth-moving squad, a compaction squad, and a grading squad.
    - (4) A transportation platoon, composed of platoon headquarters and three identical dump truck squads.

### **330. Employment**

- a. The battalion is a balanced organization capable of carrying on simultaneously all phases of airfield construction. It is therefore the basic unit for the construction or major rehabilitation of airfields in a theater. Normally it is assigned to an engineer aviation group. Alternatively, an independent battalion

may be placed under the direct command of a numbered air force.

*b.* All elements of a battalion normally operate under the direct supervision and control of the battalion commander.

*c.* The battalion's work is ordinarily confined to the construction, expansion, rehabilitation, or major repair of airfields and other facilities required exclusively for the Air Force; and, in an emergency, to fighting as infantry in the defense of construction sites. It does not undertake the routine maintenance of operational airfields.

### **331. Description of Equipment**

*a. Tools and Equipment Sets.* Operating squads and platoons of the engineer aviation companies have sets of pioneer and carpenter tools and demolition equipment. Supplementary equipment sets are carried by headquarters and service company.

#### *b. Construction Equipment.*

(1) Headquarters and service company heavy construction equipment includes air compressors, craneshoels, graders, crawler tractors, road rollers, a rooter, and ditching machine. For quarry operations there is a crushing and screening plant and a quarry equipment set containing drilling tools. Heaters, tanks, distributors and aggregate spreaders are also provided.

(2) Each engineer aviation company has crane shovels, motorized road graders, road and sheepsfoot rollers, road scrapers, and crawler and wheel type tractors with dozer. There are also welding, electric lighting,

and flood lighting equipment sets. In addition, company equipment may be augmented by equipment from headquarters and service company as required for tasks assigned.

*c. Material Hauling Equipment.* The battalion has dump trucks for movement of material for roads and airstrips, and of other Class IV engineer supplies. It also has tractor trucks and a heavy wrecker truck.

*d. Armament.* The armament of the battalion consists of caliber .50 and caliber .30 machineguns, caliber .45 submachineguns, 3.5-inch rocket launchers, rifles, carbines, and pistols.

*e. Augmentation.* The T/O & E provides for an augmentation of equipment when authorized by the Department of the Air Force, or if outside the continental United States, by the major Air Force, commander; together with an augmentation of personnel for the operation, maintenance, etc., of such equipment. Included are items for quarrying, rock-crushing, concrete and bituminous work, material handling, and activities auxiliary thereto.

*f. Detailed Lists of Equipment.* See T/O & E 5-415A.

### **332. Communications**

Radio facilities are provided for the operation of internal company and battalion command nets and for communicating with the group headquarters. The battalion has telephones and a central office set for communication between battalion headquarters sections and with the companies when centralized. The companies have telephone facilities for work

project control. Higher headquarters installs wire to the battalion switchboard.

### **Section III. ENGINEER AVIATION GROUP**

#### **333. Mission**

The mission of the engineer aviation group is to support the operations of the Air Force by construction work and allied activities beyond the scope of a single engineer aviation battalion.

#### **334. Assignment**

The group is normally assigned to an engineer aviation brigade.

#### **335. Capabilities**

*a. The Group.* Its capabilities depend on the number and type of its component units.

*b. Headquarters and Headquarters Company.* It is trained and equipped to exercise technical and administrative command over the assigned engineer aviation battalions, together with such additional assigned or attached engineer troops as the situation may demand; and to perform design and layout work for large-scale construction projects.

#### **336. Organization**

*a.* The group is a flexible organization which, beside its headquarters and headquarters company, consists of a varying number of engineer aviation battalions, normally from two to four, which may be supplemented by additional attached units.

*b.* For detailed organization of the component units, see elsewhere in this manual.

c. The headquarters and headquarters company is organized under T/O & E 5-412A (see fig. 37). It consists of—

- (1) Group headquarters, which includes an administrative and communications section, an engineering and intelligence section, an operations section, and a supply section, performing the usual S1, S2, S3, and S4 duties.
- (2) The headquarters company, which includes company headquarters and the enlisted personnel of group headquarters.

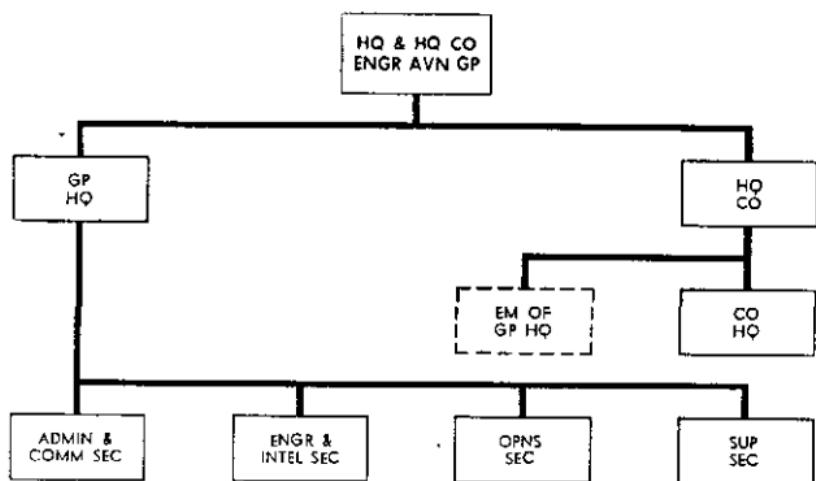


Figure 37. Organization of headquarters and headquarters company, engineer aviation group.

### 337. Employment

a. The group, being composed primarily of engineer aviation battalions, can undertake all types of work of which that unit is capable, on a larger scale. If other engineer units are attached—for example, maintenance, supply or topographic units, on an

"ARWAF" basis—the group may be made more completely self-contained.

b. Normally the group forms part of an engineer aviation brigade and operates units under its direct supervision. Alternatively, an independent group may be assigned under the direct command of a numbered air force.

### **338. Description of Equipment**

a. For the equipment of the component elements of the group, see appropriate parts of this manual.

b: The equipment of headquarters and headquarters company is largely individual or for housekeeping, local security, and engineer control. The latter includes surveying, drafting, and reproduction facilities, reference texts, and laboratory testing sets. Armament consists of caliber .50 and caliber .30 machineguns, caliber .45 submachineguns, 3.5-inch rocket launchers, rifles, carbines, and pistols.

### **339. Communications**

Radio equipment is provided to permit the group to form a command net of its component battalions and other subordinate units, and to join the net of its higher headquarters. A telephone central is provided for intragroup wire communications by telephone, since all components of a typical group have telephones. One teletypewriter set is provided for use to higher and adjacent headquarters; no subordinate units in the group are authorized a teletypewriter.

## **CHAPTER 9**

### **THE ENGINEER SERVICE ORGANIZATION**

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#### **Section I. GENERAL**

##### **340. General**

As explained in paragraph 25, the engineer service organization is not an operating or administrative entity, but a collective term for a number of cellular units known as "teams" and having certain common features. They are all organized under T/O & E 5-500A.

##### **341. General Nature of Teams**

a. The concept of the team dates from World War II. Modern war demands the presence, in a theater of operations, of a great variety of organized groups of individuals having specialized skills. Customarily, in the past, any such unit was organized as a company or multiple thereof, largely self-sufficient as to supply, administration, transport, etc. In such a unit, numerous administrative personnel are needed to housekeep for the specialists. With the multiplication of specialist needs, arising out of the increasing complexity of weapons and equipment, the aggregate of such "overhead" personnel serving the specialist groups becomes large enough to make it a real factor in the Army's manpower problem. Moreover, some specialist groups are too small to jus-

tify a housekeeping overhead, even if no other factor were involved. It is of course true that any self-contained military unit whatever, including all the companies, battalions, etc., described in this manual, consists fundamentally of operating specialists plus housekeeping overhead. However, when the latter element can be reduced or eliminated without loss of efficiency, it should be done.

b. To this end, cellular type units known as teams have been organized. They are of two general types: those which augment other engineer units, or elements thereof, performing the same mission; and those which perform missions peculiar to themselves. A team has the following characteristics—

- (1) It consists of a group of individuals trained to work together as specialists in some particular line.
- (2) In this capacity, it may perform certain operations as a group; or it may become the specialized cadre around which a larger organization is built; or its personnel may act as inspectors, instructors, or supervisors.
- (3) Its personnel are specialists.
- (4) Its equipment is in general restricted to certain transportation, mission equipment, tools, and supplies pertaining to its specialty.
- (5) It follows from (3) and (4) above that the typical team is not self-sufficient as to administration, shelter, messing, supply, storage facilities, signal communications, medical care, etc., but must largely rely, in these fields, on the unit to which it is attached.

*c.* While some teams consist of only a handful of specialists, others—for example, certain topographic teams—are in effect small-scale replicas of corresponding fully organized troop units.

### **342. Mission**

Briefly stated, the mission of an engineer team may be—

*a.* To perform engineer technical and service operations where units of less than company size are needed.

*b.* To increase the productive capacity of fixed strength units where increments of less than company size are needed.

### **343. Categories and Nomenclature**

*a.* Engineer teams fall into seven categories, designated by capital letters, as follows—

A. Administrative and headquarters team.

B. Supply teams.

E. Maintenance and parts teams.

F. Firefighting teams.

G. Equipment operating teams.

H. Construction, utilities, and electrical power teams.

I. Topographic and intelligence teams.

*b.* Each individual team has a title. In addition it is designated by two capital letters, the first standing for the category of the team (see *a* above), the second for the individual team. Thus, under category G, “Equipment operating teams,” the first one listed in T/O & E 5-500A is designated “Team GA: Dump Truck”; the next is designated “Team GB: Rock Crusher”; etc.

### **344. Assignment**

Engineer teams may be assigned as follows:

*a.* To regularly organized engineer troop units, especially construction, topographic, maintenance, and supply units. This is the normal assignment of the majority of them.

*b.* To large tactical commands. Thus, Team EA or EB may be assigned to a task force not requiring the services of a full strength field maintenance company; Team IG is normally assigned to a corps; etc.

*c.* To a post, camp, station, warehouse area, public utilities plant, etc., for operational, maintenance, or safety activities. The fire-fighting and utility teams are examples. Such tasks are normally in the communications zone, and such a team may on occasion be assigned direct to communications zone headquarters.

*d.* As command and administrative cadres. Teams AA, AB, AC, and AD may be thus assigned.

*e.* In certain cases one team may be attached to another team.

*f.* Theoretically an individual team may be shifted at will from one assignment or attachment to another. However, present thinking favors the idea that, once a team has been assigned to a command, it should remain there permanently or at least for a lengthy period. The advantages are obvious. The team will operate more efficiently after its personnel have come to know the individuals in the associated organization with whom they must deal; and the team personnel are more likely to receive equitable treatment, in the matter of promotions, etc., if the organization feels that they have become an integral part of itself.

### **345. Service Teams: The Composite Service Organization**

Two other categories of teams which may be attached to engineer troops are mess teams, and automotive maintenance teams. These are organized under T/O & E 29-500A, collectively designated the "composite service organization."

*a. Mess Detachments.* These include Teams CA, CB, and CC. A team provides basic personnel and equipment for operating a mess for anything from a small detachment up to 700 men, depending on the team. It may be attached to a service platoon or company having no such personnel, or to a unit whose mess personnel need augmentation for some such reason as increased strength, an unusual splitting up of the unit into detachments needing separate messes, etc.

*b. Automotive Maintenance Detachments.* These include Teams DA to DN inclusive.

- (1) Teams DA, DB, DC, and DD provide the minimum basic personnel and equipment necessary to operate an automotive maintenance section for engineer units of varying sizes and with varying amounts and kinds of automotive equipment.
- (2) Teams DE, DF, DG, DH, DI, DJ, DK, DL, DM, and DN provide basic personnel and equipment for the augmentation of the automotive maintenance sections of existing engineer units. The teams differ according to the types of specialists they provide, the nature of the units which they are intended

to augment, and the number and nature of the vehicles to be maintained.

- (3) For the detailed basis of allocation of the above personnel see T/O & E 29-500A and SR 310-30-1.

c. *Aircraft Detachments.* These include Teams EA to EE inclusive. Teams EA and EB, Army fixed wing aircraft detachments, each provide a plane (observation, utility, or command) and technical personnel, for attachment to units, including engineer units, which lack organic aircraft and are authorized this type of service. Teams EC, ED, and EE, Army rotary wing aircraft detachments, each provide a helicopter (reconnaissance, utility, or cargo) and technical personnel for similar use.

## **Section II. ADMINISTRATIVE AND HEADQUARTERS TEAMS**

### **346. General**

These are of two sub-categories. Teams AA to AD inclusive are organized to furnish the command and administrative cadre for service teams or units of varying size. They may be assigned anywhere in a theater.

### **347. Team AA: Platoon Headquarters (Component of Company)**

a. *Capabilities.* Command and administrative control of two or more service teams.

b. *Allocation.* One per two or more service teams with a strength of not less than 40 individuals. Not required if commissioned officers are assigned to the teams.

### **348. Team AB: Platoon Headquarters (Separate)**

*a. Capabilities.* Command and administrative control of two or more service teams not part of a company.

*b. Allocation.* One per unit comprising 40 to 60 individuals. Not required if commissioned officers are assigned to team.

### **349. Team AC: Company Headquarters**

*a. Capabilities.* Command and administrative control of two or more service platoons.

*b. Allocation.* One per unit comprising two or more service platoons with an aggregate strength of not less than 120 individuals.

### **350. Team AD: Battalion Headquarters**

*a. Capabilities.* Command and administrative control of three or more service companies, or a group of engineer units of company or smaller size with an aggregate strength of approximately 750 to 1,100 individuals. Furnishes direct administrative assistance to separate detachments which are not attached to companies.

*b. Allocation.* One per group of three or more service companies or teams with an aggregate strength of 750 to 1,100 individuals.

## **Section III. SUPPLY TEAMS**

### **351. Team BA: General Supply**

*a. Capabilities.* Receives, stores, issues, and maintains records of class II and IV engineer supplies for approximately 35,000 troops.

*b. Allocation.* Normally augments an engineer depot company. May augment Depot Operating Team BB. One team per special task force of up to 35,000 troops.

### **352. Team BB: Depot Operating**

*a. Capabilities.* Operates a depot for the receipt, storage, and issue of engineer general supplies and equipment, and maintains records of class II and IV supplies, for approximately 90,000 troops.

*b. Allocation.* Normally augments an engineer depot company. One team per special task force of from 70,000 to 90,000 troops.

### **353. Team BC: Equipment Supply**

*a. Capabilities.* Operates a small depot for the receipt, assembly, servicing, issue, and shipment of engineer mechanical and electrical equipment in support of a small task force or base. Capable of handling equipment supply for a force of about 35,000 troops, including the assembly and initial conditioning of heavy engineer equipment before storage or issue, and the inspection and minor repairs of heavy equipment going into depot stock, to insure serviceability while in storage.

*b. Allocation.* Augments an engineer depot company or an engineer depot battalion; may augment Depot Operating Team BB. One team per special task force of up to 35,000 troops.

## **Section IV. MAINTENANCE AND PARTS TEAMS**

### **354. Team EA: Field Maintenance**

*a. Capabilities.* Provides engineer field maintenance support for about 140 major items of engineer

construction equipment, or for 90 vehicle equivalents.

*b. Allocation.* Normally one per special task force requiring a maintenance force less than a platoon of an engineer field maintenance company (or Team EB).

### **355. Team EB: Field Maintenance**

*a. Capabilities.* Provides engineer field maintenance support for approximately 375 major items of engineer construction equipment, or for 180 vehicle equivalents.

*b. Allocation.* Normally one per special task force requiring a force less than a platoon of an engineer field maintenance company and greater than Team EA. May also be used to augment an engineer field maintenance company.

### **356. Team EC: Special Equipment Maintenance**

*a. Capabilities.* Provides personnel to operate a mobile machine shop for the repair of special engineer equipment, including sniperscopes, mine detectors, odographs, searchlights, small quantities of miscellaneous infrared devices, precision instruments, and similar items. The team is capable of maintaining approximately 1,050 sniperscopes, 700 mine detectors, 25 odographs, 6 searchlights, and miscellaneous items.

*b. Allocation.* Normally one per engineer field maintenance company where there is a high concentration of special engineer equipment.

### **357. Team ED: Parts**

*a. Capabilities.* Provides parts supply support for 500 major items of engineer equipment employed

by an engineer force operating in an area which does not require support of a larger parts supply unit. The team can handle approximately 70 tons of spare parts, or 25,000 line items, per month.

*b. Allocation.* Normally one per special task force, or one per Field Maintenance Team EB; and as required to augment an engineer parts depot company or an engineer depot maintenance company.

## **Section V. FIRE FIGHTING TEAMS**

### **358. Team FA: Headquarters**

*a. Capabilities.* Planning for overall strategic fire defense; controls fire-fighting teams assigned or attached to it.

*b. Allocation.* Normally one per two to four fire-fighting teams and one water tank team.

### **359. Team FB: Fire Truck**

This team is capable of establishing organized fire protection and fire prevention programs on an area basis. Can provide fire protection for an area housing from 5,000 to 10,000 troops, or an area containing warehousing or open stockpile storage of 100,000 square feet.

### **360. Team FC: Fire Trailer**

*a. Capabilities.* This team, including the team chief with volunteer personnel, can furnish fire protection to an area housing from 5,000 to 10,000 troops, or to a warehouse or open storage area of 100,000 square feet.

*b. Allocation.* One per post, base camp, or station housing up to 5,000 troops, or per warehouse or open

storage area of 100,000 square feet when a fire-truck team is not required.

#### **361. Team FD: Water Tank**

*a. Capabilities.* Transports water for fire-fighting purposes when insufficient water storage is available.

*b. Allocation.* One per fire-fighting platoon; additional teams as required.

### **Section VI. EQUIPMENT OPERATING TEAMS**

#### **362. Team GA: Dump Truck**

*a. Capabilities.* Provides supervisory personnel, drivers, and dump trucks for hauling bulk materials such as dirt, gravel, coal, road metal, etc. Capacity for hauling depends upon factors such as type of material, distance per trip, and loading facilities. Maximum hauling capacity, 40 tons.

*b. Allocation.* Normally is attached to a dump truck company to augment its hauling capacity; may be attached to a construction company or service unit.

#### **363. Team GB: Rock Crusher**

*a. Capabilities.* Provides personnel for the operation of a 50-ton-per-hour crushing and screening plant.

*b. Allocation.* Normally attached to an engineer construction unit, to furnish and operate equipment for the production of crushed stone.

#### **364. Team GC: Pipeline Operating**

*a. Capabilities.* The operation and maintenance (except for major overhaul or rebuild) of a petro-

leum pipeline system not exceeding 50 miles of line and 3 pumping stations.

*b. Allocation.* Normally attached to an engineer pipeline company for operating and maintaining pipelines. May operate independently where the employment of a pipeline company is not warranted.

### **365. Team GD: Forestry**

*a. Capabilities.* Provides personnel and equipment to conduct logging and sawmill operations for the production of rough lumber and timber piling. Capable of producing 10,000 to 15,000 board feet of rough lumber or timber piling per day.

*b. Allocation.* Normally attached to an engineer forestry company. May operate independently when the employment of a forestry company is not warranted.

### **366. Team GE: Well Drilling**

*a. Capabilities.* Provides supervisory personnel and equipment for drilling water wells; installs casings and pumps for wells.

*b. Allocation.* Normally attached to a construction unit which has the mission of supplying water by wells to units or stations, and which can augment the team by the additional personnel necessary for well-drilling operations.

### **367. Team GF: Water Purification**

*a. Capabilities.* Provides personnel and equipment for purifying up to 3,000 gallons of potable water per hour, and storage facilities for 12,000 gallons.

*b. Allocation.* Normally attached to an engineer water supply company. May operate independently when the employment of a water supply company is not warranted.

### **368. Team GG: Water Purification**

*a. Capabilities.* Provides supervisory personnel for the operation of a central water plant or a municipal water system. When augmented by utilities personnel, can operate single or multiple standard purification units forming a central plant supporting up to 60,000 individuals. When augmented by utilities personnel, civilians, and/or public works operating personnel, can operate a central municipal water system supporting up to 200,000 individuals.

*b. Allocation.* Normally one per engineer brigade.

### **369. Team GH: Water Transport**

*a. Capabilities.* Provides personnel and equipment for short hauls of about 10 to 15 miles, to transport water in bulk to water distribution points; 4,500 gallons may be transported at one trip. Daily capacity depends on such factors as length of haul, condition of roads, and whether the area is subject to enemy attack.

*b. Allocation.* Normally one per engineer water supply company.

### **370. Team GI: Gas Generating**

*a. Capabilities.* Provides personnel to operate an acetylene generating plant of 750 cubic feet per hour capacity, and two oxygen and nitrogen generating plants of 1,000 cubic feet per hour capacity each. Operates and maintains machinery to generate acety-

lene, oxygen, and nitrogen, and to store limited quantities of these gases.

*b. Allocation.* Normally one to an engineer maintenance and supply group.

### **371. Team GJ: Carbon Dioxide Generating**

*a. Capabilities.* Provides for the generation, storage, and transportation of carbon dioxide in gaseous and liquid form and in the form of dry ice. Operates machinery for generating hydrogen and carbon dioxide. Can store limited quantities of these gases.

*b. Allocation.* Normally one to an engineer maintenance and supply group.

## **Section VII. CONSTRUCTION, UTILITIES, AND ELECTRICAL POWER TEAMS**

### **372. Team HA: Headquarters Port Construction**

*a. Capabilities.* Provides personnel to augment an engineer staff section or unit for the performance of specialized phases of port planning, such as capacity computation, layout, site selection, design, material requirements, and special equipment needs.

*b. Allocation.* Normally one per engineer construction group when engaged in major port projects.

### **373. Team HB: Diving**

*a. Capabilities.* Provides personnel and equipment to perform marine diving in support of port construction and rehabilitation and other types of engineer construction, including underwater pipelines whose installations or repair may require diving personnel and equipment.

*b. Allocation.* Normally one per engineer construction group when engaged in a major port or underwater pipeline project.

#### **374. Team HC: Welding**

*a. Capabilities.* Provides welders and equipment for attachment to units whose organic personnel and equipment are inadequate.

*b. Allocation.* Normally one per engineer construction group, and two per engineer maintenance and supply group.

#### **375. Team HD: Utilities**

*a. Capabilities.* Provides personnel and equipment for maintenance of utilities at installations of up to 2,500 individuals. Provides post engineer service in oversea or theater of operations installations. Maintains utilities and furnishes utilities service and repair, including refrigeration maintenance.

*b. Allocation.* Normally one per oversea or theater camp, base, depot, or installation of up to 2,500 individuals.

#### **376. Team HE: Utilities**

*a. Capabilities.* Same as Team HD, but serving up to 4,000 individuals.

*b. Allocation.* Normally one per oversea or theater camp, base, depot, or installation of up to 4,000 individuals.

#### **377. Team HF: Utilities**

*a. Capabilities.* Same as Team HD, but serving up to 6,000 individuals.

*b. Allocation.* Normally three, in the communications zone, per supported field army.

### **378. Team HG: Utilities**

*a. Capabilities.* Same as Team HD, but serving up to 10,000 individuals.

*b. Allocation.* Normally one per typical field army, and two in the communications zone per supported field army.

### **379. Team HH: Power Line**

*a. Capabilities.* Provides personnel and tools for the installation of high voltage electric power lines, and for the maintenance of approximately 60 miles of such lines.

*b. Allocation.* Normally one per two electric power generating plants of from 300 to 2,500 kilowatt capacity each.

### **380. Team HI: Power Plant Maintenance**

*a. Capabilities.* Provides personnel and equipment for the maintenance of electric power plants of from 300 to 2,500 kilowatt capacity, provided welding team HC is attached. Furnishes supervisory personnel for the construction or rehabilitation of such plants.

*b. Allocation.* Normally one per two such plants.

### **381. Team HJ: Power Plant Operating**

*a. Capabilities.* Provides personnel for the operation of electric power plants containing from one to three diesel-driven generators whose capacities range from 300 to 2,500 kilowatts each.

*b. Allocation.* Normally four per engineer brigade in the communications zone.

### **382. Team HK: Foundry**

- a. Capabilities.* Provides personnel for the operation of one set of engineer foundry equipment.
- b. Allocation.* Normally one per engineer depot maintenance company, when foundry service is required.

## **Section VIII. TOPOGRAPHIC AND INTELLIGENCE TEAMS**

### **383. Team IA: Survey**

- a. Capabilities.* Provides personnel and equipment for the survey operations of one party.
- b. Allocation.* Normally one per engineer brigade.

### **384. Team IB: Survey Platoon**

- a. Capabilities.* Provides personnel and equipment for three survey parties, and for the preparation of map manuscript on a limited scale.
- b. Allocation.* Normally to an engineer base survey company, when mapping operations require additional effort but less than a base survey company.

### **385. Team IC: Photomapping Platoon**

- a. Capabilities.* Provides personnel and equipment for the preparation of topographic maps, by multiple methods, from aerial photographs.
- b. Allocation.* Normally to an engineer base photomapping company, when its operations require additional effort but less than that represented by another such company.

### **386. Team ID: Map Reproduction Platoon**

*a. Capabilities.* Provides personnel and equipment for the production of maps from original manuscript, and of limited quantities of photostats.

*b. Allocation.* Normally to an engineer base map reproduction company, when its operations require additional effort but less than that represented by another such company.

### **387. Team IE: Map Depot Platoon**

*a. Capabilities.* Provides personnel and equipment for the receipt, storage, issue, and distribution of maps for a base, army, or corps headquarters. The platoon can operate as a depot.

*b. Allocation.* Normally three per engineer topographic battalion, army, when the situation calls for the establishment of forward depot.

### **388. Team IF: Relief Map Making**

*a. Capabilities.* Provides personnel and equipment to construct original terrain models at scales from 1:5,000 through 1:50,000, and to produce quantities of plastic reproductions thereof.

*b. Allocation.* Normally one per engineer base topographic battalion.

### **389. Team IG: Technical Intelligence (Collection)**

*a. Capabilities.* Provides personnel and equipment for finding, collecting, identifying, photographing, and reporting on elements of engineer technical intelligence, such as foreign engineer materiel, construction, organization, training, tactics, techniques, installations, and fortifications. Also ca-

pable of preparing and illustrating training aids and instructing in their use.

*b. Allocation.* Normally one per corps.

### **390. Team IH: Technical Intelligence (Research)**

*a. Capabilities.* Provides personnel and equipment for collecting, receiving, evaluating, photographing, and reporting on elements of engineer technical intelligence, such as engineer materiel, construction, organization, training, tactics, techniques, installations, fortifications, research, and development. Prepares and illustrates training aids of items of engineer intelligence. Assists with the interrogation of enemy military and civilian personnel for engineer intelligence. Coordinates the activities of Teams IG.

*b. Allocation.* Normally one per field army.

### **391. Team IJ. Geodetic Survey**

*a. Capabilities.* Provides personnel and equipment for high order geodetic surveys and computations for guided missiles, and as otherwise required in field army or theater operations.

*b. Allocation.* Normally one per field army as required.

### **392. Team IK: Terrain**

*a. Capabilities.* Provides personnel and equipment for collecting, evaluating, and disseminating terrain data, making terrain studies, and providing consultant services in military geology and military hydrology.

*b. Allocation.* Normally one per field army, but may be assigned at a lower level.



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