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FM 5-162

Reference

DEPARTMENT OF THE ARMY FIELD MANUAL

ENGINEER CONSTRUCTION AND CONSTRUCTION-SUPPORT UNITS

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HEADQUARTERS, DEPARTMENT OF THE ARMY
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HEADQUARTERS
DEPARTMENT OF THE ARMY
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ENGINEER CONSTRUCTION AND CONSTRUCTION-SUPPORT UNITS

		Paragraphs	Page
CHAPTER	1. INTRODUCTION	1-1-1-3	1-1
	2. CONSTRUCTION IN A THEATER OF OPERATIONS	2-1-2-17	2-1
	3. ENGINEER COMMAND	3-1-3-20	3-1
	4. ENGINEER CONSTRUCTION BRIGADE	4-1-4-10	4-1
	5. ENGINEER CONSTRUCTION GROUP	5-1-5-10	5-1
	6. ENGINEER CONSTRUCTION BATTALION		
Section	I. General	6-1-6-8	6-1
	II. Headquarters and headquarters company, engineer construction battalion	6-9-6-15	6-2
	III. Engineer equipment and maintenance company	6-16-6-23	6-6
	IV. Engineer construction company	6-24-6-31	6-8
CHAPTER	7. ENGINEER PORT CONSTRUCTION COMPANY	7-1-7-9	7-1
	8. ENGINEER CONSTRUCTION SUPPORT COMPANY	8-1-8-9	8-1
	9. ENGINEER PIPELINE CONSTRUCTION SUPPORT COMPANY	9-1-9-9	9-1
	10. ENGINEER DUMP TRUCK COMPANY	10-1-10-9	10-1
	11. CONSTRUCTION PLANNING	11-1-11-10	11-1
	12. OPERATIONS		
Section	I. Assignment and employment of units	12-1-12-3	12-1
	II. Tactical operations	12-4-12-10	12-2
	III. Environmental considerations	12-11, 12-12	12-5
	IV. Logistics	13-13-13-17	12-6
	V. Maintenance	12-18, 12-19	12-8
CHAPTER	13. TRAINING		
Section	I. General	13-1, 13-2	13-1
	II. Army training program	13-3-13-6	13-2
APPENDIX	A. REFERENCES		A-1
	B. AUTOMATIC DATA PROCESSING SYSTEM, ENGINEER COMMAND		B-1
	C. INSTALLATION SUPPORT		C-1
INDEX		INDEX 1

*This manual supersedes FM 5-162, 19 August 1964, including all changes, and FM 5-162-1 (Test), 27 March 1967.



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CHAPTER 1

INTRODUCTION

1-1. Purpose

This manual provides guidance for commanders, staff officers, and other personnel concerned with the employment of engineer construction and construction-support units.

1-2. Scope

a. This manual covers the mission, assignment, organization, major items of equipment, capabilities, and operations of the engineer command, the engineer construction brigade, and the engineer construction group, including their attached construction and construction-support units. When used with FM 5-1, which provides basic doctrine governing the activities of engineer troop units in a theater of operations, coverage is in sufficient detail to guide commanders and staffs in the accomplishment of the unit mission. The material contained herein is applicable without modification to both limited or general war, either nuclear or nonnuclear, and to cold war or stability operations.

b. This manual is in consonance with the following International Standardization Agree-

ments which are identified by type agreement and number at the beginning of the appropriate sections in the manual: Stanag 2079, Rear Area Security and Rear Area Damage Control; Solog 125, Minimum Potability Standards for Field Water Supply.

1-3. Recommendations for Changes

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



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CHAPTER 2

CONSTRUCTION IN A THEATER OF OPERATIONS

2-1. Mission of the Engineer Construction and Construction-Support Units

a. The overall mission of engineer construction and construction-support units is construction, rehabilitation, and maintenance of all types of facilities required to support combat service operations in the COMMZ, particularly facilities which are of a permanent, semipermanent or complex nature and which require special units to construct shelters and other basic structures for signal communications facilities but do not install signal communication materiel. Additionally, engineer units do railroads and petroleum pipelines. Engineer construction units may also be employed in the combat zone on a task or mission-type basis to accomplish specialized construction tasks that are beyond the capabilities of the nondivisional engineer combat units to perform construction tasks of an interzonal construction nature such as pipeline construction, or to support the U.S. Air Force. The normal assignment of engineer construction and construction-support units, as given in this manual, is applicable to a type theater army support command and a type field army. This does not preclude variations in assignment as the situations change and the demands for engineer construction support shift.

b. The theater army commander allocates design and planning projects to the theater army support command (TASCOM). Except for that construction undertaken by the Engineer Brigades of field Army, the TASCOM commander is responsible for Army construction throughout the theater and normally is also responsible for Air Force construction in the theater. He discharges his construction responsibility through the engineer command. The engineer command commander accom-

plishes the theater construction mission by tailoring subordinate commands with the attachment of appropriate Engineer units.

2-2. Role of Construction and Construction-Support Units

Engineer construction and construction-support units operating in a theater of operations provide engineer combat support to the combat elements. Engineer combat support includes construction, destruction, and other engineer operations which facilitate the offensive effort and increase the defensive strength of the combat elements. Typical tasks performed in the communications zone, and in the combat zone, when required, include construction and maintenance of routes of communication; support of denial operations and barriers; tactical cover and deception operations; construction of rigid petroleum pipelines and field engineering tasks, such as field fortifications and demolitions. By itself, the task of constructing and maintaining routes of communication to insure the uninterrupted flow of personnel, supplies, equipment and materials to the combat elements is one of great magnitude. In tasks of this type, execution of the construction mission must be efficient and timely. At times, during the battle, success of the combat element may depend upon the ability of construction and construction-support units to complete their construction missions promptly, efficiently, and with a maximum of improvisation. Accordingly, these units must be highly trained in military construction, with the ability to adapt to any operational environment.

2-3. Types of Construction Organizations

a. *Command.* The volume of military construction in a theater of operations requires numerous engineer construction and construc-

tion-support units, working in conjunction with other units, teams, and civilian labor. Coordination and supervision of these elements is accomplished by the following engineer command organizations:

(1) *Engineer Command.* The engineer command is required to exercise command and control over two or three engineer brigades within a theater army support command (TASCOM) or three to six engineer construction groups; a base topographic battalion; and miscellaneous units. Organized under a table of organization and equipment (TOE), this unit is designed to supervise and monitor theater construction. The engineer command is composed of a headquarters and headquarters company to which are attached from two to three engineer construction brigades, three to six engineer construction groups, or a combination thereof, and other separate units. See chapter 3 for a discussion of the engineer command.

(2) *Engineer Construction Brigade.* The construction brigade is composed of a headquarters and headquarters company to which normally are attached from three to six engineer construction groups and other separate units as required. The construction brigade headquarters is required to command and coordinate the activities of these engineer construction units. See chapter 4 for a discussion of the engineer construction brigade.

(3) *Engineer Construction Group.* The construction group is a command organized similar to the brigade, and has a headquarters and headquarters company to which are normally attached from 3 to 5 engineer construction battalions and other construction and construction-support units of the number and type required by the group mission. See chapter 5 for a discussion of the engineer construction group.

b. *Engineer Construction Units.* Construction units are those units which engage in actual construction operations, independently or in conjunction with each other, and include:

(1) *Engineer construction battalion.* The engineer construction battalion consists of a

headquarters and headquarters company, an engineer equipment and maintenance company, and three identical construction companies. It contains varied types of construction equipment and is capable of performing, when supported by attachments of specialized personnel and equipment, all construction commonly required by the Army, Air Force, or other U.S. and Allied forces in a theater of operations. It is capable of independent operation on general construction tasks, although it is usually a part of a construction group. See chapter 6 for a discussion of the engineer construction battalion.

(2) *Engineer port construction company.* The engineer port construction company specializes in the type of construction unique to port and inland waterway facilities and POL marine terminal facilities. Chapter 7 covers the port construction company.

c. *Engineer Construction-Support Units.* Construction-support units are those units which augment the capabilities of the construction units in their construction efforts by supplying specialized equipment and operators. They include:

(1) *Engineer construction support company.* The engineer construction support company is a separate company which maintains, transports, and operates heavy construction equipment in support of construction battalions and other construction units. See chapter 8 for a discussion of the construction support company.

(2) *Engineer pipeline construction support company.* The engineer pipeline construction-support company is a separate company which maintains, transports, and operates pipeline construction equipment in support of construction units engaged in the construction of pipelines and related facilities. See chapter 9 for a discussion of the pipeline construction support company.

(3) *Engineer dump truck company.* The engineer dump truck company, also a separate company, maintains and operates dump trucks in support of construction battalions or other engineer units. Chapter 10 discusses the dump truck company.

d. Teams of the Engineer Service Organization. Any number and type of teams from the engineer service organization (TOE 5-500-series) such as utilities, dredging, diving, and other teams, may be attached to construction and construction-support units to provide increased capabilities. See FM 5-33 for a complete listing of the 5-500-series teams, and their composition, capabilities, and typical employment.

e. Engineer Land Clearing Company. Land clearing operations in heavily forested or jungle areas will require support of the specialized engineer land clearing company (TOE 5-87T). For operational details, see TM 5-330 and TM 5-331A.

2-4. Tables of Organization and Equipment (TOE)

a. Level 1 (Full Strength) and Level 2 and 3 (Reduced Strength). Construction units completely staffed by U.S. military personnel normally are organized under the Level 1, Level 2, or Level 3 columns of the applicable TOE. The personnel and equipment allowances under Level 1 provide the unit full capabilities for execution of the stated mission during prolonged periods of combat. The columns under Level 2 and 3 adapt the TOE to the lesser requirements for personnel and equipment, from approximately 90 percent at Level 2 to 80 percent at Level 3, during prolonged non-combat periods, and for a limited period of combat.

b. Type B Units. Engineer construction units organized under column K of a TOE are known as Type B units. These units consist of the minimum U.S. military personnel necessary for command, supervision, administration, technical assistance, and specialized maintenance, augmented with non-U.S. personnel. These non-U.S. personnel may be either indigenous personnel or third state nationals. Such units are normally organized and employed in rear areas only. Use of indigenous personnel can contribute substantially to the unit's construction effort. It is highly desirable that the same personnel be employed daily developing a trained and coordinated crew. Civil affairs units or staffs may provide information re-

garding the quantity and availability of trained and knowledgeable civilian labor; recommend appropriate policies for employment and payment of civilian labor to preclude strained relations, distrust, and unfavorable competition with the local economy. As they consist largely of command and supervisory personnel, headquarters and headquarters companies of engineer commands, brigades, and groups are not adaptable to a Type B organization.

2-5. Assignment and Employment

a. Engineer Command and Construction Organizations. An engineer command is normally assigned to the theater army and is usually located and employed in the communications zone (COMMZ). The engineer command may be further assigned to a theater army support command (TASCOM), when such a command is organized and when construction and other engineer support operations are entirely in support of the TASCOM. The engineer port construction company, however, may be assigned to a field army when working on an inland waterway port or during the initial stages of an invasion when a communications zone has not yet been established.

b. Construction-Support Units. The engineer dump truck company and the engineer construction support company may be assigned to either the theater army support command and attached to an engineer construction group, or assigned to the field army and attached to an engineer combat group. The engineer pipeline construction support company normally is assigned to the theater army support command and attached to an engineer construction group.

2-6. The Commander and His Unit

The commander of an engineer construction or construction-support unit operating in a theater of operations is faced with many diverse operational situations involving both simple and complex construction tasks. The ability of his unit to accomplish these tasks and thereby discharge the commander's responsibilities depends upon a variety of factors. Primary among these are job knowledge, prior preparation and training, and the ability of the commander, his staff, and the operating elements

of his unit to perform as an entity. In arriving at this state of readiness the principles governing military construction must be employed constantly for every construction task.

2-7. Principles Governing Military Construction

a. Construction should be accomplished within the allocated time; should utilize a minimum of materials, equipment, and skilled labor; and should have as an objective the conservation of natural resources and supplies.

b. Maximum use should be made of installations and facilities described in the Engineer Functional Components Systems and other standard drawings when they are applicable.

c. If new design is necessary, it should be simple and flexible to provide for multipurpose use and future expansion of the completed work.

d. All designing and planning must reflect available materials and level of training of construction personnel.

e. The permanency of any structure erected must not exceed limits established by the theater commander.

f. Existing facilities must be used before initiating new construction.

g. Only the minimum facilities consistent with military necessity can be provided. In view of the extremely heavy demands on engineer effort and the tonnages involved, economy of construction is most important.

h. Generally, a large project is completed in units to allow the completed parts to be used while construction continues. There are instances, however, in which time is the vital factor. In such cases, economy of manpower is secondary and the project is completed in the fastest and most practical manner. Production-line methods may be employed in some instances.

i. Underground or protected sites should be considered in the construction of essential facilities. Improvisation should be used whenever possible to reduce material requirements.

j. Facility planning should be of such a nature as to avoid creating lucrative targets. Dispersion of installations should be considered at all times.

k. Vague delineation of a project inevitably leads to confusion and friction. The responsible engineer should strive for an explicit understanding with the using agency, and, in particular, should point out borderline features not covered by the project plans.

l. Camouflage, where considered necessary, should be planned during initial site selection and construction. Early consideration of camouflage requirements prevents excessive costs, limits destruction of existing terrain, and insures better concealment.

2-8. General Construction

a. General construction performed by engineer construction units includes such structures as headquarters installations, housing facilities, hospitals, depots, protective shelters, storage and supply facilities, workshops, laundries, bakeries, refrigerated warehouses, training facilities, and miscellaneous related projects.

b. Construction of these structures follows the standard plans found in TM 5-302. Layout and site drawings, when necessary, are normally provided by the group headquarters. Frequently, however, such matters will be left to the discretion of the battalion commander.

c. The battalion commander is expected to requisition the materials and any special equipment needed unless the brigade or group S-4 arranges in advance for a credit for the battalion at the appropriate supply point or depot. For repairs and alterations on existing structures, the battalion commander is given latitude in details and gives similar latitude to his subordinate officer in charge of the actual work.

d. Portions of the plans found in TM 5-302 should be used whenever applicable. If a representative of the organization for which the structure is intended is available, he should be consulted, but the engineer officer in charge should report any unnecessary addition and refinements to higher headquarters for validations of the necessity.

e. Protective construction is integrated with existing strategic, tactical, and logistical concepts, and provides a balanced protection from all weapons effects which can be expected. Semipermanent protective facilities may pro-

vide for continuous day-to-day operations rather than emergencies only. Engineer and other troop effort available for the construction of semipermanent shelters is limited, making the use of civilian contracting firms or local labor and equipment desirable wherever possible. Maximum use is made of existing facilities, modified or altered as required for the degree of protection sought. Maximum use of self help by users to construct housing facilities is desirable whenever engineer effort is critical. For a discussion of protective shelters, see TM 5-311.

2-9. Road Construction

a. Existing road nets are seldom adequate for the extensive traffic and heavy loads of a modern army, and must be improved and constantly maintained. For this reason, construction units are more often employed on road construction, maintenance, and repair than on any other category of work.

b. Road construction improvements and repairs must be done rapidly. The roads must be able to stand up under hard usage and must be planned to allow for expansion and improvement as well as to meet the immediate needs. Road work is progressive in character. Hasty repair of existing roads and installation of temporary bridges necessary for the passage of combat elements are followed by progressive improvement and new construction. Military road construction is complicated by factors not present in civil road construction, since it cannot await good weather or ideal materials, cannot interrupt traffic, and is also subject to destructive enemy action.

c. Construction battalions normally are assigned responsibility for the road net in a given area. Orders from group headquarters prescribe certain details including roads to be maintained and new roads to be constructed; but these orders do not specify the details of materials or methods of operation. The mission of the battalion is to insure that the roads in its assigned area are passable for unimpeded traffic. The road net is not completed with the first round of repairs and improvements. Certain portions break down under heavy traffic and repairs are made promptly. The battalion

commander needs to know at all times the condition of the road net and be quick to adjust assignment of equipment, materials, and labor. For further discussion on road construction, including reconnaissance, design, construction, and maintenance of military roads, see TM 5-330.

2-10. Bridges

a. Most of the railway and highway bridges constructed by engineer construction units are of the semipermanent type. Semipermanent bridges usually replace the temporary bridging and are intended to last for the duration of the hostilities. The most common structure is a timber or steel stringer span with either timber trestles or pile-type supports. Precast or cast-in-place concrete structures may be employed where the situation and supply of materials permits. A semipermanent bridge should be tied in, wherever possible, with the existing road net. Such bridges are required to carry heavier loads than the temporary bridges and are constructed in accordance with the principles of military bridging consistent with the tactical situation.

b. Permanent bridges may sometimes be built in the rear areas along main routes. Very special circumstances may justify the decision to expend the additional effort and materials necessary for this type of construction. (For a discussion of military bridges, see FM 5-36 and TM 5-312.)

2-11. Railroads

a. New construction, rehabilitation, and major repairs of railroads are responsibilities of engineer units, with the construction battalion performing the work. Higher headquarters establishes priorities for the work to be done in rail line construction. Close coordination and liaison is established between the engineer construction organization and the agency operating the railway, as special tools and equipment available to the agency are needed by the construction battalion in performing this type mission.

b. Because of the enormity of the job of constructing a new railroad, existing lines and facilities are utilized to the fullest. Since

terminals and yards, rather than the main line tracks, are more likely to become bottlenecks, railway construction in a theater of operations consists mainly of extending terminals and providing yards and sidings at depots and other installations. Reconstruction of main line tracks into the combat zone may be required as the army advances. The construction or reconstruction of a railway in the theater of operations is an intersectional service operation. The transportation railway service is responsible for that reconnaissance of existing lines necessary for evaluating damage and forming a plan for operations. Where possible, engineer personnel should participate in the reconnaissance. When continued movement of train traffic is paramount, command authority may be given to lower construction standards, allowing low-speed train operation. Details on the construction, reconstruction, and construction characteristics of military railways are contained in TM 5-370.

2-12. Pipeline Construction

a. The construction of a military petroleum pipeline system in a theater of operations is an intersectional service operation involving the Supply and Maintenance Command, the Engineer Command, and the Transportation Command. The Supply and Maintenance Command has the dominant interest and responsibility in preparing coordinated broad plans and policies for the supply and distribution of petroleum products. The Transportation Command provides for all but pipeline and local distribution movement of bulk and packaged petroleum products by military and commercial means. Transportation truck units habitually engaged in intersectional movement of bulk petroleum products are normally assigned to the senior petroleum operating headquarters. The Engineer Command provides for the design and construction of petroleum pipeline, storage, and dispensing facilities. Design data for these facilities are coordinated with the senior petroleum operation headquarters that will be responsible for the operation of the system. Maintenance of petroleum pipelines and related facilities is a divided responsibility of the Supply and Maintenance Command and the

Engineer Command. Petroleum operating units perform organizational maintenance and engineer units perform direct support, general support, and depot maintenance on petroleum pipelines and related facilities. Additionally, engineer units perform all categories of maintenance on petroleum drilling and producing equipment and refining facilities. (For a further discussion on the delineation of maintenance responsibilities, see TM 5-343 and TM 10-1109.)

b. The responsible engineer headquarters prepares the construction plans for petroleum handling systems; and it commands, supervises, and inspects all aspects of a petroleum pipeline construction project. Port construction companies have the responsibility for constructing POL marine terminal facilities which include tanker unloading facilities, submarine petroleum pipelines, and overland petroleum pipelines to and including the first on-shore manifold facility. At this point, construction battalions, augmented by engineer pipeline construction support company personnel and equipment, construct permanent or hasty storage facilities and overland pipelines, and install the related facilities such as pumps, valves, filters, and traps.

c. Advanced construction of POL facilities in the field army area normally is accomplished by construction battalions and engineer pipeline construction support companies sent forward from the COMMZ on a mission-type basis. Temporary rigid pipeline and flexible pipeline systems (assault pipelines) normally will be installed and recovered by combat engineer battalions of the field army.

d. Because of the magnitude of the task of supplying a theater of operations with the class III supplies required for its operation, detailed planning is essential. Special consideration must be given to design of the theater pipeline system, stockpiling of the vast amounts of pipe and related facilities, maximum use of specialized troops and equipment, and dispersion of completed facilities. (For a discussion of military petroleum pipeline systems, see FM 10-67, TM 5-343, TM 5-301, TM 5-302, TM 5-303, and appropriate TM's of the 10-series.)

2-13. Port Construction

a. A large ocean or inland waterway port has a wide variety of facilities. However, the activities of the engineer port construction company are usually confined to the construction, or major repair, of structures on or immediately adjacent to the waterfront, such as piers, quays, slips, locks, drydocks, jetties, transit sheds, waterfront storage and repair facilities, and cargo-handling facilities; transportation facilities serving the waterfront or beach such as railroad tracks, yards, highways, and parking areas; and the construction of marine POL facilities.

b. Very large-scale port work, or work involving heavier or more specialized equipment than is organic to the port construction company, may need to be supplemented by other engineer units or by civilian labor. For underwater excavation beyond the capacity or range of action of the company's organic equipment, the unit must rely upon floating dredges manned by either civilian or engineer dredge crew units such as one of the teams of TOE 5-550. Detailed information on tides, depths, wave heights, and bottom conditions may be obtained from the Military Hydrology or Hydrographic Survey Teams assigned to the theater.

c. The port construction company normally operates as one element of a large-scale coordinated construction operation under an engineer construction group or brigade, along with dredging teams, construction battalions, dump truck companies, and other units as required. The company does not normally engage in routine maintenance or minor repair of port facilities.

d. In the construction of port shore installations such as warehouses, roads, and railroad tracks, standard military procedures are followed, the only difference being that much of port construction work is done under or over water. (For a further discussion of the construction and rehabilitation of ports, see TM 5-360.)

2-14. Airfield and Heliport Construction

a. Airfield construction by engineer construc-

tion units involves the construction of airfields in battle, forward, support, and rear areas for the appropriate aircraft type liaisons, surveillance, light lift, medium lift, heavy lift, or tactical—plus heliports, landing pads and associated facilities, required by both Army and Air Force.

b. Airfield construction is similar to road construction in that the equipment used, the sequence of operations followed, the methods used, and the type of construction employed are generally the same. Both require the use of earthmoving and paving equipment. Airfields, however, require a greater concentration of equipment and have a greater requirement for quality, grade, and smoothness dictated by modern high-performance aircraft.

c. The theater army commander establishes the airfield and heliport construction policies, based on standards, specifications, and requirements developed for the theater of operation. These policies normally are developed by the theater army commander in consonance with the Joint, Unified, Specified or Combined Command plans. Because of the necessity to consider hazards to navigation and other factors not normally found in other facility construction, close coordination is required between the engineer constructing unit and responsible officials of the Army Aviation and Air Force units who will use the facility, concerning site selection and design criteria. If possible, the engineer unit which will construct airfields/heliports, accomplishes reconnaissance to select or evaluate proposed sites and makes recommendations to the appropriate commander for final site determination. Upon approval of site location the engineer unit normally prepares plans and specifications by site adaptation of standard designs. After approval of plans and specifications, determination of construction priorities, and receipt of construction directives, the construction unit commander employs available resources to execute the work.

d. Installation, maintenance, and repair are the responsibilities of the occupying Air Force or Army units. However, when an existing airfield or other air facility is deteriorated or damaged to the point of requiring repair beyond

the capabilities of the using unit, repair becomes rehabilitation and is the responsibility of engineer construction forces. The engineer construction battalion is usually assigned such missions, as it is capable of performing rehabilitation in a concentrated area or in numerous dispersed locations.

e. If airfield construction is required in areas having no army component, engineer construction units may be attached to the commanding headquarters; they will remain, however, under the control of the senior engineer unit commander unless otherwise determined by the army commander releasing them, or by higher army authority.

f. Emergency recovery support missions (usually limited to emergency restoration of utilities and high-priority operational facilities) for Air Force installations may be assigned to engineer construction units. On arrival at an installation, recovery forces operate under the supervision of their own commander and assist the local commander in the emergency recovery operations.

g. A discussion of the planning, site selection, and design of airfields and heliports in a theater of operations is contained in TM 5-330.

2-15. Engineer Repair and Utilities Support

Although the initial construction of utilities systems is a responsibility of the Engineer command, engineer repair and utilities support, including procurement of utilities services from local sources, is a responsibility of the Area Support Command, TASCAM. Engineer repair and utilities support are accomplished by construction, utilities, and electrical power teams of TOE 5-530 which are assigned to and under the operational control of the area support groups of the Area Support Command, TASCAM. These teams perform repairs and minor construction within the installation, and give the installation commander quick action on small projects. Reconstruction and initial operations of municipal utilities in a large city of particular significance to our forces may be beyond the capabilities of these utilities teams and may therefore be classed as major construc-

tion to be performed by a construction unit (app C).

2-16. Engineers in the Cold War

a. The cold war has created a definite need for U.S. military construction engineers as advisors to indigenous military engineer forces and indigenous civilian communities engaged in stability operations and civic action programs. To meet this need, TOE 5-560 provides three types of engineer civic action teams. These teams may be combined in various groupings, depending upon the situation, to form engineer detachments which can operate in a stability operations role as part of U.S. Army Special Action Forces (see FM 31-22 and FM 31-23). They may also be used in countries where there is no threat of insurgency to aid in civic action programs. When so used they operate under MAAG or other U.S. military authority.

(1) *Team KA, Engineer Civic Action Headquarters.* This team provides supervision and staff planning for the operation of all engineer elements assigned or attached to a special action force. It also provides an engineer staff to a special action force and administrative support for subordinate teams.

(2) *Team KB, Engineer Civic Action Control.* This team provides Engineer staff personnel for a special forces command and control element subordinate to the special action force. It also provides supervision staff planning, coordination, and administrative support for subordinate engineer teams.

(3) *Team KC, Engineer Civic Action Advisory.* Team KC provides:

(a) Advice and assistance to host country engineer forces on civic action projects such as farm-to-market roads, bridges, village wells, and sanitation measures, and construction of schools, hospitals, and other public buildings.

(b) Assistance to host country engineer units in preparing to support their own tactical troops for internal defense and internal development operations.

(c) Advice and assistance to U.S. Mili-

tary Forces when committed in support of host country forces.

(d) Supervision of operations with host country counterparts.

b. Basis of Allocation.

(1) Team KA, Engineer Civic Action Headquarters, is allocated on the basis of one per two or three engineer civic action control teams (KB).

(2) Team KB, Engineer Civic Action Control, is allocated on the basis of one per four to nine engineer civic action advisory teams (KC).

(3) Team KC, Engineer Civic Action Advisory, is allocated on the basis of one per host country force comparable in size to a U.S. Army engineer combat battalion, or one per municipal area for civic action as required.

2-17. Engineer Construction Support for Independent Corps

A corps usually is a major subordinate command of a field Army. When the corps performs such a role or when its assigned missions require it to operate far removed from the field army, the corps is known as an independent corps (see FM 100-15). An independent corps is similar to a field Army or theater army in that it may have area responsibilities encompassing base development functions. In the case of an independent corps, combat service support

is provided by a Corps Support Command (COSCOM), the engineer combat brigade, and other combat service support units as required. The COSCOM would have as its nucleus a support brigade of a type field army support command. The support brigade's augmentation consists of sufficient theater army support command (TASCOM)-type combat service support elements to enable the corps to conduct independent operations. The Engineer combat brigade of the corps is responsible for all engineer activity in the corps area. In the event the requirements for engineer effort exceed the capabilities of the brigade, it will be augmented by adding engineer construction units and other engineer units, and, if necessary for command, control and communications, will evolve into a modified engineer command tailored to meet requirements of the corps area. The type engineer units that may be required to be attached to the combat brigade to carry out theater base engineer activities are—

HHC, Engr Const Gp	TOE 5-112
HHC, Engr Const Bn	TOE 5-116
Engr Topo Bn, Army	TOE 5-305
Engr Const Spt Co	TOE 5-114
Engr Equip and Maint Co	TOE 5-117
Engr Const Co	TOE 5-118
Engr Dump Trk Co	TOE 5-124
Engr Pipeline Const Spt Co	TOE 5-177
Engr Port Const Co	TOE 5-129
Tm GA, Forestry Plat	TOE 5-520



CHAPTER 3

ENGINEER COMMAND

3-1. Mission

The mission of the engineer command is to perform operational planning and supervision; and to command and coordinate the activities of assigned or attached engineer construction brigades, groups, and other units engaged in construction, mapping and related activities.

3-2. Assignment

The engineer command is assigned to, and allocated on the basis of one per theater army or the TASCOT when such a command is organized. It is physically located in the COMMZ.

3-3. Composition of the Engineer Command

The engineer command is a flexible organization which may be tailored to fit the operational environment of a theater of operations. The engineer command normally is employed when construction and other engineer support requirements exceed that which can be provided by an engineer brigade. For a force in excess of twelve divisions or when the complexity of the construction mission or the geographic conformation dictates, the engineer command may be composed of an engineer base topographic battalion and from two to three engineer construction brigades with each brigade commanding and controlling two to four engineer construction groups, and selected teams of the TOE 5-500-series. Basically, the command consists of a headquarters and headquarters company and the following units:

- (1) Engineer construction brigades.
- (2) Engineer construction groups.
- (3) Engineer construction units.
- (4) Engineer construction support units.
- (5) Engineer base topographic battalion.
- (6) Teams of the engineer service organization (TOE 5-500).

3-4. Capabilities

a. The engineer command may be organized under the Levels 1, 2, or 3 columns of TOE 5-201.

(1) *Level 1 (full strength)*. When organized under Level 1, this unit has full capabilities to execute the stated mission and provides:

(a) General construction support to the army and other services and allies within the communication zone and support to the field army on a task basis, as required.

(b) Planning coordination, and supervision of construction or rehabilitation of aircraft landing facilities, ports, routes of communication (roads, railroads, and inland waterways), missile sites, depots, hospitals, troop camps, PW and internee compounds, administrative and logistical facilities, POL distribution and storage facilities, and operational and training facilities.

(c) Topographic support to Theater Army including programming data for mapping support and coordinating mapping requirements with CONUS.

(d) Operational plans, project plans, designs and construction directives; allocation of engineer troops, materials and equipment to projects; and guidance and technical assistance to units engaged in construction projects.

(e) Comptroller services for the command and assigned or attached units. When required, the capability of the comptroller may be expanded by the attachment of appropriate comptroller cellular teams.

(2) *Levels 2 and 3*. See paragraph 2-4a.

b. When the mission to be performed or the workload imposed on this unit exceeds the capabilities indicated above, the additional capabilities required must be provided from appropriate cellular teams of the 500-series TOE or by the establishment of a modification

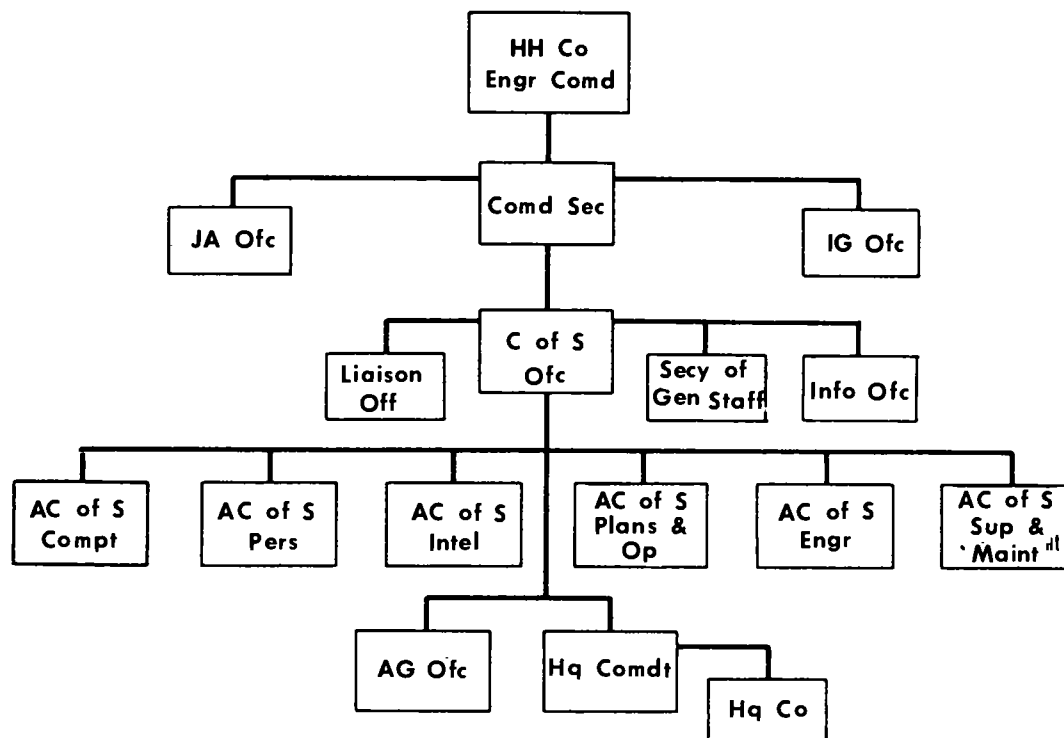


Figure 3-1. Organization chart, headquarters and headquarters company, engineer command.

table of organization and equipment (MTOE) under the provisions of AR 310-49.

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

d. Additional Capabilities. This unit is dependent upon TOE 1-407, for air transport required for command, control, and liaison activities of the command; TOE 55-19, for daily administrative motor transport services; TOE 12-67, for personnel administration services; TOE 11-137, or other appropriate unit of the U.S. Army Strategic Communications Command (Theater), for communication service; and appropriate elements from the Medical Command for medical service and advice.

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

3-5. Organization

The engineer command is a flexible organization that can concentrate and control construction effort throughout the COMMZ and displace effort forward to accomplish specific tasks as required in the field army area. The number and composition of the units assigned or attached depend upon the assigned theater mission. The headquarters and headquarters company, however, is a fixed organization (fig. 3-1) and is organized under TOE 5-201. It consists of the elements shown in figure 3-1 and described briefly in paragraph 3-6 through 3-17.

3-6. Command Section and Personal Staff

The command section contains the command element of the engineer command. It consists of the commanding general, his deputy, aides-de-camp, a sergeant major, and clerical personnel. The commanding general, assisted by

his deputy, commands and coordinates the activities of the engineer command and its multiple assigned or attached units, and is responsible for the implementation of all engineer matters relative to construction, mapping, and related activities in the communications zone. The staff judge advocate and the inspector general are on the commanding general's personal staff. For a discussion of their functions, see FM 101-5.

3-7. The Chief of Staff

This section contains the personnel and equipment needed to coordinate the efforts of the staff and assure prompt and efficient staff response to the requirements of the commanding general and the command. Included within the chief of staff section are the secretary to the general staff and the liaison officers. The responsibilities of the chief of staff are outlined in FM 101-5. The liaison officer fulfills the chief of staff's responsibility to maintain continuity in the interchange of information and promote cooperation and coordination of effort between the engineer command, TASCOT and other commands. In addition, liaison officers from other commands are housed within the Chief of Staff Section. The secretary of the general staff provides executive assistance to the chief of staff and is responsible for those major areas outlined in FM 101-5.

3-8. Assistant Chief of Staff, Comptroller (ACofS Compt)

Serves as principal staff officer to the commander with respect to management engineering, reviewing internal controls, controlling reports, programing, budgeting, and progress and statistical reporting and analysis; providing advice and assistance and, with appropriate delegation of authority, acting for the commander within his area of responsibility; and exercising staff responsibility over development and utilization of the Automatic Data Processing System (ADPS). To provide the comptroller with the means of accomplishing his mission, the following elements are responsible for the functions as indicated:

a. Administrative Section. This section is responsible for—

(1) Performing normal office administrative duties.

(2) Performing secretarial duties for the ACofS, comptroller.

(3) Operating the office message center which includes inquiries into the servicing computer complex.

b. Management Engineering Division. This division is responsible for—

(1) Conducting management surveys and special project studies.

(2) Administering the reports control program of the command.

(3) Reviewing established ADP systems and ADP equipment utilization.

(4) Coordinating changes in ADP requirement with Theater Army Comptroller or TASCOT comptroller.

c. Program/Budget Division. This division is responsible for—

(1) Analyzing funding program and budget guidance and recommending courses of action.

(2) Coordinating the development of a command position on budgeting matters and the preparation of budgetary reports.

(3) Performing periodical analysis of fund utilization.

d. Internal Review Division. This division is responsible for—

(1) Conducting internal reviews involving security controls and procedures for achieving goals.

(2) Auditing nonappropriated funds.

(3) Interpreting regulations and directives governing nonappropriated funds, and indoctrinating responsible personnel.

(4) Processing reports of survey.

3-9. Assistant Chief of Staff, Personnel (ACofS, Pers)

The assistant chief of staff, personnel, is the principal staff assistant to the chief of staff in matters pertaining to the management of personnel, as individuals, while under military control, both friendly and enemy, military and civilian. The ACofS, personnel, supervises the overall operation of the personnel management and services function and recommends assignment of personnel based upon command re-

quirements. He is also responsible for manpower management; the development and maintenance of morale; the maintenance of discipline, law, and order; headquarters management; and for miscellaneous matters not assigned specifically to another general staff officer. The chaplain is assigned to the office of the ACofS, personnel, who thus has staff responsibility for the chaplain and his functions. For additional details on the ACofS, personnel, see FM 101-5.

3-10. Assistant Chief of Staff, Intelligence (ACofS, Intel)

This staff section provides the skilled personnel and equipment for map program planning and technical supervision of map compilation; surveying, and geodetic activities including supervision, collection, maintenance and dissemination of survey control data; supervision and coordination of map reproduction including evaluation of reproduction facilities and planning the employment of such facilities in the map reproduction program. In addition, this activity supervises the topographic and map supply program including operation of map depots and supply points throughout the command. The ACofS for intelligence is also the staff topographic specialist and acts as the senior control officer for all topographic activities. The ADPS Operations and Plans Officer in this section is responsible for the proper design and utilization of ADPS throughout the command and advises the commander on ADPS. The NCO systems supervisor assists the ADPS officer. For additional details on the ACofS, intelligence (G-2) see FM 101-5.

3-11. Assistant Chief of Staff, Engineering (ACofS, Engineering)

The assistant chief of staff for engineering and his section are responsible for those functions pertaining to engineering design and construction within the command. These functions include design of such installations and facilities as ports, routes of communications, air landing facilities, pipelines and bulk POL storage areas; building complexes such as cantonments, warehouses, and prisoner of war enclosures; railroads and other vertical and horizontal

construction required in a theater of operations. Additionally, he is responsible for the design of utilities required for these installations and facilities. He also aids in the formulation of theater construction plans, standards, and priorities. He provides staff supervision of construction planning and construction operations of subordinate engineer units. To assist him, the Engineering Officer has a staff consisting of a Civil Engineer, a Mechanical Engineer, and a Sanitation Engineer.

3-12. Assistant Chief of Staff, Supply-Maintenance (ACofS, Sup-Maint)

The assistant chief of staff for maintenance and supply supervises and coordinates activities pertaining mainly to class IV stocks and equipment required to support construction projects of the command. This section works closely with the engineering section to assure supplies and equipment are available when required in projects. The assistant chief of staff for maintenance and supply formulates plans, policies, and directives pertaining to supply and maintenance. To assist him he has a staff consisting of an Engineer Maintenance Officer, a Supply Officer, a Project Materiel Officer, various enlisted assistants in the supply, maintenance, and clerical fields. The Maintenance Officer of this section provides the technical knowledge required to formulate maintenance plans and directives. In addition, when required, he coordinates repair activities between the assigned units and repair facilities. The supply officer and project materiel officer of this section, in coordination with the engineering section, plan and schedule the flow of materiel for major construction projects. In addition, they enter the supply chain, when required, to solve organizational supply problems. Enlisted personnel of this section provide assistance within the areas of procurement, supply, and maintenance. For additional details on the assistant chief of staff, supply-maintenance (G-4), see FM 101-5.

3-13. Assistant Chief of Staff, Plans-Operation (ACofS, Plans-Operations)

The assistant chief of staff, plans-operations

is responsible for the preparation of current and long-range plans, procedures, policies, and programs pertaining to operations and functions of the engineer command. This section:

- a. Develops and maintains the troop basis.
- b. Develops the command operations order.
- c. Develops policies and guidance for and evaluates the training of the command.
- d. Coordinates displacement of subordinate units and assignment of facilities.

The assistant chief of staff, plans and operations has a staff consisting of an Operations Officer, Rear Area Protection Officer, and a Troop Operations Officer. Additionally, there is an Installation Services Engineer and a Real Estate Officer who are responsible for staff planning and construction activities in their respective areas. Enlisted draftsmen and technical and clerical personnel are also included to provide necessary support for the section.

3-14. Adjutant General's Office

This office operates under the staff supervision of the ACofS, personnel and performs the usual duties of headquarters administration. The functions of this office include:

- a. Provision of internal administrative services for the headquarters, including message center services, reproduction facilities, central classified document control and repository, and library service for the headquarters correspondence and publications.
- b. Coordination with the servicing army post office for receipt and dispatch of headquarters official mail.
- c. Reproduction of administrative orders, bulletins, letters, and other administrative publications.
- d. Messenger service between elements of the headquarters and higher and adjacent headquarters.

3-15. Headquarters Commandant

The headquarters commandant is responsible for supervision of security, training, motor and air transport, and other support activities required by the headquarters. The headquarters commandant, as indicated by his title, coordinates the support activities. He is as-

sisted by an administrative NCO and a clerk-typist.

3-16. Company Headquarters

This headquarters contains the personnel and equipment which provide the company with administrative, supply, mess, motor transport, and maintenance services. Two enlisted aides, on the personal staff of the general officers are also included in the headquarters company.

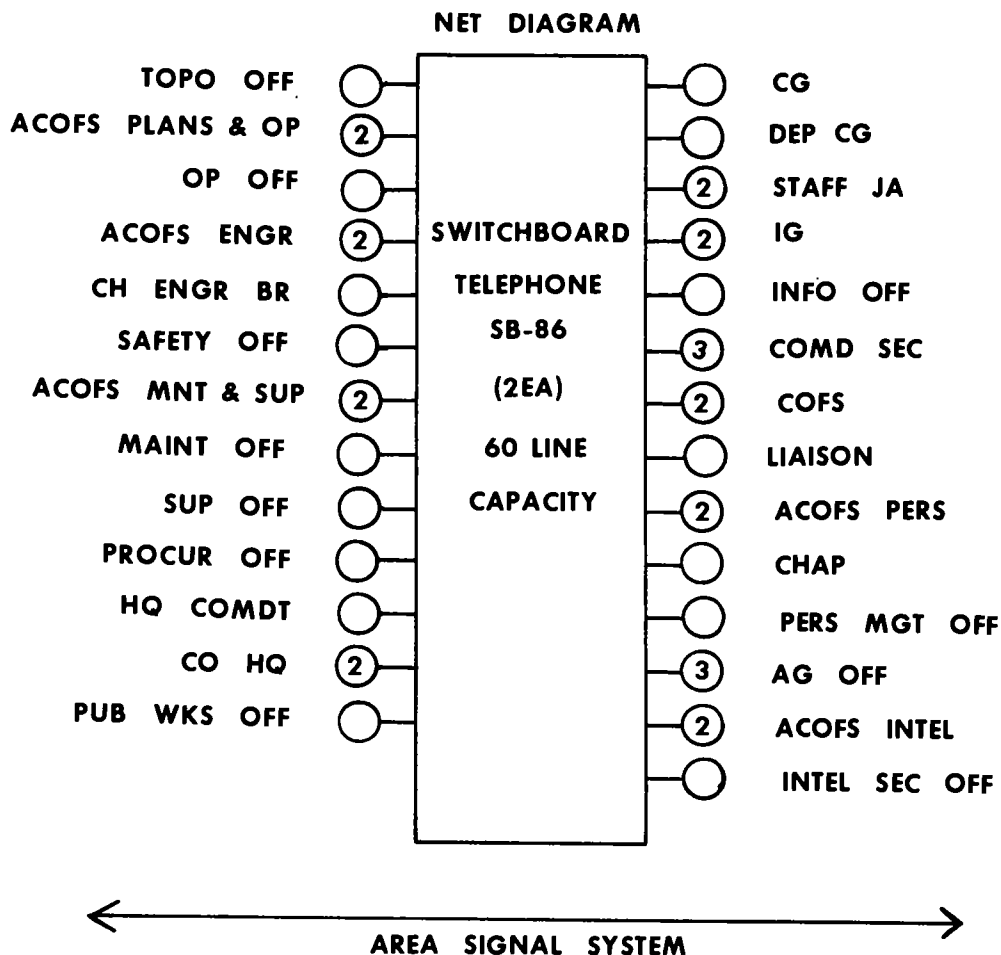
3-17. Employment

a. The engineer command is employed whenever the construction activity exceeds the coordination and supervision capability of an engineer construction brigade and when direct command of three to six engineer construction groups and other attached engineer units is desired. The engineer command plans, coordinates and supervises the construction or rehabilitation of ports, routes of communications, depots, hospitals, troop cantonments, administrative and storage facilities, POL transmission, distribution, and storage facilities, railroads, airfields and related projects, and inland waterways. The engineer command maintains continual liaison with the Field Army Engineer for intersectional projects and provides backup construction support to the field army when required.

b. On a large land mass, where the construction activity exceeds the capability of six engineer construction groups, intermediate headquarters in the form of engineer construction brigades may be introduced to provide a better span of control. In this instance the engineer construction brigades are assigned or attached to the engineer command, and the engineer construction groups are assigned or attached to the engineer construction brigades.

3-18. Items of Equipment

The equipment of headquarters and headquarters company, engineer command, is limited to individual equipment and that needed for housekeeping, local security, communications, ground transportation, administration, and engineer control. For the major items of equipment of the attached units of the engineer command, see the discussion of the individual units.



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*Figure 3-2. Wire net, Engineer command.***3-19. Mobility and Category**

a. This unit is approximately 10 percent mobile with organic transportation.

b. This unit is designated a Category III unit.

3-20. Communication

The Engineer command is dependent upon the area communications system for normal, routine communications with assigned units and

higher and lateral commands. The U.S. Army Strategic Communications Command (Theater) operates the theater army communication system (TACS) throughout the COMMZ. Communications within headquarters of the Engineer command normally will be installed, operated, and maintained by signal operations units of The Theater Army Signal Operations Command. Entry into the TACS from local communications switchboard and communica-

tion centers is normally provided by signal units of the signal operations command. Figure 3-2 indicates telephone and other internal wire net requirements. Installation of all cir-

cuitry and that communications equipment not authorized the engineer command by TOE 5-201 is to be provided by appropriate signal units.



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CHAPTER 4

ENGINEER CONSTRUCTION BRIGADE

4-1. Mission

The mission of the engineer construction brigade is to command assigned and attached units and coordinate the engineer construction activities within the appropriate command.

4-2. Assignment

The engineer construction brigade normally is located in the communications zone and is assigned to the theater army support command (TASCOM) with further assignment to the engineer command.

4-3. Organization

The engineer construction brigade is a flexible organization. The number and composition of the units attached to it depend upon its mission. Its headquarters and headquarters company, however, is a fixed organization (fig. 4-1) and is organized under Part I, TOE 5-111. It consists of two elements as follows:

a. Brigade Headquarters. The Brigade headquarters consists of—

- (1) Brigade commander.
- (2) Deputy Brigade Commander.
- (3) Executive Officer.
- (4) S-3.
- (5) Adjutant S-1.
- (6) Brigade chaplain.
- (7) Brigade surgeon.
- (8) Chemical staff officer.
- (9) Civil engineer.
- (10) Communications officer.
- (11) Engineer equipment officer.
- (12) S-2.
- (13) S-4.
- (14) Aide-de-camp.
- (15) Sergeant major.

b. Headquarters Company. Headquarters company consists of a company headquarters

and the personnel of the following operating sections of the brigade:

- (1) Administrative section.
- (2) Operations and intelligence section.
- (3) Engineering and plans section.
- (4) Supply and maintenance section.
- (5) Communications section.
- (6) Aviation section.

4-4. Duties and Functions

In the mission of commanding, planning, supervising, and coordinating the activities of the brigade and other assigned/attached units, the brigade commander, his staff, and the staff sections perform the duties and the functions outlined in FM 5-1, FM 101-5, AR 611-101, AR 611-112, and AR 611-201.

4-5. Capabilities

a. Level 1. At level 1 (full strength), the engineer construction brigade is capable of:

(1) Commanding and supervising a force of two to four engineer construction groups and other assigned/attached units.

(2) Planning, coordinating, and supervising construction or rehabilitation of ports, routes of communication, airfields, heliports, depots, hospitals, troop camps, administrative facilities, PW compounds, POL distribution/storage facilities, and protective structures.

(3) Providing operational plans, project plans, designs, and construction directives; allocating troops, materials, and equipment to projects; and providing guidance and technical assistance to units engaged in construction projects.

(4) Providing rotary wing aircraft to facilitate construction support activities and reconnaissance activities.

(5) Serving as control headquarters for a

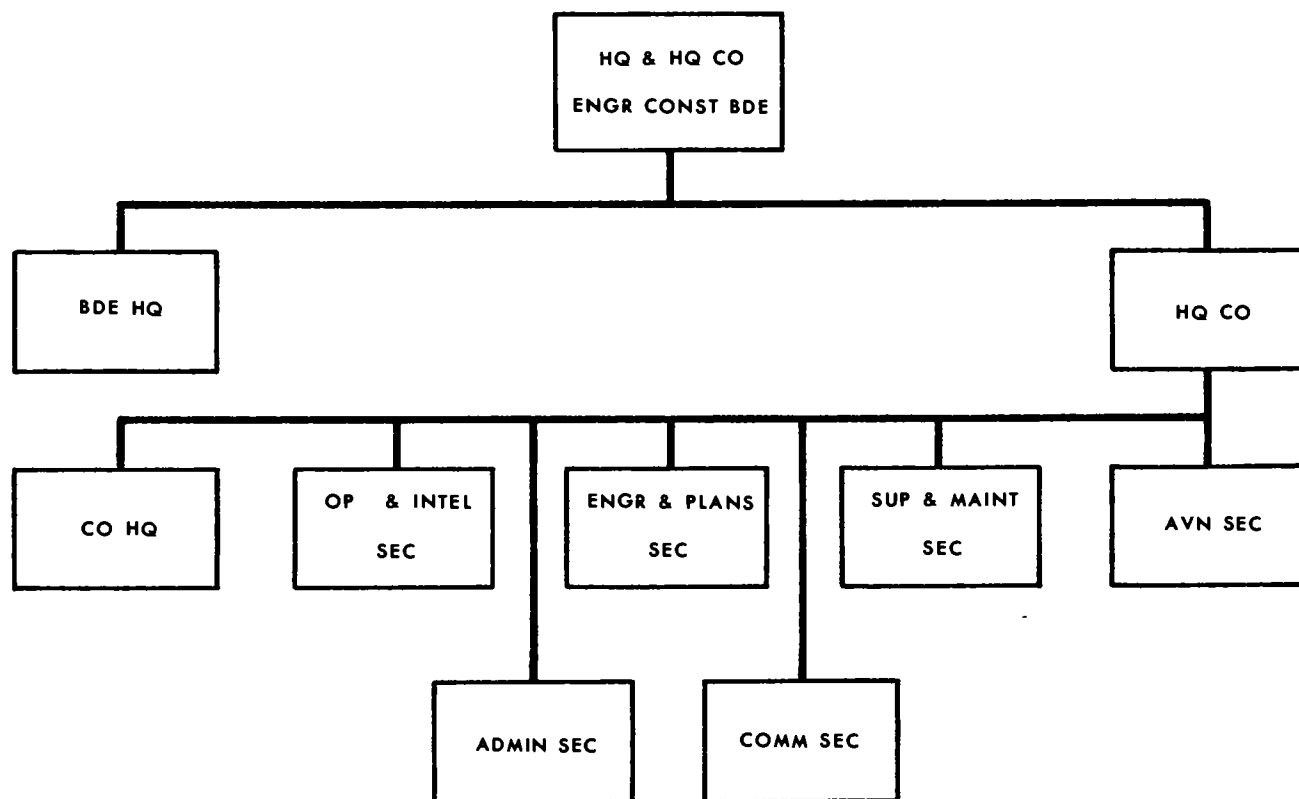


Figure 4-1. Organizational chart, headquarters and headquarters company, engineer construction brigade.

separate task force to plan, design, supervise and coordinate major construction projects.

b. Levels 2 and 3. See paragraph 2-4a.

c. Type B Unit. As the brigade is composed primarily of command and staff personnel, headquarters and headquarters company, brigade, it is not adaptable to a Type B organization.

d. Construction Capabilities. When the brigade becomes operational through the attachment of other units, its construction capabilities may be measured by the number and type of its component units.

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

f. Support Requirement. This unit is dependent upon other supporting theater army

elements for personnel, legal and medical services, ADP support, and communications facilities when requirements exceed organic capability.

4-6. Employment

The brigade is employed whenever the construction activity is of such magnitude as to exceed the coordination and supervision capabilities of a single engineer construction group and when direct command of from two to four engineer construction groups and other engineer units is desired. The brigade plans, coordinates, and supervises construction or rehabilitation of ports, routes of communications, depots, hospitals, troop camps, administrative facilities, POL distribution and storage facilities, and airfields and related Air Force projects. One or more engineer construction brigades are assigned to a type theater army with further assignment to the engineer com-

mand. The brigade's area of responsibility covers the whole or a portion of the communications zone. Any construction or construction-support in support of the combat engineers in the combat zone is accomplished by the brigade on a mission basis.

4-7. Major Items of Equipment

The equipment of headquarters and headquarters company, engineer brigade, is limited to individual equipment and that needed for housekeeping, local security, communications, air and ground transportation, and engineer control. Equipment needed for engineer control includes surveying, drafting, and reproduction equipment; reference texts; and laboratory sets for testing soils, concrete, and asphalt. For the major items of equipment of the component units of the construction brigade, see the discussion of the individual units.

4-8. Mobility

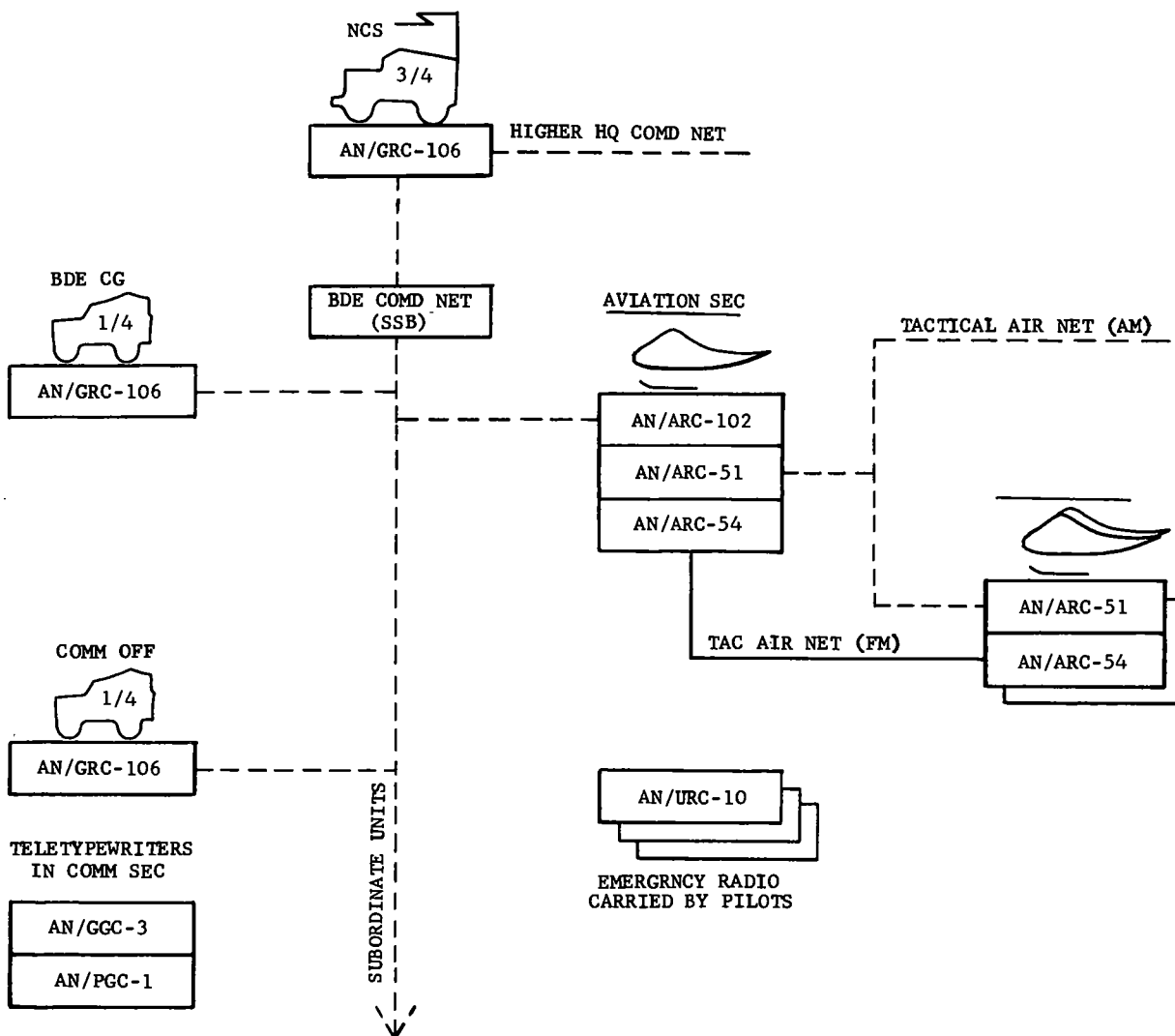
Headquarters and headquarters company, engineer brigade, is 66 percent mobile.

4-9. Category

This unit is designated a Category III unit. (Reference unit categories, AR 320-5.)

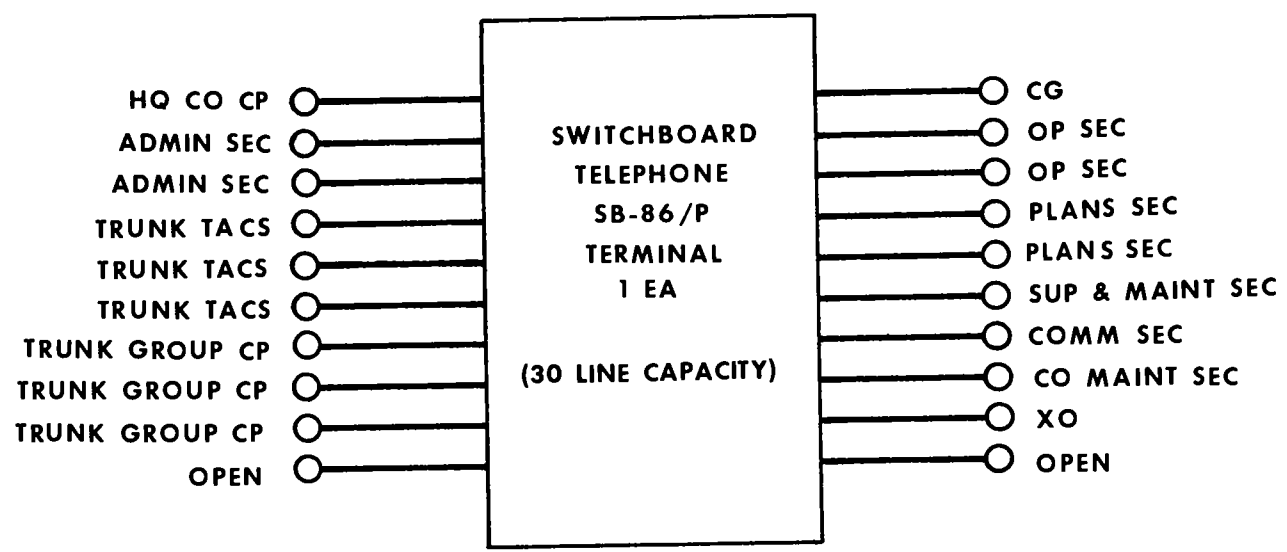
4-10. Communications

The engineer construction brigade has organic communications equipment which includes radios, teletypewriters, and telephone facilities. The radio net is shown in figure 4-2 and the wire net is shown in figure 4-3. However, the brigade is dependent upon the area communication system for supplemental communication means to communicate with assigned units and higher and lateral commands. This supplemental communication will normally be installed, operated, and maintained by signal units of U.S. Army Strategic Communications Command (Theater). The U.S. Army Strategic Communications Command (Theater) operates the theater army communication system (TACS) throughout COMMZ.



Note: The AN/ARC-51 Radios and the AN/ARC-54 Radios are issued with the helicopters. The AN/ARC-54 Radios are used for intercommunication between helicopters. The AN/ARC-102 is carried on the helicopter that carries the BDE CG and establishes an SSB Net with his staff and subordinates.

Figure 4-2. Radio Net, Engineer Construction Brigade.



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Figure 4-3. Wire Net, Engineer Construction Brigade.



CHAPTER 5

ENGINEER CONSTRUCTION GROUP

5-1. Mission

The mission of the engineer construction group is to perform engineer planning and design; and to command, plan, and coordinate the operations of assigned and attached engineer construction, construction-support, and other units engaged in field construction, rehabilitation, or maintenance of facilities in support of Army or Air Force operations.

5-2. Assignment

The engineer construction group normally operates in the communications zone of a theater of operations. It is assigned to the theater army support command and is further assigned or attached to an engineer command or brigade.

5-3. Organization

Like the engineer brigade, the engineer construction group is a flexible organization and only becomes operational when working units are assigned or attached to it. The headquarters and headquarters company, engineer group, however, is a fixed organization and is organized under TOE 5-112 (fig. 5-1). It consists of two elements as follows:

a. Group Headquarters. Group headquarters consists of the commander, executive officer, S-1, S-3 (performs additional duties as S-2), S-4, chaplain, communications officer, maintenance officer, and sergeant major.

b. Headquarters Company. Headquarters company consists of the personnel of a company headquarters and the personnel of the operating sections of the group.

(1) *Company headquarters.* Company headquarters provides the command, administration, mess, supply, and organizational maintenance for the headquarters company.

(2) *Administrative section.* Supervised by the S-1, this section provides the personnel required to process personnel management and related actions; maintain records of assigned personnel, and process administrative and classification actions.

(3) *Operations section.* Supervised by the S-3, this section provides the personnel and equipment required to plan, design, and direct field construction, rehabilitation or maintenance of facilities, buildings, heliports, and cargo and tactical airfields. This section is also involved to a limited degree with plans and designs for petroleum storage and distribution facilities, and port and railroad facilities. As the S-3 performs the additional duties of the S-2, this section also handles all intelligence matters for the group.

(4) *Supply and maintenance section.* Supervised by the S-4, this section provides the personnel and equipment to supervise and coordinate group supply and maintenance activities. The maintenance officer is a staff member. His assistant and the equipment required for supervision of maintenance operations are included in this section. The food service technician is responsible for supervision of mess management within the group.

(5) *Communications section.* Supervised by the communications officer, this section provides the personnel and equipment required to install, operate, and maintain a group communications system (radio and wire) and message center. This section is organized to operate on a 24-hour basis.

(6) *Aviation section.* Supervised by the aviation officer, this section provides the personnel and equipment required to provide rotary wing aircraft support to the group reconnaissance and construction activities.

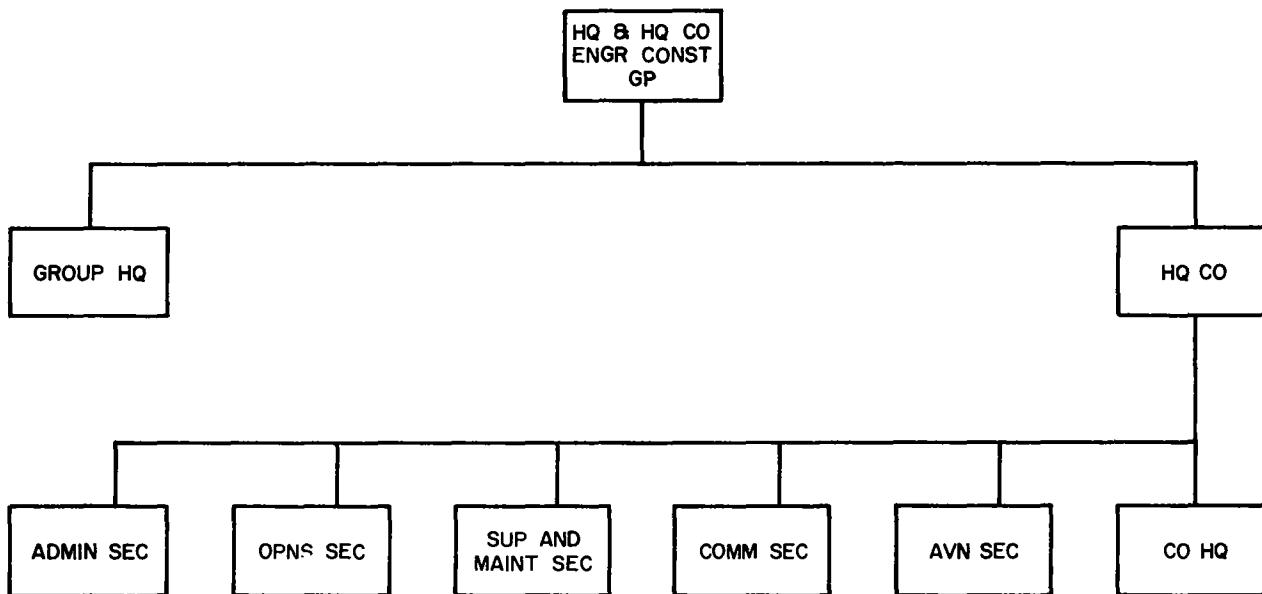


Figure 5-1. Organizational chart, headquarters and headquarters company, engineer construction group.

5-4. Duties

Although its operations are on a smaller scale, the group resembles the brigade in concept of organization and in operations. The duties of the group commander and his staff, and the personnel of the group sections, with some variations, are similar to their brigade counterparts and are outlined in FM 5-1, FM 101-5, AR 611-101, AR 611-112, and AR 611-201.

5-5. Capabilities

a. *Level 1.* At level 1, (full strength) this unit is capable of providing—

(1) Technical, operational, and administrative control of three to five engineer construction battalions and supporting engineer service units.

(2) Design, planning, and supervision required for the construction or rehabilitation of routes of communications, buildings, and

installations, cargo and tactical airfields, heliports, limited petroleum storage and distribution facilities, and limited port and railroad facilities.

(3) Project assignment to subordinate units, allocation of troops and the distribution and coordination of construction equipment and materials.

(4) Rotary wing aircraft for support of reconnaissance and construction activities.

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

b. *Levels 2 and 3.* See paragraph 2-4a.

c. *Type B Unit.* As it is composed primarily of command and staff personnel, the headquarters and headquarters company, engineer construction group is not adaptable to a Type B organization.

d. *Construction Capabilities.* When the

group becomes operational through the attachment of subordinate construction and construction-support units, its construction capabilities may be measured by the number and type of its component units.

e. The headquarters and headquarters company, engineer construction group, is dependent upon the medical detachment of attached engineer battalions or upon medical facilities of the field army or TASCOM for unit level medical service.

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

5-6. Employment

a. The engineer construction group normally is given an area assignment in the communications zone by the engineer construction command or brigade to which it is attached. When required, mission-type assignments may also be accomplished in the field army area by the engineer construction groups of the communications zone.

b. Because of their flexible organization, groups can be employed in several ways: in conjunction with other construction groups within the brigade on large-scale coordinated projects; independently on normal recurring tasks encountered in a typical theater of operations; or by the attachment of specialized teams or units to perform complex and specialized tasks. The operations section of the group has a capability for the planning and design of field construction. Work assignment may be designated by area, task, or a combination of the two—area-task (see para 12-2).

c. The group and its assigned or attached units can perform all construction tasks required by an army in a theater of operations. These tasks include troop housing, road, bridge, railroad, pipeline, port, administrative facility, airfield, and heliport construction. By the attachment of appropriate teams from

TOE 5-500-series, the group also has a capability of reconstructing or rehabilitating municipal utility systems. The group may be given separate mission-type assignments. These may include construction of port, construction of an airfield and related facilities, or interzonal tasks such as the construction of a theater pipeline or an inland waterway.

d. The number and types of construction and construction-support units assigned or attached to the group are based on the mission of the group. As an example, if the group is given a port construction mission, one or more engineer port construction companies are attached to it. In like manner, if the group is given a mission to construct a pipeline, one or more engineer pipeline construction support companies are attached to it. Normally, however, there are three or more engineer construction battalions assigned or attached to the group.

5-7. Major Items of Equipment

The equipment of headquarters and headquarters company is limited to individual equipment and that needed for housekeeping, local security, communications, ground and air transportation, and engineer control. Engineer control equipment includes surveying, drafting, and reproduction equipment; reference texts; and laboratory sets for testing soils, concrete, and asphalt.

5-8. Mobility

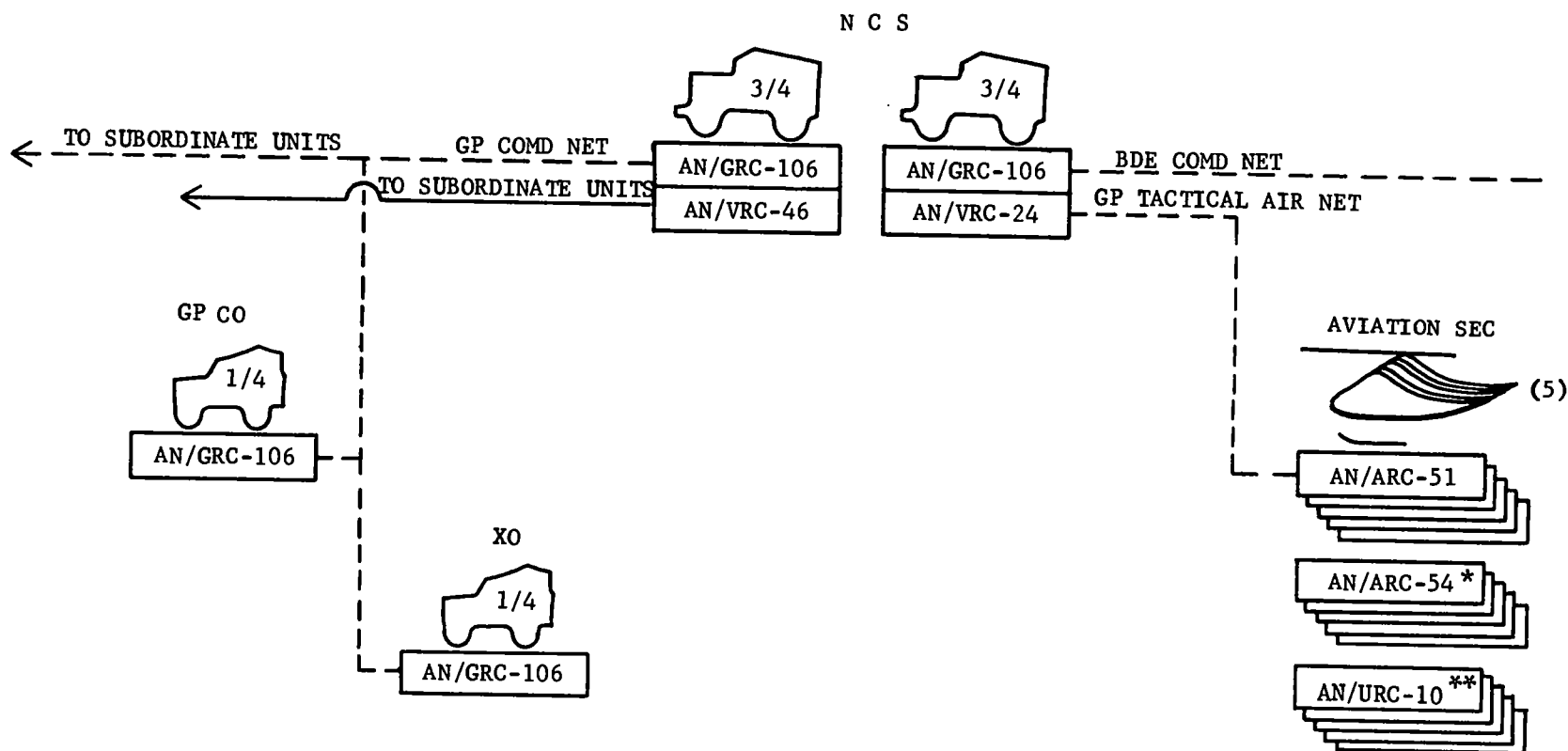
Headquarters and headquarters company, engineer construction group, is 75 percent mobile and 100 percent air transportable in medium transport aircraft.

5-9. Category

This unit is designated a category II unit.

5-10. Communications

Signal communications equipment of the group includes radio, teletypewriter, and telephone facilities. The radio net is shown in figure 5-2 and the wire net is shown in figure 5-3.



* USED FOR INTERCOMMUNICATION BETWEEN HELICOPTERS
 ** EMERGENCY RADIO CARRIED BY PILOTS

FM NET _____

AM NET - - - - -

Figure 5-2. Radio net, engineer construction group.

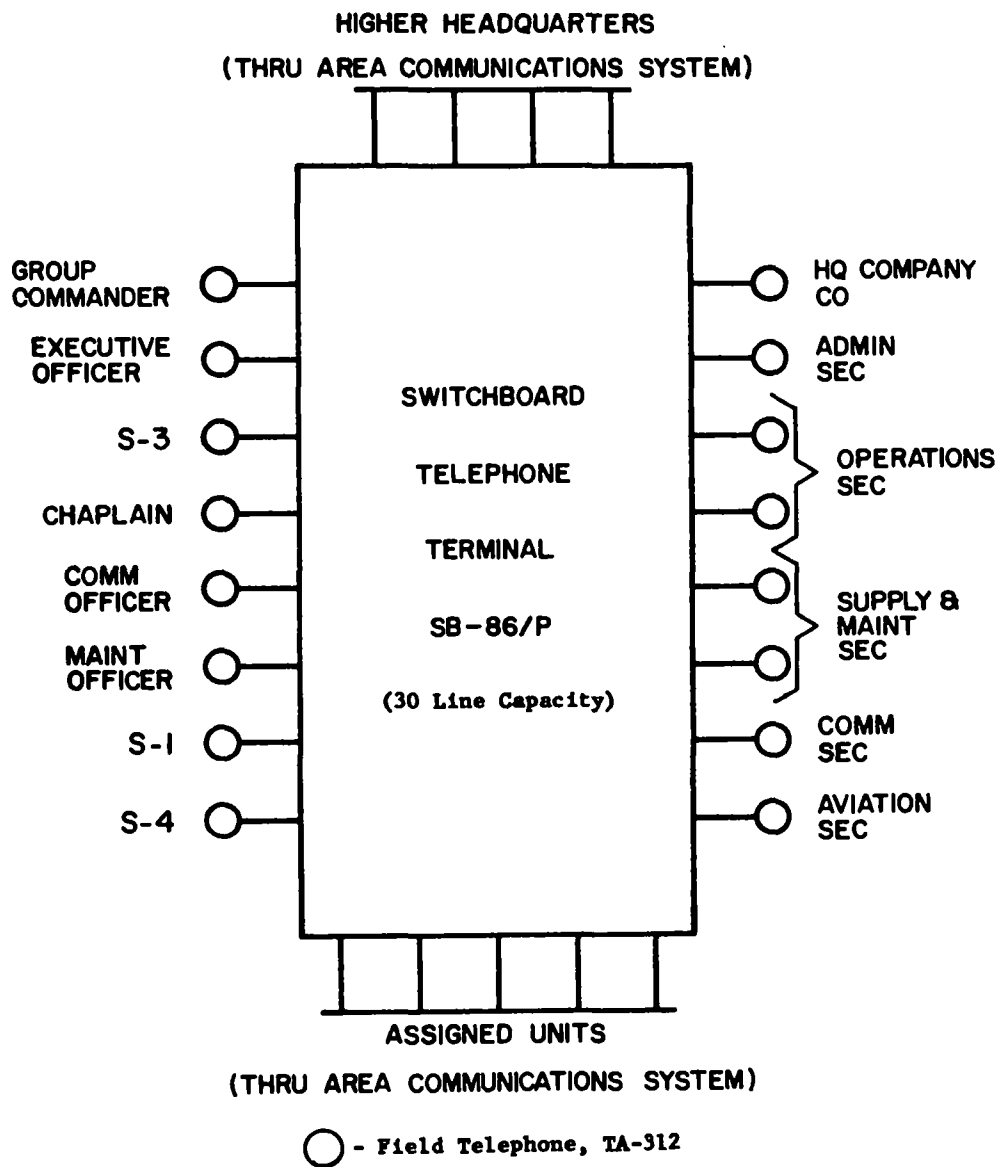


Figure 5-3. Wire net, engineer construction group.



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CHAPTER 6

ENGINEER CONSTRUCTION BATTALION

Section I. GENERAL

6-1. Mission

The mission of the engineer construction battalion is to construct and rehabilitate roads, airfields, heliports, pipeline systems, structures, and utilities for the Army and the Air Force in the communications zone and rear areas of the combat zone; and to assist in emergency recovery operations.

6-2. Assignment

The engineer construction battalion normally operates in the communications zone where it is assigned to the theater army support command and further assigned or attached to an engineer construction group.

6-3. Organization

The engineer construction battalion (fig. 6-1) is organized under TOE 5-115, and consists of a headquarters and headquarters company, one engineer equipment and maintenance company and three identical engineer construction companies.

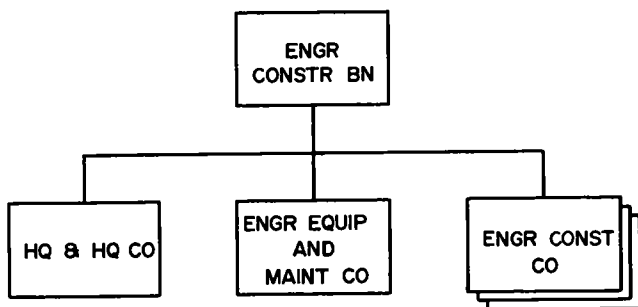


Figure 6-1. Organizational chart, engineer construction battalion.

6-4. Capabilities

a. Level 1. At level 1, full strength, this unit is capable of providing—

(1) Construction or rehabilitation of routes of communications, bridges, heliports, tactical and cargo airfields.

(2) General construction of buildings, structures and related facilities.

(3) Limited reconstruction of railroads, railroad bridges, and ports.

(4) Limited bituminous paving.

(5) Minor protective construction.

(6) Sustained operations on a two-shift basis.

(7) Medical service for the battalion to include emergency medical treatment, operation of the battalion aid station, evacuation of sick and injured personnel when practicable, and supervision of sanitation in the battalion.

b. With Attachments. When at level 1, (full strength) and supported by attachments of specialized personnel and equipment, the battalion has the following capabilities in addition to the above:

(1) Large-scale bituminous and portland cement paving operations.

(2) Large-scale quarrying and crushing operations.

(3) Major reconstruction of railroads and railroad bridges.

(4) Major rehabilitation of ports.

(5) Major protective construction.

(6) Construction of pipelines, storage tanks, and related facilities.

c. Levels 2 and 3. At levels 2 and 3, reduced strength, this unit is organized to fulfill lesser requirements for personnel and equipment

during prolonged noncombat periods and for a limited period of combat. The reduced operational capabilities are in digressive, 10 percent personnel increments from approximately 90 percent for level 2 to 80 percent for level 3.

(1) At level 2, skilled labor construction capabilities are reduced 20 percent while equipment construction capabilities generally remain at Level I.

(2) At Level 3, equipment construction capabilities are reduced 50 percent, while skilled labor remains at Level 2.

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

6-5. Employment

a. The engineer construction battalion may be employed independently as a unit; may operate separately, assigned to the commander of the major force supported; or may operate as an integral element of the engineer construction group. While the battalion is designed to function as a unit under the command of the battalion commander, its organic construction companies may be temporarily detached for specific missions.

b. The battalion may be used in an area assignment where it is responsible for all construction activities within the area, or in a task assignment, or in a combination of both—area-task (para 12-2). When required, it may also operate in the field army area on a mission-type assignment.

c. When properly supported by attachments of specialized units or detachments from the construction group, the battalion can perform

specialized heavy construction. It can do this when operating as a unit, or with the construction companies operating independently.

d. The battalion has a limited planning and design capability. It depends upon the group for any specialized planning and design. If the battalion is operating independently, and there is a demand for specialized planning and design, it must be augmented by the attachment of specialized personnel for these tasks.

6-6. Major Items of Equipment

For the major items of equipment in the construction battalion, see the discussions of the individual organic companies.

6-7. Mobility

Headquarters and headquarters company is 100 percent mobile; the engineer equipment and maintenance company is 84 percent mobile; and each of the construction companies is 87 percent mobile by organic transportation. The entire battalion is 100 percent air-transportable in heavy transport aircraft. Some items of equipment, such as the crushing and screening plant organic to the equipment and maintenance company, must be disassembled for air transportation.

6-8. Communications

The construction battalion provides radios for communication between its headquarters and higher headquarters and its organic and attached units. Radio and telephone communications are also provided for communications between the various company headquarters and their operating elements. The battalion radio net is shown in figure 6-2 and the wire net is shown in figure 6-3.

Section II. HEADQUARTERS AND HEADQUARTERS COMPANY, ENGINEER CONSTRUCTION BATTALION

6-9. Mission

The mission of the headquarters and headquarters company of the engineer construction battalion is to provide command, planning, direction, coordination, and control of the en-

gineer construction battalion and attached units.

6-10. Assignment

Headquarters and headquarters company is organic to the engineer construction battalion.

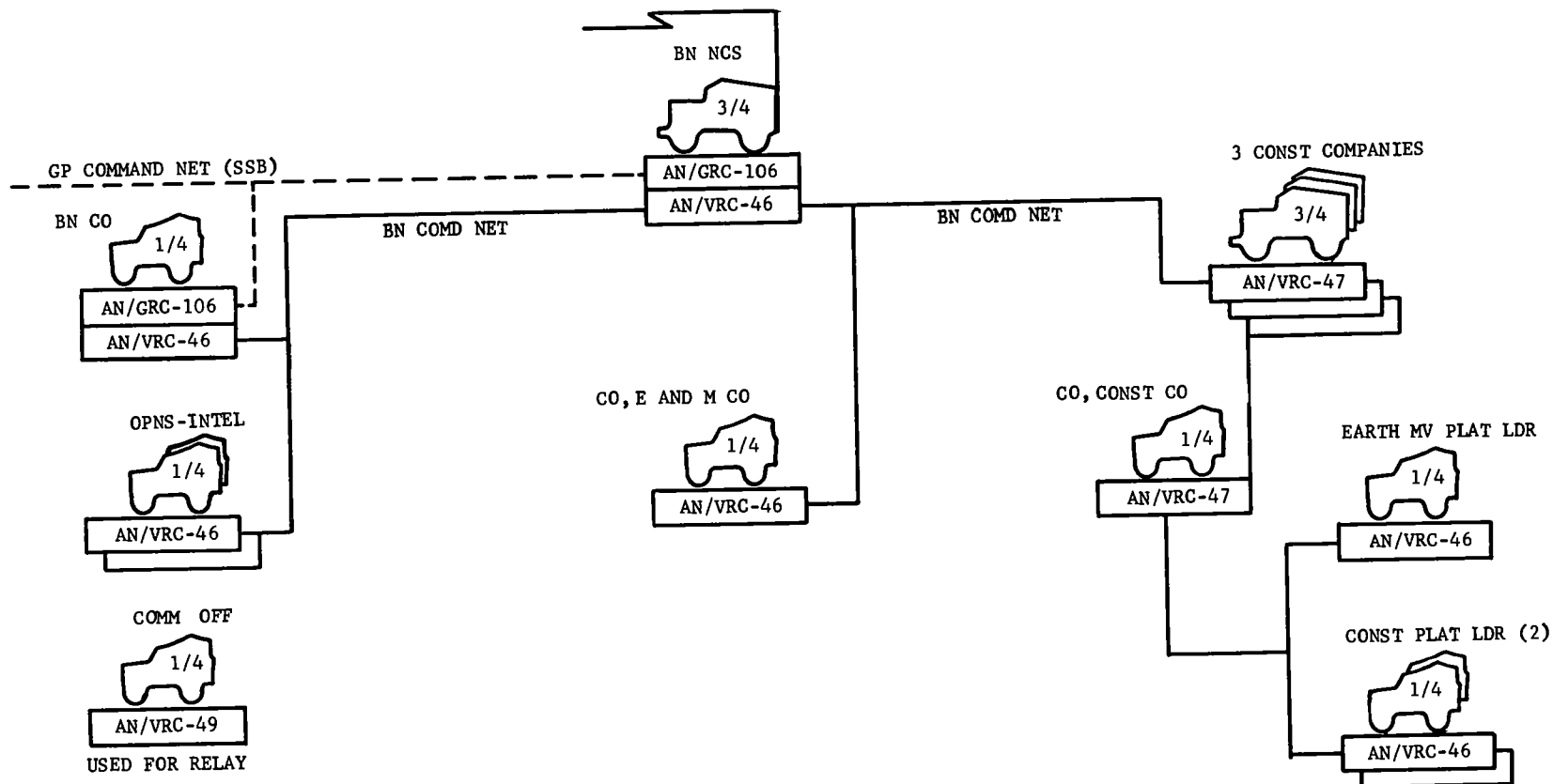


Figure 6-2. Radio net, engineer construction battalion.

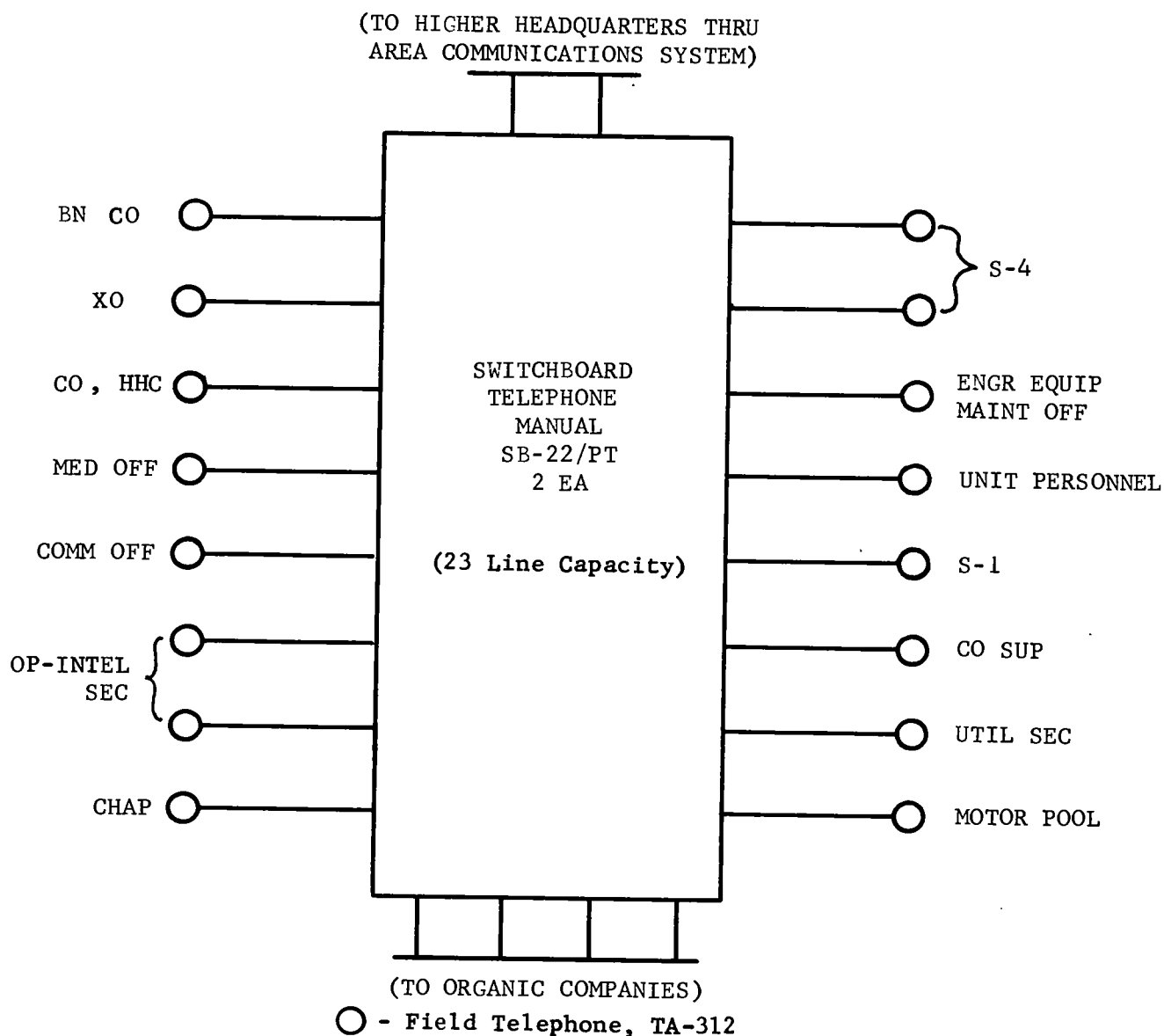


Figure 6-3. Wire net, engineer construction battalion.

6-11. Organization

Headquarters and headquarters company, engineer construction battalion, is organized under TOE 5-116 (fig. 6-4) and consists of two elements as follows:

a. *Battalion Headquarters.* Battalion headquarters consists of—

- (1) Battalion commander.
- (2) Executive officer.
- (3) S-3.

- (4) Battalion surgeon.
- (5) Chaplain.
- (6) Engineer equipment maintenance officer.
- (7) S-1.
- (8) S-4.
- (9) Communications officer.
- (10) Sergeant major.

b. *Headquarters Company.* Headquarters company consists of a company headquarters

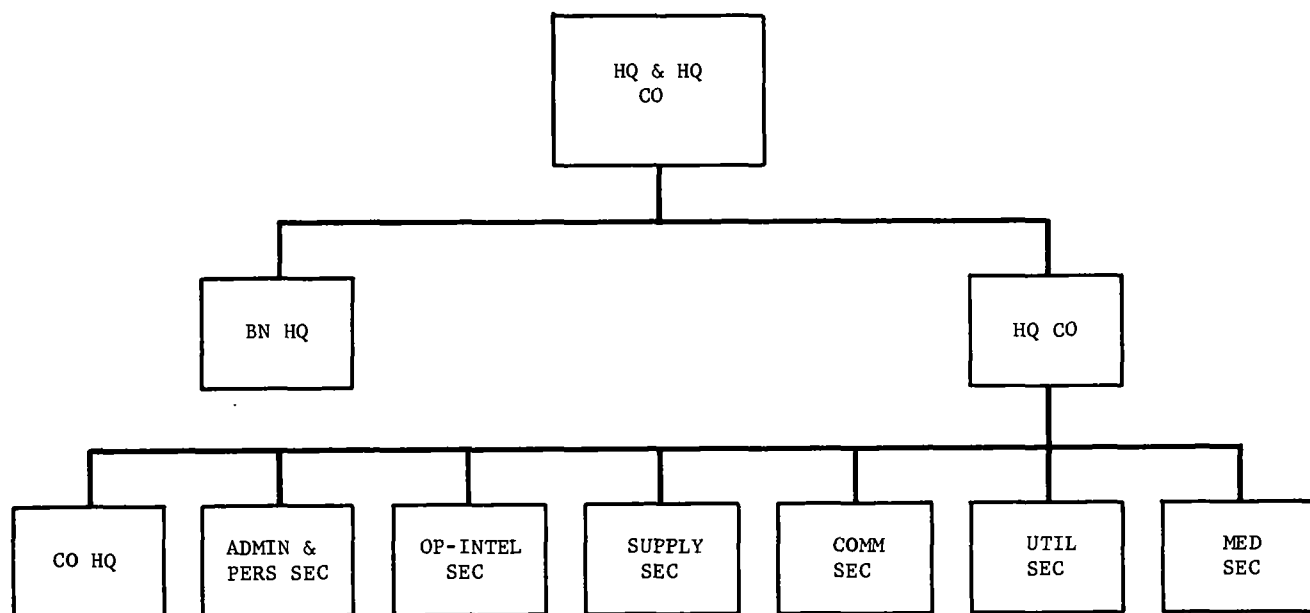


Figure 6-4. Organizational chart, headquarters and headquarters company, engineer construction battalion.

and the personnel of the following operating sections of the battalion:

- (1) Administrative and personnel section.
- (2) Operations and intelligence section.
- (3) Supply section.
- (4) Communications section.
- (5) Utilities section.
- (6) Medical section.

6-12. Duties and Functions

The duties of the battalion commander and his staff, and the functions of the staff sections are outlined in FM 5-1, FM 101-5, AR 611-101, AR 611-112, and AR 611-201.

6-13. Capabilities

a. *Level 1.* At level 1, full strength, headquarters and headquarters company engineer construction battalion is capable of—

- (1) Providing command and staff functions for the battalion and attached units.
- (2) Furnishing administrative, supply, medical services to units in the battalion.
- (3) Performing ground reconnaissance, and preliminary and final surveys for battalion projects.

(4) Limited capability preparing necessary design and detail plans, construction layouts, site adaptations, and bills of materials for construction projects.

(5) Providing technical advice and direction, and furnishing overall supervision for construction projects.

(6) Providing and supervising battalion communications and providing wire communications for subordinate units.

(7) Providing engineer intelligence for the battalion.

(8) Coordinating equipment requirements of the companies and effecting temporary interchanges when operational requirements dictate.

(9) Furnishing construction and utility specialists for special projects and for supervision of construction forces of the battalion, contract labor, or indigenous personnel.

(10) Providing two water points for supplying potable and nonpotable water in support of battalion construction operations and for potable water for battalion units and for other units as required.

(11) Providing its own administration, supply, company level organizational maintenance, and mess for the company; also, provide personnel administration for attached units.

b. Level 2 and 3. The level 2 and 3, reduced strength, column adapts the table of organization and equipment to the lesser requirements for personnel and equipment during prolonged noncombat periods and for a limited period of combat. The reduced operational capabilities are in digressive, 10 percent increments from approximately 90 percent for level 2 to 80 percent for Level 3. At Level 3 the water points are reduced to one.

c. Type B Unit. This unit is adaptable to a Type B organization. Its capabilities, when organized as a Type B unit, depend upon the proficiency of the indigenous personnel or third state nationals assigned to the unit.

Section III. ENGINEER EQUIPMENT AND MAINTENANCE COMPANY

6-16. Mission

The mission of the engineer equipment and maintenance company is to support the engineer construction battalion with engineer direct support maintenance and to reinforce the construction capability of the battalion by providing construction specialists and equipment with operators.

6-17. Assignment

The engineer equipment and maintenance company is organic to the engineer construction battalion.

6-18. Organization

The engineer equipment and maintenance company is organized under TOE 5-117 (fig. 6-5) and consists of a company headquarters, an equipment platoon, and a maintenance platoon.

6-19. Duties and Functions

The duties of the company personnel may be found in AR 611-101, AR 611-112, and AR 611-201. The functions of the company headquarters and the two platoons are discussed briefly below.

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

6-14. Employment

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

6-15. Major Items of Equipment

The equipment of headquarters and headquarters company is restricted to that needed for housekeeping, and such technical items as water purification sets, surveying sets, and asphalt, concrete, and soil testing sets used by personnel of the battalion staff sections.

a. Company Headquarters. Company headquarters is divided into—

(1) Headquarters section, which provides the command, administration, mess and supply for the company.

(2) Company maintenance section, which provides organizational maintenance on automotive materiel and construction equipment for the company.

b. Equipment Platoon. The equipment platoon consists of—

(1) Platoon headquarters, which provides command and control of the platoon sections.

(2) Construction equipment section containing items of specialized equipment and operators employed in support of construction companies as required.

(3) Asphalt section, which furnishes personnel and equipment for bituminous surface treatment in support of individual construction company efforts.

(4) Rock processing and quarry section, which furnishes personnel and equipment for quarry and rock processing operations and production of aggregate in support of construction activities. The platoon may be augmented by

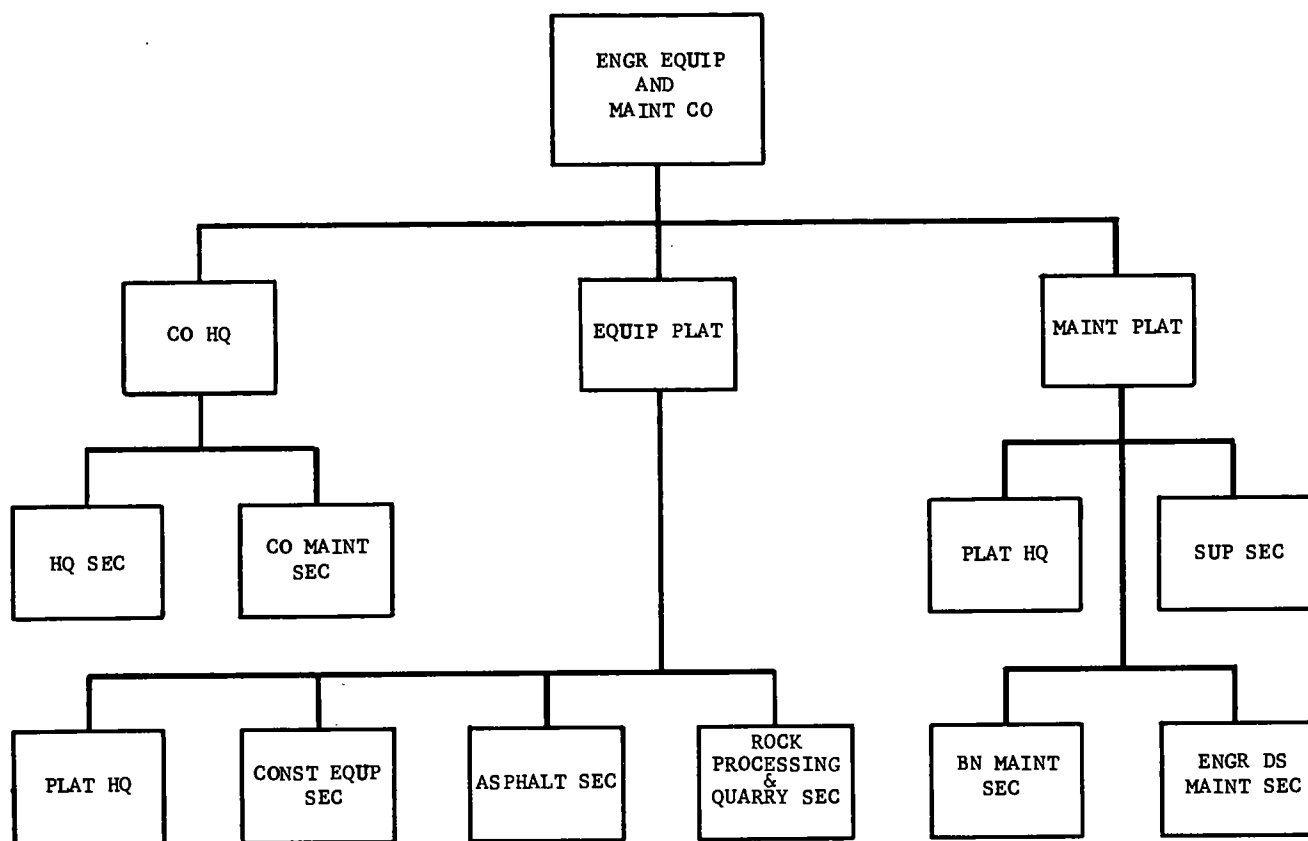


Figure 6-5. Organizational chart, equipment and maintenance company, engineer construction battalion.

an additional rock processing and quarry section depending on the type of rock drilling equipment issued.

c. Maintenance Platoon. The maintenance platoon consists of—

(1) Platoon headquarters, which provides command and control of the platoon sections.

(2) Engineer direct support maintenance section, which furnishes engineer equipment repairmen to perform direct support maintenance on all engineer equipment of the battalion, as well as contact maintenance teams for job site repair of engineer equipment.

(3) Battalion maintenance section, which furnishes personnel and equipment to provide the battalion with a full organizational maintenance capability by providing backup organizational maintenance support to the organic companies.

(4) Supply section, which provides personnel and equipment for requisitioning, maintaining stock levels, and storing and issuing mission load repair parts for engineer equipment of the battalion. Mission load repair parts includes repair parts for the direct support maintenance of the maintenance platoon and for repair parts for organization and maintenance units in the battalion.

6-20. Capabilities

a. Level 1. At level 1 (full strength) this unit is capable of providing—

(1) Battalion level organizational maintenance of engineer construction, power generation and automotive equipment organic to the engineer construction battalion.

(2) Direct support maintenance for engineer construction and power generation equipment organic to the Engineer Construc-

tion Battalion to include contact maintenance teams for job site repair.

(3) Repair parts required to support the battalion maintenance program.

(4) Machine shop facilities.

(5) Equipment and specialist personnel to support the construction companies in bituminous operations.

(a) Dust palliation

(b) Surface treatment

(c) Penetration macadam paving

(d) Road mix paving

(e) Low type portable plant mix asphaltic concrete of three tons per hour.

(6) Aggregate.

(7) Dump truck support to the construction companies or its organic crushing and asphalt equipment.

(8) Engineer heavy equipment to reinforce the construction companies.

b. Level 2 and 3. See paragraph 2-4a.

c. Type B Unit. This unit is adaptable to a Type B organization. Its capabilities, when organized as a Type B organization, depend upon the proficiency of the indigenous personnel or third state nationals assigned to the unit.

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

6-21. Employment

The engineer equipment and maintenance company is employed in support of the organic construction companies of the construction battalion. It provides additional capabilities to those units by supplying specialized personnel and equipment, performing direct support

maintenance for the battalion's organic engineer vehicles and equipment, and backup organizational maintenance for the entire battalion.

6-22. Major Items of Equipment

a. Company Headquarters. Equipment of company headquarters consists largely of individual items of equipment; items needed for housekeeping, communications, and administration; and the equipment required by the company maintenance section to perform organizational maintenance.

b. Equipment Platoon. The major items of equipment in the equipment platoon include an earth auger, crane shovels, ditching machines, scoop loaders, a pneumatic tool and compressor outfit, dump trucks, bituminous material distributors, bituminous heating kettle, rollers, aggregate spreaders, a rotary sweeper, a compressor, a crushing and screening plant, full-tracked heavy tractors, and generators.

c. Maintenance Platoon. The major items of equipment in the maintenance platoon consist of an organizational equipment repair shop, equipment maintenance contact shops, a semi-trailer repair parts shop, wreckers, a general-purpose equipment repair shop and generators.

6-23. Communications

The company is provided with a radio for access to the battalion radio net. Field telephones and a switchboard provide wire communication. Figure 6-6 shows the wire net of the company.

Section IV. ENGINEER CONSTRUCTION COMPANY

6-24. Mission

The mission of the engineer construction company is to—

a. Excavate, haul, compact, and grade earth; and to provide stabilized earth subgrades for airfields, heliports, roads, railroads, levees, supply storage areas, and similar projects.

b. Construct and rehabilitate buildings, port and beach facilities, bridges, drainage structures, pipelines and storage tanks, and railroads and their related facilities. The company also installs and repairs utilities.

6-25. Assignment

The engineer construction companies are organic to the engineer construction battalion.

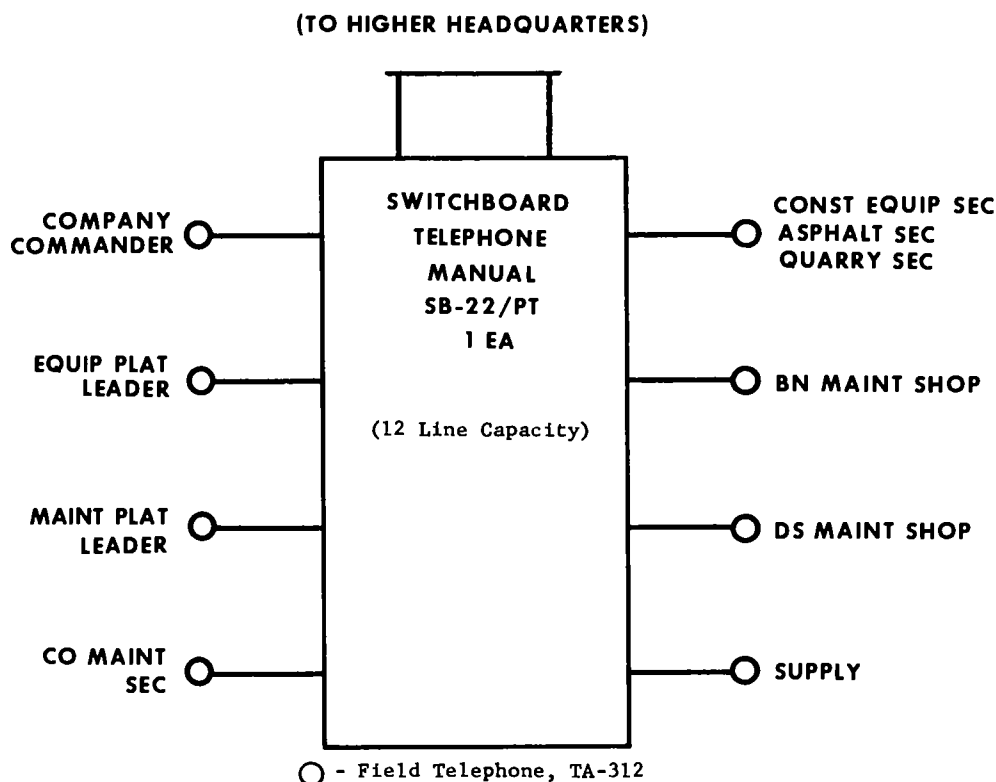


Figure 6-6. Wire net, equipment and maintenance company, engineer construction battalion.

6-26. Organization

The engineer construction company is organized under TOE 5-118 (fig. 6-7) and consists of a company headquarters, an equipment maintenance section, an earthmoving platoon, and two general construction platoons.

6-27. Duties and Functions

The duties of the company personnel may be found in AR 611-101, AR 611-112, and AR 611-201. The functions of the company headquarters and the organic platoons are discussed briefly below.

a. Company headquarters provides command and administration, all supplies except repair parts, communications with organic platoons, and planning and supervision of company construction operations.

b. Equipment maintenance section performs organizational maintenance for organic engineer construction equipment and automotive

equipment and vehicles, maintains dispatch and maintenance records, and maintains authorized repair parts stockage.

c. *Earthmoving Platoon.* The earthmoving platoon, consists of a platoon headquarters, a grading and compaction section, and an excavation and embankment section. It performs drainage, grading, embankment, and excavation operations for roads, airfields, railroads, and area development.

d. *Two General Construction Platoons.* Each of these platoons consists of a platoon headquarters and three general construction squads. They are used collectively or separately in support of the earthmoving platoon when it is engaged in clearing and grubbing, material handling, and the construction of drainage structures. They may also be used on general construction tasks such as construction or rehabilitation of buildings and similar facilities; bridges, pipelines, and storage tanks; and installation of related utilities.

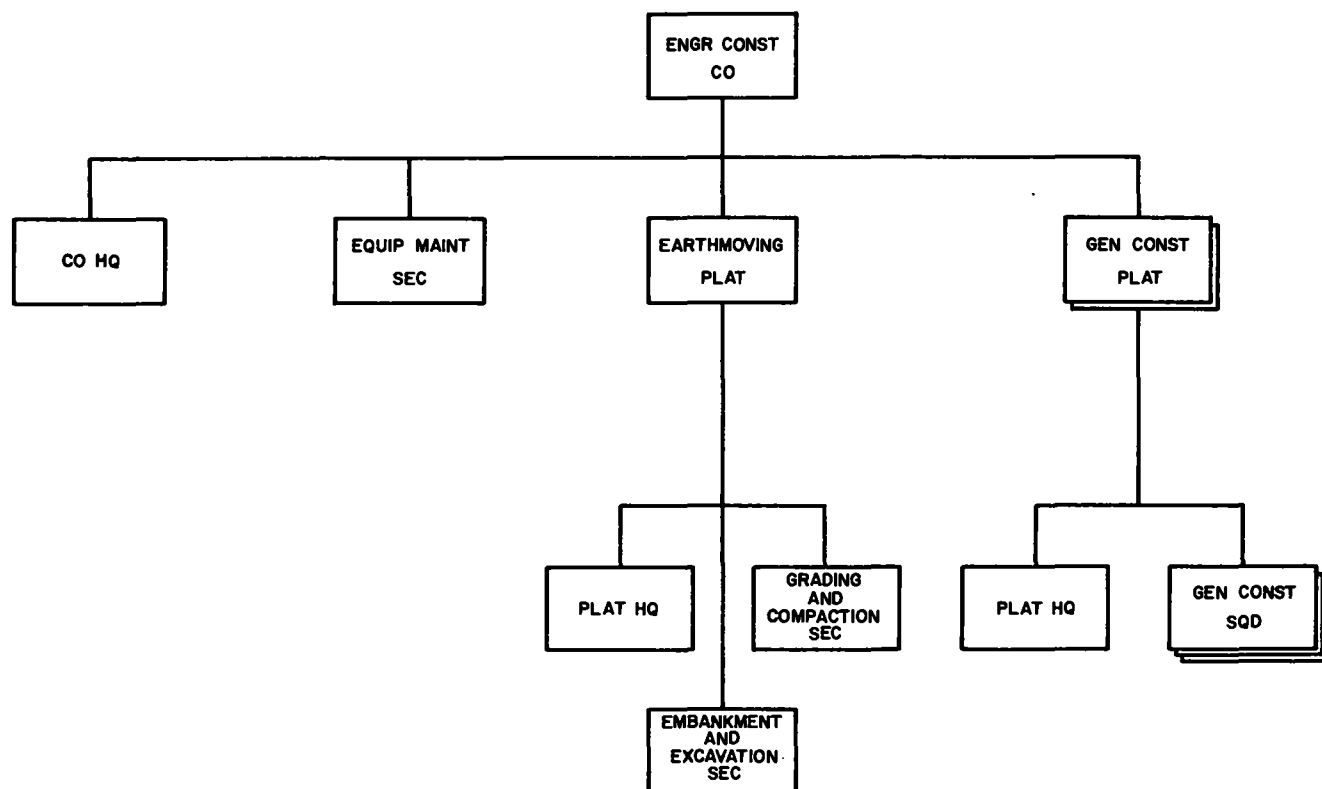


Figure 6-7. Organizational chart, construction company, engineer construction battalion.

6-28. Capabilities

a. *Level 1.* At level 1 (full strength) this unit is capable of—

(1) Constructing or rehabilitating theater of operations buildings, shelters, pipeline systems, and operational facilities; and erecting prefabricated structures.

(2) Installing electric, water and sewage facilities for theater of operations installations.

(3) Performing heavy general construction when supported with additional construction personnel and heavy equipment.

(4) Operating borrow pits and hauling borrow pit material; performing cut and fill; compacting natural or fill material to provide subgrades and base courses of specified bearing strength, and leveling natural or fill material to desired grades.

(5) Providing construction effort for emergency recovery operations.

(6) Providing its own administration, supply, mess, and organizational maintenance.

(7) Operating on a two-shift basis.

b. *Level 2 and 3.* The level 2 and 3 columns (reduced strength) adapt this table for reduced operational capabilities in digressive 10 percent increments from 90 percent for level 2 to 80 percent for level 3.

c. *Type B Unit.* This unit is adaptable to a Type B organization. Its capabilities, as such, depend upon the proficiency of the indigenous personnel or third state nationals assigned to the unit.

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

6-29. Employment

The basic work unit of the engineer construction battalion—the engineer construction com-

pany—is organized for two-shift operations in all necessary functions including mess, construction equipment operations, and vehicles (dump trucks). It may be used as an integral part of the battalion on large projects or as a separate unit on company-size projects. When performing specialized construction tasks, this company may be augmented by personnel and equipment from supporting elements.

6-30. Major Items of Equipment

The major items of equipment of the engineer construction company include a trailer-mounted welding shop, 18-cubic yard scrapers, dump trucks, full-tracked and rubber-tired

tractors with dozer blades, scoop loaders, water distributors, graders, rollers, crane shovels, concrete mixers, pneumatic tool and compressor outfits, floodlight sets, and portable electric pioneer outfits.

6-31. Communications

The company is provided with radios for access to the battalion radio net and for communication between the company commander, and the three platoon leaders (fig. 6-2). Field telephones and a switchboard provide wire communication between the operating elements of the company and to battalion. Figure 6-8 shows the wire net of the company.

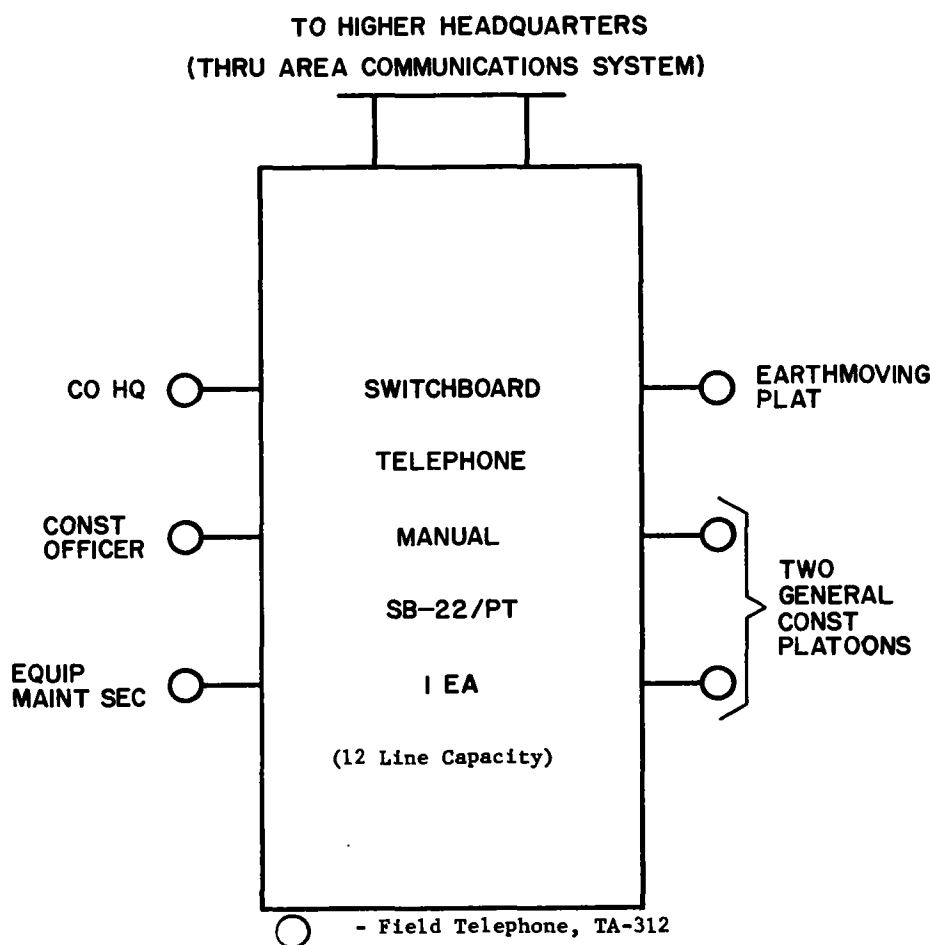


Figure 6-8. Wire net, construction company, engineer construction battalion.



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CHAPTER 7

ENGINEER PORT CONSTRUCTION COMPANY

7-1. Mission

The mission of the engineer port construction company is to perform special engineering work involved in providing port, beach, and marine POL facilities in support of military operations.

7-2. Assignment

The engineer port construction company normally is assigned to the theater army support command for further assignment to the engineer command or an engineer construction brigade or group. It may be assigned to the field army and attached to an engineer combat brigade or group as required for support of amphibious, riverine or other special operations requiring marine engineering construction support.

7-3. Organization

The engineer port construction company is organized under TOE 5-129 (fig. 7-1). It consists of a company headquarters, two construction platoons, and a service platoon.

7-4. Duties and Functions

The duties of the company personnel may be found in AR 611-101, AR 611-112, and AR 611-201. The functions of the company headquarters and the organic platoons are discussed briefly below.

a. Company headquarters is divided into—

(1) Headquarters section, which provides command, administration, and mess on a two-shift basis.

(2) Operations section, which maintains control over construction projects by inspecting and assisting the company commander in his supervision; prepares construction plans, charts and diagrams; performs limited survey missions; and maintains records of work ef-

forts, materials used or needed, and other information pertinent to the construction effort.

(3) Supply section, which provides organizational and operational supplies, equipment, and parts for the company.

(4) Diving section, which provides the company with an underwater inspection, demolition, and construction capability.

b. Two construction platoons, each composed of—

(1) Platoon headquarters, which directs the operations of the platoon.

(2) A general construction section which is employed in general construction duties in connection with port construction including submarine pipeline and POL terminal construction.

(3) A pile-driving section which operates the pile-driving equipment used in the construction of piers, quays, slips, and other facilities requiring piling.

c. Service platoon, consisting of—

(1) Platoon headquarters, which directs the operations of the platoon.

(2) Maintenance section, which performs organizational maintenance on organic automotive and engineer equipment and direct support maintenance on organic engineer equipment for the company.

(3) Equipment section, which operates specialized engineer equipment in support of the construction platoons.

(4) Transportation section, which provides and operates the wheeled vehicles needed in support of the company.

7-5. Capabilities

a. *Level 1.* At level 1 (full strength) this unit is capable of—

(1) Operating in conjunction with other engineer units in performing specialized tasks

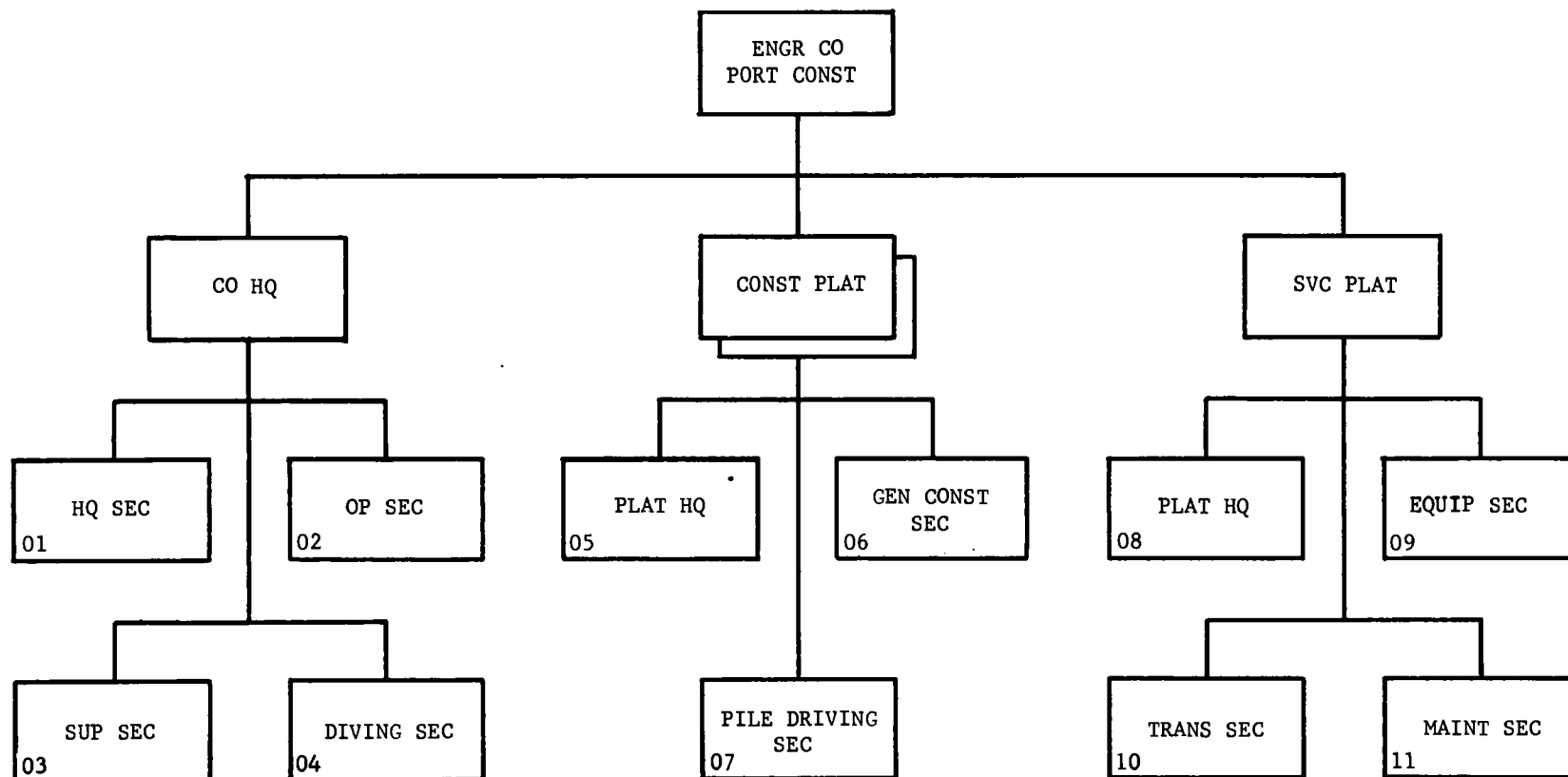


Figure 7-1. Organizational chart, engineer port construction company.

in the construction and complete rehabilitation of port facilities and construction of beach facilities.

(2) Operating in conjunction with other engineer units in the installation and/or rehabilitation of tanker unloading facilities to include submarine pipeline and limited construction and/or rehabilitation of on-shore POL storage facilities.

(3) Performing organizational maintenance of organic automotive equipment and organizational and direct support maintenance of organic engineer equipment.

(4) Performing two-shift operations.

b. *Level 2 and 3.* See paragraph 2-4a.

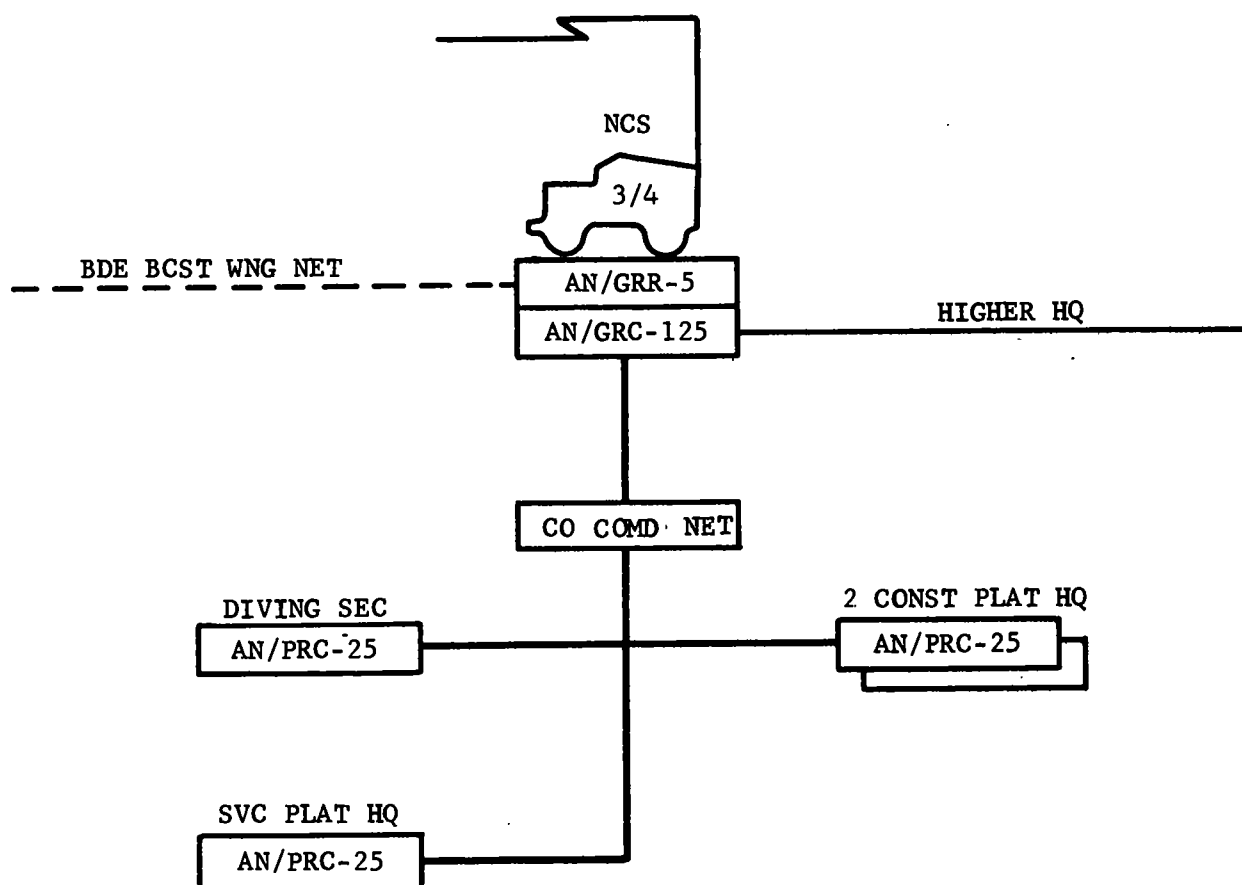
c. *Type B Unit.* This unit is adaptable to a Type B organization. When so organized, its capabilities depend upon the proficiency of the

indigenous personnel or third state nationals assigned to the unit.

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

7-6. Employment

a. The company's activities are normally located in the communications zone. On occasion, however, it may function within the field army area (combat zone), particularly when working on inland waterway ports or during the early stages of construction and rehabilitation of port facilities before a communications zone is established. It normally operates as one element of a large-scale, coordinated construction operation under an engineer group or engineer brigade, although at a rela-



NOTE: TWO LCM WITH SCR-8 RADIOS ORGANIC TO THE UNIT

Figure 7-2. Radio net, engineer port construction company.

tively detached location and in a comparatively independent manner.

b. The activities of the engineer port construction company are mainly limited to the construction or major repair of waterfront structures and POL off-loading facilities and anchorages. Typical structures are off-shore moorings, piers, quays, slips, locks, drydocks, jetties, cargo-handling facilities, marine railways, and harbor craft repair facilities. POL facilities work includes launching and anchoring welded submarine pipelines and installing (and in some cases fabricating) anchors and pipeline buoys. Any major construction and/or rehabilitation of on-shore POL storage facilities (including storage tanks) should be accomplished by other engineer construction units. While the port construction company may be employed on waterfront railyards, roads, hardstands, and covered storage, these

projects are more appropriately assigned to engineer construction battalions.

c. For large scale operations or work involving more equipment than is organic to the company, the company may have to be supplemented by other construction engineer units or by civilian labor and equipment. It is preferable to assign related on-land subprojects to a construction battalion and let the port construction company handle the specialized waterfront construction rather than attach a port construction company to a construction battalion that is not familiar with the special techniques of waterfront and harbor work.

d. The company can do a limited amount of dredging with its two-cubic-yard cranes mounted on its barge assembly sets. For extensive underwater excavation, floating dredges (TOE 5-550) should be used.

e. Construction platoons, augmented as nec-

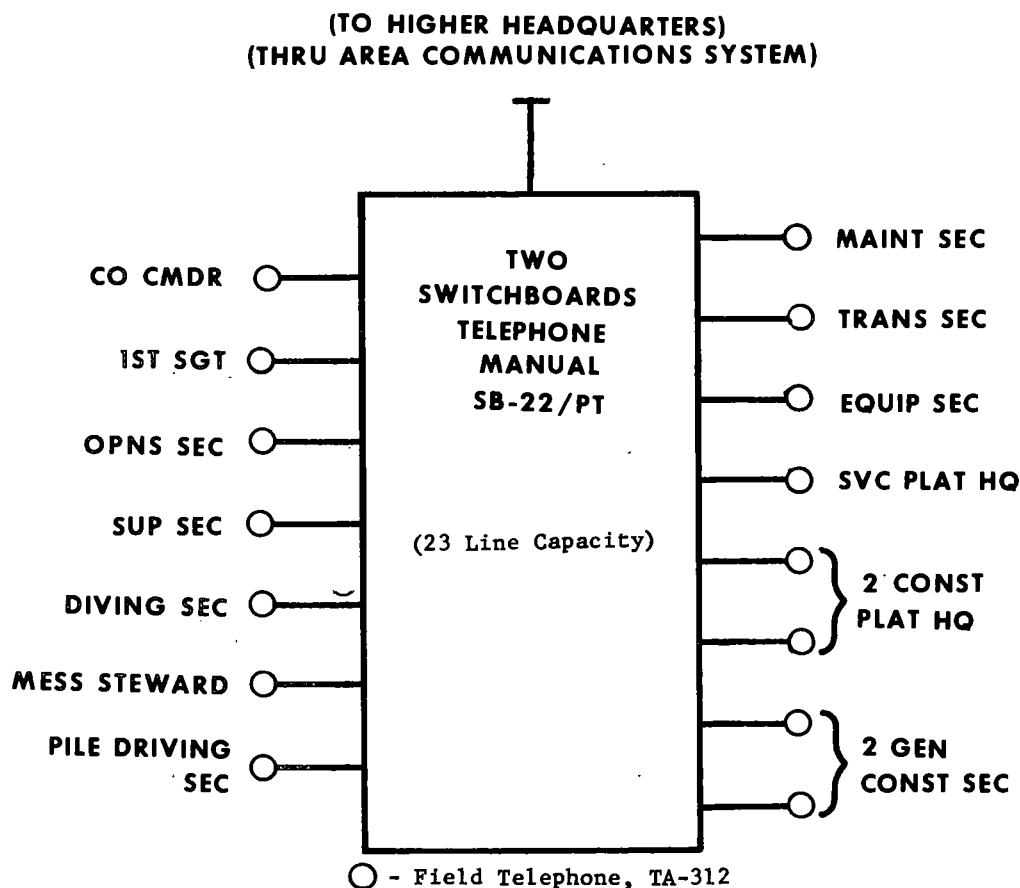


Figure 7-3. Wire net, engineer port construction company.

essary with divers, equipment, and ship personnel, are capable of independent operation when given administrative support such as mess, supply, and maintenance. Appropriate platoon projects are rehabilitation of small ports or construction of POL tanker anchorages and off-loading facilities.

7-7. Major Items of Equipment

The major items of equipment of the engineer port construction company include diving equipment; pipeline equipment; crane-shovels, with attachments for dredging, excavating, pile driving and other work; hydraulic jacks; compressors; pumps; tractors; concrete mixers; barge assembly sets; diesel-powered outboard propelling units; and boat and landing craft mechanized (LCM).

7-8. Mobility

The engineer port construction company is 50 percent mobile by vehicle when the LCM and cube barge sets are excluded. The company is 100 percent mobile when conditions favor concurrent land and water movement.

7-9. Communications

Communications to higher or adjacent units is by telephone where wire tie-in is provided by signal units. Internal communication is by radio and telephone. The two LCM organic to the unit are equipped with SCR-8 radios for communication with each other. The company radio net is shown in figure 7-2. The wire net is shown in figure 7-3.



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CHAPTER 8

ENGINEER CONSTRUCTION SUPPORT COMPANY

8-1. Mission

To provide rock crushing, bituminous mixing, paving and other construction support equipment with operators; to increase the capabilities of the construction group in major horizontal construction projects such as highways, storage facilities, and aircraft landing facilities.

8-2. Assignment

The engineer construction support company normally is assigned to the theater army for further assignment to the engineer command and is normally attached to an engineer construction group, TOE 5-112. The engineer construction support company may also be assigned to field army and attached to an engineer combat group, TOE 5-52.

8-3. Organization

The engineer construction support company consists of a company headquarters and four specialized operating platoons and is organized under TOE 5-114 (fig. 8-1).

8-4. Duties and Functions

The duties of the company personnel may be found in AR 611-101, AR 611-112, and AR

611-201. The functions of the company headquarters and the organic platoons are discussed briefly below.

a. Company headquarters contains the personnel and equipment required to command and control the unit and provide administration, mess, supply, and communication support to the company.

b. The equipment platoon supports the operations of the quarrying and processing platoon, the asphalt platoon, and other construction units by providing heavy cranes and tractors with operators; and provides heavy pile-driving equipment with operators in support of construction units engaged in pile-driving operations.

c. The maintenance platoon contains the personnel and equipment required to perform organizational and limited direct support maintenance on organic engineer equipment. The direct support maintenance function has the capability to accomplish repairs on the job site in order to maintain equipment deadline at a minimum as well as to avoid the problem of evacuating hard-to-move heavy construction equipment to a shop for repairs. In addition, the maintenance platoon recovers and

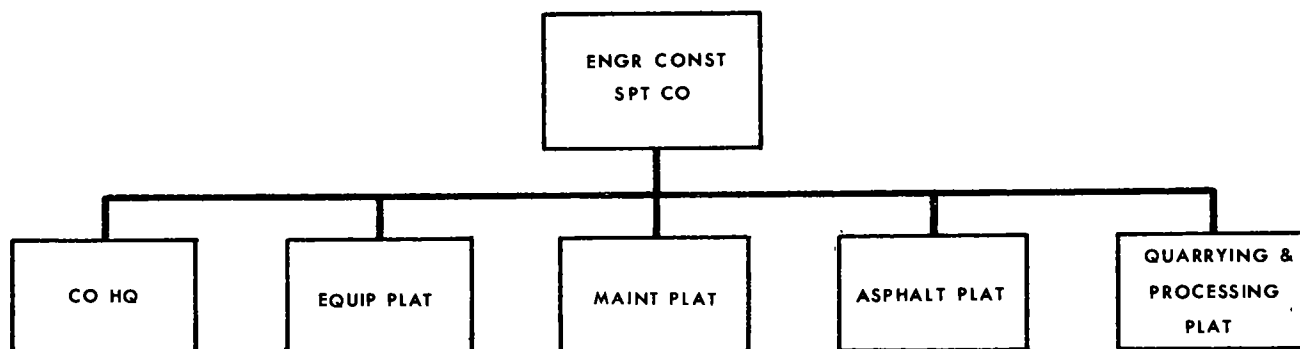


Figure 8-1. Organizational chart, engineer construction support company.

evacuates disabled vehicles and equipment; requisitions, stores, and maintains the authorized allowance of repair parts and maintenance repair parts records; and provides for administrative control of all company vehicles and engineer mechanical equipment.

d. The asphalt platoon supports construction units engaged in bituminous paving operations by providing asphalt technicians and equipment with operators.

e. The quarrying and processing platoon establishes and operates quarries for the production of aggregate in support of construction units requiring such material.

8-5. Capabilities

a. *Level 1.* At level 1 (full strength), this unit is capable of—

(1) Operating in support of an engineer group engaged in construction projects.

(2) Providing a rated capacity of seventy-five tons per hour of crushed rock and sand from rock quarries and gravel pits or providing a rated capacity of seventy-five tons per hour of washed and sized precrushed rock.

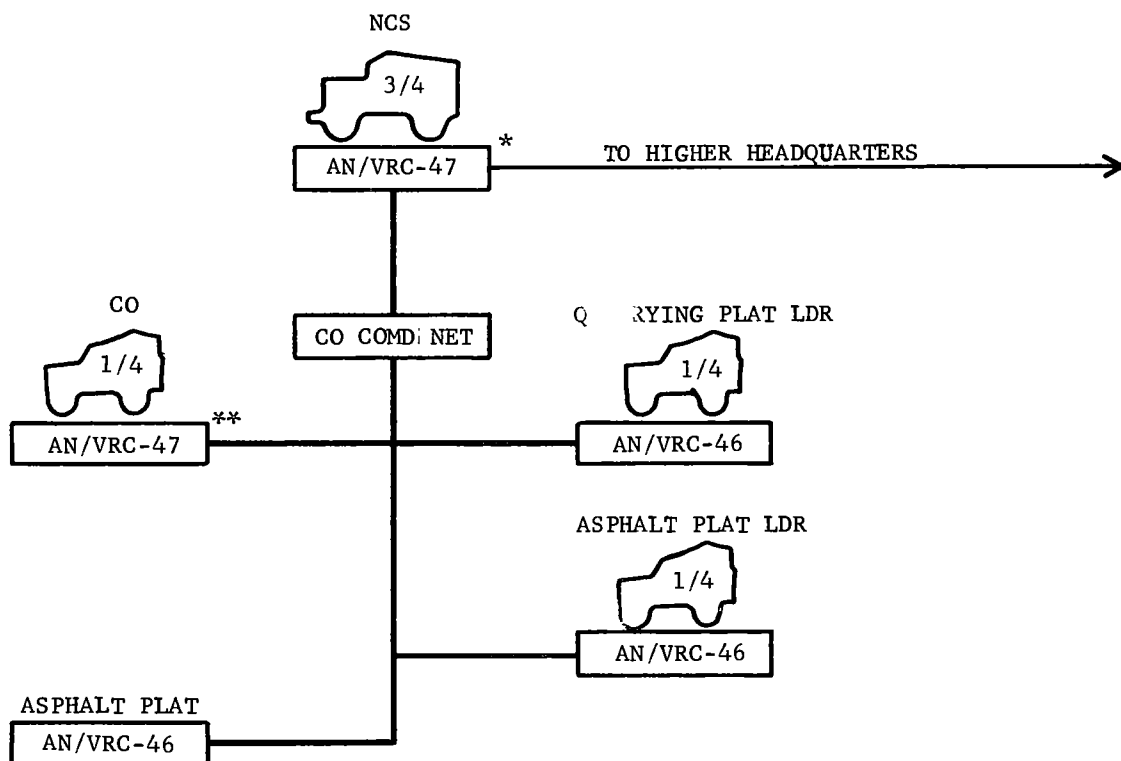
(3) Providing a rated capacity of one hundred and twenty to one hundred and fifty tons per hour of bituminous mixes and blends for paving projects.

(4) Providing equipment with operators to support construction operations (less bituminous) on a two-shift basis.

(5) Providing equipment and personnel to conduct quarrying operations on a two-shift basis.

(6) Providing equipment and technical personnel for oneshift bituminous paving operations.

(7) Performing organizational maintenance.



* NET CONTROL STATION OPERATES IN THE COMPANY NET, MONITORS THE HIGHER HEADQUARTERS NET AND ENTERS THE HIGHER HEADQUARTERS NET AS REQUIRED.

** AUXILIARY RECEIVER MONITORS NETS OF HIGHER HEADQUARTERS.

Figure 8-2. Radio net, engineer construction support company.

nance for all organic equipment and limited direct support maintenance for organic engineer equipment.

b. Levels 2 and 3. See paragraph 2-4a.

c. Type B Unit. This unit is adaptable to a Type B organization. The capabilities of a Type B organization are the same as those of a full strength organization. The Type B column adapts the TOE of this unit to the lesser requirements for United States military personnel. Vacancies existing in the Type B column are indicative of the type of positions which can be filled by non-United States personnel. The number of non-United States personnel must be determined by the major commander to which the unit is assigned and will depend upon the capacity of available personnel to produce, number of shifts and other local conditions.

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

8-6. Employment

The engineer construction support company will be employed by the engineer group to increase the construction capabilities of organic battalions requiring coarse and fine aggregates for road and airfield construction and for concrete production, mixed bituminous materials for paving projects, and heavy equipment with operators for hauling, loading, grading, digging, and shoveling operations beyond the capabilities of the battalions. This unit will normally operate asphalt equipment in more than one location at the same time.

8-7. Major Items of Equipment

Major items of equipment include full-tracked medium tractors, rotary compressors, crane-shovels, ditching machines, piledrivers, pneumatic tool outfits, wheeled tractors, a general purpose repair shop, a contact equipment maintenance shop, an asphalt mixing and paving set, bituminous material tank distributor,

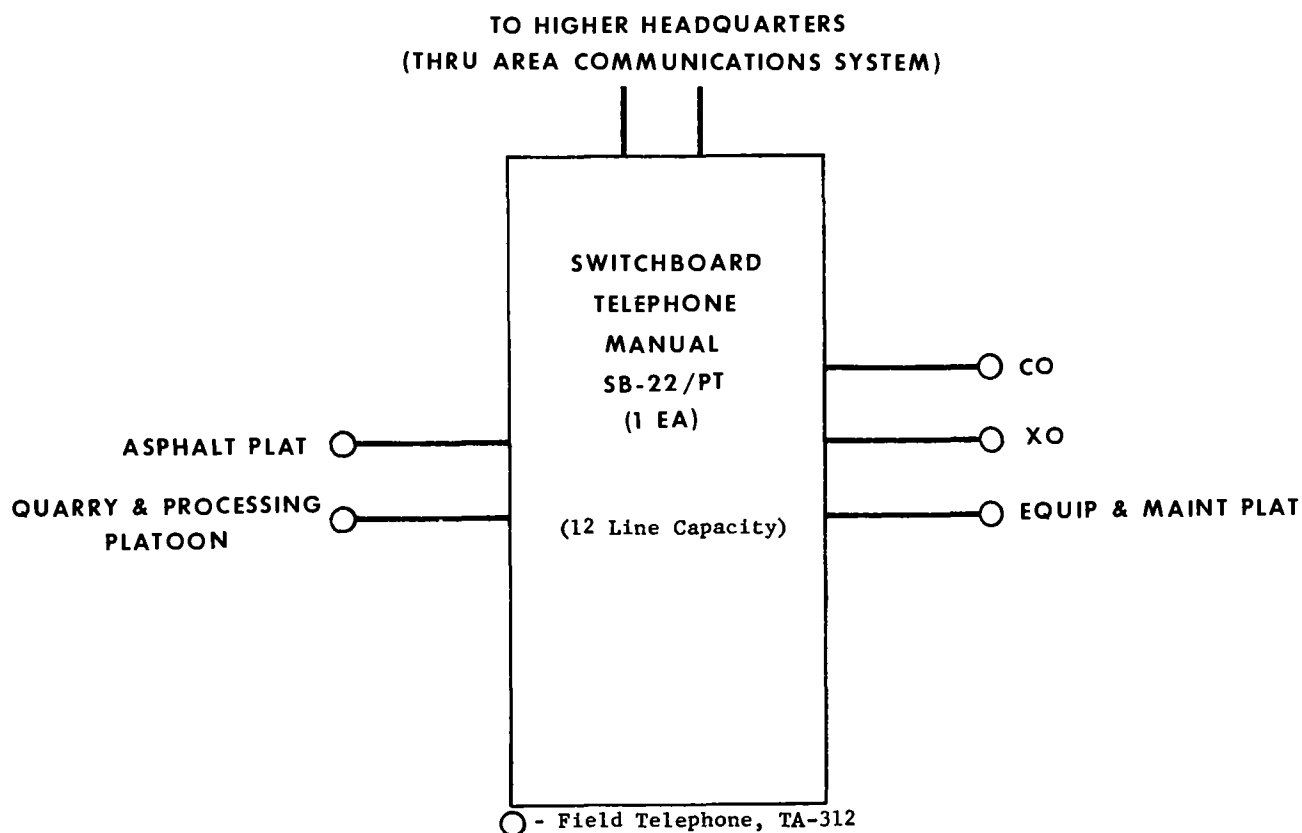


Figure 8-3. Wire net, engineer construction support company.

60-ton trailers, rollers, aggregate spreaders, rotary sweepers, generators, aggregate storage bins, a crushing and screening plant, a washing and screening plant, rock-drilling equipment, and dump trucks.

8-8. Mobility

The engineer construction support company is approximately 50 percent mobile with organic transportation.

8-9. Communications

The engineer construction support company has been provided with the minimum essential equipment required to permit internal radio and wire communications and to communicate with supported units and the next higher headquarters. Figure 8-2 shows the company radio net and figure 8-3 shows the company wire net.

CHAPTER 9

ENGINEER PIPELINE CONSTRUCTION SUPPORT COMPANY

9-1. Mission

The mission of the engineer pipeline construction support company is to provide technical personnel and specialized equipment to assist construction and combat engineer units in the construction, rehabilitation and maintenance (except organizational maintenance) of pipeline systems and to assist using units in specialized repairs.

9-2. Assignment

The engineer pipeline construction support company normally is assigned to the theater

army and attached to an engineer construction group. The engineer pipeline construction support company may also be attached to an engineer combat group.

9-3. Organization

The engineer pipeline construction support company consists of a company headquarters, a maintenance and support section, and three pipeline construction support platoons. It is organized under TOE 5-177 (fig. 9-1).

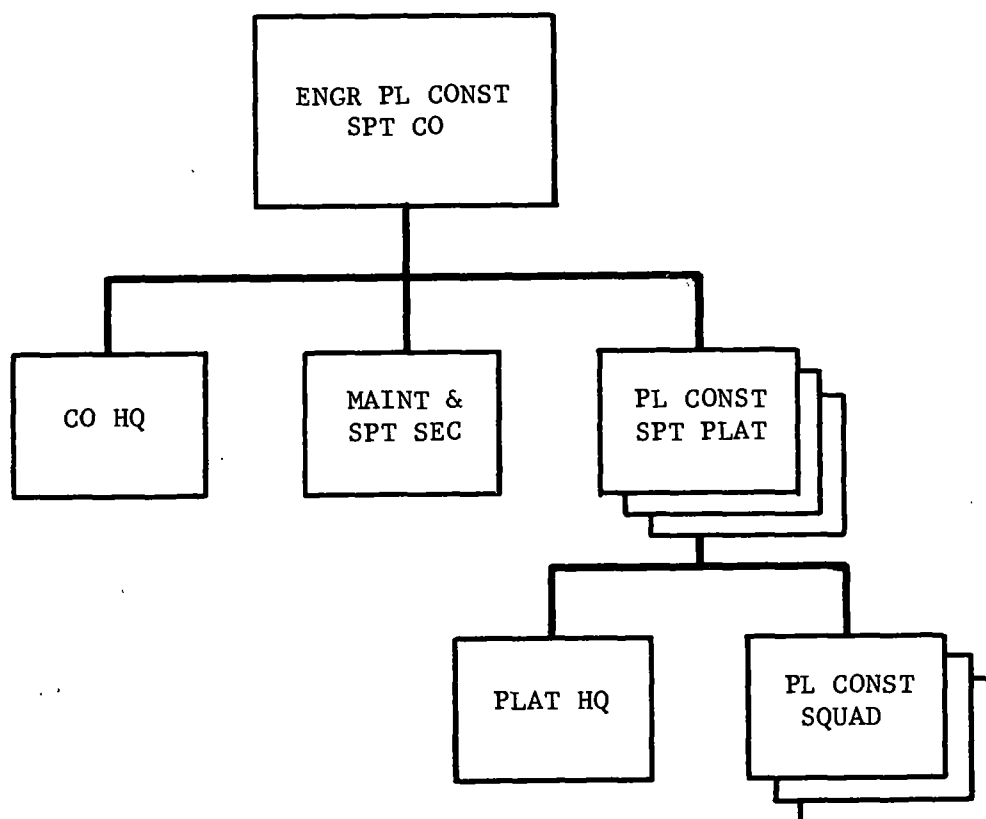
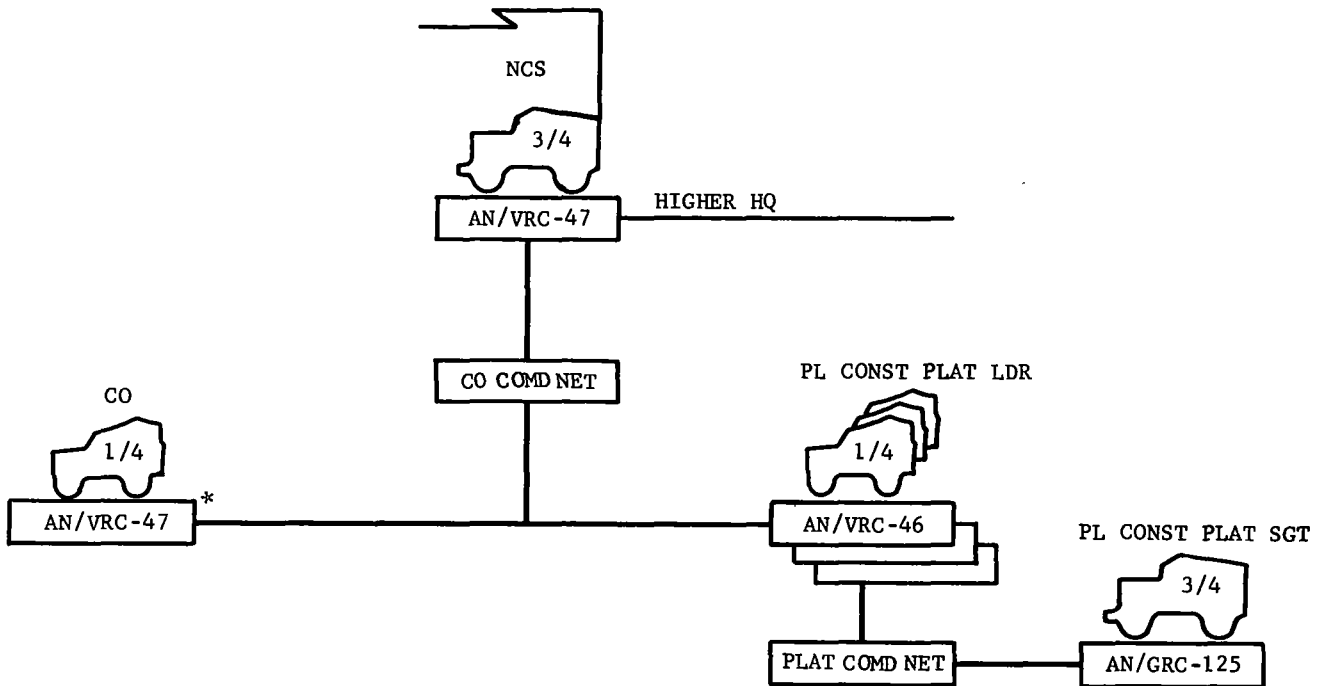


Figure 9-1. Organizational Charts, Engineer Pipeline Construction Support Company.



* AUXILIARY RECEIVER MONITORS BDE CMD NET

Figure 9-2. Radio net, engineer pipeline construction support company.

9-4. Duties and Functions

The duties of the company personnel may be found in AR 611-101 and AR 611-201. The functions of the company headquarters and other company elements are discussed briefly below.

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

b. Maintenance and Support Section. This section performs organizational maintenance of organic equipment and provides equipment and personnel to support the construction efforts of the pipeline construction support platoons.

c. Pipeline Construction Support Platoons. These platoons provide the necessary skills and specialized equipment to support the efforts of construction units engaged in the construction of petroleum pipeline systems and facilities.

9-5. Capabilities

a. Level 1. At Level 1 (full strength), this unit is capable of—

(1) Providing advisory personnel, specialized tools and equipment, on a two-shift basis, to three engineer companies engaged in pipeline construction for pipe-stringing, pipe-coupling, storage tank erection, and pump station and dispensing facility construction.

(2) To a limited degree, constructing and rehabilitation of pipeline systems, including the erection of storage tanks, when construction units are not available.

(3) Performing organizational maintenance on all organic equipment.

b. Levels 2 and 3. See paragraph 2-4a.

c. Type B Unit. The capabilities of a Type B organization are the same as those of a full strength organization. The Type B column adapts the TOE of this unit to the lesser requirements for United States military personnel. Vacancies existing in the Type B column

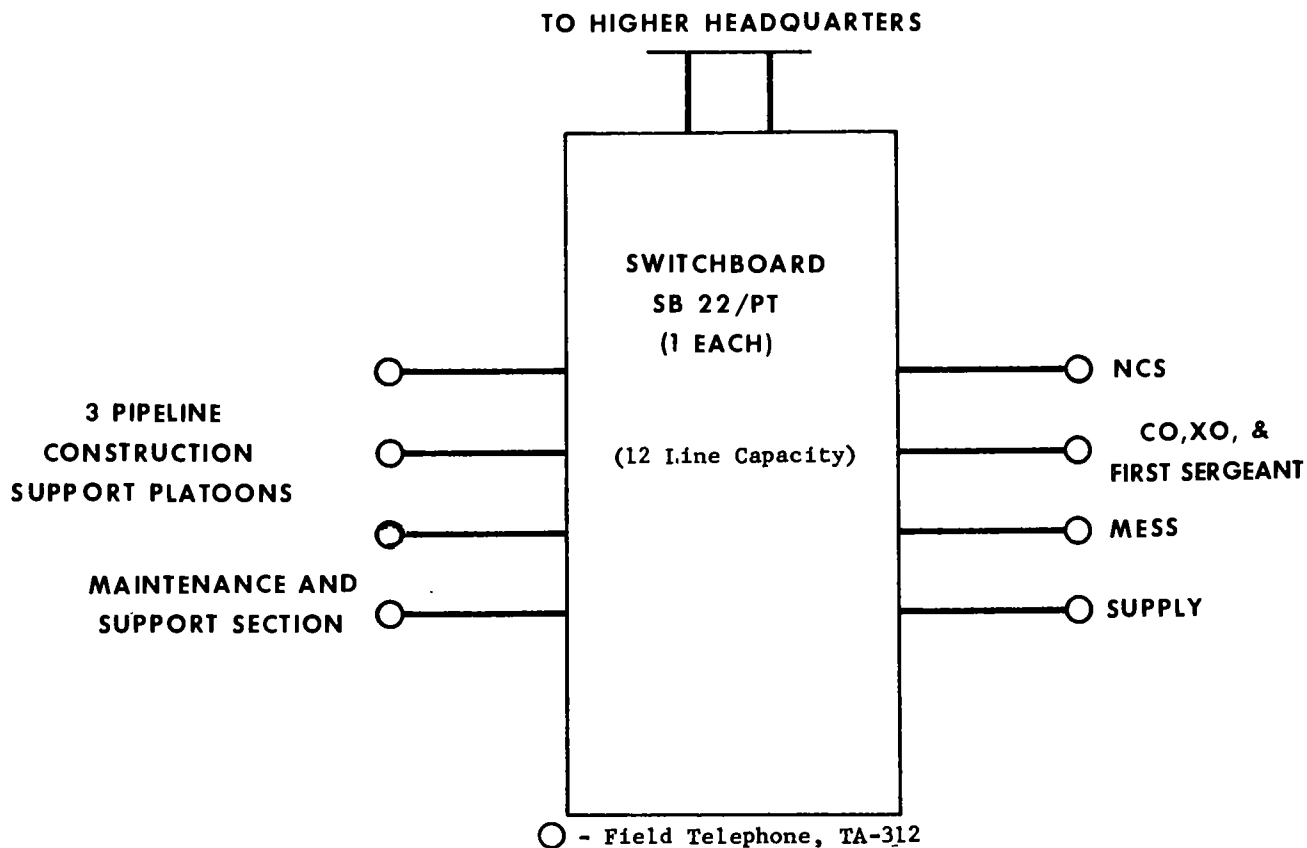


Figure 9-8. Wire net, engineer pipeline construction support company.

of the TOE are indicative of the types of position which can be filled by non-United States personnel. The number of non-United States personnel must be determined by the major commander to which the unit is assigned and will depend upon capacity of available personnel to produce, number of shifts and other local conditions.

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

9-6. Employment

The engineer pipeline construction support company supports the engineer construction battalion in all phases of petroleum pipeline and storage construction through its assigned technical personnel and specialized equipment. Whenever circumstances make it necessary, the engineer pipeline construction support

company is equipped to construct or repair pipelines at a reduced rate using only assigned company personnel. The pipeline construction support company may support combat engineer units in the combat zone on a mission type basis, when required.

9-7. Major Items of Equipment

The major items of equipment of an engineer pipeline construction support company include generators, a crane-shovel, a scoop loader, a pneumatic tool and compressor outfit, an organizational repair shop, a contact maintenance shop, a full-tracked medium tractor, erection outfits, and pipeline construction equipment sets.

9-8. Mobility

The engineer pipeline construction support company is 100 percent mobile when the pipe

transporters are utilized to transport the trailer-mounted welders and other impedimenta.

9-9. Communications

The engineer pipeline construction support company provides radio communication be-

tween higher headquarters and the company headquarters and between the company and its elements. It provides telephone communications between the company headquarters and its elements. Figure 9-2 shows the radio net and figure 9-3 shows the wire net.

CHAPTER 10

ENGINEER DUMP TRUCK COMPANY

10-1. Mission

The mission of the engineer dump truck company is to provide and operate dump trucks for the movement of bulk materials in support of other engineer units.

10-2. Assignment

The engineer dump truck company is assigned to the theater army, field army, or army corps. It is normally attached to an engineer construction group.

10-3. Organization

The engineer dump truck company consists of a company headquarters, a maintenance and service section, and two identical dump truck platoons. It is organized under TOE 5-124 (fig. 10-1).

10-4. Duties and Functions

The duties of the company personnel may be found in AR 611-101, AR 611-112, and AR 611-201. The functions of the company headquarters and other company elements are discussed briefly below.

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

b. Maintenance and Service Section. The maintenance and service section provides organizational maintenance for the organic vehicles and has the responsibility for refueling the dump trucks of the platoons.

c. Two Dump Truck Platoons. Each platoon is composed of a headquarters and three identical dump truck sections. These platoons are the operational elements of the company.

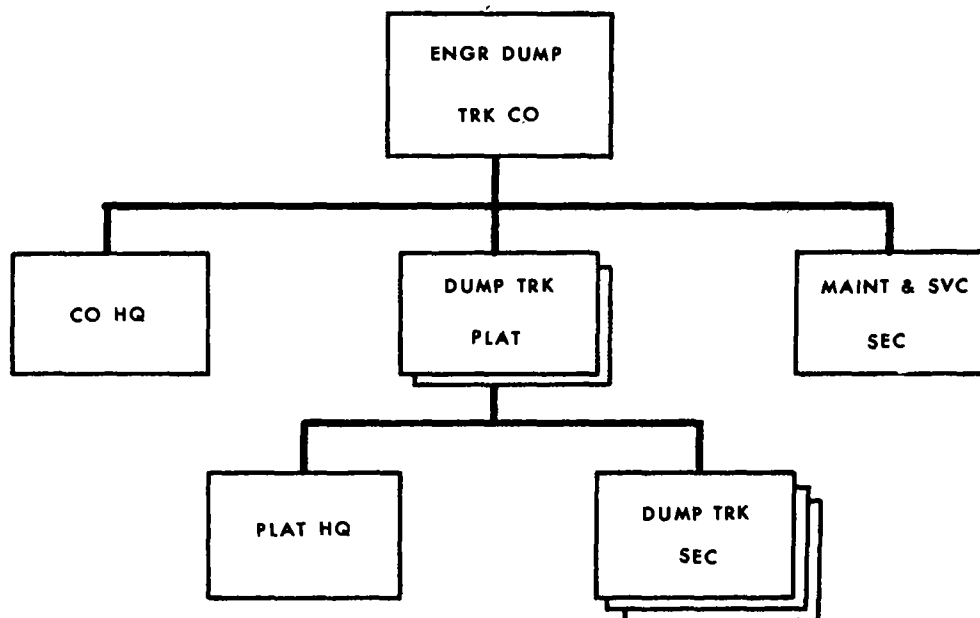


Figure 10-1. Organizational Chart, Engineer Dump Truck Company.

10-5. Capabilities

a. *Level 1.* At Level 1 (full strength), this unit is capable of moving 240 to 312 cubic yards of bulk material such as gravel, earth, or crushed stone, per trip. The amount of material that this unit can haul in one day depends on various factors such as weather conditions, distance of haul, type of haul route, type of material being hauled, loading-unloading facilities and the skill of the drivers.

b. *Levels 2 and 3.* See paragraph 2-4a.

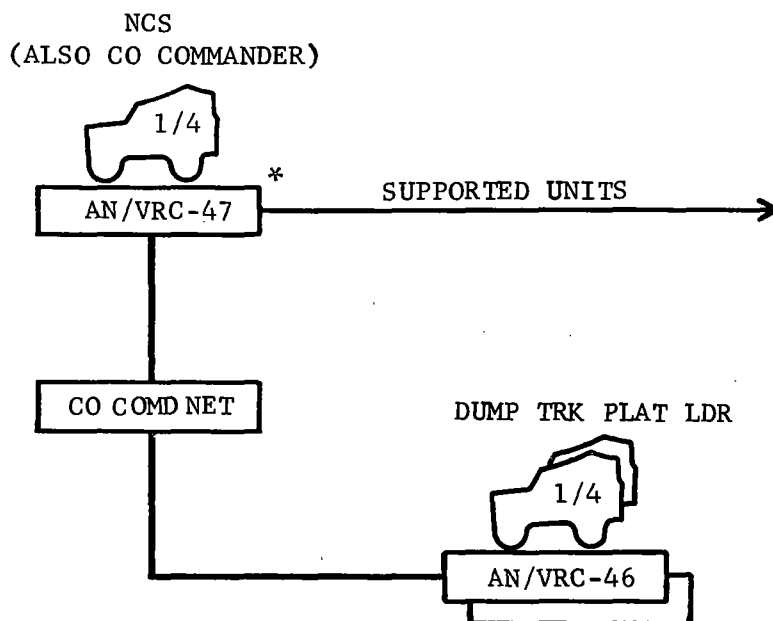
c. *Type B Unit.* This unit is adaptable to a Type B organization. The capabilities of a Type B organization are the same as those of a full strength organization. The Type B column adapts the TOE of this unit to the lesser requirements for United States military personnel. Vacancies existing in the Type B column are indicative of the type of positions which can be filled by non-United States personnel. The number of non-United States personnel must be determined by the major commander to which the unit is assigned and

will depend upon the capacity of available personnel to produce, number of shifts, and other local conditions.

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

10-6. Employment

a. The engineer dump truck company usually is attached to, or placed in support of, an engineer unit engaged in the construction or repair of roads, railroads, aircraft landing facilities, field fortifications, or other tasks requiring the movement of large quantities of bulk materials. The supported unit normally is responsible for loading the trucks. The support may be given by the entire dump truck company, by its platoons, or by sections of the platoons. When subunits are attached to another unit, company headquarters remains with the larger detachment at a central location to permit servicing of the equipment. If great distances are involved and subunits are



*NET CONTROL STATION OPERATES IN THE COMPANY NET, MONITORS THE HIGHER HEADQUARTERS NET AND ENTERS THE HIGHER HQ NET WHEN REQUIRED.

Figure 10-2. Radio net, Engineer Dump Truck Company.

separated from the company, a portion of the maintenance and service section may also be sent with the subunit to reinforce the maintenance capabilities of the supported unit. When vehicles and personnel are attached to another unit, that unit is responsible for the proper operation and maintenance of the vehicles. The company operates more effectively on mission-type assignments under the control of its own commander than by attachment of its subunits to the supported unit.

b. Employment of dump trucks should be based upon approximately 75 percent of the organic vehicles being available at a given time. This permits the company to schedule the required periodic maintenance inspections and minor repairs.

10-7. Major Items of Equipment

The major items of equipment of the engineer

dump truck company—in addition to its dump trucks—include a fuel servicing tank truck, a medium wrecker, a trailer-mounted arc welder, and organizational maintenance sets for vehicle maintenance.

10-8. Mobility

The dump truck company is one hundred percent mobile in organic transportation.

10-9. Communications

The dump truck company provides telephone communication between the company headquarters and the maintenance and service section, and between the company headquarters and each of the dump truck platoons. It provides radio communication between the higher headquarters, company headquarters, and the dump truck platoons. Figure 10-2 shows the radio net and figure 10-3 shows the wire net.

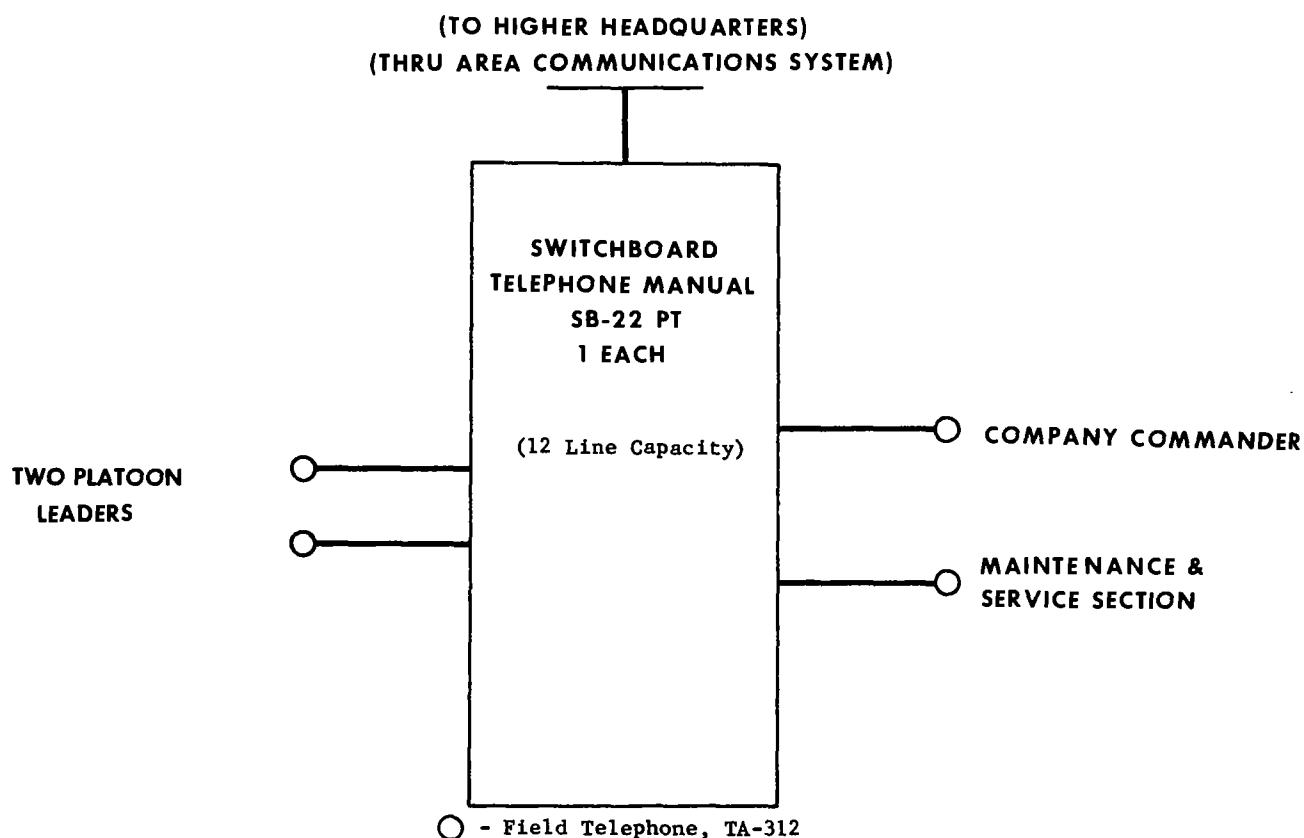


Figure 10-3. Wire net, Engineer Dump Truck Company.



CHAPTER 11

CONSTRUCTION PLANNING

11-1. General

a. Broad plans and policies for construction in the theater are established by the theater commander. They are based on coordinated planning by construction representatives of theater army, navy, and air force. The theater army commander establishes policies, standards, priorities, and scale of construction for his subordinate echelons, based upon recommendation of the engineer staff. In turn, the engineer staff furnishes supervision in the execution of theater army construction directives pertaining to all aspects of construction. The TASCOM commander is responsible for army construction throughout the communication zone. He exercises this responsibility through the commander of the engineer command. The field army commander is responsible for all construction in the combat zone. He exercises this responsibility through the army engineer brigade and through the corps engineer.

b. The orderly and rapid execution of an engineer construction mission depends upon thorough and careful planning. While a task is rarely completed without unforeseen difficulties and interruptions, careful planning allows for and reduces such problems, and insures the completion of the work in the allotted time with the allotted men, equipment, and materials. Based upon accurate information, the engineer commander should estimate carefully the requirements of the task and adapt his resources to those requirements. This involves visualizing the execution of the task from its conception to its completion, with all its phases and manifold ramifications, leaving no predictable factor unconsidered.

c. Operational planning is accomplished at the Engineer command, brigade and group level, with progressively more detailed plan-

ning occurring at the lower echelons by the individuals in direct charge of the project. When a battalion is employed as a unit on a single task, battalion planning is limited to the details necessary to insure that work assignments and equipment and material allocations are adequate, and that full use is made of the battalion's capabilities. Battalion planning considers the methods best suited for accomplishing the mission. It does not dictate all details to the subordinate commanders to whom the actual work is assigned—they must be left free to make their own plans within the limits of the overall plan. On a priority project, the subordinate commander is often asked to present his plan for approval.

d. Planning is not terminated with the completion of an initial plan for a particular mission or phase of operation. Rather it is a continuous process; for as operations progress, plans must be reviewed and revised as new developments arise or are anticipated. For further discussion on planning, see TM 5-330 and TM 5-331.

11-2. Responsibility

On a project of battalion-size or smaller, the battalion operations officer prepares plans for the accomplishment of the project to include the allocation of engineer troops and construction equipment to the various tasks in the project. Group headquarters sets up the requirements and may furnish typical drawings to illustrate the type of construction desired. The battalion is responsible for site adaptation of plans, field modifications, construction detailing, supervision, and management. Projects larger than battalion-size usually come under the jurisdiction of an engineer construction group, with the group headquarters' operations section doing the planning and as-

signment of the tasks and coordinating the attached units.

11-3. Construction Directives

The construction process starts with the receipt by a unit of a construction directive—an order to construct, rehabilitate, or maintain some facility. The directive assigns a certain task to the unit, and allows the unit commander to draw materials and any additional equipment he might need to accomplish the task. Group headquarters, based on general directives from the engineer command, brigade or higher headquarters, issues job directives or project orders to the unit responsible for the construction. If support from a construction-support company is required, that company will receive a directive or order specifying the particular support it will be required to provide. This directive contains the construction plans, designs, specifications, and standards with reference to army or theater standards, when appropriate. This data is prepared at Engineer Command, brigade or group headquarters. The construction battalions have a limited design capability, and unless augmented, do not have a capability for extensive design and planning. The directive may specify the job-site as a result of reconnaissance and planning by the headquarters issuing the directive, or it may require the construction unit to select several tentative sites, conduct reconnaissance, and submit the report on recommended sites for approval. Figure 11-1 shows a sample construction directive.

11-4. Reconnaissance

a. Construction reconnaissance is detailed. Road nets are sketched and overlays are prepared for use with existing maps. Special terrain features are noted which might influence the layout of the job site. Reconnaissance missions are assigned to individuals experienced in the type of construction involved and who know just what information, unique to the particular project, is necessary. They must be able to recognize the relative importance of all the various factors. It is often desirable, if possible and if applicable, for the commander of the unit for which the completed construc-

tion is intended to accompany the reconnaissance party.

b. Often, a study of local methods and materials will yield valuable information, as they have been developed through the years to meet local conditions. An inspection of local road construction might disclose data on drainage or subgrade which would be helpful in locating and designing new roads, airfields, railroads, and buildings. Existing road surfacing and buildings may indicate that a local material, while unusual and not prescribed by Army manuals, is adaptable to the construction being planned. It is wise to use the local construction methods when using native materials, as these methods have been developed to meet the limitations and strength factors of native materials.

c. A checklist is helpful in insuring that all requirements are met and might include such items as the following:

- (1) Is the area large enough for the facility planned?
- (2) What existing transportation facilities are there?
- (3) What type of terrain exists?
- (4) What are the soil conditions?
- (5) What natural concealment and cover exists?
- (6) What are the existing facilities, and are local building resources available?
- (7) Will expansion be possible?
- (8) What sewage disposal is necessary?
- (9) What electrical power exists?
- (10) What will water supply entail?
- (11) What is the proximity of other military installations?

d. The operations and intelligence section of the construction battalion studies the plan and surveys the proposed site. From the reconnaissance reports, it determines the road and rail nets within and adjacent to the site, grades of roads or areas, and the location of all structures and facilities. It determines storm water and surface water drainage requirements, including ditching and culverts, and what utilities will be required. It prepares detailed site plans, indicating the roads, railroad sidings, building grades, contours, drainage, utilities and all other information pertinent to the

HEADQUARTERS
35th Engineer Group (Construction)
APO US Forces

10 September 1968

SUBJECT: Construction Directive No. 45

CO, 577th Engineer Battalion (Construction)

1. Scope: You are directed to construct a 3,000-man cantonment, standard 4 construction, in accordance with attached drawings and TM 5-302.
2. Priority: 1.
3. Location: Vicinity Big Buildup CQ 830295.
4. Real Estate: Release of real estate has been obtained by this headquarters effective 15 September 1968.
5. Attachments: By separate directive, the 513th Engineer Company (DT) has been directed to provide one dump truck platoon, with operators and maintenance personnel, to support two-shift-per-day operations. Attachment is effective 150800 September 1968 and terminates 100800 October 1968 unless sooner released.
6. Schedule: Work may commence not earlier than 150800 September 1968 and must be completed not later than 20 November 1968.
7. Construction Supplies: Class IV supplies will be requisitioned from HAVITT Depot CQ 8444432 in accordance with established procedures.
8. Coordination: Direct coordination is authorized with CO, 8 Inf Bde to establish local priorities within the overall project.
9. Administration:
 - a. Progress Reports: Submitted weekly per SOP this HQ.
 - b. Construction Schedule: Submitted NLT 20 September 1968.

FOR THE COMMANDER:

2 Incl
1. Layout
2. Std Drawings

L. A. JACKSON
MAJ S-3

Figure 11-1. Sample construction directive.

1	2	3	4
WORK ITEM	UNIT OF MEASUREMENT	QUANTITY	REMARKS
1 Clearing and grubbing; Trees, Stumps and boulders	Acre	—	Actual area does not include bare spots
2 Stripping: Light Stripping, Heavy Stripping, Hauling	Acre Cu. Yd. Feet		Average haul distance Average haul distance
3 Ditching and diking Deep	Cu. Yd.		If not uniform or involves large quantities
Shallow	lin. Ft.		If uniform or involves small quantities
4 Earthwork Excavation	Cu. Yd.		Measure in place before removal
Structure Excavation	Cu. Yd.		do
Hauling	Feet		Center of cut in mass to Center of cut in fill
Spreading and Compacting	Cu. Yd.		Spreaded and compacted in layers of specified thickness

Figure 11-2. Sample work sheet for work items and materials quantities.

project. The referenced army or theater standard plans in the job directive are modified as required.

e. If a structure is to be rehabilitated, it is checked for structural stability. Measurements are taken and records and drawings are made of existing conditions. New drawings are then made showing the special details for rehabilitation. For further discussion on engineer reconnaissance, see FM 5-36 and TM 5-330.

11-5. Analyzing and Estimating Job Requirements

The job itself must be carefully analyzed and the requirements of men, materials, and equipment must be closely estimated. This analysis and estimation involves the preparation of:

a. Quantity surveys of work items and materials, based upon designs and field surveys (fig. 11-2).

b. The work estimate sheet listing all work items, aids, and field tests requiring equipment

and labor; the dates of completion, quantities and output of each piece of equipment, and the manpower required to accomplish the task (fig. 11-3).

c. Equipment requirement schedules which list each piece of equipment, the task it is to perform, and the time period it will be in use (fig. 11-4). For further discussion on equipment scheduling, see TM 5-333.

d. Labor requirement schedule for scheduling work items and the number of man-days required for each task. For larger jobs, this may be expanded to show the required men per task, per day, week, or month (fig. 11-5).

e. Materials requirement schedules which list all materials by type, total quantity of each type, and the amount of each type required each day (fig. 11-6).

11-6. Job-Site Layout

a. Job-site layout for the construction operation is essential and should be so planned as to result in a smooth flow of equipment and

Project or Sub-Project Description <u>4700 FOOT AIRSTRIP CLEARED TO 250 FOOT</u> <u>WIDTH PLUS 100 FOOT AISLE EACH SIDE FOR</u> <u>WASTE MATERIAL MINIMUM OPERATION</u>										
Sheet prepared by <u>L.M.W.</u> Project Starting Date <u>6 JUNE</u> Completion Date <u>25 JUNE</u>										
WORK OPERATION			EQUIPMENT ESTIMATE (Based on 2-10hr. shifts each day)					LABOR ESTIMATE (Excluding supervisors and equipment operators)		
No	Description	Quantity	Machine	Estimated hourly Output	Required Machine hours	Number of Machines assigned	Total days Machines assigned	Required Man-hours	No of men assigned each shift	Total days Men assigned
1	CLEARING AND GRUBBING (HEAVY)	48 ACRES	TRACTOR D7 W/ DOZER	0.25 ACRES	192	3	4	480	6	4
2	STRIPPING 6 TO 18 IN DEEP	43,520 CU. YD.	TRACTOR (D7) W/ DOZER TRACTOR (D7) W/ SCRAPER GRADER MOTORIZED	50 CU. YD. 85 CU. YD. 120	322 322 120	2 2 1	8 8 6	NONE		
3	DRAINAGE (SEE P. 6 DETAILS)	(SEE P. 6 DETAILS)	TRACTOR (D7) W/ DOZER POWER SHOVEL 3/4 CU. YD. DUMP TRUCK	(SEE P. 6 FOR DETAILS)	120 36 140	1 1 4	6 2 2	1320	6	11
4	EXCAVATION DOZER & SCRAPER	65,600 CU. YD.	TRACTOR (D7) W/ DOZER TRACTOR (D8) W/ 12 CU. YD. SCRAPER	50 CU. YD. 85 CU. YD.	340 572	2 5	9 6	200	1	10

Figure 11-3. Sample work estimate sheet.

Project No. <u>5</u> Chart No. <u>5</u> Date <u>25 AUG 1968</u>																	
WORK ITEM	NUMBER OF LABORERS REQUIRED																
	MONTH <u>SEPTEMBER</u>							YEAR <u>1968</u>							TOTAL MAN DAYS		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14		15	16
CLEARING AND GRUBBING	-	-	12	12	12	12	-										48
STRIPPING	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DRAINAGE	-	-	12	12	12	12	12	2	-	-	-	-	-	-	-	-	132
EXCAVATION	-	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	20
SPREADING AND COMPACTING	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FINE GRADING								10									60

TOTAL	-	-	24	24	24	24	12	12									260
Additional remarks: <u>NONE:</u>																	
Signature <u>J. G. Smith</u> <u>1st Lt, CE</u>																	

Figure 11-5. Sample labor requirement schedule.

		PROJECT NO. <u>7</u> CHART NO. <u>6</u> DATE <u>27 JULY 1968</u>												
MATERIEL	TOTAL QUANTITY	DAILY REQUIREMENTS FOR <u>AUG</u> (MONTH)												
		1	2	3	4	5	6	7	8	9	10	11	12	13
CONCRETE														
CEMENT	(1,000 CU. YDS.) 6000 SACKS	300	300	400	400	400	400	400				600	600	
FINE AGGREGATE	500 CU. YDS.	25	25	40	40	40	40	40				50	50	
COURSE AGGREGATE	750 CU. YDS.	40	40	60	60	60	60	60				75	75	
WATER														
MIX	32 (1,000 GAL)	2	2	2	2	2	2	2				3	3	
CURING	100 (1,000 GAL)		1	2	3	4	4	4				4	4	
SURFACE TREATMENT														
MC-1 (PERMANENT)	70 TONS			10	10	10	10	10	10					
MC-3 (BINDER COAT)	100 TONS											10	10	
MC-3 (SEAL COAT)	70 TONS													
AGGREGATE (BINDER COAT)	800 YDS.											8	8	
AGGREGATE (SEAL COAT)	420 CU. YDS.													
COMMENTS: <i>None</i>														

SIGNATURE H.H. 77/Action
Capt. G2

Figure 11-6. Sample materials requirement schedule.

11-8. Supervision

a. Staff officers should advise subordinate unit commanders of the plans and policies prescribed by higher headquarters and should assist unit commanders in their implementation. Staff officers also determine the extent to which the plans and policies are being followed and advise the commander(s) thereof.

b. Progress reports are made to measure the work accomplished on a project. Examination of these progress reports:

(1) Reveals if the work is being performed at the estimated rate.

(2) Indicates possible necessity for adjustment of equipment on manpower.

(3) Establishes a valuable basis for estimating future construction projects of a similar nature.

c. Personal inspections should be concerned with such basic questions as: Are the approved plans and specifications being followed, and is the most efficient use being made of labor and equipment? Checklists aid in conducting thorough inspections. It is important that construction operation schedules be studied to determine if they are up-to-date and accurate, as progress reporting on the construction schedules insures adequate distribution of men, materials, and equipment to the various phases of work and provides a means of determining when and where critical construction materials are required. Requirements must be foreseen and planned well in advance if construction is not to be delayed because of shortages of labor and materials.

d. Inspection should determine if the proper

construction methods and equipment procedures are being used. In some instances, unbalanced situations may be noted such as a deficiency in excavating capacity in one area or an excess in another area. Thorough inspection determines if construction requirements of the project and the construction capabilities of the unit are in balance, and what, if any, additional equipment is needed. If additional equipment is required, the group S-3 should be requested to obtain it from other sources.

e. Comparisons should be made between the various working elements for the purpose of increasing the output of the less efficient. Inspection determines whether the officers and men have been properly trained for their work and if they know of, and have access to, training and technical references concerning the construction in which they are engaged. Inspection determines if personnel are assigned to jobs for which they are mentally and physically adapted.

11-9. Other Management Systems

There are many other management systems. Chief among these is Program Evaluation and Review Technique (PERT). PERT is similar to CPM, but incorporates mathematical probability in predicting project completion times.

It is used in situations where a degree of uncertainty exists as to the amount of time required to complete specific activities of the project. PERT finds most use in research and development, but can be used in construction planning, especially where a constructing unit has had little experience with the task they are to undertake, or where important variables such as weather extremes are involved.

11-10. Use of Engineer Functional Components System (EFCS)

The Engineer Functional Components System provides standards of construction, phases, standard plans, bills of materials, equipment and unit augmentation, and general guidelines for the construction effort required for given facilities. It thus relieves the construction units of much of the task of preparing drawings, specifications, and bills of materials. In addition, the system is so designed as to be adaptable to automatic data processing (app B) in determining the overall requirements for the engineer support of military operations in any given theater of operations. This includes requisitioning, shipping, and maintaining balanced stocks of material, equipment, and units. The system is developed in three technical manuals, TM 5-301, TM 5-302, and TM 5-303.



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CHAPTER 12

OPERATIONS

Section I. ASSIGNMENT AND EMPLOYMENT OF UNITS

12-1. General

a. The principles of chain of command and integrity of units are adhered to at all levels of command when missions are assigned to subordinate units. Group and battalion missions usually give the commander greater latitude than the battalion commander gives to his subordinate company commanders. Area assignments are common, and assignment of numerous small tasks should be avoided whenever an area or general mission assignment will do. If several small tasks must be assigned, they should all be included under one project directive.

b. When making assignments, the integrity of the elements receiving the assignments must be maintained. The assignment should be within the capabilities of the operating element reinforced, if necessary, by elements from separate companies of the group.

12-2. Types of Assignments

There are three types of work assignment—area, task, and a combination of the two—area-task.

a. *Area Assignment.* In an area assignment, a specific area is assigned to a unit. The unit then becomes responsible for all construction, rehabilitation, and maintenance within that area. Priorities of construction work tasks may be specified in this type of assignment.

b. *Task Assignment.* A task assignment designates a unit for a specific construction project. If more than one unit is required, the headquarters issuing this assignment acts as the control agency and divides the projects into tasks. Units on a task assignment are kept intact. The task is adapted to the capability of the unit.

c. *Area-Task Assignment.* The combination assignment occurs when a unit is given an area assignment, and, in addition, a task assignment in some other unit's area. As an example, a construction unit having an area responsibility might, in addition, be given a task assignment of constructing a bridge, extending a pipeline, or maintaining a main supply route in some other unit's area of responsibility. This type of assignment allows for the maintenance of the principle of unit integrity. It also allows for a more stable engineer command structure even under changing engineer workload conditions.

12-3. Control of Assignments

Engineer Command, Brigade and group headquarters are responsible for operational planning, coordinating, and supervising all missions assigned. They determine the type of assignment a particular project requires and designate the separate companies or special engineer teams to support the construction battalion for the expeditious accomplishment of the mission. Operation can be in one or two ways—centralized control, or decentralized control—the choice depending upon the time element and the availability of materials.

a. *Centralized Control.* Centralized control requires the controlling headquarters to be responsible for all planning, design, bills of materials, and arrangements for transportation. The battalions are the operating line units. In addition to construction tasks, they accomplish job planning and field modification design for their particular tasks. The battalions accept requests only from the responsible headquarters and make no changes in the original directives. Examples of construction

projects requiring such centralized control are a major initial rehabilitation of a port, or the initial reconstruction of railroad and highway bridges on an expedited basis but with only limited materials available.

b. Decentralized Control. Under decentralized control, the construction battalions become the planning, designing, coordinating, and close supervising headquarters. Decentralized control requires that the battalions be augmented with plans personnel, as engineer command, brigade and group perform only the

preliminary steps and leaving the details to the battalions. Within limits, the battalions have approval authority for acceptance of work requests as long as the basic working plans are not disrupted. Decentralization can also be extended to company level where a smaller but similar operation is involved. Lower decentralization does not normally occur, as the company is the lowest echelon having administrative, mess, maintenance, and supply capabilities.

Section II. TACTICAL OPERATIONS (STANAG 2079)

12-4. General

Although the primary mission of engineer construction and construction-support units is to construct, rehabilitate, and maintain routes of communications and related facilities, these units must always be ready to defend themselves; must maintain close-in security on the march, in bivouac, and on the job; and must be prepared to participate in rear area security and rear area damage control, and, within the limits of their equipment and training, be prepared to support offensive and defensive operations. In addition, they must be prepared to support indigenous military and paramilitary forces of U.S. Army units in the conduct of stability operations.

12-5. Offensive Operations

Engineer construction and construction-support units may be used to support an offensive operation by moving into the field army service area of a combat zone to assume responsibilities for the repair and maintenance of routes of communication—responsibilities that are normally assigned to the nondivisional engineer combat units. This permits the nondivisional engineer units to move forward and provide close support to the attacking forces. The primary task of construction and construction-support units when so employed is, to repair and maintain the routes of communication—to include air lines of communication—within the field army service area,

keeping them open and passable for the supplies and combat troops moving forward.

12-6. Defensive Operations

a. During a defensive operation, engineer construction units conduct reconnaissance; repair, maintain, and improve routes for supply and evacuation; assist in the organization of the ground; construct command posts, observation posts, emplacement, and obstacles; and assist in flank and rear area security.

b. In the event of a speedy withdrawal or enemy breakthrough, the haste with which the engineer work is performed is increased, with emphasis upon assistance in the movement of the retiring columns and delay of the enemy by the destruction of bridges, railways and roads, and the construction of barriers. For a discussion on the demolition of routes of communication and military facilities, see FM 5-25 and FM 55-21.

c. Denial operations are planned and executed as part of the theater operation plan. They are set forth in a special denial plan annex to the operations plan (FM 31-10). Engineer construction battalion commanders normally are given denial responsibility for their own supplies, materials, and equipment, and must remove them to the rear or destroy them. Sometimes a battalion commander may be given an area responsibility and be involved in denying both military and civilian materials and equipment within that area and must remove them to the rear or destroy them.

Denial operations involve the destruction or removal, as applicable, of military equipment and installations, military supplies, routes of communication facilities, signal communication facilities, utilities, industrial plants, fuels, food, motor transportation, raw materials, ships and port facilities, building structures, and locks and dams.

12-7. Stability Operations

a. Stability operations is defined as that type of internal defense and internal development operations and assistance provided by the Armed Forces to maintain, restore, or establish a climate of order within which responsible government can function effectively and without which progress cannot be achieved.

b. Engineer advisors, teams or units may be required to support stability operation in a host country at all levels of intensity of subversive operation. U.S. Army engineer forces initially committed probably will be special units formed from Team KB Engineer Control, and Team KC, Engineer Advisory, taken from the TOE 5-500-series. In more advanced stages of stability operations, engineer construction and construction-support units may have to be deployed in support of a host country's struggle against insurgency. These engineer construction and construction-support units not only will be concerned with their primary mission of construction, rehabilitation, and maintenance of routes of communication, but may also be required to provide training and advice to host country engineer forces. Engineer support must be closely coordinated with other U.S. agencies to insure efficient programing. Coordination and free exchange of ideas with the local civil authorities is of equal importance. Whenever possible, projects should be set up as joint enterprises between indigenous military and civil forces. In many situations, engineer functions will involve pioneer task accomplished with local materials and limited equipment. Improvisations and the use of field expedients will be the rule rather than the exception.

c. Military civic action provides the engineer commander with a method to improve

his civil military relationships, and strengthen the socioeconomic posture of the area. Through civic actions, the military forces are able to reduce sources of civilian discontent and add materially to political stability and security. Engineer units have the capability of participating in civic action projects; first, through planning and technical assistance to local government agencies, and second, through provision of additional resources in the development of their civic action project. The following list is considered representative of engineer tasks in support of civic action.

(1) Construction of simple irrigation and drainage systems.

(2) Reclamation of land by clearing and draining swamps.

(3) Grading operations.

(4) Forestry activities such as planting, thinning, and reforestation.

(5) Setting up and operating saw mills.

(6) Devising and constructing flood controls.

(7) Assessment and development of acceptable sand and gravel resources for road work and general construction.

(8) Construction of housing and other buildings.

(9) Construction, repair, or improvement of roads, bridges, railway equipment, and airfields.

(10) Improvement of sanitary conditions.

(11) Providing safe water supply systems.

(12) Preparation of necessary maps and charts as required for planning road, railroad, and airfield projects; irrigation and land development; political subdivisions and geographical features; and land use.

(13) Construction, repair and operation of utility systems.

d. For a more detailed discussion of stability operations, see FM 31-23 and FM 100-20.

12-8. Security

a. Security encompasses all the measures—active and passive—taken by a command to protect itself from surprise attack, observation, and annoyance by the enemy. All engineer commanders are responsible for the security of their own commands—to the degree

determined by the enemy situation, the terrain, positions of friendly troops, mission of the command, and—most important—the security measures taken by a higher command. The provision of absolute security for an engineer construction unit is impracticable. Absolute security would require all members to engage actively in a security mission, which would make it impossible for the unit to accomplish any other mission. Rather, the engineer commander adopts sound and reasonable measures and determines the size of the security detachment accordingly.

b. Construction operations are extremely vulnerable to guerrilla activities. The destruction of communication means is common; and materials, installations, and sources of raw materials are often targets of guerrilla sabotage. Units must have security at work sites as well as during any temporary halt. Perimeter protection provides this security and can be had by a unit using its own troops or by arranging for the provision of security forces from adjacent units. At times arrangements can be made for the using units to provide job site security for the constructing unit during a project.

c. During movement, an engineer commander has various methods of providing the necessary march security; the choice will be dictated by the situation. There is usually a frontal security force, an advance guard, and security forces to the rear and on the flanks. Single vehicles and convoys that cannot provide their own security are grouped and escorted through danger areas by armed security detachments which have been organized by the area commands and consist of elements of armor, infantry, and combat engineers. The convoy then operates as outlined in FM 31-22.

12-9. Rear Area Protection

a. The commanders of armies and theater army logistical commands are responsible for the general protection of their respective areas. They establish rear area control centers with appointed controllers. Depending upon the size and organization of these areas, subarea control centers and subarea controllers may also be established. These centers are responsible

for assisting in the planning and for organizing supervising, and conducting rear area security and area damage control within their respective areas. The concept of rear area security and area damage control is essentially that of taking reventive measures, and—failing that—of mutual support among the various areas, installations, and units. Planning anticipates disastrous damage to each element in the area and designates the source of recuperative assistance to each element.

b. Rear area security forces consist of military forces located in the rear areas. They include the permanently or semipermanently located combat support and combat service support units; combat units stationed in the rear area for defense of that area; combat units in transit, in reserve, and in rest areas; air defense units; personnel replacements; and Air Force and Naval forces. The limited number of combat units available for rear area security is held under a centralized control to provide a mobile reserve and patrol; these units are not used to garrison static defensive positions or to protect installations. This falls to the service-support units and administrative units which are trained in infantry, weapons and tactics; by practice alerts; and by tactical exercises.

c. Rear area damage control forces consist of heavy rescue teams furnished by engineer construction and construction-support units and ordnance maintenance units. The number of teams depends upon the rear area damage control plan. The size of these teams varies with the size of the disaster. The basic unit is the organic squad equipped with squad tools, air compressors, bulldozers, and a crane or heavy wrecker. From the squad, the team can be increased to platoon, company, battalion, or even larger size, if the situation is critical enough to warrant such increase. These teams enter the disaster area and move heavy loads, clear routes of communication of rubble and debris, fight fires, salvage equipment, and rescue personnel. Light rescue teams are organized as company-size units, except medical units and those units furnishing heavy rescue teams. These teams also use the squad as a basis. They rescue personnel and equipment when such rescue does not require the use of heavy

equipment. Labor teams of squad size are furnished by all company-size units. These teams perform tasks which do not require special training or equipment. Decontamination teams are also organized as company-size units and perform decontamination activities within a prescribed area.

d. The use of either tactical or service troops in a manner which detracts from their ability to perform their primary mission is a command decision. Engineer units with rear area damage control missions, prescribed under approved rear area damage control plans, continue to operate under their engineer commander. Upon implementation of the plan, those portions of the engineer units with rear area damage control missions are directed and supervised by the rear area security controller or subarea controller.

e. For further discussion on rear area protection, see FM 19-45-1 (Test).

12-10. Defense Against Air Attack

Defensive measures by engineer units consist principally of developing a passive and active air defense.

a. Passive air defense is directed toward the protection of personnel and equipment by training personnel in aircraft recognition; digging shelters for personnel near working areas and bivouacs; dispersing vehicles and equipment; concealing bivouacs and working areas; providing an effective warning system.

b. Active air defense is limited to engaging low flying hostile aircraft with small arms fire. The low altitude air threat which may face the engineer units may be partially countered by aggressive use of large volume of fire which unit (non-air defense) weapons can place against this threat. Large volumes

of fire from non-air defense weapons have proven capable of destroying both high and low speed aircraft or disrupting their attack. Use of unit weapons in this role must be balanced against the requirement to prevent disclosure of position, and premature expenditure of ammunition. Engineer units standing operating procedures should cover, but not be limited to, the following items relevant to engagement of aircraft with non-air defense weapons:

(1) *Applicability.* Operators of designated weapons.

(2) *Relation to primary mission.* Primary mission is never prejudiced.

(3) *Relation to passive air defense.* The necessity for aggressively engaging hostile aircraft is balanced with the requirement to place in proper perspective the tactic of withholding fire to preclude disclosure of position.

(4) *Authority to engage.* Authority to engage attacking aircraft delegated to individual weapons operators and to engage all other hostile aircraft on orders through unit chain of command, subject to the rule for engagement and rules for withholding fire.

(5) *Rule for engagement.* Normally self-defense only against all attacking aircraft and those positively identified enemy aircraft which pose a threat to the unit.

(6) *Rules for withholding fire.* When ordered. When not positive that aircraft are actually attacking or otherwise hostile. When friendly aircraft or troops are endangered.

(7) *Firing techniques.* Lead and super-elevation. Massed fire. Maximum rate of fire. Maximum use of tracer ammunition.

(8) *Unit training requirements.* Motivation and discipline. Gunnery. Aircraft recognition.

Section III. ENVIRONMENTAL CONSIDERATIONS

12-11. General

Operations in desert areas, northern areas, mountain regions, jungles, and forests make it necessary for an engineer commander to deviate from standard operating techniques. Certain environments require specialized items of

equipment or material. Other environments require modification kits to adapt standard items for operations in the locale. For example, operations in the arctic require special arctic clothing and equipment for personnel, special vehicles for operations on ice and snow, and

special materials such as high-early cement, special paints, and arctic lubricants. Construction techniques and styles also vary to a great degree because of differences in soil and climate. Each special environment requires study by commanders and their staffs. This study would include a review of the physical characteristics of the area, the special equipment needed, and the variance of construction techniques from the normal. This manual contains no discussion of special operations; rather, it refers the reader to specific field and technical manuals.

12-12. References

For a general discussion of special environmental considerations see FM 5-1 and FM 100-5. For specific and detailed discussions, see FM 31-25 for desert operations; FM 31-30 for jungle operations; FM 31-70 and FM 31-71 for cold weather and northern operations; FM 31-72 for mountain operations; and FM 21-40 for CBR operations.

Section IV. LOGISTICS (SOLOG 125)

12-13. Supply

a. Supply for a unit involves determination of requirements, and their requisitioning, receipt, and distribution. All commanders are responsible for insuring that the determination of requirements is economical and reflects only actual needs for efficient unit operation and maintenance; that the supplies are requisitioned and received; that they are properly safeguarded; and that they are distributed to the proper units, at the proper time, in the proper amounts and condition, and in accordance with established priorities.

b. Equipment and supplies to be carried by individuals and units are authorized by unit's TOE's and in directives from the commanders. As these supplies are expended, they are replenished from the supply facilities in the communication zone and the army area.

12-14. Request for Supplies and Equipment

a. Engineer units operating in the COMMZ receive direct support supply and services (less medical and ammunition) from ASCOM or its subordinate units. Direct support medical supply and services are provided by the Medical Command, TASCOM, while direct support ammunition supply and services are provided by the Ammunition Group, Supply, and Maintenance Command, TASCOM, Request to the appropriate subordinate units of

these commands are prepared and submitted in accordance with instructions from higher headquarters and the unit SOP and schedules are established by the supply officers. They contain enough information to identify the requesting and supplying elements and to indicate exactly what is needed and the quantities required. The battalion S-4 prepares the requests based on the informal requests submitted by the subordinate units. Separate companies prepare and submit their requests directly to the proper supply point or depot.

b. The supply officers of the engineer command, brigade and group are not in the supply channel. They, however, aid the battalions and separate companies in obtaining any unusual or critical items of supply or equipment.

12-15. Distribution

Supplies are issued to units by either supply point distribution or unit distribution.

a. In supply point distribution, the receiving unit draws its supplies at a supply point, depot railhead or truckhead. The receiving unit uses its own transportation to move the supplies to its area.

b. In unit distribution, the issuing agency transports the supplies to the user.

c. *Distribution of Supplies to Units.*

(1) *Class I Supplies (Subsistence)*

(a) Engineer units transmit a unit

strength report to their supporting supply point. A formal ration request is not required.

(b) Rations are delivered to the supported unit by the supply and service company operating the Class I supply point.

(2) *Class II Supplies (Clothing, tool sets, individual equipment, administrative)*

(a) Engineer units submit requests for Class II supplies to supporting direct support supply and service units using single line item request forms as prescribed by AR 735-35.

(b) Requisitions for regulated and command controlled items are processed through command channels. Requests are submitted through intermediate commands to the approving commander. Following approval, the appropriate stock control agency issues shipping instructions to the storing general support unit which makes shipments directly to the user.

(3) *Class III Supplies (POL)*

(a) Engineer units transmit forecasts of requirements and informal requests for delivery to supporting direct support supply and service units.

(b) Delivery may be made to the engineer unit by tanker trucks of the DS Supply and Service Unit. In other cases where appropriate, the Supply and Service unit may operate a dispensing facility for supported units.

(4) *Class IV Supplies (Construction).*

(a) Engineer units submit requests for construction supplies to the supporting DS Supply and Service Unit.

(b) Requisitions are forwarded electronically to the commodity managers at ICC. Upon approval, a material release is issued authorizing shipment to using units.

(5) *Class V Supplies (Ammunition)*

(a) Engineer units submit estimates of ammunition and explosives (required supply rate) through command channels. Approved expenditure (available supply rate) is announced by commanders and constitutes authority to request delivery.

(b) Engineer units prepare transportation orders for Class V requirements within the available supply rate and transmit the request to the supporting direct support ammunition supply unit.

(c) Supply point distribution is normal.

(6) *Class VI Supplies (Personal Demand Item)*

(a) Sales facilities are operated by direct support supply and service units.

(b) Engineer units obtain personal demand items from mobile exchanges operated by direct support supply and service units or by using facilities in the supply and service unit area.

(7) *Class VII (Major End Items) and Class X Supplies (Non-Military Items)*

(a) Engineer units submit requests to supporting DS Supply and Service Units.

(b) Direct support units forward requisitions electronically to commodity managers and procedures similar to those used for Class II regulated items are used.

(8) *Class VIII Supplies (Medical)*

(a) Engineer units submit requests for medical supplies to medical depots in accordance with AR 725-50 and AR 711-16.

(b) Alternate methods are normal to allow flexible, responsive support to user demands. Designated medical facilities in the combat and communications zone will respond to requests for medical supplies for use in Engineer units.

(9) *Class IX Supplies (Repair Parts and Components)*

(a) Repair parts for items other than low-density items. Engineer units submit requests to supporting direct support maintenance units in accordance with AR 735-35.

(b) Repair parts for low density items. Engineer units have direct support maintenance responsibility for low-density items. Authorized stockage lists in accordance with AR 711-16 are prepared and requisitions for repair parts are forwarded to commodity managers. Repair parts are issued by general support repair parts supply units.

(c) TASCOT Engineer units with organic direct support maintenance capability include:

1. Engineer Construction Battalion (TOE 5-115).

2. Engineer Construction Support Company (TOE 5-114).

3. Engineer Port Construction Company (TOE 5-129).

4. Engineer Topographic Battalion (TOE 5-346).

5. Engineer Topographic Company (TOE 5-347).

6. Engineer Topographic Company (TOE 5-348).

7. Engineer Topographic Company (TOE 5-349).

12-16. Local Procurement

a. General. Every effort is made to simplify the problems of supply by local procurement. Class IV supplies include many items which may be procured locally, such as lumber, cement, structural steel, railroad rails and ties; manufactured items such as plumbing and electrical supplies, hardware, paints, and camouflage materials, and repair parts.

b. Utilizing Local Resources. Engineer commanders and staff officers at all levels must always be alert to locate and use local resources. Policies with regard to the use of local resources are set forth by the theater headquarters and enforced by engineer staff sections and commanders at lower levels.

c. Engineer Local Procurement. Local procurement by engineers often involves using the output of industrial plants in the theater of

operations and may involve taking over such plants and supervising their operations and maintenance. Probably the most common forms of local procurement are the use of sand and gravel resources and the quarrying of rock. Another is the exploitation of forests by engineer forestry units.

12-17. Water Supply

ASCOM furnishes potable and nonpotable water in the COMMZ. Engineer construction battalions furnish water points for use in remote areas and to augment or temporarily replace ASCOM water supply sources. The Engineer Construction Battalion provides two water points for supplying potable and nonpotable water in support of battalion construction operations and potable water for other units as required. The water supply personnel of the utilities section of the construction battalion headquarters company set up water supply points. The source of the water dictates the type of treatment, and theater of operations regulations establish the purification standards. SOLOG 125 states minimum potability standards for field water supply. Rationing of water is a command function, and the battalions enforce limitation of water consumption on direct orders emanating from higher authority.

Section V. MAINTENANCE

12-18. Categories of Maintenance

a. There are four categories of maintenance as follows (AR 750-1):

(1) Organizational maintenance (formerly known as 1st and 2nd echelon maintenance).

(2) Direct support maintenance (formerly known as 3rd echelon maintenance).

(3) General support maintenance (formerly known as 4th echelon maintenance).

(4) Depot maintenance (formerly known as 5th echelon maintenance).

b. The scope of each of the four categories of maintenance may be found in the "Maintenance Allocation Chart" in the appropriate technical manual.

c. Organizational maintenance is performed by all using units. When a unit is authorized and capable of performing maintenance in a category other than organizational maintenance, it will be so indicated in the TOE under the "Capability" statement. Each commander is responsible for the performance of his assigned maintenance.

d. An effective maintenance program depends upon accurate, complete, and timely preparation, maintenance, and submission of equipment records. Details on records associated with equipment maintenance and their preparation, processing, and disposition are contained in TM 38-750.

12-19. Responsibility

Responsibility for maintenance and care of equipment exists at all levels of command and extends down to the individual operator. Each commander is responsible for the planning and organization of an effective maintenance system and for the training, indoctrination, inspection, and coordination of his command, as necessary, to insure careful use of equipment and satisfactory maintenance (DA Pam 750-1). Higher commanders and their staffs and inspection teams frequently inspect the equip-

ment and assist in maintenance problems. Specialized maintenance units perform maintenance of a higher order than the organizations can accomplish; but this does not relieve the commander of his responsibilities. For specific instructions on maintenance of engineer equipment, see the technical manual written for the specific piece of equipment. For a complete description of the maintenance support system in a theater of operations and details on how direct and general support maintenance are provided, see FM 29-22.



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CHAPTER 13

TRAINING

Section I. GENERAL

13-1. General

a. The success of an army in a theater of operations depends largely upon the quality and quantity of instruction given to individuals and units. Modern warfare demands that construction engineers be thoroughly trained in the construction of field fortifications and protective construction which in turn necessitates an intimate knowledge of special weapons effects; they must be proficient in mine warfare which includes not only a knowledge of minelaying—mechanically or by hand—but also a knowledge of enemy mine warfare which permits successful minefield breaching. Denial operations and barriers call for a knowledge of demolitions including the employment of the atomic demolition munition. It is equally important that construction engineer units be trained to suspend their engineering activities and deploy rapidly to conduct combat operations or to provide close support to combined or joint combat operations and, in all cases, they should be knowledgeable of CBR defensive operations.

b. Decentralization and the ensuing relative autonomy of smaller units make training of the platoons and companies for independent operations mandatory. Job organization for round-the-clock operations, emphasizing the conduct of engineering tasks during darkness and under extreme or unusual conditions, is an important part of all engineer unit training.

c. Engineer training gives special attention to the use of hand and power tools, heavy construction equipment, and special equipment such as mechanical minelayers and obstacle erectors. Such training should include practice in the maintenance of engineer and ordnance

equipment and vehicles. Tasks such as clearing rubble-strewn urban areas and tree-blown-down areas and fighting mass conflagrations must be emphasized in engineer training programs. Training in chemical, biological, and radiological warfare, to include decontamination procedures, must be included.

d. At all levels, countersurveillance training, including camouflage and employment of deceptive devices, is integrated with all other training.

e. All engineer troops are indoctrinated with the importance of seeking, observing, and rapidly reporting information of an engineering nature to insure the prompt development of engineer intelligence. Some individuals are technically trained in the production and use of engineer intelligence.

f. Combat engineer units are trained to fight as infantry units. All other engineer units are trained to protect themselves from local ground attack.

13-2. Responsibilities

a. The engineer command commander, and/or the engineer construction brigade commander through their operations officers are responsible for implementing Department of the Army training policies and directives; for conducting specific training as necessary; for determining and carrying out training requirements generated by operational missions; and for maintaining their subordinate units at the peak of operational readiness.

b. The engineer construction group commander, through his operations officer, is responsible for coordinating the training programs of his entire group. This includes the

coordination of the various training schedules, the use of training areas, and the use of training aids and facilities. The group operations section plans and prepares the training programs of the headquarters and the headquarters company and attached separate companies, and is responsible for inspecting the training programs of the attached construction battalions.

c. The construction battalion commander is responsible for the training of the organic units of his battalions in the operations for which they are organized. Assisted by his S-3 and operations section, and under the broad and general guidance of the group S-3, he plans, directs, conducts, and supervises the training of his units. In accordance with the directives and policies issued by higher headquarters, he prepares master training sched-

ules, designating the time to be spent on specified subjects; assigns responsibility for the conduct of the training; insures the use of performance and proficiency standards consistent with those of higher headquarters; and procures and controls the use of training facilities, aids, and equipment. He is responsible for organizing and supervising battalion schools and determining student quotas of subordinate units for attendance at service or specialist schools conducted by higher headquarters. As necessary, he issues training directives regarding the type of instruction or information to be given. The construction battalion commander should utilize the various members of his staff to assist him in the planning and supervision of those particular aspects of training pertaining to the staff officers' specialized fields of responsibility.

Section II. ARMY TRAINING PROGRAM

13-3. General

The training being conducted by the Army at a given period can be appropriately placed into one of three categories—individual training, unit training, or combined training. Training may be subdivided into two stages, the cycle training and the post-cycle or operational readiness training.

13-4. Army Training Program Cycle Training

The five formal phases of cycle training in sequence of conduct are as follows:

a. *Basic Combat Training (BCT) Phase.* The basic combat training phase is the first part of individual training and transforms the untrained recruit into a basic soldier. Basic training is conducted in accordance with ATP 21-114.

b. *Advanced Individual Training (AIR) Phase.* The second part of individual training is the advanced individual training phase which includes training to qualify the soldier in branch material subjects and the skills he must know to effectively perform in the military occupational specialty (MOS) authorized

by the TOE. Advanced individual training for engineer construction troops is outlined in ATP 5-114.

c. *The Basic Unit Training (BUT) Phase.* The basic unit training phase is conducted to integrate individuals into effective working teams of squads, sections, platoons, and companies for the performance of both combat and noncombat tasks.

d. *The Advanced Unit Training (AUT) Phase.* This phase integrates the company-size teams, now fully capable of accomplishing their TOE missions, into the coordinated units (battalion, group, or brigade) within their respective branches.

e. *The Field Exercises and Maneuvers Phase.* This phase provides for the training of large units on the ground under simulated combat conditions.

13-5. Operational Readiness Training

Operational readiness training is the sixth phase of training and is begun when a unit has satisfactorily completed its Army Training Test (ATT) and is awaiting movement to a combat zone. The objectives during this cycle are to—

a. Correct deficiencies noted during the conduct of cycle training.

b. Develop and maintain the unit at a peak of operational proficiency.

c. Perfect the unit's proficiency in the conduct of special exercises.

13-6. Training Management

The commander, in discharging his responsibility for training, makes use of the many training publications and aids provided for his guidance by the Department of the Army. Assisted by his staff, he plans, directs, and supervises the training program using this literature to guide and assist in the development and execution of effective procedures in training management. In addition to the Army Regulations that state broad training policies and requirements, he and his staff must be familiar with the following training publications concerning the appropriate unit.

a. *Army Training Program (ATP)*. ATP's outline minimum essential training for units and individuals of the Active Army and Reserve Components. They prescribe subjects, hours to be devoted to each subject, and applicable supporting Army Subject Schedules. The ATP normally concludes with an ATT. With battalion or larger size units, it occurs at the end of AUT; for separate companies the training is completed with BUT after which the ATT follows.

b. *Army Subject Schedules (ASubjScd)*.

(1) Army Subject Schedules provide detailed guidance to instructors for the preparation of lesson plans and the scheduling of branch, general, or military occupational spe-

cialty training, in a particular subject as outlined in the Army Training Programs.

(2) MOS Army Subject Schedules outline instructions to be performed in training centers or units to develop proficiency in individuals according to the requirements of the MOS code (AR 611-201).

c. *Training Circulars*. Training circulars promulgate training directives, policies, or information of an interim nature which requires too frequent revision for inclusion in training literature. They are also used to promulgate new training doctrine, tactics, or techniques for immediate dissemination.

d. *Army Training Tests (ATT)*. ATT's provide guidance for testing individuals and units under simulated combat conditions to evaluate their ability to perform assigned missions, and to evaluate the ability of the soldier to apply the minimum skills requisite to success in battle.

e. *Training Directive*. A training directive is an all-inclusive term given to oral instructions or written training publications that are of a directive nature, regardless of contents or publishing headquarters. Generally, a directive establishes a definite policy or orders that a specific requirement or specific objectives be accomplished. Training directives include such publications as training memorandums and training schedules.

f. *References*. For a more detailed discussion of training and training management, see FM 21-5 and FM 21-6.



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APPENDIX A

REFERENCES

A-1. Army Regulations (AR)

1-35	Basic Policies and Principles for Interservice and Interdepartmental Logistic Support.
27-20	Investigation and Processing of Claims.
310-31	Organization and Equipment Authorization Tables; Tables of Organizations and Equipment.
310-49	Tables of Distribution and Allowances, Common-type Tables of Allowances.
320-5	Dictionary of United States Army Terms.
320-50	Authorized Abbreviations and Brevity Codes.
380-5	Safeguarding Defense Information.
385-40	Accident Reporting and Records.
385-55	Prevention of Motor Vehicle Accidents.
420-13	Organization, Functions and Utilization of Personnel.
420-17	Work Management.
611-101	Manual of Commissioned Officer Military Occupational Specialties.
611-112	Manual of Warrant Officer Military Occupational Specialties.
611-201	Enlisted Military Occupational Specialties.
711-16	DSU/Installation Stock Control and Supply Procedures.
725-50	Requisitioning, Receipt, and Issue System.
735-35	Supply Procedures for TOE and TDA Units or Activities.
750-1	Maintenance Concepts.
750-3	The Army Integrated Equipment Record Maintenance Management System (TAERS).
750-5	Organizations, Policies, and Responsibilities for Maintenance Operations.

A-2. Department of the Army Pamphlets (DA Pam)

108-1	Index of Army Films, Transparencies, GTA Charts and Recordings.
310-series	Index of Military Publications.
750-1	Preventive Maintenance Guide for Commanders.

A-3. Field Manuals (FM)

3-8	Chemical Reference Handbook.
3-10	Employment of Chemical and Biological Agents.
3-12	Operational Aspects of Radiological Defense.
5-1	Engineer Troop Organizations and Operations.
5-15	Field Fortifications.
5-20	Camouflage.
5-25	Explosives and Demolitions.
5-26	Employment of Atomic Demolition Munitions (ADM).
5-30	Engineer Intelligence.

5-33	Engineer Cellular Teams.
5-34	Engineer Field Data.
5-35	Engineers' Reference and Logistical Data.
5-36	Route Reconnaissance and Classification.
5-142	Nondivisional Engineer Combat Units.
8-16-1 (Test)	Medical Service, Field Army.
8-17-1 (Test)	Medical Service, Communications Zone.
9-6	Ammunition Service in the Theater of Operations.
10-67	Petroleum Supply in Theaters of Operations.
11-23	U.S. Army Strategic Communications Command (Theater).
16-5	The Chaplain.
19-25	Military Police Traffic Control.
19-45-1 (Test)	Rear Area Protection.
20-32	Landmine Warfare.
20-33	Combat Flame Operations.
21-5	Military Training Management.
21-6	Techniques of Military Instruction.
21-26	Map Reading.
21-30	Military Symbols.
21-31	Topographic Symbols.
21-40	Chemical, Biological, and Nuclear Defense.
23-12	Technique of Fire of the Rifle Squad and Tactical Application.
23-65	Browning Machine Gun, Caliber .50 HB, M2.
24-18	Field Radio Techniques.
24-20	Field Wire and Field Cable Techniques.
29-22	Maintenance Battalion and Company Operations (Nondivisional).
31-10	Barriers and Denial Operations.
31-16	Counter guerrilla Operations.
31-22	U.S. Army Counterinsurgency Forces.
31-23	Stability Operations, U.S. Army Doctrine.
31-25	Desert Operations.
31-30	Jungle Training and Operations.
31-45	Explosive Ordnance Disposal Service.
31-50	Combat in Fortified and Built-up Areas.
31-70	Basic Cold Weather Manual.
31-71	Northern Operations.
31-72	Mountain Operations.
41-10	Civil Affairs Operations.
44-1	U.S. Army Air Defense Artillery Employment.
54-2	The Division Support Command.
54-3	The Field Army Support Command.
54-6-1 (Test)	The Area Support Command TASTA-70.
54-7	The Theater Army Support Command.
54-8 (Test)	The Administrative Support; Theater Army (TASTA-70).
55-series (Test)	Transportation.
55-21	Transportation Railway Supervisory Units.
60-30	Embarkation and Loading—Amphibious.
100-5	Operations of Army Forces in the Field.
100-10	Combat Service Support.

100-15	Field Service Regulations; Larger Units.
101-5	Staff Officers Field Manual; Staff Organization and Procedure.
101-10-1	Staff Officers' Field Manual—Organizational, Technical, and Logistical Data, Unclassified Data.

A-4. Technical Manuals (TM)

3-210	Fallout Prediction.
3-220	Chemical, Biological, and Radiological (CBR) Decontamination.
5-200	Camouflage Materials.
5-220	Passage of Obstacles Other Than Minefields.
5-230	General Drafting.
5-232	Elements of Surveying.
5-233	Construction Surveying.
5-235	Special Surveys.
5-248	Foreign Maps.
5-258	Pile Construction.
5-297	Well Drilling Operations.
5-301	Staff Tables of Engineer Functional Components System.
5-302	Construction in the Theater of Operations.
5-303	Bills of Materials and Equipment of the Engineer Functional Components System.
5-311	Military Protective Construction (Nuclear Warfare and Chemical and Biological Operations).
5-312	Military Fixed Bridges.
5-330	Planning, and Design of Roads, Airbases, and Heliports in the Theater of Operations.
5-331	Management; Utilization of Engineer Construction Equipment.
5-331A	Utilization of Engineer Construction Equipment, Volume A—Earthmoving, Compaction, Grading, and Ditching Equipment.
5-332	Pits and Quarries.
5-335	Drainage Structures, Subgrades, and Base Courses.
5-337	Paving and Surfacing Operations.
5-343	Military Petroleum Pipeline Systems.
5-349	Arctic Construction.
5-360	Port Construction and Rehabilitation.
5-370	Railroad Construction.
5-441	Topographic Surveying.
5-460	Carpentry and Building Construction.
5-530	Materials Testing.
5-541	Control of Soils in Military Construction.
5-545	Geology.
5-700	Field Water Supply.
5-704	Construction Print Reading in the Field.
5-725	Rigging.
5-742	Concrete and Masonry.
9-1900	Ammunition, General.
9-1300-214	Military Explosives.
10-1109	Organizational Maintenance: Military Petroleum Pipelines, Tanks, and Related Equipment.
38-750	Army Equipment Record Procedures.

A-5. Army Training Programs (ATP)

5-114	Engineer Construction Battalion and Construction Support Units.
21-114	Male Military Personnel Without Prior Service.

A-6. Tables of Organization and Equipment (TOE)

1-407	Aviation Service Support Company.
5-87T	Engineer Land Clearing Company.
5-111	Headquarters and Headquarters Company, Engineer Construction Brigade.
5-112	Headquarters and Headquarters Company, Engineer Construction Group.
5-114	Engineer Construction Support Company.
5-115	Engineer Construction Battalion.
5-116	Headquarters and Headquarters Company, Engineer Construction Battalion.
5-117	Engineer Equipment and Maintenance Company, Engineer Construction Battalion.
5-118	Engineer Construction Company, Engineer Construction Battalion.
5-124	Engineer Dump Truck Company.
5-129	Engineer Company, Port Construction.
5-177	Engineer Pipeline Construction Support Company.
5-201	Headquarters and Headquarters Company, Engineer Command.
5-346	Headquarters and Headquarters Detachment, Engineer Base Topographic Battalion.
5-347	Engineer Base Reproduction Company.
5-348	Engineer Base Survey Company.
5-349	Engineer Base Photomapping Company.
5-500-series	Engineer Service Organizations.
5-530	Engineer Construction, Utilities and Electrical Power Teams.
5-550	Engineer Dredge Teams.
5-560	Engineer Civic Action Teams.
9-500-series	Ordnance Service Organizations.
11-137	Signal Communications Center Operations Company.
12-67	Personnel Service Company.
55-19	Transportation Car Company, Army, Logistical Command or Airborne Corps.

APPENDIX B

AUTOMATIC DATA PROCESSING SYSTEM, ENGINEER COMMAND

B-1. General

This appendix describes the application of current automatic data processing systems (ADPS) to engineer command operations and describes the procedures to be employed during operations where ADPS is not available, damaged, or otherwise inoperable. The current ADPS used by the engineer command in a theater of operations is adaptable to and will be eventually incorporated into the Combat Service Support (ADP) System (CS₃) planned for TASTA-70. Expansion of the current system, to increase operational efficiency of the engineer command, will be included in the CS₃ program.

B-2. Application of ADP Support to Engineer Operations

a. Engineer construction planning and supply data for a theater of operations are contained in the Engineer Functional Components System (EFCS), TM 5-301, TM 5-302, and TM 5-303. This system, designed for use with ADPS, is based on standardized construction materials, and estimating procedures. The EFCS provides summarized logistical data necessary in the planning of engineer projects; standardized bills of material tabulated by federal stock number, and standardized construction drawings to be followed in constructing facilities in a theater of operations. The EFCS can be used at any echelon for engineer planning, operations, and requisition of construction materials with or without ADP assistance.

b. *Application of ADP to the EFCS.* The EFCS, with the exception of drawings, is recorded on magnetic tapes, in the Honeywell 400 computer at the Engineer Data Processing Center. This EFCS data bank is updated

quarterly by the Office of the Chief of Engineers in response to changing requirements reported from the field and by new data received from supply and research and development agencies. Additionally, selected component of EFCS, appropriate to the various theaters, have been provided to the U.S. Army Mobility Equipment Command and the U.S. Army Materiel Command in CONUS and to U.S. Army, Pacific, and U.S. Army, Vietnam. These components were provided on tapes and card decks converted in the case of the U.S. Army Mobility Equipment Command for use on that agency's IBM computer. As developed, construction material can be requisitioned by a using unit in a theater of operations equipped with, and employing the EFCS code. This procedure, fully automated, interfaces computers between logistical commands in the field with U.S. Army, Pacific, in turn, and between U.S. Army, Pacific, and U.S. Army Mobility Equipment Command, so that at any echelon the EFCS coded requisition can be exploded and be either filled or forwarded. An example of this procedure is shown in figure B-1.

B-3. Limitation of Current System

As now used, automated processing of EFCS data, in the theater of operations and CONUS, simplifies supply requisitioning and expedites delivery of construction material to the theater. However, the system has limitations which prevent fully automated support of construction operations as follows:

a. The EFCS, with standard design and bills of material, does not permit automated substitution of design or material. This must be done manually at using unit level and can only be done effectively when the using unit can query the Inventory Control Center as to

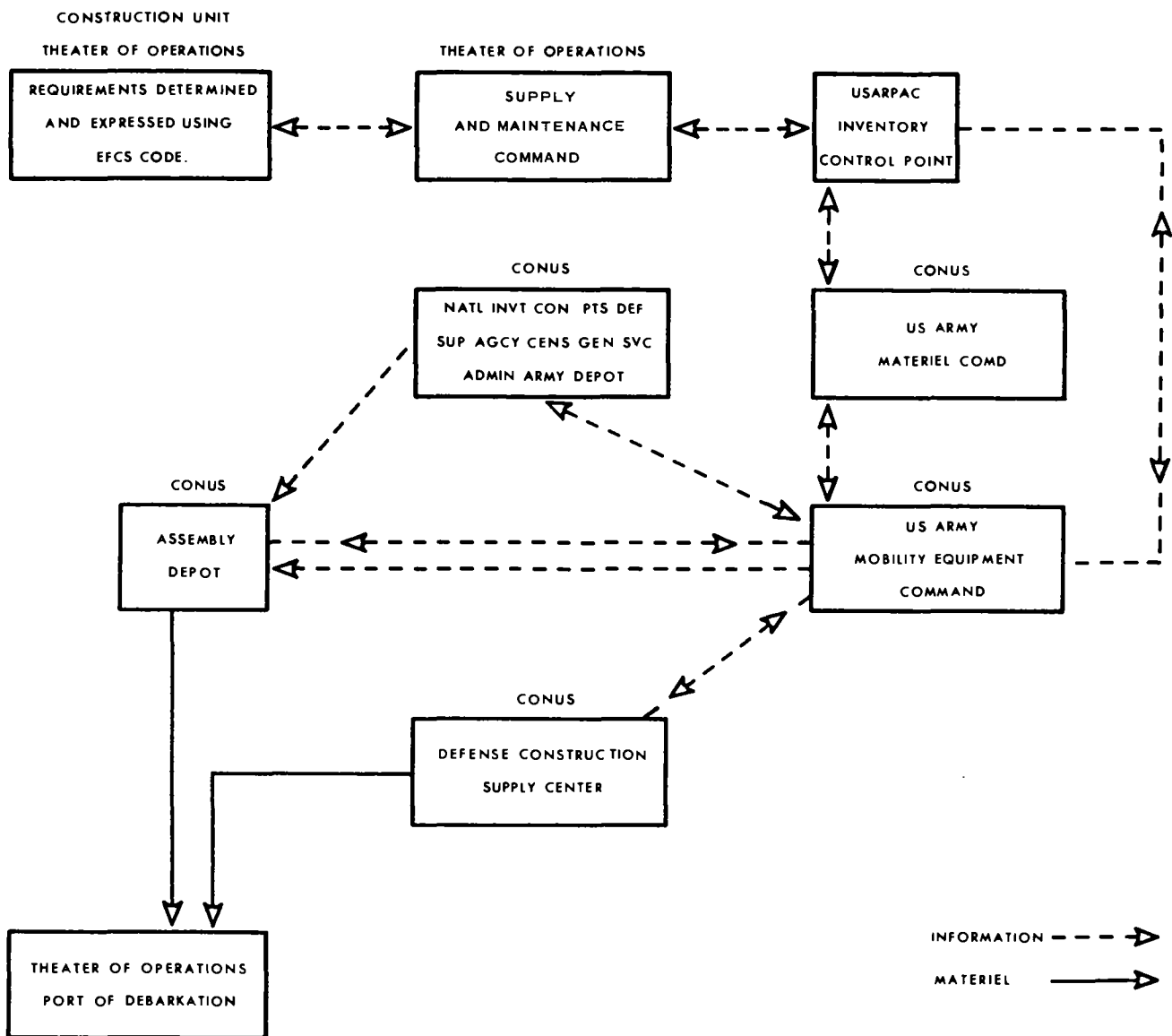


Figure B-1. Engineer supply procedures for army troop construction in Southeast Asia.

the availability of suitable substitutions. The current ADPS in theater is normally not available to engineer construction organizations for such queries, and those organizations do not have the capability to maintain their own inventory data except in manually posted hard copy.

b. Engineers in the field must perform repetitive and sometimes complex engineering

calculations manually. Although many civil engineering computer programs are now available for these computations, current ADPS in theaters of operations do not use the formula translation (FORTRAN) language common to these programs.

c. Construction management data processing, including program evaluation; progress and completion reports, and troop status re-

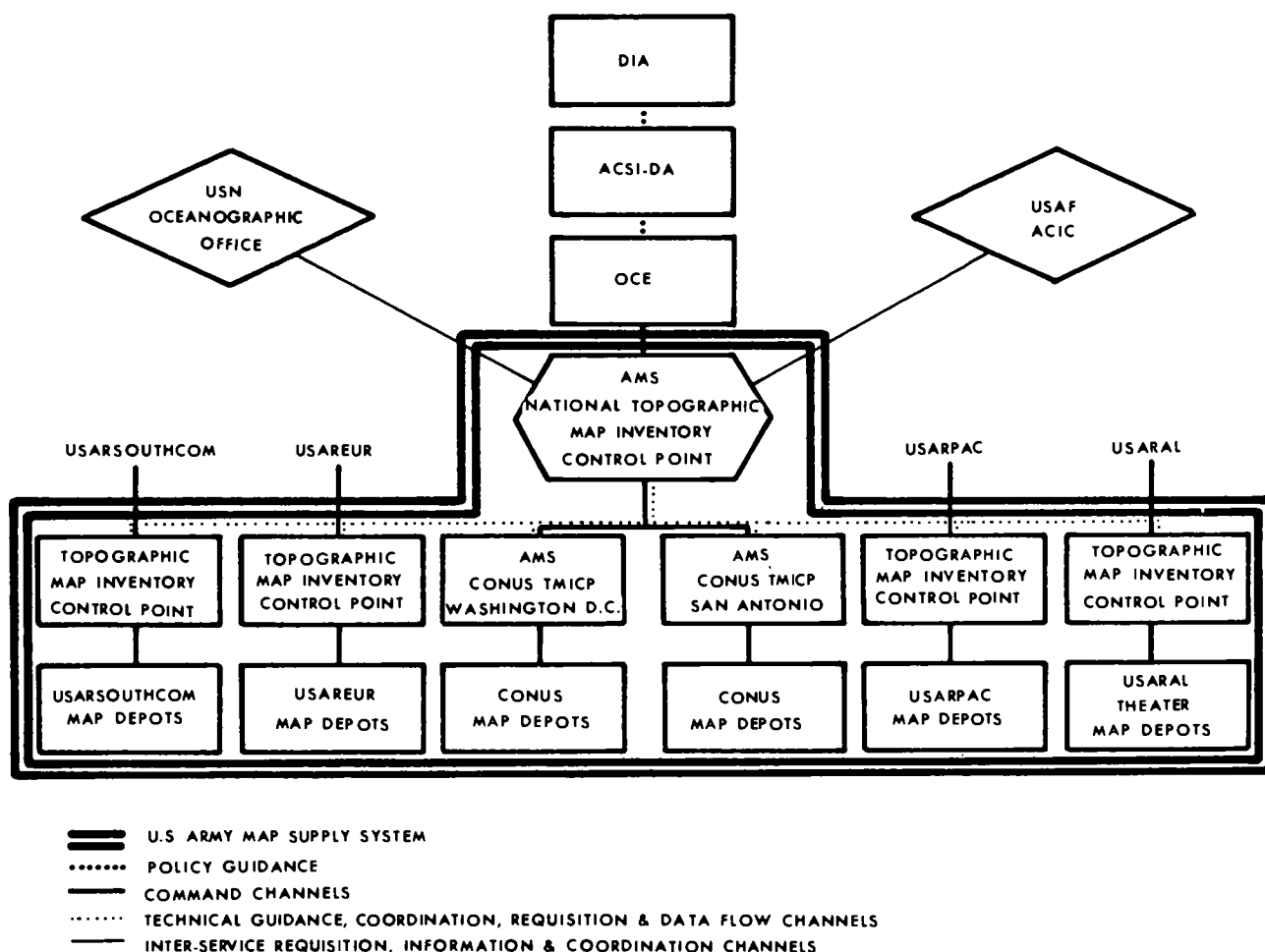


Figure B-2. U.S. Army map supply organization.

ports, is performed manually. Eventually expansion of the theater ADPS under the TASTA-70 program may allow for computerization of these tasks using computers of the ASCOM.

B-4. ADP Support for Topographic Operations

a. *General.* Topographic support in and to the theaters of operation makes use of ADPS in two major functions as follows:

(1) Survey computations necessary to provide geodetic control and cartographic data. At such time as appropriate program tapes are standardized and issued, these computations will be performed on the Field Artillery Digital Automatic Computer (FADAC) which is

organic to the Engineer Base Survey Company (TOE 5-348), Engineer Topographic Company (TOE 5-327), and the Engineer Topographic Battalion (Army) (TOE 5-306).

(2) Map supply, including requisition and inventory control. Map supply is partially automated with a computed at U.S. Army Map Service (USAMS) and with ADP equipment available to topographic map inventory control points (TMICP) in all theaters. USAMS is designated as the National Topographic Inventory Control Point and interfaces with theaters of operations topographic map inventory control points, worldwide, tying together the U.S. Army Map Supply Organization. Figure B-2 shows this organization.

NTMCP MAP INVENTORY-DATA TO BE COLLECTED

TYPE REPORT	DOC. IDENTIFIER	ROUTING IDENTIFIER	STOCK NUMBER	EDITION	QUANTITY	VOUCHER NUMBER	COUNTRY	SECURITY CODE	RELEASE CODE	METHOD	PRIORITY AREA	EXPORT ACTY	REC'D IN SHIPMENT TO	SCHEDULED DATE	EXPORT AGENCY	TYPE REPORT	AS OF DATE	EXPORT NUMBER	FILE CHANGE CODE
1. LOADING CARD	EB1	AO2	1301XND49	02	01500	00700	CCC	M	EE		WM2	WM1				5025	00491		
2. STOCK RECEIPT	EE2	AO2	1301XND49	02	00500	AT5Y8143400122				G	WM2	WM1				5025	00492		
3. STOCK ISSUE	BB5	AO2	1201XND49	02	01000						WM3					5025	00492		
4. STOCK TRANSFER	BB6	AO2	1201XND49	02	01000	AT5Y8150410024					WM1	WM2				5022	00494		
5. ITEM ON ORDER	ED1	AO2	1201XND49	02	01000						WM1	AO2				5025	00495		
6. ITEM DUE IN	ED2	AO2	1201XND49	02	01000						WM1	AO2	5127			5025	00496		
7. ITEM DUE OUT	BD2	AO2	1301XND49	02	00400						WM2		5127			5022	00497		
8. DUE OUT CANCELLATION	BD4	AO2	1301XND49	02	00400						WM2					5025	00498		
9. COMMITTED STOCK	EB1	AO2	1301XND49	02	00500						WM2					5025	00499		
10. FILE CHANGE-DELETE	BP1	AO2	1201XNP17	02		580					A22					5047	00500	01	
11. FILE CHANGE-ADD	BP1	AO2	1201XNP17	02	00150						A22					5152	00501	02	
12. FILE CHANGE-OVERLAY	BP1	AO2	1301XNP17	02		012 01000					A22					5152	00502	04	
12. EXCESS STOCK	EH1	AO2	M745XL2528	02	00900						CS7					5152	00511		
14. REORDER POINT	BM1	AO2	1201XNP17	02	00400						WM2					5152	00502		
15. PRINTING COMPLETION-REPRINT	BP1	AO2	1301XNP17	02	00500	51301127A					A22					5152	00504		
16. PRINTING COMPLETION-REVISION	BP2	AO2	1201XNP17	02	14000	51201142C					AO2					5180	00505		
17. PRINTING COMPLETION-NEW MAP	BP5	AO2	EO24X597511	01	19740	05024017C					AO2					5180	00506		
18. REFORMAT ON HAND	BB1	AO2	ED24X597511	01							A22	AMS			M	5180	00507		
19. SCHEDULED REPRINTING	EB1	AO2	ED24X597511	02	00500	05024008A					A22		5210			5180	00507		
20. CHANGE TO SCHEDULED REPRINTS	BS2	AO2	ED24X597511	02							A22		5290			5202	00601		
21. SCHEDULED REVISION	E22	AO2	1201XNP17	02	13500	51201142C					AO2		5175			5152	00508		
22. CHANGE TO SCHEDULED REVISION	EB4	AO2	1201XNP17	02							AO2		5224			5172	00602		
22. SCHEDULED NEW MAP	BB5	AO2	BD24X597511	01	18000	05024017C					AO2		5175			5152	00509		
24. CHANGE TO SCHEDULED NEW MAP	BS6	AO2	BD34X597511	01	22000						AO2					5168	00602		
25. IN-TRANSIT CARD	ET1	AO2	ED24X597511	01	02000	A45FYD51520001				G	A22	AO2				5152	00510		

Figure B-3. Data processing requirement, TMICP.

b. ADP Applications to U.S. Army Map Supply. Theaters of operation TMICP's operated by engineer base topographic battalions, or their equivalents, have access to automatic data processing equipment to perform their functions at the present time but do not have organic or sole user capability. An example of the type data processed in each such TMICP is shown in figure B-3. Map depots and other in-theater topographic units rely upon manual data processing.

B-5. Future Uses of ADPS for the Engineer Command

a. Upon attainment of full CS₃ (ADPS for TASTA-70) capability, the engineer command, using an area support command/engineer command computer will have the capability to perform—

- (1) Troop operations planning.
- (2) Limited construction design.
- (3) Modification design.
- (4) Construction supply requisitioning.

(5) Map supply, requisitioning and inventorying.

(6) Construction management.

b. Implementation of the CS₃ system will also require the employment of ADPS input/output devices at engineer construction group and battalion level.

B-6. Procedures When ADPS Is Inoperable

In the event of destruction or damage to ADP support, construction and topographic support would continue using manual procedures. To insure a smooth transition to a manual from an automated system, the engineer command will establish standing operating procedures detailing format and frequency for reports, and other administrative actions in the area of construction and topographic support. For design and construction materials requisitioning, engineer units will continue to rely on the EFCS and normal engineer planning techniques.



APPENDIX C

INSTALLATION SUPPORT

C-1. General

a. Engineer Installation Support. This support, which is under the area support group of ASCOM, is designed to provide a completely flexible post engineer planning and operational capability which can be reinforced or reduced in strength in response to varying requirements.

b. Mission and Functions. In providing installation support to units serviced by the area support group, the installation support organization provides the following services:

(1) Operation and maintenance of utilities.

(2) Repair and minor alterations of buildings, grounds, and utilities within the area support group area.

(3) Fire protection service.

(4) Sewage and trash disposal.

(5) Installation water supply.

(6) Real estate services.

c. Organization. See figure C-1 and figure C-2.

d. Command Relationships.

(1) With other area support group directorates, staff elements and higher headquarters—Normal staff relationships.

(2) With subordinate units—Operational control and technical supervision.

C-2. Concept of Operations

The area support group will perform installation support functions through a director of installations, who will be delegated responsibility and operational authority to plan and execute assigned tasks.

a. The directorate of installations operates in a manner similar to that of a post engineer, utilizing varying numbers of engineer service teams to maintain, repair, and make minor alterations to buildings, grounds, and utilities

within the area of the area support group and to provide real estate services. The director of installations would also be responsible for systematic application of sound work management principles.

(1) The administrative services division provides office services to the directorate and may also process work order requests which exceed the capabilities or authorization of the utilities teams.

(2) The engineering and plans division is the engineering and master planning office for the directorate. Many job order requests will pass through this office for design work prior to return to the field. Construction plans to meet known or anticipated area support requirements will also be prepared here for transmission to TASCOT and the engineer command. Plans for alterations to existing structures will also be prepared for execution by utilities teams.

(3) The operations division prepares orders, directives and policy for installations support in all phases including repair and maintenance of streets, railroads, local army airlanding facilities, buildings and utilities, operation of water supply, sewage disposal, and electric power distribution, and fire prevention and protection. This division will provide staff supervision of all of these activities.

(4) Real estate division, see paragraph C-3e.

b. In performing his mission, the director of installations will dispose his personnel so as to insure the most efficient and responsive use of their capabilities.

(1) Facilities dispersed over a large area normally will require that engineer utilities and water supply teams be broken down and attached to units occupying the facilities. Firefighting platoons will normally occupy

central locations or locations nearest installations constituting the greatest hazards.

(2) Where facilities are concentrated, utilities units will operate from a centralized location receiving administrative support from the parent headquarters company, area support group.

c. In addition to directing the operations of installation support units, the director of installations is responsible to the area support group commander for engineer staff advice and assistance. The director will plan and prepare construction requirements for the group, coordinate with construction units assigned to accomplish those requirements, and accept the finished product for the Area Group Commander.

d. The numbers and types of engineer teams required for installations support in an area support group will vary according to the size of the area, the type facilities, and nature of the missions of the units supported. In a well developed area, in which a proportionate share of all TASCOM missions are performed, it is estimated that approximately 300 engineer officers and men will be required to provide the required installations support.

(1) Utilities teams, reinforced by local labor, will establish their headquarters in or near the largest concentrations of facilities. From these points preventive maintenance teams will be used to establish a routine of inspection and repair of all facilities within their assigned areas.

(2) Where isolated facilities are supported, or in activities such as hospitals where maintenance of facilities and continuous operation of utilities is critical to mission accomplishment, utilities elements will be stationed full-time in the facility.

(3) In addition to routine maintenance, repair, and operation of utilities and real property, the utilities team will respond to approved job order requests for minor alterations and new construction in operating facilities. Typical tasks are installation of office partitions, electrical outlets, changes to interior plumbing, and installation of doors and windows in existing structures. With respect to

installation roads, hardstands, heliports, rail sidings and other exterior facilities, repair and maintenance will occupy the bulk of team capabilities. However, turnouts, short access and exists, new parking areas and the like may be accomplished.

(4) The operation of sewage disposal plants, incinerators and sanitary fills for trash disposal will be accomplished to the extent possible by nonmilitary labor under the supervision of utilities personnel. The function of custodial services will likewise be performed by nonmilitary personnel, but normally will be limited to major headquarters and specially designated facilities. The custodial maintenance of buildings and grounds, and the collection and hauling of unit trash will be a part of the normal police responsibility of using units.

(5) Utilities teams will each maintain their own operating stocks of engineer class IV material on hand. This is necessary to insure smooth accomplishment of the facilities maintenance mission. Stockage levels for operational stock will be determined by the area support group commander based upon the type and extent of the facilities within his area of responsibility.

(6) Water purification and the operation of central water plants will depend upon the existence of suitable water sources, and accessible stream or reservoir in the case of field type water point location, or rehabilitated municipal systems. The teams provided can operate in either mode and will normally attempt to provide potable water points as close to using units as practicable.

(7) In the area support command area of operation, the (ASCOM) real estate team will acquire the records on property and maintain a file of actions pertaining to it. In the case of new property, requisitions would probably be processed through civil affairs channels to the host nation. If a current system is followed, the host nation would obtain the desired property from its owner(s) and turn it over to the U.S. Army.

(8) In effecting this turnover, the real estate team would survey jointly with the host

nation representative and/or owner, inventory and note the condition of all elements of the property. It would then establish a file of record inventory and claims purposes for the area support group with a copy to area support command.

(9) Firefighting support is provided on the basis of size and type structural facilities and open storage areas to be protected. Where requirements exceed the capability of attached firefighting teams it is assumed that a significant indigenous capability will be available for incorporation in an area fire protection service.

(10) In addition to fighting fires, the firefighting teams will perform fire prevention inspections of facilities to detect fire hazards which can be eliminated, reporting their findings to both unit commanders and director of installations of the area support group.

(11) In area damage control operations, the firefighting platoons, augmented by organized firefighting teams from units occupying the facilities, will be the major means for limiting primary and preventing secondary damage from fire. Other than firefighting, the installations support organization has a very limited capability in area damage control. For all practical purposes, rehabilitation and emergency reconstruction of facilities must be provided by the engineer command.

(12) Command control—Utilities, water supply, firefighting, and real estate units are assigned to the area support group as needed and may be further attached to supported units for rations, quarters, and administration. The director of installations exercises operational control of all installations support organizations and units within the limits of authority granted him by the area support group commander.

e. Construction support is discussed in (1) through (3) below.

(1) The engineer command will provide both general and direct construction support to ASCOM in accordance with TASCOT directives and policies. Construction forces operating in the area of responsibility of an area

support group will receive installations support in the same manner as will other operating units, taking over only those activities in self-support mutually agreeable to the area commander and the engineer commander.

(a) Construction units will perform the major repair and rehabilitation tasks required, and will perform routine maintenance on roads, railroads and airfields. All new construction and major alterations, exceeding in scope that previously described, will also be accomplished by construction units in accordance with force construction plans.

(b) As construction is accomplished, the installations support workload may either increase or decrease. Thus, the entire construction program must be considered from the standpoint of installations support to determine its net impact in terms of either reinforcement of installations support teams or a reduction in strength.

(2) Installations support involves frequent requirements in an active theater for construction or rehabilitation of facilities which exceed the capabilities of the engineer utilities organizations. These are over and above those construction tasks contained in the theater construction program and may arise for a variety of reasons. The more common are—

(a) Enemy action may inflict severe damage or total destruction upon facilities for which a continued requirement exists. Repair or replacement of these normally will be a task for the engineer command and will be accomplished when assigned a priority by TASCOT. Where the job is so small as to have no significant impact on the construction program, it may be accomplished as a part of general support by the construction element responsible for the area.

(b) Operational requirements by elements of the mission commands may require enlargement, major modification or remodeling existing facilities. These requirements frequently will appear as job order requests in the installations support directorate where, assuming a substantiated requirement, the di-

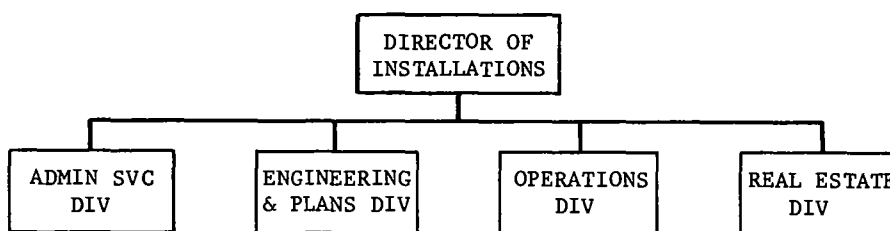


Figure C-1. Director of Installations, ASGP.

rector of installations will prepare a construction request. Such projects may be accomplished by arrangement with the construction unit in general support; however, the magnitude of the task may require submission of a construction project request through command channels. Such requests must go through TASCOM headquarters to obtain approval and a priority for engineer command action.

(3) Since the addition or deletion of facilities will require adjustments in the programming of construction material, it is imperative that the director of installations be aware of such actions at the outset. Thus, he normally will serve as a channel for construction requests, regardless of the command relationship of the requester. Further, consultation with the director of installations, or his counterpart on the general staff, will frequently result in either expediting the required construction or the provision of an acceptable substitute facility.

C-3. Organizations and Capabilities

a. Team HF, TOE 5-530 provides personnel and equipment for maintenance and repair of buildings, grounds, and utilities at installations of from 2,500 to 4,000 individuals. Utilities service includes maintenance of installed refrigeration, air conditioning, and electrical appliances. This unit is capable of providing supervision of varying numbers of civilian laborers engaged in repairs and utilities tasks; numbers will vary with the task, and skill of the labor force.

b. Team GC, TOE 5-520 provides the personnel and equipment to operate a waterpoint

producing 3,000 gallons of potable water per hour or 60,000 gallons per 20-hour day. The unit can store 9,000 gallons of water in organic equipment which normally is adequate to meet requirements.

c. Team GD Central Plant TOE 5-520, provides personnel and equipment to operate up to four water points producing 12,000 gallons of potable water per hour. Storage capability totals 36,000 gallons. With labor augmentations this unit can operate a municipal water plant of a size normally associated with a city of 200,000 people.

d. Team AB, TOE 5-500 provides personnel to command and administer two or more engineer teams totaling not more than 60 individuals. This team will coordinate the operations of water purification teams (GC) attached to the area support group.

e. Team HC, TOE 5-530 provides personnel and equipment for surveying, inventorying, and recording, real estate acquisitions and transactions. It also can serve in a special staff capacity in real estate matters with the team commander performing duties as command real estate officer.

f. Team FA, TOE 5-510 provides personnel and equipment to plan and supervise area fire prevention and firefighting program, and to control two to six firefighting teams.

g. Team FB, TOE 5-510 provides fire protection and implements fire prevention programs for areas housing 5,000 to 10,000 personnel, or warehouses and open storage amounting to 100,000 square feet. This capability is based on a radius of operations per-

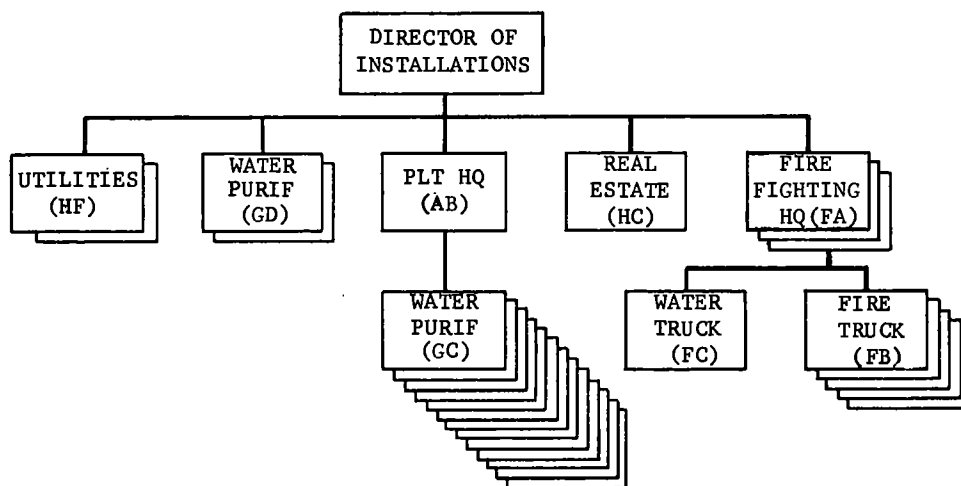


Figure C-2. Engineer Installation Support Organization, ASGP.

mitting centralized location of the team and rapid access to any point in the team's area of responsibility. When these conditions are not met additional units may be necessary to achieve the foregoing levels of protection.

C-4. Organization Within an Installation

a. When an area support group is operating over a large area with no large installation therein, the engineer teams are assigned to the area support commander and controlled by his Director of Installations. These teams then receive their messing, pay, medical and supply support from the area support group. When an installation within the area command becomes large enough to require a fixed assignment of several engineer teams, it is desirable for these teams to come under the installation commander and post engineer control and for these teams to receive their support from the installation.

b. Normally, the post engineer is the senior engineer officer assigned to the installation. His management responsibilities vary in com-

plexity with the size and mission of the installation. The primary mission of the post engineer is to accomplish real property maintenance activities. His other duties include master planning, construction—MCA funds, and troop construction, see AR 420-13.

c. The post engineer organizational structure, shown in figure C-3, has been found to use most effectively the services of assigned personnel at the majority of installations of the Department of the Army. The structure consists of three support officers and four operating divisions. Each functional element of the post engineer organization is responsible for:

(1) Development and execution of its particular function.

(2) Analysis of its operation and the cost thereof to the extent that work will be accomplished in the most efficient and economical manner.

(3) Preparation of its position of the Annual and Long Range Work Plans.

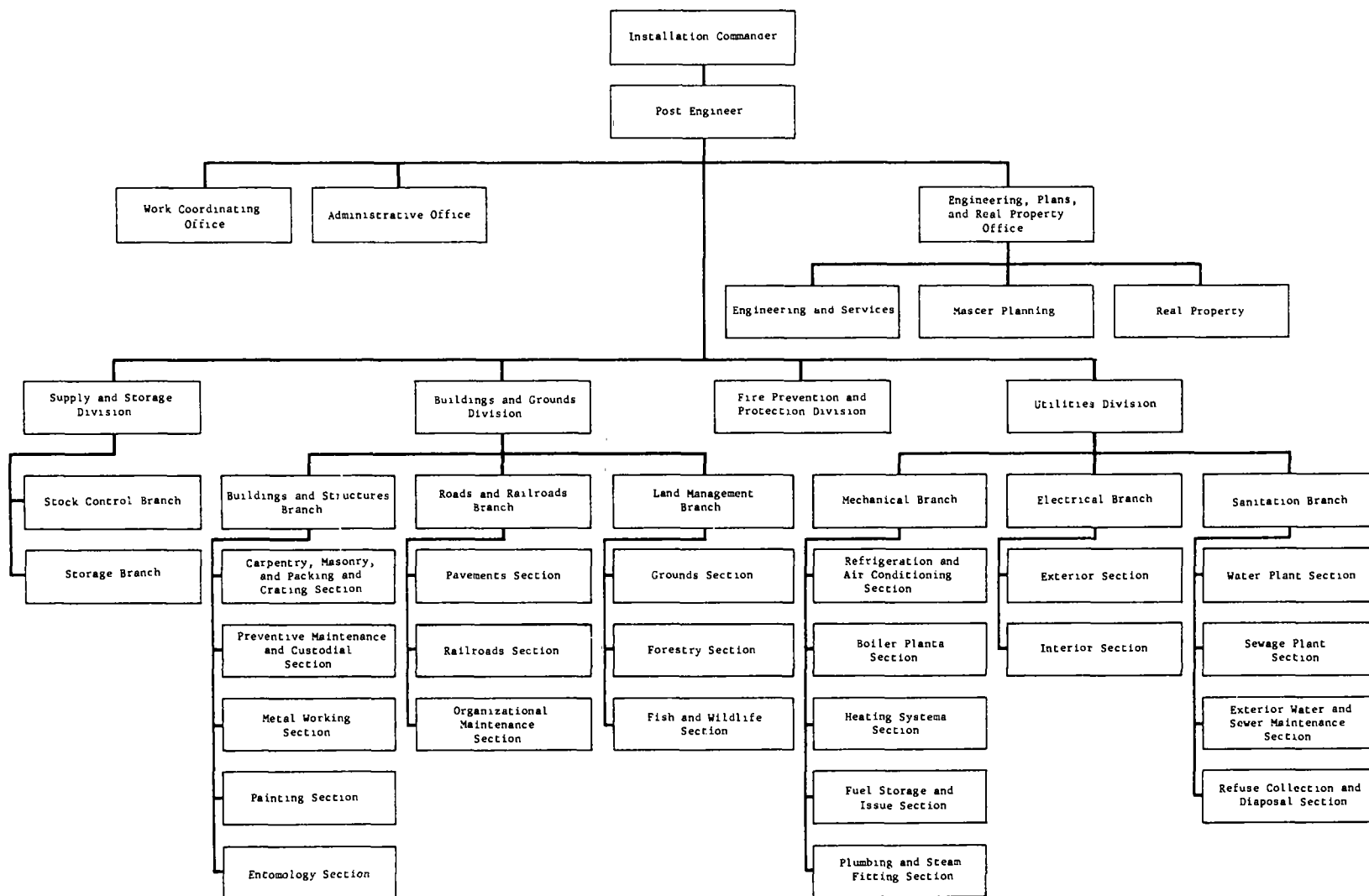


Figure C-3. Post engineer organization.

INDEX

	Paragraphs	Page		Paragraphs	Page
Advanced individual training	13-4b	13-2	Communications:		
Advanced unit training	13-4c	13-2	Construction battalion	6-8	6-2
Air attack	12-10	12-5	Construction brigade	4-10	4-3
Airfield construction	2-14	2-7	Construction company	6-31	6-11
Area assignment	12-2a	12-1	Construction group	5-10	5-3
Area-task assignment	12-2c	12-1	Construction support com-		
Army subject schedules	13-6b	13-3	pany	8-9	8-4
Army training program	13-6a	13-3	Dump truck company	10-9	10-3
Army training tests	13-6d	13-3	Engineer command	3-20	3-6
Assignment:			Equipment and maintenance		
Construction and construc-			company	6-23	6-8
tion support units	2-5	2-3	Pipeline construction support		
Construction battalion	6-2	6-1	company	9-9	9-4
Construction brigade	4-2	4-1	Port construction company ..	7-9	7-5
Construction company	6-25	6-8	Construction:		
Construction group	5-2	5-1	Airfields and heliports	2-14	2-7
Construction support com-			Bridges	2-10	2-5
pany	8-2	8-1	General	2-8	2-4
Dump truck company	10-2	10-1	Pipeline	2-12	2-6
Engineer command	3-2	3-1	Ports	2-13	2-7
Equipment and maintenance			Railroads	2-11	2-5
company	6-17	6-6	Reconnaissance	11-4	11-2
HHC construction battalion ..	6-10	6-2	Roads	2-9	2-5
Pipeline construction support			Construction battalion	2-3b(1),	2-2,
company	9-2	9-1		6-1—	6-1,
Port construction company ..	7-2	7-1		6-8	6-2
Basic combat training	13-4a	13-2	Construction brigade	2-3a(2),	2-2,
Basic unit training	13-4c	13-2		4-1—	4-1—
Battalion, construction	2-3b(1)	2-2		4-10	4-3
Bridges	2-10	2-5	Construction company	6-24—	6-8—
Brigade	2-3a(2)	2-2		6-31	6-11
Capabilities:			Construction directives	11-3	11-2
Construction battalion	6-4	6-1	Construction group	2-3a(3),	2-2,
Construction brigade	4-5	4-1		5-1—	5-1—
Construction company	6-28	6-10		5-10	5-3
Construction group	5-5	5-2	Construction support company ...	2-3c(1)	2-2,
Construction support com-				8-1—	8-1—
pany	8-5	8-2		8-9	8-4
Dump truck company	10-5	10-2	Construction support units . . .	2-3c	2-2
Engineer command	3-4	3-1	Construction units	2-3b	2-2
HHC construction battalion .	6-13	6-5	Control:		
Pipeline construction support			Centralized	12-3a	12-1
company	9-5	9-2	Decentralized	12-3b	12-2
Port construction company ..	7-5	7-1	Defensive operations	12-6	12-2
Centralized control	12-3a	12-1	Directives, construction	11-3	11-2
Cold war	2-16	2-8	Dump truck company	2-3c(3)	2-2,
Command organizations	2-3a	2-1		10-1—	10-1—
				10-9	10-3

	Paragraphs	Page		Paragraphs	Page
Duties:			Labor requirement schedule	11-5d	11-5
Construction brigade	4-4	4-1	Land clearing company	2-3e	2-3
Construction company	6-27	6-9	Logistics	12-13—	12-6—
Construction group	5-4	5-2		12-17	12-8
Construction support company	8-4	8-1	Maintenance	12-18,	12-8,
Dump truck company	10-4	10-1		12-19	12-9
Equipment and maintenance company	6-19	6-6	Management systems	11-9	11-9
HHC construction battalion	6-12	6-5	Materials requirement schedules	11-5e	11-5
Pipeline construction support company	9-4	9-2	Mission:		
Port construction company	7-4	7-1	Construction battalion	6-1	6-1
Employment:			Construction and construction support units	2-1	2-1
Construction battalion	6-5	6-2	Construction brigade	4-1	4-1
Construction brigade	4-6	4-2	Construction company	6-24	6-8
Construction company	6-29	6-10	Construction group	5-1	5-1
Construction group	5-6	5-3	Construction support company	8-1	8-1
Construction support company	8-6	8-3	Dump truck company	10-1	10-1
Dump truck company	10-6	10-2	Engineer command	3-1	3-6
Equipment and maintenance company	6-21	6-8	Equipment and maintenance company	6-16	6-6
HHC construction battalion	6-14	6-6	HHC construction battalion	6-9	6-2
Pipeline construction support company	9-6	9-3	Pipeline construction support company	9-1	9-1
Port construction company	7-6	7-3	Port construction company	7-1	7-1
Engineer command	2-3a(1)	2-2,	Mobility:		
	3-1—	3-1—	Construction battalion	6-7	6-2
	3-20	3-6	Construction brigade	4-8	4-3
Engineer functional components system	2-7b,	2-4,	Construction group	5-8	5-3
	11-10	11-9	Construction support company	8-8	8-4
Equipment:			Dump truck company	10-7	10-3
Construction battalion	6-6	6-2	Pipeline construction support company	9-8	9-3
Construction brigade	4-7	4-3	Port construction company	7-8	7-5
Construction company	6-30	6-11	Offensive operations	12-5	12-2
Construction group	5-7	5-3	Organization:		
Construction support company	8-7	8-3	Construction battalion	6-3	6-1
Dump truck company	10-7	10-3	Construction brigade	4-3	4-1
Engineer command	3-18	3-5	Construction company	6-26	6-9
HHC construction battalion	6-14	6-6	Construction group	5-3	5-1
Port construction company	7-7	7-5	Construction support company	8-3	8-1
Equipment and maintenance company	6-16—	6-6—	Dump truck company	10-3	10-1
	6-25	6-8	Engineer command	3-5	3-2
Equipment requirement schedule	11-5c	11-5	Equipment and maintenance company	6-18	6-6
Field exercises and maneuvers	13-4e	13-2	HHC construction battalion	6-11	6-4
Group headquarters	5-3a	5-1	Pipeline construction support company	9-3	9-1
Heliport construction	2-14	2-7	Port construction company	7-3	7-1
HHC construction battalion	6-9—	6-2—	Pipeline construction	2-12	2-6
	6-15	6-6	Pipeline construction support company	2-3c(2),	2-2,
Independent corps	2-17	2-9		9-1—	9-1—
Job-site layout	11-6	11-5		9-9	9-4
			Planning, construction	11-1—	11-1—
				11-10	11-9

	Paragraphs	Page		Paragraphs	Page
Port construction	2-13	2-7	Teams:		
Port construction company	2-3b(2),	2-2,	Engineer service organiza-		
	7-1—	7-1—	tion	2-3d	2-3
	7-9	7-5	KA	2-16a(1),	2-8,
				b(1)	2-9
Railroads, construction	2-11	2-5	KB	2-16a(2),	2-8,
Rear area protection	12-9	12-4		b(2)	2-9
Repair parts	6-19c(4)	6-7	KC	2-16a(3),	2-8,
Road construction	2-9	2-5		b(3)	2-9
Scheduling	11-7	11-6	Training circulars	13-6c	13-3
Security	12-8	12-3	Training directive	13-6e	13-3
Stability operations	12-7	12-3	Training management	13-6	13-3
Supervision	11-8	11-8	Type B units	2-4b	2-3
Supply	12-13—	12-6—	Water supply	12-17	12-8
	12-16	12-8	Work estimate sheet	11-5b	11-5
Tables of organization and equip-			Work sheet for work items and		
ment	2-4	2-3	materials quantities	11-5a	11-5
Task assignment	12-2b	12-1			



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By Order of the Secretary of the Army:

WILLIAM C. WESTMORELAND,
General, United States Army,
Chief of Staff.

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Major General, United States Army,
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