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WAR DEPARTMENT

**ENGINEER FIELD MANUAL**

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**ENGINEER TROOPS**

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# ENGINEER FIELD MANUAL

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## ENGINEER TROOPS



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(For explanation of symbols see FM 21-6.)

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# ENGINEER FIELD MANUAL

## ENGINEER TROOPS

(This manual supersedes FM 5-5, 31 January 1941, including C 1, 17 January 1942.)

### CHAPTER 1

#### GENERAL

■ **1. PURPOSE AND SCOPE.**—This manual is designed to serve as a general reference on engineer organization. It covers the mission, classification, organization, equipment, armament, and training of engineer units.

■ **2. CLASSIFICATION.**—*Engineer troops are classified as combat units or service units in accordance with Circular No. 422, War Department, 1942.*

*a. Combat classification.*—(1) Combat units are those whose functions require close contact with the enemy. They include general engineer and some special engineer units attached or assigned to divisions, corps, and armies. They receive extensive combat and tactical training.

(2) Engineer headquarters of corps and higher units, including all bases and defense commands, are in the combat classification.

*b. Service classification.*—Service units are those whose functions are characterized by service activities rather than combat. They include some general engineer and a majority of special engineer units attached to corps and higher headquarters. They are organized, trained, and equipped to do the more technical and permanent engineer work. Service units receive less extensive combat and tactical training than combat units.

■ **3. ASSIGNMENT.**—The Army of the United States is divided into Army Ground Forces, Army Air Forces, and Army Service Forces. Regardless of where or with what units they are serving, engineer troops generally are identified with one of these three forces, as shown in the following paragraphs.

■ 4. ENGINEER UNITS, COMBAT, WITH GROUND FORCES.—*a. Engineer combat battalion.*—This battalion is an organic part of the infantry division. It consists of a headquarters, headquarters and service company, three lettered companies, and a medical detachment. It is completely motorized, including transportation for all personnel.

*b. Engineer combat battalion, nondivisional (attached to corps or army).*—This unit is organized, trained, and equipped the same as the engineer combat battalion of the infantry division. The number of battalions attached to corps and army depends upon the situation.

*c. Engineer squadron.*—This squadron is an organic part of the cavalry division. It consists of a headquarters, headquarters and service troop, two lettered troops, and a medical detachment. It is completely motorized, including transportation for all personnel.

*d. Armored engineer battalion.*—This battalion is an organic part of the armored division. It consists of a headquarters, headquarters company, four lettered companies, and a medical detachment. It is completely motorized.

*e. Engineer motorized battalion.*—This battalion is an organic part of the motorized division. It consists of a headquarters, headquarters and service company, three lettered companies, a reconnaissance company, and a medical detachment. It is completely motorized, including transportation for all personnel.

*f. Engineer mountain battalion.*—This battalion is an organic part of the mountain division. It consists of a headquarters, headquarters and service company, a motorized company, two pack companies, and a medical detachment. It has not sufficient transportation to move all personnel and equipment.

*g. Airborne engineer battalion.*—This battalion is an organic part of the airborne division. It consists of a headquarters, headquarters and service company, a parachute company, two glider companies, and a medical detachment. Personnel, armament, vehicles, and equipment required for each mission are transported by aircraft to the scene of operations.

*h. Engineer light ponton company.*—This company is equipped with the M3 pneumatic bridge, which can handle all normal infantry division loads and may be reinforced to carry heavier loads. It has two bridge platoons each equipped with one unit of M3 pneumatic bridge, and a light equipage platoon which has one unit of footbridge and equipment for ferrying. The company is an organic unit of army and higher echelons.

i. *Engineer heavy ponton battalion.*—This battalion is equipped with heavy ponton equipage to provide means of stream crossing for military vehicles too heavy to pass over a light ponton bridge. It has two lettered companies of two bridge platoons each. Each bridge platoon is equipped with one unit of heavy ponton equipage. The battalion is an organic unit of army and higher echelons.

j. *Engineer treadway bridge company.*—This company consists of company headquarters and two bridge platoons. It is an organic unit of the armored force, and normally is attached to an armored engineer battalion. Each bridge platoon transports one unit of steel treadway bridge equipage for construction of ferries and bridges in river-crossing operations of the armored division.

■ 5. ENGINEER UNITS, SERVICE, WITH GROUND FORCES.—a. *Engineer light equipment company.*—This unit consists of a company headquarters and two equipment platoons. It furnishes supplementary equipment, with operators, to combat battalions, and also operates as a replacement pool for construction equipment. It is attached to corps or army.

b. *Engineer depot company (with Army Service Forces as well as Army Ground Forces).*—This company operates engineer depots and other engineer supply points. It has three depot platoons, and a depot section in the headquarters platoon. Organic equipment is that necessary for operating depots. It is attached to army and higher echelons.

c. *Engineer parts supply company.*—A provisional organization for this unit includes a headquarters platoon, a procurement platoon, and a warehouse platoon. Its mission is to establish and operate an engineer spare parts supply depot and other spare parts supply agencies. It may operate as an individual supply unit. Sections or detachments may assist in operation of supply points in army service areas and in corps.

d. *Engineer maintenance company.*—This company consists of a headquarters platoon, two maintenance platoons, and a contact platoon. It executes third-echelon maintenance of all equipment for which the Corps of Engineers has maintenance responsibility. This includes engineer equipment used by other arms and services as well as that used by engineers. It is attached to corps and higher echelons.

e. *Engineer dump truck company (with Army Service Forces as well as Army Ground Forces).*—This unit consists of com-

pany headquarters and two platoons of two operating sections each. It furnishes dump trucks to transport road and other construction materials on engineer work. Exclusive of dump trucks, the organic equipment is that necessary for maintenance of the unit in the field. It is attached to army and higher echelons.

*f. Engineer topographic company (corps).*—This company makes, procures, and reproduces maps for a corps. It increases the density of control and extends control for field artillery fire. It is equipped with mobile printing and photographic equipment mounted in van type trailers.

*g. Engineer topographic battalion (army).*—This battalion procures and reproduces maps for an army. It makes controlled and uncontrolled mosaics and maps of limited areas. It contains a survey company which may extend surveys in army areas to corps units. All equipment is mobile.

*h. Engineer camouflage battalion (army).*—This battalion may be attached to an army. It consists of a headquarters, headquarters and service company, four lettered companies, and a medical detachment. It gives technical assistance in camouflage methods and inspects camouflage work.

*i. Engineer camouflage company (separate).*—This company operates with an independent corps or task force. Its duties are similar to those of the army camouflage battalion.

*j. Engineer water supply battalion.*—This battalion consists of a headquarters, headquarters and service company, three lettered companies, and a medical detachment. It is equipped to procure, pump, purify, store, distribute, and transport water. It is attached to army and higher echelons.

■ 6. ENGINEER UNITS, COMBAT, WITH ARMY AIR FORCES.—*a. Engineer aviation battalion.*—This battalion consists of a headquarters, headquarters and service company, three lettered companies, and a medical detachment. It constructs independently an airdrome with all appurtenances. Organic equipment includes many items of heavy construction machinery not found in other engineer units.

*b. Engineer aviation company.*—This company is identical to the lettered company of the aviation battalion. It is used for small construction programs or for maintaining airdromes in remote localities. It may be reinforced with additional equipment and operators for particular missions.

*c. Airborne engineer aviation battalion.*—This battalion consists of a headquarters, headquarters and service company,

three construction companies, and a medical detachment. Personnel, lightweight construction machinery, and supplies are transported by aircraft to the scene of operations. The unit is designed to provide quickly the minimum base facilities necessary for limited operation from an advanced landing field.

■ 7. ENGINEER UNITS, SERVICE, WITH ARMY AIR FORCES.—*a. Engineer aviation topographic company.*—This company consists of company headquarters, two drafting and mapping platoons, a reproduction platoon, and a geodetic control platoon. It prepares and reproduces maps, aerial photos, and aeronautical charts for the Army Air Forces.

*b. Engineer air force headquarters company.*—This company consists of an engineering platoon, a camouflage platoon and a reproduction platoon. It is attached to an air force headquarters or to an air service command, and executes technical missions in connection with activities of engineer aviation units. One or more such units is provided for each air force.

■ 8. ENGINEER UNITS WITH ARMY SERVICE FORCES.—All such units are classified as service troops. They may be organized, trained, and equipped to do either general or special engineer work.

*a. The engineer general service regiment* includes a headquarters, headquarters and service company, two battalions of three lettered companies each, and a medical detachment. The regiment is trained and equipped to undertake all types of general engineer work in the communications zone. It does not have sufficient motor transportation to carry all personnel.

*b. The engineer special service regiment* consists of a headquarters, headquarters and service company, two battalions of three lettered companies each, and a medical detachment. It is designed to undertake the more important engineer construction projects of a permanent nature. In strength it is similar to the engineer general service regiment. There is a high proportion of noncommissioned personnel who specialize in design, preparation of plans, and supervision of difficult construction work.

*c. The engineer heavy equipment company* consists of a headquarters platoon and a service platoon. Its principal mission is to make available to general engineer units various items of heavy engineer mechanical equipment and some skilled operators.

*d. The engineer heavy shop company* is composed of a head-

quarters platoon, a manufacturing platoon, and a repair platoon. Its mission is to do fourth-echelon maintenance of all equipment for which the Corps of Engineers has maintenance responsibility. The manufacturing platoon is equipped with heavy-duty fixed shops. Its repair platoon is equipped with mobile repair shops.

*e.* The *engineer topographic battalion, GHQ*, is about twice the strength of the army type topographic battalion. It reproduces maps on four 22- by 29-inch rotary presses with auxiliary equipment. The equipment is fixed. The battalion also is equipped to prepare maps by photogrammetrical methods and it may, if necessary, advance horizontal and vertical control to the zones of army type topographic battalions. Frequently it may be required to reinforce these units.

*f.* The *engineer port repair ship* is divided into a headquarters section and an operating section. It maintains channel markings and other aids for pilots, and removes obstructions from channels or ship berths.

*g.* The *engineer port construction and repair group* is a special unit which includes a headquarters, headquarters company, engineer group, and the necessary additional operating personnel from available engineer and other service units. It does engineer work in the repair or rehabilitation of waterfront facilities and installations of ports of debarkation in a theater of operations.

*h.* The *engineer petroleum distribution detachment* is composed of a headquarters section and several operating sections. Its mission is to design, construct, operate, and maintain military pipe-line systems as a means for transporting, distributing, and storing gasoline in bulk in a theater of operations.

*i.* The *engineer gas generating unit* consists of a commissioned officer and a small group of occupational specialists organized as two similar sections. It produces and supplies oxygen, acetylene, and nitrogen gases.

*j.* The *engineer utilities detachment* is flexible in organization; number and composition of officer and enlisted personnel depend upon population, location, area, and facilities of the post or military installation the unit serves. Its mission and responsibilities are explained in detail in AR 100-80.

*k.* The *engineer forestry battalion* includes a headquarters, headquarters and service company, three or more forestry companies, and a medical detachment. Its mission is to exploit woodlands in or near a theater of operations so as to provide an abundant and ready supply of forest products, especially lumber.

l. The *engineer parts supply company* is composed of a depot headquarters staff section, a headquarters platoon, a procurement platoon, and a warehouse platoon. Its mission is to establish and operate an engineer parts supply depot and other spare parts supply agencies. The company may form part of an engineer supply depot or of the engineer section of a general depot, or it may operate as a separate supply unit.

m. The *engineer parts supply separate platoon* is composed of a depot headquarters staff section, a detachment headquarters, a technical section, and a warehouse section. Its mission and operation are similar to those of the engineer parts supply company.

n. The *engineer mobile searchlight maintenance unit* is composed of a small group of occupational specialists equipped with a motorized third-echelon electrical repair shop. It provides mobile third-echelon maintenance for searchlights.

■ 9. ENGINEER COMBAT GROUP HEADQUARTERS.—This is primarily a tactical command group, composed of a headquarters, headquarters company, and attached engineer units. Engineer combat group headquarters are organized, in general, on the basis of one per four engineer combat battalions or the equivalent in other engineer units. They are attached to corps and army, and through them the corps or army engineer exercises his control of engineer units.

■ 10. ENGINEER HEADQUARTERS.—Engineer headquarters are provided for corps, army, communications zone and its sections when established, theater of operations headquarters, general headquarters, army air forces and separate air forces, task forces, base commands, and defense commands.

## CHAPTER 2

### STAFF DUTIES AND ORGANIZATION OF ENGINEER UNITS

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#### SECTION I

#### THE UNIT ENGINEER

■ 11. GENERAL.—*a.* Within each combined arms unit, engineer troops are commanded by an engineer officer termed the "unit engineer."

*b. Dual capacity.*—(1) The unit engineer commands engineer troops and also functions as a staff officer on the special staff of the commander of the higher unit. This special staff function is exercised by the unit engineer of all echelons down to and including the platoon commander when his unit is attached to an infantry unit.

(2) As a staff officer the unit engineer must have a proper appreciation of the problems of the commander and the staff of the unit.

*c. Duties.*—(1) The unit engineer is responsible without specific instructions for carrying out the duties prescribed for engineers (see FM 5-6 and 101-5) except those taken over by higher echelons or otherwise exempted by higher authority.

(2) The unit engineer has the following responsibilities (see FM 101-5):

(*a*) Advising his commander and staff on engineer matters.

(*b*) Preparing plans for use of engineer troops, including recommendations for their apportionment to smaller units.

(*c*) Determining requirements of engineer equipment and supplies, including camouflage materials, and methods of procurement, storage, and distribution.

(*d*) Construction, maintenance, and repair of the following works: camps, cantonments, warehouses, hospitals, and other

structures, including incidental installations except signal communication; roads and trails; all means of river crossings; docks; and airdromes and landing fields.

(e) Supply of all fortification materials, and construction of defensive works not assigned to other troops.

(f) Construction, repair, maintenance, and operation of portable and fixed electric light plants, water supply systems, and all other utilities of general service not otherwise assigned, and construction of railways.

(g) Military mining, demolitions, and construction and removal of obstacles.

(h) Surveys and mapping, and procurement, production, and distribution of maps.

(i) Engineer reconnaissance.

(j) Recommendations for traffic regulations on roads and bridges.

(k) Preparation of signs for marking routes.

(l) Supervision, within limits prescribed by the commander, of engineer and camouflage activities in subordinate units, including work performed by troops other than engineers.

(m) Development within the unit of measures for camouflaging personnel and installations; preparation of instructions concerning camouflage, use of camouflage material, and protective coloration of all equipment except aircraft.

(n) Examination of captured engineer equipment and intelligence regarding its use.

(o) Preparation of terrain estimates.

d. *Relations.*—(1) The relationship between a unit engineer and the unit engineers of subordinate units is not one of command. Any instructions to be carried out by an engineer of a lower unit must be incorporated in orders of his unit commander. However, every unit engineer has authority to make technical inspections of engineering work in progress in the area controlled by his unit commander, even though troops engaged on such work are not under the latter's command. He also has authority to require technical reports direct from engineers of subordinate units. By these inspections and reports he supervises the work of subordinate units to insure its execution in accordance with plans of his unit commander. A spirit of cooperation between unit engineers of all echelons is essential.

(2) The engineer of a large unit must have close relationships with the general staff of that unit, as laid down in FM 101-5. His contacts are in the dual capacity of commander of

engineer troops and special staff officer. Contacts with G-4 and G-3 are of special importance. He should also maintain contact with commanders of subordinate elements of the unit.

(3) The unit engineer confers with other members of the special staff in preparing plans or projects in which they are concerned, so that a plan presented to the unit commander for approval will carry as full concurrence as possible. Certain special staff officers whom he must consult frequently are:

(a) The *ordnance officer*, who supplies ammunition and anti-tank mines, and maintains most engineer vehicles (third echelon).

(b) The *signal officer*, who maintains wire communication between the engineer headquarters and higher headquarters, and may train engineer radio personnel.

(c) The *provost marshal*, who puts into effect the traffic circulation plan.

(d) The *quartermaster*, who supplies food, gasoline, and oil, and, at times, furnishes additional transportation.

(e) The *artillery officer*, who often is consulted on routes for movement of artillery units, and on camouflage and survey requirements of artillery.

(f) The *antiaircraft officer*, who provides antiaircraft protection during employment of engineer troops, especially in river-crossing operations, construction of landing fields, and road and railroad work.

## SECTION II

### ENGINEER STAFFS

■ 12. GENERAL.—a. *Size*.—An engineer headquarters consists mainly of the engineer commander and his staff. The size of the staff of an engineer headquarters depends on the extent and the importance of the engineer operations.

b. *General functions*.—The staff obtains information required by the commander, prepares plans, translates decisions into orders, causes orders to be transmitted to troops, sifts the multitude of details coming into the command post and brings to the commander's attention matters which require his action or about which he should be informed. It makes a continuous study of the situation and prepares tentative plans for possible contingencies. Within the scope of its authority it supervises execution of plans and orders and takes action as necessary to carry out the commander's decisions.

■ 13. THE STAFF OFFICER.—*a. General.*—The staff officer should have a thorough knowledge of the policies of his commander, should be helpful to commanders of subordinate units and cultivate friendly relations with them. He should organize and train his assistants to do routine work. He is expected to think and to plan, to make a continuous study of the situation, and always to have a plan ready for a possible contingency. To perform his functions properly he must inspect constantly to see that plans approved by the commander are being carried out correctly.

*b. Mutual assistance.*—Staff officers and their sections must be prepared to assist other staff sections when required by the situation. Each staff officer frequently will be required to take over the functions of an absent one. This mutual assistance and cooperation is essential for the proper functioning of a small staff, but does not relieve any officer of the responsibility for carrying out assigned duties.

*c. Functional relation.*—A staff officer as such has no command except as delegated by the commander to varying extents, depending on the situation. All policies, decisions, and plans must be authorized by the commander before they are put into effect. When a staff officer issues an order in the name of the commander the responsibility for it is the commander's, even though he may not know of the order.

■ 14. ORGANIZATION.—A staff generally consists of an executive officer and four sections—personnel and administrative, intelligence, operations and training, and supply. In staffs of engineer units, heads of these sections are termed S-1, S-2, S-3, and S-4, respectively. Due to the increased scope and technique of engineer duties of army and higher unit engineers, the four sections of their staffs constitute an "executive staff" group, and a second staff group is added known as the "engineering staff." In the division and lower units, the "executive staff" alone constitutes the staff of the unit engineer.

### SECTION III

#### STAFF OF DIVISION ENGINEER

■ 15. THE EXECUTIVE OFFICER.—*a.* In addition to being second in command, the executive officer is responsible for the work of the staff, and for the control and coordination of operations in accordance with orders and policies of the division engi-

neer. The division engineer delegates to the executive officer much of the active command of the unit in field operations. It is essential that the executive officer enjoy the division engineer's complete confidence.

b. The executive officer must be familiar with the situation of the division as a whole and assist the division engineer in accomplishing his functions as a special staff officer.

c. The executive officer normally remains at the unit command post when the division engineer is away. When he leaves the command post the next senior member of the unit staff represents the commander.

■ 16. ADJUTANT (S-1).—*a. General.*—The adjutant handles communications, personnel, and administrative matters for the unit. He is responsible for athletics, entertainments, and morale work when no officers are specially designated for those duties.

*b. Duties.*—Under field service conditions his specific duties may include:

(1) Keeping records relative to classification, reclassification, assignment, pay, promotion, transfer, retirement, and discharge of all personnel.

(2) Obtaining award of decorations, citations and other honors.

(3) Handling details of leaves and furloughs.

(4) Supervising punishments, including courts martial matters.

(5) Maintaining strength, casualty, and prisoner of war reports, and other personnel statistics.

(6) Obtaining replacements and making arrangements for receiving, processing, assigning, and quartering them.

(7) Laying out the command post and establishing routine procedures affecting its operation.

(8) Making recommendations with regard to shelter, command, and administration of quartering areas.

(9) Supervising maintenance of sanitation, through the surgeon.

(10) Obtaining means for recreation and for maintaining or building morale. General supervision over the work of the chaplain, and contact with welfare agencies.

(11) Operating the postal service.

(12) Taking charge of the collection and evacuation of prisoners of war in cooperation with S-2 and S-4.

(13) Maintaining the unit journal.

■ 17. INTELLIGENCE OFFICER (S-2).—*a. General.*—The intelligence officer is S-2 on the staff of the unit engineer and commands the intelligence section. He is also the unit camouflage officer.

*b. Duties.*—(1) *Collection, evaluation, and dissemination of engineer information.*—The principal duty of the intelligence officer is to gather and evaluate engineer information and furnish it as needed. He recommends to the battalion commander missions for the reconnaissance section and other agencies. The information collected pertains to maps; routes of communication; terrain; sources of engineer supplies or usable equipment; engineering structures, both on friendly and hostile territory; all mine fields, booby traps, and obstacles laid by either friendly or enemy troops; and examination of enemy engineer equipment and enemy practices regarding its use. This information is available to S-3, S-4, and the division staff, and must be made available as promptly as possible to all others concerned. S-2 must conserve the efforts of reconnaissance agencies by specifying what information is of especial importance during a stated period, and by issuing definite reconnaissance instructions to the gathering agencies. (See FM 5-6.)

(2) *Engineer situation map.*—As an aid in collecting, evaluating, and disseminating the information gained, S-2 keeps a situation map showing the engineer situation and the results of engineer reconnaissance. The results of engineer reconnaissance should also be passed on to the staff officer directly concerned with the information.

(3) *Training schedules.*—S-2 also assists S-3 in the supervision of training in engineer reconnaissance and combat intelligence. Training must be carefully planned and supervised so engineer troops gain a proper viewpoint on the scope and importance of engineer reconnaissance and the making of engineer reconnaissance reports.

(4) *Combat intelligence.*—S-2 is charged with—(a) Conduct of combat intelligence activities of the engineer unit.

(b) Counterintelligence duties and cooperation with S-1 in censorship of postal matter and in secrecy requirements in handling messages.

(c) Training, inspection, and supervision of camouflage activities of the engineer unit.

(d) Examination of enemy personnel, captured documents, and matériel of immediate importance to the unit.

(e) Procurement and distribution of maps to all units of the

division. For this purpose he must operate in accordance with general policies laid down by division G-2, and in close cooperation with the assistant division engineer and with S-4. In addition, S-2 plans surveying and mapping activities involving participation by the air force and artillery.

(f) Assisting division engineer in carrying out his functions as a special staff officer by furnishing him, through the assistant division engineer, detailed information on which to base his advice to the division commander.

■ 18. OPERATIONS AND TRAINING OFFICER (S-3).—*a. General.*—S-3 is primarily concerned with the operations and training of the unit. He supervises the operations section. He is also the unit chemical officer.

*b. Duties.*—In performing his duties S-3 does the following:

(1) Plans and supervises training as directed by the commander.

(2) Plans the allocation of engineer troops to various tasks in accordance with the situation and the decisions of the commander; prepares orders for issuance to troops under the division engineer's command; and prepares recommended engineer paragraphs of, or annexes to, orders issued by the division commander. He coordinates his plans with S-4 to be sure the plan of operations is adequately supported by the plan of supply.

(3) Arranges details of movement of the battalion.

(4) Makes a continuing study of the situation so as to be able to make recommendations at any time on employment of the battalion.

(5) Recommends policies and training schedules for conduct of engineer training, including schools.

(6) Utilizes his assistants in the operations section to make technical reconnaissance and plans for accomplishing engineer tasks.

(7) Recommends to the division engineer priorities of assignment of major engineer equipment.

(8) Assists the division engineer in preparing his recommendations to the division commander regarding the division traffic circulation plan.

(9) Assists the unit engineer in making plans concerning employment of demolitions and other obstacles to hinder movement of the enemy. This requires a continuing study of the tactical situation of the division, of enemy capabilities, and of terrain.

(10) Trains, inspects, and supervises chemical activities of the engineer unit.

(11) Keeps an operations map based on information furnished by the assistant division engineer, by division orders, and by messages picked up by the engineer radio which is in the division command net. S-3 generally should keep dispositions of the engineer unit and of major units of the division on his division situation map, and also important elements of the engineer situation. He should not, however, clutter up his map with details, relying on the S-2 engineer situation map for this information. The S-3 situation map enables all engineer staff officers to make a continuing study of the division situation so they may plan their operations to meet contingencies which may arise and which can be predicted, at least tentatively, from a study of the general situation.

(12) Recommends security measures for battalion headquarters and the battalion.

(13) Prepares tactical reports as directed.

(14) When necessary, he recommends that the division engineer request attachment of additional engineer troops from the corps, or that the corps assume responsibility for engineer work in a portion of the divisional area.

■ 19. SUPPLY OFFICER (S-4).—*a. General.*—S-4 is the supply officer of the engineer unit and functions as the engineer supply officer for the entire division. S-4 supervises the supply section of the engineer unit and is responsible for its functioning in accordance with plans of the unit engineer and of higher headquarters. In general he must keep in close touch with S-2 and S-3, with the tactical situation, with headquarters and service company, with subordinate commanders and their troops, with division G-4, and with all supply installations.

*b. Duties.*—Duties of S-4 are:

(1) He studies and collects detailed information of the supply situation in cooperation with S-2. This includes such data as local resources, available credits in depots and other stocks under unit control, and captured engineer supplies. With this information he advises the unit engineer as to availability of equipment and materials essential to a proposed operation.

(2) He supervises stockages, operations, and displacement of engineer distributing points in accordance with the tactical situation, and arranges for conservation, or destruction when necessary, of engineer supplies.

(3) He examines engineer requisitions both from his own unit and from other arms, makes recommendation for priorities of issue, and recommends issuing supply points.

(4) He recommends to the division engineer allocation of available engineer supplies, estimates future requirements, and arranges in advance for obtaining and issuing them. This is especially important in the case of fortification materials.

(5) S-4 is water supply officer for the division. He recommends to the unit engineer the number and location of water supply points. These recommendations, when approved by the unit engineer and division G-4, are incorporated into drafts of paragraphs prepared by S-3 for inclusion in division field and administrative orders.

(6) S-4 keeps a continuing inventory of available stocks of engineer materials both in distributing points and available locally. He arranges for taking over and distributing engineer supplies found locally.

(7) He furnishes transportation and truck drivers required for the actual procurement and distribution of maps.

(8) S-4 allocates transportation, other than organic, to subordinate units.

■ 20. SPECIAL STAFF OFFICERS, DIVISION ENGINEER.—*a. General.*—Certain staff functions may be handled by officers of the unit staff as additional duties or they may be the primary duty of officers not on the unit staff. In the latter case these officers are members of the special staff of the unit engineer.

*b. Assistant division engineer.*—(1) His principal duty is liaison with division headquarters, where he makes available engineer information of interest to the division staff, and obtains information of value to the unit engineer. He keeps himself informed of the results of engineer reconnaissance, the dispositions and strength of the engineer unit, and the status of engineer supply. Staff officers cooperate with the assistant division engineer in this regard and make all pertinent information available to him immediately. This information should be posted on an engineer situation map kept at the division command post by the assistant division engineer and his section.

(2) The assistant division engineer keeps the headquarters of his unit constantly informed of the division's tactical situation and such information of the enemy as may affect division plans materially. This knowledge is gained through discussion of the situation with G-2 and G-3 and their assistants,

and through frequent inspections of the G-2-3 situation maps. In gathering such information the assistant division engineer should be careful not to annoy the division general staff sections more than is absolutely essential.

(3) In the absence of the division engineer, the assistant division engineer acts for him at the division command post. If the situation permits he communicates with the executive officer on important matters concerning the employment of engineers; otherwise, he does not hesitate to give appropriate advice.

(4) The assistant division engineer exercises immediate supervision over the division engineer section at the division command post. He must be there at all times when the division engineer is absent.

(5) He anticipates requirements of the division for maps and advises S-2 of the requirements in advance. He also receives requests for maps from G-2 and forwards these requests to S-2.

*c. Personnel officer.*—(1) The warrant officer in the administrative section of headquarters and service company is the personnel adjutant and assistant S-1.

(2) He is responsible under the adjutant for the administration of all company and detachment records of which the adjutant is custodian. These do not include basic company records retained by company commanders.

(3) He is charged with preparation, maintenance, and safe-keeping of all records, reports, rosters, returns, files, documents, correspondence, and statistics of a personnel and administrative nature that are not required to be kept at company headquarters.

(4) He is charged with custody of company funds when the companies go into combat or when, in the opinion of the commander, funds might be lost because of casualties. (See TM 12-250.)

(5) He is charged with training of personnel to replace administrative section clerks.

*d. Transportation officer.*—(1) In the combat battalion and the squadron he is called a motor officer and commands the repair section. In the armored battalion he commands the motor section and in the motorized battalion he commands the transportation platoon.

(2) He must be qualified through training and experience to direct supply and maintenance operations of his platoon or section and to advise the unit commander, his staff, and

subordinate commanders on technical aspects of automotive operations and maintenance.

(3) In addition, he has the duties of a platoon commander. He employs his platoon, as directed by the headquarters and service company commander, to procure and distribute spare parts and supplies and to perform second-echelon maintenance on motor vehicles of the battalion. (See FM 25-10.)

*e. Communications officer.*—This officer is designated by T/O for the motorized battalion. The commander of the combat battalion, armored battalion, squadron, mountain battalion, or airborne battalion assigns an officer as communications officer. For detailed description of duties of the communications officer in combat, and for the manner of their performance, see FM 7-25. In general he must—

(1) Advise the unit engineer and staff on matters of signal communication technique.

(2) Prepare plans and recommendations for the battalion communication system, and establish, operate, and maintain it.

(3) Supervise technical training of communication personnel, when so directed.

(4) Offer technical advice and assistance to S-4 regarding supply of signal communication materials for the battalion.

(5) Make recommendations for initial and successive locations of the command post of his unit, if not prescribed by higher authority.

(6) Make recommendations for procuring and replacing signal communication personnel.

*f. S-3, air.*—To effect close and rapid coordination between the armored engineer battalion and the air support, an S-3 air officer is included in the T/O for the armored engineer battalion. This officer is trained in the tactics and technique of air support aviation, in air observation, and in aerial photography. He is an assistant to the battalion S-3. The principal duties of the S-3 air officer are to—

(1) Advise the division engineer and battalion staff on use of air facilities.

(2) Prepare and expedite requests for air support, aerial photography, and air observation pertaining to engineer activities.

(3) Inform battalion headquarters of air action to be taken.

*g. Camouflage officer.*—Normally S-2 of the unit staff performs the duties of camouflage officer, which are to—

(1) Advise the division engineer and battalion staff on camouflage technique.

(2) Assist in supervising training of division personnel in camouflage methods and in adaptation of local materials in camouflage work.

(3) Recommend camouflage standards and regulations for the division.

(4) Make frequent inspections of camouflage work and camouflage discipline, and recommend necessary corrective measures.

(5) Supervise training of battalion personnel in camouflage methods.

*h. Reconnaissance officer.*—The reconnaissance officer exercises immediate supervision over the reconnaissance section of headquarters and service company. He utilizes this section for and personally participates in reconnaissance missions assigned by the battalion commander. He works in close cooperation with S-2, S-3, and S-4.

*i. Chemical officer.*—Normally S-3 of the unit staff performs the duties of chemical officer. He is the adviser to the unit commander and staff in all matters involving the use of gas and smoke, and defense against chemicals. His duties are:

(1) Recommendation to S-4 concerning supply of chemical munitions and antichemical protective equipment.

(2) Supervision and coordination of gas defense training in unit, and periodic inspections of gas defense equipment.

(3) Supervision of installation and maintenance of gas defensive measures.

(4) Supervision of use of decontaminating agents.

(5) Supervision of gas reconnaissance of routes and areas before their use by troops.

(6) Recommendations concerning use of chemicals and smoke.

(7) Checking to see that standing orders concerning gas defense measures are issued and executed.

(8) Studying types and characteristics of chemicals and chemical equipment used by the enemy, and his methods of employing them.

*j. Battalion surgeon.*—(1) *General.*—The battalion surgeon commands the battalion medical detachment and supervises the medical service of the battalion. He serves as adviser to the battalion commander and staff on matters affecting the health of the command and the sanitation of the battalion area.

(2) *References.*—Duties and operation of the medical detachment and evacuation service, FM 7-30 and 8-10. Military

sanitation and first aid, FM 21-10. Field sanitation, FM 8-40. Records of sick and wounded, FM 8-45. Medical reference data, FM 8-55.

(3) *Duties.*—The duties of the surgeon are given in Army Regulations and in FM 8-10. In general the battalion surgeon:

(a) Instructs the battalion's personnel in personal hygiene, military sanitation, and first aid.

(b) Makes medical and sanitary inspections, and keeps the battalion commander informed of the medical situation, in the battalion.

(c) Establishes and operates battalion first aid station and dispensary.

(d) Requisitions medical and dental supplies and equipment required by medical detachment.

(e) Prepares medical plan, including recommendation for location of battalion aid station.

(f) Verifies status of medical supplies in all elements of the battalion, and takes steps to insure timely replenishment.

(g) Supervises collection and evacuation of wounded.

(h) Supervises preparation of casualty lists and other required records pertaining to the medical service.

*k. Battalion chaplain.*—(1) *General.*—The engineer armored battalion has a chaplain. Normally he is adviser to the commander and staff on all matters pertaining to religious and moral activities of the command.

(2) *Duties.*—The duties of the chaplain are more specifically covered in AR 60-5 and TM 16-205. In general his duties are—

(a) Supervision of spiritual welfare of command.

(b) Conducting religious services, including funerals.

(c) Spiritual ministrations to sick and wounded.

(d) Correspondence with relatives of deceased personnel.

(e) Coordination of religious work of various welfare societies.

(f) Preparation of estimates and allotment of funds for religious activities not specifically charged to other agencies of the command.

(g) Preparation of reports relative to religious and moral activities of the command.

## SECTION IV

### ENGINEER STAFFS OF HIGHER UNITS

■ 21. CORPS ENGINEER AND STAFF.—*a. Organization.*—The corps engineer section is organized as shown in figure 1. The staff

## ENGINEER TROOPS

includes an executive officer and an operations officer. A small group of enlisted personnel handles routine matters.

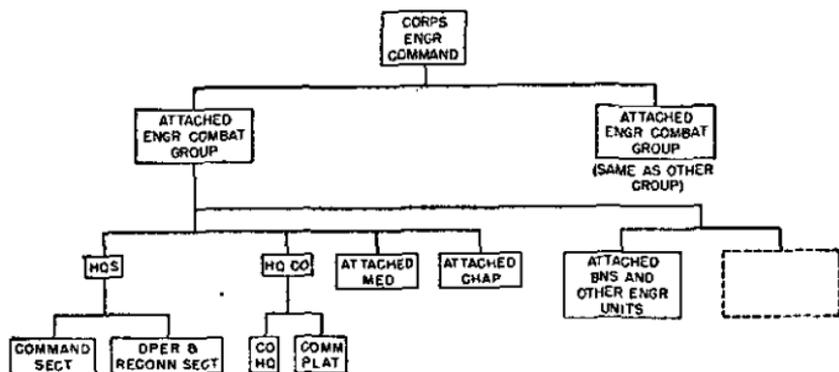


FIGURE 1.—Corps engineer section (see T/O 5-100-1).

*b. General.*—The corps engineer headquarters supervises engineer operations in the corps. Because of the small size of the staff, each officer must be familiar with practically all work of the office in addition to the special functions of his position.

*c. Corps engineer.*—(1) *General.*—The corps engineer is a unit engineer. He commands all engineer troops assigned or attached to the corps and is a member of the staff of the corps commander.

(2) *Duties.*—The corps engineer has the following principal duties:

(a) Maintenance of roads and bridges.

(b) Liaison with division engineers, with special attention to relieving division engineer troops as far forward as his resources permit.

(c) Allocating and distributing engineer supplies to corps troops.

(d) Providing for taking over accumulated engineer materials, especially those captured from the enemy.

(e) Procurement and distribution of maps for corps troops.

(f) Establishing corps engineer depots.

(g) Establishing third-echelon maintenance and repair facilities.

(h) Keeping corps commander informed as to the engineering situation and its effect upon operations of the corps.

(i) Making technical reports to army engineer, arranging with him for attachment to the corps of such additional en-

gineer troops and transportation as the situation demands, and reporting to him upon adequacy of operations of army engineer troops working in his corps area.

(j) Assisting G-4 to prepare the traffic circulation plan by recommending traffic regulations and the direction, amount, and kind of traffic to be authorized on various roads.

(k) Planning and inspecting engineer operations in the corps area.

(l) Executing general supervision of camouflage work and seeing that camouflage discipline is maintained.

d. *The staff.*—(1) *General.*—The members of the staff make studies, compile and distribute engineering information, draw up projects, draft orders, and make technical inspections. The corps engineer assigns work to attached units.

(2) The *executive officer* is responsible for the work of the staff, and for the control and coordination of troop operations in the corps in accordance with orders and policies of the corps engineer.

(3) The *operations officer* supervises collection, evaluation, and distribution of engineer information; compiles data on such subjects as water and forest resources and technical operations of engineer troops; plans surveys and mapping activities in which air force and artillery take part; is responsible for all map distribution in the corps; and coordinates, plans, and supervises operations of engineer units attached to the corps.

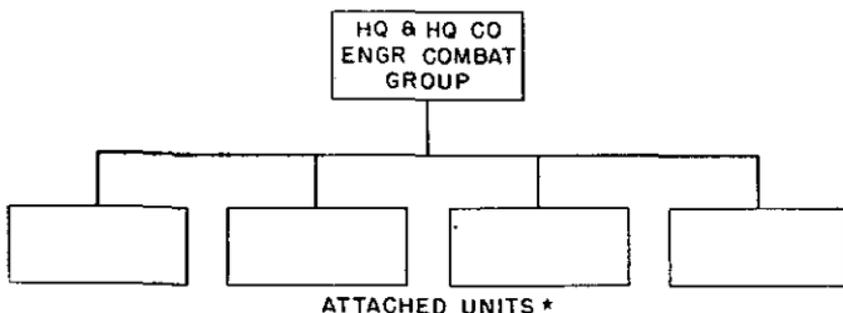


FIGURE 2.—Engineer combat group (T/O tentative).

\* Attached units will consist of four engineer battalions or the equivalent thereof, using any combination of combat, heavy ponton, topographic, camouflage or water supply battalions and light equipment, maintenance, depot, dump truck, light ponton, or topographic companies to set up the desired operational or training team.

■ 22. ENGINEER COMBAT GROUP HEADQUARTERS.—*a. Organization.*—The engineer combat group headquarters is a special tactical engineer group assigned or attached to corps and higher echelons. It consists of command, staff, and service groups, and is organized as shown in figure 2. The group is flexible and may be composed of the approximate equivalent of four battalions. For example, it may consist of three combat battalions, a light equipment company, a maintenance company and a depot company; or other combination of combat, ponton, maintenance or other units to set up the desired operational or training team.

*b. Mission.*—Its mission is to supervise, under the direction of the corps engineer or engineer of a higher headquarters, the operations of such engineer combat battalions and other engineer units as may be attached to it.

■ 23. STAFF OF THE ARMY ENGINEER.—*a. Organization.*—Organization of the army engineer headquarters is shown in figure 3.

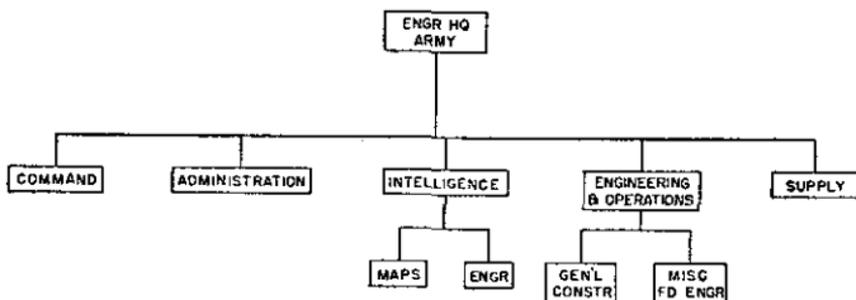


FIGURE 3.—Army engineer headquarters (T/O 5-200-1).

*b. Army engineer.*—The army engineer is a member of the special staff of the army commander and commands all engineer units assigned or attached to the army. He also commands engineer supply establishments within the army area that are not controlled by higher headquarters.

*c. Intelligence section.*—Duties of this section include the collection and dissemination of all engineer information in the form of maps and map revisions for army headquarters and lower echelons, terrain estimates, advice to the engineer of the necessary engineer operations and the available supplies and equipment, and intelligence of enemy equipment and practices regarding its use.

*d. Operation section.*—Duties of this section involve the coordination, planning, and supervision of the execution of all engineer works in the army area and as far forward into corps areas as it is feasible to support these echelons.

*e. Duties of the army engineer.*—The duties of the army engineer include—

(1) Attachment, when necessary, of engineer troops under his command to corps and divisions.

(2) Maintenance of routes of communication, particularly main supply routes.

(3) Maintenance of army and corps engineer depots.

(4) Liaison with the corps engineers.

(5) Informing army commander of engineer situation and making recommendations when situation demands use of troops other than engineers on engineering work.

(6) Distributing to all echelons information secured from engineer reconnaissance so full use may be made of engineer supplies captured from the enemy; and seeing that intelligent use is made of available roads.

(7) Collaborating in preparation of traffic circulation plan for army by recommending such traffic regulations on roads and bridges as may be required by their condition.

(8) In a defensive situation, submitting coordinating plans for defense positions to be organized by corps.

(9) Insuring adequacy of engineer supply.

■ 24. STAFF OF THE ENGINEER, COMMUNICATIONS ZONE SECTION.—

*a.* If a theater of operations is of any considerable size, theater reserves are organized and communications zones

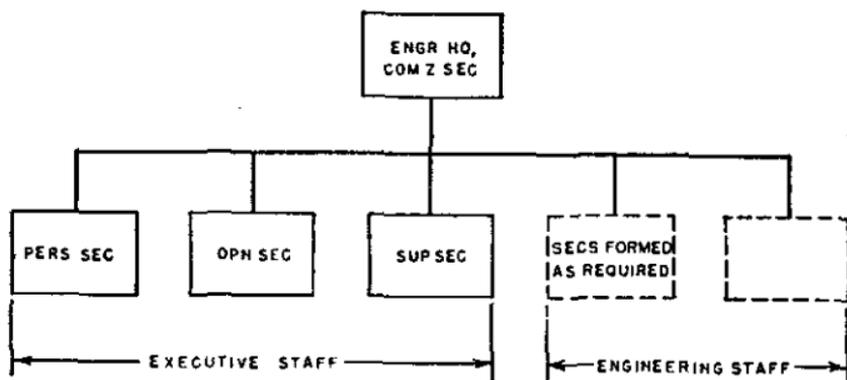


FIGURE 4.—Engineer headquarters, communications zone section (T/O 5-600-1).

established. The functions of the commanding general of the communications zone and the various members of his staff are usually so extensive as to require division of the area behind the armies into a number of communications zone sections, designated by number, area, or location, each under a commanding general with his own staff.

b. The organization for engineer headquarters, communications zone section, is shown in figure 4. While the activities outlined for engineer headquarters, army, are normal for a higher headquarters, the situation in any particular theater of operations may require sections for additional types of operations such as forestry and military mining. These sections are formed as required.

c. The *communications zone engineer* commands all engineer troops assigned or attached to his section and is a member of the special staff of the commanding general, communications zone section. He is responsible for the execution in his area of the various duties and activities with which engineers are charged, except those which have been reserved from the commanding general of his section by some higher commander.

d. The *executive staff* is organized the same as the unit staff described in section II of this chapter.

e. The organization of the headquarters *engineering staff* of the communications zone section is not fixed, as explained in b above, but varies according to the military situation and the character and location of the theater of operations.

■ 25. STAFF OF ENGINEER, COMMUNICATIONS ZONE.—Figure 5 shows the organization of engineer headquarters, communica-

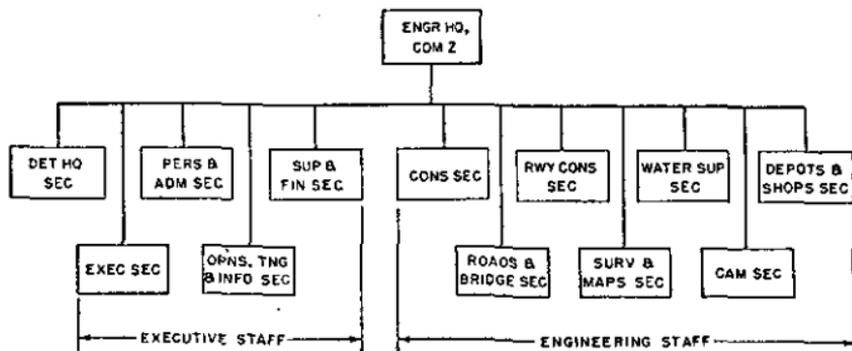


FIGURE 5.—Engineer headquarters, communications zone (T/O 5-600-1).

tions zone. The executive staff is similar to the unit staff described in section II of this chapter. The engineering staff consists of separate sections for each engineer activity.

■ 26. STAFF OF THE ENGINEER, THEATER HEADQUARTERS.—The organization of this staff is shown in figure 6 and consists of an executive officer in charge of the executive staff, and a director of construction in charge of the engineering staff. Each staff is organized and has functions similar to those of the engineer headquarters for the communications zone.

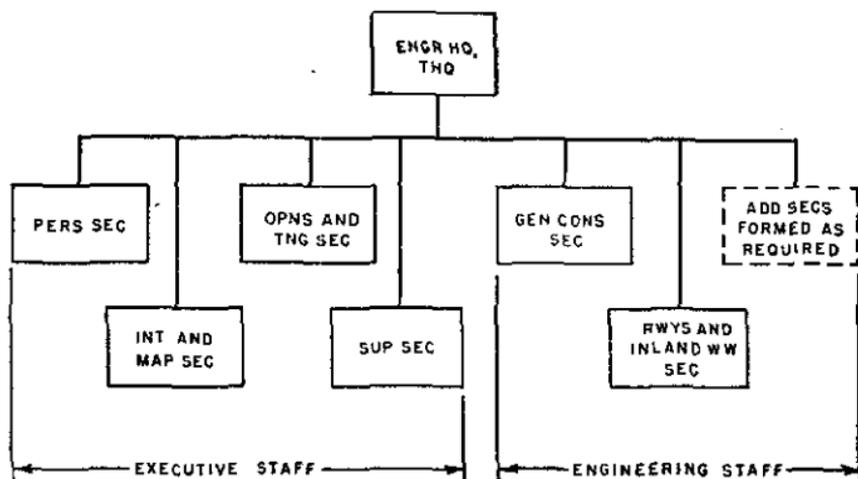


FIGURE 6.—Engineer headquarters, THQ (GHQ) (T/O 5-300-1).

■ 27. STAFF OF AIR FORCE ENGINEER.—a. Figure 7 shows the organization of the engineer section, headquarters, air force. This section consists of the air force engineer and his staff, the staff being divided into sections.

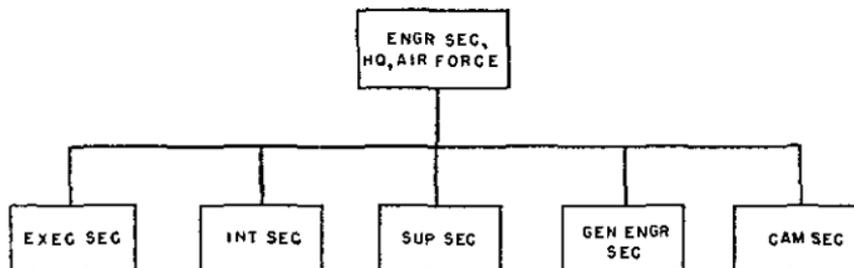


FIGURE 7.—Engineer section, headquarters, air force (T/O 5-800-1).

## ENGINEER TROOPS

b. The duties of the executive, intelligence, and supply staff sections are similar to the duties of those sections in headquarters already described. The duties of the general engineering and camouflage staff sections are to plan and inspect engineer and camouflage work performed under control of the air force engineer. These sections are expanded to fit conditions.

c. The air force engineer is the unit engineer and commands all engineer troops either assigned or attached to the air force, except those assigned or attached to subordinate units thereof. He is responsible for meeting the demands and needs of the air force for engineer work. As unit engineer, he is a member of the special staff of the air force commander.

d. Staff duties of the air force engineer are:

(1) Furnishing, to air force commander, technical advice and assistance on engineer problems.

(2) Planning and supervising employment of all aviation engineer units assigned to air force.

(3) Reconnaissance and recommendations in conjunction with A-3 as to selection of sites for advanced airdromes.

(4) Preparation of air force engineer administrative plans, instructions, orders, and training directives.

(5) Liaison with engineers of Army Ground Forces and Army Service Forces.

(6) Determination of engineer equipment and material requirements for contemplated air force operations.

(7) Administration of supply credits for engineer material and administration of engineer funds for air force.

(8) Inspection of engineer work, troops, equipment, and material.

e. Duties of the air force engineer exercised through units under his command include:

(1) Command of all engineer troops not assigned to subordinate units.

(2) Construction of field airdromes and advanced landing fields.

(3) Rehabilitation of captured airdromes through employment of aviation battalions or airborne aviation battalions.

(4) Reproduction of maps, charts, and overlays, and, in conjunction with photographic squadrons, preparation of charts and target maps as required.

■ 28. STAFF OF ENGINEER, AIR SERVICE COMMAND.—The engineer section of the air service command, headquarters, consists of

the engineer, his staff, and enlisted personnel. The staff officers assist the engineer in work connected with the expansion, maintenance, and servicing of existing airdromes or air bases occupied by the air force. In static situations, all construction activities and the troops to execute them may be placed under the direction of this headquarters. Normal duties of the air service command engineer and his staff are:

a. Supervision and control of engineer activities in air service command.

b. Maintenance and improvement of air force facilities.

c. Provision of engineering construction, maintenance, and supply services for service center area.

d. Inspection and training of engineer units attached to air service command.

e. Technical inspection and supervision of engineer installations at airdromes, air bases, and other air force installations.

f. Assistance to air force units in providing and maintaining camouflage; provision for instructing air force units in camouflage.

g. Recommendations to A-4 on traffic regulation when required.

■ 29. OTHER ENGINEER STAFFS, AIR FORCES.—There will be additional engineer staffs with fighter, bomber, and air support commands.

## SECTION V

### ENGINEER REGIMENTAL, BATTALION, AND COMPANY ORGANIZATION

■ 30. REGIMENT.—*a. Organisation.*—Engineer regiments include both general and special service. They are organized into a headquarters and headquarters and service company, two battalions, a medical detachment, and attached chaplain.

*b. Attachments.*—An engineer regiment may have other engineer units or elements of other arms and services attached to it. The regimental commander coordinates the action of attached units with that of his own.

*c. Regimental headquarters.*—Regimental headquarters consists of the regimental commander and his staff. The regimental staff is similar to the staff of divisional engineer units discussed in section III of this chapter. In general, duties and responsibilities of regimental commanders in commanding and

supervising operations are the same as those of the commander of a divisional engineer battalion except that the regimental commanders have no staff functions with higher command. Functions, duties, and relationships of staff officers of engineer regimental headquarters are the same, in principle, as those of the staff officers of battalion headquarters of divisional battalions.

*d. Headquarters and service company.*—Headquarters and service company of the regiment consists of company headquarters, which includes the command personnel for routine administration, messing, and supply of the company; a headquarters platoon, which furnishes enlisted personnel for the staff sections of regimental headquarters; and a service platoon, which furnishes transportation, special equipment and operators, and repair service for the entire regiment. Company headquarters also operates the regimental officers' mess.

*e. Battalion.*—(1) Battalions which are *components of regiments* consist of a small headquarters and headquarters detachment and three lettered companies. They are unsuited for independent missions away from their regiments unless provided with a provisional service unit. Such a unit would be made up of detachments from headquarters and service company.

(2) *Independent battalions and squadrons* are made up of headquarters, a headquarters and service company or troop, two or more lettered companies or troops, and a medical detachment. The battalion headquarters and service company or troop is organized into a company or troop headquarters and various functional sections without a platoon organization, and has functions similar to those of the headquarters and service company of a regiment.

*f. Attached medical.*—(1) *General.*—Each regiment or independent battalion includes a medical detachment of two or more medical officers, one of which is dental. In the case of the mountain battalion one is a veterinary officer. The senior medical officer is the unit surgeon. Enlisted personnel include medical, dental, sanitary, and surgical technicians, truck drivers, litter bearers, and first-aid men. The mountain battalion also has veterinary personnel. For mess and routine supplies it is attached to one of the companies, usually headquarters company. Transportation of the usual medical detachment consists of a cross-country ambulance and light trucks and trailers for command, personnel, equipment, and supplies. Its routine equipment and medical supplies are suf-

ficient for first-aid treatment and care of sick persons not requiring hospitalization.

(2) *Duties.*—The primary functions of the medical detachment are to collect casualties, and to set up and operate aid stations from which the more serious cases are evacuated by the division or higher unit ambulance services. The medical detachment operates most efficiently when used as a single unit. It maintains a routine dispensary and sick call for minor ailments. Duties of the unit surgeon are described in section III of this chapter.

(3) Since the medical detachment has neither the strength nor the equipment for adequate care of an engineer unit when dispersed, ordinarily engineers use the facilities of the nearest aid stations regardless of arm or service.

■ **31. COMPANY.**—*a. General.*—The engineer company is designated as a lettered company or an independent company. In either case it is the basic administrative unit that can sustain itself in the field. It is the smallest engineer unit commonly employed on a detached mission.

*b. Lettered company.*—The lettered company is a component of an engineer battalion, and normally consists of company headquarters and either two or three numbered platoons. The following organization is typical of the combat company or troop:

(1) *Company headquarters* include the following personnel and their duties:

(a) A *company commander*, responsible for administration, discipline, training, messing, welfare, and operation of the company.

(b) An *administrative officer*, in most engineer companies a lieutenant in company headquarters who relieves company commander of normal routine duties of company administration, supply, messing, and operation and repair of transportation.

(c) A *first sergeant*, who assists company commander in administration of company, and is responsible for maintenance of all company records, interior administration, and police.

(d) A *mess sergeant* responsible to company commander for training of cook and cook's helpers, and charged with procurement and preparation of rations and feeding the men.

(e) A *motor sergeant* responsible to company commander for servicing, repair, and operation of all transportation assigned to company; and charged with training of all truck

drivers, supervising loading and movement of company transportation, and directing activities of company automobile mechanics.

(f) A *supply sergeant*, who supervises activities of supply personnel and is charged with procurement and issue of clothing, armament, equipment, and supplies; maintenance of supply records; and storage and care of company stocks.

(g) *Other noncommissioned officers*, technical specialists charged with supervision of special operations and advising company commander on special problems.

(h) *Technicians* of third, fourth, and fifth grades, receiving pay allowances of noncommissioned officers of same grade. These men are skilled occupational specialists and include tractor drivers, automobile mechanics, and air-compressor operators.

(i) *Privates*, including privates, first class, or privates who have routine assignments as bugler, orderly, or cook's helper. Basics are used as fillers and replacements as circumstances require.

(2) The *platoon* is usually divided into headquarters and three squads or operating units. The headquarters usually includes a lieutenant as platoon commander, a platoon sergeant, and enlisted men for routine work. The platoon commander is responsible for training, discipline, and employment of his platoon. Actual handling of the platoon in engineer work is the duty of the platoon sergeant, the lieutenant remaining free to exercise general supervision.

(3) The *squad* is the basic operating unit and usually consists of a sergeant, unit foreman; a corporal, assistant unit foreman; and other enlisted personnel including carpenters, electricians, mechanics, riggers, demolition men, and truck drivers. In completely motorized units, the squad has organic transportation for tools, equipment, and personnel.

■ 32. INDEPENDENT COMPANY.—An independent company normally consists of a headquarters platoon and one or more other platoons. Generally they are organized, trained, and equipped to do special work.

a. *Headquarters platoon* includes company headquarters and one or more sections variously designated as administrative, service, supply, maintenance and repair or other overhead function for the benefit of the entire company. Headquarters platoon functions are similar to those of company headquarters of a lettered company.

b. Platoons of independent companies are normally divided into platoon headquarters and one or more operating sections, the headquarters supervising and controlling work of the sections. Each section has personnel and equipment for doing technical work or for executing special engineer missions.

c. Organization of independent companies is not uniform.

## CHAPTER 3

### EQUIPMENT AND ARMAMENT OF ENGINEERS

■ 33. GENERAL.—*a. Basis.*—Equipment issued to engineer organizations is prescribed in tables of basic allowances (T/BA-5) or tables of equipment (T/E-5 series). These are supplementary to AR 310-60, in which general provisions governing their preparation and application are given. For each supply service there is a section in T/BA-5 or the T/E-5 series which lists items furnished by that supply service, and basis of issue per organization or subdivision thereof, or per individual. Supply services which prescribe allowances of equipment for engineer troops are the Chemical Warfare Service, the Corps of Engineers, the Medical Department, the Ordnance Department, the Quartermaster Corps, and the Signal Corps. Modifications in the issue of equipment are made from time to time in accordance with developments in weapons, equipment, and organization; critical shipping requirements; and changing conditions of warfare.

*b. Arm and service publications.*—Components of sets and kits, spare parts and accessories to articles, and supplies issued to organizations on a time basis are found in supply publications of the supply services. For engineer supplies the publication is Engineer Supply Catalog, Parts I, II, and III.

*c. Organizational balance.*—In the preparation of engineer tables of organization and engineer tables of equipment a balance has been maintained among the controlling factors of personnel, duties, equipment, weights, and mobility. Weights of tools, accessories, spare parts, and organizational equipment have been kept within the safe capacity of the assigned trucks and trailers. Special heavy equipment and machinery are organically assigned to engineer units or carried in depots in a theater of operations for issue when necessary. This issue is affected by the nature of the engineer work to be accomplished, the importance of time for completion of the work, and the capacity of the engineer unit in trained personnel and repair facilities fully to utilize the maximum performance of the equipment. In order to maintain organizational balance, the factors outlined above must be considered along with the special requirements for each theater of operations.

■ 34. ORGANIZATIONAL EQUIPMENT.—*a. General.*—Organizational equipment consists of individual clothing and equipment, messing equipment, marking and cleaning kits, and other standard sets issued generally to similar units of all arms. Since issue and purpose of such equipment is the same for all engineer units, they are not discussed in subsequent chapters but are summarized below.

*b. Companies.*—Companies are issued organizational equipment for interior administration; for messing, sheltering, supplying, and otherwise providing for the men; and for the maintenance and repair of transportation and equipment. Functional equipment is discussed in subsequent paragraphs.

*c. Regiments and independent battalions.*—Additional organizational equipment is not issued to the headquarters itself, but to pertinent headquarters and service companies or troops. It includes additional tentage, officers' mess equipment, field safes, typewriters, duplicating machines, and similar administrative accessories.

*d. Engineer headquarters.*—Engineer headquarters is issued organizational equipment necessary for enlarged administrative duties; for shelter, messing, and care of the unit engineer and his staff; and for enlisted personnel of the headquarters. The basis of issue in the tables of basic allowances is the number of officers and men comprising the particular headquarters. The items of equipment correspond generally to those issued to companies and headquarters and service companies for similar purposes.

*e. Use.*—Organizational equipment as a rule is used by special personnel included in company headquarters. Thus the first sergeant is assigned and held responsible for administrative equipment such as field desks, typewriters, and other equipment used by company clerks, stenographers, and orderlies. Similarly, the mess sergeant is responsible for items such as field ranges, cooking utensils, and kitchen tentage; and the supply sergeant, for stock of spare parts and equipment, for marking and cleaning equipment, and for repair kits.

■ 35. ENGINEER EQUIPMENT.—*a. General.*—Tools, machinery, and transportation are equipment primarily for engineer work and differ with each engineer organization. As a general rule tools and machinery used by engineer troops are standard commercial items.

*b. Basic sets.*—For convenience of issue, engineer tools have been assembled into sets suitable for different classes of work.

Basic tool sets include blacksmith, carpenter, demolition, pioneer, and tinsmith. These sets are made up of essential hand tools and a small amount of miscellaneous materials required for the usual types of engineer work. Other basic sets are issued for drafting, duplicating, sign painting, and sketching work. All basic sets are issued to general engineer units, and some are issued to special engineer units.

*c. Supplementary sets.*—In addition to the basic sets, supplementary sets are issued to specific engineer units. These sets augment the equipment in basic sets, so as to give each engineer unit tools to suit its strength, and to enable it to do a wider variety of engineer work.

*d. Mechanical equipment.*—Mechanical equipment consists of power and construction machinery. All general and some special engineer units are authorized various items of this equipment. It enables small numbers of engineers to execute greater missions, and to accomplish missions in less time. Engineer units are organically equipped with labor-saving machinery and mechanical devices to as great an extent as practicable, consistent with mobility. Certain items of equipment are issued to lettered companies; other items are issued to headquarters and service company, either for performance of highly technical work that forms a small but important part of the engineer mission, or for assignment to subordinate units for reinforcing purposes. Mechanical equipment may be classified as—

(1) *Standard*, including pieces of mechanical equipment such as medium tractor with angledozer, motorized air compressor, road grader, concrete mixer, motorized earth auger, and powered shovel.

(2) *Special*, including pieces that are organic equipment with engineer aviation units and that are designed to expedite construction, maintenance, and repair of airdromes. Items of special mechanical equipment are carryall scraper, trencher, sheepfoot roller and asphalt mixer.

*e. Special equipment.*—Special engineer units are issued equipment designed specifically for the task for which they are organized. Thus, forestry units are equipped with portable sawmills, ponton units with floating bridge equipage, mapping units with surveying and map reproduction equipment, and water supply units with well-drilling machinery and mobile water purification trucks.

■ 36. TRANSPORTATION.—*a.* Transportation organic with all engineer troop units and engineer headquarters is motorized, except in pack companies of the engineer mountain battalion; it has riding horses and pack and riding mules.

*b.* Vehicles issued to engineers are in accordance with current tables of basic allowances. They include engineer special-purpose trucks and trailers, ordnance trucks, trailers, half-track vehicles, and scout cars.

■ 37. ARMAMENT.—*a.* Engineer troops are armed for—

(1) Personal protection.

(2) Security.

(3) Tank hunting.

(4) Combat as infantry in an emergency.

(5) Protection and defense of barriers, mine fields, prepared demolitions, and obstacles.

(6) Defense of airdromes, dumps, depots, and other installations.

*b.* Individual weapons include bayonet, pistol, carbine, rifle, caliber .45 submachine gun, antitank rifle grenade, and hand grenades.

*c.* Supporting weapons are crew-served; they include caliber .30 machine guns, caliber .50 machine guns, and antitank rocket launcher.

*d.* The portable flamethrower is an assault weapon used against fortifications.

■ 38. SIGNAL COMMUNICATION.—*a. General.*—The term "signal communication" includes all means and methods used to send messages. The normal agencies of signal communication available to engineer units in their operations include the message center, a field telephone system, radio equipment, pyrotechnics, and a messenger service. Messenger service employs available light transportation, such as  $\frac{1}{4}$ -ton trucks and  $\frac{3}{4}$ -ton command cars, and runners; in the pack company of the mountain battalion animals are used. Signal equipment issued to engineer units is discussed below.

*b. Radio.*—Radio communication equipment is issued to all Army Ground Forces engineer combat units and to engineer aviation battalions. It is organic with headquarters and service companies of the battalions of all of the above units, and with lettered companies of the armored engineer battalion only. In divisional units, one set is for operation in the divisional command net, the others are distributed to other echelons as directed by the commanding officer. Although the

portability of radio sets favors their use by engineers, the sets should supplant other types of communication only in emergencies.

*c. Wire communication.*—(1) Signal equipment used in establishing wire communication includes switchboards, telephones, and accessories. This equipment is issued to the headquarters and service company of engineer units.

(2) Engineer regiments establish wire communication from the regimental command post to the battalion command posts or to an advanced message center located as near as possible to the command posts of the battalion. An engineer unit with a brigade or division has wire communication established to the unit command post by brigade or division signal personnel. Wire communications from battalions to lower units are established by personnel in the engineer unit. The heavy ponton battalion and light ponton company establish wire communications when constructing floating bridges and for traffic control on bridges.

*d. Other signal facilities.*—Other signal facilities include panels, flares, Very pistols, and signal lamps for air-ground recognition.

■ 39. AIR FORCES EQUIPMENT.—Airborne engineer units are provided with cargo parachutes, individual parachutes, and aerial-delivery type container assemblies.

■ 40. CHEMICAL WARFARE EQUIPMENT.—For chemical warfare the principal items issued to engineer troops, in addition to portable flamethrowers, are service gas masks, decontamination apparatus, incendiary grenades, and chemical land mines. Special gas masks are issued for animals of the pack companies of the mountain battalion.

## CHAPTER 4

### TRAINING OF ENGINEERS

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#### SECTION I

#### MOBILIZATION TRAINING PROGRAMS (MTP)

■ 41. GENERAL.—*a.* Mobilization training programs provide for basic training of the individual soldier. They are effective upon activation.

*b.* The 5-series of MTP is prescribed for engineer troops. The programs furnish a general guide for the balanced training of troops so they may be prepared to take the field on short notice.

■ 42. TRAINING OBJECTIVE.—The training of all engineer troops follows the basic instructions in FM 21-5, with the objective of developing an offensive spirit in the soldier and the unit.

■ 43. BASIC TRAINING.—All engineer soldiers are given basic military training. (See FM 21-5.)

■ 44. ENGINEER TRAINING.—*a.* Military engineer training undertakes to qualify individuals for duties necessary to the engineer work for which units are responsible. Training varies with the type of organization. The procedure is first to train the individual in his assigned specialty and then to train groups of individuals in combined tasks under their appropriate commanders.

*b.* The objective of engineer training is to develop effective military operating units, such as squad, platoon, and company. Squads and platoons should be kept intact. These are elementary engineer teams, held together by the spirit of comradeship and the direct personal influence of their leaders.

*c.* Specialist training varies with the individual's prior experience. Technical specialists and machine operators in

headquarters and service companies and in company headquarters are trained by attachment to companies and platoons doing work that demands exercise of their specialties.

■ 45. **COMMAND TRAINING.**—Although command training applies only to leaders, it is vital. Command should be decentralized and interference with subordinate commanders held to the minimum consistent with coordinated effort. Officers must know how to plan, estimate, organize, and supervise work, and how to allot tasks to subordinate units to insure that, without supervision, an assigned mission will be begun promptly and executed rapidly.

■ 46. **COMBAT TRAINING.**—*a.* Combat training instructs the unit in combat and in security when on the march, in bivouac, and while engaged in engineer work. Engineers use extended order drill as prescribed in FM 22-5. Infantry methods and formations prescribed in FM 7-10 are modified only to conform with engineer strength, armament, and organization. (See FM 5-6.) Any general procedures adopted by engineer units are uniform within all subordinate units.

*b.* Engineer troops are armed with a variety of weapons. Engineers must be trained to care for their individual and supporting weapons, to be proficient in their use, to know their capabilities, and to keep them clean and ready for immediate use at all times.

## SECTION II

### UNIT TRAINING

■ 47. **GENERAL.**—*a.* The primary purpose of unit training is to provide balanced training with emphasis upon well-organized and well-trained squads and platoons. Unit training programs are put into operation after completion of individual training.

*b.* This section is prepared as a guide to unit training of the engineer combat battalion. Its principles, modified by differences in organization, mission, and equipment, apply to other engineer units.

*c.* The unit commander supervises and inspects training to determine its progress and adequacy. Constant supervision is essential, but it must be informal and should not interrupt continuity of training. In addition, each commander, from the platoon up, must test his units to insure the mastery of each subject before passing to the next.

■ 48. SCOPE.—*a.* A unit training program is interested only in training units. Combined training follows. Enlisted men receiving unit training should have completed individual training and be reasonably well trained as individual soldiers and as basic members of the squad and platoon, ready to progress to more advanced training. Advanced training should include practical application of previous training. It should carry training of individuals, specialists, and small units to standards considerably higher than those reached at the end of individual training. It should prepare platoons, companies, and the battalion for combined training.

*b.* Divisional engineers need almost no unit training in general construction as practiced in the zone of the interior or in peacetime. Construction projects in camps, such as building barracks, target ranges, bayonet courses, and grenade courses, and normal peacetime road maintenance, while affording excellent training for other general engineer units, are not proper training assignments for combat engineer units.

*c.* During unit training, officers and enlisted men of the combat battalion should be developed into an engineer unit capable of performing any duty normally assigned to it in a combat situation. (Duties are listed in sec. I, ch. 5.)

*d.* Any training program, once decided on and started, may require modification for many reasons. However, progressive and balanced training should be preserved.

■ 49. TRAINING FACILITIES.—*a. Site.*—Problems of training combat engineer troops are similar to those common to other combatant arms and services as set forth in FM 21-5 and MR 3-1. Training may be carried out in almost any locality, but if possible terrain and climate should approximate conditions in the probable theater of operations. Large areas are necessary; for the prescribed training subjects include not only most of those given infantry but also certain engineer subjects, such as explosives and demolitions, which require additional isolated areas as a safety precaution. The terrain should vary from flat to rolling or mountainous, contain numerous types of roads and bridges, have both dry and muddy ground conditions, and include sand, clay, loamy, and rocky soils. It should also contain all kinds and sizes of standing timber, and streams and gullies of various depths and widths.

*b. Equipment.*—Full use of all equipment must be made to insure efficient and complete execution of engineer training missions. When the amount of training equipment is inade-

quate for the number to be trained, schedules must be prepared for rotating the available equipment. When shortages in training equipment occur, substitute equipment should be obtained or improvised. Resourcefulness in devising training expedients is essential.

■ 50. TRAINING TEXTS.—*a.* For a list of War Department publications and visual training aids for conducting engineer training, see FM 21-6 and 21-7.

*b.* Normally, Field and Technical Manuals contain sufficient material for training purposes, but ingenuity must be used to apply this material to specific training tasks.

*c.* Training films, film strips, and graphic portfolios are valuable aids to instruction and are employed where practicable.

■ 51. TIME.—Unit training programs normally are based on a 48-hour training week. More time is utilized when desirable, especially in marches and field exercises. Open time is used to compensate for interruptions; for additional instruction in subjects inadequately learned; to provide refresher training; and for subjects given local emphasis, such as orientation talks. Formal athletic competitions, or preparation for athletic competitions should be conducted in time outside the prescribed training week.

■ 52. PROCEDURE AND METHODS OF INSTRUCTION.—Instruction is conducted as prescribed in FM 21-5. The subordinate unit commanders are the instructors in all unit training. Only in schools, review of MTP training, and other allied subjects, should instruction be centralized. Advanced training should be practical and should repeat MTP training only when necessary.

*a. Basic training.*—(1) Review of basic and general subjects must be continued regularly to maintain a high standard of individual proficiency.

(2) In order to avoid monotony, periods devoted to review of basic training should be short.

*b. Field exercises.*—Squads, platoons, companies, and battalions should cover an engineer subject by field exercises involving a tactical situation. Emphasis should be placed on solving the tactical as well as the engineer problems. Where applicable, training in the supply of engineer materials, rations, water, gasoline, and ammunition should form a part of the exercise. Periods should be long enough to permit the

performance of the assigned task under the assumed tactical situation; frequently this will mean several days for a single exercise. Night operations should include technical operations, such as bridge building and laying mine fields, as well as tactical operations. One or more of the subjects included in the weekly program should be covered in a night operation. All operations should be conducted without lights. Every exercise should be followed by a thorough critique.

*c. Organizational unity.*—In combat zones, combat battalions normally accomplish their technical engineer tasks by breaking up into small units. Therefore the emphasis in technical training should be placed on making squads and platoons effective operating units. For bridging missions companies must be trained as units.

*d. Troop schools.*—Troop schools for officers and noncommissioned officers will be conducted throughout the entire training period as preparation for subsequent instruction of units. The schools should rehearse basic principles of each exercise before execution. The schools will be held as directed by higher authority.

*e. Troops' preparation.*—Troops should be grounded in the fundamentals of each task prior to its execution.

*f. Performance.*—Whenever any unit performs an exercise in an unsatisfactory manner, the exercise should be repeated until it is done satisfactorily.

■ 53. ENGINEER TRAINING.—The military application of all engineer work will be stressed constantly so all personnel may see it in its proper perspective.

■ 54. TACTICAL TRAINING.—The primary mission of the engineer combat battalion is engineer work. However, in an emergency the battalion may be held in mobile reserve and used as infantry in combat. Therefore tactical training must be conducted in order to meet that emergency.

*a. Scope.*—Tactical training that is stressed includes protection of working parties, defense of road blocks and other obstacles, combat actions of squads and platoons, motor movements, entraining and detraining, entrucking and detrucking, night tactical operations, field tactical operations, and field tactical training of the battalion.

*b. Combat intelligence.*—Each commander of a combat unit is responsible for obtaining information on the enemy forces

opposing him. In general, in the combat battalion, the staff agency for combat intelligence is the intelligence (S-2) section. Personnel used for intelligence work are trained and employed in accordance with the doctrines prescribed in FM 30-5, 30-15, and 30-25. Since the reconnaissance section of the combat battalion is not available for combat intelligence most of the time a small group should be trained in this duty. Training of the engineer squad should include additional training for combat or reconnaissance patrol.

*c. Security on the march.*—The doctrine of security is found in FM 100-5 and 7-10 and should be followed at all times by all engineers. Moving columns make excellent targets for low-flying aircraft. All engineer troops must be instructed thoroughly in protective measures against such attacks.

*d. Local security.*—Engineer troops engaged in work at or near the front are trained to keep their weapons immediately available. During unit training, leaders will stress this practice and decide plans of action under simulated enemy interference.

■ 55. TRAINING IN CHEMICAL WARFARE.—*a.* To meet the probable use of toxic gas by the enemy, engineer troops must be trained thoroughly in chemical warfare; in how the enemy can use it; and in defense against chemical attack.

*b.* For thorough training, all instruction is practical rather than theoretical, making maximum use of the training munitions and supplies authorized by AR 775-10, Tables of Basic Allowances, and Tables of Equipment for engineers.

*c. References.*—Principles governing offensive and defensive use of chemicals, together with combined operations and security in connection therewith, are found in FM 100-5, 3-5, and TM 3-305.

■ 56. TRAINING IN OPERATION AND MAINTENANCE OF EQUIPMENT.—Motor maintenance, training of driver, and maintenance, care, and operation of engineer mechanical equipment are stressed concurrently with other training. Maintenance or organizational transportation and mechanical equipment is taught by training in—

*a. First-echelon maintenance.*—This training is essentially preventive maintenance by operator or driver and assistants. It includes—

- (1) Correct operation.
- (2) Operator servicing, lubricating, and cleaning.

(3) Tightening and minor adjustments.

(4) Inspections within companies and similar units.

*b. Second-echelon maintenance.*—This training is essentially preventive maintenance by organizational mechanics and maintenance specialists. It includes—

(1) Centralized organizational servicing and lubrication.

(2) Preventive maintenance, adjustments, minor repairs, and unit replacements within the limits of time available and equipment authorized.

(3) Systematic maintenance inspections within independent battalions and similar units.

■ 57. SPECIALIST TRAINING.—*a.* Technical or specialist schools will be conducted as necessary to perfect the individual in his technical specialty. Such schools should be scheduled to interfere as little as possible with unit exercises. Each individual specialist normally should attend any exercise scheduled by his unit.

*b.* Specialist training should include training of such communication personnel as radio and switchboard operators, message center clerks, and code clerks.

*c.* Technical engineer training, especially the military aspects of specialist work, is given maximum time. Because of the skilled nature of the tasks on which engineer units are employed, personnel should be recruited from men already trained in civil life for those tasks. A lack of equipment may make it impossible to give specialist training in early stages of training periods. But when equipment is available and units are operating under combat conditions, unit commanders should utilize the apprentice system continually to train additional personnel as replacements. Casualties cannot then cripple work of their units, and expansion of units to meet emergencies can be made readily.

■ 58. STAFF TRAINING.—*a.* Headquarters of the engineer combat battalion is perfected in its duties by training in—

(1) Staff functions and operations.

(2) Mechanics of issuing orders.

(3) Planning of battalion operations.

(4) Proper distribution of work to companies.

(5) Inspection of the execution of engineer work.

(6) Engineer needs of troops of other arms of the division.

*b.* (1) To plan and put into operation the unit training program of an engineer organization, battalion headquarters

## ENGINEER TROOPS

must develop and put into practice a standing operating procedure based on that of the next higher unit.

(2) The will of the commander should be expressed in standing operating procedure for technical and tactical emergencies. To be effective it must be revised from time to time. Modern warfare is characterized by speed of movement and rapidly changing situations. No unit commander should permit a standing operating procedure to standardize the technical or tactical employment of his troops, to narrow the scope of training, or to destroy the opportunities for use of initiative.

■ 59. SERVICE TRAINING.—Members of headquarters and service company are perfected in their specialties by additional technical instruction and training carried on concurrently with the performance of their duties. Training is scheduled for small groups when it will interfere least with the normal functional duties of the company.

■ 60. MEDICAL TRAINING.—Members of the medical detachment are perfected in their specialty by additional technical instruction and training conducted concurrently with the performance of their duties. In addition, training is given in basic, technical, combat, and tactical subjects. First-aid training is conducted under the supervision of the unit surgeon and is in accordance with the doctrines contained in FM 8-5 and other pertinent Medical Field Manuals.

### SECTION III

#### TRAINING MANAGEMENT

■ 61. TRAINING MANAGEMENT.—*a.* Fundamental training doctrines are prescribed in FM 100-5 and 21-5.

*b.* Detailed instructions in regard to military training of engineers are contained in Engineer Field and Technical Manuals and in special instructions in Mobilization Regulations, Training Circulars, and periodic training directives.

### SECTION IV

#### ENGINEER DRILLS AND INSPECTIONS

■ 62. ENGINEER DRILLS.—*a. Training.*—Engineer drills are utilized in training the individual to use special tools and equip-

ment, and in training groups of individuals to execute definite engineer tasks under the command and supervision of commissioned and noncommissioned officers.

*b. Purpose.*—The primary purpose of drills for engineers is to develop efficient work units. Drills develop group feeling and teamwork, establish standardized training procedures, and assist in development of leadership and maintenance of discipline.

*c. General.*—Actual engineer operations generally are not conducted according to formal drills. Methods of procedure described in engineer field and technical manuals are modified to suit conditions. Most tasks given an engineer unit present problems that require improvised solutions. This rarely can be accomplished by following a formal drill. When a task involves repeating a number of identical operations or use of standard equipment, such as erection of wire entanglements, construction of ponton bridges, and unloading and loading tools, systematized organization for work may approximate a drill.

■ 63. FORMAL INSPECTIONS.—*a.* Formal inspections are executed according to rules for the class of troops with which the engineer unit is serving. Thus, formal inspection for the engineer combat battalion follows the rules prescribed for the infantry rifle battalion, except that the inspection normally includes engineer transportation, equipment, and tools.

*b.* Formal inspections of troop units without transportation are executed as for infantry.

*c.* When held with transportation, unless otherwise directed, tools and spare parts are inspected. Ordinarily each company should be inspected in its own area or at a designated place where companies will be inspected successively. Platoon commanders give commands to open and close ranks and to lay out and load tools. Tools are laid out in lines to the sides and rear of each vehicle, within the frontage of the platoon. Space is left between and around sets to permit easy inspection. The manner in which tools are laid out is prescribed by the unit commander.

■ 64. TACTICAL INSPECTIONS.—*a. Purpose.*—Tactical inspections of engineer units consist of practical examinations and tests. They have two purposes:

(1) Reviewing essentials of subjects of instruction included in the master training program.

(2) Determining whether or not individuals and the engineer unit as a whole habitually apply the information taught.

*b. Value.*—Tactical inspections are invaluable training aids in that they stimulate the unit to its best effort and indicate where corrective measures should be applied. Examinations and tests are not the final goal of achievement but are merely a gage of proficiency and of the quality of instruction. The goal of any engineer unit is the ability to perform quickly and effectively its missions under actual combat conditions.

*c. Scope.*—Tactical inspection of an engineer unit is made by testing the unit with a tactical mission appropriate to the unit and its equipment. The inspection should embody problems that test the unit in the march to, the organization for, and the execution of a definite engineer mission. The equipment and transportation always are present. Practical tests are conducted in the use of special equipment carried by the unit. This can be done either by requiring execution of a prescribed task or by inspecting work that has been done by the unit with this equipment. Tactical inspection is primarily a test of the organization as a working unit. Allowance is made for the experience and training of the unit.

*d. Influencing factors.*—Inspecting officers must consider certain factors that will influence their evaluation of performances of the units inspected.

(1) Inspectors must be thoroughly familiar with the units.

(2) Availability and condition of facilities and equipment for training must be taken into account.

(3) Where balanced training has been impossible, for example, where no target range or ponton bridge or mechanical equipment has been available, ratings should be proportioned to show actual points earned by the unit as against possible earned points had conditions been ideal.

## CHAPTER 5

### ENGINEER UNITS, COMBAT, WITH ARMY GROUND FORCES

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#### SECTION I

#### ENGINEER COMBAT BATTALION, INFANTRY DIVISION

■ 65. MISSION.—The mission of the engineer combat battalion of the infantry division is to increase the division's combat effectiveness by means of general engineer work. It is often reinforced when the division acts independently, and may be reinforced as required when the division operates with larger units.

■ 66. ORGANIZATION.—The battalion consists of headquarters, a headquarters and service company, three lettered companies, and a medical detachment. Organization is shown in figure 8. (For details see T/O 5-15.)

■ 67. EQUIPMENT.—Organic equipment consists of engineer tools and machinery necessary to execute the ordinary engineer work required by the division. Most of the tools are integral parts of basic squad and platoon sets such as carpentry, demolition, and pioneer. Stream-crossing equipment, includes assault boats, pneumatic reconnaissance boats, and pneumatic floats. The battalion has a few items of mechanical equipment, including motorized air compressors and medium tractors.

■ 68. TRANSPORTATION.—Enough transportation is provided for simultaneous movement of all personnel and equipment. Vehi-

cles include light trucks for command and reconnaissance, light cargo trucks and trailers for transportation of tools and equipment, and 2½-ton dump trucks for engineer work.

■ 69. ARMAMENT.—Individual weapons include the bayonet, carbine, rifle, and pistol. Supporting weapons include caliber .30 and caliber .50 machine guns, caliber .45 submachine guns, antitank rocket launchers, and antitank rifle grenades.

■ 70. TRAINING.—Basic and unit training are in accordance with principles outlined in chapter 4. Tactical training is allied with engineer field training. In an emergency, the combat battalion fights as infantry. Training for combat includes general tactical disposition of the entire battalion.

■ 71. PLATOON.—*a. Organization.*—The platoon consists of platoon headquarters and three squads of 13 men each. (For details see T/O 5-17.)

*b. Platoon headquarters.*—The platoon headquarters conducts reconnaissance, plans the work of the platoon, initiates supply arrangements, assigns tasks to the squads, and exercises general supervision over the execution of engineer work.

*c. Squad.*—The squad performs the principal tasks assigned to the platoon. A squad may be assigned a separate task under its leader; or, the three squads may work under the platoon sergeant. The squad may be divided into two groups, one under the squad leader and one under the corporal. However, the normal work party is one squad with its own tool sets: a carpenter set, a pioneer set, and a demolition set, all transported in a 2½-ton dump truck. The normal duty of the squad leader is to supervise the work of the squad, but he will do actual work when necessary and when it does not detract from proper supervision. The squad operates and cares for transportation and equipment assigned to it.

*d. Duties.*—(1) The platoon is a highly mobile unit for executing general engineer work. Its duties include digging, clearing, and grubbing; rigging; carpentry; construction; demolitions; wrecking; and care of tools.

(2) When the platoon is reinforced with equipment and specialists from company headquarters, or from headquarters and service company, it can perform tasks for which its organic personnel and equipment are inadequate.

(3) The platoon is armed with the weapons listed in paragraph 69. With this firepower, and its mobility, the platoon

can participate in defense against air and ground attack, and in offense when fighting as infantry.

■ 72. COMPANY.—*a. Organization.*—The company consists of company headquarters and three platoons. (For details see T/O 5-17.)

*b. Company headquarters.*—(1) Company headquarters directs, controls, and assists the operations of the three platoons. It includes personnel and equipment for administration, messing, and routine supply; for engineer reconnaissance, supply, planning, and estimating; and for execution of special engineer tasks.

(2) The company commander divides company tasks into platoon tasks, preferably keeping platoons intact. He may assign company headquarters personnel and equipment to assist platoons. His duties are to—

(*a*) Analyze the task, divide it into its components, and allot work and available means to his subordinate commanders, making as full use as possible of platoon organization.

(*b*) Supervise execution of work, seeing that tasks are carried out properly, that correct methods are used, that supply of material is maintained, that difficulties are anticipated and provided for, and that platoon commanders are given all possible facilities in executing their work.

(*c*) Train his company in all its functions.

(*d*) Lead his company in combat.

(*e*) Make engineer reconnaissance rapidly, accurately, and continuously; and submit information properly and promptly.

(3) Engineer work done by the company is the same as that done by platoons. Company headquarters can furnish its mechanical equipment and engineer tool sets to assist platoons.

■ 73. BATTALION HEADQUARTERS.—Battalion headquarters consists of the unit (division) engineer and his staff, with duties and functions explained in detail in chapter 2. T/O 5-16 shows its organization. Battalion headquarters directs, controls, and assists headquarters and service company and three lettered companies in executing engineer work and in combat.

■ 74. HEADQUARTERS AND SERVICE COMPANY.—Headquarters and service company is composed of company headquarters and sections designated as division engineer, administrative, intelligence, operations, reconnaissance, supply, and repair. For

details see T/O 5-16. For functions and duties of the company see chapter 2.

*a. Company headquarters.*—Company headquarters consists of the company commander, an administrative officer, and personnel for handling routine administrative, mess, and supply functions for headquarters, and headquarters and service company.

*b. Division engineer section.*—The division engineer section is supervised by the assistant division engineer. Duties of the section conform to duties outlined for an assistant division engineer in chapter 2. Enlisted personnel assigned to this section prepare sketches, plans, designs, and graphical reports for general use. Additional personnel from other sections of headquarters and service company is required from time to time to assist in this work. Standard topographic map work is not a normal duty.

*c. Administrative section.*—Duties of the administrative section are in accordance with duties of the adjutant (S-1) outlined in chapter 2. In general, this section is charged with handling all battalion administrative matters and operating the message center, and signal communication equipment at battalion headquarters.

*d. Intelligence section.*—The intelligence section is supervised by S-2, who also is camouflage officer for the battalion. Functions of the section conform to duties of S-2 outlined in chapter 2. It does miscellaneous surveying, drafting, camouflage inspection, and photography, but extensive tasks of this nature are not expected of the unit. Surveying is an occasional job, limited to simple field work.

*e. Operations section.*—The operations section is supervised by S-3, with duties as outlined in chapter 2. In general, this section is charged with formulating plans, specifications, and detailed orders for all operations of the battalion, preparation of training programs and schedules, training inspections, and engineer reconnaissance.

*f. Supply section.*—The supply section supervised by S-4, has duties in accordance with those of S-4 outlined in chapter 2. It operates the portable water supply equipment of the battalion. It transports and cares for tools and equipment assigned to the section. Supplementary equipment and supplies for reinforcing lettered companies are transported by this section.

*g. Repair section.*—The repair section operates under the commander of headquarters and service company, and super-

vises the second-echelon maintenance of all battalion motor transportation and engineer mechanized equipment. Responsibility for maintenance is a command responsibility of the commander of the unit to which the vehicle or equipment is assigned. The section's equipment includes a motorized maintenance shop, welding equipment, a 4-ton wrecking truck, and miscellaneous tools. Part or all of the battalion's transportation may be pooled under this section for operation under battalion control.

■ 75. ECHELONS.—In many cases it is desirable to split battalion headquarters and headquarters and service company into forward and rear echelons. Composition of each echelon is decided by the battalion commander to fit each situation.

■ 76. ATTACHED MEDICAL.—*a.* The medical detachment consists of two officers, one a dentist, and enlisted men. (For details see T/O 5-15.) The detachment provides two company aid men for each lettered company; however, it does not have strength to provide litter bearers. Personnel for this purpose must be drawn from engineer elements of the battalion, or obtained from the division medical battalion.

*b.* Organic transportation includes a light truck for command and reconnaissance, and for transporting personnel, medical equipment, and supplies.

*c.* The medical officer is battalion surgeon and a member of the special staff of the battalion commander. His duties and functions are explained in chapter 2.

*d.* Duties of the medical detachment in the field are outlined in chapter 2. In general, the medical detachment contributes to the health and hence to the general efficiency of the battalion.

■ 77. DUTIES.—*a.* Duties the battalion is most commonly called upon to perform are—

(1) Removal and passage of enemy obstacles, including mine fields and booby traps.

(2) Preparation of obstacles by demolitions and other means, including laying mine fields and setting booby traps.

(3) River-crossing operations to include use of assault boats, preparation of fords, and other stream-crossing expedients; and construction of vehicle ferries, portable bridges, and, in emergencies, ponton bridges capable of sustaining combat-team loads. (See ch. 5, sec. VIII.)

## ENGINEER TROOPS

(4) Emergency repair and maintenance of roads, and reinforcement, repair, and maintenance of bridges.

(5) Engineer reconnaissance.

(6) Providing local security for own working parties.

b. Important duties less common than those given above are—

(1) Rapid general lay-out of rear positions, signs for marking routes, and guiding units to sectors.

(2) Construction of fixed bridges and roads.

(3) Construction, improvement, and maintenance of advance landing fields.

(4) Defense of mine fields and other obstacles.

(5) Combat as infantry.

(6) In a stabilized situation, construction of the more elaborate defensive installations requiring the use of special engineer equipment.

(7) Tank hunting.

c. Duties performed by specialists or other small groups of the battalion are—

(1) Advising division commander on technical matters.

(2) Supply of engineer tools, equipment, and materials.

(3) Water supply.

(4) Map supply.

(5) Camouflage inspection.

d. For modification of normal organization of engineer units for combat see FM 5-6.

## SECTION II

### ENGINEER COMBAT BATTALION, NONDIVISIONAL

■ 78. GENERAL.—Engineer combat battalions, nondivisional, are attached to corps and army. The number of battalions attached at any one time varies according to the situation.

■ 79. MISSION.—a. When attached to corps, these units do general engineer work in the forward part of the corps area, and such engineer work in the division service areas as may be taken over by corps. They reinforce divisional engineers or relieve them of engineer tasks so they may work farther to the front.

b. When attached to army, they do general engineer work in the army area as far forward as possible.

■ 80. ORGANIZATION AND EQUIPMENT.—Organization and equipment are identical with those of the engineer combat battalion described in section I of this chapter. Organization is shown in figure 8. For details see T/O 5-15.

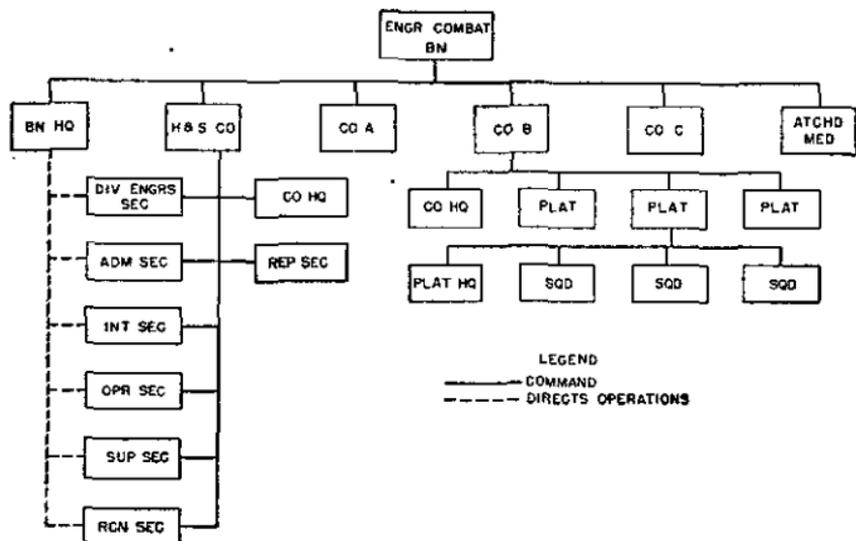


FIGURE 8.—Engineer combat battalion, infantry division, or nondivisional (T/O 5-15).

■ 81. TRAINING.—Since engineer combat battalions, nondivisional, have missions similar to those of combat battalions of the infantry division, their training is the same.

■ 82. EMPLOYMENT.—*a.* This unit, when attached to corps, is employed under the tactical command of engineer combat group headquarters, assigned to corps. They follow closely behind the infantry divisions and take over the maintenance of roads to relieve the division engineer troops; replace the temporary bridging expedients with more substantial structures capable of carrying the heaviest military loads; and take over the engineer dumps released by the division engineers.

*b.* When attached to army, the unit is employed under the direction and supervision of engineer combat group headquarters assigned to army. It is used in preparation for, during, and after an attack, principally upon the maintenance of routes of communication in rear of the several corps.

■ 83. DUTIES.—*a. When attached to corps.*—(1) Most common duties are:

(a) Improvement and maintenance of roads, bridges, and landing fields, mainly in the corps service area.

(b) Construction of or extension of barrier zones.

(c) Engineer assistance to corps troops and to troops attached to the corps.

(d) Engineer reconnaissance.

(e) Reinforcement of divisional engineer units either by taking over engineer work in division rear areas or by attachment of subordinate units, to divisional engineer units.

(f) River-crossing operations to include use of assault boats, preparation of fords and other stream-crossing expedients, and construction of vehicle ferries, portable bridges, and ponton bridges capable of sustaining combat-team loads.

(g) Providing local security for own working parties.

(h) Removal and passage of enemy obstacles, including mine fields.

(2) Important duties less common than those given above are:

(a) General construction, including construction of roads and bridges.

(b) Operation of utilities to a limited extent.

(c) Defense of mine fields and other obstacles.

(d) Rapid general lay-out of rear positions, marking routes, and guiding units to sectors.

(e) In a stabilized situation, construction of the more elaborate defensive installations requiring the use of special engineer equipment.

(f) Combat as infantry.

(g) Tank hunting.

(3) Duties performed by specialists or other small groups of the battalion are:

(a) The supply of engineer tools, equipment, and materials, to a limited extent.

(b) Water supply.

*b. When attached to army.*—Most common duties are:

(1) Construction, improvement, and maintenance of roads, bridges, and landing fields; and construction of railways.

(2) Engineer assistance to corps when necessary.

(3) Engineer assistance to army troops and troops attached to army.

(4) Construction of army depots and other installations.

(5) Installation and operation of water supply facilities.

- (6) Engineer reconnaissance.
- (7) Provision of engineer materials for use of corps and divisions.
- (8) Operation of utilities in army area.
- (9) Provision of local security for own working parties.
- (10) Construction of deliberate field fortifications including concrete structures.

## SECTION III

## ENGINEER SQUADRON

■ 84. MISSION.—*a.* The engineer squadron is the engineer component of the cavalry division, and does general engineer work.

*b.* The squadron may be reinforced with other engineer troops when the cavalry division acts independently, operates as part of a cavalry corps, or is assigned or attached to another echelon.

■ 85. ORGANIZATION.—The engineer squadron consists of headquarters, a headquarters and service troop, two lettered troops, and a medical detachment. Organization is shown in figure 9. (For details see T/O 5-115.)

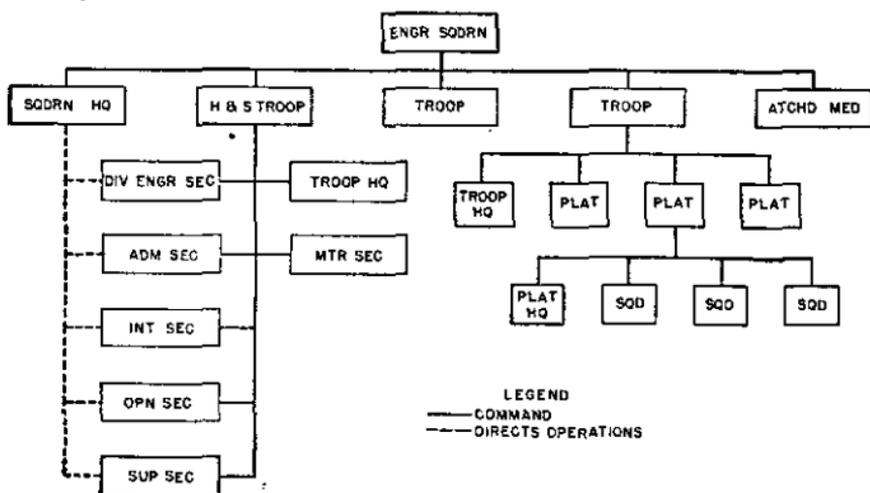


FIGURE 9.—Engineer squadron (T/O 5-115).

■ 86. EQUIPMENT.—The unit's engineer tools, equipment, and machinery are generally the same as those of the engineer combat battalion.

■ 87. TRANSPORTATION.—The squadron is completely motorized. Types of vehicles and their use are generally the same as in the combat battalion.

■ 88. ARMAMENT.—Armament is similar to that of the engineer combat battalion.

■ 89. TRAINING.—Engineer squadrons are trained to operate with the cavalry division. In addition to basic and unit training prescribed for engineer troops in chapter 4, their training includes principles of tactics and technique of cavalry.

■ 90. PLATOON.—The platoon is identical in organization, armament, and equipment with the platoon of the combat battalion discussed in section I of this chapter. Because of the special tactical operations of the cavalry division certain duties are emphasized in training the platoon. These include proficiency in—

a. Independent operations, including detachment of small groups for execution of hasty repairs to insure passage of advance cavalry elements.

b. Engineer ground reconnaissance in forward zones.

c. Engineer work with the rear guard, including rapid preparations for demolitions and construction of obstacles.

■ 91. TROOP.—The troop of the engineer squadron is identical with the company of the combat battalion in organization, armament, and equipment. (For details see T/O 5-17.)

■ 92. SQUADRON HEADQUARTERS.—Squadron headquarters includes the division engineer and his staff. (For details see T/O 5-116.) Command and staff duties explained in chapter 2 are applicable.

■ 93. HEADQUARTERS AND SERVICE TROOP.—The headquarters and service troop consists of troop headquarters and several service sections. There are sections to provide personnel for operation of the staff sections of squadron headquarters, a section for supply, and a section for motor maintenance and repair.

■ 94. MEDICAL DETACHMENT.—The medical detachment consists of two officers, one medical and one dental, and enlisted men as shown in T/O 5-115. Transportation includes a cross-coun-

try ambulance, command and reconnaissance truck, and a 2½-ton cargo truck for transporting personnel, equipment, and supplies. Functions and duties of the squadron surgeon and of the detachment as a whole are explained in chapter 2.

■ 95. DUTIES.—The duties of the engineer squadron are generally similar to those of the engineer combat battalion. Because of the mobility of the cavalry division and the rapidity with which the situation changes in distant operations the squadron—

a. Keeps routes of communication and supply open for movement of the entire column.

b. Erects and overcomes obstacles.

c. Makes maximum use of demolitions and engineer expedients.

d. Disrupts or destroys hostile routes of enemy withdrawal, by flank operations.

e. Engages in combat whenever necessary to accomplish its mission.

f. Performs continuous engineer reconnaissance.

## SECTION IV

## ARMORED ENGINEER BATTALION

■ 96. MISSION.—a. The armored engineer battalion facilitates the rapid movement of the armored division and impedes hostile ground forces by means of general engineer work.

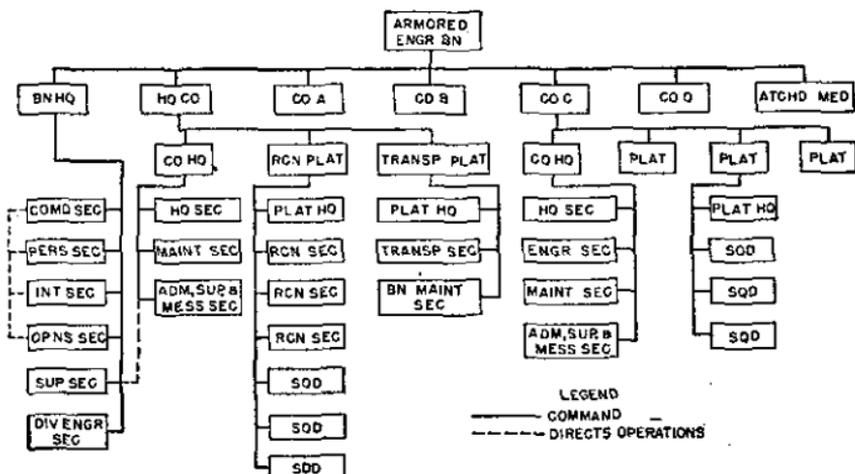


FIGURE 10.—Armored engineer battalion (T/O 5-215).

b. In facilitating movement of the division, a treadway bridge company, when required, is attached to the battalion to provide crossings by either ferries or floating bridges.

■ 97. ORGANIZATION.—The battalion consists of headquarters, headquarters company, four lettered companies, and a medical detachment. Organization of the battalion is shown in figure 10. (For details see T/O 5-215.)

■ 98. EQUIPMENT.—a. Basic engineer tool sets are the same as those issued to engineer combat battalions. This battalion is equipped with air compressors, trailed angledozers, portable engineer water-supply equipment sets, a motorized general purpose repair shop, and trailer-mounted welding equipment.

b. Stream-crossing equipment includes pneumatic reconnaissance boats and pneumatic floats.

■ 99. TRANSPORTATION.—There is sufficient transportation for the simultaneous movement of all personnel and equipment. For details see current Tables of Organization, Tables of Equipment, and Tables of Basic Allowances for engineers.

■ 100. ARMAMENT.—Individual weapons include the bayonet, carbine, pistol, rifle, and caliber .45 submachine gun. Supporting weapons are sufficient for the defense of engineer working groups against small hostile mechanized or infantry parties. For details see current Tables of Organization.

■ 101. RADIO COMMUNICATION.—The armored engineer battalion is equipped with radios, the detailed distribution of which is shown in current Tables of Basic Allowances and Tables of Equipment.

■ 102. TRAINING.—a. Basic and unit training outlined in chapter 4 are applicable to troops of the armored engineer battalion.

b. Technical training of radio operators is covered in FM 24-5. Radio operators should be permanently assigned to the same sets and to the same stations. They are required to inform their leaders promptly of any messages received or intercepted, and to report when outgoing messages have been cleared.

c. Combined training emphasizes coordination of engineer operations with tactics and technique of armored force units. Engineer troops must be familiar with the capabilities, limita-

tions, and general employment of tanks. During combined operations the staff must adjust the performance of its functions to those developed for the special staff of the armored division.

■ 103. **LETTERED COMPANY.**—The lettered company consists of company headquarters and three platoons. (For details see T/O 5-217.)

*a. Company headquarters.*—Company headquarters is divided into a headquarters section, an engineer section, a maintenance section, and an administrative, supply, and mess section (trains).

(1) *Headquarters section.*—This section consists of a captain as company commander, a lieutenant as reconnaissance and communication officer, and enlisted personnel for operation of the section.

(2) *Engineer section.*—This section is supervised and controlled by a staff sergeant. Its personnel performs special engineer tasks for the whole company, including operation of a portable water-purification unit, provision of a medium tractor and a motorized air compressor with operators, and execution of drafting and carpenter work.

(3) *The maintenance section.*—This section is supervised by a maintenance sergeant. Its personnel performs normal maintenance and repair of all company motor vehicles.

(4) *Administrative, supply, and mess section.*—This section is charged with routine duties of company administration, mess, and supply. It is supervised by a first sergeant, and includes necessary operating personnel.

*b. Platoon of the lettered company.*—This platoon consists of platoon headquarters and three squads.

(1) *Platoon headquarters.*—Headquarters includes a lieutenant and enlisted personnel necessary for operations. Platoon headquarters has radio equipment for use when acting on detached missions. It can reinforce the squads with platoon tool sets including carpenter, demolition, and pioneer.

(2) *Squad.*—The squad is organized to perform the basic engineer tasks normally encountered in armored force operations. For details of composition see T/O 5-217.

(3) *Training.*—The platoon is trained in combat principles which parallel those of attached infantry units of the armored division. Engineer training is similar to that of the platoon of the engineer combat battalion, infantry division. Special emphasis is given in training the platoon for—

(a) Overcoming enemy obstacles, including passage of enemy mine fields.

(b) Hasty repair of roads and detours.

(c) Hasty repair, improvisation, and reinforcement of bridges and culverts.

(d) Use of pneumatic floats for ferrying; preparation of fords, and use of other expedients for crossing armored vehicles and attached troops over streams on a broad front.

(e) Rapid construction of obstacles, and preparation of antitank mine fields, including their defense when required.

(f) Engineer reconnaissance.

c. *Company training.*—Company training is designed to develop the unit to a high degree of proficiency in the orderly and rapid execution of engineer work as a member of the various armored combat teams.

■ 104. BATTALION HEADQUARTERS.—Battalion headquarters is divided into a command section, a personnel section, an intelligence section, an operations section, a supply section, and a division engineer section. (For details see T/O 5-216).

a. *Command section.*—This section consists of the battalion commander (division engineer) and his staff. Duties and functions of the staff are explained in chapter 2.

b. *Personnel section.*—A first lieutenant, personnel officer, assisted by a warrant officer, clerical, is in charge of the personnel section. Enlisted personnel are designated for specific personnel record tasks such as morning report, pay roll, and service records.

c. *Intelligence section.*—This section furnishes personnel for the activities of the battalion S-2. In addition to performing the normal duties of a unit S-2 as explained in chapter 2, the intelligence officer coordinates all engineer reconnaissance activities.

d. *Operations section.*—This section has personnel for maintaining and operating engineer equipment not assigned to the companies. This mechanical equipment may be used for a special task, to assist in operations of the reconnaissance platoon, or for reinforcement of the lettered companies. A chemical sergeant, under S-3, supervises all matters involving the use of gas and smoke, and defense against chemicals.

e. *Supply section.*—The officer in charge of the supply section is assistant to the battalion supply and transportation officer. Enlisted personnel have routine supply duties.

f. *Division engineer section.*—This section is under the

supervision of the assistant division engineer. This section does drafting and operates duplicating equipment. It is assigned a radio which operates in the division command net. A staff sergeant, camoufleur, assists the assistant division engineer in formulating and directing camouflage activities.

■ 105. HEADQUARTERS COMPANY.—Headquarters company is divided into a company headquarters, a reconnaissance platoon, and a transportation platoon, as detailed in T/O 5-216.

a. *Company headquarters.*—Company headquarters consists of a headquarters section, a maintenance section, and an administrative, supply, and mess section.

(1) *Headquarters section.*—The headquarters section is the battalion, as well as the company communications section. The officer commanding headquarters company is also battalion supply (S-4) and transportation officer. He is a member of the battalion staff. His chief assistant commands the supply section of battalion headquarters. Enlisted personnel give routine assistance. His noncommissioned assistant is a technical sergeant, communications, who assists in the training, instruction, and supervision of work of the battalion communication personnel.

(2) *Maintenance section.*—Maintenance section personnel includes a staff sergeant and other necessary enlisted personnel. This section handles maintenance and repair of motor vehicles assigned to battalion headquarters and headquarters company.

(3) *Administrative, supply, and mess section.*—A first sergeant supervises activities of this section. Personnel, equipment, and routine duties are generally the same as those of similar sections in lettered companies.

b. *Reconnaissance platoon.*—This section consists of platoon headquarters, three reconnaissance sections, and three squads.

(1) *Platoon headquarters.*—The platoon commander controls and supervises work of the three reconnaissance sections and squads, and coordinates their activities with operations of divisional reconnaissance groups. Platoon headquarters can reinforce the sections and squads with basic engineer tool sets. It is equipped with a radio for keeping the battalion command post informed of its movements, and for transmission of reconnaissance information.

(2) *Reconnaissance section.*—This section works in conjunction with the advanced reconnaissance groups of the armored division. Forms for engineer reconnaissance reports shown in FM 5-6 are used.

(3) *Squad*.—Organization, functions, and duties are the same as those of the squad of the lettered company.

(4) *Duties*.—In operations the reconnaissance platoon of the armored engineer battalion normally is attached to the reconnaissance battalion of the armored division. The platoon performs the following duties:

(a) Assists advance of the battalion by removing obstacles and road blocks, and by providing passage of enemy mine fields which cannot be detoured.

(b) Obtains engineer information, and transmits to the engineer command post information necessary for the engineer battalion to make timely preparation for repair of roads and bridges to be used by the armored division.

(c) Prepares road blocks and demolitions to delay or halt hostile forces.

*c. Transportation platoon*.—The transportation platoon is divided into platoon headquarters, a transport section, and a battalion maintenance section.

(1) *Platoon headquarters*.—The transportation platoon is commanded by a lieutenant as assistant transportation officer. Functions and duties of this headquarters are in accordance with the duties of a unit transportation officer described in chapter 2.

(2) *Transport section*.—This section is under supervision of a sergeant as truckmaster. The section cares for and transports the battalion supply of ammunition, antitank mines, explosives, division engineer supplies, and fuel and lubricants.

(3) *Battalion maintenance section*.—This section is responsible for second-echelon maintenance and repair of all transportation and motorized equipment for which the battalion is responsible. It is equipped with a general-purpose motorized repair shop and trailer-mounted and portable welding equipment.

*d. Personnel*.—Personnel are trained in the use of organic weapons, particularly automatic weapons, so as to be capable of fighting in small groups.

■ 106. ATTACHED MEDICAL.—The medical detachment is commanded by the unit surgeon. He is assisted by two lieutenants, one medical and one dental, and necessary enlisted personnel. Transportation is shown in current Tables of Organization. The duties of the unit surgeon and of the detachment as a whole are explained in chapter 2.

- 107. DUTIES.—The armored engineer battalion must—
- (1) Reconnoiter and mark roads, trails, and other routes.
  - (2) Reconnoiter bridges, defiles, obstacles, and areas.
  - (3) Construct, improve, or reinforce fords, bridges, and culverts.
  - (4) Construct floating bridges and ferries.
  - (5) Transport infantry elements across streams, using pneumatic equipment.
  - (6) Construct, defend, and remove obstacles, including mine fields.
  - (7) Fight as infantry when required.
  - (8) Execute demolitions.
  - (9) Establish and operate water points.
  - (10) Locate and, if necessary, prepare advance landing fields.
  - (11) Provide emergency road repair and maintenance.
  - (12) Supply maps, including reproduction of maps.
  - (13) Provide engineer supply.
  - (14) Provide local security for its own working parties.
  - (15) Supervise and inspect camouflage.
  - (16) Engage in tank hunting.

## SECTION V

## ENGINEER MOTORIZED BATTALION

■ 108. MISSION.—*a.* The mission of the engineer motorized battalion is to increase combat effectiveness of the infantry motorized division by performing all engineer work required to facilitate its movement in the advance, and to impede hostile forces interfering with its operations.

*b.* Operations of the motorized division are conducted with a maximum of speed. Components of the engineer battalion must be well forward to insure expeditious advance of leading elements in difficult areas.

*c.* The battalion is reinforced by attachment of additional motorized engineer troops as required when the division is operating either independently or with larger units.

■ 109. ORGANIZATION.—The battalion consists of battalion headquarters, a headquarters and service company, three lettered companies, a reconnaissance company, and a medical detachment. Its organization is shown in figure 11. (For details see T/O 5-75.)

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■ 110. EQUIPMENT.—*a.* Basic engineer tool sets and equipment are similar to those in the combat battalion. This equipment includes a motorized general-purpose repair shop and trailer-mounted welding equipment.

*b.* Stream-crossing equipment includes pneumatic floats, assault boats, and pneumatic reconnaissance boats.

■ 111. TRANSPORTATION.—Trucks and trailers are similar to those of the combat battalion. The engineer motorized battalion has sufficient transportation for simultaneous movement of all personnel and equipment.

■ 112. ARMAMENT.—Individual weapons include the bayonet, carbine, rifle, and pistol. Supporting weapons are similar to those of the combat battalion.

■ 113. RADIO COMMUNICATION.—Radio communication is available down to include squads of lettered and reconnaissance companies.

■ 114. TRAINING.—Basic and unit training outlined in chapter 4 are applicable. Combined training emphasizes—

*a.* Close cooperation and coordination of reconnaissance with divisional ground reconnaissance groups.

*b.* Rapid execution of engineer work in preparing routes and overcoming obstacles to insure expeditious advance of division elements and a maximum exploitation of mobility.

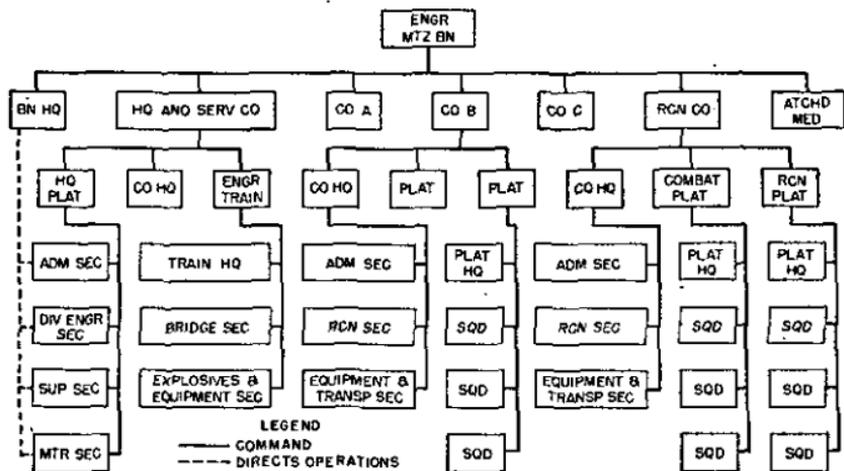


FIGURE 11.—Engineer motorized battalion (T/O 5-75).

c. Tactics and technique of the motorized division in combat, including development of an aggressive fighting spirit in engineer troops operating with the most advanced divisional groups and combat teams.

■ 115. **LETTERED COMPANY.**—The lettered company consists of company headquarters and two platoons. Its organization is shown in figure 11. For details see T/O 5-77.

a. *Company headquarters.*—This headquarters consists of an administrative section, a reconnaissance section, and an equipment and transportation section.

(1) *Administrative section personnel.*—The personnel includes that necessary for handling company administration, supply, and mess.

(2) *Reconnaissance section.*—This section operates with advance reconnaissance groups of combat teams and is responsible for sending in timely reports for transmission to battalion headquarters. In addition it evaluates and consolidates reconnaissance information gathered by the two platoons of the company.

(3) *Equipment and transportation section.*—This section includes operators for the heavy equipment and mechanics for handling motor maintenance and repair for the company. Heavy equipment for reinforcing the platoons includes a motorized air compressor and a medium tractor.

b. *Platoon.*—The platoon consists of a platoon headquarters and three squads.

(1) *Platoon headquarters.*—This headquarters controls and supervises operations of the squads. It is equipped with platoon tool sets for reinforcing the squads.

(2) *Squad.*—The squad is smaller than that of the combat company but its organization is generally the same. It has tool sets for carpenter, demolition, and pioneer work.

c. *Training.*—Engineer training is the same as that of the combat company. Special emphasis is placed on training the company and platoons for offensive action as part of a motorized division combat team. Platoon training emphasizes—

(1) Rapid removal of enemy obstacles and passage of enemy mine fields.

(2) Hasty repair of roads including use of expedients and improvisation of detours.

(3) Hasty repair or reinforcement of bridges and culverts.

(4) Expeditious employment of stream-crossing equipage.

■ 116. RECONNAISSANCE COMPANY.—The reconnaissance company consists of company headquarters, a combat platoon and a reconnaissance platoon. Its organization is shown in figure 11. (For details see T/O 5-78.)

*a. Company headquarters.*—The headquarters consists of an administrative section, a reconnaissance section, and an equipment and transportation section.

(1) *Administrative section personnel.*—The personnel includes that necessary for handling routine administrative, mess, and supply functions.

(2) *Reconnaissance section.*—This section directs and supervises activities of the reconnaissance platoon. It is the clearing point for information sent in by the reconnaissance platoon and compiles it for early transmission to the battalion command post.

(3) *Equipment and transportation section.*—This section is directed and supervised by a staff sergeant. Heavy equipment consists of a motorized air compressor and a medium tractor. The section does company motor repair and maintenance.

*b. Combat platoon.*—This platoon has the same organization, armament, equipment, and supplies as the platoon of the lettered company. It employs its squads in conjunction with operations of the reconnaissance platoon.

*c. Duties.*—The company works in cooperation with other reconnaissance groups. It facilitates advance of reconnaissance elements by overcoming obstacles and making hasty repairs to roads and bridges.

■ 117. BATTALION HEADQUARTERS.—Battalion headquarters consists of the unit (division) engineer and his staff, with duties and functions outlined in chapter 2. T/O 5-76 shows the organization. This headquarters assists, directs, and controls its subordinate units in the execution of engineer work.

■ 118. HEADQUARTERS AND SERVICE COMPANY.—*a. Organization of headquarters and service company* (fig. 11).—It consists of company headquarters, a headquarters platoon, and an engineer train. (For details see T/O 5-76.)

*b. Company headquarters personnel.*—The personnel handles company transportation and routine administrative, mess, and supply functions of the company.

*c. Headquarters platoon.*—The platoon is divided into an administrative section, a division engineer section, a supply section, and a motor section. Each section provides personnel

and equipment for operation of various staff sections of battalion headquarters.

*d. Engineer train.*—This consists of train headquarters, a bridge section, and an explosives and equipment section.

(1) *Train headquarters.*—The train is commanded by a lieutenant, assisted by a technical sergeant as train leader. They supervise and control its operations.

(2) *Bridge section.*—The bridge section includes necessary personnel for transportation and maintenance of stream-crossing equipment.

(3) *Explosive and equipment section.*—This section is commanded by a staff sergeant. Its personnel handles transportation of demolition equipment, and the battalion supply of explosives and antitank mines.

■ 119. **ATTACHED MEDICAL.**—The medical detachment of the motorized battalion consists of the unit surgeon, a medical and a dental officer, and enlisted personnel as shown in T/O 5-75. Transportation includes a cross-country ambulance, a command and reconnaissance truck, and a 2½-ton cargo truck with trailer for transportation of personnel, equipment, and supplies. Duties of the unit surgeon and of the detachment are explained in chapter 2.

■ 120. **DUTIES.**—*a.* Duties which the engineer motorized battalion will most commonly be called upon to perform are:

(1) Rapid removal and passage of enemy obstacles, including mine fields.

(2) Preparation of obstacles by demolition and other means, including laying mine fields.

(3) River-crossing operations.

(4) Emergency repair of roads and bridges, and limited construction of detours.

(5) Engineer reconnaissance.

(6) Provision of local security for own working parties.

(7) Defense of mine fields and other obstacles.

(8) Combat.

(9) Water supply.

(10) Engineer supply.

(11) Map supply.

(12) Technical advice and assistance in camouflage.

(13) Tank hunting.

*b.* The battalion moves so rapidly and continuously while in forward areas that there is little opportunity to improve

## ENGINEER TROOPS

routes of advance. All engineer efforts will be expended toward insuring expeditious advance of division elements.

### SECTION VI

## ENGINEER MOUNTAIN BATTALION

■ 121. MISSION.—*a.* The engineer mountain battalion is the engineer component of the infantry mountain division and does general engineer work for it.

*b.* The battalion may be reinforced with other engineer troops as circumstances and conditions require.

■ 122. ORGANIZATION.—The mountain battalion consists of headquarters, a headquarters and service company, a motorized company, two pack companies, and a medical detachment. Organization is shown in figure 12. For details see T/O 5-235.

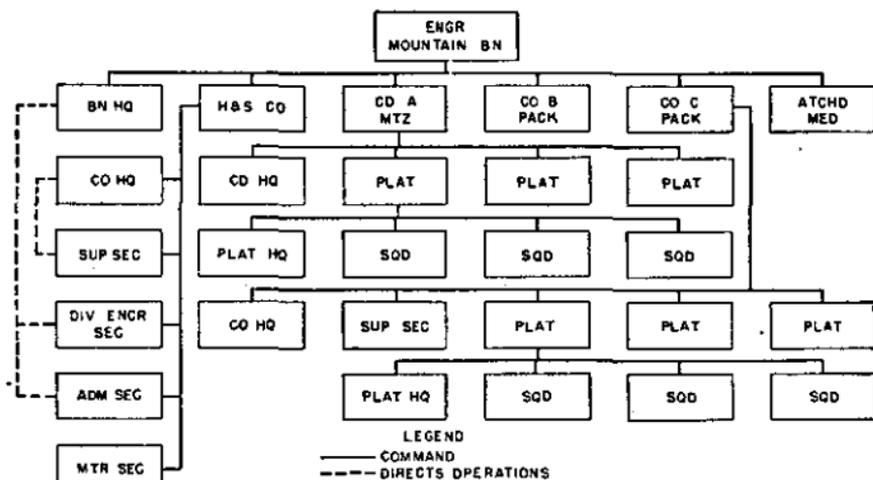


FIGURE 12.—Engineer mountain battalion (T/O 5-235).

■ 123. EQUIPMENT.—*a.* Engineer equipment is generally the same as that of the combat battalion. Stream-crossing equipage consists of pneumatic floats carried in headquarters and service company.

*b.* Individual clothing is designed to protect the troops from rigors of the climate and to conserve their physical endurance under fatiguing conditions.

■ 124. TRANSPORTATION.—The battalion uses both motor and animal transportation. Organic motor transportation in headquarters and service company and the motorized company is sufficient to move all personnel, supplies, and equipment of those units. Animal transportation organically assigned to the two pack companies is sufficient for moving all supplies and equipment, but not all personnel. Most of the animals are riding and pack mules, but there are a few riding horses, and a bell horse for each pack company.

■ 125. ARMAMENT.—Individual weapons include the bayonet, carbine, pistol, and rifle. Supporting weapons consist of caliber .30 machine guns.

■ 126. TRAINING.—*a.* Basic and unit training for engineer troops discussed in chapter 4 are applicable to all troops of the engineer mountain battalion. These troops are trained to fight as infantry. Combat principles for mountain infantry are applicable.

*b.* Basic training for personnel of pack companies includes stable management and the care of animals. Practice marches with full pack convoys are helpful in the detection, correction, and prevention of badly fitted saddles, poorly adjusted loads, and the leaving of loads on animals for excessive periods. Training in the preparation of loads for pack transport stresses balance, stability, and proper distribution of pressure.

*c.* Unit training of pack companies should be conducted in geographical areas and under climatic conditions similar to those to be encountered in the theater of operations. Subordinate units are trained to operate as detached groups. In mountain operations the independent mission is the rule.

*d.* Troops are trained in principles and practice of mountain climbing and in overcoming terrain difficulties. Mountain march training must be frequent in order to teach technique of—

(1) Posture, tread, rhythm and deep breathing, and halts and march in ascent and in descent.

(2) Using march compass, altimeter, and clinometer, including making march sketches.

(3) Construction and use of hanging scaffoldings and seat.

(4) Roping down, and safety measures.

(5) Recognition of mountainous dangers.

(6) Body care and protection.

(7) Care and use of special clothing and equipment.

■ 127. **MOTORIZED COMPANY.**—The motorized company is divided into company headquarters and three platoons. (For detailed organization see T/O 5-237.)

*a. Company headquarters.*—The headquarters performs routine administration, mess, and supply functions of the company. Its field duties in performance of engineer work are similar to those of the company headquarters of an engineer combat company, explained in section I of this chapter. Company headquarters can furnish assistance to the platoons with its mechanical equipment and engineer tool sets. Principal items of equipment include air compressors and a medium tractor. Field operations are restricted in movement through mountainous country, and its duties consist of performing engineer work at locations reasonably easy of access.

*b. Platoon.*—(1) The platoon is composed of platoon headquarters and three squads.

(2) *Platoon headquarters.*—This headquarters controls operations of the squads by assigning tasks and supervising work. It carries platoon carpenter, demolition, and pioneer sets for reinforcing the squads, and caliber .30 machine guns for their protection.

(3) *Squad.*—The squad executes the principal tasks; its organic transportation is a 2½-ton dump truck. Squad equipment includes carpenter, demolition, and pioneer sets.

■ 128. **PACK COMPANY.**—The pack company includes company headquarters, a supply section, and three platoons. It is organized, trained, and equipped to operate in relatively inaccessible and restricted areas.

*a. Company headquarters.*—Headquarters performs administration, mess, and general routine duties. It has a caliber .30 machine gun for its own protection or for assignment to a platoon. Pack mules carry basic engineer tools and equipment.

*b. Supply section.*—(1) Supply is so difficult in mountain terrain that it is handled by a special supply section. Movement is slow and delivery irregular because of difficulties of terrain and climate, and because elements of the company often operate on widely separated independent missions.

(2) The pack mules transport supplies such as ammunition, pack artillery, forage, and rations. Water for the company normally is carried in 2-gallon containers; suitable means for filling these must be provided at water supply points.

*c. Platoon.*—(1) The pack platoon is organized into a platoon headquarters and three squads.

(2) Platoon headquarters controls and supervises operations of the three squads; it is trained to perform engineer work on detached missions in relatively inaccessible places. Pack mules transport basic platoon tool sets and other equipment.

(3) The squad has a sergeant as unit foreman. The pack mules carry carpenter, demolition, and pioneer basic squad tool sets, and explosives. In actual operations each squad is assigned a caliber .30 machine gun from platoon headquarters for local security while at work.

*d. Duties.*—The pack platoon has duties in execution of engineer work similar to those of the platoon in the motorized company. It is organized and equipped to construct, repair, and maintain pack trails. It is engaged in this work most of the time.

■ 129. BATTALION HEADQUARTERS.—Battalion headquarters directs, controls, and assists the headquarters and service company, the motorized company, and the two pack companies in execution of engineer work. It consists of the unit (division) engineer and his staff. Duties and functions are outlined in chapter 2. T/O 5-236 shows organization of battalion headquarters. The battalion supply officer (S-4) commands headquarters and service company.

■ 130. HEADQUARTERS AND SERVICE COMPANY.—*a.* Headquarters and service company consists of company headquarters, a division engineer section, an administrative section, a supply section, and a motor section. These sections, except the motor section, provide personnel and equipment required for operating various staff sections of battalion headquarters.

*b.* All transportation is motorized. The company does not have mechanical equipment for reinforcing subordinate units. The pneumatic floats in the supply section are employed as in the engineer combat battalion. The company does not render assistance to pack companies in maintenance and repair of their animal equipment.

■ 131. ATTACHED MEDICAL.—*a. Medical detachment.*—This detachment consists of medical, dental, and veterinary officers, and necessary enlisted personnel. Transportation consists of a cross-country ambulance, and light trucks for command and reconnaissance and transportation of personnel, equipment, and supplies. Functions and duties of the unit surgeon and of the detachment are explained in chapter 2.

*b. Veterinary personnel.*—The veterinary personnel supervise the care and well being of the animals organic with the pack companies. They render medical and surgical treatment in healing local injuries and curing animal diseases. They instruct enlisted personnel in administering first-aid treatment to animals.

■ 132. DUTIES.—Mountain warfare is characterized by difficulties which terrain offers to movement. The importance of engineers increases with the difficulties of terrain. Duties of the battalion normally include—

*a.* Maintenance and repair of existing roads and pack trails, and construction of new roads and trails as required.

*b.* Minor repairs to railroads.

*c.* Preparation and execution of demolitions, including use of chemicals in cooperation with chemical troops.

*d.* Destroying or overcoming enemy obstacles; blocking passes and other defiles on routes of communication by constructing obstacles, laying antitank mines, and the like, including defense of same.

*e.* Engineer reconnaissance, including employment of reliable local guides when advantageous.

*f.* Providing local security while at work.

*g.* Map supply.

*h.* Water supply.

*i.* Construction of shelters.

*j.* Construction, maintenance, and operation of aerial tramways in a stabilized situation.

*k.* Combat as mountain infantry in an emergency.

*l.* Engineer supply.

*m.* Instruction and technical assistance in camouflage practice.

## SECTION VII

### AIRBORNE ENGINEER BATTALION

■ 133. MISSION.—*a.* The airborne engineer battalion increases the combat effectiveness of the airborne division by means of engineer work.

*b.* This battalion and its equipment are carried by aircraft to the scene of operations. It assists the division to seize and exploit strategical and tactical localities in hostile territory that are not immediately accessible to ground troops. A rear

echelon with earth-bound equipment remains at the base area until it can be moved overland.

c. The battalion assists in missions of destruction and demoralization in hostile rear areas; it hinders the movement of enemy reserves and supplies, blocks hostile avenues of retreat, closes passes and defile, and destroys river crossings.

d. Engineer troops may be among the first landed where obstacles must be cleared from the runways to permit subsequent landings. They improve and maintain glider landing areas, and initiate work to provide landing areas for powered aircraft.

■ 134. ORGANIZATION.—The airborne engineer battalion is composed of a headquarters, a headquarters and service company, a parachute company, two glider companies, and a medical detachment. Organization is shown in figure 13. (For details see T/O 5-225.)

■ 135. EQUIPMENT.—*a.* The battalion is equipped with basic engineer squad and platoon tool sets. Stream-crossing equipment includes pneumatic reconnaissance boats and pneumatic floats. It carries no bridge equipment. Engineer mechanical equipment consists of lightweight tractors with angledozers, and portable timber chain saws.

*b.* Battalion equipment is generally small and compact so it can be moved fairly easily by airplane. It is sufficient for accomplishment only of essential engineer tasks. This emphasis on small size and compactness also is found in types of transportation and armament organic with the battalion.

■ 136. TRANSPORTATION.—Vehicles are sufficient for administration, training, and supply when the battalion is in bivouac or at an emplaning area, and for limited operational use on engineer missions. There is insufficient transportation for all personnel and equipment. Most light vehicles are taken into action, and the heavy vehicles left behind.

■ 137. ARMAMENT.—Individual weapons include the carbine, pistol, rifle, and caliber .45 submachine gun. Supporting weapons are caliber .30 light machine guns and antitank rocket launchers.

■ 138. TRAINING.—*a.* Basic and unit training of engineers as outlined in chapter 2 is applicable to troops of airborne engi-

near units. Additional basic training is given in parachute jumping, emplaning and deplaning, and going into action upon landing.

*b. Combat training* of airborne engineer troops is similar to that of the engineer combat battalion. Airborne troops must be trained to fight upon landing, when they are especially vulnerable.

*c. Combined training* includes detailed planning and rehearsal for specific engineer operations in coordination with the other arms and services.

■ 139. PARACHUTE COMPANY.—The parachute company is organized into a company headquarters and three platoons. It normally is attached to the parachute regiment of the airborne division for specific operations.

*a. Company headquarters.*—Officer personnel includes a captain as company commander and a lieutenant as administrative officer. There is personnel for handling routine administration, maintenance, and supply. All personnel mess with headquarters and service company. Principal items of equipment for reinforcing the platoons are portable timber chain saws. Lack of organic transportation reduces company supplies to a minimum.

*b. Parachute platoon.*—This platoon consists of a platoon headquarters and three squads or operating units. Parachute platoons may be detached for operation with subdivisions of the parachute infantry regiment.

(1) *Platoon headquarters.*—Officer personnel includes a first lieutenant as platoon commander and a second lieutenant as his assistant. Enlisted personnel includes a platoon sergeant and other operating personnel. Principal items of equipment for reinforcing the squads consist of a pneumatic reconnaissance boat and a platoon pioneer set. Squads may be detached for operation with elements of the airborne division.

(2) *Squad.*—The parachute squad operates under direct control of a sergeant as unit foreman, assisted by a corporal. It can perform such engineer duties as to—

(a) Execute hasty demolitions for destruction of enemy communications, stores, utilities, and installations.

(b) Assist in capture of enemy fortified positions.

(c) Construct or remove obstacles.

(d) Assist in seizure of bridges and other important works which the enemy may have prepared for demolition, including removal of charges.

(e) Assist in capture of enemy mechanical equipment and motor vehicles.

(f) Execute minor, hasty rehabilitation work on landing fields to make them available to gliderborne elements.

■ 140. GLIDER COMPANY.—The glider company is organized into a company headquarters and two platoons. Glider companies normally accompany the glider regiments of the airborne division for specific operations. All personnel and equipment are transported to the objective by gliders and cargo planes.

a. *Company headquarters.*—(1) Officer personnel consists of a captain as company commander and a lieutenant as administrative officer. There is personnel for handling routine administration, maintenance, mess, and supply. Organic transportation include a ¼-ton truck with a ¼-ton cargo trailer for company supply, inspection, and general utility. Company headquarters can reinforce the platoons with basic tool sets and a lightweight angledozer.

(2) The commander of a glider company concentrates his unit as quickly as possible to initiate general engineer work and to assist or relieve elements of the parachute company which may be hard pressed. A glider company is capable of executing more extensive engineer work than the parachute company, and one of its principal duties is to rehabilitate landing fields and remove obstructions to make possible reasonably safe landings of powered aircraft. More extensive work on landing areas normally is executed by airborne aviation engineers, as explained in section II, chapter 7. They are transported by aircraft to the objective in the later stages of the operation.

b. *Glider platoon.*—This platoon consists of a platoon headquarters and three squads. Platoons normally are employed under company control but frequently may be detached for operation with other elements of the airborne division.

(1) *Platoon headquarters.*—The platoon commander is a lieutenant. Enlisted personnel includes a staff sergeant and other operating personnel. Principal items of equipment are a ¼-ton truck with a ¼-ton cargo trailer, squad sets of engineer equipment, and a portable timber chain saw.

(2) *Squad.*—The glider squad operates under control of a sergeant as unit foreman, assisted by a corporal. Its engineer duties are to—

- (a) Fill shell holes and clear landing strips of obstructions.
- (b) Construct and defend obstacles.

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- (c) Prepare and execute planned demolitions.
- (d) Improve and erect bridges over unfordable streams and reinforce existing bridges.
- (e) Destroy and remove enemy obstacles.
- (f) Neutralize prepared enemy demolitions.
- (g) Make minor repairs to routes of communication.
- (h) Seize enemy vehicles and equipment.
- (i) Make minor improvements for local water supply.

■ 141. BATTALION HEADQUARTERS.—Battalion headquarters consists of the unit (division) engineer and his staff with duties and functions explained in detail in chapter 2. T/O 5-226 shows the organization of battalion headquarters. Battalion headquarters directs, controls, and assists the operations of all subordinate units. The staff should be thoroughly familiar with the tactics and technique of airborne units, their capabilities and limitations in actual operations, and the difficulties involved in executing airborne troop missions. Their special duty, in addition to their general duties referred to in chapter 2, is cooperation with the division and the air forces in a detailed map-study of the objective and study of the tactical, technical, and strategical considerations involved in planning the operation.

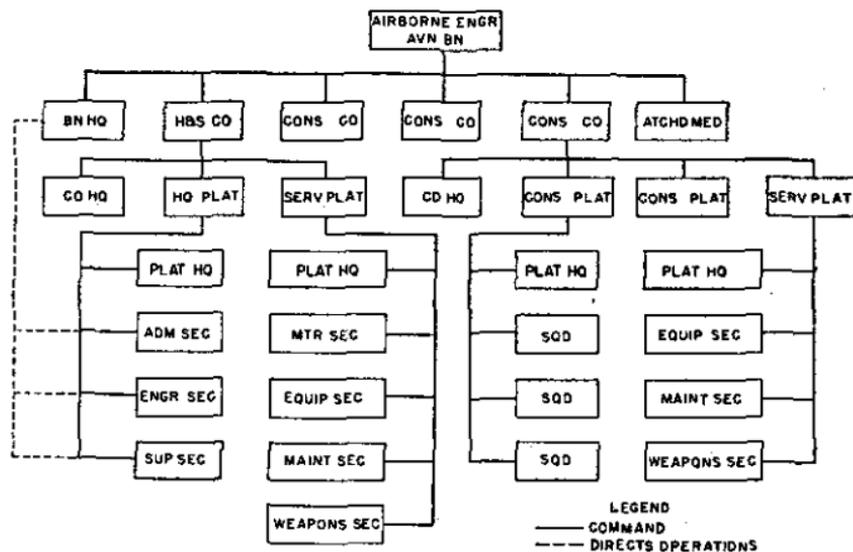


FIGURE 13.—Airborne engineer battalion (T/O 5-225).

■ 142. HEADQUARTERS AND SERVICE COMPANY.—a. *Headquarters and service company.*—This company consists of a company headquarters, an administrative section, an operations and intelligence section, a supply section, and a motor repair section. Organization is shown in figure 13.

b. *Company headquarters.*—Officer personnel includes a captain as company commander and battalion supply officer, and a lieutenant as headquarters and service company administrative officer and assistant battalion supply officer. There are enlisted personnel for routine administration and supply work. Overhead is about 50 percent of the strength of the headquarters and service company of the engineer combat battalion. There are extra facilities for providing mess for the parachute company. Transportation includes  $\frac{1}{4}$ -ton trucks and a  $\frac{1}{4}$ -ton trailer which are transported by aircraft to the objective, and  $2\frac{1}{2}$ -ton cargo trucks each with a 1-ton cargo trailer which comprise the heaviest transportation in the battalion and which remain with the rear echelon at the base area. Two of these heavier trucks and trailers are organic transportation for headquarters and service company, and one truck and trailer is organic transportation for each glider company. All personnel normally is transported to the objective. Truck drivers operate captured or requisitioned vehicles, and cooks and clerks are used for messenger service or for other duties.

c. *Administrative section.*—This section is under supervision of the battalion adjutant. It includes a small group of administrative personnel, and a communications group. Transportation is provided by a  $\frac{1}{4}$ -ton truck and a  $\frac{1}{4}$ -ton trailer.

d. *Operations and intelligence section.*—This section is under supervision of the battalion S-2 and S-3 officer. There is personnel for water supply, operation of mechanical equipment, drafting, and carpenter work. Transportation is provided by a  $\frac{1}{4}$ -ton truck and a  $\frac{1}{4}$ -ton trailer.

e. *Supply section.*—This section is supervised by battalion S-4. Supply personnel is held to a minimum. Transportation is provided by  $\frac{1}{4}$ -ton trucks and trailers. This section can reinforce lettered companies with a limited amount of equipment including platoon carpenter and pioneer sets, and pneumatic floats.

f. *Motor section.*—This section is under supervision of a warrant officer who is qualified in general motor transport. The motor section performs normal maintenance and repair of battalion transportation and mechanical equipment, and executes repairs to captured or requisitioned vehicles.

■ 143. **ATTACHED MEDICAL.**—The medical detachment of the airborne engineer battalion consists of two officers, and enlisted men as detailed in T/O 5-225. The detachment is organized to set up one field aid station and a battalion aid station. No dental personnel are provided. Dental service is a function of the division medical unit. Transportation includes a  $\frac{1}{4}$ -ton truck and a  $\frac{1}{4}$ -ton trailer for transporting medical equipment and supplies. The truck may be used as an improvised ambulance. Special medical equipment includes a crash splint unit and a flight service chest. Duties and functions of the battalion surgeon and of the detachment are explained in chapter 2.

■ 144. **DUTIES.**—Principal duties of the airborne engineer battalion are:

a. Performing its assigned mission on short notice.  
 b. Assisting in seizure and exploitation of strategical and tactical localities by—

- (1) Rapid execution of engineer reconnaissance.
- (2) Attacking hostile fortified positions.
- (3) Removal and passage of enemy obstacles.
- (4) Constructing obstacles by demolition and other means.
- (5) Minor, hasty rehabilitation of landing areas, including removal of crashed planes and other obstructions.
- (6) Hasty repair to routes of communication.
- (7) Rapid strengthening of existing bridges and construction of small bridges over unfordable streams.
- (8) Neutralizing prepared enemy demolitions to bridges and other structures.
- (9) Constructing and operating vehicle ferries using pneumatic floats.
- (10) Providing local security for own working parties.

c. Assisting in creating destruction and demoralization in hostile rear areas by—

- (1) Demolishing lines of communications.
- (2) Rendering inoperative important public utilities.
- (3) Destroying landing fields and other installations.
- (4) Raiding and capturing enemy personnel at radio stations and other communication centers to obtain information.
- (5) Destroying enemy stores by fire and other means.

d. Seizing and repairing enemy vehicles and mechanical equipment.

- e. Supplying maps and aerial photographs.
- f. Supplying water.

- g. Supplying engineer tools and equipment.
- h. Combat as infantry in an emergency.
- i. Tank hunting.

## SECTION VIII

## ENGINEER LIGHT PONTON COMPANY

■ 145. MISSION.—*a.* This combat engineer unit is organized and trained to transport and maintain its stream-crossing equipage; to construct floating bridges and rafts with this equipage; to guard and maintain completed bridges; to regulate traffic thereon; and to dismantle bridges and rafts.

*b.* The construction of floating bridges and rafts is a function of light ponton companies assisted by general engineer troops.

*c.* The other stream-crossing equipment listed below normally is turned over to divisional or corps engineer units for use in initial stages of the river crossing. Operations during that part of the offensive situation are fully discussed in FM 5-6.

*d.* Attachment of light ponton companies to divisions engaged in stream-crossing operations will be made in accordance with the tactical situation.

■ 146. ORGANIZATION.—The light ponton company consists of a headquarters platoon, two bridge platoons, and a light equipage platoon. Its organization is shown in figure 14. (For details see T/O 5-87.)

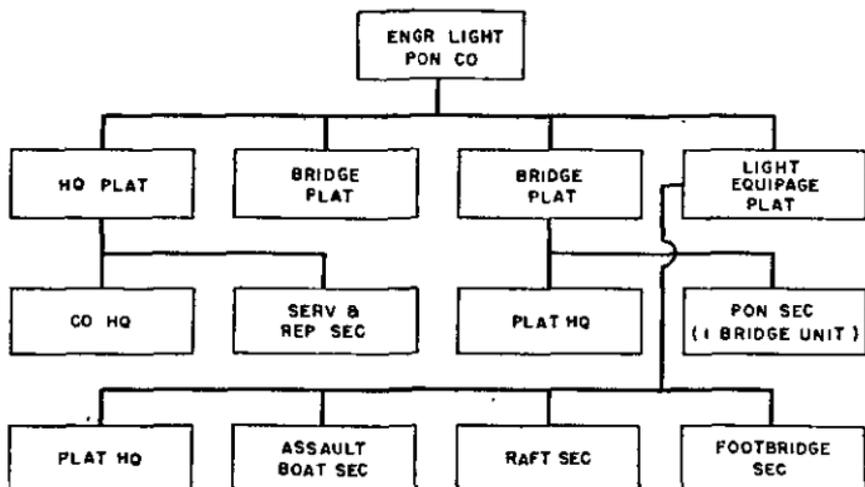


FIGURE 14.—Engineer light ponton company (T/O 5-87).

■ 147. EQUIPMENT.—*a.* The company is equipped with basic engineer tool sets.

*b.* Mechanical equipment includes a motorized air compressor, a truck-mounted crane, and tractor-mounted angle-dozers.

*c.* Stream-crossing equipment, also stocked in engineer depots, is as follows:

(1) Two units of M3 pneumatic bridge equipage or two units of M1938 10-ton ponton bridge equipage.

(2) One unit of footbridge, M1938.

(3) Twelve sets of infantry support raft.

(4) Seventy assault boats M2.

(5) Four ferry sets, infantry support.

*d.* Signal equipment includes radios and telephones. (For details see current Tables of Basic Allowances.)

■ 148. TRANSPORTATION.—The light ponton company has sufficient organic transportation for simultaneous movement of all personnel, equipment, and supplies.

■ 149. ARMAMENT.—Individual weapons include carbine and pistol. Supporting weapons include caliber .30 heavy machine guns and caliber .50 machine guns.

■ 150. TRAINING.—*a.* Individual basic and unit training is in accordance with principles stated in chapter 4.

*b.* Unit training includes—

(1) Care and operation of transportation and heavy equipment assigned to the company.

(2) Nomenclature, use, repair, and maintenance of bridge equipage and light stream-crossing equipage.

(*a*) Training in use of pontoon equipage includes employment of outboard motors.

(*b*) Training in repair of equipage is confined to repairs readily accomplished.

(3) Frequent drills and field training in safe and rapid transportation of bridge equipage to crossing sites; in unloading and launching of equipage; in construction of bridges and rafts; in operational maintenance, care, guarding, and dismantling of bridges and rafts; and in loading of component parts on company vehicles.

(*a*) Special effort is made in training to keep the bridge clear of drift and other floating objects, especial attention being given to anchor cables.

(b) Training in guarding bridges is of vital importance to insure uninterrupted flow of traffic.

(4) Training all personnel in road movements including--

(a) Organization of column.

(b) Movements under cover of darkness.

(c) Secrecy and discipline.

(d) Security.

(e) Other fundamental principles prescribed in FM 25-10.

(5) Training in concealment of vehicles.

c. Combat training includes the use of individual and supporting weapons for local security. Proficient gun crews must be developed for employment of machine guns under defensive combat conditions.

■ 151. HEADQUARTERS PLATOON.—This platoon consists of company headquarters and a service and repair section.

a. *Company headquarters.*—Officer personnel consists of the company commander and an administrative officer. Enlisted personnel handle routine administration, mess, and supply functions for the company.

b. *Service and repair section.*—This section is commanded by a lieutenant. Personnel includes enlisted specialists for maintenance and repair of motor vehicles and heavy mechanical equipment, and operators of mechanized equipment and vehicles.

■ 152. BRIDGE PLATOON.—The bridge platoon consists of platoon headquarters and a ponton section.

a. *Platoon headquarters.*—The platoon headquarters supervises and controls activities of the ponton section, and is responsible for installation, maintenance, and operation of its field telephone equipment.

b. *Ponton section.*—The ponton section transports one unit of bridge equipage.

■ 153. LIGHT EQUIPAGE PLATOON.—This platoon consists of platoon headquarters, an assault boat section, a raft section, and a footbridge section.

a. *Platoon headquarters.*—The platoon headquarters is responsible for the care and safe transportation of the equipage assigned to the platoon.

b. *Assault boat section.*—This section cares for and transports M2 assault boats.

c. *Raft section.*—This section cares for and transports the infantry support rafts and ferry sets.

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*d. Footbridge section.*—This section cares for and transports the unit of footbridge.

■ 154. DUTIES.—*a.* The light ponton company normally performs the following duties when in bivouac:

(1) Maintains local security against hostile air and ground attacks.

(2) Takes camouflage measures for concealment of transport and equipment.

(3) Maintains transport and equipment ready for employment at all times.

(4) Periodically tests equipment to eliminate parts which have deteriorated.

(5) Reinforces engineer depot personnel.

(6) Maintains or repairs roads near the ponton park.

(7) Assists nearby engineer units in performance of their duties.

*b.* The light ponton company normally performs the following duties when not in bivouac:

(1) Route reconnaissance, and reconnaissance for ponton bridge crossings.

(2) Moves its equipment forward to the site or sites of stream crossings, allowing ample time for moving out of bivouac and for approach march.

(3) Unloads and conceals vehicles.

(4) Constructs bridges and rafts using M3 pneumatic or M1938 ponton bridge equipage, and infantry support rafts.

(5) Maintains and repairs floating bridges and rafts.

(6) Operates raft ferries.

(7) Guards completed bridge.

(8) Regulates traffic on bridge.

(9) Dismantles and loads bridge equipage on trucks and trailers.

(10) Provides for hasty demolition of bridge.

■ 155. REFERENCES.—Operations of the light ponton company are discussed in FM 5-6, and technical details in TM 5-270, 5-271, 5-273, 5-275, and FM 5-10.

## SECTION IX

### ENGINEER HEAVY PONTON BATTALION

■ 156. MISSION.—*a.* This unit transports and maintains four units of heavy ponton equipage, 25-ton, M1940.

b. In a river-crossing operation the battalion is attached to corps to provide a bridge capable of supporting the heavier loads. Bridges and rafts are constructed of 25-ton ponton equipage with the assistance of general engineer troops.

■ 157. ORGANIZATION.—The heavy ponton battalion consists of battalion headquarters, headquarters and service company, two bridge companies, and a medical detachment. Its organization is shown in figure 15. (For details see T/O 5-275.)

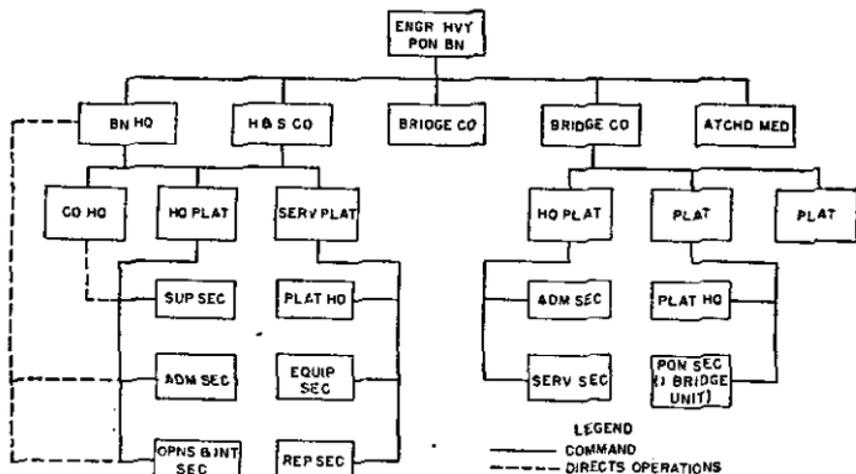


FIGURE 15.—Engineer heavy ponton battalion (T/O 5-275, tentative).

■ 158. EQUIPMENT.—a. Standard engineer tool sets and drafting equipment, and portable water supply equipment, are issued to the battalion.

b. Its mechanical equipment includes an air compressor, truck-mounted cranes, medium tractors, and tractor-mounted angledozers.

c. Maintenance and repair equipment includes a motorized general purpose repair shop and trailer-mounted welding equipment.

d. Signal equipment consists of radios and telephones. (For details see current Tables of Basic Allowances.)

■ 159. TRANSPORTATION.—The heavy ponton battalion has sufficient organic transportation for the simultaneous movement of all personnel, equipment, and supplies.

■ 160. ARMAMENT.—Individual and supporting weapons are similar to those of the light ponton company. (See current Tables of Organization.)

■ 161. TRAINING.—All training discussed for the light ponton company is applicable to the heavy ponton battalion.

■ 162. BRIDGE COMPANY.—The bridge company consists of a headquarters platoon and two bridge platoons. (For details see T/O 5-277.)

a. *Headquarters platoon* consists of an administrative section and a service section.

(1) The *administrative section* includes the company commander and an administrative officer. Enlisted personnel perform routine administration, mess, and supply functions for the company.

(2) *Service section* enlisted personnel includes operators for mechanical equipment, specialists for second-echelon repair of automotive and mechanical equipment and marine engines in the utility power boats, and for emergency repairs to metal pontoons and wood equipage.

b. The *bridge platoon* consists of platoon headquarters and a ponton section.

(1) *Platoon headquarters* supervises platoon operations. Communication personnel are attached to headquarters and service company to maintain and operate a telephone system for use while constructing the bridge and for directing bridge traffic.

(2) The *ponton section* transports one unit of 25-ton ponton bridge equipage on semitrailers drawn by tractor trucks. Personnel load and unload equipage, care for it, and construct bridges and rafts with it.

■ 163. BATTALION HEADQUARTERS.—Battalion headquarters consists of the battalion commander and his staff. (For details see T/O 5-276.) Functions and duties are in general those outlined in chapter 2.

■ 164. HEADQUARTERS AND SERVICE COMPANY.—Headquarters and service company is composed of company headquarters, a headquarters platoon, and a service platoon. (For details see current Tables of Organization.)

a. *Company headquarters*.—The commanding officer of headquarters and service company is also the battalion supply

officer (S-4). His commissioned assistant is a lieutenant who supervises headquarters company personnel in handling the routine administration, mess, and supply functions of the company.

*b. Headquarters platoon.*—The headquarters platoon consists of an administration section, an operations and intelligence section, and a supply section.

(1) *Administration section.*—This section is under the supervision of the battalion adjutant. Its routine administrative duties are discussed in chapter 2.

(2) *Operations and intelligence section.*—This section is commanded by a staff officer who combines S-2 and S-3 duties. It is responsible for reconnaissance for route movements of the battalion, and for selecting bivouacs with suitable concealment for vehicles and equipment.

(3) *Supply section.*—This section is under the direct supervision of a warrant officer who is assistant battalion S-4. In addition to normal personnel for handling battalion supply there is personnel for operating the portable water supply equipment.

*c. Service platoon.*—The service platoon consists of platoon headquarters, an equipment section, and a repair section.

(1) *Platoon headquarters.*—The service platoon is commanded by a lieutenant. Personnel maintains records of servicing and repair of equipment, procures repair stock and parts, and supervises and controls work of the two sections.

(2) *Equipment section.*—The equipment section furnishes all transportation for battalion headquarters and headquarters and service company, except the repair section of the service platoon. It reinforces the bridge companies in their construction tasks with the motorized air compressor and the truck-mounted crane and with personnel to operate them. Principal duties in this regard are moving ponton equipment in the ponton park or at the bridge site, assistance in heavy abutment construction, and preparation of bridge approaches.

(3) *Repair section.*—This section performs maintenance and repair of bridge equipage, mechanical equipment, and transportation.

■ 165. **ATTACHED MEDICAL.**—The medical detachment consists of the battalion surgeon, a dental officer, and necessary enlisted personnel. Its transportation includes a cross-country ambulance and a 2½-ton cargo truck for personnel, equipment, and

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supplies. Duties and functions of the unit surgeon and the detachment are explained in chapter 2.

■ 166. DUTIES.—The heavy ponton battalion performs duties similar to those prescribed for the light ponton company.

■ 167. REFERENCES.—Manuals containing supplementary material on this section include—

- a. FM 5-6, Operations of Engineer Field Unit.
- b. FM 5-10, Communication, Construction, and Utilities.
- c. FM 100-5, Field Service Regulations, Operations.
- d. TM 5-273, 25-ton Ponton Bridge, Model 1940.

### SECTION X

#### TREADWAY BRIDGE COMPANY

■ 168. MISSION.—a. The treadway bridge company transports, maintains, and constructs bridges with its steel treadway bridge equipage; and guards, maintains, regulates traffic upon, and dismantles completed bridges.

b. Treadway bridge companies are assigned to armored corps and normally are attached to armored divisions for river-crossing operations. Troops of the armored engineer battalion assist the company in bridge construction.

■ 169. ORGANIZATION.—The company consists of a company headquarters and two bridge platoons. Organization is shown in figure 16. (For details see T/O 5-218.)

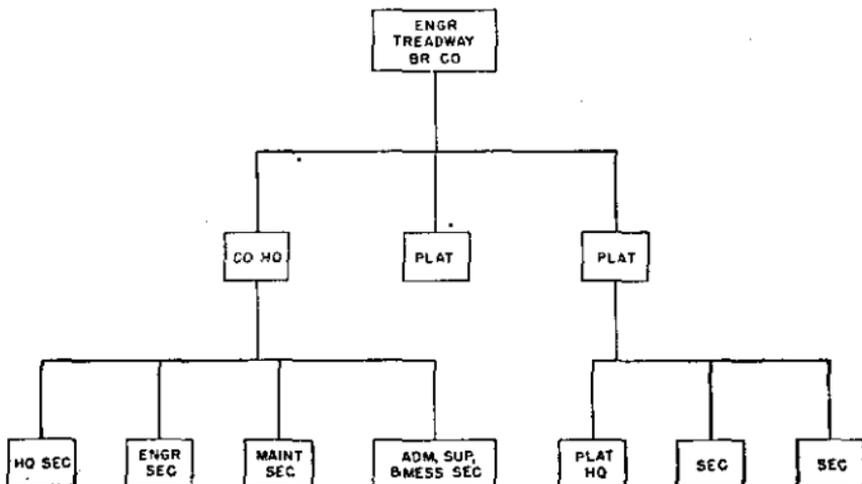


FIGURE 16.—Engineer treadway bridge company (T/O 5-218).

■ 170. EQUIPMENT.—*a.* In addition to basic engineer tool sets the company has mechanical equipment, including air compressors and cranes, to facilitate handling bridge equipment and to expedite construction.

*b.* Stream-crossing equipment includes utility powerboats, pneumatic floats, and two units of steel treadway bridge equipment, each unit providing a floating bridge about 540 feet long.

*c.* Organic radio equipment is shown in current Tables of Basic Allowances.

■ 171. TRANSPORTATION.—The company is provided with sufficient transportation for simultaneous movement of all personnel and equipment. Vehicles include light trucks and trailers for command, reconnaissance, and administration and supply; and 6-ton trucks for transporting bridging equipment.

■ 172. ARMAMENT.—Individual weapons include carbine and pistol. Supporting weapons include caliber .30 light machine guns, caliber .50 machine guns, caliber .45 submachine guns, antitank rocket launchers, and antitank rifle grenades.

■ 173. TRAINING.—*a.* Basic, technical, and combat training of the bridge company is generally similar to that given to the lettered company of the armored engineer battalion.

*b.* Unit training includes thorough instruction and proficient performance in construction, maintenance, repair, loading, transporting, and unloading the treadway bridge.

■ 174. COMPANY HEADQUARTERS.—Company headquarters consists of a headquarters section; engineer section; maintenance section; and an administrative, supply, and mess section.

*a. Headquarters section.*—The bridge company is commanded by a captain assisted by a lieutenant who is company maintenance officer in addition to his other duties. Enlisted personnel assist in reconnaissance and communication functions. A communication sergeant is charged with supervision and execution of details of company radio communication.

*b. Engineer section.*—This section is supervised by a staff sergeant as foreman mechanic. Personnel includes operators for special mechanical equipment, and boats, which are pooled in this section. This section transports bridging and stream-crossing equipment not transported by the bridge platoons.

*c. Maintenance section.*—Work of the maintenance section is controlled by the lieutenant in headquarters section. Personnel

are responsible for maintenance and repair of all transportation and motorized equipment in the company.

*d. Administration, supply, and mess section.*—Under supervision of a first sergeant, this section handles routine overhead duties for the company.

■ 175. **BRIDGE PLATOON.**—The bridge platoon consists of a platoon headquarters and two bridge sections.

*a. Platoon headquarters.*—A lieutenant assisted by a non-commissioned officer supervises activities of the bridge sections. These activities include movement out of bivouac, movement of column, delivery of equipment at site, unloading, and maintenance and care of equipment.

*b. Bridge section.*—The bridge section is responsible for transporting treadway bridge equipage. Personnel includes truck drivers, and noncommissioned officers as foremen.

■ 176. **DUTIES.**—Principal duties of the engineer treadway bridge company are to—

*a.* Transport its bridge equipment as ordered.

*b.* Construct bridges.

*c.* Care for and maintain bridge equipage when not in use.

*d.* Maintain completed bridges.

*e.* Provide for hasty demolition of bridges when necessary.

*f.* Furnish bridge guards.

*g.* Provide security for own working parties.

## CHAPTER 6

### ENGINEER UNITS, SERVICE, WITH ARMY GROUND FORCES

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#### SECTION I

#### ENGINEER LIGHT EQUIPMENT COMPANY

■ 177. MISSION.—*a.* The engineer light equipment company furnishes supplementary equipment with operators to engineer combat battalions and operates as a replacement pool for construction equipment.

*b.* Light equipment companies are attached to corps and army. One company normally is attached to a corps.

■ 178. ORGANIZATION.—The unit consists of company headquarters, two equipment platoons, and personnel for service and maintenance. For details see current Tables of Organization.

■ 179. EQUIPMENT.—Equipment is for construction and demolition operations. It includes that which is necessary to supplement organic equipment of divisional and general headquarters engineer combat battalions, and replacement items for those units. It consists of such items as air compressors, tractor-mounted angledozers, road graders, and power shovels.

■ 180. TRANSPORTATION.—*a.* There are sufficient trucks and trailers for simultaneous movement of all personnel, equipment, and supplies.

*b.* There are light trucks and trailers for administration, mess, and supply; and heavy cargo trucks as prime movers of

## ENGINEER TROOPS

flat-bed trailers for moving heavy equipment such as tractors with angledozers and power shovels.

■ 181. **ARMAMENT.**—Individual weapons include bayonets and rifles. Supporting weapons are cab-mounted and consist of caliber .30 and caliber .50 machine guns.

■ 182. **TRAINING.**—*a.* Basic and unit training outlined in chapter 4 is applicable.

*b.* Unit training is designed to prepare the company as a pool of skilled operators of light mobile equipment. Training in maintenance and repair of equipment is stressed so it will be available at all times for attachment to engineer units or for replacement of unserviceable equipment.

■ 183. **DUTIES.**—Principal duties of the light equipment company are to:

*a.* Attach its equipment with skilled operators to engineer units as required to higher authority.

*b.* Replace unserviceable equipment of engineer units with like equipment from its own pool.

*c.* Keep its mechanical equipment in serviceable condition at all times.

*d.* Maintain its pool of skilled operators of equipment by training replacements.

*e.* Provide for its own local security.

*f.* Be prepared promptly to evacuate its equipment in accordance with tactical movements.

*g.* Prepare plans for demolition and destruction of equipment, and execute them if the need arises, so its mechanical equipment will not fall into enemy hands.

*h.* Maintain close liaison with the headquarters to which attached and the units which it is serving. The operational planning of the company is by corps and army engineer headquarters and the tactical unit to which the company is attached.

## SECTION II

### ENGINEER DEPOT COMPANY

■ 184. **MISSION.**—*a.* The primary mission of the engineer depot company is the operation of engineer depots and other engineer supply points in a theater of operations. It may form a

part of a large special engineer depot or the engineer section of a general depot; or it may operate as an individual engineer supply unit. Depot sections or detachments may assist in operation of supply points.

b. Depot companies with ground forces may be attached to army. When detachments from the company are assigned to tactical service areas or commands for operation of engineer supply installations pertaining exclusively to a unit, they operate under the unit engineer.

c. When the company is used in larger depots or the communications zone, where the tonnage of supplies is too much for it to handle, it may be reinforced with civilian labor or troops from other general engineer units. When conditions warrant the attachment of an entire general engineer unit, the usual procedure is to charge the commander of the general engineer unit with sole responsibility for conduct of the depot and attach the depot company to his unit for use as depot overhead organization.

d. One engineer depot company can furnish enough personnel to handle a depot of approximately 300,000 square feet of storage area.

■ 185. ORGANIZATION.—The depot company consists of a headquarters platoon and three depot platoons, as shown in figure 17. (For further details see T/O 5-47.)

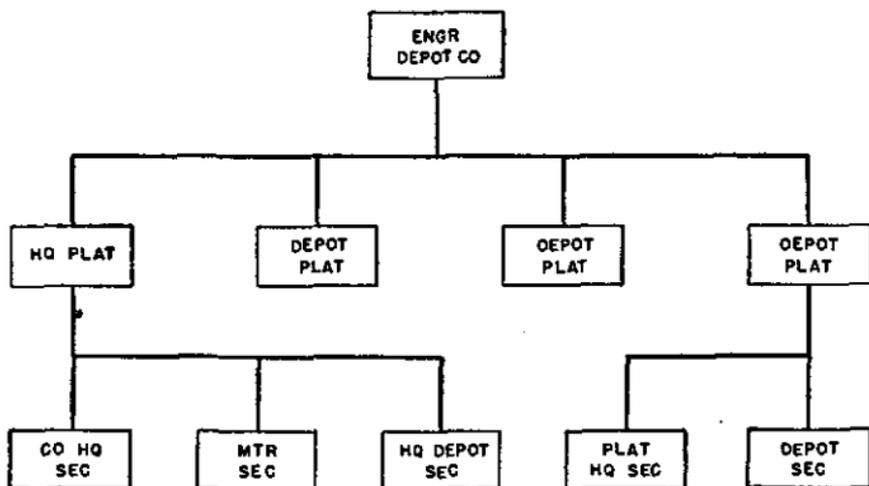


FIGURE 17.—Engineer depot company (T/O 5-47).

■ 186. EQUIPMENT.—The company is provided with basic engineer tool sets and a truck-mounted crane.

■ 187. TRANSPORTATION.—Transportation includes light trucks for liaison, interdepot communication, and light hauling; dump and cargo trucks for hauling depot stocks and water, and for kitchen use; semitrailers drawn by 5- to 6-ton tractor trucks; 1-ton cargo trailers; and trailer-mounted 250-gallon water tanks for operational purposes. There is not enough transportation simultaneously to move all company personnel, equipment, and supplies. When the company moves as a unit by rail or truck, transportation is specially assigned by higher headquarters.

■ 188. ARMAMENT.—Individual weapons include the carbine and the pistol. Supporting weapons include caliber .45 sub-machine guns and caliber .30 heavy machine guns. These are used for security of depot personnel and installations against hostile low-flying planes and raiding parties.

■ 189. TRAINING.—*a.* Basic and unit training is in accordance with principles stated in chapter 4.

*b.* The unit is trained in storage and handling procedures for all classes of engineer equipment and for those supplies of other arms and services needed in engineer work; in their inspection, and in the paper work involved in their receipt, storage, issue, and shipment.

*c.* Combat training covers, primarily, organization and tactics in effective security and defensive measures against air and ground raids; it covers individual and automatic weapons, antitank and antipersonnel mines, and obstacles. Machine guns are strategically located at depot installations to guard against surprise attacks, and well-trained crews must be available to man the guns at all times. Effective all-around defense and protection of the guns and crews must be provided. Personnel are taught how to destroy supplies and equipment when necessary to keep them from falling into the hands of enemy parachutists or ground troops. Methods of fighting incendiary bombs and defense against chemical attack are stressed.

■ 190. HEADQUARTERS PLATOON.—Headquarters platoon consists of a company headquarters section, a motor section, and a headquarters depot section.

*a. The company headquarters section.*—(1) The company

headquarters section includes the company commander, enlisted men for handling company administration and supply, and a mess for headquarters platoon. An accounting group handles the paper work connected with receipt, storage, and issue of supplies.

(2) The company commander coordinates the work of headquarters depot section and the three depot platoons. As depot officer he is not concerned with establishing priorities, that being a staff function of higher authority. He issues equipment and supplies upon submission of requisitions prepared in accordance with Army Regulations. He keeps his unit engineer informed at all times of the status of stocks and makes recommendations designed to avoid the accumulation of supplies not needed and to prevent the exhaustion of stocks that are much in demand. He maintains a guard to prevent unauthorized tampering with depot stocks and prepares plans for removal and destruction of stores in the event of a withdrawal. He plans ways and means of concealing equipment and supplies in open storage and applies such camouflage methods as will deceive enemy air and ground observation.

*b. Motor section.*—The activities of the motor section are under the direct supervision of the company motor officer. His general duties are outlined in chapter 2. The section is equipped with a truck-mounted crane and two semitrailers drawn by 5- to 6-ton tractor trucks. This equipment may be operated under company control or may be assigned to any of the depot platoons operating independently. The mechanics perform second-echelon maintenance to all company motors and mechanized equipment.

*c. Headquarters depot section.*—(1) The headquarters depot section includes a lieutenant in command of the section, non-commissioned officers, and other enlisted men, including specialists.

(2) This section is used in the operation of a part of a large depot; the whole company may be engaged in the operation. If the company is assigned to an area in which its platoons are dispersed on several supply installations, the section operates one of these installations, usually the one at company headquarters section. Its functions and duties are similar to those of the depot section, but it has extra specialists and is capable of more extensive repairing and salvaging operations than are the depot platoons.

(3) For performance of depot duties it is equipped with

standard engineer sets as shown in current Tables of Basic Allowances.

■ 191. DEPOT PLATOON.—The depot platoon consists of a platoon headquarters section and a depot section. It is suitable for employment in a portion of a large depot, where it can handle several departments; for operation of a smaller supply point such as an engineer railhead; or for attachment to another echelon, such as a corps, for operation of one or more depots. It is not necessarily attached to corps. Administrative convenience decides its attachment in such cases.

*a. Platoon headquarters section* personnel includes a lieutenant as platoon commander, a clerical group, and a group to operate a mess for the platoon. The section handles incoming requisitions, routing them to the proper place for supply; prepares outgoing requisitions for replenishment of stock; keeps note of supply levels; and operates a messenger service. It is equipped with caliber .45 submachine guns and caliber .30 heavy machine guns.

*b. Depot section* enlisted personnel is similar to that of the headquarters depot section. The section handles storage, receipt, and issue and supply items; classifying, salvaging, repairing, assembling, and testing machinery; and guarding engineer stores. Supplies are classified as transportation, water supplies, explosives, electrical supplies, lumber and shelter, technical equipment—surveying and drafting instruments, etc.—road building equipment and machinery, camouflage supplies, field fortification supplies, and others.

■ 192. DUTIES.—The depot company operates engineer supply installations, being charged in general with receipt, inspection, storage, and issue of engineer supplies. The detailed duties normally performed in the execution of its assigned mission are fully explained in preceding paragraphs. Duties of the company are influenced by the tactical situation. In a war of movement, divisions, corps, and armies receive few engineer supplies from the rear, but the collection of engineer supplies found locally within the areas is of considerable extent and importance.

Depots and similar establishments move by bounds. In an advance they are located and supplies accumulated as far forward as the tactical situation and adequate functioning of the communication system will allow. Depot platoons or detachments from depot companies may be assigned as necessary

to assist in receipt and issue of such supplies. When the advance is resumed, this depot personnel remains in the area and continues to administer these stores as directed by higher authority, usually the army engineer.

## SECTION III

## ENGINEER PARTS SUPPLY COMPANY

■ 193. MISSION.—a. The primary mission of an engineer parts supply company is to establish and operate an engineer spare-parts supply depot and other spare-parts supply agencies.

b. The company is a nonmobile unit which operates as part of the engineer depot organization of a base installation. It cannot operate as a separate supply unit unless it is furnished with motor transportation.

■ 194. ORGANIZATION.—The company consists of headquarters platoon, a procurement platoon, and a warehouse platoon. Organization is shown in figure 18.

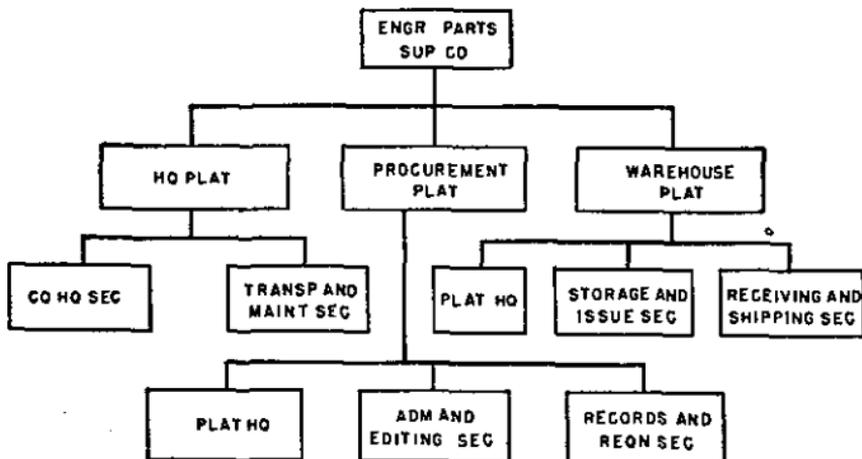


FIGURE 18.—Engineer parts supply company (T/O, tentative).

■ 195. EQUIPMENT.—The company is equipped with basic engineer tool sets.

■ 196. TRANSPORTATION.—Company transportation consists of light trucks for administration, interdepot communication, and light hauling.

■ 197. **ARMAMENT.**—Individual weapons include the carbine and rifle. Supporting weapons include caliber .45 submachine guns and caliber .30 heavy machine guns.

■ 198. **TRAINING.**—Training of the company is similar in general to that for the engineer depot company.

■ 199. **HEADQUARTERS PLATOON.**—*a.* Headquarters platoon is composed of company headquarters section and a transportation and maintenance section.

*b. Company headquarters section.*—This section includes the company commander and personnel for handling routine administrative, supply, and mess functions of the company.

*c. Transportation and maintenance section.*—This section is charged with providing, maintaining, and requiring transportation.

■ 200. **PROCUREMENT PLATOON.**—*a.* Procurement platoon is composed of a platoon headquarters, an administrative and editing section, and a records and requisition section. It is specifically charged with the responsibility of procuring and issuing spare parts for all engineer equipment operating in, or assigned to, a theater of operations.

*b. Platoon headquarters.*—The platoon commander is the administrative officer and directly supervises the administrative and editing section. He directs, supervises, and coordinates the activities of all sections in the platoon.

*c. Administrative and editing section.*—This section handles paper work connected with requisitioning and shipping of spare parts, and coordinates salvage inspection and inventory activities.

*d. Record and requisition section.*—This section handles records of equipment and stock, and procures additional stock and replacements.

■ 201. **WAREHOUSE PLATOON.**—*a.* Warehouse platoon is composed of platoon headquarters, a storage and issue section, and a receiving and shipping section. It is responsible for the physical storage and issue of spare parts.

*b. Platoon headquarters.*—The platoon commander directly supervises the storage and issue section. He directs and coordinates the activities of all sections in the platoon.

*c. Storage and issue section.*—This section is charged with storage, inventory, inspection, and salvage of parts; and with filling and delivery of orders for shipment.

*d. Receiving and shipping section.*—This section accepts and tallies-in all shipments to the company, and tallies-out all shipments to using units.

■ 202. DUTIES.—Duties of the parts supply company in a theater of operations are to—

*a.* Maintain adequate stock of spare parts and supplies at all times.

*b.* Determine accurately by field survey, when necessary, model, serial number, and total number of units of each item of engineer equipment operating in, or assigned to, theater of operations that company is to serve.

*c.* Maintain accurate records giving information required by *b*, above, for all engineer equipment in theater of operations.

*d.* Transmit through channels to Spare Parts Branch, Engineer Section, Columbus Quartermaster Depot detailed information regarding number, make, model, and serial number of all engineer equipment in theater of operations.

*e.* Collect and place in stock all surplus portions of parts field sets originally shipped direct to organizations prior to establishment of the parts supply company, so such parts will be available for general distribution to entire theater of operations.

*f.* Anticipate stock requirements by maintaining contact with operating organizations whose requirements may vary with local activities, operating conditions, distance from supply organization, and possible disruptions of transportation facilities and schedules.

*g.* Obtain suitable substitutes for parts that are not available.

*h.* Maintain initial stock levels until trends can be accurately determined.

*i.* Provide for local security of depot installations and personnel.

#### SECTION IV

### ENGINEER MAINTENANCE COMPANY

■ 203. MISSION.—*a.* The primary mission of the engineer maintenance company is third-echelon maintenance of all equipment, including that used by other arms and services, for which the Corps of Engineers has maintenance responsibility.

*b.* The unit is organized, trained, and equipped so it can do

## ENGINEER TROOPS

third-echelon maintenance of equipment brought to it, and also support the lower echelons of maintenance at points where these services may be required.

c. The entire company may operate from one bivouac shop, or one maintenance platoon may be detached to operate from a separate bivouac shop. When two shops are operated separately the contact platoon is assigned specifically to one. Normally this is the more forward of the two.

■ .204. ORGANIZATION.—The company consists of headquarters platoon, two maintenance platoons, and a contact platoon. Organization is shown in figure 19. For details see T/O 5-157.

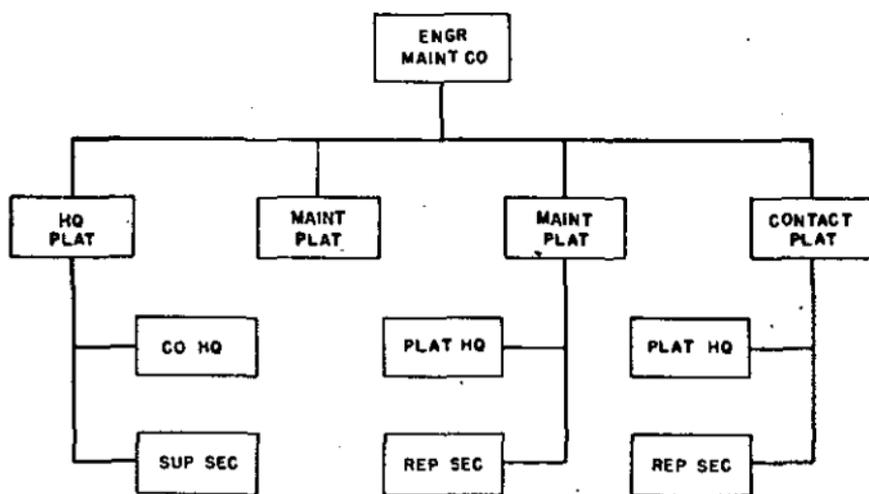


FIGURE 19.—Engineer maintenance company (T/O 5-157).

■ 205. EQUIPMENT.—Company equipment includes motorized trailer-mounted shops, power plants, and basic engineer equipment sets.

■ 206. TRANSPORTATION.—The company is completely motorized and capable of movement on short notice. Vehicles include light trucks for communication, utilities, command, reconnaissance, and maintenance, and 2½-ton cargo trucks with 1-ton trailers for spare parts, steel stock, and heavy tools.

■ 207. ARMAMENT.—Individual weapons include the carbine and pistol. Each repair section of the maintenance platoon is equipped with two caliber .30 heavy machine guns for security of their motorized shops against hostile air and ground attacks.

■ 208. TRAINING.—*a.* Basic and unit training is in accordance with principles stated in chapter 4. After unit training, proper functional operation must become automatic so maximum efficiency can be gained from the use of facilities at hand.

*b.* Combat training has as its objective the development of the company to provide local security at all times. Mobile shops of the company must be protected at all costs. Constant vigilance against surprise attack is necessary.

■ 209. HEADQUARTERS PLATOON.—Headquarters platoon consists of company headquarters and a supply section.

*a. Company headquarters.*—The company headquarters includes the company commander and a lieutenant who acts as liaison officer. The liaison officer keeps himself informed of the engineer situation and the tactical disposition of engineer troops so proper measures may be taken to support the lower echelons of maintenance.

(1) Enlisted personnel perform routine administrative and mess functions for the company.

(2) Company headquarters coordinates operations by making required reconnaissance and inspections, and assigning tasks to the platoons. There are sufficient personnel and facilities for operating two messes, should two bivouac shops be established.

*b. Supply section.*—This section is under the supervision of a lieutenant. The section is responsible for procurement, issue, and maintenance of adequate stocks of spare parts for motors and equipment, maintenance supplies such as oil and fuel, steel stocks, tools, and accessories. This section carries the trailer-mounted spare power plant, which is available on call to any platoon requiring it in an emergency.

(1) The supply of spare parts is the vital link connecting each of the several echelons of engineer equipment maintenance and repair. No equipment maintenance system can succeed without a suitable system of stockage and supply of spare parts within the field army. Engineer maintenance companies are provided with major unit assemblies and spare parts necessary for complete field overhaul and repair of the types and models of engineer equipment to be serviced. Sets of parts furnished engineer maintenance companies are based upon the probability that individual maintenance platoons frequently may be required to operate independently. In addition to spare parts sets, engineer maintenance companies are furnished supplementary supplies.

(2) The supply section has 2½-ton cargo trucks, some of which are cabinet equipped for small spare parts and some of which carry bulky spare parts and maintenance supplies. Trailers are used for bulky spare parts, maintenance supplies, and miscellaneous items, for lubrication units, and for the company reserve of lubricating oils and greases required in maintenance operations.

■ 210. MAINTENANCE PLATOON.—The maintenance platoon consists of platoon headquarters and a repair section. The duty of the maintenance platoon is to perform necessary repairs on items of equipment that require evacuation to the maintenance bivouac. The platoons have truck-mounted shops, containing all necessary equipment to effect third-echelon repairs and such fraction of fourth-echelon repairs as available time permits.

*a. Platoon headquarters.*—This headquarters includes a lieutenant, commanding the platoon, assisted by a technical sergeant as assistant master mechanic. The platoon commander executes the orders of the company commander pertaining to medium maintenance activities, and controls and oversees operations of the platoon's personnel and facilities.

*b. Repair section.*—This section operates the platoon bivouac maintenance shop under the immediate supervision of a staff sergeant, mechanic foreman. He is assisted by a shop clerk, who keeps all maintenance records and assists the section's supply personnel in handling spare parts and maintenance supplies. Personnel includes a wide variety of occupational specialists. The facilities of the repair section are composed of central-powered units, self-powered units, and service units.

(1) *Central-powered units.*—Central-powered units with the personnel assigned thereto, do most of the maintenance on items of equipment evacuated to the platoon bivouac shop. They derive their name from the fact that they are dependent on outside power for operation, drawing this power, when in the field, from the platoon power-plant trailer. Commercial power may be used when available.

(2) *Self-powered units.*—These units make it possible for certain portions of the work of the maintenance platoon to be done on location away from the platoon bivouac shop.

(3) *Service units.*—These units render service to the remainder of the platoon. There are trucks for transporting spare parts, steel stock, tools, and maintenance supplies, and a truck for wrecker service.

■ 211. CONTACT PLATOON.—The contact platoon consists of platoon headquarters and a repair section. It does maintenance at the site of breakdown. It also supports lower echelons of maintenance by periodic contacts with all troop units to which its services are available. The contact platoon is equipped with truck-mounted shops of varying job capacities.

*a. Platoon headquarters.*—This headquarters includes a lieutenant commanding the platoon, assisted by a technical sergeant as assistant master mechanic. The platoon commander executes the orders of the company commander pertaining to contact, support, reconnaissance, and recovery and evacuation missions.

*b. Repair section.*—The repair section operates the contact platoon maintenance shop facilities under the immediate supervision of a staff sergeant as mechanic foreman. A staff sergeant is charged with supervising the upkeep of all vehicles and equipment of the company. Personnel includes occupational specialists. Drivers of the mobile shops are shop maintenance mechanics. The repair section is divided into several units.

(1) *Light aid and reconnaissance unit.*—This unit is assigned light trucks for light aid and reconnaissance. Mechanics assigned to these units should be expert trouble-shooters as they will be dispatched on missions with few special facilities.

(2) *Emergency repair units.*—These units include two emergency repair shops mounted on trucks. Each unit carries its own power and is equipped with the necessary facilities to execute minor repairs.

(3) *Repair units.*—These units are those which can proceed to locations of break-downs and execute more than minor repairs.

(4) *Automotive repair unit.*—This unit provides facilities to maintain motor vehicles and equipment of the company, and to serve as an additional emergency repair unit capable of light wrecker service.

(5) *Service units.*—These units give service and assistance to the remainder of the platoon. Included are a heavy machine shop capable of heavy-duty machine-tool operations, and a wrecker truck for recovery and evacuation of equipment.

■ 212. DUTIES.—The principal duties of the engineer maintenance company are:

*a. Maintenance, reconnaissance, recovery, and evacuation.*

## ENGINEER TROOPS

b. Execution of third-echelon maintenance to engineer equipment.

c. Maintenance liaison with higher and lower echelons.

d. Supply of spare parts to engineer units in an emergency.

e. Furnishing advice on maintenance problems.

f. Providing for its own local security.

g. Providing for dispersion and concealment of shops and equipment in bivouac area.

### SECTION V

#### ENGINEER DUMP TRUCK COMPANY

■ 213. MISSION.—a. The principal mission of the engineer dump truck company is to render assistance to other engineer units by furnishing transportation for movement of bulk materials.

b. In their normal performance of this mission they are attached to engineer units engaged in road and railroad construction involving earth cuts and fills, grading, and placing road metal and track ballast; or in airdrome construction involving clearing, grading, and paving.

c. Dump truck companies are attached to army and communication zone.

■ 214. ORGANIZATION.—The company consists of a company headquarters and two platoons. Organization is shown in figure 20. (See T/O 5-88 for details.)

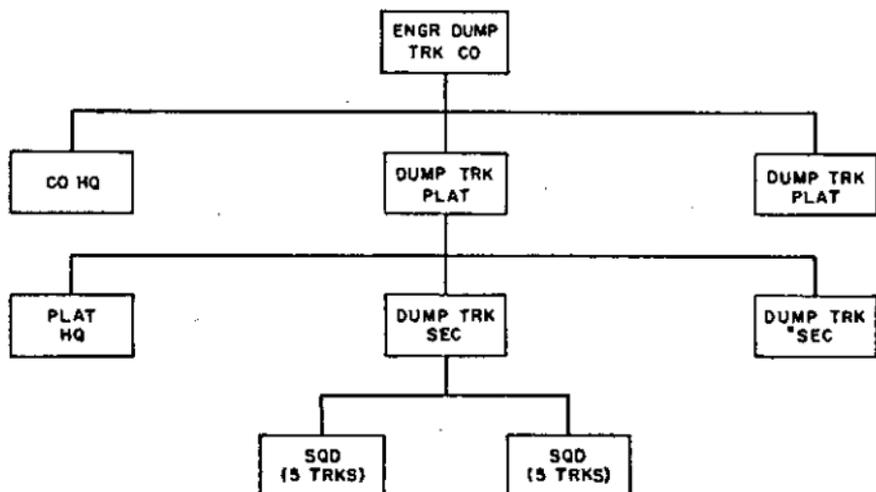


FIGURE 20.—Engineer dump truck company (T/O 5-88).

■ 215. **EQUIPMENT.**—Dump truck companies are not issued engineer tool sets or other basic equipment normally organic in engineer organizations.

■ 216. **TRANSPORTATION.**—The principal transportation consists of 2½-ton dump trucks for hauling engineer materials. Light trucks and trailers are included for kitchen and water supply, motor repair, convoy control, use at message center, inspection, reconnaissance, and general utility. The company has sufficient vehicles for simultaneous movement of all personnel, supplies, and equipment.

■ 217. **ARMAMENT.**—Individual weapons include the carbine and rifle.

■ 218. **TRAINING.**—*a.* Basic and unit training is in accordance with principles stated in chapter 4.

*b.* Unit training includes—

(1) Operation, maintenance, and repair of its transportation.

(2) Motor movements including planning, formation of motor column, march discipline, security measures, halts, and route reconnaissance. Training includes both day and night movements. Special consideration is given march discipline under blackout conditions.

(3) Use of dump trucks in hauling engineer materials, including safe loading and driving, and delivery of loads to working parties.

*c.* Combat training emphasizes the use of the carbine for local security of personnel and vehicles in bivouac, on the march, and at work.

■ 219. **COMPANY HEADQUARTERS.**—*a.* Officer personnel includes a company commander and a lieutenant as administrative officer. Enlisted personnel handle routine functions of administration, supply, and messing of the company, and current maintenance and repair of transportation.

*b.* Company headquarters is provided with 2½-ton dump trucks, which are used for detached work or to keep the platoons at full strength by furnishing replacements.

*c.* The company commander frequently may have to break up his company into platoons or sections and attach them to engineer troops distributed over a wide area. Feeding and supplying elements so distributed may be impracticable for company headquarters; if so, these services must be performed

by the units to which they are attached. Company headquarters' functions are then reduced to technical supervision of the various elements of the company, as far as this may be desirable and practicable, and repair or exchange of equipment. When the company is divided, company headquarters normally is attached to the unit to which the greatest proportion of the transportation of the company is to be attached.

■ 220. PLATOON.—The platoon consists of platoon headquarters and two dump truck sections of two squads each.

*a. Platoon headquarters.*—The platoon is commanded by a lieutenant, assisted by a staff sergeant. Platoon headquarters supervises the activities of its dump truck sections, including operation and care of platoon vehicles.

*b. Section.*—The section chief of each dump truck section is a sergeant. Each squad leader is a corporal who is in direct charge of his trucks and their drivers. A general automobile mechanic handles minor maintenance and repair of vehicles.

■ 221. DUTIES.—*a.* Principal duties of the engineer dump truck company are:

(1) Keeping its transportation properly maintained for prompt dispatch.

(2) Complete cooperation in assisting the engineer units to which attached, getting the utmost from its personnel and transportation.

(3) Providing for its own local security, requesting such additional protection as the situation demands.

*b.* In determining the size of a subdivision of a dump truck company to be assigned to an engineer unit for a specific operation involving haulage, the following factors must be taken into consideration:

(1) Cargo-carrying capacity of the trucks.

(2) Capacity of the unit served to handle the material at both loading and receiving ends of the job.

(3) Round-trip distance involved.

(4) Condition of roads to be traveled.

(5) Density of traffic to be encountered.

(6) Limitations imposed by the site of the work upon the number of trucks that can be used economically.

(7) Weather conditions.

(8) Time of operations—day, night, or both.

(9) Time available.

(10) Enemy air activity.

## SECTION VI

## ENGINEER TOPOGRAPHIC COMPANY, CORPS

■ 222. MISSION.—*a.* The engineer topographic company, corps, reproduces existing maps in quantity, distributes them to corps troops and divisions, and establishes and extends the ground control required for coordination of field artillery fire.

*b.* When aerial photographs are made available from engineer aviation topographic companies or from photomapping units of the air force, they are utilized by corps topographic companies for preparation of photomaps and for revision of maps. Initial requirements of the corps are met by the corps topographic company who rapidly prepare and supply map information, particularly the hasty type of map substitutes. The scope of the mapping work is restricted to relatively small areas.

*c.* Organic transportation is provided for all personnel and equipment.

■ 223. ORGANIZATION.—This company is a self-sustaining unit composed of company headquarters and three platoons—survey, photomapping, and reproduction. Company organization is shown in figure 21. (See T/O 5-167 for details.)

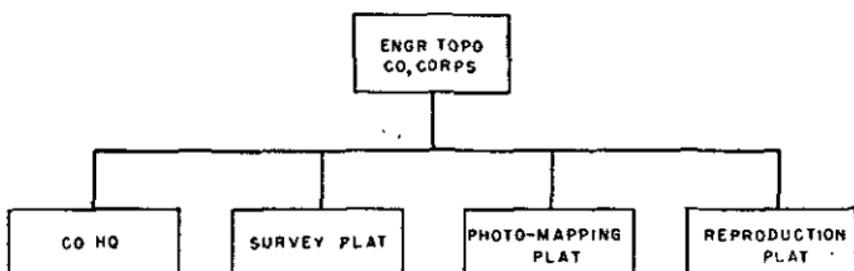


FIGURE 21.—Engineer topographic company, corps (T/O 5-167).

■ 224. COMPANY HEADQUARTERS.—*a.* The company commander is assisted by the administrative officer, a lieutenant. Their duties and functions are covered in chapter 2. Company headquarters has enlisted personnel to perform routine administrative, supply, and mess functions and to repair and maintain company equipment.

*b.* The company commander supervises and controls activi-

ties of the individual platoons by determining the needs of corps units, particularly requirements of artillery in connection with fire control, and assigning definite tasks to his platoon officers to meet these needs.

■ 225. SURVEY PLATOON.—The survey platoon is commanded by a lieutenant; it includes platoon headquarters and two survey parties. Each of these parties consists of a transit party, a level party, and a chaining party. Survey equipment and supplies are furnished to the corps topographic company in a special set including such items as theodolites, transits, levels, stadia and level rods, and tapes. Sketching sets are used in preliminary reconnaissance work. The platoon has a small amount of organic transportation; when additional vehicles are needed, they are obtained from company headquarters. Company headquarters can furnish assistance with platoon tool sets including carpenter, pioneer, sign-painting, and tin-smith equipment.

a. *Field work.*—(1) *Purpose.*—Field surveys are not designed to provide information for initiating original map projects. Survey work consists primarily of taking ground control forward to the field artillery. Survey data giving the location of batteries makes possible the concentration of indirect fire from all division artillery on a target after observing fire from a single battery. Survey information accompanied by a mosaic or wide-angle photographs makes it possible for artillery to lay on any target with reference from a registration point in the same general area.

(2) *Artillery survey units.*—Division artillery headquarters and corps artillery elements down to the battalion also have survey parties. The principal artillery survey unit is the corps observation battalion.

(3) *Artillery-engineer survey team.*—The artillery-engineer survey team is a result of the need for coordination between artillery and engineer survey units. The artillery observation battalion command and the corps topographical company commander plan together and coordinate their activities, assigning independent separate lines to the survey groups of each run in order to eliminate unnecessary duplication. If conflicts arise, the corps commander adjusts differences so tasks are undertaken in order of importance to the command as a whole.

b. *Office work.*—The survey platoon includes topographical

computers who calculate from the field notes the position and elevation of points as desired.

■ 226. PHOTOMAPPING PLATOON.—The photomapping platoon is commanded by a lieutenant and is divided into two groups, each of which contains a drafting section and a stereocomparagraph section. The platoon prepares mosaics, overlays, and overprints for reproduction. Assigned equipment includes stereocomparagraph sets and stereoscopes. In stabilized situations, the slotted templet method and the stereocomparagraphs can be employed to contour aerial photographs and to make small contoured maps. In this way it is possible to extend horizontal and vertical control into enemy territory by photographic methods. The platoon can operate on two shifts, if necessary. Photomapping equipment is transported on 1-ton cargo trailers and 2½-ton trucks. The platoon is normally located with company headquarters.

■ 227. REPRODUCTION PLATOON.—*a.* The reproduction platoon is commanded by a lieutenant whose chief assistant is a master sergeant, general lithographer. Enlisted personnel includes skilled craftsman and occupational specialists for operation and maintenance of the reproduction equipment organically assigned to the platoon. The principal duty of the reproduction platoon is to reproduce existing maps and maps prepared by the photomapping platoon.

*b. Equipment.*—The major items of equipment are contained in a mobile reproduction equipment set and include camera copying equipment and multilith presses mounted in van type semitrailers. Other reproduction equipment includes standard sets of black-and-white process printing equipment and gelatin-process duplicating equipment. There is available in company headquarters a trailer-mounted 250-gallon water tank as the reproduction platoon needs large amounts of water for operation of the multilith presses. Paper stocks and miscellaneous reproduction equipment and supplies are carried on 1-ton cargo trailers and 2½-ton cargo trucks.

■ 228. ARMAMENT.—Individual weapons include the carbine and pistol. The company is provided with several machine guns. These automatic weapons are normally used for local security of working parties on detached missions, particularly detachments of the survey platoon.

## ENGINEER TROOPS

■ 229. TRAINING.—Basic and unit training is similar to that of the engineer aviation topographic company. Unit training includes field survey work, photogrammetry, topographical drafting, map compilation, map reproduction, and care and operation of the special equipment required for such work. Combined training includes work with artillery survey personnel and coordination of activities with mapping units of the various echelons. Mapping activities prior to field service assignment should consist of participation in maneuvers of the combined arms and services.

■ 230. DUTIES.—The duties of the corps topographical company are covered in the preceding discussion of the several platoons of the company. Briefly summarized they are—

a. To provide map information for the corps and divisions by—

(1) Extending and establishing horizontal and vertical control from army to meet corps requirements.

(2) Reproducing in quantity and distributing existing maps.

(3) Preparing photomaps and revising existing maps from aerial photographs.

b. To maintain local security.

## SECTION VII

### ENGINEER TOPOGRAPHIC BATTALION, ARMY TYPE

■ 231. MISSION.—a. The engineer topographic battalion, army type, provides adequate map information for tactical and strategical requirements of the army, and establishes and extends horizontal and vertical control for army and corps requirements. It is organized, trained, and equipped to prepare and reproduce photomaps, maps of limited areas, overlays, and sketches; and to revise and reproduce existing maps. Although it can lay controlled mosaics, it is primarily designed to prepare photomaps from uncontrolled mosaics or individual photographs.

b. This battalion normally operates with an army. It may be reinforced with detachments from a base topographic battalion; and detachments may be made from the army battalion to a corps operating on an independent mission.

■ 232. ORGANIZATION.—The battalion consists of battalion headquarters and headquarters and service company, a survey

company, a reproduction company, and a medical detachment. Organization is shown in figure 22. (See T/O 5-55 for details.)

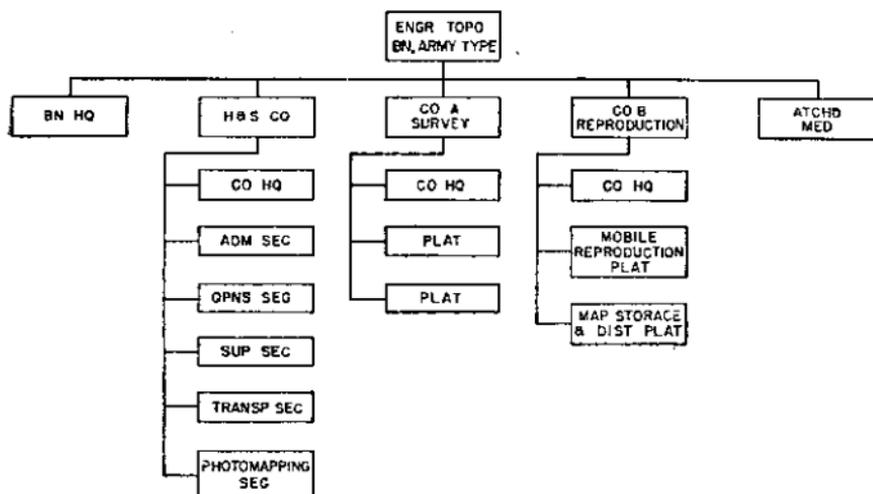


FIGURE 22.—Engineer topographic battalion, army type (T/O 5-55).

■ 233. EQUIPMENT.—Reproduction equipment organic with the battalion is mounted in trailers drawn by tractor trucks; respective trailers are designated as process camera, grainer, laboratory and supply, photo, press, and process plate. Triangulation towers are also mounted on truck-drawn trailers. In the field, tank trailers carry the water needed for operational purposes; and a special water-supply equipment provides pumping facilities for furnishing water to the reproduction company.

■ 234. TRANSPORTATION.—Transportation is sufficient to move all personnel and equipment. (See current Tables of Organization for details.)

■ 235. ARMAMENT.—Individual weapons include the carbine and pistol. The battalion does not have supporting weapons.

■ 236. TRAINING.—*a.* Basic and unit training common to all engineer troops is discussed in chapter 4. Combined training with arms and services of the army and corps is similar to that of the corps topographic company. In addition the bat-

talion is trained to develop teamwork within the battalion and with other survey and mapping units. Battalion headquarters is trained in establishing liaison with the assistant chief of staff, G-2, who states map requirements; the army engineer, who formulates mapping operations; and the air force officer, who is contact officer on photomapping activities.

b. A large proportion of the total personnel are skilled craftsmen and occupational specialists.

■ 237. SURVEY COMPANY.—*a. General.*—(1) The survey company is divided into company headquarters and two survey platoons. (For details see T/O 5-58.)

(2) The company's mission is to recover horizontal and vertical control, where it has been previously established; to provide a band of picture points and establish their position and elevation; and to identify (on photographs) roads, streams, lakes, towns, and other features, for the photomapping section in headquarters and service company. It carries ground control as far forward as possible to be picked up by corps topographic companies. When use of the aerial photographic method of mapping is impracticable the survey company, in addition to establishing control, may be required to fill in topographic details, thus producing maps entirely by ground methods. Since ground surveys are slow work, this method is not generally used. It should be regarded as an emergency method for small areas only, where great speed cannot be expected.

(3) Transportation is sufficient to move all personnel and equipment.

*b. Company headquarters.*—Company headquarters is composed of two sections. A headquarters section under the administrative officer, includes enlisted personnel for routine administration, mess; supply, operation of trucks, and maintenance and repair of company transportation and equipment. A drafting section, under a lieutenant, includes topographic surveyors, draftsmen, and computers. This section takes the field notes and makes the necessary computations for revision of maps and plotting of ground control points and lines on aerial photographs. The finished work is then submitted to the photomapping section. Company headquarters also has enough extra personnel to operate eight separate messes, so that each field party can be messed and quartered where it is located.

*c. Survey platoon.*—(1) The survey platoon is divided into

four field parties. Each survey platoon has triangulation sets and transit traverse sets with equipment for field work, including transits, levels, theodolites, tapes, range poles, and miscellaneous supplies. Field parties are capable of performing survey work of first-order precision. However, the usual line that is run is of third-order precision. For picture-point control, the allowable error is usually greater.

(2) The survey project is started in the same way as in the base topographical battalion, even though fewer picture points are required. If the mosaic is to be uncontrolled, no picture points, or picture points only at infrequent intervals, are used. Bands of control are run 15 to 20 miles apart across the area to be mapped, and the mosaic is checked into these.

■ 238. REPRODUCTION COMPANY.—*a.* The company commander is assisted by the administrative officer, a lieutenant. The company is divided into company headquarters, a mobile reproduction platoon, and a map storage and distribution platoon. Most of the work of the reproduction company is black-and-white maps.

*b. Company headquarters* includes personnel for performing routine duties of administration, mess, and supply; maintenance and repair of transportation; for operation of electric lighting sets; and for editing maps.

*c. Mobile reproduction platoon* is commanded by a lieutenant and is organized so it can operate in two shifts, each shift supervised by a lieutenant.

*d. Map storage and distribution platoon* is commanded by a lieutenant. Enlisted personnel keep records of all transactions in the storage and distribution of maps. Cargo trucks are furnished for use as libraries of finished maps.

■ 239. BATTALION HEADQUARTERS.—Battalion headquarters is organized as shown in T/O 5-56. Staff functions and duties outlined in chapter 2 are applicable.

■ 240. HEADQUARTERS AND SERVICE COMPANY.—Headquarters and service company is composed of company headquarters and sections designated as administrative, operations, supply, transportation, and photomapping. It furnishes personnel for operation of various staff sections of battalion headquarters.

*a. Company headquarters.*—Company headquarters is commanded by a captain, assisted by enlisted personnel for ad-

ministration, supply, and mess of battalion headquarters and headquarters and service company.

*b. Administrative section.*—Normal functions and duties of the administrative section under command of the battalion adjutant are explained in chapter 2.

*c. Operations section.*—This section is commanded by S-3, battalion operations officer. In addition to its duties in planning the operations of the battalion, this section prepares specifications for aerial photography; collects, evaluates, and files control data from outside sources; assists in initial stages of establishing control for survey work; prepares mapping specifications; makes field checks; and does final editing of all maps prepared by the battalion.

*d. Supply section.*—This section is commanded by S-4, battalion supply officer. All transportation for use of battalion headquarters and headquarters and service company is pooled in this section. Its normal functions and duties pertaining to battalion supply are outlined in chapter 2. Finished maps are delivered to distributing agencies by this section. Distribution of maps directly to troops using them is not a function of the topographic battalion.

*e. Transportation section.*—This section is commanded by a lieutenant. It is charged with maintenance and repair of all battalion transportation. It furnishes drivers for all vehicles assigned to headquarters and service company.

*f. Photomapping section.*—(1) When control or pictures are returned from the survey company, the plot is made and the mosaic is laid by the photomapping section. Personnel, in addition to a lieutenant in command, includes a warrant officer, second in command; aerial phototopographers; topographical draftsmen; and others.

(2) Photomaps may be prepared from mosaics or from large photographs received from air force photomapping units. The photomapping section has stereocomparagraph sets used to plot topography over a moderate-sized area. However, functions of the army topographic battalion do not include furnishing topographic maps, but only line maps or photomaps.

(3) The photomapping section can be organized to operate on two shifts.

■ 241. ATTACHED MEDICAL.—The attached medical section consists of a captain, unit surgeon, a lieutenant, dental officer, and necessary enlisted personnel. Transportation includes a

cross-country ambulance and a truck for transporting personnel, equipment, and supplies. Duties of the unit surgeon and the detachment as a whole are explained in chapter 2.

■ 242. DUTIES.—The duties of the battalion are covered in preceding discussions of the companies and their subdivisions. Briefly summarized they are—

a. Providing map information to the army in the shortest practicable time by—

(1) Establishing and extending horizontal and vertical control for army and army corps requirements.

(2) Preparing and reproducing photomaps, maps of limited areas, overlays, and sketches.

(3) Revising and reproducing existing maps.

b. Fighting in self-defense.

c. Locating headquarters of the battalion and the reproduction company near army headquarters to obtain close coordination in planning and executing mapping operations which involve the army commander, G-2, the army engineer, the artillery commander, and the air officer.

(1) Authority to make reproductions of any nature comes from army headquarters. Requests for work are reviewed by the appropriate unit engineer. No work should be done without proper authorization.

(2) The battalion commander obtains from G-2 all available maps of the area of proposed operations, and prepares, through his staff, plans for amplifying and correcting them.

## SECTION VIII

### ENGINEER CAMOUFLAGE BATTALION, ARMY TYPE

■ 243. MISSION.—a. The engineer camouflage battalion, army type, is organized, trained, and equipped to supervise and inspect camouflage work, discipline, and training in the army area. In addition, it conducts experiments for new camouflage methods and may prepare detailed plans for general or special camouflage installations.

b. In general, camouflage work is executed by the troops of the activity or area being camouflaged. General engineers are charged with supervision and inspection of camouflage work for the higher unit or headquarters to which they are assigned or attached. The elements of the camouflage battalion assist by advice, demonstration, and instruction.

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■ 244. ORGANIZATION.—The army camouflage battalion is a command and administrative unit, and consists of a battalion headquarters, a headquarters and service company, four lettered companies, and a medical detachment. Its organization is shown in figure 23. (For details see T/O 5-95.)

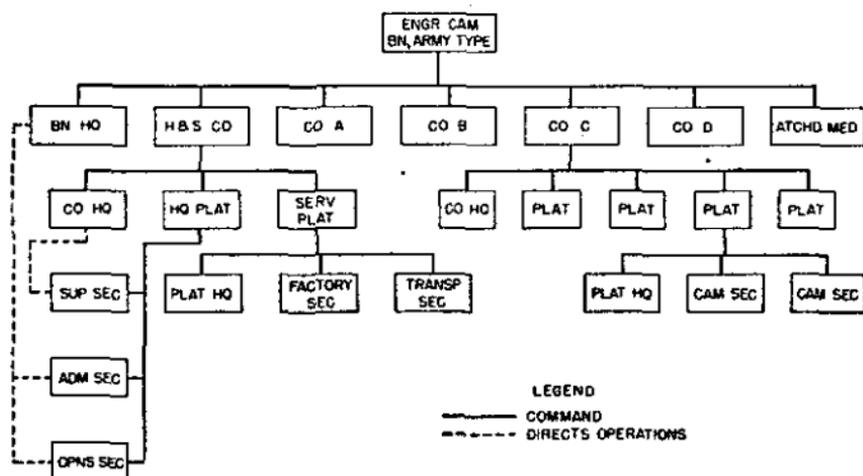


FIGURE 23.—Engineer camouflage battalion, army type (T/O 5-95).

■ 245. EQUIPMENT.—Organic equipment consists of such engineer tools and equipment as are necessary for demonstrating and fabricating camouflage materials in limited quantities. Most of the tools are integral parts of basic engineer sets.

■ 246. TRANSPORTATION.—Transportation consists of light trucks and trailers for command, reconnaissance, and inspection purposes; and for transporting supplies, equipment, and camouflage material. There is sufficient transportation to move all personnel, equipment, and supplies. An important use of vehicles is in transporting camouflage inspection and demonstration parties, and in operating schools for camouflage instruction.

■ 247. ARMAMENT.—Individual weapons include the carbine and pistol. There are no supporting weapons assigned to the battalion.

■ 248. TRAINING.—*a.* Basic and unit training follows the principles outlined in chapter 4.

b. The camouflage battalion rarely is employed as infantry in combat. Personnel are trained to use their weapons in self-defense and in security on the march and in bivouac.

c. Unit training includes—

- (1) Principles and practice of camouflage technique.
- (2) Construction and erection of special devices used in camouflage operations.
- (3) Planning of general and special camouflage installations.
- (4) Manufacture of camouflage materials.
- (5) Rules of camouflage discipline for troops of all arms and the methods of teaching and enforcing it.
- (6) Interpretation of aerial photographs with reference to visibility of camouflage from the air and detection of camouflaged enemy activities.
- (7) Selection of positions for installations of all kinds with a view to protection from enemy observation and detection.
- (8) Supply of camouflage materials to all arms and services.
- (9) Necessity for close cooperation with units of other arms and services.

d. Personnel of the army camouflage battalion consist largely of skilled technicians and specialists. The efficiency of its operations is increased by recruiting civilian specialists such as men from motion picture and theatrical art departments, including art directors, property men, model builders, scenery builders, special effects men; commercial artists and illustrators; architects, building contractors, and landscape architects; painters, riggers, linemen, plasterers, mechanics, and carpenters.

■ 249. COMPANY.—The lettered company is organized into a company headquarters and four camouflage platoons. (For details see T/O 5-97.)

a. *Company headquarters.*—(1) Company headquarters includes the company commander; personnel for handling routine administrative, mess, and supply duties; and technical specialists in camouflage construction and inspection for performing technical work common to all the platoons and assisting them in their camouflage activities.

(2) Company headquarters has engineer equipment and basic engineer sets for doing special work and for reinforcing the platoons. The company camouflage set includes special tools and expendable supplies.

b. *Platoon.*—(1) The camouflage platoon consists of a lieut-

tenant in command and occupational specialists in camouflage practice and technique.

(2) *Platoon equipment.*—(a) Platoon equipment includes standard engineer sets and a small quantity of camouflage materials such as wire, rope, osnaburg, nets, stakes, and cold-water paints. Each platoon is assigned a stereoscope for studying aerial photographs for camouflage efficiency.

(b) Stereovision is a most important aid in identifying camouflage installations. Since objects register in exaggerated relief, they are much easier to identify. Stereoscopic pairs should be taken of an area which contains installations, so repairs may be made or installations adjusted. This should be done frequently to maintain camouflage discipline.

(3) *Employment.*—(a) Camouflage platoons are given area missions. The area which one platoon can cover varies from 10 to 50 square miles, depending upon the density of the concentration of troops and military installations. The members of the platoon travel through their assigned area, observe the state of camouflage discipline, lend assistance and give expert advice to the commanders of troops whose activities should be camouflaged, suggest corrective measures, and facilitate the distribution of camouflage supply. They make periodical and emergency reports to their company commander, who takes appropriate action, either directly or through channels.

(b) During concentration of forces for an offensive, concealment is vital. Troops that are to move into an area must be informed beforehand as to the camouflage restrictions. This prevents revealing their presence to enemy aerial or ground observation. When an attack has stabilized and troops commence to construct field fortifications, trained camoufleurs are needed to design concealment for such fortifications, and to plan the use of decoys and dummies. Camouflage measures must be undertaken concurrently with, rather than subsequent to, the construction of field fortifications and the location of field artillery and antiaircraft gun emplacements. The platoons remain indefinitely in their areas, insuring the continuity of camouflage policy, regardless of the movements of other troops. They study the local characteristics of the terrain and the effects of seasonal changes upon visibility. A record is maintained of the successes and failures of their camouflage technique with reasons therefor.

■ 250. BATTALION HEADQUARTERS.—a. Battalion headquarters consists of a lieutenant colonel, battalion commander; a

major, executive officer; a captain, adjutant (S-1); a captain, operations (S-3); and a first lieutenant, personnel officer. Their functions and duties are described in chapter 2.

b. Battalion headquarters assists, controls, and directs the activities of headquarters and service company and the four lettered companies. The battalion commander confers with G-3 of army headquarters and the army engineer and gives expert advice on camouflaging training, modern camouflage practice, the issue and enforcement of camouflage regulations, the camouflage of specific installations, and the solution of camouflage problems of major importance.

■ 251. HEADQUARTERS AND SERVICE COMPANY.—Headquarters and service company consists of a company headquarters, a headquarters platoon, and a service platoon. (For details see T/O 5-96.) It includes the personnel for operating the various staff sections of battalion headquarters, the supply service for the battalion, and the manufacture of camouflage materials used by the battalion.

a. *Company headquarters.*—The company commander is also the battalion supply officer (S-4), and is on the battalion commander's staff. The company has normal enlisted personnel for handling routine administration and supply of the company and the messing of the company and battalion headquarters.

b. *Headquarters platoon.*—The headquarters platoon is divided into an administrative section, an operations section, and a supply section.

(1) *Administrative section.*—The battalion adjutant is in charge of the administrative section which is supervised by the battalion sergeant major. Clerical personnel handle routine administrative work and operate the battalion message center as described in chapter 2.

(2) *Operations section.*—The operations section is supervised by S-3. It plans and sets up pilot models of camouflage installations, and gives instruction and furnishes drawings to the personnel of the camouflage companies. This section may be charged with planning, developing, and conducting courses of instruction in camouflage principles and technique in one or more army or army corps schools. This section has drafting and printing equipment.

(3) *Supply section.*—The supply officer (S-4), is in charge of the supply section which includes a technical sergeant who supervises the supply of all camouflage materials to the

battalion. In addition to enlisted personnel for driving the cargo trucks and for handling clerical work, there is an operator of the motorized air compressor assigned to this section. The compressor is used mainly by the factory section in the service platoon and operations of the companies.

*c. Service platoon.*—The service platoon is divided into a platoon headquarters, a factory section, and a transportation section.

(1) *Platoon headquarters.*—The platoon headquarters includes a first lieutenant in command, a staff sergeant, and a truck driver.

(2) *Factory section.*—The work of the factory section is under the direct control of a second lieutenant. His chief assistant is a sergeant, camoufleur, who supervises factory operations. The camoufleurs fabricate camouflage materials in limited quantities and adapt prefabricated materials to local conditions. A general draftsman makes working drawings for factory use and reports. This section has drafting equipment, basic tool sets, and supplementary equipment. The supplementary equipment set for the army camouflage battalion includes special motor-driven cloth cutters, paint mixers, and heavy-duty sewing machines.

(3) *Transportation section.*—The transportation section is under the direct supervision of a warrant officer who is designated motor assistant. Enlisted personnel operate organic vehicles and perform second-echelon maintenance for the battalion.

■ 252. ATTACHED MEDICAL.—The medical detachment includes a captain, battalion surgeon; a first lieutenant, dental officer; and twelve enlisted men. Transportation consists of a cross-country ambulance, a command and reconnaissance truck, and a 2½-ton cargo truck for personnel, equipment, and supplies. Duties of the unit surgeon and the detachment as a whole are described in chapter 2.

■ 253. DUTIES.—The army camouflage battalion has the following duties to perform in the army area:

*a.* Advice and assistance in selecting easily concealed positions. In a rapidly moving situation, the battalion concentrates on those installations which will remain in the same locality for several days or more, and upon parts or sites for large or important supply installations. This assistance requires prompt and complete knowledge of the army G-4 plan.

The battalion commander should be prepared to accompany representatives of G-4 in reconnaissance of such locations.

*b. Supervision of camouflage practice.*—This duty is delegated to subdivisions of the battalion, down to and including the camouflage platoon, the basic operating unit. The sixteen platoons in the battalion may be dispersed throughout the army area.

*c. Inspection of existing camouflage.*—This includes corrective criticism and recommendations for remedial action.

*d. Demonstration of correct camouflage technique, including construction of pilot models, dummy installations, and decoy models for all arms and services, is coordinated with the battalion-operated schools in the army and corps areas.*

*e. Erection for field units of minor camouflage of common interest to all troops.*

*f. Supply of special camouflage materials, equipment, and tools.*

*g. Camouflage reconnaissance.*

*h. Local security.*

■ 254. REFERENCES.—The fundamental principles of camouflage are treated in detail in—

FM 5-20, Camouflage.

FM 21-45, Protective Measures, Individuals and Small Units.

## SECTION IX

### ENGINEER CAMOUFLAGE COMPANY, SEPARATE

■ 255. MISSION.—The engineer camouflage company, separate, is assigned to an independent corps. It may be the camouflage unit accompanying a task force. The company performs the same missions for its independent unit as does the army camouflage battalion for its army.

■ 256. ORGANIZATION.—The separate camouflage company is organized in the same manner as the lettered company of the army camouflage battalion. Organization is shown in figure 24. (For details see T/O 5-297.)

■ 257. ARMAMENT AND EQUIPMENT.—Armament and equipment are much the same as those of the lettered camouflage company of the army battalion.

## ENGINEER TROOPS

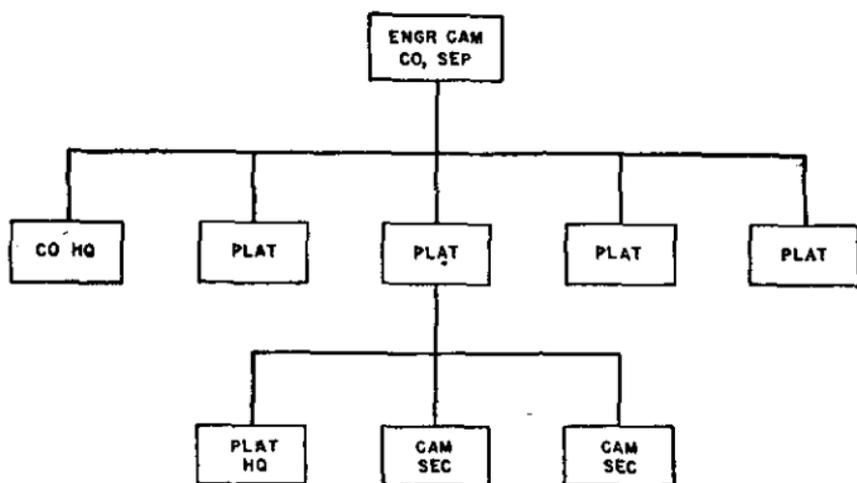


FIGURE 24.—Engineer camouflage company, separate (T/O 5-297).

■ 258. TRANSPORTATION.—There is sufficient transportation for all personnel, equipment, and supplies. It consists of light trucks and trailers for administration, mess, and supply; for field party operation; and for inspection and reconnaissance.

■ 259. TRAINING.—Basic and unit training and special engineer-training are the same as for the lettered company of the army camouflage battalion.

■ 260. COMPANY HEADQUARTERS.—Company headquarters consists of the company commander; an administrative officer; personnel for handling details of company administration, mess, supply, and motor maintenance; and a technical group for camouflage activities.

■ 261. PLATOON.—The camouflage platoon may be subdivided into a platoon headquarters and two operating sections. The latter may be given area missions. The platoon of the separate company has personnel, transportation, equipment, and supplies similar to those of the platoon of the lettered company of the army camouflage battalion.

■ 262. DUTIES.—The principal camouflage duties of the separate camouflage company in an independent area are substantially the same as those of the army camouflage battalion in an army area explained in section I of this chapter.

## SECTION X

## ENGINEER WATER SUPPLY BATTALION

■ 263. MISSION.—*a.* The principal mission of the engineer water supply battalion is the procurement, purification, and distribution of potable water to troops in areas where the local supply is inadequate. It may also be charged with the operation and repair of water plants, and with developing water supply sources and installing and operating water supply points in the absence of general engineer units.

*b.* The water supply battalion may be employed as a unit, or subdivisions may operate alone or be attached to other engineer units.

*c.* Commanders of troops of all arms are responsible for providing their units with an adequate supply of water. When the local supply is inadequate in quantity or quality, the water supply battalion develops additional facilities and purifies and distributes water to meet the minimum requirements of the command. Most of the actual work in developing additional water supply facilities, including installation and operation of water supply points, is accomplished by general engineer units of all echelons. Such work is usually done concurrently with other engineer tasks. As unit engineer, the commanding officer of any engineer unit assigned or attached to any military unit or tactical grouping automatically assumes responsibility for the supply of water to that military unit. The presence of a water supply battalion or detachments therefrom does not relieve the unit engineer and the general engineer troops under his command from their water supply responsibilities. The water supply battalion is organized primarily as a pool of tank trucks and mobile purification units. As such, it is not an agency to which all water supply duties are delegated. Instead it should be used normally only for such special tasks as the procurement, purification, and distribution of water. Water may be transported by railway tank cars to railheads; the water supply battalion then transports it either from such railheads or from water supply points to water distributing points. Both types of water points are installed and operated by general engineer troops. Water is transported from distributing points by the using units.

*d.* Water supply battalions attached to army are under the command of the army engineer, who exercises control

## ENGINEER TROOPS

through his engineer group headquarters. The battalion is responsible for water supply and water transportation in the area it serves.

■ 264. ORGANIZATION.—The unit consists of battalion headquarters, a headquarters and service company, three lettered companies, and a medical detachment. Organization is shown in figure 25. (For details, see T/O 5-65.)

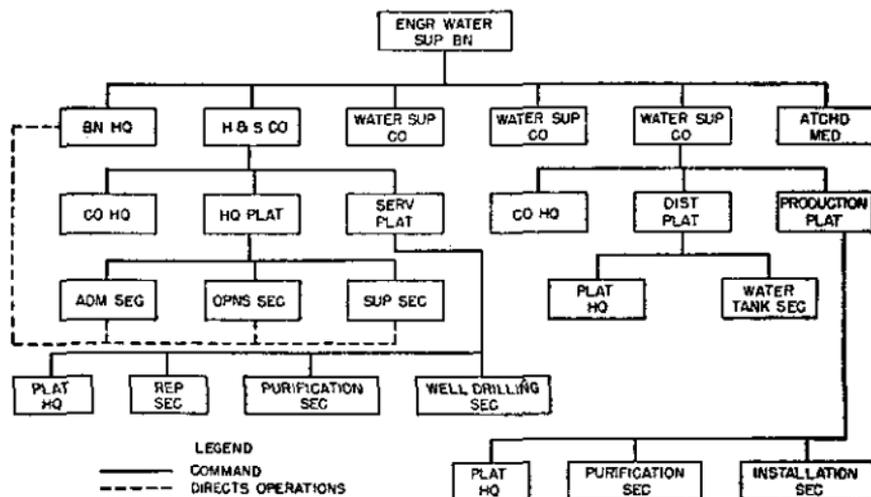


FIGURE 25.—Engineer water supply battalion (T/O 5-65).

■ 265. EQUIPMENT.—*a.* Most of the basic engineer tool sets common to all general engineer units are included in the equipment of the battalion.

*b.* Special water supply equipment includes a percussion well-drilling machine, a rotary well-drilling machine, mobile water purification units, supplementary sets, and water supply equipment sets. The battalion is also equipped with a motorized air compressor.

■ 266. TRANSPORTATION.—There is sufficient transportation for the simultaneous movement of all personnel, equipment, and supplies. The officers and men ride on the special vehicles when the unit moves. For water transportation each lettered company has tractor-drawn water tanks mounted on semi-trailers, and light cargo trucks, each mounting a water tank. Other transportation includes light trucks and trailers for

reconnaissance, for quick dispatch of men and tools, and for transportation of personnel, equipment, and supplies.

■ 267. ARMAMENT.—Individual weapons include the carbine and pistol. The battalion does not have supporting weapons.

■ 268. TRAINING.—*a.* Basic and unit training follows the principles explained in chapter 4.

*b.* Unit training includes operation, maintenance, and care of transportation, special machinery, and equipment assigned to the battalion; handling of motor convoys; development of water resources, including installation of water points; principles and technique of water purification and of distribution of water over wide areas; and water supply reconnaissance.

*c.* The battalion is responsible at all times for its own local security against air and ground attacks.

■ 269. WATER SUPPLY COMPANY.—*a. Organization.*—(1) The lettered company consists of company headquarters, a distribution platoon, and a production platoon.

(2) The company is organized as a basic water supply unit and is equipped to procure, pump, transport, and store water. It may operate under the direct command of the battalion commander or it may be attached to other units.

(3) Two water supply units to develop sources and purify and transport water can be formed in the company. By attaching a purification unit from headquarters and service company, three units can be formed. Since well water generally requires only chlorination, a purification unit is not essential in such cases; however, consuming organizations must be told of the need of chlorinating in Lyster bags if a purification unit is not used. If a purification unit is available, its use is preferable to chlorination by consuming organizations.

*b. Company headquarters.*—The company headquarters consists of the company commander and an administrative officer, and enlisted personnel for routine administration, mess, supply, and maintenance and repair of automotive equipment. The company commander supervises, coordinates, and controls operations of the platoons in the company sector. When possible, the company commander establishes and maintains liaison with major units being served so water supply installations may follow their movement without losing contact.

*c. Distribution platoon.*—The distribution platoon consists

of platoon headquarters and a water tank section. It is equipped only for transportation of water but may operate its source of supply by attaching an installation squad from the production platoon. It also may be equipped to purify water by attaching a purification section from the production platoon or from headquarters and service company.

(1) Platoon headquarters includes a lieutenant as platoon commander assisted by a platoon sergeant. It supervises and controls transportation of water throughout the company sector.

(2) *Water tank section.*—The activities of this section are under the direct charge of a sergeant, truckmaster. The section contains three basic water transportation units, each under the control of a corporal, truckmaster. One unit consists of 1,500-gallon water tanks mounted on semitrailers and drawn by 4- to 5-ton tractor trucks, with winch; and two units of 2½-ton cargo trucks mounted with 700-gallon water tanks.

*d. Production platoon.*—The production platoon consists of platoon headquarters, a purification section, and an installation section. The duties are development and operation of sources, construction of water supply points, and purification of water. It may be operated as a unit or sections thereof may be attached to distribution platoons.

(1) *Platoon headquarters* consists of a lieutenant as platoon commander assisted by a platoon sergeant. This headquarters generally supervises platoon operations.

(2) The *purification section* operates two mobile water purification units on a two-shift basis, each of which is supervised by a sergeant, water supply foreman. There are two 2½-ton cargo trucks for carrying section tools, parts, and equipment.

(3) The *installation section* is under the direct charge of a sergeant as construction foreman. It can be organized into two operating units, each under a corporal, construction foreman. This section installs and operates water supply equipment at temporary water supply points. Necessary tools and equipment are included in a set especially designed for use by a water supply company. It includes centrifugal pumps, canvas water-storage tanks, reducers, strainers, couplings, elbows, nipples, valves, hose, and miscellaneous tools. When necessary, the platoon may be reinforced with equipment from headquarters and service company.

■ 270. BATTALION HEADQUARTERS.—Battalion headquarters consists of the battalion commander and his staff officers, including executive, adjutant, operations officer, supply officer, personnel officer and assistant adjutant, and assistant operations officer. (For details see T/O 5-65.) Functions and duties of the staff are in general those outlined in chapter 2.

■ 271. HEADQUARTERS AND SERVICE COMPANY.—Headquarters and service company consists of company headquarters, a headquarters platoon, and a service platoon. Personnel and equipment are included for operating the various staff sections of battalion headquarters, the supply service for the battalion; supervision and reinforcement of water supply operations of the lettered companies; maintenance and repair of battalion transportation and equipment, and well-drilling operations. It is not organized or equipped to transport water as are the lettered companies. It is provided with water supply equipment and transportation to permit the battalion commander to increase the capacity of water supply companies. Water supply and water purification equipment may also be attached to other units for special missions without reducing working capacities of water supply companies. When so attached, they operate under the direct supervision of the headquarters and service company commander. Organization of headquarters and service company is shown in figure 25. (For details see T/O 5-66.)

a. *Company headquarters* consists of the company commander and a lieutenant who handles company administrative details and is also assistant battalion supply officer. There is also personnel for routine administration and messing of the company and battalion headquarters.

b. *Headquarters platoon* consists of an administrative section, an operations section, and a supply section.

(1) *Administrative section*.—The administrative section consists of the battalion adjutant, the personnel officer, and enlisted personnel for routine clerical work and operation of the message center.

(2) *Operations section*.—(a) Personnel for the operations section includes the operations officer, assistant operations officer, a warrant officer as assistant on construction and utilities, and necessary enlisted personnel. The section maintains a situation and operations map which is posted daily with the latest information on water resources. It also prepares other maps showing location of water points.

(b) Battalion S-3 is also intelligence officer. He normally handles plans, training, operations, orders, estimates, reconnaissance, intelligence, and inspections of water supply work of the lettered companies. He also establishes required liaison with the unit to which the battalion may be attached. In the absence of specific requirements, he establishes liaison as necessary to keep abreast of the situation and of operations requirements.

(c) Water supply reconnaissance may be subdivided into an initial phase and a routine phase of reconnaissance.

1. *The initial phase* consists of obtaining basic information required for establishing water service in a new or progressing theater of operations, and includes, principally, determining the location and condition of water sources, and the location and water requirements of troops to be supplied. To determine the situation in the initial phase S-3 obtains all available data from higher headquarters, formulates plans for necessary reconnaissance, and assigns missions to such personnel as he deems necessary.

2. *The routine phase*, which consists of the compilation and circulation of water supply information, is a primary concern of the assistant operations officer. Water supply reconnaissance is a continuous responsibility of lettered company commanders. They consult the S-3 situation and operations maps, frequently, submit daily reports unless otherwise specified, and institute special reconnaissance missions, dispatching such parties as are necessary for expeditious performance. Particular attention must be given to—

Changing location of troops being served.

Water sources.

Road network and road conditions.

Location of conveniently accessible points on the road net for distributing points, and concealment and camouflage requirements.

Location of engineer materials.

Location of concealed positions suitable for future occupation.

(3) *Supply section*.—The supply section provides personnel for operation of battalion supply under the direction of battalion S-4.

c. The *service platoon* consists of platoon headquarters, a repair section, a purification section, and a well-drilling section.

(1) *Platoon headquarters* personnel includes a lieutenant, as platoon commander, and necessary enlisted personnel. Platoon headquarters supervises and controls the work of the sections, and dispatches its special equipment and operators to their assistance when required.

(2) The *repair section* is under the direct supervision of a warrant officer, motor assistant. It has personnel for maintenance and repair of transportation and equipment beyond the capabilities of the companies. A motorized air compressor is available for assignment to the lettered companies, or to the well-drilling section for developing wells.

(3) The *purification section* is under the direct control of a staff sergeant, water supply engineer. Personnel can be organized as three basic water purification units similar to those of the purification section in the lettered company, and are intended primarily to reinforce the production platoons of those companies. When these water purification units are attached to other units, the purification truck is accompanied by its personnel.

(4) The *well-drilling section* is under the control of a technical sergeant as well driller. It can be organized into two basic well-drilling units: one unit equipped with a percussion well-drilling machine and the other with a rotary well-drilling machine. These units may be attached to reinforce the companies of the battalion, in which case they are under the supervision of the company commander; or they may operate independently under the direct supervision of the headquarters and service company commander. The characteristics of the two types of well-drilling machines are such that each is best suited to a definite type of geological formation. Both units may be used in a single operation, each in turn being used in the formations to which it is best suited and in which it operates to best advantage. When they are to operate separately, consideration must be given to the assigned missions of each and the geological formations to be expected at the site of each well. The type of equipment best suited to the formations expected should be used.

■ 272. ATTACHED MEDICAL.—The medical detachment is made up of the unit surgeon, a lieutenant as dental officer, and necessary enlisted personnel. Transportation consists of a cross-country ambulance; a command and reconnaissance

truck; and a 2½-ton cargo truck for transporting personnel, equipment, and supplies. General duties and functions of the unit surgeon and of the detachment as a whole are stated in chapter 2. The unit surgeon of the water supply battalion has the special duty of advising the battalion commander on the pathological aspects of water supply.

■ 273. DUTIES.—The principal duties the water supply battalion is called upon to perform in a theater of operations include—

- a. Reconnaissance of water resources.
- b. Procurement of water, including development of water sources by drilling, impounding, and construction.
- c. Operation of field water points, including regulation of traffic.
- d. Transportation of water from source to field distribution points.
- e. Distribution of water at above points and at sources under military control.
- f. Posting of signs indicating location of water points within sectors of responsibility.
- g. Preparation of maps showing location of water points, and distribution of map information to higher authority for distribution to field units.
- h. Maintenance of records of water supply installations within sectors of responsibility.
- i. Provision for local security of own working parties, and for installations not protected by other troops.
- j. Recommendation of suitable regulations for the proper use and conservation of water and for the prevention of pollution.
- k. Camouflage of water supply installations.
- l. Arrangement with higher engineer echelons for delivery of water by tank car in the event of dearth of natural supplies.
- m. Operation and repair of water plants in territory occupied or otherwise under military control.

■ 274. REFERENCES.—For additional information on water supply operations, technical details on construction incident to installations, and the care, maintenance, and operation of the mobile water purification units, see—

- a. FM 5-6, Operations of Engineer Field Unit.
- b. FM 5-10, Communications, Construction, and Utilities.
- c. TM 5-295, Water Supply and Water Purification.

## CHAPTER 7

### ENGINEER UNITS WITH ARMY AIR FORCES

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#### SECTION I

#### ENGINEER AVIATION BATTALION

■ 275. MISSION.—*a.* The primary mission of this unit is to construct, repair, maintain, camouflage, and defend field airdromes.

*b.* It is the basic engineer construction unit of an air force and is completely equipped for the independent construction of an airdrome and all its appurtenances.

*c.* The number of battalions assigned to a theater of operations depends upon the amount of construction required, the rate of destruction by the enemy, and the availability of local construction facilities. Normally, one battalion is allotted for every two air force combat groups, and from one company to one battalion for each service center area.

*d.* The battalion may be reinforced by attachment of other engineer troops and equipment.

■ 276. ORGANIZATION.—This unit consists of battalion headquarters, a headquarters and service company, three lettered companies, and a medical detachment. Figure 26 shows the organization. (For details see T/O 5-415.)

■ 277. EQUIPMENT.—*a.* The battalion is equipped with basic engineer tool sets, drafting and surveying equipment, and a set of supplementary equipment.

*b.* Heavy construction equipment includes many items not found in other engineer units. Heavy units are assigned to all subordinate organizations in the battalion down to and including the platoon, and is used for clearing, earth moving, land grading, compaction of earth, and paving work. Special mobile shops maintain and repair this equipment.

## ENGINEER TROOPS

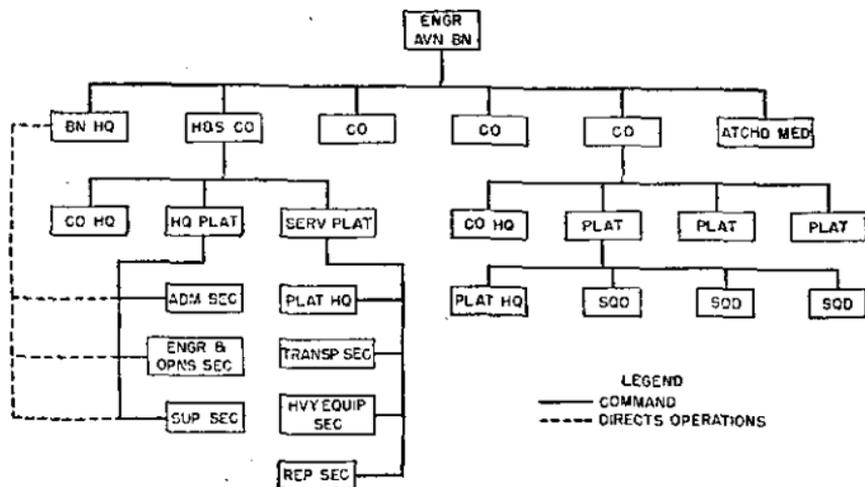


FIGURE 26.—Engineer aviation battalion (T/O 5-415).

■ 278. TRANSPORTATION.—*a.* Organic vehicles are not sufficient for the simultaneous movement of all personnel, equipment, and supplies. The heavier trucks are prime movers for trailer-mounted equipment.

*b.* Vehicles are similar to those in the engineer combat battalion. All cargo and dump trucks are provided with winches. During preliminary airdrome construction work, winches are particularly important for such work as hauling and removing stumps, felled trees, and large boulders.

■ 279. ARMAMENT.—Total armament for the battalion is shown in current tables of organization. Individual weapons include the bayonet, rifle, carbine, and pistol. Supporting weapons include caliber .30 machine guns, caliber .50 machine guns, caliber .45 submachine guns, antitank rocket launchers, and 37-mm antitank guns. Supporting weapons are available in units down to and including the platoon. This armament gives the battalion relatively strong firepower when acting as a whole; and if the battalion is widely scattered, armament can be distributed down to and including the platoon to preserve effective firepower.

■ 280. TRAINING.—*a. Basic and unit training.*—The basic and unit training outlined in chapter 4 is applicable. The unit has a large proportion of occupational specialists, including

mechanics, equipment operators, and foremen. They do not constitute a military unit until they are capable of taking care of themselves under field service conditions and, therefore, each individual must receive essential basic military training.

b. *Unit.*—(1) Unit training of the battalion centers around the platoon; the objective is to develop a well-trained engineer organization capable of working independently on an assigned task within the limitations of its personnel and equipment. Special emphasis is placed on developing skilled crews for earth-moving, compaction, grading, surfacing operations, and demolition work.

(2) Training in the use and maintenance of its heavy equipment is progressive throughout the unit program. Each equipment operator and foreman must learn the capabilities of his equipment and how to guard against excessive demands which may be made upon it.

(3) Unit training should be obtained by engaging in actual construction work. Every opportunity should be taken to employ engineer aviation battalions on projects where practical experience can be obtained in the construction of runways, air-base facilities, and similar work. Substitute training projects in lieu of airdrome construction are general post and station construction work such as is done on roads, parking areas, athletic fields, and rifle ranges.

c. *Combat.*—Combat training of the battalion is progressive throughout its training, with particular emphasis on local security while at work and while in bivouac; assistance in the active defense of an airdrome against hostile air and ground attack; and such offensive tactics as will train the troops in effectively attacking and repelling hostile ground forces.

d. *Specialists* (see ch. 4 on specialist training).—Every effort should be made to obtain civilian occupational specialists from the highway, paving, earth-moving, and heavy equipment worker classes. The number of pieces of expensive and complex machinery in the battalion requires continuous schooling of specialists to operate, repair, and maintain them. This training is imperative, since the operational efficiency of the battalion is based on the availability and continuous performance of its equipment. Recurrent break-downs, stoppages, and similar losses in equipment operation, result in inefficient performance by the unit as a whole. Training in the use of equipment is best obtained by actual work on bat-

talion and company tasks. Extensive classroom work, using charts, blackboards, photographs, blueprints, and manufacturers' manuals, is of assistance in completing instruction. The training of replacements should be continuous; it is the responsibility of the battalion commander to see that there is an assistant for every competent operator and that understudies continually are being developed.

*e. Camouflage.*—Training in camouflage technique must be given to all battalion officers who in turn must train the men. Camouflage of installations is essential in all airdrome construction, and training should be continuous so as to develop proper methods and procedure, thereby avoiding wasted effort and expense from ill-conceived camouflage. Qualified officers should conduct schools for air force officers and selected enlisted personnel.

■ 281. PLATOON.—*a. Organization.*—The platoon of the engineer aviation battalion consists of platoon headquarters and three squads. For details see Current Tables of Organization.

*b. Platoon headquarters.*—The commander of the platoon is a lieutenant. He conducts necessary reconnaissance; plans task assignments for the three squads, putting the platoon equipment and transportation where it will be most effectively employed; and supervises the work to utilize methods and secure results specified by approved plans. Platoon equipment includes mechanical equipment and hand tool sets, and a 4- or 5-ton dump truck.

*c. Squad.*—The squad is organized generally the same as the squad of the engineer company of the combat battalion, with the same squad tool sets and a 2½-ton squad dump truck with winch. Mechanized equipment from the headquarters and service company or from company headquarters is attached to platoons for temporary reinforcement on particular jobs, the equipment being used by individual squads according to need.

*d. Duties.*—The duties of the platoon include digging, clearing and grubbing, rigging, carpentry, demolitions, wrecking, and care of tools and equipment. Other duties, particularly in airdrome construction, include moving, grading, compacting, leveling, and stabilizing earth; providing drainage, including subdrains and culvert construction, blind drains, and diversion of small streams; surfacing work using concrete, asphalt materials, gravel, sand, and clay mixtures, and prefabricated steel mats or other material; execution of camou-

flage practice and technique; maintenance and repair of air-dromes and incidental installations.

■ 282. COMPANY.—*a.* The engineer aviation company is organized into a company headquarters and three platoons. (For details see T/O 5-417.)

*b. Company headquarters.*—The normal duties and functions of company headquarters are outlined in chapter 2. Personnel includes operators of heavy equipment in company headquarters and mechanics for repairing and maintaining the equipment and transportation for the entire company. The company has insufficient personnel and equipment to do extensive survey work.

■ 283. BATTALION HEADQUARTERS.—This consists of the battalion commander and his staff.

■ 284. HEADQUARTERS AND SERVICE COMPANY.—This company includes company headquarters; a headquarters platoon consisting of an administrative section, an engineering and operations section, and a supply section; and a service platoon consisting of platoon headquarters, a transportation section, a heavy equipment section, and a repair section. (For details see T/O 5-416.)

*a. Company headquarters* performs the normal functions of routine administration, mess, and supply for headquarters and headquarters and service company.

*b. Headquarters platoon* furnishes the personnel for the various staff sections of battalion headquarters.

(1) *Administrative section.*—Performs administrative work of the battalion and operates the message center. Its duties (those of the adjutant in charge of this section) are outlined in chapter 2.

(2) *Engineering and operations section.*—This section is supervised by the battalion engineering officer, assisted by a lieutenant. Enlisted personnel includes specialists in drafting, surveying, and camouflage.

(3) *Supply section.*—Supervised by S-4 from battalion headquarters, it performs normal supply functions for the battalion. Duties of S-4 outlined in chapter 2 are applicable.

*c. Service platoon* furnishes transportation, equipment, and repair service to the entire battalion.

(1) *Platoon headquarters* commanded by a lieutenant, controls the operations of the platoon in the allocation of trans-

portation and equipment and in the handling of maintenance and repair work.

(2) *Transportation section* is commanded by a lieutenant. It furnishes trucks and drivers to individuals and subordinate units of the battalion. It has enough truck drivers to operate the trucks on a two-shift basis. All vehicular transportation of headquarters and service company is pooled under this section.

(3) *Heavy equipment section* carries equipment shown in current tables of equipment. This section is commanded by a lieutenant. Enlisted personnel includes all equipment operators. Additional operators are provided for operating equipment on a two-shift basis. Much of the equipment is used to reinforce lettered companies. As a special task this section operates a small pool of paving equipment organic with the section.

(4) *Repair section* has the personnel and facilities for executing second-echelon maintenance and repair of all heavy equipment and transportation.

■ 285. ATTACHED MEDICAL.—The medical detachment consists of medical and dental officers, and necessary enlisted men. Transportation includes a cross-country ambulance, a command and reconnaissance truck, and a light cargo truck for transporting personnel and medical equipment and supplies. Duties and functions of the battalion surgeon and the detachment as a whole are outlined in chapter 2.

■ 286. DUTIES.—Principal duties of the engineer aviation battalion are—

a. Construction of field airdromes and landing fields including—

(1) Landing fields with runways, taxiways, hard standings, and dispersed installations.

(2) Facilities for servicing and arming aircraft.

(3) Storage areas for gasoline, oil, and ordnance supplies. Supplies are dispersed, concealed, and sometimes protected.

(4) Housing for personnel.

(5) Defensive installations, and protective structures if used.

(6) Camouflage.

(7) Water supply.

(8) Sanitary facilities.

b. Rehabilitation of captured airdromes.

c. Defense of airdromes.

d. Local security of working parties.

e. Hasty demolition of airdromes to hinder their use by the enemy.

■ 287. REFERENCE.—For technical details see TM 5-255, Aviation Engineers.

## SECTION II

## AIRBORNE ENGINEER AVIATION BATTALION

■ 288. MISSION.—a. The airborne engineer aviation battalion is used to fit captured airdromes for early use by army air forces. Speed is the keynote of its operations. It is further charged with maintenance of captured fields, which initially may be in enemy territory, until relieved by an engineer aviation battalion.

b. This unit may accompany a task force to provide minimum advance base facilities for troop-carrier and air support operations. In an amphibious operation the light equipment of this unit is well adapted for unloading on beaches where port facilities do not exist.

■ 289. ORGANIZATION.—It consists of headquarters, a headquarters and service company, three construction companies, and a medical detachment. Organization is shown in figure 27. (For details, see T/O 5-455.)

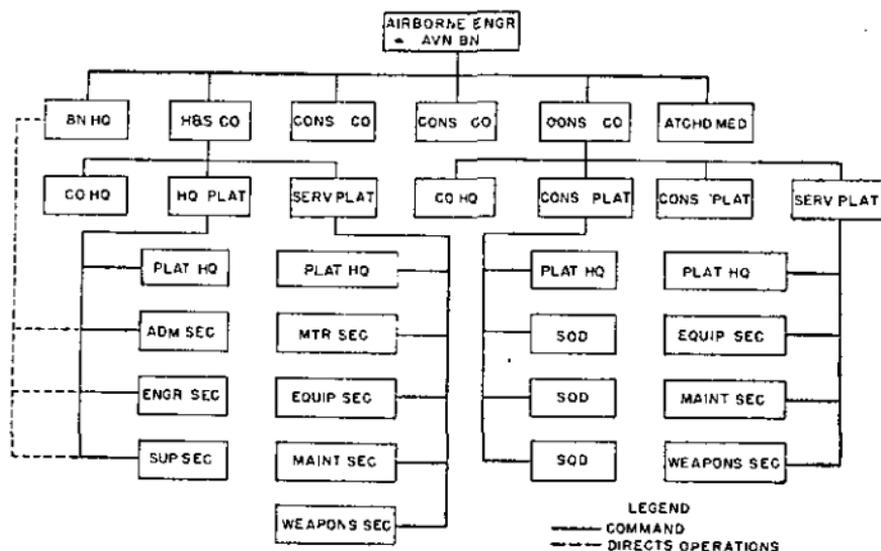


FIGURE 27.—Airborne engineer aviation battalion (T/O 5-455, tentative).

■ 290. EQUIPMENT.—*a.* The battalion has light mechanical equipment, which corresponds to the heavier equipment used by the engineer aviation battalion.

*b.* The unit is equipped with engineer tool sets and equipment intended for the same purposes as that issued to a standard aviation battalion. To assist the companies and platoons in their tasks, they have special and supplementary equipment sets designed expressly for use in airborne operations.

*c.* Major items of signal equipment include signal panels, signal flares, and radios.

■ 291. TRANSPORTATION.—Organic transportation is sufficient for administration, training, and supply when the battalion is in bivouac or at an emplaning area, and for operational use on engineer missions. There is insufficient transportation for all personnel and mechanical equipment. Light vehicles transported to the site of operations include bicycles, ¼-ton trucks, and 1-ton trailers. Heavier vehicles that remain at the emplaning area include 2½-ton dump trucks.

■ 292. ARMAMENT.—Individual weapons include the bayonet, carbine, pistol, rifle, caliber .45 submachine gun, and antitank rocket launcher. Supporting weapons are caliber .50 machine guns, each with antiaircraft mount.

■ 293. TRAINING.—*a.* Basic and unit training outlined in chapter 4 is applicable. The troops are given specialized training in loading and unloading cargo planes and gliders.

*b.* Unit training in the efficient use of special equipment and transportation is in general the same as that conducted by all engineer aviation battalions. Special emphasis is placed on the following:

(1) *Officer training.*—(*a*) Logistics of emplaning and deplaning troops, equipment, vehicles, and supplies.

(*b*) Planning the execution of engineer work so as to perform specific missions on short notice.

(*c*) Planning and executing tactical operations, particularly airdrome defense requiring precise coordination with air forces, parachute troops, and supporting arms.

(*d*) Communication with supporting aviation and task force headquarters.

(*e*) Administration, supply, and evacuation of units where normal transportation facilities are lacking.

(2) *Troop training.*—(a) Emplaning and deplaning.

(b) Methods of loading and unloading supplies and equipment into and out of aircraft.

(c) Organizing for a prompt commencing of work immediately after landing, with emphasis upon emergency repair to landing areas.

(d) Recovery, repair, and operation of captured transportation and equipment.

(e) Communication with supporting aircraft, with emphasis on ways and means of being identified by own air force.

c. *Combat training.*—Troops of airborne aviation engineer battalions are given the same tactical training as are other aviation engineer units. Airborne engineer troops must be trained to fight upon landing or to take part in combat as infantry in an emergency. Although they are adequately armed individually and with supporting weapons for their own local security, they should not be unnecessarily committed to combat, and under no circumstance should they constitute a combat force in the initial effort of securing a field and reducing enemy defensive installations.

d. *Combined training.*—It is expedient to station the airborne engineer aviation battalion at an air base having air force units, as this situation provides close contact with elements of air force personnel, equipment, facilities and installations. Combined training is designed to develop teamwork in close cooperation with the air force to meet its operational needs and with units of the airborne command to meet its requirements.

■ 294. *CONSTRUCTION COMPANY.*—This company consists of company headquarters, two construction platoons, and a service platoon. Organization is shown in figure 27. For details see current Tables of Organization.

a. *Company headquarters.*—(1) Officer personnel includes the company commander and an administrative officer, a lieutenant. In addition to enlisted personnel for handling routine administration, mess, and supply functions for the company, there is a communications group which operates radio equipment for communication with battalion headquarters and with the construction platoons, and which employs panel sets for air-ground communication.

(2) Functions and duties of the company commander are, in general, similar to those for the commander of the lettered company of the standard aviation battalion.

*b. Construction platoon.*—This platoon consists of platoon headquarters and three squads. It is the basic working unit for independent task assignment. It is organized, armed, and equipped to do hasty repair and rehabilitation work necessary for minimum landing facilities.

(1) *Platoon headquarters.*—(a) Platoon headquarters includes the platoon lieutenant, who is assisted by enlisted personnel, including communication specialists.

(b) All personnel, transportation, equipment, and supplies are transported to the objective. Engineer tools include squad tool sets and a portable gasoline hammer.

(2) *Squad.*—The construction squad is under the direct supervision of a noncommissioned officer as construction foreman. Technicians and specialists do carpenter, chemical, and demolition work, and operate pneumatic tools. Organic squad equipment includes a few hand tools. The squad is capable of undertaking any minor engineer task.

*c. Service platoon.*—This platoon consists of platoon headquarters, an equipment section, a maintenance section, and a weapons section. The construction company is often detached from the battalion and assigned an independent mission. In that case the service platoon is responsible for the maintenance and repair of all company transportation and equipment.

(1) *Platoon headquarters.*—A lieutenant commands the platoon; he is assisted by a noncommissioned officer as foreman mechanic. The platoon commander supervises and coordinates work of the various sections. He is directly responsible for the safe loading and securing of the construction equipment organically carried in the company, and for its rapid unloading immediately after landing at or near the objective. It is necessary to do some manhandling of equipment in loading on and unloading from transport aircraft.

(2) *Equipment section.*—A noncommissioned officer as equipment foreman is in direct charge of the work of this section. This section is a pool of airborne construction equipment and includes air compressors with pneumatic tools, a lightweight leaning-wheel road grader, air-operated sump pumps, and carry-all scrapers. The tractors assigned to each platoon may also be pooled under company control. For field operations the company is equipped with a trailer-mounted water tank.

(3) *Maintenance section.*—A noncommissioned officer as foreman mechanic is in charge of the work of this section.

This section is responsible for second-echelon maintenance and repair of all company mechanical equipment and transportation. It also recovers, salvages, and repairs captured enemy construction equipment and transportation.

(4) *Weapons section*.—This section is primarily an anti-aircraft unit for security of the company while at work. It can be organized as two gun crews.

■ 295. BATTALION HEADQUARTERS.—Battalion headquarters controls and directs the operations of the headquarters and service company and of the three construction companies. It consists of the battalion commander and his staff, the latter including an executive officer, an engineer officer, a supply officer, and an adjutant. Duties and functions of the staff are in general as described in chapter 2.

■ 296. HEADQUARTERS AND SERVICE COMPANY.—This company is made up of company headquarters; a headquarters platoon consisting of an administrative section, and engineering section, and a supply section; and a service platoon consisting of a motor section, an equipment section, a maintenance section, and a weapons section. Organization is shown in figure 28. For details, see current tables of organization.

a. *Company headquarters*.—The company headquarters includes the commander of the headquarters and service company and an administrative officer, a lieutenant. Enlisted personnel handle normal functions of administration, mess, and supply for battalion headquarters and the company. Most of the personnel and transportation accompany the battalion to the scene of operations.

b. *Headquarters platoon*.—The headquarters platoon furnishes the personnel for the various staff sections of battalion headquarters. Each section, except administrative, is provided with a rifle with grenade discharges and antitank grenades.

(1) *Administrative section* is supervised by the adjutant, assisted by a warrant officer in charge of personnel work and records. Its normal duties are explained in chapter 2. Normally, the personnel, equipment, and transportation of this section remain with the rear echelon of the battalion at the emplaning site.

(2) *Engineering section* is supervised by the battalion engineer officer. Enlisted personnel includes noncommissioned officers for supervising construction, general operations, and

employment of mechanical equipment; and technical specialists for drafting and defense against chemical warfare. The section can execute a limited amount of drafting and reproduce simple drawings and sketches. It does not have personnel or surveying equipment for running lines and grades, since the battalion is not expected to do extensive grading or construction work necessitating surveys. Normal operations of the battalion do not require detailed planning in the use of facilities, or preliminary steps for providing supplies and engineer material. The battalion copes with conditions as they exist and makes on-the-spot repairs in the most expeditious manner. All personnel and transportation of this section accompany the battalion to its objective.

(3) *Supply section* is supervised by battalion S-4, with duties as explained in chapter 2. Enlisted personnel handle normal supply functions for the battalion. The section is divided between the forward and rear echelons when the battalion is operating on a specific mission. S-4 normally divides his time between the forward echelon, where he determines the needs of the battalion operating units, and the rear echelon, where stocks of supplies and supplemental equipment are held. He is responsible for seeing that cargo parachutes and aerial containers are properly prepared and packed for return to the rear echelon so containers may be refilled with supplies needed at the site of operations.

*c. Service platoon.*—This platoon renders service to the entire battalion with its personnel, equipment, and special facilities, most of which accompany the battalion to its objective.

(1) *Motor section.*—This section supplies vehicles and drivers for the entire company.

(2) *Equipment section.*—Work of this section is under the direct control of a noncommissioned officer as equipment supervisor. Enlisted personnel includes mechanical equipment operators, an electrician, and a water supply mechanic. This section contains a pool of road construction equipment, including an asphalt repair set, a grader, sheepsfoot rollers, a light rooter, carry-all scrapers, and tractors. The battalion engineering officer, assisted by a noncommissioned officer as equipment supervisor, is responsible for allocating equipment to the companies.

(3) *Maintenance section.*—The maintenance section is under the supervision of a noncommissioned officer as foreman mechanic. Personnel are trained and equipped to execute third-echelon maintenance of all battalion equipment. They are

also specially trained to augment battalion equipment by recovering and repairing captured enemy equipment.

(4) *Weapons section*.—The weapons section is organized and equipped in the same way as the weapons section of construction companies of the battalion. It provides antiaircraft protection for battalion headquarters and headquarters and service company.

■ 297. *ATTACHED MEDICAL*.—The medical detachment of the airborne engineer aviation battalion consists of the unit surgeon, officer assistants, and necessary enlisted personnel. It is organized, trained, and equipped to set up a headquarters aid station and an independent field aid station with each construction company on a separate mission. Transportation includes a  $\frac{1}{4}$ -ton truck and a 1-ton cargo trailer for transporting medical equipment and supplies. The truck may be used as an improvised ambulance. Medical equipment and supplies are provided in greater quantities than for the standard engineer aviation battalion. These are necessary for establishing company aid stations, when the companies operate separately, immediately after a landing. Duties and functions of the battalion surgeon and of the detachment as a whole are explained in chapter 2.

■ 298. *DUTIES*.—Principal duties of the airborne engineer aviation battalion are—

a. Rapid rehabilitation of captured airdromes. This work may include—

- (1) *Duties of primary importance*—(a) Filling bomb craters.
- (b) Construction of dirt and turf runways.
- (c) Removal of obstacles, including crashed planes.
- (d) Neutralization of small contaminated areas.
- (e) Providing temporary facilities for servicing aircraft.

(2) *Duties of secondary importance*.—(a) Limited amount of essential camouflage work.

(b) Construction of semipermanent ground installations, including dispersal areas and access roads.

(c) Installation of utilities, including power, field lighting, and water and gasoline supply systems.

b. Defense of airdromes by—

(1) Constructing obstacles, including the laying of mine fields.

(2) Preparing demolitions.

(3) Combat as infantry in an emergency.

## ENGINEER TROOPS

- c. Local security of own troops while at work.
- d. Engineering:
  - (1) Minor surveys.
  - (2) Preparation and reproduction of simple sketches and drawings.
  - (3) Technical advice to air forces.
- e. Engineer supply.
- f. Water supply.
- g. Recovery, repair, and operation of captured mechanical equipment and transportation.

### SECTION III

#### ENGINEER AVIATION TOPOGRAPHIC COMPANY

■ 299. MISSION.—*a.* The mission of the engineer aviation topographic company is to revise, prepare, and reproduce maps, aeronautical charts, navigation charts, target charts, and mosaics for the Army Air Forces.

*b.* It cooperates with photographic units of the air force, and normally is provided on the basis of one per photo squadron.

■ 300. ORGANIZATION.—The company consists of company headquarters, a drafting and mapping platoon, a reproduction platoon, and a geodetic control platoon. Organization is shown in figure 28. (See T/O 5-447 for details.)

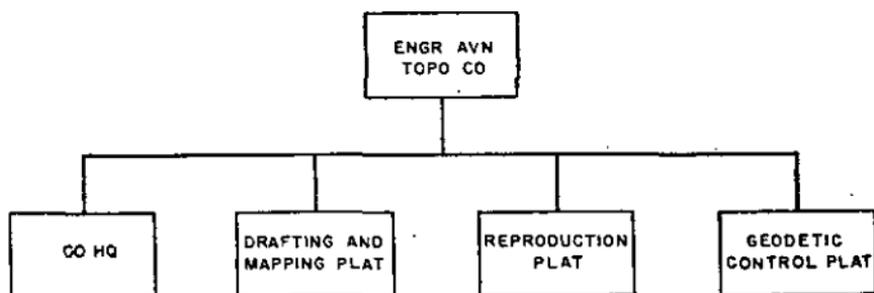


FIGURE 28.—Engineer aviation topographic company (T/O 5-447).

■ 301. COMPANY HEADQUARTERS.—The company commander is assisted by a lieutenant as administrative officer. Their duties and functions are similar to those of the officers in the let-

tered engineer company explained in chapter 2. Enlisted personnel perform routine administration, mess, and supply; operation, maintenance, and repair of motor transportation; and map storage and distribution. Company headquarters maintains close liaison with the air force in executing topographical missions. Transportation consists of trucks needed to meet normal requirements for reconnaissance, supply, and field operations.

■ 302. DRAFTING AND MAPPING PLATOON.—This platoon is commanded by a lieutenant and includes skilled personnel for compiling and plotting field notes and for preparing controlled mosaics. It prepares and revises aeronautical navigation charts and target charts.

■ 303. REPRODUCTION PLATOON.—This platoon is equipped with a process camera mounted in a van type trailer drawn by truck tractor and with truck-mounted presses. These presses are large enough to reproduce the standard 22- by 28-inch aeronautical charts. The platoon has duplicating equipment and a black-and-white process printing set for making prints from tracings. Electric lighting sets are used to furnish power for operating the presses and other equipment when commercial sources of power are not available.

■ 304. GEODETIC CONTROL PLATOON.—This platoon performs field work in establishing ground control points for aerial photography. Control points may be 25 to 50 miles distant from each other and are usually landmarks such as intersections of streams or crossroads. The platoon can be organized as three field parties. Field work consists of making celestial observations for calculating the geodetic position of the occupied point. A computing section reduces field notes for use by the drafting and mapping platoon. Company headquarters furnishes transportation to accessible points and the air force to points inaccessible by ground.

■ 305. TRAINING.—Personnel receive basic and unit training common to all engineer troops as outlined in chapter 4. Unit training includes field work in establishing ground control, topographical drafting and map compilation, reproduction of aerial photographs, map reproduction, and care and operation of the special equipment required for such work. Combined training includes coordinating the activities of the company with those of air force photo-mapping squadrons.

- 306. DUTIES.—The company's principal duties are:
- Preparation of aeronautical charts and navigation charts for use by aviation units such as observation and bombardment squadrons in theater of operations.
  - Correction of aeronautical and target charts.
  - Cooperation with photo-mapping squadrons in their mapping activities.
  - Reproduction of charts in desired quantities.
  - Combat in self-defense.

## SECTION IV.

## ENGINEER AIR FORCE HEADQUARTERS COMPANY

■ 307. MISSION.—*a.* The engineer air force headquarters company performs technical and specialized services in conjunction with the activities of engineer aviation battalions.

*b.* The company operates under the air force engineer or air service command engineer through his engineering staff.

■ 308. ORGANIZATION.—The company consists of company headquarters, an engineering platoon, a camouflage platoon, and a reproduction platoon. Organization is shown in figure 29. (For details see T/O 5-800-2.)

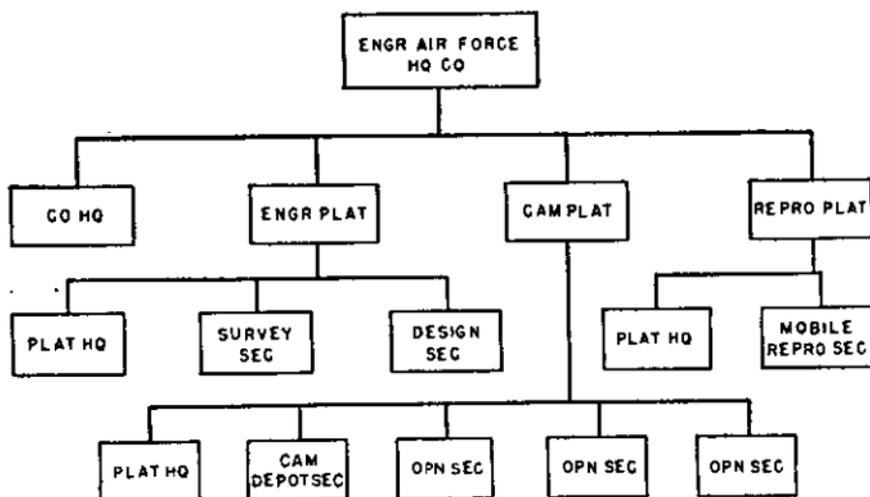


FIGURE 29.—Engineer air force headquarters company (T/O 5-800-2).

■ 309. EQUIPMENT.—*a.* The unit is equipped with organic engineer equipment.

b. The reproduction platoon is equipped with press and camera units mounted in van type semitrailers.

■ 310. TRANSPORTATION.—Company headquarters has a limited amount of transportation for command and reconnaissance, administration, mess, and water and general supply purposes, and for transporting survey parties and equipment of the engineering platoon to and from their field work. The camouflage platoon has light trucks and trailers for operational use. The reproduction platoon, in addition to its organic mobile reproduction equipment, is provided with light trucks for liaison, supply of stock, and distribution of maps.

■ 311. ARMAMENT.—Individual weapons include the carbine and rifle. Supporting weapons for providing additional security include caliber .50 machine guns, and a half-track with armament.

■ 312. TRAINING.—*a.* Basic and unit training outlined in chapter 4 is applicable.

*b.* Unit training is designed to develop individual platoons to a high degree of perfection in their specialized engineer work. The company is trained to render maximum technical assistance to the air force engineer or air service command engineer and his staff. Personnel of the engineering platoon and of the camouflage platoon are trained in their specialized work in the same manner as like personnel in other engineer aviation units. Personnel of the reproduction platoon are trained in the same manner as like personnel in engineer mapping units.

*c. Combat training.*—All personnel must be thoroughly trained in the employment of crew-served weapons for local security. Personnel assist in the defense of airdromes or other air force installations. Training for combat is the same as that given to personnel of the engineer aviation battalion.

■ 313. COMPANY HEADQUARTERS.—*a.* Officer personnel includes the company commander, and a lieutenant as administrative officer. Enlisted personnel includes groups for handling routine administration, mess, supply, and maintenance and repair of transportation. There are sufficient cooks and cook's helpers to operate separate messes for field parties working on detached missions.

*b.* The company operates under the technical supervision

and direction of the air force engineer or air service command engineer. Field task assignments follow the requirements laid down by the engineering staff of engineer headquarters of the air force or the air service command. Command posts must be near one another for continuous contact and maximum cooperation. The company commander accompanies officers of the engineering staff on all engineer reconnaissance missions to plan the location of proposed airdromes and other air force installations.

■ 314. ENGINEERING PLATOON.—*a.* This platoon consists of platoon headquarters, a survey section, and a design section. It does field and office work for the preparation of topographical maps, lay-outs, designs, and estimates pertaining to airdrome construction.

*b. Platoon headquarters.*—The engineering platoon is commanded by a lieutenant, assisted by a noncommissioned officer as chief designer. Platoon headquarters supervises and controls the engineering tasks of the survey and design sections.

*c. Survey section.*—The supervisor of surveys is a lieutenant. His chief assistant is a technical sergeant as topographic surveyor. Enlisted personnel can be organized into two survey parties, each consisting of a party chief, an instrumentman, a topographic recorder, a topographic computer, a rodman, and a chainman. The section is provided with standard surveying equipment which includes instruments and accessories for running traverses and levels and for doing plane table work.

*d. Design section.*—A lieutenant is supervisor of the drafting room and chief designer. Enlisted personnel includes technical specialists for executing topographical drawings and plans for lay-outs of installations, construction details, and utilities; and for estimating required earthwork and construction materials and facilities.

■ 315. CAMOUFLAGE PLATOON.—This platoon consists of platoon headquarters, a camouflage depot section, and three operating sections. It makes studies for camouflaging proposed airdromes; makes experiments in camouflage technique, particularly in the field of camouflage deception; and gives instruction in the principles and practice of camouflage technique to officers and selected enlisted personnel of engineer aviation units and the Army Air Forces.

*a. Platoon headquarters.*—The camouflage platoon is commanded by a lieutenant. His chief assistant is a noncommissioned officer as camoufleur. Platoon headquarters coordinates the work of the various sections by assigning tasks, making inspections, supervising procurement of camouflage materials and supplies, providing technical assistance on problems of camouflage design, and arranging schedules and classes for camouflage instruction.

*b. Camouflage depot section.*—The work of this section is supervised by a lieutenant. Personnel are charged with procurement and storage of camouflage materials and supplies, camouflage design, construction of pilot models, and experimentation in camouflage deception and the fabrication of camouflage materials. The section is provided with carpenter, demolition, pioneer, sketching, sign painting, and camouflage sets.

*c. Operating section.*—Each of the three operating sections is supervised by a lieutenant. Normally the sections operate on detached missions to demonstrate and instruct in the principles and practice of camouflage work, offer advice on methods and application of materials, and observe and report on camouflage discipline. Each section is provided with squad tool sets.

■ 316. REPRODUCTION PLATOON.—This platoon reproduces routine forms, maps, camouflage posters, and other special work for the air force engineer.

■ 317. DUTIES.—Principal duties of the engineer air force headquarters company are:

- a.* Liaison with air force engineer or air service command engineer and his staff.
- b.* Reconnaissance for location of airdrome sites.
- c.* Surveying and designing for airdrome construction.
- d.* Camouflage of airdromes, and instruction in camouflage practice.
- e.* Reproduction of routine engineer headquarters maps and posters.
- f.* Provision for own local security, and combat in defense of airdromes when required.

## CHAPTER 8

### ENGINEER UNITS WITH ARMY SERVICE FORCES

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#### SECTION I

### ENGINEER GENERAL SERVICE REGIMENT

■ 318. **MISSION.**—The engineer general service regiment performs general engineer work—particularly that requiring most skilled labor—throughout the army service area and communication zone of a theater of operations. A general service regiment, by reason of its large headquarters organization, larger number of specialists, special equipment, and the fact that it remains a longer time in an area, is capable of executing extensive and permanent work. General service regiments may be reinforced with other engineer units.

■ 319. **ORGANIZATION.**—The regiment consists of a headquarters and headquarters and service company, two battalions, and a medical detachment. Organization of the regiment is shown in figure 30. (For details see T/O 5-21.)

■ 320. **EQUIPMENT.**—Mechanized equipment includes an earth auger, air compressors, tractors, road graders, and power shovels. Other engineer equipment consists of portable water supply sets, basic tool sets, and basic drafting equipment.

■ 321. **TRANSPORTATION.**—There is insufficient transportation to move all personnel, equipment, and supplies simultaneously.

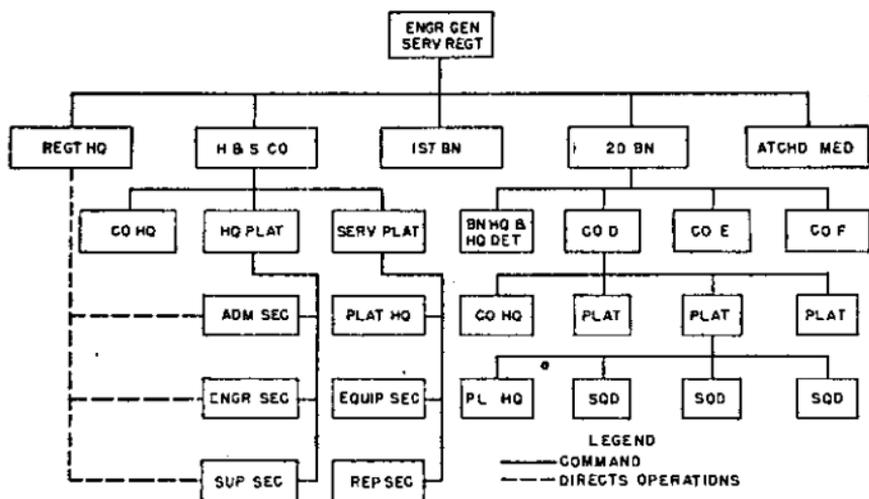


FIGURE 30.—Engineer general service regiment (T/O 5-21).

Trucks for work purposes in the general service regiment are, therefore, materially reduced. They are principally light types. Heavy cargo trucks are prime movers for power shovels and angledozers.

■ 322. ARMAMENT.—Individual weapons include bayonet, carbine, pistol, and rifle and rifle grenade. Supporting weapons consist of caliber .30 and caliber .50 machine guns.

■ 323. TRAINING.—Basic and unit training is in accordance with principles stated in chapter 4. Unit training consists of training the regiment in engineer operations to permit a rapid and orderly organization for, and execution of, general engineer work. Smooth-working teams rather than an aggregation of highly specialized individuals is the desired objective. Tactical training in conjunction with engineer tasks is limited to local security against hostile ground and air attack. Little stress is placed on training the general service regiment for combat as infantry since such a role is not expected.

■ 324. PLATOON.—As in other engineer units, the platoon of the lettered company is a basic engineer work unit and is equipped with organic engineer tools. It is organized primarily for engineer work. In the platoon of the general service

company all transportation and platoon tools are pooled in platoon headquarters. (For details see T/O 5-27.)

■ 325. COMPANY.—The general service company is organized into a company headquarters and three platoons. It is commonly employed in detached missions. For platoons assigned to special engineer tasks, company headquarters provides a motorized air compressor with power tools and an angledozer. In company headquarters and the individual platoons there are a number of highly skilled occupational specialists and equipment operators, which enable the company to execute technical engineer tasks. For speedy performance of its work the company is generally reinforced with heavy equipment and equipment operators from headquarters and service company. (For details see T/O 5-27.)

■ 326. BATTALION.—The general service battalion consists of a headquarters and headquarters detachment and three lettered companies.

a. The functions of battalion headquarters and headquarters detachment are to direct, control, and assist the operations of the three companies. Battalion headquarters is the agency by means of which the nine basic work units (platoons) are kept employed at engineer work; it has no special personnel for administration and supply. Lacking a headquarters and service company, the battalion does less than half as much work as the regiment.

b. When the battalion is employed as a unit on special work such as road, railroad, bridge, or building construction work, the consolidation of certain company tools and equipment into a battalion shop may speed up operations and assist in more unified execution of the work as a whole. The battalion does not have the personnel or equipment to perform the special work executed by the regiment. The assignment of special equipment to a battalion without an assignment of additional personnel should be discouraged.

c. Battalion headquarters and headquarters detachment is trained in accordance with principles set forth in chapter 4. Emphasis in training is placed on the mechanics of issuing orders, on the planning of battalion operations, on the proper distribution of work to companies, on the handling of the combined transportation, and on the inspection and execution of engineer work.

■ 327. REGIMENTAL HEADQUARTERS.—Regimental headquarters consists of the regimental commander and his staff. Staff duties and functions follow generally the outline in chapter 2. Regimental headquarters directs, controls, and assists headquarters and service company and the two battalions in the execution of engineer work; controls operations of the administration, engineer, and supply sections of headquarters platoon; and directs the operation of the working units included in the service platoon and the two battalions. (For details see T/O 5-21.)

■ 328. HEADQUARTERS AND SERVICE COMPANY.—*a.* This is divided into a company headquarters, a headquarters platoon, and a service platoon. Routine administration and supply of the regiment are performed by the company.

*b.* Properly handled, the headquarters and service company permits battalions to execute their missions without being required to furnish personnel for headquarters details. Individuals and small detachments may be attached to battalions from time to time for the execution of special work.

*c.* The engineer section includes in its personnel such occupational specialists as structural designer, structural draftsman, and mechanical draftsman. This section is assigned surveying equipment; however, surveying is only an occasional job for the general service regiment, since its equipment permits only ordinary location surveys and simple base-line and control work.

*d.* All heavy equipment with prime movers and equipment operators are grouped in the equipment section. They are assigned as needed to reinforce the lettered companies.

*e.* The repair section is responsible for the repair of all regimental vehicles and equipment to the extent permitted by its organic tools and equipment.

■ 329. ATTACHED MEDICAL.—The medical personnel consists of a headquarters section and two battalion sections. Transportation includes a cross-country ambulance and light truck for command and for transporting personnel, equipment, and medical supplies. Functions of the unit surgeon and of the detachment as a whole are outlined in chapter 2.

■ 330. DUTIES.—*a.* The main duty of general service regiments attached to army is general construction work and work on roads and bridges. In any situation they will be used to perform the following duties:

(1) Construction, improvement, and maintenance of roads, railways, bridges, and airdromes.

(2) Engineer assistance to army troops and troops attached to army.

(3) Construction of depots and other installations.

(4) Installation and operation of water supply facilities.

(5) Engineer reconnaissance.

(6) Engineer supply.

(7) Operation of utilities in the army area.

(8) Provision of local security for own working parties.

*b.* Duties of general service regiments attached to communication zone consist largely of general construction work at ports, bases, depots, airdromes, and of the construction of roads and railroads at these points.

## SECTION II

### ENGINEER SPECIAL SERVICE REGIMENT

■ 331. MISSION.—*a.* The mission of the engineer special service regiment is to undertake the construction of large permanent engineer projects, particularly those requiring a high degree of engineering skill and experience.

*b.* This regiment may operate independently; it may be attached to another engineer unit, such as an engineer port construction and repair group; or it may be the nucleus of a large engineer organization, such as that required for rehabilitation of destroyed utilities of captured cities. In such cases it may be reinforced with either prisoners of war or civilian labor, or both. It is organized primarily for direction of work of civilian labor.

■ 332. ORGANIZATION.—It consists of a headquarters and headquarters and service company, two battalions of three lettered companies each, and a medical detachment. Organization is shown in figure 31. (For details see T/O 5-251.)

■ 333. EQUIPMENT.—*a.* Its equipment includes most of the basic engineer tools, drafting, duplicating, and miscellaneous sets.

*b.* Mechanical equipment consists of items such as air compressor, road graders, and power shovels.

■ 334. TRANSPORTATION.—There is insufficient transportation for simultaneous movement of all personnel and equipment. The

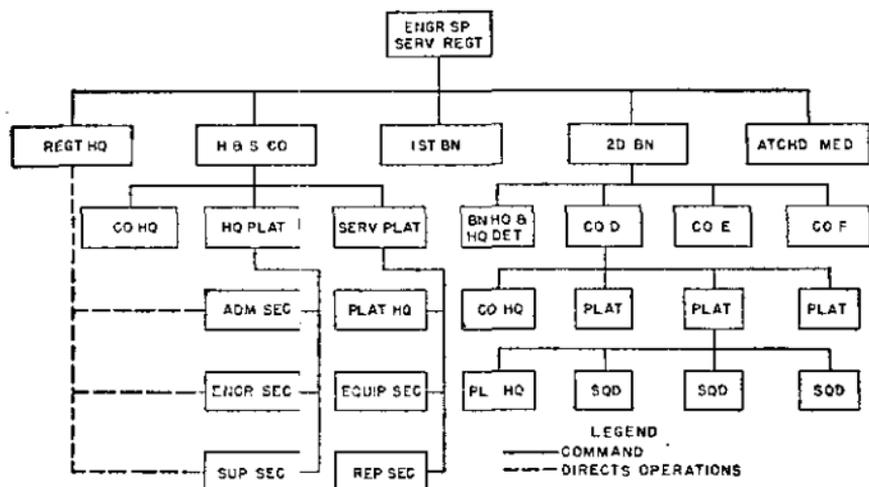


FIGURE 31.—Engineer special service regiment (T/O 5-251).

regiment, contemplating localized operations of its elements, has a small number of light trucks and trailers for command, administration, and supply. A few heavier trucks serve as prime movers of trailer-mounted mechanical equipment.

■ 335. ARMAMENT.—Individual weapons are bayonet, carbine, pistol, and rifle. Supporting weapons are caliber .30 machine guns with each of the lettered companies and other allowances as shown by current Tables of Basic Allowances.

■ 336. TRAINING.—*a.* Basic and unit training for engineer general service regiments applies to the special service regiment.

*b.* Unit training emphasizes construction and engineering. Planning, design, field surveys, methods of construction, and night operations are stressed, since the regiment and its elements are engaged primarily on such work in an overseas theater.

*c.* Combat training is devoted to use of individual weapons and supporting weapons to protect operations and equipment of the units when at work and to provide security when on the march or in bivouac. Use of a special service regiment or elements thereof for combat as infantry is not contemplated.

*d.* Training of personnel in their particular duties should not be a problem. The regiment is an aggregation of skilled occupational specialists and technicians. The main strength of enlisted personnel is in noncommissioned grades. Direction

of training will be the welding of these technical specialists into a military organization, disciplined to a chain of command.

■ 337. COMPANY.—The lettered company of a special service regiment consists of a company headquarters and three platoons. Its duties and functions parallel those of the company of a general service regiment.

■ 338. BATTALION.—It consists of a headquarters and headquarters detachment and three lettered companies. (For details see T/O 5-255.) It is similar to a general service regiment in functions and duties.

■ 339. REGIMENTAL HEADQUARTERS.—Regimental headquarters consists of the regimental commander and his staff. (For details see T/O 5-251.) It directs, controls, and employs its headquarters and service company and two battalions on engineer work.

■ 340. HEADQUARTERS AND SERVICE COMPANY.—This is identical in organization to the like company of the engineer general service regiment. Strength of personnel is in technicians and specialists for supervising work, executing special tasks, or operating heavy mechanical equipment. (For details see T/O 5-252.)

■ 341. ATTACHED MEDICAL.—The medical detachment is organized into a headquarters section and two battalion sections. (For details see T/O 5-251.) Functions and duties of the unit surgeon and of the detachment as a whole are explained in chapter 2.

■ 342. DUTIES.—The special service regiment is extremely well fitted by its organization, equipment, and training to perform the following duties:

a. New construction of major roads, bridges, railroads, rail centers, buildings, depots, cantonments, power plants, and dock facilities.

b. Rehabilitation of destroyed utilities in large cities, including sewer works, water supply installations, electric light and power facilities, roads and bridges, gas, refrigeration, and dock installations and facilities.

c. Airdrome construction for ferry commands, base defense commands, etc.

d. Reinforcement of engineer troops of army service forces

or relieving of other engineer troops by taking over their work.  
 e. Provide local security of own working parties.

## SECTION III

## ENGINEER BASE EQUIPMENT COMPANY

■ 343. MISSION.—*a.* The mission of the engineer base equipment company is to make available to engineer units various types of heavy construction equipment and some skilled operators.

*b.* Normally the company operates from one locality, with its special equipment attached to various engineer units. For best performance its base should be at or near an engineer depot.

*c.* The equipment company recovers and evacuates abandoned or captured heavy mechanized equipment. Equipment that requires second-echelon maintenance is evacuated to the company bivouac. After service and repair the equipment is absorbed by the company for field task assignments or it is turned over to the engineer depot for retention and future issue. Units of equipment which require third- or fourth-echelon maintenance are evacuated to engineer maintenance companies or heavy shop companies, as the need requires.

■ 344. ORGANIZATION.—This company consists of a headquarters platoon and a service platoon. Its organization is shown in figure 32. (For details see T/O 5-377.)

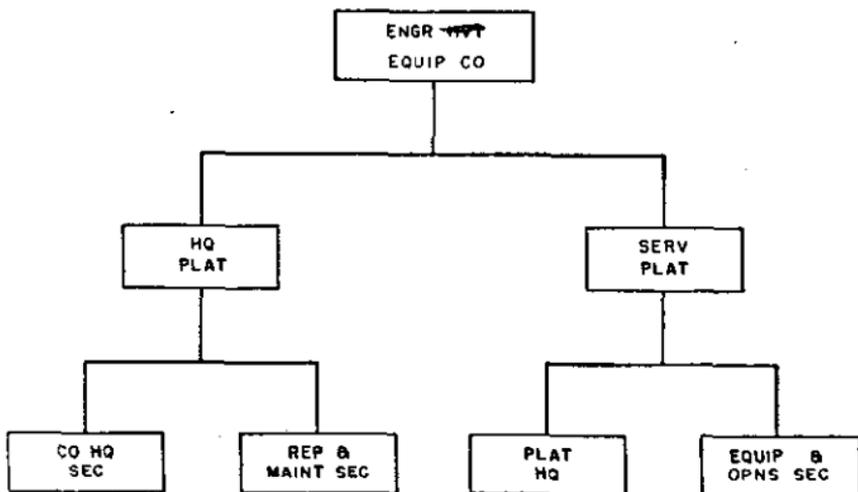


FIGURE 32.—Engineer equipment company (T/O 5-377).

■ 345. EQUIPMENT.—*a.* The company has drafting and welding equipment and basic engineer tool sets for operational, maintenance, and repair work.

*b.* This unit has no organic construction equipment, but all such equipment assigned to the area as depot stock should be turned over to the base equipment company.

■ 346. TRANSPORTATION.—The company does not have enough transportation to move all of its personnel, tools, supplies, and mechanical equipment simultaneously. There are a few light trucks and 1-ton cargo trailers for use in performing administrative, command, liaison, and inspection functions, and for use in hauling tools, spare parts, and miscellaneous supplies. Certain items of mechanical equipment are trailer-mounted and are hauled by prime movers. Approximately one-half of all items must be transported by trailers. The number of trailers in the company is sufficient for the purpose.

■ 347. ARMAMENT.—Individual weapons include the carbine and rifle. The unit has no supporting weapons.

■ 348. TRAINING.—*a.* Basic training outlined in chapter 4 is applicable.

*b.* Unit training consists of training personnel to attain a high degree of proficiency in the operation, use, and care of transportation and mechanical equipment organic with the unit, and of such items as it may become responsible for from time to time.

(1) Each operator must be thoroughly trained and educated to know his piece of equipment, particularly—

(*a*) How it functions.

(*b*) How to run it efficiently without abusing it.

(*c*) What its capabilities and limitations are.

(*d*) When minor adjustments are necessary, and how to make them.

(*e*) How to recognize faulty performance that indicates serious trouble.

(2) Special emphasis is placed on proper care and preventive maintenance. Mechanics and operators must familiarize themselves with manufacturers' maintenance manuals and parts catalogs and conform strictly to directions and instructions therein. All personnel are trained to form the habit of making cursory inspections of equipment, and should be held responsible for promptly reporting any defects discovered in any equipment.

c. Combat training includes tactics and technique of security of the company in bivouac, at work, and on the march.

d. Personnel assigned to equipment companies should be competent occupational specialists who have been associated with private contractors, State highway departments, or similar organizations.

■ 349. HEADQUARTERS PLATOON.—This platoon consists of company headquarters section and a repair and maintenance section.

a. *Company headquarters section.*—(1) Officer personnel includes a company commander and a lieutenant as administrative officer. The company commander, in addition to his command functions and responsibility for employment of the company as explained in chapter 2, advises higher echelons as to the kind and amount of assistance his company can render to engineer units. He should ascertain the nature and extent of construction work, recommend the use of equipment for specific tasks, and be prepared to dispatch it where and when required. He should maintain a situation map posted with the latest available information pertaining to the general situation and, more particularly, to the engineer situation.

(2) The enlisted personnel in company headquarters section handle normal routine administration, mess, and supply functions of the company.

b. *Repair and maintenance section.*—A lieutenant commands this section and supervises all maintenance and repair work. He should be familiar with the design and construction of general and special types of engineer mechanical equipment, understand methods of assembly and adjustments, and be qualified by knowledge and experience to maintain highest standards of principles and practice in equipment maintenance and repair.

■ 350. SERVICE PLATOON.—This platoon consists of platoon headquarters and an equipment and operator section. It is responsible for the majority of items of mechanical equipment assigned to the equipment company. In a theater of operations, service platoons of equipment companies are the principal source of heavy equipment and of equipment operators to reinforce general engineer units for executing extensive construction work.

a. *Platoon headquarters.*—The service platoon is commanded by a lieutenant assisted by a staff sergeant and other en-

listed personnel. Transportation consists of light trucks. These are available for platoon use in liaison, and hauling spare parts.

*b. Equipment and operations section.*—(1) A lieutenant commands this section. He is responsible for assigning equipment and equipment operators, under direction of the platoon commander. He obtains information for planning routes of movement of equipment from the company bivouac to the unit to be served, insures its prompt dispatch, keeps himself informed of its operational use, provides for necessary field servicing, and makes provision for its return to the company bivouac upon completion of work.

(2) Most of the equipment normally is scattered over a wide area and remains on specific tasks until released by the commander of the engineer unit to which attached.

■ 351. DUTIES.—Principal duties of the engineer heavy equipment company are to—

*a.* Train its personnel in operation, use, maintenance, and servicing of power and construction equipment.

*b.* Supply engineer heavy equipment with operators to engineer units.

*c.* Recover and evacuate captured or abandoned mechanical equipment to engineer maintenance or heavy shop companies for third- or fourth-echelon maintenance and repair.

*d.* Maintain liaison with the army engineer and with engineer troop units so its facilities will be employed to the utmost capacity.

*e.* Assist at engineer depots in assembling heavy mechanical equipment and placing it in operation.

*f.* Maintain and repair organic equipment.

*g.* Provide its own local security.

#### SECTION IV

### ENGINEER HEAVY SHOP COMPANY

■ 352. MISSION.—*a.* The mission of the engineer heavy shop company is to perform fourth-echelon maintenance of all equipment for which the Corps of Engineers has maintenance responsibility.

*b.* The company may install and operate its organic fixed equipment at a semipermanent base; or it may take over and operate established shop facilities.

c. Unserviceable equipment requiring fourth-echelon maintenance is recovered and evacuated from depots, directly from units using it, or from engineer maintenance companies, and is returned to these sources when repaired.

■ 353. ORGANIZATION.—The company is administratively self-sustaining; it consists of a headquarters platoon, a manufacturing platoon, and a repair platoon. (See T/O 5-357 for details.)

■ 354. EQUIPMENT.—a. Basic engineer equipment sets are issued to this unit.

b. Heavy-duty fixed equipment includes an electrical repair shop, a forge shop, a general repair shop, a machine shop, a motor shop, a welding shop, a woodworking shop, and a tool-room heavy shop. These shops may be operated using electricity from commercial sources.

c. Mobile, truck-mounted equipment includes emergency repair shops, welding shops, and a general purpose shop. They are assigned to the mobile repair section of the repair platoon. Electricity for operation of mobile shops and searchlights is provided by trailer-mounted power plants, but commercial facilities are used when available.

■ 355. TRANSPORTATION.—The company has a small number of light trucks in the headquarters platoon for purposes of administration, inspection, and liaison. Other transportation is in the mobile repair section of the repair platoon and includes a light truck for liaison and wrecking trucks for operational purposes.

■ 356. ARMAMENT.—Individual weapons include the carbine and pistol. The company is not equipped with supporting weapons.

■ 357. TRAINING.—a. Basic and unit training is in accordance with principles stated in chapter 4.

b. Unit training of the heavy shop company has as its objective the building of a strong, efficient, and effective military organization for producing work of a high quality. To accomplish this objective the following fundamentals are stressed:

- (1) Training of officers and noncommissioned officers in—
  - (a) Planning and lay-out of shop facilities.

## ENGINEER TROOPS

- (b) Manufacturing methods and processes.
- (c) Standard shop practice.
- (d) Coordination of work of platoons.
- (e) Supervision and management of production.
- (f) Establishment of a system of accounting, including progress records, stock records, and production records.
- (g) Requisitioning spare parts, tools, and stock.
- (h) Liaison with higher and lower echelons.
- (2) Training of specialists in—
  - (a) Operation, maintenance, and care of machinery and tools.
  - (b) Standard shop practice.
  - (c) Storage and handling of materials, stock, and spare parts.
  - (d) Assembling and disassembling heavy equipment.
  - (e) Principles and rules of accident prevention.
- c. Combat training is given in the employment of individual weapons for local security.

■ 358. HEADQUARTERS PLATOON.—This platoon consists of company headquarters, a supply section, and a technical section. It is charged with general coordination of the work of other platoons of the company.

a. *Company headquarters.*—(1) Commissioned officers include a company commander and a lieutenant as administrative officer. Enlisted personnel handles routine administrative and mess functions.

(2) The company commander's position corresponds to that of a superintendent or manager in smaller civil shops or factories.

b. *Supply section.*—(1) This section is under direct supervision of the company supply officer, assisted by the supply sergeant and other enlisted personnel.

(2) It is charged with storage of finished stock manufactured by the platoons, procurement of stock material for the various shops, procurement and supply of spare parts and tools, maintaining a system of stock records, and handling these supplies.

(3) Spare parts for fourth-echelon maintenance are furnished from depot stocks. Complete and balanced assortments of major and minor assemblies are included in fourth-echelon depot stock in proportions necessary for the number of machines to be serviced.

(4) The supply section supplies electric power to fixed

equipment in the several shops. If an existing shop or factory is taken over for operation this section furnishes the fuel and provides the operating personnel.

*c. Technical section.*—(1) This section is under the direct supervision of a lieutenant, assisted by a master sergeant as master mechanic, and other enlisted personnel.

(2) The section's work is confined almost exclusively to preparation of plans and drawings based on specifications and designs contained in manufacturers' catalogs.

■ 359. MANUFACTURING PLATOON.—This platoon consists of platoon headquarters, a welding and forge section, a machine shop section, and a woodworking and pattern section. The heavy-duty fixed equipment of the company is allocated to these sections. It has no organic transportation.

*a. Platoon headquarters.*—The platoon commander is a lieutenant, with a technical sergeant as assistant. He occupies the same position as a factory foreman in a civilian establishment. Each section of the platoon is under direct control of a noncommissioned officer who occupies the same position as a department foreman in commercial shops.

*b. Welding and forge section.*—The foreman of this section is a welder sergeant; he is assisted by other occupational specialists. Fixed equipment includes a welding shop with facilities for both electric-arc and gas welding, and a forge shop consisting of a forging machine, forges, and miscellaneous blacksmith tools and supplies. This section does all welding and forge work for repair of equipment.

*c. Machine shop section.*—The foreman of this section is a staff sergeant, machinist; he is assisted by occupational specialists. Fixed equipment consists of a general repair shop including power-driven machines and air tools. This section manufactures all machined parts for repair of equipment.

*d. Woodworking and pattern section.*—The foreman for this section is a staff sergeant, machine woodworker; he is assisted by other occupational specialists. Fixed equipment consists of a pattern and woodworking shop and includes power-driven machines. This section manufactures wooden patterns for the foundry section.

■ 360. REPAIR PLATOON.—This platoon consists of platoon headquarters, a mobile repair section, and a repair section. It has fixed equipment for executing such repair work as is not performed by the manufacturing platoon, and mobile equipment for executing third-echelon maintenance in the field.

*a. Platoon headquarters.*—The platoon commander is a lieutenant, assisted by a technical sergeant. His duties generally correspond to those of the commander of the manufacturing platoon; but in addition he executes orders of the company commander pertaining to contact, recovery, and evacuation missions. He maintains liaison with field units in his assigned area so as to render third-echelon maintenance assistance, and he employs his mobile repair section in similar manner as contact platoons of engineer maintenance companies.

*b. Mobile repair section.*—(1) This section is under the direct supervision of a staff sergeant as repair shop foreman; he is assisted by occupational specialists and other personnel.

(2) Its maintenance equipment and facilities consist of mobile repair shops identical with those of the engineer maintenance company in both character and employment.

(3) Transportation is as shown in current tables of equipment.

(4) This section operates the mobile shop bivouac of the heavy shop company. It performs specific contact missions by executing third-echelon maintenance of equipment at the site of breakdowns in areas of the communications zone not covered by operations of engineer maintenance companies.

*c. Repair section.*—(1) This section is under the direct supervision of a staff sergeant as repair shop foreman. His chief assistant is a sergeant as machine shop foreman; he is assisted by occupational specialists and other personnel.

(2) Its principal equipment is a heavy-duty fixed electrical repair shop for general overhauling and reconditioning of electric motors, generators, and ignition systems. It does all repair work on carburetors, batteries, instruments, tires, and wood construction of damaged equipment. This section has no organic transportation. Tools and equipment of other sections of the company are available to its mechanics for execution of their tasks. The heavy shop company is authorized special equipment for repair of tires and tubes, including vulcanizing.

■ 361. DUTIES.—Principal duties which the engineer heavy shop company normally performs include—

*a. Maintenance reconnaissance.*

*b. Execution of third-echelon maintenance to engineer equipment at sites of break-downs.*

*c. Execution at its shop location of fourth-echelon main-*

tenance on engineer equipment and component assemblies including—

- (1) General overhauling.
  - (2) Reclamation.
  - (3) Salvaging.
  - (4) Rebuilding.
  - (5) Reconditioning.
- d.* Maintenance of liaison with higher and lower echelons.  
*e.* Supply of spare parts to engineer units in an emergency.  
*f.* Furnishing advice on maintenance problems.  
*g.* Providing its own local security.

## SECTION V

### ENGINEER TOPOGRAPHICAL BATTALION, BASE

■ 362. MISSION.—*a.* The base topographical battalion prepares topographic maps by photogrammetric methods, and furnishes to army topographic battalions advanced points for control purposes.

*b.* This battalion normally is employed in long-range mapping programs designed to provide complete and accurate maps of critical areas within the United States, and to reinforce army topographic battalions in theaters of operation.

*c.* It is employed in the quantity reproduction of existing maps of a theater of operations, and of such other maps, sketches, and drawings of permanent character as may be prepared.

*d.* Whenever suitable base plants exist in suitable localities, they may be taken over and operated by the battalion instead of setting up a new plant. The battalion can make maps of first-order precision, and can lay mosaics or print photomaps; its principal function is to prepare and reproduce contoured maps.

■ 363. ORGANIZATION.—The battalion is composed of battalion headquarters, a headquarters and service company, two survey companies, a photo-mapping company, a reproduction company, and a medical detachment. Organization is shown in figure 33. (See T/O 5-185 for details.)

■ 364. EQUIPMENT.—Organic equipment includes fixed rotary offset presses with all necessary auxiliary equipment, and trailer- and truck-mounted tanks. The battalion has no engi-

ENGINEER TROOPS

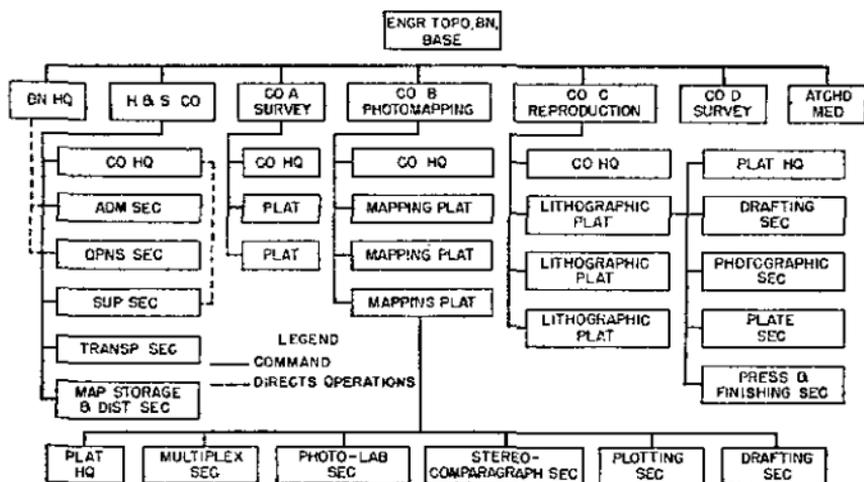


FIGURE 33—Engineer topographic battalion, base (T/O 5-185).

near water supply equipment, as it operates from a fixed location. Water is obtained from commercial sources, or a permanent water supply installation is developed by special engineer units.

■ 365. TRANSPORTATION.—Trucks and trailers are assigned to the unit for administration and supply and for use of the survey companies in field work. Except for these companies, the battalion is relatively immobile.

■ 366. ARMAMENT.—Weapons are similar to those in the army topographic battalion. For details see current tables of basic allowances.

■ 367. TRAINING.—Basic and unit training is similar to that for other engineer topographical units.

■ 368. SURVEY COMPANY.—The survey company is organized, trained, armed, and equipped exactly as the survey company of the army topographic battalion. Functions and field operations are generally the same except that, in the communication zone, there is less call for cruder and more rapid methods, and greater demand for more precise surveys. Base survey companies may be called upon for general mapping, for surveys of sites for camps and general construction projects, and for geological surveys.

■ 369. PHOTOMAPPING COMPANY.—*a.* This company is made up of company headquarters and three mapping platoons. Operation may be on a three-shift, 24-hour basis, one platoon being assigned to each shift.

*b.* Company headquarters includes the company commander, a second in command, and an administrative officer. There are enlisted personnel for routine administration, mess, and supply, and for operation, care, and maintenance of transportation. There are skilled specialists for technical work. Company headquarters receives control points or pictures from the survey companies and distributes them to the mapping platoons with calculations made by the topographical computers. The company commander supervises and controls work of the platoons.

*c.* The mapping platoon consists of platoon headquarters and multiplex, photolaboratory, stereocomparagraph, plotting, and drafting sections.

(1) *Platoon headquarters* consists of a platoon commander, a second in command, and necessary enlisted personnel for supervising and coordinating work of the various sections.

(2) *Multiplex section* personnel includes aerial phototopographers. It develops topography on the basis of ground control furnished by the survey companies.

(3) *Photolaboratory section* personnel consists of aerial photographic laboratory technicians who prepare diapositives for the multiplex section.

(4) *Stereocomparagraph section* personnel consists of aerial phototopographers and photogrammetrists. The stereocomparagraph supplements the multiplex in plotting contours. The pictures received from the survey companies are placed in stereoscopic plotting instruments, either the stereocomparagraph or the multiplex, where planimetry, control points, and topography are drawn.

(5) The *plotting section* consists of photogrammetrists, aerial phototopographers, and topographical draftsmen. It prepares projections and control sheets for other sections of the platoon.

(6) The *drafting section* chief is a staff sergeant, aerial phototopographer. The section compiles or revises maps by assembling results of work completed by other sections and preparing it for reproduction, including color separation drawings where required.

*d.* Special equipment organic in each mapping platoon in-

cludes stereocomparagraph sets and stereoscopes. Equipment organic in company headquarters includes an ammonia-process reproduction set, drafting equipment, plotting instruments, and stereoscopic (multiplex) sets.

■ 370. REPRODUCTION COMPANY.—The reproduction company is divided into company headquarters and three lithographic platoons. Operation may be on a three-shift or 24-hour-per-day basis, a lithographic platoon being assigned to each shift.

*a. Company headquarters.*—Commissioned officers include the company commander and an administrative officer. Enlisted personnel are included in two groups—an overhead group for routine administration, mess and supply, and for operations maintenance, and repair of transportation of the company; and a technical group which assists in technical supervision and operations of the company. The company has a limited amount of transportation for routine administration and supply. The company commander distributes work to the three platoons, and supervises and controls their operations.

*b. Lithographic platoon.*—The lithographic platoon is composed of platoon headquarters and drafting, photographic, plate, and press and finishing sections.

(1) *Platoon headquarters* consists of the platoon commander and a small technical and command group.

(2) The *drafting section* consists of topographic draftsmen who execute drafting work including lithodrafting. Compilation and color separation of maps are done by the photomapping company.

(3) *Photographic section* personnel consists of photographic technicians, including wet-plate and copy camera photographers, retouch artists, and printers. It is equipped to make wet-plate and film negatives; contact prints in limited quantities, and ozalids or black-and-white prints. The section receives the map from the drafting section, and photographs it. Blue-line prints are made on metal-mounted boards which are sent back to the photomapping company where the map is redrafted.

(4) *Plate section* personnel includes photo-transfer lithographers, lithographic draftsmen, and a plate-grainer operator. This section prepares lithographic plates.

(5) The *press and finishing section* consists of occupational specialists. The section reproduces maps on rotary offset presses. Finished maps are furnished as requested or as re-

quired for approved distribution. Maps are sent, through company headquarters, to the map storage and distribution section of headquarters and service company.

■ 371. BATTALION HEADQUARTERS.—Battalion headquarters is organized as shown in T/O 5-186. Staff functions and duties outlined in chapter 2 are applicable.

■ 372. HEADQUARTERS AND SERVICE COMPANY.—Headquarters and service company is made up of company headquarters and sections for administration, operations, supply, transportation, and map storage and distribution. It furnishes personnel for operation of various staff sections of battalion headquarters.

*a. Company headquarters.*—Commissioned officers include the company commander who is also battalion supply officer, S-4, and a lieutenant who is company administrative officer. Normal functions and duties of this headquarters are outlined in chapter 2.

*b. Administrative section.*—Under the battalion adjutant the administrative section handles all battalion administrative work and operates the message center. Detailed functions conform with duties of the adjutant as explained in chapter 2.

*c. Operations section.*—The operations section is supervised by the battalion executive officer assisted by the operations and intelligence officer, a lieutenant as assistant S-2 and S-3, and a warrant officer. Enlisted personnel includes topographic draftsmen and surveyors, and clerks. Functions and duties are the same as for the operations section of the army topographic battalion discussed in section III of this chapter.

*d. Supply section.*—This section is under command of S-4, assisted by a lieutenant. It handles routine battalion supply functions. Included in the personnel is an instrument-repair man who maintains and repairs all surveying instruments used in the battalion. He has an instrument-repair set especially designed for such use.

*e. Transportation section.*—This section is commanded by a lieutenant who is transportation officer. Personnel consists of automobile mechanics and truck drivers for all vehicles of headquarters and service company, as the section includes the company motor pool. Duties of the transportation officer are explained in chapter 2.

*f. Map storage and distribution section.*—This section works under the supervision and control of a warrant officer. Finished maps prepared by the reproduction company are turned

over to this section, which divides them into packages and distributes them to the next lower headquarters, normally army headquarters.

■ 373. ATTACHED MEDICAL.—The medical detachment consists of the unit surgeon, a dental officer, and necessary enlisted personnel. Transportation includes a cross-country ambulance, a command-and-reconnaissance truck, and a cargo truck for transporting personnel and medical equipment and supplies. Duties of the unit surgeon and the detachment are explained in chapter 2.

■ 374. DUTIES.—In performance of its duties, headquarters of the battalion and the reproduction company normally are located in the immediate vicinity of a major headquarters or base. Close coordination of its activities with higher channels of command is mandatory. The base battalion is to the unit engineer of its command as the army battalion is to the army engineer. Duties of the base topographic battalion are covered in the preceding discussions of subordinate units of the battalion and their component parts. Briefly summarized they are:

*a.* Preparing, by photogrammetric methods, topographic maps meeting accuracy requirements of all military forces.

*b.* Initiating and prosecuting long-range mapping programs designed to provide complete and accurate maps of critical areas.

*c.* Reproducing in quantity maps compiled by the battalion or already existing.

*d.* Recovering and establishing control points, and carrying forward horizontal and vertical control to army topographic units and aviation topographic companies.

*e.* Fighting in self-defense.

## SECTION VI

### ENGINEER PORT REPAIR SHIP

■ 375. MISSION.—*a.* The engineer port repair ship is an engineer unit with personnel and equipment to maintain channels and ship berths by removing sunken ships and other obstructions, and to maintain channel markings and other aids for pilots.

*b.* It also does needed work on docks and wharves in conjunction with engineer port construction and repair groups.

■ 376. ORGANIZATION.—It consists of headquarters section and an operating section as shown in figure 34. (For details see current Tables of Organization.)

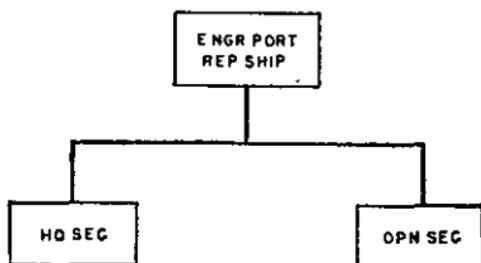


FIGURE 34.—Engineer port repair ship (T/O, tentative).

■ 377. EQUIPMENT.—Personnel of this unit operate from a specially equipped ship. Its facilities include a heavy crane and a machine shop.

■ 378. ARMAMENT.—The armament of the port repair ship is listed in current Tables of Basic Allowances.

■ 379. TRAINING.—Basic military training prescribed for engineer soldiers is applicable to members of this unit for the purpose of instilling discipline and coordinating their operations under a military chain of command. The ship's operating personnel is trained in fundamentals of seamanship and navigation.

■ 380. HEADQUARTERS SECTION.—*a.* Officer personnel includes the ship's master as commanding officer, and his staff consisting of a chief mate who is second in command; a chief engineer; second and third mates; a first assistant engineer, and two other assistant engineers. They control the ship's operations, and plan and supervise work of the operating section.

*b.* Enlisted personnel handle routine administration, mess, and supply functions; operation, maintenance, and repair of the ship; radio communication; and medical treatment.

■ 381. OPERATING SECTION.—The officer in charge of this section is designated as marine salvage wrecker. Enlisted personnel consists of specialists and technicians for marine diving, machine-shop work, welding, and operating the heavy crane.

■ 382. DUTIES.—Principal duties of the engineer port repair ship are:

*a.* Keeping channels, anchorages, and ship berths free of obstructions.

*b.* Maintaining and repairing buoys, spars, and other channel markings.

*c.* Marking hazards to navigation such as sand bars, shoals, and sunken ships.

*d.* Rendering assistance to engineer port repair and construction groups.

## SECTION VII

### ENGINEER PORT CONSTRUCTION AND REPAIR GROUP

■ 383. MISSION.—*a.* The primary mission of the engineer port construction and repair group is to make ready for use the facilities of ports of debarkation in a theater of operations, and to perform work involved in improvement or expansion of such ports, exclusive of harbors.

*b.* Engineer port construction and repair groups operate under the direction of the commanding general, theater of operations, who provides additional operating personnel from available engineer troops and service units.

*c.* Its work is performed in conjunction with engineer port-repair ship operations offshore.

■ 384. ORGANIZATION.—*a.* It is composed of any grouping of the following units: headquarters; headquarters company for the group; finance section; signal detachment; engineer general service regiment; quartermaster truck company; quartermaster service battalion or port battalion; medical detachment or station hospital; and military police. Civilian labor may augment the organic units.

*b.* Headquarters and headquarters company of the group consist of a group headquarters, a headquarters platoon, and a construction platoon. Organization is shown in figure 35. (For details see T/O 5-52.)

■ 385. EQUIPMENT.—*a.* Basic engineer tool sets, drafting equipment, and supplementary equipment are items of issue to the headquarters company.

*b.* Special machinery, heavy-construction equipment and

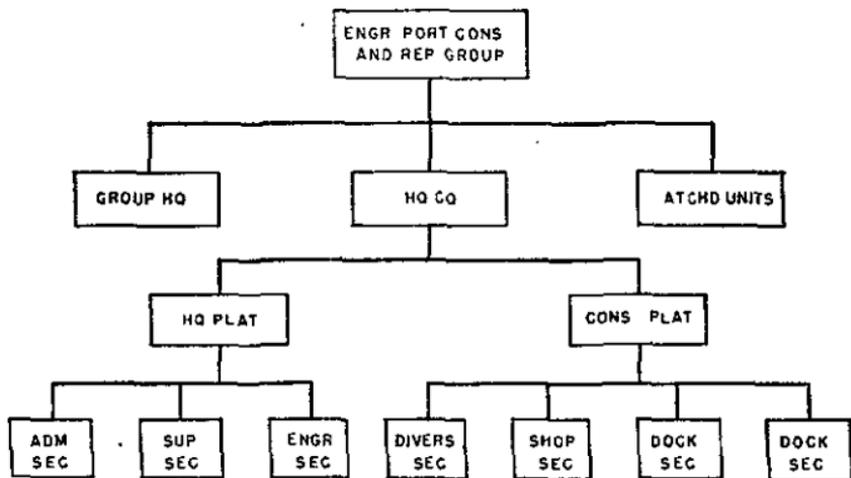


FIGURE 35.—Engineer port construction and repair group (T/O 5-52, tentative).

scows, generally associated with port construction, are organic equipment.

■ 386. TRANSPORTATION.—There are a small number of light vehicles, including cargo and dump trucks, for routine administration, mess, and supply, command and inspection, and for hauling and general utility.

■ 387. ARMAMENT.—Individual weapons include the carbine, pistol, and rifle.

■ 388. TRAINING.—*a.* Appropriate basic military training is given to individuals in this organization for the purpose of instilling discipline and obedience to a military chain of command.

*b.* A large majority of enlisted personnel are in noncommissioned grades, and do the same work as in their civilian occupations. A minimum of specialist training is, therefore, required. Unit training has as its objective the developing of a highly resourceful military organization capable of taking the field and executing its mission with a standard of performance comparable to that of like work in civilian practice.

■ 389. GROUP HEADQUARTERS.—Group headquarters consists of the group commander, an officer as marine construction en-

gineer, and an officer who handles combined duties of executive and plans-and-training officer. The group commander commands headquarters company and all attached units.

■ 390. HEADQUARTERS PLATOON.—Headquarters platoon consists of an administrative, supply, and engineer sections.

*a. Administrative section.*—Officer personnel in the administrative section consists of the company commander who is also adjutant of the group, and a lieutenant as administrative officer of headquarters company. Enlisted personnel handles routine administration, mess, and supply functions.

*b. Supply section.*—The supply section, under the supply officer, is responsible for routine supply of headquarters company and procurement of reinforcing equipment and construction materials.

*c. Engineer section.*—Officer personnel of the engineer section includes a structural engineer and a mechanical engineer. Enlisted personnel performs drafting and surveying. This section is charged with engineer planning and design of water-front structures, foundations, and mechanical facilities.

■ 391. CONSTRUCTION PLATOON.—The construction platoon consists of a divers' section, a shop section, and two dock sections.

*a. Divers' section.*—The divers' section is under the supervision of an officer, as master diver. Enlisted personnel consists of marine divers and divers' attendants. This section does underwater work incident to construction of quay walls, wharves, piers, etc.

*b. Shop section.*—The shop section, under an officer as mechanical engineer, is responsible for machine shop work pertaining to rehabilitation of damaged mechanical facilities. Enlisted personnel includes specialists in mechanical repair and machine shop work.

*c. Dock section.*—(1) Dock sections normally are provided on the basis of one per general service battalion or similar engineer unit.

(2) Officer personnel includes a marine construction engineer and construction engineers. Noncommissioned personnel are foremen for various phases of construction. Other enlisted personnel includes dock builders and equipment operators.

(3) This section comprises a pool of heavy construction

equipment including pile extractors, pile drivers, concrete mixers, tractors, and power shovels.

■ 392. DUTIES.—Principal duties of the engineer port construction and repair group are:

*a.* Construction pertaining to rehabilitation of—

(1) Water-front structures and foundations, including quay walls, wharves, and piers, affording direct connection between water and land carriers.

(2) Open and covered facilities.

(3) Cargo-handling machinery.

(4) Accommodations for direct access to port facilities of trucks and canal and river craft.

(5) Coal and oil storage facilities, with supporting piers.

(6) Railroad tracks and yards properly considered as an integral part of port facilities.

(7) Repair shops and facilities for overhauling and repairing ships.

*b.* Construction involving improvement or expansion of existing facilities.

*c.* Planning and design, including surveys.

*d.* Camouflage of port facilities.

## SECTION VIII

### ENGINEER PETROLEUM DISTRIBUTION UNIT

■ 393. MISSION.—*a.* The primary mission of the engineer petroleum distribution unit is to design, construct, operate, and maintain military pipe-line systems for transporting, distributing, and storing gasoline in bulk in a theater of operations.

*b.* Fluids other than gasoline may be transported, distributed, and stored, using facilities of a military pipe-line system.

*c.* Some specific uses for military pipe-line systems in a theater of operations are:

(1) Transportation of fluid over terrain too rugged for other means of transportation.

(2) To relieve congestion in areas with limited road systems.

(3) Rapid transport of fluids over long distances.

(4) Transporting fluids over short distances where conditions arising from enemy action make other means of transportation impracticable.

■ 394. ORGANIZATION.—The unit is a command and administrative unit divided into a headquarters section and several operating sections. These are designated as terminal, pipe-line construction, safety, laboratory, camouflage, tank farm, maintenance and transportation, and distribution. Organization is shown in figure 36.

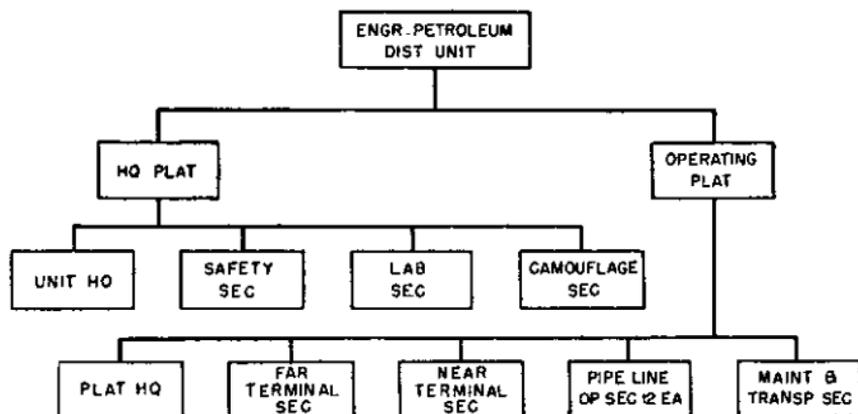


FIGURE 36.—Engineer petroleum distribution unit (T/O, tentative).

*a. Headquarters section.*—(1) Included in headquarters section are the detachment commander and his staff, and small groups of enlisted personnel for handling mess and supply. There are sufficient cooks for assignment to several field parties engaged in construction or operation of the pipe-line system at widely separated points.

(2) The detachment commander, assisted by his staff and other commissioned personnel with their technical assistants, is responsible for reconnaissance, laying out and planning, design, and construction of military pipe-line systems.

*b. Safety section.*—(1) Personnel of the safety section are responsible for preparation of safety rules and regulations, and for their enforcement. The objective is to educate all personnel in the safe handling of gasoline and in precautionary measures for eliminating fire hazards. Routine inspections are made to insure that proper signs are posted and to observe violations of safety rules and regulations.

(2) It is important that each man connected with the handling of gasoline be fully acquainted with the hazards of gasoline and the prevention of contamination of fuel.

*c. Laboratory section.*—The principal duty of personnel in this section is to make laboratory tests at the pipe-line terminal to determine the extent of contamination resulting from dispatching different grades of petroleum products through a pipe line. Samples are taken frequently and the gravity checked with a hydrometer to determine the exact time to switch tanks when changing products.

*d. Camouflage section.*—Personnel of the camouflage section renders technical assistance and advice in camouflage technique, and collaborates with crews of the pipe-line construction section during all phases of construction of the system. Preliminary reconnaissance for location of the pipe line takes advantage of all natural growth, such as brush or trees, to conceal the line from enemy observation. During construction there must be a minimum disturbance of natural growth. Storage tanks are difficult to camouflage, and extreme care is exercised in selecting tank sites to make full use of all available terrain and natural growth.

*e. Tank-farm section.*—(1) Personnel of the tank-farm section are responsible for supervising operations at tank-farm sites, which consist of several steel cylindrical tanks for the above-ground storage of gasoline. Hillside tank sites are used wherever possible, having the advantages of allowing the tank to be set in a pit, providing a positive gravity feed to pumps of dispensing stations located on the hill below the tank site, and being more easily camouflaged.

(2) An important duty is fire protection and prevention. In a theater of operations special provision must be made to counteract effects of incendiary bombs and other enemy air activity. Constant vigilance is necessary for detecting leakages in installations and effecting immediate repairs.

*f. Terminal section.*—The terminal section is under the direction of a terminal officer. Personnel operates the terminal by providing technical supervision in administration, receipt, storage, and dispatching of fluids; gaging; tank switching; and maintenance and care of facilities.

*g. Pipe-line construction section.*—(1) For construction of the pipe-line system, personnel of this section is organized into independent crews for preparing right-of-way, handling and stringing pipe and couplings, coupling the line, and installing pumps, valves, and other pump-station equipment.

(2) For its operation, the pipe-line system is divided into appropriate sections, and the aforementioned crews are or-

ganized to perform the following duties in their respective sections:

(a) Maintain security of the pipe line with the assistance of attached security troops.

(b) Operate pumping stations, including normal maintenance and repair.

(c) Operate bulk distribution points.

(d) Assist other sections of the detachment.

*h. Maintenance and transportation section.*—(1) Personnel of the maintenance and transportation section is divided into two groups, group operating a motor pool and providing vehicles and drivers for the detachment, and a second group repairing major pipe-line breaks and maintaining pipe-line equipment except terminal and communication facilities.

(2) A maintenance and repair crew normally is based at each station along the pipe line, and is under direct supervision of a noncommissioned officer in charge of the station. Security patrols are maintained along the line to prevent sabotage, search for small leaks, and report other mishaps.

(3) Patrol groups, as well as operating personnel, should be prepared to effect demolition of the pipe-line system to prevent it falling intact into enemy hands. The completeness with which any demolition program can be carried out depends upon the amount of time available. A pipe-line system transporting gasoline is effectively destroyed by fire. Demolition of pump stations by explosives is the quickest and most efficient method.

*i. Distribution section.*—The distribution section consists of commissioned officers who exercise general supervision over distribution of gasoline to various installations along the system. These installations include tank farms located at the beachhead or landing point; storage and dispensing stations in quartermaster areas, which include armored division dumps, air field dumps, and filled can dumps; and engineer areas consisting of several terminal storage tank sites with dispensing facilities, which augment quartermaster facilities.

■ 395. EQUIPMENT.—The unit is equipped with basic engineer tool sets, supplementary equipment including tools especially designed for laying and coupling large-size pipe, drafting sets, welding equipment, mechanical equipment, supplies for testing liquids, and other items applicable to pipe-line operations.

■ 396. TRANSPORTATION.—*a.* Organic vehicles include light trucks and trailers for command, reconnaissance, liaison, and

inspection; interior administration, mess, and supply; delivering pipe, fittings, and other supplies to field parties; and for general maintenance and repair operations.

b. Trucks of conventional oil-field design are organic. These trucks are 2½-ton 6 x 6 prime movers with rear-mounted winch, flat bed, detachable A-frame and 2-wheel semitrailers with bolsters. They may be used for hauling and spotting pumping units as well as hauling pipe.

■ 397. TRAINING.—*a.* Basic and unit training is in accordance with principles explained in chapter 4. Although the unit has a large percentage of occupational specialists, and its personnel will be widely dispersed and must of necessity be partially self-contained, they are subject to a military chain of command. It is therefore necessary that basic training be stressed as in other engineer units.

*b.* Unit training has as its objective organizing within the unit skilled teams, each identified with a particular phase of construction and operation of a pipe-line system. Owing to the specialized nature of the work, it is essential that men inducted into the service who were employed or who had experience in civilian pipe-line operations, be assigned to duty with petroleum distribution units.

*c.* Combat training has as its objective the development of the ability of the individual and of operating teams in the field to defend themselves at all times. Where the entire pipe-line system must be protected, assistance of combat troops must be provided. Antiaircraft defense may be required to protect terminal and other important installations.

■ 398. DUTIES.—The principal duties which the engineer petroleum distribution unit will perform in the execution of its assigned mission are:

*a.* Lay-out and planning of military pipe-line systems including—

- (1) Ground reconnaissance and map study.
- (2) Ground surveying.
- (3) Marking of route.

*b.* Design of system including—

- (1) Pipe-line design.
- (2) Determining number and location of pumping stations.
- (3) Location of pressure-reducing regulators.
- (4) Location of check valves and block valves.
- (5) Location of loading stations as required for tactical operations.

- (6) Terminal facilities.
- c. Construction of system in accordance with approved design.
  - d. Camouflage of system concurrently with construction, and maintenance of camouflage during operation.
  - e. Operation of system.
  - f. Maintenance and repair for continuous operation.
  - g. Fire prevention and other safety precautions.
  - h. Security against enemy activity.
  - i. Demolition of the system to prevent falling into hands of enemy.
  - j. Local security of own working parties.
  - k. Liaison with headquarters Army Service Forces and with field units in the theater of operations.

## SECTION IX

## ENGINEER GAS GENERATING UNIT

■ 399. MISSION.—*a.* The mission of the engineer gas generating unit is to install, operate, and maintain its organic gas generating equipment for the production and supply of oxygen, acetylene, and nitrogen gases.

*b.* It is attached to an engineer depot company or similar unit. Plants are located where required in a theater of operations. Oxygen, acetylene, and nitrogen gases, in cylinders, are kept available at engineer supply points including army engineer depots.

■ 400. ORGANIZATION.—*a.* The unit consists of a lieutenant assisted by a small group of occupational specialists including sergeants as foremen, plant operators, and assistants, and mechanics for maintenance and repair of equipment.

*b.* Enlisted personnel is divided into two similar sections for operating the gas plants on day and night shifts.

■ 401. EQUIPMENT.—Principal items of equipment are the mobile acetylene generating plant and two skid-mounted oxygen generating plants. Basic engineer tool sets are issued to the unit to conform to its needs.

■ 402. TRANSPORTATION.—Vehicles consist of a light truck for utility purposes, and a trailer-mounted water tank for operations. It is sufficient to move all personnel and equipment.

■ 403. ARMAMENT.—Individual weapons consist of the carbine and rifle. This unit is not equipped with supporting weapons.

■ 404. TRAINING.—Members are given essential basic training so the unit can function as a military organization. Unit training has as its objective the training of two similar teams in the operation, maintenance, and care of organic generating plants for continuous peak performance.

■ 405. DUTIES.—Principal duties of the engineer gas generating unit are to—

a. Collaborate with unit it is attached to for administration, mess, and supply; and siting of its equipment.

b. Install its generating plants, making suitable provision for concealment from enemy observation.

c. Operate and maintain its generating plants continuously.

d. Provide its own local security.

## SECTION X

### ENGINEER UTILITIES DETACHMENT

■ 406. MISSION.—The engineer utilities detachment is responsible for performing necessary operations under provisions of AR 100-80. In part, this regulation charges the Chief of Engineers, under the Commanding General, Army Service Forces, with direction of work pertaining to the maintenance and repair of buildings, structures, and utilities for the Army, and with the operation of water, gas, electric, and sewer utilities.

■ 407. ORGANIZATION.—a. This special unit is flexible in organization. In general, it consists of a headquarters, a headquarters detachment, and several operating sections. Size and composition of the detachment depends upon the requirements of the post or military installation it serves.

b. Operating sections include engineering, maintenance and repair, operations, and power plant and refrigeration.

■ 408. EQUIPMENT.—Basic sets are provided for blacksmith work, electrical testing, pipe fitting, water testing, and similar functions.

■ 409. TRANSPORTATION.—Vehicles include trucks for light hauling and general utility. Fire-fighting equipment is mounted

on standard military trucks. At air force stations crash trucks are organic vehicles.

■ 410. ARMAMENT.—For armament, see current Tables of Equipment and Tables of Basic Allowances for engineers.

■ 411. TRAINING.—Basic training common to similar special engineer units is applicable.

■ 412. DUTIES.—Principal duties of the engineer utilities detachment are—

*a.* Maintenance and repair of buildings, structures, grounds, and utility systems, and permanently installed property attached thereto.

*b.* Operation of utilities.

*c.* Construction, including extensions, alterations, and rehabilitation necessary to a proper discharge of duties in maintenance, repair, and operation of facilities.

*d.* Provision for its own local security.

## SECTION XI

### ENGINEER FORESTRY BATTALION

■ 413. MISSION.—*a.* The engineer forestry battalion supplies lumber and other forest products from available woodlands in or near a theater of operations.

*b.* Battalions may either set up and operate the sawmills with which they are equipped, or they may take over and operate existing sawmills.

*c.* Forest products of a battalion may be the sole source of supply, or they may be supplementary to lumber and timber shipped from the zone of interior to a theater of operations.

■ 414. ORGANIZATION.—It consists of a battalion headquarters, a headquarters and service company, three or more forestry companies, and a medical detachment. Figure 37 shows the organization. (See T/O 5-386 for details.)

■ 415. EQUIPMENT.—*a.* It has basic engineer equipment sets. Supplementary equipment sets include special tools and accessories required for sawmill and logging activities.

*b.* Mechanical equipment includes portable chain saws, portable, skid-mounted sawmills, and tractors.

ENGINEER FIELD MANUAL

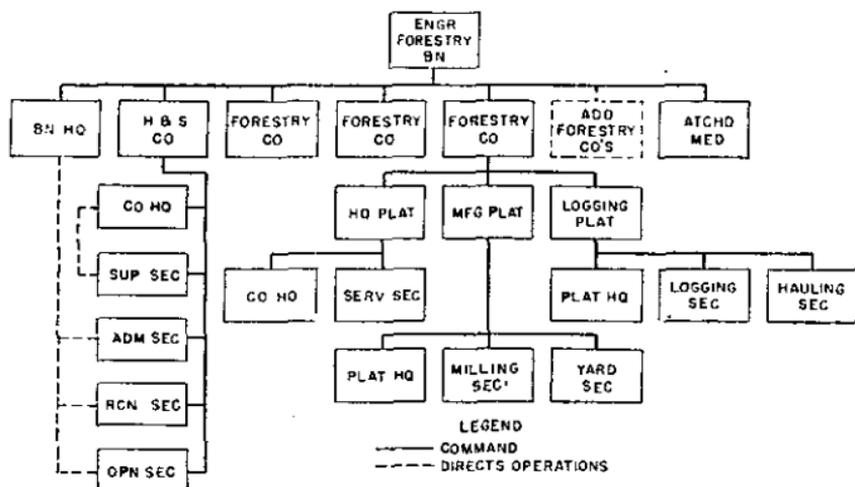


FIGURE 37.—Engineer forestry battalion (T/O 5-386).

■ 416. TRANSPORTATION.—Battalion transportation is insufficient for simultaneous movement of all personnel, equipment, and supplies, but sufficient for administration, supply, and localized activity. Vehicles include light trucks for inspection, liaison, and reconnaissance, and for carrying tools and small pieces of equipment; light cargo trucks for kitchen and water, supplementary equipment, tools, motor repair, and spare parts; heavy cargo trucks for prime movers of medium tractors and trailers, and for hauling logs and lumber; and cargo trailers for kitchen and water and for hauling equipment.

■ 417. ARMAMENT.—Individual weapons include the carbine, pistol, and rifle.

■ 418. TRAINING.—*a.* Basic and unit training for engineer forestry troops are in accordance with principles outlined in chapter 4.

*b.* The objective of unit training is the development of a military organization capable of exploiting timbered areas and conducting prolonged lumber operations in isolated areas. Since the demand for lumber products in a theater of operations ordinarily is great, the unit commander must obtain a maximum of team work and efficiency.

*c.* Forestry battalions do not engage in combined training.

Characteristic of such units is their ability to work independently and to perform their engineer mission, normally, without assistance from other engineer units.

d. Combat training is primarily concerned with security of working parties and facilities.

■ 419. FORESTRY COMPANY.—This company consists of headquarters platoon, a manufacturing platoon, and a logging platoon. Organization is shown in figure 37. (For details see T/O 5-387.) To provide complete flexibility, the individual platoons of the company are capable of independent operation. The headquarters platoon maintains a central supply point, the manufacturing platoon operates its portable sawmill equipment at a mill site, and the logging platoon works in a third area some distance away.

a. *Headquarters platoon.*—The headquarters platoon consists of company headquarters and a service section.

(1) *Company headquarters.*—The company headquarters includes a company commander, and a lieutenant as administrative officer. Enlisted personnel perform routine functions of administration, mess, and supply. The company commander is responsible for planning and supervising operations of the various subdivisions of his company. His position corresponds to that of a superintendent in civilian lumber enterprises.

(2) *Service section.*—The service section includes a lieutenant as commander, and enlisted personnel for maintenance and repair of transportation and mechanical equipment, general carpenter work, sharpening and repairing miscellaneous tools and equipment, making signs, classifying lumber, and logging. This section has no organic transportation. Company headquarters furnishes necessary vehicles.

b. *Manufacturing platoon.*—The manufacturing platoon consists of a platoon headquarters, a milling section, and a yard section.

(1) *Platoon headquarters.*—The platoon headquarters is commanded by a lieutenant, assisted by a technical sergeant as operations sergeant.

(2) *Milling section.*—The milling section is divided into three operating units.

(a) *Operation and repair unit.*—The operation and repair unit includes skilled mechanics who assemble, disassemble, and maintain the portable sawmill, and who are also responsible for operating electric lighting equipment.

(b) *Milling unit.*—The milling unit includes two staff sergeants as milling foremen, and other enlisted personnel.

(c) *Shipping unit.*—The shipping unit includes a sergeant as shipping foreman, and other enlisted personnel. This unit does the sorting, handling, loading, and trucking of lumber from the sawmill to the storage yard. The shipping foreman keeps appropriate records of sawmill products delivered to the yard section.

(3) *Yard-section.*—The yard-section foreman is a staff sergeant. The section is divided into two operating units—

(a) *Piling unit.*—The piling unit includes a corporal as foreman, and other enlisted personnel. It handles the freshly cut lumber from the sawmill and stores it in piles according to classification. It follows accepted standards for piling boards, planks, and timber to insure proper drying and the prevention of decay, warping, and checking of the wood. It keeps the yard clean, neat, and orderly. It observes fire-prevention rules and makes provision for protection of the lumber against fire.

(b) *Shipping unit.*—The shipping unit consists of a sergeant as shipping foreman, and other enlisted personnel. It handles all deliveries and shipments of lumber, and paper work incidental thereto. It keeps progressive records of grades, sizes, and classifications for use—boards, planks, studding, beams, and the like—of all lumber held in storage. It strives to avoid accumulation of sizes least used, and to prevent depletion of those in greatest demand. It controls stocks so lumber in quantity always is available to meet unforeseen contingencies.

c. *Logging platoon.*—The logging platoon consists of platoon headquarters, a logging section, and a hauling section.

(1) *Platoon headquarters.*—The platoon headquarters is commanded by a lieutenant, assisted by a technical sergeant as operations sergeant. The position of the platoon commander corresponds to that of a logging engineer in civil life; he must be an expert cruiser of sound judgment and extensive woods experience. He is responsible for logging operations.

(2) *Logging section.*—(a) The foreman, a staff sergeant, is a timber cruiser. He must be an experienced woodsman who, from examination of a tract of timber, can estimate the quantity and quality of stumpage, report upon the lay of the land, and calculate the time, labor, and machinery required for logging operations.

(b) This section may be divided into several operating units—

1. The *timber cruising unit* makes accurate cruises and sketches preliminary to actual felling of standing timber.
2. Two *cutting units* or felling crews may be organized for felling trees and cutting them into logs.
3. The *moving unit* assists cutting crews to move felled trees into cutting position, and to move logs to be hauled away.

(c) *Hauling section*.—The hauling section does the ax work necessary in lopping tops, scaling, and cutting out brush so the logs may be dragged to a point of assembly for loading on trucks and transporting to the sawmill.

■ 420. BATTALION HEADQUARTERS.—Battalion headquarters supervises and coordinates operations of headquarters and service company and several forestry companies. It consists of a battalion commander and his staff, including an executive and operations officer (S-3) and an assistant, an acquisition officer and an assistant, and an adjutant (S-1). Duties and functions of staff officers, with the exception of acquisition officers, are in general those described in chapter 2. Duties of the acquisition officers are described under the reconnaissance section of headquarters and service company.

■ 421. HEADQUARTERS AND SERVICE COMPANY.—a. The company is organized into company headquarters, an administrative section, a reconnaissance section, an operations section, and a supply section. Organization is shown in figure 37. (For details see T/O 5-386.)

b. *Company headquarters*.—Officer personnel includes a captain as commander of headquarters and service company and as battalion supply officer (S-4), and a lieutenant as administrative officer. Enlisted personnel handle routine administration, mess, and supply; maintenance and repair of vehicles; general carpentry; installation and operation of electric lighting equipment; and inspection and classification of lumber.

c. *Administration section*.—The administration section is supervised by the battalion adjutant. His chief assistant is a warrant officer as battalion personnel officer. Normal functions and duties of this section are explained in chapter 2.

d. *Reconnaissance section*.—The reconnaissance section is

supervised by the battalion acquisition officer, assisted by technical specialists. It is responsible for investigating forest resources and acquiring timber rights.

*e. Operations section.*—The operations section is supervised by the battalion S-3, who also is executive officer, assisted by technical specialists. Its principal duty is planning operations of companies.

*f. Supply section.*—The supply section is supervised by the battalion S-4. Enlisted personnel handles supply functions for the battalion.

■ 422. ATTACHED MEDICAL.—Officer personnel of the medical detachment includes a captain as unit surgeon, and a first lieutenant as dental officer. Enlisted personnel includes a staff sergeant and other enlisted specialists. Transportation includes light trucks. Functions and duties of the unit surgeon and of the detachment are explained in chapter 2.

■ 423. DUTIES.—The principal duties of the engineer forestry battalion are—

- a.* Air, ground, and map reconnaissance of forest resources.
- b.* Negotiating for acquisition of timber rights.
- c.* Executing timber land surveys.
- d.* Establishing base camps at sawmill and logging sites.
- e.* Exploiting standing timber by—
  - (1) Logging operations.
  - (2) Transporting logs to the sawmills.
  - (3) Manufacturing forest products.
- f.* Supplying lumber and timber in accordance with orders and directives of the unit engineer, the battalion commander.
- g.* Maintaining its sawmill and mechanical equipment.
- h.* Providing its own local security.

## SECTION XII

## ENGINEER FIRE-FIGHTING PLATOON

■ 424. MISSION.—The primary mission of the engineer fire-fighting platoon is to provide fire protection at camps, depots, ports, bases, and airdromes; its secondary mission is to provide trained instructors in fire-fighting methods and in fire-prevention measures.

■ 425. ORGANIZATION.—*a.* The platoon is organized into a headquarters section and three fire-fighting sections. It is attached to some other unit for rations and administration.

*b.* Enlisted personnel consist primarily of fire fighters and equipment operators.

■ 426. EQUIPMENT.—The fire-fighting equipment issued to units assigned to duty with Army Ground Forces or Army Service Forces installations consists of one class 325, oversea type, fire-pumper truck and three class 1,000, 500 gallons-per-minute, two-wheel trailer, fire-pumper units. (See par. 430*b.*) The equipment issued to units assigned to duty with Army Air Forces installations consists of one class 125 or 135 crash-fire truck, one class 1,000, 500 gallons-per-minute, two-wheel trailer, fire-pumper unit, and two class 1,010, high-pressure, two-wheel, crash-fire trailers. Each unit is equipped with hose, nozzles, hand extinguishers, and other supplementary fire-fighting equipment. Details of other equipment are found in T/O & E 5-500.

■ 427. TRANSPORTATION.—Transportation consists of light vehicles. They serve as prime movers for hauling fire-fighting trailers to fires and for liaison, interstation communication, and control. Transportation is sufficient to move all personnel, equipment, and supplies simultaneously.

■ 428. ARMAMENT.—Armament consists of carbines.

■ 429. OPERATION.—*a.* Normally the platoon is dispersed, each section operating as a unit and responsible for a particular part of the total territory covered but assisting other sections upon call for help.

b. Headquarters section is responsible for organizing system of fire alarm and fire location, dispatching fire-fighting sections promptly and correctly, operating the fire-fighting truck, establishing local security and camouflage installations for the platoon, and for submission of plans to higher commanders for the promotion of fire-prevention and fire-fighting training in its assigned area.

c. The fire-fighting section is the basic fire-fighting unit. Each section is equipped with a fire-fighting trailer unit.

■ 430. CAPABILITY.—*a.* Each section can operate two hose lines simultaneously. This is sufficient to control small or moderate fires. However, additional personnel and equipment are required to control a general conflagration. Assignment of platoons or sections to an area is based on a survey of the area, with particular attention to the concentration of personnel, supplies, and inflammable buildings in the area, probability of enemy air raids, and availability of water. Normal assignment is one platoon per air force group, one platoon per 50,000 persons at camp, and one platoon per 2,000,000 square feet of storage space of a depot, port, or base.

*b.* Capacities of fire-fighting equipment are listed in the following table:

Class of truck or trailer	Water tank capacity (gal.)	Discharge rate (g.p.m.)	Pump pressure (lb. per sq. in.)
125 truck	300	60	600-800
135 truck	300	60	350
325 truck	300	300	120
1,000 trailer	None	500	120
1,310 trailer	150	35	300-800

*c.* Each type of fire-fighting unit is equipped to pump foam, fog, or liquid. Foam is used for oil and gasoline fires. It requires addition of special chemicals in the water. Fog is a spray of exceedingly fine particles of water and is obtained through special nozzles. High-pressure fog is considerably more effective than a solid stream of water in extinguishing fires, and can be used effectively to extinguish fires of inflammable liquids and greases.

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*Superseded*

U. S. GOVERNMENT PRINTING OFFICE  
**ENGINEER FIELD MANUAL**

FM 5-5  
C 1

**ENGINEER TROOPS**

CHANGES }  
No. 1 } WAR DEPARTMENT,  
WASHINGTON 25, D. C., 31 March 1944.

FM 5-5, 11 October 1943, is changed as follows:

■ 4. ENGINEER UNITS, COMBAT, WITH GROUND FORCES.

\* \* \* \* \*  
*e. Engineer motorized battalion.*—Rescinded.

■ 5. ENGINEER UNITS, SERVICE, WITH GROUND FORCES.

*b. Engineer depot company (with Army Service Forces as well as Army Ground Forces).*—This company operates engineer depots and other engineer supply points. It has a parts supply platoon, three depot platoons, and a depot section in the headquarters platoon. Organic equipment is \* \* \* and higher echelons.

*c. Engineer parts supply company.*—Rescinded. (See par. 8o.)

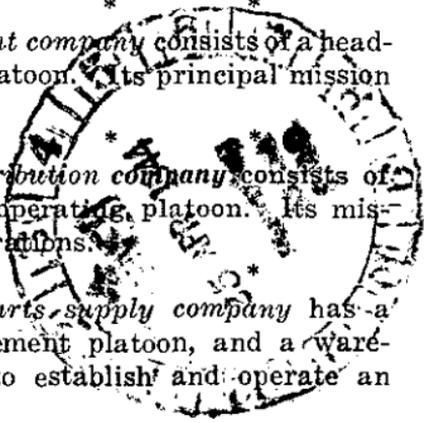
*j. (Superseded.) Engineer water supply company.*—This company consists of a headquarters and four production platoons. Platoons can operate independently. The company purifies and stores water and fills water containers at purification points.

■ 8. ENGINEER UNITS WITH ARMY SERVICE FORCES.

*c. The engineer base equipment company* consists of a headquarters platoon and a service platoon. Its principal mission \* \* \* some skilled operators.

*h. The engineer petroleum distribution company* consists of a headquarters platoon and an operating platoon. Its mission is \* \* \* theater of operations.

*o. (Added.) The engineer parts supply company* has a headquarters platoon, a procurement platoon, and a warehouse platoon. Its mission is to establish and operate an



engineer spare parts supply depot and other spare parts supply agencies. It may operate as an individual supply unit. Sections or detachments may assist in operation of supply points in army service areas and in corps.

■ 9. ENGINEER COMBAT GROUP HEADQUARTERS (Superseded).—Engineer combat group headquarters exercises tactical and technical command of such engineer units as may be attached to it. It has greater engineer responsibility than that held by the engineer regiment which it replaces. The group is flexible, its composition being determined by a thorough analysis of engineer needs to support a tactical mission. To insure coordinated teamwork and full efficiency, the group must be assembled well in advance of any operation and receive training as a group. Units comprising the group are self-sufficient for administration and supply, group control in these functions being limited to staff coordination and supervision. For planning and executing engineer operations, however, the intelligence (engineer reconnaissance) and operations and training elements must be strongly developed.

■ 11. GENERAL.—*a.* (Superseded.) Engineer troops form part of the organization of all large tactical units down to and including the division. They are also assigned as needed to task forces and to certain headquarters in the communications zone and the zone of the interior. The term "unit" is used herein to denote those larger units of all arms of which the engineers form a component part such as division, corps, army, etc.

*b.* (Superseded.) *Command.*—(1) Except in units where the commander of the engineer troops within the unit is *ex officio* unit engineer, the unit engineer has no command function.

(2) In units where the unit engineer is separate from the commander of the engineer troops within the unit, he functions solely as a staff officer on the special staff of the unit commander.

(3) As a staff officer, the unit engineer must have a proper appreciation of the problems of the commander and the staff of the unit.

\* \* \* \* \*

Figure 1, page 21, is rescinded.

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■ 22. (Superseded.) ENGINEER COMBAT GROUP HEADQUARTERS AND HEADQUARTERS COMPANY—*a. Organization.*—The engineer combat group headquarters and headquarters company is a tactical engineer group assigned or attached to corps or higher echelons. It is organized as shown in figure 2.

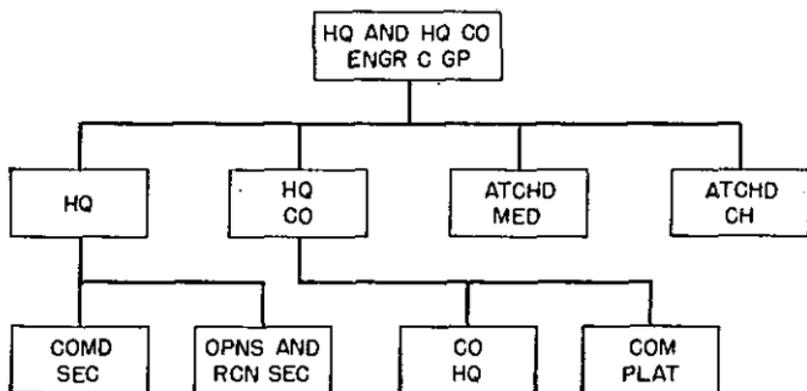


FIGURE 2.—Headquarters and headquarters company engineer combat group (T/O & E 5-192).

*b. Command.*—The group commander commands all the units attached or assigned to the group.

*c. Reconnaissance and operation.*—The operation and reconnaissance section collects, evaluates, and disseminates data on the tactical situation as it affects engineer operations, data on the quantity and conditions of engineer structures and construction that will affect tactical operations, and data on the local availability of engineer equipment and supplies. It plans the distribution of the troops, equipment, and supplies to the tasks allotted and assists the attached units when procurement of depot stock is difficult.

*d. Headquarters company.*—Headquarters company performs the housekeeping for the headquarters personnel and establishes and operates communication with the attached units.

*e. Duties of group commander.*—The duties of the group commander include—

(1) Allocation and supervision of attached units and equipment in the accomplishment of tasks assigned by the unit engineer.

(2) Accomplishment of any necessary additional tasks within the capabilities of the group.

(3) Insuring adequate supply to attached units.

(4) Liaison with adjacent engineer groups or units whether of same, lower, or higher echelon.

■ 74. HEADQUARTERS AND SERVICE COMPANY.

\* \* \* \* \*

*g. Maintenance section.*—The maintenance section operates under the commander of headquarters and service company, and supervises the second-echelon maintenance of all battalion motor transportation and engineer mechanized equipment. Responsibility for maintenance \* \* \* equipment is assigned. The section's equipment includes a 4-ton wrecking truck, welding equipment, and miscellaneous tools. Part or all \* \* \* under battalion control.

■ 108. MISSION.—Rescinded.

■ 120. DUTIES.—Rescinded.

■ 145. MISSION.

\* \* \* \* \*

*b.* The construction of floating bridges and rafts is a function of light ponton companies. (See FM 5-6.)

\* \* \* \* \*

## CHAPTER 5

### ENGINEER UNITS, COMBAT, WITH ARMY GROUND FORCES

\* \* \* \* \*

#### SECTION XI (ADDED)

#### HEADQUARTERS AND HEADQUARTERS COMPANY, ENGINEER COMBAT GROUP

■ 176.1. MISSION.—The primary mission of the engineer combat group is the support of the operations of corps or army combat troops.

■ 176.2. ORGANIZATION.—The organization of the engineer combat group consists of the command, staff, and attached or assigned units.

*a. Command section.*—Command of the group is exercised by the group commander in accordance with the policies of the tactical commander. Directives from the corps or army com-

## ENGINEER TROOPS

mander will normally be broad instructions covering the nature and extent of the supporting operations to be performed by the group, rather than specific and detailed task assignments restricting the initiative of the group commander. The group executive must insure complete coordination between S-2, S-3, and S-4 to the end that free interchange of effort and information is effected within the staff.

*b. Operations and reconnaissance section.*—This section includes S-2, S-3, and S-4. The channel of supply is directly with army or independent corps and the functions of S-4 in relation to this channel are supervisory only. S-4 does, however, have a responsible function in controlling allocation of the light equipment company support, allocation of local materials not susceptible to process by depot organizations, and the allocation of shop support to any task. S-2 is a combined engineer reconnaissance, liaison, and intelligence agency designed to provide the group commander and staff with complete information of the engineer situation. He collects directly from attached units all available engineer information within the area in which the group is operating, evaluates it, transmits it to higher headquarters and to adjacent groups and units. Both S-2 and S-4 are essential agencies to S-3, providing him with the information upon which he bases his planning.

*c. Administration.*—The group exercises only such administrative supervision as is required for proper command control. No S-1 is provided as such, the function being performed by the commander of the group headquarters company and the special service officer acting as an assistant. The administrative supervision exercised by the group headquarters must include control of replacement, transfer, and promotion of officers within the group, and of transfer of enlisted personnel within, to, or from the group, as well as the administrative control essential to operations. Group headquarters personnel, however, must be competent to inspect and supervise the administrative training of its units.

*d. Attached or assigned units.*—The composition of the group is determined by the engineer mission and the units and facilities available. The group commander should recommend

to the corps or army commander the number and type of units required to execute the mission. The units allocated to the group for the mission should be assembled as early as possible in order to learn each others limitations and capabilities through practicing on tasks similar to those required in the contemplated operation. The group commander estimates the situation and assigns subordinate missions to the attached or assigned units including the support by attachment of elements of the light equipment company to the combat battalions. He usually prescribes the time of completion of unit tasks and exercises close supervision over execution of the mission by increasing or decreasing unit tasks in order to conserve manpower and insure timely, over-all completion of the group mission. The group should not interfere with the execution of the unit missions to the destruction of initiative in the subordinate units. The group must not be considered a headquarters from which units are habitually detached to lower echelons but rather as a highly developed technical planning and operating organization particularly adapted to execute the engineer requirements of higher echelons. In major theaters, the backbone of the group might be considered two combat battalions, a light equipment company, and a maintenance company, reinforced with other appropriate units depending on the nature of the work. For heavy road or other construction work, another combat battalion with a dump truck company probably would be added. For a river-crossing operation, the reinforcements might well be a heavy ponton battalion, two light ponton companies, and a tread-way bridge company. For heavy pioneer road or trail construction, two combat battalions might be added. This example does not preclude the formation of a group with any combination of units as dictated by the task confronting it. (For details see T/O & E 5-192 and fig. 2.)

■ 176.3. EQUIPMENT.—Equipment includes drafting, reproduction, camouflage, surveying, and unit engineer equipment.

■ 176.4. TRANSPORTATION.—Sufficient vehicles are provided to make this unit mobile. They include cargo trucks and trailers, weapon carriers, and vehicles for command and reconnaissance.

■ 176.5. ARMAMENT.—Armament includes carbines, machine

## ENGINEER TROOPS

guns, submachine guns, pistols, and antitank rocket launchers.

■ 176.6. TRAINING.—Basic and unit training as outlined in chapter 4 is applicable. Group headquarters is divided into a command section and an operations and reconnaissance section. Personnel are trained for performing routine section functions. Headquarters company personnel handle similar functions for the group headquarters.

■ 178. ORGANIZATION (Superseded)—*a. Components.*—The company consists of the company headquarters, two equipment platoons, and a service platoon. (For details see T/O & E 5-367. Also see fig. 16.1.)

*b. Company headquarters.*—The company headquarters includes the company commander and enlisted personnel to handle administration, supply, mess, and communication. Equipment attached to other units is dispatched from the company headquarters.

*c. Equipment platoon.*—In addition to the platoon commander, personnel includes an equipment supervisor and a pool of operators for the vehicles and heavy equipment of the platoon.

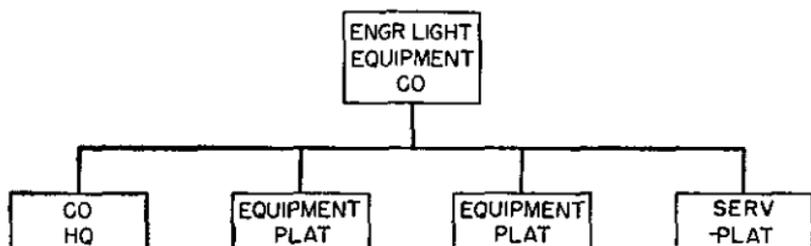


FIGURE 16.1.—Engineer light equipment company (T/O & E 5-367).

*d. Service platoon.*—The service platoon consists of personnel for servicing and maintaining the engineer equipment and vehicles of the company. A motorized emergency repair shop and a motorized general-purpose shop are provided to facilitate the work of the platoon.

■ 179. EQUIPMENT (Superseded).—The engineer light equipment company is a flexible equipment pool with operators to augment division engineer equipment for construction and demolition work. It includes that necessary to supplement

organic equipment of divisional and general headquarters engineer combat battalions and replacement items for those units. It consists of such items as motorized earth augers, air compressors, truck-mounted cranes, motorized road graders, towed road scrapers, power shovels, tractor-mounted angledozers, and heavy tractors.

█ 185. ORGANIZATION.—The depot company consists of a headquarters platoon, a parts supply platoon, and three depot platoons as shown in figure 17. (For further details see T/O & E 5-47.)

█ 190. HEADQUARTERS PLATOON.—Headquarters platoon consists of a company headquarters and a depot headquarters section.

*b. Motor section.*—Rescinded.

190.1. (Added) PARTS SUPPLY PLATOON.—*a.* The parts supply platoon consists of a platoon headquarters section and a

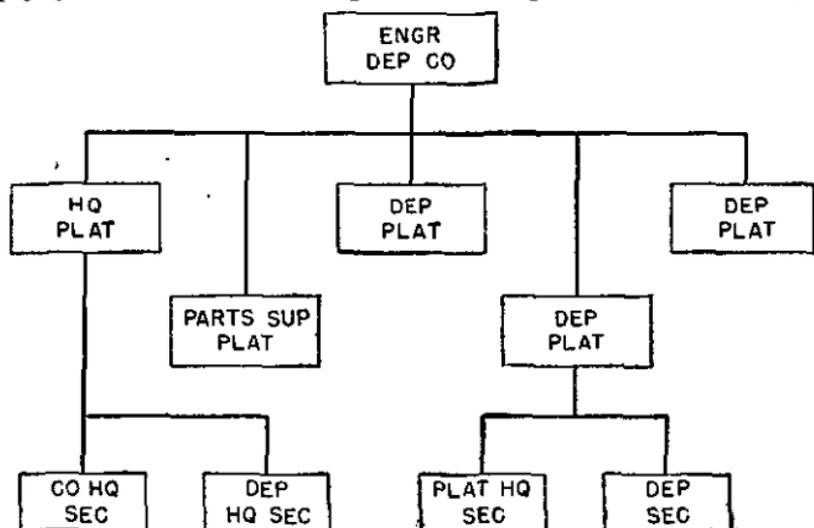


FIGURE 17.—Engineer depot company (T/O & E 5-47):

spare parts section. It handles the spare parts for first-, second-, third-, and fourth-echelon maintenance of engineer equipment in the normal field army of three corps or operates with the depot company as a part of a base depot organization.

*b.* It normally operates a supply point at the location of the

## ENGINEER TROOPS

headquarters platoon and may furnish a few individuals to supply first- and second-echelon repair parts at the sub depot.

Section III, Engineer parts supply company, chapter 6, is rescinded. (See sec. XVIII, ch. 8.)

Figure 18, page 96, is rescinded.

■ 203. MISSION.—*a.* The primary mission of the engineer maintenance company is third- and fourth-echelon maintenance of all equipment including that used by other arms and services for which the Corps of Engineers has maintenance responsibility.

*b.* The unit is organized, trained; and equipped so it can do job-site third- and fourth-echelon maintenance as well as the similar maintenance of equipment brought to it. It also supplements construction work.

\* \* \* \* \*

210. MAINTENANCE PLATOON.—The maintenance platoon \* \* \* the maintenance bivouac. The platoons have truck-mounted shops containing all necessary equipment to effect such third- and fourth-echelon repairs as available time permits.

\* \* \* \* \*

## CHAPTER 6

### ENGINEER UNITS, SERVICE, WITH ARMY GROUND FORCES

\* \* \* \* \*

#### SECTION X (SUPERSEDED)

#### WATER SUPPLY COMPANY

■ 263. MISSION.—The principal mission of the water supply company is the purification and limited storage of water and the filling of water containers at purification points. It supplements but does not replace general engineer units charged with supplying water to specific troop units. It also may be charged with operating and repairing civilian water plants in occupied territories.

■ 264. ORGANIZATION.—The company consists of a company headquarters and four production platoons as shown in figure 25. (For details see T/O & E 5-67.)

■ 265. COMPANY HEADQUARTERS.—The company headquarters

consists of the company commander, administrative officer, and enlisted personnel for routine administration, mess, supply, and motor maintenance. Sufficient mess personnel is provided to operate a separate mess for each platoon when it is operat-

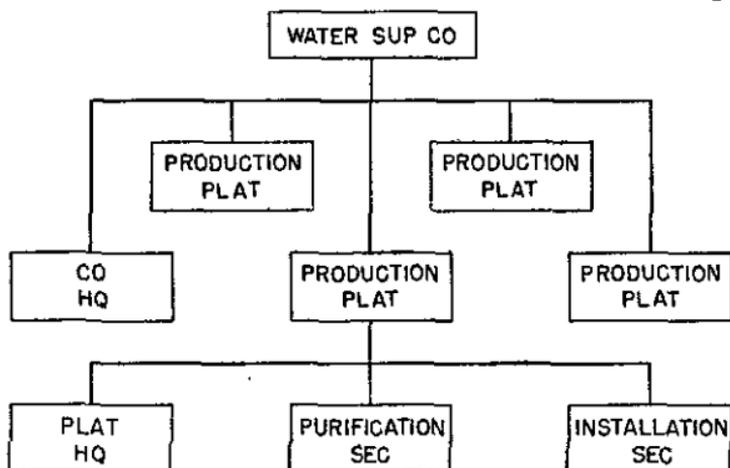


FIGURE 25.—Water supply company (T/O & E 5-67).

ing on an isolated mission. Specialists include a carpenter, a topographic draftsman, and a canvas-cover repairman.

■ 266. PRODUCTION PLATOON.—Each production platoon has a platoon headquarters, a purification section, and an installation section.

*a. Platoon headquarters.*—The platoon headquarters consists of the platoon commander, a platoon sergeant, and a truck driver.

*b. Purification section.*—The purification section operates two mobile water-purification units each on a two-shift basis. Each unit is supervised by a sergeant, water-supply foreman. There are two 1-ton trailers for carrying section tools, parts, and equipment.

*c. Installation section.*—The installation section is under the direct charge of a sergeant, construction foreman. It can be organized into two operating units. This section installs water-supply equipment and dispenses water at temporary water-supply points. Specialists include carpenters, pipefitters, and water tenders.

■ 267. EQUIPMENT.—*a.* Equipment for producing and distributing purified water includes eight mobile purification units

## ENGINEER TROOPS

each with a capacity of 33,600 gallons per 8-hour day; gasoline-driven centrifugal pumps with capacities of 55 gallons per minute against a 50-foot head; 3,000-gallon canvas storage tanks; and chemicals, tools, hose, pipe fittings, and water cans, the latter being filled and exchanged for empty cans delivered by the unit receiving the water.

b. Equipment for installing and maintaining water-supply facilities includes canvas workers', carpenter, pipe-fitting, sign-painting, tinsmith and supplemental water-supply sets, and oxyacetylene-welding equipment.

■ 268. TRANSPORTATION.—The company has light vehicles for command, reconnaissance, administration, and supply. One-quarter and one-ton trailers are furnished to move unit equipment and supplies. Two-and-one-half-ton cargo and dump trucks haul supplies and personnel.

■ 269. ARMAMENT.—Armament consists of caliber .30 carbines, caliber .45 submachine guns, caliber .50 machine guns for antiaircraft and ground defense, and 2.36-inch rocket launchers for antitank defense.

■ 270. TRAINING—*a. Basic training.*—Basic and unit training follow the principles explained in chapter 4.

*b. Unit training.*—Unit training includes operation, maintenance, and care of transportation and special equipment; motor movements; reconnaissance of water resources; installation of water points; principles and technique of water purification; and local security against air and ground attack.

■ 271. DUTIES.—The principal duties of the water-supply company are:

*a. Operating field water points.*

*b. Distributing water at water points.*

*c. Posting signs indicating the location of water points established by the company and regulating close-in traffic.*

*d. Preparing overlays showing location of water points and water sources and forwarding map information to army headquarters for dissemination to field units.*

*e. Maintaining records of water-supply installations within its sector of responsibility.*

*f. Recommending regulations for the proper use and conservation of water and for the prevention of pollution.*

- g. Camouflaging water-supply installations.
- h. Arranging with army headquarters for delivery of water in cans to distant units.
- i. Operating and repairing water plants in territory under military control.
- j. Providing local security for working parties and for water-supply installations not protected by other troops.

## CHAPTER 7

## ENGINEER UNITS WITH ARMY AIR FORCES

\* \* \* \* \*

## SECTION V (ADDED)

## ENGINEER AVIATION CAMOUFLAGE BATTALION

■ 317.1. MISSION.—*a.* The engineer aviation camouflage battalion is organized, trained, and equipped to supervise and inspect camouflage work, discipline, and training of a theater air force.

*b.* It normally operates as an integral part of a theater air force and can supervise its entire camouflage program.

■ 317.2. ORGANIZATION.—The battalion consists of battalion headquarters, headquarters company, three letter companies, and a medical detachment. Its organization is shown in figure 29.1. Details are given in T/O & E 5-465.

■ 317.3. EQUIPMENT.—*a.* *Organic equipment* includes engineer tools and equipment necessary for demonstrating, fabricating, and erecting camouflage materials in limited quantities. Most of these tools are components of standard engineer sets.

*b.* *Transportation* consists of light trucks and trailers for command, reconnaissance, and inspection purposes; and for transporting supplies, equipment, and camouflage materials. The organization is mobile, with sufficient transportation to move all personnel, equipment, and supplies. An important use of vehicles is the transportation of parties inspecting and demonstrating camouflage or conducting camouflage schools.

*c.* *Armament* includes the carbine, M1 rifle, pistol, sub-machine gun, caliber .50 machine gun, and antitank rocket launcher.

■ 317.4. TRAINING.—*a.* Basic and unit training follows the principles outlined in chapter 4 and in paragraph 248.

## ENGINEER TROOPS

b. Appreciation of the functions and operations of the other air force elements is emphasized.

c. Planning and installation of dummy air force installations is an important part of unit training.

■ 317.5. COMPANY.—The letter company is organized into a company headquarters and three camouflage platoons of three operating sections each. (See T/O & E 5-467.) Normally, separate tasks are assigned to each company; hence each is designed and trained to operate independently of the battalion.

a. *Company headquarters.*—(1) Company headquarters includes the company commander; personnel for routine administrative, mess, and supply duties; and technical specialists in camouflage construction and inspection for performing technical work common to all the platoons and assisting them in their camouflage activities.

(2) Company headquarters has engineer equipment and basic engineer sets for doing special work and reinforcing the platoons. The company camouflage set includes special tools and expendable supplies.

(3) When the company operates separately, a supplemental camouflage equipment set and a motorized air compressor are issued to it.

b. *Platoon.*—(1) The camouflage platoon consists of a lieutenant in charge and occupational specialists in camouflage practice and technique.

(2) *Platoon equipment* includes standard engineer sets.

(3) *Employment.*—Normally camouflage platoons are given area missions consisting of any or all of the following:

(a) Camouflage instruction of air force units.

(b) Inspection and technical advice on camouflage problems.

(c) Construction and maintenance of camouflage installations, such as dummy positions.

(d) Specific security missions.

■ 317.6. BATTALION HEADQUARTERS.—a. Battalion headquarters is organized as shown in T/O & E 5-466. Staff functions and duties outlined in chapter 2 are applicable.

b. Battalion headquarters assists, controls, and directs the activities of headquarters company and the three letter companies. The battalion commander, attached to the air force

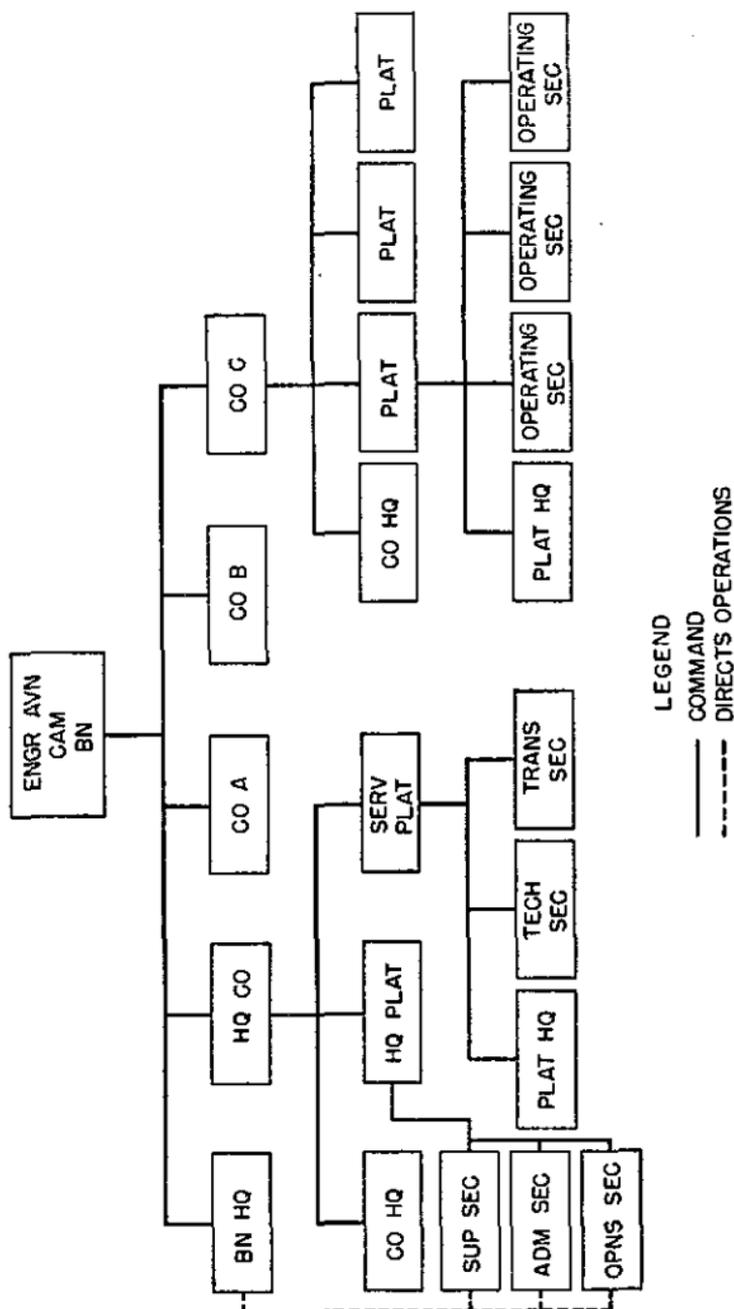


FIGURE 29.1.—Engineer aviation camouflage battalion (T/O &amp; E 5-465).

## ENGINEER TROOPS

staff, is camouflage adviser, planning and directing all camouflage projects and coordinating them with air force operations.

■ 317.7. HEADQUARTERS COMPANY.—Headquarters company consists of company headquarters, a headquarters platoon, and a service platoon. (For details see T/O & E 5-466.) It included personnel for the various staff sections of battalion headquarters, for the battalion supply service, and for the manufacture and delivery of camouflage materials.

a. *Company headquarters* has the normal personnel for handling routine administration and supply of the company and for the messing of the company and battalion headquarters.

b. *Headquarters platoon* is divided into an administrative section, and operations section, and a supply section.

(1) *Administrative section*.—The battalion adjutant is in charge of the administrative section; he is assisted by the battalion sergeant major. Clerical personnel handle routine administrative work and operate the message center as described in chapter 2.

(2) The *operations section*, under the supervision of S-3, plans and sets up pilot models of camouflage installations and gives instruction and furnishes drawings to the personnel of the camouflage companies. Also it may be charged with planning, developing, and conducting courses of instruction in camouflage principles and technique in one or more air force schools. It supervises intelligence activities of the battalion. It has drafting and reproduction equipment.

(3) *Supply section*.—The supply officer, S-4, is in charge of the supply section. A technical sergeant supervises the supply of all camouflage materials to the battalion. In addition to the usual supply personnel, there are two purchasing agents or buyers. They procure locally materials especially adapted to the camouflage scheme of the battalion.

c. The *service platoon* is made up of a platoon headquarters, a technical section, and a transportation section.

(1) *Platoon headquarters* consists only of the platoon commander, who is also the battalion transportation officer.

(2) The *technical section* includes occupational specialists trained to fabricate camouflage materials in limited quantities and to adapt prefabricated materials to local conditions.

(3) The *transportation section* operates organic vehicles

and performs second-echelon maintenance for the battalion.

■ 317.8. ATTACHED MEDICAL.—The medical detachment includes a battalion surgeon, a dental officer, and a small group of enlisted men. Transportation consists of a cross-country ambulance, a ¼-ton truck for command and reconnaissance, and 2½-ton truck for personnel, equipment and supplies. Duties of the unit surgeon and of the detachment as a whole are described in chapter 2.

■ 317.9. DUTIES.—The aviation camouflage battalion performs the following duties in the theater air force area:

a. Advises and assists in selecting easily concealed positions.  
b. Recommends a plan for camouflage discipline to be enforced from the time the site is selected and until it is abandoned.

c. Supervises camouflage practice.

d. Inspects existing camouflage.

e. Determines correct camouflage technique, including construction of pilot models, dummy installations, and decoy models for the air force.

f. Erects and maintains camouflage at airdromes.

g. Supplies special camouflage materials, equipment, and tools.

h. Conducts camouflage reconnaissance.

i. Conducts camouflage schools.

j. Maintains local security.

## SECTION VI (ADDED)

### ENGINEER AVIATION REGIMENT

■ 317.10. MISSION.—The primary mission of this unit is to construct, repair, maintain, camouflage, and defend field airdromes. It operates in important theaters where such work is concentrated in a small area. The headquarters and service company of the regiment acts as a depot or pool for additional equipment, which may be sent to individual battalions as the need arises. The battalions are the same as the engineer aviation battalions described in paragraph 275.

■ 317.11. ORGANIZATION.—The engineer aviation regiment is composed of a headquarters and headquarters and service company and three aviation battalions. (For details see T/O 5-411. Also see fig. 29.2.)

## ENGINEER TROOPS

■ 317.12. HEADQUARTERS AND HEADQUARTERS AND SERVICE COMPANY.—*a.* The headquarters and service company has equipment for earth moving, grading, draining, hauling, and surfacing and maintaining airdromes in addition to that organic to each battalion. (For details see T/O 5-412. Also see fig. 29.3.)

*b.* The organization of the headquarters and headquarters and service company includes a regimental headquarters, a company headquarters, and three platoons: the headquarters platoon, the engineering platoon, and the service platoon. The headquarters platoon has an administration and a supply section. The engineering platoon has a reconnaissance and survey section, a drafting and reproduction section, a plans

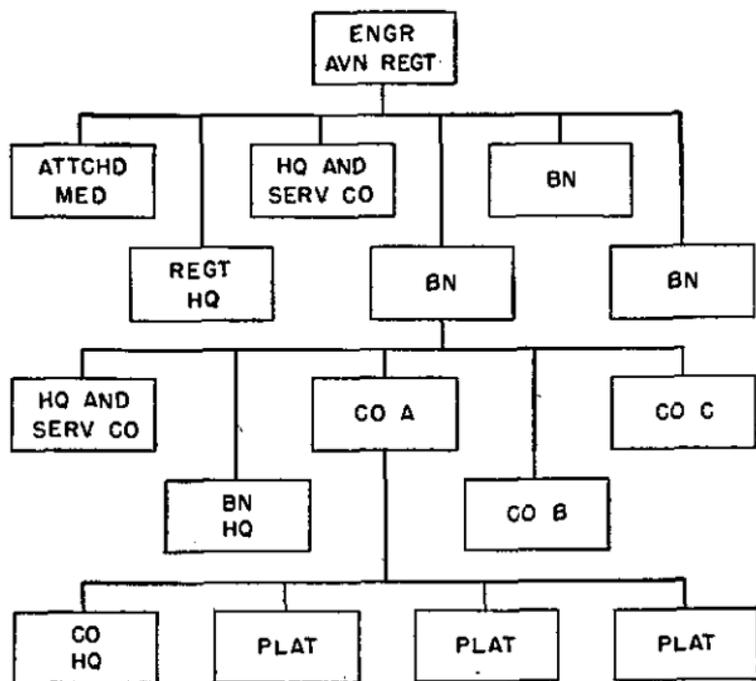


FIGURE 29.2.—Engineer aviation regiment (T/O 5-411).

and training section, and a camouflage section. The service platoon has a platoon headquarters, a transportation section, an equipment section, and a repair section. (For details see T/O 5-412. Also see fig. 29.3.)

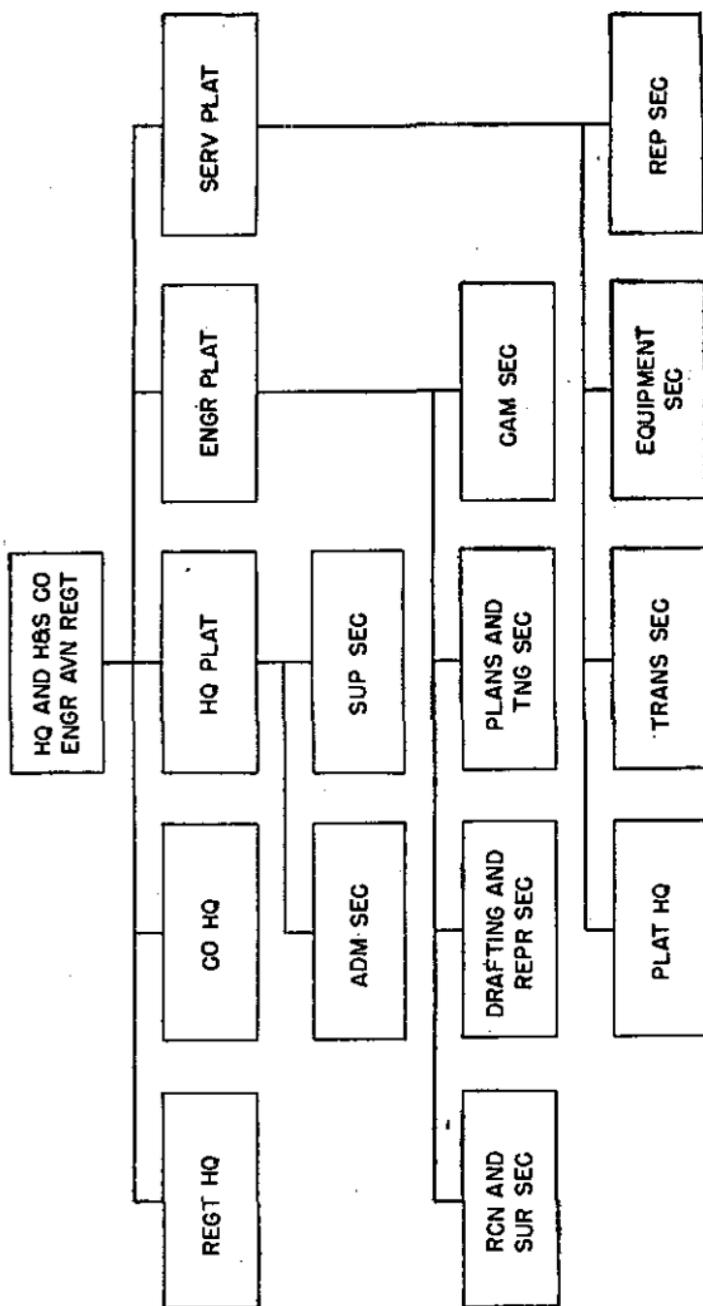


FIGURE 29.3.—Headquarters and headquarters and service company, engineer aviation regiment (T/O 5-412).

## ENGINEER TROOPS

■ 317.13. TRAINING.—*a.* The basic and unit training outlined in chapter 4 is applicable.

*b.* Training in the use and maintenance of organic heavy equipment is progressive throughout the unit training program. Each operator and foreman must learn the capabilities of his equipment and how to guard against excessive wear.

*c.* Training of the regiment in combat tactics is essential. Troops are trained in local security while at work and while in bivouac, assisting in the active defense of an airdrome against hostile air and ground attack, and attacking and repelling hostile ground forces.

### CHAPTER 8

#### ENGINEER UNITS WITH ARMY SERVICE FORCES

\* \* \* \* \*

#### SECTION III

#### ENGINEER BASE EQUIPMENT COMPANY (SUPERSEDED)

■ 343. MISSION.—*a.* The mission of the engineer base equipment company is to furnish engineer units with heavy construction equipment and skilled operators.

*b.* Normally the company operates as part of an engineer depot group.

*c.* The equipment company recovers abandoned or captured heavy mechanized equipment. Equipment requiring second-echelon maintenance is evacuated to the company bivouac for repair. Equipment requiring third- or fourth-echelon maintenance is evacuated to engineer maintenance companies or heavy shop companies. Repaired equipment is returned to the company for field task assignments or is turned over to the engineer depot for future (permanent) issue.

■ 344. ORGANIZATION.—The company consists of depot headquarters staff section, company headquarters, an equipment platoon, and a service platoon. Its organization is shown in figure 32. (For details, see T/O & E 5-377.)

■ 345. EQUIPMENT.—*a.* The company has drafting and welding equipment and basic engineer tool sets for operational, maintenance, and repair work.

*b.* The company has no organic construction equipment.

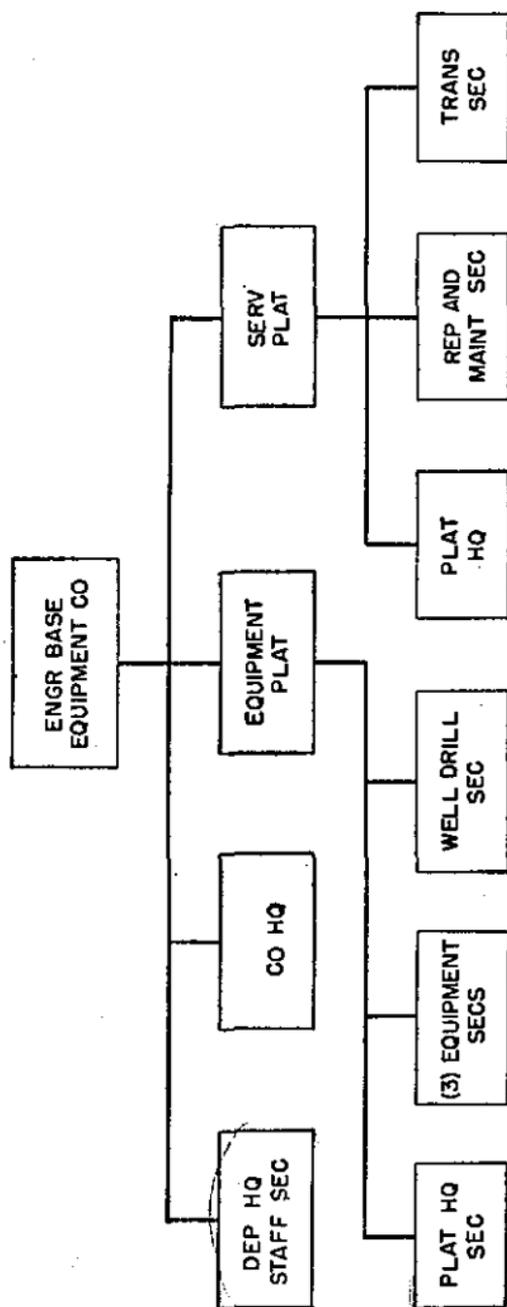


FIGURE 32.—Engineer base equipment company (T/O & E 5-377).

## ENGINEER TROOPS

It will draw such equipment from depot stock, as required.

c. The following transportation is provided: two 20-ton semitrailers; twelve 8-ton and eight 16-ton low-bed trailers; three  $\frac{3}{4}$ -ton weapon carriers; two  $\frac{1}{4}$ -ton, twelve 4-ton cargo, and eight 6-ton prime-mover trucks; and two 5- to 6-ton truck tractors. This is considered sufficient for normal operations. No provision is made for administrative transportation. For independent operation, three  $2\frac{1}{2}$ -ton cargo trucks and three 1-ton trailers are added. For maintenance of assigned equipment, one general-purpose motorized shop and one heavy wrecking truck are added.

■ 346. ARMAMENT.—Individual weapons include the carbine and rifle. Supporting weapons include caliber .50 machine guns.

■ 347. TRAINING.—a. Basic training outlined in chapter 4 is applicable.

b. Unit training consists of training personnel to become proficient in the assembly, operation, use, and care of transportation and mechanical equipment—both that organic with the unit and that for which it may become responsible.

(1) Each operator must be thoroughly trained in his piece of equipment. He must know—

(a) How it functions.

(b) How to run it efficiently without abusing it.

(c) Its capabilities and limitations.

(d) How and when to make minor adjustments.

(e) How to recognize performance that indicates serious trouble.

(2) Preventive maintenance must be given special emphasis. Mechanics and operators must familiarize themselves with manufacturers' maintenance manuals and parts catalogs and conform strictly to instructions therein. All personnel are trained to watch for and report any defects in equipment.

c. Combat training includes tactics and technique of security of the company in bivouac, at work, and on the march.

d. Personnel should be competent occupational specialists who have been associated with private contractors, State highway departments, or similar organizations.

■ 348. COMPANY HEADQUARTERS.—The headquarters includes a company commander and normal personnel for the routine

administration, mess, and supply functions of the company. In addition to his command functions and responsibilities for employing the company as explained in chapter 2, the company commander advises higher echelons as to the kind and amount of assistance his company can render to engineer units. He should ascertain the nature and extent of construction work, recommend the use of equipment for specific tasks, and be prepared to dispatch it where and when required. He should keep a situation map posted with the latest information on the general situation and, particularly, on the engineer situation.

■ 349. **EQUIPMENT PLATOON.**—This platoon consists of platoon headquarters, three equipment sections, and a well-drilling section.

*a. Platoon headquarters.*—The equipment platoon is commanded by a lieutenant assisted by another lieutenant and enlisted personnel.

*b. Equipment section.*—This section consists of occupational specialists who operate heavy engineer construction equipment. In a theater of operations, equipment sections are the principal sources of heavy equipment and operators to reinforce general engineer units in executing construction work.

*c. Well-drilling section.*—This section consists of occupational specialists who operate various types of well-drilling equipment.

■ 350. **SERVICE PLATOON.**—This platoon consists of a platoon headquarters, a repair and maintenance section, and a transportation section.

*a. Platoon headquarters.*—This service platoon is commanded by a lieutenant assisted by a technical sergeant and other enlisted personnel.

*b. Repair and maintenance section.*—This section includes a lieutenant and enlisted occupational specialists who perform first- and second-echelon repair and maintenance of all equipment and vehicles under company control.

*c. Transportation section.*—This section consists principally of operators of trucks and semitrailers.

■ 351. **DUTIES.**—Principal duties of the engineer heavy equipment company are to—

*a.* Train its personnel in assembly, operation, use, maintenance, and servicing of power and construction equipment.

## ENGINEER TROOPS

*b.* Assemble and condition all construction equipment received by the depot group for depot stock.

*c.* Deliver heavy construction equipment, with operators, to engineer units in the theater of operations.

*d.* Recondition equipment returned by using units.

*e.* Recover captured or abandoned mechanical equipment and evacuate it to engineer maintenance or heavy shop companies for third- or fourth-echelon maintenance and repair.

*f.* Provide personnel for operation and maintenance of well-drilling equipment.

*g.* Maintain liaison with the army engineer and with engineer troop units so its facilities are employed to the utmost.

*h.* Maintain and repair organic equipment.

*i.* Provide its own local security.

■ 356. ARMAMENT.—Individual weapons include the carbine and rifle. Supporting weapons include caliber .50 machine guns.

■ 376. ORGANIZATION (Superseded).—It consists of a headquarters section, a deck section, an engine section, and operating sections. See T/O & E 5-500 and fig. 34.)

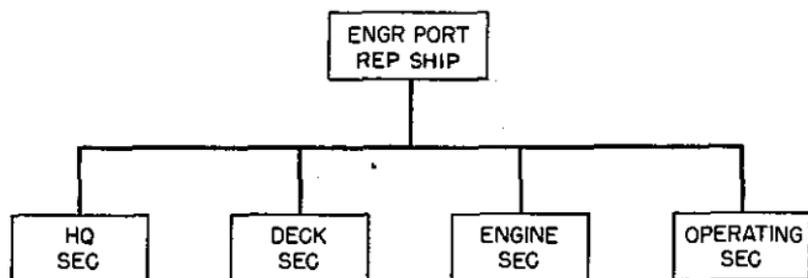


FIGURE 34.—Engineer port repair ship (T/O & E 5-500).

■ 380. HEADQUARTERS SECTION (Superseded).—Headquarters section consists of the ship's master as commanding officer and administrative, mess, supply, and communication personnel required aboard the repair ship.

■ 380.1. (Added) DECK SECTION.—The chief mate, assisted by the second mate, both commissioned officers, operates the deck section. The latter is responsible for above-deck activities and navigation. Personnel includes a boatswain, a quartermaster, a carpenter, and seamen.

■ 380.2. (Added) ENGINE SECTION.—The engine section consists of the chief engineer, his assistants, and the necessary personnel for the operation of the ship's engines and auxiliary equipment. It depends on the operating section for all except minor maintenance work.

## SECTION VIII ENGINEER

### PETROLEUM DISTRIBUTION COMPANY

■ 393. MISSION.—*a.* The primary mission of the engineer petroleum distribution company is to design, construct, operate, and maintain military pipe-line systems for transporting, distributing, and storing gasoline in bulk in a theater of operations.

\* \* \* \* \*

■ 394. ORGANIZATION (Superseded).—*a. Components.*—The company is composed of a headquarters platoon and an operating platoon. (For details see T/O & E 5-327. See also fig. 36.)

FIGURE 36.—Engineer petroleum distribution company  
(T/O & E 5-327).

*b. Headquarters platoon.*—(1) Headquarters platoon includes company headquarters, a safety section, a laboratory section, and a camouflage section.

(2) *Company headquarters* consists of personnel for administration, supply, communications, and separate mess for each of the pumping stations which can be established.

(3) *Safety section* is responsible for preparation and enforcement of safety rules and regulations. The objective is to educate all personnel in the safe handling of gasoline and in precautionary measures for eliminating fire hazards. Routine inspections are made to insure that proper signs are posted and to observe violations of safety rules and regulations. It is important that each man connected with the handling of petroleum products be acquainted fully with its hazards and with means of preventing its contamination.

(4) *Laboratory section.*—The principal duty of the laboratory section is to make laboratory tests at the pipe-line terminal to determine the extent of contamination resulting from dispatching different grades of petroleum products through the line. Samples are taken frequently, and the gravity is

checked with the hydrometer to determine the exact time to switch tanks when changing products. It maintains a constant check on the octane rating of all fuels and carefully checks captured petroleum products.

(5) *Camouflage section*.—The camouflage section gives technical assistance and advice in camouflage technique and collaborates with the pipe-line operating sections during all phases of the system's construction. Preliminary reconnaissance for location of the pipe line takes advantage of all natural growth, such as brush or trees, to conceal the line from enemy observation. During construction natural growth is disturbed as little as possible. Storage tanks are difficult to camouflage, hence their sites are selected to make full use of all available terrain and natural growth.

*c. Operating platoon*.—(1) *Components*.—The operating platoon consists of the platoon headquarters, a far-terminal section, a near-terminal section, pipe-line operating sections, and a maintenance and transportation section.

(2) *Platoon headquarters* consists of the platoon commander and a technical assistant who supervises the construction and operation of pipe-line installations.

(3) The *far-terminal section* operates the storage facilities at the far terminal. It is under the supervision of an enlisted terminal supervisor. Its principal operations are gauging, tank switching, and the preparation of reports on the supply.

(4) The *near-terminal section* operates the terminal. It supervises receipt, storage, and dispatching of fluids; gauging and tank switching; and maintenance and care of facilities. It is under the supervision of the terminal officer.

(5) *Pipe-line operating sections*.—(a) There are 12 pipe-line operating sections in the operating platoon. Each has personnel for preparing the right-of-way; handling and stringing the pipe and couplings; coupling the line; and installing pumps, valves, and their pumping-station equipment.

(b) Each section is capable of manning one pumping station and patrolling and maintaining 10 miles of pipe line. Local security must be provided by attached troops and by elements of the command in the area in which the company is situated. Patrol groups, as well as operating personnel, should be prepared to destroy the pipe-line system to prevent

its falling intact into enemy hands. The completeness with which any demolition program can be carried out depends on the time available. A pipe-line system transporting gasoline is destroyed effectively by fire. Demolition of pump stations by explosive is the quickest and most efficient method.

(6) *Maintenance and transportation section.*—(a) Personnel of the maintenance and transportation section is divided into two groups. One operates and is responsible for second-echelon maintenance of the company vehicles. The other repairs major pipe-line breaks and maintains all pipe-line equipment except terminal and communication facilities.

(b) Maintenance and repair crews are mobile and can move rapidly to the site of any major repair job. They may bivouac near the platoon headquarters or may be attached to one of the pipe-line operating sections.

■ 398. DUTIES.—The principal duties which the engineer petroleum distribution company will perform in the execution of its assigned mission are:

\*            \*            \*            \*            \*

### SECTION XIII (ADDED)

#### HEADQUARTERS AND HEADQUARTERS COMPANY ENGINEER BASE DEPOT GROUP

■ 431. MISSION.—a. The engineer base depot group headquarters and headquarters company is organized to provide the necessary overhead to supervise the operation of an engineer base depot group.

b. Normally the depot group is at or near the port of debarkation. It operates, with attached troops, either the engineer section of a general base depot or an engineer base depot.

■ 432. ORGANIZATION.—a. The headquarters company provides the headquarters with a nucleus of administrative personnel for an engineer depot group consisting of one or more of the following organizations:

- (1) Engineer base depot company.
- (2) Engineer heavy shop company.
- (3) Engineer base equipment company.
- (4) Engineer parts-supply platoon or company.
- (5) Engineer gas-generating unit.
- (6) Quartermaster truck company.

## ENGINEER TROOPS

b. When operating as an engineer branch depot, it also may have attached the following: a military police company, a medical company or base hospital, a finance section, and representative sections of other technical services. (For details see T/O & E 5-592; also see fig. 38.)

■ 433. EQUIPMENT.—*a. Transportation* consists of light trucks for liaison, interdepot communication, and company administration and supply. The unit is not mobile; frequent movement is not contemplated.

*b. Armament* consists of carbines, M1903 rifles, pistols, and caliber .50 machine guns for local security and protection against low-flying aircraft.

■ 434. TRAINING.—Basic training outlined in chapter 4 is applicable. Specialized training covers administration, supply procedure and records, depot operation, and equipment assembly and maintenance.

■ 435. HEADQUARTERS COMPANY—*a. Components.*—The headquarters company consists of a company headquarters and administration section, a depot supply section, a depot shop section, and a transportation section.

*b. Company headquarters* consists of the company commander, an administrative officer, and personnel for handling routine administration, supply, and mess for headquarters and headquarters company.

*c. The administrative section* is supervised by the adjutant, who is also headquarters company commander. The duties of the section are those of the adjutant outlined in chapter 2. In general, the section does the routine administrative and personnel work of the group headquarters.

*d. The depot supply section* operates under the depot supply officer. It maintains stock records, receives incoming requisitions, prepares shipping documents, sends shipping documents to warehouses for issue, procures by local purchase necessary items not in stock, and reports excess items. For units whose operations it controls, see figure 38.

*e. The depot shop section* is supervised by the depot shop officer. It routes repair work from lower-echelon maintenance units to the fourth-echelon maintenance facilities of the heavy shop company, establishes priorities if necessary, recommends

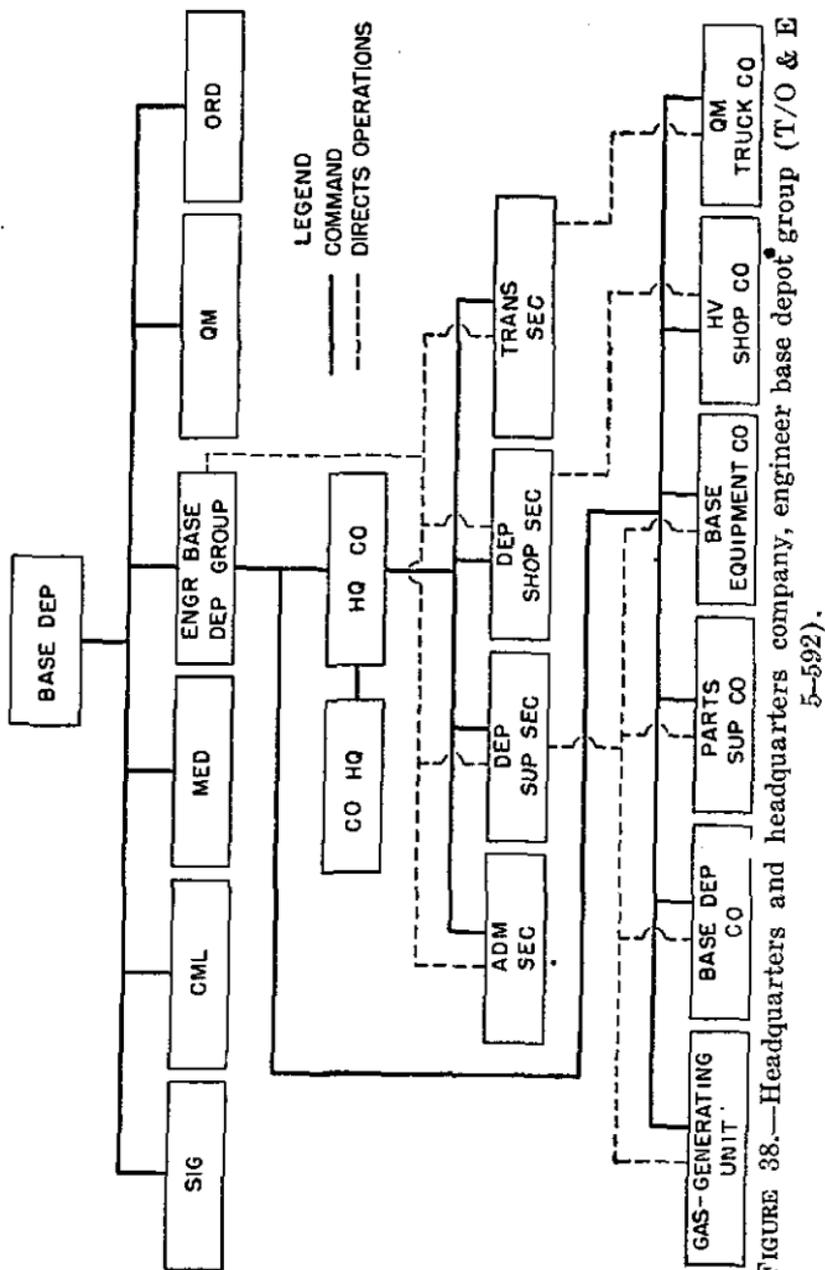


FIGURE 38.—Headquarters and headquarters company, engineer base depot group (T/O & E 5-592).

levels of inventory of spare parts for use of the heavy shop company, and initiates reports of recurring failures in mechanical equipment which indicates a necessity for change in design or in methods of operation or maintenance. It directs the assembling and servicing of engineer equipment received in the depot.

*f.* The *transportation section* operates organic vehicles and does second-echelon maintenance for the company. It meets the transportation requirements of attached units by assigning tasks to the attached quartermaster truck company or by arranging for such other motor, rail, water, or air transportation as is necessary for the efficient operation of the depot.

■ 436. DEPOT HEADQUARTERS.—Under the commander of the engineer base depot group the officers of the depot headquarters comprise a staff to supervise and direct the operation of the sections of headquarters company, the duties of which are outlined in paragraph 435.

■ 437. CAPACITY.—The capacity of the depot is determined by its attached units. The headquarters and headquarters company may be augmented by civilian clerical help where available, thus increasing its control capacity.

■ 438. DUTIES.—Principal duties of the engineer base depot group headquarters and headquarters company are to—

*a.* Coordinate the administrative activities of attached units.

*b.* Direct the procurement, storage, and issue of engineer supplies.

*c.* Anticipate future engineer supply requirements.

*d.* Arrange transportation for the movement of depot stocks.

*e.* Regulate fourth-echelon maintenance of all engineer equipment in the theater of operations to which assigned.

*f.* Direct the assembling and servicing of engineer equipment received in the depot.

#### SECTION XIV (ADDED)

##### ENGINEER BASE DEPOT COMPANY

■ 439. MISSION.—The mission of the base depot company is to receive, store, and issue engineer supplies and equipment. It operates the warehousing and storage facilities of the engi-

neer section of a base general depot or engineer branch depot.

■ 440. ORGANIZATION.—This unit consists of a headquarters staff section, company headquarters, and administrative section, a receiving section, a storage and issue section, a shipping section, and a transportation and maintenance section. (For details see T/O 5-267. See also fig. 39.)

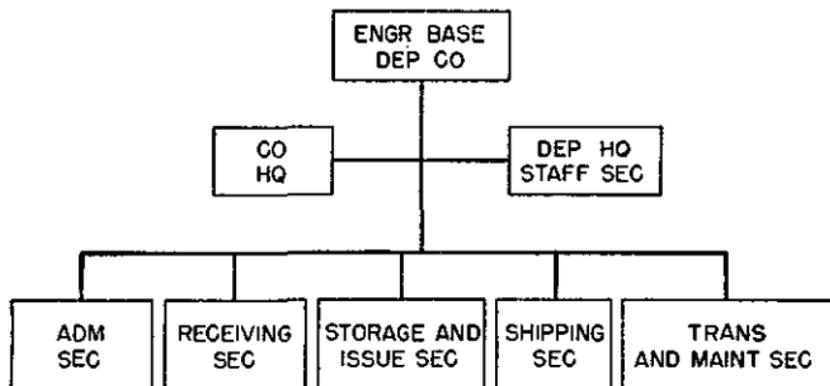


FIGURE 39.—Engineer base depot company (T/O 5-267).

■ 441. EQUIPMENT.—Equipment is limited to that necessary for operation of a stabilized depot as a component of a base depot group.

■ 442. TRANSPORTATION.—The unit has light vehicles for command and administrative purposes but depends on the base depot group for vehicles to move supplies in and out of the base depot. If it is to operate independently, the unit must be provided three 2½-ton cargo trucks and three 1-ton trailers.

■ 443. ARMAMENT.—Carbines, M1903 rifles, and caliber .50 machine guns comprise the armament of the company.

■ 444. TRAINING.—*a.* Basic and unit training follow the principles outlined in chapter 4.

*b.* The unit is trained in storage and handling methods for all classes of engineer equipment and supplies and in the preparation and maintaining of records and reports on their receipt, storage, issue, and shipment.

■ 445. DEPOT HEADQUARTERS STAFF SECTION.—A small force of clerical personnel under the company commander, who is a member of the base depot staff, maintains the necessary records and prepares reports to keep the depot headquarters

## ENGINEER TROOPS

informed at all times of the status of supply in the base depot company.

■ 446. COMPANY HEADQUARTERS.—The company headquarters consists of personnel for routine administration, mess, and supply of the company.

■ 447. ADMINISTRATIVE SECTION.—The administrative section is composed of clerical personnel for maintaining stock records for the depot, receiving incoming requisitions, and preparing and routing shipping documents for supplies leaving the depot. Statistical reports may be required of the section for the depot headquarters staff section.

■ 448. RECEIVING SECTION.—The personnel of the receiving section receive, check, and report to the administrative section all supplies entering the depot.

■ 449. STORAGE AND ISSUE SECTION.—The storage and issue section, commanded by a lieutenant, includes personnel for storing, checking, issuing, and preparing reports of supplies and equipment in the depot. Civilian laborers and/or quartermaster service troops normally are required to assist in the proper storage and handling of engineer items in a base depot.

■ 450. SHIPPING SECTION.—The shipping section constructs packing cases and packs supplies and equipment for outgoing shipments requiring repacking or change in composition.

■ 451. TRANSPORTATION AND MAINTENANCE SECTION.—The transportation and maintenance section includes mechanics for the assembly, lubrication, preservation, and maintenance of all mechanical equipment for which the unit may be responsible either organically or temporarily while it is in storage in the base depot.

■ 452. CAPACITY.—Under normal conditions and augmented by civilian laborers and/or quartermaster service troops, this unit will serve a force including 15,000 engineer troops.

■ 453. DUTIES.—Principal duties of the base depot company are to—

- a. Receive, store, and issue engineer supplies and equipment.
- b. Maintain stock record accounts.
- c. Prepare and forward status of supply reports.
- d. Recommend stock levels of items carried in the depot.

- e. Report impending shortages or excesses of items stocked in the depot.
- f. Purchase items locally to prevent shortages when operating an independent depot.
- g. Assemble, preserve, and maintain engineer equipment stored in the depot.
- h. Maintain local security around company installations.

## SECTION XV (ADDED)

## ENGINEER SPECIAL BRIGADE

■ 454. MISSION.—The engineer special brigade provides personnel and equipment for transporting combat troops from a friendly near shore to a hostile far shore when the distance is not over 100 miles. The brigade resupplies these troops during the early stages of establishing a beachhead. The brigade can transport one division when reinforced by naval LCT boats.

■ 455. ORGANIZATION.—The brigade is organized with a brigade headquarters, a headquarters company, and three boat and shore regiments. A boat maintenance battalion, an ordnance maintenance company, a quartermaster headquarters and headquarters company, a medical battalion, a signal company, and a band complete the organization. (For details see T/O 5-510S, 5-510-1S, 5-511S, 5-555S, 8-195S; and T/O & E 9-97S, 10-276S, and 11-537S. Also see fig. 40.)

■ 456. EQUIPMENT.—Heavy engineer equipment includes tractor- and truck-mounted cranes; motorized shops for emergency repair, heavy machine work, light machine work, small tool repair, tool and bench work, and welding; 35- and 80-drawbar horsepower Diesel tractors; 16-ton full flat-bed trailers; and water-supply equipment. Other heavy equipment includes 250-gallon tank trailers, 750-gallon tank trucks, 2½- and 4-ton wreckers, and a small-arms repair truck. Boats are furnished for salvage and fire fighting.

■ 457. TRANSPORTATION.—Transportation includes light vehicles for command, reconnaissance, and administration; 1½- and 2½-ton cargo trucks and 2½-ton amphibian trucks for supplies and personnel; and 6-ton prime movers for towing the 16-ton trailers and for carrying supplies. Water transportation consists of 2½-ton amphibian trucks, command and

## ENGINEER TROOPS

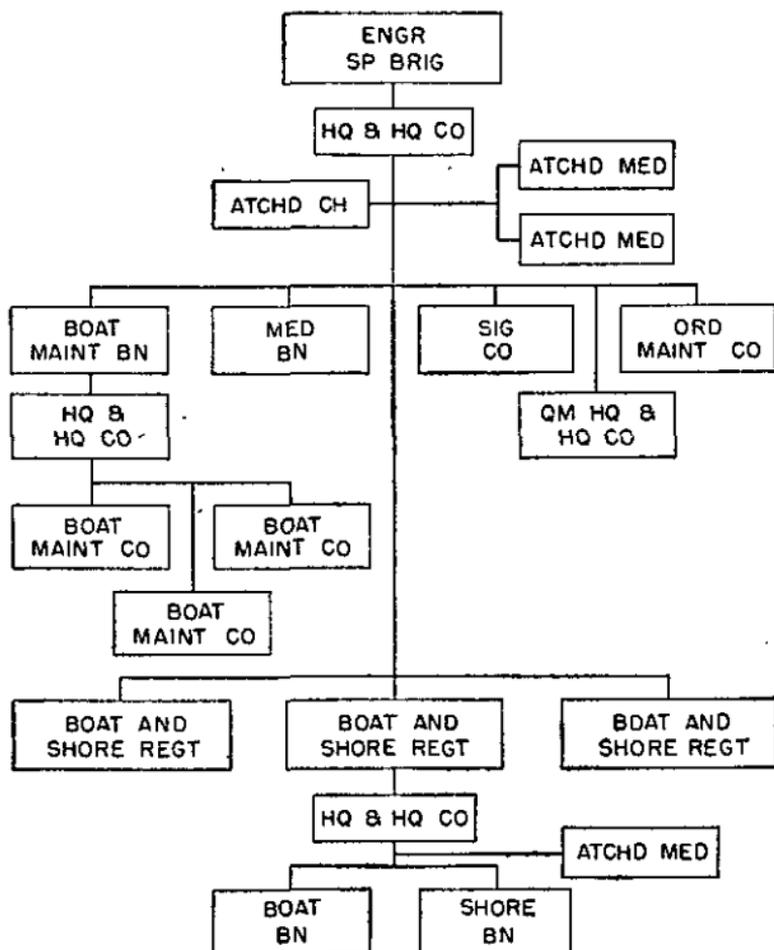


FIGURE 40.—Engineer special brigade (T/O 5-510S).

navigation boats, tank lighters, patrol boats, and surf-landing boats.

■ 458. **ARMAMENT.**—Armament includes carbines, pistols, rifles, submachine guns, machine guns, antitank guns, and rocket and grenade launchers.

■ 459. **TRAINING.**—The personnel of the engineer special brigade are trained as a unit by the Army Service Forces under the Engineer Amphibian Command. Personnel include mechanics, boat operators, machinists, and heavy equipment operators.

■ 460. DUTIES.—The duties of the engineer special brigade closely parallel the mission as stated above.

## SECTION XVI (ADDED)

## ENGINEER SPECIAL SHOP BATTALION

■ 461. MISSION.—This unit provides facilities and operating personnel for fourth- and fifth-echelon maintenance and salvage of special brigade equipment.

■ 462. ORGANIZATION.—One special shop battalion services the equipment of two engineer special brigades. The battalion consists of a battalion headquarters, a headquarters detachment, a power-plant repair company, a hull-repair company, a salvage and dockage company, and a depot company. Each of these companies can operate independently.

*a. Battalion headquarters.*—Headquarters is commanded by a lieutenant colonel who is assisted by 2 majors, 1 captain, 1 first lieutenant, and 16 enlisted men. (See T/O & E 5-536S and fig. 41.)

*b. Headquarters detachment.*—The detachment has a captain and 12 enlisted men. (See T/O & E 5-536S.)

*c. Power-plant repair company.*—This company consists of a company headquarters, a supply section, and two power-plant repair platoons. Each platoon has a headquarters, an inspection section, a salvage and fire-prevention section, and a repair section. (See T/O & E 5-537S.)

*d. Hull-repair company.*—This company has a company headquarters, a steel hull repair platoon, and a wood hull repair platoon. Each platoon has a headquarters, a salvage and fire-prevention section, a repair section, and a supply section. (See T/O & E 5-538S.)

*e. Salvage and dockage company.*—This company has a company headquarters and a salvage platoon with three sections: a salvage section, a dockage section, and a supply section. (See T/O & E 5-539S.)

*f. Depot company.*—This company has a company headquarters and three platoons: a wood-hull platoon, a steel-hull platoon, and a power-plant platoon. Each of the platoons has a repair section of two units. (See T/O & E 5-547S.)

ENGINEER TROOPS

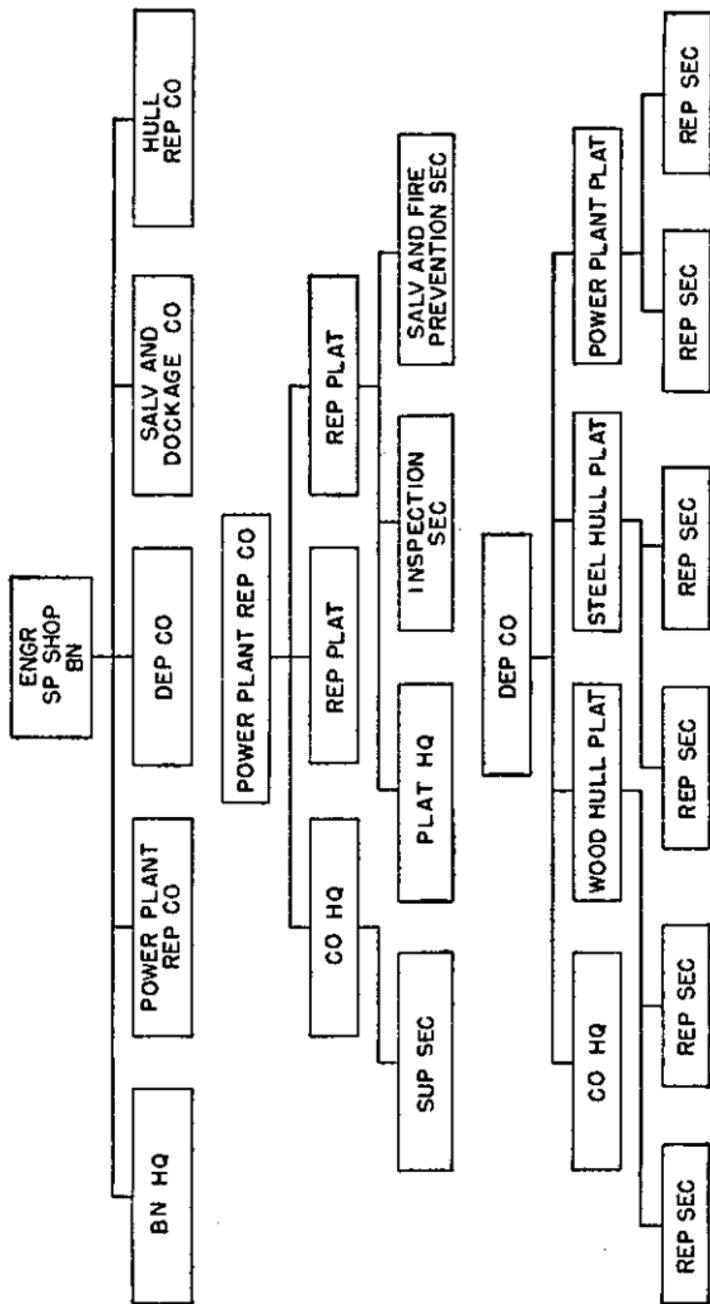


FIGURE 41.—Engineer special shop battalion (T/O & E 5-536S).

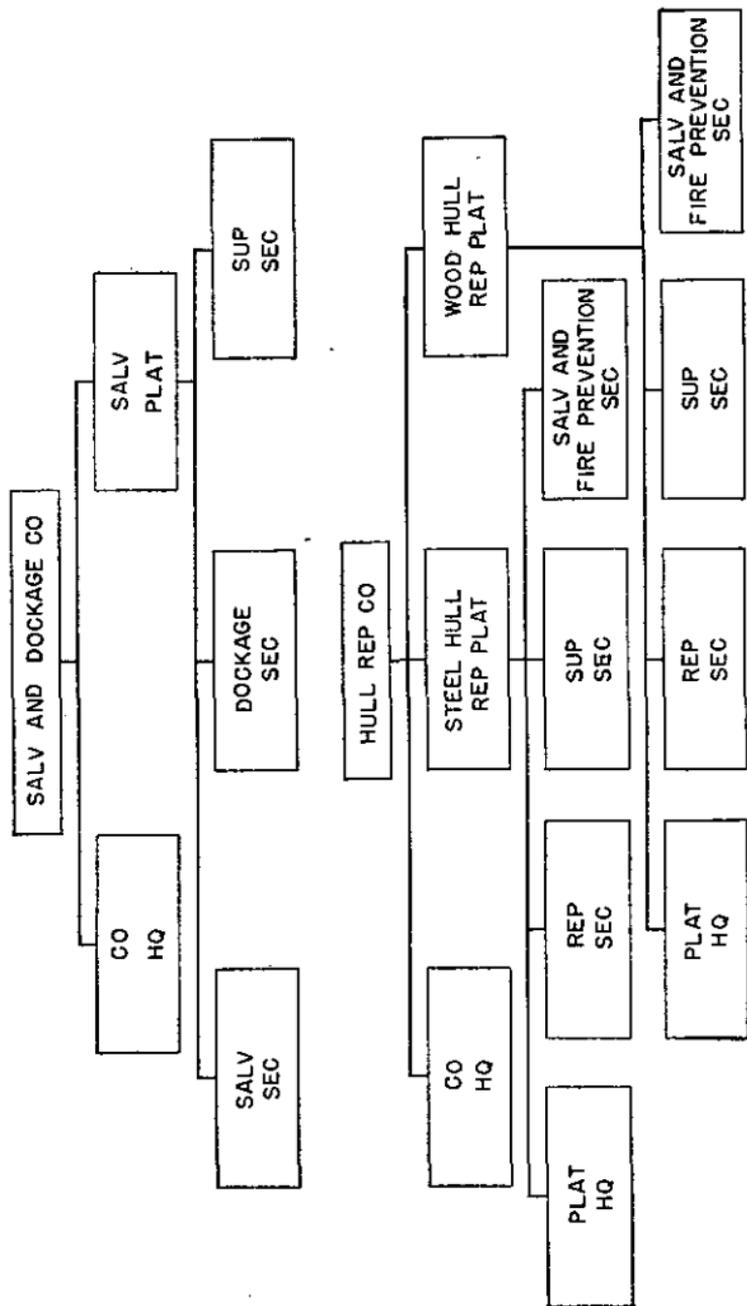


FIGURE 41.—Engineer special shop battalion (T/O &amp; E 5-586S)—Continue.

■ 463. EQUIPMENT.—Equipment includes the standard engineer sets and such special items as tractors, cranes, air compressors, and boats for recovery, maintenance, and repair of engineer equipment in the engineer special brigade. Like the engineer special brigade, the special shop battallion has a number of boats for the prevention of fire, for salvage, and for utility purposes.

■ 464. TRANSPORTATION.—The battalion has transportation for both water and land operations. This includes tractors, trailers, cargo trucks, prime movers, truck-mounted cranes, vehicles for command and reconnaissance, and utility, fire-fighting, and salvage boats.

■ 465. ARMAMENT.—Armament includes carbines, machine guns, pistols, and rifles.

■ 466. TRAINING.—Most of the enlisted personnel in the special shop battallion are specialists trained as a unit by the Army Service Forces. Included in the unit are mechanics, clerks, carpenters, electricians, marine divers, motorboat operators, Diesel mechanics, and painters.

■ 467. DUTIES.—The duties of the special shop battallion are varied and include repair and servicing of the motorized land and water equipment of the engineer special brigade.

#### SECTION XVII (ADDED)

##### ENGINEER SERVICE ORGANIZATION

■ 468. GENERAL.—The engineer service organization is a cellular unit for coordinating platoons, companies, battalions, or specialized engineer units. The unit is employed where standard engineer organizations do not contain the required specialists or equipment, or are too large or too small.

■ 469. ORGANIZATION.—The size, organization, function, and capacity of the engineer service organization depend on specific needs of theaters. Hence, no organizational chart can be provided. For details see T/O & E 5-500, changes Nos. 1 to 7.

#### SECTION XVIII (ADDED)

##### ENGINEER PARTS SUPPLY COMPANY

■ 470. MISSION.—*a.* The primary mission of an engineer parts supply company is to establish and operate an engineer parts supply section of an engineer depot.

b. The company is a nonmobile unit which operates as part of the engineer depot organization of a base installation. It cannot operate as a separate supply unit unless it is furnished with motor transportation.

■ 471. ORGANIZATION.—The company consists of a depot staff section, headquarters platoon, a procurement platoon, and a warehouse platoon. Organization is shown in figure 42.

■ 472. EQUIPMENT.—The company is equipped with basic engineer tool sets.

■ 473. TRANSPORTATION.—Company transportation consists of light trucks for administration, interdepot communication, and light hauling. A 5- to 6-ton tractor and 20-ton semi-trailer permit limited movement of heavy equipment.

■ 474. ARMAMENT.—Individual weapons include the carbine and rifle. Supporting weapons include caliber .50 machine guns.

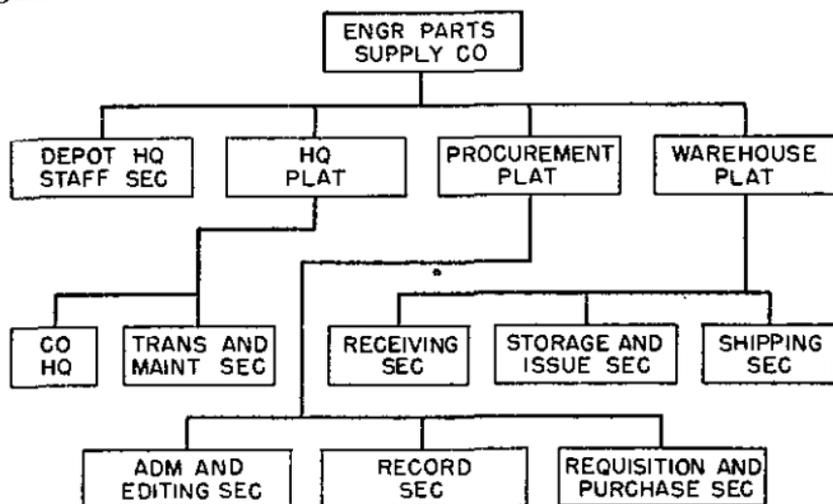


FIGURE 42.—Engineer parts supply company (T/O 5-247).

■ 475. TRAINING.—Training of the company is similar in general to that for the engineer depot company.

■ 476. DEPOT HEADQUARTERS STAFF SECTION.—This small group of enlisted personnel under the supervision of the company commander provides liaison with the engineer depot group with which the company normally operates.

■ 477. HEADQUARTERS PLATOON.—The headquarters platoon is composed of the company headquarters and a transportation and maintenance section.

*a. Company headquarters.*—The company headquarters includes the company commander, an assistant, and enlisted personnel for routine administration, supply, and mess.

*b. Transportation and maintenance section.*—This section provides, operates, and maintains company transportation.

■ 478. PROCUREMENT PLATOON.—The procurement platoon consists of administrative and editing, record, and requisition and purchase sections. It is charged with procuring and issuing spare parts for all engineer equipment operating in or assigned to a theater of operations.

*a. Administrative and editing section.*—This section handles paper work connected with requisitioning and shipping of spare parts and coordinates salvage inspection and inventory activities.

*b. Record section.*—This section maintains the stock records of the spare-parts depot.

*c. Requisition and purchase section.*—This section is responsible for maintaining adequate stock levels either by requisition or by purchase from local sources.

■ 479. WAREHOUSE PLATOON.—The warehouse platoon consists of the receiving section, storage and issue section, and shipping section. It is responsible for the physical storage and issue of spare parts.

*a. Receiving section.*—This section has personnel for accepting and tallying-in all shipments to the company.

*b. Storage and issue section.*—The storage and issue section is charged with storage, inventory, inspection, and salvage of parts, and with filling of orders for shipment.

*c. Shipping section.*—The shipping section packs and tallies-out all shipments to depots of lower echelon or to using units.

■ 480. DUTIES.—Duties of the parts supply company in a theater of operations are to—

*a.* Maintain adequate stock of spare parts and supplies at all times.

*b.* Determine accurately, by field survey when necessary, model, serial number, and total number of units of each item

of engineer equipment operating in or assigned to the theater served.

c. Maintain accurate records giving information required by b.

d. Transmit through channels to Spare Parts Branch, Engineer Section, Columbus Army Service Forces Depot, Columbus, Ohio, detailed information regarding number, make, model, and serial number of all engineer equipment in theater of operations.

e. Collect and place in stock all surplus portions of parts field sets shipped direct to organizations before the parts supply company was established. Thus such parts will be available for general distribution to the entire theater of operations.

f. Anticipate stock requirements by maintaining contact with engineer depot companies, maintenance companies, and operating organizations whose requirements may vary with local activities, operating conditions, distance from supply agencies, and possible disruptions of transportation facilities and schedules.

g. Obtain suitable substitutes for parts that are not available.

h. Maintain initial stock levels until trends can be determined accurately.

i. Provide local security for depot and personnel.

[A. G. 300.7 (15 July 1943).]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,  
*Chief of Staff.*

OFFICIAL:

J. A. ULIO,  
*Major General,*  
*The Adjutant General,*

*Sup*

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**O. K. TO RELEASE**  
*5-29-44* *Grinn*

**ENGINEER FIELD MANUAL  
ENGINEER TROOPS**

CHANGES }  
No. 2 }

WAR DEPARTMENT,  
WASHINGTON 25, D. C., 10 May 1944.

FM 5-5, 11 October 1943, is changed as follows:

Figure 13 is rescinded and the following substituted therefor:



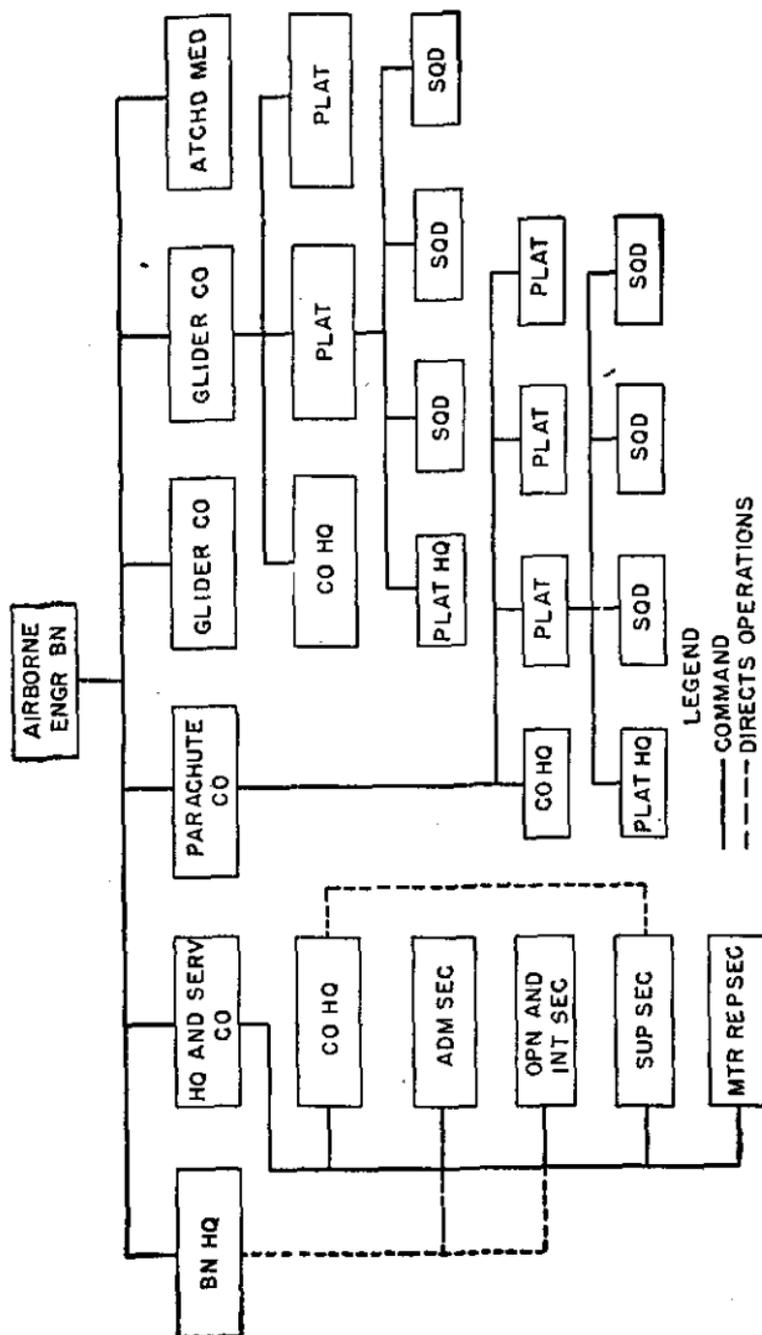


FIGURE 13.—Airborne engineer battalion (T/O 5-225).



■ 483. EQUIPMENT.—Organic engineer equipment includes camouflage, drafting, gelatin-process reproduction, sketching, sign painting, and surveying sets for use in operation of the group headquarters.

■ 484. TRANSPORTATION.—Transportation consists of  $\frac{1}{4}$ -ton trucks,  $\frac{3}{4}$ -ton command car,  $1\frac{1}{2}$ -ton, 6 x 6, trucks, and  $2\frac{1}{2}$ -ton cargo trucks. A 1-ton, 250-gallon tank trailer, a 1-ton cargo trailer, and a  $\frac{1}{2}$ -ton trailer are provided for mess use and for moving supplies and equipment.

■ 485. ARMAMENT.—Armament includes caliber .45 pistols, caliber .30 carbines, caliber .30 M1 rifles, caliber .30 machine guns, and a caliber .50 machine gun.

■ 486. TRAINING.—Basic and unit training follow the principles set forth in chapter 4. Specialized training is given in the operation of the headquarters sections, motor movements, motor maintenance, and local security. Personnel assigned to group headquarters should have civilian training and experience in civil-engineering design or construction methods.

■ 487. GROUP HEADQUARTERS COMPANY.—The group headquarters company consists of company headquarters and administrative, operations, engineer, and supply sections.

*a. Company headquarters.*—The company headquarters is composed of the company commander, an assistant company commander, and enlisted personnel for mess, supply, transportation, and company administration.

*b. Administrative section.*—(1) The administrative section consists of an adjutant (S-1) and enlisted personnel for group administration and communication.

(2) The group is not an administrative headquarters for attached battalions. It exercises only such administrative supervision as is required for proper command control. This includes control of replacement, transfer, and promotion of officers within the group; transfer of enlisted personnel within, to, or from the group; awards of decorations; establishment of uniform leave and rotation policies; and administrative control essential to operations. In addition, group headquarters per-

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sonnel must be competent to inspect and supervise the administrative training of subordinate units. Attached special units normally will be attached for administration to one of the battalions but may be attached to the group headquarters when required by location and task assignment.

*c. Operations section.*—(1) The operations section consists of the operations officer (S-3), enlisted assistants, photographer, and a demolitions specialist.

(2) The operations officer (S-3), and the operations section work closely with the engineer section. Recommendations for assignment of tasks to attached construction battalions are prepared by the operations officer after consultation with the engineer officer and are submitted to the group commander for approval. The operations officer supervises the execution of approved projects in accordance with directives of the group commander. During the training period, the operations officer plans and supervises the group training.

*d. Engineer section.*—(1) The engineer section is composed of the engineer officer, an assistant, enlisted designers, a surveying party, draftsmen, and reconnaissance personnel.

(2) The section surveys selected sites and prepares general plans and designs for assigned tasks. Skilled designers and draftsmen are provided for work on roads, bridges, and structures.

*e. Supply section.*—(1) The supply section consists of the supply officer (S-4), an assistant, and enlisted personnel for general supply and supervision of water supply.

(2) The supply officer (S-4) normally controls the issue of engineer materials (class IV) by means of allocations and priorities. Supplies of classes I, II, III, IV, and V are obtained by each battalion directly from the supply agency or dump concerned. The group headquarters has insufficient personnel to move supplies for subordinate units. Water reconnaissance and general supervision of water supply also are charged to the group supply officer.

■ 488. GROUP HEADQUARTERS.—*a.* In addition to the officers in staff sections of headquarters company, the group headquarter-

ters includes the group commander, executive officer, orientation officer, and special service officer.

b. The group commander estimates the situation and assigns subordinate missions to the construction battalions of the group. He usually prescribes the time of completion of unit tasks and exercises close supervision over execution of the mission by increasing or decreasing unit tasks to conserve manpower and to insure timely, over-all completion of the group mission. The group should not interfere with the execution of the unit missions to the destruction of initiative in the subordinate units. The group must not be considered a headquarters from which units are habitually detached to lower echelons but rather as a highly developed technical planning and operating organization particularly adapted to execute the engineer requirements of higher echelons.

■ 489. ATTACHED MEDICAL.—*a.* The group medical detachment consists of the group surgeon and a small number of enlisted technicians. In addition to providing medical care for personnel of the group headquarters, the group medical officer supervises the medical detachments of the attached battalions.

*b.* The detachment has a 1½-ton, 6×6, truck and a ¼-ton trailer for the movement of personnel and equipment.

■ 490. DUTIES.—The duties of the group headquarters and headquarters company are to—

*a.* Plan the engineer program in its area of responsibility.

*b.* Select and survey sites for engineering projects.

*c.* Design structures, roads, and bridges.

*d.* Assign tasks to attached units; supervise their work; set completion dates; and require compliance with schedules, plans, and orders.

*e.* Supervise operation and training of attached construction battalions and special engineer units.

*f.* Establish communication with subordinate headquarters.

*g.* Coordinate procurement and allocation of engineer construction materials.

*h.* Execute engineer reconnaissance.

*i.* Provide its own internal administration to include local security of group headquarters.

## ENGINEER TROOPS

## SECTION XX (ADDED)

## ENGINEER CONSTRUCTION BATTALION

■ 491. MISSION.—The engineer construction battalion performs general engineer work in the communications zone or the zone of the interior that requires skilled personnel and heavy engineer equipment. It designs and constructs permanent structures and facilities beyond the capabilities of combat engineers. It may be assigned all construction work in an area or all work on a specific job. It is capable of doing the following types of work:

a. Building, repairing, and maintaining roads, airfields, railways, drainage structures, and bridges of all types.

b. Constructing cantonments, wharves, depots, and similar installations.

c. Constructing rear defensive positions.

d. Operating public utilities, including installation and operation of water-supply facilities.

■ 492. ORGANIZATIONS.—a. The battalion consists of a headquarters and headquarters and service company, and three construction companies; a medical detachment, as listed in T/O & E 8-500, may be assigned. The battalion may operate independently or as part of an engineer construction group. (See T/O & E 5-75 and fig. 44.)

b. The battalion is organized to operate and supervise in two shifts—

(1) All dozers, shovels, cranes, and air compressors.

(2) All trucks of 2½ tons and over.

(3) All repair and maintenance personnel.

(4) Mess facilities.

c. A shift is considered to be 10 hours; two shifts per day leaving 4 hours for servicing, adjustments, and minor repairs. Sufficient trailer-mounted lubricators and maintenance personnel are furnished to permit the servicing of all heavy equipment *once each shift*.

d. Because road rollers, concrete mixers, and the earth auger are less frequently used, they are operated on one shift only.

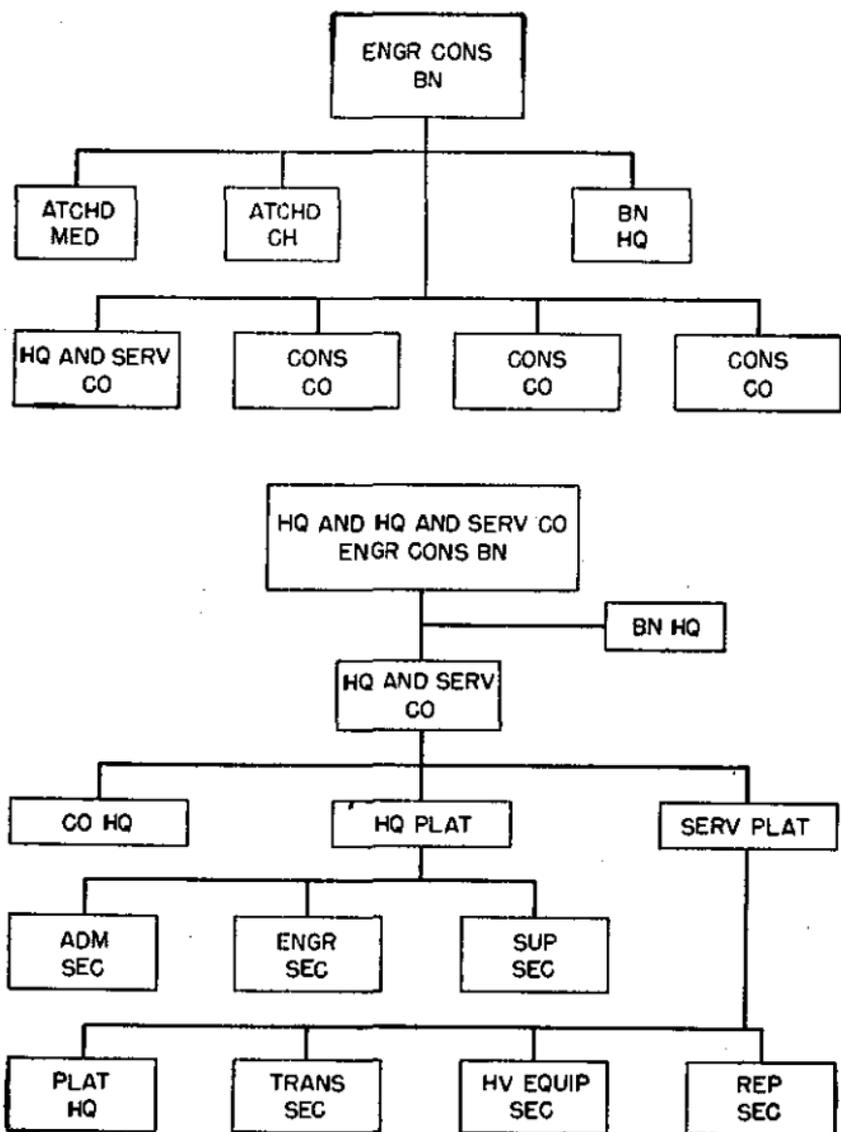


FIGURE 44.—Engineer construction battalion (T/O 5-75 and 76).

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■ 493. EQUIPMENT.—*a.* Heavy engineer equipment includes a skid-mounted earth auger, motorized air compressors, a 20-ton tractor-operated crane,  $\frac{3}{4}$ -yard truck-mounted cranes, motorized road graders, a towed road grader, 14-cubic-foot concrete mixers, 10-ton road rollers, a 5- to 8-ton road roller, sheep's-foot road rollers, cable-operated rooters, 8-yard road scrapers, 20-ton semitrailers,  $\frac{3}{4}$ -yard power shovels, 80-DBHP tractors, and trailer-mounted electric generators.

*b.* Prime movers and 20-ton trailers are used as cargo hauling units when not engaged in moving equipment.

*c.* Night lighting equipment is furnished as night work is necessary and desirable in many situations.

*d.* Maintenance equipment includes a 4-ton wrecker, trailer-mounted lubricators, and motorized shops for emergency repair, general-purpose repair work, heavy machine work, and welding.

*e.* Engineer equipment sets are provided for blacksmithing, camouflage, canvas work, carpentering, drafting and duplicating, electric lighting, pioneer work, soil testing, sign painting, sketching, surveying, tinsmithing, equipment maintenance, and water supply.

■ 494. TRANSPORTATION.—Transportation consists of  $\frac{1}{4}$ -ton trucks, a  $\frac{3}{4}$ -ton command car,  $1\frac{1}{2}$ -ton, 6 x 6, cargo trucks,  $2\frac{1}{2}$ -ton dump trucks, and 6-ton prime movers. The battalion is not mobile. Its vehicles are used for command and reconnaissance, hauling of supplies and construction materials, and the movement of heavy equipment.

■ 495. ARMAMENT.—Armament consists of caliber .45 pistols, caliber .30 carbines, caliber .30 M1 rifles, caliber .30 and caliber .50 machine guns, and grenade and rocket launchers.

■ 496. TRAINING.—Basic and unit training outlined in chapter 4 is applicable. Specialized training covers the design and construction of theater of operations facilities, operation and maintenance of heavy engineer equipment, and road, rail, and oversea movement of equipment. Personnel assigned to the battalion should have a background of civilian training and experience in construction trades or general contracting.

■ 497. CONSTRUCTION COMPANY.—The construction company consists of a company headquarters and three platoons. (See T/O & E 5-77 and fig. 45.)

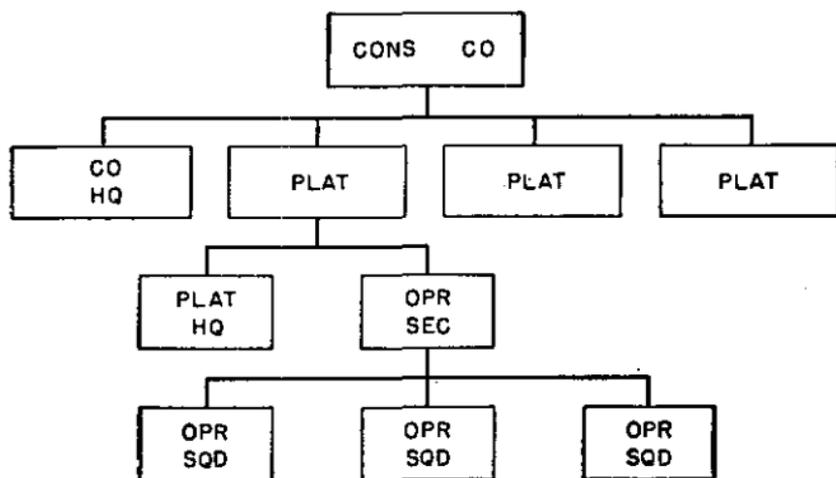


FIGURE 45.—Construction company (T/O & E 5-77).

The engineer construction company normally will be assigned to a specific construction job under the immediate supervision of battalion headquarters. Additional specialists or equipment may be attached from the headquarters and service company when necessary.

*a. Company headquarters.*—(1) The company headquarters includes the company commander; an administrative officer; personnel for routine administration, mess, motor, and supply; supervisors for construction machinery; specialists for blacksmithing, carpentry, demolitions, electrical work, painting, plumbing, quarrying, sheet-metal work, and welding.

(2) Maintenance personnel for two-shift operations include a construction-equipment mechanic foreman, automobile mechanics, and construction-equipment mechanics. Two operators are provided for air compressors, highway-construction machinery, and trucks of 2½ tons or larger.

*b. Platoon.*—The platoon consists of platoon headquarters and an operating section of three operating squads.

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(1) The platoon headquarters includes a lieutenant, platoon commander; enlisted construction foreman; and a bridge carpenter, a rigger, a toolroom keeper, and truck drivers. The specialists lay out work, assist in scheduling the work of the various trades, act as lead men in particularly difficult tasks, and advise the platoon leader in the work of the various trades.

(2) Each operating squad includes a unit foreman, a unit subforeman, a bridge carpenter, construction carpenters, a construction worker, a demolition man, an electrician, a jackhammer operator, a plumber, and a stonemason.

■ 498. HEADQUARTERS AND SERVICE COMPANY.—*a. Company headquarters.*—(1) The company headquarters is composed of the company commander, assistant company commander, and enlisted personnel for routine administration, mess, and supply. (See T/O & E 5-76 and fig. 44.)

(2) The commander of headquarters and service company is the principal agent of the battalion commander in insuring proper operation, maintenance, and utilization of heavy equipment and motor vehicles throughout the battalion. The importance of this task to the successful accomplishment of the battalion mission warrants its taking most of this officer's time; the details of company mess, supply, and administration must be left largely to his assistant.

*b. Headquarters platoon.*—The headquarters platoon consists of administrative, engineer, and supply sections.

(1) *Administrative section.*—The administrative section operates under the supervision of the adjutant assisted by the personnel officer. Enlisted specialists are provided for administration and communication. In addition to other duties, the adjutant is communication officer and is charged with operation of the battalion message center and with maintenance of communication to the companies.

(2) *Engineer section.*—The engineer section consists of the engineering and plans and training officer; an assistant; and enlisted personnel for supervision of building construction, camouflage, electrical work, and bridge and road construction; foremen for rigging, quarrying, and bridging; mechanical and structural draftsmen and designers; clerks; and demolition,

electrical and surveying specialists. This personnel prepares the required detailed plans of the battalion, based upon general or type plans furnished by group headquarters.

(3) *Supply section*.—The supply officer, assisted by a warrant officer as assistant supply officer, directs the supply section. Enlisted personnel consists of supervisors and specialists for general supply and water supply.

c. *Service platoon*.—(1) *Platoon headquarters*.—The platoon headquarters consists of the platoon commander, an assistant, a warrant officer as motor officer, and a clerk.

(2) *Transportation section*.—(a) The transportation section consists of the battalion motor sergeant, an assistant, dispatchers, automobile mechanics, drivers for light and heavy trucks, and wrecker operators.

(b) Motor transportation is pooled under the transportation section for normal work assignments in order to obtain maximum efficiency work.

(3) *Heavy equipment section*.—The heavy equipment section consists of a highway construction machinery supervisor, two shift foremen, and operators for crane shovels, air compressors, concrete mixers, highway-construction machinery, jackhammers, power earth auger, and road-graders.

(4) *Repair section*.—The repair section is composed of a machine-shop foreman, two shift foremen, a blacksmith, machinists, machinists' helpers; automobile, carburetor, construction-equipment, Diesel, and general mechanics; a pipefitter, toolroom keepers, and welders.

■ 499. **BATTALION HEADQUARTERS**.—Battalion headquarters includes the battalion commander, executive officer, and staff members listed under the staff sections of headquarters and service company.

■ 500. **ATTACHED MEDICAL**.—The medical detachment is organized under T/O & E 8-500, attached medical section, which provides medical service for a battalion operating alone. It consists of a medical officer, a dental officer, and enlisted medical and dental technicians. Training is in accordance with section II, chapter 4.

■ 501. DUTIES.—The principal duties of the engineer construction battalion are to:

- a. Survey sites for engineering works.
- b. Design and lay out construction projects.
- c. Construct roads, bridges, buildings, and other permanent facilities.
- d. Operate and maintain organic heavy equipment.
- e. Install and operate water points to supply its own troops.
- f. Provide its own local security.

[A. G. 300.7 (20 Mar 44).]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,  
*Chief of Staff.*

OFFICIAL:

J. A. ULIO,  
*Major General,*  
*The Adjutant General.*

DISTRIBUTION:

As prescribed in paragraph 9a, FM 21-6: except, D (20), Ch Engrs (500), Engr Bd (50), Engr Sch (1000), AF Schs (10), Inf Sch (100), Armd Force Sch (100), Comd & Gen Stf Sch (500); R 1, 2, 4, 6-11, 17, 18, 44 (6), 5 (10); Bn 1, 2, 4, 6-11, 17, 18, 44 (4), 5 (6); C 5 (10); Engr RTC (1000); Engr UTC (1000).

For explanation of symbols, see FM 21-6.

Supervisor

FM 5-5

C-3

7-18-44

ENGINEER FIELD

O.K. TO RELEASE  
ENGINEER TROOPS

B L.M.W.

WAR DEPARTMENT,  
WASHINGTON 25, D. C., 5 July 1944.

CHANGES }  
No. 3 }

FM 5-5, 11 October, 1943, is changed as follows:

■ 2. CLASSIFICATION.

\* \* \* \* \*

c. *Army Ground Force Classification (Added).*—Army Ground Force engineer units are also divided into division and non-division units.

(1) *Division units are units organic with the several types of division.* Included are the combat, armored, airborne, and light combat battallions, and the engineer squadron.

(2) *Nondivision units include all engineer units assigned to Army Ground Forces but not assigned to divisions.* They are War Department Reserve attached to army and corps in sufficient numbers and types to fulfill the assigned mission. Non-division units are organized for training and operations into groups of four battallions or the equivalent.

■ 5. ENGINEER UNITS, SERVICE, WITH GROUND FORCES.

\* \* \* \* \*

d. *Engineer maintenance company.* This company consists of a contact platoon. It executes third- and fourth-echelon maintenance of all equipment for which the Corps of Engineers has final responsibility. This includes engineer and other echelons.

g. *Engineer topographic battalion (army).*—This battallion procures of limited areas. It consists of battalion headquarters, headquarters and service company, reproduc-



tion company, and photomapping company. All equipment is mobile.

\* \* \* \* \*

■ 7. ENGINEER UNITS, SERVICE, WITH ARMY AIR FORCES.

\* \* \* \* \*

c. (Added.) *Engineer aviation depot company*.—This company is identical with the engineer depot company described in paragraph 5b. Its employment is discussed in AAF Regulation 65-1.

d. (Added.) *Engineer aviation maintenance company*.—This company is identical with the engineer maintenance company assigned to Army Ground Forces. It executes third- and fourth-echelon maintenance of engineer equipment of units assigned or attached to Army Air Forces.

■ 8. ENGINEER UNITS WITH ARMY SERVICE FORCES.

\* \* \* \* \*

p. (Added.) The *engineer construction battalion* is organized, trained, and equipped to perform engineer work in the communications zone requiring the use of heavy engineer equipment and skilled tradesmen. It consists of a headquarters and headquarters and service company and three construction companies. A group headquarters may be organized to supervise the work of from three to six battalions when a large amount of engineering work is required in a small area.

q. (Added.) The *engineer petroleum production depot* consists of depot headquarters and headquarters company, a refinery battalion, an oil field battalion, and a special construction company. With attached service units, it provides, erects, operates, and maintains equipment for drilling wells, pumping crude oil, transporting it by pipeline to the refinery, and refining it into petroleum products.

■ 20. SPECIAL STAFF OFFICERS, DIVISION ENGINEER.

\* \* \* \* \*

d. *Transportation officer*.—(1) (Superseded).—In the combat battalion and the squadron, he is called a motor officer and commands the maintenance section. In the armored battalion he commands the motor section.

\* \* \* \* \*

## ENGINEER TROOPS

(3) (Superseded). He employs his section, as directed by the headquarters and service company commander, to procure and distribute spare parts and supplies and to perform second-echelon maintenance on motor vehicles of the battalion. (See FM 25-10.)

\* \* \* \* \*

### ■ 21. CORPS ENGINEER AND STAFF.

\* \* \* \* \*

c. *Corps engineer*.—(1) *General* (Superseded).—The corps engineer is a member of the corps commander's special staff. As such he does not command engineer troops assigned or attached to the corps, but transmits to the group commanders the orders of the corps commander that affect the operations of corps engineer units.

#### (2) *Duties*.

\* \* \* \* \*

(c) (Superseded).—Allocation of engineer supplies to corps troops.

\* \* \* \* \*

(f) (Superseded).—Recommending location and establishment of army engineer depots in corps service area.

\* \* \* \* \*

### ■ 23. STAFF OF THE ARMY ENGINEER.

\* \* \* \* \*

b. *Army engineer* (Superseded).—The army engineer is a member of the special staff of the army commander. He assigns missions to the army combat groups in accordance with orders of the army commanding general. He may also assign tasks considered essential to the engineer mission. He designates the location within the army area of engineer supply establishments not controlled by higher headquarters.

\* \* \* \* \*

### ■ 74. HEADQUARTERS AND SERVICE COMPANY.

\* \* \* \* \*

h. *Reconnaissance section* (Added).—The two reconnaissance parties of this section operate with the division cavalry recon-

## ENGINEER FIELD MANUAL

naissance troop to provide advance engineer and combat intelligence to the battalion. This information is evaluated and disseminated by S-2.

On figure 8, change "OPR SEC" to "OPN SEC" and "REP SEC" to "MAINT SEC."

### ■ 83. DUTIES.—*a. When attached to corps.*

\* \* \* \* \*

(2) Important duties less common than those given above are:

\* \* \* \* \*

(b) Rescinded.

\* \* \* \* \*

*b. When attached to army.*—Most common duties are:

(1) (Superseded) Construction, improvement, and maintenance of roads and bridges.

\* \* \* \* \*

(4) Rescinded.

\* \* \* \* \*

(8) Rescinded.

\* \* \* \* \*

Section V, Engineer motorized battalion, chapter 5, is rescinded.

Figure 11, Engineer motorized battalion (T/O 5-75) is rescinded.

■ 165. ATTACHED MEDICAL (Superseded).—The medical detachment consists of the battalion surgeon and necessary enlisted personnel. Its transportation consists of a  $\frac{3}{4}$ -ton weapons carrier. Duties and functions of the detachment and the unit surgeon are discussed in chapter 2.

### ■ 167. REFERENCES.

\* \* \* \* \*

*b.* (Superseded) FM 5-10, Construction and Routes of Communication.

\* \* \* \* \*

# ENGINEER TROOPS

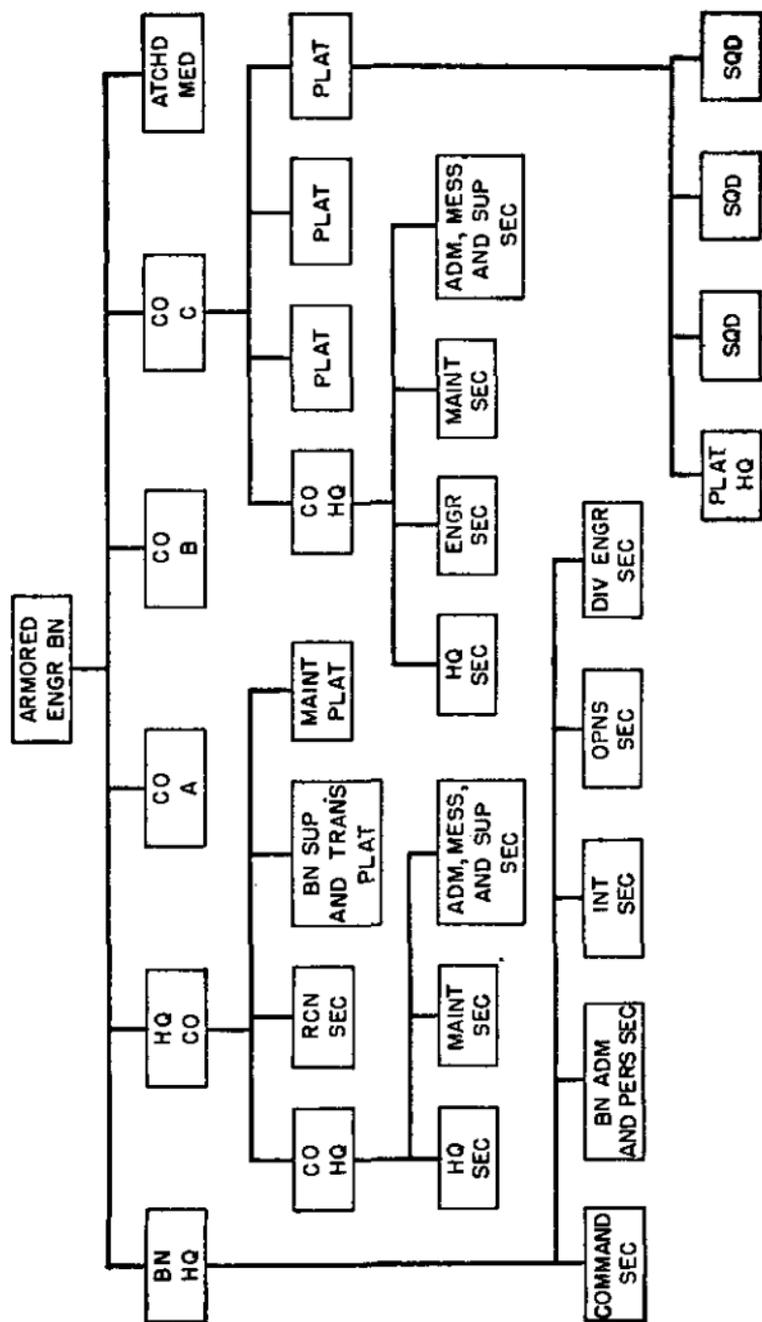


FIGURE 10.—Armored engineer battalion (T/O & E 5-215.)

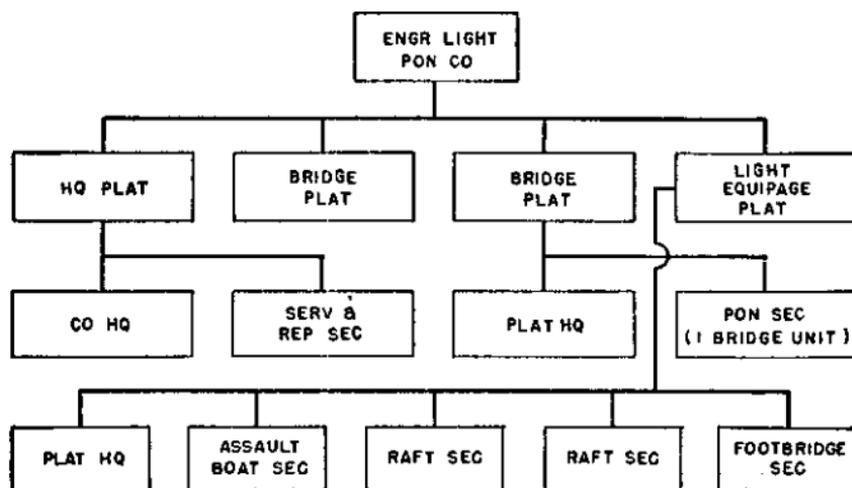


FIGURE 14.—Engineer light ponton company (T/O & E 5-87).

■ 169. ORGANIZATION.—The company consists of a company headquarters and two bridge platoons. Organization is shown in figure 16.

(For details see T/O & E 5-627.)

Change legend of figure 16 to read: Engineer treadway bridge company (T/O & E 5-627).

■ 170. EQUIPMENT.

\* \* \* \* \*

b. Stream-crossing equipment includes utility powerboats, pneumatic boats, and a steel-treadway bridge M1, providing a floating bridge about 1,080 feet long or one steel-treadway bridge M2, providing a floating bridge about 864 feet long.

\* \* \* \* \*

■ 184. MISSION.—a. The primary mission \* \* \* of supply points. The parts supply platoon stores and issues spare parts for engineer equipment in use in the assigned area. It maintains stock levels sufficient to insure prompt repair of major items of equipment.

\* \* \* \* \*

## ENGINEER TROOPS

■ 188. ARMAMENT (Superseded).—The Company is armed with carbines, submachine guns, caliber .50 machine guns, and 2.36-inch rocket launchers. The armament is used to defend depot installations from hostile low-flying aircraft, armored vehicles, or raiding parties.

### ■ 190. HEADQUARTERS PLATOON.

*a. The company headquarters section.*—(1) (Superseded).—The company headquarters section includes the company commander and enlisted men for handling company administration, supply, and mess.

\* \* \* \* \*

### ■ 191. DEPOT PLATOON.

*a. (Superseded).*—*Platoon headquarters section* includes a lieutenant and enlisted section leader, clerk, and truck driver. The section supervises the operation of the depot; handles incoming requisitions, routing them to the proper place for filling; prepares outgoing requisitions for replenishment of stock; and keeps records of supply levels.

*b. Depot section* enlisted \* \* \* headquarters depot section. It receives, stores, and issues engineer supply items and classifies, salvages, and guards engineer stores. Supplies are classified \* \* \* supplies, and others.

■ 207. ARMAMENT. (Superseded).—Individual weapons are carbines and submachine guns. Each platoon is equipped with a caliber .50 machine gun for the protection of convoys and bivouacs from hostile air and ground attacks. The 2.36-inch rocket launcher is provided for protection against mechanized attack.

■ 232. ORGANIZATION.—The battalion consists of battalion headquarters and headquarters and service company, photo-mapping company, reproduction company, and medical detachment. (For details, see T/O & E 5-55 and fig. 22.)

ENGINEER FIELD MANUAL

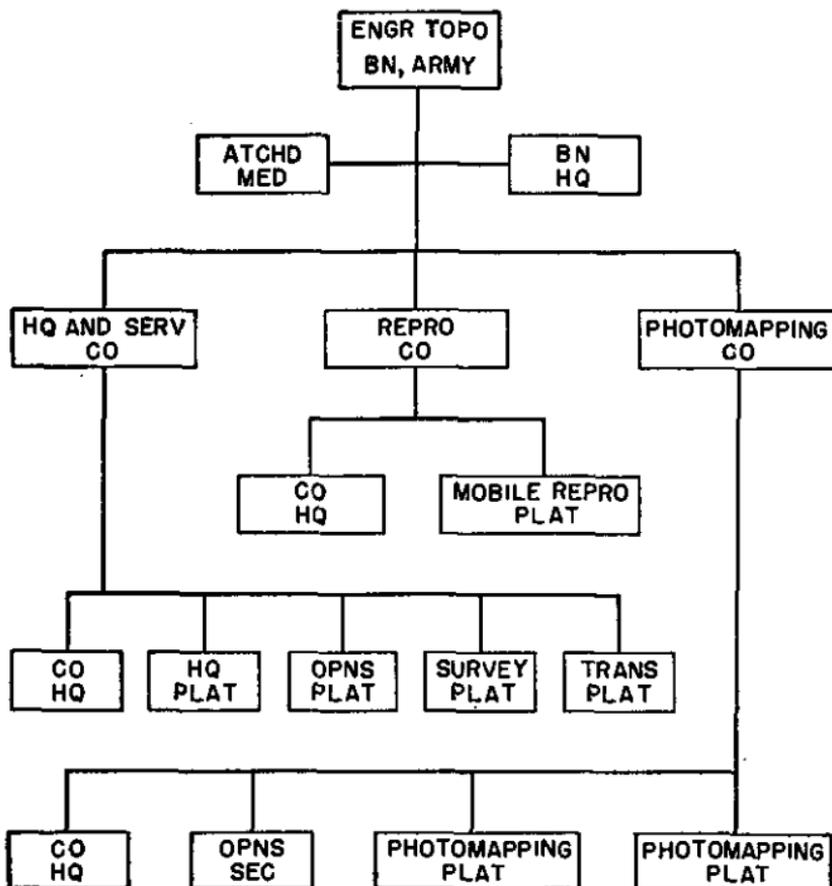


FIGURE 22.—Engineer topographic battalion, army (T/O & E 5-55).

■ 233. EQUIPMENT (Superseded).—*a.* Organic reproduction equipment is mounted in van trailers drawn by tractor trucks or in 2½- or 4-ton van trucks. The equipment is divided into camera, laboratory, photographic, plate-grainer, plate-process, press, and map-layout sections.

*b.* Surveying equipment is provided for precise traverses, reconnaissance surveys, and triangulation.

*c.* Water-supply equipment furnishes water necessary for operation of photographic equipment and for normal needs of personnel.

## ENGINEER TROOPS

■ 234. TRANSPORTATION (Superseded).—Transportation consists of 1/4-ton trucks, 3/4-ton weapons carriers, 1 1/2-, 2 1/2-, and 4-ton cargo trucks, a 2 1/2-ton tank truck, and a 4-ton wrecker.

■ 235. ARMAMENT (Superseded).—Armament consists of carbines, pistols, submachine guns, caliber .50 machine guns, and 2.36-inch rocket launchers.

■ 236. TRAINING.—*a.* Basic and unit \* \* \* and mapping units. Battalion headquarters is trained in establishing liaison with the army G-2, who states map requirements; the army engineer, who formulates mapping operations; and the air force officer, who is contact officer on photomapping activities.

\* \* \* \* \*

■ 237. (Superseded.) REPRODUCTION COMPANY.—The company is divided into company headquarters and mobile reproduction platoon. Most of the work of the company is black-and-white maps.

*a. Company headquarters.*—Company headquarters includes personnel for routine administration, mess, and supply; maintenance and repair of transportation; operation of electric lighting sets; and for editing maps.

*b. Reproduction platoon.*—The mobile reproduction platoon is organized to operate the reproduction equipment on a two-shift basis.

■ 238. (Superseded.) PHOTOMAPPING COMPANY.—The photomapping company consists of company headquarters, operations section, and two photomapping platoons. From information provided by the survey platoon of headquarters and service company the photomapping company makes a plot and constructs aerial mosaics for reproduction by the reproduction company. Photomaps may be prepared from mosaics or photographs received from air force photomapping units. Stereocomparagraph sets are used to plot topography over a moderate sized area. Generally, however, line maps or photomaps rather than topographic maps are produced.

*a. Company headquarters.*—The company headquarters is composed of the company commander, a warrant officer, computers, and personnel for routine administration, mess, supply, and transportation.

*b. Operations section.*—The operations section, commanded by a lieutenant, consists of an aerial phototopographer, a clerk, computers, and topographic draftsmen. This section computes positions from triangulation notes or primary traverse notes and plots controls for mosaics to be constructed by the photomapping platoons.

*c. Photomapping platoon.*—The photomapping platoon consists of the platoon commander, aerial phototopographers, and topographic draftsmen. From the plots prepared by the operations section, the platoon constructs projections, prepares and mounts photographs, and when required, contours planimetric maps.

■ 239. BATTALION HEADQUARTERS (Superseded).—Battalion headquarters consists of the battalion commander, executive officer, operations officer, supply officer, and adjutant. Staff functions are as outlined in chapter 2.

■ 240. HEADQUARTERS AND SERVICE COMPANY (Superseded).—Headquarters and service company is composed of the company headquarters, and headquarters operations, survey, and transportation platoons.

*a. Company headquarters.*—Company headquarters is composed of the company commander and enlisted personnel for routine company administration, supply, and mess.

*b. Headquarters platoon.*—The administration and supply sections comprise the headquarters platoon.

(1) *Administrative section.*—The administrative section consists of the adjutant and S-1 and enlisted personnel for battalion administration.

(2) *Supply section.*—The supply section consists of the supply officer and enlisted supply and instrument repair personnel.

*c. Operations platoon.*—The operations platoon is commanded by S-3, battalion operations officer. In addition to its duties in planning the operations of the battalion, this platoon collects, evaluates, and files control data from outside sources; assists in initial stages of establishing control for survey work; prepares specifications and aerial photography for mapping; makes field checks; does final editing of all maps prepared by the battalion; and stores and delivers maps to distributing agencies. Distri-

## ENGINEER TROOPS

bution of maps directly to using troops is not a function of the battalion. The platoon is composed of the planning section and the map storage and distribution section.

(1) *Planning section.*—The planning section consists of aerial phototopographers, topographic surveyors and draftsmen, map editors, and clerks.

(2) *Map storage and distribution section.*—The map storage and distribution section maintains files of maps and distributes them to designated agencies when directed. Personnel includes a lieutenant, map-storage and distribution chief, map-depot clerk, map folder, map moulder, and clerks for map-supply records and distribution.

*d. Survey platoon.*—(1) The survey platoon is divided into platoon headquarters and four survey sections.

(2) The platoon recovers horizontal and vertical control where it has been established previously; provides a band of picture points and establishes their position and elevation; and identifies roads, streams, lakes, towns, and other features on photographs for the photomapping company. It carries ground control as far forward as possible, where it is picked up by corps topographic companies. When use of the aerial photographic method of mapping is impracticable, the survey platoon may fill in topographic details to a limited extent, producing maps entirely by ground methods. This type of work is slow and the limited facilities of the platoon precludes its use under normal circumstances.

(3) The survey platoon is divided into four field parties. It has triangulation sets and transit traverse sets with equipment for field work, including transits, levels, theodolites, tapes, range poles, and supplies. Field parties are capable of performing survey work of first-order precision, whereas the usual line run is of third-order precision. For picture-point control, the allowable error is usually greater.

*e. Transportation platoon.*—The transportation platoon is made up of the transportation officer, motor sergeant, truck drivers, automobile mechanics, and a welder. The platoon performs second-echelon maintenance for the battalion and furnishes drivers for headquarters vehicles. As a representative of the battalion commander, the transportation officer supervises driver training and motor maintenance in the battalion.

■ 241. ATTACHED MEDICAL (Superseded).—The attached medical section consists of the unit surgeon and necessary enlisted personnel. A  $\frac{3}{4}$ -ton weapons carrier is provided for transporting personnel, equipment, and supplies. Duties of the unit surgeon and the detachment are explained in chapter 2.

■ 242. DUTIES (Superseded).—The principal duties of the battalion are to—

a. Provide map information to the army by—

(1) Establishing and extending horizontal and vertical control.

(2) Preparing and reproducing photomaps, maps of limited areas, overlays, and sketches.

(3) Revising and reproducing existing maps.

b. Provide own local security.

c. Locate the battalion near army headquarters for close liaison with G-2, army engineer, artillery commander, and air officer.

■ 247. ARMAMENT (Superseded).—Individual weapons are carbines, pistols, and submachine guns. Caliber .50 machine guns and 2.36-inch rocket launchers provide antiaircraft and anti-tank protection.

■ 249. COMPANY.—The lettered company \* \* \* (See T/O & E 5-97.) Depending on the requirements for camouflage work, this company operates as part of a battalion or as a separate unit without change in organization or principal mission.

\* \* \* \* \*

# ENGINEER TROOPS

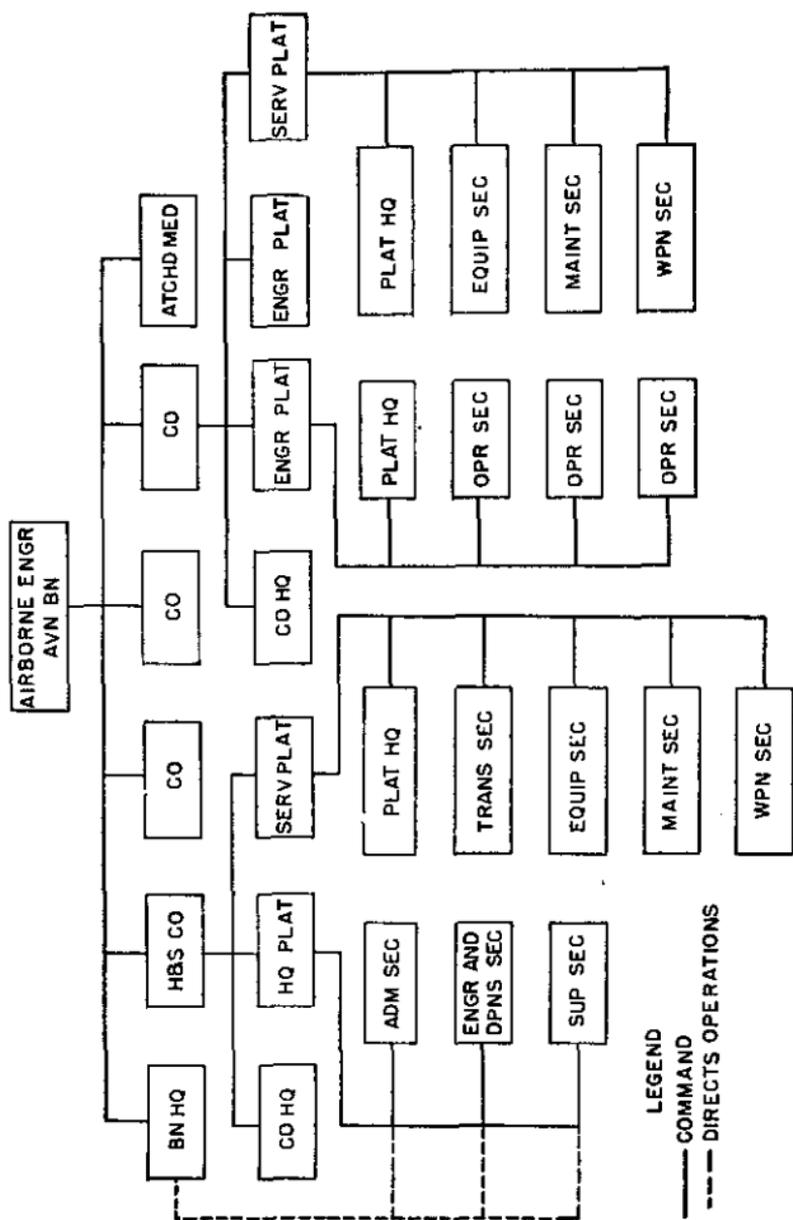


FIGURE 27.—Airborne engineer aviation battalion (T/O 5-455).

ENGINEER FIELD MANUAL

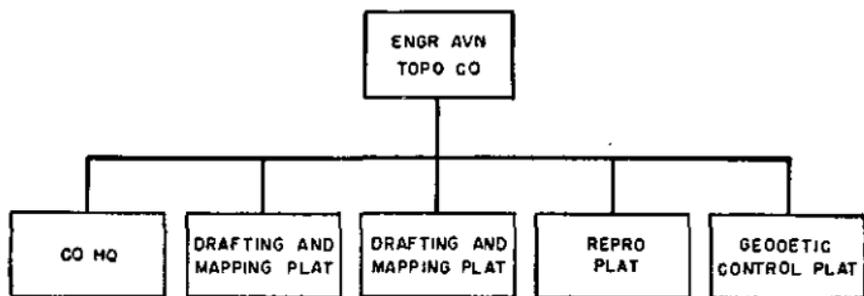


FIGURE 28.—Engineer aviation topographic company (T/O 5-447).

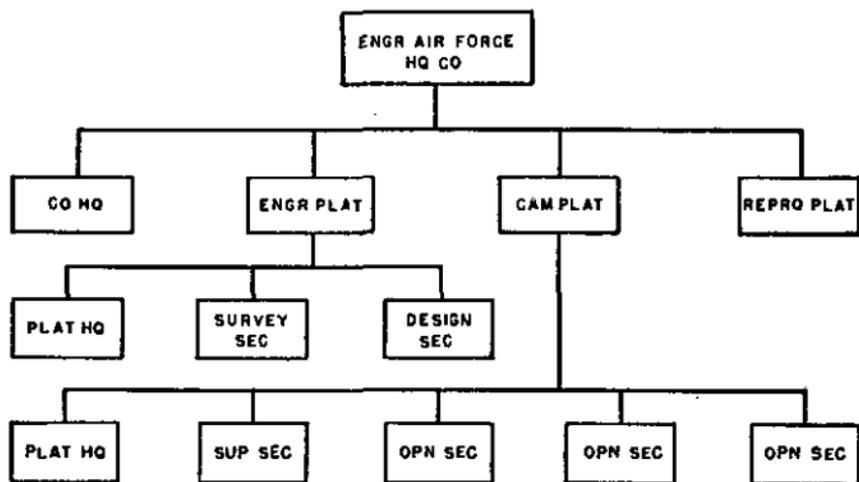


FIGURE 29.—Engineer air force headquarters company (T/O & E 5-8002).

## ENGINEER TROOPS

### CHAPTER 7

\* \* \* \* \*

#### SECTION VII (ADDED)

#### ENGINEER AVIATION TOPOGRAPHIC ORGANIZATION

■ 317.14. MISSION.—The mission of the engineer aviation topographic organization is to furnish map and chart compilation, and reproduction and geodetic control facilities to the air forces in the field.

■ 317.15. ORGANIZATION.—The unit is flexible, its size varying to meet air force requirements. It may be organized as a battalion or a company depending on the amount of work anticipated. See T/O & E 5-400.

■ 317.16. EQUIPMENT.—Engineer equipment includes motorized reproduction equipment mounted in van type semitrailers or trucks. Sections are provided for camera, laboratory, map-layout, photographic, plate-grainer, photo-process, and press equipment. Sets are provided for astronomic position finding, map compilation, drafting, electric lighting, pioneer work, and pipe fitting.

■ 317.17. TRANSPORTATION.—Transportation consists of  $\frac{1}{4}$ -ton trucks,  $\frac{3}{4}$ -ton command cars and weapons carriers, and  $2\frac{1}{2}$ -ton cargo trucks. The trailer mounted equipment is moved by  $1\frac{1}{2}$ - and 5- to 6-ton truck-tractors, and a 4-ton wrecker is provided for maintenance purposes.

■ 317.18. ARMAMENT.—Armament consists of carbines, rifles, pistols, submachine guns, caliber .50 machine guns, and 2.36-inch rocket launchers.

■ 317.19. TRAINING.—Basic and unit training is outlined in chapter 4. Combined training develops coordination with air force units, particularly the photo-reconnaissance aviation which furnishes the unit with aerial photographs used in the

compilation of maps, charts, and mosaics. Specialized training is given in the operation of organic equipment to attain efficiency before operations in the field. Previous experience in similar work is desirable in personnel assigned to the unit.

■ 317.20. ENGINEER AVIATION TOPOGRAPHIC COMPANY.—The engineer aviation topographic company consists of headquarters, photomapping, and reproduction platoons; operations, photo-printing, and photolibrary sections, and a mess team. When authorized a geodetic control platoon may be added.

*a. Headquarters platoon.*—The headquarters platoon consists of the company commander, an assistant, and enlisted personnel for routine administration, mess, supply, and transportation. A mess team appropriate to the size of the company is assigned to the headquarters platoon.

*b. Photomapping platoon.*—The photomapping platoon may be either of two type units which are identical in function but vary in numbers of specialists. The amount of work anticipated determines which organization is adopted. In either case, the platoon consists of the platoon commander, an assistant, and enlisted aerial phototopographers, topographic draftsmen, clerks, geodetic computers, and truck drivers.

*c. Reproduction platoon.*—The reproduction platoon may be either of two types of units which are identical in function but vary in numbers of specialists and equipment. The amount and type of work anticipated determines which organization is adopted. In either case, the platoon consists of the platoon commander, an assistant, and enlisted photolithographic cameramen, plate makers, pressmen, carpenters, electricians, engine operators, filter-unit operators, clerks, and truck drivers. Motorized mobile reproduction equipment consists of camera, press, and plate grainer sections; and in the larger platoon laboratory, map-lay-out, and plate-process sections are added.

*d. Geodetic control platoon.*—(1) The geodetic control platoon consists of the platoon commander, two assistants, a topographic surveyor, clerks, geodetic computers, instrument men, and truck drivers.

(2) The platoon is equipped to operate four surveying parties capable of furnishing astronomical positions for aeronautical charts and a limited amount of control for aerial mosaics and maps.

## ENGINEER TROOPS

*e. Operations section.*—(1) The operations section, identical in company and battalion, consists of two officers and enlisted aerial phototopographers, topographic draftsmen, clerks, geodetic computers, and truck drivers.

(2) Its function is to plan and supervise the work of the unit to insure prompt and satisfactory completion of assignments.

*f. Photoprinting section.*—(1) The photoprinting section consists of an officer, a photographic laboratory chief, photographic laboratory technicians, an operating engineman, and truck drivers.

(2) The section operates a motorized photographic laboratory for rapid production of photographic prints from film furnished by photo-reconnaissance aviation.

*g. Photolibrary section.*—(1) The photolibrary section, common to company and battalion, consists of a lieutenant and enlisted aerial phototopographers, topographic draftsmen, clerks, and truck drivers.

(2) The section maintains files of negatives and prints and performs a limited amount of plotting and tabulation of aerial photographs.

■ 317.21. ENGINEER AVIATION TOPOGRAPHIC BATTALION.—The engineer aviation topographic battalion consists of battalion headquarters, and headquarters and service, photomapping, and reproduction companies. Geodetic control platoons may be attached as required.

*a. Battalion headquarters.*—Battalion headquarters consist of the battalion commander, executive officer, operations officer, supply officer, adjutant, and enlisted personnel for battalion administration, supply, and operations.

*b. Headquarters and service company.*—Headquarters and service company consists of headquarters and transportation platoons, operations, photoprinting, and photolibrary sections, and a mess team. The operations, photoprinting, and photolibrary sections are identical in organization and function to those in the separate company discussed in the preceding paragraph.

(1) *Headquarters platoon.*—The headquarters platoon consists of the company commander, an assistant, and enlisted per-

## ENGINEER FIELD MANUAL

sonnel for routine company administration, mess, supply, and transportation. Other personnel includes construction carpenters and an electrician.

(2) *Transportation platoon.*—The transportation platoon, commanded by a lieutenant, includes a motor sergeant, automotive equipment mechanics, and truck drivers.

*c. Photomapping company.*—(1) The photomapping company is composed of a headquarters platoon, one or more photomapping platoons, and a mess team. The organization of the photomapping platoon is the same as in the engineer aviation topographic company.

(2) The headquarters platoon is made up of the company commander, an assistant, an electrician, a mechanic, and personnel for routine administration, mess, supply, and transportation.

*d. Reproduction company.*—(1) The reproduction company consists of headquarters platoon, one or more reproduction platoons, and a mess team. The reproduction platoon may be either of the two types described in preceding paragraphs.

(2) The headquarters platoon is composed of the company commander, an assistant, an electrician, a mechanic, and personnel for routine administration, mess, supply, and transportation.

■ 317.22. ATTACHED MEDICAL.—Whenever possible medical service is furnished by other units. When location prevents this, a medical detachment, T/O & E 8-500, will be attached upon War Department authority.

■ 317.23. DUTIES.—Principal duties of the engineer aviation topographic organization are to—

*a.* Prepare, compile, and reproduce aeronautical charts, maps, and target charts.

*b.* Compile, reproduce, and distribute mosaics and other special map information as may be required by the air forces.

*c.* Plot, index, and store aerial film.

*d.* Make all special contact prints, enlargements, and restituted prints from such film.

*e.* Supplement theater ground force mapping and model making facilities.

## ENGINEER TROOPS

■ 318. MISSION.—The engineer general service regiment performs general engineer work—particularly that requiring skilled labor—throughout the communication zone of a theater of operations. A general service \* \* \* other engineer units.

■ 330. DUTIES (Superseded).—Principal duties of the general service regiment are to—

a. Construct, improve, and maintain roads, bridges, and airdromes.

b. Construct depots, ports, bases, and other installations in the communication zone.

c. Install and operate water-supply facilities and other utilities.

d. Engineer reconnaissance.

e. Supply of own troops.

f. Provide own local security.

■ 363. ORGANIZATION (Superseded).—The battalion is composed of a headquarters and headquarters company, a photomapping company, and a reproduction company as required by the battalion mission. Engineer survey companies, T/O & E 5-188, may be assigned as required. Platoons or teams organized under T/O & E 5-500 may be attached when necessary. Where medical service is not available a medical detachment, T/O & E 8-500, will be attached.

Figure 33. Engineer base topographic battalion (T/O & E 5-185), is rescinded.

■ 368. SURVEY COMPANY (Superseded).—The survey company consists of company headquarters and three survey platoons. The base survey company may be called upon for general mapping, and for surveys of sites for camps and general construction projects.

a. *Company headquarters.*—Company headquarters includes the company commander, two assistants, and enlisted personnel for routine mess, administration, supply, and operation and maintenance of motor transportation. Specialists include surveyors, a carpenter, an instrument repairman, draftsman, and topographic computers.

## ENGINEER FIELD MANUAL

The company commander assigns and supervises the work of the survey platoons. The specialists perform the office computations of field notes and plot information for use in planning or map making.

b. *Survey platoon*.—The survey platoon consists of the platoon commander, a topographic surveyor, riggers, a construction carpenter, a clerk, truck drivers, and three survey parties each of which has a party chief, an axman, recorders, rodmen, instrumentmen, and tapemen.

### ■ 369. PHOTOMAPPING COMPANY.

\* \* \* \* \*

b. Company headquarters includes the company commander, an administrative officer, and enlisted personnel for routine administration, mess, supply, and transportation. There are skilled \* \* \* of the platoons.

c.

\* \* \* \* \*

(4) *Stereocomparagraph section* personnel consists of aerial phototopographers. The stereocomparagraph supplements \* \* \* topography are drawn.

(5) The *plotting section* consists of aerial phototopographers and topographic draftsmen. It prepares projections \* \* \* of the platoon.

(6) The *drafting section* chief is a staff sergeant, topographic draftsman. The section compiles \* \* \* drawings where required.

■ 370. REPRODUCTION COMPANY.—a. *Company headquarters*.—Commissioned officers include the company commander and two assistants. Enlisted personnel are included in two groups—an overhead group for routine administration, mess, supply, and operation of motor equipment; and a technical group which assists in technical supervision and operations of the company. The company has \* \* \* controls their operations.

\* \* \* \* \*

## ENGINEER TROOPS

### ■ 372. HEADQUARTERS AND SERVICE COMPANY.

\* \* \* \* \*

*a. Company headquarters.*—Consists of the company commander and normal company headquarters personnel. Normal functions and \* \* \* in chapter 2.

\* \* \* \* \*

*c. Operations section.*—The operations section is supervised by the operations officer assisted by a warrant officer. Enlisted personnel includes topographic draftsmen and surveyors, a map editor, and clerks. Functions and duties \* \* \* of this chapter.

*d. Supply section.*—This section is under command of S-4. It handles routine \* \* \* for such use.

\* \* \* \* \*

### ■ 373. ATTACHED MEDICAL (Superseded).

—Where medical service is not available a medical detachment organized under T/O & E 8-500 will be attached. Duties of the unit surgeon and the detachment are explained in chapter 2.

### ■ 375. MISSION.

\* \* \* \* \*

*c. (Added).*—It provides space and facilities for loading, transporting, and discharging heavy engineer equipment and materials required by engineer port construction and repair groups for the first stages of clearing debris and construction in captured or liberated ports.

*d. (Added).*—The ship has equipment to handle heavy obstructions sunk alongside wharves, in harbors, or on piers within reach of the ship's tackle.

### ■ 381. OPERATING SECTION.

—The officer in \* \* \* marine salvage wrecker. Enlisted personnel consists of marine divers, machinists, welders, and mechanics.

### ■ 387. ARMAMENT (Superseded).

—Weapons include carbines, rifles, pistols, caliber .50 machine guns, and grenade launchers.

### ■ 419. FORESTRY COMPANY.

—This company consists \* \* \* a logging platoon. It may operate as part of a forestry battalion or as a separate company depending on the work required. Organization is shown \* \* \* some distance away.

\* \* \* \* \*

## CHAPTER 8

## ENGINEER UNITS WITH ARMY SERVICE FORCES

\* \* \* \* \*

## SECTION XXI (ADDED)

## ENGINEER PETROLEUM PRODUCTION DEPOT

■ 502. MISSION.—The mission of the engineer petroleum production depot is to explore and exploit petroleum resources. With its attached units it locates oil deposits, drills wells, constructs pipe lines and storage facilities, builds and operates refineries, and fills drums constructed and cleaned in its drum plant.

■ 503. ORGANIZATION.—The petroleum production depot consists of a depot headquarters and headquarters company, a refinery battalion, an oil field battalion, and a special construction company. The depot is designed for independent operations; it requires the attachment of two engineer fire fighting platoons, an engineer forestry company, two quartermaster service companies, a quartermaster company (special), a signal company, a medical company, a transportation company (special), and a company of an engineer general service regiment. (For details of the depot organization see T/O & E 5-651S and fig. 46.)

■ 504. TRAINING.—Basic and unit training is outlined in chapter 4. Personnel must have the civilian training and experience required for the specialist position to which assigned. Specialized training develops the individually trained specialists into a smoothly operating team.

■ 505. HEADQUARTERS COMPANY.—The depot headquarters company consists of the company headquarters and administrative, supply, and accounting sections.

*a. Company headquarters.*—The company headquarters consists of the company commander and enlisted personnel for

## ENGINEER TROOPS

motor maintenance and routine company administration, mess, and supply.

*b. Administrative section.*—The Administrative section includes personnel for group administration and operations. The adjutant and his assistant supervise the work of the administrative personnel. The S-3 is assisted by an oil-field draftsman.

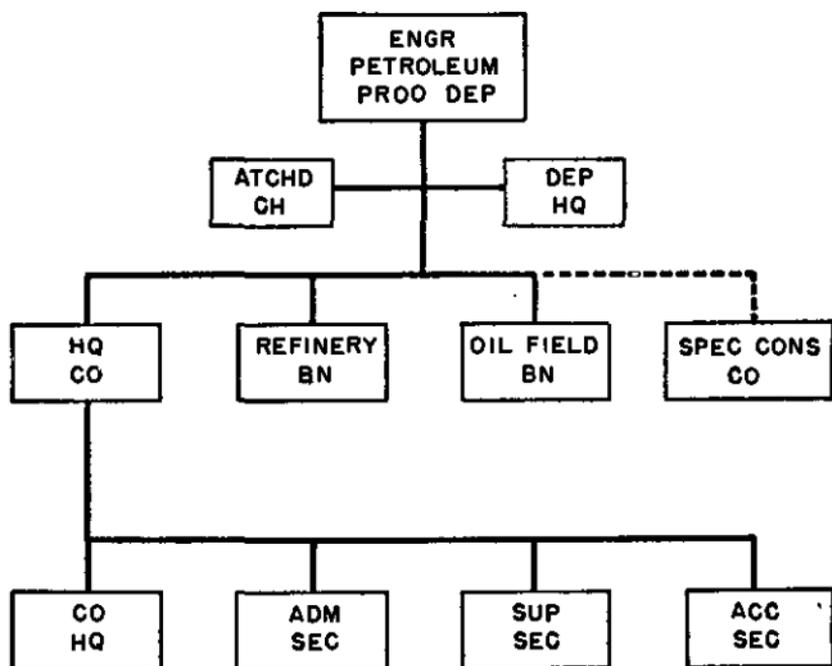


FIGURE 46.—Engineer petroleum production depot (T/O & E 5-651S).

*c. Supply section.*—The supply section consists of the supply officer, two assistants, enlisted water-supply engineers, and general-supply personnel.

*d. Accounting section.*—The accounting section consists of the chief accountant, assistant accountants, and enlisted stenographers and an oil-field accountant.

■ 506. EQUIPMENT.—Organic engineer equipment of the headquarters company includes camouflage, canvas-workers', drafting-and-duplicating, electric-lighting, and reproduction-equipment sets.

## ENGINEER FIELD MANUAL

- 507. TRANSPORTATION.—Unit vehicles are  $\frac{1}{4}$ -ton trucks, a  $\frac{3}{4}$ -ton command car, and  $2\frac{1}{2}$ -ton cargo trucks.
- 508. ARMAMENT.—Armament includes pistols, carbines, rifles, submachine guns, and caliber .50 machine guns.
- 509. DEPOT HEADQUARTERS.—In addition to the officers in the sections described in paragraph 505, the depot headquarters consists of the commanding officer, executive officer and S-2, refinery superintendent, drilling and production superintendent, exploration and exploitation engineer, and refinery construction engineer.
- 510. DUTIES.—The duties of the depot headquarters and headquarters company are to supervise—
- a. Location of oil fields and well drilling.
  - b. Construction of pipe lines, oil-storage tanks, refineries, and auxiliary installations.
  - c. Operation of refineries.
  - d. Drum manufacture and filling.
  - e. Accounting for property and production.
  - f. Limited exploration for oil fields.

### SECTION XXII (ADDED)

#### ENGINEER REFINERY BATTALION

- 511. MISSION.—The mission of the engineer refinery battalion is to construct, operate, and maintain oil refineries. During the construction a special construction company must be attached. Operations include manufacture, cleaning, and filling of 55-gallon oil drums.
- 512. ORGANIZATION.—The refinery battalion consists of the battalion headquarters and headquarters company, a refinery maintenance company, a refinery operating company, and a drum plant company. (For details see T/O & E 5-655S and fig. 47.)
- 513. EQUIPMENT.—*a.* Heavy engineer equipment includes 315-CFM air compressors, a road grader, concrete mixers, a trailer-mounted asphalt pump,  $\frac{3}{4}$ -cubic yard power shovels, a 750-gallon skid-mounted gasoline and oil tank, and 30-, 55-, and 80-DBHP tractors.

## ENGINEER TROOPS

b. Special equipment consists of gin poles, derricks, and other heavy lifting equipment; air-compressor tools, a 3½-cubic-foot concrete mixer, concrete buggies, special generating and electrical equipment, auxiliary-supply equipment, acetylene generators, hand tools for painting, masonry, forging, carpentry, steam fitting, rigging, electrical work, and tank erection; measuring and surveying instruments; and miscellaneous tools and supplies.

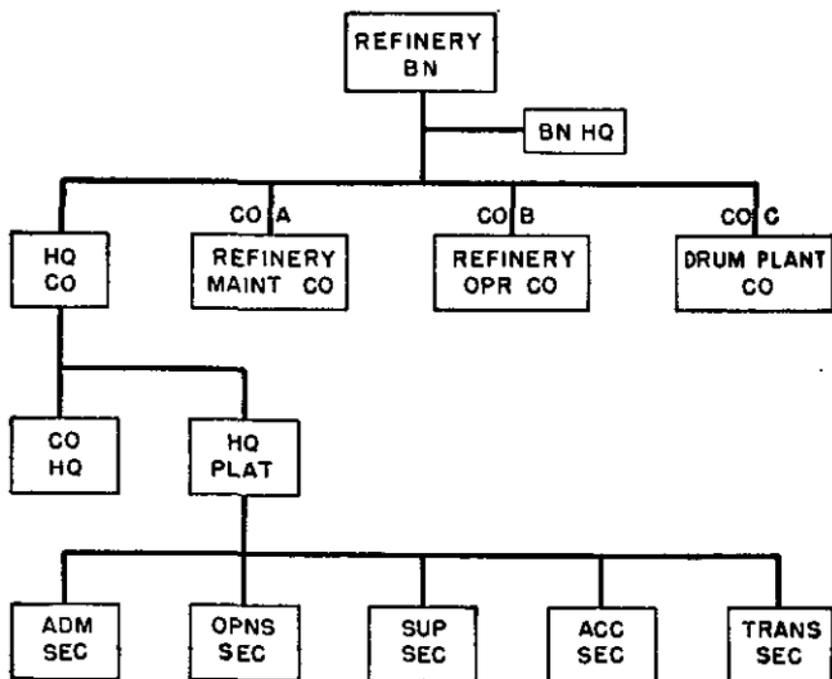


FIGURE 47.—Engineer refinery battalion (T/O & E 5-655S).

■ 514. TRANSPORTATION.—a. Unit transportation consists of ¼-ton trucks, ¾-ton weapons carriers, 1½- and 2½-ton cargo trucks, 2½-ton dump trucks, and 4-ton oil-field trucks.

b. Barges and marine tractors of the special transportation company and trucks of the quartermaster service companies provide additional transportation.

■ 515. ARMAMENT.—a. Armament consists of carbines, rifles, submachine guns, pistols, caliber .50 machine guns, and 2.36-inch rocket launchers.

■ 516. TRAINING.—In addition to basic and unit training, the battalion is specially trained to erect, maintain, and operate oil refineries, refinery pipe lines, pumping machinery, and heavy engineering equipment. Each company emphasizes the particular function for which it is responsible but includes enough general training to enable it to work efficiently as part of the battalion team. Operations are divided into two phases: first, the construction of the refinery and other installations; second, the operation and maintenance of the plant. This requires training each individual to perform two tasks, one during construction and another in operation or maintenance later. So far as possible, tasks assigned require related skills.

b. All refinery personnel must be trained in fighting oil fires. The attached fire fighting platoons form only a nucleus of a fire fighting organization and must be augmented by operating personnel.

c. Personnel assigned to the battalion must be experienced in refinery operation and maintenance since the special training period is too short to fully train inexperienced men.

■ 517. REFINERY MAINTENANCE COMPANY.—The refinery maintenance company consists of the company headquarters and administrative, supply, shop, automotive equipment, and service sections. (See fig. 48.)

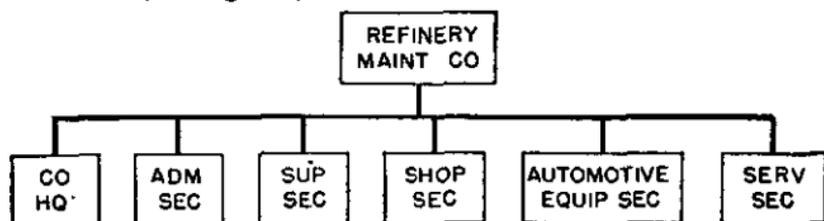


FIGURE 48.—Refinery maintenance company (T/O & E 5-6598).

a. *Company headquarters.*—The company headquarters consists of the company commander and mechanical engineer, an assistant as machine, tool, and supply officer, and enlisted personnel for routine administration, mess, and supply.

b. *Administration section.*—The administration section is commanded by an assistant mechanical engineer assisted by a warrant officer as trades supervisor. Enlisted personnel is provided for accounting and clerical work.

## ENGINEER TROOPS

*c. Supply section.*—The supply section consists of a toolroom-keeper foreman, a supply sergeant, clerks, and warehousemen.

*d. Shop section.*—The shop section consists of boilermaker, Diesel mechanic, electrician, machinist, pipe fitter, welder, carpenter, blacksmith, rigger, and instrument repair foremen; blacksmiths, boilermakers, carpenters, Diesel mechanics, electricians, instrument repairmen, machinists, painters, pipe fitters, toolroom keepers, and welders.

*e. Automotive equipment section.*—Commanded by an automotive maintenance officer, the automotive equipment section has crane operator, Diesel mechanic, and construction equipment operator foreman; a motor sergeant; and crane operators, Diesel mechanics, automobile mechanics, roadgrader and bulldozer operators, and truck drivers.

*f. Service section.*—The service section consists of a utilities maintenance officer and assistant; carpenter, pipe fitter, utility, welder, demolition, insulator, carpenter, electrician, and mason foremen; water-supply engineer, carpenters, clerk, draftsmen, surveyors, electricians, insulators, stone masons, oil-spreader pumpers, air-compressor operators, painters, pipe fitters, riggers, truck drivers, water-supply men, and welders.

■ 518. REFINERY OPERATING COMPANY.—The refinery operating company consists of the company headquarters, and oil movement, laboratory, and engineering sections. (See fig. 49 and T/O & E 5-657S.)

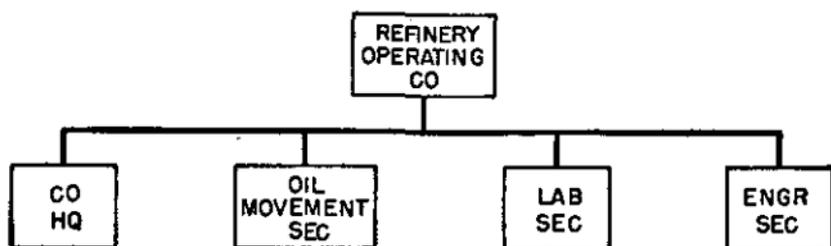


FIGURE 49.—Refinery operating company (T/O & E 5-657S).

*a. Company headquarters.*—The company headquarters is composed of the company commander who is assistant refinery operating engineer, an administrative officer, a Diesel engine repair officer, and water-supply and routine administrative, mess, and supply personnel.

*b. Oil movement section.*—The oil movement section consists of the oil movement officer; ethyl blenders, gaugers, a knock tester, a loading foreman, clerks and oil- and water-pump men.

*c. Laboratory section.*—The laboratory section, commanded by a petroleum engineer, consists of laboratory technicians, knock tester, samplers, clerks, truck driver, and laboratory-utility repairmen.

*d. Engineering section.*—The engineering section consists of a shift superintendent, an assistant, stillmen, clerks, oil-pump men, and truck drivers.

■ 519. DRUM PLANT COMPANY.—The drum plant company consists of the company headquarters, a drum manufacturing platoon, a drum filling platoon, and a drum cleaning platoon. (See fig. 50 and T/O & E 5-658S.)

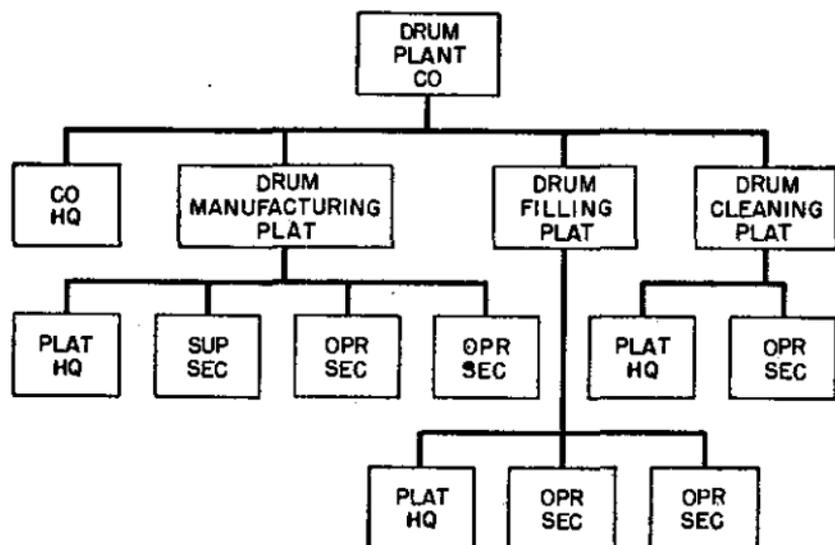


FIGURE 50.—Drum plant company, refinery battalion (T/O & E 5-658S).

*a. Company headquarters.*—The company headquarters consists of the company commander as drum manufacturing engineer, a mess, supply, and transportation officer, water-supply men, and administrative, mess, accounting, and supply personnel.

*b. Drum manufacturing platoon.*—The drum manufacturing platoon consists of a platoon headquarters, supply section, and two operating sections.

## ENGINEER TROOPS

(1) *Platoon headquarters.*—The platoon headquarters consists of a drum plant manufacturing superintendent and accounting and inspecting personnel.

(2) *Supply section.*—Supply section personnel includes a supply sergeant, laborers, lift-truck operators, and stock clerks.

(3) *Operating section.*—The operating section consists of manufacturing-plant foremen, one as section leader; refinery electricians, power-station and machinist foremen; shop-maintenance mechanic, Diesel engine operator, drum handlers, drum loaders, flanger operators, grinder operators, laborers, leak repairers, machinist, painters, seamer, seam welders, shear operators, spot welder, and swedge and tester operators.

*c. Drum filling platoon.*—The drum filling platoon consists of the platoon headquarters and two operating sections.

(1) *Platoon headquarters.*—The platoon headquarters consists of a platoon commander as filling-plant supervisor, filling-plant foremen, and a shipping clerk.

(2) *Operating section.*—The operating section consists of drum-capper and drum-filler foremen, drum cappers, drum fillers, laborers, and pump operators.

■ 520. *BATTALION HEADQUARTERS COMPANY.*—The battalion headquarters company consists of the company headquarters and the headquarters platoon.

*a. Company headquarters.*—The company headquarters consists of the company commander and enlisted personnel for water supply, utilities repair, and company administration, mess, and supply.

*b. Headquarters platoon.*—The headquarters platoon consists of the administration, operations, supply, accounting, and transportation sections.

(1) *Administration section.*—The administration section is composed of the adjutant and S-1, personnel adjutant, and clerical personnel.

(2) *Operations section.*—The operations section consists of the operations officer (S-3), processing engineers, mechanical engineer, products superintendent, electrical engineer, plant and shop superintendent, construction engineer, safety and inspection engineer, construction supervisors, construction foremen, camouflage technician, and clerks.

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(3) *Supply section.*—The supply section consists of the supply officer, refinery-equipment stockmen, and enlisted supply personnel.

(4) *Accounting section.*—The accounting section consists of a refinery accountant and enlisted accountants and clerks.

(5) *Transportation section.*—The transportation section consists of the transportation superintendent, Diesel maintenance officer, motor sergeant, mechanics, and tractor and truck drivers.

■ 521. DUTIES.—The principal duties of the refinery battalion are to—

- a. Assist in refinery construction.
- b. Operate an oil refinery.
- c. Maintain the oil-refinery plant and auxiliary equipment.
- d. Test, blend, and store petroleum products.
- e. Provide water supply for the refinery.
- f. Manufacture, clean, and fill drums.
- g. Maintain records of refinery operations.
- h. Set up and maintain property and supply records.

### SECTION XXIII (ADDED)

#### OIL FIELD BATTALION

■ 522. MISSION.—The mission of the engineer oil field battalion is to produce and deliver crude petroleum to the refinery; tankers are attached where necessary. It explores potential oil fields and installs, constructs, operates, and maintains drilling, production, transportation, pipeline, and storage facilities.

■ 523. ORGANIZATION.—The oil field battalion is composed of battalion headquarters, headquarters company, service company, and drilling company. It is augmented by service troops attached to the group headquarters. (For details see fig. 51 and T/O & E 5-665S.)

■ 524. EQUIPMENT.—Heavy equipment of the battalion, most of which is in the service company, consists of air compressors, motorized and towed road graders,  $\frac{3}{4}$ -cubic-yard shovels, 80-DBHP crawler tractors, 30-DBHP wheeled tractors, trailer-mounted power plants, trailer-mounted asphalt pumps, 750-gallon skid-mounted tanks, 4-wheel tandem trailers, and trailer-

ENGINEER TROOPS

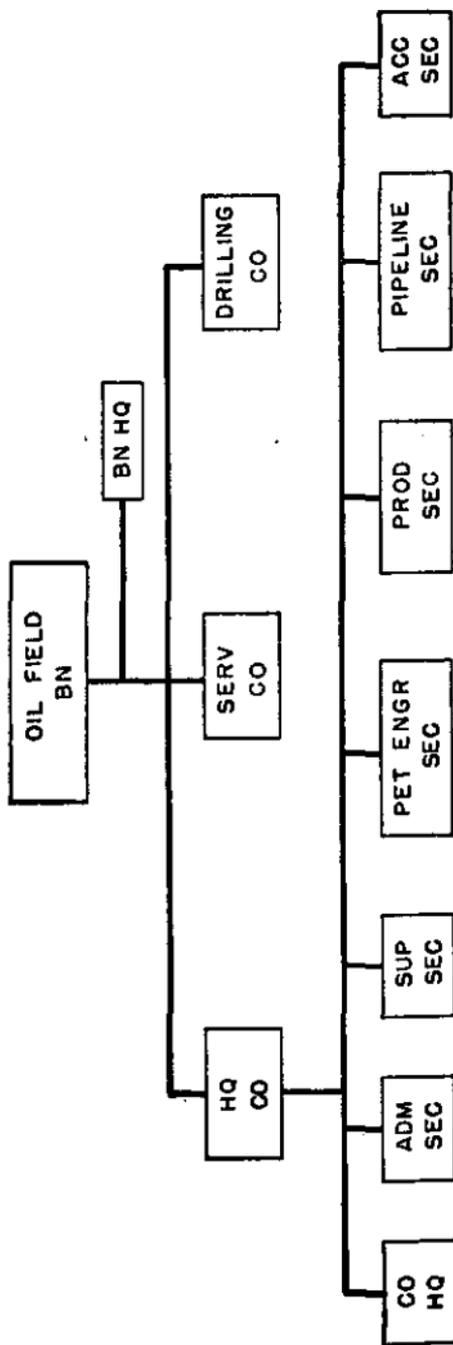


FIGURE 51.—Oil field battalion (T/O & R 5-665S).

mounted welding equipment. In addition, special equipment for drilling wells from 1,000 to 4,000 feet deep is provided.

■ 525. **TRANSPORTATION.**—*a.* Transportation consists of  $\frac{1}{4}$ -ton trucks,  $\frac{3}{4}$ -ton weapons carriers and command cars,  $1\frac{1}{2}$ - and  $2\frac{1}{2}$ -ton cargo trucks modified by oil-field bodies,  $2\frac{1}{2}$ -ton gasoline-tank trucks,  $2\frac{1}{2}$ -ton dump trucks, 4-ton flat-bed trucks, and 6-ton trucks with oil-well servicing units and cementing equipment.

*b.* When necessary the shallow water equipment of the transportation company and the trucks of the quartermaster service companies are utilized.

■ 526. **ARMAMENT.**—Armament consists of pistols, carbines, rifles, caliber .50 machine guns, and submachine guns.

■ 527. **TRAINING.**—The specialized work of the oil field battalion makes it imperative that personnel assigned to it possess civilian qualifications for the job to which assigned. The techniques and skills required in this unit cannot be taught in a necessarily short training period. Technically qualified men are given the basic and unit training covered in chapter 4.

■ 528. **DRILLING COMPANY.**—The drilling consists of the company headquarters, three drilling platoons, cementing section, and mechanical section. (See fig. 52 and T/O & E 5-667S.)

*a. Company headquarters.*—The company headquarters consists of the company commander, who is a rotary-drilling engineer, a mess, supply, and transportation officer, and personnel for routine administration, mess and supply.

*b. Drilling platoon.*—The drilling platoon consists of the platoon headquarters and four drilling sections.

(1) *Platoon headquarters.*—The platoon headquarters consists of a platoon commander, an assistant rotary-drilling engineer, and a warrant officer.

(2) *Drilling section.*—The drilling section is composed of oil-well drillers, oil-well derrickmen, and assistant oil-well drillers.

*c. Cementing section.*—The cementing section consists of oil-well cementers and heavy-truck drivers.

*d. Mechanical section.*—The mechanical section consists of a Diesel maintenance officer, Diesel mechanic foreman, and automobile and Diesel mechanics.

ENGINEER TROOPS

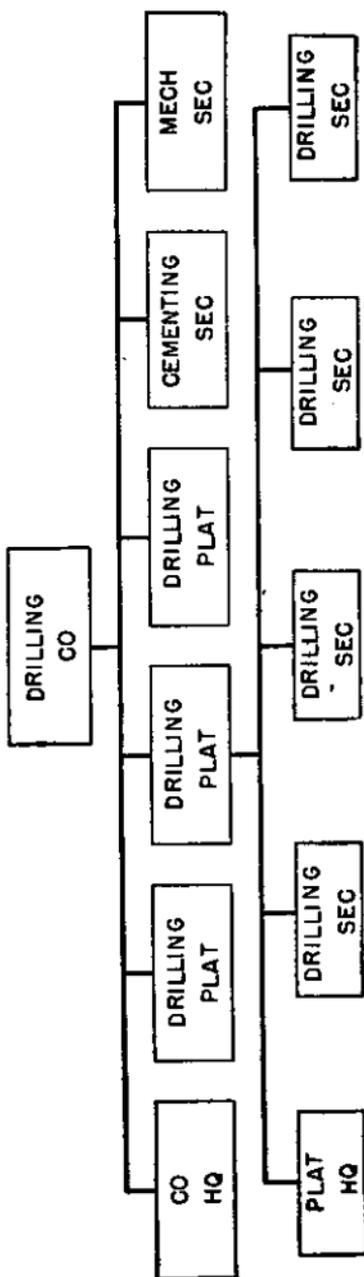


FIGURE 52.--Drilling company, oil field battalion (T/O & E 5-667S).

■ 529. SERVICE COMPANY.—The service company consists of the company headquarters and electrical, carpenter, machine shop, and equipment and transportation sections. (For details see fig. 53 and T/O & E 5-669S.)

*a. Company headquarters.*—The company headquarters is composed of a company commander, an administrative officer, and personnel for routine administration, mess, and supply.

*b. Electrical section.*—The electrical section, commanded by an assistant electrical engineer, consists of electrical foremen and oil-field electricians.

*c. Carpenter section.*—The carpenter section consists of a construction engineer, carpenter foremen, and construction carpenters.

*d. Machine shop section.*—The machine shop section is composed of an electrical engineer, a shop supervisor, an assistant utilities maintenance officer, a shop foreman, an assistant shop foreman, oil field blacksmiths, pipe machinists, drilling-equipment mechanics, light and heavy oil-tool mechanics, and welders.

*e. Equipment and transportation section.*—The equipment and transportation section consists of an automotive repair officer, an oil field equipment supervisor, oil field equipment stockman, auto repair and lubrication foremen, Diesel and gasoline engine mechanics; air-compressor, shovel, and road-grader operators, tire repairmen, tractor drivers, and truck drivers.

■ 530. HEADQUARTERS COMPANY.—The battalion headquarters company consists of company headquarters and administrative, supply, petroleum engineering, production, pipe line, and accounting sections. (See fig. 51 and T/O & E 5-666S.)

*a. Company headquarters.*—The company headquarters consists of the company commander, the administrative officer, and personnel for water supply, motor maintenance and operation, and company administration, mess, and supply.

*b. Administrative section.*—The administrative section consists of the adjutant, also S-1, and administrative personnel.

*c. Supply section.*—The supply section is composed of the supply officer and enlisted supply personnel.

*d. Petroleum engineering section.*—The petroleum engineering section consists of a petroleum engineer and geologist, assistants, electric-log engineers, and enlisted draftsmen.

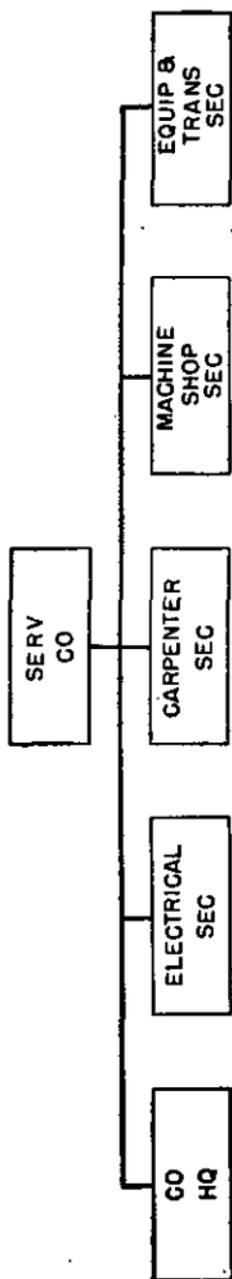


FIGURE 53.—Service company, oil field battalion (T/O & E 5-669S).

*e. Production section.*—The production section consists of production engineers, assistants, mud engineers, and enlisted production foremen, acid treaters, safety engineers, laboratory technicians, field-station operators, and water-supply engineers and operators.

*f. Pipe-line section.*—The pipe-line section consists of a mechanical engineer, pipe-line supervisor, rotary-drilling engineer, pipe-line engineer, assistant pipe-line engineers; enlisted tank farm, pump-station, pipe-line layer, and pipe-line station foremen; petroleum-pumping-equipment mechanic repairmen, dock hands, message center clerk, pipe-line layers, and pump-station operators.

*g. Accounting section.*—The accounting section is composed of commissioned and enlisted oil-field accountants, oil-field equipment stockmen, clerks, and typists.

■ 531. DUTIES.—Principal duties of the oil-field battallon are to—

- a. Explore oil fields.
- b. Drill oil wells.
- c. Prepare, install, and cement well casings.
- d. Lay out and install pipe lines.
- e. Erect storage facilities for crude petroleum.
- f. Maintain oil-field machinery.
- g. Construct, operate, and maintain necessary utilities.
- h. Set up and maintain records of equipment and production.
- i. Provide necessary water supply.
- j. Promulgate oil-field safety rules and regulations.

#### SECTION XXIV (ADDED)

#### ENGINEER SPECIAL CONSTRUCTION COMPANY

■ 532. MISSION.—The mission of the engineer special construction company is to assist the engineer petroleum production depot to which it is attached in the construction of an oil-refining plant consisting of refinery; oil-storage tanks, drum plant for manufacturing, filling, and cleaning drums; transportation and pipeline installations; and other related facilities.

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■ 533. ORGANIZATION.—The company consists of a company headquarters, tank construction platoon, and pipe fitting platoon. (For details see T/O & E 5-677S and fig. 54.)

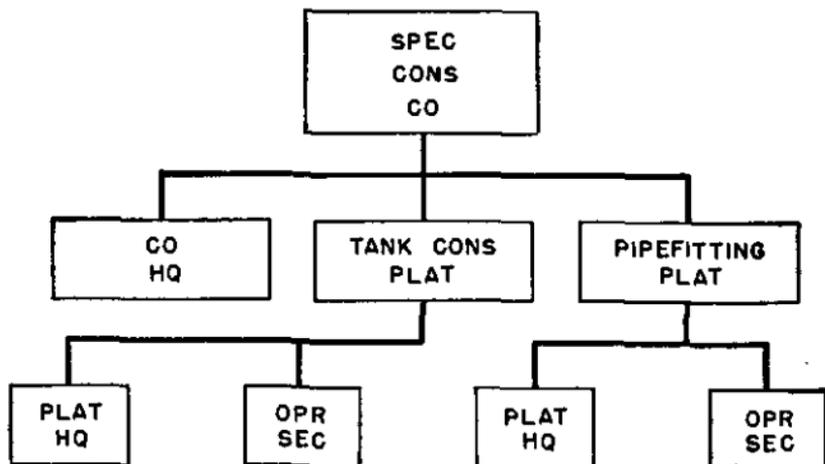


FIGURE 54.—Special construction company (T/O & E 5-677S).

*a. Company headquarters.*—The company headquarters consists of the company commander and tank construction engineer; mess, supply, and transportation officer; and enlisted master welder, rigger foreman, and routine administrative, mess, and supply personnel.

*b. Tank construction platoon.*—The tank construction platoon consists of the platoon headquarters and an operating section.

(1) *Platoon headquarters.*—The platoon headquarters consists of a tank-construction supervisor, and tank erection, boiler-maker, carpenter, mason, and machinist foreman.

(2) *Operating section.*—The operating section is composed of a tank job superintendent, welding-unit chiefs, bricklayers, insulators, crane operators, hoist operators, electricians, machinists, painters, riggers, and welders.

*c. Pipe fitting platoon.*—The pipe fitting platoon consists of a platoon headquarters and an operating section.

(1) *Platoon headquarters* consists of a pipe fitter supervisor, a pipe fitting supervisor, a pipe fitting foreman, and welding inspectors.

(2) *Operating section.*—The operating section is composed of a pipe fitter job superintendent, welding-unit chiefs, pipe-

## ENGINEER FIELD MANUAL

fitter unit foremen, boiler makers, construction carpenters, crane operators, electricians, machinists, pipe fitters, plumbers, and welders.

■ 534. EQUIPMENT.—Engineer equipment includes 60 trailer-mounted welding sets, pipe fitting equipment, and special tools for refinery pipe fitting and tank construction.

■ 535. TRANSPORTATION.—Transportation is limited to one 1½-ton, 6 x 6, truck assigned to the company headquarters for routine administrative use.

■ 536. ARMAMENT.—The company is armed with carbines, rifles, and calibre .50 machine guns.

■ 537. TRAINING.—Basic and unit training outlined in chapter 4 is applicable. Specialized training consists of developing civilian specialists into a well-coordinated and smoothly operating military team.

■ 538. DUTIES.—Principal duties are:

- a. Erection of electric-welded oil storage tanks.
- b. Boiler making in connection with erection of refinery plant units.
- c. Welding pipe and other fittings in the construction of refineries.

[A. G. 300.7 (3 May 44).]

By ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,

OFFICIAL:

*Chief of Staff.*

J. A. ULIO,

*Major General,*

*The Adjutant General.*

DISTRIBUTION:

As prescribed in paragraph 9a, FM 21-6 except D (20), OCE (500), Engr Board (25), Engr Sch (500), Inf Sch (100), Armored Sch (100), Cmd & Gen Staff Sch (250); CG, Theater of Operations (25); Engr, Theater of Operations (25); R 1, 2, 4, 6-11, 17, 18, 44 (6), 5 (10); Bn 1, 2, 4, 6-11, 17, 18, 44 (4), 5 (6); C5 (10).

For distribution symbols, see FM 21-6.

Sup

FM 5-5  
C 4

ENGINEER FIELD MANUAL

ENGINEER TROOPS

12-6. WAR DEPARTMENT,  
WASHINGTON 25, D. C., 18 November 1944.

CHANGES }  
No. 4 }

FM 5-5, 11 October 1943, is changed as follows:

■ 8. ENGINEER UNITS WITH ARMY SERVICE FORCES.

\* \* \* \* \*  
l. Rescinded.  
\* \* \* \* \*

■ 19. SUPPLY OFFICER (S-4).—*a. General.*—S-4 is the supply officer of the engineer unit. He coordinates and supervises supply of fortification and construction material by army to division units; in *emergencies*, he is responsible for all engineer supplies to the division. S-4 supervises the \* \* \* all supply installations. The only engineer supply point he establishes within the division is for local materials.

*b. Duties.*

\* \* \* \* \*  
(2) Rescinded.

(3) He examines engineer requisitions both from his own unit and from other arms and makes recommendations for priorities of issue.

\* \* \* \* \*

(6) S-4 keeps a continuing inventory of stocks of engineer materials available locally. He arranges for \* \* \* supplies found locally.

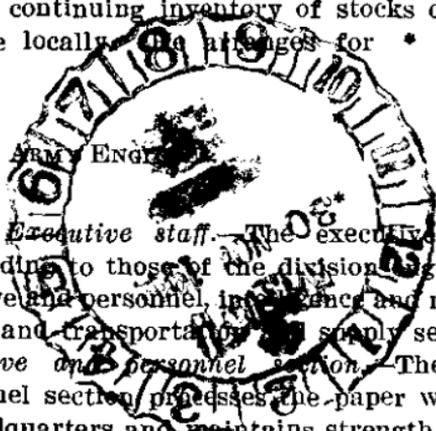
\* \* \* \* \*

■ 23. STAFF OF THE ARMY ENGINEER HEADQUARTERS

\* \* \* \* \*

*c. (Superseded.) Executive staff.*—The executive staff has functions corresponding to those of the division engineer staff. It has administrative and personnel, intelligence and map, operations and training, and transportation and supply sections.

(1) *Administrative and personnel section.*—The administrative and personnel section processes the paper work of the army engineer headquarters and maintains strength records of army engineer units necessary for planning purposes.



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(2) *Intelligence and map section.*—The intelligence and map section collects and disseminates engineer information in the form of maps and map revisions for army headquarters and lower echelons, prepares terrain estimates as required by the army commander, and furnishes information on enemy engineer equipment and its use.

(3) *Operations and training section.*—The operations and training section advises the army engineer of necessary engineer operations, recommends changes in or additions to training of army engineer units, and cooperates with the intelligence and map section in maintaining the engineer situation map.

(4) *Transportation and supply section.*—The transportation and supply section supervises the operation of army engineer depots, keeps the army engineer informed of available supplies and equipment, recommends supply levels and allocations, and makes necessary arrangements for movement of supplies in the army area.

d. (Superseded.) *Engineering staff.*—The engineering staff furnishes technical information and advice to the army engineer. It is divided into roads, general construction, and miscellaneous field engineering.

(1) *Roads.*—Plans roads and supervises road construction and maintenance in the army area.

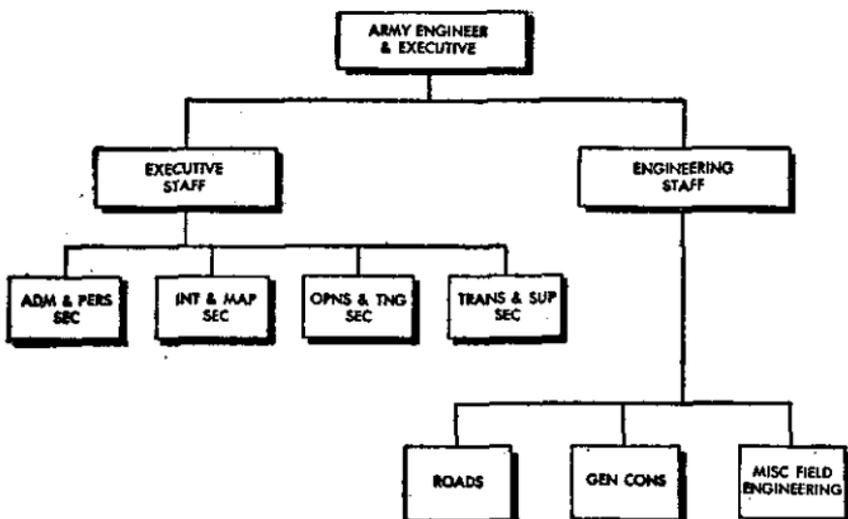


FIGURE 3.—Army engineer headquarters (T/O 5-200-1).

## ENGINEER TROOPS

(2) *General construction.*—General construction is charged with design and inspection of airfields and over-all supervision of shelter, water supply, utilities, forestry, and operation of quarries for general use.

(3) *Miscellaneous field engineering.*—Miscellaneous field engineering includes planning and supervision of demolitions, camouflage, floating bridges, fortifications, mining, and other engineering duties not assigned to other sections.

■ 24. STAFF OF THE ENGINEER, COMMUNICATIONS ZONE SECTION.—Rescinded.

Figure 4, page 24, Engineer headquarters communications zone section (T/O 5-600-1), is rescinded.

■ 25. STAFF OF ENGINEER, COMMUNICATIONS ZONE.—Rescinded.

Figure 5, page 25, Engineer headquarters, communication zone (T/O 5-600-1), is rescinded.

■ 26. STAFF OF THE ENGINEER, THEATER HEADQUARTERS.—Rescinded.

Figure 6, page 26, Engineer headquarters, THQ(GHQ) (T/O 5-300-1), is rescinded.

■ 36. TRANSPORTATION.

\* \* \* \* \*

c. (Added.) The armored engineer battalion, combat battalion, squadron, heavy ponton battalion, light ponton company, and treadway bridge company are mobile; sufficient vehicles are issued to move organic personnel and equipment simultaneously. Other engineer units are semimobile. The logistical data for engineer units may be found in Engineer Supply Bulletins listed in War Department Pamphlet No. 12-6.

■ 37. ARMAMENT.

\* \* \* \* \*

d. Rescinded.

■ 40. CHEMICAL WARFARE EQUIPMENT.—For chemical warfare, the principal items issued to engineer troops are service gas masks, decontamination apparatus, incendiary grenades, and chemical land mines. Special gas masks \* \* \* the mountain battalion.

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■ 83. DUTIES.—*a. When attached to corps.*—(1) Most common duties are:

(a) Improvement and maintenance of roads, bridges, and landing fields for liaison type planes, mainly in the corps service area.

\* \* \* \* \*

*b. When attached to army.*

\* \* \* \* \*

(10) Construction of deliberate field fortifications.

■ 153. LIGHT EQUIPAGE PLATOON.—This platoon consists of platoon headquarters, an assault boat section, two raft sections, and a footbridge section.

\* \* \* \* \*

*c. Raft section.*—Each raft section cares for and transports the infantry support rafts and ferry sets.

\* \* \* \* \*

■ 209. HEADQUARTERS PLATOON.

\* \* \* \* \*

*b. Supply section.*—This section is \* \* \* tools, and accessories.

\* \* \* \* \*

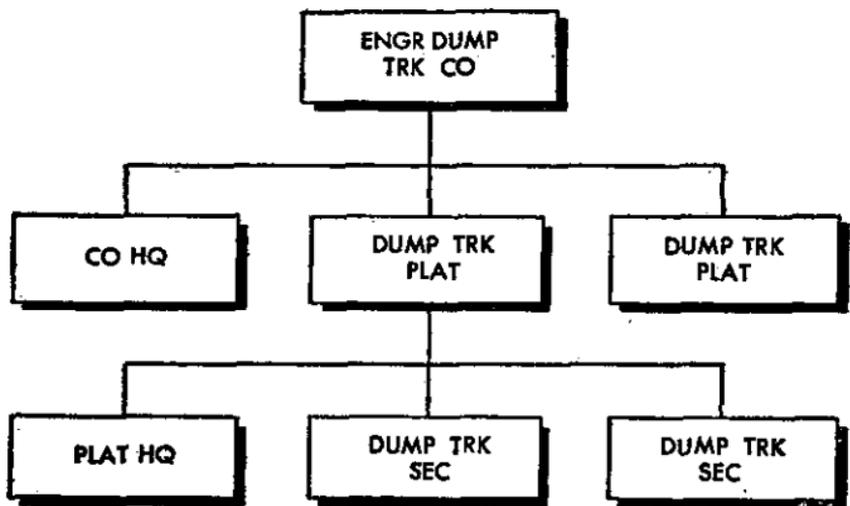


FIGURE 20.—Engineer dump truck company (T/O & E 5-88).

## ENGINEER TROOPS

■ 217. ARMAMENT (Superseded).—Carbines are the individual weapon and caliber .50 machine guns the supporting weapon.

■ 219. COMPANY HEADQUARTERS.

\* \* \* \* \*

b. Company headquarters is provided with 2½-ton cargo trucks.

\* \* \* \* \*

■ 256. ORGANIZATION.—The separate camouflage \* \* \* in figure 24. (For details see T/O 5-97.)

FIGURE 24.—Engineer camouflage company (T/O 5-97).

■ 277. EQUIPMENT.

\* \* \* \* \*

b. Heavy construction equipment \* \* \* other engineer units. It is used for clearing, earth moving, land grading, compaction of earth, and paving work. Special mobile shops \* \* \* repair this equipment.

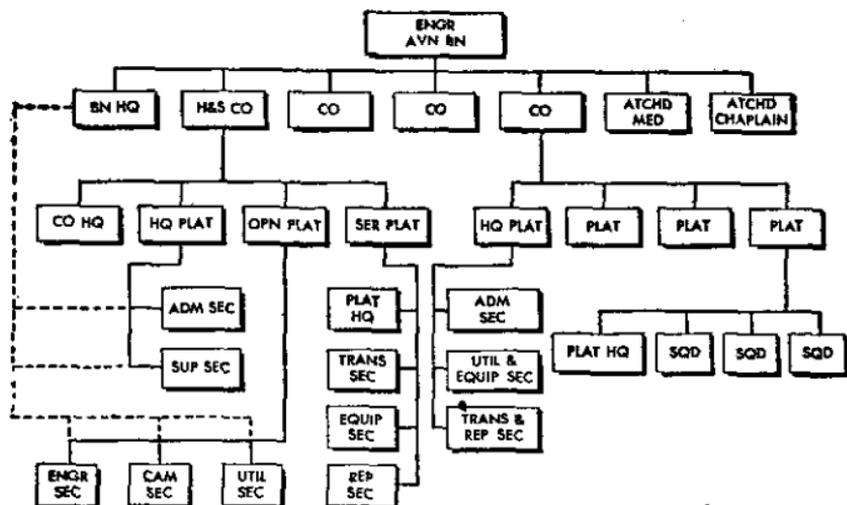


FIGURE 26.—Engineer aviation battalion (T/O & E 5-415).

■ 279. ARMAMENT.—Total armament for \* \* \* carbine, and pistol. Supporting weapons include caliber .50 machine guns, caliber .45 submachine guns, antitank rocket launchers, 60-mm mortars, and M16 multiple gun motor carriage and armament. Supporting weapons are \* \* \* preserve effective firepower.

## ■ 281. PLATOON.

\* \* \* \* \*

*b. Platoon headquarters* (Superseded).—The commander of the platoon is a lieutenant. He conducts necessary reconnaissance, plans assignments for the three squads, and supervises the work to utilize methods and secure results specified by approved plans. Platoon equipment includes hand tool sets; when mechanized equipment and transportation is required for a particular job, it is attached from headquarters and service company or from the company headquarters platoon.

*c. Squad* (Superseded).—Squad organization is generally the same as that of the squad of the engineer company of the combat battalion. The same type of squad tool sets are issued but the squad has no transportation integrally assigned.

\* \* \* \* \*

■ 282. COMPANY (Superseded).—*a. Organization*.—The engineer aviation company is organized into a headquarters platoon and three construction platoons. (For details see T/O & E 5-417.)

*b. Headquarters platoon*.—The headquarters platoon consists of an administrative section, a utilities and equipment section, and a transportation and repair section. All company transportation and mechanical equipment is in this platoon. Personnel includes administrative personnel and operators and mechanics for operation, maintenance, and repair of equipment and transportation.

■ 284. HEADQUARTERS AND SERVICE COMPANY.—This company includes company headquarters; a headquarters platoon consisting of an administrative section, and a supply section; an operations platoon consisting of an engineering section, a camouflage section, and a utilities section; and a service platoon consisting of platoon headquarters, a transportation section, an equipment section, and a repair section. (For details see T/O & E 5-416.)

\* \* \* \* \*

*b.*

\* \* \* \* \*

(2) *Engineering and operations section*.—Rescinded.

\* \* \* \* \*

## ENGINEER TROOPS

c.

\* \* \* \* \*

(3) *Equipment section* carries equipment shown in current tables of equipment. This section is \* \* \* with the section.

\* \* \* \* \*

d. (Added.) *Operations platoon* supervises construction, surveying, utilities operation, and camouflage work of the battalion.

(1) *Engineering section*.—This section is supervised by the battalion engineering officer. Enlisted personnel includes a construction foreman, surveyors, and draftsmen.

(2) *Camouflage section*.—This section is supervised by a lieutenant, the assistant operations and camouflage officer in battalion headquarters. Enlisted personnel are camouflage specialists.

(3) *Utilities section*.—This section includes personnel to operate electric-lighting equipment, water-purification equipment, and to service utilities operated by the battalion.

■ 343. MISSION (As changed by C 1).—a. The mission of the engineer base equipment company is to furnish engineer units with heavy construction equipment and skilled operators and instructors.

b. Normally the company operates as part of a base general or branch depot.

\* \* \* \* \*

■ 344. ORGANIZATION (As changed by C 1).—The company consists of company headquarters, an equipment platoon, and a service platoon. Its organization is \* \* \* T/O & E 5-377.)

■ 346. ARMAMENT (As changed by C 1).—Individual weapons include the carbine. Supporting weapons include \* \* \* .50 machine guns.

On figure 32 (C 1, page 20), Engineer base equipment company T/O & E 5-377), delete "Depot headquarters staff section."

■ 351. DUTIES (As changed by C 1).

\* \* \* \* \*

b. Assemble and condition all construction equipment received by the depot for depot stock.

## ENGINEER FIELD MANUAL

c. Deliver heavy construction equipment, with operators or instructors, to engineer units in the theater of operations.

\*                    \*                    \*                    \*

Section VI, Engineer Port Repair Ship; Section IX, Engineer Gas Generating Unit; Section X, Engineer Utilities Detachment; and Section XII, Engineer Fire-fighting Platoon, of chapter 8, Engineer Units with Army Service Forces, are rescinded. See section XVII, Engineer Service Organization.

■ 440. ORGANIZATION (As added by C 1).—This unit consists of a headquarters staff section, company headquarters, and three platoons each with a platoon headquarters, a receiving section, a storage and issue section, a shipping section, and a transportation and maintenance section. (For details see \* \* \* also fig. 39.)

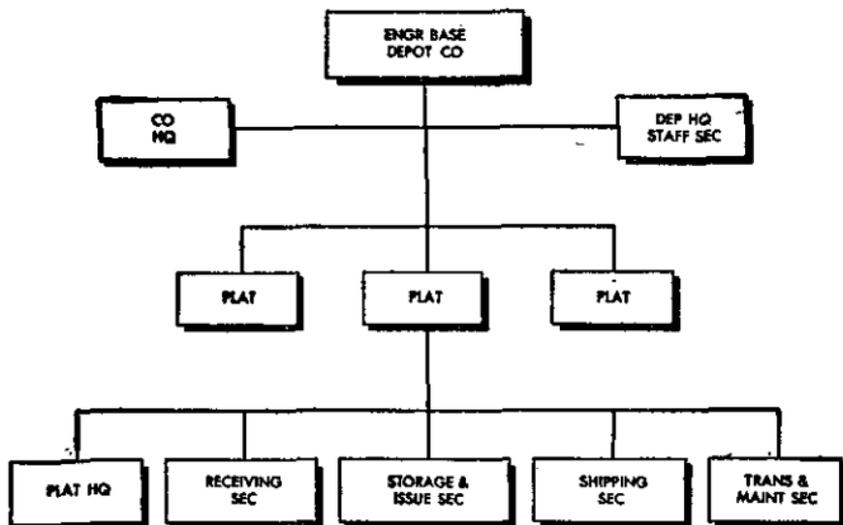


FIGURE 39.—Engineer base depot company (T/O & E 5-267).

■ 443. ARMAMENT (As added by C 1).—Carbines and caliber .50 machine guns comprise the armament of the company.

■ 446. COMPANY HEADQUARTERS (As added by C 1) (Superseded).—The company headquarters consists of personnel for routine administration, mess, and supply of the company. It also includes personnel for maintaining depot stock records, receiving incoming requisitions, and preparing and routing shipping documents for supplies leaving the depot. The sec-

## ENGINEER TROOPS

tion may be required to furnish statistical reports for the depot headquarters staff section.

■ 447. (As added by C 1) (Superseded.) **PLATOON HEADQUARTERS.**—The platoon headquarters consists of personnel for routine administration of the platoon.

### SECTION XVII (As added by C 1) (Superseded)

#### ENGINEER SERVICE ORGANIZATION

■ 468. **ORGANIZATION.**—*a. General.*—The engineer service organization is a cellular unit providing specialized teams of varying sizes, functions, and capabilities for use where standard organizations are too large or cannot meet the particular engineer needs of the theater.

*b. Use.*—The team organization permits variety and flexibility with maximum use of manpower and equipment. Teams may be combined to form a composite platoon, a company, or a battalion, depending on the scope of the mission. Individual teams may be attached to a standard engineer unit to increase its capabilities or, occasionally, to units of other arms or services.

*c. Composition.*—The organization is composed of eight parts (see T/O & E 5-500):

- (1) Administrative.
- (2) Supply.
- (3) Water supply and transportation.
- (4) Maintenance.
- (5) Utilities.
- (6) Fire fighting.
- (7) Topographic.
- (8) Marine.

■ 469. **ADMINISTRATIVE.**—Part I, administrative, consists of headquarters cells for a platoon within a company, a separate platoon, a company, and a battalion; five types of mess teams; and two types of repair teams.

*a. Headquarters cells.*—When authorized by the War Department, a platoon headquarters is organized for the equivalent of 2 or more teams or sections with a total strength of at least 20 men; a company headquarters, for the equivalent of 2 or

more platoons with a total strength of at least 100 men; and a battalion headquarters, for the equivalent of 3 companies.

*b. Mess teams.*—The type mess team used depends on the size of the organization serviced. Capacities range from 40 to 100 men per team type 1 to 276 to 325 men for team type 5.

*c. Repair teams.*—Both types of repair teams do second-echelon maintenance on the basis of 1 mechanic per 15 motor vehicles.

■ 469.1. SUPPLY.—Part II, supply, includes three types of supply teams of varying capacities; an acetylene, nitrogen, and oxygen gas generating team; and a carbon dioxide supply team.

*a. Supply teams.*—The supply teams receive, store, issue, and ship engineer supplies. They operate small engineer depots and supply points with the assistance of service troops and/or civilian labor. Supply team type 1 can serve approximately 15,000 troops; team type 2, approximately 30,000 troops; and team type 3, approximately 75,000 troops.

*b. Acetylene, nitrogen, and oxygen gas generating team.*—The acetylene, nitrogen, and oxygen gas generating team is organized to supply these gases in the theaters of operations. It is attached to a depot company or similar organization for operation. Equipment includes one semitrailer-mounted acetylene generating plant with a capacity of 750 cubic feet per hour, and two semitrailer-mounted oxygen-nitrogen generating plants, each with a capacity of about 500 cubic feet of oxygen and 500 cubic feet of nitrogen per hour.

*c. Carbon dioxide supply team.*—The carbon dioxide supply team operates carbon dioxide container-converters to supply theater requirements for fire-extinguisher gases. One team should accompany each five converters or fraction thereof sent to a theater of operations.

■ 469.2. WATER SUPPLY AND TRANSPORTATION.—Part III, water supply and transportation, includes two types of water purification teams, a water distillation team, a well drilling team, and two types of water transportation teams, to develop water sources and to purify, distill, and transport water. It also includes two types of dump truck teams and a dump truck augmentation team.

## ENGINEER TROOPS

*a. Water purification teams.*—The water purification teams are organized to supply different quantities of water. One team operates portable water purification equipment for one water point and can purify approximately 600 gallons per hour. The other type team is equipped with a mobile water-purification unit with a capacity of approximately 4,200 gallons per hour.

*b. Water distillation team.*—The water distillation team provides personnel to operate salt-water distillation equipment with a capacity of 2,500 gallons per day. The team should be used only where there are no adequate sources of ground water.

*c. Well drilling team.*—The well drilling team has rotary or percussion-type equipment for drilling water wells. It has enough personnel for two-shift operation.

*d. Water transportation teams.*—The water transportation teams provide personnel and equipment for bulk transportation of water. One type team is equipped with five 2½-ton, 700-gallon water tank trucks; the other is equipped with eight 4- to 5-ton truck tractors and eight semitrailer-mounted 1,500-gallon water tanks.

*e. Dump truck teams.*—The dump truck teams include drivers and vehicles for moving bulk materials such as dirt and gravel. One type team has a capacity of 30 tons of materials per trip; the other, 60 tons per trip. In actual operation, capacities vary, depending on the character of materials hauled, loading facilities available, and distance of haul.

*f. Dump truck augmentation team.*—The dump truck augmentation team is organized to provide two drivers per dump truck to an engineer dump truck company operating with a construction unit on at least two shifts per day. The team has no vehicles.

■ 469.8. MAINTENANCE AND SPECIAL EQUIPMENT.—Part IV, maintenance and special equipment, includes five types of maintenance teams, a mobile searchlight maintenance team, two types of refrigeration maintenance teams, a foundry team, a sawmill team, a rock crusher team, and a welding team.

*a. Maintenance teams.*—The maintenance teams provide third- and minor fourth-echelon maintenance for engineer equipment where the volume of work does not warrant the use of an engineer maintenance company. Capacity of the teams

range from type 1 which can service 5,000 troops to type 5 which can service 50,000 troops. The amount of equipment authorized each type team varies, but includes 1 or more of the following types of motorized shop equipment: electrical repair, general-purpose repair, light and heavy machine-shop equipment, and tool and bench equipment.

*b. Mobile searchlight maintenance team.*—The mobile searchlight maintenance team consists of enlisted specialists and a motorized electrical repair shop capable of maintaining about 30 searchlights.

*c. Refrigeration maintenance teams.*—Refrigeration maintenance team type 1 provides skilled personnel for third-echelon maintenance of air-conditioning and refrigeration equipment for organizations having a small number of refrigeration machines. Climate and condition of machinery determine the capacity of the team. Team type 2, which provides personnel for fourth- and fifth-echelon maintenance, should be used with every 10 type 1 teams or major fraction thereof.

*d. Foundry team.*—The foundry team is normally assigned as needed to a heavy shop company. The team can produce molten metal as follows: cast iron, approximately 108 pounds per hour; steel, approximately 100 pounds per hour; and bronze, approximately 132 pounds per hour. On a 24-hour basis, it can produce average size and weight castings at the rate of 2,000 pounds of cast iron, 1,600 pounds of steel, and 1,800 of bronze.

*e. Sawmill team.*—The sawmill team operates a portable gasoline-engine-driven sawmill. Additional personnel and equipment is needed for logging operations and for delivery, storage, and issue of finished forestry products.

*f. Rock crusher team.*—The rock crusher team operates a 25 cubic foot per hour, two-unit crushing and screening plant on a two-shift basis. Additional personnel and equipment is required for quarrying and transporting rock.

*g. Welding team.*—The welding team provides skilled personnel for attachment to units where the volume of work is greater than can be handled by assigned welders. The team may be attached to a petroleum distribution company, a heavy shop company, a maintenance company, or a construction battalion. It is assigned as directed by army or theater of operations commander.

## ENGINEER TROOPS

■ 469.4. UTILITIES.—Part V, utilities, includes six types of utilities teams and three types of hospital utilities teams.

a. *Utilities teams.*—Utilities teams are organized to operate utilities at military installations; they may be assigned to any branch except the Medical Department. When assigned to Army Air Forces, they may also be required to do minor maintenance of landing, taxiing, and parking surfaces. The team designation (T/O & E 5-500) indicates the size of installation which the team normally services. Capacities can be increased by addition of civilian labor, service troops, or prisoner-of-war labor. The 6,000-man and 10,000-man teams provide complete post engineer service and personnel for oversea installations.

b. *Hospital utilities teams.*—Hospital utilities teams are assigned as directed by the commanding general of the service command or by the theater of operations commander. Team type 1 furnishes utilities service to hospitals with 150- to 250-bed capacity. Team type 2 services hospitals with 300- to 450-bed capacity. Team type 3 services hospitals with 500- to 900-bed capacity; refrigeration team type 1 should be added when air-conditioning equipment is furnished.

■ 469.5. FIRE FIGHTING.—Part VI, fire fighting, consists of fire fighting headquarters, a fire truck team, a crash truck team, a fire trailer team, a crash trailer team, and a water tank team. Combinations of teams to provide protection for various installations are listed in T/O & E 5-500.

■ 469.6. TOPOGRAPHIC.—Part VII, topographic, includes a map depot team, a model makers team, two types of survey teams, a survey liaison team, a reproduction team, and a photomapping team.

a. *Map depot team.*—The map depot team receives, stores, and issues maps and can provide map depot facilities for one base section. It is assigned as directed by the theater of operations commander.

b. *Model makers team.*—The model makers team makes scale terrain models to assist in planning air and ground force operations. Since photographic processes are used in model making, the team is normally attached to a topographic unit. It is assigned as directed by the theater of operations commander.

*c. Survey teams.*—The type 1 survey team is composed of one topographic survey party; the type 2 team consists of three survey parties and necessary overhead. Capacity of the teams depends on the terrain and the detail required.

*d. Survey liaison team.*—The survey liaison team maintains liaison with Allied armies on exchange of maps, color pulls, and control; project planning; items of equipment and supply; and minor map-making service for theater headquarters. Normal assignment is one team per theater.

*e. Reproduction team.*—The reproduction team includes personnel and equipment to reproduce material such as photographs or printed or typed manuscript which are furnished in final form for reproduction. It cannot reproduce maps, sketches, or aerial photos not previously prepared by photomapping personnel. The team may be assigned to corps or similar headquarters for reproduction of documents, forms, and the like, or it may be used to increase the capacity of a base topographic battalion.

*f. Photomapping team.*—The photomapping team makes original topographic maps from aerial photographs. It has no planning, computing, or reproduction facilities and should therefore be attached to a topographic unit which can provide them. It may also be used to increase the capacity of a base topographic battalion.

■ 469.7. MARINE.—Part VIII, marine, provides two types of port repair ship teams, a floating power plant team, and two types of diving teams.

*a. Port repair ship teams.*—The port repair ship teams assist in harbor clearance and repair work by removing heavy obstacles and debris. They include personnel and equipment for machine, blacksmith, and carpenter shops. Team type 1 operates a steam-driven port repair ship, and team type 2 a Diesel-driven ship.

*b. Floating power plant team.*—The floating power plant team operates an electrical plant producing 30,000 kilowatts at 13,800 volts. It is assigned as directed by the War Department or the theater of operations commander.

*c. Diving teams.*—The diving teams are staffed and equipped to perform marine diving. Equipment, tools, and materials for

## ENGINEER TROOPS

underwater work, other than basic diving gear, must be provided from theater of class IV stock. Type 2 teams are never used independently; they are used to augment type 1 teams. Both type teams may be used to supplement diving personnel in standard units.

[AG 300.7 (15 Sep 44).]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,  
*Chief of Staff.*

OFFICIAL:

J. A. ULIO,  
*Major General,*  
*The Adjutant General.*

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For explanation of symbols, see FM 21-6.

Sup

FM 5-5  
C 5

O.K. TO RELEASE  
ENGINEER TROOPS  
WAR DEPARTMENT  
WASHINGTON 25, D. C. 28 December 1944.

CHANGES }  
No. 5 }

FM 5-5, 11 October 1943, is changed as follows:

■ 8. ENGINEER UNITS WITH ARMY SERVICE FORCES.

r. (Added.) The *engineer refrigeration operating and maintenance team* consists of a small group of specialists in the quartermaster fixed refrigeration company who operate engineer refrigeration equipment and perform first- and second-echelon maintenance. Personnel are quartermaster troops who have been given specialist training by the Corps of Engineers.

■ 83. DUTIES.—a. When attached to corps.

(3) Duties performed by \* \* \* the battalion are:

(a) (Superseded.) Operation of an engineer supply point for local materials.

b. When attached to army.—Most common duties are:

(7) (Superseded.) Operation of an engineer supply point for local materials.

■ 135. EQUIPMENT.—a. The battalion is \* \* \* platoon tool sets. Stream-crossing equipment consists of pneumatic reconnaissance boats. It carries no bridge equipment. Engineer mechanical equipment consists of lightweight bulldozers, air compressors, and portable gasoline-driven chain saws.

■ 139. PARACHUTE COMPANY.—The parachute company \* \* \* for specific operations. Addition of mess, automotive maintenance, and parachute maintenance personnel may be authorized by the War Department to enable the company to operate as a separate unit. In that case additional equipment is also authorized, including vehicles, mess equipment, pneumatic reconnaissance boats, and chain saws.

a. Company headquarters.—Officer personnel includes \* \* \* as administrative officer. There is personnel for handling rou-

## ENGINEER FIELD MANUAL

tine administration and supply. All personnel mess \* \* \* and service company. Lack of organic \* \* \* to a minimum.

b. *Parachute platoon.*—This platoon consists \* \* \* parachute infantry regiment.

(1) *Platoon headquarters.*—A first lieutenant commands the platoon. Enlisted personnel includes \* \* \* other operating personnel. Principal items of equipment for reinforcing the squads are basic tool sets. Squads may be \* \* \* the airborne division.

\* \* \* \* \*  
■ 140. **GLIDER COMPANY.** The glider company \* \* \* and cargo planes.

a. *Company headquarters.*—(1) Officer personnel consists \* \* \* as administrative officer. There is personnel for handling routine administration and supply. Messing facilities and transportation are furnished by headquarters and service company. Company headquarters can reinforce the platoons with basic tool sets.

\* \* \* \* \*  
b. *Glider platoon.* This platoon consists \* \* \* the airborne division.

(1) *Platoon headquarters.*—The platoon commander \* \* \* other operating personnel. Principal items of equipment are squad sets of engineer equipment.

\* \* \* \* \*  
■ 142. **HEADQUARTERS AND SERVICE COMPANY.**—a. *Headquarters and service company.*—This company consists of a company headquarters, an administrative section, an operations section, a supply section, and a maintenance section. Organization is shown in figure 13.

b. *Company headquarters.*—Officer personnel includes \* \* \* engineer combat battalion. There are extra facilities for providing mess for the parachute and glider companies. Light transportation includes  $\frac{1}{4}$ -ton trucks,  $\frac{1}{4}$ -ton trailers, and  $\frac{1}{2}$ -ton dump trailers, which are transported by aircraft to the objective. Two and one-half ton cargo trucks and  $2\frac{1}{2}$ -ton dump trucks with 1-ton cargo trailers comprise the heaviest transportation in the battalion; they remain with the rear echelon at the base area and are not available in the combat phase. Two of these heavier trucks and trailers are organic transportation for headquarters and service company, and one truck

## ENGINEER TROOPS

and trailer is organic transportation for each glider company and for the parachute company. Eight ¼-ton trucks and trailers are organic transportation for headquarters and service company, four ¼-ton trucks and ½-ton dump trailers for the parachute company, and three ¼-ton trucks and ½-ton dump trailers for each glider company. All personnel normally \* \* \* for other duties.

\* \* \* \* \*  
d. *Operations section*.—This section is \* \* \* a ¼-ton trailer.

\* \* \* \* \*  
f. *Maintenance section*.—This section is \* \* \* general motor transport. The maintenance section performs normal maintenance and repair for battalion transportation and mechanical equipment, and executes repairs to captured or requisitioned vehicles.

### ■ 141. DUTIES.

\* \* \* \* \*  
b. Assisting in seizure \* \* \* tactical localities by—

\* \* \* \* \*  
(9) Rescinded.

\* \* \* \* \*  
e. Rescinded.

\* \* \* \* \*  
g. Rescinded.

\* \* \* \* \*

FIGURE 13 (as changed by C 2).—Airborne engineer battalion.  
*Change OPN and INT SEC to OPN SEC, and MTR REP SEC to MAINT SEC.*

## CHAPTER 6

### ENGINEER UNITS, SERVICE, WITH ARMY GROUND FORCES

\* \* \* \* \*

#### SECTION XI (ADDED.)

### ENGINEER TECHNICAL INTELLIGENCE TEAMS

■ 272. *MISSION*.—Two types of technical intelligence teams, the combat team (T/O & E 5-398T) and the research team (T/O & E 5-399T), operate in theaters of operations. The combat team furnishes technical intelligence information for use in the theater of operations; the research team sends information to the zone of interior for further study.

## ENGINEER FIELD MANUAL

■ 273. ORGANIZATION AND DUTIES.—*a. Combat team.*—The combat team consists of an officer and a small number of enlisted men. When authorized for the theater, it is assigned to the engineer section of corps or army headquarters. Organic transportation is sufficient to make the unit mobile. Duties include—

(1) Examining captured enemy equipment and giving advice on its use.

(2) Photographing new enemy equipment, fortifications, and demolitions.

(3) Reporting on items of general engineer interest, and on field operations which would be of value as intelligence.

(4) Assisting in identification and recognition of new enemy equipment.

*b. Research team.*—When authorized for the theater, the research team is assigned to the engineer section of army headquarters. It has the same duties as the combat team and, in addition, procures, inspects, crates, and prepares sample items of captured enemy equipment for shipment to the zone of interior. Because of these additional duties, it is slightly larger than the combat team. This unit is also mobile.

[AG 300.7 (20 Nov 44)]

BY ORDER OF THE SECRETARY OF WAR:

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*The Adjutant General*

G. C. MARSHALL

*Chief of Staff*

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For explanation of symbols, see FM 21-6.