

FM 55-55-1 (Test)

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DEPARTMENT OF THE ARMY FIELD MANUAL

TRANSPORTATION TERMINAL OPERATIONS

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HEADQUARTERS, DEPARTMENT OF THE ARMY
MARCH 1967

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FOREWORD

This manual is published to provide interim guidance to commanders, staff officers, and other personnel concerned with terminal operations support under the TASTA-70 concept of organization and operation. This information can be utilized to facilitate reorganization under the TASTA concept. Firm information on the organizational structure and composition of units will be as contained in TOEs when published. Although the basic TASTA-70 study has been approved by Department of the Army, detailed doctrine contained in this test field manual is under continuing development and review.

Readers are encouraged to submit comments and recommendations for changes that will improve the clarity, accuracy, and completeness of the manual. Comments should be constructive in nature and reasons should be provided for each recommendation to insure understanding and to promote a valid basis for evaluation. Each comment should be keyed to a specific page, paragraph, and line of the test. Comments should be forwarded direct to the Commanding Officer, U.S. Army Combat Developments Transportation Agency, Ft. Eustis, Va., 23604. An information copy of recommendations that propose changes to approved Army doctrine may be sent, through command channels, to the Commanding General, U.S. Army Combat Developments Command, Fort Belvoir, Va., 22060, to facilitate review and evaluation.



FIELD MANUAL

No. 55-55-1 (TEST)

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON 25, D.C., 16 March 1967

TRANSPORTATION TERMINAL OPERATIONS

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CHAPTER 1

INTRODUCTION

1. Purpose and Scope

a. This manual is published as a training, planning, and operational guide for unit commanders, staff officers, and other personnel associated with the organization and employment of the following units:

- (1) Transportation terminal brigade, TOE 55-111.
- (2) Transportation terminal group, TOE 55-112.
- (3) Transportation terminal battalion, TOE 55-116.
- (4) Transportation terminal service company, TOE 55-117.
- (5) Transportation terminal transfer company, TOE 55-118.

b. The manual describes the organization, mission, assignment, capabilities, task equipment, concept of employment, and operations of these units in all types of Army terminal operations.

c. The doctrine presented herein is applicable without modification to general, limited, and cold war.

d. Readers and users of this manual are encouraged to submit comments or recommended changes, with reasons therefor, to the U.S. Army Combat Developments Command Transportation Agency, Fort Eustis, Va. 23604. Comments should be keyed to the specific page, paragraph, and line of the text in which a change is recommended.

2. Types of Terminal Operations

a. *General.* A terminal is any military or commercial facility, regardless of size or complexity, at which cargo and personnel are loaded, unloaded, and handled in transit be-

tween any of the various modes of transportation. Transportation terminal units are designed to provide command and control and the physical means for performing terminal functions in the following types of operations:

- (1) Port terminal operations.
- (2) Logistics over-the-shore (LOTS) operations.
- (3) Amphibious operations.
- (4) Shore-to-shore operations.
- (5) Inland waterway operations.
- (6) Inland terminal operations (serving air, rail, and motor transport).

b. *Port Terminals.* Port terminals are developed shoreside installations varying in size from large deepwater complexes containing several wharves, anchorage areas, shore-based cranes, drydocking facilities, cargo sheds, sorting and storage areas, rail sidings, etc., to small, shallow-draft, one- or two-wharf facilities with minimum provisions for cargo handling, storage, and clearance.

c. *Logistics Over-the-Shore Operations.* A LOTS operation is a transshipment of troops, supplies, and equipment over the shore to inland modes of transportation when conventional terminal facilities are not available. These operations may be conducted from ship to shore or from shore to shore. LOTS operations may be instituted to supplement or increase tonnage capabilities of an existing terminal, to replace the tonnage capacity of a terminal made untenable by enemy action, to relieve congested lines of communication, or to reduce the land transportation required to support combat forces. They may be conducted jointly in support of other Department of Defense agencies for resupplying missions or in support of a landing force following an

amphibious assault and unilaterally in support of landed forces (air, airborne, or amphibious), to provide alternate terminal facilities, or to establish terminal support where port facilities do not exist.

d. Amphibious Operations. An amphibious operation is an attack launched from the sea by naval and landing forces involving a landing on a hostile shore to gain a lodgement area from which to carry out further combat operations ashore, to obtain an advanced air or naval base area, or to deny the use of the seized positions to the enemy.

e. Shore-to-Shore Operations. A shore-to-shore operation is an assault movement of personnel and materiel directly from a shore staging area to the objective in assault surface craft or in assault surface craft and assault aircraft without intermediate transfers between types of craft or ships involved in the assault. Shore-to-shore operations are normally uniservice and are conducted to establish a force on or to withdraw it from the far shore. As indicated in *c* above, LOTS operations may also be conducted from shore to shore in support of landed forces after an assault.

f. Inland Waterways. An inland waterway in a theater of operations is normally operated

as a complete system involving—singly or in combination—rivers, inland lakes, canals, or intracoastal waterways and two or more water terminals. The use of inland waterways for military purposes is normally envisaged only in underdeveloped areas in which alternate modes are either lacking or insufficient. These waterways are used principally for civilian traffic and for the restoration of the local economy. Inland waterways can be used to relieve the pressure on other modes of transportation and are especially useful for moving a large volume of bulk supplies and heavy, outsize items not easily transported by other means. Although inland waterways are an economical means of transport, they are relatively slow compared to other modes and are especially vulnerable to enemy action and to climatic changes.

g. Inland Terminals. Inland terminals provide cargo transfer facilities at intermediate points in air, rail, and truck transportation nets and form connecting links between these modes when terrain conditions and operational requirements necessitate a change in carrier. Inland terminals may also be established at depots and user receiving points and adjacent to large ocean terminals to load backlogged cargo onto clearance transportation.

CHAPTER 2

GENERAL CONCEPTS

3. Command Relationships

a. The command element in the communications zone is the theater army support command (TASCOM), which provides an integrated support system for one or more field armies. Its operational area extends from the ocean terminals of the theater to the rear boundary of the field army, thereby providing the necessary link between the combat force and its source of manpower and materiel replenishment in the continental United States. The TASCOM is organized into six commands (fig. 1): five of these are mission commands, which operate on a perpendicular axis from the water's edge forward to the field army area, and the sixth is an area support command. Details of TASCOM operations are contained in FM 54-7 (FM 54-8, TEST).

b. The transportation command (fig. 2) is one of the five mission commands of the TASCOM. It has the necessary movement control, motor transport, terminal service, lighterage, rail, and aviation units to provide an integrated transportation system capable of supporting the TASCOM mission. The transportation command receives personnel replacements and supplies at shipside, air terminals, or rear area depots and delivers them as far forward as possible toward the combat zone with minimum unloading, reprocessing, rehandling, or transshipping at intermediate points. The operational functions of the transportation command are detailed in FM 55-6.

c. Depending upon the size and complexity of the theater, the senior terminal headquarters under the transportation command will be either a terminal group or a terminal brigade. The group provides command, planning, supervision, and coordination of the operations of

up to six terminal battalions—a force normally sufficient to support one field army. In divided theaters or in large theaters requiring two or more groups, a brigade may be assigned to provide an intermediate level of command, thereby becoming the terminal “mission” headquarters for the theater. In each case, the group and brigade functions are essentially the same, and their internal organization reflects this similarity.

d. The terminal battalion is the basic operating unit in the terminal structure and provides the command element for each water terminal in the theater.

4. Water Terminal Operating Environment

a. Water terminal operations are conducted at established port facilities and over beaches. Because of the vulnerability of fixed port facilities to mass destruction weapons, water terminal operations in a theater are characterized by the use of numerous small terminals rather than a few large ones. The degree of dispersion depends on, among other things, the nature of the enemy threat, the availability of suitable facilities, and the transportation net available to clear cargo from the terminals. Terminal activities may, in fact, be spread over hundreds of miles of coastline. As a result, subordinate terminal units down to battalion and, on occasion, down to separate companies may have to operate independently in locations far removed from parent units, sources of support, and the main supply routes. Problems of communication, command control, and efficient use of lighterage and land transport resources multiply under these conditions and planning consideration must be directed to these factors at all levels.

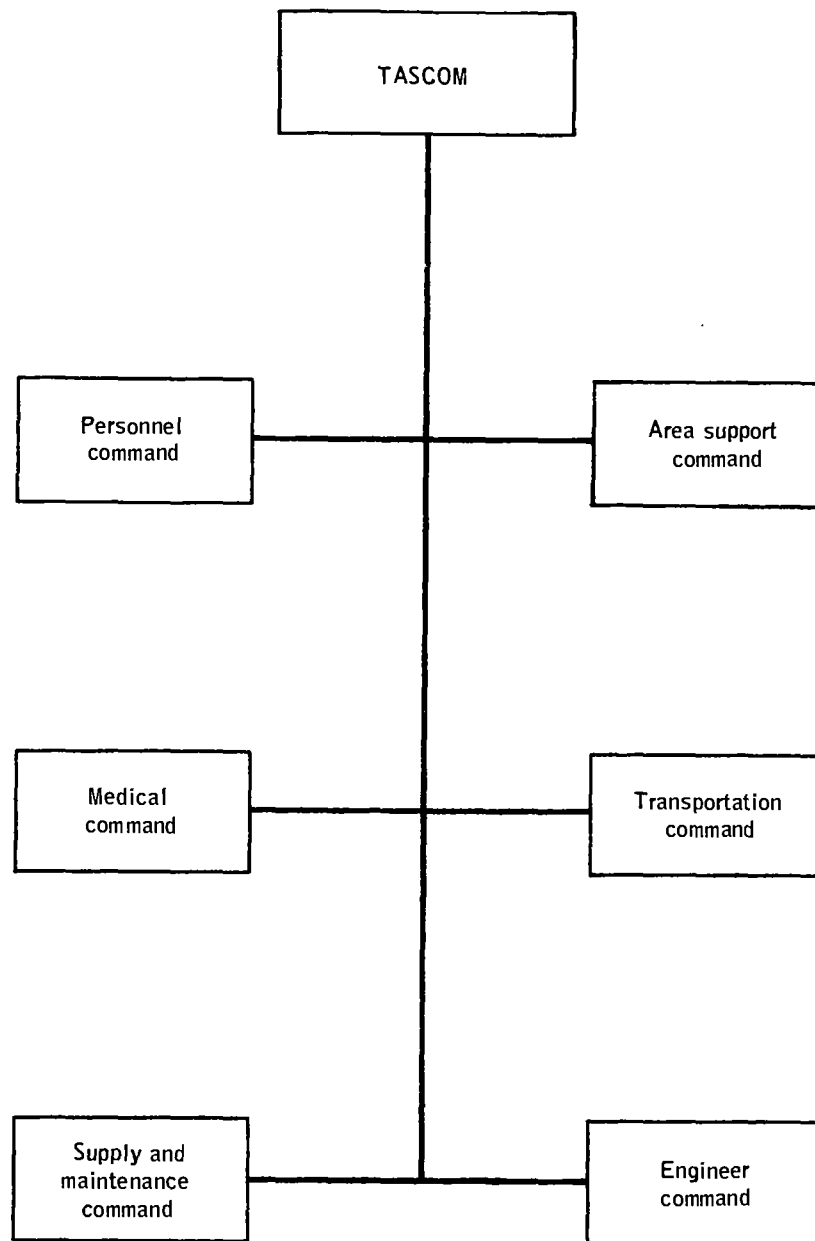


Figure 1. Theater army support command organization.

b. Dispersion, however, should be kept to a practical minimum consistent with the theater commander's estimate of the threat from area destruction weapons and the problems incident to defense of the dispersed terminals. Normally, the direct line distance between ships and between ships and major shoreside activities should be at least 1 nautical mile. To avoid creating targets for large long-range nuclear weapons, not more than four ships should be berthed simultaneously in a single port or har-

bor area or within an area of less than 5 nautical miles square. Not more than two ships should be handled simultaneously at one beach terminal, and these should be kept at least 1 nautical mile apart. The distance between each two-ship operation should be at least 5 nautical miles.

5. Cargo Mix

a. Approximately 95 percent of theater daily resupply requirements will arrive by surface

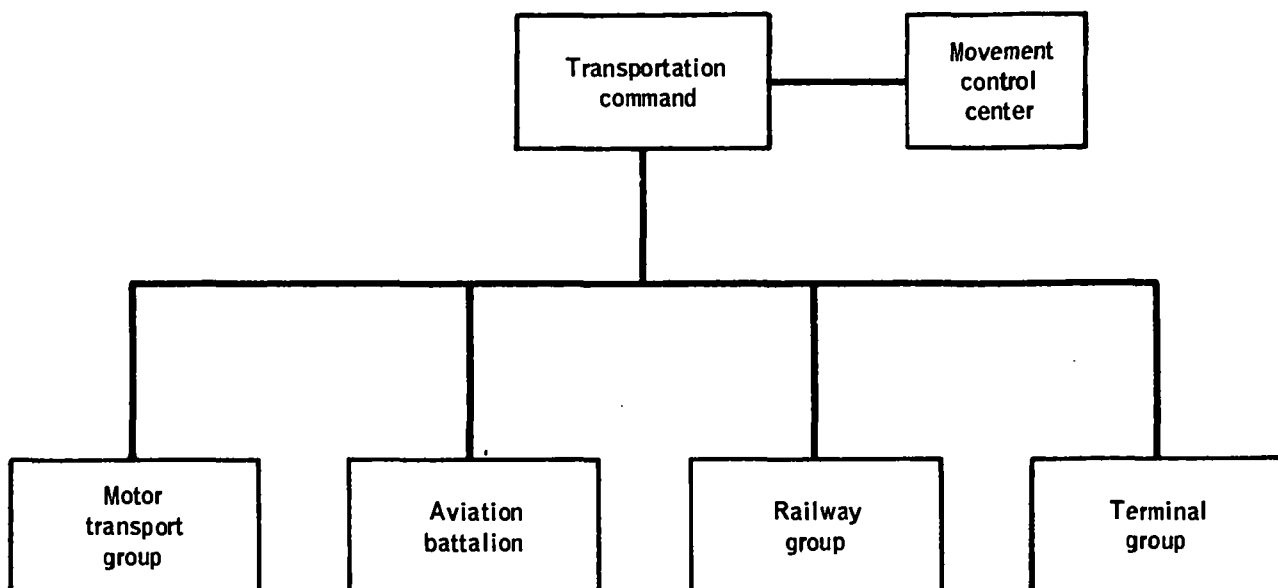


Figure 2. Type transportation command organization.

transport. At least 60 percent of this tonnage will consist of dry cargo, and the remainder will be bulk POL. Half of the dry cargo will normally be moved forward into the theater by rail, 35 percent by motor transport, and 15 percent by air. Upwards of 40 percent of all cargo arriving by surface means will be delivered through beach terminals.

b. The percentage of dry cargo that will move directly forward, bypassing the TAS-COM rear area depots will depend upon a number of factors, including the depth of the theater, effectiveness of the supply control system, and the extent to which problems attending the unitization of supplies, repair parts, and equipment into tailored, direct consumption loads are solved. Whatever the conditions, the terminal service must be capable of clearing all incoming cargo from the immediate vicinity of the entry points without delay so as to avoid target-size accumulations of supplies and equipment on or near the shoreline.

c. Dry cargo which is adaptable to unitization will arrive in the theater on pallets and in containers of various sizes. Some 65 percent by weight of theater dry cargo requirements will be so unitized. Most of the remainder will consist of vehicles and of items which can be

considered unitized loads in themselves as, for example, crafted or wheel-mounted compressors, generators, and construction machinery. An estimated 5 percent will consist of items which are by their nature not adaptable to unitization as, for example, telephone poles and structural components of major items of equipment. Ships carrying vehicles, large containers, and other heavy lifts will be given first priority for discharge at fixed piers or protected anchorage berths. Ships carrying palletized and other nonheavy lift cargo will be given second priority for discharge at piers and protected anchorage berths, if available, and, when necessary, at less-protected offshore berths. The use of unprotected anchorage berths will be avoided if at all possible because of the danger of attack from the sea and the degrading effects which wind and sea state have on productivity. Ships will be loaded in the continental United States in a manner which will permit discharge with their own cargo gear to the maximum extent practicable.

d. Ships lying at anchorage berths will be discharged into lighters. When lighters can be unloaded at wharves, amphibians are not required, and military flat barges and locally procured lighters will be employed. When the delivery point is a beach or an unimproved

section of a port area, amphibians and landing craft must be employed. Vehicles and heavy, outsize equipment will be loaded into LCM-8's or LARC-60's. LARC-5's will normally be used for general cargo up to palletized loads, and LARC-15's will be employed as the ship-to-shore delivery means for containers and small vehicles.

e. Bulk petroleum products arriving by large oceangoing tankers must be discharged at berths especially designed for the purpose. Since fixed tanker berths are usually co-located with tank farms, which are extremely vulnerable to all forms of attack and sabotage, the majority of tankers will have to be discharged at offshore berths equipped with submarine pipelines. If the oceangoing tanker is too large to use available berths, it may be necessary to lighten it by pumping the product to coastal tankers and fuel barges for subsequent transfer to dispersed and concealed storage facilities and pipelines. Bulk POL may also be transferred directly over the shore to hasty storage facilities by use of submarine floating pipelines. The responsibility of the terminal battalion is normally limited to providing berthing services for the tankers. The petroleum group of the supply and maintenance command is responsible for discharging the vessel and clearing POL from the terminal.

6. Night Operations

Terminal operations will be conducted around the clock for the most part. During hours of darkness, floodlighting systems will be used on piers, at transfer points, and aboard ships in protected harbors whenever the enemy situation permits. When the ship berths are directly visible from the sea, as in LOTS operations over ocean beaches, personnel will be equipped with light-intensification equipment or luminescent materials, such as paint and tape, will be applied to cargo and equipment to enhance visibility. The same equipment and aids to night vision will be used in ports and harbors when enemy action prevents the use of ordinary lighting equipment.

7. Communications

The terminal group and brigade require the attachment of a communications organization

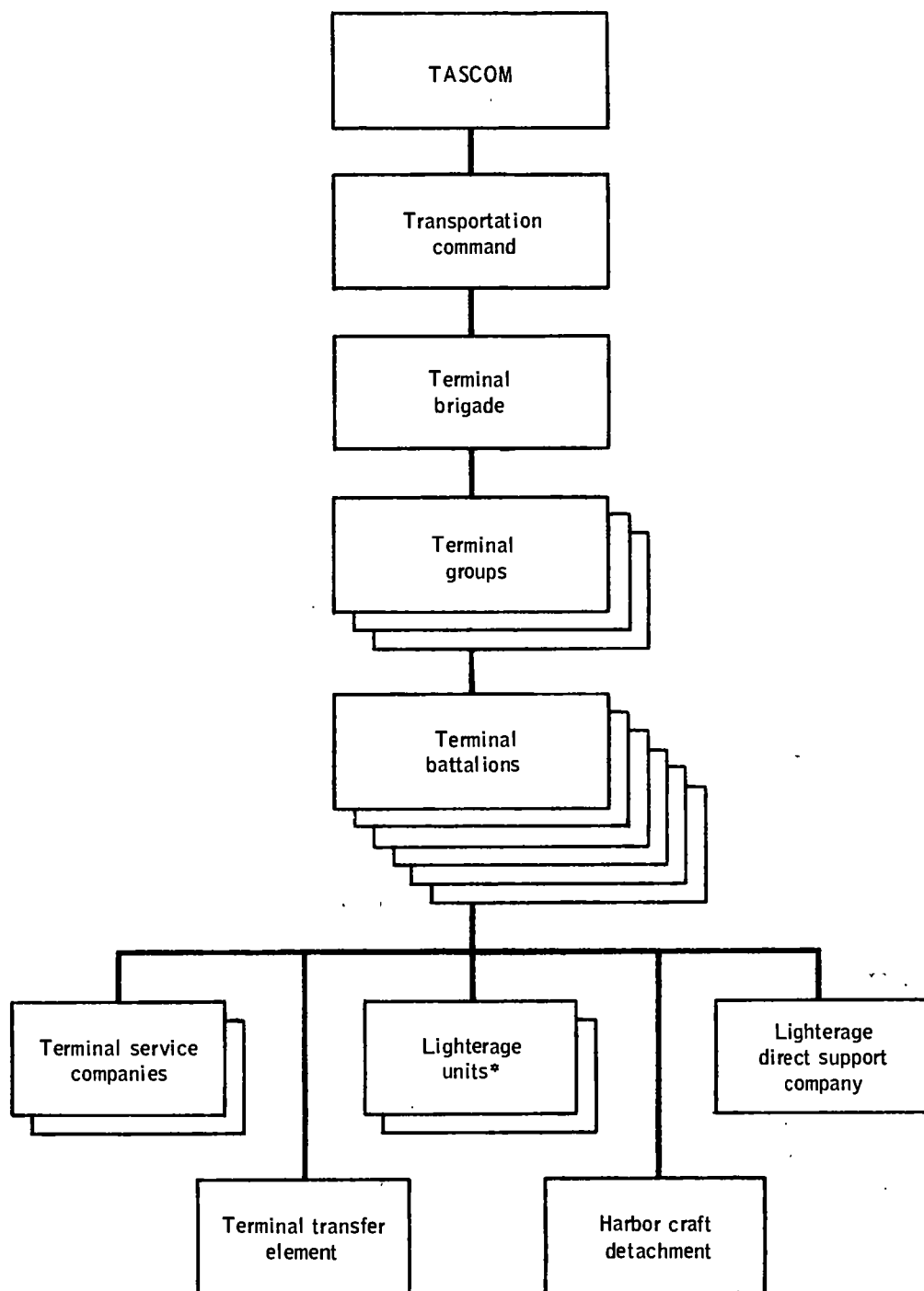
for both internal and external communications. This service will include telephone and radio circuits connecting command headquarters with subordinate units and with the transportation command, the supply and maintenance command, and the theater movement control system. The communications system must be extremely responsive, reliable, and flexible to insure that the commander will be able to exercise effective control over his widely dispersed operations and over the flow of personnel and cargo to first destination in the theater.

8. Water Terminal Operating Organizations

The water terminal organization (fig. 3) consists of terminal service, lighterage, and direct support maintenance and supply units and the command units necessary to supervise and coordinate their operations. The size and composition of the water terminal organization in a theater depends on a number of variables, such as the number of ports and beaches to be used, the quantity of cargo and number of personnel to be moved through the terminals, and the capabilities and availability of local resources and facilities. As the basic operating headquarters in the theater terminal structure, the terminal battalion provides direct command, control, and operational supervision over terminal service companies and the amphibian and boat units attached to deliver cargo to and through the beach. The following organizations provide the terminal operating elements for the battalion:

a. The terminal service company (TOE 55-117) loads, unloads, and transships cargo in conventional water terminals or in logistics over-the-shore operations.

b. Amphibian units (TOEs 55-138 and 55-139 and team FK, TOE 55-500), along with boat companies (TOEs 55-128 and 55-129), move cargo and personnel from ship to shore (FM 55-50 and FM 55-58). They are equipped with amphibians and landing craft of various sizes to permit the handling of all types of cargo. Amphibians move cargo directly to transfer points inland and thereby avoid congestion on beaches. Harbor craft (tugs, barges, picket boats) are provided for in cellular teams contained in TOE 55-500 (FM 55-57).



*Boat or amphibian companies as required.

Figure 3. Type theater terminal organization.

c. Lighterage direct support companies (TOE 55-158) provide direct support maintenance for and receive, store, and issue all repair parts required for organizational and direct support maintenance of wheeled amphibians and landing craft (FM 55-50).

9. Inland Terminals

Inland terminals are established at both ends of and at intermediate points along theater air, rail, and motor transport systems to provide for the transshipment of cargo carried by these modes. Army cargo handling at these inland

terminals is a primary function of the terminal transfer company (TOE 55-118). In the field army area, these companies are assigned to the transportation brigade and, in the communications zone, to the transportation command. Normally, operation and control of the entire inland terminal facility is assigned to the mode battalion or group having primary transport responsibility for the system, and terminal transfer companies are attached to these elements for operational control. A detailed discussion of inland terminal operations is contained in chapter 12.

CHAPTER 3

THE TERMINAL BRIGADE

10. General

The transportation terminal brigade headquarters (TOE 55-111) is employed when circumstances prevent adequate supervision and coordination of theater terminal operations by one or two terminal groups. The brigade is not normally activated unless the size and complexity of terminal operations make it necessary to employ three or more groups, but this choice is also largely influenced by the number of other mode group headquarters attached to the transportation command. If the total number of mode groups becomes excessive, it may be desirable or necessary to interpose a terminal brigade when only two groups are operative in order to simplify overall command and control problems for the transportation command.

11. Mission and Assignment

The mission of the headquarters and headquarters company, transportation terminal brigade, is to provide command and supervision of and staff planning for units employed in the operation of water terminals. The brigade is assigned to the theater army support command (TASCOM) and is normally attached to a transportation command.

12. Capabilities

a. The transportation terminal brigade is capable of providing command, control, and administration for up to five transportation terminal groups.

b. This unit is dependent upon the area support command of TASCOM for processing personnel administrative actions, including classification, personal affairs, maintenance of personnel records, pay actions, personnel ac-

counting, casualty reporting and rosters, and orders affecting personnel actions.

13. Functions

a. The brigade headquarters is responsible for command of units attached to the brigade and of all terminal activities in the assigned areas of operation. These activities include reception, debarkation, embarkation, and transshipment of personnel; receipt, loading, unloading, segregation, and transshipment of cargo to initial destination; training of all assigned and attached troops; initiation of defense plans for assigned areas; and liaison with appropriate agencies of the Navy, the Air Force, the Military Sea Transportation Service, the Military Airlift Command, and military, naval, and civilian agencies of allied and occupied countries in accordance with prescribed policies.

b. In carrying out these activities, the brigade headquarters is responsible for—

- (1) Management of military and civilian personnel.
- (2) Administration of labor management policies with respect to non-United States civilians and employees and execution of policies regarding non-United States civilian labor.
- (3) Intelligence, including collection, processing, and dissemination of information of intelligence value; supervision of intelligence training; conduct of security investigations; and supervision of military and civil censorship activities.
- (4) Preparation of standing operating procedures, directives, and plans for installation-type security, area secu-

urity, and area damage control within assigned area and coordination of those plans with subordinate commanders and area support commands.

- (5) Preparation of current and long-range plans, procedures, policies, and programs pertaining to terminal operations and functions.
- (6) Selection and allocation of units by types and numbers required to support the mission of the transportation terminal brigade.
- (7) Inspections of units, installations, and activities of subordinate units.
- (8) Supervision and planning for training of subordinate units.
- (9) Development of plans for the movement of personnel and cargo through and out of the subordinate terminals.
- (10) Coordination with the movements management center for terminal clearance.
- (11) Development of requirements for communications and automatic data processing systems service required for the support of the terminal brigade and subordinate units.

- (12) Development of requirements for construction, rehabilitation, maintenance, and repair of facilities and installations and for provision of utilities and firefighting support in the terminal area.

- (13) Local procurement of materiel and services, particularly stevedoring contract services, for support of the brigade and subordinate units.

- (14) Provision of field services to include food service supervision.

- (15) Development of standing operating procedures, directives, current and long-range plans, procedures, policies, and programs in the logistics field pertaining to subordinate units and coordination with direct support elements supplying materiel and equipment used in operation of terminal activities.

- (16) Maintenance management, including development of appropriate policies, procedures, and operational instructions for issuance to subordinate units relative to maintenance activities.

CHAPTER 4

THE TERMINAL GROUP

14. General

The transportation terminal group headquarters (TOE 55-112) is normally responsible for all theater terminal operations for the theater army support command (TASCOM). However, when the size and complexity of the theater create requirements for the employment of two or more terminal groups and the consequent assignment of a terminal brigade as the theater terminal mission headquarters, the terminal group assumes a subordinate role and is assigned responsibility for terminal operations on an area basis.

15. Mission and Assignment

a. The mission of the headquarters and headquarters company, transportation terminal group, is to provide command, staff planning, and supervision of units employed in the operation of water terminals.

b. The transportation terminal group is assigned to TASCOM and is normally attached

to a transportation terminal brigade or the transportation command.

16. Capabilities

a. The transportation terminal group is capable of providing command, control, staff planning, coordination, and supervision of operations, training, and administration of up to six transportation terminal battalions.

b. The group is dependent upon the area support command of TASCOM for processing administrative actions, to include classification, personal affairs, maintenance of personnel records, pay actions, personnel accounting, casualty reporting and rosters, and orders affecting personnel actions.

17. Functions

Whether operating as the terminal mission headquarters for the theater or as a subordinate element of a terminal brigade, the terminal group performs, within its area of responsibility, essentially the same functions listed in paragraph 13.

CHAPTER 5

THE TERMINAL BATTALION

18. General

a. The headquarters and headquarters company, transportation terminal battalion (TOE 55-116), provides the basic operating headquarters for theater terminal operations and is the normal command element for each two- and four-ship water terminal. In addition, the terminal battalion headquarters also acts as the command element in the operation of inland waterways (ch 11) and is the key terminal organization in support of amphibious operations (ch 10).

b. The terminal battalion, therefore, is necessarily a flexible organization, its components varying according to the particular requirements of each of its diversified missions. Tailoring is accomplished by modifying the number and types of units attached for each task. In addition to the units listed in paragraph 20a, transportation truck companies and certain nontransportation units may be attached to the terminal battalion to meet specialized mission requirements.

19. Mission and Assignment

a. The mission of the headquarters and headquarters company, transportation terminal battalion, is to provide command, administration, supervision, and operational control of units employed in the operation of water terminals.

b. The transportation terminal battalion is assigned to a theater army support command (TASCOM) and is normally attached to a transportation terminal group. It may be attached to a transportation terminal brigade or may operate separately under the supervision of the transportation command. When providing combat service support in an amphibious

operation, the terminal battalion is normally attached to an engineer amphibious command.

20. Capabilities

a. The terminal battalion is capable of commanding up to seven transportation terminal-type units (terminal service, terminal transfer, boat, amphibian, harbor craft, or lighterage direct support companies) or the equivalent of a four-ship terminal in an established port facility or a two-ship terminal in a beach operation.

b. This unit is dependent upon the area support command of TASCOM for processing administrative actions, to include classification, personal affairs, maintenance of personnel records, pay actions, personnel accounting, and casualty reporting.

21. Functions

The headquarters and headquarters company, transportation terminal battalion, is responsible for—

a. Command of units conducting water terminal operations.

b. Operational control of loading, unloading, and cargo transfer operations.

c. Overall supervision of documentation activities of the battalion and maintenance of ships' files.

d. Determining the estimated workload and requirements for transportation and assuring that necessary transport is available.

e. Assisting and advising subordinate operating units concerning identification, segregation, and documentation of cargo, either aboard ship or on shore.

f. Consolidating requisitions and procuring supplies and equipment for subordinate units.

g. Conducting maintenance inspections of vehicles and equipment.

h. Exercising staff supervision over all maintenance, supply, evacuation, real estate, and food service activities of the battalion.

i. Providing wire communications and message center service for communication with higher headquarters and with subordinate units of the battalion.

CHAPTER 6

THE TERMINAL SERVICE COMPANY

22. General

a. The terminal service company (TOE 55-117) is the basic working unit in theater water terminal operations. It is organized to work a single ship on a two-shift, around-the-clock basis but may be employed to handle two ships simultaneously in a one-shift, 10-hour day without changing its total daily capability.

b. The terminal service company may operate separately, or its operations may be integrated with those of one or more other terminal service and lighterage units supervised by the same battalion. When time, space, and tactical conditions permit, it is generally more economical for a terminal battalion to operate centralized equipment pools, maintenance shops, and documentation centers. Under these circumstances, the battalion controls the equipment, the maintenance personnel, and the documentation clerks of the companies. This relieves the company commander of all functions except handling cargo—discharging from ship to wharf or lighter and loading the cargo aboard clearance transport or moving it to a temporary holding area. When operating separately, however, the company must analyze proposed operations against equipment available and must notify the terminal battalion or group of any additional support needed. It must also perform all documentation needed to forward the cargo to its initial destination.

c. Higher headquarters provide or arrange for such services as utilities, finance, courts and boards, supply, medical, and maintenance support. The terminal service company is responsible for loading or discharging the cargo, placing it aboard clearance conveyances, documenting it, and, when necessary, moving it into temporary holding areas. Rail and motor transport clearance will be arranged for on a mission

basis by the headquarters supervising the operation. As in all discharge operations, the request for clearance conveyances is based upon the cargo disposition instructions, which also furnish the movements information necessary to forward the cargo to its initial destination.

23. Mission and Assignment

a. The mission of the transportation terminal service company is to load, unload, and transship cargo at conventional water terminals and in over-the-beach operations. In addition, the unit sorts cargo by destination and prepares all required documentation to account for and record the movement of cargo into and out of the terminal.

b. The terminal service company is normally attached to a transportation terminal brigade or terminal group and is further attached to a transportation terminal battalion for operational supervision. When committed in support of amphibious operations, the company is attached to an engineer amphibious brigade, group, or battalion.

24. Capabilities

a. A full-strength terminal service company has the following daily capabilities.

- (1) Discharging 1,350 short tons of mixed cargo, 1,200 short tons of general cargo, or 1,800 short tons of vehicles.
- (2) Loading 660 short tons of mixed cargo, 600 short tons of general cargo, or 900 short tons of vehicles.

b. For long-range planning purposes, a daily discharge capability of 720 short tons should be used in determining the number of terminal service companies required or for estimating

average terminal productivity in sustained operations under good conditions.

c. In beach operations, the effects of weather and sea state on the supporting lighterage unit in sustained operations may reduce productivity significantly below that given above. In planning for specific operations, consideration must be given to those factors which degrade the overall tonnage potential of these units over extended periods. These factors are described in FM 55-50 and FM 55-58.

25. Organization and Functions

The terminal service company is composed of a company headquarters, two ship platoons, two shore platoons, a documentation platoon, and a stevedore gear and equipment maintenance platoon.

a. Company headquarters consists of the commander, administration and supply personnel, and an executive officer for complete two-shift control when the unit operates around the clock.

b. Each ship platoon is designed to work one standard 5-hatch ship and is made up of five 15-man hatch sections. In normal 20-hour-day employment, each platoon works one shift. In discharge operations, the ship platoon is responsible for breaking the cargo out of the hold, lifting it over the side, and landing it on the wharf or into lighters. During loading, the ship platoon receives cargo at shipside, lifts it into the ship, and stows it in the hold. Each hatch section is composed of a hatch foreman, an assistant foreman, a signalman, 2 winch operators, and 10 longshoremen.

(1) The hatch foreman is responsible for loading or unloading the hatch assigned to his section. He usually stations himself on deck where he can observe the entire operation. He selects and obtains the proper type of cargo gear and equipment and assigns tasks for the personnel of his section during each operation. He supervises the positioning and rigging of booms, save-alls, cargo nets, etc., and observes and enforces safety regulations.

(2) The assistant hatch foreman personally directs and supervises the long-

shoremen working in the hold. He directs the stowing, bracing, and lashing or the breakout of the cargo and enforces safety regulations.

(3) On most ships, the winch operators are unable, while operating the winch, to see the cargo hook after it passes into the hold or over the side of the ship. A signalman positions himself so that he can see the draft at all times and makes certain that his signals can be clearly seen by the winch operators. Standard signals for winch operators are illustrated in TM 55-513.

(4) Modern cargo-handling methods require two winches for loading or discharging cargo. On some ships, the winches are located so that one man can operate both, and this is normally speedier and more efficient. In many cases, however, the winches are designed so that an operator is required for each, and both winchmen must be trained and teamed so that each is familiar with the other's habits and reactions. Both must be thoroughly trained in the operation of all the various types of winches found on modern cargo ships.

(5) Eight of the longshoremen work in the hold in two teams of four under the supervision of the assistant hatch foreman. The remaining two work on the wharfs in the discharge area or serve as jumpers on lighters alongside.

c. The shore platoons provide the materials handling equipment and personnel to load and unload cargo on the wharf or at the beach. Each platoon is made up of a headquarters and a cargo handling section, and each is manned for one-shift operation. Each cargo handling section is headed by a cargo equipment foreman, who is overall section chief, and a stevedore foreman, who supervises the longshoremen. Materials handling equipment operators and truck drivers are assigned to both sections, but the equipment of each is pooled and operated around the clock. The unit is authorized rough-terrain cranes, forklift trucks,

tractors, and dump trucks to handle cargo on the wharf or at the beach. The longshoremen move cargo to and from the ship's gear and into and from clearance and incoming transportation and assist in handling cargo moved within the terminal and temporary holding areas.

d. The documentation platoon accounts for all cargo handled by the company and prepares all transportation documentation required for the movement of the cargo within the terminal. The platoon is composed of a headquarters, a documentation section, and a cargo checking section, each of which is manned for two-shift operation. All cargo documentation at shipside is accomplished by the cargo checking section, which tallies each item as it is loaded or unloaded and ascertains that each is properly marked and documented. Two checkers are assigned to check cargo into or out of each hatch—one in the hold and one on the wharf

or in the discharge area. The 12 clerks in the documentation section are normally pooled with clerks of other terminal service companies in a battalion-operated documentation center. In those cases when the terminal service company is operating separately, the documentation section works directly with its parent unit in two shifts of six men each.

e. The stevedore gear and equipment maintenance platoon is responsible for storing, accounting for, and performing organizational maintenance on cargo equipment, gear, materials handling equipment, and other hardware authorized by TOE. Although not specifically designed for two-shift operation (that is, duplication of skills), the platoon is normally required to work around the clock, and the engineer repair technician in charge must assign his personnel to shifts in accordance with the amount and type maintenance to be performed.

CHAPTER 7

THE TERMINAL TRANSFER COMPANY

26. Mission and Assignment

a. The mission of the transportation terminal transfer company (TOE 55-118) is to transship cargo at Army air, rail, motor, and inland barge terminals. This includes unloading, segregating, cooping, temporary holding, documenting, and loading cargo whenever a change in carrier occurs.

b. The terminal transfer company may be attached to a transportation brigade in the field army area or to the transportation command in the communications zone.

- (1) When employed in the field army area, the company is normally attached to a motor transport group or to an aviation group. These attachments are on a mission basis and provide the group with the necessary cargo transfer capability. Operational control of the entire terminal facility is assigned to a battalion or a company of the group having primary transport responsibility.
- (2) In the communications zone, the company may be attached to a terminal brigade or group to operate inland terminals or transfer points directly related with the forward movement of cargo entering the theater through water terminals. The company or its elements may also be attached to a terminal battalion to support terminal service company shore platoons in relieving holding area congestion at water terminals by loading backlogged cargo onto clearance transportation.
- (3) The terminal transfer company is not normally assigned to operate at distribution points, but the company or its elements may be committed in

support of supply units performing these functions if cargo backlog or similar conditions indicate a requirement for temporary employment of this type.

- (4) Inland waterway terminal assignment of this unit is limited to the transfer of cargo between small canal boats and other transportation modes. Port, beach, and inland ship canal cargo discharge operations are functions of the transportation terminal service company.
- (5) The terminal transfer company may also be employed to assist in staging units taking part in airborne operations or to assist in clearing cargo backlogs in ocean terminals.

27. Capabilities

a. A full-strength terminal transfer company is capable of transshipping an average of 900 short tons of cargo daily. This tonnage capability is based on a 20-hour day and takes into account all procedures incident to the movement of the cargo.

b. Each operating platoon with its normal complement of personnel and equipment can transfer 300 short tons of cargo per day.

28. Organization and Functions

a. The company is organized and equipped to transfer cargo at all types of Army inland terminals except large inland waterway terminals serving ocean-type shipping. It consists of a company headquarters, an equipment platoon, and three terminal transfer platoons, each containing a platoon headquarters, a cargo equipment squad, and four 10-man cargo transfer squads. This structure includes personnel

to process and prepare documentation for all cargo handled and personnel and tools to perform organizational maintenance of unit equipment.

b. The terminal transfer company is equipped with 4,000- and 6,000-pound commercial-type forklifts, 15,000-pound rough-terrain forklifts, 20-ton rough-terrain cranes, handtrucks, roller conveyors, trucks and trailers, and various cargo slings necessary for the performance of its mission. Other equipment additions or substitutions may be provided for particular missions under special authorization. In addition, sufficient tools and repair parts are provided

for organizational maintenance of all unit equipment.

c. The company is normally employed with each of its three transfer platoons assigned to work a separate terminal. When elements of less than platoon size are needed, the required number of cargo transfer squads and the necessary equipment can be detailed to other terminals or transfer points for short periods. The company headquarters or platoon headquarters should be relocated when it is evident that administrative, maintenance, and communication problems can be reduced or eliminated by decreasing the distance between elements.

CHAPTER 8

PORT TERMINAL OPERATIONS

29. General

a. In order to efficiently accomplish its mission of placing men and materiel where and when needed, the Army logistics system must be planned and coordinated from its origin in the continental United States (CONUS) to its final destination in the theater. Cargo must be palletized or containerized to facilitate handling and consolidated for movement direct to the ultimate receiving activity or the most distant breakbulk point. Vessels must be stowed so that the integrity of consolidated shipments is maintained and sorting of components is not required in the theater. Upon arrival of supplies and material in the theater, the transportation command is responsible for continuing their uninterrupted movement as far forward as possible and to the consumer if feasible. Because this forward movement begins in the theater at the ocean terminals of arrival, the efficiency of the total transportation system is largely dependent upon the rapidity with which the terminal operating units discharge ships and clear cargo through the terminal.

b. A free flow of information on an informal basis is necessary to augment formal transactions and to assure that the movements systems of CONUS activities mesh with those of the theater. This information should include desired changes in port designators for individual shipping address codes as units displace or changes occur in the transportation system. Based on information received from the terminal operators, the movements control center advises Military Traffic Management and Terminal Service (MTMTS) and CONUS terminals of changed terminal capabilities (ability to handle particular commodities such as POL, ammunition, or heavy lifts, or increases or decreases in daily tonnage capabilities) and

other factors which influence either the CONUS or transoceanic routing of shipments.

30. Planning

a. *General.* Although passive defense against mass destruction weapons demands dispersion of ships and shoreside transfer activities, it is not intended that existing developed ports in a theater will be ignored. The physical layout of most harbors and ports is such that a limited degree of dispersion can be achieved within the boundaries of the port itself. Dispersion within an established terminal does not permit maximum utilization, but it does allow the commander to take partial advantage of the many facilities of the port without unduly endangering the accomplishment of his mission. The extent to which the commander uses the established terminal represents a calculated risk taken after a careful evaluation of the likelihood of a nuclear attack and the probable effect the destruction of the port would have on the theater logistical plan. However, to avoid creating targets for large, long-range nuclear weapons, for general planning purposes not more than four ships will normally be berthed simultaneously within a single port or harbor area or within an area less than 5 nautical miles square. In addition, the direct-line distance between ships and between ships and a major shoreside activity or built-up facility should be at least 1 nautical mile.

- (1) Planning must be based on the following factors: physical characteristics and layout of the port and/or beaches, logistical support requirements as determined by the overall scheme of operations, and the personnel and equipment which the terminal units must have to meet the target tonnage requirements. In both the

planning and operations phases, these factors greatly affect each other. The target tonnage factor is the basic factor, for it is in effect the mission of the terminal units. To accomplish this mission, personnel and physical facilities must be balanced. This will involve the employment of beaches, rehabilitation of destroyed or damaged piers, construction of new piers, use of indigenous labor and equipment, or a combination of these.

- (2) The ship and the terminal service company are the basic units to be considered in planning all discharge operations. Although the terminal service company is capable of discharging one ship around the clock at a rate of 1,350 short tons per 20-hour operating day, an average daily productivity of 720 short tons per company should be used for long-range planning purposes.
- (3) Using the ship and the terminal service company as basic factors, the fixed personnel and equipment factors may be determined. Upon determining these factors, planners can estimate requirements quickly and accurately for either pier operations or beach operations or a combination of both.

b. Operational Planning. The operations section of the terminal battalion begins its planning immediately upon receipt of the mission. The mission to discharge a specific ship will be accompanied by the ship's papers (cargo stowage plan, hatch lists, and ocean manifest) and the cargo disposition instructions. Planning is based upon these papers and the personnel and equipment available. It includes a determination of—

- (1) Point of discharge (wharf or anchorage).
- (2) Types of terminal units required.
- (3) Special equipment required for special or heavy lifts.
- (4) Priorities of discharge if any.
- (5) Arrangements for terminal clearance, including transportation required, depot capability to receive

cargo, and necessity for temporary holding or further segregation.

c. Ammunition and Hazardous Cargo Handling. Planning must also take into consideration the special requirements for handling ammunition and other hazardous cargo. Provisions must be made for classified storage facilities and properly cleared personnel for handling classified cargo (AR 700-65). Constant coordination between terminal operators and ammunition units on the inspection, unloading, clearance, courier service, safety, and special security requirements for conventional and special ammunition entering terminals is an absolute necessity. Special requirements governing the transportation and handling of military explosives and other hazardous cargo on board vessels and in ports are provided in Coast Guard publication 108 (CG 108). Safety instructions for the special handling of water, air, rail, and motor transport shipments of biological materials and hazardous-type chemical cargo are contained in AR 55-8, AR 55-16, and AR 55-228. For a hazardous-type chemical shipment, FM 101-40 sets forth a requirement for a munitions safety control (technical escort) unit to guard shipments, protect personnel handling the shipments, dispose of damaged munitions, and decontaminate objects and areas accidentally contaminated during shipment. Details about the handling of chemical ammunition are given in TM 3-250 and TM 9-1300-206. Information on decontamination is given in TM 3-220 and instructions for first aid for individuals exposed to chemical agents are given in FM 21-41 and TM 8-285.

31. Estimating Throughput Capacity

A terminal battalion's mission will include an assigned tonnage based on the throughput capacity of the terminal. Terminal throughput capacity is the estimated daily tonnage that can be brought into, discharged, and cleared from the terminal. Terminal throughput capacity is determined by three major factors: terminal reception capacity, terminal discharge capacity, and terminal clearance capacity. The smallest of these three figures (expressed in tons) is the limiting factor and is therefore the terminal throughput capacity. For general planning purposes, each of these three capacities are estimated and expressed in short tons handled per

20-hour working day. The three factors are defined as follows:

a. *Terminal reception capacity* is the physical capability to receive ships into a harbor or coastal area and to accommodate them for discharge. This capacity can be expressed in an estimated tonnage that could be discharged from the accommodated ships daily and is based primarily on an evaluation of the physical facilities of the terminals (wharf spaces, anchorages, etc.).

b. *Terminal discharge capacity* is the number of tons that can actually be discharged from the accommodated ships daily. This capacity is based primarily on an evaluation of the available cargo-handling equipment and personnel.

c. *Terminal clearance capacity* is the number of short tons that can be moved through and out of the terminal daily on inland conveyances. This capacity is based on available clearance transportation and cargo-handling equipment and personnel over and above that engaged in direct ship discharge.

32. Ship Destination Meeting

a. Surface shipping destined for a major overseas theater is normally moved in Navy-controlled convoys. This procedure results in wide fluctuations in terminal workloads, as ships arrive in groups rather than singly. To determine where each ship in a convoy should be discharged and to what destinations its passengers and cargo should be shipped requires careful advance planning and constant coordination. The overall destination of shipping is determined at theater army support command (TASCOM) staff level.

b. The assistant chief of staff (ACofS), movements, TASCOM, conducts periodic meetings at which detailed ship destination decisions are made. Normally present at these meetings will be representatives of the TASCOM staff, the movement control center, the inventory control center, the principal mission commands (personnel, supply and maintenance, transportation), the U.S. Navy, and the Military Sea Transportation Service (MSTS), as well as the host nation and allied forces which may be concerned. The transportation command commander will normally have his terminal commander (brigade or group) accompany him to

these meetings to provide information on current and projected water terminal capabilities. Based on the workloads of the theater terminals, relative locations of depots for inbound cargo, and the capabilities of the segments of the transportation system, incoming ships are directed to a particular water terminal for discharge. Upon determination of the terminal of discharge and based on cargo destination information furnished by the inventory control center, the movement control center issues cargo disposition instructions and determines the mode of transport to be used for the movement of cargo from the terminal of discharge to its designated depot. This information, together with vessel manifest information, is relayed to the terminal battalion responsible for the terminal at which the vessel is to be discharged. This plan is included in the TASCOM movements program, and extracts are furnished to the consignee and to interested transportation movement offices so that they can plan for receipt of the cargo. Based on the cargo disposition instructions, the terminal battalions make plans and give specific assignments to terminal units for discharge of vessels and for terminal clearance.

c. After the major decision as to disposition of the incoming shipping is made, there are a number of actions which the terminal brigade or group must coordinate with other agencies before ship discharge and port clearance operations can commence. Principal among these are—

- (1) Detailed cargo disposition instructions for military and civilian aid cargo, to include diversions, and detailed routing instructions.
- (2) Arrangements for the clearance of personnel and cargoes which are to be moved directly forward, bypassing TASCOM rear area facilities.
- (3) Individual ship berth assignments.

d. Ship berth assignments require coordination with local MSTS representatives and may also involve local host nation authorities and will usually be done at the terminal battalion level. Detailed disposition and routing instructions for personnel and U.S. and allied military cargo requires coordination with the supply and maintenance command, the personnel com-

mand, and the recipient nation or allied command—the latter through the liaison officers attached to the terminal group. Disposition of civilian aid cargoes will require liaison with representatives of the government of the recipient nation; assistance in this matter may be given by foreign liaison officers and U.S. civil affairs agencies. The movements control center will provide detailed routing instructions for U.S. military cargo and will have personnel at each discharge site to assist terminal personnel. Movement control teams will also arrange for line haul transport equipment to be available to the terminal operators and will effect coordination with the transportation mode operators to that end.

33. Vessel Unloading

a. Based upon the vessel manifest and the cargo disposition instructions received, the terminal battalion plans the discharge of the individual ships. This planning includes the specific location within the terminal to be used, the method of discharge (floating or shoreside cranes, alongside or offshore discharge, and order of hatches and cargo within the hatches to be worked), and the designation of specific units to work each vessel.

b. The operating terminal battalions work closely with the local transportation movements office to insure that variations from the vessel discharge plan are coordinated with the clearance mode operators to prevent unnecessary delays to either cargo, personnel, or clearance transport equipment.

c. When a terminal service company has been assigned the mission of unloading cargo from a vessel and it has been determined that all papers (manifest, stowage plan, hatch lists, and cargo disposition instructions) are in order and that all cargo handling equipment necessary for the job is on hand, unloading operations can begin. Detailed procedures and techniques for unloading cargo vessels are contained in TM 55-513.

d. Before movement or unloading of the first draft of cargo, a boarding party goes aboard the vessel to inspect the cargo to be discharged and its manner of stowage. The boarding party may consist of all or a number of the following personnel with interests as indicated:

- (1) *The terminal operations officer*, who determines and reports the general condition of ship's equipment and facilities, delivers pertinent terminal regulations and orders of the terminal commander to the master of the vessel and to the military troop commander, obtains copies of ship's papers when advance copies have not been received, determines major damage to or pilferage of cargo, and obtains other information pertinent to the unloading to the vessel's cargo.
- (2) *A customs representative*, who checks for clearances, narcotics, and weapons, and performs other necessary customs activities in accordance with theater directives and laws of the host nation.
- (3) *An MSTS representative*, who determines from the ship's officers the requirements for repair, fuel, stores, etc., and delivers MSTS instructions to the vessel master.
- (4) *The surgeon and/or veterinarian*, who check for communicable diseases, sanitary conditions of troop spaces and facilities, and condition of perishable cargo.
- (5) *The harbormaster*, who coordinates matters pertaining to berthing, tug assistance, and employment of floating cranes and other harbor craft under his control.
- (6) *The ship platoon leader*, who coordinates the detailed plans for cargo unloading.
- (7) *Lighterage unit representatives*, who coordinate plans for the employment of lighters for unloading vessels at anchorage berths.
- (8) *The troop movement officer*, who coordinates plans for the movement of troop units or casualties through the terminal.

34. Cargo Clearance

a. Based on the location and on requirements for transport, the transportation movement office coordinates with the mode operators for the placement of appropriate transport at the

locations and times necessary to clear the cargo from the terminal. Cargo clearance is the act of moving cargo from shipside and transporting it to its first destination outside the terminal operating area. This first destination may be the final destination or it may be a rear area depot, and will be identified in the cargo disposition instructions.

b. The importance of prompt clearance of cargo cannot be over-emphasized. It is essential to the efficiency and success of the total theater logistics system, and it is necessary in order to avoid congestion in the terminal area. A continuing cargo backlog feeds upon itself and slows down operations to a point that it can bring on a collapse of the entire terminal effort.

c. The most efficient method of clearance is to discharge cargo directly from the ship to clearance transport; however, operating conditions do not always permit this. Conditions which may prevent direct clearance from shipside are: cargo mixed to such an extent that it cannot be segregated without delaying operations; special situations which require segregation by item, lot, or weight; lack of proper transport; inability of receiving installations to accept cargo; and delays in the receipt of cargo disposition instructions. When such conditions exist, cargo should be moved to temporary holding areas.

d. Temporary holding areas are usually located adjacent to or very near the pier discharge area. Cargo should never be placed in temporary holding areas until every effort has been made to clear it from the terminal. If temporary holding is necessary, the cargo held should not exceed 1 day's discharge and should be cleared from the terminal at the earliest possible time. If the amount of cargo in the temporary holding area becomes excessive, a terminal transfer element (platoon or company) should be attached to load clearance transport equipment as it becomes available in order to relieve the terminal service units discharging the ships from this additional and capability-reducing burden.

e. The number and location of temporary holding areas within the terminal depend upon

the availability of suitable sites, type and quantity of cargo to be discharged, equipment and personnel available, and the location and modes of transportation employed in the terminal clearance operation. The areas should have a hard surface and should be located between the discharge points and the inland transportation net to permit efficient use of materials handling equipment in moving cargo from shipside to the area, within the area, and from the area to the transportation net.

35. Vessel Loading

a. Although the primary function of a terminal organization in the theater is the reception, debarkation, and transshipment of troops and materiel, there are occasions when it is necessary to load troops and supplies aboard vessels leaving the theater. These outbound movements may vary from infrequent shipments to large-scale evacuations of cargo and personnel. The terminal commander's responsibility for outbound cargo is approximately the same as for inbound cargo. The primary difference is that the operation is performed in reverse order. It includes initiating port releases; booking, receiving, and stowing the cargo; and preparing the necessary documentation. The terminal group commander assigns the loading mission to a terminal battalion and conducts the necessary coordination with MSTs.

b. The ACofS, movements, TASCOC, establishes procedures for the movement of freight from points within the theater to the terminal for further movement to CONUS or other destination outside the theater. These procedures generally provide for the shipping agency to submit a request to the movement control center, which coordinates the necessary shipment actions at the periodic ship destination meetings. Then, based on overall workload, ship and delivery transport availability, and cargo location, a loading terminal is selected, the mode of transportation is determined, and bulk shipping space is allocated.

c. The terminal group issues cargo booking information to the terminal battalion operating the selected terminal, and this information is used to preplan vessel stowage, storage requirements, and operational workload. When the

berthing time of the vessel has been definitely established, the battalion assigns the loading mission and disseminates the following information to its subordinate units:

- (1) Location of loading berth.
- (2) Time that loading is scheduled to begin.
- (3) Time that cargo is to be received.
- (4) Estimated departure date of the vessel.
- (5) Special cargo to be loaded and materials handling equipment required.

d. Plans are made for the receipt, temporary holding, and movement of the cargo to the loading area, and port releases are forwarded to the shipping agency by the terminal battalion. Port releases are carefully scheduled to prevent interference with the terminal clearance program and to avoid delays in loading.

e. When the nature of the cargo has been determined, the battalion prepares the prestowage plan (TM 55-513) for loading the particular vessel with the cargo indicated. The prestowage plan is presented to the appropriate vessel authority for approval and, upon arrival of the vessel, it is presented to the ship's master or his representative for final approval. When the vessel is on berth, it is also necessary to conduct a thorough inspection of holds, hatches, and ship's gear to check for any difficulty that might arise during loading operations.

f. The prestowage plan prepared by the battalion and approved by the appropriate ship's representative becomes the basis on which to call cargo forward to the terminal area. In calling the cargo forward, the battalion commander must consider planned loading time aboard ship and the area available for temporary holding in the event that the cargo arrival time and loading time do not coincide. Before the time scheduled for the loading operation to begin, it is desirable to have sufficient cargo on hand for at least 1 day of the loading operation to insure continuous loading in case some shippers cannot meet the planned port call later. Cargo received before the loading time must be moved into a temporary holding area so as not to interfere with any clearance operation.

36. Documentation

a. *General.* Cargo moving through Army terminals is documented in accordance with AR 55-10, Military Standard Transportation and Movement Procedures (MILSTAMP). The basic document for all cargo movements under these procedures is the transportation control and movement document (TCMD), a multi-purpose form which can be prepared manually or mechanically as a punchcard. The manual version of the form, DD 1384, is a seven-part document, which is originated by the shipper for each transportation unit and which accompanies the cargo to the ultimate consignee. Detailed procedures for preparing and processing the TCMD and allied documents are contained in AR 55-10, but a general outline of the internal documentation procedures at Army terminals is provided in this paragraph. The TCMD is used—

- (1) To provide advance notice of shipment to consignees.
- (2) As an airbill, a highway waybill, a dock receipt, and a cargo delivery report.
- (3) For movement control of shipments worldwide within the Department of Defense transportation system, including in-transit reporting and tracing actions.
- (4) As a source document for mechanically prepared air and ocean manifests.
- (5) As a source of logistic management data.

b. *Inbound Movements.*

- (1) For ships outloaded in CONUS, MTMTS transmits manifest data to the terminal group by electronic means. The terminal brigade has the manifest reproduced in a format and in the number of copies required by the TASCOT staff, the movement control center and the inventory control center. After the discharge terminal for a ship has been determined, its cargo manifest is transmitted to the terminal battalion designated to discharge the ship.

- (2) The terminal battalion reproduces the incoming data in a format and in the number of copies necessary for the actual discharge of the ship. Detailed cargo disposition instructions are provided by the movement control center.
- (3) Upon arrival of the ship, the reproduced manifest is used as a basis for checking the cargo off the ship. The data as to quantity, identity, and condition of incoming cargo developed by the unloading terminal service unit are used to prepare the cargo outturn message and to reconcile the manifest. Upon reconciliation of the ship discharge data with the manifest, the terminal battalion prepares a cargo outturn report and forwards it to group headquarters for transmission to MTMTS and to other interested agencies as listed in MILSTAMP.
- (4) The above general procedures may have to be modified somewhat when ships arrive from theaters other than CONUS, especially if no data processing equipment is available at the loading port. In this case, the manifest will be forwarded by airmail or courier to the terminal group, which retransmits it to the designated discharge port. If the sea distance is short, the manifest may not arrive before the ship and the terminal battalion responsible for discharging the ship may have to obtain a copy of the manifest from the ship's master.
- (5) The TCMD will normally be used as the basic document for checking and documenting incoming cargo, although other forms, made up locally if necessary, may serve the purpose. The hatch checker originates a partial TCMD (in six copies) for each lighter or truck load. When drafts of cargo are moved away from the hook separately, a separate partial TCMD is made out for each draft. In order to avoid delays, the information the hatch checker transcribes on the TCMD should be confined to the data essential for identification and onward routing of the cargo, including—
- (a) Transportation control number (TCN).
 - (b) Destination (as per markings).
 - (c) Number and types of pieces (boxes, pallets, CONEX containers, giving the serial numbers of the latter).
 - (d) Commodity.
 - (e) Lighter or truck number.
 - (f) Signs of loss, pilferage, or damage to cargo.
 - (g) Vessel name, voyage number, stowage location.
 - (h) Checker's name and date.
- (6) The hatch checker retains one copy of the TCMD and turns the remaining five copies over to the lighter, vehicle, or forklift truck operator, or to another checker at dockside. The operator turns over four copies to the next custodian of the cargo, retaining one copy as a receipt and as proof of delivery.
- (7) Except when cargo is moved directly from shipside to a local consignee, it must be reconstituted into transportation units, such as rail car loads or line haul truck loads, before clearing the terminal area. These units may differ from those in which the cargo left shipside and may require new sets of TCMDs. A copy of these new, and more complete, TCMD's accompanies the cargo to destination. The TCMD forms the basis for the preparation of bills of lading, freight warrants, and train manifests as required. Both the hatch checker's partial TCMD's and the TCMD's prepared to cover onward movement are used by the documentation section of the terminal battalion to reconcile the ship's manifest and to prepare cargo outturn messages and outturn reports. They are used further by movement control personnel to notify the consignees that shipments are on the way and to follow the shipment's progress to destination.

c. Outbound Movements.

- (1) Procedures for offering cargo for shipment, handling movement releases, and documenting outbound cargo are subject to theater regulations. Theater regulations will be designed, however, for compatibility with Department of Defense procedures as laid down in AR 725-50 and AR 55-10.
- (2) The TCMD is used to cover outbound movements in either manual or punch-card form. Freight warrants and/or bills of lading will cover the cargo if shipped to the loading port by commercial means, and the TCMD will serve as backup for these documents.
- (3) In planning for handling outbound cargo, the terminal commander must consider the size of the shipment and the nature of the cargo because these affect the choice of loading berth as well as of equipment and personnel. Also of importance are the volume and schedule of inbound traffic and the clearance requirements created thereby.
- (4) The terminal service unit actually charged with loading the cargo prepares prestowage plans, which are subject to approval by MSTs, and the necessary ocean shipping documents (manifest, stowage plan, and, if required, hatch lists). Upon receipt of the ship loading data from the terminal concerned, the terminal group transmits the cargo traffic message to the discharge port and arranges for the forwarding of the ship's manifest data to destination by electronic means or by airmail/courier as appropriate. If more than one loading terminal is involved, each is responsible for notifying the next terminal of the ship's departure and for manifesting the cargo loaded. The final loading terminal consolidates the manifest and transmits it to the terminal group for further transmission to the destination terminal. The last loading terminal also prepares the ship's departure message.

d. Daily Operations Report. In addition to the documentation required by existing regulations, the terminal group will normally require that a daily operations report be prepared by each terminal battalion operating a port or beach terminal. This report will normally include the following information.

- (1) Number of passengers embarked, debarked, and awaiting embarkation and debarkation. Also, number of passengers to be handled during the next 24 hours.
- (2) Number of tons (weight and measurement) of cargo by major category (general, vehicles, POL) discharged, loaded, cleared (by mode), and awaiting discharge, loading, and clearance. Also, the number of tons booked and expected in the next 24 hours.
- (3) Number of ships which have arrived, have departed, remain in port, and are expected to arrive and depart during the next 24 hours. Also, the status of ships in port, such as discharging, loading, awaiting orders, under repair, etc.
- (4) Workload for the month so far, and anticipated for next month.
- (5) Summaries of available ship berths, number and capacity of lighters and trucks, number of gangs for ship and pier work, covered and open storage space, number of railroad cars which can be accommodated and cleared, etc.

37. Floating Craft Maintenance

a. Maintenance and repair of floating craft used in water terminal operations poses problems and requires arrangements which are somewhat different than for other types of equipment. Except for amphibians, which can move inland for maintenance work, maintenance and repair facilities for landing craft and other floating equipment must be located afloat or near the water's edge. This fact may also influence the location of units and facilities for the maintenance and repair of other equipment used in terminal areas.

b. The larger floating equipment items such as tugs, yard tankers, floating cranes, and beach

discharge lighters carry allowances of repair parts and are self-sufficient to a certain extent with respect to direct support and some aspects of general support maintenance. Smaller craft which carry few if any spares are more directly dependent on direct and general support units for their maintenance support. Floating repair shops of the floating craft general support companies provide the bulk of backup maintenance for floating equipment operating in port terminals.

c. Because of the wide dispersion of water terminal operations, much direct and general support maintenance, especially for amphibians and landing craft employed in logistic over-the-shore operations, will be provided by contact units. This will also hold true for emergency repair and salvage operations. An explanation of the floating craft maintenance system and the operation of support units is contained in FM 55-50.

d. A marine engineer technician on the terminal battalion staff is responsible for staff supervision of organizational and direct support maintenance for all marine equipment in the attached companies. He is additionally responsible for staff supervision of general support maintenance if this function is assigned at battalion level. This officer supervises correct recording of maintenance activities within the battalion in accordance with existing directives and conducts periodic inspections as necessary. He prepares reports of inspections, disseminates technical information, and provides technical maintenance assistance when required.

e. A marine maintenance officer is provided on the staff of the terminal group and terminal brigade to exercise staff supervision over general support maintenance functions for the command. The commanders of the attached general support units also act as special advisers on floating craft maintenance to the marine maintenance officer and to the terminal group or brigade commander.

38. Personnel Moves

Personnel moves may consist of casualties or units being redeployed or may occur as a part of a tactical operation. The transportation terminal units' responsibility for personnel moves

is discussed under the two general headings of inbound and outbound.

a. Inbound Personnel Moves (Debarkation).

- (1) In order to plan properly for the debarkation and disposition of personnel, the troop movement officer of the terminal group headquarters and the commanders of the terminal operating units (battalions and terminal service companies) require certain advance information. This advance information is obtained from approved movement programs; directives of higher headquarters; projected information, such as preembarkation radio messages and lists of personnel in embarkation terminal staging areas awaiting transportation to the over-sea theater; passenger lists; and pre-arrival information. The movement programs and projected information enable the troop movement officer and the rail and motor transportation planning officers to make advance plans.
- (2) The receipt of the passenger list enables the troop movement officer and others concerned to make specific and detailed plans for the reception of incoming personnel. The passenger list provides the name, rank, serial number, shipment number, and organization of all personnel aboard a vessel, broken down by units, casualties, officers, warrant officers, nurses, enlisted men, and civilians. This information is necessary for the staging areas to make preparations for billeting and messing. The staging area commanders notify the troop movement officer and the terminal operating unit commanders of the location of each unit's billet. The motor and rail transportation planning officers are also given this information. Based upon this information and the tentative date of the vessel's arrival, trucks and/or rail equipment can be ordered. The information contained in the passenger list is disseminated to all other interested agencies.

- (3) Usually the last item of advance information necessary to permit final planning is an accurate forecast of the estimated time of arrival of a vessel, which an oversea terminal ordinarily receives in the radio message sent by the ship's master 24 to 48 hours before the ship's arrival.
- (4) Detailed coordination is necessary at the terminal command level before the actual debarkation to provide the terminal battalion commander with the information and support required for an orderly and efficient debarkation. Agencies and personnel concerned with predebarkation planning and coordination include the following:
 - (a) Troop movement officer.
 - (b) Movements officer.
 - (c) Rail transportation planning officer.
 - (d) Highway transportation planning officer.
 - (e) Provost marshal.
 - (f) Post surgeon.
 - (g) Staging area commander.
 - (h) Replacement command (if casualties are involved).
 - (i) Commanders of the terminal operating units assigned this mission.
- (5) Items requiring coordination include the following:
 - (a) Estimated time of arrival of vessel.
 - (b) Exact mission assignment, including pier or anchorage and lighterage assignment for the vessel.
 - (c) Time debarkation operations are to begin and estimated time hold baggage and other impedimenta will be available.
 - (d) Final arrangements for: assignment of boarding parties, provision of adequate facilities for the use of debarking troops, order of debarkation, security measures, traffic control plan, provision of adequate transportation to effect terminal clearance, designation of routes to the staging area, and provision of escorts if trucks are used.

- (e) Special information, if any, which may affect debarkation plans, such as the length of time a vessel can remain at the terminal.

- (6) After effecting the necessary coordination, the troop movement officer publishes a debarkation order incorporating all final plans. If the estimated time of arrival is changed after the debarkation order has been published, the troop movement officer is responsible for securing and disseminating a new estimated time of arrival to all interested personnel as soon as possible. The actual debarkation is accomplished by the responsible terminal battalion and one or more of its terminal service companies.

b. Outbound Personnel Moves (Embarkation).

- (1) Careful coordination is required to assure an orderly and efficient embarkation. In addition to the personnel listed for debarkation (a(4) above), embarkation coordination also involves representatives from the embarking units and the military departments aboard the vessel(s).
- (2) The problems which must be resolved to provide the operating unit commander and others with the required information and support are similar to those incurred in inbound movements. Detailed plans and final arrangements must be completed for the following:
 - (a) Composition and designation of the advance party and the time it will embark. These advance details should include cooks; bakers; butchers, if necessary; kitchen police; guards; and guides.
 - (b) Baggage details, arrangements for the loading of equipment to accompany troops, and any additional equipment that appears on the organizational equipment list. (An officer from each unit or movement order of casualties should be appointed unit transport baggage officer.)

- (c) Method of transporting troops from staging area to shipside. Schedules, showing time of departure of each unit from the staging area and arrival and embarkation times at the pier.
- (d) Detailed traffic control arrangements, including military police to escort truck convoys through congested city areas if necessary.
- (e) Pier traffic plan.
- (f) Number of gangplanks to be used in the embarkation of each ship.

39. Communications

Efficient exercise of command and prompt transmission of information and instructions require the establishment of a reliable signal communications system. When operations are being conducted under dispersed conditions, the problem becomes more complex because of the increased distances between the headquarters and its subordinate elements. A good communications system among ports, depots, beach sites, and control points is essential. A wire communications system is preferable for this purpose, particularly in a static situation; however, radio or motorized messenger service may be used. Coordination of the complex operations incident to the proper functioning of a terminal group requires early establishment and continued operation of an efficient integrated signal communications network. Communications requirements are developed on a project basis and vary according to size and composition of the terminal organization and the number of sites operated. In addition to the communications traffic necessary to the operation and administration of a terminal group and its subordinate units, a requirement may exist for direct visual and radio communication with incoming or outgoing military-operated or military-controlled vessels for information concerning berthing, anchoring, movement, and status or for other operating instructions or information. When such a requirement exists, it will be developed on a project basis. Coordination of details involving planning, technical matters, supply, and person-

nel, including security, training, and operational procedures involving signal equipment and communications systems, is effected by the signal officer in accordance with policy established by the commander. The establishment of radio and telephone circuits to and between the terminal group and subordinate battalions is a command function for which the communications officer has planning and coordinating responsibility. Owing to the large volume of traffic generated by subordinate terminal units and the urgency for prompt transmission, total reliance on signal long lines is infeasible.

40. Area Defense

a. General. The terminal command and its subordinate units are required to defend their administrative and operating areas against enemy attack. Inasmuch as terminal units operate only in areas which are friendly from the outset or have been militarily secured, the principal types of ground attack to which they are subject will normally involve irregular forces and saboteurs. Terminal operating units are especially vulnerable to guerrilla attack when wide dispersion is practiced due to the threat of mass destruction weapons and/or the nature of the combat operations and the geography of the theater. Terminal units operating in developed port areas, on the other hand, are more vulnerable to sabotage and underwater demolition than to surface attack. The seriousness of these threats depends to a large extent on the attitude of the local population and on the effectiveness of local administrative, police, and security organizations.

b. Planning for Defense.

- (1) The director of plans, operations, and security is responsible to the terminal brigade or group commander for planning the defense of the operational areas of units under his jurisdiction. The defense will be planned in coordination with the area support commander. Other agencies with which prior coordination is required are the U.S. Navy and host nation civil and defense forces, if any. Cooperation with local host nation

agencies and establishment of communications with them are essential in the defense against guerrillas and the control of sabotage efforts.

(2) Included in the planning function are—

- (a) Thorough analysis of actual and potential enemy threats.
 - (b) Analysis of the physical features of the operational areas to determine the best method for organizing their defense with available resources.
 - (c) Analysis of local communications facilities to determine how they can augment or be included in the military communications system to advance defensive capabilities.
 - (d) Coordination of plans with those of the area support command.
- (3) On the part of the terminal brigade and its subordinate units, defense against air attack is passive; active defense will be provided by air defense units. Harbor defense and defense against submarine attack are naval responsibilities, which may be as-

signed to either U.S. or allied naval forces.

c. Nonmilitary Considerations.

- (1) The defense of water terminal areas directly or indirectly involves the local population. If the local population and authorities are friendly, defense will be facilitated or may even be confined largely to internal security measures. If the local population, or a material segment thereof, is unfriendly, area defense is vastly complicated, regardless of the official attitude of the authorities.
- (2) A perimeter defense will usually cause some residential areas to be inclosed. This causes serious security problems and imposes hardships on the local population. If the local population is considered unfriendly or unreliable, a choice will have to be made between clearing the area of all civilians or imposing strict controls to include pass systems, curfews, and screening. Assistance from civil affairs agencies and military police rear area operations centers will have to be sought in these matters.

CHAPTER 9

LOGISTICS OVER-THE-SHORE OPERATIONS

41. General

a. The probability that existing port capacities in many areas will be insufficient to support theater tonnage requirements and the possibility of the use of mass destruction weapons requires that emphasis in planning be shifted from large port complexes to widely scattered beach operations. For general planning purposes, it is estimated that upwards of 40 percent of all cargo entering a theater by surface means will be delivered through dispersed beach terminals. Accordingly, the senior terminal commander in the theater must continually plan and provide for the opening of new beaches to accommodate increased tonnages to replace the tonnage capacity of a port or beach that has been made untenable by enemy action, to relieve congested routes of communications, and to reduce the land transportation required to support the combat elements. Plans should include the proposed location and layout of the area, the type of lighterage to be used, the task organization necessary to attain the desired tonnage capacity, the route and methods of movement to the area, construction effort required, communication requirements, and logistical support procedures.

b. In planning for the opening of new logistics over-the-shore (LOTS) sites, the first step is to determine the beach areas available. The degree of dispersion that can be attained is directly related to the daily tonnage requirement and the size and nature of the assigned area. As soon as practicable after the limiting points of the area have been designated, reconnaissance should be made to determine the sites most suitable for operations. The selection of these sites should be based primarily on the existing capability to accommodate the desired tonnage. Major factors considered in selection

of beach discharge sites include tide, surf, beach gradients, bars, characteristics of the bottom and beach surface, anchorage areas, weather, and topographic features (FM 55-50 and FM 55-58).

c. The commander should not lose sight of the fact that LOTS operations are almost wholly dependent upon favorable weather conditions and that lighterage operations alongside a vessel are particularly hazardous if more than a moderate sea is running. Heavy surf conditions reduce the amount of cargo brought in by lighters and can cause suspension of the entire operation (FM 55-50).

d. After the initial reconnaissance has been completed and the terminal battalions have been assigned to dispersed sites along the coastline, the terminal group commander must insure that each battalion has the units, equipment, and other support necessary for the assigned mission. Beaches ideally suited for LOTS operations without prior preparation or alteration are seldom found, and some degree of engineering support is usually required to enable landing craft to beach and to provide exits from the beach to the discharge areas and the clearance transportation net.

e. At each LOTS discharge point, the beach area requires the closest attention and the greatest supervision. The success of each beach operation depends to a great extent on the efficiency of cargo operations on the beach itself. Supplies and equipment being brought to the beach must be kept moving across it toward inland destinations as rapidly as possible. A cluttered beach offers a lucrative target to the enemy and hinders the movement of cargo. The employment of amphibians (FM 55-50) to the maximum extent feasible for lightering

general cargo aids significantly in reducing beach congestion.

f. The employment of terminal units over widely separated distances along a coastline requires careful evaluation of the maintenance system supporting a complex of scattered operations. When operations are conducted in a dispersed situation, increased emphasis must be placed on organizational maintenance. Unit maintenance personnel should be well trained, and every effort must be made to remedy minor troubles in order to prevent costly breakdown of equipment. The terminal group standing operating procedure should establish the procedure for providing maintenance support. Floating craft units operating in support of terminal operations over an extended length of coastline require mobile marine repair facilities and on-site repair service.

g. In dispersed beach terminal operations, all terminal units, operating equipment, cargo, and facilities are separated as widely as operational efficiency permits. Troops, materials, establishments, and activities are spread over a wide area to avoid offering the enemy a concentrated target. Discharge operations are scheduled so as to offer the enemy a remunerative target as seldom as possible and for as short a time as possible.

h. Dispersion greatly increases the requirements for all forms of protection and should therefore be kept to a minimum consistent with the commander's estimate of the threat from area destruction weapons. Normally, the direct-line distance between ships and between ships and major shoreside activities should be at least 1 nautical mile. To avoid creating targets for large, long-range nuclear weapons, not more than two ships should be handled simultaneously at one beach terminal, and these should be kept at least 1 nautical mile apart. The distance between each of these two-ship discharge sites should be at least 5 nautical miles.

i. Each of these two-ship terminals will be under the direct operational supervision of a terminal battalion and, as a minimum, will be manned by two terminal service companies, two light or medium amphibian companies, one medium boat company, and a lighterage direct support element. In addition, one or

more truck companies may be attached for intraterminal transportation and clearance assistance, and terminal transfer elements may be required to aid in clearing cargo backlogs in the discharge areas. Harbor craft teams may also be attached as required. The functions of a number of these terminals, dispersed along a maximum of 150 miles of shoreline, will be coordinated by a terminal group or brigade. General support maintenance for the lighterage employed is provided by the floating craft general support company (TOE 55-157) as described in FM 55-50.

j. The minimum troop assignments given above are based on the average planning factor that 25 percent of all cargo entering a theater will be vehicles and other heavy lifts and that the remainder will be general cargo. Of the 2,700 short tons of mixed general cargo which two terminal service companies are capable of discharging per day (1,350 each), 75 percent, or approximately 2,000 short tons, will be lightered by the amphibian units (1,000 tons each) and the remaining 25 percent (approximately 700 tons) will be delivered ashore by the medium boat company.

k. In addition to the environmental factors delineated in this chapter, the same planning considerations and the same operational functions and procedures described in chapter 8 must be provided for and carried out by the terminal organizations assigned to conduct LOTS operations.

42. Reconnaissance and Site Selection

a. Normally, the initial selection of possible beach sites for LOTS operations is made by the terminal group or brigade commander in consultation with proper naval authorities from an extensive study of maps and hydrographic charts and from an analysis of aerial reconnaissance reports. Final determination as to the feasibility of operations at these sites is made by a detailed ground and water reconnaissance of the selected area. Each of these should be as thorough as time and the situation permit. Aerial reconnaissance is useful in verifying information obtained from the map reconnaissance. Road nets shown on the map may have been destroyed or made impassable, new roads may have been built, bridges may

have been destroyed, or structures may have been built on the beach. It is imperative that naval authorities be consulted early in the study so that advice about possible anchorage areas as well as about difficulties and hazards to navigation will be available as early as possible.

b. The party to conduct the ground and water reconnaissance must include personnel capable of advising the terminal group commander on such matters as—

- (1) The engineering effort required to prepare and maintain the area.
- (2) The signal construction and maintenance required for necessary communication within the beach area, as well as between the beach area and the terminal group headquarters.
- (3) The need for and location of beach dumps, transfer points, maintenance areas, etc.
- (4) The type of lighterage that could be employed most effectively.
- (5) The need for and location of safe haven facilities for lighterage.
- (6) The location and desirability of anchorage areas.
- (7) The possibility of using spud piers and other special equipment.
- (8) Vulnerability to enemy attack of the terminal area, its seaward approaches, and its connections with the interior.

c. The typical reconnaissance party should consist of but should not be restricted to the following personnel:

- (1) Representatives of the terminal group commander to coordinate or supervise the reconnaissance team and to recommend task organization.
- (2) The terminal battalion commander and appropriate members of his staff.
- (3) An engineer officer, preferably from the supporting engineer unit.
- (4) A signal officer, preferably from the supporting signal unit.
- (5) Representatives of amphibian units to be employed to locate desirable en-

trances to and exits from water, transfer points, etc.

- (6) Representatives of landing craft units to be employed to select beach areas, anchorages, maintenance areas, navigation aids, etc.
- (7) Representatives of units with special type equipment to be employed.
- (8) Naval representatives to advise on anchorage areas and naval support required.

d. In addition to gaging beach area characteristics in accordance with the criteria described in FM 55-50 and FM 55-58, the reconnaissance party must determine whether the beach area selected has sufficient anchorage to accommodate the number and types of ships required to support the beach operations being planned. If the naval representative has indicated the anchorage areas that are acceptable to the Navy, they must be examined to determine whether the lighterage to be used can traverse the area between the anchorage areas and the beach. For example, sandbars or reefs just offshore may preclude the use of LCM's (landing craft, mechanized), LCU's (landing craft, utility), or barges in certain areas and necessitate the use of amphibians until a channel can be cleared. Among the salient features to be considered are—

- (1) *Depth.* For large cargo ships, a minimum depth of 30 feet and a maximum of 210 feet is required. The minimum depth is dictated by the maximum draft of ships to be discharged and the ground swell conditions; the maximum depth is imposed by the length and weight of anchor chain.
- (2) *Size.* A circle with an 800-foot radius is required to provide a free-swinging area. Dispersion requirements, however, may necessitate a much larger radius if operations are being conducted under threat of atomic warfare. Bow and stern mooring is not considered desirable in tidal areas because athwartship currents cause excessive strain on mooring gear and appreciable changes in depth necessitate continuous watching of the anchored vessels. The type of offshore

bottom also has a significant bearing on how close ships can be anchored to each other because a ship will drag anchor if the bottom is too rocky or slushy.

- (3) *Landmarks.* Landmarks (especially those assisting navigation and location of beaches), such as prominent hills, are helpful.
- (4) *Underwater obstacles.* Underwater obstacles, such as bars, shoals, reefs, rocks, wrecks, and enemy installations which might interfere with the passage of vessels to and from the area should be noted. An estimate should be made of the degree of interference offered and the amount of work involved in clearing channels.

e. During the reconnaissance, the terminal battalion commander also selects and assigns company areas and frontages, indicates areas of defense responsibilities, and tentatively organizes the area of operations. Upon completion of the reconnaissance, the findings are analyzed and the most desirable beach areas are selected. Alternate beaches are chosen and listed in order of suitability. The sites selected are submitted by the battalion commander to the terminal group commander along with a written plan for implementing operations at the selected beach.

43. Beach Capacity

a. General. For general planning, beach capacity may be determined by applying the data contained in FM 101-10-1. However, these data are based on average conditions and are seldom applicable to a specific beach operation. To determine the capacity of a particular discharge site, several factors must be considered. These factors can be divided into two groups—those which limit the cargo handling capacity of the beach and those which restrict the flow through the area because of the nature of the beach and the hinterland. The group of factors which most limit the quantity of supplies that can be handled determines the capacity of the beach.

b. Factors Affecting Handling Capacity.

- (1) Personnel available for discharging

ships and handling cargo on the beach and in the discharge areas.

- (2) Type and availability of mechanical aids and transportation equipment for beach clearance.
- (3) Types and amount of lighterage available for operation.
- (4) Enemy's ability to interrupt operations.

c. Limitations Imposed by Terrain. Most of these factors are self-explanatory but, since beach exits and the nature of the hinterland play such important roles in beach capacity, they are discussed in detail. Possible limitations are—

- (1) Length and width of the beach.
- (2) Underwater obstacles.
- (3) Tidal range.
- (4) Strength and directions of tidal stream (rip currents and littoral currents).
- (5) Surf.
- (6) Gradient of beach as it affects the landing of lighterage and the movement of supplies across the beach proper.
- (7) Bearing surface of the beach.
- (8) Availability and nature of beach exits.
- (9) Nature of the hinterland.
- (10) Weather.

d. Beach Exits.

- (1) The capacity of a beach to discharge and clear supplies and personnel to inland destination is often limited by the capacity of the road net from the waterline to dumps, to principal inland areas, and to the interior communications net. The useful capacity of the beach can never exceed the capacity of this road net. Therefore, an early and detailed analysis must be made to determine the capacity of the existing road net. If the capacity is inadequate, new roads must be built. This requires additional engineering support both for construction and maintenance.

- (2) The number of exits required varies according to the physical characteristics of the roads, the type and amount of cargo to be handled, and the type of conveyance to be used in beach clearance. Different types of equipment should have separate routes.
- (3) The nature of the area adjacent to the beach is a factor which may limit the number of possible exits from the beach. An otherwise ideal beach may be backed by sand dunes, seawalls, swamps, or other obstacles which hamper beach clearance operations.

c. Hinterland. In the selection of a beach for unloading cargo, the reconnoitering officer must consider more than the beach and its exits. Thought must be given to the availability of a road or rail net or the possibility of building one to tie the beach exits and/or beach dumps to the main transportation net. Consideration must also be given to the existence of or need for telephone and telegraph lines, radio stations, and powerlines. If suitable roads exist, thorough reconnaissance should be made to determine their exact physical characteristics. The strength and width of any bridges in a road net are of prime importance in evaluating capabilities or limitations.

44. Beach Transfer Points

a. The requirement for beach transfer points must be considered during the reconnaissance and their locations should be designated.

b. Beach transfer points are those locations where cargo is transferred from amphibians to a clearance mode of transportation for delivery to destination. A desirable beach transfer point will have the following characteristics:

- (1) It should be located to the rear of the beach so as not to interfere with operations at the shoreline (FM 55-50).
- (2) It should be on the route the amphibians travel in moving from and to the water.

- (3) It should be near the clearance route from the beach where cargo trucks moving in the traffic pattern can receive their load without interference with other traffic and still have access to and exit from the transfer point.
- (4) It should be so selected that the amphibians will cross the beach and make it unnecessary to prepare a beach roadway for the cargo trucks.
- (5) There should be room for a roadway on either side of the materials handling equipment operating at the transfer point so that there is no interference between the amphibian and the cargo truck.
- (6) Cranes should be located on firm, level ground with their longer axis parallel to the direction of movement of the vehicles so that the loads can be transferred with the least amount of movement of the boom.

45. Temporary Holding Areas

a. In general, the problems of cargo clearance in beach operations are the same as for conventional port terminals. However, differences in the physical characteristics of the operating areas may require modification of procedures and use of different types of equipment. In an ideal situation, clearance transportation capacity is balanced with the discharge capability and the cargo is moved through and out of the terminal area as fast as it is unloaded from the ships. This balance seldom occurs, however, and some degree of cargo backlog must be anticipated and provided for by the establishment of temporary holding areas. These areas should be located near the transfer points used by amphibians to accommodate the cargo that cannot be immediately transferred to clearance conveyances. Cargo unloaded from landing craft that cannot be immediately cleared should also be brought to these same holding areas to avoid congestion and cargo pileup on the beach.

b. When clearance transportation later becomes available to move this cargo from the holding areas, an additional burden is imposed on the terminal service companies engaged in

their primary task of unloading lighters delivering cargo from the ship. Any effort diverted by these units toward handling cargo in the holding areas only serves to impair capability to keep the lighters moving, and if this practice is continued, the entire operation will eventually collapse. This problem is solved by assigning terminal transfer elements (squads, platoons, or companies) to load backlogged cargo in the holding area onto clearance transportation, thereby maintaining the flow of cargo out of the terminal without disrupting the discharge operation at the ship by slowing lighter turnaround.

c. Temporary holding areas should be located away from the main clearance roads in order to minimize road congestion and to present less lucrative targets. Roads leading from the main clearance roads to the holding area must be kept in good condition, and each area should have a separate entrance and exit. If tracked vehicles are to be used as well as trucks and amphibians, separate traffic nets may be necessary. The ground should be level, firm, and dry, and the surrounding area should be large enough so that holding facilities can be expanded to meet anticipated maximum requirements.

46. Traffic Control

Adequate control over vehicles is a vital factor in the prevention of congestion in the terminal area and the prompt clearance of cargo to its initial destination. Careful consideration should be given to the following factors in controlling vehicular traffic in the beach area:

a. There should be a sufficient number of drivers for around-the-clock operations.

b. The employment of motor transport equipment should be carefully planned for maximum utilization.

c. Motor transport units should be pooled at group level or attached directly to the operating terminal battalions in accordance with requirement fluctuations and the degree of dispersion between beach sites.

d. Capacity loading of vehicles should be accomplished whenever this practice is consistent with cargo segregation requirements.

e. Where practical, vehicles should be loaded in such a way that they can be unloaded completely at one discharge point.

f. Control procedures should be set up to provide readily available information on the location and current employment of all motor transport facilities so that equipment or units can be diverted with a minimum of disruption of the overall operation.

47. Beach Management

The requirements for clearing personnel, supplies, and equipment from the beaches usually exceed available capacity. Careful planning and close supervision are necessary to achieve maximum use of the available equipment, personnel, and facilities. Some measures which assist in clearing supplies and equipment from the beach area are—

a. Making maximum use of amphibians.

b. Continuous improvement of the beach in general to increase overall operational capacity and efficiency.

c. Advance planning to enable the handling of peak workloads without disrupting operations.

d. Maintenance of close liaison and coordination with the transfer points and temporary holding areas so as not to exceed their receiving capacities and yet maintain a near-capacity flow of cargo to them.

e. Separation of landing points for amphibians and landing craft to prevent clearance conflict.

f. Holding documentation, records, and reports to a minimum.

g. Location of beach parking areas for materials handling equipment and clearance vehicles in areas readily accessible to the discharge points.

h. Adoption of an enforced traffic circulation plan to avoid conflict in the flow of traffic.

i. Location of bivouac areas and messing areas so as to prevent unnecessary loss of time in moving personnel to and from working points.

j. Adoption of alert systems and defense plans to prevent a surprise enemy attack and to enable the terminal to maintain an adequate defense.

48. Expediting Unloading Operations

When unloading operations are being conducted, terminal service company personnel should be constantly alert for new ways to expedite the movement of cargo. Some practical expedients are—

a. Where operating conditions are favorable such as moderate surf, firm beach, etc., empty semitrailers may be placed in the landing craft and the cargo may be loaded into the semitrailers at shipside. When the landing craft is beached, the semitrailer may be towed directly from the landing craft to the depot or to the temporary holding area, thus eliminating a shoreline transfer operation.

b. When barges are used in the discharge operation, stowage of cargo aboard and the movement of the cargo to the hook of fixed or mobile shorebased cranes may present a problem. The use of forklift trucks aboard a barge and a crawler crane alongside a dried-out barge has been found practicable to facilitate operations.

c. Normally, crawler cranes are necessary at the shoreline when cargo must be lifted from landing craft and placed in highway transportation. Surf action, unless protected against, causes sand to wash from under the tracks of the crawler, with the result that the crane tips over when picking up a lift. In this type of operation it is helpful to install a wider track on the crane, to operate from a floating platform or a platform fabricated out of sandbags or some other material that will hold against washing action of the surf, or to use a perforated splashboard on the seaward side of the tracks to break surf action and retain sand under the tracks. Crawler cranes must be protected from corrosive action caused by the salt water. A heavy coating of grease and frequent washing with clear or fresh water protect against this danger. Soft sand provides poor traction for wheeled vehicles. An expedient which may be useful is a reasonable less-

ening of air pressure in pneumatic tires. The decreased pressure facilitates movement in sand.

d. Pontoon causeways, if available, or causeways made of sandbags or other solid material, reaching from the shoreline to the beaching area of large landing craft on shallow beaches, will facilitate the unloading of motor vehicles. These causeways will eliminate the possibility of drowning out, because vehicles can roll ashore without passing through the water.

e. Each terminal service company operation site should have at least one truck dispatcher when clearance is being accomplished by truck. The dispatcher uses the transportation control and movement document to back up his dispatch slip which shows destination of load. He can thus dispatch loaded trucks immediately, saving time and avoiding the congestion which might result if there were only one dispatch point in the battalion area. If movement by convoy is dictated the formation of the convoy serials is expedited because of the faster rate of dispatch of single vehicles to make up these serials.

49. Shore-to-Shore Operations

Shore-to-shore operations—both tactical and logistical—may be conducted across or along rivers, between islands, along a coastline, or between a continental landmass and an off-shore island. Except for the fact that ocean shipping is not involved, terminal unit functions in these operations are the same as described herein for LOTS and amphibious operations. In a shore-to-shore assault, terminal organizations are attached to the combat unit conducting the operation and provide the same support as described in chapter 10. Command elements and relationships in logistical shore-to-shore operations are the same as in conventional water terminals and in ship-to-shore LOTS operations. The terminal service company ship platoons work in the loading area on the near shore, and the shore platoons operate discharge points in the objective area. Amphibian and landing craft units provide the lighterage service, and terminal transfer elements may be assigned to clear cargo backlogs.

CHAPTER 10

AMPHIBIOUS OPERATIONS

50. General

a. The Army component of an amphibious task force is a task organization formed of Army units assigned for the specific purpose of participating in an amphibious operation. This component is referred to as the *army landing force*. The composition and size of the army landing force vary with the type and size of the amphibious operation, the landing force mission, and the operational environment.

b. The army landing force and each of its subordinate echelons must be balanced forces capable of independent operations for the execution of the amphibious attack. An amphibious operation by its very nature requires reinforcement of the basic tactical element at each echelon of the landing force to provide combat support and interim combat service support capability pending establishment of normal support systems in the objective area. The Army meets the requirements of the amphibious operation through temporary internal reorganization of assault units and grouping of units as task organizations, including certain units which by design provide specialized support needed in the assault on a hostile shore.

51. Engineer Amphibious Units

Engineer amphibious units are among the Army units designed to provide specially qualified personnel and units for performance of combat support and interim combat service support functions as part of the Army force executing landings. Engineer amphibious units provide only certain specialized elements required for formation of shore parties to support various size landing forces as follows (for further details, see FM 5-144):

a. Engineer amphibious command: shore party headquarters for a corps landing force.

b. Engineer amphibious group: shore party headquarters for a division landing force.

c. Engineer amphibious company: shore party headquarters for a brigade landing team consisting of not more than two battalion landing teams.

52. The Shore Party

a. The shore party is organized to accomplish combat engineering type tasks which facilitate landing and passage of the beach obstacle and to afford an interim logistical support capability through development and operation of a beach support area. The conduct of shore party operations is a command function of the landing force. The army landing force commander exercises his shore party command function through the appropriate engineer amphibious commander.

b. Since engineer amphibious units provide only the basic components of shore parties, the shore party task organization at each echelon must include other combat and combat service support units as required. Among these are selected staff elements of terminal groups and terminal battalions, as well as terminal service companies, boat companies, and amphibian companies.

53. Relief of the Shore Party

a. As soon as the amphibious assault phase of the operation is completed and the landing force is firmly established on the beach, the shore party is dissolved and the engineer amphibious units are relieved in order to support combat operations inland or to start planning the next amphibious assault. Upon termination

of the assault phase, control of the beach support area is passed to a corps support command (COSCOM) or a field army support command (FASCOM), depending upon the size of the operation and anticipated theater development. Selected staff elements of these commands, as well as of the supporting transportation brigade, are initially attached to the landing force to facilitate a smooth transition of command when the engineer amphibious units are relieved. A terminal group or terminal battalion, operating under the transportation brigade of either a FASCOM or COSCOM, immediately assumes responsibility for water terminal operations in the objective area. The terminal service companies and lighterage units employed then revert to terminal battalion control and continue logistical beach operations in support of the landed force.

b. Other units attached to the engineer amphibious command for combat service support should be those which are scheduled to become elements of the FASCOM or COSCOM that is to assume base or theater development responsibility. This procedure insures continuity of logistical effort and reduces the shipping space required to transport logistical units to the objective area.

54. Terminal Group Staff Planning

a. The terminal group staff plans are based on personnel and cargo (tonnages and characteristics) to be landed on each assault beach of the amphibious operation and the subsequent logistics over-the-shore operations to be conducted in support of the landed force. These factors determine the transportation units and equipment that are required to accomplish the anticipated terminal operations. Transportation terminal, amphibian, boat, and truck units are among the principal elements that are attached to the engineer amphibious command. Plans for the employment of Army lighterage must take into consideration both the requirements for supporting or augmenting Navy lighterage during the amphibious operation proper and the assumption of the logistical lighterage role when the engineer amphibious command is phased out.

b. As the terminal operations in the early stages of an amphibious operation are actually

an interim function performed as a part of the shore party mission of the engineer amphibious command, a transportation troop list must be submitted to the engineer amphibious command headquarters for approval. When the troop list is approved, the plan is then developed for the embarkation, movement, and debarkation of the units required for the terminal operation and coordinated with the engineer amphibious command headquarters. Subsequently, another troop list, which includes other combat service support units normally assigned to the terminal group, is prepared for the logistical support of the objective area and submitted to the FASCOM (or COSCOM) through the transportation brigade for approval and coordination. Upon approval, a plan is developed for the embarkation, movement, and debarkation of these units. The terminal group staff coordinates with the transportation brigade staff in the selection of suitable sites (which may or may not be the assault beaches) for terminal operations to insure that the development of these sites and facilities is included in the base development plan.

55. Terminal Unit Functions

a. Selected elements of the terminal group or terminal battalion are attached to the engineer amphibious command at the beginning of the planning phase of the operation, with additional elements to be phased in later as the situation develops. Terminal service companies and lighterage units are attached as working elements of the shore party and actively participate in embarking and debarking the landing force and its equipment. This procedure insures continuity of water terminal operations when control of the logistical support effort passes from the engineer amphibious command to the relieving command (FASCOM or COSCOM).

b. Terminal group and battalion personnel perform liaison duties between the two commands and are actively employed in the planning for the operation. In the performance of their liaison duties, they send operational information, intelligence pertaining to beach operations, special supply requirements, and other appropriate planning data to the participating headquarters. The specific number

and category of personnel required are governed by the size and complexity of the particular amphibious operation.

c. The attached terminal units train with the shore party and support the assault elements by accomplishing combat service support functions within their capabilities and as required by the engineer amphibious command. These functions include embarking the landing force; unloading ships and aircraft in the objective area; initial receipt, unloading, movement inland, temporary holding, and segregation of cargo; and assisting troop units to land and move across the beaches. As the combat situation permits, the engineer amphibious command headquarters, with attached terminal group personnel, becomes operational ashore. Terminal group personnel supervise the operations of the terminal battalions as other transportation units are phased ashore and become operational under terminal battalion control.

d. When operating together, the FASCOM (or COSCOM) elements, including the transportation brigade and the terminal group, and the engineer amphibious command complement each other. Normally, the engineer amphibious command initially supervises the operation of

the entire logistical support effort, with certain elements of the terminal group attached. As the area is stabilized and space ashore permits, elements of the FASCOM, the transportation brigade, and remaining elements of the terminal group are phased ashore and the engineer amphibious command is phased out.

e. The landing force commander's decision to relieve the engineer amphibious command is dependent upon the tactical situation, the development of facilities, and the establishment of adequate logistical units and staffs in their operating areas. When the decision to relieve the engineer amphibious command has been made, the shore parties are dissolved and the attached service units are transferred from the engineer amphibious command to the relieving FASCOM (or COSCOM). Since the transportation units have been operating under the terminal group from the outset, the flow of supplies and vessel discharge operations are not interrupted by this transfer of control. Elements of the engineer amphibious command, if more appropriate units are not available, may be attached to the terminal group or the FASCOM (or COSCOM) to perform normal engineer functions.

CHAPTER 11

INLAND WATERWAY OPERATIONS

56. General

a. The use of inland waterways for military purposes is normally envisaged only in underdeveloped areas in which alternate modes are either lacking or insufficient. These waterways are used principally for civilian traffic and for restoration of the local economy. Further, it is assumed that rehabilitation of these waterways will be undertaken by local authorities and that a minimum of military effort will be diverted for the purpose, except where designated for immediate military use and equipment salvage.

b. Two advantages of using inland waterways as a transportation mode are the ability to move large quantities of volume cargo and the relative ease of movement of large, heavy, or outsized loads. Disadvantages include the slow movement of the carrier, the vulnerability to sabotage and enemy action, weather and seasonal interruptions such as flooding and freezing, location restrictions on direct movement of supplies either forward or laterally, and requirements for rehandling at a terminal or transfer point because of shipment diversions. For these reasons, inland waterway capability is incorporated into the transportation service only when sufficient transport capability cannot be provided by the other modes.

57. Inland Waterway Terminals

a. An inland waterway terminal normally includes facilities for mooring, cargo loading and unloading, dispatch and control, and the repair and service of all craft capable of navigating the waterway. Terminals either exist or are established at the origin and terminus of the inland water route, and intermediate terminals are located along the way wherever a change in transportation mode is required.

b. Terminals on an inland waterway system can be classified as general cargo, liquid, or dry bulk commodity shipping points. Terminals of the two latter types usually include special loading and discharge equipment that permits rapid handling of great volumes of cargo.

58. Organization for Inland Waterway Operations

a. When required, an inland waterway service may be formed to control and operate a waterway system, to formulate and coordinate plans for using inland waterway transport resources, and to provide for the integration and supervision of local civilian facilities used in support of military operations. This operational organization may vary in size from a single barge crew to a complete inland waterway service, depending upon the requirements. It may be composed entirely of military personnel or may be manned by local civilians supervised by military units of the appropriate transportation staff section.

b. Inland waterway units are normally a part of the theater army support command transportation intersectional service, but they may be assigned to the field army support command if the inland waterway operation takes place wholly within its area of responsibility.

c. Although an inland waterway service may be operated by a terminal group, a terminal battalion composed of appropriate terminal service, terminal transfer, harbor craft, boat, and/or amphibian units will most often be employed in this capacity. A typical inland waterway organization is shown in figure 4.

59. Estimating Inland Waterway Capabilities

When determining the capability of an in-

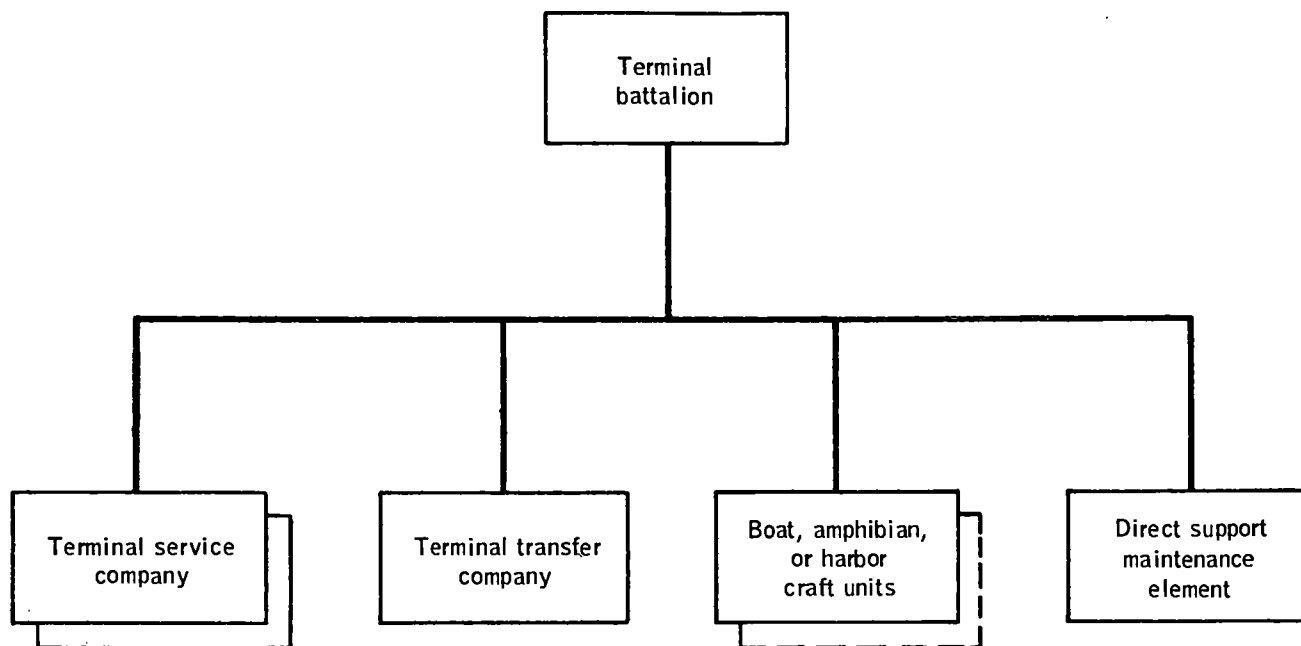


Figure 4. Sample organization for inland waterways service.

land waterway, the following must be considered:

- a. Restricting widths and depths of channel.
- b. Vertical and horizontal clearance of bridges.
- c. Location of dams or other bars to navigation.
- d. Location of locks; dimensions, timing, method of operation, and other limiting factors.
- e. Frequency, duration, and effect of seasonal floods and droughts.
- f. Normal freezeup and opening dates.
- g. Navigation hazards—rapids, falls, etc.
- h. Speed and fluctuation of current.
- i. Waterway maintenance requirements.
- j. Changes of channel.
- k. Availability of civilian and/or military craft.
- l. Availability of skilled bargemen, pilots, and tugboat operators from civilian and/or military sources.
- m. Number of terminals.
- n. Terminal facilities, including wharves, cranes, materials handling equipment, marine maintenance shops, and port clearance.

o. Ability of the waterway to displace its capacity daily over a considerable period of time.

60. Determination of Inland Waterway Movement Capability

a. *General.* The capacity of a waterway, the availability of craft, and the adequacy of terminal facilities are factors that must be considered when estimating inland waterway movement capability. Any of these factors may limit an inland waterway operation; each one must be examined to determine its impact upon the waterway movement capability. It is necessary, in the absence of definite information, to make certain assumptions when estimating inland waterway movement capability.

b. *Assumptions.* It is assumed that—

- (1) Waterway is usable.
- (2) Weather is favorable.
- (3) Civilian use of the waterway has been suspended.
- (4) Manpower and fuel are available and adequate.
- (5) Vessels are weight-loaded to 60 percent of capacity.
- (6) Average deadline rate is 20 percent.

- (7) Waterway operations are 15 hours per day.
- (8) Average speed is 4 miles per hour (6.4 kilometers per hour).
- (9) Port operations are 20 hours per day.
- (10) Cargo handling averages 30 tons per hour per barge.
- (11) Average locking cycle is 45 minutes.
- (12) Empties pass through the locks on the return trip.
- (13) Effect of current is ignored.
- (14) Cargo movement is only in one direction.

c. Waterway Movement Capability. There are two types of waterways—open and restricted. In this discussion, lakes, rivers, channels, canals, and other navigable inland bodies of water without locks or other restrictive features are open waterways, and waterways with locks or other restrictive features are restricted waterways. The actual movement capability of the waterway depends upon the length of time that the daily capacity can be maintained.

d. Capacity formulas.

- (1) *General.* The formulas given below may be used to determine movement capability over waterways. In these formulas and in the formulas for determining barge and tug requirements discussed in *e* below, the letters used have the following meanings:

A = number of barges

B = tons per barge

C = percentage of usable barges

D = factor for military loading. (This is the reduction factor that must be applied to each operation: it is determined by the loading and unloading of personnel, equipment, and facilities available.)

E = one-way distance in miles or kilometers

F = navigating operating hours per day

G = average speed in miles or kilometers per hour

H = actual load of one barge in tons

I = terminal handling rate in tons per hour

J = length of terminal working day in hours

K = number of locks

L = length of longest locking cycle in minutes

M = lock operating hours per day

N = tows per mile

O = number of passages per day

P = daily tonnage requirement

Q = turnaround time in days for barges

R = number of barges per tow

S = turnaround time in days for tugs

- (2) *Turnaround time.* The turnaround time in days for barges and tugs used in the formulas is the sum of navigating time, terminal time, and lock time. Methods of determining these times are—

$$\text{Navigating time} = \frac{E \times 2}{F \times G}$$

$$\text{Terminal time} = \frac{H \times 2}{I \times J}$$

$$\text{Lock time} = \frac{K \times L}{M \times 60}$$

- (3) *Capacity formula for open waterway.* A simple formula applicable only to open waterways is—

$$\text{Capacity in tons per day} = N \times G \times F \times B \times D$$

- (4) *Capacity formula for restricted waterway.* When the waterway is restricted but the number of possible passages per day is known, a simple formula is—

$$\text{Capacity in tons per day} = B \times O \times D$$

- (5) *Capacity formula for both open and restricted waterways.* If the number of possible passages per day is not known, but the basic information (information represented by the letters *A* through *M* in (1) above) is available, the following formula may be used for an open or restricted waterway.

Capacity in tons per day =

$$\frac{A \times B \times C \times D}{\frac{E \times 2}{F \times G} + \frac{H \times 2}{I \times J} + \frac{K \times L}{M \times 60}}$$

Example: How many tons of military stores per day can be moved on a 300-mile (483-kilometer) waterway that has 10 locks if—

One hundred 1000-ton capacity, self-propelled barges are available.

The percentage of useable barges is 80.

The factor for military loading is 0.6.

Navigating operating hours per day are 15.

Average speed is 4 miles per hour (6.4 kmph).

Load of each barge is 600 tons.

Terminal handling rate per hour is 30 tons.

Length of terminal working day is 20 hours.

Locking cycle is 45 minutes.

Lock operating hours per day are 15.

$$\text{Capacity} = \frac{100 \times 1000 \times .80 \times 0.6}{\frac{300 \times 2}{15 \times 4} + \frac{600 \times 2}{30 \times 20} + \frac{10 \times 45}{15 \times 60}}$$

$$= 3,840 \text{ tons per day}$$

e. Availability of Craft.

- (1) *Barges.* Barge requirements can be determined after the route capability is computed or after the daily tonnage requirements are established. The formulas given below may be used to determine the number of barges required for open and restricted waterways.

(a) Open waterway.

$$\text{Barges required} = \frac{P \times O}{B}$$

(b) Restricted waterway.

$$\text{Barges required} = O \times Q$$

- (2) *Tugs.* When tugs are used, the arrangement of the tows must be considered. It is sometimes possible to operate with fewer tugs than tows because the tugs do not have to wait in port while the cargo is being transferred. Moreover, one tug can often tow more than one barge. In planning a towing operation, the fit of the tow in the locks must be considered. The following formula can be used to determine the number of tugs or towboats required to move the available barges:

$$\text{Number of tugs or towboats required} = \frac{A \times S}{R \times Q}$$

f. Adequacy of Terminal Facilities. Generally, lack of terminal facilities does not restrict inland waterway movement since temporary berthing facilities can usually be constructed. Without mechanical handling facilities, general cargo can be handled at the rate of 10 tons per hour per barge. With forklifts, at least 30 tons per barge can be handled. Nevertheless, when existing port facilities are inadequate and additional facilities cannot be improvised, the existing port facilities may be the most restrictive factor in the entire movement. In such a case, the capacity of port facilities determines the inland waterway movement capability. This problem cannot be solved by using formulas; its solution requires careful analysis and sound judgment.

CHAPTER 12

INLAND TERMINAL OPERATIONS

61. Operational Environment

a. In most situations, field army transport services are provided principally by motor and air transport. Therefore, inland transfer operations are conducted chiefly at terminals and transfer points serving those modes. These terminals are established throughout corps and army rear areas as required to provide an adequate transportation service. If usable terminal facilities exist, they are incorporated into the transportation network. However, since transportation must be responsive to the combat service support needs, cargo transfer activities normally occur under austere circumstances. Terminals serving rail and inland waterways are established as required along existing routes whenever sufficient lift capability cannot be provided by motor and air.

b. Cargo transfer operations at inland terminals are conducted by the terminal transfer company in the field army area under the supervision of the transportation brigade in the field army support command (FASCOM) and in the communications zone under the transportation command of the theater army support command (TASCOM). Assignment and attachment, command relationships, unit functions, and operational techniques will vary in accordance with the needs of the respective terminals. The operational variations imposed by different modes of transport are discussed individually in this chapter.

c. FASCOM is established as a major subordinate unit of the field army to command and control field army combat service support units and operations. The FASCOM headquarters operates generally on the basis of assigning missions to subordinate units for execution—a system of centralized control and decentralized operations. Detailed functions and responsibilities

of the support command are contained in FM 54-3.

d. The transportation brigade provides transportation support on an Army-wide basis, deploying its units throughout the field army area to provide both local haul and line haul transportation support, transportation movements management, and terminal facilities. The structure of the transportation brigade is tailored to match the particular support requirements, and the number of subordinate units, including terminal transfer companies, will vary according to the situation. Figure 5 shows a type transportation brigade. Essentially, the brigade transport units provide the connecting link between the transportation intersectional services and direct support, general support, and/or using units in the field army area. In addition, the brigade provides forward-moving transportation for cargo delivered by Air Force aircraft into the field army service area. Detailed operational responsibilities of the brigade and its organizational elements are discussed in FM 55-9.

62. Staff and Unit Planning

a. A determination as to numbers, types, and locations of terminals within the theater results from staff planning at FASCOM/TASCOM and transportation brigade/Command level. Terminal planning at this level normally includes the following five-step process:

- (1) Computation of the terminal workload required to support the operation, expressed as cargo tonnage per day.
- (2) Estimation of terminal capacity, which is the total tonnage that can be received, processed, and cleared through the terminal in one day.

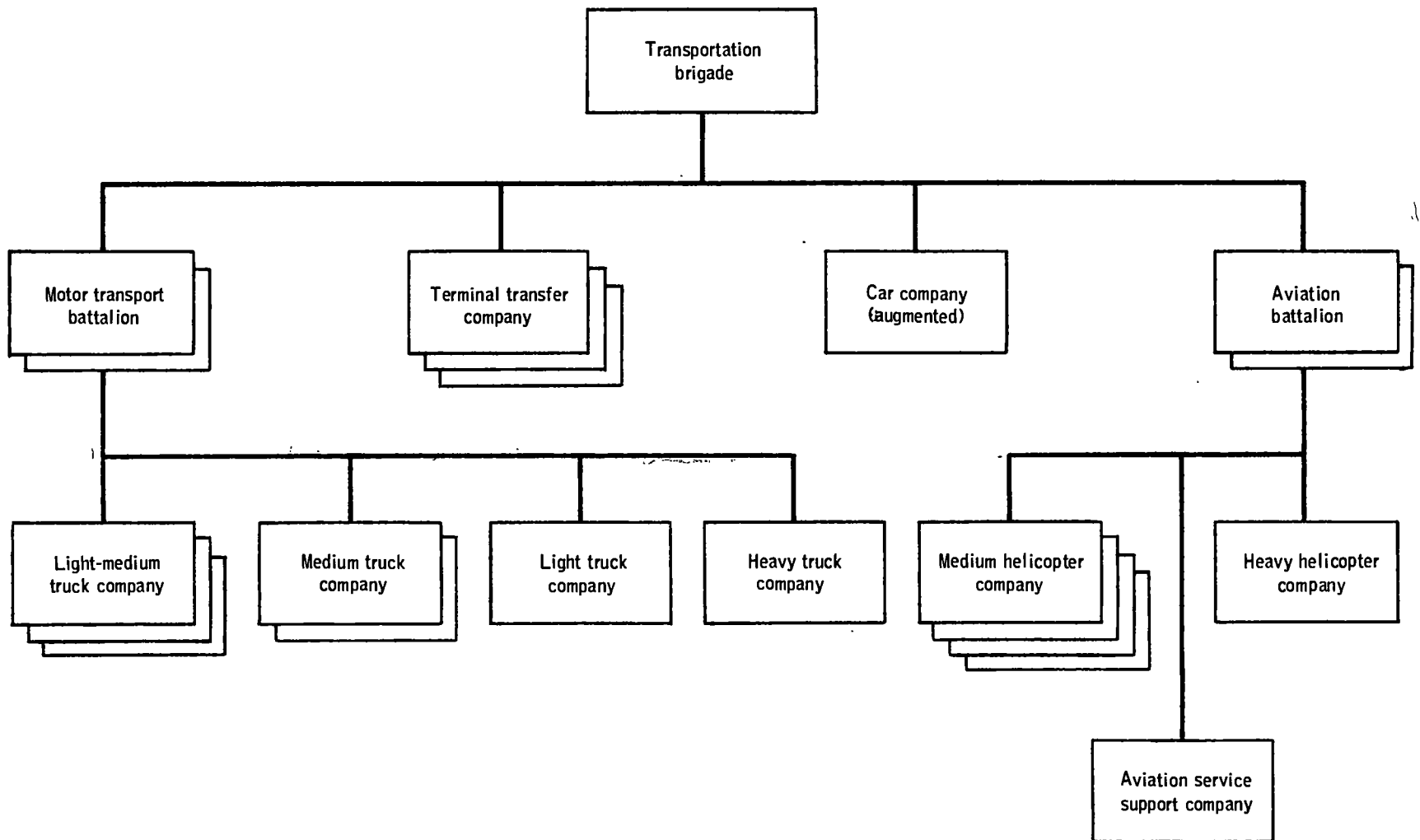


Figure 5. Type transportation brigade organization.

- (3) Estimation of construction requirements, which are the requirements for repair and rehabilitation of facilities and construction of new facilities necessary to increase the terminal capacity to equal the required terminal workload.
- (4) Estimation of equipment requirements, which is the amount of equipment needed to process the required workload through the terminal with maximum efficiency.
- (5) Estimation of personnel requirements, which are the units and individuals needed for administration and operation in processing the required workload through the terminal.

b. FM 101-10-1 contains a detailed checklist for estimating inland terminal capacity and treats terminal planning at staff level in detail.

c. Unit level planning begins when the company is assigned the mission to perform terminal transfer functions at a specific site. If the terminal facility exists before the assignment of the terminal transfer company or its elements, initial procedures will include a meeting between the transfer unit commander and the transport mode commander to define and determine mutual support requirements. The meeting should be followed by a joint inspection of the terminal area to acquaint the transfer unit commander with the layout. Tentative real estate allocations for all units to operate at or from the proposed terminal are normally made during this area reconnaissance.

63. Operational Planning

Once the area and general mission are assigned, the following factors provide the basis for operational planning by the unit commander:

a. Physical characteristics and layout of the terminal area—

- (1) Physical restrictions on working space.
- (2) Availability of hard surfaces in the transfer areas.

- (3) Existing facilities for storage and maintenance of materials handling equipment and other equipment.
- (4) Proximity of exit routes to transfer points.
- (5) Distances between unloading and loading points and temporary holding areas.

b. Characteristics of transportation equipment—

- (1) Number of individual carriers that can be handled simultaneously.
- (2) Turnaround time of delivery transportation.
- (3) Unit loading and unloading rates for types of transportation.
- (4) Effects of size and maneuverability of carriers on location of transfer points within the terminal.
- (5) Effects on use of and requirements for materials handling equipment.

c. Types of cargo to be handled—

- (1) Size and type of packaging.
- (2) Average weights of units of cargo.
- (3) Requirements for breakdown into smaller lots or consolidation for re-loading.
- (4) Shelter and protective requirements in holding areas.
- (5) Fragility and/or perishability.
- (6) Problems involved in and precautions for handling hazardous cargo.

d. Requirements for and selection of temporary holding areas—

- (1) Estimated availability of clearance transportation as compared with volume of delivery transportation.
- (2) Shelter and protection requirements.
- (3) Additional documentation required.
- (4) Distances from loading and unloading points.
- (5) Requirements for materials handling equipment in holding area.

e. Composition of work force—

- (1) Number and size of teams required, based on the above factors and the

planning guides outlined in paragraph 64.

- (2) Allocation of materials handling equipment according to types of carriers and types of cargo.
- (3) Arrangement of shifts for around-the-clock operation.
- (4) Provisions for consolidation of documentation.

f. Establishment of unit procedures for documentation, communications, supply, and maintenance of equipment.

g. Provisions for area defense and damage control (based on overall terminal and area plans).

64. Personnel and Equipment Requirements

a. Time studies of cargo handling operations indicate that the following are valid averages for long-range planning purposes:

- (1) When cargo must be handled entirely by hand, personnel requirements can be computed on the average of $\frac{1}{2}$ ton per man-hour for a 10-hour shift. For example, the number of men required to handle 120 short tons of cargo per 10-hour shift is computed as follows:

$$\begin{aligned}\text{Number of men} &= \frac{\text{Daily tonnage}}{\text{Shift length in hours} \times \frac{1}{2} \text{ ton per man-hour}} \\ &= \frac{120}{10 \times \frac{1}{2}} \\ &= \frac{120}{5} \\ &= 24\end{aligned}$$

- (2) The above formula is valid only for the normal 10-hour shift where the daily tonnage requirement is expected to remain constant. It includes the working supervisors but does not provide for documentation of the cargo. Generally, one cargo checker per shift is sufficient at each loading or unloading site. However, it is good practice to train terminal transfer unit cargo handlers as checkers to meet additional requirements should they occur.

(3) Normally, a maximum of five men can be effectively employed to load or unload an Army aircraft or truck by hand. This crew consists of a working foreman and four cargo handlers, or a half-squad. Two of the men work in the cargo compartment of the carrier and the other two on the ground, loading platform, or other carrier involved in the cargo transfer. The foreman divides his time between the two and assists as needed. One squad can load or unload two trucks or two aircraft by hand when the carriers are located close enough together to permit the squad leader and the single cargo checker to properly discharge their duties at each location.

- (4) An entire squad is required to load or unload a rail car by hand—four working in the car and four on the outside. The supervisor and checker assist as required.
- (5) Because inland waterway craft do not normally carry cargo that can be entirely manhandled, full employment of the equipment platoon and the cargo equipment squads is required in this type of operation.

b. Cargo should be transferred mechanically when the supplies are unitized and the materials handling equipment is compatible with the carriers. For planning purposes, the personnel requirements for mechanical handling of cargo by such equipment as rough-terrain forklifts, cranes and/or tractor-trailer trains is usually limited to an operator for each piece of materials handling equipment and appropriate supervisory personnel.

65. Air Terminals

a. Air cargo transfer operations within the theater take place at both Air Force and Army air terminals. The Air Force commander is responsible for providing terminal facilities at all points served by the Military Airlift Command or Tactical Airlift aircraft, including loading and unloading both the aircraft and Army clearance and delivery transportation. However, the Army commander may, by local agreement (AR 59-106), provide personnel to par-

participate in loading and unloading Army transportation at these facilities, and accept responsibility for loading and unloading Air Force aircraft at forward landing fields or airstrips that are not a regularly scheduled stop for tactical airlift aircraft. In each of these situations, the terminal transfer company or its elements would be employed. In addition, the transfer company or its elements may furnish personnel to load and unload Air Force tactical airlift command aircraft conducting Army unit moves.

b. FASCOM establishes and operates Army air terminals in corps and field army rear areas to support Army air lines of communication. Necessary facilities and services are provided at these terminals to obtain timely and effective air movement of troops and supplies and to facilitate efficient use of available aircraft. The senior Army officer of the transport units operating at these points normally acts as terminal commander. Terminal transfer units load and unload aircraft, document cargo moving through the terminal, and operate cargo segregation and temporary holding facilities. The transportation movements officer located at or near the terminal coordinates the flow of cargo and passengers into and out of the airlift system.

c. When Army aircraft are employed in a local distribution operation, shipping and receiving agencies, rather than the terminal transfer company, are responsible for loading and unloading aircraft.

d. At division level, the division support command is responsible for air terminal operations, establishing one or more air terminals according to the volume of cargo received or distributed by air. Normally, division air terminals are operated by the supply and transport battalion, but elements of the terminal transfer company may be transported by air to forward airstrips to unload cargo for limited periods of time.

e. Terminal transfer companies or their elements are assigned to air terminals on the basis of the daily tonnage to be moved through a terminal. In order to obtain a smooth flow of cargo through these terminals, capacities of clearance and delivery transportation must be

balanced with the transfer capability. The ideal situation is a perfect match in which cargo moves through and out of the terminal at the same rate that it comes in. This seldom occurs, however, and some degree of cargo backlog must be anticipated. If the backlog becomes too great, the throughput capacity of the terminal is reduced by the resulting increase in cargo handling within the holding areas. In all situations, every effort must be made to insure that cargo availability and clearance transportation are equal to the tonnage requirements of the ultimate user.

f. Most of the cargo delivered by air will be unitized on 40- by 48-inch pallets. The transfer unit's forklifts will be used to unload and move cargo from the aircraft unloading point to clearance transportation or temporary holding areas. Forklifts and cranes will be employed when loading or unloading surface transportation, and cargo discharged from aircraft will frequently be consolidated to make the most efficient use of the heavier cargo handling equipment. Conversely, cargo unloaded from surface carriers may have to be segregated and prepared into units compatible with aircraft space and weight capacities.

g. The transfer company is also provided with a variety of slings for rigging external loads for helicopter delivery, and arrangements must be made for periodic return of these items by the aircraft units so that a sufficient supply will always be available in the terminal.

h. Safety precautions to be observed during aircraft loading and unloading are outlined in appendix C (STANAG 3465).

66. Motor Transport Terminals

a. Motor transport terminals in the field army area are normally located at both ends of a line haul operation where they form the connecting link between local hauls and the line haul service. They may also be located at intermediate points along the line haul route where terrain conditions necessitate a change in type of carrier. Terminal transfer elements provide the cargo handling service at motor transport terminals and function under the operational control of the senior motor transport

commander. Cargo transfer at forward terminals is a responsibility of division support command personnel.

b. Motor transport unit capabilities extend from 720 to 2,160 short tons per company per day for local hauls and from 360 to 1,080 tons per day for line-haul operations. Therefore, terminal transfer requirements at motor transport terminals will range from an augmented platoon (additional squads) to two augmented companies (additional platoon), depending upon the number of truck units operating through the terminal.

c. Based on the planning factors noted in paragraph 64, a full-strength terminal transfer company is capable of discharging 12 trucks at a time when employed on a 10-hour-per-day basis. Both light and medium truck companies operate with an average availability of 45 vehicles, each making 4 trips per day in local haul operations and 2 trips per day in line hauls. In order to permit the truck units to maintain this turnaround schedule, each transfer squad must load or unload an average of one truck per hour. At normal manual handling rates, this average can be maintained with relative ease—particularly when 2½-ton trucks are being used. However, when heavier vehicles are employed, the unit commander must insure that handling rates keep pace with the truck turnaround schedules by carefully allocating the unit's heavier cargo handling equipment among the squads so that delays at each transfer point are held to a minimum.

67. Rail Terminals

a. Rail terminals may include yard tracks, repair and servicing facilities, accommodations for train crews, and railheads. They are located at originating and terminating points of trains and at sites which mark the limits of the rail operating divisions. A railhead is a small yard or terminal on or at the forward end of a military railway where troops, supplies, and equipment are transferred to other modes of transportation for further movement forward.

b. Army rail units provide an intersectional transportation service. The units are assigned to the transportation command, TASCOT, and

operational control is exercised by the transportation railway group or brigade. Rail capability within the field army will be exploited whenever usable facilities exist, provided tactical considerations are favorable. Fluidity of the front, ability to maintain air superiority, extent of guerrilla activity, and the attitude of the native populace are some of the considerations affecting the decision to employ rail units and the extent of their employment in the combat zone.

c. Terminal transfer units are employed at terminating railheads in the field army area to transfer cargo delivered from communications zone depots and terminals to forward-moving FASCOM transportation. When so employed, the transfer units works with the railway detachment operating the terminal but is under the operational control of the FASCOM transport organization responsible for further movement of the cargo forward.

d. The transfer unit's heavier cargo handling equipment, particularly the 20-ton rough-terrain cranes, will be put to maximum use at rail terminals. In general, the cranes will be employed to unload vehicles and other heavy equipment from flatcars and gondolas, and forklifts and conveyors will be used to discharge boxcars. Although heavier cargo items are handled in large proportion at rail terminals, the increased requirement for temporary holding and cargo breakdown and repackaging may tend to lower average handling rates, and this factor should be taken into consideration when throughput and clearance capacities are being computed.

e. As noted in paragraph 64, one cargo transfer squad, appropriately augmented with materials handling equipment, will be employed to unload each rail car. Although the capacities of U.S. rail cars average 50 tons each, 75 to 80 percent of the cars used in oversea theaters will be local equipment, most of which is rated in the 15- to 30-ton range. Generally, rail cars loaded with heavy bulky items such as ammunition, barbed wire, cement, vehicles, packaged weapons, and tools will be loaded to rated capacity. However, when the cargo is made up of such items as rations, clothing, and tentage, loads will average from 50 to 75 percent of the car's rated capacity.

f. Detailed information on transportation railway operations is contained in FM 55-21. Planning factors and other reference data are tabulated in FM 55-15.

68. Inland Waterway Terminals

a. Terminal transfer units are employed only at small intermediate cargo transfer points on inland waterway systems (ch 11). Limitations on the unit's employment at these points are the size and configuration of the waterway craft and the capabilities and capacities of the unit's cargo handling equipment. When the waterway delivery means is composed largely of barges, landing craft, and similar types of floating equipment, the terminal transfer company may be employed in the transshipping process. However, when larger, ocean-type shipping is operated, transportation terminal service companies (TOE 55-117) must be assigned for loading and discharge. In the latter situations, the terminal transfer unit may be assigned to support terminal service company shore platoons in relieving holding area congestion by loading backlogged cargo onto clearance transportation.

b. Generally, if the waterway originates in the field army area, the terminal transfer company will be attached to the organization operating the waterway. However, if the waterway system originates in the communications zone and is part of the intersectional transportation service, the transfer unit in the field army area will be under the operational control of the commander providing the clearance transportation.

69. Personnel Moves

While the terminal transfer company is designed to function primarily in cargo transfer operations, it may on occasion be required to assist in the movement of personnel through a terminal to which it is assigned. Situations in which it could be so employed are as follows:

a. *Intraterminal Unit Moves.* When requested by the troop movement officer or the terminal commander, transfer company personnel can assist in processing a unit through the terminal by serving as guides and by providing

transport and materials handling equipment for movement of the troops and equipment from the point of debarkation to the loading area.

b. *Casualty Evacuation.* Terminal transfer personnel may assist in evacuation of casualties only when requested to do so by the senior medical corps representative responsible for transfer to the patients and only in the manner directed by him and his assistants. Extreme care must be exercised when moving the sick and injured, and personnel untrained in this duty should not be used. However, the transfer operational can be materially aided by using unit personnel as terminal guides and as assistants in loading and unloading accompanying supplies and equipment.

c. *Prisoners of War, Refugees, and Displaced Persons.* Intraterminal movements of persons in these categories will be conducted under the control and supervision of military police and/or civil affairs personnel. When requested, members of the transfer company may assist as guards, guides, or interpreters and may help move property, supplies, and equipment.

70. Documentation

a. The terminal transfer company uses the transportation control and movement document (TCMD) (para 36) as a dock receipt for cargo arriving at the terminal, as a cargo delivery receipt when the cargo is cleared forward, as an accountable document during temporary holding, and as a record of all shipments handled. Spaces are provided on the form to record transshipment and temporary holding by location, time, and type of carrier. Normally, these are the only entries that will be made by terminal transfer personnel. However, when accompanying TCMD's are mechanically prepared or when extra copies are not available, record copies containing details such as control numbers, commodity designations, weight, pieces, cube, shipper, consignee, etc., will be prepared by the transfer company. In addition, a locally prepared register or index of these record documents should be maintained by platoon and/or company documentation sections.

b. The receiving checker is responsible for tallying the cargo actually received against the

accompanying TCMD and for indicating discrepancies, damages, improper packing, and improper or insufficient markings on the form. When the receipted cargo is to be immediately shipped out, the checker records transshipment and handling data in the spaces provided on the document, prepares record copies as required, and hands the completed TCMD to the operator of the forwarding carrier. The record copy is signed by the carrier and sent to the company or platoon documentation section for registering and filing.

c. If a shipment is to be held temporarily because of lack of sufficient clearance transportation, receiving and storage data are recorded on the accompanying document and a record copy is prepared for filing by the documentation section. When the cargo is ready for forwarding, the documentation section prepares any new documents necessitated by consolidation

or breakdown of shipments and turns these over to the proper checker, who completes the shipping information in the spaces provided. Completed record copies are then registered and filed by the documentation section.

d. In large terminal complexes, the volume of cargo handled may require more detailed shipment planning by the terminal transfer company, in which case a shipment planning worksheet may be used. This document, which is explained in detail in AR 55-10, facilitates assembly of shipment units and transportation units for both storage and transporting activities and provides a basis for preparation of the TCMDs.

e. Additional forms and documentation procedures that may be required will be explained in appropriate theater, FASCOM, or TASCOC directives.

CHAPTER 13
INTERMEDIATE STAGING AREA OPERATIONS

(To be published)

APPENDIX A

REFERENCES

1. Army Regulations

AR 55-8	Transportation of Biological Materials
AR 55-10	Military Standard Transportation and Movement Procedures (MILSTAMP)
AR 55-16	Movement of Cargo by Air and Surface—Including Less than Release Unit and Parcel Post Shipments
AR 55-228	Transportation by Water of Explosives and Hazardous Cargo
AR 55-510	Harbor Craft
AR 55-510-1	Harbor Craft
AR 59-106	Operation of Air Force Terminals
AR 220-10	Preparation for Oversea Movement of Units (POM)
AR 220-58	Organization and Training for Chemical, Biological and Radiological Operations
AR 320-5	Dictionary of United States Army Terms
AR 320-50	Authorized Abbreviations and Brevity Codes
AR 600-20	Army Command Policy and Procedure
AR 611-101	Manual of Commissioned Officer Military Occupational Specialties
AR 611-112	Manual of Warrant Officer Military Occupational Specialties
AR 611-201	Manual of Enlisted Military Occupational Specialties
(O) AR 700-65	Nuclear Weapons and Nuclear Weapons Materiel
AR 725-50	Requisitioning, Receipt, and Issue System
AR 735-35	Supply Procedures for TOE and TDA Units and Activities
AR 746-5	Color and Marking of Army Materiel
AR 750-1	Maintenance Concepts
AR 750-5	Organization, Policies, and Responsibilities for Maintenance Operation
AR 750-16	Maintenance of Transportation Corps Amphibians
AR 750-1900-1	Maintenance of Army Watercraft and Floating Equipment

2. Field Manuals

FM 3-12	Operational Aspects of Radiological Defense
FM 5-144	Engineer Amphibious Units
FM 7-11	Rifle Company, Infantry, Airborne, and Mechanized
FM 7-30	Infantry, Airborne, and Mechanized Division Brigades
FM 19-25	Military Police Traffic Control
FM 21-40	Chemical, Biological, and Nuclear Defense
FM 21-41	Soldier's Handbook for Defense Against Chemical and Biological Operations and Nuclear Warfare
FM 21-48	Chemical, Biological, and Radiological (CBR), and Nuclear Defense Training Exercises

FM 23-65	Browning Machinegun, Caliber .50 HB, M2
FM 29-22	Maintenance Operations in the Field Army
FM 30-5	Combat Intelligence
FM 30-16	Technical Intelligence
FM 31-11	Doctrine for Amphibious Operations
FM 31-12	Army Forces in Amphibious Operations (the Army Landing Force)
FM 31-15	Operations Against Irregular Forces
FM 31-20	Special Forces Operational Techniques
(C) FM 31-20A	Special Forces Techniques (U)
FM 31-21	Special Forces Operations
(S) FM 31-21A	Special Forces Operations (U)
FM 31-30	Jungle Training and Operations
FM 31-60	River-Crossing Operations
FM 31-70	Basic Cold Weather Manual
FM 31-71	Northern Operations
FM 44-1	U.S. Army Air Defense Employment
FM 54-3	The Field Army Support Command
FM 54-5-1 (Test)	Supply and Maintenance Command, TASCOC
FM 54-6-1 (Test)	The Area Support Command
FM 54-7	Theater Army Support Command
FM 54-8 (Test)	The Administrative Support Theater Army
FM 55-6-1 (Test)	Transportation Services in a Theater of Operations
FM 55-8	Transportation Intelligence
FM 55-9	Transportation Services and the Transportation Brigade in the Field Army
FM 55-10	Transportation Movements Services, Field Army
FM 55-15	Transportation Reference Data
FM 55-21-1 (Test)	Transportation Railway Units and Operations
FM 55-31-1 (Test)	Motor Transport Operations and Motor Transport Units
FM 55-46-1 (Test)	Army Air Transport Operations
FM 55-50-1 (Test)	Transportation Amphibian Operations
FM-55-57	Transportation Harbor Craft Units and Marine Maintenance Units
FM 55-58	Transport Boat Operations
FM 57-10	Army Forces in Joint Airborne Operations
FM 60-30	Embarkation and Loading—Amphibious
FM 100-5	Field Service Regulations—Operations
FM 100-27	U.S. Army/U.S. Air Force Doctrine for Tactical Airlift Operations
FM 101-5	Staff Officers' Field Manual: Staff Organization and Procedure
FM 101-10-1	Staff Officers' Field Manual: Organizational, Technical and Logistical Data, Unclassified Data
FM 101-10-2	Staff Officers' Field Manual: Organizational, Technical, and Logistical Data, Extracts of Tables of Organization and Equipment
(S) FM 101-10-3	Staff Officers' Field Manual: Organization, Technical, and Logistical Data, Classified Data (U)
FM 101-40	Armed Forces Doctrine for Chemical and Biological Weapons Employment and Defense

3. Technical Manuals

TM 3-220	Chemical, Biological, and Radiological (CBR) Decontamination
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TM 3-250	Storage, Shipment, and Handling of Chemical Agents and Hazardous Chemicals
TM 5-311	Military Protective Construction (Nuclear Warfare and Chemical and Biological Operations)
TM 8-285	Treatment of Chemical Warfare Casualties
TM 9-238	Deepwater Fording of Ordnance Materiel
TM 9-1300-206	Care, Handling, Preservation, and Destruction of Ammunition
TM 10-405	Army Mess Operations
TM 38-230	Preservation, Packaging, and Packing of Military Supplies and Equipment
TM 38-750	Army Equipment Record Procedures
TM 38-750-1	Maintenance Management: Field Command Procedures
TM 55-501	Harbor Craft Crewman's Handbook
TM 55-508	Landing Craft Operator's Handbook
TM 55-509	Marine Engineman's Handbook
TM 55-510	Amphibious Lighter: Operator's Handbook
TM 55-513	Transportation Corps Military Stevedoring
TM 55-1930-205-10	Operator's Manual: Lighter Amphibious (LARC-V), Self-Propelled, Diesel, Aluminum, 5-ton, Design 8005, FSN 1930-710-5728
TM 55-1930-206-10	Operator's Manual: Lighter, Ambibious, Resupply, Cargo (LARC-XV), Self-Propelled, Diesel, Aluminum, 15-ton, Design 8004, FSN 1930-710-5729

4. Technical Bulletins

TB 38-750/1	The Army Equipment Record System and Procedure: Protection and Storage of Army Equipment Log Book Assembly
TB 55-1900-201-12/1	Application of Nonslip Walkway Compound, Harbor Tugs
TB 55-1900-202-12/1	Floating Craft Preventive Maintenance
TB 55-1930-203-12/1	Installation of Ways, Stowing, and Launching of BARC from Cargo Vessels
TB 746-93-1	Color and Marking of Military Vehicles, Construction Equipment and Materials Handling Equipment
TB 746-93-4	Painting of Vessels
TB TC 11	Arc Welding on Water-Borne Vessels
TB TC 16	Standard Tug Boat Signals

5. Supply Bulletin

SB 38-100	Preservation, Packaging, and Packing Materials, Supplies, and Equipment Used by the Army
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6. Tables of Organization and Equipment

TOE 5-500	Engineer Service Organization
TOE 8-500	Medical Service Organization
TOE 10-()	Food Service Support Company
TOE 10-407	Airdrop Supply Company
TOE 11-500	Signal Service Organization
TOE 55-17	Transportation Light Truck Company
TOE 55-111	Headquarters and Headquarters Company, Transportation Terminal Brigade

TOE 55-112	Headquarters and Headquarters Company, Transportation Terminal Group
TOE 55-116	Headquarters and Headquarters Detachment, Transportation Terminal Battalion
TOE 55-117	Transportation Terminal Service Company
TOE 55-118	Transportation Terminal Transfer Company
TOE 55-128	Transportation Medium Boat Company
TOE 55-129	Transportation Heavy Boat Company
TOE 55-138	Transportation Light Amphibian Company
TOE 55-139	Transportation Medium Amphibian Company
TOE 55-157	Transportation Floating Craft General Support Company
TOE 55-158	Transportation Lighterage Direct Support Company
TOE 55-500	Transportation Service Organization

7. Army Training Programs

ATP 21-113	Personnel Aboard Ship and En Route to Oversea Stations
ATP 55-111	Transportation Terminal and Water Transport Units

8. Army Subject Schedules

ASubScd 21-6	Individual Protective Measures for Chemical and Biological Operations and Nuclear Warfare
ASubScd 21-22	Marches and Bivouacs
ASubScd 38-1	The Army Equipment Record Procedures
ASubScd 55-1	Organization, Mission, Functions, and Capabilities of Transportation TOE Units
ASubScd 55-8	Marine Maintenance
ASubScd 55-10	Introduction to Transportation Intelligence
ASubScd 55-11	Orientation of Vessel Personnel
ASubScd 55-12	Nomenclature and Types of Army Vessels and Amphibians
ASubScd 55-13	Marlinspike Seamanship
ASubScd 55-14	Transportation Intelligence
ASubScd 55-15	Shipboard Emergency Drills
ASubScd 55-16	Piloting and Navigation
ASubScd 55-17	Vessel Operations—Deck Department
ASubScd 55-20	Vessel Tows and Towing
ASubScd 55-21	Landing Craft Operations
ASubScd 55-22	Marine Communications
ASubScd 55-25	Water Terminal and Beach Operations
ASubScd 55-61A10	MOS Technical Training of Seaman and Harbor Craft Boatswain —MOS 61A10 and MOS 61B20 and Refresher Training of MOS 61B20

9. Army Training Test

ATT 55-111	Transportation Terminal Units and Teams
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10. Training Circular

TC 5-9	Near Infrared Night Vision and Detection Equipment and Its Application
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11. Department of the Army Pamphlets

DA Pam 108-1	Index of Army Films, Transparencies, GTA Charts and Recordings
DA Pam 310-1	Index of Administrative Publications (Army Regulations, Special Regulations, Circulars, Pamphlets, Department of the Army Posters, Joint Chief's of Staff Publications, and General Orders)
DA Pam 310-2	Index of Blank Forms
DA Pam 310-3	Index of Doctrinal, Training, and Organizational Publications (Field Manuals, Reserve Officers' Training Corps Manuals, Training Circulars, Army Training Programs, Army Subject Schedules, Army Training Tests, Firing, Tables and Trajectory Charts, Tables of Organization and Equipment, Type Tables of Distribution, and Tables of Allowances)
DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (types 7, 8, and 9), Supply Bulletins, Lubrication Orders, and Modification Work Orders

12. Forms

DA Form 2400	Equipment Utilization Record
DD Form 1384	Transportation Control and Movement Document

13. Coast Guard Publication

180	Handling of Munitions and Hazardous Cargo
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APPENDIX B

EMPLOYMENT OF NON-AIR DEFENSE WEAPONS AGAINST AIRCRAFT

1. General

The doctrine contained in this appendix prescribes the normal conditions under which non-air defense weapons will be employed against the low-altitude air threat. It has the objectives of increasing the effectiveness of these fires and of reducing the incidence of indiscriminate employment of these weapons when their use is not appropriate or is likely to be ineffective.

2. Concept

a. The substantial low-altitude air threat faced by units in the combat theater may be partially countered by aggressive use of the large volumes of fire which non-air defense weapons can place against this threat.

b. Exercise of the individual and collective right of self-defense against hostile aircraft must be emphasized. Hostile aircraft include all attacking aircraft and those positively identified enemy aircraft which pose a threat to the unit. Large volumes of fire from non-air defense weapons have proven capable of destroying both high- and low-speed aircraft or disrupting their attack. Exercise of this right does not demand specialized use of communications and is independent of theater air defense rules for engagement and air defense control procedures.

c. Indiscriminate use of non-air defense weapons must be prevented because of the danger to friendly aircraft and troops and the requirement to place in proper perspective the techniques of withholding fire to preclude disclosure of positions. Effective and safe employment of these weapons necessitates Army-wide training.

d. Situations may arise in which the exercise of the right of self-defense should be

temporarily suppressed or in which freer use of non-air defense weapons against aircraft should be encouraged. The former case involves a local decision that prevention of position disclosure is paramount. Notice of such restriction is disseminated through command channels. The latter case should be based on a theater-level decision.

e. Use of a single rule of engagement—"Engage hostile aircraft"—is based on common-sense interpretation. For example, all aircraft attacking the unit and enemy aircraft performing operations such as forward air control, reconnaissance, surveillance, or dropping or landing troops are clearly hostile aircraft.

3. Rule of Engagement

In the absence of orders to the contrary, individual weapon operators will engage attacking aircraft. Engagement of all other hostile aircraft will be on orders issued through the unit chain of command and will be supervised by unit leaders. Nothing in this rule is to be taken as requiring actions prejudicial to accomplishment of the primary mission of the unit.

4. Techniques

The following techniques should minimize the destructive and/or deterrent effect against aircraft. Aircraft may be divided into two categories: low-speed and high-speed. Low-speed aircraft include helicopters and liaison, reconnaissance, and observation fixed-wing aircraft. High-speed aircraft include all other propeller aircraft and all jet fixed-wing aircraft. This distinction will result in simplified engagement procedures.

a. Engagement of Low-Speed Aircraft. In accordance with the rule for engagement, low-speed enemy aircraft are engaged with aimed fire, employing the maximum weapon rate of fire. Aerial gunnery techniques (less lead) generally applicable to all small arms and automatic weapons are presented in FM 23-65.

b. Engagement of High-Speed Aircraft. In accordance with the rule of engagement, high-speed enemy aircraft are engaged with maximum fire aimed well in front of the aircraft and above its flight path in order to force it to fly through a pattern of fire. This technique is not unaimed barrage fire, but requires a degree of aimed fire. It does not, however, call for careful estimation of aircraft speed and required lead.

c. Use of Tracer Ammunition. Automatic weapons should utilize the highest practical proportion of tracer ammunition to enhance the deterrent or disruptive effect.

d. Massed Fire. Units should employ a massed fire technique when using small arms and automatic weapons in an air defense role.

5. Standard Operating Procedure (SOP) Outline

Company level SOP should cover, but not be limited to, the following items relevant to engagement of aircraft with non-air defense weapons:

a. Applicability. Operators of designated weapons.

b. Relation to Primary Mission. Primary mission never prejudiced.

c. Relation to Passive Air Defense. Necessity for aggressively engaging hostile aircraft balanced with the requirement to place in proper perspective the tactic of withholding fire to preclude disclosure of position.

d. Authority to Engage. Authority to engage attacking aircraft delegated to individual weapons operators and to engage all other hostile aircraft ordered through unit chain of command, subject to the rule for engagement and rules for withholding fire.

e. Rule for Engagement. Normally self-defense only against all attacking aircraft and those positively identified enemy aircraft which pose a threat to the unit.

f. Rules for Withholding Fire. When ordered; when not positive that aircraft are actually attacking or otherwise hostile; when friendly aircraft or troops are endangered.

g. Position Selection. (See FM 44-1.) Applicable only to weapons specifically assigned an air defense role; for example, designated single barrel caliber .50 machineguns.

h. Firing Techniques. Lead and superelevation; massed discipline, gunnery, aircraft recognition.

APPENDIX C

SAFETY ON THE GROUND (AIR TERMINALS)

Pertinent portions of STANAG 3465 covering safety procedures at air terminals are included here for the information of terminal transfer company commanders. The complete text of this STANAG is contained in FM 55-46.

1. Safety Perimeter

For each type of aircraft, a safety perimeter must be defined and forbidden to all personnel not taking part in the maintenance, supply, and loading or unloading operations.

2. Vehicle Traffic

a. All traffic on the airfield will be regulated according to a traffic plan. The speed of vehicles must be specified by panels on congested or dangerous routes.

b. The movement of vehicles is forbidden within the safety perimeter except for supply, loading, and unloading operations.

3. Loading, Unloading, and Supplying of Aircraft

a. In order to avoid any damage to the aircraft, the loading and unloading operations must be carried out under the control of a competent representative of the air transport

unit with experienced personnel and appropriate equipment.

b. Special attention must be given to the movement of vehicles within the safety perimeter. In all cases, chocks will be placed at such a distance that the vehicle cannot damage the aircraft.

c. The loading and unloading of heavy or bulky loads must be carried out with special precautions.

4. Fire Risks

a. It is essential that all fire risks be eliminated on the hardstands. Any flame must be prohibited within 100 feet (30 meters) of the safety perimeter. Smoking will be prohibited within the same area.

b. Fire extinguishing equipment must be placed in conspicuous positions near the hardstand.

5. Explosives, Ammunition, Dangerous Cargo

a. Explosives, ammunition, and other dangerous cargo must be stocked at the prescribed safety distance from the hardstands.

b. The handling of this type of cargo must be carried out in accordance with precautions prescribed in theater directives.

By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

Official:

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Major General, United States Army,
The Adjutant General.

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