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DEPARTMENT OF THE ARMY FIELD MANUAL

Part 2, S/S Aug 72, 2M 55-51

TRANSPORTATION

HARBOR CRAFT

UNITS AND

MARINE

MAINTENANCE

UNITS

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FIELD MANUAL

No. 55-57

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., 8 July 1960**TRANSPORTATION HARBOR CRAFT UNITS
AND MARINE MAINTENANCE UNITS**

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PART ONE

INTRODUCTION

CHAPTER 1

GENERAL

1. Purpose and Scope

a. The mission, assignment, capabilities, organization, equipment, operations, maintenance, and training of the transportation harbor craft cellular units (TOE 55-500) and the transportation floating craft depot maintenance company (TOE 55-157) are discussed in this manual. The employment of these units in logistical and tactical water transportation operations in support of logistical over-the-shore (LOTS) operations, amphibious operations, terminal complexes, and on inland waterways is also explained.

b. Information contained in this manual is based upon current TOE. Minor changes in TOE will not alter the methods and principles presented in the manual because organization and equipment are not discussed in detail.

c. The material presented herein is applicable without modification to both nuclear and nonnuclear warfare.

d. Users of this manual are encouraged to submit recommended changes or comments to improve the manual. Comments should be keyed to the specific page, paragraph, and line of the text in which change is recommended. Reasons should be provided for each comment to insure understanding and complete

evaluation. Comments should be forwarded direct to US Army Transportation School.

2. References

The duties and responsibilities of key personnel and the technical operations of harbor craft are discussed in FM 55-58 and TM 55-501. Characteristics and identifying symbols for Transportation Corps craft are given in FM 55-15. References are listed in appendix I.

CHAPTER 2

EMPLOYMENT OF HARBOR CRAFT

3. Transportation Corps Responsibility

The Transportation Corps is responsible for providing logistical and tactical water transport in support of water terminal operations. Water terminals, concentrated and dispersed, are under transportation terminal commands. Theater of operations terminal commands are established to meet operational requirements of the military services in the oversea area. The terminal command is responsible for receiving, debarking, embarking, and transporting troops and for loading, unloading, and transshipping supplies and materials. For details on the organization and operation of terminal commands, see FM 55-51.

4. Military Sea Transportation Service Responsibility

Operating directly under the Chief of Naval Operations, the Military Sea Transportation Service (MSTS) provides all ocean carrier service for all departments and agencies of the Department of Defense. Thus the control, operation, and administration of ocean transportation, excluding personnel and cargo transported by Navy fleet units, are under one authority. Although MSTS charters commercial shipping space when necessary, its responsibilities are generally operational in nature. The individual services authorize transportation via MSTS, which coordinates all requirements by time and place and schedules vessels to meet the requirements of shippers. The transportation terminal command headquarters and the water terminals maintain active contact with counterpart MSTS

headquarters for the coordinated ocean movement of personnel and cargo. MSTS's responsibility for personnel begins upon embarkation and terminates upon debarkation. Its responsibility for cargo commences when the cargo is stowed and accepted free on board ship at destination. Cargo discharged to the wharf or into lighterage is the responsibility of the terminal command.

5. Requirements for Harbor Craft

Floating equipment is required to transfer and transport men and materials in ship-to-shore, shore-to-shore, shore-to-ship, harbor, inland waterway, inter-island, and coastwise operations. To satisfy these requirements, the Army's marine fleet includes tugs, barges (propelled and nonpropelled), floating cranes, landing craft, power boats, liaison craft, and amphibians. Normally landing craft and amphibians are reserved for use in LOTS and amphibious operations; however, they may be employed advantageously in harbor and inland waterway operations. The number and type of floating craft required will vary according to the assigned mission. In general harbor craft are used in the operations described below.

a. Terminal Command Operations. Harbor craft units provide and operate craft to assist in mooring and unmooring ships, to augment lighterage or pierside operations by providing barges and towing service, and to shift and operate floating cranes used to make heavy lifts in harbors and adjacent areas in terminal commands. Tugs or specially equipped craft are used for fire prevention and control.

b. Inland Waterway Operations. Shallow draft and other special features are integrated into certain

vessels designed for inland waterway operations. Where channel depths permit, other harbor craft may be used. Landing craft can also be used in inland waterway operations if available.

c. Amphibious Operations. Harbor craft can be used to fuel and to tow stranded amphibians during ship-to-shore and shore-to-shore movements. The use of landing craft and amphibians in amphibious and LOTS operations are discussed in FM's 55-53 and 55-58.

d. Logistical Over-the-Shore Operations. Harbor craft can be used to handle cargo barges and to tow disabled landing craft and amphibians. They can also be used in salvage and refueling operations.

e. Special Operations. Special operations in which harbor craft are used include arctic and tropic operations and special missions, such as hydrographic surveying, target towing, intelligence, and counterintelligence. The hull and machinery of craft used in the arctic and the tropics may be modified to suit climatic conditions. Craft used in hydrographic surveying, intelligence, counterintelligence, target towing, or other special missions are issued special equipment for these assignments.

CHAPTER 3

EMPLOYMENT OF MARINE MAINTENANCE UNITS

6. General

The Transportation Corps is charged with the maintenance and repair of all U. S. Army floating equipment. This maintenance responsibility is all inclusive: it covers the maintenance, repair, and adjustments of hull, machinery, and equipment of all types of Army floating equipment. Because all marine maintenance is necessarily accomplished in the field, there are only two maintenance echelons—organizational and depot.

7. Organizational Maintenance

Organizational maintenance is maintenance performed by the vessel crew, by the unit to which harbor craft are assigned, and by marine maintenance cellular units when assigned (TOE 55-500).

a. Maintenance by the vessel's crew varies with the capabilities of assigned personnel and the tools and equipment authorized for their use. Normally the two- or three-man crew of a small vessel is only capable of greasing, oiling, cleaning, and making minor adjustments while aboard, whereas the crew of a large vessel that makes coastwise or extended cruises is capable of making major repairs.

b. Maintenance capability within the unit is not inherent to the harbor craft unit described in this manual. This capability must be drawn from TOE 55-500 on the basis of the number of craft assigned the unit. Other units, such as the light and medium boat

companies, have this capability and with the support of the appropriate maintenance teams (TOE 55-500) can be made independent of depot maintenance.

c. Marine maintenance cellular teams, described in TOE 55-500, may be used to support organizational maintenance in a boat company, BARC company, harbor craft company, or to support any combination of these units assigned to a terminal operation.

8. Depot Maintenance

Depot maintenance is all maintenance over and above organizational maintenance. It is accomplished by the assignment of a floating craft depot maintenance company to a terminal command (pars. 28-31). This company is located as centrally as possible to the dispersed elements it supports. The floating craft depot maintenance company may be required to support one or more of the harbor craft operations explained in paragraph 5.

PART TWO

HARBOR CRAFT UNITS AND MARINE MAINTENANCE UNITS

CHAPTER 4

MISSION, ASSIGNMENT, AND ORGANIZATION OF HARBOR CRAFT UNITS

Section I. MISSION AND ASSIGNMENT

9. Mission

Composite harbor craft units provide, operate, and maintain the harbor craft required for the logistical support of the Armed Forces. A harbor craft unit may be assigned one or more of the following missions:

a. To operate and maintain barges, tugs, cranes, power boats, and liaison craft used in the water transportation network within a harbor and on the protected waters within the area.

b. To transport freight and passengers from the harbor or central terminals to smaller, outlying installations.

c. To provide and operate harbor craft equipment on an inland waterway.

d. To supplement the TOE of other organizations used in terminal, amphibious, LOTS, and special operations.

10. Assignment

Units may be assigned or attached to higher echelon units or may be organized into companies, platoons, or detachments.

11. Capabilities

a. The capabilities of the individual teams of the harbor craft units are given in TOE 55-500.

b. Unless specifically provided for in the basic organization, these teams must be furnished administrative, supply, mess, and depot maintenance service. Mess teams and automotive maintenance teams are drawn from TOE 29-500. Support by other technical services is drawn from the service organization TOE of the service concerned or provided on an area basis.

Section II. ORGANIZATION, FUNCTION, AND EQUIPMENT

12. Organization

Because of the diversified nature of its operations, it is necessary for a harbor craft company to be a flexible organization. Flexibility is achieved by cellular organization under TOE 55-500. In the cellular organization, small units called teams are organized. Each team can be integrated with other teams to form a unit of any desired type or strength. The manner of assembling these teams into an operating unit is based, first, on an estimate of the requirements of a given operation and, second, on TOE 55-500, which establishes the strength and character of the teams. Each team has a code designation and is designed to do a particular job, such as man a vessel, operate a barge, or operate a headquarters. These teams may be joined with teams of other services to form any desired combination of operating units: they may augment a basic organization to fit that organization for the requirements of a particular mission.

13. Harbor Craft Teams

a. *Administrative and Headquarters Teams.* The administrative and supply functions for harbor craft units are performed by shore-based teams (TOE 55-500). Administrative and headquarters teams consist of a component platoon headquarters, a separate platoon headquarters, a company headquarters, and a battalion headquarters team (par. 21).

b. *Mess Teams.* Crews of large harbor craft include mess personnel who live and mess aboard ship (TOE 55-500). Mess personnel for small harbor craft are obtained from TOE 29-500. Crews of small craft are billeted and messed ashore with the personnel of headquarters teams.

c. *Automotive Maintenance Teams.* These teams are obtained from TOE 29-500 for the automotive maintenance support of harbor craft units.

d. *Supply Teams.* Supply teams from TOE 55-500 consist of supply specialists capable of receiving, storing, and issuing Transportation Corps supplies and maintaining the property books for vessels. The size and number of supply teams used are based on the number of vessels assigned.

e. *Floating Equipment Teams.* TOE 55-500 lists the floating equipment teams and specifies the type of vessel each crew will man. Crew team data, together with the characteristics of the vessels they man, are given in FM 55-15.

f. *Floating Equipment Maintenance Teams.* Floating equipment maintenance teams provide personnel for organizational and depot maintenance of engines, hull, and auxiliary equipment (par. 30). The diver team provides qualified personnel for underwater welding and cutting, salvage, hull repair, and piling

structure inspection. Radio, radar, and other electronic maintenance teams are provided by TOE 11-500.

14. Personnel

The personnel of harbor craft units have the primary mission of operating the craft assigned to them and of performing the administrative, organizational maintenance, and supply functions necessary to the operation of the unit. For detailed information on the functions and duties of harbor craft personnel, see AR's 55-310 and 750-1900-1, SR 55-510-1, and TM's 55-501 and 55-507.

15. Organizational Equipment

Organizational items of equipment are listed in TOE 55-500. Items of equipment used by attached mess, automotive maintenance, radio maintenance, radar maintenance, and other teams are listed in the TOE from which these teams are drawn.

16. Floating Equipment

The most common types of standard floating equipment, together with essential characteristics and related data, are described in FM 55-15. For a complete listing of all floating equipment used in harbor craft operations, refer to the 55- series supply manuals.

17. Movement Requirement Table

Unit commanders working under tables of organization and equipment must maintain a movement requirement table for organizational items of equipment. This table includes weight, cube, packing and crating requirements; critical dimensions for outsize items; and transport requirements by rail, highway, air, or water (SR 55-720-1).

Section III. ORGANIZATION OF HARBOR CRAFT UNITS FOR OPERATION IN WATER TERMINALS

18. General

Transportation harbor craft units are usually employed in logistical support operations conducted by a transportation terminal command. They may also be used in a joint operation to support resupply missions for other Department of Defense agencies. A terminal command is assigned harbor craft units to enable it to—

- a. Move cargo and personnel within the area.
- b. Berth and unberth oceangoing vessels.
- c. Conduct security patrols.
- d. Furnish ferry service.

19. Organization of a Terminal Command

The types, capabilities, and organization of the terminal commands are outlined in FM 55-51. The capabilities of a specific terminal command depend entirely upon the number of terminal units and other types of units assigned or attached to it: the number of units assigned or attached is determined by the particular mission.

20. Transportation Terminal Battalion

A transportation terminal battalion is a composite organization formed under a headquarters and headquarters detachment, transportation terminal battalion (TOE 55-116), to meet the requirements of a particular operation. A possible composition of a terminal battalion is shown in figure 1. When harbor craft, landing craft, or amphibians are used in a terminal operation, the battalion is augmented with boat control, communications, and other technically qualified

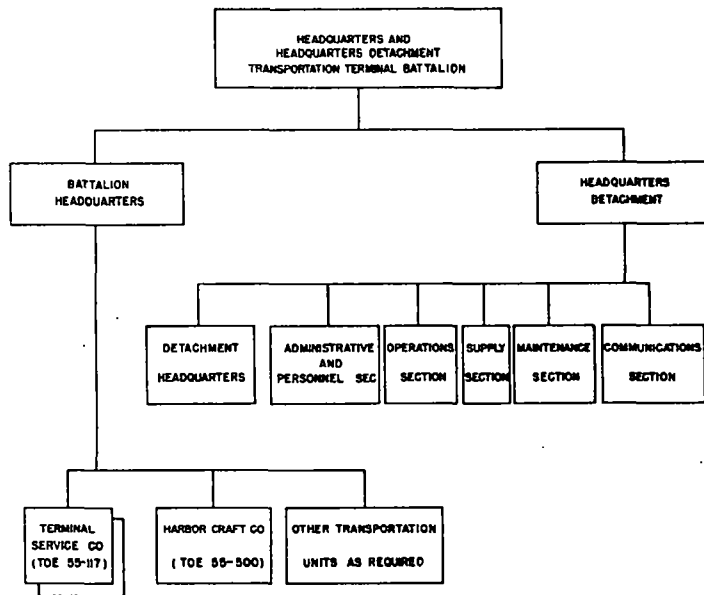


Figure 1. Possible composition of a terminal battalion.

personnel to make floating equipment operations feasible. Further information on the organization and operations of the battalion is in FM 55-52.

21. Transportation Harbor Craft Battalion

The present concept of assigning harbor craft direct to the terminal operating unit eliminates the requirement for a harbor craft battalion. Should a requirement develop for a harbor craft battalion, teams from TOE 55-500 can be organized into a battalion-size unit. The Transportation Boat Battalion (TOE 55-126) could be used as a guide for determining personnel and equipment requirements and FM 55-58 for planning operations and training.

22. Harbor Craft Units Employed in a Water Terminal

The number and capabilities of harbor craft teams and floating equipment maintenance teams employed in a water terminal vary according to the operating conditions and tonnage requirements. Therefore harbor craft units are organized in company or platoon strength, or assigned as individual cellular units to a higher headquarters. The senior harbor craft operating unit within a terminal command is usually a company. In a dispersed operation, the operating unit may be a company or platoon attached to a terminal battalion or a platoon or platoons attached to a terminal service company.

23. Harbor Craft Company

(fig. 2)

The harbor craft company consists of a company headquarters team and two or more operating platoons composed of the harbor craft cellular teams necessary

to carry out the mission of the company. Mess teams, vessel supply teams, and maintenance teams are assigned to the company headquarters. The company

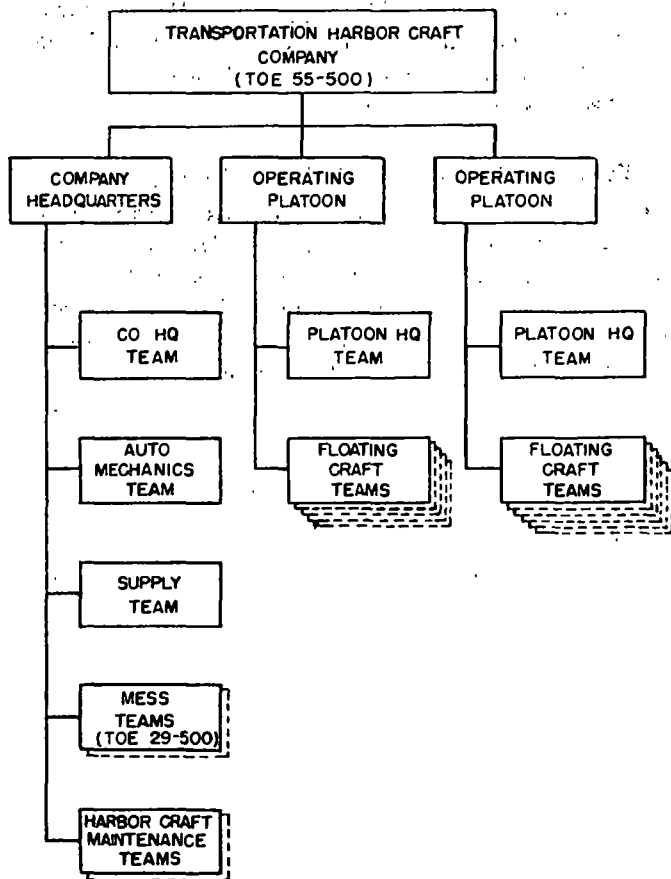


Figure 2. Possible composition of a harbor craft company.

headquarters provides command, supervision, and administration for company personnel. It is formed into command and administrative echelons. The company commander, executive officer, and first sergeant form the command echelon. The supply and attached mess teams form the administrative echelon; the assigned harbor craft and maintenance repair teams constitute the remainder of the company.

24. Component Harbor Craft Platoon Headquarters

The harbor craft platoon headquarters provides a command element for 2 or more cellular teams composed of not less than 40 enlisted men that will operate as a component of a higher unit. The component platoon headquarters does not include supply, mess, or personnel specialists, and therefore is dependent upon the organization to which assigned for that support.

25. Separate Harbor Craft Platoon

a. The separate harbor craft platoon headquarters provides a command element for 2 or more cellular teams of not less than 40 enlisted men that will be attached to a larger organization but that will operate separately. To make its separate operation feasible, the platoon headquarters team is assigned supply and personnel specialists. If messing facilities are not available in the unit to which the platoon is assigned, appropriate mess teams may be drawn from TOE 29-500.

b. When cellular units of less than 40 enlisted men are organized for a specific mission, they are assigned directly to a unit.

Section IV. ORGANIZATION OF HARBOR CRAFT UNITS FOR INLAND WATERWAY OPERATIONS

26. General

Inland waterways include all rivers, lakes, inland channels, and canals of sufficient depth to accommodate inland waterway traffic. Military inland waterways are defined as those inland waterways in theaters of operation that are under military control. Inland waterway craft have shallow draft, good maneuvering capabilities, and minimum clearance requirements.

27. Organization of a Terminal Service for Unit Operation on an Inland Waterway

A terminal service unit operating on an inland waterway is organized to control and operate both military and civilian harbor craft in the service of the Transportation Corps.

This unit may be commanded by a terminal command A, B, or C (TOE 55-131, -121, -111, respectively), by a transportation terminal battalion (TOE 55-116), or by a terminal service company (TOE 55-117). Normally the minimum size of an operating unit for inland waterway service is a battalion; however, smaller commands may be organized depending on the characteristics of the waterway, the length of communication lines, and the means available for the supervision of subordinate elements. When the total number of terminal service and harbor craft personnel required is from 100 to 300, a company serves as the senior operating unit. A platoon serves when the total number of personnel required for the operation is less than 100. The organization of the unit for service on an inland waterway is similar to that of any other terminal

service and harbor craft combination (pars. 12 and 22). Personnel and equipment for inland waterway service are drawn from TOE 55-500, which provides sufficient units of various capabilities to meet any operational need. When landing craft can be operated and are available, the unit may be supplemented by the appropriate boat unit.

CHAPTER 5

THE TRANSPORTATION FLOATING CRAFT DEPOT MAINTENANCE COMPANY

28. General

Harbor craft units are authorized to perform organizational maintenance within the capabilities of their personnel and equipment (par. 104). The maintenance capability aboard a small vessel may be limited to cleaning, painting, and making minor adjustments, whereas major repairs can be made aboard a large vessel because its crew includes qualified engineers. All harbor craft have unit-maintenance team support. Maintenance beyond the capability of a harbor craft unit is performed by a floating craft depot maintenance company or other authorized agencies (par. 103b).

29. Mission, Assignment, and Capabilities

a. The mission of the transportation floating craft depot maintenance company (TOE 55-157) is to provide depot maintenance for Army floating equipment, including the landing craft and amphibians for which the Transportation Corps has responsibility. The unit exchanges major assemblies and rebuilds old assemblies received in exchange. It performs major rebuild and repair of all floating marine craft and maintains a complete and adequate supply of parts and assemblies for mission support (par. 105).

b. The unit is assigned to a transportation terminal command, and at full strength is capable of providing depot maintenance on a 24-hour basis for approximately 100 self-propelled craft and all associated non-propelled craft.

30. Organization and Function

The company consists of company headquarters, repair control section, machine repair section, supply section, hull repair section, electrical repair section, and floating machine shop crew (fig. 3). The unit must be augmented by a barge crane and crew when this equipment is not available locally. The company may also be augmented by maintenance and repair teams from TOE 55-500 when the number of craft for maintenance exceeds the capacity of the depot maintenance company. Radio and radar maintenance teams may be drawn from TOE 11-500 and attached to the depot maintenance company when signal maintenance facilities in the area are inadequate or nonexistent. The depot maintenance company also furnishes contact maintenance teams. These teams are organized from personnel of the various sections as the existing situation demands. They are transported to the site by the most expeditious means. Shop vans may be moved via road nets or on landing craft. If only handtools are needed, helicopters may be used to transport the team.

31. Equipment

The primary piece of equipment of the transportation floating craft depot maintenance company is the floating marine equipment repair shop. This is a 210-foot, nonpropelled, steel-hull barge equipped with the handtools, special tools, and power tools necessary to provide depot maintenance for harbor craft, landing craft, and amphibians. In addition, the unit is equipped with $\frac{1}{4}$ -, $\frac{3}{4}$ -, $2\frac{1}{2}$ -, and 5-ton trucks; water and cargo trailers; a 120-foot barge with a conversion kit; a 26-foot utility boat; an LCM(6); and an LCM(8).

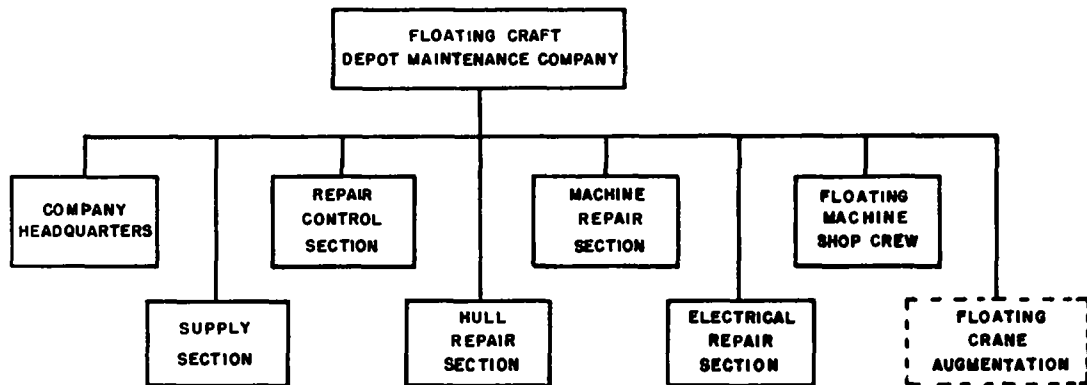


Figure 3. Organizational chart of a floating craft depot maintenance company.

The conversion kit, erected on the barge, provides a sheltered floating storage area for sheet steel, lumber, and overhauled equipment when the floating repair shop is operating offshore.



CHAPTER 6

COMMAND AND STAFF RELATIONSHIP OF THE TERMINAL BATTALION TO ASSIGNED OR ATTACHED HARBOR CRAFT UNITS

Section I. COMMAND

32. General

a. The terminal battalion commander commands assigned and attached units and personnel in accordance with the provisions of AR 220-60. In addition to being familiar with the operations of the terminal battalion (FM 55-52), the terminal commander must also have a thorough knowledge of water terminal and inland waterway operations and understand the employment, capabilities, and limitations of the units and equipment under his control. He must be familiar with the functions and capabilities of units from arms and other services with which he may be associated.

b. The battalion commander insures that his battalion is ready for effective employment at all times. His operational responsibilities for harbor craft are to—

- (1) Maintain all battalion craft in serviceable condition.
- (2) Plan the details of all vessel movements, executed under Army control, of battalion and attached units—including the assignment of vessel units to missions, movement schedules, navigation, control, and communications.
- (3) Procure and install special equipment.
- (4) Operate, maintain, and control barges.
- (5) Operate and control patrol functions.

- (6) Coordinate with the Navy details regarding the assignment, employment, and release of attached unit craft operating under Navy command.
- (7) Employ and supervise direct-hired civilian personnel and equipment required by his unit.

33. Standing Operating Procedure

a. Standing operating procedure states the policies of the battalion commander; it prescribes the procedure to be followed in routine situations. The standing operating procedure is a set of instructions having the force of orders, covering those features of operation which lend themselves to a definite or standardized procedure without loss of effectiveness. The procedure is applicable unless prescribed otherwise in a particular case. Items, such as weather measures, vessel dispatching, message distribution, shipboard safety, emergency and salvage procedures, routine vessel fueling, and harbor movement operations are included in the standing operating procedure for harbor craft (FM 101-5).

b. Each staff officer should prepare complete standing operating procedures for the personnel of his section. Specific duties of each individual should be set down so completely that a newly assigned person can readily understand the routine and special duties of any position.

Section II. BATTALION PERSONNEL

34. Adjutant (S1)

The adjutant's responsibilities in a terminal battalion to which harbor craft personnel are assigned are similar to those of the adjutant outlined in FM 55-52.

35. Intelligence (S2)

a. Usually the operations officer is also the battalion intelligence officer although intelligence duties may be assigned to the adjutant or other staff officers. Intelligence activities are conducted as prescribed in FM's 30-5, 30-15, 30-16, 55-8, 100-5, and 101-5.

b. For harbor craft operations the intelligence officer—

- (1) Obtains and distributes information about the terminal command area.
- (2) Secures and distributes maps, charts, overlays, aerial photographs, terrain models, and other operational aids.
- (3) Briefs harbor craft personnel who are assigned to reconnaissance groups or other groups on special missions.
- (4) Conducts beach and wharf reconnaissance and compiles other hydrographic intelligence as required.
- (5) Forwards directly to the U. S. Army Transportation Intelligence Agency, Washington 25, D.C., a copy of operational intelligence data and other data described above and in appendixes IV and V of FM 55-8.

36. Operations Officer (S3)

Battalion plans for harbor craft operations are prepared by the operations officer in coordination with the other staff sections. In addition to his duties of operating in accordance with the principles set forth in FM's 100-10 and 101-5, the operations officer—

a. Recommends the number and types of floating equipment and the number of personnel needed to accomplish the assigned mission. He coordinates these

recommendations with the adjutant and the logistics officer.

b. Maintains records and keeps the battalion commander informed of the operations and the operational status of battalion craft, using the reporting system prescribed by the standing operating procedure.

c. Acts as civil affairs liaison officer.

37. Logistics Officer (S4)

The duties and functions of the battalion logistics officer are covered in detail in chapter 10.

38. Augmenting Personnel

a. When terminal operations require the use of floating equipment, the headquarters detachment is augmented with vessel control, maintenance, and vessel supply sections. With the exception of the augmenting sections, the terminal battalion sections are discussed in FM 55-52. The operations of the augmenting sections are discussed in chapter 8.

b. The personnel augmenting the terminal battalion headquarters for water terminal operations consists of a navigation officer, boat control officer, floating equipment maintenance officer, and the enlisted personnel necessary to support these functions.

c. A vessel supply team(s) from TOE 55-500 is also assigned to the unit according to the number of craft assigned.

Section III. COMPANY PERSONNEL

39. Unit Commander

a. In addition to the customary duties and responsibilities of a unit commander, a harbor craft unit commander has certain duties peculiar to harbor craft unit

operations. He is responsible for the command and operation of all vessels and floating equipment assigned to the unit. He assigns crews, issues orders, makes inspections, keeps a log of operational movements, prepares reports, requisitions marine supplies, and supervises and coordinates repairs to his craft and equipment. The task of the unit commander is frequently complicated by the fact that vessels of the harbor craft unit are often away from their base for extended periods of time. The harbor craft unit commander must have a thorough knowledge of seamanship, vessel characteristics and capabilities, marine operations, and military administration.

b. The commander of the floating craft depot maintenance company must be familiar with all phases of hull, engine, and electrical repair and with maintenance supply procedures.

40. Administrative, Mess, and Supply Elements

The administrative, mess, and supply elements are organized similarly to those of the transportation boat units (FM 55-58). The mess element is not organic to the harbor craft unit but is drawn on the basis of assigned personnel from TOE 29-500 (par. 13).

PART THREE
HARBOR CRAFT OPERATIONS
CHAPTER 7
ADVANCE PLANNING

Section 1. INTELLIGENCE

41. General

During the advance planning phase of an operation, the water transportation and harbor facilities of each area are investigated. The planner considers the various aspects of operations and support requirements to select the administrative and headquarters element and subordinate mess, supply, vessel operating, and maintenance elements from TOE 29-500 and TOE 55-500.

42. Harbor and Inland Waterway Intelligence

a. When harbor craft operations are being planned for a given area, the following information should be collected and integrated into the plans of the operation:

- (1) Docking facilities.
- (2) Navigational aids.
- (3) Effects of winds and tides.
- (4) Restrictive features, such as depth of water, hazards to navigation (natural and manmade), maneuvering area, etc.
- (5) Availability of local personnel and craft.
- (6) Location and capacity of repair facilities.
- (7) Locations, characteristics, and capacity of clearance facilities.

- (8) Assistance or interference by civilian population.

b. In an inland waterway operation, the following additional information must be ascertained:

- (1) Geographical location of the waterway.
- (2) Type of waterway (river, canal, bay, or combination thereof).
- (3) Width of waterway.
- (4) Effect of seasonal changes (ice, flood, etc.).
- (5) Location of locks, cuts, bridges, and other manmade features.
- (6) Speed of current.
- (7) Location, capacity, and other factors concerning transfer points and means of clearance serving these locations.
- (8) Communication facilities used in operation of waterway.

43. Sources of Information

Possible sources of information are: Army, Navy, and Air Force intelligence studies, line-of-communications planning data studies, civil affairs area studies, strategic engineering studies, National Intelligence Agency surveys, statistics published by commercial or Government agencies, reconnaissance reports, sailing directions, harbor and coast pilot manuals, river pilot manuals, current and tide tables, hydrographic charts, and aerial photographs. All available sources of information should be used.

44. Reconnaissance

Reconnaissance should be initiated within the terminal command area in which harbor craft units are to operate as soon as the military situation permits. The reconnaissance should determine the accuracy of

all previously gathered information besides the rehabilitation required as a result of combat damage to the area (par. 62). The composition and size of reconnaissance teams will vary, but should include experts on port operations, inland waterway operations, navigation, salvage, and construction.

45. Rehabilitation Plans

To insure the most rapid utilization of harbor facilities, advance plans should also provide for the employment of engineer units to assist in rehabilitation of wharves, locks, and bridges; removal of obstacles; and coordination with appropriate civil affairs units for assistance.

Section II. TERMINAL CAPACITY PLANNING

46. General

To estimate the floating equipment requirements for water terminals and inland waterways, the advance planner must determine the logistical requirements of the operation. The planner must consider harbor craft requirements according to the type and volume of cargo involved and static floating equipment requirements for normal administrative needs.

47. Water Terminal Capacity

Water terminal capacity is the estimated tonnage that can be discharged daily and cleared inland from ships: this estimate is made by evaluating the physical facilities of the water terminal. For details see FM 55-51.

48. Discharge Over Wharves

Planning discharge operations over wharf facilities should include planning for discharge alongside a wharf,

or by lighter, or by a combination of both (FM 55-51). The number of tugs, lighters, and other harbor craft equipment needed is determined largely by the type of discharge planned (app. II).

49. Inland Waterway Capacity

To estimate inland waterway capacity, the planner should consider the following factors.

a. Turn-Around Time. Turn-around time is the time required for a craft to be loaded, move to its destination, to be unloaded, and return to its home terminal ready to be loaded again. It includes time for resupplying and refueling unless this is done during the loading and unloading. The component factors of turn-around time are—

- (1) *Length of haul.* Length of haul is the distance between loading and unloading points.
- (2) *Speed of craft in still water.* The speed of inland waterway vessels varies according to the type or size of the tow and the type and horsepower of the propulsion unit. An average figure of 4 knots may be used if figures based on experience are not available.
- (3) *Speed and direction of current.* Speed and direction of current can often be discounted since the resistance encountered when traveling in one direction may be balanced by assistance from the current when traveling in the opposite direction. This does not always apply because when going downstream in a fast stream, speed may have to be reduced to make it possible to stop or to maneuver at a moment's notice. Also, in areas where a

tidal range exists, resistance from the current will be encountered at various stages of the tide.

- (4) *Loading and unloading time.* If complete planning information is not available, the rate of loading and unloading is estimated as 7.2 short tons per barge gang per hour.
- (5) *Time consumed in locks on each trip.* If exact data is not available, the time taken by a craft and its tow to go through a lock may be figured as $1\frac{1}{2}$ hours per lock.
- (6) *Hours of operation per day.* An operating day is normally 20 hours. The remaining 4 hours are used for maintenance, refueling, resupplying, rigging tows, or dropping barges from the tow.

b. Capacity Formula. The number of tons that a given number of barges can transport a given distance daily can be determined by using the following formula:

$$\text{Tons moved daily} = \frac{\text{number of barges} \times \text{tons per barge} \times \text{hours of operation per day}}{\text{turn-around time in hours}}$$

For example, when thirty 100-ton barges are available for an operation requiring 60 hours turn-around time, the tons moved daily would equal

$$\frac{30 \times 100 \times 20}{60} = 1,000 \text{ tons daily}$$

50. Floating Equipment Requirements

a. Cargo Craft. To determine the number of barges or cargo craft required to move a given tonnage a given distance forward daily, use the following formula:

$$\text{Number barges required} = \frac{\text{daily tonnage} \times \text{hours turn-around time}}{\text{tons per barge} \times \text{hours of operation daily}}$$

For example, when it is required to move 2,000 tons of cargo forward each day for a distance that required 100 hours turn-around time, each barge carrying 100 tons of cargo, the number of barges required would equal

$$\frac{2,000 \times 100}{100 \times 20} = 100 \text{ barges}$$

b. Tugs and Towboats. Since a single tug or towboat can normally be used to tow more than one barge and loading time is not a consideration in tug or towboat availability, it follows that fewer tugs than barges will be required in any given situation. To determine the number of tugs or towboats required to efficiently operate a given number of barges in a given situation, use the following formula:

$$\text{Number of tugs} = \frac{\text{total number of barges} \times \text{turn-around time for tugs in days}}{\text{number of barges per tow} \times \text{turn-around time for barges in days}}$$

For example, when the turn-around time for tugs and barges is 3 and 5 days, respectively, and the total number of barges is 100, the number of tugs required (carrying 4 barges per tow) would equal

$$\frac{100 \times 3}{4 \times 5} = 15 \text{ tugs}$$

51. Increasing Capacities of Waterways

The tonnage that can be transported by a given

number of barges or cargo craft can be increased by any of the following means.

a. Load Per Barge. Every craft is normally designed to carry a specified load; however, under favorable operating conditions the load limit may be exceeded.

b. Hours of Operation. An operating day is normally considered 20 hours. Any improvement in operations which will increase the length of the operating day will increase the tonnage capability of the waterway. Use of radar for navigation, for example, may permit night operations even under blackout conditions.

c. Speed of Travel. Any increase in the speed of travel will reduce turn-around time and increase waterway capability accordingly. However, speed that causes increased requirements for waterway and shore maintenance facilities must be avoided.

d. Time in Locks. Improvement in lock operations which reduces transit time for craft will also reduce turn-around time.

e. Channel Improvements. Under conditions of craft saturation on a waterway, alteration of the limiting constriction of the waterway will increase waterway capacity.

f. Type and Size of Tows. In terms of tons of cargo moved per horsepower, push-towing ranks first, pull-towing second, and towing with barges alongside last. The size of the waterway frequently determines the type of tow. An increase in the number of barges towed by each tug or towboat will increase the overall capacity of the waterway; however, the additional towboat load must not reduce the number of barges transported per day.

g. Loading and Unloading Time. Improvements in materials handling equipment, loading methods, and terminal operating procedures which reduce the time required for loading and unloading barges will increase waterway capacities by reducing barge turn-around time.

52. Employment of Local Civilians

In planning the type and size of organizations that will operate in a water terminal or inland waterway, the planner must consider to what extent military personnel and equipment must be used. Local civilian personnel and equipment should be used to the maximum extent possible. The three phases into which harbor craft operations in water terminals and on inland waterways are divided affect the employment of local civilian personnel and equipment. The phases are as follows:

a. Phase I. In this phase only military personnel are used: local civilian employees and equipment are not available or it is not advisable to use them.

b. Phase II. This is the transitional phase: military personnel and equipment are augmented by local civilian personnel and equipment. This phase can be used if there is little danger of enemy attack.

c. Phase III. This is a posthostility operation. Local civilian personnel and equipment are used to the fullest extent possible with a minimum of military supervision.

53. Responsibility for Employing Local Civilians

The employment of local civilian personnel is a command responsibility. Determination of availability of

civilian personnel is a civil affairs responsibility. The hiring of civilian personnel is normally accomplished in coordination with civil affairs units. Civilian personnel handbooks prepared by the Department of Defense describe the forms, records, and reports required for controlling and administering local civilian personnel. These publications give background and operational information about a specific country or area and are issued only to units having a requirement for them.

54. Maintenance Requirements

Intensive planning is necessary to achieve the efficient organization necessary to maintain a fleet of vessels in effective operating condition. The planner must determine the extent of marine maintenance to be performed within a given area of operation (water terminal or inland waterway). By studying a proposed installation, with particular attention to the number and size of craft to be serviced, the planner can select maintenance units with the technical training and equipment necessary to perform the required maintenance (pars. 28-31). Marine maintenance teams may be assigned directly to harbor craft units or to a transportation floating craft depot maintenance company. TOE 55-500 and TOE 55-157 should be used when determining hull and maintenance team requirements for depot maintenance.

55. Organization of Units

Using the preceding planning information, TOE 55-500 capability, mission, basis of allocation, and assignment factors, the planner can develop the personnel and equipment requirements into the cellular organizations

(companies, company, or platoon) required to support the mission.

56. Formation of Units

The military requirements for a water terminal operation or for an inland waterway operation will determine the number of craft required to accomplish a mission. The total of all personnel selected will be the total strength of the unit and will form a platoon- or company-size organization. Appendix II contains planning data for determining harbor craft, personnel, and equipment required for an operation. The basis of allocation for each harbor craft team is listed in TOE 55-500. After the basic unit is determined, the planner must—

a. Determine the number of control and utility craft required for administrative purposes.

b. Select suitable teams from TOE 55-500 to man all craft to be used in the operation. When round-the-clock operation is contemplated, team personnel must be augmented because some teams are organized to operate one 10-hour shift.

c. Divide the personnel into suitable operating platoons of from 40 to 100 men each, adding a platoon headquarters team for each operating platoon.

d. Determine the number and type of boat maintenance teams and repair teams required (TOE 55-500) and form these teams into a maintenance and repair platoon by adding a platoon headquarters. If the total number of personnel for maintenance and repair does not exceed 40, they may be organized as a section of the company headquarters platoon.

e. Add a company headquarters team, automotive maintenance teams, and supply teams.

f. Total all personnel required and subtract the number of personnel for which mess personnel are provided within vessel teams; then select a suitable mess team from TOE 29-500 to provide for the remainder who are shore based.

g. If landing craft are used, refer to TOE 55-127, -128, and -129 for the organization and equipment of these units.

CHAPTER 8

OPERATIONS

Section I. UNIT OPERATIONS

57. General

a. Operational functions of the harbor craft unit are not rigidly established because of the variation in the missions and the circumstances under which the unit operates. Flexibility in unit operations must be maintained. Successful operations of harbor craft units demand adaptation of personnel, equipment, and procedures to prevailing circumstances in conformity with the rules, regulations, and procedures which are in use and recognized as sound harbor craft practices.

b. In this section, the operations of the harbor craft unit and its relationship to the operations section of the terminal battalion or other headquarters to which it may be assigned are discussed. The relationship of harbor craft operations to the harbormaster and the operation of a separate platoon in support of dispersed terminal operations are also explained. Nautical controls and publications are discussed briefly.

c. Details about the operation and navigation of vessels and the duties of on-board personnel are given in TM's 55-501 and 55-508 and AR 55-310.

58. Operations Section in a Terminal Command

The terminal command operations officer directs and coordinates the functions of the operations, movements, and documentation branches. He is responsible for adjusting equipment requirements between battalions and anticipating future operations and

requirements. He is also responsible for the berthing of all ships and craft and for wharf operations. These operations are carried out by the terminal battalion and attached units (fig. 4). The harbormaster is attached to this branch. For details on the operations of G3, sec FM 55-51.

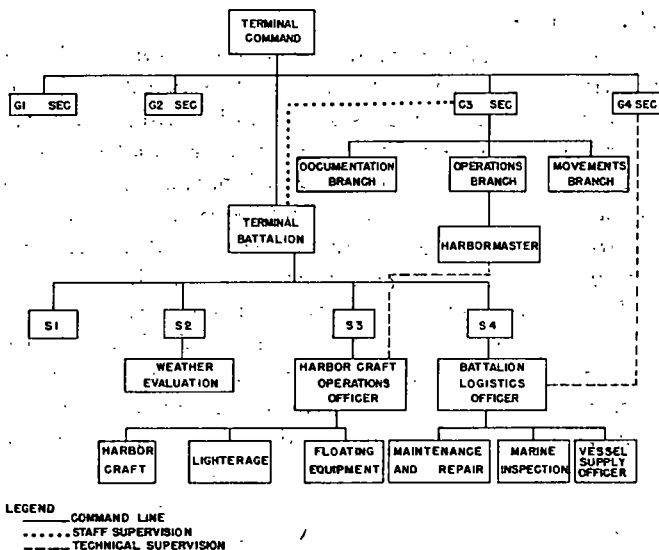


Figure 4. Command and operations relationship.

59. Harbor Craft Units in a Terminal Battalion

Harbor craft units organized in company or platoon strength may be assigned or attached to a terminal command; a terminal battalion, or other headquarters. The operations activities of the composite-type harbor craft units vary according to the circumstances of the mission (par. 57). When harbor craft are used by a terminal battalion, the activities of a terminal battalion operations section parallel the activities of the opera-

tions section of a transportation boat battalion (FM 55-58). Only the operations functions that pertain to harbor craft in a terminal battalion are considered in this section.

60. Operations Section (S3)

a. General. The battalion operations officer operates under the authority of the battalion commander and plans, supervises, and coordinates the operations of the harbor craft. He usually represents the battalion commander at all terminal command operations meetings. He directs and supervises terminal service, vessel, lighterage, and floating equipment operations. He coordinates supply and maintenance activities with the battalion logistics officer: timely arrangements for these services prevent delays.

b. Mission Assignment of Vessels. The battalion operations officer designates vessels to carry out harbor craft missions assigned by the terminal command. The battalion operations officer is directly responsible to the battalion commander for all vessel operations. He is assisted by a navigation officer and by a vessel control officer who are directly responsible to him and who supervise vessel assignments. The missions of the vessels are designated by the terminal command operations division through the harbormaster (par. 61). The harbormaster assigns the mission; the battalion operations officer, or his representative, assigns and dispatches the harbor craft or other floating equipment necessary to accomplish the mission. This procedure insures maximum efficiency and effective utilization of available equipment, precludes conflict in movement, and reduces traffic to the absolute minimum.

c. Weather Evaluation. The assembling and dissemination of weather information is the responsibility of the intelligence officer (G2). The terminal battalion operations officer evaluates the weather information in terms of operations. Acting under the authority of the battalion commander, he determines whether or not vessel operations are to be restricted or halted because of weather conditions.

d. Lighterage Pools. The terminal battalion operations officer directs and coordinates the mission assignments of lighterage in the battalion. The missions are assigned the terminal battalion by the terminal command. The battalion operations officer may also be required to direct the operations of a boat pool if boats are attached to the terminal battalion. For details of boat operations, see FM 55-58.

61. Relationship of Harbormaster to Operations Section

The harbormaster, operations division of G3, terminal command, coordinates all harbor floating activities to meet operational requirements. His coordination does not involve functions of command, control, or physical dispatch of operational equipment (fig. 4). He supervises and coordinates the activities necessary for efficient marine operation. The operations section of the terminal battalion keeps the harbormaster informed of the operational condition of all vessels. The harbormaster assigns harbor craft berthing and allocates harbor craft equipment to terminal battalions and subordinate headquarters, based upon the requirements of the terminal command and upon respective mission priorities. For details on the duties, responsibilities, and functions of the harbormaster, see FM 55-51.

62. Unit Reconnaissance

The terminal command conducts reconnaissance of sites selected as possible beach discharge points. The harbor craft units send representatives with the reconnaissance party (par. 44). The terminal battalion operations officer usually represents the terminal battalion commander. The terminal battalion operations officer must be capable of advising the terminal commander on such matters as the location and desirability of anchorage areas, types of lighterage that can be employed, engineering required to prepare and maintain an area of operations, maintenance areas, etc. For details on terminal command reconnaissance, see FM 55-51.

63. Operations and Bivouac Areas

The terminal battalion advises the terminal command operations officer on the selection of an operations area. After considering the defense of the area, its proximity to the harbor craft area, and operation and supply factors that may affect harbor craft operations (pars. 41-56) the battalion operations and logistics officers recommend location of bivouac areas for shore-based harbor craft personnel. The bivouac and messing areas are located so as to prevent losing time moving personnel to and from the working area.

64. Area Defense

a. The terminal battalion must be capable of defending its area of operations, actively and passively, against enemy attack. Defense plans are developed for the entire area by the terminal command and integrated into an overall defense plan for the command. The harbor craft unit commander is responsible for preparing in advance a defense plan for his particular

area in coordination and conformity with the overall rear area security plan. He should be thoroughly familiar with operations against airborne attacks, guerrilla action, and infiltration (FM 31-15).

b. The battalion operations officer is normally the battalion defense officer. He is responsible to the battalion commander for planning the defense of the operational area under battalion jurisdiction. He assists and advises the commander in all defense matters and coordinates and executes defense plans.

c. Although harbor craft personnel are thoroughly trained to perform their primary function as soldiers, the proper functioning of a defense plan makes re-orientation and additional training necessary. Training should be accomplished whenever personnel can be spared from regular duties. Because of the necessity of maintaining watches even when the vessel is not on dispatch, this training can best be accomplished in small groups. Training should include firing of weapons and orientation on perimeter defense. Personnel should be carefully briefed on the layout of the area and should know their roles in the defense plan. The terminal command defense officer coordinates all training activities and conducts both day and night practice alerts to insure effectiveness of the terminal defense plan.

65. Operations on Inland Waterways

Operating units on inland waterways are under the staff supervision of the operations officer of the senior terminal unit. His duties are similar to those of the battalion operations officer in a concentrated or dispersed operation or in a LOTS operation (par. 60a). The operations officer is responsible for coordinating

craft and terminal operations, dispatching floating equipment, locating dispatched craft, advising pilots or operators on waterway conditions, and supplying craft with charts and other navigational information. He also supervises inland waterway operations performed by local civilian personnel. He provides staff supervision necessary to comply with the operational directives of the operations section of the terminal command.

Section II. TECHNICAL OPERATIONS

66. Dispatch of Vessels

a. The dispatching of vessels is normally the responsibility of the terminal battalion operations officer, acting under the authority of the battalion commander (par. 60). When dispatching vessels, the operations officer considers the type, nature, and extent of the mission as well as weather and communication factors. Under special conditions, large vessels may be dispatched on ocean voyages. Such vessels are dispatched either directly by the commanding officer of the terminal unit or by the battalion operations officer with the specific approval of the commanding officer. The battalion operations officer, assisted by the logistics officer's marine inspector, must then insure that the vessel is in all respects ready for sea, that its equipment and maintenance potential are adequate, and that provisions are made for its supply and fueling.

b. Detailed sailing orders are dispatched directly to vessels. Ship-to-shore phone is used to dispatch vessels in harbor operations. Orders are dispatched by the representative of the terminal battalion operations officer.

c. The successful movement of supplies and equipment depends largely upon efficient dispatching. The unit operations officer may designate a subordinate officer as his dispatcher (par. 60). The dispatcher works closely with the harbor master and is usually located in the terminal operations office. He is responsible for—

- (1) Dispatching vessels.
- (2) Knowing the location of vessels, barges, and other floating equipment.
- (3) Knowing the operational status of equipment, the date of readiness or expected availability of all floating equipment in maintenance and repair, the date the loading or unloading of vessels will be completed, and the expected arrival date of additional equipment being allocated to the unit.
- (4) Being thoroughly familiar with local communications procedures and instructions and seeing that vessels comply with these rules.

d. Operations requirements may dictate that a vessel that is not in all respects ready for sea be assigned a mission. When this is done, the vessel master is responsible for informing the operations officer of the condition of his vessel. The operations officer, assisted by maintenance and marine inspection personnel, must then decide whether or not to accept the vessel. If the vessel is accepted the master is notified. The master enters in the log the conditions under which his vessel is sailing and then carries out the mission. The determination by the operations officer to sail the vessel under the unfavorable conditions entered in the log relieves the master of his responsibility for the vessel to the degree specified in the log. In all other

respects, the master continues to be fully responsible for the vessel. Acceptance of the vessel for a mission under such conditions by an unauthorized person in no way relieves the master of responsibility. For vessel master's responsibility, see TM 55-501.

67. Laws, Rules, and Regulations

a. The laws, rules, and regulations pertaining to the merchant marine of the United States that are not in conflict with Army regulations and orders of the Department of the Army are applicable to harbor craft. All personnel concerned with harbor craft must be familiar with these rules and regulations and strictly observe them. In situations where military forces are operating within areas not under the exclusive control of the military, such as in a friendly territory under a civil affairs agreement, all personnel concerned with harbor craft must comply with the applicable laws, rules, and regulations of the government concerned.

b. All masters, mates, and marine engineers are required to be licensed by the U. S. Coast Guard or the Office of the Chief of Transportation (AR 750-1900-1). When vessels are manned by civilian personnel, civilian personnel regulations must be followed.

c. Harbor craft comply with the U. S. statutes that apply to private vessels. The applicable statutes are those that govern the movement and navigation of vessels in international and inland waters, salvage, marine casualty, and customs procedures (CG 200). When necessary, harbor craft can be operated as public vessels. (A public vessel is not required to follow the rules and regulations that govern the merchant marine.) For safety reasons, commanders should not resort to

this method of operation except in extreme emergencies, such as might be encountered in time of war.

d. The Transportation Corps, within limits of sound military practices, adheres to the statutes which pertain to inspection of vessels and loadline requirements. These acts and subsequent regulations establish the requirements for the seaworthiness of U. S. vessels. The U. S. Coast Guard is by law the enforcement agency of these acts; the Coast Guard and the American Bureau of Shipping are the legal inspecting agencies. Rigid inspections are made to determine the seaworthiness and competence of vessels to navigate any waters that are common highways of commerce. These inspections cover the following:

- (1) Basic construction of the vessel.
- (2) Alterations or repairs.
- (3) Proper safety equipment and appliances.
- (4) Condition of navigation and communications equipment.
- (5) Cargo gear and cargo areas.
- (6) Ground tackle.
- (7) Fire prevention and extinguishing apparatus.
- (8) Lifeboats and lifeboat equipment
- (9) Propulsion and auxiliary machinery.
- (10) Lights and signals.
- (11) Hull and decks.
- (12) Stability.
- (13) Complement.
- (14) Safety training of officers and crew as required by law.

e. Harbor craft comply with the laws that affect the documentation, entry, and clearance of vessels and that do not duplicate existing Department of the Army procedures.

f. Army regulations and special regulations establish and control the operation of harbor craft. These regulations cover operation, maintenance, and repair of craft and regulate the duties, responsibilities, and conduct of personnel.

g. Harbor craft must be operated not only in accordance with the laws and regulations which govern them, but also in accordance with accepted practices of good seamanship.

68. Berth Assignments

The harbormaster is responsible for all berth assignments within a water terminal area. The usual procedure is for him to assign a specific area for the berthing of harbor craft. Areas are designated for barge pools and small boat pools. Specific berth assignments may be given to large harbor craft. The terminal battalion operations officer assigns his vessels to berths within the areas designated by the harbormaster. If a change of berth to an unassigned area or additional berthing is required, the operations officer requests the change or addition from the harbormaster.

69. Security Requirements

The battalion operations officer, under the direction of the battalion commander and in conformity with G3 directives, establishes security regulations for all floating equipment under his jurisdiction. When in port, a large, manned vessel normally has an officer on watch who is responsible for the security of the vessel. He is assisted by a security watch or when tied up to a wharf, a gangway watch (TM 55-501). Security watches assigned from shore-based personnel are maintained over all unmanned floating equipment. When the danger of sabotage, thievery, or guerrilla

activities increases, security watch personnel must be increased.

70. Harbor Patrol and Security

The harbor craft unit furnishes patrol boats to protect seaward approaches to a water terminal and to provide harbor security. These boats are drawn from TOE 55-500. If the harbor craft unit maintains a small boat pool, boats from this pool may also be assigned to patrol activities.

71. Heavy Weather Measures

Weather conditions affect operations very greatly. Adverse weather may make operations too dangerous to be continued. Heavy weather, such as typhoons, hurricanes, and precipitous seas, may not only call for curtailment or abandonment of operations, but also for emergency measures to protect harbor craft from severe damage or destruction. Weather information must be given priority transmission (par. 79d). The unit SOP (par. 33) will contain heavy weather procedures. For example, SOP's for typhoon procedures may provide for the putting to sea of all large vessels, the beaching of barges and small craft, and the anchoring or mooring of all other harbor craft. There is no established doctrine covering heavy weather procedures; it is determined by the area and experience. For details on the preparation of harbor craft for heavy weather at sea, see TM 55-501.

72. Emergency Measures and Salvage Procedures

a. The harbor craft unit commander must prepare an SOP covering emergency measures and salvage procedures. Actions during major disasters, evacuation,

and withdrawal are covered in detail in FM 55-51, salvage procedures in TM 55-501.

b. The harbor craft unit commander, in coordination with the Navy and Air Force, must establish an SOP for air-sea rescue.

73. Reporting Defective Navigational Aids

Harbor craft vessel operators will report, by the most expedient means consistent with established communications procedures, any navigational aids that are not functioning. The report is made to the unit operations officer or directly to the harbormaster, according to the SOP.

Section III. NAUTICAL CONTROLS AND PUBLICATIONS

74. Rules of the Road

a. *General.* The operations of all vessels are subject to nautical rules of the road. In the United States, these rules are classified as international, inland, and pilot rules. The United States has established coastal lines of demarcation denoting the areas where these rules apply.

b. *International Rules of the Road.* International maritime conferences have established international rules of the road which govern the operation of all vessels on the high seas. These rules have been made into laws by the legislative bodies of all of the principal maritime nations including the United States.

c. *Inland and Pilot Rules.* The Congress of the United States has enacted into law inland rules of the road that govern operations within U. S. inland waters and pilot rules that govern operations within specific U. S. waters. For example, pilot rules have been en-

acted which apply specifically to navigation of the Panama Canal.

d. Coverage and Enforcement. The Coast Guard is responsible for enforcing the rules of the road. All persons navigating or piloting public or private vessels must be familiar with the rules of the road and conform strictly thereto in the navigation of vessels. Rules of the road govern the following nautical procedures:

- (1) Lights that are to be carried by all types of vessels.
- (2) Sound signals.
- (3) Meeting and passing.
- (4) Action to be taken in fog and limited visibility.
- (5) Distress signals.
- (6) Prudence and precautionary measures.

75. Charts

Charts of coastal waters, harbors, and tidewater rivers of the United States are prepared and issued by the U. S. Coast and Geodetic Survey, Department of Commerce. Charts of foreign waters are prepared and issued by the U. S. Navy Hydrographic Office or the pertinent foreign government. The U. S. Army Corps of Engineers prepares and issues charts of certain inland waters of the United States. Most charts used by harbor craft vessels are Mercator projections. A great circle chart on a gnomonic projection is used for long ocean voyages. Lambert projections may be used within and near the Arctic and Antarctic Circles. In order that charts may be corrected in accordance with changing situations in or around various waterways, "Notice to Mariners," is published weekly by the Coast and Geodetic Survey. In addition to the

features usually shown on a land map, nautical charts show—

- a. Water depths.
- b. Ship channels.
- c. Location of navigational aids.
- d. Obstruction to navigation.
- e. Type and features of ocean bottom.
- f. Landmarks.
- g. Restricted areas.
- h. Anchorage and quarantine areas.
- i. Location of bridges, piers, locks, etc.

76. Nautical Publications

Important nautical publications are—

a. *The American Nautical Almanac.* The Naval Observatory prepares annually "The American Nautical Almanac." This gives the positions of various celestial bodies used by navigators; times of sunrise, sunset, moonrise and moonset; and other astronomical information important to navigators.

b. *Tide Tables and Current Tables.* The U. S. Coast and Geodetic Survey of the Department of Commerce annually prepares and publishes "Tide Tables" and "Current Tables." These tables give predictions of tides and tidal currents by areas.

c. *Light Lists.* The U. S. Navy Hydrographic Office publishes "Light Lists" containing detailed information on the characteristics and positions of navigational lights. These lists also give a brief description of light structures and their fog signals if any. They list the lights along the various coasts of the world by areas, except the coasts of the United States and its possessions. The U. S. Coast Guard

prepares and publishes "Light Lists" for the U. S. coasts.

d. Sailing Directions.

- (1) "Sailing Directions," published by the Hydrographic Office, gives information of interest to mariners about the coasts and harbors of foreign areas. It includes detailed information on—

- (a) Dangers to navigation.

- (b) Methods of approaching and entering harbors.

- (c) **Harbor** facilities.

- (d) **Winds**, tides, and currents.

- (e) **Coastlines**.

- (f) **Harbors**.

- (2) "Coast Pilots," published by the Coast and Geodetic Survey, contains similar information about the coast and harbors of the United States and its possessions.

e. Radio Navigational Aids. "Radio Navigational Aids," a Hydrographic Office publication, has information on the following subjects—

- (1) Radio beacons.

- (2) Stations transmitting navigational warnings.

- (3) Time signals.

- (4) Methods of obtaining medical advice.

- (5) Stations to which quarantine reports may be made.

f. Other Publications. Other publications of the United States, foreign governments, and civilian organizations which will aid the mariner in the operation of his vessel are listed in TM 55-501.

77. Navigational Instruments and Accessories

Compasses, echo-sounding machines, radio direction finders, and many other instruments used for navigation and piloting are installed aboard harbor craft. For details on these and other instruments and accessories which are indispensable to the navigation of vessels, see TM 55-501.

PART FOUR
MISCELLANEOUS
CHAPTER 9
SIGNAL COMMUNICATIONS

Section I. GENERAL

78. Introduction

a. This chapter outlines responsibility for signal communications, communications duties of harbor craft unit personnel, communications in concentrated and dispersed operations, communications in inland waterways, and means of signal communication employed in operation and administration of harbor craft units.

b. Coordination of the complex floating and shore-based elements of a harbor craft unit operation requires the establishment of an efficient and integrated signal communications network. No organic signal equipment is provided for shore-based elements of harbor craft units. This equipment is provided by the headquarters to which it is assigned or attached.

c. Details of installing, operating, and maintaining communication systems are covered in FM's 11-16, 11-17, 24-18, 24-20 and ACP's 118(D), 121(B) and (B)-1, 122(B), 126, 129(A), 131, and 134(A).

79. Responsibility for Communications

Responsibility for communications is based on the following principles:

a. Communications between the terminal battalion and the terminal command are established by the

terminal command, between the terminal battalion and the harbor craft company by the terminal battalion, and between the harbor craft unit and the inland waterway unit by the senior terminal unit.

b. Communications between the harbor craft unit and any other element of the headquarters command to which it is assigned are established by the command.

c. When in support of a unit, the harbor craft unit or its elements establish communications with the supported unit; when the harbor craft element is attached to a unit, the unit establishes communications.

d. All communications personnel are indoctrinated with the principle that weather information, particularly storm warnings, must receive priority transmission at all times.

80. Communications Duties of Harbor Craft Personnel

a. *General.* The headquarters command to which the harbor craft unit is attached plans and integrates the communications network within the command area. The communications functions of the command are performed by assigned Signal Service Organization teams (TOE 11-500) who operate message centers, radar, radio, telephone switchboards, teletypewriters, and other similar services.

b. *The Harbor Craft Unit Commander.* The harbor craft unit commander is responsible for all communications and procedures within his command. He is responsible for indoctrination of all unit personnel in communication principles and procedures. He insures that an adequate communications network is established within the harbor craft organization. He is responsible for his unit performing efficiently as a component of the communication system to which it is

attached. If elements of the harbor craft unit function in support of another unit, the harbor craft commander insures that communications are established with the supported organization. The harbor craft unit commander insures that all personnel comply with procedures for reporting weather information (par. 79d).

c. Communications Officer.

- (1) The communications officer serves as adviser on communications requirements, techniques, and procedures. He supervises harbor craft communications, the operation and maintenance of communications equipment, and the training of communications personnel.
- (2) The communications officer prepares signal instructions for the harbor craft unit. He works closely with the operations officer so that communications requirements of the operation plan will be met. He informs the unit commander and staff about what communications facilities are provided as well as the practical capabilities and limitations of the equipment.
- (3) If personnel from TOE 11-500 teams are attached directly to a harbor craft unit, they are formed into a communications section headed by the communications officer. This section is formed into wire, radio, radio repair, and message-center subsections.

d. Masters of Vessels. The vessel master is responsible for all signal communications aboard his vessel. He has a thorough knowledge of all methods of signaling. He is familiar with the established signal communications procedure of the harbor craft unit to which his vessel is attached and of the terminal com-

mand or other headquarters command of the area in which his vessel operates. AR 55-310 defines the communications responsibilities of the master; TM 55-501 gives additional information.

e. Radio Operator. The radio operator is directly responsible to the master for the operation of all radio communications equipment aboard the vessel. For details on the functions and duties of the radioman, see TM 55-501.

f. Harbormaster. The office of the harbormaster is furnished with sufficient visual, telephone, teletypewriter, and radio communications equipment and personnel to maintain adequate coordination with the terminal battalion or harbor craft unit. Messenger and courier service by air, motor vehicle, and marine craft, and on foot must be planned for as required. Communications functions and responsibilities of the terminal command and the harbormaster are outlined in FM 55-51.

81. Communications in Concentrated and Dispersed Operations

Communications systems vary with the type of operation.

a. In a concentrated operation, marine radio and visual signal equipment is integrated into a communications net. Messenger and courier service between shore-based elements of the harbor craft unit and its floating equipment is easily established.

b. In a dispersed operation where vessels are deployed at various operational sites, reliable communications may be facilitated by using helicopters, light-aircraft pickup, or message relay service. Detailed information

about communications equipment and typical networks for subordinate units can be found in FM 24-18 and tables of organization and equipment of transportation boat units and terminal units.

82. Communications in Inland Waterway Operations

Harbor craft floating equipment operating on inland waterways are provided with visual and electronic communication facilities necessary to carry out efficient operation. Communication facilities at shore installations provide entry into the communication system supporting the area of operation. Ship-to-shore radio facilities are established at dispatching points, headquarters, and terminals. Ship-to-shore radio and visual communication facilities are used to minimize congestion on waterways having locks, narrow gorges, or other restricting features. Communications between operating units and the boat and harbor craft control agency, usually located in the terminal battalions, should be established as soon as possible. Direct communications can transmit movement programing rapidly to operating agencies.

Section II. MEANS OF COMMUNICATION

83. General

a. The various means of communication used are radio, wire, messenger, visual, and sound.

b. The means of communication employed by harbor craft in an operation and the restrictions placed upon communications are covered in the SOP of the harbor craft unit or of the command to which it is attached. Sailing orders issued to vessels may also contain specific communications procedures and instructions pertaining to the individual mission.

c. All communications originating from floating equipment will comply with signal operating instructions (SOI) and standing signal instructions (SSI). Appropriate extracts of these instructions will be aboard all vessels equipped with Signal Corps equipment.

d. All personnel concerned must be familiar with communications security requirements which are designed to prevent unauthorized persons from gaining information of military value.

84. Radio

a. *General.* Radio provides a rapid and reliable means of establishing communications between ships, aircraft, and shore installations. The Signal Corps provides a variety of radio and radio teletypewriter sets to fill the many requirements of harbor craft, aircraft, and shore installations. Radio sets range in size and design from the small-voice-modulated command sets capable of transmitting several hundred yards to large shipboard and shore-based equipment capable of transmitting thousands of miles. Normally the receivers of these sets can be tuned over a much broader frequency range than the associated transmitter: this permits the guarding or monitoring of stations far beyond the range of the transmitter, both in distance and frequency. Radio or radio teletypewriter equipment may be the only practicable means of communication in dispersed operations or when vessels are operating at extended distances from their bases. Close coordination between the operations, intelligence, and communications sections of a unit is essential to maximum communications security.

b. Continuous Wave Radio.

- (1) Communication between ships, aircraft, and shore installations is usually by the international Morse code over continuous wave (CW) or interrupted continuous wave (ICW). This method is especially valuable when considerable distances are involved. Continuous wave or interrupted continuous wave transmission is better than other methods because it is less susceptible to jamming and electrical interference. In addition, there is less interference from other stations on crowded frequencies. However, this method has the following disadvantages:
 - (a) All operators in the continuous wave or interrupted continuous wave nets must be highly skilled.
 - (b) Messages are extremely vulnerable to enemy interception because of the long-range characteristic.
 - (c) The transmitting vessel may be positioned with reasonable accuracy by enemy radio locators.
 - (d) This method is slower than other radio methods.
- (2) The procedures to be followed in continuous wave operation are prescribed in ACP 124. These procedures also apply to combined or joint operation and require strict compliance of all stations in the net.

c. Voice Radio. Radio sets capable of voice operation are installed on most floating equipment. Voice is the most rapid means of transmitting intelligence by radio. Voice radio sets are simple to operate and

require minimum operator training. They are generally used for short range operation by harbor craft, shore stations, aircraft, command installations, and air warning stations. Voice operation procedures are prescribed in ACP 125.

d. Radio Teletypewriter. Radio teletypewriter provides the most rapid means of exchanging large volumes of communications traffic. A station may be manual, characters being transmitted as they are typed on a teletypewriter keyboard, or semiautomatic, perforated tapes being used. Radio teletypewriter teams from TOE 11-500 are generally used in shore installations, but they may also be employed on large harbor craft. The range characteristic of radio teletypewriter transmission is similar to that of continuous wave or interrupted continuous wave. The radio teletypewriter can provide a printed record of all traffic received and transmitted. This method has two disadvantages: it requires the use of more equipment and is more susceptible to jamming than voice or continuous wave operations. Procedures governing radio teletypewriter operation are given in ACP 126.

e. Harbor Craft Radio Nets. Harbor craft radio nets are integrated into the nets established by the signal communications officer of the terminal command, terminal battalion, or other headquarters command to which the harbor craft units are attached. Figure 5 shows a typical radio net for a harbor craft unit. Large harbor craft units are usually equipped with sufficient radio communication facilities to tie in with Army, Navy, and Air Force nets. Small harbor craft are equipped with sets suitable for their particular mission.

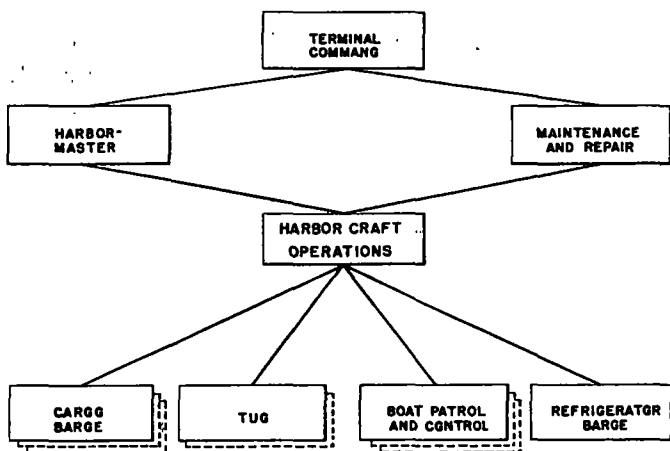


Figure 5. Typical harbor craft company radio net.

85. Radio and Radar Maintenance

Radio and radar maintenance beyond the capability of an organization is performed by signal repair and maintenance units in the area. If maintenance personnel are required by the organization to which harbor craft are assigned, request for attachment of appropriate maintenance teams should be made to the signal officer of the parent unit.

86. Wire

Direct wire communication may be used between shore-based elements of the harbor craft unit and between the harbor craft unit and elements of the command to which it is attached. For example, telephone communication is usually maintained between the harbormaster's office and the operations section of the harbor craft or terminal service unit.

87. Messenger

The type of direct messenger service used is determined by the distance and circumstances involved in communication. Messenger and courier service may be by air, motor vehicle, marine craft, or on foot and must be planned for and provided as required.

88. Visual

Visual communication includes the use of semaphore, lights, pyrotechnics, and flag hoists. Operational conditions determine the type of visual signals used (TM 55-501).

89. Sound

Sound communication includes bells, horns, whistles, and public address systems. For details, see TM 55-501.

CHAPTER 10

SUPPLY, PROPERTY, MAINTENANCE, AND INSPECTION

Section I. SUPPLY

90. General

This section describes briefly the supply organization that supports the operating units and gives responsibilities and procedures for requisitioning unit and vessel supplies of all classes.

91. Function of Logistics Officer (G4)

The logistics section of the terminal command, terminal battalion, or other headquarters command to which a harbor craft unit is assigned plans, coordinates, and supervises supply, evacuation and hospitalization, service, real estate, maintenance, purchasing and contracting, and food service supervision.

92. Functions of the Terminal Battalion Logistics Officer (S4)

a. The terminal battalion logistics officer supervises and directs the supply and logistics of all units assigned to the battalion. He is normally assisted by a property book officer (PBO), and when harbor craft are assigned, by a vessel supply officer (VSO). The precise level or levels within an organization that have a vessel supply officer appointed are determined by the commanding officer and are dependent upon organizational structure and operational requirements. In performing his duties that pertain to harbor craft, the logistical officer—

- (1) Keeps the terminal battalion commander informed of the supply status of the units.
- (2) Cooperates with the unit operations officer to insure that harbor craft operations are fully supported by adequate and timely supply.
- (3) Supervises the operations of the marine inspector, property book officer, and the vessel supply officer when he is assigned to the battalion.
- (4) Recommends the location of vessel supply and maintenance installations.
- (5) Supervises sanitary measures aboard vessels in coordination with medical personnel.
- (6) Plans, provides for, and supervises the transportation of supplies.
- (7) Plans and coordinates the collection and disposition of captured enemy craft in the battalion area, based upon the intelligence collection plan of the battalion intelligence officer.
- (8) Plans for use of local vessels and facilities to support operations.

b. The property book officer has informal accountability and maintains consolidated property books for all units within the battalion except the property books of vessels (c below). He is also directly responsible for all property in his physical possession. The property book officer—

- (1) Establishes consolidated property books and other supply records for all units assigned in accordance with AR's 711-16 and 735-35.
- (2) Keeps the unit commanders informed of the supply status of their units.

- (3) Maintains accurate records of supplies on requisition.
- (4) Requisitions or procures, stores, and distributes all supplies except medical and vessel supplies.
- (5) Conducts physical inventories of all property accounts as required by AR 735-35.
- (6) Initiates report of survey, statement of charges, or other authorized adjustment action in accordance with AR's 735-10 and 735-11.

c. The vessel supply officer has informal accountability and maintains property books for all Transportation Corps floating equipment. He is also directly responsible for all property in his physical possession. The vessel supply officer—

- (1) Establishes vessel property books and other supply records for Transportation Corps floating equipment, in accordance with AR 735-1900-3, which was issued from stock before vessel property books were prepared by the issuing depot. Vessel property books are usually established and issued on shipping documents by the depot.
- (2) Initiates supply action on initial as well as recurring issue items.
- (3) Assists the responsible officer by providing him with stock catalogs, tables of allowances, and lists of authorized repair parts and other items.
- (4) Assists the vessel responsible officer in requesting and accounting for supplies and in interpreting regulations governing these operations.

- (5) Exercises supervision over the supply for vessels assigned to him for support.
- (6) Initiates required reports and assists responsible officers in preparation of reports of survey and quarterly reports of operational losses.

93. Supply Functions of the Vessel Master

The vessel master is the responsible officer for property aboard his vessel. He consolidates the supply requests of his department heads and submits requests to the vessel supply officer. If a vessel has adequate facilities, the vessel master maintains his own property book aboard. If a vessel does not have sufficient storage space or supply personnel, the property book is maintained by the vessel supply officer.

94. Supply Procedure

Although supply procedures for harbor craft units are the same as those established for other Army organizations, the procurement, maintenance, and care of property and supplies aboard vessels present serious problems. The requisition of supplies through normal channels and the procurement of supplies through direct purchase is often difficult because of such factors as extended voyages, difficulty in obtaining funds for emergency procurement, and the sizeable stock of on-board supplies required to meet emergencies. The difficulty of vessel supply is further increased by the need for nonstandard items. Vessels on extended voyages may expedite receipt of supplies upon their return to home port by forwarding supply requests via air mail or through ship-to-shore radio communication.

95. Sources of Supply Authority

Tables of organization and equipment and tables of allowanees shown in a vessel's activation list (a list of all equipment, parts and supplies placed aboard by the builder) are authorization for procuring, requisitioning, and stocking supplies. Equipment for organizations is authorized in TOE 55-500 for the harbor craft unit and in TOE 55-157 for the floating craft depot maintenance company. Nonexpendable items required for vessel operation are drawn on a TA basis. When an item required for operation of the vessel is not shown in the TA but is shown in the vessel activation list, the activation list is cited as the authority for requisitioning. Each general type of vessel is covered by an appropriate TA. TA 55-100 is the authorization for the procurement of expendable items necessary to operate an Army vessel for 60 days. Vessels that have to be away from their home port for over 60 days are authorized additional supplies.

96. Requisitioning and Procuring Supplies

a. All classes of supply items except those for vessels, marine maintenance and repair, and medical supplies are issued by the supply property book officer. Medical supplies are distributed directly through medical channels.

b. Supplies for harbor craft are obtained by submitting one of the following:

- (1) A requisition or informal request to the vessel supply officer when the vessel is in the home port (AR 735-1900-3).
- (2) A requisition to the nearest vessel supply officer when the vessel is away from port or when this is not feasible, to the technical

service supply point in the area or in the vicinity of the area where the vessel is serving.

c. The distribution of non-TA supplies and equipment (items for which there is no known authority but which are required for the efficient operation of a vessel) may be handled by the floating craft depot maintenance supply officer. Non-TA supplies include such items as—

- (1) Special wall and ceiling electrical fixtures.
- (2) Glass for windows, chart cases, etc.
- (3) Repair parts for engine pumps, motors, generators, compressors, and winches for which the vessel has on-board installation personnel capability.

d. The following types of items are either carried on hand receipt for the vessel by the vessel supply officer or are on the vessel activation list and are procured through the vessel supply officer.

- (1) Flags, tools, linens, fiber and wire rope, dishes, and silverware replacements.
- (2) Items authorized by TA's.
- (3) Repair parts authorized as on-board spares by the published vessel activation list.

e. Supplies for small craft that have shore-based crews or for boats assigned to a harbor craft unit are requisitioned and stocked by the vessel supply officer.

f. Petroleum, oil, and lubricants (POL) supplies are obtained by submitting a request to the vessel supply officer. Vessels are bunkered at designated areas within the harbor. Permission to fuel is obtained from the operations officer.

g. Subsistence stores are requisitioned directly by vessels from the appropriate supply section of G4 or S4. If warranted by the number of vessels involved, the G4 or S4 section may appoint a port steward to supervise the distribution of rations and inspect ration accounts.

97. Vessel Supply Procedures in Dispersed Operations

In a dispersed operation, vessels may not have access to a vessel supply officer (par. 100). When they do not, they receive their supplies from the logistic officer at the nearest installation or supplies are forwarded, through the operations officer, by the vessel supply officer of the unit to which the vessels are assigned.

Section II. SUPPLY AND PROPERTY ACCOUNTABILITY AND RESPONSIBILITY

98. General

a. Accountability for property and supplies aboard harbor craft is in accordance with provisions of AR 735-1900-3. All Government property and equipment furnished for use on harbor craft are accounted for in a stock record account. The stock record account is maintained on shore by a vessel accountable officer or by an individual designated for this purpose by the terminal or installation commander. The records for all the vessels of a given unit are correlated and maintained under the responsible officer. Terminal or installation commanders are responsible for insuring that all Government property and equipment aboard harbor craft are accounted for in accordance with the above regulations.

b. The terminal commander may designate the harbor craft unit commander as the accountable officer for all equipment assigned to his unit. When this is done, the unit commander has formal accountability and assumes the functions of the vessel accountable officer.

c. The master is responsible for his vessel and all the nonexpendable items used thereon. The master is also informally accountable for all Government property and equipment used on his vessel. He is responsible for insuring that the vessel cost accounting log is properly kept. The log contains information about the following items:

- (1) Fuel and lubricant issued (diesel, lube oil, etc.).
- (2) Cost of laundry per month.
- (3) Water, if chargeable.
- (4) Docking fees.
- (5) Pilotage fees.
- (6) Per diem drawn by any of the crew.
- (7) Total cost of rations.
- (8) Cost of supplies, including repair parts.
- (9) Cost of organizational and depot repairs.
- (10) Total crew, military and/or civilian.
- (11) Number of days worked in each pay grade.
- (12) Hourly use of vessel.
- (13) Standby hours.
- (14) Total hours vessel is deadlined.
- (15) Mission and area of operation.

99. Issue, Transfer, or Turn-In of Harbor Craft Equipment

a. Issue of Harbor Craft Equipment.

- (1) The responsible officer for harbor craft

(military or civilian) prepares a request when supplies are needed and arranges for the receipt of supplies upon notification that they are ready.

- (2) The harbor craft accountable officer, or his representative, prepares, edits, and forwards requisitions; picks up supplies from the technical service accountable officer; and arranges for delivery of supplies to the responsible harbor craft officer.
- (3) The technical service accountable officer delivers supplies to the harbor craft accountable officer or advises him when supplies are available for pickup, processes issue slips, and issues supplies to the harbor craft accountable officer.

b. Transfer or Turn-In of Property.

- (1) Responsible officers for harbor craft—
 - (a) Request the harbor craft accountable officer's advice in determining serviceability of items.
 - (b) Prepare and forward requests for turn-in or transfer of property.
 - (c) Take immediate action for the preparation of a report of survey for property lost, damaged, or destroyed and for the submission of this report to the harbor craft accountable officer.
- (2) The vessel accountable officer—
 - (a) Requests assistance when required from the chief of the appropriate technical service division for inspection, classification, or identification of property.
 - (b) Processes turn-ins or transfer requests.

- (c) Obtains from the appropriate technical service accountable officer, or his representative, the necessary certification and submits supply and turn-in slips to the property disposal division.
- (d) Completes and forwards reports of survey in accordance with current directives.
- (e) Delivers serviceable and economically repairable items, with appropriate documents, to the technical service accountable officer.

100. Supply and Maintenance of Vessels Dispatched to Isolated Stations

When a vessel is detached for duty from the unit to which it is ordinarily assigned, it may be supplied by the headquarters to which it is temporarily attached. If the headquarters to which it is temporarily attached is unable to provide supply, the operations officer of the harbor craft unit from which the vessel has been detached shall insure that provisions are made for the vessel's supply. The supply and maintenance of a vessel dispatched to an isolated station or on an extended voyage may be provided for by—

a. Provisioning the vessel for the duration of the voyage before it departs.

b. Arranging for emergency repairs and supplies by one of the following methods:

- (1) A requisition submitted to a logistics officer at or near the area in which the vessel is serving (par. 97).
- (2) Procurement by the master when authorized to disburse funds for supplies and emergency repairs. (Funds are limited to a specific amount: this amount may be exceeded only

when the health of the troops or the safety of the vessel so dictates.)

- (3) Procurement by the master when authorized to obligate funds within established limits for necessary supplies, emergency repairs, and nonpersonal services required for accomplishment of assigned mission.

c. The master signs receipts, property vouchers, and documents in the name of the accountable officer and is held responsible for the safekeeping and proper use of all supplies (AR 735-1900-3).

101. Vessel Property Book

a. Harbor craft vessel property books contain all the necessary records, papers, etc., for the vessel.

b. The vessel activation list of category A and B vessels is kept aboard and with the property book. The activation list for other vessels is kept by the vessel supply officer. See TM 55-501 for vessel categories.

c. Harbor craft data sheets are a permanent part of the vessel's property book and are kept with the vessel when it is turned in or transferred. AR 55-304 prescribes procedures for filling out these forms and delineates conditions under which changes are submitted. Major modifications of a vessel or of on-board equipment must be approved. Any change or modification must be reflected in the data sheet.

Section III. MAINTENANCE

102. Unit Maintenance Functions, Responsibilities, and Procedures

The harbor craft unit is responsible for providing organizational maintenance for all nonfloating equip-

ment which it uses. This maintenance consists of checking proper operation, preventing disorders, inspecting, cleaning, servicing, preserving, lubricating, and adjusting as required. Organizational or first-echelon maintenance is that performed by the personnel who actually use the equipment. Second-echelon maintenance is performed by trained mechanics within the organization. The harbor craft unit is only capable of first-echelon maintenance for its shore-based (nonfloating) equipment. For example, if higher echelon maintenance has to be performed on any vehicles assigned to the unit, this maintenance is performed by elements of the headquarters command to which the harbor craft unit is attached (par. 104).

103. Vessel Maintenance

The categories and echelons of maintenance responsibilities for harbor craft are described in AR 750-5 and in AR 750-1900-1. Harbor craft maintenance categories are—

a. Organizational Maintenance.

- (1) Maintenance performed by the personnel of a vessel within the limits of their capability.
- (2) Maintenance performed by the maintenance and repair section of the harbor craft unit.

b. Depot Maintenance.

- (1) Depot maintenance is all maintenance above organizational level. It is provided by the floating equipment depot maintenance company. Depot maintenance is characterized by the terms "major repairs" or "rebuild." If the depot maintenance company has a marine railway or floating drydock, it will be

able to perform complete maintenance for harbor craft and floating equipment.

- (2) Depot maintenance is the responsibility of the Chief of Transportation or appropriate oversea commander (AR's 750-5, 750-1900-1; 780-770; SR 780-10-1; and TM 55-507). Depot maintenance is performed by one of the following:
 - (a) Floating craft depot maintenance company (pars. 29-31).
 - (b) Designated agencies authorized to perform or supervise the contractual performance of this category of maintenance.
 - (c) Commercial contract when repairs are beyond the capabilities of available Government depot maintenance facilities.
- (3) Oversea commanders have depot maintenance responsibility. Depot maintenance within the continental limits of the United States is authorized by the Chief of Transportation.

104. Maintenance Functions and Responsibilities of Harbor Craft Unit Personnel

Organizational maintenance is the responsibility of the harbor craft unit and includes part and assembly replacement or repair. This responsibility does not exceed the capabilities of assigned personnel or the tools and equipment authorized for their use (AR 750-1900-1 and TM 55-507).

a. Organizational maintenance beyond the capability of the vessel crew is performed by a maintenance and repair section composed of maintenance teams (TOE 55-500) attached to the harbor craft unit. These teams may be formed into a separate company

assigned to a battalion, or into a platoon or a section assigned to a company. The maintenance and repair section is headed by a maintenance and repair officer. The maintenance and repair section usually consists of an assistant maintenance and repair officer, a marine inspector, a marine supply branch, and sometimes a diving officer.

b. The maintenance and repair officer—

- (1) Acts as adviser to the commanding officer of the harbor craft unit on all matters concerning the maintenance and repair of all vessels assigned or receiving marine logistical support.
- (2) Maintains and repairs all floating equipment assigned or otherwise committed to the command when the work is beyond the capabilities or facilities of the regularly assigned crew.
- (3) Is responsible in an emergency for limited assistance to any vessel.
- (4) Screens all requests for repair, refusing those that should be made by the vessel crew and forwarding for depot maintenance those not within the unit's capability.
- (5) May operate marine railway or drydocking facility for repairing, inspecting, and painting small craft.
- (6) Receives incoming correspondence and publications and makes necessary distribution. Prepares reports and edits correspondence. Maintains files on work orders, cost accounting, correspondence, personnel, and other related matters.
- (7) Is responsible for scheduling spot check inspections of vessel made by marine in-

spectors and for submitting a report to the vessel master and the responsible unit commander.

- (8) Estimates damage and cost of repairs, including the exact nature of damage and location, for marine casualty reports.
 - (9) Reviews supply requirements to improve supply support.
 - (10) Operates diving facilities for underwater repairs, emergency work, and construction.
 - (11) Determines requisition priorities, eliminating false urgency.
 - (12) Is responsible for the maintenance of time, leave, and other personnel records of all civilian employees assigned to the maintenance and repair section.
 - (13) Establishes a technical library on vessels and equipment.
- c. The assistant maintenance and repair officer—
- (1) Assumes the responsibilities enumerated above in the absence of the maintenance and repair officer.
 - (2) Assumes the administrative responsibilities of the maintenance and repair section which includes but is not limited to—
 - (a) Supervising all administrative matters.
 - (b) Checking and distributing incoming communications.
 - (c) Supervising and editing the dispatch of outgoing correspondence and material.
 - (d) Maintaining the maintenance and repair section files.

(e) Maintaining a current roster of all personnel, military and civilian, assigned to the maintenance and repair section.

(f) Supervising the submission of reports to higher headquarters.

d. The marine inspector—

- (1) Performs timely, periodic inspections of the floating equipment of the harbor craft unit to insure that maintenance and repair are accomplished correctly and adequately in accordance with U. S. Coast Guard rules and regulations, Army regulations, Transportation Corps policies, and command directives.
- (2) Provides masters of vessels and responsible company commanders with copies of deficiencies noted during inspections. (The marine inspector's performance of his duties does not relieve vessel masters, responsible officers, and commanding officers of their responsibility for inspecting their assigned vessels and for taking corrective action.)
- (3) Represents the commanding officer during all vessel inspections conducted by higher headquarters. Prepares reports and correspondence for the commanding officer on subjects related to marine matters.
- (4) Maintains a file of inspection reports, repairs, specifications, and other related correspondence.
- (5) Reviews and processes all requests for depot maintenance, design changes, and additions. Insures that the requests contain sufficient data, justification, and supporting information.

- (6) Verifies and forwards reports in cases of reported substandard contractual repairs.
 - (7) Reviews and processes all marine casualty reports.
 - (8) Makes inquiries and recommendations about supply support consistent with changing operational requirements and other commitments.
 - (9) Recommends and arranges for fumigation when needed.
 - (10) Edits and forwards DA Form 55-145 (Inspection of Boiler or Pressure Vessel) submitted in accordance with AR 850-300.
- e. The marine supply branch—
- (1) Advises the maintenance and repair officer about any problem relating to the supply function.
 - (2) Maintains proper level of authorized supplies by constant inventory and requisition in accordance with AR 711-16.
 - (3) Requisitions other items as required for repair or installation in accordance with priority established by the maintenance and repair officer.
 - (4) Maintains a property book for all nonexpendable property within the section.
- f. The diving officer—
- (1) Operates a diving branch which can be transported by water or highway for emergency repair or routine underwater work.
 - (2) Maintains supplies, equipment, and personnel in a sufficient state of preparedness to be available in an emergency with little loss of time.

- (3) Performs operations, training, or repairs as directed by the maintenance and repair officer.

105. Maintenance Functions and Responsibilities of the Floating Craft Depot Maintenance Company

The harbor craft unit is supported by a floating craft depot maintenance company, which is usually assigned to a terminal command. The floating machine shop (par. 31), which houses all maintenance shops required for depot maintenance of harbor craft units, is mobile and is towed to the site of operations by a tug. Its personnel is organized into contact maintenance teams and issued specialized tools and equipment. These teams are available to harbor craft units during the initial stages of an operation and can give immediate assistance to them either by augmenting their personnel or by repairing items beyond their maintenance capability. The contact maintenance teams can be moved by truck, boat, or helicopter to points requiring their assistance. When the combat situation permits, the floating machine shop is moved to a central location and continues to perform its depot maintenance function under the supervision of a terminal command. The floating craft depot maintenance company maintains a complete and adequate supply of parts and assemblies. It exchanges major assemblies and rebuilds old assemblies received in exchange. It performs major rebuild and repair of all floating marine craft. The duties and responsibilities of the key personnel of the floating craft depot maintenance company are similar to those outlined for the key organizational maintenance personnel (par. 104).

Section IV. INSPECTIONS

106. General

Inspections of a harbor craft unit help to keep the harbor craft unit commander and other key personnel informed about the status of all activities for which they are responsible. Inspections are conducted periodically by higher headquarters, including installation, Office of the Chief of Transportation, and Department of the Army.

107. Command Inspection

a. Command inspection is one in which the commander actually participates. It is an examination of personnel, facilities, and equipment. Its purpose is to determine the condition, completeness, and economical use of equipment and supplies and to insure that subordinate commanders are complying with established procedures. These inspections also enable the commander to insure that the unit and its floating equipment are maintained in a high state of combat readiness. Command inspections are performed by commanders at all levels.

b. Command inspections will be performed frequently enough to give the commander a personal, overall picture of conditions. Through these inspections, he is able to fix responsibility for neglect and carelessness and to commend outstanding performances.

c. Command inspections may be either formal or informal. For a formal inspection, adequate advance notice is given and all equipment and personnel associated with the harbor craft unit are included in the inspection. Informal inspections may be held without advance notice.

108. Command Maintenance Inspections

Command maintenance inspections are conducted to determine the serviceability of equipment and to predict future maintenance and exchange requirements. These inspections are conducted by unit and depot maintenance personnel. When vessels are assigned to a post, the post marine inspector may also make command maintenance inspections. (The major commanders or Office of the Chief of Transportation representatives may make such spot check inspections as authorized by AR's 750-5, 750-725, and 750-1900-1.) The inspections described below are made frequently to insure that a vessel is ready at any time for command maintenance inspection.

a. Operating personnel on all vessels are required to inspect all machinery under their jurisdiction. The chief engineer will make frequent and thorough inspections of compartments, areas, and equipment under his jurisdiction to insure adequate maintenance and safe, economical, and efficient operation. When equipment is found to be in need of repair, the findings are listed in the vessel's log. A list of these findings is prepared and brought to the attention of the command or installation to which the vessel is assigned.

b. Marine inspections, at any level of command, are made to insure that proper maintenance is being performed on Transportation Corps equipment and to insure that maintenance and repairs are accomplished in accordance with U. S. Coast Guard rules and regulations, Army regulations, Transportation Corps policies, and command directives.

c. The U. S. Coast Guard makes periodic inspections of such items as major structural changes, machinery installations, approved installation of components, etc.

Transportation Corps vessels are built to American Bureau of Shipping requirements whenever practicable. American Bureau of Shipping inspections are required as part of the U. S. Coast Guard annual inspections. For details, see AR 750-1900-1.

d. Vessels may also be submitted to Public Health Service quarantine.

Section V. ORDERS, RECORDS, AND REPORTS

109. Orders

The terminal battalion commander puts his plans for harbor craft operations into effect through orders to his staff and to unit commanders. Orders are issued personally by the unit commander or by the staff in the name of the unit commander. Orders may be either oral or written messages, letters of instruction, or operation orders. Oral or bulletined special instructions are, in effect, fragmentary orders of the operation order. For complete details of operation, administrative, and fragmentary orders, see FM 101-5. Orders should be clear, concise, and complete. Orders given by voice communication should be confirmed by written orders if possible.

110. Unit Records and Reports

a. Responsibility for the proper execution of maintenance forms, records, vessel records, reports, and related documents rests upon the commanding officers of all harbor craft units. SR 55-510-1 provides for the maintenance of records used in the operation of harbor craft. In addition, theater commanders may require and authorize the preparation of records other than those listed in SR 55-510-1.

b. Some of the recurring reports which must be made by harbor craft unit personnel are listed below. For details on journals, historical reports, standing operating procedure, operation orders, etc., see appropriate FM in the 100-series.

- (1) *Annual report.* This report is prepared when directed by higher headquarters. This is usually required in the fourth quarter of each fiscal year. The nature and details of the report are specified by higher headquarters in the directive for the report.
- (2) *Historical report.* This report is prepared by all companies and staff specialists and is submitted to the unit operations office for consolidation. The operations office reviews all reports and selects pertinent information for the unit historical report.
- (3) *Monthly, weekly, and daily reports.* Monthly, weekly, and daily reports are also required. The form and content of these reports are determined by the headquarters command to which the harbor craft unit is attached.
- (4) *Operational intelligence reports.* Periodic operational intelligence reports concerning major additions or improvements to transportation facilities and evaluation of local facilities, equipment, and labor within the command are required for transmittal to the U. S. Transportation Intelligence Agency (par. 35b).

111. Vessel Records and Reports

a. Vessel data sheets are kept aboard all crewed, large vessels and in the office of the vessel supply officer for small craft. These data sheets are part of the vessel's

property book. They contain the specifications for the vessel, approved major modifications of the vessel, and approved modifications of on-board equipment. Data forms must be prepared within 30 days after a newly acquired craft is received at its initially assigned station and when a change is made in a craft or in an item of machinery which alters the data previously submitted. When changes are made in characteristics or equipment, only data forms affected by such changes are required. For details on distribution and preparation of data forms, see AR's 55-304, and 700-1900-5.

b. The ship's log is kept up to date by the responsible officers assigned to the vessel. No erasures will be made in the logbook. The officer making the correction lines through the error in red ink and initials the change. All data required for the careful and safe navigation and operation of the vessel are entered in the ship's logbook. For current regulations and directives pertaining to the maintenance and disposition of logbooks, see AR 345-278.

c. All dispatch tickets are initially entered in the rough log and ultimately converted to smooth log entries.

d. Vessel masters and property custodians will submit quarterly cost and utilization reports. Cost reports include information on crew costs, operating services, crew travel, and POL and operating supplies and equipment. Any excessive or extensive costs and/or repairs are explained in the report, and shipyard overhaul is indicated if applicable.

e. Docking plans and other vessel drawings, as well as technical manuals pertaining to on-board equipment, will be retained on board or with vessel files.

f. In the event of an accident or collision, immediate and followup reports must be made as required by current directives (AR 56-19).

g. Other harbor craft vessel records are ship's manifests and medical supply records.

CHAPTER 11

TRAINING

112. Introduction

a. Modern warfare exposes all units to potential attack. Therefore, it is imperative that the transportation harbor craft unit be capable of defensive combat and of providing for the security of its troops and installations in addition to performing its technical mission.

b. Unit commanders are responsible for the training of personnel in their units. Training includes individual and unit training in both military and technical fields.

c. Training is both continuous and comprehensive. It should produce an efficiently functioning organization capable of sustained operations under varying conditions. Individuals must be trained as both soldiers and technicians.

d. Coordination of training is accomplished through a standard training cycle. In this cycle, men advance successively through four phases of training, regardless of their MOS or the type of unit to which they belong.

113. Phases of Training

The sequence of the phases of training is as follows:

a. *Basic Combat Training.* The soldier is taught the fundamentals of infantry combat, including squad tactics. He also receives instructions in military skills common to all arms and services.

b. *Advanced Individual Training.* The soldier trains for his military occupational specialty (MOS), such as

clerk, cook, able seaman, crane operator, and marine oiler.

c. Basic Unit Training. Trained individuals are formed into effective teams, such as barge crew, harbor craft crew, and floating crane crew. The teams learn to operate as components of platoons and companies.

d. Advanced Unit Training. Teams are welded into an operating unit. Advanced unit training is conducted for headquarters staff and operating echelons of all levels of both fixed and composite organizations.

114. Post Cycle Training

In addition to the standard training cycle phases, post cycle training is also accomplished. Post cycle training consists of the following:

a. Refresher Training. The primary purpose of refresher training is to correct deficiencies found during or after completion of the standard training cycle.

b. Cadre Training. The cadre for new harbor craft units is taken from a unit that has already completed the standard training cycle.

c. Training for Special Operations. This training for transportation harbor craft units consists mostly of additional training for arctic operations, tropic operations, etc.

115. Unit Training Problems and Exercises

Problems and exercises involved in unit training are listed in ATP 55-126. At least one third of unit training should be conducted during the hours of darkness and should stress individual and unit night discipline. Preparatory to conducting exercises and problems, reference should be made to FM 21-5 for the application of tactics and techniques to specific situations.

116. Responsibilities of Commanders

Administrative and tactical responsibilities of commanders are cited in AR's 220-50, 220-60, and 220-70 and appropriate ATP's. Commanders can use these regulations as guides in the supervision of administration and in the training of individuals and units under their command.

117. Specialist Training

The suggested methods and procedures for training individuals to qualify them in their military occupational specialties and to conform to mobilization requirements are given in ATP 55-126.

APPENDIX I

REFERENCES

1. Army Regulations

AR 10-5	Department of the Army.
AR 55-19	Marine Casualties.
AR 55-304	Operating Costs and Utilization of Harbor Boats.
AR 55-305	Water Transportation; General Provisions.
AR 55-310	Vessel Master.
AR 55-420	Transport and Harbor Boat Messes.
AR 55-510	Harbor Craft.
AR 220-50	Regiments; General Provisions.
AR 220-60	Battalions, Battle Groups, Squadrons; General Provisions.
AR 220-70	Companies; General Provisions.
AR 320-5	Dictionary of United States Army Terms.
AR 320-50	Authorized Abbreviations and Brevity Codes.
AR 345-250	Record Administration; Management and Planning Files.
AR 345-278	Records Administration; Transportation Service Files.
AR 380-5	Safeguarding Defense Information.
AR 611-201	Manual of Enlisted Military Occupational Specialties.
AR 700-1900-5	Floating Equipment Data.

AR 705-5	Army Research and Development.
AR 711-10	Supply Economy.
AR 711-16	Installation Stock Control and Supply Procedures.
AR 725-5	Preparation, Processing, and Documentation for Requisitioning, Shipping, and Receiving.
AR 725-8	Preparation and Processing of Electrical Accounting Machine-Punched Card Requisitions and Related Supply Documents.
AR 725-55	Oversea Order and Shipping Time.
AR 725-750	Transportation Corps Sources of Supply.
AR 735-2	Transfer of Property Accountability and Responsibility.
AR 735-5	General Principles and Policies.
AR 735-10	Principles and Policies; Accounting for Lost, Damaged and Destroyed Property.
AR 735-11	Accounting for Lost, Damaged and Destroyed Property.
AR 735-35	Supply Procedures for TOE Units, Organizations, and Non-TOE Activities.
AR 735-1900-3	Supply and Property Accounting Procedures for Army Floating Equipment.
AR 750-5	Maintenance Responsibilities and Shop Operation.

AR 750-325	Spot Check Inspection and Reports, Chemical Corps Materiel.
AR 750-725	Maintenance Inspections and Reports, Transportation Corps Equipment.
AR 750-1900-1	Maintenance of Transportation Corps Watercraft.
AR 780-11	Depot Missions; General.
AR 780-770	Depot; Missions; Transportation Corps.
AR 850-300	Inspection of Steam Boilers.
SR 55-510-1	Harbor Craft.
SR 55-510-4	Precautionary Measures, Gasoline-Powered Harbor Craft.
SR 55-720-1	Preparation for Oversea Movement of Units.
SR 55-730-10	United States Army, Navy, and Air Force Joint Ocean Shipping Procedures.
SR 56-360-10	Request for Assignment of Radio Call Signs and Frequencies for Army Vessels.
SR 710-735-1	Stock Control of On-board Spares, Initial Spare Parts Support, Operating Equipment, and Operating Supplies for Transportation Corps (TC) Floating Equipment.

2. Field Manuals

FM 11-16	Signal Orders, Records, and Reports.
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FM 11-17	Tactical Communications Center Operation.
FM 21-5	Military Training.
FM 21-6	Techniques of Military Instruction.
FM 21-30	Military Symbols.
FM 21-76	Survival.
FM 22-5	Drill and Ceremonies.
FM 24-18	Field Radio Techniques.
FM 24-20	Field Wire and Field Cable Techniques.
FM 30-5	Combat Intelligence.
FM 30-15	Examination of Personnel and Documents.
FM(C)30-16	Technical Intelligence (U).
FM 31-21	Guerilla Warfare and Special Forces Operations.
FM 55-8	Transportation Intelligence.
FM 55-15	Transportation Corps Reference Data.
FM 55-51	Transportation Terminal Commands, Theater of Operations.
FM 55-52	Transportation Terminal Battalion and Terminal Service Company.
FM 55-53	Transportation Amphibious Truck Company.
FM 55-58	Transportation Boat Units.
FM 60-5	Amphibious Operations Battalion in Assault Landings.
FM 60-30	Amphibious Operations; Embarkation and Ship Loading (Unit Loading Officer).

FM 100-5	Field Service Regulations; Operations.
FM 100-10	Field Service Regulations; Administration.
FM 101-1	The G1 Manual.
FM 101-5	Staff Officers' Field Manual; Staff Organization and Procedure.

3. Technical Manuals

TM 10-1101	Petroleum Handling Operations.
TM 55-335	Operation of Floating Cranes.
TM 55-501	Harbor Craft Crewman's Handbook.
TM 55-507	Transportation Corps Floating Craft Preventive Maintenance.
TM 55-508	Landing Craft Operator's Handbook.
TM 55-509	Harbor Craft Engineman's Handbook.
TM 55-513	Transportation Corps Military Stevedoring.

4. Pamphlets

DA PAM 108-1	Index of Army Motion Pictures, Film Strips, Slides, and Phono-Recordings.
DA PAM 310-1	Index of Administrative Publications.
DA PAM 310-2	Index of Blank Forms.
DA PAM 310-3	Military Publications: Index of Training Publications; Field Manuals, Reserve Officers' Training Corps Manuals,

Training Circulars, Army Training Programs and Mobilization Training Programs, Army Subject Schedules, Army Training Tests, War Department and Department of the Army Posters and Firing Tables and Trajectory Charts.

DA PAM 310-4 Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Orders.

DA PAM 310-5 Military Publications; Index of Graphic Training Aids and Devices.

5. Department of the Army Forms

DA FORM 55-145 Inspection of Boiler or Pressure Vessel.

6. Tables of Organization and Equipment

TOE 11-500 Signal Service Organization.

TOE 29-500 Composite Service Organization.

TOE 55-111 Headquarters and Headquarters Company, Transportation Terminal Command C.

TOE 55-116 Headquarters and Headquarters Detachment, Transportation Terminal Battalion.

TOE 55-117 Transportation Terminal Service Company.

TOE 55-121 Headquarters and Headquarters Company, Transportation Terminal Command B.

TOE 55-126	Headquarters and Headquarters Company Transportation Boat Battalion.
TOE 55-127	Transportation Light Boat Company.
TOE 55-128	Transportation Medium Boat Company.
TOE 55-129	Transportation Heavy Boat Company.
TOE 55-131	Headquarters and Headquarters Company, Transportation Terminal Command A.
TOE 55-157	Transportation Floating Craft Depot Maintenance Com- pany.
TOE 55-260	Transportation Depot Com- pany.
TOE 55-500	Transportation Service Organi- zation.

7. Table of Allowance

TA 55-100	Allowances of Transportation Corps Expendable Supplies for Army Vessels.
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8. Army Training Program

ATP 55-126	Transportation Water Trans- port and Maintenance Units.
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9. Department of Commerce, Coast and Geodetic Survey

Coast Pilots.
Current Tables.
Navigation Laws of the United
States.
Tide Tables.

10. Department of the Navy

- Bluejacket's Manual.
- Light List.
- HO 205 Radio Navigational Aids.
- Sailing Directions.
- The American Nautical Almanac.

11. Department of the Treasury, Coast Guard

- CG 170 General Rules and Regulations for Vessel Inspection, Ocean and Coastwise.
- CG 200 Marine Investigation Regulations and Suspension and Revocation Proceedings.
- CG 191 Rules and Regulations for Licensing and Certificating of Merchant Marine Personnel.

12. Allied Communications Publications

- ACP-118(D) Visual Call Sign Book.
- (CM) ACP-121(B) Communications Instructions—General.
- ACP-121(B)-1 Communications Instructions—General—Supplement 1.
- (CM) ACP-122(B) Communications Instructions—Security.
- (CM) ACP-124(B) Communications Instructions—Radiotelegraph Procedures.
- (CM) ACP-125(B) Communications Instructions—Radiotelephone Procedures.
- (CM) ACP-126 Communications Instructions—Teletypewriter Procedures.
- ACP-129A Communications Instructions—Visual Signaling Procedure.

ACP-131 Communications Instructions—
Operating Signals.
ACP-134(A) Telephone Switchboard Oper-
ating Procedures.

13. Miscellaneous Publications:

American Merchant Seaman's Manual, edited by Felix M. Cornell and Allan C. Hoffman, 5th edition, Cornell Maritime Press, Cambridge, Md., 1957.

Farwell, Raymond Forrest, *Rules of the Nautical Road*, revised by Alfred Prunski, Annapolis, Md., 1954.

Rules for Building and Classing Steel Vessels, American Bureau of Shipping, New York, N. Y., 1953.

Ship's Medicine Chest and First Aid at Sea, Miscellaneous Publication No. 147, U. S. Government Printing Office, Washington 25, D. C., 1955.

Turpin, Edward A., and MacEwen, William A., *Merchant Marine Officer's Handbook*, Cornell Maritime Press, Cambridge, Md., 1943.

APPENDIX II

PLANNING DATA

1. Basic Planning Factors

For general planning, the transportation terminal service company is considered capable of working one vessel round-the-clock, discharging cargo at the rate of 720 short tons per day. This discharge may be in the stream or alongside a wharf. For planning purposes, the average cargo vessel is considered to have five hatches (FM 101-10). A discharge rate per terminal service company of 720 short tons per 20-hour day is a long range planning factor and should not be used as a daily operations rate. The long range planning factor is based on 365 days per year; this takes into consideration such delays to discharging as enemy action, lack of equipment, breakdown of gear, inclement weather, berthing and shifting of vessels, opening hatches, rigging gear, etc. The daily operations rate is an experience factor based on type of cargo, discharging conditions, etc.; it is used for ordering equipment and transportation in the daily operations meeting. This rate may vary with each day's operation.

a. Using a five-hatch cargo ship as the basic unit, fixed personnel and equipment factors may be determined; from this, a planning agency can estimate requirements quickly and accurately for either beach or wharf operations or a combination of both. To prevent bottlenecks in the transportation cycle, enough personnel and equipment to maintain the planned rate of discharge must be available at all points from shipside to dumps or depots: all computations are based on this

premise. Substitutions may be made for certain items of equipment when those specified are not available. The overall requirement in table I of this appendix may be used as a guide. It lists personnel and equipment required to maintain the rate of discharge in various methods of operation.

b. If all possible combinations of available equipment and personnel have been considered, and it is apparent that target tonnages cannot be successfully handled additional equipment and personnel must be obtained or alternate plans must be made.

2. Basis for Equipment Requirements

Requirements for equipment listed in table I are determined as indicated below:

a. *Amphibious Trucks.* One amphibious truck company per five-hatch unit (FM 55-53).

b. *Landing Craft.* Two LCM(6) platoons, or one LCM(8) platoon, or one LCU platoon per five-hatch unit (FM 55-58).

c. *Barges.* A planning factor of three barges per hatch is used for barges of all sizes up to 100 feet. With 100-foot or larger barges, it is possible to discharge two hatches simultaneously into one barge: this gives a planning factor of three 100-foot barges for two hatches. Since the usual vessel has a superstructure amidships and a total of five hatches, only two combinations of two hatches each can be used. However, to be consistent, three additional 100-foot barges are added for the remaining hatch. The total for the standard cargo ship would then be nine barges of 100 feet or more for a single ship: the factor of 9 will be used for computations. During actual operations, at least three of these barges should be diverted to

other two-hatch units and the balance made up by three smaller barges.

d. Harbor Tugs. Because loaded lighters must be moved from shipside and replaced by empties without delay to hatch crews, harbor tugs are usually expected to move only one barge at a time. To be consistent with previous factors (15 barges per vessel), it appears that 5 harbor tugs would be required. On the other hand, since all hatches do not usually complete discharging into a lighter at precisely the same moment, four harbor tugs are considered ample. In addition, one harbor tug should be allowed for each floating crane. When not placing the crane, the tug may be used in barge or berthing operations.

e. Harbor Launches. Two harbor launches per vessel are required to move gangs to and from ships working in the stream, to accomplish shipside administration, and to accommodate supervisory personnel. One of these craft should be capable of transporting sufficient hatch gangs to operate a vessel; the other should be a smaller, faster craft for the use of supervisory personnel and the delivery and pickup of pilots.

f. Floating Cranes. For the planner, the factor expressing the cargo handled by each crane is the number of heavy lifts made rather than the total tonnage handled. Since most floating cranes do not have deck space on which to land cargo a barge must be used in conjunction with each crane. As a rule, a crane merely removes heavy lifts from a hatch by supplementing ship's gear: it is essentially a part of a hatch unit and is not credited with tonnage. One floating crane is considered necessary for each five-hatch unit projected.

g. Harbor Craft Units. Harbor craft units must be organized with a particular water terminal in mind as the requirements vary with the type of work. After requirements for barges, tugs, harbor launches, and floating cranes have been determined from tables I and II, a harbor craft unit (TOE 55-500) capable of operating the equipment should be assigned.

3. Equipment and Personnel Requirements for the Discharge of Vessels

Table II illustrates suggested equipment and personnel requirements for the discharge of 22 vessels in 3 different situations: all vessels being worked at wharves; 15 of the vessels being worked at wharves and the remainder being discharged in the stream; and all vessels being worked in the stream. Table II shows the sharp difference in personnel and equipment requirements between the wharf and stream methods of discharge.

Table I. *Equipment and Personnel Required to Maintain a Discharge Rate of 720 Short Tons in a Water Terminal*

Method of discharge	Equipment		Personnel	
	Type required	Number	Units Required	Number
Wharves, fixed or floating-----	Floating crane-----	1	Terminal svc co with attached harbor craft sec.	1
Amphibious trucks-----	Amphibious truck	30	Terminal svc co with attached harbor craft sec.	1
	Harbor launch.	2	Amph trk co-----	1
Barges-----	Barge-----	15	Terminal svc co-----	1
	Harbor tug-----	4	Harbor craft co-----	1
	Harbor launch-----	2		
	Floating crane-----	1		
LCM(6)'s-----	LCM(6)-----	16	Terminal svc co-----	1
	Harbor launch-----	2	Harbor craft plat-----	1
	Floating crane-----	1	Boat plat-----	2
LCU's-----	LCU-----	6	Terminal svc co-----	1
	Harbor launch-----	2	Hv boat plat-----	1
	Floating crane-----	1		

Table II. *Equipment and Personnel Required to Work Twenty-two 5-Hatch Vessels*

	Methods of discharge											
	1		2				3				Total	
	Wharf	Wharf	In stream				Total	In stream				
Amph trks			Barges	LCM's	LCU's	Amph trks		Barges	LCM's	LCU's		
No. of 5-hatch vessels.....	22	15	3	1	2	1	22	6	2	7	7	22
Equipment required ¹												
LCM(6)'s.....					32		32			112		112
LCU's.....						6	6				42	42
Barges.....				15			15		30			30
Harbor tugs.....	4	2		4			6		8			8
Harbor launches.....	6	2	6	2	4	2	16	12	4	14	14	44
Personnel required ²												
Terminal svc co.....	22	15	3	1	2	1	22	6	2	7	7	22
Amph trk co.....			3				3	6				6

¹ Heavy-lift requirements determine the number of floating cranes needed.² Harbor craft units (TOE 55-500) may be assigned as needed.

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