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Joint Tactics, Techniques, and Procedures for Joint Logistics Over-the-Shore (JLOTS)



12 November 1998

PREFACE

1. Scope

This publication contains doctrine and procedures for the conduct of joint logistics over-the-shore (JLOTS) operations across the range of military operations. This publication also includes procedures concerning the transition from amphibious operations to a JLOTS operation.

2. Purpose

This publication has been prepared under the direction of the Chairman of the Joint Chiefs of Staff. It sets forth doctrine and selected joint tactics, techniques, and procedures (JTTP) to govern the joint activities and performance of the Armed Forces of the United States in joint operations and provides the doctrinal basis for US military involvement in multinational and interagency operations. It provides military guidance for the exercise of authority by combatant commanders and other joint force commanders and prescribes doctrine and selected tactics, techniques, and procedures for joint operations and training. It provides military guidance for use by the Armed Forces in preparing their appropriate plans. It is not the intent of this publication to restrict the authority of the joint force commander (JFC) from organizing the force and executing the mission in a manner the JFC deems most appropriate to ensure unity of effort in the accomplishment of the overall mission.

3. Application

a. Doctrine and selected tactics, techniques, and procedures and guidance established in this publication apply to the commanders of combatant commands, subunified commands, joint task forces, and subordinate components of these commands. These principles and guidance also may apply when significant forces of one Service are attached to forces of another Service or when significant forces of one Service support forces of another Service.

b. The guidance in this publication is authoritative; as such, this doctrine (or JTTP) will be followed except when, in the judgment of the commander, exceptional circumstances dictate otherwise. If conflicts arise between the contents of this publication and the contents of Service publications, this publication will take precedence for the activities of joint forces unless the Chairman of the Joint Chiefs of Staff, normally in coordination with the other members of the Joint Chiefs of Staff, has provided more current and specific guidance. Commanders of forces operating as part of a multinational (alliance or coalition) military command should follow multinational doctrine and procedures ratified by the United States. For doctrine and procedures not ratified by the United States, commanders should evaluate and follow the multinational command's doctrine and procedures, where applicable.

For the Chairman of the Joint Chiefs of Staff:



DENNIS C. BLAIR
Vice Admiral, US Navy
Director, Joint Staff

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EXECUTIVE SUMMARY
COMMANDER'S OVERVIEW

- **Summarizes Logistics Over-the-Shore Operations**
- **Reviews Organization and Command**
- **Covers the Planning of Joint Logistics Over-the-Shore**
- **Discusses Facility Installations and Preparations, Ocean Transport, and Ship Discharge Operations**
- **Describes Lighterage Operations, Shoreside Cargo Discharge Operations, and Beach and/or Port Clearance and Marshalling Operations**
- **Explains Cargo Control and Documentation**
- **Reviews Liquid Cargo Offshore Operations**

An Overview of Logistics Over-the-Shore Operations

Doctrine, principles, and guidance during logistics over-the-shore operations is applicable to each of the Military Services, combatant commands, and the subordinate elements of these commands.

Logistics over-the-shore (LOTS) is the process of **discharging cargo** from vessels anchored off-shore or in-the-stream, **transporting** it to the shore and/or pier, and **marshalling** it for movement inland. LOTS operations are conducted over unimproved shorelines, through fixed-ports not accessible to deep draft shipping, and through fixed-ports that are inadequate without using LOTS capabilities. Both the Army and Navy may conduct LOTS operations, and the **scope of the LOTS operations** will depend on geographic, tactical, and time considerations. **Joint logistics over-the-shore (JLOTS)** operations are defined as operations in which Navy and Army LOTS forces conduct LOTS operations together under a joint force commander (JFC).

Organization and Command

The joint logistics over-the-shore (JLOTS) forces are normally organized along functional lines, with Service elements integrated under the tactical control of the JLOTS commander.

Combatant commanders have overall responsibility for JLOTS operations in their area of responsibility. The combatant commander may delegate responsibility to subunified commanders or joint task force commanders in the conduct of their assigned missions. The United States Army, Navy, Marine Corps, and the Coast Guard **have personnel and equipment necessary for the conduct of LOTS operations**. The delegated commander or JLOTS commander is responsible for detailed planning and execution of JLOTS off-load operations. JLOTS operations frequently follow amphibious operations (an **amphibious operation** is an attack launched from the sea by naval and landing forces embarked in ships or craft involving a landing on a hostile or potentially hostile shore). Forces assigned to conduct an amphibious operation are organized as an **amphibious task force** or a **joint amphibious task force**.

Planning JLOTS Operations

The coordination for deliberate and crisis planning of JLOTS must be complete and detailed due to its operational complexity and the many forces involved.

Planning for JLOTS operations is complicated by the need for detailed coordination among the various Service forces involved, the complex logistic activities, joint command relationships, and other peculiar operational factors. Operational planning includes **early and continuous dissemination of planning data**, **concurrent planning**, and **throughput capacity planning**. JLOTS operational considerations include the sequence of work, general considerations, and specific considerations.

The execution of JLOTS in a dual major theater war scenario is heavily dependent on Reserve forces. Both the Army and Navy have significant forces in the Reserve Component devoted to this mission. Early mobilization with appropriate flexible deterrent options can mean having sufficient forces available to carry out JLOTS missions.

Facility Installations and Preparations

The establishment of JLOTS capability requires a period of preparation and facility installation that will precede the startup of JLOTS operations.

The **installation**, **setup considerations**, and **requirements** to prepare systems for throughput operations are extremely important. The major naval system for offshore discharge includes the **cargo offload and discharge system (COLDS)**, which is made up of pontoon cans that are configured in various ways to make up lighterage components, and the offshore bulk fuel system.

Side loadable warping tugs are the workhorses of the COLDS and are used to install, tend, and maintain other causeway powered and non-powered system components. A **roll-on/roll-off (RO/RO) discharge facility** provides a means of debarking vehicles from a ship to lighterage, while elevated causeway systems provide the capability to deliver containers across the beach. Terminal service unit materials handling equipment, rough terrain container handlers, lightweight amphibious container handlers, yard tractors, and trailers are used in the preparation of the LOTS operation area. A successful JLOTS operation requires completion of numerous tasks, depending on specific requirements. These may include beach reconnaissance, hydrographic survey, preparation of lighterage discharge sites, air cushion amphibious discharge berms, amphibian water entry and exit points, beach roadways, beach exits, bulk fuel and/or water hoses, beach interfaces for temporary causeways and piers, ammunition stowage, and heliports.

Ocean Transport

Strategic sealift is the principal delivery means for the equipment and logistic support of land and air forces.

Strategic sealift employed in support of JLOTS operations includes Military Sealift Command common-user ships and pre-positioning ships and commercial ships. These ships are capable of conducting over-the-shore and port operations from anchorage. They deliver cargo in accordance with requirements based on cargo, required delivery dates, the tactical situation, and ship capability and availability. **Nearshore and offshore hydrographic conditions will significantly influence ship anchorage positions.** Strategic locations of ships, a variety of lighterages, security, and environmental threats must also be taken into consideration.

Ship Discharge Operations

Cargo off-loading is an essential element of the strategic sealift mission.

Cargo off-loading of strategic sealift ships may be conducted by Navy or Army forces augmented by civilian ship crews. The **Navy** has primary responsibility for providing forces and equipment for conducting strategic sealift download of maritime pre-positioning forces and assault follow-on echelon vessels. The **Army** is responsible for providing forces and equipment for conducting strategic sealift download of Army pre-positioning ships carrying Army war reserve stocks. The Army and Navy are additionally tasked with conducting strategic sealift off-load operations of sustainment supplies and those vessels discharging

forces incident to the development of a base, garrison, or theater. **The JLOTS commander and support forces prepare for discharge** by coordinating command preparations, lighterage, equipment, equipment availability, personnel, and the movement of personnel. Containership discharges, both self-sustaining and non-self-sustaining, RO/RO discharges, breakbulk discharges, barge ships, and semi-submersible ships must be coordinated with the correct type of equipment and staff. **JLOTS operations and equipment are weather-, environmental-, and sea condition-sensitive** (wind, sea states, ground swell, current, tidal conditions, near-shore hydrographic conditions), and can adversely impact ship discharge rates and cargo arrival at the shoreside discharge points.

Lighterage Operations

The JLOTS commander will designate responsibilities for control of lighterage in the JLOTS operation order.

The procedures for control of lighterage in JLOTS have been standardized through incorporation of both Army and Navy methods, including the **Joint Lighterage Control Center,** which provides overall guidance, supervision, and control of lighters; **ship lighterage control points,** providing correct location alongside the discharging vessel; **beach lighterage control points,** responsible for directing lighterage to correct discharge points on the beach; and **debarkation officers,** responsible for unloading cargo in accordance with the unloading plan. Maintenance and repair of lighterage will be conducted by Navy and Army units both on the ships and ashore. **The effective use of lighterage in support of the ship-to-shore movement of cargo is primarily weather dependent,** including sea state, surf conditions, beach gradient, and the characteristics of the onload and discharge sites. **Landing craft** and **causeway ferries** are used to transport vehicles ashore from offshore discharge positions. All lighterage is capable of transporting most breakbulk cargoes to beach discharge sites for discharge by rough terrain cargo handling equipment or crane. **Barge ships** are self-sustaining with regard to off-loading their complement of barges, but the barges themselves are not self-sustaining. A certain number of casualties to lighterage is probable in a JLOTS operation. The mission of the salvage organization is to keep lighterage lanes and ashore discharge areas clear of disabled lighterage so that movement to and over the beach is maintained.

Shoreside Cargo Discharge Operations

The mission to conduct cargo discharge operations includes the interfacing of transportation modes in the surf zone, seaward of the surf line, and on the beach.

These systems should complement ship off-load systems so that there will be sufficient over-the-shore throughput capability to match ship discharge rates. **Floating causeway pier operations, elevated causeway operations, and amphibian operations help discharge cargo.** Since cargo is off-loaded in the surf zone, particular care must be taken with some cargoes to ensure protection from wetness, weather, damage, and being stalled because of lack of traction. However, wet landings may not be permissible for vehicles, supplies, and equipment not specifically waterproofed.

Beach and Port Clearance and Marshalling Operations

Beach throughput is dependent on receipt, transfer, and clearance rates.

Within the beach area, **locations must be established and clearly marked** for lighterage and vehicle landing sites, staging and loading areas, bulk fuel and water storage, Class V dumps, and beach operational group functional areas. These locations should ease local security requirements. **A large inland staging or marshalling area is the key to continuous throughput.** The beach operations organization is task-organized around a nucleus from the supported forces. The **port operations organization** is responsible for the port facilities and the throughput of supplies and equipment as they are off-loaded from the ships. Cargo will be turned over to the separate Services in the marshalling area and prepared for onward movement.

Cargo Control and Documentation

Automated data is captured in JLOTS by the logistics applications of automated marking and reading symbols technology and cargo documentation requirements.

Marine air-ground task force, **logistics automated information system**, and the **Worldwide Port System** serve as the cargo control and documentation systems used to receive and process military standard transportation and movement procedures data in a JLOTS operation. They provide an **on-line, real time cargo monitoring and managing capability** with which landing force logistics personnel may track or control cargo from the point of origin to distribution to consumers and users in the amphibious objective area.

Liquid Cargo Operations

Military units operating the inland petroleum and water distribution systems may or may not be under operational control of the JLOTS commander.

Liquid cargo operations may be viewed in three distinct increments: ocean transport of liquid cargo from origin to offshore locations in the operational area; cargo transfer operations from offshore to the high water mark; and beach storage area operations. The **offshore petroleum discharge system** was designed to provide either an expeditionary or operational level force in the objective area with large volumes of fuel products ashore over a sustained period of time. Certain scenarios may require bulk water support, particularly in arid environments. Reverse osmosis water purification barges may have to be brought in to provide water for potable water and distribution systems.

CONCLUSION

JLOTS, as overseen by the JFC, incorporates the traditional LOTS role of the Army and Navy. Each Service is capable of loading and unloading ships with or without the benefit of fixed port facilities in either friendly or undefended territory. Equipment and supplies are moved to shore through different types of powered, non-powered, and elevated causeway systems, landing craft, and cranes. Planning for JLOTS requires staff, equipment, and lighterage coordination along with special attention to weather, surf conditions, beach gradient, and the characteristics of the onload and discharge sites.

CHAPTER I
AN OVERVIEW OF LOGISTICS OVER-THE-SHORE OPERATIONS

"I believe that the task of bringing the force to the fighting point, properly equipped and well-formed in all that it needs, is at least as important as the capable leading of the force in the fight itself."

General Sir John Monash, 1865-1931
quoted in Horner, The Commanders, 1984

1. Purpose

a. This publication establishes joint tactics, techniques, and procedures for joint logistics over-the-shore (JLOTS) operations. JLOTS operations are conducted in support of the joint force commander's (JFC's) campaign or operation plan (OPLAN) to achieve assigned objectives.

b. This publication:

- Outlines the **missions and responsibilities** of the JFC and Service component commanders relative to JLOTS operations;
- Describes the command, control, communications, and computer (C4) systems of cargo discharge organizations, whether temporary or permanent in nature;
- Provides **guidance** for the planning of cargo discharge operations, whether routine or emergency;
- Provides **guidance for preparation** of both the strategic sealift assets involved and the receiving beach or underdeveloped port area;
- Describes **lighterage control, movement, and concepts of employment;**
- Describes **shoreside components** of the cargo discharge systems, their installation, capabilities, limitations, equipment, and special considerations;
- Describes the **equipment, techniques, and procedures** used in the ship-to-shore movement of liquid cargoes; and
- Defines **cargo documentation** requirements.

c. **Tests.** Operations conducted to develop and test the concepts of these evolutions have included tests of the offshore discharge of container ships held in the early 1970s, logistics over-the-shore (LOTS) I tests in 1977, JLOTS II tests conducted in 1983 through 1984, and the JLOTS III test, conducted in three phases from 1991 through 1993. Several joint Service exercises, including SOLID SHIELD '89 and DISPLAY DETERMINATION '89, also contributed to the development of doctrine, procedures, and planning factors.

2. Applicability

a. The **throughput capability** described in this publication is based upon empirical data observed and obtained (as described in paragraph 1.c. above) and minimal extrapolation. It should be noted that the joint task force (JTF) commander must appreciate

the degree to which throughput can be degraded by inadequately trained or equipped forces. During **JLOTS III tests**, the Joint Test Directorate observed a 40 percent decrease in roll-on/roll-off (RO/RO) discharge rates and a 60 percent decrease in container discharge rates compared to those in the previous version of this publication. The JLOTS III test report contained in the JLOTS III Throughput Test Summary Report, referenced in Appendix O, "References," under Miscellaneous References, 13 i., states clearly the specific erosion of capability caused by lack of operator and command and control (C2) training. The JLOTS commander must be apprised of the training and materiel status of the JLOTS forces and make careful adjustments to anticipated throughput planning factors as necessary.

b. This publication does not include doctrine for maritime pre-positioning force (MPF) operations or amphibious operations, which are the subject of separate publications. However, this publication does include procedures concerning the transition from amphibious operations to a JLOTS operation.

3. References

Additional information may be found in the doctrinal publications or Service regulations listed in Appendix O, "References."

4. Peacetime Responsibilities of the Services and the United States Transportation Command

a. **US Army**. The US Army organizes, trains, and equips Army elements to accomplish discharge of Army pre-positioning ships and support JLOTS operations and waterway main supply route requirements as required by the commanders of a combatant command (CINCs).

b. **US Navy.** The US Navy organizes, trains, and equips Navy elements to accomplish download of MPF and assault follow-on echelon (AFOE) vessels, execute offshore petroleum discharge system (OPDS) operations, and support JLOTS operations as required by the CINCs.

c. **Commander in Chief, US Transportation Command (USCINCTRANS).** USCINCTRANS is the Department of Defense (DOD) manager for the defense transportation system. USCINCTRANS provides the single port manager (SPM) for worldwide common-user sea ports, including those discharge sites requiring JLOTS operations. USCINCTRANS has additional responsibilities, as follows.

- In coordination with the Chairman of the Joint Chiefs of Staff (CJCS), maintains oversight responsibility for all DOD JLOTS-related programs including research and development, acquisition, training, and doctrine.
- Reviews Joint Pub 4-01.6, "Joint Tactics, Techniques, and Procedures for Joint Logistics Over-the-Shore (JLOTS)," as required and updates as appropriate.
- In coordination with the Services, tasks strategic sealift assets, i.e., sea barge (SEABEE), lighter aboard ship (LASH), OPDS, transport-auxiliary crane ship (T-ACS), fast logistics ship, large medium speed RO/RO ships, and fast sealift ships for participation in offshore single-Service or joint training annually.
- Maintains a highly trained pool of personnel from Military Sealift Command (MSC) that serve as liaison officers to the JLOTS commander during operations and JLOTS tests, exercises, and evaluations.

- Oversees SPM activities during JLOTS operations.

- Monitors the development and updating of the mission operations handbook for strategic sealift ships such as the T-ACS, SEABEE, LASH, and OPDS.

- Oversees a no-notice activation program for RO/RO ships to ensure that the vessels can meet their full operational status categories of Ready Reserve Force (RRF) as well as reduced operational status -4 or -5.

- Reviews approved Service program objective memorandums for JLOTS items.

- Provides JLOTS technical planning as required.

- Maintains oversight on other JLOTS matters not covered above.

5. Definition and Scope of LOTS Operations

a. LOTS is the process of **discharging cargo** from vessels anchored offshore or in-the-stream, **transporting** it to shore or pier, and **marshalling** it for movement inland. LOTS operations range in scope from bare beach operations to operations supplementing fixed-port facilities and intratheater movements.

b. Both Navy and Army may conduct LOTS operations.

- In an amphibious operation, **the Navy may conduct LOTS operations in conjunction with the Marine Corps**. During an amphibious operation, the Navy is responsible for the discharge of cargo and supplies to the high water mark, where the landing force assumes the responsibility for acceptance, transfer, and transportation to inland marshalling areas.

- **Army LOTS operations are generally conducted as part of base, garrison, or theater development**, but may be conducted immediately after amphibious operations or as a separate evolution when no amphibious operation precedes it. It may be supported and/or coordinated with other Services or allied and coalition forces. During Army LOTS operations, supplies and equipment are moved ashore and made available for onward movement to the organization responsible for theater movement control.

c. The scope of the LOTS operation will depend on geographic, tactical, and time considerations. A LOTS operation area (LOA) is the geographic area required to successfully conduct a LOTS operation. Figure I-1 displays what a typical LOA may look like.

6. Definition and Scope of JLOTS Operations

a. **JLOTS operations occur when LOTS elements of the Army and Navy conduct LOTS operations together under a JFC.** Traditionally Navy LOTS includes the use of Marine Corps forces. Generally, LOTS operations will be joint in all but a few exceptions.

b. The **scope of JLOTS operations** extends from acceptance of ships for off-load through the arrival of equipment and cargo at inland staging and marshalling areas.

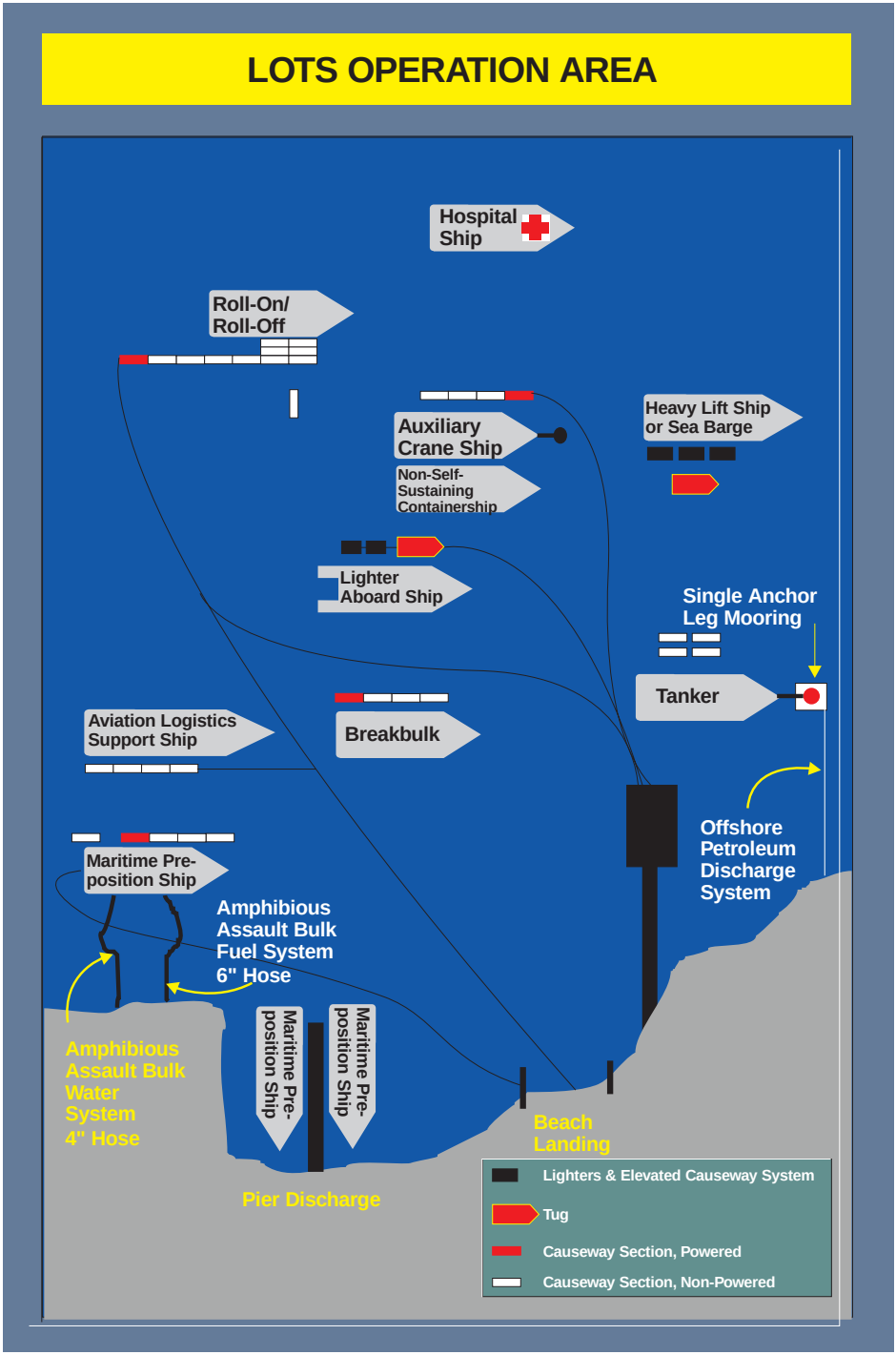


Figure I-1. LOTS Operation Area

CHAPTER II
ORGANIZATION AND COMMAND

"Organization is the vehicle of force."

MGEN J.F.C. Fuller
The Foundation of the Science of War, 1926

1. Overview

This chapter provides a broad overview of the **execution of the JLOTS operation** as well as the C2 of those task organizations formed to perform such operations. A description and discussion of an **amphibious operation** is provided initially to set the stage for the onset of a JLOTS operation that could follow. Additionally, this chapter describes the transition that occurs on termination of an amphibious operation where initial ship-to-shore control is vested with the Navy component and is ultimately passed to Army forces for LOTS operations. Planners should understand that a JLOTS operation can be executed without an amphibious operation preceding it.

2. Command and Organization

Forces assigned to conduct the JLOTS operation are organized by the JFC, who is assigned in accordance with the guidance in Joint Pub 0-2, "Unified Action Armed Forces (UNAAF)." (The term "joint force" used in this publication refers to unified commands, subordinate unified commands, or JTFs.) **The JLOTS forces are normally organized along functional lines,** with Service elements integrated under the tactical control (TACON) of the JLOTS commander. United States Transportation Command (USTRANSCOM) forces will normally also be under the TACON of the JLOTS commander. The composition of the JLOTS operational staff should contain appropriate representation of participating Service components. Each Service's senior officer or noncommissioned officer within the JLOTS organization should be afforded access to the JLOTS commander and, via the JLOTS commander, to higher Service component commanders to address Service-related concerns or unique administrative requirements. In order to effectively conduct JLOTS operations when called on to do so, JLOTS training and exercises must be conducted periodically.

3. Responsibilities of the Combatant Commanders

Geographic combatant commanders have overall responsibility for JLOTS operations in their area of responsibility (AOR). The geographic combatant commander may delegate authority to subunified commanders or JTF commanders in the conduct of their assigned missions. To accomplish this, the supported and supporting combatant commanders should have the following responsibilities.

a. **Supported CINC**

- Identifies potential requirements for JLOTS operations during the deliberate planning process and ensures force apportionment.
- Develops JLOTS concept of operations and initiating directive, if the JLOTS operations is controlled directly by the combatant command.
- Exercises combatant command (command authority) (COCOM) of assigned forces.

- Ensures security of JLOTS operations within the AOR.
- Allocates resources.
- Designates the component to provide the JLOTS commander, if the JLOTS operations is controlled directly by the combatant command.
- Performs intelligence threat assessment during the planning phase and develops indications and warnings intelligence during execution of JLOTS operations.
- Provides necessary transportation intelligence on available means of inland communication, including roads, railroads, airfields, inland waterways, and pipelines.

b. **Supporting CINCs**

- Provide input to supported CINC regarding concept of operations.
- Provide forces to the supported CINC as directed.

4. Responsibilities of the Service Component Commanders

Service component commanders normally support JLOTS operations as follows.

a. Provide recommendations to the JFC on JLOTS operations.

b. Provide, equip, and train active and reserve forces to meet required delivery timelines for the conduct of JLOTS operations.

c. Develop implementing plans for JLOTS operational contingencies.

d. Designate JLOTS commander, as tasked by the JFC.

5. Service Component Mission Responsibilities

Each component has Service personnel and equipment necessary for the conduct of LOTS operations. During the planning for and execution of JLOTS operations, **each Service component will furnish such equipment and perform those tasks required by the CINC's allocation of resources**, as designated in the OPLAN and operation order (OPORD). In Appendix M, "Unit Capabilities," Figure M-16 reflects the Service elements required to conduct a number of logistics tasks.

a. **US Army.** The primary responsibilities of the US Army in JLOTS operations are listed in Figure II-1.

b. **US Navy.** The primary responsibilities of US Navy forces in LOTS and JLOTS operations are listed in Figure II-2.

c. **US Marine Corps. Marine Corps forces require JLOTS support for sustained logistics buildup ashore.** They possess limited capability to augment JLOTS operations with shore-based tactical motor transport, materials handling, bulk liquid, and C2 assets. The Marine Corps primary responsibilities identified in Figure II-3 are valid in supporting JLOTS only until the Marine air-ground task force (MAGTF) commander requires combat service support element units for follow-on Marine Corps missions.

d. **US Coast Guard. The Coast Guard is organized, trained, and equipped to provide port safety and security functions to the port area in a LOTS or JLOTS environment.** General functions concerning

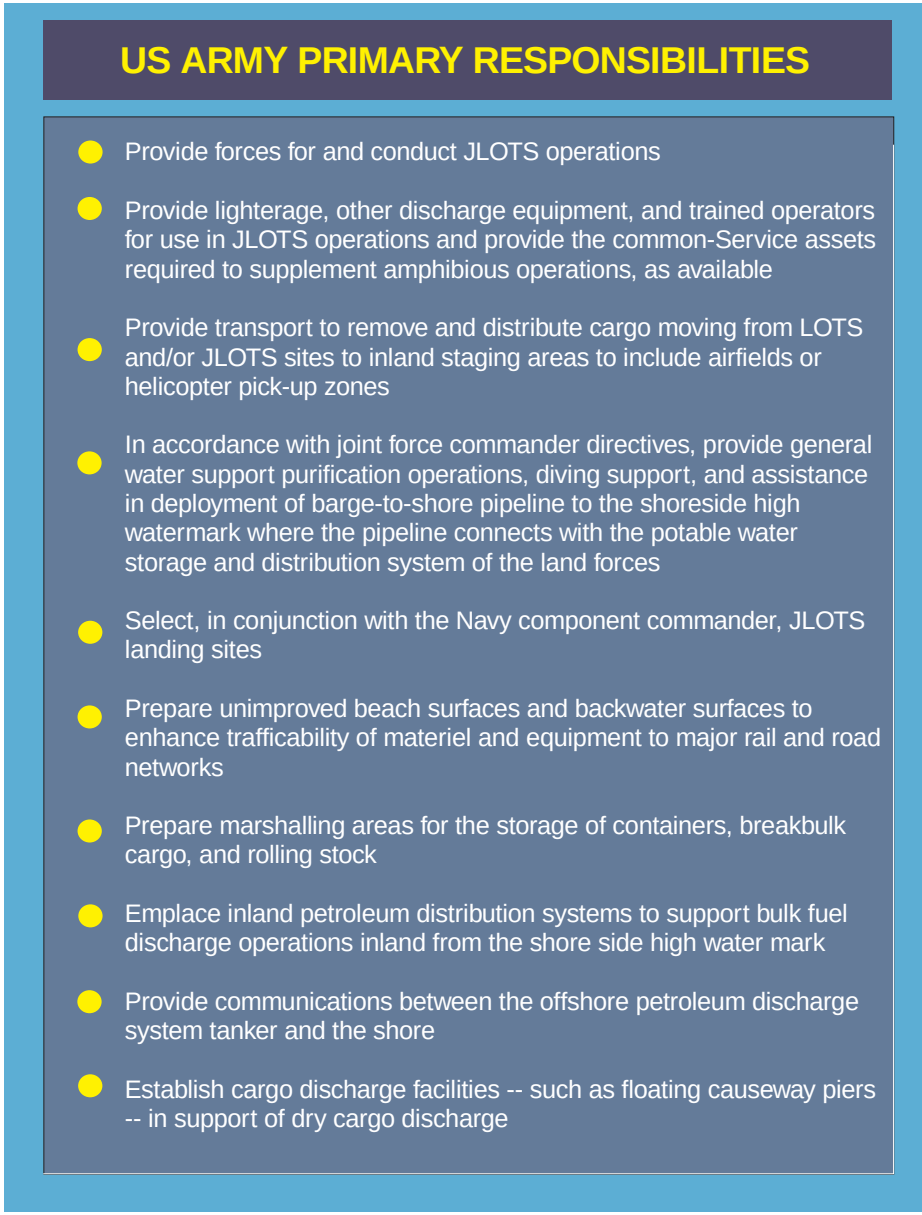


Figure II-1. US Army Primary Responsibilities

harbor and port security are covered in Naval Warfare Publication (NWP) 3-10, "Naval Coastal Warfare." If requested, the Coast Guard may provide as a unit or as individual components port security units, port safety and/or security boarding teams, and high endurance cutters or patrol boats. The teams that make up the details, depending on specialty, will assist the JLOTS commander by providing elements trained in port security and port safety to help ensure the security of vessels, port facilities, and cargo as well as the safety of cargo operations during outload and off-load operations. Coast Guard forces

US NAVY PRIMARY RESPONSIBILITIES

- Provide, as required by the joint force commander, appropriate naval forces and equipment
- Exercise command of Navy ships and boats to ensure safe and proper operation and to take action against the enemy, if necessary
- Exercise a minimum of tactical control over the disposition and operation of other participating ships as necessary to protect them
- Provide for offshore petroleum discharge to the shoreside high water mark
- Provide lighterage, other discharge equipment, and trained operators for use in JLOTS operations and common-Service assets as required
- Provide potable water as directed by the joint force commander
- Select, in conjunction with a land commander, the LOTS operation area and LOTS landing sites
- Erect cargo discharge facilities, such as the elevated causeway system, in support of dry cargo discharge operations
- Conduct beach party operations, including control and salvage of lighterage and control of the beach transit of disembarked vehicles and cargo
- Provide mobile inshore undersea warfare units for seaward surveillance in support of JLOTS security
- Construct expeditionary facilities to support beach operations and enhance throughput, provide camp support, and security

Figure II-2. US Navy Primary Responsibilities

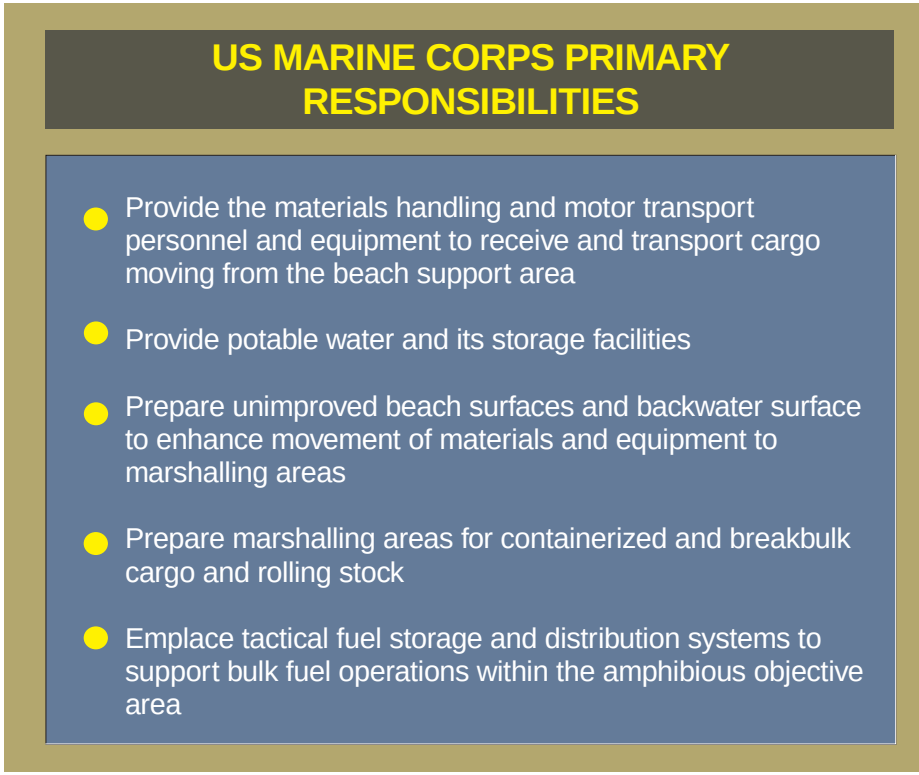


Figure II-3. US Marine Corps Primary Responsibilities

are committed to CINC support missions through the 1995 Secretary of Department of Transportation and Secretary of Defense memorandum of agreement (MOA). Coast Guard LOTS and JLOTS support assets should be included in a CINC's deliberate planning process. JLOTS is considered an extension of the traditional deployed port operations, security and defense mission. This mission includes protecting shipping and harbor security from waterborne threats. JLOTS is an expeditionary port in comparison to normal Coast Guard operations. Coast Guard elements will require space for refueling of patrol craft and billeting space, if not deployed ashore, and normal logistic support. Coast Guard forces work in conjunction with mobile inshore undersea warfare (MIUW) units to provide surveillance and interdiction in the seaward operational area in accordance with naval coastal warfare doctrine contained in NWP 3-10, "Naval Coastal Warfare," and NWP 3-10.3, "Inshore Undersea Warfare." It should be noted that Coast Guard units and details are not self-sufficient and must be supported by the receiving commander, particularly when deployed outside the continental United States.

6. Responsibilities of the JLOTS Commander

The JLOTS commander is responsible for detailed planning and execution of JLOTS operations. This will be accomplished through a central planning team composed of representatives from participating Service and USTRANSCOM components. Regardless of the Service providing the JLOTS commander, responsibilities and procedures for the

conduct of JLOTS operations remain the same. **Principal responsibilities of the JLOTS commander are as follows.**

a. **Publish an OPORD or directive** that states responsibilities of all forces under TACON and describes procedures for the conduct of the JLOTS operation.

b. **Handle JLOTS execution**, beginning with acceptance of ships for off-load, through the arrival of equipment and cargo at inland staging and marshalling areas.

c. **Coordinate over-the-shore liquid cargo operations.** For OPDS, responsibility includes acceptance of OPDS vessels and the installation and operation of OPDS to its termination point on the beach, where it interfaces with the inland petroleum distribution systems (IPDSs) and the amphibious assault bulk fuel system (AABFS).

7. Common-User Sealift

The **COCOM** of common-user sealift in support of a JLOTS operation remains with USCINCTRANS unless transferred to the commander of another unified command as directed by the Secretary of Defense. **Operational control (OPCON)** is usually delegated to the Commander, Military Sealift Command (COMSC) or the designated subordinate. **TACON** is usually assigned to the supported CINC and delegated to the on-scene naval officer in tactical command (OTC).

a. **The OTC will act as the sole contact with strategic sealift shipping at the JLOTS site** for tactical matters and will issue sailing orders to ships in coordination with the JLOTS commander and the MSC area commander's representative. The JLOTS commander is subordinate and responds to the OTC in tactical matters affecting strategic shipping involved in the JLOTS operation. In addition to the normal duties, the **MSC area representative** serves as a special staff adviser to the JLOTS commander and is the JLOTS commander's point of contact for operational matters dealing with strategic shipping in the JLOTS operational area. The MSC representative is normally located aboard ship. If the MSC representative has the personnel available, one of the MSC representatives should be located with the JLOTS commander. Rapid communication and coordination between the JLOTS commander and MSC representative are essential for efficient operations.

b. Specific discussion relative to authority and responsibilities of the ship master and coordination with embarked military units is detailed in Appendix K, "Command, Organization, and Working Relationships with Civilian Merchant Mariners."

8. C2 Relationships

C2 relationships are as prescribed by Joint Pub 0-2, "Unified Action Armed Forces (UNAAF)." **The following conditions apply.**

a. In an amphibious operation, **command and inter-Service relationships** will be guided by Joint Pub 3-02, "Joint Doctrine for Amphibious Operations."

b. In JLOTS operations, **Service elements must be integrated under one JLOTS commander** who normally has TACON authority to task-organize elements as necessary. Service elements should be employed in a manner consistent with their training, unit, and job description. They should be afforded access to the JLOTS commander and, via the JLOTS commander, to higher Service component commanders for Service-related issues. Responsibilities and details for all aspects of the JLOTS operation are provided in an OPORD or other appropriate document prepared by the JLOTS commander.

c. **Specific JLOTS operations will be identified by the JFC during concept development.** At that time, tentative JLOTS sites will be selected and force requirements identified. Landing sites will be selected by agreement between the supporting Navy component commander and the JLOTS commander and will be approved by the JFC. The JLOTS commander is responsible for consideration of the inland access requirements.

d. **The JLOTS commander will coordinate the positioning of ships for JLOTS operations** at the selected landing sites with the supporting Navy component commander, in accordance with priorities established by the JFC.

e. **JLOTS operations may follow amphibious operations** that are routinely the responsibility of the Navy. The **transition from amphibious to JLOTS operations** will entail passing TACON of the off-load site(s) and logistics landing force from the commander, amphibious task force (CATF) to the JLOTS commander once the amphibious operation is terminated. This transition will be accomplished as directed by the JFC or in accordance with the JFC's initiating directive or OPORD. Off-load assets that are at the site of an amphibious operation would normally be retained by the on-scene maritime force commander at the termination of the amphibious operations. Any exception to this procedure must be approved by the JFC. If the OPORD or JFC directs that amphibious task force (ATF) off-load assets be diverted to subsequent LOTS and JLOTS operations as the off-load transitions to Army LOTS, those assets should be recovered at the earliest practical moment for further employment in their primary amphibious function.

f. During **ship-to-shore operations**, command relationships are as follows.

- **During an amphibious operation**, the CATF is responsible for the ship-to-shore movement. The CATF exercises this control through a Navy control group (See Figure II-4).

- **With the termination of the amphibious operation**, the ATF is disestablished and a transition is made from amphibious operation to LOTS or JLOTS. Normally, this transition involves a period in which the Navy and supported Marine Corps or Army forces continue to conduct ship-to-shore movement using the basic control organization and procedures used for the amphibious operation. As Army transportation units arrive in the area, they report to their Service component but functionally integrate into the existing Navy and Marine Corps or Army cargo discharge organization. The JLOTS ship-to-shore C2 organization, when operationally ready and directed by the JFC, will assume TACON of the JLOTS operation. Control of all ship-to-shore assets is transferred from the Navy component commander to the JLOTS organization. Navy ship-to-shore assets not already withdrawn will remain under the TACON of the JLOTS commander but will be phased out as directed in the OPORD. Ship-to-shore JLOTS command relationships are shown in Figure II-5.

9. Amphibious Operations

a. **Background. An amphibious operation is an attack launched from the sea by naval and landing forces embarked in ships or craft involving a landing on a hostile or potentially hostile shore**. Forces assigned to conduct an amphibious operation are organized as an ATF or, when the criteria for a JTF are met, a joint amphibious task force. Joint Pub 3-02, "Joint Doctrine for

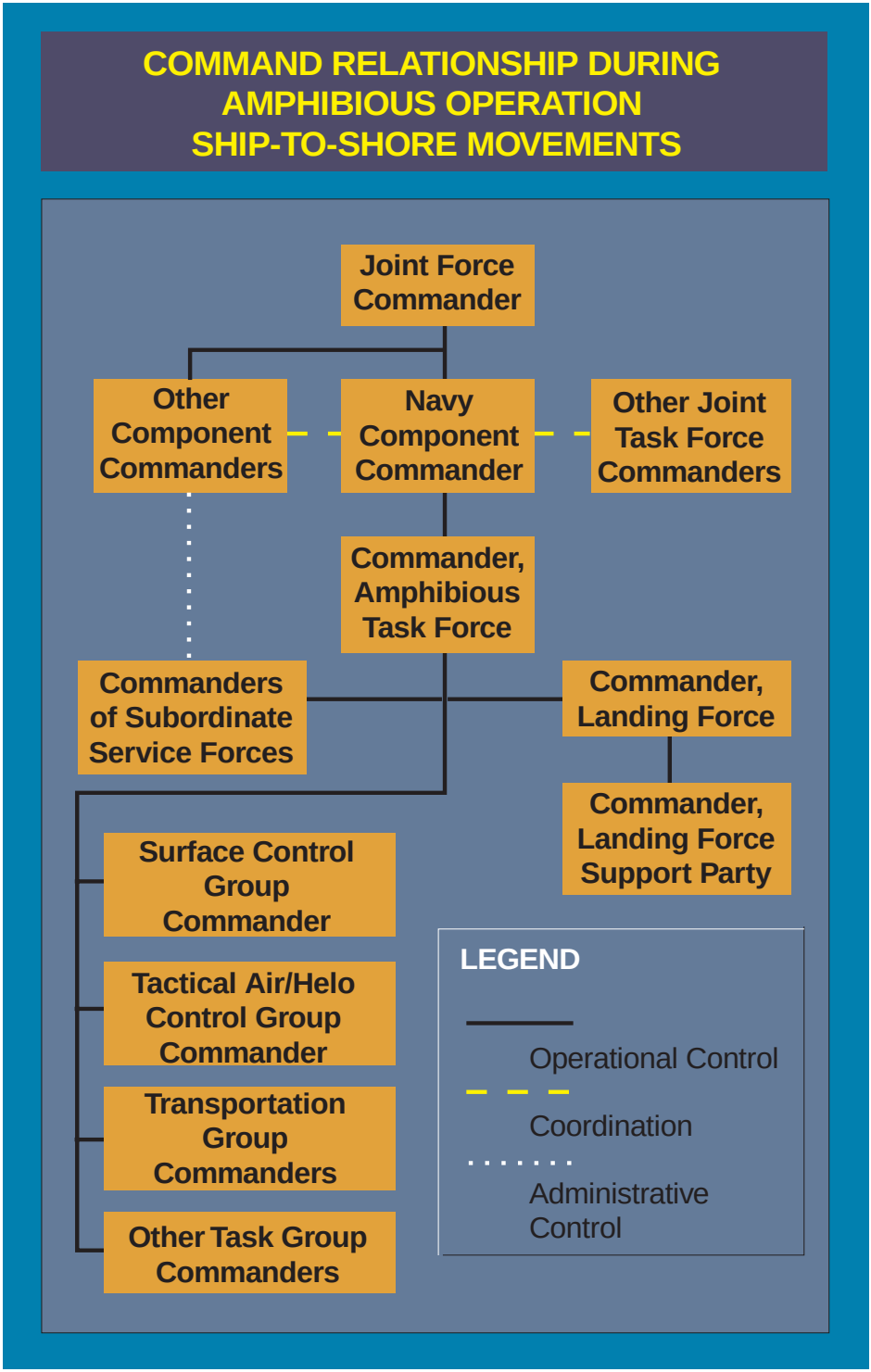


Figure II-4. Command Relationship During Amphibious Operation Ship-to-Shore Movements

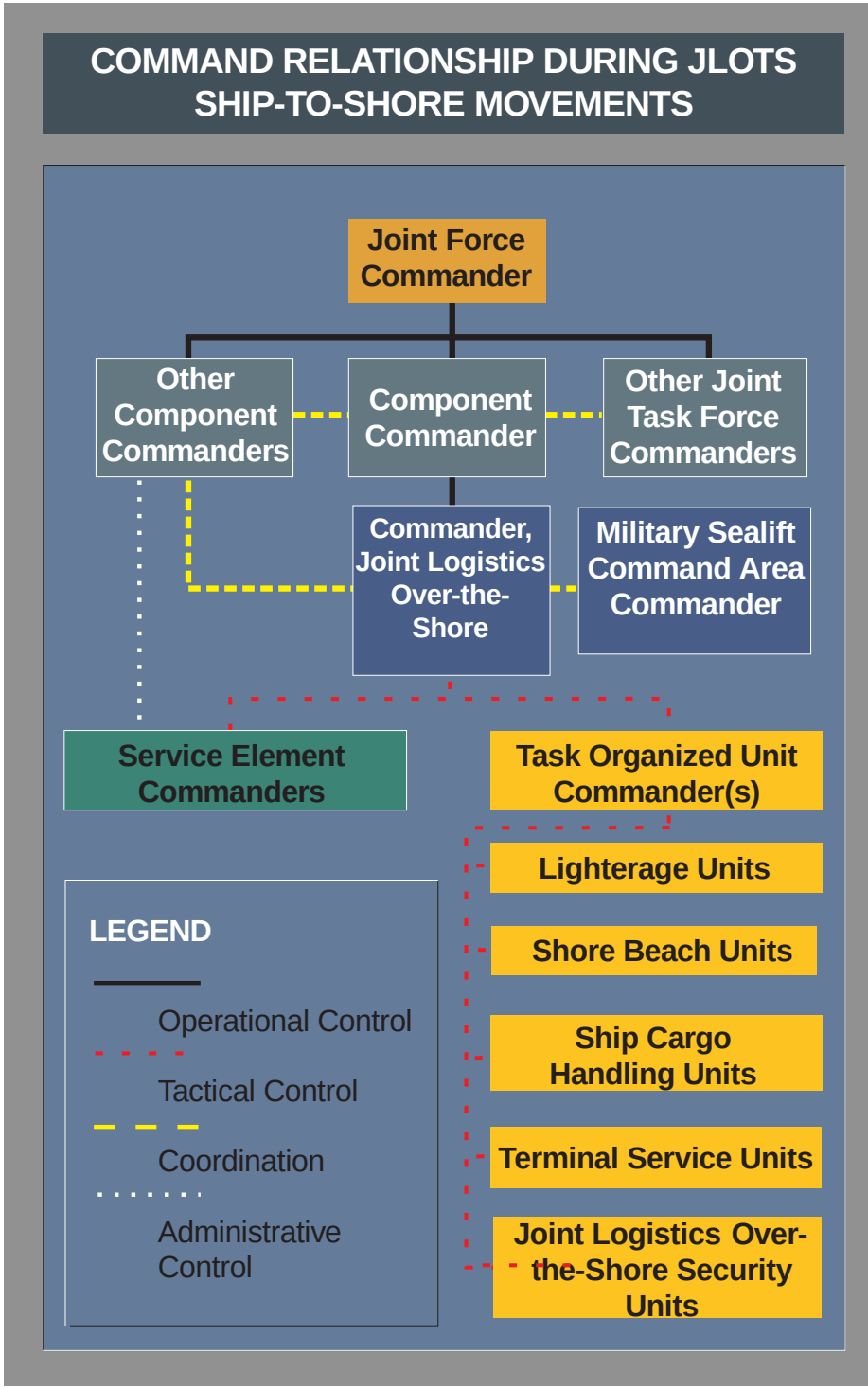


Figure II-5. Command Relationship During JLOTS Ship-to-Shore Movements

Amphibious Operations," contains detailed doctrine for amphibious operations. A condensed discussion is presented here to set the stage of transition into JLOTS. **Items pertaining to these operations are as follows.**

- Amphibious operations may be conducted for the **purposes** listed in Figure II-6.

- The amphibious operation is separate and distinct, but is also **usually part of a campaign or operation of greater magnitude**. As an entity, the typical amphibious operation includes planning and embarkation of landing forces and equipment, rehearsal, movement to the amphibious objective area (AOA), landing of forces with accompanying supplies and equipment, and support of the landing force until termination of the amphibious operation. **Movement of the landing force to or from the objective area** is made predominantly by Navy surface ships but also includes movement by self-deployed aircraft, Air Mobility Command (AMC) airlift, MSC sealift, or commercial ships. All ships assigned to the ATF are called assault shipping. **Movement between assault shipping** (including both Navy and commercial ships assigned to the ATF) **and the hostile shore** is made by landing craft, amphibious vehicles, and helicopters. The operation focuses on ship-to-shore movement of the landing force from the assault shipping to designated landing areas in accordance with the tactical requirements of the commander, landing force (CLF). **Administrative unloading of personnel and materiel** from ships may be conducted after security has been assured through seizure and control of adequate land areas and adjacent sea areas to ensure unimpeded discharge of personnel and cargo.

- **The ATF is a task organization formed for the purpose of conducting the specific amphibious operation.** The ATF always includes Navy forces and a landing force with their organic aviation, and may include MSC-provided ships and Air Force forces when appropriate. **The CATF is designated by higher authority based on the mission and composition of the ATF.** The CATF plans and executes the deployment of

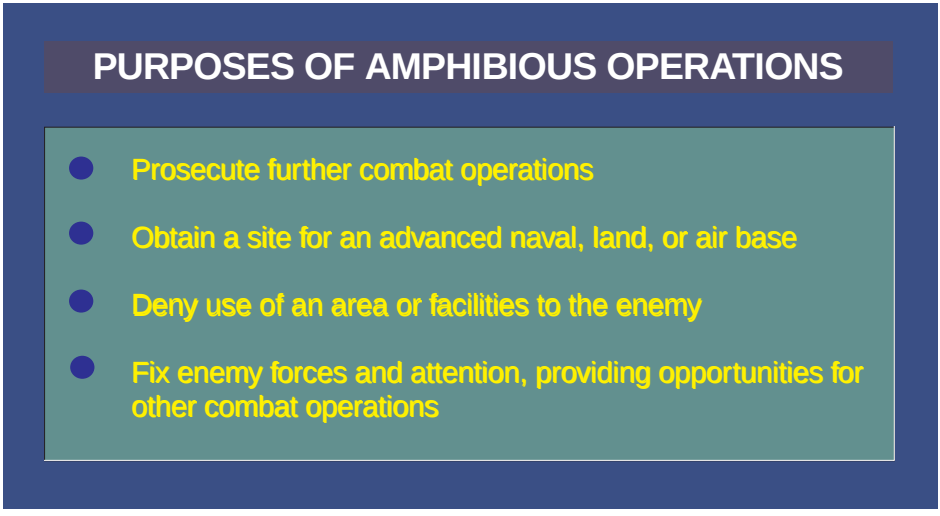


Figure II-6. Purposes of Amphibious Operations

forces by all transportation modes and the landing of all forces and supplies in accordance with the requirements of the CLF. For movement, the ATF may be organized into an advance force (pre-D-day) and a main body (D-day and post-D-day). The landing force is divided into two echelons — the assault echelon (AE) and the AFOE.

b. **Assault Echelon.** The AE consists of the **assault troops**, **vehicles**, **aircraft**, **equipment**, and **supplies** required to initiate the assault landing. Also, it may include landing forces staged by any mode to advance support bases near the objective area before the assault. Pre-staged forces at advanced support bases provide initial combat capability in addition to those forces embarked in Navy amphibious ships.

c. **Assault Follow-on Echelon.** The AFOE consists of the assault troops, vehicles, aircraft, equipment, and supplies that, though not needed to initiate the assault, are **required to support and sustain the assault**. To accomplish its purpose, the AFOE is normally required in the objective area no later than 5 days after commencement of the assault landing.

d. **AE and AFOE Considerations.** Considerations pertaining to the AE and AFOE include the following.

- **Loading and unloading of the AE and AFOE are the responsibility of the CATF.** Units and unit equipment are marshalled at their home stations and staged at ports of embarkation in accordance with their time-phased deployment schedules. Ships are combat-loaded to facilitate expected requirements of the concept of operations ashore and the supporting landing plan. Ship unloading is accomplished by the normal Navy ship-to-shore control and support agencies' central control officer, Helicopter Direction Center, tactical logistic group, and the landing force support party (LFSP). The **CATF exercises overall control of the ship-to-shore movement.** The CATF is responsible for debarkation and off-load until termination of the amphibious operation, when the responsibilities for debarkation or off-load are passed to another off-load organization designated by higher authority. (The amphibious operation would not normally be terminated until the AFOE is ashore.) The CLF informs the CATF of the requirements for units, materiel, and supplies, and specifies the time at which they will be required. **The CLF is responsible for the movement of cargo within the beach support area and into inland combat service support (CSS) areas.** Since most MSC-provided ships have neither the organic off-load capabilities nor the organic ability to control debarkation of embarked troops or cargo, their off-load is conducted by the ATF with naval or landing force personnel and equipment.

- Shipping used to resupply the ATF or to transport additional units, supplies, and equipment required for the buildup of the beachhead is called follow-on shipping. Essentially, **follow-on shipping delivers reinforcements and stores after the AE and AFOE have been landed**. This shipping is provided by the commander of a unified command and is echeloned into the AOA as required by the CATF. The CATF provides protection for and controls both assault and follow-on shipping within the AOA. The CATF orders shipping forward, as necessary, to fulfill the needs of the landing force for units, materiel, and supplies. Upon unloading, empty follow-on shipping assets are returned to a location where USTRANSCOM, through MSC, assumes employment

responsibility for them. Additionally, the MSC commander, under the numbered fleet commander, assumes responsibility for coordinating protection of shipping. Upon disestablishment of the AOA, control of follow-on shipping passes from the CATF to the Navy OTC or JLOTS commander, as appropriate.

10. Transition to JLOTS Operations

As a function of the on-scene Service component force capabilities, **several possible transitions may occur in assuming control of the off-load.**

a. **Before termination of the amphibious operation, some Army off-load elements may have arrived or be arriving in the landing area.** Control of those Army units that are normally associated with the ship-to-shore movement is passed to the CATF. Likewise, control of any shore-based Army units will be vested with the CLF. Army elements will be incorporated into the existing ship-to-shore organization described in Figure II-7.

b. **Upon termination of an amphibious operation, as directed by a JFC, a transition to LOTS or JLOTS operations is conducted.** If all discharge forces in an operation remain Navy and Marine Corps, it is considered a Navy LOTS operation, which normally continues under the control of the Navy component commander. The same basic control organization exists as during the amphibious operation (See Figure II-8). As Army discharge forces arrive and are incorporated with the Navy and/or Marine Corps personnel, the discharge becomes a JLOTS.

c. Upon mutual agreement between the Navy OTC and the designated JLOTS commander, or when directed by the JFC, **the JLOTS commander assumes the responsibility for JLOTS through the organizations depicted in Figure II-8**. Whether the JLOTS commander is from the Navy or Army component, normally the Navy off-load support personnel and applicable Marine Corps LFSP personnel and equipment will be transferred to the TACON of the JLOTS commander and be assimilated into appropriate task organizations until the JFC releases Navy and Marine Corps forces to reembark aboard amphibious shipping to prepare for a future potential amphibious operation. Army off-load elements associated with the ship-to-shore movement need to be integrated into the JLOTS organization by being transferred to the JLOTS commander. The JLOTS commander's responsibility for cargo and/or equipment delivery extends from ship acceptance for off-loading through arrival of cargo and/or equipment at inland staging and marshalling areas.

d. As required in the CINC's and/or subordinate JFC's OPORD, **the naval off-load personnel and equipment may phase out of the specific operation being supported by the JLOTS commander** to be available for support of other operations. Naval elements will be transferred from the JLOTS commander to the Navy component commander. Ultimately, the JLOTS operations may transition to Army LOTS.

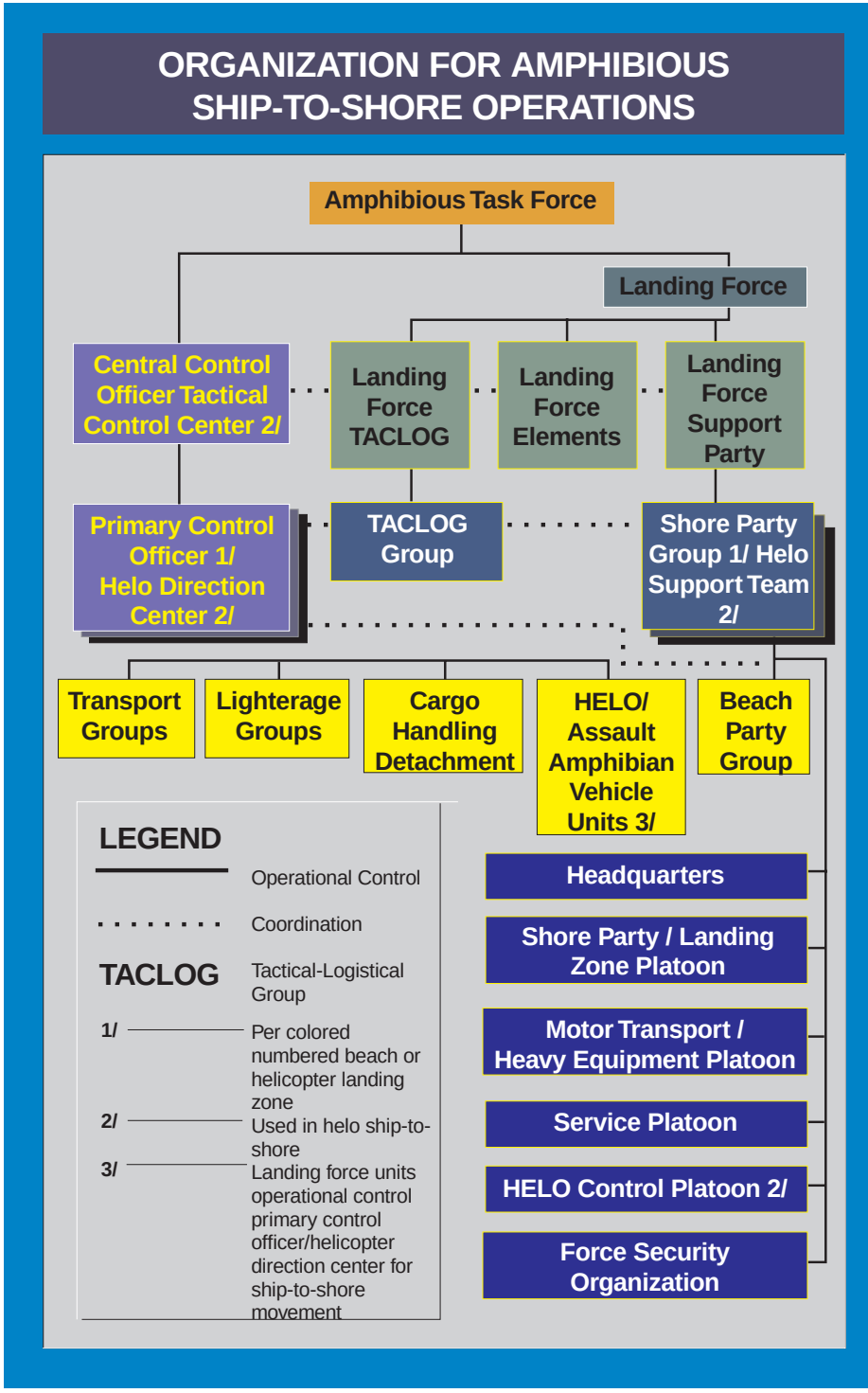


Figure II-7. Organization for Amphibious Ship-to-Shore Operations

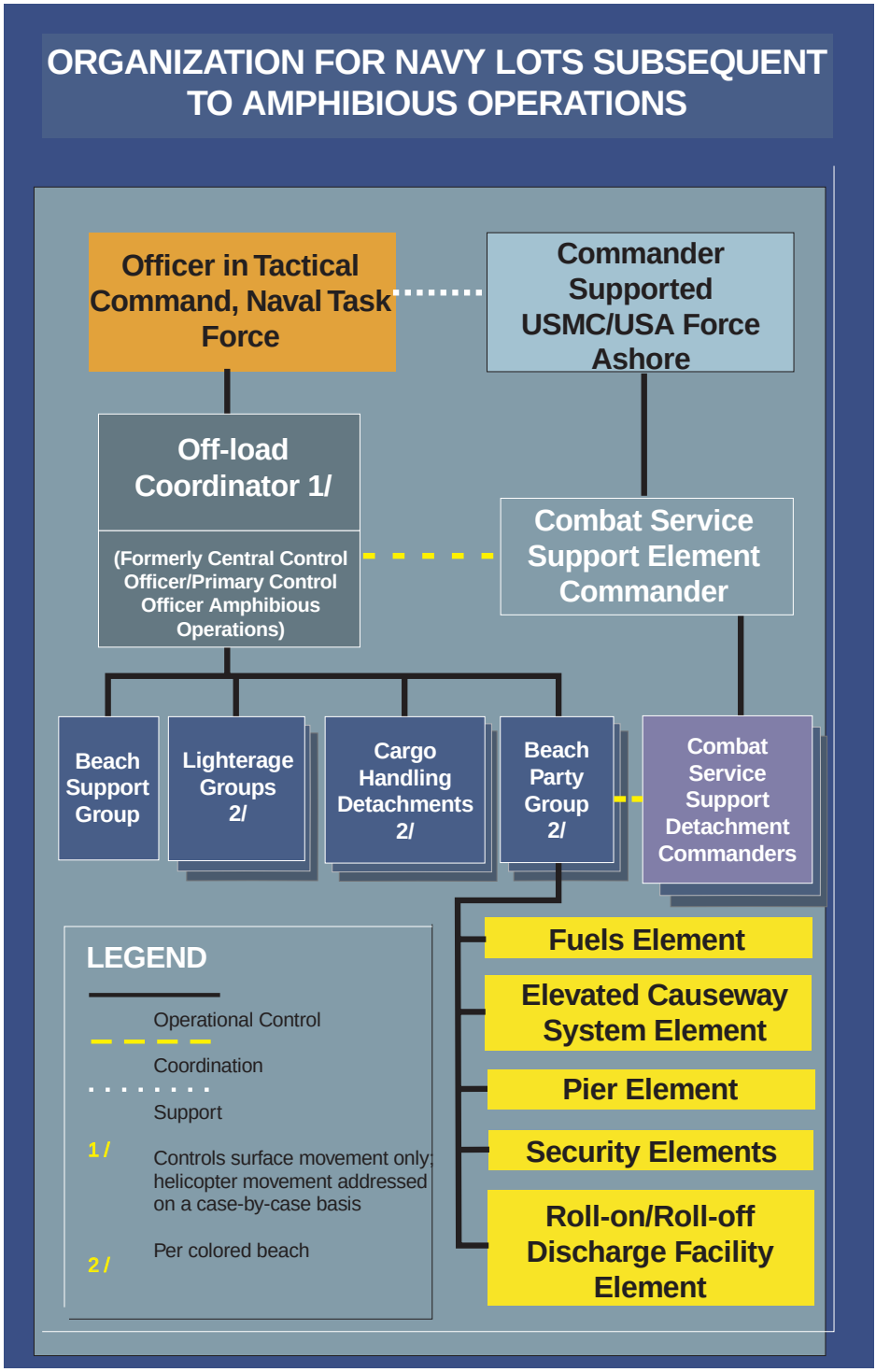


Figure II-8. Organization for Navy Logistics Over-the-Shore Subsequent to Amphibious Operations

CHAPTER III
PLANNING JLOTS OPERATIONS

"In war nothing is achieved except by calculation. Everything that is not soundly planned in its details yields no result."

Napoleon

1. Overview

Planning for JLOTS operations is complicated by the need for detailed coordination between the various Service forces involved, the complex logistic activities, joint command relationships, geographic distance between ships and marshalling yards, and other peculiar operational factors. JLOTS tests reveal the need for complete and detailed planning. **This chapter discusses operation planning procedures and considerations** valid in both deliberate and crisis action planning.

2. Responsibilities

Planning responsibilities are outlined in Chapter II, "Organization and Command."

3. Operation Planning

a. **Planning Procedures.** Planning procedures used by the JLOTS commanders should basically follow those shown below.

- Receive and analyze the mission to be accomplished.
- Conduct terrain analysis, review the enemy situation, and begin collecting necessary intelligence for the JLOTS site location.
- Develop and compare alternative courses of action as they apply to JLOTS operations.
- Select the best alternative.
- Develop and obtain approval for its concept.
- Prepare a plan.
- Publish the plan.

As the above procedures are executed, **the JLOTS commander must provide early and continuous dissemination of planning data** to senior, subordinate, supporting, and supported commanders. Additionally, staff officers and/or staff noncommissioned officers and liaison officers that are to be assigned to the JLOTS staff should be assigned as early as possible in the planning phase.

b. **Concurrent Planning.** Because many of the planning problems are of mutual concern to all participants, **concurrent planning is necessary**. The allocation of resources, such as available shipping, lighterage, ship-to-shore transfer systems, and LOTS equipment, will be based on the amount of equipment, dry cargo, bulk fuel, and water that must be discharged to meet the needs of supported forces. The plans of supported forces must be sufficiently advanced to provide a basis for determining requirements and for setting discharge priorities.

c. **Throughput Planning. Throughput is the average movement** of containers, wheeled vehicles, tracked vehicles, breakbulk cargo, and bulk liquid cargo that can pass through a port or beach daily. It covers movement from arrival at the port or in-stream, to off-loading cargo onto lighters or piers, to the exit or clearance from bare beach

or port complex. Throughput is usually expressed in measurement tons (MTs) or square feet. Reception and storage may affect final throughput. **The JLOTS commander's goal**, when planning for throughput, **should be to keep cargo continuously moving from the ships through the marshalling yards to port complex exit**. Continuous movement of cargo is a key factor for efficient and effective throughput operations. Some of the major considerations for throughput planning analysis are shown in Figure III-1.

d. **Throughput Rate. Throughput rate is the quantitative measure of average daily movement** of containers, wheeled vehicles, tracked vehicles, bulk liquid cargo, and breakbulk cargo that is moved from cargo ships, containerships, RO/RO vessels, and reverse osmosis water purification units (ROWPU) and tankers to marshalling yards or storage areas ashore. There are **five distinct and continuous events** that occur during throughput operations that impact the throughput rate: ship cargo transfer, cargo movement from ship-to-shore (lighter transit time), beach cargo transfer, cargo movement (transit time) to marshalling yards, and cargo clearance from port complex. **Training and effective C4 in these five events are key factors to sustaining throughput rates.** See Appendix A, "Planning Factors," for further discussion of the five throughput events. JLOTS throughput capacity depends on the following.

- The **number of suitable anchorages and maneuvering spaces available** for off-load systems in the off-load area is a factor and is based on an evaluation of the weather, water depth, underwater obstacles, and surf conditions.

- **Beach capacity** is an estimate of cargo that may be unloaded over a designated strip of shore per day and depends on the number of ships that can be discharged at one time. It is expressed in gallons or barrels for bulk liquid cargo, short tons for breakbulk cargo, square feet for vehicles, and the number of containers that can be unloaded, segregated or sorted, and placed on the beach or conveyed directly to transportation for movement inland. Beach capacity is based on the amount of space for storage and the amount of floating and cargo-handling equipment and personnel available for the discharge operation.

- **Beach throughput** depends on both the off-load and clearance rates. The off-load capacity rate is the rate cargo is discharged from lighterage. Beach throughput is a major consideration of JLOTS operations.

- **Clearance capacity** is an estimate of the cargo that may be transported inland from a beach or port over the available means of inland communication, including roads, railways, inland waterways, pipelines, and airheads. Clearance capacity includes the short tons of cargo and the number of containers and troops that can be moved daily from the beach or port complex to initial inland locations. It is based on transportation furnished by supporting highway, rail, inland waterway, and airlift units. The clearance capacity rate is the rate at which cargo can be moved from beach discharge points or the port complex to inland staging and marshalling areas.

4. Considerations

JLOTS operational considerations include the sequence of work, general considerations, and specific considerations.

a. **Sequence of Work.** The following is typical.

- Consider **strategic sealift requirements** necessary to deploy selected outsized

THROUGHPUT PLANNING ANALYSIS CONSIDERATIONS

- Reception capabilities
- Existing facilities (considers storage space, marshalling areas, and the number of port exits)
- Host-nation support
- Topography (soil conditions)
- Weather (analyze prevailing weather patterns and conditions)
- Hydrography (cargo transfer operations normally cease as the seas reach sea state 3)
- Number and types of ships to be unloaded
- Number of anchorages and their distances offshore and maneuvering space available
- Number of crane ships available
- Number of cargo handling and clearance units available
- Status of training of cargo handling and clearance units
- Number and types of lighters available and their transit times
- Number of beach transfer systems available, such as elevated causeway system and floating causeway piers
- Ship cargo transfer rates
- Length and depth of beach and natural and/or manmade obstacles in the beach area
- Beach egress route
- Communications systems in the operational area
- Distance and transit time to the marshalling yards
- Access to rail and road networks
- Type and quantity of cargo to be handled
- Cargo configurations
- Day and/or night evolutions

Figure III-1. Throughput Planning Analysis Considerations

military equipment needed to conduct over-the-shore operations for discharge or loading of designated ships. See Appendix B, "Lighterage Characteristics."

- **Deploy** over-the-shore systems and equipment for sustained container, RO/RO, breakbulk, vehicle, and bulk fuel operations.

- **Install and prepare over-the-shore cargo transfer systems and equipment**, i.e., RO/RO discharge facilities (RRDFs), elevated causeway piers, floating causeway piers, amphibian discharge site, and beach and pier improvements.

- **Transition**, if necessary, from an amphibious operation to a LOTS or JLOTS operation.

- **Manage and control movement of cargo** in sustained operations over-the-shore.

b. **General Considerations.** The items in Figure III-2 should be considered (See Appendix C, "Ship Characteristics").

c. **Specific Considerations.** The following specific considerations must be addressed.

- **Communications Planning.** A communications plan for the effective interface of Service-unique communication systems in support of JLOTS operations must be developed (See Appendix D, "Communications Procedures").

- **Ship Discharge Plans.** Discharge plans must be drafted as soon as possible after receipt of the ship's manifests and final stow plan from Military Traffic Management Command (MTMC) and distributed to those units and individuals directly involved with throughput operations. The plans should be made available to other interested parties as required by the JLOTS commander. For further discussion on the ship discharge plan, see Chapter VI, "Ship Discharge Operations."

- **Lighterage Repairs and Supply Support.** Planning must provide for the repair and maintenance of lighterage during the operation (See Appendix E, "Support and Maintenance Operations").

- **Safe Haven Plan.** A safe haven for both strategic vessels and lighterage should be designated (See Appendix F, "Safe Haven Requirements").

- **Lighterage Availability and Utilization Plans.** The availability of lighterage by types, a generalized ship-to-shore movement plan, and procedures to be used in the event of inclement weather should be promulgated.

- **Weather Support Plan.** Appendix G, "Sea State, Weather, and Surf," contains information on weather conditions.

- **Retrograde Cargo Operations.** Eventually, repairable material for servicing out of country must be loaded on available shipping. When the operation is over, units and supplies could be moved to a staging area for another operation, to the control of a CINC with another AOR, or to the continental United States.

- **Security Planning** (See Appendix J, "Security of Off-load Anchorage or Beach Areas").

GENERAL OPERATIONAL CONSIDERATIONS

- Concept of operations ashore that the JLOTS operations will support
- Anchorage areas, including number of anchorages suitable for offload operations and adequate maneuvering room for offload systems to be effectively employed
- Landing sites, including staging areas, trafficability, beach gradient or width, surf, tides or current, sandbars, soil conditions, and environmental limitations
- Sea state conditions, weather characteristics
- Geographic and hydrographic natural obstacles and constrictions adjacent to the beach operating area for canalizing hostile forces without restricting JLOTS operations
- Date of landing, considering availability of forces, seasonal conditions in the area, local conditions of weather, duration of darkness and daylight, and designation of limiting dates by higher authority
- Type and quantity of cargo to be deployed and landed
- Separation of offshore petroleum discharge system and/or inland petroleum distribution system from other cargo operations to minimize risk or loss or damage due to enemy action and to reduce interference with dry cargo operations
- Personnel and equipment required to conduct operations
- Types of ships to be worked and their sequence of arrival
- Numbers and types of offload systems that must be installed
- Proximity and nature of camp support
- Logistic support
- Engineer support
- Security threat
- Meteorological support
- Host-nation support

Figure III-2. General Operational Considerations

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CHAPTER IV
FACILITY INSTALLATIONS AND PREPARATIONS

"To rely on rustics and not prepare is the greatest of crimes; to be prepared beforehand for any contingency is the greatest of virtues."

Ho Yen-hsi
(early commentator to Sun Tzu), c. 500 BC

1. Overview

a. The establishment of JLOTS capability requires a period of preparation and facility installation that will precede the startup of JLOTS operations. **This chapter provides a description of the different JLOTS systems.** It describes the installation, setup considerations, and requirements to prepare systems for throughput operations with the exception of liquid cargo systems and operations that are discussed in detail in Chapter XI, "Liquid Cargo Offshore Operations." Also included are site preparation considerations for the overall JLOTS operations. Although many current systems are unique to one Service, an increasing number of joint procurements are in progress that will provide similar equipment to more than one Service. This chapter will identify which Services utilize the systems described and any differences between the Services' use of the equipment.

b. **The JLOTS commander must ensure that all available data for a JLOTS operational area be thoroughly researched and validated with a site survey.** A **concept of operation** should include a detailed soil analysis, prevalent weather conditions, beach gradient, tides, tidal range, and currents. These factors are further defined as a part of the site survey. **Site survey teams** need to include engineer personnel to determine trafficability of beach and marshalling yard sites, as well as determining locations for pier or bare beach transfer sites. **Dive team hydrographic surveys** should verify bottom conditions and location/clearance of underwater obstacles in the vicinity of piers, bare beach splash points, and amphibious discharge sites (ADSs). **Separation of the various facilities** should allow adequate space for lighters to maneuver and prevent damage should one of the facilities (such as the floating causeway pier) broach in heavy seas. Planners should consider 200 to 400 meters of separation between beach cargo transfer facilities.

c. The **systems available for the conduct of LOTS operations** are described in subsequent paragraphs. Following systems descriptions, some considerations in preparation for type operations are covered. This information provides an overview. Individual system manuals should be consulted for detailed planning information.

d. The major naval system for offshore discharge is divided into the **cargo offload and discharge system (COLDS)** and the **offshore bulk fuel system (OBFS)**. The COLDS system, described here, contains a number of subsystems that are being procured by both the Army and Navy. The OBFS and its major subsystems will be described in Chapter XI, "Liquid Cargo Offshore Operations."

e. **Army LOTS equipment** includes lighterage, RRDFs, causeway systems, terminal service unit materials handling equipment (MHE), shore-based water storage systems, and a tactical petroleum terminal (TPT). The majority of construction equipment will be provided by supporting engineer units.

2. Cargo Offload and Discharge System

a. **COLDS. The COLDS is made up of the Navy standard system of components**, of which the basic building block is the 5- by 5- by 7-foot Navy lighterage (NL) pontoon can. These cans are configured in various ways to make up lighterage components. Causeways made up in the Navy standard system are typically 90 feet long and 21 feet wide by 5 feet. Nonpowered units weigh about 67 tons and powered units weigh up to 106 tons. Other COLDS considerations follow.

- **Components of COLDS are deployed on Navy amphibious shipping strategic sealift ships and maritime pre-positioning ships (MPS).** The Navy landing ship dock carries landing craft and landing craft, air cushion (LCAC) in its well deck. Strategic sealift such as SEABEEs and LASH ships are used to deploy the majority of Army and Navy lighters in the DOD inventory. Units require heavy lift capability to get them off the ship. Navy amphibious construction battalions (PHIBCBs) and Army floating craft companies assist in deployment of the systems from strategic sealift shipping and assemble the systems in theater.

- Once assembled, **Navy standard causeways and Army modular causeways have nearly identical operating procedures and characteristics**. Navy lighterage and Army modular standard causeways are interoperable and can be connected end-to-end to form causeway ferries and piers. They are not interchangeable at the component level and cannot be connected side-to-side because of different freeboards and connection systems.

b. **Side Loadable Warping Tug (SLWT). The SLWT, the workhorse of the COLDS system, is the craft used to install, tend, and maintain other causeway system components.** The SLWT currently exists in the Navy and in the Army. Both are of standard configuration. The SLWT is 85 feet long (5 feet shorter than other Navy standard causeways) to keep it within the parameters for side loading on the Navy's landing ship, tank (LST) class ships when the A-frame is in the stowed position. The SLWT is propelled by two water jet propulsion assemblies (WPAs) that occupy the place of the aftmost four pontoon cans and the bow section is made up of 5- by 5- by 7-foot cans. The SLWT is equipped with a dual-drum winch, an A-frame and appropriate rigging, and a stern anchor that provides for its performance of warping tug functions. The SLWTs install elevated causeway systems (ELCASs), OPDSs, and RRDF systems and perform a wide variety of other functions, such as powering causeway ferries, emplacing anchors, and performing surf salvage (See Figure IV-1).

c. **Causeway Section, Powered (CSP). The CSP** (see Figure IV-2) **is the normal power unit for causeway ferries**; the SLWT can also perform the function. The CSP propulsion system is identical to that of the SLWT. However, its hull is 5 feet longer, and it does not have a winch, A-frame, or stern anchor installed.

d. **Causeway Section, Nonpowered (CSNP).** The CSNP is made up of three 7-foot wide and six 15-foot long configurations of the basic pontoon can to produce the 90- by 21-foot sections. The different configurations of the CSNP are described in the following paragraphs.

- **Causeway Section, Nonpowered (Intermediate) (CSNP[I]).** The

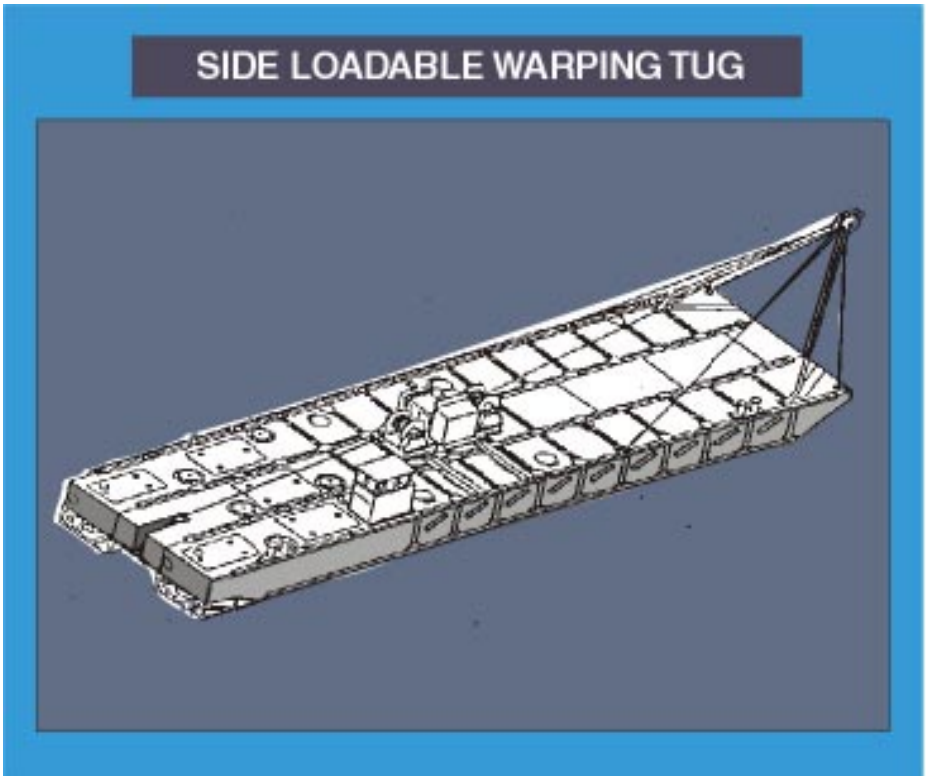


Figure IV-1. Side Loadable Warping Tug

CSNP(I) has flexor units at both ends to permit coupling with other powered or nonpowered causeway sections. Some sections also have side-mounted flexors (side connectors) to permit assembly into the three-causeway wide by two-causeway long RRDF platforms. A further variant has side connector slots and internal spud wells and is used in the pierhead of the ELCAS. The CSNP(I) is shown in Figure IV-3.

- **Causeway Section, Nonpowered (Beach End) (CSNP[BE]).** The CSNP(BE) is equipped with a folding beach ramp. It is used as the beach end of causeway ferries, permitting rolling stock to drive off the ferry. It also permits container handlers to drive onto the causeway and pick up containers. Additionally, the CSNP(BE) is used as the shore end of the causeway pier used during JLOTS operations (See Figure IV-4).

- **Causeway Section, Nonpowered (Sea End) (CSNP[SE]).** The CSNP(SE) is equipped with a sloping notch and rhino horn. It is used as the seaward end of a causeway pier used by assault forces and the Army and as an administrative pier. The Army also includes one CSNP(SE) as a seventh section of the Army RRDF. The notch is designed to receive the bow of an LST. The rhino horn slips through a hole in the bow ramp of the landing craft, utility (LCU) or landing craft, mechanized (LCM) -8 to hold the LCU or LCM-8 in position while vehicles are embarked and debarked. The CSNP(SE) is shown in Figure IV-5.

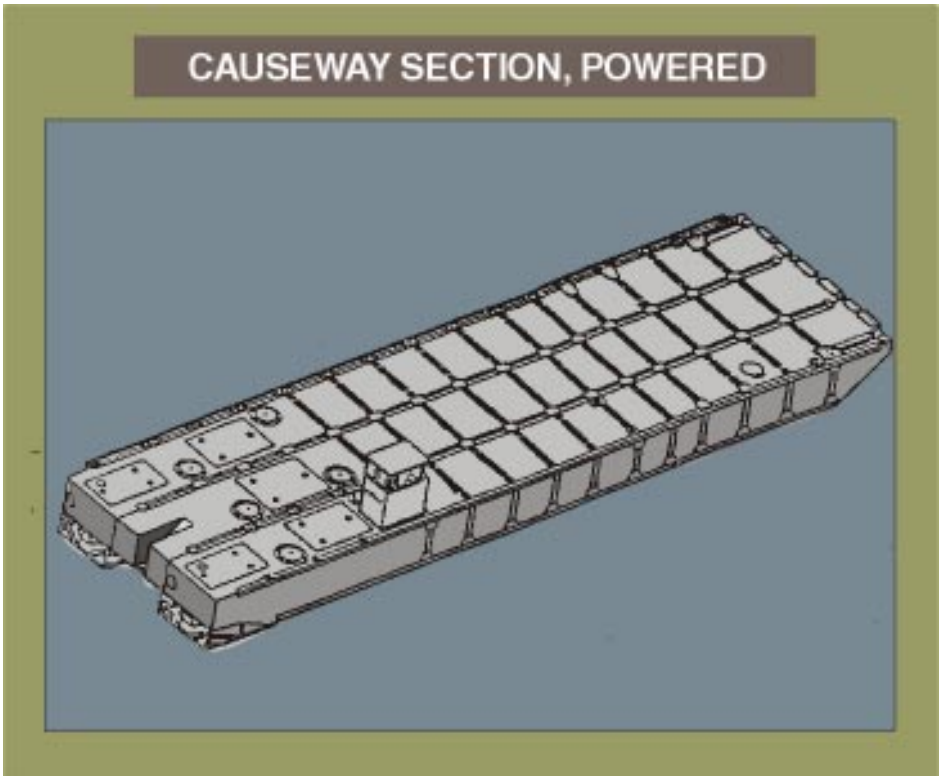


Figure IV-2. Causeway Section, Powered

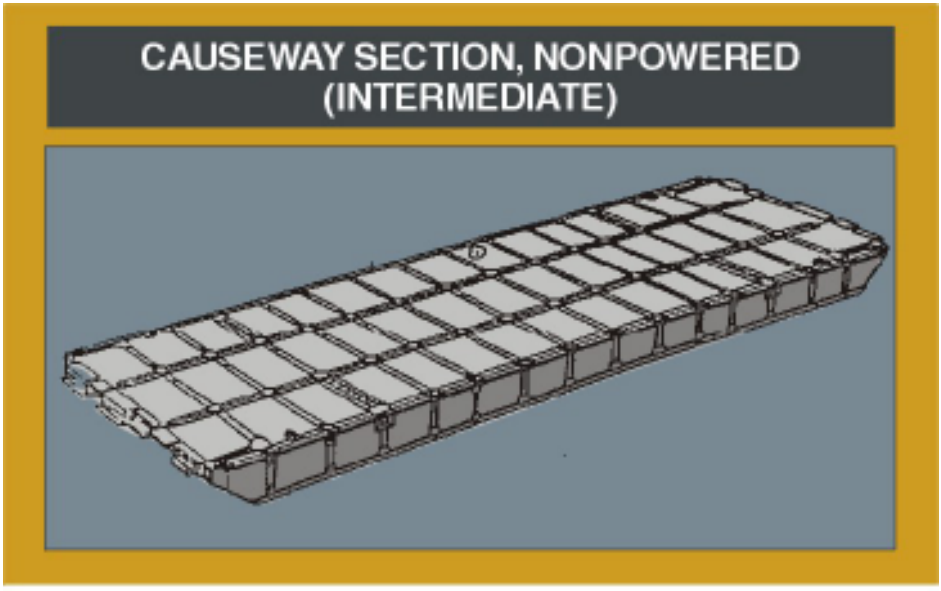


Figure IV-3. Causeway Section, Nonpowered (Intermediate)

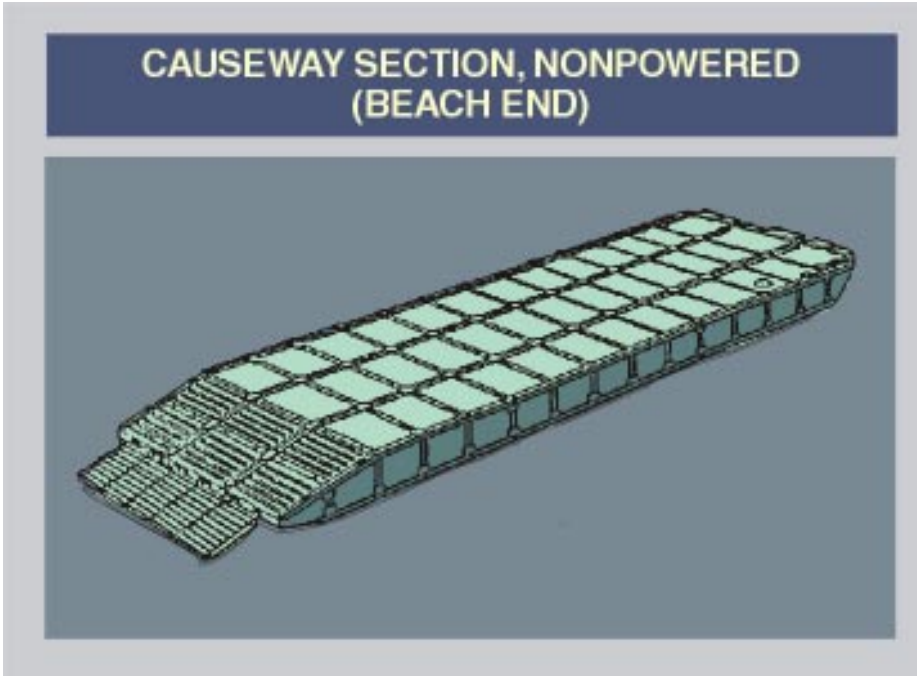


Figure IV-4. Causeway Section, Nonpowered (Beach End)

e. **Army Modular Causeway System.** The Army's modular causeway system is similar to the NL causeway system. **The modular causeway section (MCS) is the basic unit that comprises the Army's floating causeway systems.** These MCSs are the building blocks that make up the MCS causeway ferry, RRDF, and the MCS floating causeway pier (See Figure IV-6).

- **The MCS is termed "modular" because it is comprised of nine separate modules; six 20-foot end rake** modules and three 40-foot quadrafloat modules. The end rakes are fully compatible with the NL end rakes (P8M, P8F, P8C) in that the modular end rakes are right hand (402-MR), left hand (402-ML), and center (402-MC). Two end rakes are attached to a quadrafloat module (400) and these three modules are now called a "string." Three strings make up a MCS which is 80 feet long by 24 feet wide and 4.5 feet in depth (six inches less than an NL section). See Figure IV-7 (end rake) and Figure IV-8 (quadrafloat).

- The dimensions of the modules and the International Organization for Standardization (ISO) twistlocks and twistlock receptors allow the modules to be configured into an **International Organization for Standardization Package (ISOPAK)** which meets ISO 40-foot container standards for length and width. The ISOPAKs can be stowed in 40-foot container cells. The total weight of an ISOPAK is approximately 47,000 pounds (23.7 tons), and a complete MCS weighs approximately 142,200 pounds (71.1 tons). A rough terrain container handler (RTCH) has the capability to easily pick up and move the individual ISOPAKs (See Figure IV-9).

f. **Navy RO/RO Discharge Facility. As shown in Figure IV-10, the RRDF provides a means of debarking vehicles from RO/**



Figure IV-5. Causeway Section, Nonpowered (Sea End)

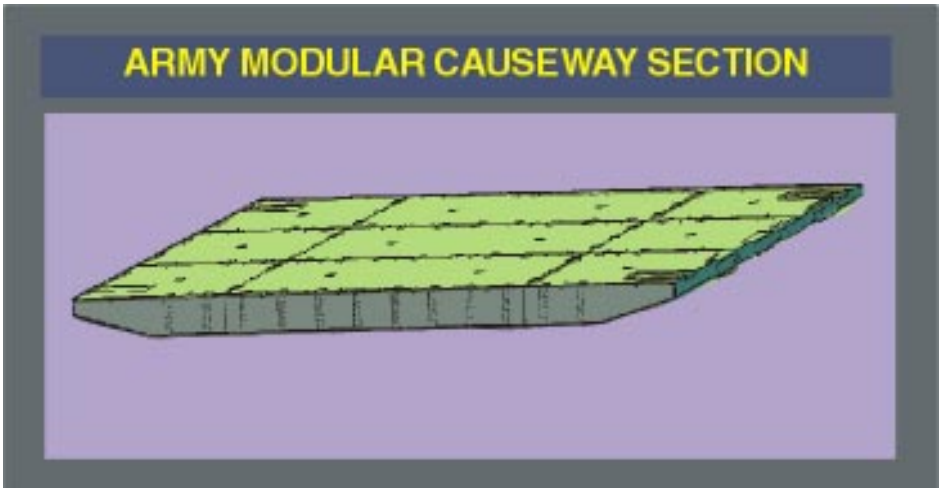


Figure IV-6. Army Modular Causeway Section

RO ships in-stream to lighters. It consists of six CSNP(I) joined together in a configuration of 2-long, 3-wide sections to form a 65-foot by 182-foot Navy standard RO/RO platform. Vehicles can be driven from the ship onto the platform and then onto causeway ferries, LCUs, or logistics support vessels (LSVs) for delivery to the beach. The RRDF requires the services of one SLWT and one CSP for assembly, operations, and maintenance and a 6,000-pound forklift is required during assembly. Assembly time is approximately 6 to 8 hours. Detailed procedures for RRDF assembly, installation, and operation are provided in Naval Facilities Engineering Command Technical Manual

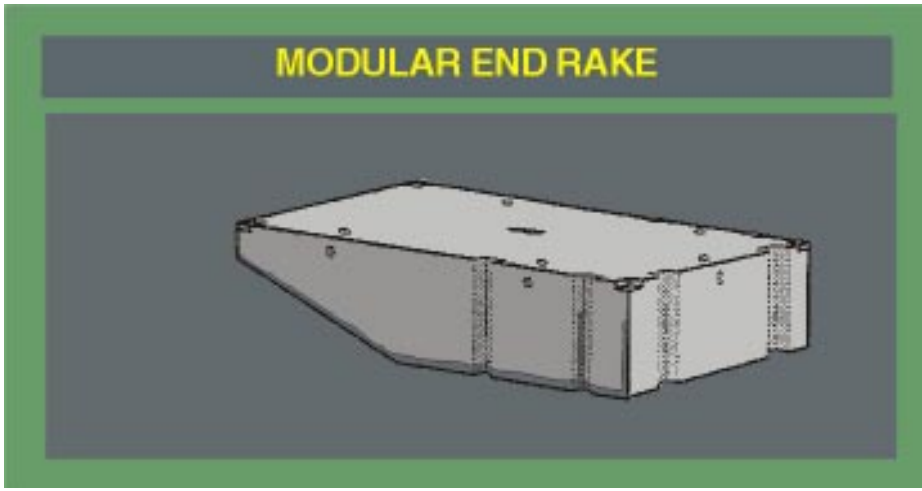


Figure IV-7. Modular End Rake

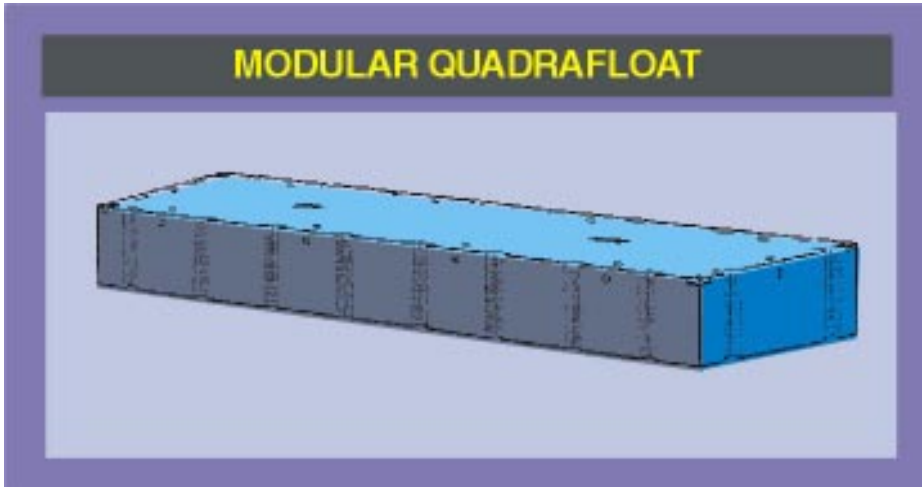


Figure IV-8. Modular Quadrafloat

(TM) 9-CE-023.02, "Installation/Retrieval and Operation/Maintenance Instructions for the RO/RO Discharge Facility."

g. **Army Modular RO/RO Discharge Facility.** The Army's modular RRDF has **no standard configuration**. Design of the facility has been an evolutionary process facilitated by joint operational tests and evaluations. It is constructed with eight sections forming a rectangle and two sections end-to-end inboard and aft. A sea end section is placed one string outboard of the end-to-end sections. Fenders are placed along the outboard sides of the two end-to-end sections. The "finger pier" configuration just described provides stable side mooring, keeps the lighter from getting under the ship's counter, and provides lighter masters more confidence when approaching and mooring. Detailed procedures for RRDF assembly, installation, and operation are provided in Army TM-55-1945-20114, "Installation/ Retrieval and Operation/Maintenance Instructions for the RO/RO Discharge Facility." Planners should know the calm water ramp is only compatible

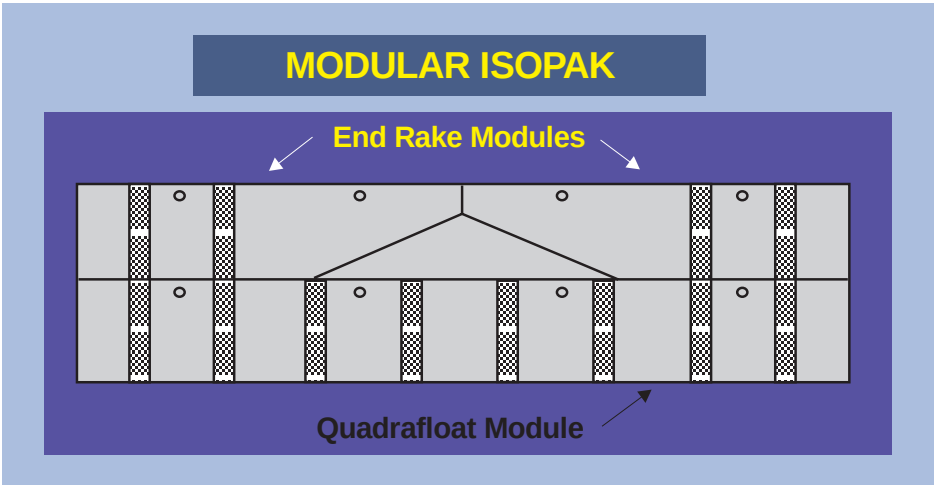


Figure IV-9. Modular ISOPAK

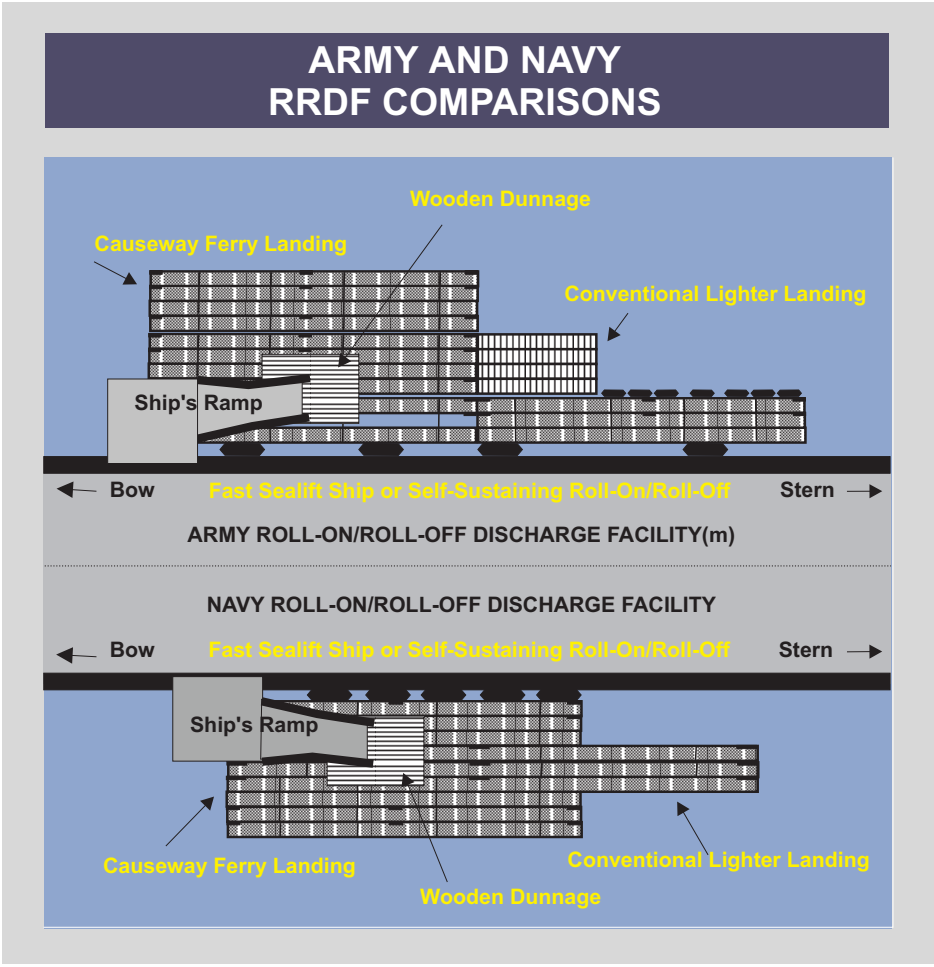


Figure IV-10. Army and Navy RRDF Comparisons

with the NL RRDF. Assembly time is approximately 6 to 8 hours. **RRDF considerations include the following.**

- **Special Considerations.** The RRDF may be installed moored to a non-self-sustaining ship in sea state 0-1 and into a self-sustaining ship in sea state 0-2. The RRDF can be safely operated through sea state 2. The sea current limitation on the system for installation and operation is 4 knots.

- **Components and Capabilities.** The principal elements of the RRDF are RO/RO platform, ship fendering system, and calm water ramp (CWR). RRDF component and capability considerations include the following.

  •• The RO/RO platform is composed of six Navy or seven CSNPs to form the **floating platform**. The platform can be fender-moored to the ship by mooring lines or stand-off moored by using SLWTs. The platform provides a base for the fender system and the free end of the ramp. It also serves as the interface roadway between the ramp and the lighterage, which will move the rolling stock ashore.

  •• The **ship platform fendering system** is composed of two foam-filled cylinders, a pivoting bearing structure, an adjustable webbed support structure, and a foundation frame with mounting pedestals. Three fender systems are mounted at the shipward end of the transfer platform.

  •• The **CWR** is 120 feet long and is composed of three 40-foot welded sections that are fastened together on the platform using pins at the bottom and bolts at the top. The CWR is used for loading and unloading non-self-sustaining RO/RO ships. A 6,000-pound forklift should be available on the platform for materials handling before and during assembly. Clear width between the side trusses is 14 feet and the ramp has a load capacity of 134,000 pounds. The maximum ramp operating angle is 15 degrees. The ramp surface has a stud pattern and is painted with a textured coating to provide a high traction surface. The maximum sea state for a tank on the ramp is sea state 1.

  •• The **ramp** is assembled and connected to the ship using the ship's existing hardware. The end adapter allows for relative motion between the ramp and platform independent of the movement of the ship. Use of heavy dunnage is required to prevent wear and chafing between the ramp (either ship or RRDF) and the platform. Detailed procedures for RRDF assembly, installation, and operation are provided in NAVFAC TM-9-CE-023.02 and Army TM-55-1945-20114, "Installation/Retrieval and Operation/Maintenance Installations for the RO/RO Discharge Facility."

h. **Elevated Causeway System.** The ELCAS is a key element in the movement of containerized cargo ashore in an unimproved beach area. **It provides the capability to unload lighterage from beyond the surf zone and where difficult beach gradients exist**, such as sand-bars, that may cause conventional lighters to ground far from a dry beach. The ELCAS is also capable of removing rolling stock (within the capacity of the container crane) and breakbulk cargo from lighters. The Navy ELCAS inventory consists of two systems: the ELCAS (modular) known as ELCAS(M) and the older ELCAS (NL). The ELCAS(M) system is easily transportable by RRF shipping and the commercial intermodal transportation system since it is constructed using ISO-compatible modules. Descriptions of the two systems follows.

- **The ELCAS (M) is a temporary pier and roadway consisting of connected 8-foot by 40-foot ISO-compatible modules, transportable into the theater by T-ACS ships, elevated on piles and extending seaward across the surf zone up to 3,000 feet from the beach.** It provides for throughput of containerized cargo off-loaded from lighterage at the pierhead and carried by tractor trailers to the beach. The system is constructed in an elevated position above the water by cantilevering one section at a time. In addition to the ISO modules, the system includes piling and pile driving and extraction equipment, fender systems, a beach ramp, lighting systems, safety equipment, cranes, RTCHs, and turntables for maneuvering truck trailers at the pierhead during use.

- **The ELCAS (M) is required to extend up to 3,000 feet seaward until a mean high water depth of 20 feet at the end of pierhead is reached.** The 240-foot by 48-foot pierhead must be capable of round-the-clock simultaneous lighterage off-loading operations on both sides. Installation of a 3,000-foot system is required within 10 days (24-hour operations) in environmental conditions through sea state 3 and 16-knot winds. The system is also required to withstand severe storm conditions, including 75-knot winds, 9-foot surf, and 2-foot storm surge with a maximum of 24 hours warning for preparation.

- The ELCAS(NL) consists of standard NL pontoon sections. Each pontoon section is 90 feet long and 21 feet wide and weighs about 67 tons. The pier consists of beach, roadway, and pierhead NL sections that, when joined together, form a pier that is up to 1,800 feet long and elevated 20 feet above the mean low water (MLW) mark. Installation of the ELCAS(NL) requires 14 days to complete 810 feet.

- The **ELCAS site** requires the pierhead be located beyond the surf zone and at an MLW depth of 12 feet. Also, the ELCAS deck should be 20 feet above MLW to survive high storm tides. The **type of seafloor** and seafloor gradient will dictate total footage of pile and number of pile splices required to support ELCAS and its traffic. Rock bottoms should be avoided; sand is the most desirable substrate for pier installation; clay seafloors are the least. After selecting the general area, soundings from the beach out to the 20-foot water depth should be taken within a week of the ELCAS installation. Usually, the same type of bottom density (soil composition) will not be found from the beach to the pierhead. In addition to seafloor investigation, the **type of beach** is also important. A gentle slope is desired for location of staging areas, equipment storage, work equipment, and messing shelter areas. Weather reports, prevailing currents, tide table, and seafloor samples should also be checked for the ELCAS installation timeframe. Historical data and the surrounding terrain and environment are the only information available to operators to determine subsurface soil properties.

3. Special Equipment and Material

Descriptions of **key items of equipment to be used in the preparation of the LOA** are discussed in this section.

a. **Terminal Service Unit MHE.** Terminal service units have a limited beach preparation and construction capability. Although terminal service units are responsible for beach preparation, **engineer combat-heavy**

and port construction engineer units will provide supervisory personnel and perform most engineering construction tasks in the operational area. Construction equipment organic to terminal service units includes dump trucks and bulldozers. Bulldozers are used for several purposes, including surface preparation, berm construction, and vehicle MHE recovery. Tires can be placed on the bulldozer's blade to push landing craft back in the water.

b. **Rough Terrain Container Handler. Marine Corps landing support units and Army terminal units with container-handling capability are equipped with RTCHs.** RTCHs are rated at 50,000 pounds and are capable of handling containers of 20, 35, and 40 feet in length on beaches and within terminals. RTCHs cannot discharge containers from landing craft but are ideal for discharging containers from single or double-wide causeway ferries. For more information on Army operations in this area, see Field Manual (FM) 55-15, "Transportation Reference Data," and FM 55-60, "Army Terminal Operations." Figure IV-11 shows the RTCH and various other MHE.

c. **Yard Tractors and Trailers. Yard tractors are designed to shuttle trailers within terminals rather than along highways.** These vehicles are highly maneuverable but cannot operate on loose sand and they have difficulty on sloped surfaces such as causeway ferry beach ramps and the ELCAS turntable ramp. These tractors have an automatic, hydraulic lift fifth wheel that allows coupling and movement of semitrailers without retraction of land legs. Terminal units are also equipped with M871 or M872 semitrailers. These trailers can transport either breakbulk cargo or containers. The M871 can transport one 20-foot container. The M872 can transport two 20-foot containers or one 35- to 40-foot container.

4. Beach Preparations

a. Most major beach preparations will be accomplished by the engineer unit assigned to the task. To ensure a successful JLOTS operation, **the following beach preparation tasks must be conducted** before JLOTS units occupy an undeveloped beach.

- **Beach Reconnaissance.** This task locates a site for JLOTS systems that meet the following criteria.
  - •• Accessible to main supply routes.
  - •• Accessible for lighterage and suitable for ELCAS installation.
  - •• Suitable for beach crossing roads and beach hard stands.
- **Hydrographic Survey.** A hydrographic survey is one of the first beach preparation tasks required. The information gained on beach gradient and underwater topography will be used during other beach preparations. The survey will be conducted by Army or Navy divers.
- **Preparation of Lighterage Discharge Sites.** Debris or rocks may have to be removed from lighterage discharge sites. Also, where shallow gradient prevents craft from dry ramp discharge, sand ramps must be constructed and maintained. It may be necessary to install beach markers and lights.
- **Amphibian Water Entry and Exit Points.** Water entry and exit points may be prepared for air cushion vehicles or debris removal for wheeled amphibians.
- **Beach Roadways.** Beach roadways will be constructed where the bearing

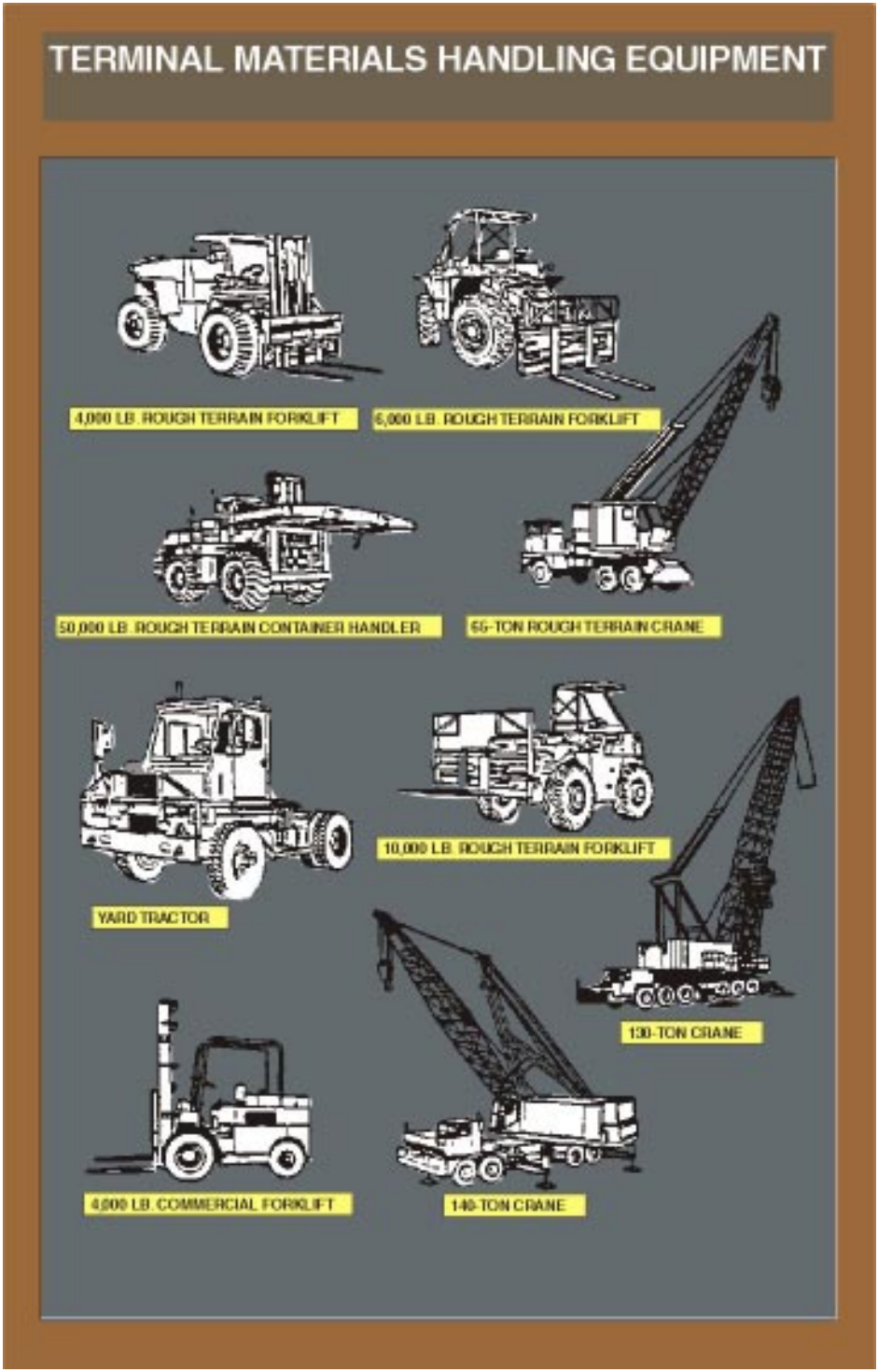


Figure IV-11. Terminal Materials Handling Equipment

capacity of the beach surface is less than the ground pressure of the MHE or RO/RO cargo. Roadways may be constructed by using beach reinforcement expedients, including mobility matting, sand grid, or local materials such as gravel or crushed rock. Airfield steel planking and UNI-MAT (a commercial wooden interlocking mat system) are also excellent beach surfacing materials. Beach roadways must be wide enough for the largest vehicle and must be constructed with areas for passing and turning.

- **Beach Exits.** The number and size of beach exits are related to the type and quantity of vehicular traffic required for the operation. Beach exit construction will usually require bulldozing roadway cuts through sand dunes and filling in swamps or creeks behind the beach. At least one beach exit will be constructed to handle the largest vehicle that will be moved off the beach.

- **Bulk Fuel and/or Water Hoses (Onshore Preparation).** Bulk fuel and water delivery hoses will be floating or sunk to the bottom. The lines will be buried at the surf line to prevent abrasion. Burying of bulk fuel or water lines will normally be accomplished by the unit tasked with installing the system. Required preparations are detailed in the technical manuals for the systems involved.

- **Beach Interfaces for Temporary Causeways and Piers.** Interfaces, such as sand or expedient material ramps, may be required for the efficient use of causeways or piers. The composition and gradient of the beach will be the deciding factors in determining the type of interface, if any, that is required.

- **Ammunition Storage.** Temporary storage facilities must be provided in order to segregate ammunition from other cargo.

- **Heliports.** Helicopter landing zones will be established when onward movement of cargo by helicopter is required.

b. **Preparations should be made for the following amphibians.**

- **Wheeled Amphibians.** The US Army currently uses the lighter, amphibious resupply cargo, 60 ton (LARC-LX) wheeled amphibian. This 200,000-pound vehicle has high mobility because of its independently driven wheels with low ground pressure tires. As a result, minimum preparation is required at the discharge site except for roadway widening to accommodate its 27-foot width and 75-foot turning radius.

- **Landing Craft, Air Cushion.** The LCAC can operate over most beaches with no improvements required. Consideration should be given to maintaining separation of beaches and transit routes used by air cushion vehicles and conventional displacement craft.

- **MHE Considerations.** All amphibian discharge sites must have room for a roadway on either side of MHE operating at the transfer point to eliminate interference between the amphibian and the cargo truck. The sites must also have firm, level ground for crane and MHE operation. Surface expedient may be required to achieve this. Preparation of discharge sites can be accomplished by terminal service companies with the aid of engineer or naval construction battalion support, if required.

c. **The following considerations apply to preparing the marshalling area.**

- **Container Marshalling Area.** With more military ocean-going cargo now being containerized, **facilities must be provided to store containers temporarily after they are discharged from lighterage and to prepare them for onward movement**. A marshalling area is provided for this purpose and it is similar to a fixed-port container transfer facility. However, in addition to the space for storing containers temporarily, the area must have space and facilities for repacking and repairing the containers and for performing any other operational or administrative functions required to marshal them. An area approximately 200 by 300 meters is required for every 1,000 single-tier 20-foot container unit. This includes space for a 4-foot aisle between container tiers, a 25-foot corridor on each side of the block of containers, tractors to back in and straddle containers, cranes or RTCH to deliver and pick up containers, and an area for unstuffing. **A separate area is required for the storage of ammunition containers.** Empty containers coming back must be stored for retrograde. Responsibility for construction of these areas lies with the supporting combat heavy engineer units and terminal service units with their earth-moving equipment.

- **In-Transit Storage Area Preparation.** In-transit storage areas are used to **temporarily store cargo requiring further transportation to units or depots**. In-transit storage areas should not become depots. Only cargo awaiting clearance transportation should be stored in these areas, not cargo awaiting issue for use. Once in-transit storage areas begin to be used as depots, the resulting congestion causes the operation's primary mission of discharging ships to cease. Support engineers are responsible for constructing in-transit storage areas and access routes. Earth-moving equipment with operators from some terminal units may also be available for this construction. FM 55-50, "Army Water Transportation Operations," and FM 55-60, "Army Terminal Operations," contain further information on Army operations in this area. **In-transit considerations are as follows.**

•• **In-transit storage points are located to provide easy access** from discharge points and to clearance transportation nets. Storage areas can be located as far away from the beach as necessary as long as vehicle turnaround time does not result in cargo backing up at discharge points. Also, when estimating the capacity of storage areas, the operating capacity is considered to be 50 percent of the total capacity.

•• **Cargo is segregated within and between storage areas.** The most important criteria for segregating cargo is hazardous material, including ammunition. When possible, breakbulk cargo and containers are stored in separate areas because different equipment is used in handling these types of cargo. Depending on the situation, other criteria used to segregate cargo include priority, mode of clearance, and next destination.

•• **In-transit storage areas must be clearly marked to assist drivers in delivering or picking up cargo.** These markers are also used at beach lanes when division of shore discharge points by type of cargo is efficient or necessary. If personnel are not thoroughly familiar with military markings, plain language is added to the signs.

- **Bulk Fuel or Water Tank Farm.** Construction of a road network, berms, and pads for bag farms are engineer responsibilities.

- **Ammunition Sites.** Each storage installation should be arranged into three separate storage areas, when possible. They should also provide for dispersion of stocks to facilitate receipt, issue, and inventory operations. The following areas should be included in any layout plan: bivouac area, ammunition supply point office, vehicle holding area, vehicle assembly area, demolition area, segregation area, inert salvage area, surveillance maintenance area, and the ammunition sling-out area. Refer to FM 9-38, "Conventional Ammunition Unit Operations," for additional information.

d. **Support Maintenance Facility Preparation.** JLOTS support services and facilities should be established using the following guidelines to assist in the development of an efficient operation.

- **Support services** are located in areas that do not interfere with operations.

- **Messing and billeting facilities** for JLOTS personnel should be close enough to the operational area to ensure that shift changes and meals are accomplished without consuming excessive time.

- **First aid facilities** are centrally located in the operational area to permit ease of access when required.

- **Refueling and maintenance of watercraft** may be accomplished at the safe haven, at the beach from ELCAS, or from other lighterage (See Appendix E, "Support and Maintenance Operations"). These processes should be designated in the OPORD and done ashore, if possible.

- **Preparations of the area** will be accomplished by the lowest echelon unit with equipment and personnel assets capable of accomplishing the task in the particular area designated.

- As with most CSS units, **a transportation group's subordinate units are dispersed over a wide area**. Support is provided to these dispersed units by the designated area support group.

e. A summary of **responsibilities and operational conditions for JLOTS facilities and equipment** is shown in Figure IV-12.

Responsibilities and Maximum Conditions for Installations and Operations

EQUIPMENT	INSTALLED BY	OPERATED BY	MAX SS FOR INSTAL. 3	MAX SS FOR CGO. OP. 3	REMARKS
LCM-8	N/A	ACU/MBCo.	N/A	2	Note 1
LCU -1600	N/A	ACU/HBCo.	N/A	2	Note 1
LCU -2000	N/A	HBCo.	N/A	2	Note 1
LSV	N/A	Tm. FL	N/A	2	Note 1
CSP+1,2, or 3	N/A	ACB/Tm. N	2	2	Note 1
LARC-V	N/A	BMU/UCT	N/A	2	Note 1
LARC-LX	N/A	Tm.H	N/A	2	Note 1
LCAC	N/A	ACU	N/A	2	Note 1
RRDF	ACB/Tm.M	ACB/Tm. M	2	2	
ELCAS	ACB	ACB/BMU/TSCo	2	3 to 5 for survivability	Note 2
CWP	ACB/Tm. K	ACB/TSCo.	2	2	
OPDS	ACB/UCT Army Engrs.4	Tanker Crew	3	2	Note 4
AABFS	ACB	ACB	3	3	

Legend
SS = sea state, ACU = assault craft unit, MBCo. = Army medium boat company, HBCo. = Army heavy boat company, ACB = amphibious construction battalion, BMU = beachmaster unit, UCT = underwater construction team, EPCCo. = Army engineer port construction company, TSCo. = Army terminal service company, Tm. = Army transportation watercraft teams FL, H, K, M, and N.

Notes
1. There are no mandated sea state limits for lighterage operations; these are recommendations based on test data.
2. Maximum sea state for ELCAS (NL and M) operations is 2, survival in up to sea state 5. Note that high wind will also effect ELCAS crane operations and could limit cargo off-load even when sea states are 2 or below. Additionally if causeway lighterage cannot transit due to sea state ELCAS operational capability is limited to LCU cargo movement of 20-foot containers.
3. Sea state referes to the Pierson-Maskowitz scale shown in Appendix G.
4. Maximum sea state for OPDS installation is 2 (limited by Navy SLWTs). OPDS operations (fuel pumping from tanker) is up to sea state 5, survival in sea state 7.

Figure IV-12. Responsibilities and Maximum Conditions for Installations and Operations

CHAPTER V
OCEAN TRANSPORT

"All was ruled by that harsh and despotic factor, shipping."

Winston Churchill
The Grand Alliance, 1950

1. Overview

Strategic sealift is the principal delivery means for the equipment and logistic support of land forces. Strategic sealift employed in support of JLOTS operations includes MSC common-user ships and pre-positioning ships. These ships are capable of conducting port operations and LOTS operations from anchorage. They deliver cargo in accordance with requirements based on cargo required delivery dates, the tactical situation, and ship capability and availability. This chapter discusses the elements essential to the reception of strategic sealift ships in the LOA.

2. Assigning Anchorages

Ships are normally assigned anchorages that facilitate cargo throughput with due consideration to ship characteristics, oceanographic and topographic conditions, cargo type, lighterage routing scheme, and security considerations. When not depicted on nautical charts, **anchorages are usually assigned by the factors shown in Figure V-1**. If all other considerations are suitable, a distance off the beach of approximately 2,000 yards is good for anchoring ships and conducting an efficient discharge. Watercraft may be assigned to take soundings of selected anchorages to confirm charted depths. Specific ships may be assigned to positions alongside the T-ACS. Assignment will be made by the JLOTS commander prior to the ship's arrival in the off-load area. Anchorage planning factors in Appendix A, "Planning Factors," will be considered. Additionally, anchorage assignment should consider the lighterage mix to be used to off-load that ship's particular cargo. For example, causeway ferries are efficient for vehicles and containers, and LCM-8s are efficient to off-load ships with breakbulk cargo. An offshore anchoring or mooring plan is part of an efficient JLOTS operation.

a. **Oceanographic and topographic conditions nearshore and offshore hydrographic conditions will significantly influence ship anchorage positions.** Ship anchorages are usually located directly off the selected landing beaches to facilitate expeditious off-loading at reasonable distances with suitable sea area, water depth, and bottom characteristics. Offshore gradients should allow anchoring close to shore to minimize lighterage distances consistent with ship safety. Strategic sealift ships do not generally have the maneuverability of naval amphibious ships. They may be more sensitive to offshore currents and nearshore swell conditions. **Principal oceanographic and topographic influences in the assignment of anchorages include:**

- Oceanographic features of offshore areas;
- Configuration of the coastline;
- Weather, climate, tidal, swell, and current conditions; and
- Proximity of compatible beaches or lighterage seaward approaches to ports.

b. **Cargo Type.** Ideally, **strategic sealift ships should be anchored near the beaches over which their cargo will cross**. Effective

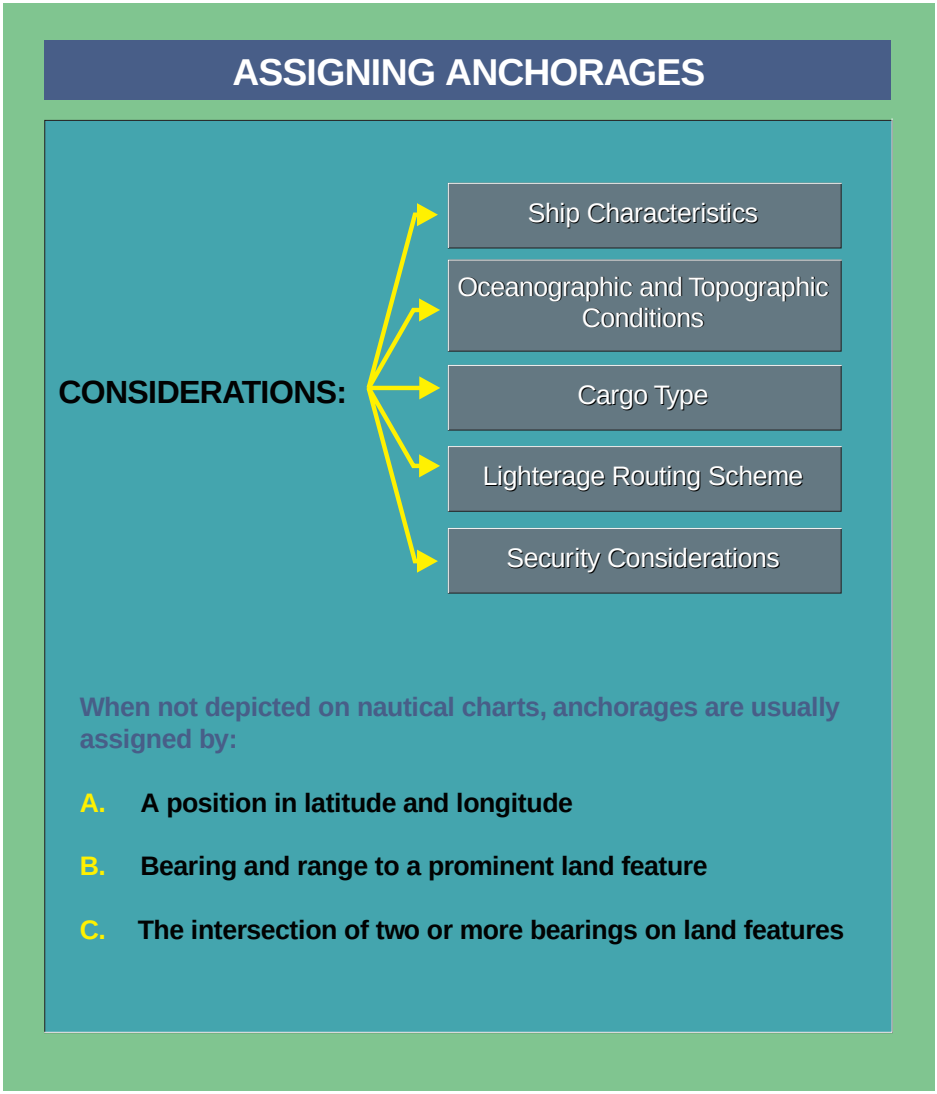


Figure V-1. Assigning Anchorages

positioning of ships will result in increased efficiency in lighterage control and increased cargo throughput.

c. **Ammunition Ship Anchorages.** In the operational area, **anchorage locations for ammunition ships are designated by the JLOTS commander** in coordination with the Coast Guard liaison officer and should normally comply with host-nation restrictions.

d. **Lighterage Routing Scheme.** A large number and variety of lighterage are expected to be operating. Therefore, **anchorage assignments should take into consideration established offshore traffic patterns** which are critical to positive lighterage control and to smooth and safe operations. Appendix A, "Planning Factors," provides utilization considerations of lighterage by type for various types of cargo.

e. **Security Considerations and Threat Environment. Anchorage positions must also take into consideration potential hostile actions**, such as mining capability, small-arms range, swimmer attacks, and small craft attacks. They must be protected from air and submarine attacks as well. **Anchorages should be positioned to afford maximum protection to the ships anchored therein.** MIUW units and US Coast Guard forces may be available to accomplish functions outlined in Appendix H, "Personnel Movement in the LOTS/JLOTS Operation Area" and Appendix J, "Security of Off-load Anchorage or Beach Areas," if tasked, as specified in Chapter I, "An Overview of Logistics Over-the-Shore Operations."

f. **Procedures.** Ships arriving for discharge will be directed to an anchorage by the supporting Navy component commander based on anchorage assignments made by the JLOTS commander.

3. Ship Arrival Meeting

a. Prior to the arrival of the ship, **a copy of the ship's manifest will be forwarded to the JLOTS commander**. These documents provide detailed information on the quantity, type, and location of the cargo aboard the ship. Planners use this information to develop ship discharge and lighter usage plans.

b. A **ship arrival meeting is the first and most important of meetings** that should be conducted between ship's crew and the debarkation officer. This first meeting should include the ship's master and mates, appropriate representatives of the JLOTS commander (such as the debarkation officer and/or officers in charge of the joint lighterage control center [JLCC] and ship lighterage control point [SLCP]), and the MSC representative. Additional representatives such as customs, surgeon and/or veterinarian, host nation, or military police may also be required to attend. **The meeting is conducted as soon as possible after the arrival of the ship** to introduce key personnel, discuss working relationships (see Appendix K, "Command, Organization, and Working Relationships with Civilian Merchant Mariners"), existing problem areas, and the ship discharge and lighter usage plans. Further, it establishes communication procedures, safety and security considerations (see Appendix J, "Security of Off-load Anchorage or Beach Areas" and Appendix L, "Safety Considerations in JLOTS Operations"), working hours and/or shift changes, scheduled times for daily meetings, and other matters that will assist or hinder the expeditious and efficient discharge of cargo. Hindrances may be in the form of unforeseen conditions such as degraded or inoperative support equipment, unexpected priority cargo, or oversized and/or heavy lifts not noted on advanced stow plans or manifests.

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CHAPTER VI
SHIP DISCHARGE OPERATIONS

"Without supplies neither a general nor a soldier is good for anything."

Clearchus of Sparta
(speech to the Greek army), 401 BC

1. Overview

a. **Cargo off-loading is an essential element of the strategic sealift mission.** Cargo off-loading of strategic sealift ships may be conducted by Navy and/or Army forces augmented by civilian ship crews and USMC support unit force personnel as necessary, depending on the scenario. Subject to the requirements of the appropriate JFC, **any of the Service components may be directed to provide forces and equipment to augment the other Service component for JLOTS operations**. The **Navy** has the primary responsibility for providing forces and equipment and conducting strategic sealift cargo discharge operations incident to amphibious operations and MPF deployments. The **Army** has primary responsibility for providing forces and equipment and conducting strategic vessel discharge operations incident to base, garrison, or theater development operations. Through its Army component, MTMC, USTRANSCOM provides the SPM for all common-user seaports worldwide. When necessary in areas where MTMC does not maintain a manned presence, a port management cell will be established to direct water terminal (i.e., fixed, unimproved facility, and/or bare beach) operations including the work loading of the Port Operator based on the CINCs priorities and guidance. Depending on the situation, the geographic combatant commander may also request, in their command arrangement agreement (CAA) with USTRANSCOM, MTMC to operate some or all water terminals in the theater. This chapter addresses those ship discharge operations pertaining to preparation, cargo type, and off-loading system limitations.

b. **Communication and coordination between the JLOTS commander and the MSC representatives are essential for efficient operations.** The number of MSC representatives made available to the JLOTS commander must be tailored to the number of ships under MSC control. These representatives are assigned to the JLOTS commander for the operation and it is therefore the JLOTS commander's responsibility to outfit them with adequate communications equipment. In order to do this, the commander must have additional communications assets authorized within the table of organization and equipment (TOE). Should the MSC representatives require internal communications between themselves, then MSC must provide the equipment and coordinate the frequencies with the JLOTS commander's communications-electronics officer.

2. Preparation for Discharge

a. **Command Preparations Prior to Ship Arrival.** In conjunction with the staff and support forces, **the JLOTS commander must ensure that the unloading systems** (lighterage, cranes, hatch kits, winches, auxiliary crane ships, and other requirements) **and embarked vehicles for discharge are prepared for discharge operations**. Ship and cargo configuration and ship stow plans must be considered when developing unloading equipment and personnel requirements. The JLOTS commander's staff and designated units will accomplish the items listed in Figure VI-1 prior to the cargo ship's arrival.

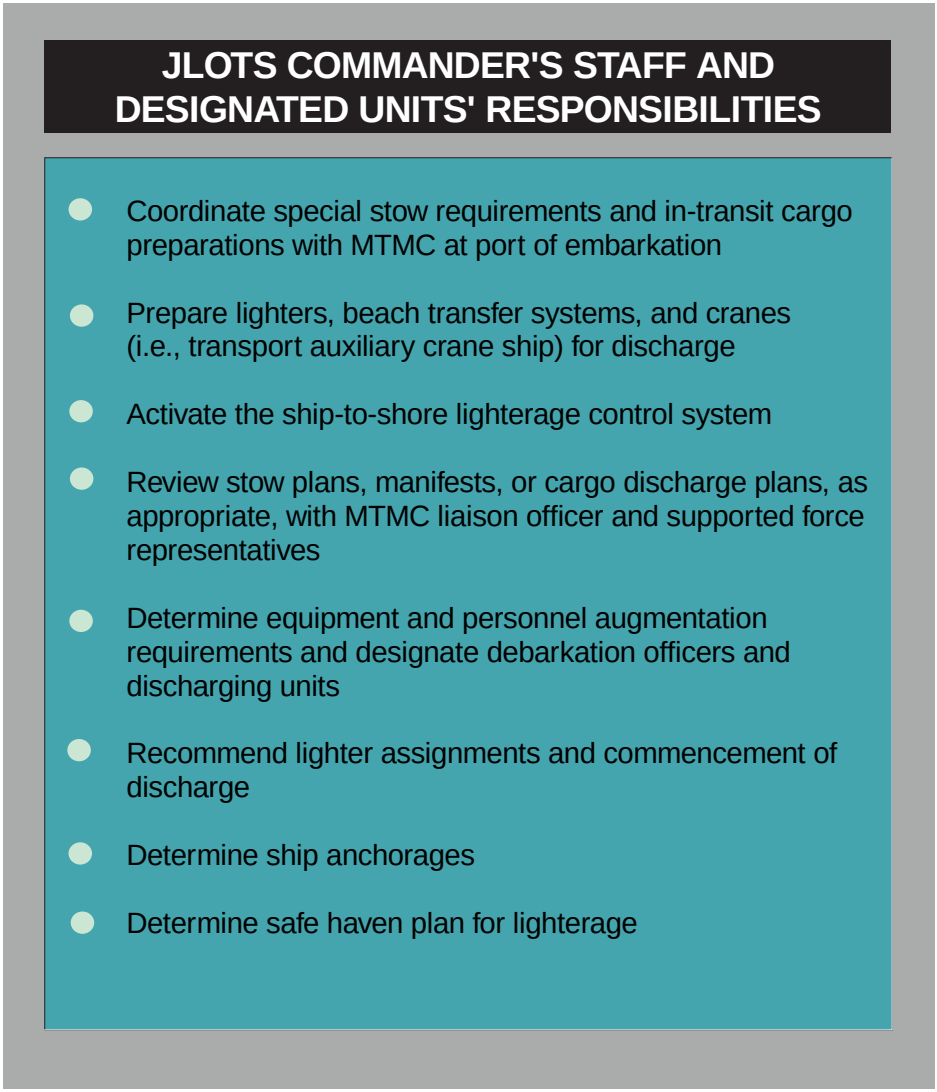


Figure VI-1. JLOTS Commander's Staff and Designated Units' Responsibilities

b. **Command Preparations After Ship Arrival. The JLOTS commander's designated debarkation officers must be well-trained** with excellent working knowledge of LOTS operations and ship discharge procedures. Debarkation officers are provided aboard each working cargo vessel to effect efficient and coordinated discharge operations. In order to perform their duties, **they must necessarily have control over all military organizations operating aboard or on platforms** (i.e., RRDFs) **moored to the ships**. Included in the organizations mentioned below are the SLCP, hatch crews and/or teams, crane crews (on some ships), RRDF crews, and augmentation personnel that are assigned to assist in ship unloading. For better control and coordination of the discharge operations aboard the cargo ship, the debarkation officer will accomplish the tasks listed in Figure VI-2, on arrival of the cargo vessels in the anchorage areas.

DEBARKATION OFFICER RESPONSIBILITIES

- Coordinate ship arrival meeting
- Coordinate support requirements (i.e., messing, sleeping berths, portable sanitary facilities)
- Assist in the preparation of ship cargo handling systems (i.e., cranes, winches, elevators, lights, ramps)
- Activate ship lighterage control point
- Prioritize transfer operations as necessary based on JLOTS commander's guidance
- Realign personnel to perform specific functions if required
- Establish communications net for discharging elements aboard ship
- Inspect and prepare rolling stock for transfer (i.e., check for dead batteries, flat tires, deadlined vehicles) and ensure augmentation personnel are equipped with proper equipment or rolling stock preparation
- Prepare fenders for and install RRDF
- Prepare cargo transfer stations (i.e., reach rods [used for unlocking container twist locks], sea painters, dunnage, fenders for lighters)
- Prepare MHE
- Obtain additional firefighting equipment if required
- Prepare night lighting and combat portable lighting systems
- Execute cargo discharge operations in accordance with ship discharge plans
- Coordinate onboard ship security with MSC and vessel crew

Figure VI-2. Debarkation Officer Responsibilities

Appendix A, "Planning Factors," Figure A-2 provides representative preparation times by ship types and cargo unloading systems.

c. **Lighterage. Lighterage for the off-load of strategic sealift ships consists of LSVs, landing craft, amphibians, and causeway ferries.** The availability of air cushioned and amphibious lighterage is dependent on the scenario, postamphibious operation commitments, and the direction of the JFC. Therefore, all lighterage belonging to the ATF or MPF may not be available for general off-loading of strategic sealift ships following completion of the initial amphibious mission. Army lighterage assets may be substituted if Navy lighterage is unavailable. The operational characteristics of various lighters are discussed in Chapter VII, "Lighterage Operations."

- **Causeway Ferries.** Ferries will be constructed in a ratio of powered to nonpowered sections based on weather conditions and load requirements. The minimum size ferry is one powered section with one nonpowered beach end.
- **Landing Craft.** LCM-8s will be used primarily to transport palletized breakbulk cargo, personnel, and heavy single lifts, such as tracked vehicles. LCUs and other lighterage will be prepared and used as available, commensurate with the type of cargo to be off-loaded.

Figure VI-3 displays types of lighterage that can be expected to be assigned to specific types of ships for cargo discharge.

d. **Ship Discharge Plan.** To effectively execute the discharge of ships delivering cargo to the operational area, **the JLOTS commander must ensure that discharge plans are developed, coordinated, and followed**. The elements of a discharge plan will vary with different types of vessels that are to be unloaded. Essential elements of any discharge plan will include the items shown in Figure VI-4.

e. **Equipment Availability. Material and equipment aboard most strategic sealift ships are limited to what is normally**

LIGHTERAGE UTILITY FOR DIFFERENT TYPES OF SHIPS

SHIP TYPE	LIGHTERAGE
BREAKBULK	LCU, LCM-8, LARCX-LX
CONTAINERSHIP	CAUSEWAY FERRY, LCU[1/], LARC-LX, LSV
RO/RO	CAUSEWAY FERRY, LCU, LCM-8[2/], ARMY LSV
LASH	CRAFT FOR BARGE TOWING[3/]
SEABEE	CRAFT FOR BARGE TOWING[3/]

1/ For containers, LCUs 1600 and 2000s can be off-loaded at the ELCAS; the LSV can only be off-loaded at a causeway pier.
2/ Army rhino horn-equipped LCM-8s only.
3/ LASH and SEABEE barges can only be off-loaded by ELCAS or shoreside cranes.

Figure VI-3. Lighterage Utility for Different Types of Ships

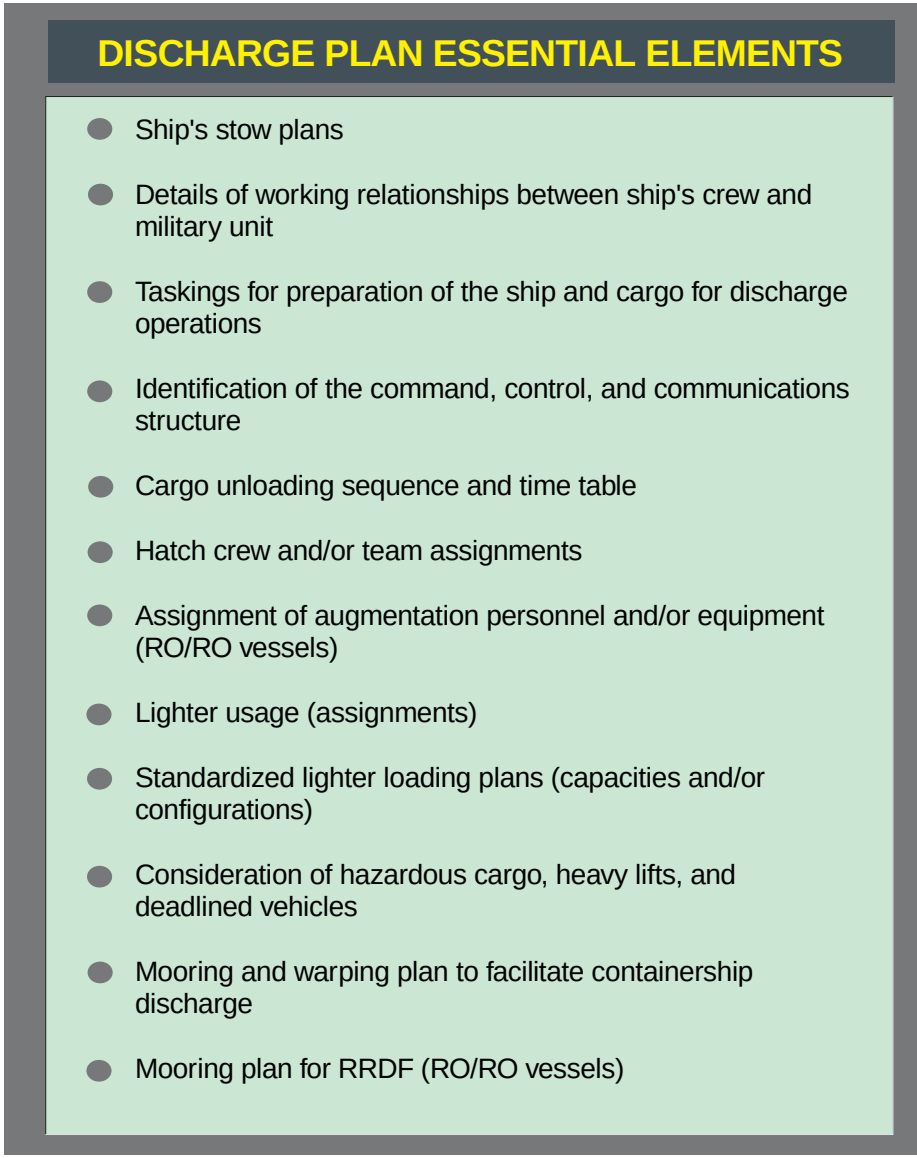


Figure VI-4. Discharge Plan Essential Elements

provided aboard merchant ships for commercial maritime operations. Such ships are generally equipped to meet normal pierside off-load requirements. However, strategic sealift ships originating from commercial sources most likely will not be equipped to conduct prolonged JLOTS operations. **The off-load preparation element must be prepared to provide necessary cargo discharge support equipment necessary for the expedient and safe off-load operations.** Such equipment augmentation is available from pre-positioned war reserve stocks as explained in NWP 3-02.21, "MSC Support of Amphibious Operations." However, this program may not be sufficient to extend to all ships involved in general off-load operations.

f. **Personnel. Navy cargo handling force (NCHF) personnel, Army terminal service stevedores, or civilian mariners (in the case of the T-ACS) will make the preparations for the discharge of cargo from strategic sealift ships**, including topping or spotting booms, opening hatches, removing shoring or dunnage, and other preparations. The supported unit (such as US Army or Marine Corps forces) will provide additional personnel as necessary for loading or unloading ships and in the preparation thereof. A ship arrival meeting of ship's crew, MTMC's management cell representative, NCHF, and/or terminal service operations representatives will determine sequence for equipment positioning and individual Service responsibilities.

g. **Movement of Personnel.** Within the beach area, **the movement of personnel must be controlled** to ensure noninterference with off-load operations, the safety of transients, and security considerations. **The JLOTS commander will establish a plan for movement and control of personnel** within the immediate off-load area and between the beach and the offshore discharge sites. These areas should be considered controlled areas and only authorized personnel should be allowed in them. The transportation of passengers (such as hatch crews and/or teams, shipboard personnel, military authorities, reliefs, rations, working parties and their small items of equipment [e.g., slings, tool kits, battery chargers]) should be included in such a plan.

3. Containership Discharge

Discharge of containerships, both self-sustaining and non-self-sustaining ships, will be conducted as an integral part of JLOTS. Container unloading order is provided by the ship unless specific cargo is needed ashore. During ship discharge planning, the debarkation officer should calculate the "long hold" to get an estimate of the length of time that will be required to unload the containership. The "long hold" of a ship is that hold that will require the most time to unload. Characteristics of various ship classes are in Appendix C, "Ship Characteristics."

a. **Self-Sustaining Ship. The numbers of self-sustaining containerships are diminishing.** Most are a combination of breakbulk containerships and RO/RO containerships that have limited capacity. **These ships can discharge directly to lighterage for further transfer ashore.** Adequate spreader bars (if appropriate), steadying lines, and cargo handlers are necessary to lift and control containers during discharge.

b. **Auxiliary Crane Ship Operation.** Logistic support for military operations requires off-loading US merchant ships in areas where no ports exist or where existing port facilities are inadequate. **The T-ACS alleviates this dependence on port facilities** and allows increased use of the merchant marine to support military logistics operations.

- **Preparations.** On arrival in the operations area, the T-ACS should establish communications with the JLOTS commander to obtain pertinent instructions and anchorage assignment. Information on expected containerships and their cargo should also be requested. Preparations can then be made accordingly.

- **Anchoring.** The T-ACS high holding power, balanced fluke, port anchor should be used in the assigned anchorage where containerships and lighters will be mooring alongside. In this mode, the nest will swing to the T-ACS anchor. No other anchors will be used except in an emergency. In deteriorating sea

conditions, mooring of T-ACS may be by a dual-point mooring system to provide a continuous lee for lighterage.

- **Self-unloading.** The T-ACS has the capability to carry 20- and 40-foot cargo containers as well as outsized cargo and vehicles in SEASHEDs and flatracks. Containers may be off-loaded by the T-ACS cranes using the 20- or 40-foot spreader bars. Outside support includes the NCHF, lighterage crews, and the terminal service company. Outsized cargo and vehicles will require slings. Standard slings have been provided for the T-ACS use. Cargo that requires special slings should come to the T-ACS with these special slings. Self-off-load operations will be conducted under the direction of the JLOTS commander to ensure that facilities are available to receive lighterage and handle cargo. When the T-ACS cargo has been off-loaded, hatch covers should be replaced in preparation for containership cargo off-load.

- **Containership Mooring.** Preparation and scheduling are important factors for mooring the containership alongside the T-ACS. It is also important to establish early communication with the containership so that information may be exchanged. To assist in mooring containerships to T-ACS, **MSC may provide a mooring master experienced in offshore alongside mooring**. However, each ship master remains responsible for the safety of his or her own ship, its crew, and cargo. Each T-ACS is outfitted with fenders and mooring lines to accommodate alongside mooring with non-self-sustaining containerships (NSSCSs) and lighters. **Advance information** on the containership and its container load will allow proper positioning alongside and placement of mooring lines and fenders. Depending on operating area conditions, the T-ACS and the containership can complete the mooring by one of two methods: either alongside with the T-ACS at anchor, or with both ships underway. The **cargo handling officer** is responsible for coordinating with the T-ACS vessel master and/or mooring master to ensure the mooring plan supports the ship discharge plan. Factors that could influence the decision include:

  - Sea state;
  - Weather conditions;
  - Current set and drift;
  - Availability of tugs to assist in mooring the two ships together;
  - Maneuvering room or lack thereof; and
  - Experience of ship handlers.

The two primary methods of mooring are discussed in the appropriate T-ACS Class Mission Operations Handbooks.

- **Container Cargo Transfer Operation. The primary function of the T-ACS is to provide crane service to move containers from the containership to the lighterage.** To assist in cargo transfer operations, the T-ACS provides facilities for a **cargo control office** to manage transfer operations. The **cargo discharge personnel** for the containership and all personnel required on the lighters will be supplied by JLOTS units. The relationship between the cargo handling force and the containership and T-ACS officers and crews is shown in Figure VI-5. Factors affecting these operations include the following.

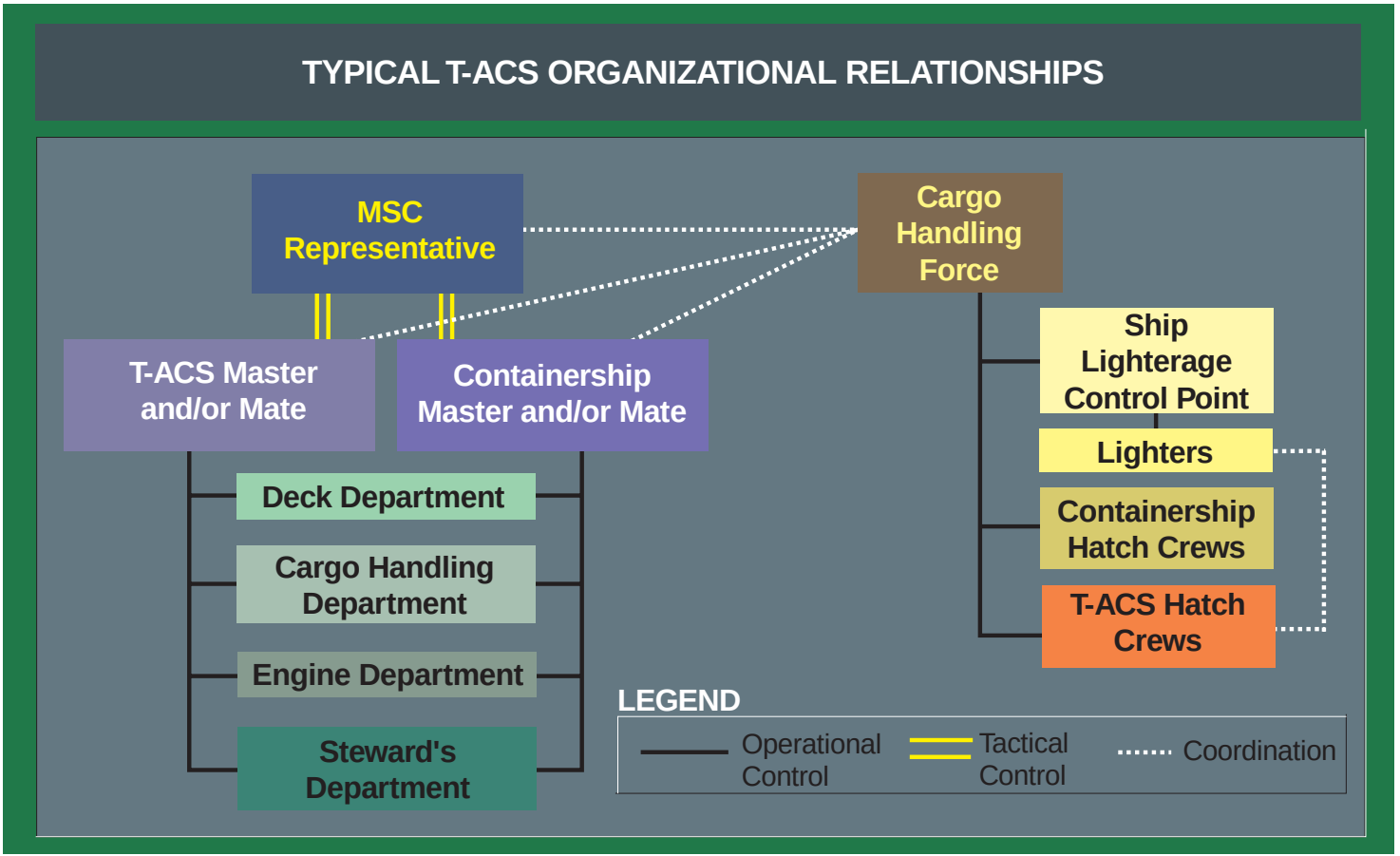


Figure VI-5. Typical T-ACS Organizational Relationships

•• **Cranes should be manned and cargo teams stationed, as required, to maintain maximum container throughput.** The T-ACS crew is responsible for rotating crane pedestals and attaching power swivels. Some T-ACS have three sets of twin cranes, and because of the various configurations of the containerships, cranes may not be employed at the same time. In planning JLOTS, containerships should be positioned to achieve best crane utilization. Night operations will normally be conducted in white light.

•• **Lighters will be called alongside by the JLOTS commander's representative, the SLCP.** The T-ACS crew must be alert to lighterage movements and be prepared to pass sea painters or provide other assistance to the lighters.

•• **When the containers within reach of the crane have been off-loaded, the containership will be warped to reach the remaining containers.** With larger containerships, the containerships may have to be relocated several times. When feasible, the first position of the containership should be as far forward as possible; then natural forces will assist in warping aft as opposed to pulling the containership forward against wind or current. When the containership has been moved forward or aft and secured, off-load operations may resume.

•• **T-ACS container discharge operations are affected by windward sea conditions and should be terminated at the discretion of the cargo handling force, generally beyond 13 knots.** T-ACS container unloading operations are also affected by rolling while at anchor. Ocean swells can create a five degree ship roll that may stop cargo operations due to uncontrollable pendulation of containers. However, termination of cargo operation on the ship is at the discretion of the cargo handling force and vessel master. If this occurs, the use of tugs to turn the vessels into prevailing seas to allow continued container transfer is an option that should be considered by the debarkation officer and the JLOTS commander. Tugs or stern anchors can also be used to turn the ship to create a lee for lighters.

•• Upon completion of cargo operations and departure of the containership, **the condition of the side rigging and fenders should be determined**. If necessary, repairs should be made and preparations completed to receive the next containership.

- **Operation and Responsibility List.** A generalized function and responsibility list is shown in the T-ACS Class Mission Operations Handbooks.

4. RO/RO Discharge

a. **Discharge Operations. RO/RO ships are the preferred mode of transporting tracked or wheeled combat equipment to an operational area.** They have the distinct advantage of a fast turnaround (load and off-load) when equipment can be driven on and off the ships. To take advantage of their inherent ramp discharge capability, **the Army and the Navy have developed an RRDF to provide a means of placing vehicles aboard lighters**. The facility can be arranged without a ramp for self-sustaining RO/ROs or with a ramp for non-self-sustaining RO/ROs. The RRDF is discussed in Chapter IV, "Facility Installations and Preparations." The relationships between the debarkation officer, MSC representative, and RO/RO vessel master and crew are shown in Figure VI-6.

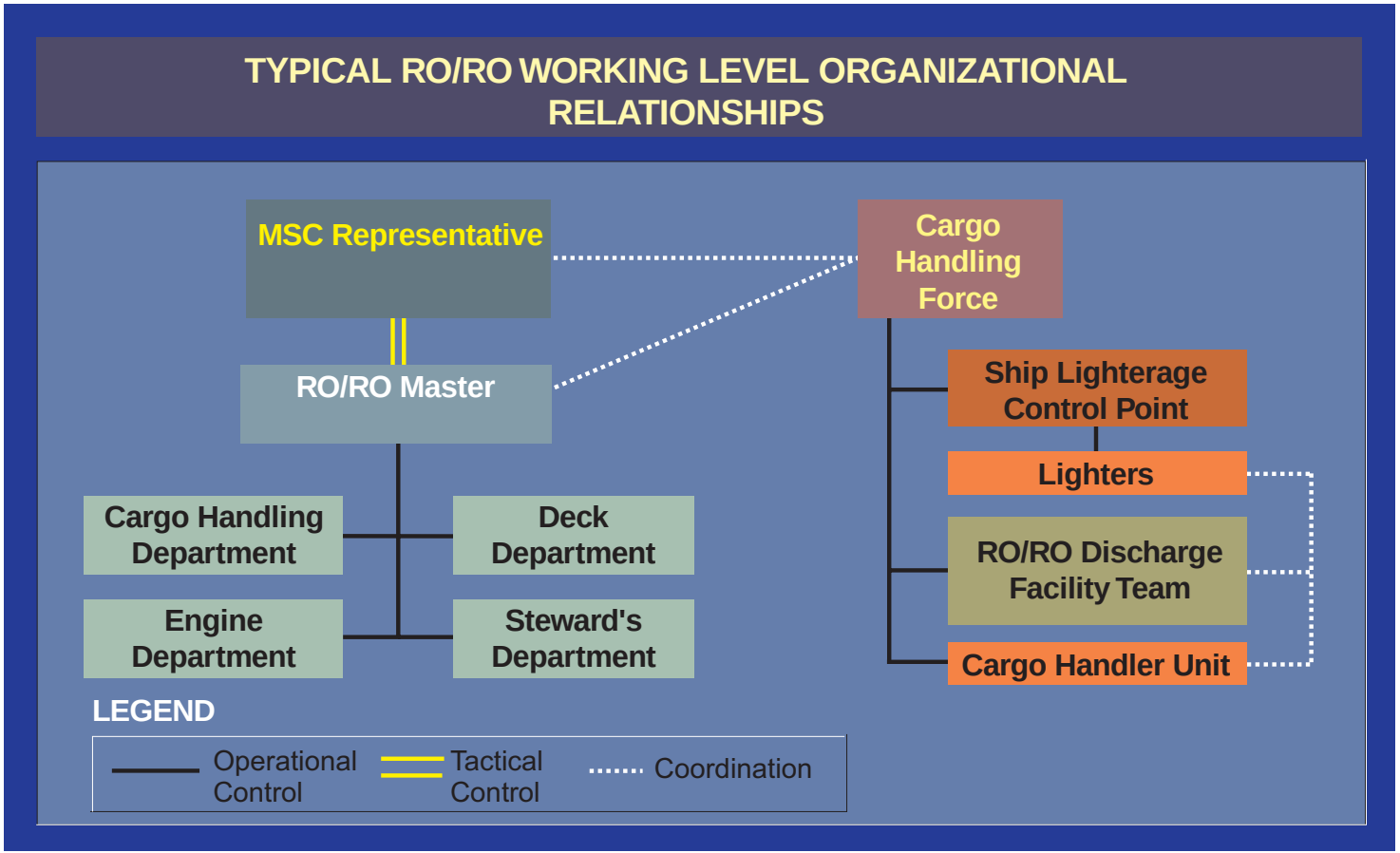


Figure VI-6. Typical RO/RO Working Level Organizational Relationships

b. **Vehicle Discharge.** Under favorable weather conditions, **vehicles carried aboard RO/ROs can be driven off the ramp directly onto the RRDF** and then onto causeway ferries, LCUs, and LSVs for transit ashore. However, if the sea conditions preclude the safe working limits of the facility, vehicles may be lifted onto LCUs and LSVs by ship cranes or by T-ACS and then driven off at the beach. Provision for vehicle drivers will be designated in the OPORD.

c. **Navy RRDF.** The RRDF requires a typical crew of 19 to assemble and a crew of 12 to operate and maintain. Continuous 24-hour a day operation requires a crew of 24 personnel to operate and maintain.

d. **Army RRDF.** The Army RRDF is manned to operate at continuous 24-hour days with 16 enlisted personnel and no officers. The crew is capable of emplacing, operating, retrieving, and maintaining the platform. Assembly from the modular ISOPAK configuration requires augmentation from a terminal service company.

e. **Self-Sustaining Ship.** Self-sustaining RO/ROs can discharge military vehicles (e.g., tanks, recovery vehicles, trucks, tractor-trailers, and forklifts) over their own ramps, over the RRDF, and onto lighterage for transit ashore. Planners need to know that RO/RO ramps require certification for offshore transfer operation. MSC should ensure that certification of ramps is accomplished prior to designating RO/RO vessels for JLOTS offshore operations.

5. Breakbulk Discharge

a. **Breakbulk discharge operations involve the off-loading of a multitude of nonhomogeneous cargoes** such as pallets, bags, bales, cartons, crates, cases, barrels, or drums. Breakbulk vessels are used most effectively for transporting pallets, heavy lifts, and outsized cargo.

b. **General cargo or breakbulk ships**, with multiple hatches and holds fitted with booms or cranes for their own self-support of over-the-side cargo loading and discharging, **are normally associated with these discharge operations**. The ships are also able to accommodate limited heavy lifts, vehicles, bulk cargoes, refrigerated commodities, and containers. However other ships, such as NSSCSs with breakbulk cargo stowed in installed SEASHEDs or flatracks, or RO/RO ships with breakbulk cargo, may require the off-load assistance of a floating crane or T-ACS.

c. **Breakbulk cargo is normally discharged from the ship's holds, using the ship's gear, directly over the side into alongside lighterage.** The ship's cargo discharge gear is usually operated by Navy or Army cargo handlers. In the case of non-self-sustaining ships, cranes from other sources are used to augment their discharge operations. Lighterage is shuttled between the ships and the shore until the ships are off-loaded.

d. **One of the commodities most frequently shipped breakbulk is ammunition.** While the military today is using increasing levels of containerization, some Class V materials still may require breakbulk operations. Class V materials often involve a variety of handling requirements for items as variable as projectile skids and missiles, requiring the use of various ammunition-certified and/or approved slings and forklifts that cargo handling personnel will need to provide.

6. Barge Ships

Two types of barge-ship systems are currently in operation: the LASH and the SEABEE. These ships are unique in ship discharge operations because they carry the largest of unitized cargo and are self-sustaining. These ships are typically used

in JLOTS operations for deploying lighters and heavy outsized cargo to the operational area. Protected waterways usually are required for barge handling and towing services; furthermore, extensive barge-marshalling areas are required within protected waters. The barges themselves are not self-sustaining and will require towing and crane services for positioning and discharging their contents.

a. **LASH.** The LASH is a single-decked vessel with large hatches, wing tank arrangements, and a clear access to the stern. The LASH has a gantry crane for cargo handling with capacities from 446 to 455 long tons (LTs). The function of this crane is to convey lighterage from the stowed location aboard the ship to the stern region and to lower the lighterage into the water. Some LASH ships are equipped with container gantry cranes for the handling of onboard complement of containers. Different classes of LASH ships have capacities ranging from 24 to 89 barges or a mixture of LASH barges and military lighterage. This vessel is capable of deploying all components of the ELCAS (NL) system. The cantilever lifting frame is required to enable the gantry crane to lift causeway sections. The cantilever lifting frame capacity is 150 tons.

b. **SEABEE.** The SEABEE is arranged much differently from the LASH in that it has three decks on which the cargo barges or lighters are stowed. Barges are brought to each deck level by a stern elevator and are moved forward on the decks by two transporters, one port and one starboard. Two barges can be loaded or off-loaded concurrently in a cycle of about 40 minutes. SEABEE ships can carry up to 38 barges. The capacity of the elevator is 2,000 LTs. The SEABEE ship is the preferred ship to transport LCMs, LCU-1600s and LARC-LX, small tugs, and heavy outsized equipment. The vessel also has the capacity to fully load the Navy's ELCAS (NL) system, or move up to five LCACs in support of Marine Corps missions.

c. **LASH or SEABEE Barges. The LASH barge**, as shown in Figure VI-7, **performs the cargo transport function and can be carried by any LASH ship**. The hold of the lighter is an unobstructed rectangular space completely free of pillars, web frames, and protruding brackets. Virtually all LASH barges are designed for general purpose dry cargo. **The SEABEE barges are dimensionally larger than the LASH counterpart**, yielding more than twice the deadweight and bale cubic capacity for cargo (See Figures VI-8 and VI-9).

d. **Barge Ship Operations.** On arrival in the JLOTS area, the barge ship drops its anchor in a river, bay, semisheltered harbor, or ties up to a pier. Upon discharge, barges are towed to a marshalling area by lighterage assigned by the JLCC and then off-loaded. Once off-load is complete, they may be towed back to the ship for reembarkation.

- **When protected waterways are not available**, **offshore discharge of barge carriers** can be conducted in seas up to sea state 3. This is a difficult task requiring well trained tug crews. The ship requires a minimum 45 feet of water astern to discharge the barges; however the barges may be towed to a cove or pushed up a river or harbor for discharge. Fully loaded LASH and SEABEE barges draw 8.6 feet and 10.6 feet, respectively. Because of these drafts, barges cannot be beached for discharge operations, but they may be discharged by crane alongside an ELCAS or at a fixed-pier.

- **The SEABEE ship may carry tugs**, stacked causeway sections, LCUs, LCACs, and other watercraft **or heavy lift equipment to better support JLOTS operations**. Addition of these items will offset the numbers of barges

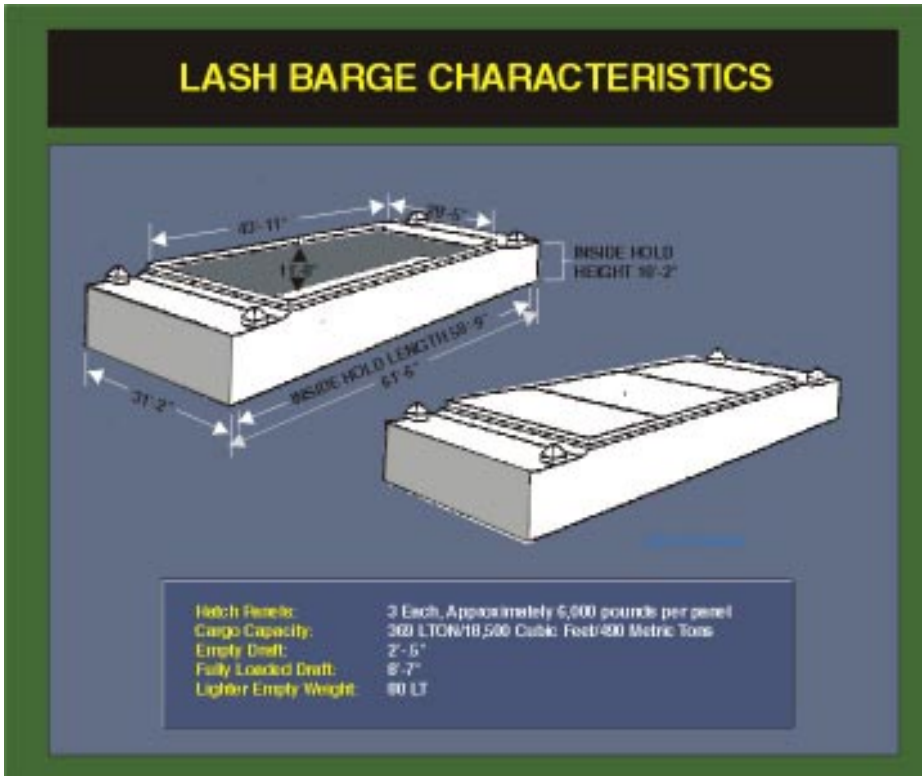


Figure VI-7. LASH Barge Characteristics

carried. Similarly, LCMs and causeway sections may be carried on the LASH ship.

- **Discharge from a LASH ship in a seaway is done while at anchor.** The minimum anchoring depth for LASH is variable depending on many factors; 50 feet is a good planning factor. LASH ships have swell mechanisms on the lighter cranes that compensate for wave action (the relative vertical motion between the lighter lift frame and the ship). However, as wave heights exceed 6 feet, the potential for damage to the ship and lighter increases rapidly. (Note: Swell mechanisms only work well when moving LASH barges. When moving causeway sections with the cantilever lifting frame, care must be taken to avoid injuring crew members and damaging equipment.)

- **The SEABEE should load or discharge barges and lighterage in protected or calm water** (sea state 0-2) because the barge elevator cannot be subjected to motion-induced stresses. Barges can be loaded in up to 5-foot waves in the elevator well and lighters can be loaded in up to 3-foot waves in the elevator well. Virtually no differences in barge handling, mooring, towing, loading, and discharging methods exist between LASH and SEABEE barges except for the SEABEE's larger size and method of off-loading their barges. For these reasons, the discussion below is confined to LASH capabilities.

•• **The discharge operation for LASH barges will be limited** by the ability of the tugs to handle barges or floating outsized cargo components under the prevailing sea conditions. The ship will

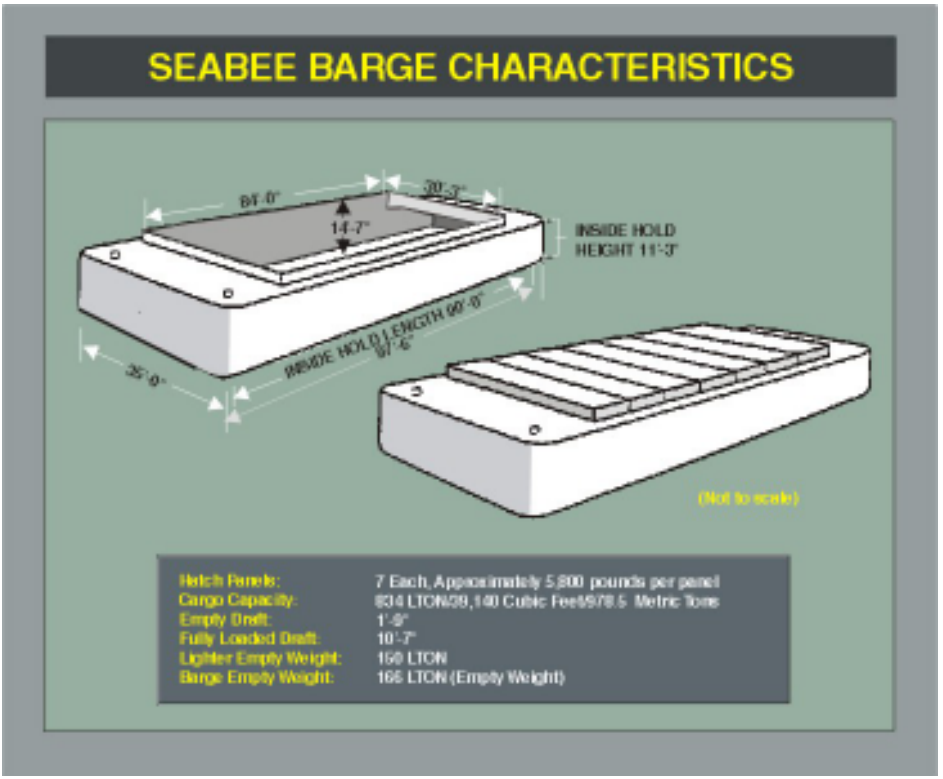


Figure VI-8. SEABEE Barge Characteristics

steam from its anchorage and should provide a lee at the transom for barge discharge. A realistic planning rate of discharge of barges from the LASH ship is one barge every 25 minutes.

•• **Specialized equipment has been constructed** to further enhance the cargo-carrying capability of and facilitate discharge from LASH ships. The LCM-8 lift beam and cantilever lifting frame facilitate the handling of LCM-8s, causeway sections (including loaded causeway sections), and other outsized cargo.

e. **Other Planning Considerations.** During planning for barge ship discharge operations, the following considerations must be coordinated with operating units.

- **Tug operations** to move barges from ship to barge marshalling areas and from barge marshalling areas to a discharge point.

- **Barge marshalling areas** for holding loaded barges awaiting vacant discharge berth and empty barges awaiting return to ship.

- **Pierside discharge points** at either developed or undeveloped facilities. Operators will allow sufficient space astern to allow tugs and barges to be worked. Dependent on whether it is a LASH or SEABEE barge, 100 or 200 feet of additional pier space is required.

f. **Empty Barges.** A prime planning challenge for barge ship operators is the

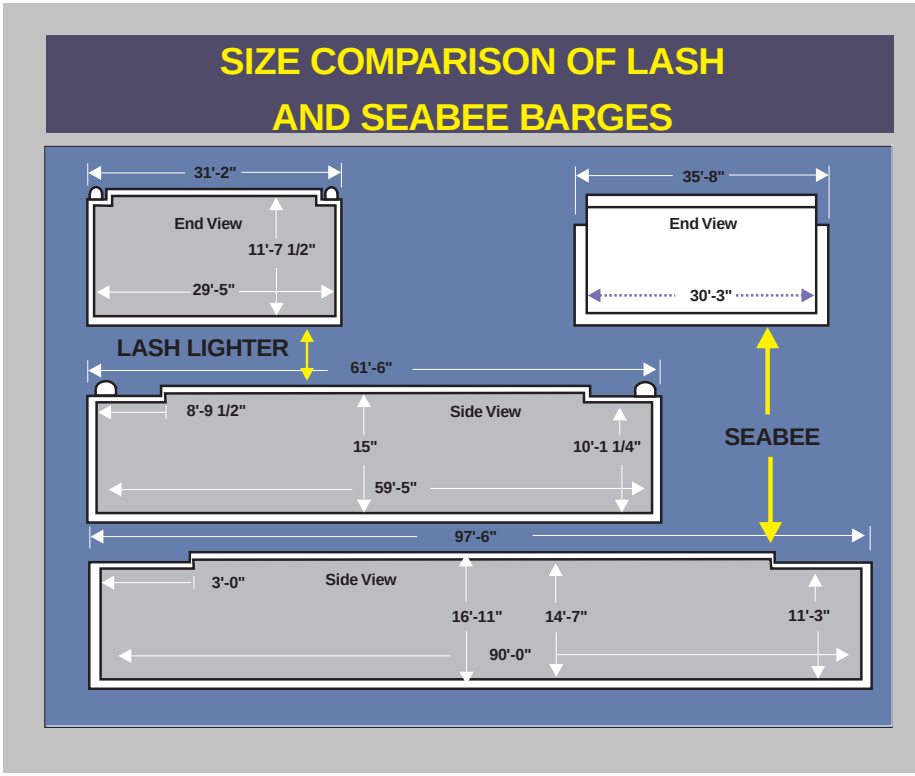


Figure VI-9. Size Comparison of LASH and SEABEE Barges

speedy return of empty barges. There are a limited number of barges available in inventory. They must be returned as quickly as possible so that sufficient barges will be available for further loading at seaports of embarkation (SPOEs).

7. Semi-submersible Ship

A large amount of outsized military cargo has to be transported during a military contingency. This cargo could include tug boats, barges, landing craft, amphibious air cushioned lighters, floating cranes, single anchor leg mooring (SALM) systems, and others. Lifts could range from approximately 50 to 2,252 LTs. **These types of cargoes can be quickly loaded and discharged using float-on/ float-off (FLO/ FLO) methods.** Currently there are four different commercial semi-submersible ship design types: open deck ships ("servant" type), converted tankers ("cormorant" type), combined product tanker and heavy lift ships ("sea swan" type), and dock ships ("dock express" type).

a. **Flat-Deck Semi-submersibles. The flat-deck ships**, such as the motor vessel (MV) Super Servant with a forward deckhouse and no stern deckhouse, **are also very capable semi-submersibles**. These ships each have a 250-ton heavy-lift derrick that increases their flexibility. These ships range in length from 525 to 591 feet (with a 131-foot beam), with deck sizes from 51,668 square feet to 60,280 square feet. They are capable of lifting loads from 20,180 to 23,430 LTs. The maximum submerged draft of these ships approaches 72 feet; the ships' service speed is approximately 14 knots.

b. **Converted Tankers.** These ships are similar to the MV American Cormorant,

which is **able to accommodate single unit loads up to 45,000 tons**. The MV American Cormorant is classified as one of the world's largest heavy-lift ships. The ship's submerged draft can be in excess of 60 feet, depending on the draft of the cargo to be floated aboard. Maximum ship speed is in excess of 16 knots.

c. **Semi-submersible Operations. During a FLO/FLO operation, the hull is submerged horizontally by flooding ballast tanks until the cargo becomes buoyant and is floated out, either under its own power or towed.** Most semi-submersibles are capable of a four-point moor. Anchorages should be in sheltered waters with minimal currents because semi-submersible operations are normally calm-water evolutions. Environmental conditions exceeding sea state 1 or currents of more than 0.25 knots will normally prohibit semi-submersible loading or discharge operations. Each vessel type loaded aboard the semi-submersible will float as the semi-submersible submerges based on their individual drafts.

- To conduct safe semi-submersible operations, **the supported forces will have to provide large numbers of line handlers, fenders, and safety equipment** (depending on the type and numbers of cargo to be discharged). Tugs or pusher boats should be positioned to assist in the discharge and subsequent transit of FLO/FLO cargo to their ultimate delivery points.

- **Semi-submersible ships are of great value to a JLOTS operation**, not only because they are capable of safely delivering such huge outsized loads (no lifting required in most cases) but also because most semi-submersibles can carry liquid cargoes (water, bulk fuel) in some of their ballast tanks.

8. System Limitations

a. **JLOTS systems and subsystems are interdependent, weather-dependent**, and should be interoperable between the Services. It is important to note that any one JLOTS system or subsystem operating alone is not capable of satisfying or performing all functions associated with the offshore, instream discharge of equipment and supplies and the transshipment and off-loading of cargo ashore. Through the JLOTS MOA between the Army and Navy a JLOTS Master Plan was developed to integrate near- and far-term solutions to JLOTS operations in heavy weather.

b. To constitute an effective operating system, JLOTS equipment must be designed and developed to function in the demanding environmental conditions that are prevalent worldwide. Currently, heavy weather conditions halt JLOTS operations because of the hazards to personnel and equipment. The most difficult operating situation is in heavy weather when wave height, length, and period along with accompanying ground swell are classified as greater than sea state 2. The Army and Navy have established the ability to operate in all sea conditions through sea state 3 as the threshold capability.

c. There are four primary areas of concern with the LOTS systems and the interfaces between these systems when influenced by a combination of ground swell and sea state 3 conditions.

- Severe pendulation of suspended crane loads, creating a dangerous condition for personnel and equipment.

- Dissimilar motion between the various vessels and watercraft used in a LOTS operation. The roll motion of sealift ships

(influenced primarily by long period ground swell) and the motion lighters or causeway systems alongside (influenced by shorter period sea) creates a relative motion problem at their interface. RO/RO sealift ships' ramps are not designed to withstand the relative motion between the ramp and platform.

- Hazardous operating conditions (green water on deck) for causeway lighterage systems transiting from ship to shore, posing a danger to personnel and equipment.
- Hazardous surf zone operations stopping all beach discharge due to high surf.

d. **JLOTS equipment is also limited in the ability to transfer outsized cargo.** Such operations may be limited to a single discharge method or site. Specific systems or equipment limitations can be found in applicable technical manuals prepared by the cognizant Service or developer. These additional limitations applicable to specific ships should be addressed by the JLOTS planners.

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CHAPTER VII
LIGHTERAGE OPERATIONS

"Supply and transport stand or fall together; history depends on both."

Winston Churchill
The River War, 1899

1. Overview

This chapter addresses those **aspects of JLOTS operations involving lighterage**. Planning factor figures that will assist planners in developing reliable lighterage estimates are located in Appendix A of this publication, "Planning Factors."

2. Responsibilities

The JLOTS commander will designate responsibilities for control of lighterage in the JLOTS OPORD. Assignment of responsibilities will be heavily dependent on the type of units available (Army or Navy) to conduct discharge operations. Service unit capabilities are discussed in detail in Appendix M, "Unit Capabilities." The procedures for control of lighterage in JLOTS have been standardized through incorporation of both Army and Navy methods. **The following terms are used to describe the lighterage control organization.**

a. **Joint Lighterage Control Center. The center operates under and reports to the JLOTS commander or designated representative.** Personnel that will staff the JLCC must be identified very early in the planning phase so sufficient training can be accomplished. These personnel should come to the JLCC staff with Service lighterage control center (LCC) expertise in LOTS operations. The Services' LCC personnel and equipment are integrated to form the JLCC. **During the planning phase** of a JLOTS operation, personnel assigned to the JLCC must allocate watercraft as requested by the debarkation officers in support of lighter usage plans. **When the operation commences**, the JLCC will be the key coordinating body for management and modification of lighter usage plans based on requests by the debarkation officer through the SLCP. The JLCC must be physically located, ashore or afloat, in a position that affords the best visibility of the lighter operating area and does not interfere with shoreline transfer points or lighter transit lanes. A notional JLCC organizational structure is shown in Figure VII-1.

b. **Ship Lighterage Control Point.** Personnel manning the SLCP should have an **excellent working knowledge** of lighter cargo capacities, deck loading configurations, lighter communications capabilities, and operating speeds. Additionally, they should be knowledgeable of the cargo ships that will be used during operations and they should know how to optimally use assigned lighters at the ships discharge points.

c. **Beach Lighterage Control Point (BLCP).** Personnel manning the BLCP should be **very familiar with lighter discharge operations** involving the use of floating causeway piers, elevated causeway piers, amphibian discharge sites, and bare beach sites. Additionally, a working knowledge of beach clearance systems is beneficial. Collocation of the beach clearance unit (BCU) commander with the BLCP is recommended when only one BLCP is in operation. If two or more BLCPs are required, the BCU commander may locate centrally providing liaisons to each BLCP. These liaison personnel should have a working knowledge of beach transfer and clearance operations and an established communications

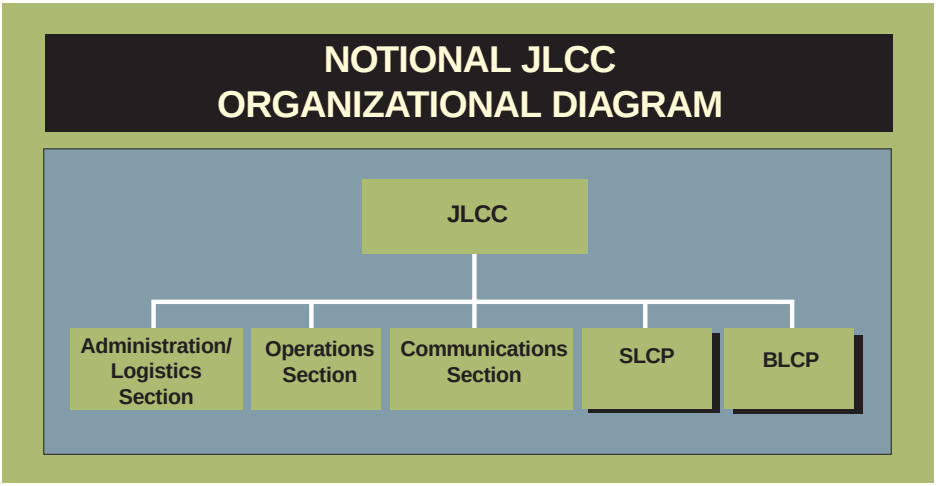


Figure VII-1. Notional JLCC Organizational Diagram

net. They keep the BCU commander advised of types and condition of cargo being called forward by the BLCP and any specialized equipment required at the beach transfer facilities, such as jumper cables, tow bars, chains, and tool kits.

3. Lighter Control

Decentralized control of lighter movement is necessary for effective and efficient lighter operations. **For JLOTS operations, a JLCC is established.** Once the JLCC is established, SLCPs and BLCPs are emplaced as necessary to control the actual ship-to-shore movement of lighters and cargo.

a. **Joint Lighterage Control Center. The JLCC is established to provide overall management and guidance throughout the JLOTS operation.** This includes assignment of lighters to SLCPs, monitoring ship-to-shore movement of lighters, ensuring safe lighterage operations, resolving disputes, managing available craft, establishing lighter anchorage sites outside of the active operations area, coordinating lighterage waterborne medical evacuations, and controlling lighterage entry and exit from the operational area. **When the operation commences, the JLCC will be the key coordinating body for lighter usage plans.** Figure VII-2 contains a list of additional functions that the JLCC performs.

b. **Ship Lighterage Control Point. The SLCP keeps track and controls the movement of lighters assigned to it by the JLCC and/or lighter usage plan.** At the direction of the debarkation officer, it calls lighters from the queuing area to the correct cargo transfer station alongside the discharging vessel. Once the lighter is loaded and at the direction of the debarkation officer, the SLCP issues instructions for the loaded lighter to cast off and contact the appropriate BLCP. Additionally, the SLCP should monitor ship and lighter usage plans, maintains radio contact, and coordinates with the BLCPs and JLCC as required.

c. **Beach Lighterage Control Point.** As control of a lighter is passed from the SLCP to the BLCP, **the BLCP**, in coordination with the BCU commander, **is then responsible for directing lighters to correct beach transfer sites at the beach or to a queuing area** to await for a correct beach transfer facility or bare beach site. The BLCP should obtain information from the lighter as to the quantity, type, and status of its cargo. This information is passed to the BCU so that adequate provisions can be made to receive and transfer

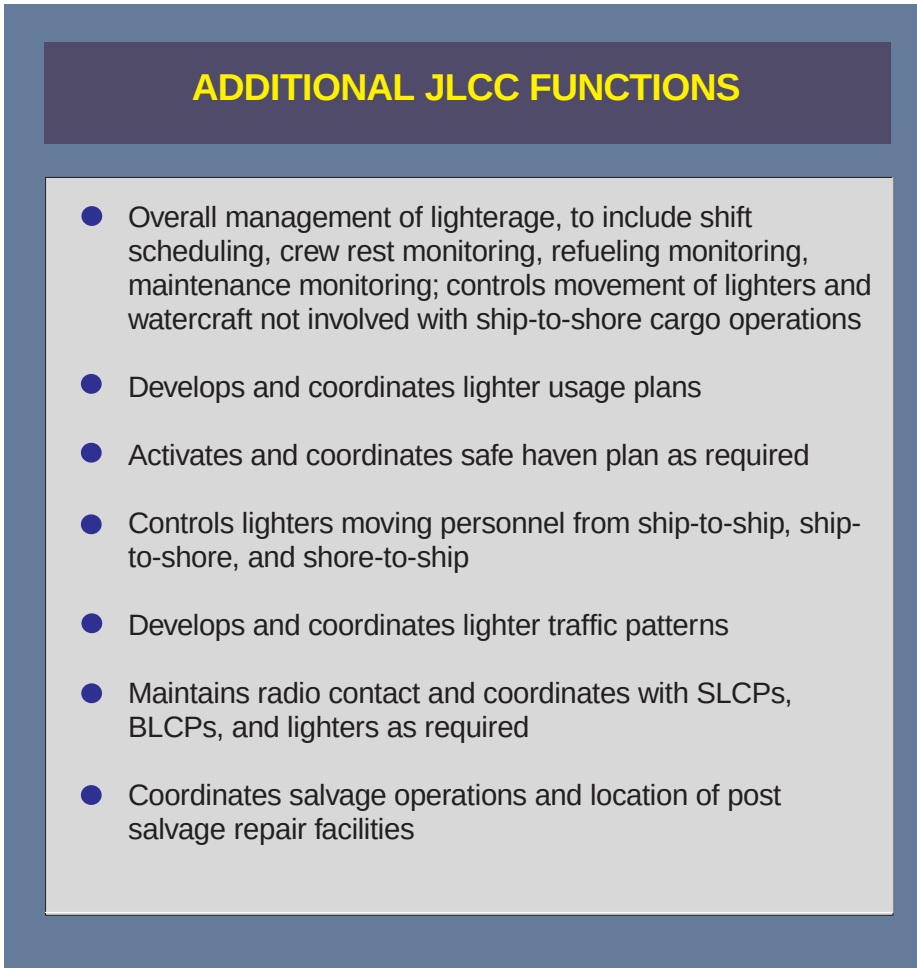


Figure VII-2. Additional JLCC Functions

any special or nonoperative cargo. Once the lighter has been called forward and unloaded, the BLCP issues instructions to cast off and report to the SLCP. The BLCP should maintain radio contact and coordinate with the SLCPs and JLCC as required.

d. **Lighter Responsibilities. Well-trained lighter masters are essential to effective cargo throughput operations.** During cargo operations, they must at all times maintain radio contact with the BLCPs and SLCPs and check in and check out when entering and leaving the operational area. **Knowing the conditions of the cargo loaded onto their crafts is an essential factor for timely discharge at the beach.** This information is provided to the BLCP so that arrangements can be made for any special equipment required to assist in cargo transfer once the lighters are moored. An additional responsibility of lighter masters is to keep the SLCP informed of administrative requirements such as refueling, crew rest, maintenance, and/or other administrative matters not covered by the lighter usage plan.

e. **Traffic Patterns. Traffic patterns are established by the JLCC and included in the lighter usage plans** to minimize the risk of collisions and allow an unhampered flow of lighter traffic. The two primary elements

of traffic patterns are beach lanes and queuing circles. **Beach lanes** are lanes that lead to cargo transfer points on the beach. These lanes, other fairways, and hazards to navigation are marked by flags in the daytime and by lights at night. **Queuing circles** are holding patterns used by lighters waiting to move alongside the discharging vessel or waiting for an open beach transfer facility. The goal of lighter management is to keep lighters loading and unloading cargo and out of queuing circles.

4. Transition

Transition of lighterage assets from dedicated Service support (Navy or Army) to joint operations is largely scenario dependent. However, in a representative situation, the Navy or Marine Corps system would provide the initial commercial ship unloading capability and would deliver not only the follow-on supplies and equipment to the amphibious assault forces but also the necessary sustained support. Upon arrival of the Army forces, dual operations would be conducted until the Army is fully established and the JFC designates which Navy systems to begin to withdraw, if required, to support other operations. Control would then shift to the Army, using an agreed phased-transition procedure (See Figure VII-3).

5. Lighterage Maintenance

Maintenance and repair of lighterage will be conducted by Navy or Army units as described below.

a. **Navy Maintenance Support.** The Navy has the capability to establish two repair teams as the lighterage repair element — one afloat on the boat haven ship and one ashore as the lighterage repair element. This is true as long as a boat haven ship remains in the area. On departure of the boat haven ships, the lighterage repair element ashore will make all repairs. A lighterage repair plan is promulgated by preventive maintenance of lighterage equipment. **Lighterage maintenance considerations include the following.**

- A **self-sustaining capability** to the maximum extent possible. Maintenance and support elements are capable of intermediate-level craft repair at designated lighterage support havens. Emergency lighterage equipment casualties will be corrected on station or at the designated haven.

- **Reporting lighterage casualties** immediately to the off-load control officer (OCO), who will contact the beach party element to coordinate repairs. The lighterage repair officer will ensure that lighterage equipment repair support is accomplished in the most efficient and expeditious manner. The causeway pilots, boat coxswains, and the repair coordinator will be responsible for reporting to the JLCC and updating the status of the casualties.

b. **Army Lighterage Maintenance.** The maintenance concept for watercraft provides maximum self-sufficiency, supportability, and maintainability with a minimum use of personnel, parts, material, and equipment. **Organizational and direct support maintenance for Army watercraft and amphibians are normally performed by the crew and unit maintenance personnel.** Backup direct support and general support maintenance are performed by a floating craft maintenance company for both types of craft or by a separate lighter maintenance company for older amphibians. Depot-level maintenance that exceeds the capability of Army maintenance units is principally performed under contract by civilian shipyards. Army maintenance units are deployable to support contingencies. **Depot-level civilian contract maintenance** may be obtained during contingency

Transition Functions and Control for LOTS and JLOTS Operations

FUNCTIONS	RESPONSIBLE PERSON/ACTIVITY BY OPERATION TYPE				
	PHIBOP	MPF OPS	NAVY LOTS	JLOTS	ARMY LOTS
Commanding	CATF	MPF Commander	OTC	JLOTS Cmdr	Terminal Gp. Cdr.
In Charge of Off-loading	Asslt Group Cmdr.	PCO	OCO	OCO	Terminal Bn. Cdr.
Ship Discharge	Cmdg. Officer	Debarkation Officer	Debarkation Officer	Debarkation Officer	Ship Plat. Ldr.
Lighterage Cntl (overall)	PCO	PCO	OCO	JLCC	LCC
Lighterage Cntl (at ship)	Combat Info Center	LCT	LCO	SLCP	SLCP
Lighterage Cntl (At Beach)	BPT	BPT	BPT	BLCP	BLCP
Beach Clnc. & Marshalling Yd.	Shore Party	Shore Party	Shore Party	BCU	BOG

Legend
CATF = commander, amphibious task force, OTC = officer in tactical command, CMPF = commander, maritime pre-positioning force, Asslt. Gru. = Assault group, JLCC = joint lighterage control center, LCC = lighterage control center, SLCP = ship lighterage control point, CIC = combat information center, LCO = lighterage control officer, LCT = lighterage control team, BLCP = beach lighterage control point, BPT = beach party team, BCU = beach clearance unit, BOG = beach operations group, PCO = Primary Control Officer, OCO = Off-loading Control Officer.

Figure VII-3. Transition Functions and Control for LOTS and JLOTS Operations

deployment through the DOD Logistics Civilian Augmentation Program.

c. **Single-Service Support.** Normally, boat maintenance will be Service-oriented; i.e., Navy lighterage will be repaired or maintained by the Navy. During phase-in or phase-out periods, when Service maintenance organizations are not in place, **a single Service may be required to perform repair or maintenance for all craft**.

6. Operational Limitations

The use of lighterage in support of the ship-to-shore movement of cargo is weather-dependent. As sea state increases or temperature decreases dramatically, lighterage productivity decreases. As discussed in Chapter VI, "Ship Discharge Operations," the ship-to-shore movement of cargo is currently limited by the capabilities of the discharge facilities to handle the cargo.

Lighter and ship discharge operations begin to degrade as conditions enter the upper half of sea state 2 and significant wave heights reach 2.5 to 3.5 feet. The inherent risks of operating in sea state 3 are not worth the minimal productivity and possible equipment damage which could occur. Such damage could prevent timely resumption of operations as weather clears.

7. Lighterage Types and Operational Characteristics

The lighterage assets organic to naval LOTS include landing craft and causeway ferries. The type of lighters will be dependent on the weather, sea state, surf conditions, beach gradient, and characteristics of the loading and discharge sites. Both **landing craft** and **causeway ferries** have navigational lights and can operate under conditions of reduced visibility, although they will require vectoring from the ship control centers. Lighterage characteristics are contained in Appendix B, "Lighterage Characteristics."

a. **Landing Craft, Mechanized. Navy LCM-8s** are attached to assault craft units (ACUs) and to the class amphibious attack cargo ships. **Army LCM-8s** are assigned to transportation medium boat companies. LCMs are propelled by two main diesel engines driving twin screws. They are designed to transport breakbulk cargo, wheeled and tracked vehicles, and personnel and equipment **from offshore ships through a surf zone and onto a beach** where bow ramps are lowered and cargo is off-loaded to a beach. LCMs are capable of operating on a 24-hour basis with two crews and are able to retract from the beach on their own power.

b. **Landing Craft, Utility (LCU-1600 Class). Navy LCUs** are attached to ACUs, and **Army LCUs** are assigned to transportation heavy boat companies. LCUs are capable of transporting containers, breakbulk cargo, RO/RO cargo, outsized cargo, and personnel **from offshore off-load sites to beach discharge sites**. They are self-sustaining lighterage capable of operating on extended missions based upon provisions and fuel capacity. LCUs are capable of beaching and retracting under their own power and are equipped with a stern anchor to assist in retracting. The 1600 Class LCU is a twin screw vessel powered by two diesel engines. Its pilot house and crew quarters are located on the starboard side, which allows the craft ramps on both the bow and stern to provide full drive-through capability. They are also capable of marrying to a causeway, RRDF, or to another LCU if they are fitted with a "rhino" horn.

c. **Landing Craft, Utility (LCU-2000 Class). Army 2000 Class LCUs are assigned to transportation heavy boat companies and are used to move personnel, containers, vehicles, and other cargoes.** They are self-sustaining and self-deliverable vessels that perform ship-to-shore and extended missions. LCUs are capable of beaching and retracting under their own power and are equipped with a stern anchor to assist in retracting. The 2000 Class LCU is a twin screw vessel powered by diesel engines. The engine room and crew quarters are located in the aft section. Cargo must be loaded and discharged via the bow ramp or by crane.

d. **Landing Craft, Air Cushion.** The Navy has procured LCACs for assignment to ACUs. The LCAC employs air cushion vehicle (ACV) technology with gas turbine propulsion. The LCAC delivers cargo from a seaward launch point at speeds in excess of 40 knots. The high speed over the beach craft can carry a 60-ton payload. **LCACs can transport a wide variety of wheeled and tracked vehicles, weapons, personnel, and equipment.** It has a **fast turnaround** for multiple missions. The craft is capable of transiting ashore across about 70 percent of the world's littorals and proceeding to a dry landing ashore. Appendix B, "Lighterage

Characteristics," contains LCAC characteristics and a diagram (Figure B-3).

e. **Causeway Section, Powered, and Side Loadable Warping Tug. The CSP and SLWT ferry causeways to and from offshore discharge positions.** Each CSP is powered by two 360-degree rotatable WPAs that provide exceptional maneuverability and shallow draft. The CSPs can ferry the loaded causeway sections either directly through the surf zone to the beach or to the pierhead of the ELCAS. When a CSP is fitted with an A-frame at the bow, a deck winch, and other equipment, it becomes an SLWT. **Both the CSP and SLWT are used extensively in JLOTS operations** (See Figures IV-1 and IV-2). Other CSP and SLWT considerations include the following.

- The **CSP** has a crew of 6, with 12 personnel assigned for a 2-shift, 24-hour operation. The **SLWT** requires a crew of 8, with 16 personnel assigned for continuous 24-hour operation.

- **The CSP can be used with other causeway sections** to transport and off-load initially required equipment, including vehicles such as track and wheeled vehicles, bulldozers, and associated beach gear. **The CSP and SLWT can be used as lighters to transfer containers and follow-on equipment from ship to shore.** They can also be used for such tasks as installing the OPDS or for salvaging beached craft. When used for OPDS installation or retrieval, SLWTs are fitted with removable deck hardware.

f. **Causeway Section, Nonpowered. CSNPs can be carried on some types of military and commercial shipping.** They may be used as barges, propelled by lighterage to the beach, or used as components of the ELCAS (NL), RRDF, or floating causeway pier. The **versatility** of these CSNPs makes them useful in many forms, limited usually only by weather (sea state 3).

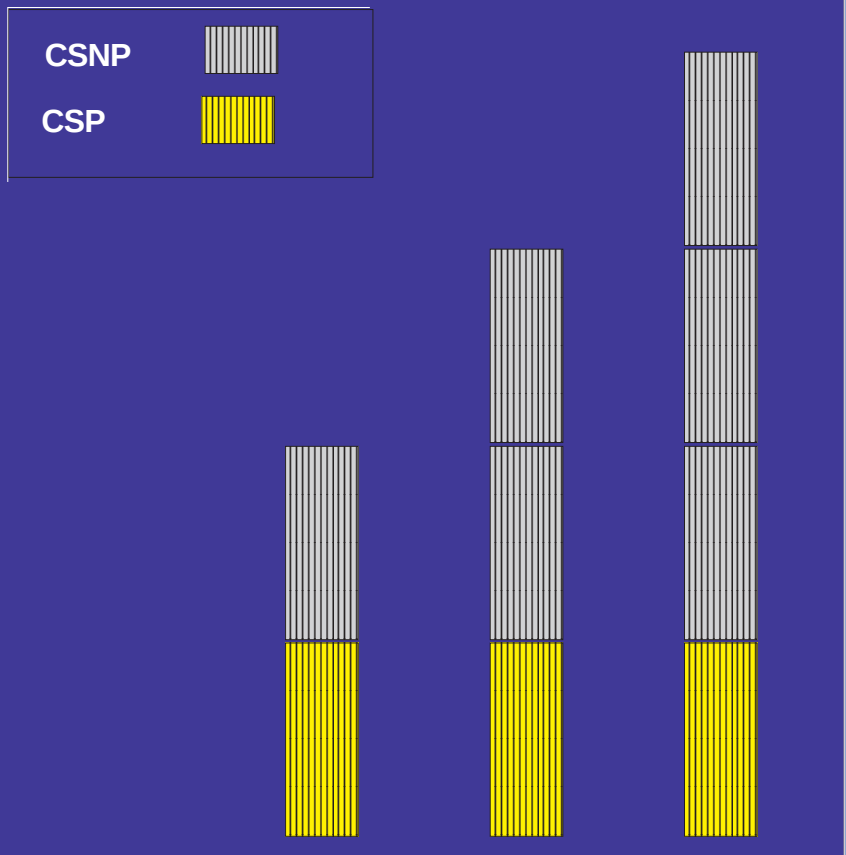
g. **Causeway Ferry. Causeway ferries are composed of CSPs and CSNPs joined together to form a barge ferry platform.** Ferries transport pallets, vehicles, and containers to the shore and are configured for beaching. Ferries will be constructed in a ratio of powered or nonpowered sections as determined by the JLOTS lighter usage plan, based on weather conditions and load requirements. The minimum size ferry has one powered section with one beach end (CSP+1). The largest practical size has one powered section, two intermediate sections, and one beach end (CSP+3). A **double-wide ferry configuration** using Army modular causeway sections is another viable causeway ferry concept. Figure VII-4 provides additional information on ferry configurations.

h. **Lighter, Amphibious Resupply Cargo, 60 Ton.** The LARC-LX is an **Army wheeled amphibian** driven by four marine diesel engines and twin propellers. It is capable of carrying heavy, outsized, or bulky cargo and can cross 17 percent of the world's beaches. It has very low land and water speeds and should not be used for the discharge of vessels moored long distances from shore. The vessel has a powered bow ramp and is ideally suited for the movement of wheeled cargo.

i. **Lighter, Amphibious Resupply Cargo (LARC-V).** The LARC-V amphibian is mainly **employed by the Navy in surf zone salvage** as part of beach party teams or in ferrying personnel between the beach and the ships anchored offshore.

j. **Barges. Army barges are available in a variety of sizes and functions**, including deck, liquid, and refrigerated versions. The seven types of barges currently in the Army inventory are nonpropelled (See FM 55-50,

NAVY LIGHTERAGE CAUSEWAY FERRY CONFIGURATIONS



Configuration:	CSP plus 1 CSNP	CSP plus 2 CSNPs	CSP plus 3 CSNPs
Designation:	CSP plus 1	CSP plus 2	CSP plus 3
Length (ft.):	180	270	360
Width (ft.):	21	21	21
Crew:	6	6	6

Figure VII-4. Navy Lighterage Causeway Ferry Configurations

"Army Water Transportation Operations"). **Barges can be successfully used in ship-to-shore operations.** These craft have a large cargo capacity and may be locally procured. One propulsion system, such as a tugboat or landing craft, can service several barges. However, during adverse weather, the barge's reliance on an outside propulsion system makes stability difficult. Barges are operated by watercraft teams. Several barge and tugboat teams can be organized into a watercraft company with C2 provided by TOE 55-500, "Headquarters Units."

k. **Logistic Support Vessel.** The LSV transports approximately 2,000 short tons (STs) of dry cargo in coastal, harbor, and inland waterway missions. **The craft possesses a beaching capability that will permit use in LOTS and JLOTS missions.** In LOTS and JLOTS operations, beach gradient variations can limit LSV cargo carrying and beaching capabilities. The vessel is capable of transporting equipment, including tanks and engineer items. Its **RO/RO design** permits rapid discharge of mobile unit equipment. The craft is **self-deployable** to the objective area. The vessel is best utilized primarily for the loading of wheeled and tracked vehicles from RO/RO vessels, rather than transporting breakbulk cargo or containers from containerships.

8. Container Operations

Twenty- and forty-foot containers are mostly efficiently transported to the beach by double-wide and regular causeway ferries. LCUs, LSVs, LCACs, and LARC-LX lighters are used to support container operations when additional lighters are required. The method of stowing containers aboard lighters is determined by the weather and swell conditions and by the method of discharge used on the beach. Lighter loading varies according to beach gradient, lighter weight limitations, and transfer facilities. Containers on landing craft are normally transferred at the water's edge by RTCHs, rough terrain container cranes (RTCCs), and 140-ton cranes or, beyond the surf zone, by a 140-ton crane at the ELCAS. **Container operations using lighters are described below.**

a. **Causeway Ferry Operations. The causeway ferry is an excellent platform for container transport** and is the most efficient lighter for container operations. Its effectiveness and capacity vary with the configurations previously described. Because of its ability to change configurations, the causeway ferry is flexible and adaptable to operational requirements, weather conditions, beach conditions, and theater off-loading capability. It is more capable of operating in shallower beach gradients than other lighters. When loading from T-ACS, two causeway ferries can nest alongside and be loaded simultaneously, reducing T-ACS crane waiting time. Athwartship placement of containers is recommended for timely transfer by the ELCAS crane or RTCHs at the bare beach site.

b. **LCU Operations. Containers can be stowed aboard LCUs** either athwartship or fore and aft, dependent upon the class of LCU. Containers are transferred from LCUs by an ELCAS crane.

c. **LCM-8 Operations.** An LCM-8 can only stow a 20-foot container fore and aft. It is, therefore, restricted to unloading by the ELCAS crane.

d. **LARC-LX Operations.** The LARC-LX moves containers from ship to a crane on the beach or to a container sorting area. It is used in beach areas of slight gradients where landing craft cannot reach the shoreline or during periods of low tide.

9. RO/RO Operations

Landing craft and causeway ferries are used to transport vehicles ashore from offshore discharge positions. All lighterage can be loaded with vehicles by the lift-on method (e.g., by a ship's cranes). However, **only LSVs, 1600-Class LCUs, 2000-Class LCUs, Army convertible LCM-8s, and causeway ferries can receive vehicles directly over a ramp from a RRDF**. An LCU marriage, however, is possible only when a seaward positioned causeway section with a "V" notch and a rhino horn have been attached to the platform. LCUs are loaded by placing their bow ramp onto the rhino horn of the RRDF sea-end causeway section. Causeway ferries are attached to the RO/RO platform via the use of flexor connectors. Vehicles are driven aboard in a manner to facilitate discharge by driving the vehicle forward. Normally, vehicles are backed aboard landing craft. Vehicles should be appropriately secured while in transit, including having brakes set. **RO/RO operation considerations include the following.**

a. **Landing Craft Operations.** On a bare beach, landing craft ground out and lower their ramps so **RO/RO cargo can be driven or towed to the dry beach**. Vehicles can also be lifted out by cranes at an ELCAS facility and driven or towed ashore. Additionally, LSVs, 1600-Class LCUs, 2000-Class LCUs, and Army converted LCM-8s can marry to an appropriate section of the seaward end of a floating causeway pier to discharge RO/RO cargo ashore.

b. **Causeway Ferry Operations.** Causeway ferries are the most versatile of the lighterage **capable of moving RO/RO cargo to the shore discharge points**. Vehicles can be driven directly onto the beach. Causeway ferries should be beached as close to beach egress routes as possible to facilitate rapid clearing and lessen beach deterioration. Upon completion of vehicle unloading and retracting, as appropriate, bulldozers may be used to push the ferry seaward until all sections are afloat.

c. **RO/RO Throughput Capability.** The mean loading and unloading time and lighterage loads are shown in Appendix A, "Planning Factors."

d. **Lighterage Procedures for RO/RO Operations.** Where possible, RO/RO operations will be conducted. When lighterage is used, the procedures listed below are followed.

- **Vehicles will be loaded** with the front of the vehicle facing the bow for ease of drive off at the beach.
- When **cargo on chassis** is loaded onto lighterage, the tractor coupling will be kept toward the bow.
- When **tracked vehicles** are driven on or off lighterage, dunnage must be laid on the lighter's cargo deck, unless the vehicle has adequate rubber track pads.
- When **driving vehicles** off lighterage, ramp angle must be considered to determine if vehicles and/or trailers might be damaged.

10. Breakbulk Operations

All lighterage is capable of transporting most breakbulk cargoes to beach discharge sites. Although some outsized cargoes may not be compatible with smaller landing craft or amphibians, **LCUs, air cushion watercraft,** or **causeway lighterage** would be able to accommodate such cargo. Breakbulk cargo is loaded aboard lighterage by ship's cranes or T-ACS. The lighterage is prepared by providing dunnage, where appropriate, and cargo-securing equipment.

Depending upon the sea state, cargo type, distance to the lighterage off-load site, and the surf conditions, **breakbulk cargo should be secured to some degree**. Considerations for breakbulk operations follow.

a. **Causeway Ferry Operations. Causeway ferries can be best employed in support of RO/RO and container off-load evolutions.** However, if used for breakbulk operations, dunnage should be available for use with nonpalletized cargoes, and lashing or cargo nets should be available for securing cargoes. Breakbulk cargo is off-loaded to a bare beach or over a floating causeway by 4,000-, 6,000-, and 10,000-pound capacity rough terrain (RT) forklift trucks and at the ELCAS by cranes.

b. **Landing Craft Operations. LSVs, LCUs, LARC-LXs, and LCM-8s are the most practical lighterage to use for the ship-to-shore transfer of breakbulk cargo.** Cargo well sides provide some protection from weather and sea conditions; however, securing of cargo with cargo nets or lashings must be considered. Dunnage is used under nonpalletized loads to facilitate off-load at the beach. Stacking of palletized cargo is dependent on weather, swell, and surf conditions. Breakbulk cargo is off-loaded in the same manner as from causeway ferries. Average bare beach off-load times are shown in Appendix A, "Planning Factors."

c. **Breakbulk Cargo Loading Operations. Breakbulk cargo will be loaded onto lighterage by crane or derrick.** The load usually will not be secured by lashing. Securing, however, must be considered where lighterage is traveling long distances in rough weather or crossing a surf line. **The procedures listed below are followed when loading breakbulk cargo onto lighterage.**

- **Palletized cargo** is loaded directly onto the deck with little or no dunnage.
- **Loose drums** are placed on their sides in a fore and aft direction and stowed bilge to bilge. The drums are tiered in pyramid fashion and stowed no higher than three tiers.
- The coxswain will determine **whether a load is suitable for the craft** and may refuse to accept it if he or she believes it represents a danger to vessel or crew.

11. Barge Operations

Barge ships are self-sustaining with regard to off-loading their complement of barges, but the barges themselves are not self-sustaining. Once off-loaded from the barge ship, the barges are completely dependent on towing and discharge services, marshalling, maintenance, sheltering from the weather, and retracting. Usually, these operations are conducted in sheltered waters. Many facets of the two different barge type systems are addressed in Chapter VI, "Ship Discharge Operations," including the characteristics of the barges concerned. This section covers operational considerations in the ship-to-shore movement of LASH and SEABEE barges.

a. **Barge Towing and Handling. The availability of suitable towboats, tugs, or pusher craft is essential for an efficient barge operation.** Desirable characteristics of tugs suited for barge handling include the items in Figure VII-5. Push-towing barges with pointed-bow tugs require considerable skill for proper barge maneuvering. In **open waterways**, barges are towed either singularly or in arrays. In **confined waters** or when approaching a cargo discharge site, it is necessary to re-rig the tow and push the barges for adequate maneuverability. Commercial and military tugs have demonstrated capabilities to handle barges. Landing craft will not be used to tow or push barges except

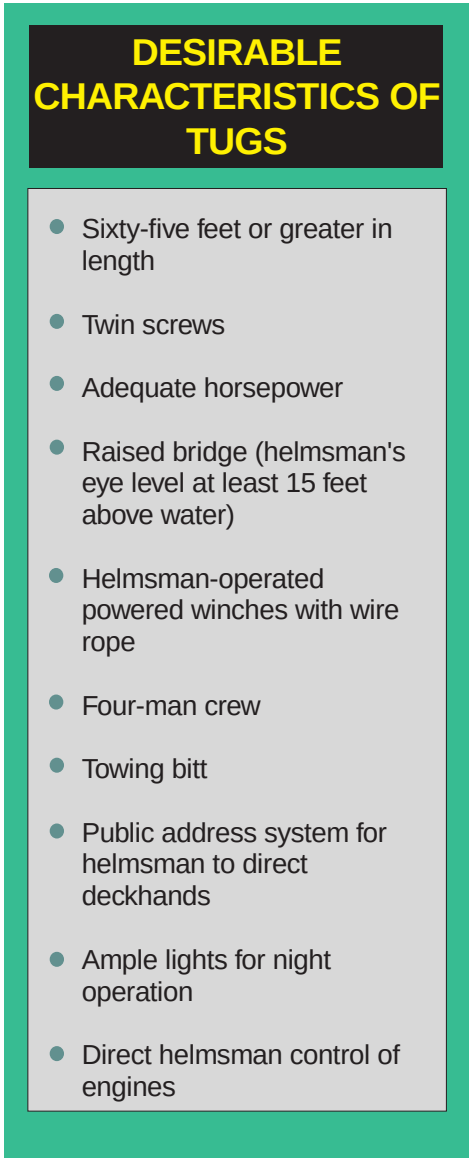


Figure VII-5. Desirable Characteristics of Tugs

in unusual situations when other assets are not available.

b. **Barge-Cargo Discharge Operations.** The various aspects of these operations are discussed below.

- **Barge Hatch Covers.** LASH barges have two types of hatch covers, pontoon and folding; SEABEE hatches are covered by seven hatch panels. Pontoon hatch covers must be removed and stowed so as not to interfere with discharge operations. Folding hatch cover barges require more care in positioning because they represent an added obstruction to swinging the hook and load. They also present an obstruction to stevedore movement and field of vision.

- **Barge Preparation.** Preparations should include predetermining stowage location and handling of hatch covers. Forklifts, lights, Jacob's ladders, and bilge pumps to de-water barges should be provided, as appropriate, to facilitate load and off-load operations.

- **Personnel.** Extra personnel may be required as signalmen since the crane operator may not be able to see into the hatch of the barge (barge height varies between 13 and 14 1/2 feet) and as tagline tenders, depending upon the degree of barge movement alongside the off-load facility.

- **ELCAS Discharge.** The most capable barge discharge facility is the ELCAS. It has adequate deck area for stowage of barge hatch covers. Also, breakbulk cargo can be loaded directly onto trailers or trucks for transportation to ashore marshalling, staging, or dump areas.

- **Discharge Rates.** These rates vary with the system being used, sea conditions, crane characteristics and operator experience, barge type being used, environmental conditions, crew experience, tug availability, lighterage type and availability, cargo configuration, beach conditions, and MHE availability. Average cargo-discharge cycle time can vary from 2 minutes per load for regularly shaped palletized cargo to over

30 minutes for larger loads (such as vehicles). Hatch covers can be removed and replaced in from 6 to 20 minutes each. Raising and lowering folding hatch covers can consume equivalent times, depending on the availability of a power source for raising and lowering the covers.

c. **Barge Marshalling.** Clustering, fendering, and retrograde sequencing are discussed in this section.

- **Marshalling and Clustering.** When a barge is discharged from a bargeship, it may be moved into a barge marshalling area or directly to the point of cargo discharge. A marshalling area should be used while the barge is awaiting a cargo discharge site. The primary concern of the JLOTS commander is the safety and security of the barges and their cargoes. Figure VII-6 depicts some methods for barge clustering in a marshalling or safe haven area. All methods require ancillary hardware, maintenance, and space.

- **Other Marshalling Techniques.** Another barge-marshalling technique is to **beach barges**. An anchor, or deadhead, is recommended to prevent the barges from returning seaward. Retrieving barges, however, may require varying degrees of effort depending upon surf conditions and length of time the barges were beached. Long-term beaching, for example, results in fouling the beach around the barges and in depositing a sandbar seaward of each barge. Pulling barges off the beach may entail a considerable effort under those conditions.

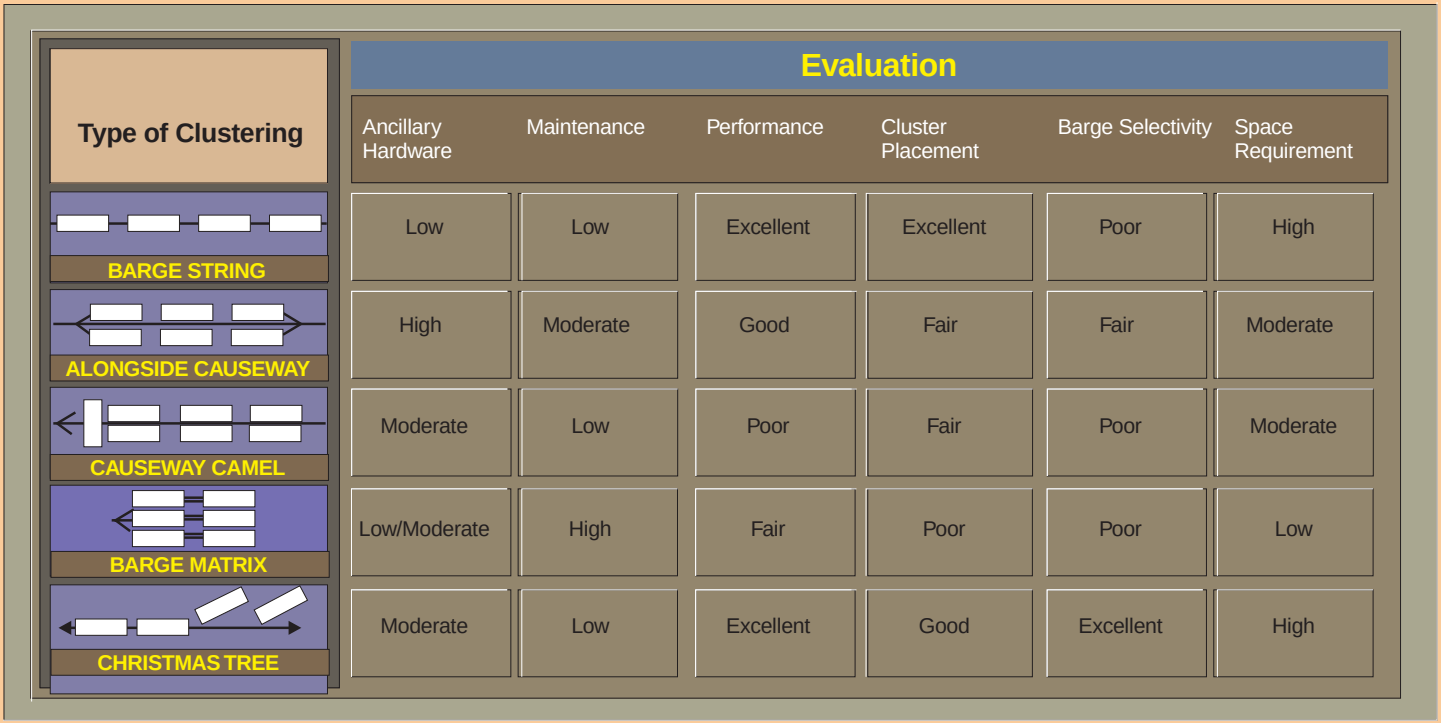
- **Fendering.** Fendering of barges is critical. Tugs require rub rails, rope fenders, tires, ship-type fenders, and/or timbers to prevent steel-to-steel contact. Protruding corners of pontoon warping tugs and landing craft must be fendered from the 1/4-inch thick steel hull of a barge.

- **Retrograde Sequencing.** Upon completion of cargo off-load, empty barges must be held in a marshalling area to await retracting to a subsequent barge ship. Such marshalling can consume a significant amount of the off-load area. Prior to arrival of a barge ship, barges should be arranged to facilitate sequencing onto the ship. Because of the limited numbers of LASH or SEABEE barges available in inventory, retracting of barges is necessary to provide for a continuous delivery of cargo by such barge-ship systems. Since such barges are critical for future transportation requirements, retracting or retrograding barges must be accomplished expeditiously. A two-barge-per-hour backload rate could be maintained in a sea state 2, since this is the limit of LASH and/or SEABEE ship upload capability. If possible, discharge and retrograde of barges should occur simultaneously to produce the greatest use of available assets and to reduce the overall duration of the operation.

d. **Barge Maintenance.** As with other lighterage, **when barges are left in an operational area, the JLOTS commander becomes responsible for their maintenance**. Because of the limited number of barges, the JLOTS commander must make necessary repairs and maintain them in order that they may be retrograded for future commitments.

e. **Barge Safe Haven Requirements.** In order to protect barges and the cargo contained therein, **it is necessary to have a designated barge safe haven area**. Barges are vulnerable to weather and sea conditions and, because of their construction, must be protected from contact with each other.

LASH BARGE MARSHALLING COMPARISON



Type of Clustering	Evaluation					
	Ancillary Hardware	Maintenance	Performance	Cluster Placement	Barge Selectivity	Space Requirement
BARGE STRING	Low	Low	Excellent	Excellent	Poor	High
ALONGSIDE CAUSEWAY	High	Moderate	Good	Fair	Fair	Moderate
CAUSEWAY CAMEL	Moderate	Low	Poor	Fair	Poor	Moderate
BARGE MATRIX	Low/Moderate	High	Fair	Poor	Poor	Low
CHRISTMAS TREE	Moderate	Low	Excellent	Good	Excellent	High

Figure VII-6. LASH Barge Marshalling Comparison

12. Lighterage Salvage Operations

A certain number of casualties to lighterage is probable in a JLOTS operation. The mission of the salvage organization is to keep lighterage lanes and ashore discharge areas clear of disabled lighterage so that movement to and over the beach is maintained (See Appendix N, "Lighterage Salvage Operations").

a. **Salvage Operations. The JLCC is responsible for coordinating the salvage of lighters throughout an operation.** For lighters within the surf zones, that responsibility is delegated to a salvage unit within the beach clearance organization. The JLCC will evaluate the salvage requirements in the operating areas and those assets available there. Adjustments will then be made to the equipment plan to include salvage equipment required but not available in the operating area. As a minimum, Purple-K Powder bottles and a P250 pump (with dewatering and firefighting attachments) will be positioned for rapid response to seaward emergencies. This same equipment will be available with the BCU for use in the surf zone. The JLCC, in coordination with the lighter repair officer, will coordinate the location of post-salvage repair facilities.

b. **Salvage Unit. The salvage unit in a JLOTS operation is formed from personnel and craft of the assigned units.** This ad hoc force will normally use an LCM as a heavy salvage boat; however, SLWTs or other self-powered craft may assist. Surf and beach salvage operations are addressed in Appendix N, "Lighterage Salvage Operations."

c. Unless otherwise directed, **salvage of broached, fouled, or craft afloat will be conducted immediately** to minimize the repair effort required to return the craft to service. Sunken craft will not be salvaged until directed by the JLCC.

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CHAPTER VIII
SHORESIDE CARGO DISCHARGE OPERATIONS

"Victory is the beautiful, bright-colored flower. Transport is the stem without which it could never have blossomed."

Winston Churchill
The River War, 1899

1. Overview

a. **The mission to conduct cargo discharge operations includes the interfacing of transportation modes in the surf zone, seaward of the surf line and on the beach.** Although most RO/RO transported equipment can be driven off ship-to-shore lighterage, other dry cargoes are discharged by specialized off-load equipment and either placed on a land vehicle for further transport or carried directly to an appropriate area. Such transfers can be accomplished at the beach or onto a platform that is connected with a beach. Air cushioned watercraft and amphibians, on the other hand, are capable of transporting cargo directly to a marshalling area, thus eliminating a transfer at the shoreline.

b. **Shoreside cargo discharge operations are both scenario- and Service support-dependent.** For example, if an amphibious assault operation precedes JLOTS, cargo off-load equipment, inherent to such an operation, may be used initially until other cargo discharge systems arrive in the objective area and are deployed. Further, **both the Army and Navy have their own lighterage assets and shoreside discharge systems**. Their capabilities vary with the discharge systems employed. These systems should complement ship off-load systems so there will be sufficient over-the-shore throughput capability to match ship discharge rates. This chapter addresses the Navy and Army shoreside discharge systems that interface the ship-to-shore movement of cargo with the shore or land cargo movement.

2. System Limitations

a. **Weather, surf conditions, and beach gradient impose the primary limitations on shoreside cargo discharge operations.** The ability of the ELCAS and floating piers to support beach transfer operations from beyond the surf has improved beach reception capability. However, lighter and ship cargo transfer operations degrade as sea conditions near sea state 3 and significant wave heights reach 3 feet. At this time, based on actual tests, evaluations, and exercises, the inherent risks of operating in sea state 3 is not practical or cost effective.

b. **The ELCAS has been demonstrated to be an effective method of discharging containers and other cargoes.** However, operations at the ELCAS are significantly reduced with cross-currents approaching 1-1/2knots, wave heights of 3 feet or more, or winds in excess of 20 knots. Additionally, the ELCAS 140-ton crane cannot completely unload all containers from fully loaded LCU-2000s unless the craft shifts positions because of the crane's inability to reach outboard containers. The LSV cannot discharge containers at the ELCAS, due to a number of technical difficulties (unless these lighters reposition themselves, shifting from starboard to port or port to starboard).

c. **Planners need to be aware that container transfer at the beach is not possible with some combinations of lighters and beach transfer systems.** An example of this interoperability problem is the RTCH, which cannot unload containers from the

LCU-1600 because the ramp opening of this vessel is not wide enough for a 20-foot container to pass through. Additionally, the forward mast head on the LCU-2000 prevents the transfer of containers using the RTCH.

d. **Specific limitations on beach discharge capabilities** are discussed in the appropriate sections in this chapter. Other system limitations include the following.

- **Yard Tractors.** The yard tractors used to move containers on trailers are equipped with two-wheel drive only, which severely restricts their ability to travel off formed or prepared roads. When used in undeveloped beach facilities, recovery resources must be made constantly available or beach stabilization systems must be in place.

- **Deployability.** The 65- and 140-ton wheeled cranes are heavy lifts and are restricted in their deployability. They require special ships for movement.

- **Personnel Augmentation.** As the JLOTS commander plans for in-stream RO/RO discharge and beach clearance, the JLOTS commander may find that organic ship and BCUs do not have the required equipment, number of personnel, or required types of military occupational specialties to accomplish this mission. At this time, the JLOTS commander must consider **augmenting the BCUs with equipment and specialized personnel** much the same way an Army fixed-port terminal commander does the port support activity. The makeup and use of augmentation personnel should be **tailored to the type of equipment and size of the units that will pass over the beach and the amount of cargo to be cleared from the beach**. Throughput operations will be impaired if the commander does not adequately plan for enough augmentation personnel and equipment. These augmentees and their equipment may be required to conduct the functions shown in Figure VIII-1. Any specialized equipment or personnel support requirements, such as cots, tents, cooks, messmen, weapons, and communications required by the JLOTS commander, should accompany the augmentation detachments. As the personnel detachments arrive and report to the JLOTS commander, they are divided, as required, to support beach clearance, marshalling yard, and ship operations. These detachments are transferred to the TACON of the JLOTS commander who may then transfer the units to the TACON of appropriate Army transportation terminal transfer company, Army terminal service company, or a Marine Corps beach and terminal operations company. Normally these detachments will be transferred to the TACON of the BCUs.

3. Floating Causeway Pier Operations

a. **Normally, one of the earliest operational requirements in support of a ship-to-shore movement is the assembly and beaching of causeway piers (CWPs).** Navy CWPs are installed by the PHIBCBs and Army CWPs are installed by the floating causeway detachment under TOE 55-530. Causeways are maneuvered by SLWTs, modified LCMs, and CSPs. **The CWP is designed primarily to form a floating bridge** for landing ships and craft when they are not able to approach close enough to the beach to load and unload wheeled or tracked vehicles and equipment directly to the beach. **The floating CWP can be relied upon for discharge of all rolling stock** and to supplement the ELCAS where it is fully operational. Once beached, the CWPs require

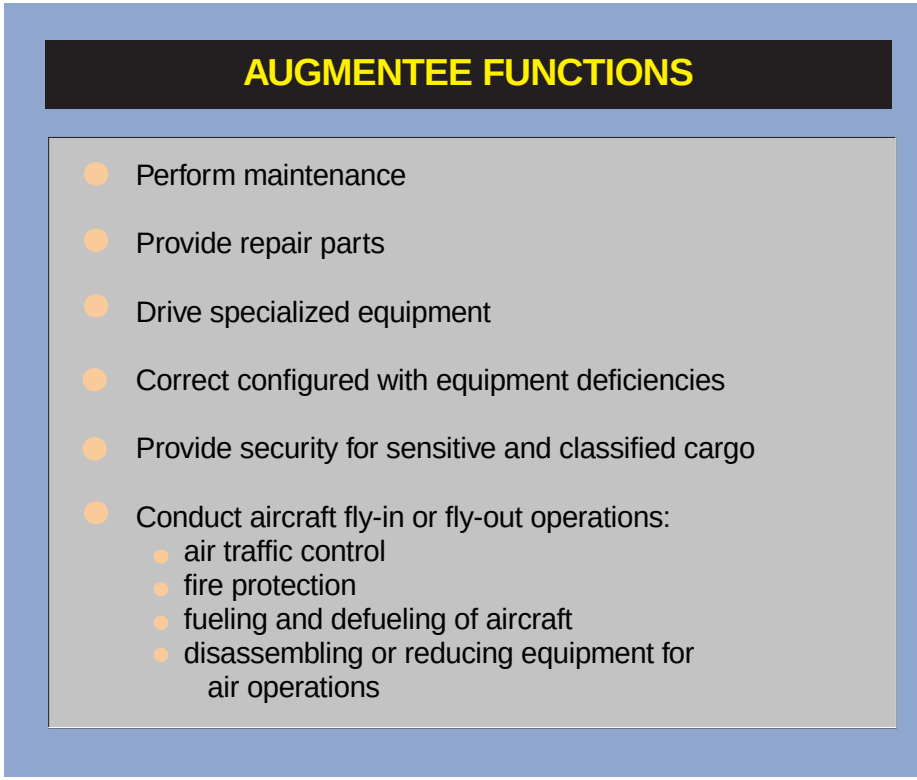


Figure VIII-1. Augmentee Functions

tending and occasional repositioning of anchors and repair as they are used to discharge landing craft.

b. Basically, there are two configurations of this pier: the **single pierhead (Navy)** and the **double pierhead (Army)**. Operationally, the piers can resist a wave height of 4 feet and ride a wave length of 80 feet. The piers are further designed to resist a lateral, 4 knot crosscurrent, assuming adequate anchors are provided. They have a draft of approximately 1 1/2 feet and each section can support 100 STs distributed or one M1A1 tank. Figure VIII-2 depicts components and configurations of both floating CWPs.

- **Navy CWPs.** The Navy CWP normally consists of no more than 12 NL causeway sections and anchoring system. The NL sections are 21 feet wide and 90 feet long. Navy CWPs are erected to a minimum length needed but no longer than 1,000 feet. The Navy CWP will vary in length depending on site conditions. Once the sections have been beached, they are held in place by two dozers while the anchoring system is installed. Configurations of the single-pierhead CWP is shown is Figure VIII-2.

- **Army CWPs.** The Army CWP consists of nonpowered modular causeway sections that are 80 feet long and 24 feet wide and an anchoring mooring system. It is designed to extend from the mean high water line out into the surf zone to a minimum MLW depth of approximately 6 feet (Army LSVs require a depth of 12 feet MLW). The maximum working length, during operations, will be determined by the beach gradient.

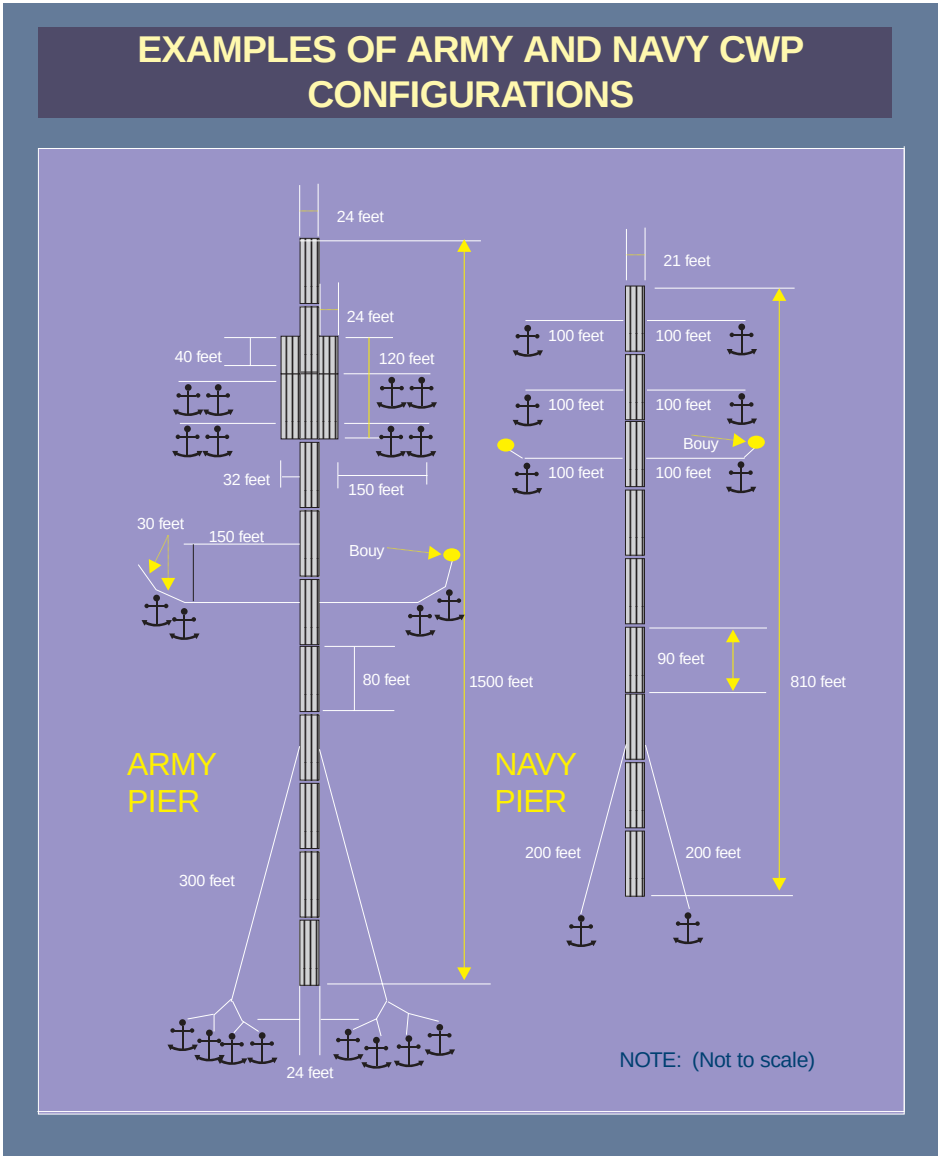


Figure VIII-2. Examples of Army and Navy CWP Configurations

Efficient insertion of the CWP (stabbing the beach) onto the prepared beach site requires a minimum of three SLWTs or CSPs or a combination of both (LCM-8s can assist). If there is negligible current and little wind, then two powered craft should be able to make an accurate landing. Configuration of the Army CWP can best be described in Figure VIII-2.

c. The JLOTS planners can determine the proper pier length and seaward end depth of the floating CWP by **analyzing both the beach survey and types of lighters that will be used during the operation**. A minimum depth of 5 feet at MLW is required at the seaward end of the CWP to assure sufficient depth for the stern of the LSV. (LSV is 273 feet long with a maximum stern draft of 12 feet.) This depth allows the LSV, LCU-2000,

and LCU-1600 access to the seaward end of the pier.

d. **Breakbulk cargo or containers are not normally discharged from lighterage over a floating causeway** unless they are on chassis or other wheeled flatbeds and can be driven or towed from lighterage.

e. **The preferred method for transferring RO/RO cargo is directly to a beach.** If this is not feasible due to the beach gradient, LCUs and LSVs are also capable of transferring RO/RO cargo over the seaward end of a floating CWP.

4. Elevated Causeway Operations

The **ELCAS** provides a means of delivering containers, vehicles, and bulk cargo ashore **without the lighterage contending with the surf zone**. The ELCAS was described in Chapter VI, "Ship Discharge Operations." Breakbulk and/or rolling stock (within crane lift capacity) can also be handled by the ELCAS from LCUs, LCMs, LASH or SEABEE barges, or causeway ferries.

a. **Container Cargo. The container handling operation consists primarily of transferring containers from lighterage to the ELCAS and then transporting the containers to staging areas on shore.** Empty trucks or trailers are driven onto the ELCAS and onto a turntable where they are rotated 180 degrees. They are then driven to a position in front of a container-handling crane. The crane on the pierhead transfers the containers from the lighterage moored alongside to the truck or trailers. After loading, the truck or trailers move from the pierhead along the ELCAS to the beach. The ELCAS roadway is of sufficient width to accommodate two-way truck traffic.

- **Manual spreader bars and slings are available only for transferring containers.** In relatively calm seas, the spreader bar is faster because connection to the container is performed with one locking action. In heavy swells, however, the spreader bars (weighing 3,000 pounds) are difficult to control during the mating operation. The sling is used under these conditions. It is dropped onto the container and the four legs with attachments are fastened to the four lower corners of the container. The crane then lifts the container from the lighterage and places it on a truck or trailer. The truck moves on to the roadway where the container is lashed down. The next truck from the turntable is driven into the loading position. The truck with the container then exits the causeway.

- **Shifting (warping) will be required for the various types of lighters** (2000 Class LCUs and causeway ferries) **that will be mooring at that ELCAS**. These lighters must be warped because the current 140-ton ELCAS crane is not capable of reaching and lifting all containers from fully loaded vessels. Due to their overall smaller deck dimension, LCU-2000's must still be warped. LCMs, causeway ferries, 1600-Class LCUs, and LARC-LXs are not required to warp at the ELCAS, but these lighters are usually unloaded at other beach load.

b. **RO/RO Cargo. RO/RO cargo is not normally discharged by lighterage over the ELCAS but directly to the beach.** However, if RO/RO cargo were discharged to the ELCAS, then it would be **lifted off by cranes** and **driven or towed to the beach**. However, the ELCAS cranes are not capable of lifting all equipment. Some extremely heavy cargo may exceed crane capacity. Assessment must be made prior to discharging anything for lift with the crane on ELCAS. The ELCAS does not come with vehicle slings or personnel trained in vehicle operations. If vehicles or breakbulk cargoes are to be lifted, the

necessary slings and appropriate cargo handling personnel must be provided.

c. **Breakbulk Cargo. Breakbulk cargo can be discharged from lighterage by ELCAS cranes** into awaiting trucks or trailers and transported to the beach. Because of crane cycle time, discharge onto the beach is more efficient.

d. **Limitations.** Operations are conducted up to and through sea state 2. **The limiting conditions are related to the lighterage capabilities for unrestricted operations.** Sea state 3 conditions significantly limit or stop discharge operations.

5. Amphibian Operations

Two types of amphibians are currently in the inventory — ACVs and wheeled amphibians.

- **Air Cushion Vehicles.** The Navy's LCAC is used primarily as an amphibious assault vehicle. The LCAC can also be employed in JLOTS operations.

- **Wheeled Amphibians.** Wheeled amphibians will normally be employed to carry breakbulk cargo, containers, or bulky and outsized wheeled and tracked vehicles. The current Army wheeled amphibian, the LARC-LX, presents problems because of its size and the angle of its vehicle ramp. Some vehicles cannot climb the ramp, and beach personnel should confirm this ability to avoid damaging engines and transmissions. Damage can be avoided by building a sand ramp or berm to reduce the LARC's ramp angle.

- **Wheeled Amphibian Parks.** Amphibian parks are required for maintenance of craft and holding craft not immediately needed for the operation. They will be located on firm trafficable soil, close enough to the operating site to allow the amphibians to move to or from the beach on call. The area must allow enough room for dispersion and concealment.

6. Bare Beach Operations

The extent of operations on a bare beach is dependent on **beach gradient and characteristics**, **weather**, **wave height and characteristics**, **beach consistency**, and the **type of cargo transiting the beach**. Since cargo is off-loaded in the surf zone, particular care must be taken with some cargoes to ensure protection from wetness, weather, damage, and being stalled because of lack of traction. Wet landings, however, may not be permissible for vehicles, supplies, and equipment not specifically waterproofed.

a. **Container Cargo. Specialized equipment** (RTCHs or RTCC) **is used to discharge containers from beached causeway ferries** and double-wide modular causeway ferries (DWMCFs). The **RTCH** is the most efficient method of off-loading causeway ferries. They pick the container up while on the ferry and place it aboard the container trailer ashore, eliminating double handling on the beach. The containers are then transported to a marshalling area well clear of beach operations or directly cleared from the beach and marshalling areas altogether. Stuffing and unstuffing of containers will not occur at the discharge point. This activity will occur at the marshalling area. Forty-foot containers can be loaded onto the **DWMCF**, which measures 48 feet wide by 160 feet long, and will be unloaded with the RTCH using a 40-foot spreader bar. The **RTCC** is capable of lifting a 20-foot container weighing 44,800 pounds and 35-foot and/or 40-foot container weighing 67,200 pounds.

b. **RO/RO Cargo.** RO/RO cargo is simply **driven or towed off the lighterage** on to the beach to a staging area.

c. **Breakbulk Cargo.** Breakbulk cargo is normally **discharged to the beach by an RT forklift**. Trucks, tractor trailers, or rough terrain forklift trucks will be required to move breakbulk cargo from beach discharge points to staging areas.

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CHAPTER IX
BEACH AND PORT CLEARANCE AND MARSHALLING OPERATIONS

"Picture puzzles are child's play compared with this game of working an unheard-of number of craft to and fro, in and out, of little bits of beaches."

Sir Ian Hamilton
Gallipoli Diary I, 1920

1. Overview

a. The **ability to clear cargo from a beach** depends upon the physical features of the beach, weather, oceanographic features, the tactical situation, and the organization and equipment of the BCUs assigned to the operations. To obtain beach throughput effectiveness, clearance units must reach and maintain maximum transfer and clearance rates.

b. Beach throughput is dependent on receipt, transfer, and clearance rates. The **receipt capability** is based on the availability of discharge points such as causeway ferries, amphibian exit points, splash points of LCUs, and LSVs. The **transfer rate** is the rate cargo is unloaded from lighters. Beach transfer begins when the crane or MHE connects and begins lifting the cargo from the deck of the lighter and ends when the cargo is placed on a transport vehicle. In the case of amphibian vessels, transfer begins when the vessels exit the water en route to the cargo and container marshalling yard. In the case of wheeled vehicles, transfer begins when the vehicle starts moving from the lighter deck and ends when it is clear of the beach. The **clearance rate** is the rate at which cargo is moved from beach transfer points to staging and marshalling areas. Throughput is a major consideration to effective JLOTS operational productivity.

c. **Details of beach clearance and marshalling operations**, including cargo accountability, **are subject to change** to conform to the supported forces procedures. Such operations will be addressed in the JLOTS commander's OPORD.

2. Beach and Marshalling Area Organization

a. **Beach Area.** Within the beach area, **locations must be established and clearly marked** for lighter and amphibian vehicle landing sites, staging and loading area, bulk fuel and water storage, Class V dumps, and beach operational support areas (billeting, messing, maintenance, services, C2, and other support areas). **Local security requirements should be considered in site selection.** Vehicle traffic routes and ACV routes connecting landing sites, staging areas, and dumps must be selected and clearly marked. One-way traffic patterns should be established whenever possible. **Amphibian vehicle landing sites** should be located on one flank of the beach. Class V landing sites and dumps should be located on the opposite flank. Landward water systems, amphibious assault, and inland distribution petroleum fuel systems, including connecting lines, must be considered when preparing for beach transfer and clearance operations. Chapter XI, "Liquid Cargo Offshore Operations," details liquid cargo operations. See Figure IX-1 for general beach area organization and review, and Chapter IV, "Facility Installations and Preparations," for dispersion of facilities.

b. **Marshalling Area. A large inland staging area** is one key to continuous throughput. Distance from the beach and road

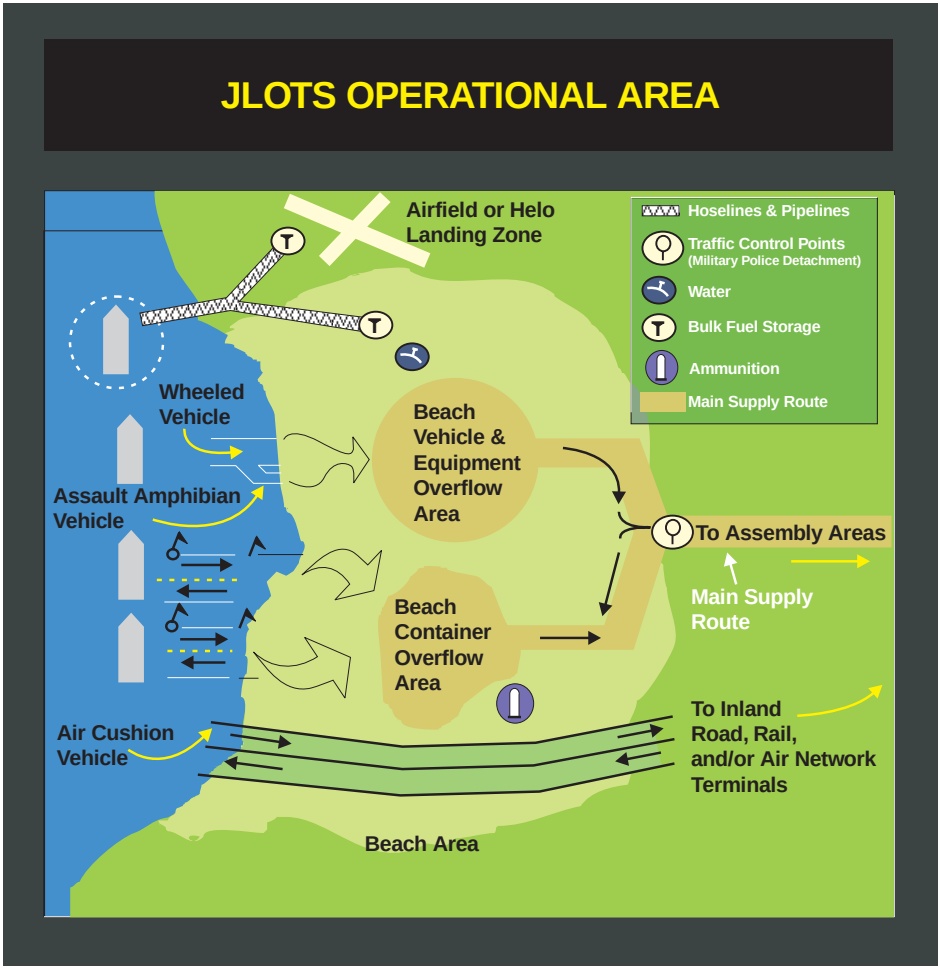


Figure IX-1. JLOTS Operational Area

network, drainage, and soil conditions should be considered in the selection area. Engineers should evaluate soil and weather conditions to determine requirements for soil stabilization. The staging or marshalling area is operated by a **BCU** and is organized into holding areas and loading areas. The **loading areas** are located near beach and staging and/or marshalling area exits to load and document cargo for transportation inland to the operational area. The **holding areas** are used to stage containers, vehicles, and equipment pending transportation to dumps or issue points. Additionally, a holding area is established for empty containers awaiting retrograde. If the road network and traffic flow permit and the staging area is large enough, the holding areas for containers and vehicles or equipment may also be used as holding points. Containers, vehicles, and equipment moving off the beaches to the staging or marshalling area are identified and documented by the documentation detachment and clearance unit. Each load is then directed to a proper holding or loading area.

c. **Beach and Port Operational Organizations.** Operational units to conduct **beach and port transfer and clearance operations** are specified in the JLOTS commander's OPORD. Although the Army,

Navy, and Marine Corps have organizational differences, their beach and port operations responsibilities are similar and are discussed below.

- **Beach Operations and Control Organizations.** In a JLOTS operation, the **BCUs** are normally task-organized around an Army terminal service company from a terminal service battalion, Navy beachmaster unit (BMU), or from a Marine Corps landing support company from a landing support battalion. The beach area is controlled by either **Marine Corps landing support personnel** or an **Army transportation terminal battalion**. For smaller JLOTS operations, a BCU could be task-organized around a platoon from one of the previously mentioned elements. The **beach landing sites and/or transfer points** are controlled by a Navy BMU or an Army BLCP established to direct lighters to specific transfer points. **Beach and amphibian transfer points** (i.e., ELCAS, causeway piers, bare beach sites, ADSs) have a designated officer in charge (OIC) or noncommissioned officer in charge of each site when the vehicle arrives at that site. Cargo movements between transfer sites and the staging areas or marshalling yard are controlled by the **BCU commander**. A notional beach layout is shown in Figure IX-2. Typical functional responsibilities for BCUs are depicted in Figure IX-3. The areas depicted in the figure are not all-inclusive, but give the planner a basic idea of those responsibilities with which a BCU commander must be concerned. **Responsibilities of a task-organized BCU commander** include, but are not limited to, the following.

  •• Providing the beach area necessary **C2** to coordinate cargo transfer and clearance.

  •• Organizing and developing the **beach area** as necessary to **support throughput**, to include designation and establishment of overflow areas.

  •• Coordinating the **locations** of the initial bulk fluid (water and fuel) transfer points.

  •• Unloading **lighterage** at the beach and establishing **beach and staging and/or marshalling area** near inland road networks.

  •• Providing **direction for drivers** to move vehicles from the lighterage.

  •• Coordinating **local security**.

  •• Providing beach clearance **vehicle assignment** to transfer points.

  •• Preparing to continue beach operations for **continuous resupply**.

  •• Accomplishing required **cargo documentation**.

  •• Coordinating required **medical support**.

  •• Coordinating required **vehicle**, **beach**, **channel**, and **road maintenance**.

3. Port Operations

JLOTS operations, as noted in Chapter I, "An Overview of Logistics Over-the-Shore Operations," **may be conducted in fixed-ports**. This section deals with those operations. The port operations organization is responsible for the port facilities and the throughput of supplies and equipment as they are off-loaded from the ships. The port operations organization operates under the overall direction of the JLOTS commander in coordination with the ship's lighterage control point (LCP) or debarkation officer. A

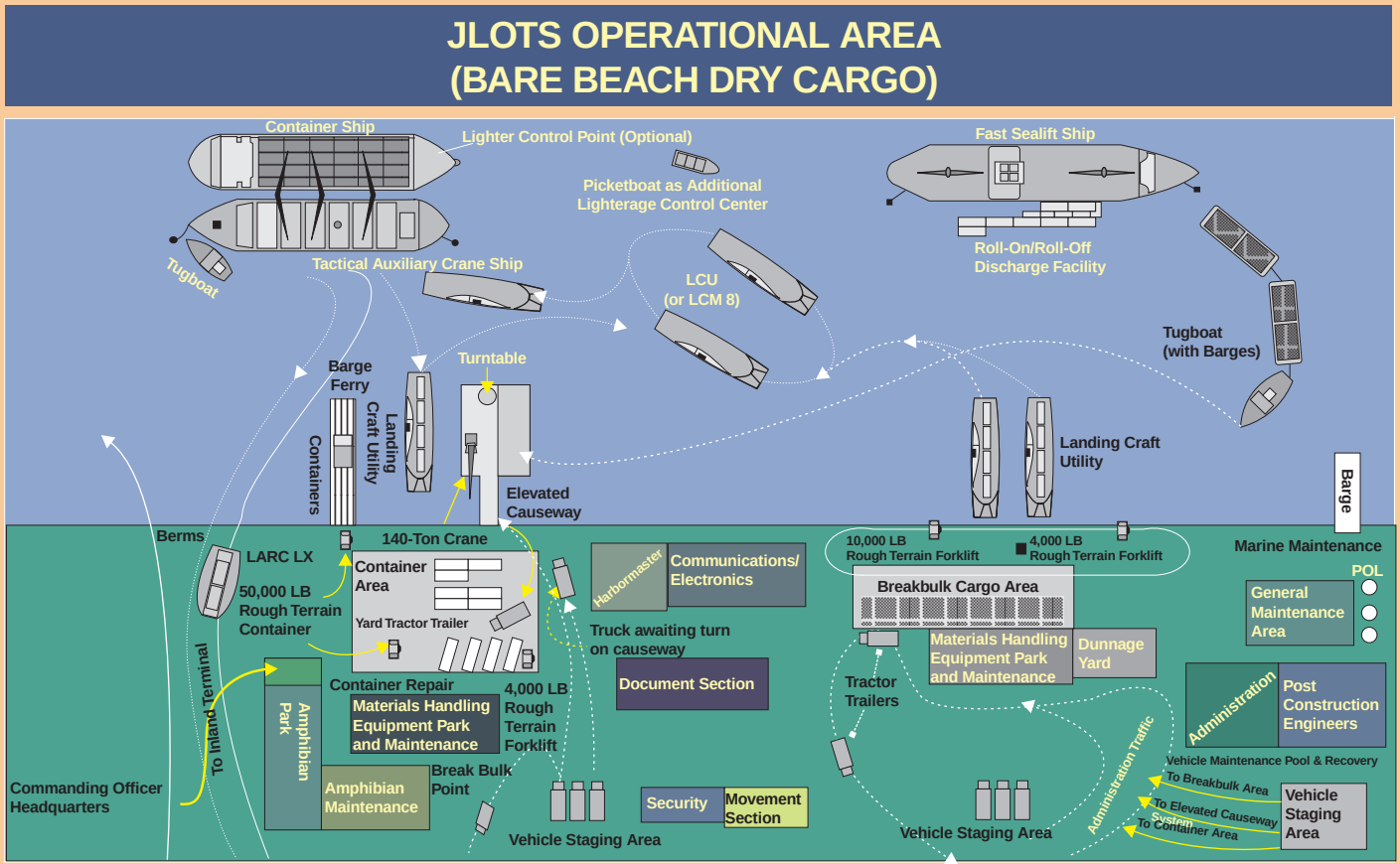


Figure IX-2. JLOTS Operational Area (Bare Beach Dry Cargo)

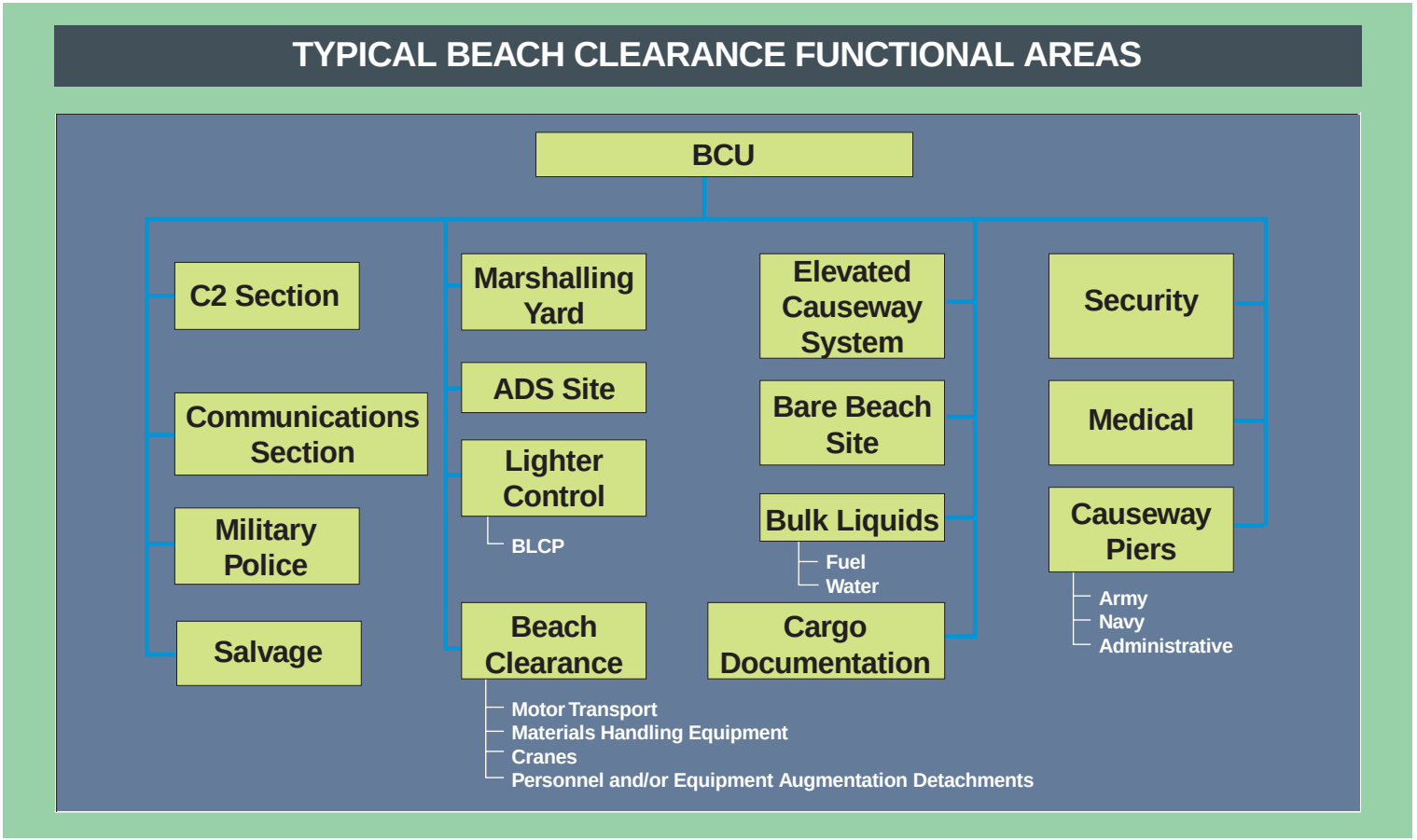


Figure IX-3. Typical Beach Clearance Functional Areas

typical port operation is shown in Figure IX-4. Specifically, the **port operations organization** is responsible for the following tasks.

a. Establishing **overflow areas** for supplies and equipment.

b. Clearing **piers and overflow areas** of material.

c. Establishing a **port operations command post** and communications with the JLOTS commander and ship's LCP or debarkation officer.

d. Establishing **liaison** with **host-nation port authorities** for employment of cargo and MHE, operations and longshoremen support, drayage, and dunnage.

e. Operating **cargo and MHE**, including shore-based cranes, forklifts, tractors, dollies, lighting, and other cargo and equipment.

f. Assisting cargo-handling units in **ship off-load**, as directed, and transporting cargo to overflow areas as necessary.

g. Providing **direction to drivers** detailed to move vehicles from the port to staging and/or marshalling areas.

h. Providing **local security** assisted by supported force augmentation.

i. Providing command support for the **port operations organization** (billeting, messing, administration, and other command support).

j. Establishing **bulk fuel** or **water reception and transfer facilities** using local facilities.

k. Preparing to **continue port operations** under joint Service operations.

l. Establishing **ACV routes** to air, rail, or road networks.

4. Marshalling Area Operations and Control

Cargo will be turned over to the separate Service organizations in the marshalling area and prepared for onward movement in accordance with established Service procedures.

a. **Control Operations.** The marshalling area will be controlled by the **Marine Corps CSS element or Army terminal transfer company personnel** who are responsible for the following marshalling area functions.

- **Offering containers** to the movement control agency for assignment to clearance mode.
- **Transferring containers** from amphibians or from intra-terminal vehicles to clearance mode.
- **Marshalling other containers** by destination, forwarding mode, priority, and commodity.
- **Recording receipt**, condition, and location of container.
- **Maintaining current container inventory** using automated or manual techniques.
- **Loading containers** onto chassis or transporter for movement to destination or to railhead, airhead, or inland waterway terminal.
- **Accomplishing necessary documentation** for accounting and onward movement.

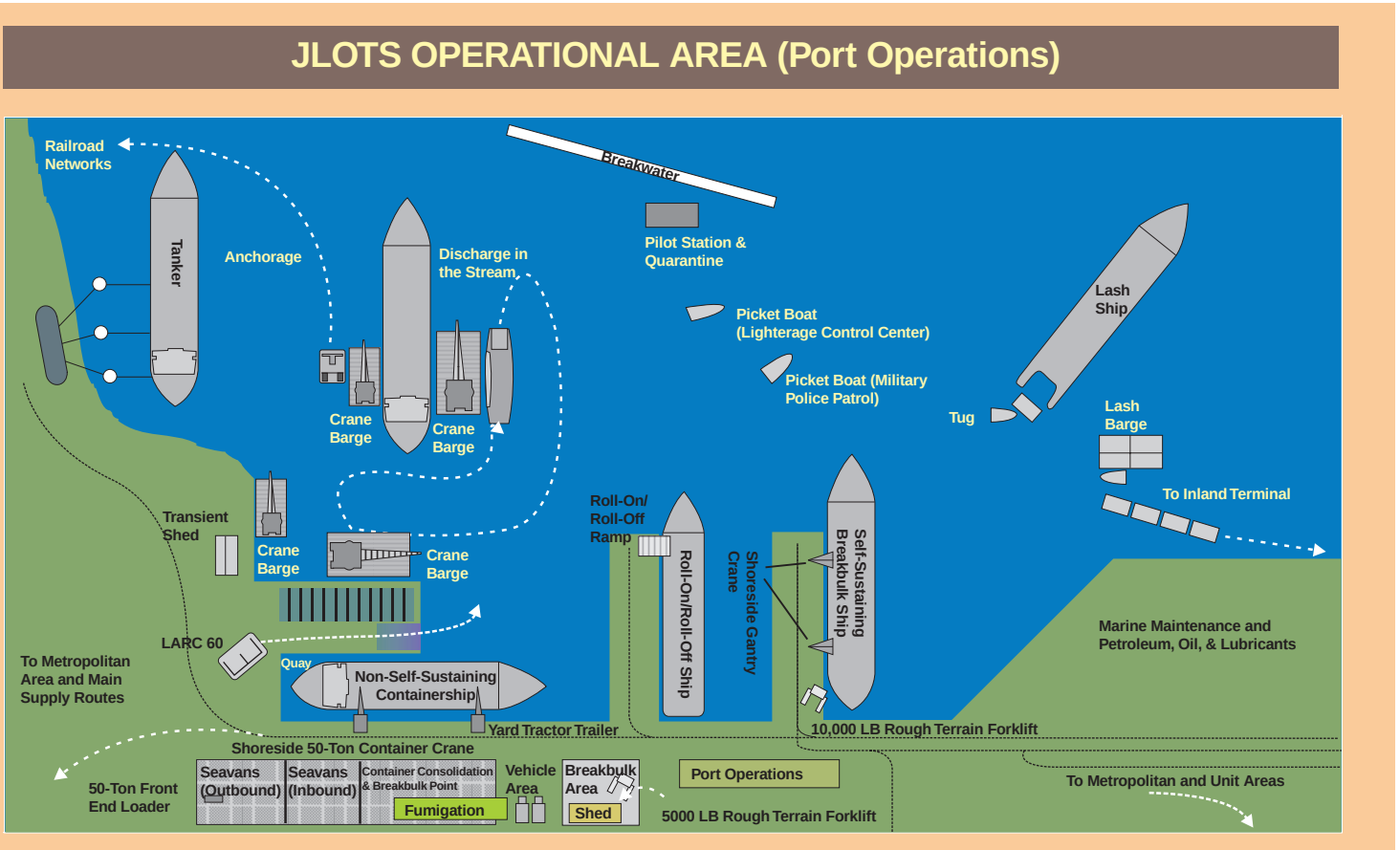


Figure IX-4. JLOTS Operational Area (Port Operations)

- **Carrying out limited maintenance, repair, servicing, and inspection** of containers.
- **Stuffing and unstuffing** containers.
- **Retrograding** of containers.

b. **Equipment. RTCHs** and **LACHs** are most commonly used at the beach discharge point and the marshalling area. **They are used to move containers** from crane side or causeway ferries to waiting clearance trailers or to relocate containers within the marshalling area. At the amphibian discharge site, cranes will remove containers from the amphibians and place them directly onto waiting vehicles. Where this is not possible or to speed operations, an RTCH may be used to lift the containers from crane side onto the vehicles. RTCHs are used at the container marshalling area to place containers on clearance vehicles. Some containers are removed from the JLOTS site or from yard tractor-trailers to the marshalling area for temporary storage.

c. **Breakbulk and Vehicle Operations. A marshalling area for temporary storage of breakbulk and vehicles is also designated.** Such cargoes or vehicles arriving at the marshalling area from the discharge point are met by cognizant marshalling area representatives who direct them to storage locations. For cargo clearance, the procedure is reversed. Clearance will be coordinated by the supported force's movements section and clearance vehicles will be controlled by the mode operators.

5. Equipment

The RTCC and the RTCH are two systems that provide beach clearance and marshalling yard units with excellent container handling capabilities. Both systems are capable of lifting and transferring 20-, 35-, and 40-foot ISO containers. The RTCH's four-wheel drive and capability to ford up to 5 feet of salt water make it well-suited for removing containers from both single- and double-wide causeway ferries and LSVs. While the RTCC has an RT capability, it is best used in fixed-position situations that are more often found in the staging or marshalling areas. The RTCC can reach and lift a 20-foot container at a 27-foot boom radius and a 40-foot container at a boom radius of 22 feet. Small RT forklifts are used effectively at the beach when transferring breakbulk or palletized cargo from lighters moored to floating causeway piers or beached ("feet dry") at the bare beach sites.

CHAPTER X
CARGO CONTROL AND DOCUMENTATION

"It is very necessary to attend to all this detail and to trace a biscuit from Lisbon into a man's mouth on the frontier and to provide for its removal from place to place by land or by water, or no military operations can be carried out."

The Duke of Wellington, 1811

1. Overview

The Department of Defense uses DOD 4500.32-R, "Military Standard Transportation and Movement Procedures (MILSTAMP)," to provide specific guidance for documenting cargo movements. This chapter provides information on **specific Service cargo control and documentation systems** that are used to receive and process military standard transportation and movement procedures (MILSTAMP) data in a JLOTS operation such as the MAGTF Logistics Automated Information Systems, and Worldwide Port System (WPS). Additionally, information is provided on the introduction of automated data capture methods in JLOTS by the logistics applications of automated marking and reading symbols (LOGMARS) technology.

2. Military Traffic Management Command

MTMC will provide expertise to the JLOTS commander on cargo control and documentation matters including manifest, cargo traffic messages, and stow plan information. MTMC is also responsible for documenting the receipt and/or movement of cargo using the WPS and other theater water terminal transportation and/or logistics automated data processing (ADP) systems. MTMC will coordinate theater required ship loading requirements with appropriate SPOEs and will workload the seaport of debarkation (SPOD) port operator based on the CINC's priorities and guidance as relayed by the JLOTS commander.

3. MILSTAMP

See Figure X-1.

The following outlines the **cargo control and documentation standards of MILSTAMP.**

a. **MILSTAMP serves primarily to outline the documentation used** in accounting for the condition and controlling the movement of cargo. It prescribes the standard data elements, codes, formats, forms documents, rules, methods, and procedures for the transportation of material.

b. The **four most important MILSTAMP documents** used in JLOTS and other beach operations are the **stowage plan**, **ocean cargo manifest** (a "ship's manifest," DD Form 1385), **transportation control and movement document** (TCMD), (DD Form 1384), and **shipping labels** (DD Form 1387). Each piece of cargo has the latter shipping label that indicates the lot of cargo, or shipment unit, of which it is a part of the TCMD. Other information about these documents follows.

- **Transportation Control and Movement Document.** A TCMD is prepared for each shipment unit, as

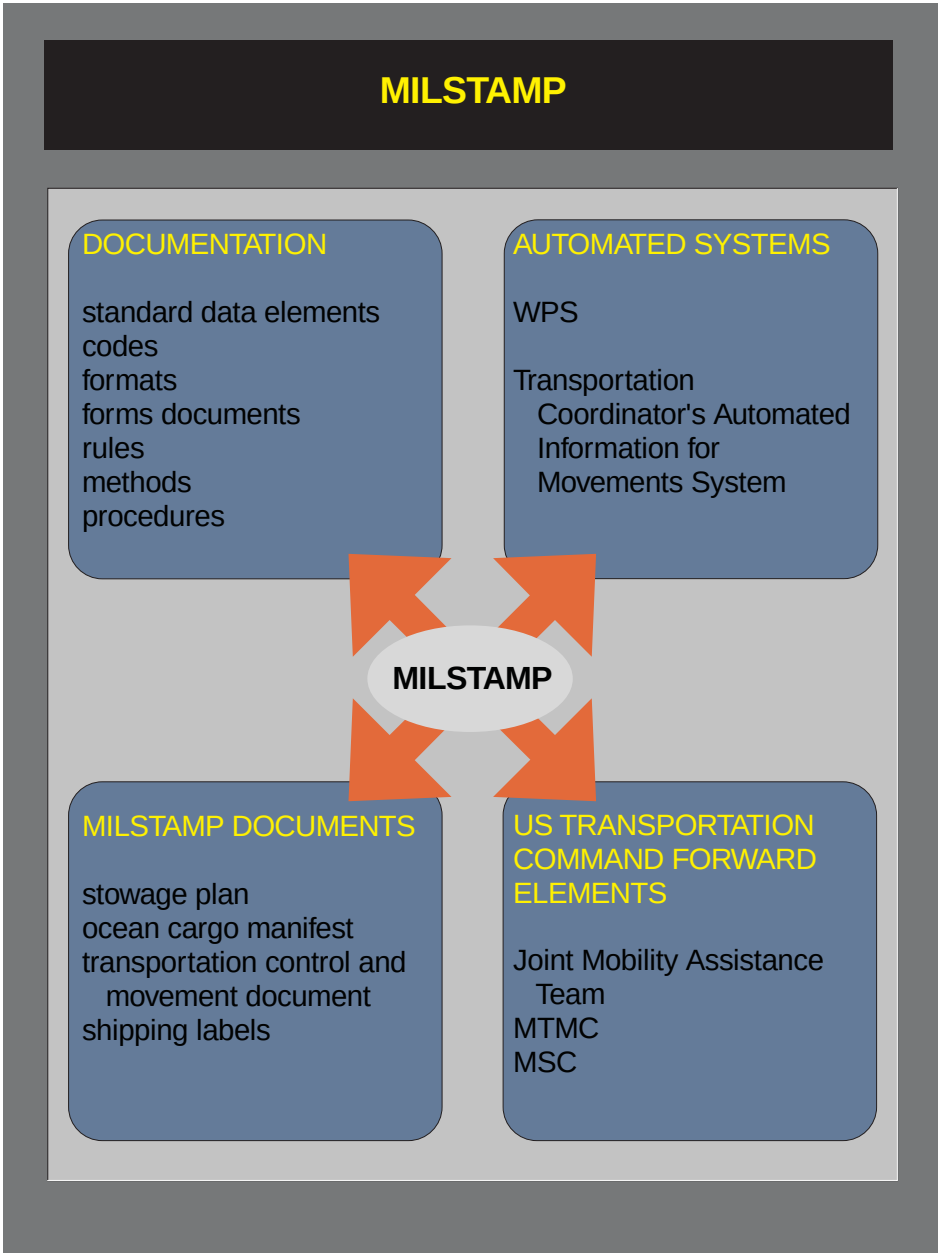


Figure X-1. MILSTAMP

defined in MILSTAMP. The shipment unit can be one or more pieces of cargo. **The TCMD provides information** required to physically handle the cargo, its routing, priority, and destination. In addition to providing this information, the TCMD serves as a receipt for the cargo and its condition as it is moved through the transportation system.

- **Ocean Cargo Manifest.** Ocean cargo manifests are made for each port of call

on a ship's voyage. **Hazardous cargo is described** in a separate section of each manifest and must be certified as prescribed in MILSTAMP. These manifests provide information on the vessel and all cargo destined for a given port of call. **Information on the vessel** includes its type, charter, estimated time of arrival, and self-sustaining characteristics. The stowage location and reprint of all information on the TCMD is given for all cargo to be discharged at the port. The ocean cargo manifest (formatted in accordance with MILSTAMP) must be **transmitted electronically** to the JLOTS commander for entry into the automated cargo documentation system. Additionally, the cargo ship should receive, from the SPOE, a copy of the ocean cargo manifest data base on computer magnetic media (floppy disc) and/or a hard copy of the manifest prior to departure. JLOTS documentation personnel at the SPOD can use the ship's manifest to aid in verifying, if required, their own manifest that was electronically transmitted.

- **Ship Cargo Stowage Plan.** A stowage plan is a **diagram of a ship** on which is overlaid the location of all cargo stowed aboard the vessel. The stowage plan is part of the Integrated Computerized Deployment System which supports administrative, tactical, and pre-position load planning for breakbulk, container, RO/RO, and fast sealift ships operations.

- In a JLOTS operation, the stowage plan and ocean cargo manifest are used for **overall operational planning**. The shipping labels, TCMDs, and stowage plan are used to **identify and track the individual pieces of cargo** moving through the operation. Documentation team members with portable bar code recorders (PBCRs) should be located on the ships in order to expedite cargo reading and have communications with the documentation OIC ashore to provide pertinent information.

4. Worldwide Port System

a. WPS is an MTMC automated information system developed to support water terminal operations during wartime and peacetime. The major water terminals supported are common-user water terminals in a theater of operations and water terminal units designated to support US Army contingency missions.

b. WPS is a menu-driven computerized system that consists of a thin-wire local area network composed of microcomputer workstations, data base file servers, multiple high-speed and specialty printers, and other peripherals. It **supports the needs of the JLOTS commander** by satisfying the cargo accounting, documentation, manifesting requirements, and related functions of a water terminal while concurrently meeting the requirements of DOD Regulation 4500.32-R "(MILSTAMP)." WPS incorporates the use of PBCRs to further automate data capture in the water terminal environment.

c. **PBCRs are used** to electronically read and temporarily store data contained in bar code labels that are attached to the cargo. The bar code labels contain the coded transportation control number plus clear descriptive data for ease of matching labels and equipment. This information is stored in the PBCR's memory and then down-loaded directly to the WPS at designated intervals or as the PBCR's memory is full. Once data is resident in the WPS, reports can then be produced as required by the JLOTS commander.

5. Transportation Coordinator's Automated Information for Movements System

a. **Transportation Coordinator's Automated Information for Movement System (TC-AIMS) is a microcomputer data base program** which allows transportation personnel to provide accurate and timely movement data to the Defense Transportation System. It is the first subsystem of the Marine Corps' cargo documentation system. This subsystem provides the JLOTS commander with an automated capability to **plan**, **coordinate**, **manage**, and **execute movements of cargo** from a SPOE and from the SPOD to the final destination. TC-AIMS allows transportation planners to manage the requests, taskings, and assets associated with daily transportation operations at all levels of command via the MAGTF Deployment System II (MDSS II). The Marine Corps interfaces with MILSTAMP and MTMC's WPS through TC-AIMS.

b. **MDSS II is a data base management and operational logistics planning tool.** MDSS II provides units the ability to accurately track, report, and account for their equipment, supplies, and personnel. At the time of operation execution, the system provides real-time retrieval of detailed information for export to other systems such as TC-AIMS, the computer-aided embarkation management system, and the computer-aided load manifesting system. **MDSS II provides the MPF community with a variety of tools** to assist in planning and tracking pre-positioned equipment and supplies.

c. **MDSS II utilizes the LOGMARS technology to collect inventory and update a unit's equipment and supplies data base.** This data is temporarily stored in the memory of the data collection device (DCD) and then downloaded directly to the MDSS II host computer. It also has the capability to update cargo data base information by downloading from DCDs via wireless modem, thereby providing immediate information to MDSS II.

6. Transition

Each JLOTS-supported Service will use its own cargo documentation and accountability systems until the JLOTS commander shifts to a single system.

7. USTRANSCOM Forward Elements

USTRANSCOM may place elements from its transportation component commands in a theater to provide management of strategic mobility operations into and out of the theater.

a. **Joint Mobility Assistance Team (JMAT).** A JMAT is a USTRANSCOM system of people, procedures, and ADP equipment that provides **dedicated transportation expertise** and **C2 and/or in-transit visibility information** to the JFC. JMATs are designed to provide a framework for integrating existing transportation data to the maximum extent possible for the JFC.

b. **Military Traffic Management Command.** USTRANSCOM provides SPM for seaports through its Transportation Component Command (TCC) MTMC. MTMC performs those functions necessary to support the strategic flow of forces, equipment and sustainment during deployment and redeployment through SPOEs and SPODs. MTMC is also responsible for providing strategic deployment status information to the CINC and to workload the SPOD port operator based on the CINC's priorities and guidance

provided by the JLOTS commander. Geographic CINCs may designate many elements to be the port operator or entry into a CAA with USTRANSCOM to allow MTMC to operate some or all water terminals including JLOTS sites. The specific roles and functions of the port manager are summarized in Appendix M, "Unit Capabilities."

c. **Military Sealift Command.** MSC usually establishes Military Sealift Command Offices (MSCOs) at theater port facilities, as directed by USCINCTRANS. Each MSCO is responsible for **coordinating the arrival and loading or discharge and departure of ships** under the OPCON of MSC.

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CHAPTER XI
LIQUID CARGO OFFSHORE OPERATIONS

"Excuses for failure attributed to shortness of fuel will be closely scrutinized; and justly."

Mahan
Naval Strategy, 1911

1. Overview

Liquid cargo operations may be viewed in three distinct increments.

a. **Ocean transport** of liquid cargo from origin to offshore locations in the AOR.

b. **Cargo transfer operations** from offshore to the high water mark.

c. **Beach storage and/or distribution** area operations.

2. JLOTS Commander's Responsibility

The JLOTS commander is responsible for offshore bulk fuel system operation, beginning with the reception of OBFS or OPDS vessels and extending to the installation and operation of OBFS to their termination point on the beach. For OPDS, the termination point is the beach termination unit (BTU) that interfaces with the Army inland petroleum distribution system and the Marine Corps AAFS. Military units operating these systems may or may not be under TACON of the JLOTS commander, depending on C2 arrangements identified in the JFC's JLOTS directive. In any case, **close coordination is required between the JLOTS commander and the Army, Navy, and Marine Corps units** to ensure continuity of liquid cargo operations. The organization for conducting bulk fuel operations during JLOTS is shown in Figure XI-1.

3. Ocean Transport Arrival

a. **Arrival.** Ship arrival information is the same as that in Chapter V, "Ocean Transport," on dry cargo ship arrival.

b. **Assigning Anchorages. Some of the factors** in assigning tanker anchorages is the **length of the discharge system to be used**, **the tanker draft**, and **the water depth**. Initial anchorage assignments for tankers should be made before a tanker's arrival in the off-load area. The assigned off-load control authority is responsible for assigning anchorages.

4. Cargo Transfer Operations

This section describes the AABFS, OPDS, and Army IPDS fuel system operations. **The initial system for transferring fuel from points offshore to reception areas on the beach is called the OBFS and consists of two subsystems: AABFS and OPDS.** Army's IPDS will be added to the BTU to increase reception, storage, and distribution of fuel in JLOTS operations. System capabilities, components, limitations, and organization and responsibilities for installation and operation are discussed in the following paragraphs.

a. **Amphibious Assault Bulk Fuel System. The bulk fuel discharge system now used to support Marine Corps amphibious assaults and MPF operations is the AABFS.** It consists of 5,000 or 10,000 feet of buoyant 6-inch hose deployed from each MPS in MPF operations. **The AABFS is an**

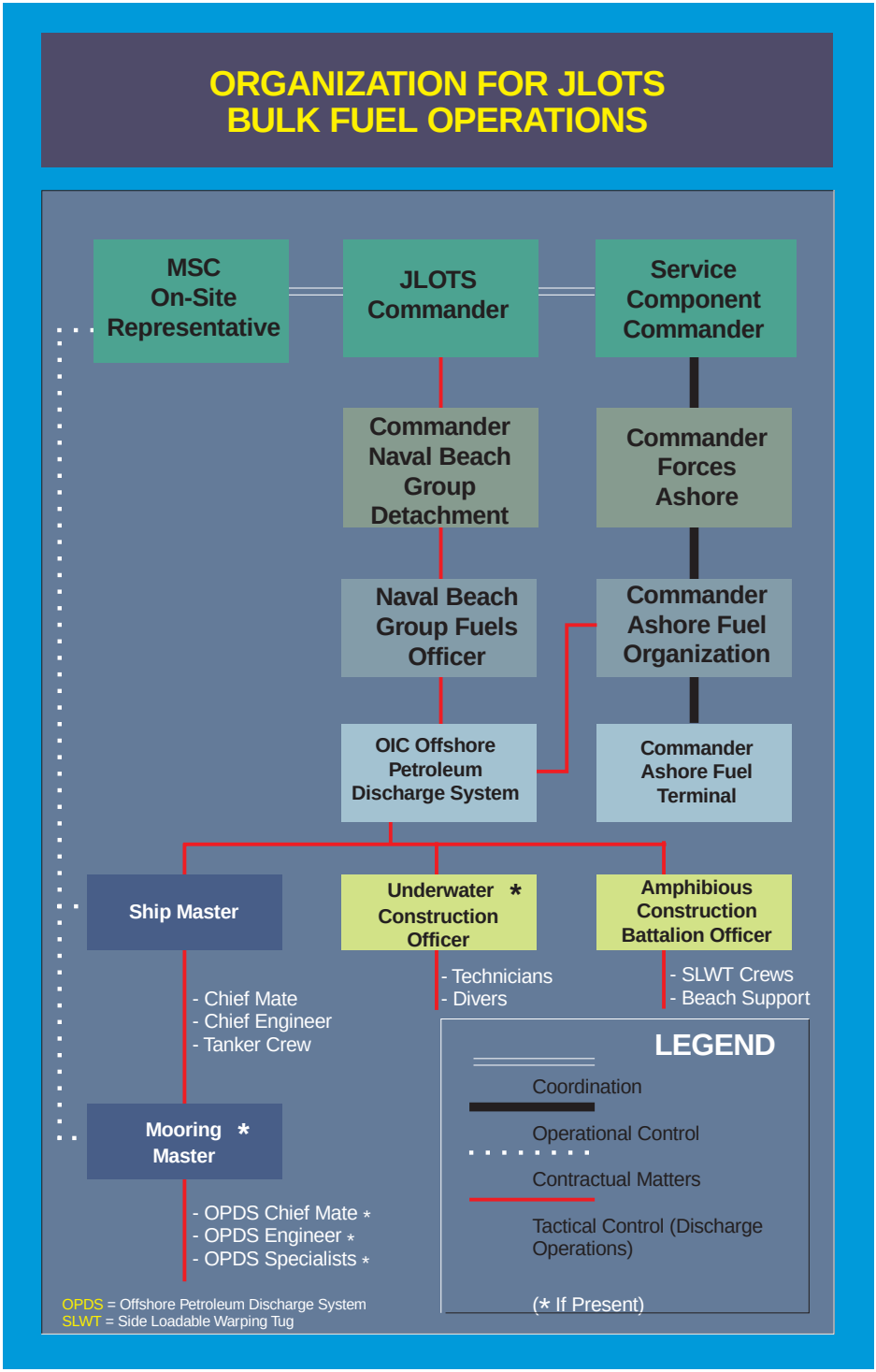


Figure XI-1. Organization for JLOTS Bulk Fuel Operations

integral part of the MPS bulk fuel transfer systems and is designed to provide the initial means of transferring those ships' fuel cargo ashore. The system has a 600 gallons per minute (GPM) capacity. Although rapidly installable, the system has a limited life expectancy because it floats on the surf. For sustained operations, a more permanent system must be installed to meet continuing demands of a large force. Operation of the AABFS is the responsibility of the PHIBCB. Operation is limited to sea state 3.

b. **Offshore Petroleum Discharge System.** The OPDS was designed to provide the Service components in an operational area with large volumes of refined petroleum products over a sustained period. The OPDS consists of two major components; a specially configured product tanker and a mobile tanker terminal, as shown in Figure XI-2. There are five OPDS tankers, of which two are normally forward-deployed. The other three are in the RRF in various conditions of readiness. Each OPDS tanker carries one complete tanker terminal, including outfitting for SLWTs to deploy it. Two of the tankers, Chesapeake and Petersburg, also have a 59 LT capacity crane to load/off-load five OPDS Utility Boats (OUBs) carried on board. The OUBs are fully outfitted and configured to perform all SLWT functions, and provide these tankers with full capability for OPDS deployment.

- In addition to the tanker terminal components carried on board, each specially configured OPDS tanker carries the following.

  •• Eight hydraulically powered storage reels, each of which carries one-half nautical mile of 6-inch internal diameter steel reinforced elostomeric conduit.

  •• Powered storage reels for other terminal hoses and for their repair.

  •• Skid beams to transport, launch, and recover the 800-ton SALM. Each beam has its own hydraulically powered linear puller and control system.

  •• One hydraulic power unit for OPDS equipment and special air compressors.

  •• Two high pressure cargo pumps, each capable of delivering 500 GPM at 740 pounds per square inch (psi) at the tanker rail.

  •• Two mooring-towing winches aft for use in placing the ship in a four-point spread mooring.

  •• Ancillary equipment such as conduit clamps, overboard chutes, tuggers, and storage racks for SLWT and/or terminal equipment and spares.

  •• For two of the tankers, a crane and stowage cradles for five OUBs (modified LCM-6s).

- The mobile tanker terminal consists of the following subassemblies.

  •• Four nautical miles (24,320 feet) of conduit. The conduit floats when air filled, and sinks when filled with refined product or water.

  •• A SALM type of SPM complete with floodable base, mooring buoys, and hoses to connect it to the rest of the terminal. The SALM product swivel permits pumping two products simultaneously from a tanker that may be rotating around the swivel because of currents and winds.

  •• Two BTUs which anchor the beach end of the conduit, control downstream pressure, and purge the conduits.

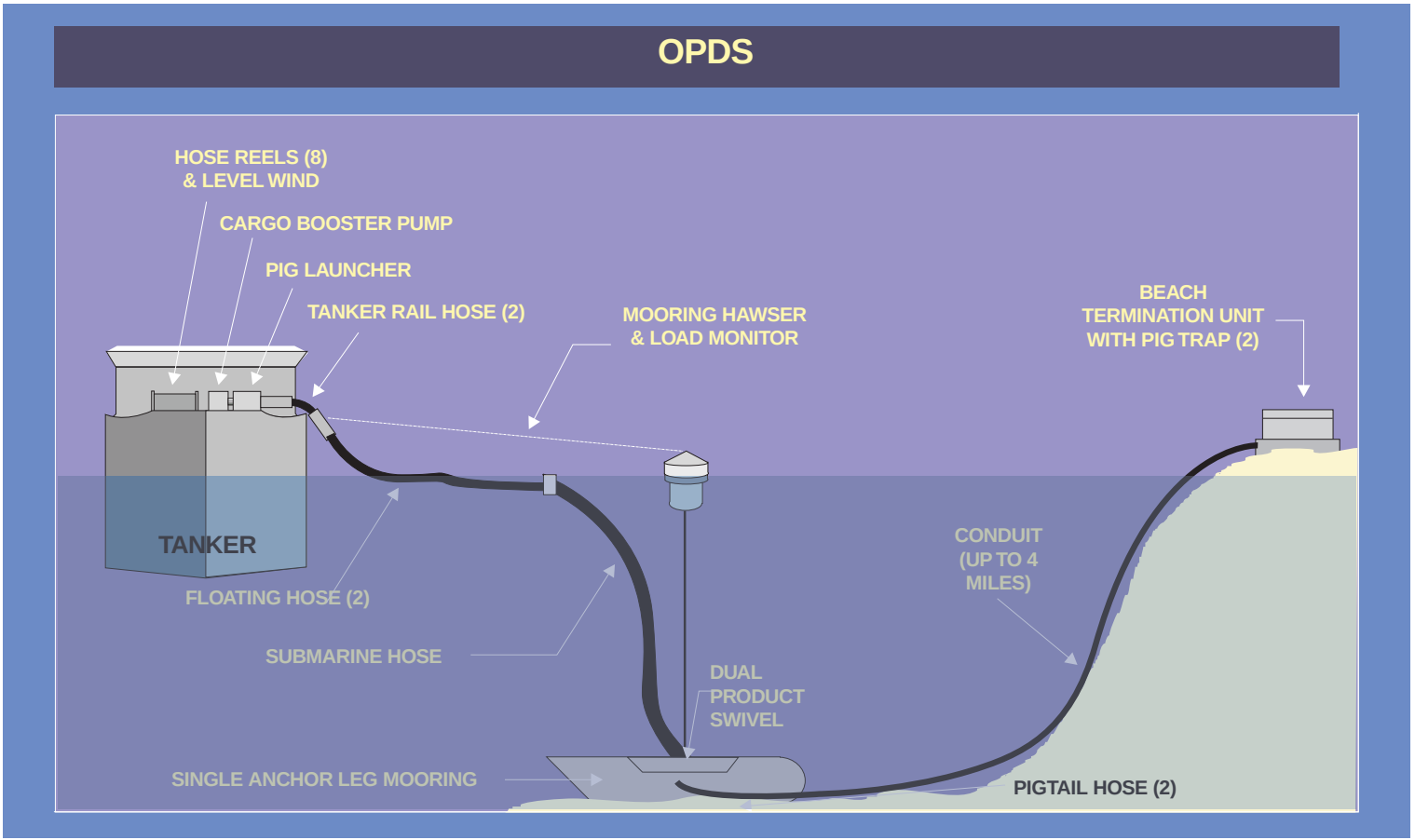


Figure XI-2. OPDS

•• Details of OPDS tankers and tanker terminals are found in a series of eleven manuals listed in Appendix O, "Reference."

c. **OPDS Capabilities and Parameters**

- Deliver 1.2 million gallons (28,600 barrels) at 1000 GPM of refined product per 20-hour day from a tanker up to 4 miles offshore through one flow line, or two products simultaneously if within 2 miles of the beach. The remaining 4 hours are for maintenance.

- Operate for at least 180 days with replenishment from supply tankers.

- Operate in sea state 5, survive in sea state 7, and remain on station in winds of 55 knots and current under 4 knots. A tensiometer on the mooring hawser will alert the ships Master to excessive loads.

- Be installable in all bottom types except rock and hard coral in water depths from 35-190 feet (250 feet maximum for conduit).

- The terminal (SPM) components are common, and may be used by any OPDS tanker with only 4 hours for tanker changeout.

- The tanker can recover and backload the terminal and transport it to another location at best tanker speed.

d. **OPDS Procedures, Organization, and Responsibilities.** The deployment, operation, and maintenance of OPDS involves both military and civilian organizations, but may be best understood if divided into tanker operations and terminal operations. The tanker operations are conducted by the tanker Master, who retains responsibility for the safety of the ship and all onboard equipment operations. The tanker terminal operations, including deployment, maintenance, and recovery, are the responsibility of the naval beach group (NBG), which usually delegates these tasks to the PHIBCBs and underwater construction teams (UCTs). The PHIBCBs control and operate OPDS support vessels, the UCT divers, and beach elements of the PHIBCBs. A specially trained PHIBCB OIC is designated to coordinate operations between the tanker, various beach group elements, and supported forces ashore which receive the fuel.

A minimum of three SLWTs or OUBs configured as towing tugs, and one additional SLWT or OUB configured as a lay-repair barge, are used to install the tanker terminal. The sequence of installation may be modified somewhat to take advantage of differences in physical environment and the need for initial operating capability. A fifth support vessel, an OUB or other lighterage, is outfitted as a dive boat to support diving operations. The outfitting gear for SLWTs, which is normally carried on the tanker, must be installed in the objective area after tanker arrival. This effort and delay does not occur with pre-outfitted OUBs. The support vessels (SLWTs or OUBs) assist the tanker in moving to a spread mooring for conduit deployment, and then deploy the conduit and BTUs to give a capability to pump ashore within 48 hours of tanker arrival. The spread mooring is an expedient to meet the required deployment schedule, and is not an all weather mooring. Immediately after pumping begins, the support vessels deploy the SALM to permit all weather pumping through the SPM within 7 days of tanker arrival. In the event that the 48 hour pumping requirement is waived, all weather pumping through the SPM may be started 4 to 5 days after tanker arrival.

e. **OPDS Manpower Requirements. Overall personnel requirements** for OPDS installation and retrieval include the **tanker crew**, **OPDS specialists**, **divers**, and **SLWT crews**. Military personnel are provided to the

supported JFC from the supporting PHIBCB and UCT. **Installation of OPDS is very labor-intensive**, requiring a major portion of abundant PHIBCB personnel and equipment assets. The JLOTS commander must be aware that these assets will not be available for other JLOTS operations while OPDS is being installed.

- **Civilian Personnel.** The tanker master may be assisted by a team of OPDS specialists as shown in Figure XI-1. These may consist of technical representatives and program management personnel.

- **Military Personnel.** The Navy component commander will provide personnel from the support PHIBCB and UCT. The JLOTS commander provides an OPDS OIC who directs all OPDS installation. The JLOTS commander must also provide sufficient divers and SLWT crews for installation and recovery of the pipeline and SALM. Additional personnel may also be required for beach support.

f. **Petroleum Systems Interfacing.** The **Navy component** has the responsibility for installation of the **bulk fuel system to the beach termination unit; Marine Corps and/or Army forces** have the responsibility for installation of the **terminal and distribution system inland**. It is likely that a Marine Corps AABFS will be installed in conjunction with the amphibious operations. Initially, interfacing with the Navy AABFS, the Marine Corps IPDS consists of bag storage assemblies and associated hoses. As theater operations mature and distribution requirements become more widespread, the Army IPDS will normally be installed to provide necessary theater-wide fuel support. An Army component element, either the petroleum and water group or the petroleum operating battalion supervises the installation of IPDS by a petroleum pipeline and terminal operating company on the inland side of the OPDS BTU and the Army's TPT beach interface unit. If required, the OPDS tanker can provide afloat storage until the Army IPDS is fully developed. It also provides reserve storage to augment Marine Corps and Army IPDS storage when filled to capacity and provides a surge capability, if required. During offshore and onshore installations, **coordination between the Service components must be continuous** to ensure logical timing of installations and proper location of the interfacing equipment at the beach.

g. **Marine Corps Fuel Systems. The Marine Corps AABFS is normally employed to receive bulk fuel over the beach for storage and use ashore** in support of the Marine Corps amphibious assault and MPF operations. The major components of the AABFS are: one beach unloading assembly, two booster pump assemblies, five tank farm assemblies (120,000-gallon capacity each), and dispensing assemblies. AABFS is capable of receiving fuel from ship-to-shore at a rate of 1,250 GPM and delivering bulk fuel by hose for a distance of 3 miles over relatively level ground. The system is installed and operated by the Bulk Fuel Company, Engineer Support Battalion of the force service support group (FSSG).

h. **Army Fuel Systems. The Army fuel system used in association with JLOTS operations is the IPDS.** The senior Army petroleum element is responsible for, and will coordinate with, the Navy petroleum element. This **joint Army-Navy coordination** will establish offshore discharge operation and inland petroleum distribution interface details on day-to-day procedures, fuel delivery schedules, quality surveillance, and custody transfer requirements for the actual bulk petroleum transferred to the pipeline and terminal operating company at the base terminal of the IPDS. IPDS consists of three components: the tactical petroleum terminal

or fuel unit; mainline pumping station; and pipeline. IPDS is maintained as operational project stocks (not unit equipment) stored in 20-foot ISO containers.

i. **Tactical Petroleum Terminal Fuel Unit. TPT is a bulk petroleum storage system.** It serves as a storage terminal in an undeveloped theater. It can be used in the developed theater to supplement existing terminals that are inadequate or damaged. The system can receive fuels at rates up to 800 GPM and has a 3.78 million gallon storage capacity. **The major components of the TPT are as follows.**

- Eighteen bulk fuel tank assemblies, each with a capacity of 5,000 barrels (210,000 gallons). To provide more flexibility, the TPT has been configured into three fuel units, each consisting of six bulk fuel tank assemblies and assorted hardware. Each occupies approximately 15 acres when emplaced.
- Fifteen trailer-mounted 600-GPM pumps.
- Beach interface unit.
- Fire suppression system.
- Associated valves, manifolding, and 42,000 feet of hoseline to connect the terminal for efficient fuel movement into and out of the terminal.

The TPT requires nearly 40 acres of unobstructed land for installation and operation.

j. The fuel from the base terminal (TPT or fuel unit) is carried inland via coupled aluminum pipeline as far forward as the corps rear area with spurs to high-volume customers such as airbases. The pipeline consists of 19-foot sections with an inside diameter of 6 inches and is configured into 5-mile sets with supporting valves, fittings, and gap crossing equipment. The fuel is moved to intermediate or head terminals by the mainline pumping station, each consisting of two 800 GPM pumps operating in parallel (one on stand-by) at 740 psi.

k. **Liquid Cargo Barges.** To supplement the above capabilities, the Army and Navy can arrange for liquid cargo barges to be available for **moving bulk petroleum products from ship-to- shore**. These barges can be used to (1) remove fuel from a ship when it is too heavily loaded to permit movement to the mooring because of draft limitations; (2) move fuel to the shore to supplement OPDS movements; or (3) move fuel from the tanker for delivery using inland waterways.

5. Tactical Water Systems

Certain scenarios, particularly arid environment operations, may require the delivery of bulk potable water to storage and distribution systems ashore. The **water-on-shore storage and distribution systems** will consist of at least one 800,000-gallon system (or appropriate segment) operated by a quartermaster (QM) water supply company (TOE 10-468L). Water can then be moved away from the beach with a Tactical Water Distribution System (TWDS) (TOE 10-470LG) and/or semitrailer-mounted fabric tanks (TOE 55-018) (See Figure XI-3).

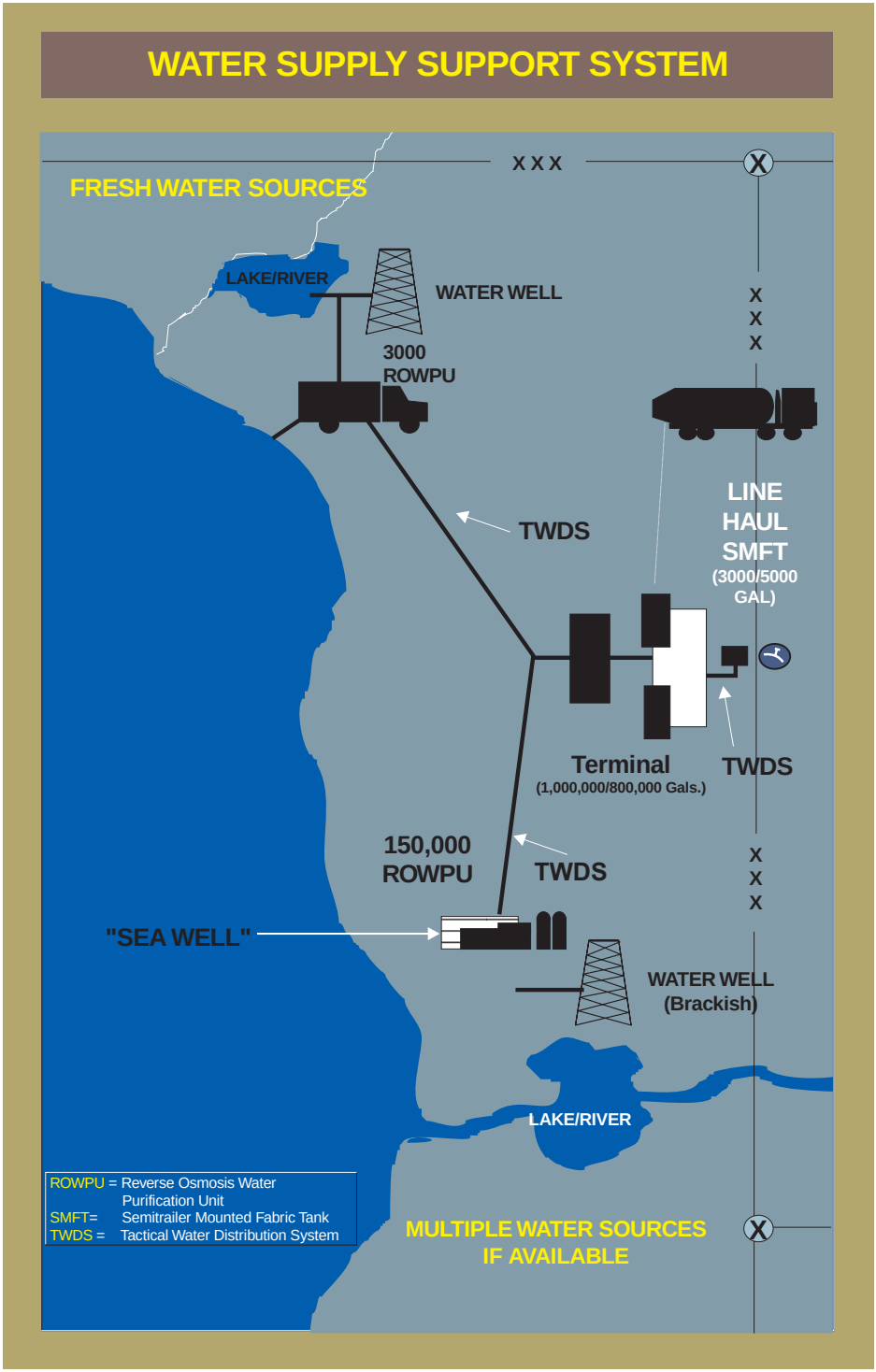


Figure XI-3. Water Supply Support System

APPENDIX A
PLANNING FACTORS

1. Overview

a. Planning, the emphasis given to it, and the considerations inherent in the planning process are critical to the success or failure of a LOTS and/or JLOTS. Throughout the main text, planning considerations have been discussed. This appendix highlights some specific planning factors and items that are fundamental for the successful conduct of JLOTS operations. Throughput, container handling, breakbulk handling, RO/RO, barge, and NCHF planning factors are presented.

b. Most planning factors provided in this appendix are representative figures; i.e., neither optimum nor worst case. The factors came from test demonstrations such as the JLOTS II and JLOTS III tests; references are cited in Appendix O, "References." Additional data were supplied by the Chief of Naval Operations Strategic Sealift Division (OP-42) and from the US Army Transportation School at Fort Eustis, Virginia. Average distance offshore for shipping to be off-loaded was assumed to be 2 miles.

2. Planning Considerations

a. **Load Planning.** Each ship participating in the LOTS operation requires a well conceived off-load plan. Subservient plans, such as crane lift plans for each hold, should be prepared from the basic off-load plan. The off-load plan requires execution from the designated command center such as the OCO or LCC.

- **Off-load Assumptions.** The following are specific off-load assumptions used in developing off-load plans.

•• Naval personnel and equipment will be initially available in conducting the off-load. Navy personnel may be phased out as the operation is transferred to Army control.

•• In off-loading RO/RO ships, the Service(s) owning the embarked vehicles must provide the vehicle drivers, who are not assigned duties as LOTS personnel.

•• Throughput planning factors are degraded in conditions that exceed 20-knot winds and 3-foot seas.

•• LASH or SEABEE barges will be off-loaded at an ELCAS or at pierside. Load planning must consider the need for an operational ELCAS in prioritizing LASH or SEABEE ship loads. Emergency off-load of LASH or SEABEE barges to lighterage could be carried out by a T-ACS.

•• Vehicles will be off-loaded from an RRDF to causeway ferries, LSVs or LCUs or by lift-on and roll-off from breakbulk or modified containerships to lighterage.

•• Crane cycle times will be considered the critical point in off-load productivity. Sufficient auxiliary equipment such as lighterage and transport equipment will be necessary to achieve the planned throughput.

•• Over sustained operations and based on experience and equipment manual data, additional time should be programmed in JLOTS planning for system preventive maintenance.

- **Personnel Considerations.** The inclusion of the following personnel should be considered for the successful execution of JLOTS operations.

  •• Double shift crews must be available for causeway ferry and certain other lighter operations to permit around-the-clock off-loading of unit equipment and cargo. In addition, an adequate number (two shifts) of T-ACS crane operators, containership hatch teams, C2 personnel, and vehicle drivers must be available to ensure efficient JLOTS operations.

  •• Crews required for major system installation (ELCAS, RRDF, and other systems) will be available for double-shift operations following installation of those systems.

  •• Personnel requirements for LASH or SEABEE barge off-loading are: (1) the terminal service company or NCHF is responsible for unloading if it is done by T-ACS; (2) the PHIBCB is responsible for unloading if it is done at the ELCAS; and (3) participating Services must provide stevedore support in both cases.

- **Lighterage Repair and Fueling Capability.** An adequate number of appropriately trained personnel must be available to provide around-the-clock capability to repair damaged lighterage and conduct fueling and/or de-fueling operations.

- **Logistic Support.** In the JLOTS operation area, logistic support of personnel participating in JLOTS operations is normally a Service responsibility. The OPORD for the JLOTS operation should specify any deviations from standing operating orders and/or special requirements and responsibilities for the provision of messing, billeting, supply (including bulk fuel for JLOTS equipment and off-loaded vehicles and/or equipment), maintenance, and health service support.

b. **Off-loading Site Selection.** Site selection and preparation is just as important to the success of JLOTS operations as equipment preparation. Considerations include the nearness of the staging area, gradient, beach width, surf observations, and surveys for tides, currents, or sandbars. Expected anchorage sites for both ships and major JLOTS equipment must be considered in selecting the landing site. A typical off-load discharge site is depicted in Figure I-1.

c. **Anchorage Selection.** The following planning data are used for anchorage at a JLOTS site.

- **Depth.** For cargo ships, a minimum water depth of 6 fathoms (i.e., 36 feet) is required.

- **Size.** Adequate safe sea room must be provided for ships to enter and depart the JLOTS site as well as swing at anchor. An anchorage area should be established using anchorage diameter, depth of water, and length of vessel.

d. **System Preparation Time.** Various preparation times for JLOTS systems required for off-load are shown in Figure A-1.

3. Throughput Planning Factors

a. Throughput planning factors have been established for the lighterage systems used in JLOTS based on exercise demonstrations such as JLOTS tests. Sustained throughput factors were calculated using neither optimum nor worst case scenarios, but are representative of achievable integrated off-load. Throughput is based on times necessary to execute the events of a LOTS operation. Such events may include the following.

SHIP OFF-LOAD PREPARATION TIMES[1/]	
SYSTEM	**TIMES**
T-ACS	10 Hours[2/]
Containerships mooring to T-ACS	2 Hours (with tugs)
ELCAS (810 ft)	14 Days
ELCAS (M)	10 Days
Breakbulk ship	2 Hours
RRDF Assembly	6-8 Hours (SS)[3/] 12 Hours (NSS)
RRDF Positioning alongside ship	2-1/2 Hours (SS)[3/] 7 Hours (NSS)
RRDF Removal	1 Hour
LASH Ship	1 Hour
SEABEE Ship	1 Hour
[1/]Most ship preparation should be done prior to dropping anchor. [2/]10 hours to off-load lighterage and then begin general cargo discharge. [3/]SS indicates self-sustaining RO/RO ship; NSS indicates non-self-sustaining RO/RO ship.	

Figure A-1. Ship Off-load Preparation Times

- Cast off and clear time from the beach.
- Transit time to the ship.
- Approach and moor time at the ship.
- Number of discharge points.
- Load time at the ship.
- Cast off and clear time from the ship.
- Transit time to the beach.
- Approach and moor time at the beach.
- Off-load time at the beach.
- Clearance time for JLOTS operations area.

b. Another factor that determines the throughput rates is the capability of the lighterage; i.e., cargo type carried or weight capacity. Figure A-2 depicts various throughput planning factors. Values summarized here are for general planning and are derived from calculations based on data contained in subsequent tables in this appendix. Additional lighterage characteristics can be found in Appendix B, "Lighterage Characteristics."

- **Lighterage Planning Factors.** The information in Figure A-2 is based on the expected effective operating speed of loaded lighterage in calm water and provides typical lighterage transit times. It includes lighterage maneuvering and/or beaching time. These events include "approach and moor" and "cast off and clear".

- **Lighterage Interface Capability.** The effective interface of multiple types of lighterage with various LOTS discharge

DISCHARGE PLANNING FACTORS

Lighter Load Planning Factors

	20-Foot Containers[1]	40-Foot Containers[1]	Wheeled Vehicles	Tracked Vehicles[2]
CF[3]	24	12	16	1 per 80 or 90 foot causeway module
DWMCF[4]	35	18	Data not available	Data not available
LCU-1600	4	3	4	2
LCU-2000	7	2	13	5
LSV	25	15	50	24

[1]Containers are single stacked. LCUs and LSV in intracoastal transportation role can stack containers two high, thus doubling the number carried.
[2]M1A1/A2 main battle tank.
[3]Maximum rated capacity is 90 to 100 short tons per causeway module.
[4]DWMCF is configured to carry 40-foot containers and not rolling stock. Vehicle planning factors are not available.

T-ACS Crane Cycle Time[1]
(Minutes: Seconds to load containers based on the number of cranes used)

1 Crane	1 container is loaded every 7:29 minutes. 24 containers are loaded in approximately 3 hours.
2 Cranes	2 containers are loaded every 10:36 minutes. 24 containers are loaded in approximately 2 hours and 7 minutes.
3 Cranes	3 containers are loaded every 16:42 minutes. 24 containers are loaded in approximately 1 hour and 56 minutes.

[1]JLOTS II test data.

Figure A-2. Discharge Planning Factors

DISCHARGE PLANNING FACTORS (cont'd)

Wheeled Vehicle Discharge Planning Factors[1]
Watercraft Cycle Times for LO/RO Discharge (all times in hours: minutes)

Craft	Load	C&C Beach	C&C FC	A&M Ship	Load	C&C Ship	A&M Beach	A&M FC	Unload Beach	Unload FC	1 mile	2 miles	3 miles	4 miles	5 miles
CF	16	00:04		00:12	03:41	00:04	00:05		00:28		05:02	05:30	05:58	06:26	06:54
LCU 1600	4	00:02		00:14	00:57	00:03	00:01		00:08		01:41	01:57	02:13	02:29	02:45
LCU 2000	13		00:07	00:11	02:30	00:04		00:12		00:30	03:50	04:06	04:22	04:38	04:54
LSV	50		00:07	00:22	07:53	00:05		00:13		01:33	10:27	10:41	10:55	11:09	11:23

[1]JLOTS III test data.
LO/RO = Lift-on/Roll-off

Wheeled Vehicle Discharge Planning Factors[1]
Watercraft Cycle Times for RO/RO Discharge (all times in hours: minutes)

Craft	Load	C&C Beach	C&C FC	A&M RRDF	Load	C&C Ship	A&M Beach	A&M FC	Unload Beach	Unload FC	1 mile	2 miles	3 miles	4 miles	5 miles
CF	16	00:04		00:34[2]	01:38	00:23[2]	00:05		00:28		03:40	04:08	04:36	05:04	05:32
LCU 1600	4	00:02		00:06	00:26	00:02	00:01		00:08		01:01	01:17	01:33	01:49	02:05
LCU 2000	13		00:07	00:09	01:33	00:04		00:12		00:30	02:51	03:07	03:23	03:39	03:55
LSV	50		00:07	00:09	05:50	00:07		00:13		01:33	08:13	08:27	08:41	08:55	09:09

[1]JLOTS III test data.
[2]Approximately 20 minutes is added to approach and moor and cast-off and clear for unflexing and flexing at the RRDF.

Figure A-2. Discharge Planning Factors (cont'd)

DISCHARGE PLANNING FACTORS (cont'd)

Tracked Vehicle Discharge Planning Factors[1]
Watercraft Cycle Times for RO/RO Discharge (all times in hours: minutes)[2]

Craft	Load	C&C Beach	C&C FC	A&M RRDF	Load	C&C Ship	A&M Beach	A&M FC	Unload Beach	Unload FC	1 mile	2 miles	3 miles	4 miles	5 miles
CF	3	00:04		00:34[3]	00:21	00:23[3]	00:05		00:09		02:04	02:32	03:00	03:28	03:56
LCU 1600	2	00:02		00:06	00:13	00:02	00:01		00:02		00:42	00:58	01:14	01:30	01:46
LCU 2000	5		00:07	00:09	00:34	00:04		00:12		00:12	01:34	01:50	02:06	02:22	02:38
LSV	24		00:07	00:09	02:27	00:07		00:13		00:58	04:15	04:29	04:43	04:57	05:11

[1]JLOTS III test data for M1A1/A2 main battle tank.
[2]Tracked vehicles can be lifted off using ships' gear or floating cranes, but this is the least productive method of discharge. In this case, discharge times will vary based on the type of tracked vehicle being handled.
[3]Approximately 20 minutes is added to A&Mand C&C for unflexing and flexing at the RRDF.

Container Discharge Planning Factors[1]
Watercraft Cycle Times for T-ACS Discharge Using 1 Crane (all times in hours: minutes)

Craft	Load	C&C ELCAS	A&M T-ACS	Load T-ACS	C&C T-ACS	A&M ELCAS	Unload ELCAS	1 mile	2 miles	3 miles	4 miles	5 miles
LCU 1600	4	00:02	00:10	00:30	00:02	00:08	00:36	01:44	02:00	02:16	02:32	02:48
LCU 2000	7	00:07	00:11	00:52	00:04	00:10	01:03	02:43	02:59	03:15	03:31	03:47

[1]JLOTS II and III test data for container operations.

Figure A-2. Discharge Planning Factors (cont'd)

DISCHARGE PLANNING FACTORS (cont'd)

Container Discharge Planning Factors[1]
Watercraft Cycle Times for T-ACS Discharge Using 2 Cranes (all times in hours: minutes)

Craft	Load	C&C ELCAS or Pier	A&M T-ACS	Load T-ACS	C&C T-ACS	A&M ELCAS or Pier	Unload ELCAS or Pier	1 mile	2 miles	3 miles	4 miles	5 miles
CF	24	00:03	00:12	02:07	00:03	00:10	03:36	06:39	07:07	07:35	08:03	08:31
LSV[2]	25	00:07	00:13	02:15	00:07	00:16	03:45	06:57	07:11	07:25	07:39	07:53

[1]JLOTS II and III test data for container operations.
[2]LSV is most productive when discharged pierside in a fixed port using port cranes or at an FC with a mobile crane and/or container handler.

Container Discharge Planning Factors[1]
CF to Beach Cycle Times for T-ACS Discharge Using 2 Cranes (all times in hours: minutes)[2]

Craft	Load	C&C Beach	A&M T-ACS	Load T-ACS	C&C T-ACS	A&M Beach	Unload Beach	1 mile	2 miles	3 miles	4 miles	5 miles
CF	24	00:04	00:12	02:07	00:03	00:05	02:00	04:59	05:27	05:55	06:23	06:51

[1]JLOTS II and III test data for container operations.
[2]Assumes container handling equipment is available in quantities sufficient to meet beach unloading time.

Figure A-2. Discharge Planning Factors (cont'd)

DISCHARGE PLANNING FACTORS (cont'd)			
Lighter Selection Based on Cargo Category and Miles From Shore			
Wheeled Vehicles (RO/RO)	Tracked Vehicles (RO/RO)	Twenty-foot Containers (LO/LO)	
1 to 5 miles	1 to 5 miles	1 mile	2 to 5 miles
LSV	LSV	CF	LSV
LCU-2000	LCU-2000	LSV	CF
CF	LCU-1600	LCU-2000	LCU-2000
LCU-1600	CF	LCU-1600	LCU-1600

Figure A-2. Discharge Planning Factors (cont'd)

Note: This next figure is a sample which shows the optimum mix of watercraft per discharge point or lane based on the cargo category being moved. Optimizing watercraft utilization is best accomplished using the Joint Over-the-Shore Transportation Estimator (JOTE) model. The JOTE model input is the number and type of craft available, amount and type of cargo to be discharged (in ST), number of lanes or loading points to be used, and the average time that the sea state is 2 or below. The model output identifies the number and type craft used in an operation, how many round trips are made, throughput attained (in ST) and cargo remaining to be discharged. Variations in daily throughput can be determined by changing the number and mix of watercraft available, increasing or decreasing the number of lanes or loading points, and increasing or decreasing the amount of time conditions are sea state 2 or below.

DISCHARGE PLANNING FACTORS (cont'd)

Notional Watercraft Optimization[1]
Type and Number of Lighters Needed at a Single Loading Point
for Maximum Cargo Throughput in a 20 Hour Day at 1 Mile from Shore

Wheeled Vehicles (RO/RO)		Tracked Vehicles (RO/RO)		Twenty-foot Containers (LO/LO)	
Craft (Round Trips)	Piece Count	Craft (Round Trips)	Piece Count	Craft (Round Trips)	Piece Count
1 LSV (2)	100	1 LSV (5)	120	CF (1 [3], 2 [2])	167
2 LCU-2000 [1 (2), 1 (1)]	39	2 LCU-2000 (4 ea.)	40		
1 LCU-1600 (1)	4				
Total pieces	143		160		167

[1]Optimization using the JOTE model is based on full utilization of the RRDF and crane loading points. For example, a loading point is occupied during the time a lighter is maneuvering to approach and moor, being loaded, and then maneuvering to cast off and clear. As the first lighter completes the C&C manuever, the second lighter begins to approach and moor. Maximum daily throughput is achieved by first determining the most productive lighter for a particular operation and then selecting other lighters than can fill in the time when that more productive craft is away from the RRDF or crane. In the two RO/RO examples we see only 1 LSV assigned to a single discharge lane. This is done to avoid any waiting to load or idle time for the LSV. However, in the case of the LO/LO container example it is better to use multiple CFs than to employ a combination of CFs and an LSV at 1 mile. Since the LSV is overall the most productive JLOTS lighter, it should not remain idle or waiting to load when other capable craft are available.

Figure A-2. Discharge Planning Factors (cont'd)

systems and/or ships will determine throughput rates. Figures A-3 and A-4 show a prioritized match of lighterage with various ships or discharge systems for the off-load of vehicles, containers, and breakbulk cargo.

NOTE: The causeway ferry is referred to as CSP +1, 2, and 3, DWMCF, and causeway ferry (CF). Unless otherwise stated, the following tables use the abbreviation CF. The floating causeway pier is referred to as the floating causeway (FC), following current usage. The FC will be employed when the LSV and LCU -1600 and -2000 are operating on gentle or flat beach gradients. All lighters can discharge directly to a bare beach in steep and moderate beach gradients. All productivity is based on a two 10-hour shift, 20-hour workday. Operations are in sea state 2 and below with all JLOTS systems considered as having full operating capability.

4. Container Handling and Transportation Planning Factors

This section presents demonstrated planning factors that can be used under favorable weather conditions to estimate off-load times in a LOTS and/or JLOTS operation.

a. **Container Transfer Times.** Containers are transferred from lighterage to beach clearance vehicles by the handling equipment operating at a particular site. The ELCAS uses a 140- or 80-ton crane, and the amphibian discharge site uses 140-ton cranes. One crane operates at each lighterage berth. Two RTCHs operate as a team to unload causeway ferries at each berth of the RTCH site. Similarly, two LACHs operate at each berth of the LACH site.

LIGHTER, CARGO, AND SHIP INTERFACE COMPATIBILITY

	Lighter	Containership and T-ACS	Breakbulk Ship	RO/RO Ship
Vehicles[1]	CF	Good	Good	Optimal
	LCUs	Good	Good	Optimal
	LSV	Optimal	Optimal	Optimal
Containers	CF	Optimal	Optimal	Optimal
	LCUs	Good	Good	Good
	LSV	Optimal	Optimal	Optimal
Breakbulk[2]	CF	N/A	Good	Good
	LCUs	N/A	Optimal	Optimal
	LSV	N/A	Good	Good

[1]Vehicle category includes both wheels and tracks, with wheeled vehicles being counted as either a single unit or separate prime mover and trailer.
[2]Breakbulk ship discharge is the least efficient JLOTS cargo transfer mode. Breakbulk ships are being phased out. The LCU-1600 and -2000 are best suited for transporting breakbulk pallets due to the need for securing loads.

Figure A-3. Lighter, Cargo, and Ship Interface Compatibility

LIGHTER, CARGO, AND BEACH DISCHARGE FACILITY COMPATIBILITY

	Lighter	ELCAS[1]	Fixed Port[2]	Bare Beach[3]	Floating Causeway[4]
Vehicles	CF	Marginal	Good	Optimal	Marginal
	LCUs	Marginal	Good	Optimal	Optimal
	LSV	No capability	Good	Optimal	Optimal
Containers	CF	Good	Optimal	Optimal	Marginal
	LCUs	Marginal	Optimal	Marginal	Marginal
	LSV	No capability	Optimal	Good	Good
Breakbulk[5]	CF	Good	Good	Optimal	Marginal
	LCUs	Good	Good	Optimal	Optimal
	LSV	No capability	Good	Optimal	Optimal

[1]LSV is too large to moor alongside the ELCAS. ELCAS crane capacity is 33.6 short tons.
[2]Use of fixed port facilities that are operational, but inaccessible to strategic sealift ships, offers most efficient method for discharging lighters carrying lift-off cargo.
[3]All JLOTS lighters operate optimally on steep and moderate beach gradients. When beach gradients become gentle or flat, only the CF has full beaching capability. The LSV and LCUs will employ floating causeway piers under these conditions. Forty-foot containers will not routinely be discharged at the beach unless loaded aboard DWMCF.
[4]CF and FC are least compatible lighter and cargo transfer platform. FC was designed to accommodate LCUs and LSVs on gentle or flat beach gradients or as an administrative pier for JLOTS craft.
[5]Breakbulk cargo is most efficiently discharged from lighters using materials handling equipment.

Figure A-4. Lighter, Cargo, and Beach Discharge Facility Compatibility

- The container transfer time in a marshalling yard is shown in Figure A-5. Trucks arriving in a marshalling yard are generally unloaded by RTCHs. The expected time to unload trucks (per container) is given below.

CONTAINER TRANSFER RATE IN MARSHALLING YARD (MINUTES PER CONTAINER)

SERVICE	20-FOOT	40-FOOT
MARINE CORPS	3	N/A
ARMY	2	3

Figure A-5. Container Transfer Rate in Marshalling Yard (Minutes Per Container)

b. **ELCAS Container Discharge Rates.** Figure A-6 displays lighterage requirements to maintain various container discharge rates over a double pierhead ELCAS.

c. **Truck Transit Times.** These transit times include the time to secure the container load on the truck exiting the beach area, including brief stops for cargo documentation functions and to travel approximately 1 mile to a marshalling yard. Figure A-7 lists the expected times. If the transit distance is longer, additional time should be calculated at 10

CONTAINER DISCHARGE RATE AT ELEVATED CAUSEWAY SYSTEM				
TYPE OF LIGHTERAGE	RATE (Containers per hour)	LIGHTERAGE REQUIREMENTS (Miles Offshore)		
		1	2	3
LCU (4 containers)	8	3	4	4
LCU-1600 (4 containers)	12	4	5	5
LCU-2000 (8 containers)	16	5	6	6
	20	6	7	8
LCM (1 container)	4	2	3	3
LARC-LX	8	3	4	4
Causeway Ferry				
(3 section)	8	2	3	3
	12	3	3	4
	16	3	4	4
	20	4	4	5
CSP	8	3	4	4
1+1	12	4	5	5
2+1	16	5	6	6
3+1	20	6	7	8

Figure A-6. Container Discharge Rate at Elevated Causeway System

TRANSIT TIMES AT THE BEACH TO MARSHALLING YARD	
TRUCK TYPE	TRANSIT TIME (Minutes)
Marine Corps 20-Foot	10
Army 20-/40-Foot	10-14

Figure A-7. Transit Times at the Beach to Marshalling Yard

miles per hour unless road and vehicle conditions are known to permit higher speeds or require lower speeds.

5. Breakbulk Handling and Transportation Planning Factors

Limited information is available on breakbulk handling times. The data gathered are limited to lighterage off-loading and truck loading at the beach. Figure A-8 summarizes

BREAKBULK OFF-LOAD AT BEACH	
LIGHTER	AVG TIME PER PALLET (Minutes)
LCU 1600	1.0
LCM-8	1.2
LARC-LX	1.5
LSV	1.0

Figure A-8. Breakbulk Off-load at Beach

breakbulk lighterage off-loading times. In general, breakbulk operations at the beach should not interfere with container operations.

6. RO/RO Throughput Planning Factors

a. **Loading and Discharging.** A mean load and discharge time for self-sustaining and non-self-sustaining RO/RO ships is summarized in Figure A-2.

b. **Vehicle Per Lighterage Trip.** The number of vehicles a lighter can carry depends upon the types of vehicles and the types of lighters used to carry the vehicles.

c. **Daily RO/RO Throughput Planning Factors.** RRDF expected performance times have been used to calculate the projected 24-hour throughput for selected lighterage combinations and the results are tabulated in Figure A-2.

7. Barge Planning Factors

Army Barge Planning Factors. Barges will be selected on their cargo carrying capacities, which include the following.

- Nonpropelled deck or liquid knockdown barge: capacity, 20 LT or 225 barrels.
- Nonpropelled deck cargo sectionalized barge: capacity, 180 LT.
- Nonpropelled deck cargo ocean towing barge: capacity, 585 LT.
- Nonpropelled deck or liquid barge: capacity, 578 LT.
- Nonpropelled refrigerator barge: capacity, 14,200 cubic feet.

8. NCHF Discharge Rates

Various discharge rates achievable by the NCHF are in this section.

a. **NCHF Palletized Cargo Shipboard Discharge Rates.** NCHF rates are based on observed data.

- **Assumptions.** The following assumptions were used to determine pierside and in-stream operation palletized cargo throughput rates established by the NCHF.

  •• All cargo is palletized.

  •• Some delays are encountered because of mechanical difficulties.

  •• Requirement exists to open hatches or shift hatch covers.

  •• Seven stevedores are available to support each hatch team.

  •• Some cargo in each hold will require "snaking" or double handling to make it accessible to the forklift.

  •• Where lighterage is involved, some delays will be encountered because of lighterage moves.

  •• The sea state is not greater than 2.

  •• Yard and stay rigs are used.

- **Pierside Operation Factors**

  •• One pallet is off-loaded every 4 minutes per hatch team.

•• Eight hatch teams are working (two ships, four hatch teams per ship).

•• Above means eight pallets are off-loaded every 4 minutes (120 per hour).

•• Two shifts, each working 12 hours, equal 24 hours.

•• 24 x 120 = 2,880 pallets per battalion per day.

- **In-Stream Operations Factors**

•• One pallet is off-loaded every 6 minutes per hatch team.

•• Eight hatch teams are working (two ships, four hatch teams per ship).

•• Above means eight pallets are off-loaded every 6 minutes (80 per hour).

•• Two shifts, each shift working 12 hours, equal 24 hours.

•• 24 x 80 = 1,920 pallets per battalion per day.

b. **NCHF Containerized Cargo Shipboard Discharge Rates.** NCHF rates are based on observed data.

- **Assumptions.** The following assumptions were used to derive these rates.

•• Cranes are available to work four hatches simultaneously per ship.

•• Containers will occasionally require respotting on truck or lighterage.

•• Some delays are encountered because of mechanical difficulties.

•• Time will be required to unlash or move containers within cells.

•• Either a manual spreader or nylon slings with container lugs are used (mechanical spreader not used).

•• Five stevedores are available to support each hatch team.

•• For in-stream operations, some delays will be encountered because of lighterage moves.

•• The sea state is not greater than 2.

- **Pierside Operations Factors**

•• Four containers are off-loaded per hour per crane.

•• Eight hatch teams are working (two ships, four hatch teams per ship).

•• Above means 32 containers are off-loaded per hour.

•• Two shifts, each working 12 hours, equal 24 hours.

•• 24 x 32 = 768 containers per battalion per day.

- **In-stream Operation Factors**

•• Three containers are off-loaded each hour per crane.

•• Eight hatch teams are working (two ships, four hatch teams per ship).

•• Above means 24 containers are off-loaded per hour.

•• Two shifts, each working 12 hours, equal 24 hours.

•• 24 x 24 = 576 containers per battalion per day.

9. Army Discharge Rates

Appendix M, "Unit Capabilities," contains Army discharge rates.

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APPENDIX B
LIGHTERAGE CHARACTERISTICS

1. Overview

Representative lighterage characteristics are provided as a planning tool for the conduct of JLOTS operations.

2. Characteristics and Capabilities

a. Nominal characteristics and capabilities for an entire class of lighterage are shown in Figure B-1. The purpose of providing this information is for use in planning these operations. Minor variations within a class of vessels exist and are not noted in the figure. For example, LCUs of the 1610 class were built in several different lots, by different manufacturers, in different years, which resulted in minor characteristic variations.

b. Figure B-1 is to be used for planning purposes only and not to be considered definitive for purposes of determining exact weights for crane lifts or for any other purpose in which safety may be affected. Exact weights and capacities may be determined by actual weighing or by examination of appropriate certification documents or operator or technical manuals.

c. Because of differences in organization, manning, and other factors, the same type of equipment may be used differently, crewed differently, or operated with different limitations and capabilities by the individual Services. For example, the figure shows that an LCM-8 is crewed by five people; another Service may use four or six in the crew. Such differences are not noted in Figure B-1.

d. Within the LCU-1610 class, LCUs 1627 and 1646 have been considered separate classes at various times. The Army refers to this class as the 1600 class.

e. Various lighterage classes are shown in Figure B-2. The LCAC is shown in Figure B-3, the LCU-2000 is shown in Figure B-4, and the LSV is shown in Figure B-5.

REPRESENTATIVE LIGHTERAGE CHARACTERISTICS

Class	Capacity (stons)	Crew	Length	Beam	Draft (Full Load)	Speed	Troops	Cargo Area L x Max W (x Min W)	Light Displacement (tons)	Ramp (Width)
LCU 1600	160.0	12	135' 3"	29' 0"	3' 2" fwd	12 kts lt	350[2/]	121'x25' (x 14')	191.5	Bow 14' Stern 18'
LCU 2000	350.0	12	175' 0"	42' 0"	5' fwd 9' aft	12 kts lt 10 kts full	350[2/]	100'x38'	550	16'
LSV	2000	29	273'	60'	12' fwd 16' aft	12 kts	900[2/]	160'x58'	4266	Bow 26' Stern 24'
LCM-8 (Steel)	65.0	5	73' 7"	21' 0"	3' 10" fwd 5' 2" aft	12 kts full	150	42'9"x14'6"	67	14'6"
LCM-8 (Alum.)	65.0	5	74' 3"	21' 0"	3' fwd 4' 8" aft	12 kts full	200	42'9"x14'6"	37.8	14'6"
CSNP	90.0	N/A	92' 0"	21' 0"	4'	N/A	N/A	92'x21'	70	N/A
CSP	35.0	6	85' 0"	21' 0"	40"	7 kts lt	N/A	60'x21'	88	N/A
SLWT	N/A	8	84' 0"	21' 0"	40"	7 kts lt	N/A	N/A	103	N/A
LARC-V	5.0	2	35' 0"	10' 0"	4' 1" fwd 4' 4" aft	9 kts water 29.5 mph land	20	16'x10'	10.5	N/A
LARC-LX	60.0[1/]	8	61' 1"	26' 7"	8' 2" fwd 8' 8" aft	6.5 kts lt	125	37'x13'8"	56	14'6"
LCAC	60.0[1/]	5	87' 11"	47' 0"	0-3'	40 kts full	24	71'x27'	99	Bow 27' Stern 15'

1/ Overload condition is 75 tons.
2/ While landing craft utilities are capable of carrying troops, this should only be done in extreme situations when the distance and time of travel are under 2 hours in sea states less than 2. These craft are not designed to transport troops in high sea state.

Figure B-1. Representative Lighterage Characteristics

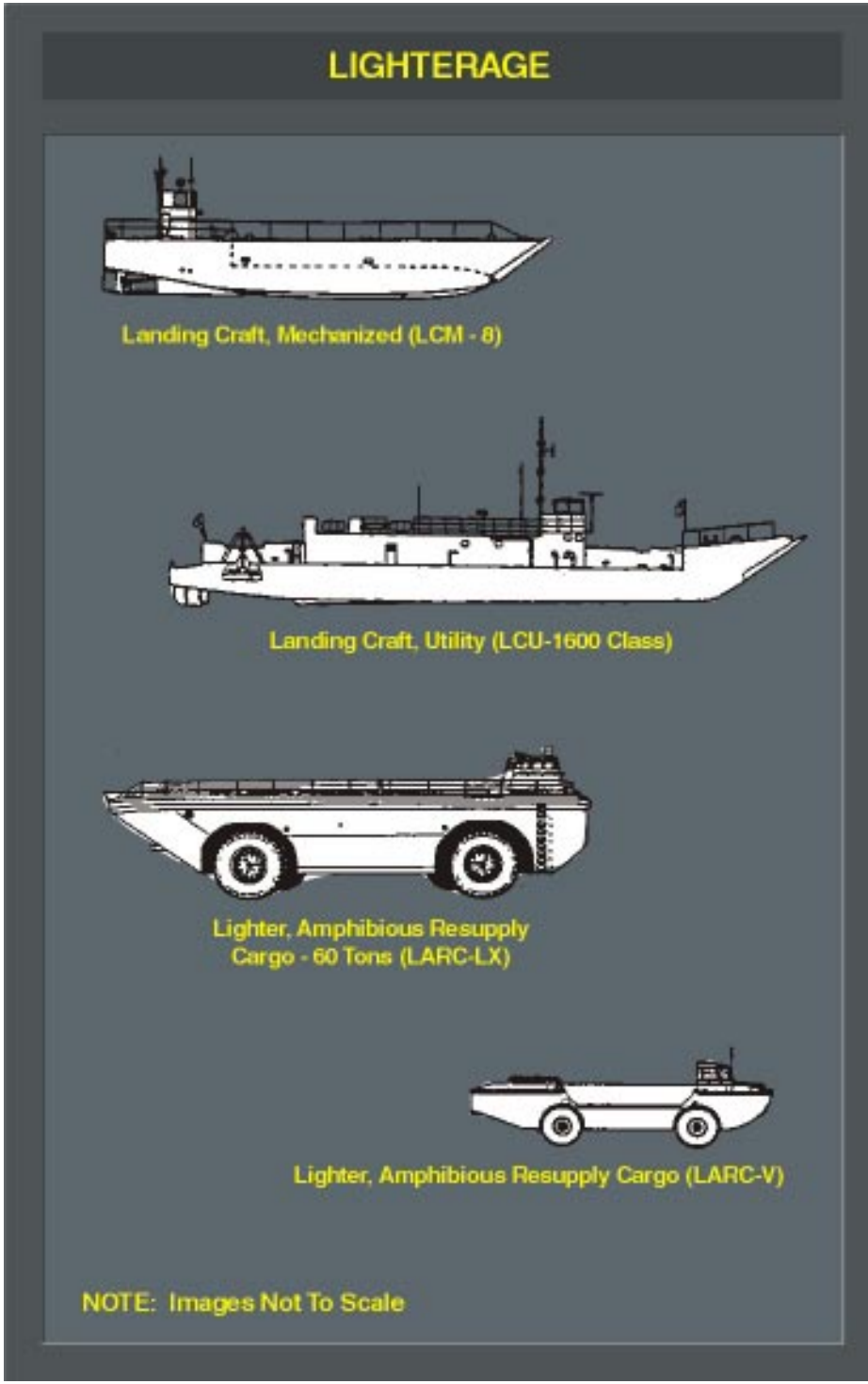


Figure B-2. Lighterage

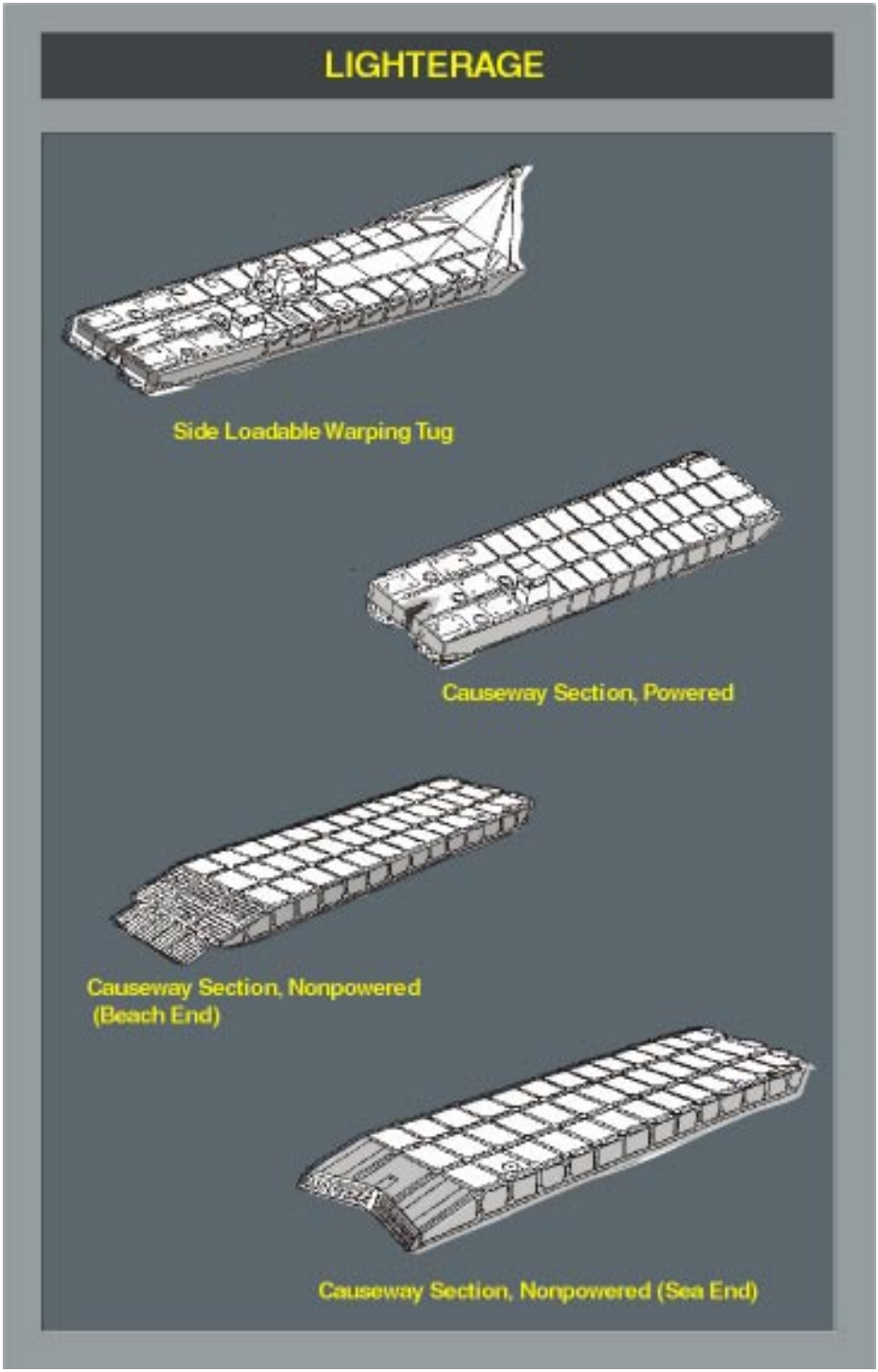


Figure B-2. Lighterage (cont'd)

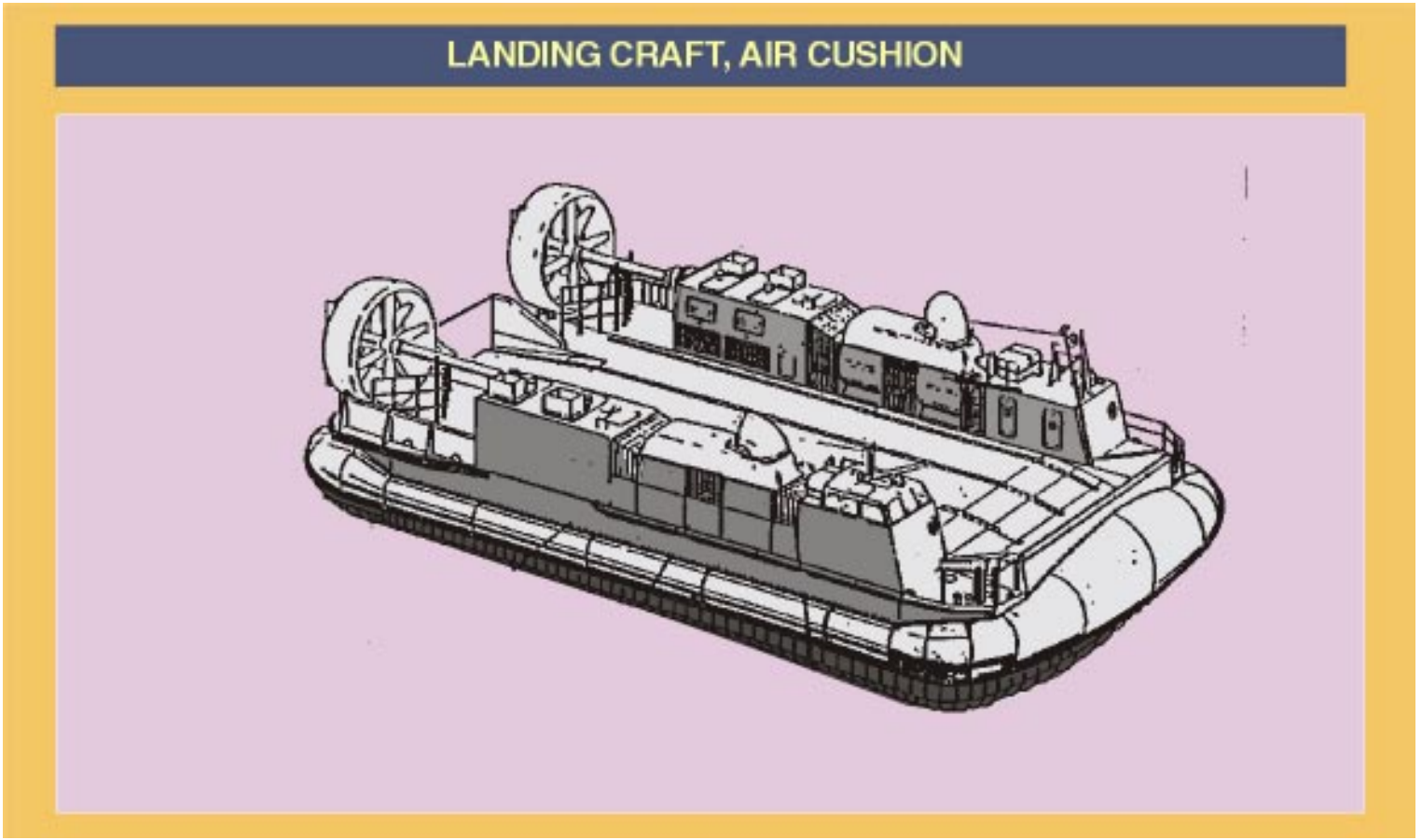


Figure B-3. Landing Craft, Air Cushion

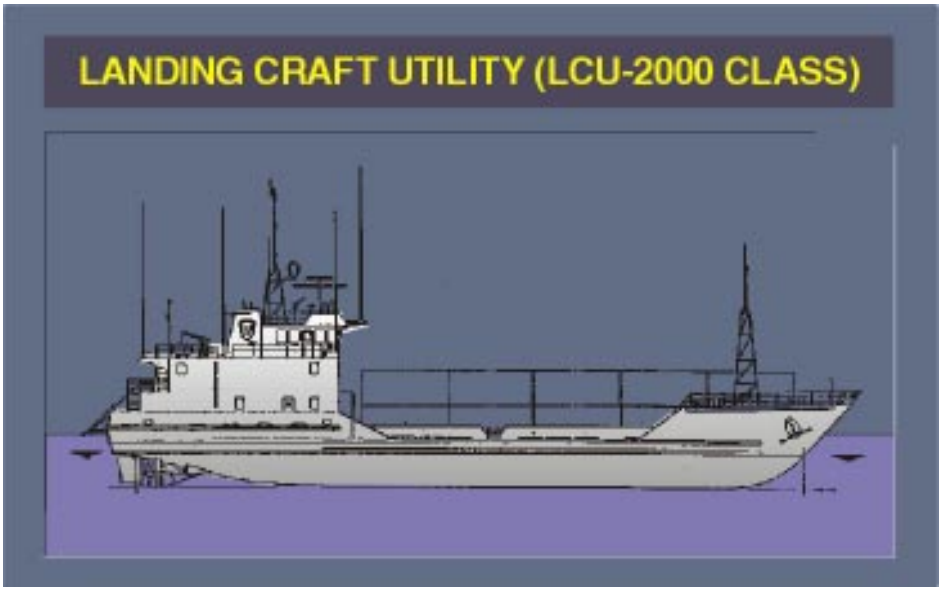


Figure B-4. Landing Craft Utility (LCU-2000 Class)

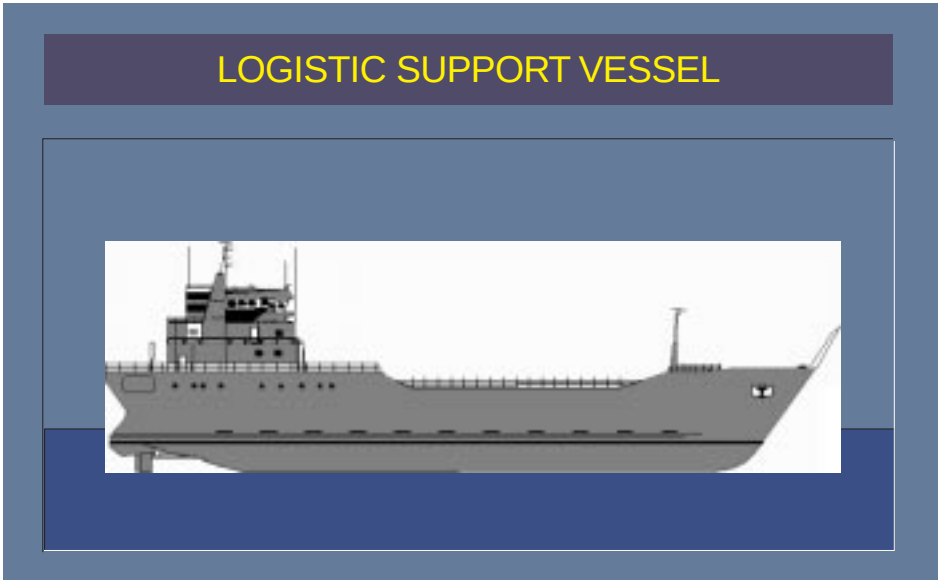


Figure B-5. Logistic Support Vessel

Note: Craft shown are not to scale.

APPENDIX C
SHIP CHARACTERISTICS

1. Overview

General characteristics of strategic sealift ships are provided in this appendix.

2. Strategic Sealift Ship Types

a. Characteristics and capacities of some of the more commonly used sealift ships that may be encountered in the JLOTS area are shown in Figure C-1. OPDS tanker configuration is shown in Figure C-2. The information is provided to give JLOTS personnel a general idea of the type and quantity of cargo that may be aboard, any special features, and the pertinent dimensions that will influence the assignment of anchorages. All possible ship types cannot be shown, however, and planners may be required to estimate based on similar types of ships and personal experience.

b. These data are current as of August 1988. The capacity figures are additive. For example, the total capacity of the PFC DEWAYNE T. WILLIAMS (TAK) MPS is 150,000 square feet of vehicle space, 346,000 cubic feet of cargo space, and 530 20-foot equivalent unit (TEU) containers. Ships currently in the RRF are included in Figure C-1. Merchant ship type designators (such as C6-S-lqd) are provided in the first column of the table for some ships.

c. Gross capacity data are given. Actual load capacity is limited by such factors as deck configuration, stow factors, and space required for tie-down. For example, a normal load planning factor is 75 percent of the gross available square footage listed, and 55 to 80 percent of the cubic feet listed, depending on the composition of the cargo loaded.

STRATEGIC SEALIFT SHIP CHARACTERISTICS

SHIP CLASS	TYPE	LENGTH OVERALL	BEAM	DRAFT FULL LD	DEADWEIGHT LONG TONS	CAPACITY 1/ KSF	CAPACITY 1/ KCF TEU	CARGO HANDLING SPECIAL EQUIP	REMARKS
ALGOL T-AKR (FSS-Fast Sealift Ship)	RO/RO Contr	946'	106'	37'	26,927	217	184	Helo deck; 4 cranes; 1 twin 35 LT midship; 1 twin 50 LT aft; side & stern ramps	Maintained by MSC in reduced operating status
GREEN MT. STATE T-ACS-9 C6-S-MA600	Aux. crane ship; Contr	666'	75'	32'	16,180		307	2 twin boom cranes; 30 LT per boom; 60 LT per pair	
KEYSTONE STATE T-ACS 1-3 C6-S-1qd	Aux. crane ship; Contr	669'	76'	33'	17,502	53	90	3 twin boom cranes; 30 LT per boom; 60 LT per pair	3 ships in RRF; carry 6 causeways & 4 LCM-8's 2/
GOPHER STATE T-ACS-4-6 C6-S-73c	Aux. crane ship; Contr	610'	78'	32'	16,442	123	711	2 twin boom cranes; 30 LT per boom; 60 LT per pair	Same as KEYSTONE STATE
DIAMOND STATE T-ACS-7-8 C6-S-1xb	Aux. crane ship; Contr	668'	76'	33'	19,867		367	Same as KEYSTONE STATE	2 ships in RRF; same as KEYSTONE STATE
PVT FRANKLIN PHILLIPS TAK (Maersk Conversn)	MPS RO/RO combo	756'	90'	33'	18,209	156	332	3 twin tandem cargo cranes; helo dck; stbd slewing stern ramp; 3 pt mooring sys	5 ships in class

Figure C-1. Strategic Sealift Ship Characteristics

STRATEGIC SEALIFT SHIP CHARACTERISTICS (cont'd)

SHIP CLASS	TYPE	LENGTH OVERALL	BEAM	DRAFT FULL LD	DEADWEIGHT LONG TON	CAPACITY 1/ KSF KCF TEU	CARGO HANDLING SPECIAL EQUIP	REMARKS
PFC DWAYNE T WILLIAMS TAK (AMSEA const)	MPS RO/RO combo	671'	106'	30'	30,000	152 522	5-39 LT pedestal cranes; helo dk; 4pt mooring sys	5 ships in class
PFC EUGENE A OBREGON TAK (Waterman conversn)	MPS RO/RO combo	821'	106'	33'	23,653	186 540	Helo dk; 30T gantry; twin 50T & twin 35T cranes; 4pt mooring sys	3 ships in class
CAPE ORLANDO	RO/RO	635'	92'	30'	20,399	186 252		MSC charter
GREEN WAVE	BBlk	505'	70'	27'	12,923	676		MSC charter
CAPE TEXAS	RO/RO	634'	89'	28'	14,634	113		2 ships in class (US flag)
CAPE GIRARDEAU (C5-S-75A)	BBlk	605'	82'	35'	22,203	1,108	Self-sustaining	2 in RRF
PRIDE (C3-S-33a)	BBlk	483'	68'	31'	12,204	562		5 in RRF
AUSTRAL LIGHTNING (C8-S-81b)	LASH	820'	100'	35'	29,813	3/ 334	Barge crane	2 in RRF
CAPE MENDOCINO (C8-S-82a)	SEABEE	876'	106'	39'	38,410	4/		3 in RRF

Figure C-1. Strategic Sealift Ship Characteristics (cont'd)

STRATEGIC SEALIFT SHIP CHARACTERISTICS (cont'd)

SHIP CLASS	TYPE	LENGTH OVERALL	BEAM	DRAFT FULL LD	DEADWEIGHT LONG TON	CAPACITY 1/ KSF KCF TEU	CARGO HANDLING SPECIAL EQUIP	REMARKS
CAPE FAREWELL (C9-S-8id)	LASH	893'	100'	38'	40,391	5/		2 in RRF
NODAWAY (T1-M-BT2)	Gasoline tanker	325'	46'	16'	3,937			1 in RRF
ALATNA (T1-MET-24a)	Gasoline tanker	302'	61'	23'	4,855			2 in RRF
POTOMAC (T5-S-12a)	OPDS	620'	84'	34'	27,467	6/	SALM; 4pt moor sys; needs 4 SLWTs to deploy	1 in RRF
AMERICAN EXPLORER (T5-S-Rm2a)	Product tanker	615'	80'	36'	22,526			1 in NDRF
PATRIOT STATE (S5-S1-MA49c)	Troop/Trng ship	547'	79'	29'	9,380			2 in RRF; 598 troop cap.
CAPE KENNEDY	RO/RO	696'	106'			148		2 in RRF
CAPE DECISION	RO/RO	680'	97'	33'	23,800	176	Strn ramp	5 in RRF
CAPE EDMONT	RO/RO	635'	92'	30'	20,223	150	Strn ramp	1 in RRF
CAPE HENRY	RO/RO	750'	106'	35'	31,035	205	Strn ramp	3 in RRF

Figure C-1. Strategic Sealift Ship Characteristics (cont'd)

STRATEGIC SEALIFT SHIP CHARACTERISTICS (cont'd)								
SHIP CLASS	TYPE	LENGTH OVERALL	BEAM	DRAFT FULL LD	DEADWEIGHT LONG TON	CAPACITY 1/ KSF KCF TEU	CARGO HANDLING SPECIAL EQUIP	REMARKS
ADM. W.M. CALLAGHAN	RO/RO	694'	92'	29'	13,500	148	strn ramp; side ramps; 2-120LT booms	1 in RRF Carry 2 LCUs
USNS SEALIFT ANTARCTIC	Product tanker	587'	84'	35'	27,200			9 ships in class; MSC charter
CAPE COD (C3-S-37c)	BBulk	495'	69'	32'	12,622	565		6 in RRF
GULF FARMER (C3-S-37d)	BBulk	495'	69'	32'	11,367	564		5 in RRF
AMBASSADOR (C3-S-38a)	BBulk	493'	73'	28'	11,018	599		4 in RRF
BANNER (C3-S-46a)	BBulk	493'	73'	31'	12,427	707		2 in RRF
COURIER (C3-S-46b)	BBulk	493'	73'	31'	12,502	753		1 in RRF
DEL MONTE (C3-S-76a)	BBulk Contr	522'	70'	31'	13,039	647		3 in RRF
COMET (C3-ST-14a)	RO/RO	499'	78'	27'	9,949	86		1 in RRF
CAPE JACOB (C4-S-lu)	BBulk Contr	565'	76'	32'	14,349	748		4 in RRF
CAPE LAMBERT	RO/RO	682'	75'	21'		77		2 in RRF

Figure C-1. Strategic Sealift Ship Characteristics (cont'd)

STRATEGIC SEALIFT SHIP CHARACTERISTICS (cont'd)								
SHIP CLASS	TYPE	LENGTH OVERALL	BEAM	DRAFT FULL LD	DEADWEIGHT LONG TON	CAPACITY 1/ KSF KCF TEU	CARGO HANDLING SPECIAL EQUIP	REMARKS
CAPE RACE	RO/RO	648'	106'	33'		133		3 in RRF
CAPE VICTORY	RO/RO	632'	87'	29'		103		2 in RRF
CAPE WRATH	RO/RO	648'	106'	38'		213		2 in RRF
USNS SHUGART	RO/RO	885'	106'	35'		302		3 vessels maintained by MSC
USNS GORDON	RO/RO	956'	106'	37'		321	Stern slewing ramp, port and starboard side ramps, 110T single pedestal twin cranes	2 vessels maintained by MSC
USNS BOB HOPE	RO/RO	950'	106'	35'	36,000	401	Stern slewing ramp, port and starboard side ramps, 110T single pedestal twin cranes	7 vessels by FY01-maintained by MSC
USNS WATSON	RO/RO	950'	106'	34'	36,114	396	Stern slewing ramp, port and starboard side ramps, 110T single pedestal twin cranes	7 vessels by FY01-maintained by MSC

Figure C-1. Strategic Sealift Ship Characteristics (cont'd)

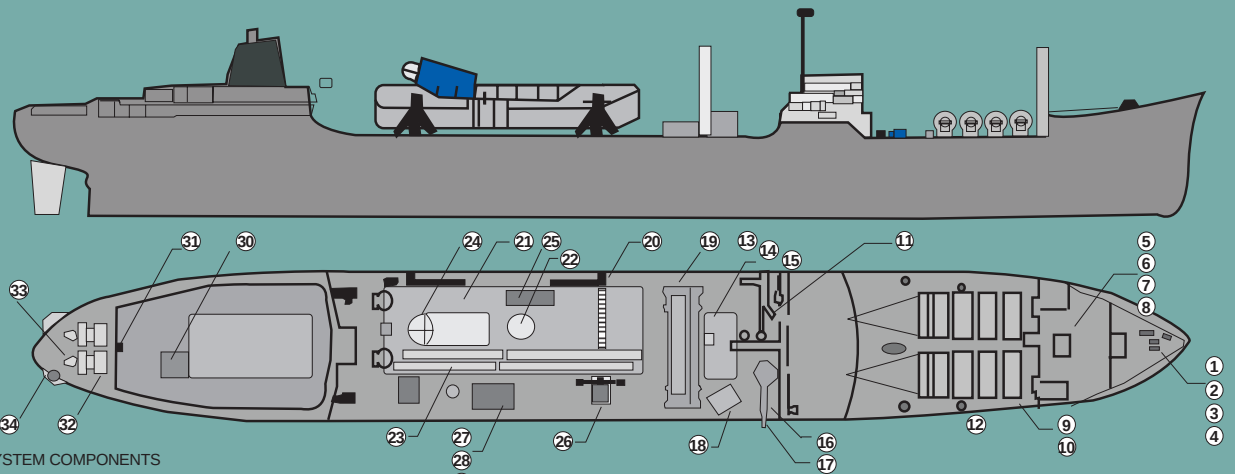
STRATEGIC SEALIFT SHIP CHARACTERISTICS (cont'd)

SHIP CLASS	TYPE	LENGTH OVERALL	BEAM	DRAFT FULL LD	DEADWEIGHT LONG TON	CAPACITY 1/ KSF KCF TEU	CARGO HANDLING SPECIAL EQUIP	REMARKS
PIONEER COMMANDER (C4-S-57a)	BBulk Contr	561'	75'	32'	13,315	643		3 in RRF
CAPE ALAVA (C4-S-58a)	BBulk	572'	75'	31'	12,728	643		5 in RRF
SANTA LUCIA (C4-S-65a)	BBulk Contr	560'	82'	30'	12,490	479 134		NDRF
CAPE BLANCO (C4-S-66a)	BBulk	540'	76'	33'	14,662	750		5 in RRF
METEOR (C4-ST-67a)	RO/RO	540'	83'	29'	12,326	117		1 in RRF
CAPE INSCRIPTION (C7-S-95a)	RO/RO Contr	685'	102'	32'	18,989	151		4 in RRF

1/ Capacity data is additive.
2/ LCM-8s must not exceed 60 long tons and they must be lifted with the beams trimmed. It is possible that safe handling of LCM-8s will require tandem lift using 4 booms.
3/ 49 LASH barges (outer dimensions: 61'-6" x 31'-2" x 15') provide about 84.5sft vehicle space or 875 cft cargo space; latter figures are not additive to total LASH capacity.
4/ 38 SEABEE barges (outer dimensions: 97'-6" x 35' x 17'-3") provide about 103.5 sft vehicle space or 8,487 cft cargo space; latter figures are not additive to total SEABEE capacity.
5/ 74 LASH barges (outer dimensions: 61'-6" x 31'-2" x 15') provide about 132 sft vehicle space or 1,321 cft cargo space; latter figures are not additive to total LASH capacity.
6/ 178,000 bbls.
7/ OPDS vessels come in various hull designs, specifics should be identified through normal MSC or Maritime Administration command channels.

Figure C-1. Strategic Sealift Ship Characteristics (cont'd)

OPDS LAYOUT ONBOARD SS AMERICAN OSPREY (OPDS 2)



SUBSYSTEM COMPONENTS

1. Single Point Mooring Bracket
2. Mooring Hawser
3. Instrumented Pin
4. Mooring Hawser Tension Readout
5. Offshore Petroleum Discharge System Storage Hold
6. Beach Termination Unit
7. Side Loadable Warping Tug Fittings
8. Conduit Repair Fittings
9. Conduit Reels
10. Conduit
11. Turning Quadrant (P/S)
12. Level Wind (P/S)
13. Offshore Petroleum Discharge System Deck House
14. HPU
15. Product Booster Pump
16. Conduit Clamp (P/S)
17. Overboarding Chute (P/S)
18. Ninth Reel
19. Pig Launcher (P/S)
20. Skid Beam
21. Single Anchor Leg Mooring
22. Dual Product Swivel
23. Submarine Hose
24. Main Mooring Buoy
25. Auxiliary Buoy
26. SLAR Linear Puller
27. Tenth Reel
28. Floating Hose
29. Pigtail
30. Towing Winch Hydraulic Pumps
31. Towing Winch Control Console
32. Towing / Mooring Winch (P/S)
33. Swivelling Fairlead (P/S)
    Stern Anchor (P/S)

Figure C-2. OPDS Layout Onboard SS AMERICAN OSPREY (OPDS 2)

APPENDIX D
COMMUNICATIONS PROCEDURES

1. Overview

Communications provide the voice and data connection by which JLOTS commanders make their intent known and conduct operations. Communications systems provide the means for critical orders and directives to flow from commanders to subordinates and status reports to return. Emphasis on good communications practices will be paramount throughout all phases of JLOTS planning and execution. Basic guidelines are found in Army FM 24-1, "Combat Communications," and the Joint Pub 6-0 series.

2. Communications Procedures

The following procedures are important for the successful execution of JLOTS operations.

a. JLOTS operations rely on both radio and wire communication for C2. The primary forms of communication for control of lighterage will be bridge-to-bridge radio (voice) communications using equipment generic to the lighterage, radio telephone using communications satellite (COMSAT) and navigation satellite (NAVSAT), walkie-talkies (preferably with three to four frequencies), or cellular telephone. Bridge-to-bridge radio communications can be initially established on channel 16 (emergency net) or channel 13 (156.6 MHZ). A common net will then be established for all lighterage operations in the area. The lighterage control center, lighterage control point, maintenance elements, and Navy and USMC stations will use these nets. Control of the lighterage net would be vested in the harbormaster, beachmaster or JLCC, acting under the direction of the JLOTS staff (operations officer).

b. Control of shoreside facilities will be carried out by both wire and radio. This net will employ wire communications to elements on the beach area and radio to mobile stations. When operating in a fixed facility, established organic communications equipment will be preferred to radio. An operations net will be established by the JLOTS staff operations officer and contain the following stations: harbormaster or beachmaster, discharge points, transfer points, staging and marshalling areas, maintenance elements, administrative areas, Army, Navy, and/or Marine Corps commands, higher headquarters, and the LCC.

c. In a hostile electronic environment or when under command-imposed radio silence, the lighterage control net may use visual signals at the LCC and LCPs to control lighterage. These signals may be lights, flags and pennants, or semaphores. Details of the Army use of these signals may be found in Army FM 55-501-1, "Landing Craft Operator's Handbook."

d. If an MIUW unit is assigned for seaward surveillance and interdiction, a separate security network will be required to enable rapid employment of interdiction patrol craft.

3. Unique Communications

a. Strategic sealift communications systems and procedures used for JLOTS are unique because of two factors. The first is the multitude of Service equipment and procedures that will be used in a JLOTS operation. The second is due to the use of commercial maritime communications systems and procedures used on merchant vessels. Therefore, a specific communications plan must be established that will ensure

interoperable communications throughout the operation between the participating forces.

b. Plans for JLOTS communications must be based on clear understanding of the capabilities of specific Service units that will participate. Under normal circumstances, naval communications equipment will augment that of commercial shipping. However, in order for commands to communicate effectively with strategic sealift ships, there must be a common understanding of the capabilities of the ships and the delivery procedures of voice and message traffic to them.

c. The communications capabilities in strategic sealift ships range from fleet and commercial satellite communications (i.e., NAVSAT, COMSAT) and on-line cryptographic systems to high frequency, continuous wave (CW) only, off-line, and unclassified communications in contract and charter vessels. Other ships are capable of communicating with commercial coastal radio stations via high frequency voice and CW systems only. These ships may be manned by either naval contingents, civil service personnel, crews from the maritime industry, or a combination thereof. Most of these ships have no cryptographic systems and are incapable of handling classified information.

d. A communications exercise similar to a command post exercise (CPX) should be conducted before a JLOTS operation to provide watch station and radio operator training. Actual nets and personnel to be used in the operation should be activated for the CPX.

e. For OPDS operations, the onshore fuels distribution commander is responsible for ensuring communications interoperability with the OPDS tanker. If OPDS communications equipment is not interoperable, the shore-based unit will provide the necessary equipment, including backup. Because of the need for tanker recall until a reserve is established ashore, tanker communications may have to span about 50 miles, which requires at a minimum a very high frequency (VHF) transceiver.

4. Communications Plan

A JLOTS communications plan will be based on the OPLAN it supports. It will reflect the communications requirements of the operation and the commanders of the participating forces. These requirements include radio frequencies, call signs, interoperable cryptographic and authentication systems, and special-purpose communications equipment or support. The communications plan details the circuits, channels, and facilities required to support the JLOTS operation, and reflects the JLOTS commander's connectivity with the JFC, Service component commanders, and other elements of the joint force as required. The communications plan should be issued to participating forces well in advance of the operation and should:

a. Provide or allocate frequencies to elements of the participating forces;

b. Identify communications security materials and communications security strapping options;

c. Identify dedicated or special purpose nets, circuits, and call signs;

d. Coordinate with supported and supporting CINCs for the use of CINC- or CJCS-controlled assets; and

e. Coordinate the use of host-nation communications facilities with the supported CINC.

APPENDIX E
SUPPORT AND MAINTENANCE OPERATIONS

1. Overview

NBG units are task-organized for JLOTS operations. They come equipped with camp services and maintenance facilities to the intermediate level. Bulk fuel, rations, water, and ammunition are supplied by the commander of the landing force or other troop commander ashore. This arrangement must be clearly spelled out in pre-JLOTS planning. The extent and nature of the support to be provided should be determined and specified in the JLOTS OPORD, letter of instruction, or other implementing directive. The Floating Craft General Support Company provides support and maintenance for Army units.

2. Lighterage

Because of the nature of JLOTS, a Navy amphibious ship might not be available for use in maintenance support. This situation will require planning for maintenance operations to be conducted ashore. The beach support unit's lighterage repair element must carefully and completely plan for the likely maintenance requirements for all lighterage to be employed. Possible alternative plans could include cooperative use of Army facilities, use of a commercial semi-submersible ship, or the rapid repair or buildup of a damaged or underdeveloped port facility. Lighterage maintenance activity would be extremely difficult to conduct from an unprotected beach subject to surf. As a last resort, maintenance can be conducted beyond the surf line from alongside the ELCAS, although this use of the ELCAS will detract from its normal cargo-transfer functions.

3. Camp Support

Army and NBG units are self-sufficient in terms of camp support. The camp area established ashore will house the members of the JLOTS team that install and maintain semipermanent installations such as the OPDS and ELCAS. Camp support must be preplanned for any attachments assigned to the NBG from external organizations. NCHF personnel will be berthed both ashore and temporarily aboard the ships they are unloading. Once ashore, NCHF personnel will integrate into the PHIBCB camp.

4. JLOTS Equipment

a. Maintenance requirements for JLOTS equipment must be carefully analyzed in view of environmental conditions, enemy threat, expected length of operation, and expected availability of higher echelon maintenance support. Maintenance planning for JLOTS operations should be concurrent with other planning and should consider the adequacy of training personnel, pooling of repair resources, amounts of repair or spare parts to stock, and a maintenance float (if required).

b. Planners should remember that equipment subjected to continuous use in less than ideal conditions is subject to breakdown and should include the time required for preventive and corrective maintenance into any timetables developed for JLOTS. Likewise, camp planners must ensure that adequate sheltered maintenance areas are provided early in advanced base construction.

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APPENDIX F
SAFE HAVEN REQUIREMENTS

1. Overview

Normally, a safe haven is designated in amphibious assault operations. Safe havens are specific Navy amphibious ships that have well decks and have the capability to provide this service and perform maintenance. These naval amphibious ships may not be available to support JLOTS operations that are conducted with strategic sealift ships. Even if the amphibious ships were available, they still would not be able to provide safe havens for all lighterage and floating discharge facilities and equipment that are employed in support of discharge operations. Since most discharge equipment is weather-sensitive, safe havens must be designated and a workable plan must be promulgated for safe haven use to ensure safe and effective JLOTS operations.

2. Site Selection

Selection of a boat haven site must be accomplished before the arrival of JLOTS facilities and lighterage. The safe haven site can be any body of navigable water that remains relatively calm during periods of heavy weather or heavy offshore swells, including breakwaters, bays, protected river mouths, and land mass lees to dominating weather and swell conditions. For some lighterage, beaching on a protected beach can suffice. Safe havens should be close to the JLOTS area.

3. Safe Haven Operations

a. Safe haven requirements will be provided for special equipment and material, RRDF, and all types of lighterage. Towing and towing backup requirements must be stated in a safe haven evacuation plan.

b. Calm water operations, such as those using the RRDF, should be conducted in an appropriate anchorage nearest the designated safe haven. Further, appropriate tug or tow boats must be dedicated to the task of moving such facilities on short notice.

c. In the event of heavy weather forecasts, tug boats, salvage craft, and any other craft that can assist in the towing of lighterage and other floating equipment to the safe haven should be placed in a weather alert status and should be prepared to execute an evacuation plan accordingly. The NBG commander will formulate the safe haven evacuation plan before arrival in the JLOTS area, and the JLOTS commander will review such procedures with Service counterparts in the event of a joint operation. Amphibians usually do not require safe havens, as they seek refuge on land from impending high surf or storm.

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APPENDIX G
SEA STATE, WEATHER, AND SURF

1. Overview

In selecting a landing site for JLOTS operations, the weather and effects of the sea play a key role. Prior to selecting a site, planners should research historical weather conditions for that particular location or region. During LOTS and/or JLOTS, continued cognizance of existing weather and surf conditions is imperative to the successful execution of a JLOTS operation.

2. Wind and Sea States

a. As shown in Figure G-1, the Pierson-Moskowitz sea state scale provides a concise and sequential listing of both wind speed and sea states. It should be used as the reference guide in determining the effect of wind speed on sea states.

b. The modified surf index is a single dimensionless numberless number which provided a relative measure of the conditions likely to be encountered in the surf zone. For the reported or forecast conditions, the modified surf index provided a guide for judging the feasibility of landing operations for each type of landing craft. When applied to a known or forecast surf condition, the modified surf index calculation provides the commander with an objective method of arriving at a safe and reasonable decision with respect to committing landing craft. Modified surf limits for landing craft should be used in conjunction with the Pierson-Moskowitz sea state scale when conducting JLOTS operations.

3. Weather Information

Weather information concerning the offshore discharge area must be analyzed carefully to determine the probable effect of weather on lighterage operations and working conditions. Cargo operations in such adverse weather are negatively affected by sea, swell, and surf conditions. Local winds, thunderstorms, and reduced visibility are other environmental conditions that affect JLOTS operations. Frequent and accurate weather and surf forecasts are essential to the expeditious, efficient, and safe off-load of strategic sealift ships.

4. Weather Forecasting

a. A meteorological team must be assigned throughout the duration of a JLOTS operation. It should be collocated with the JLOTS commander. This team will provide effective and timely on-scene 24-hour weather forecasts to the JLOTS commander once every 4 hours or as required in the event of rapidly changing weather conditions. Prior to the arrival of the meteorological team, advance hardcopy forecasts are available through the regional Naval Meteorology Oceanographic Center. Weather forecasts are also continuously provided on VHF radio (Channel 1).

b. Conditions beyond the range of synoptic forecasts are estimated by using climatological data. Current synoptic forecasts show such information as the sky and weather conditions, temperature data, visibility, strength, and direction of prevailing winds, sea and surf data, and astronomical data. The assigned Navy meteorological team is the primary source for meteorological and oceanographic data for units operating on the beach.

5. Surf

Surf can be predicted by using meteorological data to forecast weather and by examining meteorological data in conjunction with hydrographic conditions.

PIERSON-MOSKOWITZ SEA SPECTRUM							
Sea State	Significant Wave (Ft)	Significant Range of Periods (Sec)	Period of Maximum Energy (Sec)	Frequency Maximum Energy (Sec)	Average Period (Sec)	Average Wave Length (Ft)	Wind Speed (Kts)
0	0.10	0.34 - 1.09	0.87	7.22	0.62	1.31	2.51
0	0.15	0.42 - 1.33	1.07	5.87	0.76	1.97	2.83
1	0.50	0.77 - 2.43	1.95	3.22	1.39	0.57	5.17
1	1.00	1.09 - 3.43	2.75	2.28	1.96	13.14	7.31
1	1.20	1.19 - 3.76	3.02	2.08	2.15	15.76	8.01
2	1.50	1.34 - 4.21	3.38	1.86	2.40	19.70	5.05
2	2.00	1.54 - 4.86	3.90	1.61	2.77	26.27	10.34
2	2.50	1.72 - 5.43	4.36	1.44	3.10	32.84	11.36
2	3.00	1.89 - 5.95	4.78	1.31	3.40	39.41	12.66
3	3.50	2.04 - 6.43	5.16	1.22	3.67	45.98	13.68
3	4.00	2.18 - 6.87	5.52	1.14	3.92	52.54	14.62
3	4.50	2.31 - 7.29	5.86	1.07	4.16	59.11	15.51
3	5.00	2.44 - 7.68	6.17	1.02	4.38	65.68	16.35
4	6.00	2.67 - 8.41	6.76	0.93	4.80	78.82	17.91
4	7.00	2.89 - 9.09	7.30	0.86	5.19	91.95	19.34
4	7.50	2.99 - 9.41	7.56	0.83	5.37	98.52	20.02
5	8.00	3.08 - 9.71	7.81	0.80	5.55	105.09	20.68
5	9.00	3.27 - 10.30	8.28	0.76	5.88	118.22	21.93
5	10.00	3.45 - 10.86	8.73	0.72	6.20	131.36	23.12
5	12.00	3.78 - 11.90	9.56	0.66	6.79	157.63	25.33
6	14.00	4.08 - 12.85	10.33	0.61	7.34	183.90	27.36
6	16.00	4.36 - 13.74	11.04	0.57	7.84	210.17	29.24
6	18.00	4.63 - 14.57	11.71	0.54	8.32	236.45	31.02
6	20.00	4.88 - 15.36	12.34	0.51	8.77	262.72	32.70
7	25.00	4.45 - 17.17	13.80	0.46	9.80	328.40	36.56
7	30.00	5.97 - 18.81	15.12	0.42	10.74	394.08	40.04
7	35.00	5.45 - 20.32	16.33	0.38	11.60	459.76	43.25
7	40.00	6.90 - 21.72	17.46	0.36	12.40	525.43	46.24
8	45.00	7.32 - 23.04	18.52	0.34	13.15	591.11	49.04
8	50.00	7.71 - 24.28	19.52	0.32	13.87	656.79	51.70
8	55.00	8.09 - 25.47	20.47	0.31	14.54	722.47	54.22
8	60.00	8.45 - 26.60	21.38	0.29	15.19	788.15	56.63
9	70.00	9.12 - 28.73	23.09	0.27	16.41	919.91	61.17
9	80.00	9.75 - 30.72	24.69	0.25	17.54	1098.87	65.39
9	90.00	10.35 - 32.68	26.19	0.24	18.60	1182.23	69.36
9	100.00	10.91 - 34.34	27.60	0.23	19.61	1313.59	73.11

Figure G-1. Pierson-Moskowitz Sea Spectrum

The surf zone will seriously affect the progress of an operation in the following areas.

a. **Breaker Period.** The period of the breaker is the time lapse between successive wave crests and is a significant factor in determining the type of breaker, its height, refraction, and velocity. In addition, the direct effect of breaker period on lighterage is simply a matter of the frequency at which the breakers impact on the craft. Short period storm waves from local sources may arrive every 6 to 12 seconds. Under these conditions, navigational difficulties will occur because the craft will not have cleared or recovered from the impact of one breaker before the next one arrives. This difficulty is not encountered with breakers generated from long period swells. These breakers have a period of between 10 to 20 seconds. On steep beaches, long period breakers also provide an opportunity for landing craft to pass through the surf zones between breakers.

b. **Type of Breaker.** The type of breaker that lighterage is navigating will have a significant impact on its ease of operation. Plunging and surging breakers have a steep angle from trough to crest. Thus, when these breakers hit the lighterage, the effect is that of hitting a wall of water that is to be broken through rather than ridden over. If plunging or surging breakers are high enough, their pounding effect on lighterage can pose serious problems to navigation. Spilling breakers have a shallower angle from trough to crest. Lighterage tend to ride over them. Even at greater heights, if the period of the waves is long enough, lighterage can navigate without difficulty.

c. **Breaker Angle.** Under certain conditions waves will break at an angle to the shore, causing a littoral current. Short period waves, wind waves, and chop do not undergo any appreciable refraction when approaching a beach. Thus, if their deep water angle of approach is not parallel to the beach, these waves will break at an angle. The degree of refraction undergone by a long sea swell tends to be dependent on the beach gradient. On beaches with mild gradients, waves will refract enough to break almost parallel to shore. Little or no refraction occurs on steep beaches. This results in plunging breakers and a strong shore current traveling in the same direction as the waves. If wave height and angle of breaking are sufficient, this littoral current can have a speed of up to 3 or 4 knots. The speed of the current will also vary in different parts of the surf zone. Both the angle of breaking and the littoral current will cause problems for lighterage operations.

d. **Surf Damage.** Breakers that hit lighterage broadside or at an angle can cause them to broach or swamp. In order to remain perpendicular to the breakers, lighterage must approach the beach at an angle. When traversing the littoral currents, which are parallel to the beach and of varying speeds, the coxswain must constantly adjust the rudder angle and propeller revolutions per minute to prevent broaching. Once the craft has beached, the breakers will hit the lighterage at an angle. This also causes difficulty in preventing broaching or swamping long enough for the craft to be discharged.

e. **Underwater Topography.** Underwater topography affects an operation by influencing the character of the surf zone and navigation of lighterage. Other aspects of topography that influence lighterage operations include beach gradient, reefs, sandbars, and underwater obstacles.

f. **Beach Gradient.** In addition to influencing the type, speed, and depth at which waves break, beach gradient will affect how close to the shore lighterage can beach. Beaches with mild or flat gradients cause landing craft to run aground too far from the beach. Discharge equipment must move into the water to discharge cargo, which makes the operation more hazardous and increases

discharge time. Steep gradients make it difficult for landing craft operators to keep the craft at right angles to the beach. Currents or mild or angling surf can readily broach or swamp the vessel. Generally, gradients from 1:20 to 1:30 are best for LCUs and gradients from 1:10 to 1:20 are best for LCMs. Listed below are categories of beaches by steepness of the gradient.

- Steep — more than 1:15.
- Moderate — 1:15 to 1:30.
- Gentle — 1:30 to 1:60.
- Mild — 1:60 to 1:120.
- Flat — less than 1:120.

6. Surf Forecasting

a. JLOTS operations require surf forecasting in addition to surf observations. The surf height can be a critical factor in these operations. Although hazards to lighterage and discharge facilities increase with increasing breaker height, difficulties encountered also depend on the width of the surf zone, the time between breakers, and the type of breaker.

b. The OCO will monitor surf observations received at least every 2 hours from the beach party element ashore. Although the OCO may request a surf observation (SUROBS) report at any time during operations, the assigned beach party team will conduct SUROBS every 2 hours and will pass the new and evaluated information to the OCO. Such evaluation will contain a forecast of future surf conditions based on weather forecasts obtained from the meteorologists. The surf forecast format is contained in Commander, Naval Surface Force, Pacific Commander, Naval Surface Force, Atlantic NWP 3-59.3, "Surf Zone Operations." The elements of the surf forecast or surf observation report are as follows.

- **ALPHA — Significant Breaker Height.** The mean value of 1/3 of the highest breakers on the beach measured to the nearest half foot.
- **BRAVO — Maximum Breaker Height.** The highest breaker observed or forecast during the period measured to the nearest half foot.
- **CHARLIE — Period.** The time interval between breakers measured to the nearest half second.
- **DELTA — Breaker Types.** Plunging, spilling, or surging preceded by the numerical percentage of each as applicable.
- **ECHO — Angle of Breaker with the Beach.** The acute angle, in degrees, a breaker makes with the beach. Also indicates the direction toward which the breaker is moving, RIGHT flank or LEFT flank.
- **FOXTROT — Lateral Current.** The alongshore current, measured to the nearest tenth knot. Also given is the direction toward which a floating object is carried, RIGHT flank or LEFT flank.
- **HOTEL — Additional Remarks.** Other information important to landing operations, i.e., wind direction and velocity, visibility, debris in the surf zone, secondary wave system if present, and dangerous conditions.

APPENDIX H
PERSONNEL MOVEMENT IN THE LOTS/JLOTS OPERATION AREA

1. Overview

a. The movement of personnel must be controlled within the beach area to ensure noninterference with off-load discharge operations, the safety of transients, and security considerations. The off-load coordinator or terminal commander will establish a plan addressing the movement of personnel within the immediate off-load area and between the beach and offshore discharge sites. The transporting of hatch crews, shipboard personnel, military authorities, reliefs, and working parties should be included in such a plan.

b. Two types of personnel movement will be addressed in this appendix: the movement of transient troop units in and through the LOTS and/or JLOTS area, and the movement of personnel involved in the LOTS operation.

2. Transient Troop Movement

Because of the large concentration of equipment in the off-load area, the movement of transient personnel into and through the area must be minimized and closely controlled. The planning for and organization of the off-load area should include a separate area, as feasible, within the off-load area for the debarkation of personnel and units. The movement of personnel through the off-load area will be under the control and coordination of the off-load coordinator or terminal commander. Ultimately, the determining factors in planning for troop movement into and through the area are the nature and size of the unit, its parent command, its mission ashore, and the type of shipping on which it arrives.

3. Movement of LOTS Personnel

In planning for personnel movement, the JLOTS commander will allocate to the OCO or JLCC dedicated lighterage and crews. Lighterage designated for personnel movement will be assigned by the OCO to the control of one designated lighterage control officer (LCO) or ship lighterage control point. The LCO in charge of personnel movement between ships and between ship and shore will be stationed where he or she can best control the lighterage assigned. Requests for movement of personnel (e.g., a hatch team from ship A to ship B) will be directed to this LCO. The LCO will then assign appropriate lighterage, based on size of the group to be moved, equipment moving with the group (if any), and priority of the group's mission relative to that of other groups requesting movement. Lighterage assigned personnel movement functions will keep in contact with the LCO and receive movement orders from that LCO only. The LCO tasked with personnel movement must be clearly designated in the communications plan; be given radios, communications, and call signs; and be provided with locations adequate for the observation of lighterage under the LCO's control. In the event that general cargo movement lighterage is temporarily tasked to move personnel, it will fall under the tactical control of the LCO until such personnel transfer is completed. It will then go back to the control of the appropriate LCO for cargo movement. Once ashore, personnel movement procedures will be controlled by the parent organization.

4. Movement of Personnel to Vessel Decks

Lighter crews must be proficient in coming alongside a vessel and they must ensure they have appropriate fenders. If at all possible, crews should learn to come alongside a vessel and become proficient at holding a station at the companion way. If this is not possible, personnel may have to use the Jacob's ladder or be lifted by crane to the deck. If lifting personnel via crane is the only way to place personnel on deck, rope safety nets specifically designed for this purpose may need to be procured.

APPENDIX J
SECURITY OF OFF-LOAD ANCHORAGE OR BEACH AREAS

1. Overview

a. The JFC is responsible for overall security in the JLOTS area. The JFC will determine host-nation security support availability and adequacy, if applicable, and will establish additional measures to provide security as required. This responsibility may be delegated to a subordinate commander capable of providing adequate security. Appropriate forces for security must be provided, depending on the threat and tactical situation, to protect the offshore area as well as the beach reception area.

b. JLOTS operations are normally conducted in a low threat environment; i.e., the operation is out of range of enemy artillery fire. Primary threats to consider are air and rocket attack, attack by enemy forces or guerrillas operating behind the lines, and sabotage. Nuclear, biological, and chemical (NBC) warfare is considered possible. JLOTS operations are a critical link in the resupply system; therefore, an attack in one form or another is possible. The defensive posture of the terminal battalion varies depending on the type of threats considered likely.

2. Offshore Security

a. Offshore security in the anchorage area is particularly important because of the vulnerability of strategic sealift ships. Unlike naval ships, merchant type ships are relatively thin-skinned and sparsely compartmented, rendering them vulnerable to catastrophic loss. Generally speaking, these ships are unarmed, with the exception of small arms capable of providing basic self-defense against unauthorized intrusion.

b. Security measures may be both active and passive. Active security involves seeking out and neutralizing any enemy threat. Passive security focuses on timely detection of threats. Local security in the anchorage area may include the following efforts.

- Active and passive surface patrol and interdiction operations.

- Active and passive anti-swimmer operations that could include the use of combat swimmers, concussion grenades, charged firehoses, various detection systems or sensors, and roving patrols.

c. Offshore security is provided by surveillance and interdiction elements attached to the Navy component commander. Mobile inshore undersea warfare units (MIUWUs) are surveillance and C4 elements that provide seaward radar and acoustic surveillance, control patrol craft, and vector them to interdict surface and subsurface contacts. For JLOTS security tasks, the C4 functions of an MIUWU are analogous to an Army tactical operations center or rear area operations center having ultra high frequency-, VHF-, and high frequency-covered and clear communications equipment.

- Each fully equipped MIUWU has 12 officers and 60 enlisted personnel, and an air detachment complement has 5 officers and 23 enlisted personnel. Approximately two MIUWUs with reduced table of allowance (TOA) can be constituted from organic Navy support personnel and mounted-out for transit within 48-hours as an air detachment. An air detachment can be airlifted by either a single C-141B or two C-130s and sustain operations for 14 days before being evacuated or reinforced by the residual or the unit.

- In general, entry and egress into the LOTS anchorages and exclusion areas are controlled by the MIUWU. This exclusion area is designated the inner defense zone (IDZ) and its radius is determined by the effective range of the small arms and light caliber weapons of a ship's forces — about 2,000 yards. Any craft entering the IDZ via an unauthorized lane or channel is presumed hostile and may be engaged if authorized by current rules of engagement. The radius of the IDZ is also determined by the displacement of the anchorages and ship-to-ship traffic between them by lighterage and other small craft. An outer defense zone (ODZ) is established for the benign passage of commercial vessels and private craft, but is patrolled by armed craft to ensure against unauthorized entry into the IDZ. The radius of the ODZ is about 30,000 yards, the effective radar line of sight of an MIUWU. Any craft having a projected radar track into the IDZ will be intercepted by the patrol craft and warned to stay clear. For the submarine and swimmer delivery vehicle threat, sonobuoy barriers are established at 15,000 yards in the most probable threat axis or avenue of approach. Swimmer defense is the responsibility of each ship and can be effected by topside sentries; shaft rotation to create a wash; floodlights; or random percussion grenades. If combat swimmers are a very real threat, sea-air-land team support may be required.

- An MIUW TOA includes the AN/BPQ-108 Radar-Sonar-Surveillance Center van, which is towed by a 2 1/2- or a 5-ton truck and a variety of smaller support vehicles and equipment. Each MIUW has an Avon or Zodiac inflatable raft and 55-hp motor for use as a work boat. The radar is a 15- to 20-nm version of a civilian radar, the AN/TPS-66. The sonar suite consists of a passive acoustic signal processor that has target recognition capabilities and directional capabilities from information provided by either moored or free-floating sonobuoys. The installed communications equipment is primarily interoperable with fleet and US Coast Guard vessels, although the units do have AN/PRC-77 frequency modulation radios for USMC-US Army communications.

d. The US Coast Guard port security unit (PSU) will provide the JLOTS commander with teams capable of evaluating and overseeing physical security measures on waterfront facilities, performing surveillance duties, and establishing and enforcing restricted access areas, security zones, and safety zones in order to control personnel or vessel access to sensitive portions of a port area or complex. The PSU will also provide teams to oversee and supervise the transfers of military and/or commercial explosives, hazardous materials in bulk or packages, and petroleum, oils, and lubricants cargoes.

- A PSU will be assigned in accordance with the OPLAN, includes 14 officers and 103 enlisted personnel, and is composed of the following: C2 team, liaison officer, and port safety detail, as well as engineering (deployed boat and light vehicle maintenance), weapons, electronics, communications, subsistence, medical, and administrative support teams.

- The PSU's major equipment consists of six trailerable patrol boats and parts. The commander receiving the PSUs will be responsible for providing strategic lift support forces, and will also be responsible for providing vehicles, medical and subsistence support, and a location to make boat repairs. PSUs are

deployed with provisions to sustain members of a unit for 30 days.

3. Beach Security

The provision and execution of beach area security is completely scenario-dependent. In the early post-assault phase of an amphibious operation, security of the beach reception area may be carried out by air, ground, and naval combat forces. At the other end of the spectrum, as would normally be expected in a JLOTS operation, security in a nonhostile overseas environment may be provided largely by the host nation.

4. Responsibilities

Responsibilities for security planning and execution are shown below. These responsibilities are not all-inclusive and are only representative of the many security considerations attendant to various operational JLOTS scenarios.

a. **Supported CINC.** Responsibilities include the following.

- Security of strategic sealift forces during operations conducted in the AOR.
- Requests for additional security support from other unified commands and national or international agencies through the Chairman of the Joint Chiefs of Staff.

b. **Officer in Tactical Command (if assigned).** Responsibilities include the following.

- Security of the objective area to the high water line.
- Coordination of security operations with supporting and adjacent commands and country.
- Requests for additional security support or forces from higher authority.

c. **Commander of the Supported Forces Ashore.** Responsibilities include the following.

- Conducting active and passive security measures throughout all phases of operations ashore beyond the high water line, as directed by higher authority.
- Requests for additional security support or forces from higher authority as required.
- Coordination of security in the JLOTS objective area with the OTC (if assigned).

5. General Principles for Defense

The following are defensive principles to be considered for JLOTS operations.

a. **Warning Systems.** A warning system is established to alert personnel in the event of an attack. Examples of such systems are clanking of metal to indicate a NBC attack; a series of short blasts of a vehicle's horn for an air attack; and a continuous blast of a horn for a group attack. All personnel are taught how to initiate the warning system when necessary and to recognize the signals when heard. All personnel are thoroughly briefed on how to react to each type of alarm.

b. **Cover, Concealment, and Dispersion.** A JLOTS operation is so large that it is impossible to cover or conceal it. However, the proper use of smoke cover, concealment, and dispersion can minimize the effect of enemy observation and attack. Cover and concealment are used to frustrate enemy observation and fire. Vehicles are dispersed in the motorpool as passive defense against

air attack. When amphibians are used, these craft are dispersed over the entire operational area to deny enemy aircraft a concentrated target.

c. **Defensive Plans.** The four main areas for which defensive plans are developed are attacks from naval warships, air strikes, ground attack, and NBC attack.

- **Naval Attack.** Defense against naval forces is primarily a naval responsibility. Coordination with both the Navy and the Air Force is conducted. Internally, the possibility of such an attack requires personnel in the operation to know how to react against a bombardment. Personnel aboard ships and lighterage also must know procedures for shipboard firefighting and abandoning ship.

- **Air Attack**. The possibility of air attack necessitates the digging of foxholes or bunkers in all areas of the operation where personnel are located. Both passive and active air defense plans are developed. If the threat is serious enough, coordination for weapons heavier than small arms and STINGERS is made. Army FM 44-8, "Small Unit Self-Defense Against Air Attack," provides Army units guidance on defense against air attack.

- **Ground Attack.** The perimeter defense is the primary means of defense against group forces. The outer edge of this defense consists of intrusion detection systems, observation posts, and patrols. These systems are followed by a series of defensive lines. Fire plans are carefully developed so that all possible areas are covered. Automatic weapons and mines cover primary avenues of approach. Concertina wire is used to restrict and funnel enemy movements. Mortar, artillery, or naval bombardment is coordinated to cover those areas that cannot be covered by direct fire. Army FM 100-5, "Operations," contains guidance on coordination of defensive fire.

- **NBC Attack.** NBC weapons can be launched from sea, air, or ground. The primary focus of defense against these weapons is the survival of the individual soldier and minimizing the weapons impact on the operation. Use of NBC individual protection gear is required and washdown facilities must be provided.

APPENDIX K
COMMAND, ORGANIZATION, AND WORKING RELATIONSHIPS WITH CIVILIAN MERCHANT MARINERS

1. Overview

Strategic sealift ships participating in JLOTS operations are usually crewed by civilian mariners of the US Merchant Marine. Sometimes referred to as "the fourth arm of defense," the US Merchant Marine played critical roles in both World Wars I and II, the Korean War, the Vietnam War, and the Gulf War. To conduct JLOTS operations with civilian-manned ships effectively, safely, and expeditiously, it is important to understand the organization, authority, and responsibilities of the merchant mariners who operate the ships.

2. Merchant Mariners

a. **MSC Mariners.** MSC strategic sealift ships are manned, in part, by US government civil service mariners. They may or may not be members of maritime labor unions. The COMSC administers the civil service mariners program in accordance with Navy standards of personnel performance and disciplinary tradition. MSC policy also conforms as closely as possible with current conditions and practices of employment in the private commercial maritime industry. The majority of strategic sealift ships, however, are manned by private sector merchant mariners.

b. **Private Sector Merchant Mariners.** Most ships involved in JLOTS are manned by this category of civilian mariners. Conditions of employment in the Merchant Marine are contained in US Coast Guard regulations and commercial shipping company rules and working agreements, which are negotiated by maritime unions and the companies.

c. **Licensed and Unlicensed Mariners.** The master, mates, engineers, and radio officer are considered licensed personnel and must qualify and keep current through US Coast Guard examinations. All other merchant mariners are considered unlicensed personnel.

3. Strategic Sealift Shipboard Organization

Under the master, commercial merchant ships are organized in three basic departments: deck, under the chief mate; engine, under the chief engineer; and steward, under the chief steward. Additionally, one or more military organizations (a merchant ship squadron commander and staff, an off-load preparation party, and other military organizations) may be aboard.

a. **The Master.** The master's inherent authority stems from a responsibility for the safety of all embarked personnel in carrying out the assigned tasks. This authority is defined by maritime law, applicable federal statutes, and US Navy regulations. In addition, the master's authority stems from a responsibility for complying with the administrative directives of COMSC or MSC subordinate commanders and the operational orders of the task force, task group, or task unit commander when attached to the latter for OPCON. The master is responsible for enforcing all applicable US laws and all applicable orders and regulations of the US Navy, US Coast Guard, and the TFC. This responsibility includes the following.

- Safety of the ship, all persons on board, and the cargo.
- Navigation and operation of the ship.
- Maintenance of discipline among the civilian mariner crew.

- Providing the commanding officer or OIC of any embarked military unit with:

  •• Every reasonable facility and assistance required for the safety, well-being, and efficiency of the embarked military detachment; and

  •• Copies of all messages and directives pertaining to schedules, port regulations, and movements of the ship.

b. **The Chief Mate.** The chief mate (sometimes referred to as the "first officer") is the second-in-command on a merchant ship. The chief mate is in charge of the deck department and is responsible for the ship's cargo and cargo loading or unloading operations. The chief mate is usually a nonwatchstander and, in most cargo discharge operations, will be the principal interface point between the military off-load control organization and the ship.

4. On-Scene MSC Representative

During the course of JLOTS operations, it may become necessary for the JLOTS commander to require that the MSC ships take specific actions, such as shifting to a different anchorage or operations. Only an MSC representative has the contractual authority to provide legally binding direction to the ship's master. Therefore, because of the close working relationship that must exist between military and civilian mariners during JLOTS operations, it is important that an on-scene MSC representative be present. During OPDS operations, when performance of the civilian tanker crew is particularly critical to the installation and retrieval of OPDS components, the on-scene MSC representative should remain readily available to immediately resolve differences between the military OPDS personnel and the ship's crew.

5. Embarked Military Off-load Units

The most common type of military off-load unit is the off-load preparation element. This unit will conduct the off-load of strategic sealift ships, subject always to the inherent authority of the master when the safety of the ship, embarked personnel, or crew is concerned. Any differences of opinion between or among the master and commanding officers or OICs of units will be referred to the on-scene MSC representative or, in his or her absence, the JLOTS commander for resolution. The ship's master, however, is ultimately responsible for the overall safety of the ship.

6. Cooperation

Civilian crew members and military personnel are complementary and are part of a team designed to accomplish important military objectives with available sealift forces. The necessity for coordination and cooperation between civilian mariner personnel and the military cannot be too strongly emphasized. The civilian mariner personnel must realize that the Army and Navy Department have placed the military on board in order to perform an important military operation. Civilian crew personnel must also realize that the military is a distinct entity, separate from the ordinary complement of the ship and under the direction of a military officer. The ship's master and chief mate have distinct legal responsibilities for the ship's cargo handling equipment and various aspects of certain cargo discharge operations. They have the authority to stop operations if the safety of the ship or crew is endangered. Such cases should be referred to the on-scene MSC representative or, in his or her absence, the JLOTS commander for resolution, if necessary.

7. Working Relationships

Specific working relationships must be fixed before the start of a JLOTS operation as to who is responsible for the various routine matters that will normally occur during the operation. In the case of merchant vessels, these responsibilities may have to be delineated in the contract under which the merchant vessel is providing services for the operation. These matters include the following.

a. Normal working hours and conditions necessitating overtime pay for the civilian crew, including breaks for meals.

b. Who will:

- Operate what equipment, such as ship hatches and cranes;
- Provide drivers for vehicles;
- Prepare vehicles for startup;
- Provide safety observers;
- Conduct maintenance; and
- Provide cargo handling gear, such as cargo nets.

c. Functions that military personnel have to perform on the merchant vessel.

d. Personnel support to be provided for military personnel by merchant ships (e.g., messing, berthing, habitability, working facilities, and head facilities).

e. Mooring and fendering systems.

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APPENDIX L
SAFETY CONSIDERATIONS IN JLOTS OPERATIONS

1. Overview

Most LOTS operations are inherently hazardous because of the unprotected or semiprotected maritime environment, large volumes of bulk, oversized, and outsized cargo throughout, high tempo of operations, and large numbers of complex and specialized lighterage and cargo handling equipment. This appendix is not intended to be a comprehensive listing of safety warnings and cautions associated with all the systems and subsystems and evolutions associated with JLOTS operations. Specific warnings are more appropriately contained in technical manuals such as NAVFAC-460, "Elevated Causeway Facility Installation and Retrieval," COMSCINST 5100.17, the "MSC Safety Manual," series, the T-ACS class mission operations handbooks, or the OPDS operations and maintenance technical manuals. This appendix will describe general safety considerations to be observed based upon operational experience and common sense.

2. Weather and Sea State

The effects of weather and sea state and guidelines for maximum acceptable sea states are contained in the main text and referred to in Appendix G, "Sea State, Weather, and Surf." The decision to terminate JLOTS operations based on forecast or actual weather and/or sea state rests with the JLOTS commander. The decision may cover all operations or selected weather and sea state sensitive operations. Additionally, civilian masters and/or debarkation officers or ship platoon commanders may terminate operations on individual ships if, in their judgment, weather and sea state are causing unsafe conditions. In this event, the action should be reported to the JLOTS commander immediately.

3. Pre-JLOTS Requirements

Before beginning any JLOTS evolution, certain standard safety procedures should be conducted as follows.

a. Brief personnel on the safety aspects and necessary precautions that must be considered for safe operations. When more than one operation takes place in parallel, personnel should be assured that the hazards of any one operation will not inadvertently affect any of the other operations.

b. Conduct an inspection to determine the physical condition of equipment.

c. Inspect all rigging to ensure it is proper for the work to be done.

d. Ensure that personnel who have been instructed and/or given written instructions do, in fact, understand these instructions; ensure that certifications for all operations requiring certified operators are current; and ensure that all lighterage crews are Class II swimmers.

e. Exercise all equipment (e.g., cranes, lighterage, ELCAS turntable) to ensure that it responds correctly to appropriate commands.

f. Ensure that all equipment operating stations are labeled with appropriate capacity limitations data.

g. Ensure that appropriate safety devices are used and worn and that safety procedures are followed for crane and welding operations.

h. Brief all personnel on the special safety procedures to be taken when working near diving operations.

i. Determine safe haven or a place where small craft can go to get out of sea states greater than their safe operating limits. This plan should include decision charts that allow for quick determination as to what to do with a piece of equipment on the water or near the surf zone in the JLOTS area. Emergency mooring systems should be identified and worked into this plan.

4. Safety Equipment and Clothing

Personnel engaged in JLOTS operations must be appropriately equipped to minimize the potential of being killed or injured while performing their duties. Life vests, exposure suits, cold weather gear, hardhats, safety shoes, and eye and ear protection may be required depending on the evolution being performed. Loose clothing should be avoided when working around equipment such as cranes and winches. Provisioning of personal safety equipment and clothing is a Service responsibility and will be provided under each unit table of organization and equipment.

5. Fire Protection

Fire prevention and control are achieved through a combination of sound safety practices and systems of detection and alarms and firefighting equipment. Sound practices include the strict enforcement of prohibitions against smoking, open flames, and spark-producing tools in and around areas where fire hazards exist. Also, good housekeeping practices such as prevention of accumulation of flammable debris should be followed. These practices are applicable on strategic sealift ships and lighterage and at shoreside receiving terminals such as ELCAS, OPDS beach termination units, and rear fuel farms. Firefighting and damage control equipment are also extremely important. The strategic sealift ship and its crew are responsible for providing, maintaining, and operating this equipment onboard ship in accordance with US Coast Guard and MSC regulations. Lighterage and terminal crews are responsible for their respective systems. The equipment must be serviceable and crew members must be well trained in its operation. Frequent inspections must be conducted to ensure that the equipment is operable.

6. General Safety Responsibilities

Ship masters, craft masters, and terminal OICs have total responsibility for the safety of their ships, lighterage, facilities, and the crews that operate them. These duties are exercised by training, inspection, leadership, and discipline. A failure in the conduct of a safe operation jeopardizes the well-being of every individual aboard the ship or facility. Therefore, it is everyone's responsibility to act in a safe, responsible manner, performing every function as safely as possible. All personnel engaged in an operation are charged with the duty to immediately report to their supervisor any potential safety hazard or procedure that could produce an unsafe event or mishap. However, if an unsafe situation develops that does not permit time for reporting to a supervisor, anyone observing the condition should seek to have the evolution stopped.

7. Special Precautions

Most JLOTS operations, whether at the pier or beach or in the water, are hazardous. Water operations can be particularly dangerous because of adverse weather, operational task hazards, and enemy action. The efficiency of an operation may also be seriously curtailed by carelessness of personnel who permit dangerous conditions to exist or fail to repair

faulty equipment. The following special precautionary steps should be taken to prevent accidents.

a. **Shipboard Safety.** Accidents aboard ship most frequently result from falls, explosions, falling objects, faulty electrical equipment, unsafe handling procedures, and lack of protection for the eyes and extremities. During beaching operations, crew members must wear life jackets except when in the engine room or in the bridge house handling the wheel. They should be accomplished swimmers qualified in lifesaving techniques. All lines on deck should be made up in such a manner that no one can get tangled in them or trip on them. Rigging must be properly stowed and frequently and properly inspected and maintained. All personnel should wear proper clothing and use correct tools and safety gear. The bilges should be checked regularly to make sure that the landing craft is not holed or taking on water through the hull connections. The presence of fuel or fuel fumes in bilges is a sign of a potential fire hazard and must be checked immediately.

b. **Bulk Fuel Products.** Oil and grease spillage should not be allowed to accumulate on decks; spillage should be wiped up as it occurs. Bilges will be kept clean of oil and other bulk fuel products to reduce fire hazards. Approved nonvolatile cleaning agents will be used for cleaning purposes. When fuel is being received on board, no bare lights, lighted cigarettes, or any electrical apparatus that have a tendency to spark should be permitted within 50 feet of an oil hose or fuel tank. Only spark-proof tools will be used to connect or disconnect fuel lines. Bulk fuel preventive measures include the following.

- **Firefighting Equipment.** Particular attention should be given to all firefighting and damage control gear aboard. The equipment must be serviceable and operational and crew members must know the operation and location of the equipment. Frequent inspections must be conducted to ensure that the equipment is operable.

- **Fire Prevention.** "No Smoking" signs will be posted wherever potential fire hazards exist. Smoking will be permitted only in designated areas.

c. **Cargo Operations.** Special attention must be given to the proper loading, blocking, and security of vehicles or other cargo to be carried in landing craft. The ship's master is responsible for these operations and cargo must be inspected prior to movement. Cargo operation safety measures include the following.

- Personnel must be warned never to stand beneath a draft of cargo or get between a draft of cargo and a bulkhead or other cargo. They must also be warned never to pull a cargo draft into position as they might slip and fall beneath the draft. The draft is always pushed into place.

- Crew members and terminal service personnel should watch for projections and loose bandings of cargo, frayed wire, or cargo to be recoppered or rebanded before being loaded aboard. Leaky drums will not be taken aboard as cargo.

8. Safety Hazard Areas

Various hazard situations and their prevention are described below.

a. **Embarkation and Debarkation.** Personnel embarkation and debarkation at ships moored offshore should only be conducted in sea state 3 or below. Normally, Jacob's ladders are the safest method for embarkation and debarkation in poor conditions.

b. **Barges.** Most barges have coamings less than 5 feet high. In poor conditions or during cargo loading, stevedores should stay well clear of barge sides or erect a taut line or handrail.

c. **Open Hatches.** Open hatches with less than 24 inches of coaming are extremely dangerous unless protected by a handrail. Handrails must be installed when such hatches are in use.

d. **Ships Gear.** Personnel should wear protective headgear and hearing protection, if required, when working with ships gear. The ship's officers should brief Army and Navy personnel on any special safety requirements.

e. **Chain, Wire Rope, Fiber Rope, Shackles, and Hooks.** All working gear must be certified and clearly marked. Terminal supervisors must constantly ensure that the correct equipment is being used and that stevedores know its limitations.

f. **Forklift Operations.** Forklifts should be fitted with lights, overhead protective guards, and audible warning devices. Personnel should stay well clear of operating forklifts because the operator is concentrating on the task and has restricted visibility.

APPENDIX M
UNIT CAPABILITIES

1. Overview

This appendix discusses the missions, assignments, capabilities, and major equipment holdings of various Army, Navy, Marine Corps, and Coast Guard units capable of supporting LOTS operations.

2. Navy Units

a. **Naval Beach Group.** The NBG will furnish the Navy elements, composed of the naval beach party of the landing force support party, and will provide the JLOTS commander with beachmaster traffic control, pontoon lighterage, causeways, ship-to-shore bulk fuel systems, limited construction capabilities, landing craft, beach salvage capability and communications to properly command and control these specially equipped teams to facilitate the flow of troops, equipment, and supplies across the beaches. Strength levels and numbers of equipment will be based on the requirements of the appropriate operational commander, as designated in command OPORDs and OPLANs.

- An NBG is a commissioned Navy organization consisting of a commander, staff, and four Navy units — an amphibious construction battalion, a BMU, and two ACUs. The mission of the NBG is to put landing force equipment and supplies ashore during and following an amphibious assault or an MPF off-load. The NBG is an administrative organization. For operational employment, the NBG is task-organized to accomplish specific tasks to conduct LOTS as part of the participating naval forces. Figure M-1 shows an operational organization to conduct JLOTS operations, some of whose units are composed of elements belonging to the NBG.

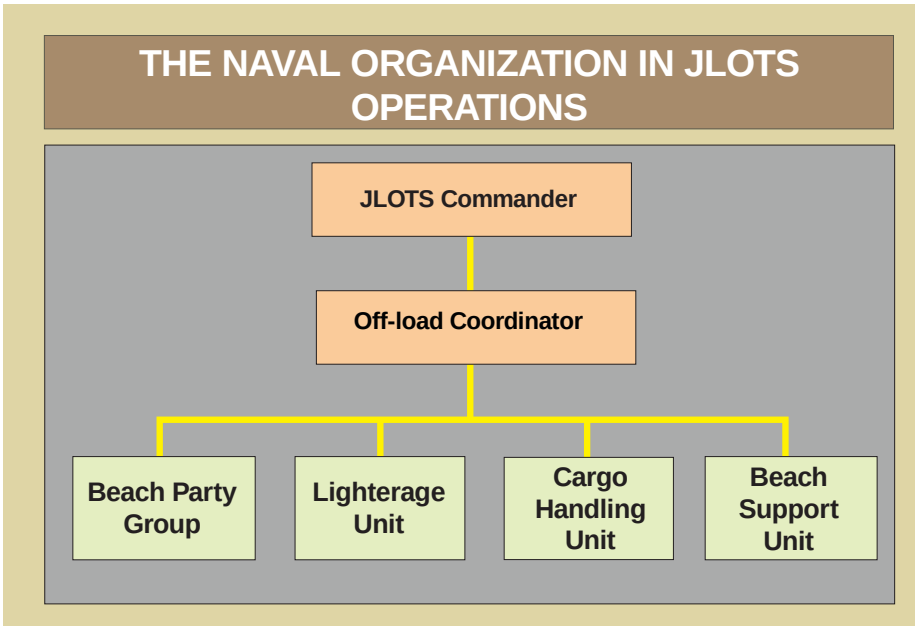


Figure M-1. The Naval Organization in JLOTS Operations

•• **Mission.** To provide the Navy elements to support the LOTS commander with beachmaster traffic control, lighterage, causeways, bulk fuel delivery, construction, landing craft, salvage, and communications to facilitate the flow of cargo across the beach.

•• **Assignment.** To JLOTS commander.

•• **Capabilities.** (1) Direct and coordinate training and administration of NBG activities, including reserve NBG unit training. (2) Provide appropriate BMU, PHIBCB, and ACU components for duty as participating naval forces in support of JLOTS operations.

b. **Amphibious Construction Battalion.** The PHIBCB provides designated elements to the JLOTS commander, supports the naval forces during the initial assault and later phases of the LOTS operation, and assists the shore party. The PHIBCB provides a unit from which personnel and equipment are formed in tactical elements and made available to appropriate commanders to operate pontoon causeways, transfer barges, fuel transfer systems, warping tugs, and ELCAS and to assist in salvage requirements. An operational organization is shown in Figure M-2.

- **Mission.** To provide elements to support the operation.
- **Assignment.** To NBG.
- **Capabilities**

  •• Install and operate CWPs, RRDF, and ELCAS.

  •• Support limited construction and camp support elements.

  •• Operate pontoon lighterage elements.

  •• Install bulk liquid systems.

  •• Provide salvage support.

  •• Provide security and beach defense.

  •• Provide lighterage repair function.

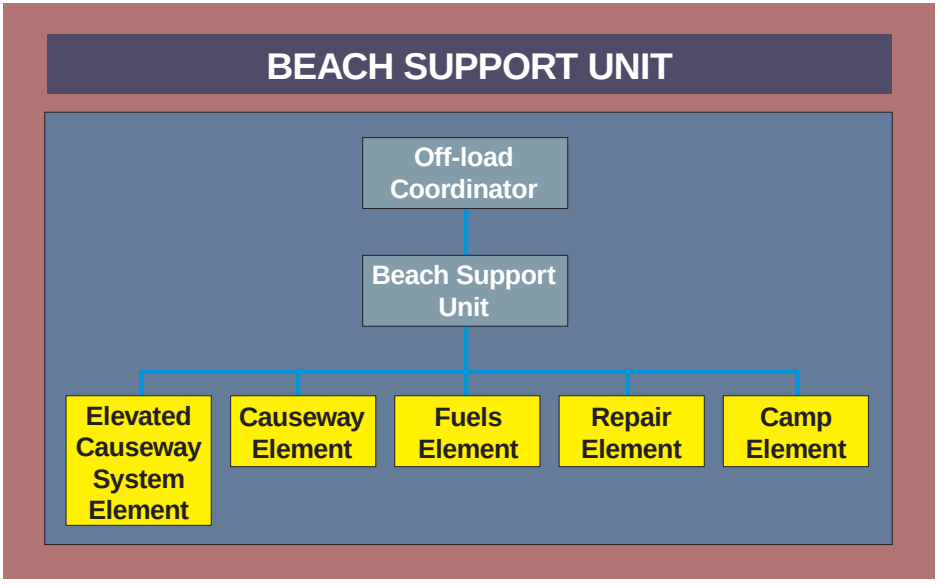


Figure M-2. Beach Support Unit

- **Major Equipment.** General construction equipment (cranes, bulldozers, front-end loaders, and other construction equipment); lighterage such as CSNP, CSP, SLWT, RRDF, and ELCAS; SALM and hosereels.

c. **Beachmaster Unit.** The BMU will conduct beach party operations for JLOTS in order to facilitate landing and moving of troops, equipment, and supplies across the beach.

- **Mission.** To conduct beach party operations to facilitate landing and moving of cargo across the beach.

- **Assignment.** To NBG.

- **Capabilities**

  •• Control landing ships, lighterage, and amphibious vehicles in the vicinity of the beach from surf line to high water mark.

  •• Determine and advise of suitability for landing of amphibious vehicles, craft, ships, and beaching causeways.

  •• Control salvage of lighterage.

  •• Provide limited assistance in local security and beach defense.

  •• Install causeway and LST beaching range markers and lights.

  •• Maintain observation of wind and surf conditions.

  •• Coordinate surf transit portion of reembarkation of equipment, troops, and supplies.

- **Major Equipment.** LARC-V.

d. **Assault Craft Units.** ACUs are commissioned units of the NBG that provide, operate, and maintain assault craft. The units may provide lighterage for LOTS operations as directed by higher authority. The ACU has no capability for advanced base functions ashore.

- **Mission.** To provide, operate, and maintain assault craft to and for the ATF commander for ship-to-shore movement. The ACU will assist with operation and maintenance of lighterage for LOTS as directed by higher authority.

- **Assignment.** To NBG.

- **Capabilities**

  •• LCU, LCM, and LCAC support for ship-to-shore movement.

  •• Maintenance and support elements for intermediate-level craft repair ashore.

  •• Administrative control of LCU, LCM, and LCAC lighterage.

- **Major Equipment.** LCU, LCM-8, and LCAC.

e. **Navy Cargo Handling Force.** The NCHF is composed of 14 battalion-sized cargo handling units that are quick response combat support units specializing in open ocean cargo handling. The units are capable of worldwide deployment in their entirety or in specialized detachments. These units are organized, trained, and equipped to (1) load and discharge Navy and Marine Corps cargo carried in MPS and merchant breakbulk and container ships in all environments; (2) operate an associated temporary ocean cargo terminal; (3) load and discharge Navy and Marine Corps cargo carried in military controlled aircraft; and (4) operate an associated expeditionary air cargo terminal.

- The F1 cargo handling battalion (CHB) is a multimission unit composed of 8

officers and 145 enlisted personnel, plus the basic unit equipment required to provide technical and supervisory cargo handling capability to fleet and area commanders in support of worldwide naval operations. Unit equipment requirements beyond the basic allowance of personnel support equipment are provided to the CHB by one or more of the supplemental equipment packages (F1A through F1G) described below. These supplemental equipment packages are tailored to the specific mission environment and to the specific requirements of the mission. The utilization of these supplemental equipment packages provides the fleet commanders a wide variety of options in utilizing the CHBs.

- The following units have the capability of being assigned to the advanced base functional components (ABFC) F1 functional mission.

  •• Navy Cargo Handling and Port Group (NAVCHAPGRU).

  •• Naval reserve cargo handling training battalion (NRCHTB).

  •• Naval reserve cargo handling battalion (NRCHB).

- Both the NAVCHAPGRU and NRCHTB are active duty battalions and are always available. The NRCHBs are composed solely of selected reserves and require slightly more time to employ.

- The specific tasks of a CHB include, but are not limited to the following.

  •• **MPS and AFOE Cargo Handling.** Providing skilled stevedores and C2 personnel capable of loading and discharging (either in-stream or pierside) commercial and MSC cargo ships associated with an MPS or AFOE operation.

  •• **Heavy Lift Marine Crane Operators.** Providing shipboard heavy lift crane operators for MPS, containership, T-ACS, and other specialized operations.

  •• **Total Cargo Class Responsibility.** Providing stevedores and C2 personnel capable of loading and discharging all classes of cargo, including munitions, in a developed or nondeveloped port or in-stream.

  •• **Limited Ocean Terminal.** Providing managerial and technically skilled personnel capable of operating a limited marine-cargo terminal in support of ship loading and discharging operations.

  •• **Limited Air Terminal.** Providing managerial and technically skilled personnel capable of loading and discharging cargo from commercial and military aircraft and operating a limited air cargo terminal.

  •• **Self-Supporting.** Providing own services to sustain the administration, messing, berthing, limited construction, organizational level maintenance, and repair requirements of the F1 ABFC unit.

- CHBs operate most effectively when employed solely in ship loading and discharge operations and when each of the 16 hatch teams is augmented by 7 unskilled personnel from the supported activity. When augmented with 112 personnel (7 per hatch team) from the supported unit, the CHB can achieve a 2,800 measurement tons per day (MTs/D) discharge rate alongside the pier and a 1,920-MTs/D discharge rate in-stream. If the CHB is not augmented, the discharge rates must be reduced by 50

percent (1,440 MTs at pierside and 960 MTs in-stream).

- The required number of ABFC F1 units is directly dependent on:

  •• Tonnage to be handled;

  •• Discharge scheduling and discharge rate desired;

  •• Number of vessels and aircraft to be discharged and loaded;

  •• Available pier and related facilities (pierside operations);

  •• Lighterage and related facilities (in-stream operations);

  •• Available indigenous labor;

  •• Available unskilled labor augmentation; and

  •• Available mechanized cargo handling equipment (may be attained by utilizing a supplemental equipment package or combination of packages [F1A through F1G]).

- The F1 CHB and its associated supplemental equipment packages (F1A through F1G) provide the widest possible flexibility in the employment of CHBs. The NAVCHAPGRU and the naval reserve cargo handling force staff are available to provide fleet and area commanders with technical planning assistance in programming F1 CHBs into specific mission scenarios. For planning purposes, the F1 CHB may be programmed with a variety of equipment packages tailored to specific mission scenarios.

  •• **F1 — CHB Personnel and Core Equipment.** This package provides the personnel and basic personnel support equipment required to work all cargo handling situations. This package is required for all scenarios. Supplemental equipment packages (added on to the basic F1 unit above to meet the environmental and requirements of specific missions) follow: **(1) F1A — Expanded Core Equipment Package.** This package provides the equipment necessary to support one CHB in mission scenarios other than MPS scenarios. This equipment package must be provided to all mission scenarios other than MPS scenarios. **(2) F1B — Cargo Handling Civil Engineering Support Equipment (CESE) Package.** This package provides the CESE (trucks, trailers, and other support equipment) necessary to support a CHB in establishing or augmenting a port. This package should be provided to a battalion in all ports where CESE is not locally available. (Note: This package provides the CESE for pier, terminal, and local delivery operations. It does not provide a line-haul capability). **(3) F1C — Cargo Handling MHE Package.** This package provides the Naval Supply Systems Command MHE (forklifts and other handling equipment) necessary to support an F1 CHB in a port where MHE is not locally available. **(4) F1D — Container Handling Crane and Equipment Package.** This package provides the mobile crane container handling forklift and associated equipment necessary to support an F1 CHB in a port that does not have locally available container-handling facilities and where it is desired that the CHB off-load and load container ships and operate a container marshalling yard adjacent to the ocean terminal. **(5) F1E — Air Cargo MHE Equipment Package.** This package provides the equipment necessary to support one detachment of an F1 CHB in the operation of an air cargo terminal. This

equipment package should be programmed into all scenarios where it is expected that the F1 CHB will be required to operate an air terminal. If air terminal operations require more than one detachment of the F1 CHB, then one F1E equipment package must be provided for each detachment. **(6) F1F — Expeditionary Tent Camp Equipment.** This package provides all the equipment necessary for one F1 CHB to establish and operate an austere expeditionary camp to provide berthing and messing for its personnel. This package should be provided to each F1 CHB in all scenarios where berthing and messing is not provided by another activity or ABFC unit. **(7) F1G — Camp Support CESE.** This package provides the CESE necessary to construct and maintain an austere expeditionary tent camp to billet and subsist one F1 CHB. This package contains only the camp support equipment to be used in cargo handling operations as listed under the F1B supplemental package.

- **Basic F1 CHB Missions.** Although the F1 CHB is a multimission unit with a wide variety of possible missions, there are three major scenarios that the battalion is normally programmed to accomplish. They are as follows.

  •• **Maritime Pre-positioning Ships Support.** The F1 CHB provides the personnel and equipment necessary to provide technical and supervisory cargo handling capabilities to fleet and area commanders in support of the MPS program. The F1 component provides the skilled stevedores and C2 personnel capable of loading and discharging commercial and MSC ships in both an open ocean and pierside environment. Component personnel and organic equipment are transported by AMC as part of the fly-in echelon of the naval support element to the selected beach or port where the MPS squadron has been deployed. Each MPS squadron consists of four or five specially configured merchant ships that carry the majority of combat equipment and 30 days of supplies for a forward-deployed Marine expeditionary force (MEF). Hatch boxes with cargo handling equipment are pre-positioned onboard each of the ships. Each MPS squadron requires two F1 CHBs to provide discharge of the cargo in-stream or pierside within the currently required timeframes. Each F1 CHB must be augmented with 112 Marine Corps personnel if the discharge timeframes are to be met. Upon completion of the MPS off-load, one F1 CHB may be retained on site to provide continuing or resupply cargo discharge services, while the other CHB may be redeployed to another cargo handling mission. Both CHBs will require additional equipment from one or more of the supplemental equipment packages (F1A through F1G), depending on the subsequent mission assignments. Planning guidance includes the following packages for the MPS mission: (1) Two F1 CHBs for each MPS Squadron (no additional supplemental equipment packages are required for the MPS mission); and (2) A total of 224 personnel from the supported Marine Corps unit to augment the CHBs.

  •• **Assault Follow-On Echelon Mission Support.** Each F1 CHB is capable of discharging cargo to support one half of an MEF within the required timeframes when augmented by the F1A expanded core equipment package. The required multiples of the F1 CHB (four each CHBs for a MEF level AFOE) plus the required quantities of the supplemental equipment packages (four each F1A packages for the MEF-level AFOE mission) provide the required technical and supervisory cargo handling

capabilities to fleet and area commanders in support of Marine Corps assault operations (MEF). The AFOE carries sufficient equipment and supplies to sustain 60 days of combat and consists of unit equipment and supplies that are not essential for the initial amphibious assault. Component personnel and organic equipment accompany the AFOE to the AOR. Marine Corps personnel will augment the F1 CHB in the unskilled positions at the level of 448 for a MEF-level AFOE. The NBG will provide required CESE, MHE, and messing and berthing for the CHB under the AFOE scenario by means of TOA number 56 (TA-56). Planning guidance for the AFOE mission provides that the number of F1 CHBs and the required number of F1A supplemental equipment packages depend on the size of the AFOE: MEF-level AFOE requires four F1 CHBs, four F1A expanded core equipment packages, and 448 personnel from the supported unit.

•• **Port or Terminal Operation Augmentation of Establishment.** When provided with the necessary supplemental equipment packages based on the specific environment and the required personnel, the F1 CHB provides the unit with equipment, skilled stevedores, and C2 personnel to augment or establish a port operation with a basic palletized cargo discharge rate of 2,880 MTs/D. Specific tasks of the CHB include, but are not limited to the following: (1) **Cargo Handling.** Providing stevedores and C2 personnel capable of off-loading and discharging commercial and MSC ships, including munitions handling, in a developed port. When all palletized cargo handling operations are pierside, the discharge rate will be 2,880 MTs/D. When all cargo handling operations are in-stream, the discharge rate will be 1,920 MTs/D. (2) **Ocean Cargo Terminal.** Providing 35 managerial and skilled technical personnel capable of operating a temporary ocean cargo terminal associated with the ship discharge. The maximum throughput rate of the marine terminal will be 240 MTs per hatch team per day and the rate of the ship's discharge will be reduced accordingly. (3) **Limited Air Terminal.** Providing a detachment of 15 managerial and skilled personnel to operate a limited air cargo terminal. The detachment provides the battalion with the capability of sustaining around-the-clock operations at the limited air cargo terminal. The establishment of the limited air cargo terminal will reduce the ship discharge rate to 2,700 MTs/D pierside and to 1,800 MTs/D in-stream. The establishment of a limited air cargo terminal requires one F1E supplemental equipment package. (4) **Crane Operators.** Providing 32 heavy-lift crane operators for containerships, T-ACS vessels, or other special operations. The discharge rate of T-ACS vessel operations is 48 containers per day (12 hours) per hatch team pierside and 36 containers per day (12 hours) per hatch team in-stream. (5) **Mobile Shore and/or Container Crane Operations.** Providing 12 mobile shore crane operators to off-load containers pierside or to operate a terminal marshalling yard. The assignment of the mobile shore container crane task requires the addition of an F1D container handling crane and equipment package to the F1 CHB. (6) **Expeditionary Tent Camp.** The F1 CHB is capable of providing its own messing, berthing, and limited base-support functions for short periods of time (less than 90 days) when provided with the F1F expeditionary tent camp supplemental equipment package. (7) **Planning Guidance for Port Establishment Augment Operations.** The following components must be

programmed for each 2,880 MTs of cargo desired discharged daily in-stream: (a) One F1 CHB; (b) One F1A expanded core equipment package; (c) One F1B cargo handling CESE package (must be provided only when adequate CESE is not locally available in the port); (d) One F1D container handling crane and equipment package (must be provided if container-handling operations are desired and container-handling equipment is not available in the port); (e) One F1E air cargo MHE equipment package (must be provided when a limited air cargo terminal is planned and there is not sufficient air cargo MHE available locally); and (f) One F1F expeditionary tent camp equipment package and one F1G camp support CESE package (must be provided if messing and berthing is not locally available or is not being provided by another command).

- **Assignment.** To NBG.

- **Capabilities**

  •• Figure M-3 provides CHB productivity factors.

  •• Figures M-4 through M-7 are the CHB Utilization Tables. Note the following: First, 16 Hatch teams assume augmentation of 112 personnel (7 per hatch team). Without augmentation, the cargo is reduced by 50 percent. Second, these figures assume palletized-cargo capacity. Rough conversion factors for other classes of cargo are: (1) breakbulk — 50 percent of the palletized cargo capacity; and (2) mixed cargo — 75 percent of the palletized cargo capacity. Third, ship operations — divide hatch team by four to determine the number of hatch teams working each ship on each shift (e.g., 2 ships, 16 hatch teams mean 4 hatch teams per shift per ship).

f. **Navy Underwater Construction Team.** The Navy UCTs are subordinate to the Commanders, Naval Construction Battalions, of US Atlantic and Pacific Fleets. UCTs perform harbor, coastal, and ocean construction diving to a maximum depth of 190 feet of seawater (FSW) using scuba or surface-supplied diving systems. UCTs are capable of underwater welding, cutting, precision blasting, light salvage, and limited ship-husbandry tasks. They are experienced in construction, repair, and installation of submarine cables, pipelines, moorings, and marine structures. For the deployment and retrieval of the OPDS, UCTs:

- Perform underwater SALM site surveys and conduit installation route survey;

- Assist PHIBCBs in the installation and stabilization of the flexible submarine product conduit for all joint units;

- Ballast SALM, connect product hoses, and set product valves;

- Disconnect product conduits underwater in depths of up to 190 FSW (This depth requirement, coupled with the requirement for voice communication with the diver, mandates that the diving operations be conducted using surface-supplied methods. Surface-supplied diving also enhances the diver's effectiveness over a broader range of environmental conditions. In addition to surface-supplied diving equipment [compressors, control consoles, and other diving equipment], a recompression chamber is required); and

- De-ballast SALM, reset product valves underwater, and unfoul SALM before blowing voids, if necessary.

CHB PRODUCTIVITY FACTORS

	Per-Hour Per Hatch Team (14 Men) 1/	Per-12-Hour Per Hatch Team (14 Men) 2/
Pier Discharge		
Palletized Cargo	15.0 MT	180 MT
Breakbulk Cargo	6.2 MT	75 MT
Mixed Cargo	10.6 MT	130 MT
Pier Ship Loading		
Palletized Cargo	8.8 MT	105 MT
Breakbulk Cargo	4.1 MT	50 MT
Mixed Cargo	6.4 MT	75 MT
In-stream Ship Discharge		
Palletized Cargo	10.0 MT	120 MT
Breakbulk Cargo	5.6 MT	70 MT
Mixed Cargo	7.8 MT	95 MT
In-stream Ship Loading		
Palletized Cargo	6.7 MT	80 MT
Breakbulk Cargo	3.6 MT	45 MT
Mixed Cargo	5.7 MT	60 MT
Container, T-ACS, Jumbo Rig, Heavy Lift Operations		
Pier Load and/or Discharge	4 Containers (128 MT)	48 Containers (1,536 MT)
Stream Load and/or Discharge	3 Containers (96 MT)	36 Containers (1,152 MT)
Ocean Terminal (Palletized Cargo)		
Throughput (Receive and Issue)	20 MT	240 MT 480 MT
One Way (Receive and Issue)	40 MT	
Air Terminal (Measured in pounds vice MT) (463L max weight is 10,000 lbs)	6,666 LBS (1-463L Plt)	80,000 LBS (10-11 463L Plt)
Pier Operation	45 MT	540 MT

1/ All per-hour figures are rounded to nearest .1 MT.
2/ All per-12-hour figures are rounded to nearest 5 MT.

Figure M-3. CHB Productivity Factors

3. Army Units

a. **US Army Transportation Terminal Group (TOE 55-112H and TOE 55-822L).** Group organization is shown in Figure M-8.

- **Mission.** To command units employed in the operation of water terminals and to perform staff planning for water terminal operations.

SHIP DISCHARGE OF PALLETIZED CARGO[1/]					
	PIER SIDE	IN-STREAM	PIER TEAM	OCEAN TERMINAL	AIR TERMINAL
2 ship	2,880 (16 HT)[2/]	0	0	0	0
2 ship	2,160 (12 HT)	0	2,160 (4 HT)	0	0
1 ship	1,440 (8 HT)	0	1,620 (3 HT)	1,200 (5 HT)	0
1 ship	1,260 (7 HT)	0	1,620 (3 HT)	1,200 (5 HT)	80,000 lbs (1 HT)
2 ship	0	1,920 (16 HT)	0	0	0
1/ In MT (unless otherwise indicated). 2/ HT=Hatch Team.					

Figure M-4. Ship Discharge of Palletized Cargo

SHIP LOADING OF PALLETIZED CARGO[1/]					
	PIER SIDE	IN-STREAM	PIER TEAM	OCEAN TERMINAL	AIR TERMINAL
2 ship	1,680 (16 HT)[2/]	0	0	0	0
2 ship	1,365 (13 HT)	0	1,620 (3 HT)	0	0
1 ship	1,050 (10 HT)	0	1,080 (2 HT)	960 (4 HT)	0
1 ship	1,050 (10 HT)	0	1,080 (2 HT)	720 (3 HT)	80,000 lbs (1 HT)
2 ship	0	1,280 (16 HT)	0	0	0
1/ In MT (unless otherwise indicated). 2/ HT=Hatch Team.					

Figure M-5. Ship Loading of Palletized Cargo

- **Assignment.** To a theater transportation command. The group is normally attached to a transportation terminal brigade.
- **Capability.** At full strength, provides command and supervision of operations, training, and administration on a 24-hour basis for up to six transportation terminal battalions.

b. **US Army Transportation Terminal Battalion (TOE 55-116H2 and TOE 55-816L).**

CONTAINER LOADING AND DISCHARGE USING AUXILIARY CRANE SHIPS, MPSs, SHORE CRANES, AND OTHER APPROPRIATE FACILITIES[1/]					
	PIER SIDE	IN-STREAM	PIER TEAM	OCEAN TERMINAL	AIR TERMINAL
2 ship	768 (16 HT) (24,576 MT)	0	0	0	0
2 ship	576 (12 HT) (18,432 MT)	0	576 (4 HT) (18,432 MT)	0	0
2 ship	432 (9 HT) (13,824 MT)	0	432 (3 HT) (13,824 MT)	432 (4 HT) (13,824 MT)	0
2 ship	384 (8 HT) (12,280 MT)	0	432 (3 HT) (13,824 MT)	432 (4 HT) (13,824 MT)	80,000 lbs (1 HT) (50 MT)
2 ship	0	576 (16 HT) (18,432 MT)	0	0	0
1/ Measured in numbers of containers.					

Figure M-6. Container Loading and Discharge Using Auxiliary Crane Ships, MPSs, Shore Cranes, and Other Appropriate Facilities

- **Mission.** To command units employed in the operation of water terminals.

- **Assignment.** To a Theater Army Area Command (TAACOM); normally attached to a transportation terminal group. The battalion may be attached to a transportation command or brigade or may operate separately under the supervision of an appropriate commander.

- **Capabilities.** At full strength, provides C2, planning, and supervision over attached units required to discharge up to four ships simultaneously at an established water terminal or up to two ships in-stream.

c. **US Army Transportation Terminal Service Company (Breakbulk) (TOE 55-117H5 and TOE 55-818L).** Company organization is shown in Figure M-9.

- **Mission.** To discharge, backload, and transship breakbulk cargo at water terminals located at ports or beaches.

- **Assignment.** To a transportation command (normally attached to a transportation terminal battalion or may operate separately under an appropriate commander).

- **Capabilities.** For planning purposes, operating on a 24-hour basis, with 75 percent availability of equipment, the operational capabilities of the unit are as indicated. At full strength, this unit:

  •• Is capable of discharging one breakbulk ship in a fixed-port or over the

PERSONNEL ASSIGNMENTS

Available	=	145 (CHB)	+	112 (Augmentees)	=	257 (2 ships, 2 shifts)

Hatch Teams (224 personnel)		
	Hatch Captain	1
	Hold Boss	1
	Crane and Winch Operator	2
	Signalman	1
	Forklift Operator	2
	Stevedores (augmented)	7
		14 per hatch team
	C2	
	Technical Supervisor	1
	Ship Supervisor	2
	Status Center Watch	2
	Communications and or Security	2
	Duty Corpsman	2
		9 per shift = 18 per battalion
	Support Personnel	
	Mechanics	2
	Corpsmen	2
	Cooks	6
	Camp Support	3
	Administration	2
		15 per battalion

Figure M-7. Personnel Assignments

beach at the daily rate of 1,000 ST of cargo per day or can backload 500 ST of cargo per day;

•• Sorts cargo by destination and loads cargo from the marshalling yards on land transportation;

•• Accounts for all cargo handled as required by MILSTAMP procedures and prepares necessary transportation documentation; and

•• Provides limited in-transit storage as required.

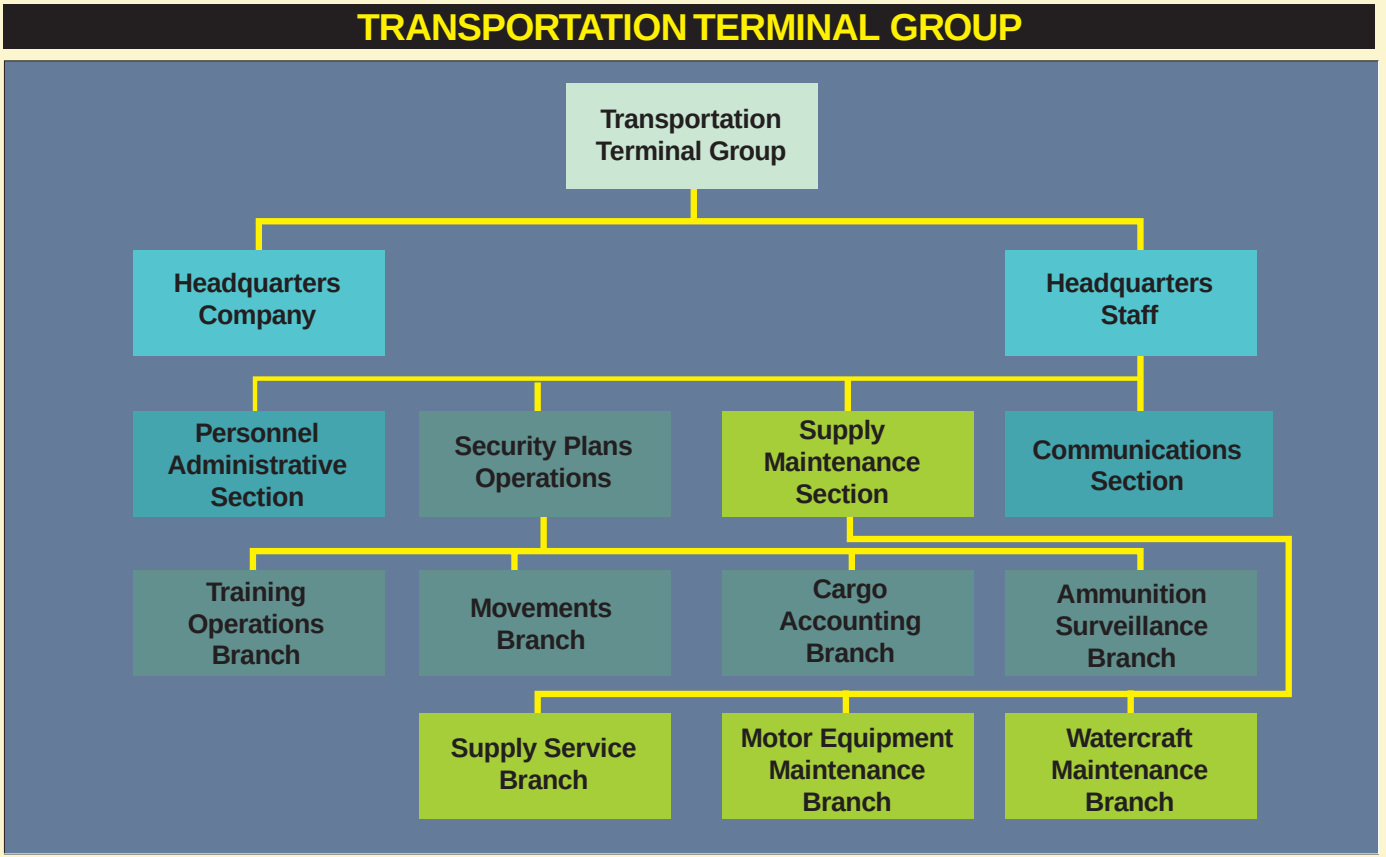


Figure M-8. Transportation Terminal Group

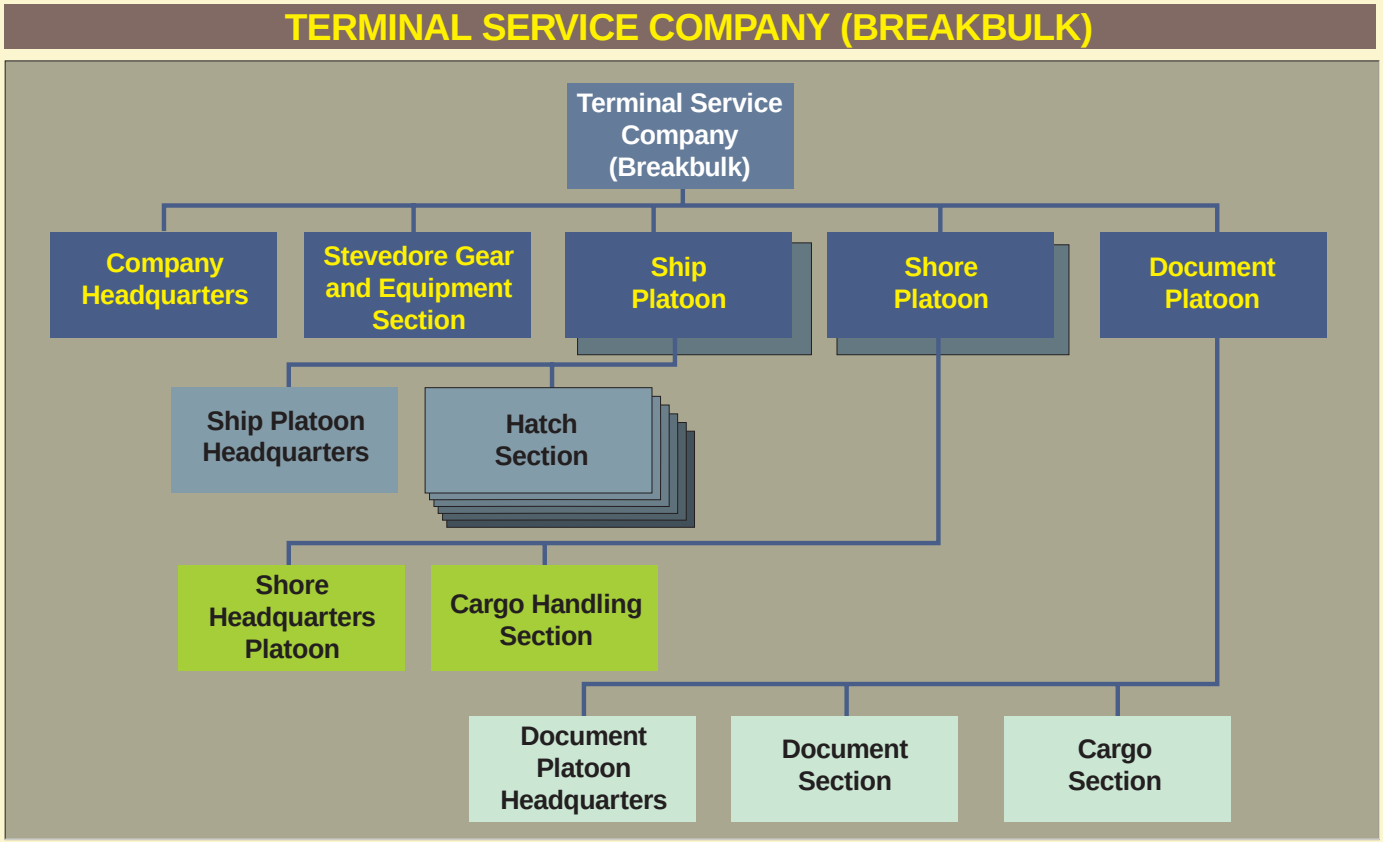


Figure M-9. Terminal Service Company (Breakbulk)

- **Major Task Equipment**

  •• Two full-track, low-speed tractors with bulldozers.

  •• Nine 10,000-lb RT forklifts.

  •• Seven 4,000-lb electric forklifts.

  •• Seven 4,000-lb gas forklifts.

d. **US Army Transportation Terminal Service Company (Container) (TOE 55-119J2).** Company organization is shown in Figure M-10.

- **Mission.** To discharge, backload, and/or transship containerized cargo at water terminals located at beaches or fixed-ports. As an exception (when augmented with team JE, a cargo hatch gang [TOE 55-560], personnel, and equipment), the unit can discharge, backload, and transship breakbulk cargo at water terminals located at beaches or fixed-ports.

- **Assignment.** To a headquarters and headquarters company, transportation command, TOE 55-2H, or a corps support command (COSCOM) when employed to support independent corps operations. The company is normally attached to a headquarters and headquarters company transportation terminal battalion (TOE 55-116).

- **Capabilities.** The following information applies to units operating at full strength, on a two-shift basis, with four cranes operational and 75 percent operational availability of other mission equipment. This unit:

  •• In offshore discharge operations, can discharge 300 containers or backload 300 containers, or simultaneously discharge 150 containers and backload 150 containers;

  •• In a fixed-port operation, can discharge 600 containers or backload 600 containers, or simultaneously discharge 300 containers and backload 300 containers;

  •• Sort containers by destination, loads containers from the marshalling yards on land transportation, performs limited stuffing and unstuffing of containers, and receives and processes containers for retrograde movement;

  •• Accounts for all cargo handled as required by MILSTAMP procedures and prepares necessary transportation documentation;

  •• Provides limited in-transit storage; and

  •• When augmented with team JH, a breakbulk augmentation (container) unit (TOE 55-560) is capable of discharging one breakbulk ship in a fixed-port or over the beach at the rate of 1,000 ST of cargo per day.

- **Major Task Equipment**

  •• Two truck-mounted, 140-ton container handling cranes.

  •• Two truck-mounted, 250- to 300-ton container handling cranes.

  •• Twenty-two commercial 34-ton flat-bed, semitrailer, breakbulk and/or container transporters.

  •• Ten 50,000-lb RTCH forklift trucks.

  •• Four 4,000-lb RT forklift trucks.

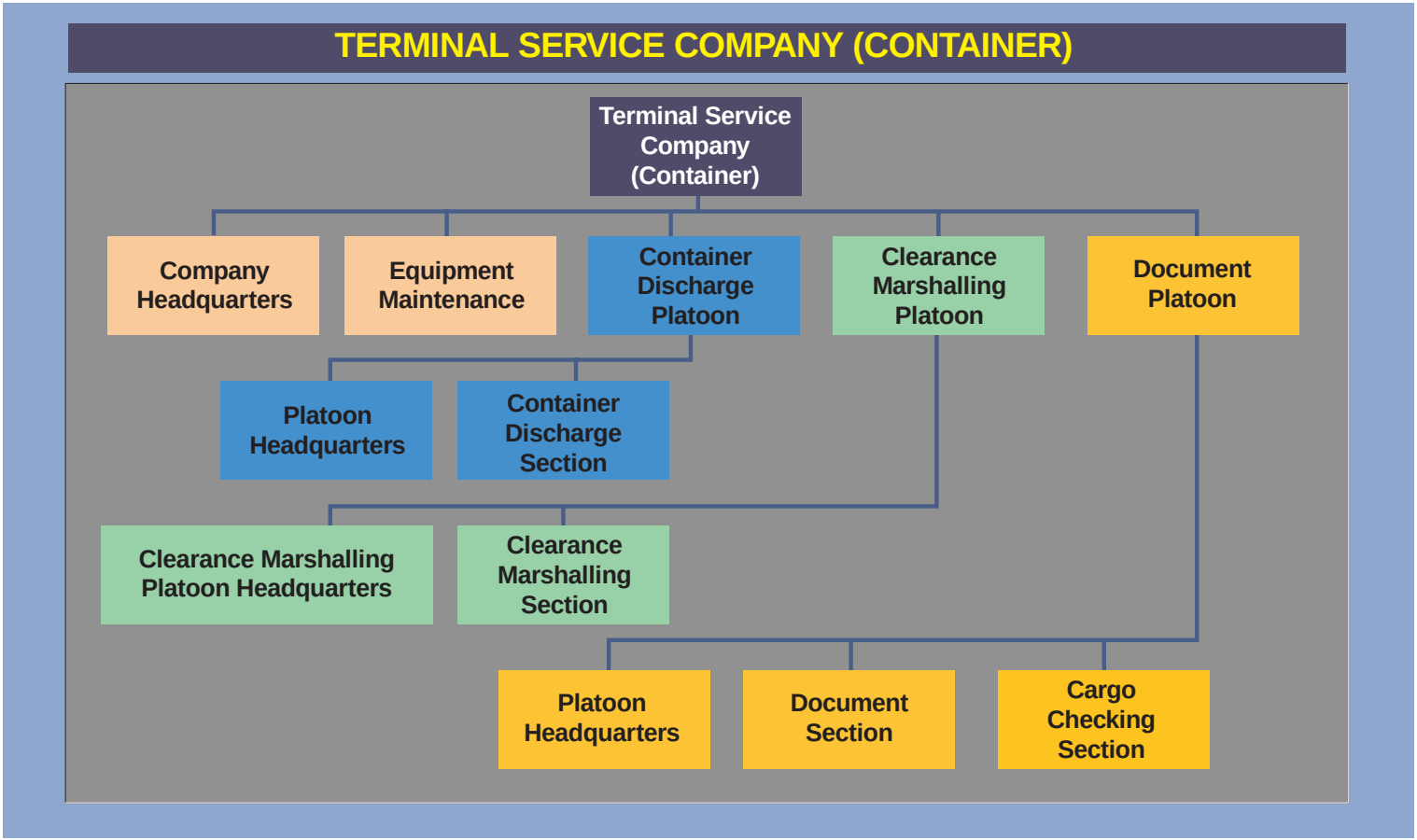


Figure M-10. Terminal Service Company (Container)

•• Twenty-two 5-ton yard-type 4x2 tractor trucks.

e. **US Army Transportation Terminal Service Company (Breakbulk and Container) (TOE 55-827L).** Company organization is shown in Figure M-11.

- **Mission.** To discharge, backload, and transship breakbulk and containerized cargo at water terminals located at fixed-ports or in LOTS operations.

- **Assignment.** To a theater transportation command or to a COSCOM when employed to support independent corps operations, normally attached to a transportation terminal battalion.

- **Capabilities.** Applies to units operating at level 1, on a two-shift basis, with 75 percent operational availability of all mission equipment.

•• **LOTS Operation.** (1) Discharge 200 containers or backload at the same rate or simultaneously discharge 100 containers and backload 100 containers when supported by a heavy crane platoon (Team JJ, see subparagraph 3j. (2) Discharge 1,600 ST of breakbulk cargo or backload at the same rate or simultaneously discharge 800 ST of breakbulk cargo and backload 800 ST. (3) Sort breakbulk and containers by destination, load breakbulk cargo and containers from the marshalling yards on land transportation, and perform limited stuffing and unstuffing of containers. (4) Receive and process containers for retrograde. (5) Provide limited in-transit storage.

•• **Fixed-Port Operation.** (1) This unit can discharge 400 containers or backload at the same rate or simultaneously discharge 200 containers and backload 200 containers when supported by a heavy crane platoon. (2) Discharge 2,500 ST of breakbulk cargo or backload at the same rate or simultaneously discharge 1,250 ST of breakbulk cargo and backload 1,250 ST. (3) Sort breakbulk and containers by destination, load breakbulk cargo and containers from the marshalling yards on land transportation,

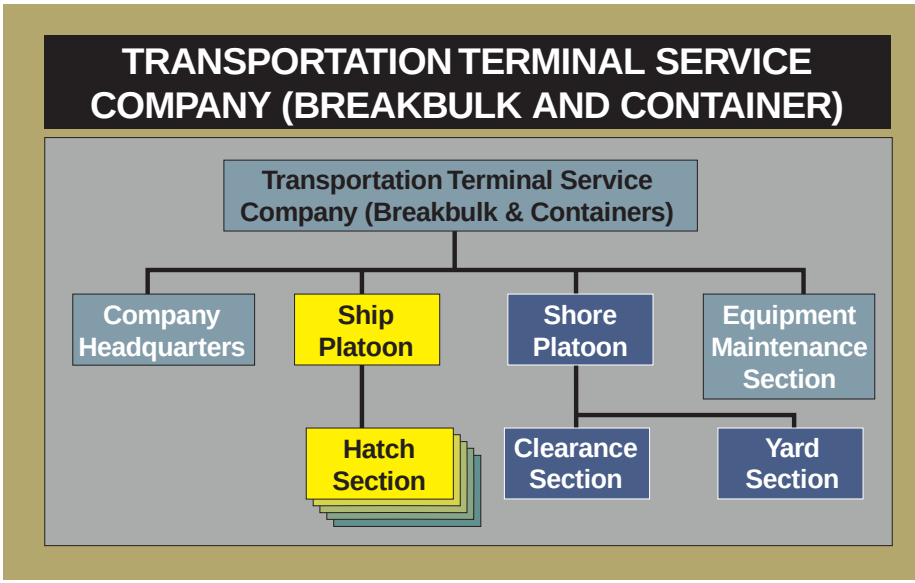


Figure M-11. Transportation Terminal Service Company (Breakbulk and Container)

and perform limited stuffing and unstuffing of containers. (4) Receive and process containers for retrograde. (5) Provide limited in-transit storage.

- **Major Task Equipment**
  - Ten 4,000-lb diesel forklift trucks.
  - Ten 4,000-lb electric forklift trucks.
  - Two 5-ton dump trucks.
  - Eighteen 5-ton tractor yard trucks.
  - Twenty-two 34-ton semitrailers.
  - Two 140-ton truck-mounted cranes.
  - Ten RTCH 50,000-lb forklift trucks.
  - Eight RT 10,000-lb forklift trucks.
  - Ten RT 4,000-lb forklift trucks.
  - Two bulldozers.

f. **US Army Transportation Terminal Transfer Company (TOE 55-118H7 and TOE 55-817L).** Unit organization is shown in Figure M-12.

- **Mission.** To transship cargo at air, rail, motor, and inland barge terminals.
- **Assignment.** Normally assigned to a TAACOM or a COSCOM. This unit is normally attached to a theater transportation command (TOE 55-62) or may be attached to a motor transport group, a terminal group, or an aviation group, as required.
- **Capabilities**
  - At full strength, this unit is capable of operating up to three separate terminals on an around-the-clock basis. Each terminal can transship 300 ST of breakbulk cargo or, when equipped with container handling equipment, 200 containers per day per terminal for a total of 900 ST of breakbulk cargo or 600 containers daily or a mix thereof.

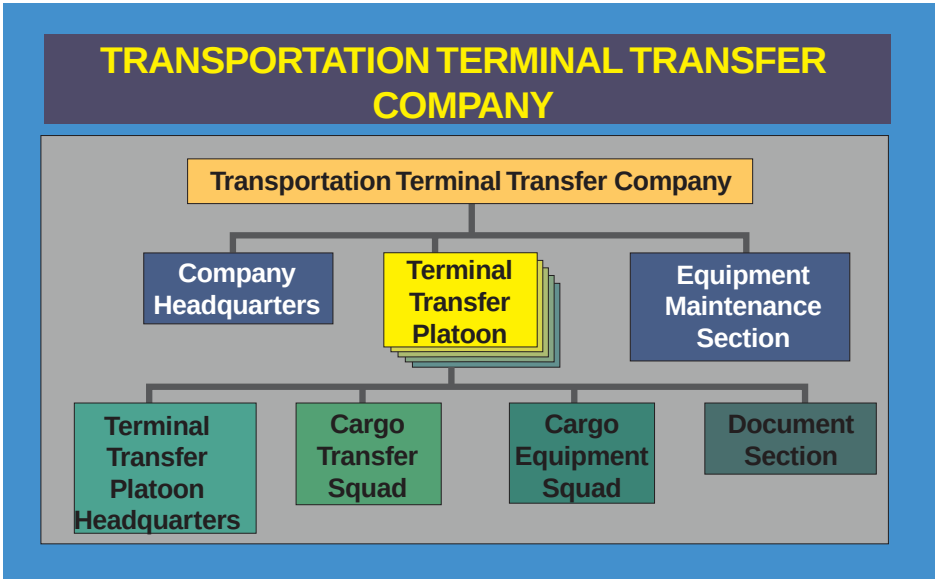


Figure M-12. Transportation Terminal Transfer Company

•• At reduced strength, this unit is capable of operating up to three separate terminals on a single shift. Each terminal can transship 150 ST of breakbulk cargo or, when container handling equipment is available, 100 containers per day for a unit total of 450 ST or 300 containers daily or a mix thereof.

•• Under both variations, this unit is capable of redocumenting transshipped cargo or containers as required.

•• This unit is capable of stuffing or unstuffing containers on a limited basis.

- **Major Task Equipment**

•• Three 140-ton truck-mounted container handling cranes.

•• Twelve 22 1/2-ton flatbed breakbulk and/or container transporter semitrailers.

•• Six 50,000-lb RTCH forklift trucks.

•• Nine RT 10,000-lb forklift trucks.

•• Six RT 4,000-lb forklift trucks.

•• Nine 2 1/2-ton dropside cargo trucks.

•• Two 5-ton dropside cargo trucks.

•• Six 5-ton tractor trucks.

•• Two 10-ton tractor trucks.

g. **US Army Transportation Medium Boat Company (TOE 55-128H5).** Company organization is shown in Figure M-13.

- **Mission.** To provide and operate landing craft for the movement of personnel and cargo in water terminal operations and to augment, when required, naval craft in joint amphibious operations.

- **Assignment.** To provide command support in a theater of operations, the company is normally attached to a transportation terminal battalion (TOE 55-116) or a transportation terminal group (TOE 55-112).

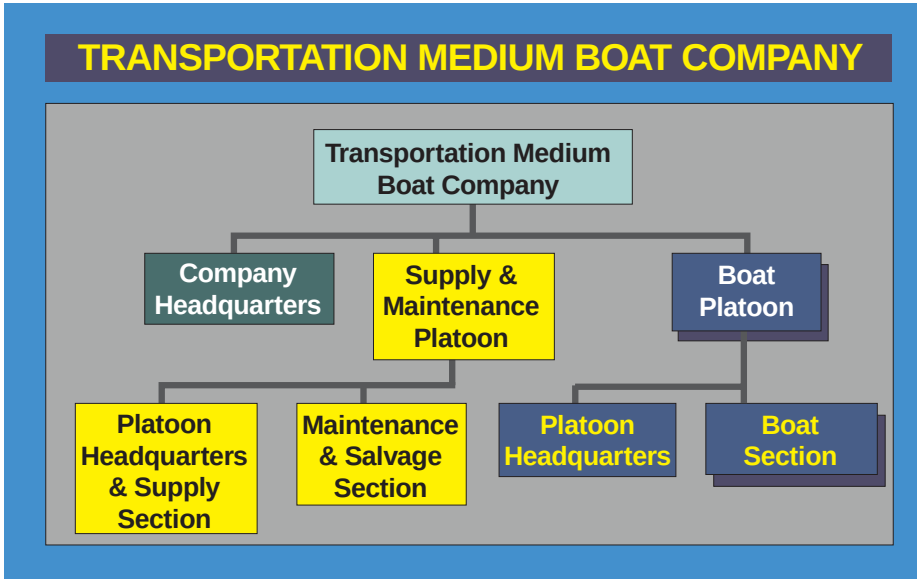


Figure M-13. Transportation Medium Boat Company

- **Capabilities.** For planning purposes, operating on a 24-hour basis, with a 75 percent availability of equipment, operational capabilities of the unit are as indicated. At full strength, this unit is capable of the following.

  •• Transporting an average of 1,000 ST of noncontainerized cargo with 12 landing craft, each carrying an average of 42 ST twice daily.

  •• Transporting 240 TEU containers per day with 12 landing craft, each carrying 1 container and making 20 trips daily.

  •• Transporting 960 ST of non-containerized cargo or transporting 3,200 combat-equipped troops, based on 16 landing craft in a one-time lift.

- **Major Task Equipment**

  •• Nineteen LCM-8.

h. **US Army Transportation Heavy Boat Company (TOE 55-129H5 and TOE 55-829L).** Company organization is shown in Figure M-14.

- **Mission.** To provide and operate landing craft for transporting personnel, containers, and outsized cargo in offshore discharge operations and for augmenting lighterage service.

- **Assignment.** To a support command in a theater of operations. The company is normally attached to a transportation terminal battalion (TOE 55-116) or a transportation terminal group (TOE 55-112). The company may be attached in support of a joint amphibious operation or may operate separately under an appropriate commander.

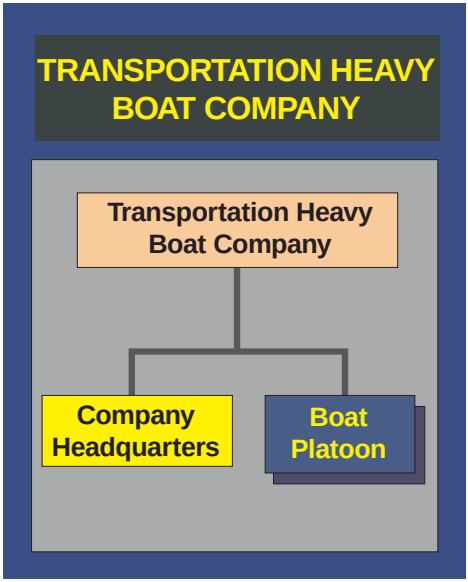


Figure M-14. Transportation Heavy Boat Company

- **Capabilities.** At full strength, operating on a 24-hour basis, this unit is capable of the following.

  •• Transports an average of 1,500 ST of noncontainerized cargo, 4,000 troops with individual equipment, 540 ST of vehicles, or 1,500 ST of medium tanks. These figures are based on an availability of 10 landing craft, each making one trip daily.

  •• Transports an average of 160 TEU containers based on an availability of 10 landing craft, each making four trips daily.

  •• Transports, in a one-time maximum lift, 1,800 ST of noncontainerized cargo or 4,800 troops with 12 craft, each capable of transporting 150 ST of cargo or 400 troops for a trip not exceeding 2 hours. (For trips between 2 and 3 hours, the maximum troop lift is 4,200. For trips over 3 hours, the maximum is 3,600.)

- **Major Task Equipment**

  •• One picket boat, 36 to 47 feet long.

  •• Twelve LCUs.

i. **US Army Transportation Watercraft Teams (TOE 55-530H and TOE 55-530L).** All teams are capable of 24-hour operations and are allocated as required.

- **Team A, Deck Cargo Barge, Nonpropelled**

  •• **Mission.** To transport cargo other than bulk liquid.

  •• **Assignment.** To a watercraft unit organized under TOE 55-500 or to a transportation terminal headquarters.

  •• **Capabilities.** Transporting 579 tons of deck cargo when under tow.

- **Team B, Picket Boat, 46 Foot**

  •• **Mission.** To provide water transportation for patrol, command, inspection, and general utility services in support of terminal or inland water operations.

  •• **Assignment.** Same as Team A above.

  •• **Capabilities.** Can carry up to 10 passengers at average speed of 14 knots.

- **Team C, Deck or Liquid Cargo Barge, 120-Foot, Nonpropelled**

  •• **Mission.** To transport deck-loaded dry cargo or bulk liquid cargo.

  •• **Assignment.** Same as Team A above.

  •• **Capabilities.** Transporting up to 4,160 barrels of liquid cargo or up to 587 ST of dry cargo when under tow.

- **Team E, Barge Crane, 100-Ton**

  •• **Mission.** To load and discharge heavy-lift cargo that is beyond the capability of ship's gear.

  •• **Assignment.** Same as Team A above.

  •• **Capabilities.** Making individual lifts up to 100 ST.

- **Team H, Amphibious Lighter, LARC-LX**

  •• **Mission.** To provide amphibious lighterage service primarily for items of heavy, outsized, or bulky equipment.

  •• **Assignment.** Same as Team A above.

  •• **Capabilities.** (1) This team consists of four LARC-LXs. Assuming an amphibian availability rate of 75 percent, Team H has the capability to transport daily 450 ST of heavy, outsized, or bulky noncontainerized cargo in five trips, or 21 20-foot containers or 2,625 combat-equipped troops in 7 trips. (2) This team provides its own unit level maintenance and surface transportation ashore.

- **Team I, Inland Waterway and Coastal, Large Tug, 143-Foot**

  •• **Mission.** To dock deep-draft oceangoing vessels, provide firefighting services, and make tows of barges and vessels.

  •• **Assignment.** Same as Team A above.

  •• **Capabilities.** Makes inland and coastal tows.

- **Team J, Logistics Support Vessel**

•• **Mission.** To engage in the intratheater line haul of cargo to support unit deployment and relocations in a theater of operations in a port-to-port operation. The LSV also has a payload of 2,000 ST in a beaching operation (1:30 gradient).

•• **Assignment.** Same as Team A above.

•• **Capabilities.** Transports 1,500 to 2,000 ST of cargo consisting of vehicles, containers and general cargo; has a RO/RO capability.

- **Team K, Floating Causeway**

•• **Mission.** To provide a temporary beach site discharge facility for military lighterage.

•• **Assignment.** To a transportation terminal service battalion or to a transportation terminal service company (TOE 55827L000).

•• **Capability.** Assembling, maneuvering, and securing the floating causeway to the beach. The floating causeway will provide the interface between lighterage and the shore, so that mobile type cargo can be transferred from the lighter to the causeway for subsequent movement ashore.

•• **Basis of Allocation.** As required.

- **Team M, RO/RO Discharge Platform**

•• **Mission.** To provide the interface between RO/RO ships and Army lighterage for rapid discharge of cargo.

•• **Assignment.** The team is assigned to a transportation terminal service battalion or to a transportation terminal service company (TOE 55827L000).

•• **Capabilities.** Installing, retrieving, operating, and maintaining the RO/RO discharge platform. Assembling, maneuvering, and securing the platform causeway can then have all conventional rolling stock off-loaded from it onto lighterage at a daily rate of 200 vehicles per 20-hour day in sea state zero. The system will be capable of operation in sea state 1 at a rate of 150 vehicles per 20-hour day.

•• **Basis of Allocation.** As required.

- **Team N, Causeway Ferry**

•• **Mission.** To move rolling stock cargo and containers from ship-to-shore.

•• **Assignment.** The team is assigned to a transportation terminal service battalion or to a transportation terminal service company (TOE 55827L000).

•• **Capabilities.** To provide a LOTS interface between RO/RO and container vessels in-stream and the shore, or engineered extension of the shore, for transfer of cargo. It will work between the RO/RO discharge platform, off-loading RO/RO ships, or the T-ACS off-loading containerships, and the beach for transfer of the cargo directly ashore, to the floating causeway, or to the elevated causeway as appropriate.

•• Basis of Allocation. As required.

j. **US Army Transportation Terminal Service Teams (TOE 55-56052).**

- **Team JB, Cargo Documentation**

•• **Capabilities.** Perforns documentation required in the loading and discharging of 500 ST of general cargo or 480

containers daily in a water terminal, railhead, truckhead, or airhead.

•• **Basis of Allocation.** One per 500 ST of general cargo or 480 containers to be documented daily.

- **Team JD, Transportation Contract Supervision**

•• **Capabilities.** Arranges for the loading or discharging of cargo from ships or barges and the clearance of discharged cargo from the terminal by contract; arranges for the movement of cargo from terminals, depots, or local procurement sources by inland waterways and highway transport contracts. Team JD also administers contracts made in connection with the loading, discharging, terminal clearance, and transport of cargo.

•• **Basis of Allocation.** One or more per transportation terminal brigade or group or area command, as required.

- **Team JE, Cargo Hatch Gang**

•• **Capabilities.** Provides personnel and equipment to handle 100 ST of cargo daily on a one-shift basis in a water terminal.

•• **Basis of Allocation.** As required.

- **Team JF, Container Handling, Ship**

•• **Capabilities.** Provides personnel and equipment to handle 240 containers daily (2 cranes on a 1-shift basis) at a water terminal or provides personnel and equipment to handle 100 containers daily on a 1-shift basis at a JLOTS site (using 2 cranes, 1 at ship side and 1 at the beach). This team also provides limited organizational maintenance to the supporting unit.

•• **Basis of Allocation.** As required.

- **Team JG, Container Handling, Shore**

•• **Capabilities.** Provides personnel and equipment to transship 120 containers at a water terminal or to transship 100 containers from the shore crane to the container marshalling area and to operate the container marshalling area on a 1-shift basis.

•• **Basis of Allocation.** As required.

- **Team JH, Breakbulk Augmentation (Container)**

•• **Capabilities.** Capable of discharging 1,000 ST of breakbulk cargo per day or backloading 500 ST of breakbulk cargo per day when attached and integrated into operations of a transportation terminal service company (container).

•• **Basis of Allocation.** As required.

•• **Major Task Equipment.** (1) Four 20-ton wheel-mounted cranes. (2) Five RT 10,000-lb forklift trucks. (3) Three electric commercial 4,000-lb forklift trucks.

- **Team JI, Automated Cargo Accounting Detachment**

•• **Capabilities.** Capable of documenting by WPS breakbulk or container cargo being loaded or discharged from up to four ships in a fixed-port operation or two ships in a JLOTS operation.

•• **Basis of Allocation.** As required.

- **Team JJ, Heavy Crane Platoon**

•• **Capabilities.** This unit, on a two-shift basis, provides: (1) Personnel and equipment to handle 400 containers in a

fixed-port operation; (2) Personnel and equipment to handle 200 containers in a JLOTS operation; and (3) Organizational maintenance on organic equipment, less communication and electronic equipment, and direct support maintenance on container handling equipment.

•• **Basis of Allocation.** As required.

•• **Major Task Equipment.** (1) Two 140-ton container-handling truck-mounted cranes. (2) Two 250- to 300-ton container-handling truck-mounted cranes.

k. **Engineer Combat Battalion, Heavy (TOE 5-415L).**

- **Mission.** To increase the combat effectiveness of division, corps, and theater Army (TA) forces by accomplishing mobility, countermobility, survivability, and general engineering tasks. The battalion constructs, repairs, and maintains main supply routes, landing strips, building structures, and utilities. When required, the battalion reinforces divisional engineer units and performs infantry combat missions.

- **Assignment.** To engineer brigade, corps, airborne corps, joint or combined task force.

- **Capabilities**

  •• Performs general engineering tasks such as construction, repair, and maintenance of landing strips, airfields, command posts, main supply routes, culverts, fords, supply installations, building structures, and other related tasks as required.

  •• Provides limited reconstruction of railroads, railroad bridges, electrical systems, and sewage and water facilities.

  •• Provides field engineering assistance and equipment support to the division engineer in preparation of major strong points and battle positions for weapons systems in support of maneuver units.

  •• Conducts engineer reconnaissance.

  •• Creates obstacles to degrade enemy mobility.

  •• Clears obstacles as part of area clearance operations (not as part of assault beaching operations).

  •• Prepares demolition targets.

  •• When required, performs infantry combat operations limited by organic weapons and equipment.

  •• Provides the capability to supervise contract construction, skilled construction labor, and unskilled indigenous personnel.

  •• Conducts area damage clearance and restoration operations.

- **With Attachments.** When supported by attachments of specialized personnel and equipment, the battalion provides large-scale bituminous paving operations, large-scale portland cement concrete paving operations, large-scale quarrying and crushing operations, major reconstruction of railroads and railroad bridges, major rehabilitation of ports, construction of petroleum pipelines and power distribution systems, and major airfield restoration and construction.

l. **Engineer Port Construction Company (TOE 5-603L).**

- **Mission.** To provide specialized engineer support in developing, rehabilitating, and maintaining port facilities, including TPT and JLOTS operations.

- **Assignment.** Normally assigned to the engineer command for further attachment to an engineer brigade or engineer group.

- **Capabilities.** At full strength, this unit is capable of the following.

  •• Constructs, rehabilitates, and maintains offshore facilities, including mooring systems, jetties, breakwaters, and other structures required to provide safe anchorage for ocean-going vessels.

  •• Constructs, rehabilitates, and maintains piers, wharves, ramps, and related structures required for cargo loading and off-loading. This unit constructs facilities for RO/RO, breakbulk, and containerized cargo handling.

  •• Installs and maintains tanker discharge facilities, including bulk petroleum jetties and submarine pipelines.

  •• Provides limited dredging and removal of underwater obstructions.

  •• Provides operators for two-shift operation of selected items of equipment.

  •• Constructs and maintains beach sites in support of JLOTS operations.

m. **Engineer Pipeline Construction Support Company (TOE 5-177).**

- **Mission.** To provide technical personnel and specialized equipment to assist construction and combat engineer units in construction, rehabilitation, and maintenance (except organizational maintenance of pipeline systems). The company provides a limited independent system and assists using units in specialized repairs.

- **Capabilities.** Provides advisory personnel to three engineer companies engaged in pipeline construction and pipe-stringing, pipe-coupling, storage tank erection, and pump station and dispensive facility construction. Specialized tools, equipment, and operators for transporting in two lifts over unimproved roads include: 21,000 linear feet of 6-inch pipe, 16,000 linear feet of 8-inch pipe, and 9,000 linear feet of 12-inch pipe. The unit provides, to a limited degree, construction and rehabilitation of pipeline systems, including the erection of storage tanks when construction units are not available.

n. **Control and Support Detachment (TOE 5-530LA).**

- **Mission.** To provide TA with control of and support to all TA diving assets.

- **Capabilities.** Provides responsive liaison and dive-mission planning and control functions for up to six lightweight teams. The detachment provides expertise to theater commands and diving detachments or teams requiring support. The detachment provides specialized diving equipment and medical support and intermediate-level maintenance of diving life-support systems to lightweight teams.

- **Basis of Allocation.** Normally, one per theater in control and support of from one to six lightweight teams.

o. **Lightweight Diving Team (TOE 5-530LC).**

- **Mission.** To provide underwater construction, light salvage, repair, and maintenance to TA missions.

- **Capabilities.** Perform scuba and lightweight surface-supplied diving to a depth of 190 FSW in support of light salvage, harbor clearance, underwater pipeline, fixed bridge, and port construction repair and rehabilitation. The team performs ship underwater repair and supports JLOTS operations. The team also performs underwater demolition, cutting, and welding and is capable of multiple diving operations.

- **Basis of Allocation.** Assigned to the control and support detachment at echelons above corps and further attached to organizations that require habitual diving support. Those organizations have been identified as the Transportation Floating Craft Maintenance Company, the Engineer Port Construction Company, and the Quartermaster Pipeline Company assigned to major submarine pipelines.

p. **Quartermaster Petroleum and Water Units**

- **Petroleum and Water Group.** The Petroleum and Water Group (TOE 10-602) serves as the integrating agency for the TA commander on all aspects of bulk petroleum distribution, planning, and operations. The group coordinates the efforts of the units operating the theater petroleum distribution system.

•• The Petroleum and Water Group is responsible for the detailed petroleum distribution planning. This is the basis for design, construction, and operation of the theater distribution system. The group is responsible for liaison with host-nation staffs, including coordination of allied pipeline and distribution systems. The group and subordinate units operate the bulk fuel distribution system extending from ports of entry through the communications zone and as far into the combat zone as practical.

•• A Petroleum and Water Group Headquarters is assigned as a functional command to the TA headquarters. The group may also be assigned to a TAACOM (or a COSCOM when the TAACOM is absent). Specifically the group: (1) Provides C2 for two to five petroleum pipeline and terminal operating battalions and/or transportation motor transport battalions (petroleum) and supervises other assigned and/or attached units; (2) Coordinates with the theater engineer command on construction and maintenance programs for the distribution system; (3) Implements and monitors the theater petroleum quality surveillance program; (4) Plans for receiving, storing, and distributing bulk petroleum and advises the theater commander on the capabilities and status of the distribution system; (5) Coordinates and provides bulk petroleum to the US Army, Navy, Air Force, and other supported activities based on directives received from the Theater Army Material Management Command; and (6) Implements host-nation support operational procedures as directed by the TAACOM and provides liaison to agencies involved in petroleum distribution operations within the TAACOM or Corps. The group will

provide command supervision for petroleum supply battalions and/or water battalions in a contingency theater.

- **Petroleum Pipeline and Terminal Operating Battalion (TOE 10-206).** The petroleum pipeline and terminal operating battalion supervises the operation and maintenance of the petroleum distribution facilities required to support a portion of the theater petroleum support mission. Operating battalions are assigned to a petroleum and water group as required. The operating battalion is responsible for supervising the operation of port of entry pipelines and terminals, tactical petroleum terminals, cross-country pipelines, and other related facilities. The battalion is capable of C2 of three to five companies, operating a petroleum pipeline up to 450 miles in length. The battalion operates a central dispatching and scheduling agency to schedule and direct the flow of bulk petroleum products through the multiproduct pipeline. The battalion coordinates the movement of bulk petroleum by means other than pipeline, such as barge, rail, and truck. The battalion supervises a quality surveillance program and can operate either a base or mobile petroleum laboratory, depending on the TOE variation. The battalion can also supervise other assigned or attached units used to operate and maintain the petroleum supply and distribution system.

- **Petroleum Pipeline and Terminal Operating Company.** On a 24-hour basis, the company can operate up to 90 miles of multiproduct pipeline and terminal facilities based on terrain features. The terminal facilities normally consist of two tank farms, each with a capacity ranging from 50,000 to 250,000 barrels. When equipped with a TPT, it provides storage of 3.8 million gallons of bulk fuel in collapsible storage tanks, based upon 100 percent fill. The company can operate six pump stations along the pipeline. The company can install and operate an organic collapsible hoseline system. The company operates a TPT when permanent or semipermanent facilities are not available, and operates loading facilities for shipment of products by coastal tanker, rail tank car, barge, and tank vehicles. Since it is responsible for all bulk fuels shipped into the theater, the company is normally assigned to a petroleum pipeline and terminal operating battalion or it may be attached to a TAACOM or an independent Corps. It may also operate as a separate company under specific conditions. The company is normally employed in the rear operational area. It may begin its operation at beach heads or base terminals located near theater ports of entry or along any 90-mile section of pipeline and extend as far forward in the theater as possible. The company can also provide limited bulk reduction capabilities.

- **Quartermaster Water Supply Company (TOE 10-46810).** The QM water supply company is normally attached or assigned to a water supply battalion. This company can install and operate two each 10-mile tactical water distribution systems as well as store 1.6 million gallons of water in collapsible tanks. When required, the company can operate eight direct support water issue points. The company can also run a TWDS system up to 80 miles when augmented with an appropriate number of TWDS teams.

q. **Transportation Floating Craft General Support Maintenance Company (TOE 55-157).** The capability of this Army

company to provide general support and maintenance are as follows.

- The mission of the marine maintenance company is to provide maintenance support for US Army marine craft and their organic navigational equipment.
- The maintenance company is normally assigned to a transportation command or terminal group, although it may be attached to a transportation terminal battalion.
- The maintenance company can provide the following services: plumbing and pipefitting, sheetmetal working, machining, welding and blacksmithing, and repairs to instruments, marine engines, power generator equipment, radar, hulls, radios, refrigeration, rigging, and marine electrical systems.
- The unit receives, stores, and issues approximately 9,000 line items of marine-peculiar repair parts and items and performs marine salvage operations.
- The unit is authorized 230 personnel and approximately 533,600 pounds (67,000 cubic feet) of equipment requiring transportation. Additional equipment and supplies constitute approximately 71,400 pounds (2,000 cubic feet). In one lift, using organic assets, the unit can move approximately 230 personnel and 1,692,000 pounds (136,000 cubic feet) of equipment and supplies. All equipment is transportable by air, except:
  - •• Deck cargo barge;
  - •• 20-ton wheeled crane;
  - •• 100 psi recompression chamber;
  - •• Mechanized landing craft;
  - •• Utility landing craft; and
  - •• Nonpropelled (towed) marine floating repair shop.
- Although shore-based repair facilities may be established if required, the bulk of the unit's work is done aboard the floating repair shop. The shop contains all the facilities necessary to support the company mission. Three repair sections, a supply platoon, and a repair control section normally function aboard the floating repair shop.
- Because of the requirements for a protected berth for a floating repair shop, the maintenance company normally operates in an established port terminal that is centrally located in relation to other terminals.
- The maintenance company must submit requests for repair parts directly to the theater material management center, which directs shipment from the field depot that stocks the requested items. Items repaired by the maintenance company are either returned to the using unit, supply stocks within the company, or the appropriate field theater supply activity that stocks marine items.
- This unit will require the continuous support of a lightweight diving team to provide adequate underwater ship's husbandry.

4. Marine Corps Units — FSSG

The FSSG is the CSS element of the MEF and as such assumes full responsibility for overall CSS for the MEF. In amphibious assault operations, the FSSG provides task-

organized elements to form the landing force support party. When the landing force is established ashore, the FSSG commander assumes control of, and responsibility for, CSS of the landing force. During subsequent operations ashore, elements of the FSSG may be assigned by the MAGTF commander to support or assist in LOTS operations. The landing support battalion of the FSSG (see Figure M-15) is organized to provide for three C2 agencies (three landing support companies) for the operation of colored beaches or helicopter support areas during the amphibious assault. Elements of the landing support companies are augmented with other elements of the FSSG through task organization to provide the initial CSS for amphibious and helicopterborne operations requiring substantial logistic support in excess of the supported units' organic capability. The beach and terminal operations company, when likewise augmented and task-organized, provides for the management and operation of ports, railheads, airheads, and other cargo terminal operations as required. Headquarters and service company provides C2, administrative, and internal supply functions, and the landing support equipment company provides equipment and maintenance support for the battalion.

5. MTMC Single Port Manager

As one of USTRANSCOM's surface TCCs, MTMC will perform SPM functions necessary to support the strategic flow of the deploying forces' equipment and sustainment supply in the SPOE and hand-off to the geographic CINC in the SPOD. MTMC has port management responsibility through all phases of the theater port operations continuum, from a bare beach (i.e., JLOTS) deployment to a commercial contract fixed-port support deployment. When necessary in areas where MTMC does not maintain a manned presence, a port management cell will be established to direct water terminal operations including supervising movement operations, contracts, cargo documentation, security operations, and the overall flow of information. As the SPM, MTMC is also responsible for providing strategic deployment status information to the CINC and to workload the SPOD port operator based on the CINC's priorities and guidance. The specific roles and functions of both the Port Manager and Port Operator are summarized in Joint Pub 4-01.5, "Joint Tactics, Techniques, and Procedures for Terminal Operations."

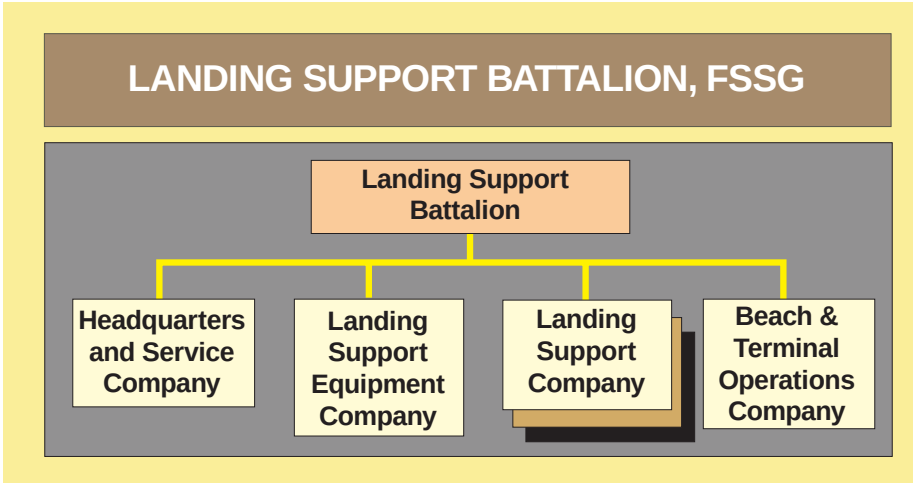


Figure M-15. Landing Support Battalion, FSSG

6. Service Functions

The Services conduct several JLOTS tasks and functions of an identical nature with different units in each Service responsible for their accomplishment. Figure M-16 shows multiple tasks with the Army and Navy units responsible for those functions. Figure M-17 provides a mission summary by organization.

Army and Navy Organizations Responsible for LOTS Tasks and Functions		
TASK/FUNCTION	ARMY	NAVY
Beach traffic control surf line to high water mark; surveys	Terminal Battalion	BMU
Lighterage Operations LCM LCU LCAC CSP CF LARC-V LARC-LX Barges, Tugs, and/or SLWT Repair and/or Maintenance LSV	 Med Boat Co Heavy Boat Co Fltng Craft Co Fltng Craft Co Heavy Amphib Co Watercraft Team Fltng Craft Co Watercraft Team Fltng Craft General Support Maint Co Watercraft Det	 ACU ACU ACU PHIBCB PHIBCB BMU PHIBCB ACU and/or PHIBCB
Fuel Offshore-bulk (OPDS) Inland-Inland pipelines (const) Inland-Inland pipelines (oper'n) Inland Fuel Distribution Assault AABFS	Engineer Pipeline Const Co Petrol Pipeline and Term Oper'n Battalion QM Co	PHIBCB and/or UCT NMCB
Construction Causeway Pier Inst'ln RRDF Inst'ln ELCAS Inst'ln Road Inst'ln	 Fltng Craft Co Fltng Craft Co Eng Prt Const Co Eng Battln (Hvy)	 PHIBCB PHIBCB PHIBCB
Salvage Support Control	 Terminal Battln and/or Fltng Craft Maint Co Boat Co	 PHIBCB and/or BMU BMU

Figure M-16. Army and Navy Organizations Responsible for LOTS Tasks and Functions

Army and Navy Organizations Responsible for LOTS Tasks and Functions (cont'd)		
TASK/FUNCTION	ARMY	NAVY
Camp Support	Internal (Co) Area Support Gp HHC Term Bn and/or Gp	PHIBCB
Communications Ashore (Admin) Shipboard Lighterage Cntrl	 Internal (Co)/Terminal Bn and/or Gp C&E HQ & HQ Co Trmnl Service Co Trmnl Battalion	 NBG NBG NBG
Beach Security	MPs	PHIBCB and/or BMU
Reembarkation of NBG and/or NCNF	Trmnl Battalion	NBG
Cargo Offload Shipboard Ops (breakbulk) Shipboard Crane Ops Supervisors and/or Hatch Teams Stevedores Unskilled Labor Shoreside Cranes Container Offload	 Trmnl Service Co Trmnl Service Co (brkblk and/or cntnrs) Transportation Co Trmnl Service Co (brkblk and/or cntnrs) Trmnl Service Co Host-Nation Suppt Trmnl Service Co (containers) Trmnl Service Co (containers)	 NCHF unit NCHF unit NCHF unit NCHF unit Spprtd unit NCHF unit and/or PHIBCBs NCHF unit

Figure M-16. Army and Navy Organizations Responsible for LOTS Tasks and Functions (cont'd)

Army and Navy Organizations Responsible for LOTS Tasks and Functions (cont'd)		
TASK/FUNCTION	ARMY	NAVY
Terminal Ops/Cntrl 4/6/10K RTFL RTCH 140 T Crane Yard Tractor Cargo Documentation Breakbulk Marshalling Yd Container Marshalling Yd Container Stuff and/or Unstuff Yd	Terminal Bn Trmnl Service Co (Breakbulk) Trmnl Service Co (Containers) Trmnl Service Co (Containers) Trmnl Service Co (Containers) ACD Det Trmnl Service Co (Breakbulk) Trmnl Service Co (Breakbulk) Trmnl Service Co (Containers) Trmnl Service Co (Containers)	Supptd unit Supptd unit Supptd unit Supptd unit Supptd unit Supptd unit Supptd unit
Water Offshore Bulk Inland	Barge Water Purification Team Water Supply Co	Amphibious Assault Bulk Water System
LOTS C2	Terminal Bn and/or Gp	NBG

Figure M-16. Army and Navy Organizations Responsible for LOTS Tasks and Functions (cont'd)

Organization Mission Summary	
COMMAND NBG	ASSIGNMENT JLOTS COMMANDER
MISSION Provide Navy elements to support LOTS and/or JLOTS commander with master traffic control, lighterage, causeways, bulk fuel delivery, construction, landing craft, salvage, and communications to facilitate flow of cargo across beach. CAPABILITIES Direct and coordinate training and administration of NBG activities. Provide BTU, PHIBCB, and ACU components.	
COMMAND PHIBCB	ASSIGNMENT NBG
MISSION Provide elements to support operation. CAPABILITIES Install and operate causeway piers, RRDF, and ELCAS. Limited construction and camp support. Operate lighterage. Install bulk liquid systems. Salvage support. Security and beach defense. Lighterage repair.	
COMMAND BTU	ASSIGNMENT NBG
MISSION Beach party operations to facilitate landing and moving cargo across the beach. CAPABILITIES Control of landing ships, lighterage, amphibious vehicles on beach. Determine and advise of suitability to land craft on beach. Control salvage. Assist beach security and defense.	

Figure M-17. Organization Mission Summary

Organization Mission Summary (cont'd)

COMMAND	ASSIGNMENT
ASU	NBG

MISSION
Provide, operate, and maintain assault craft for ship-to-shore movement.

CAPABILITIES
LCU, LCM, LCAC support.
Maintenance and support for I-level craft repair.
Administrative control of LCU, LCM, LCAC lighters.

COMMAND	ASSIGNMENT
NCHF	NBG

MISSION
Load and unload cargo carried on MPS, merchant breakbulk, and container ships; operate temporary ocean cargo terminal; load and unload cargo carried on military aircraft; operate an expeditionary air cargo terminal.

CAPABILITIES
MPS and AFOE cargo handling.
Heavy lift marine crane operators.
Total cargo class responsibility.
Limited ocean terminal.
Self support.

COMMAND	ASSIGNMENT
UCT	COM 2nd/3rd NCB; NBG

MISSION
Harbor, coastal, and ocean construction diving; OPDS installation support.

CAPABILITIES
OPDS support:
Underwater surveys.
Pipeline installation and stabilization.
Ballast SALM; connect hoses; set product valves.
Disconnect underwater pipelines.
Deballast SALM.

Figure M-17. Organization Mission Summary (cont'd)

Organization Mission Summary (cont'd)	
COMMAND MIUWU	ASSIGNMENT COMNAVIUWGRU ONE/TWO; CATF; CMPF; JLOTS CDR
MISSION Provide seaward surveillance for interdiction of hostile surface craft and submarines. CAPABILITIES Radar and sonar surveillance. Establish seaward defense zones. Assist in lighterage control and lane discipline.	
COMMAND US ARMY TRANSPORTATION TERMINAL GROUP (TTG)	ASSIGNMENT TT Brigade
MISSION Command units employed in operation of water terminals and perform operations planning. CAPABILITIES Command and supervision of operations, training, and administration of transportation terminal battalions (TTBs).	
COMMAND US ARMY TRANSPORTATION TERMINAL BATTALION (TTBN)	ASSIGNMENT TAACOM
MISSION Command units employed in operation of water terminals. CAPABILITIES C2, planning, and supervision over units responsible for discharging 4 ships at a terminal or 2 ships in-stream.	

Figure M-17. Organization Mission Summary (cont'd)

Organization Mission Summary (cont'd)

COMMAND
US ARMY TRANSPORTATION TERMINAL SERVICE CO. (TTSCO) BREAKBULK (BB)

ASSIGNMENT
TTBN

MISSION
Discharge, backload, and transship breakbulk cargo at water terminals.

CAPABILITIES
BB ship discharge at 1,000 ST/D; backload at 500 ST/D.
Sorts and loads cargo.
Cargo accountability.
Limited in-transit storage.

COMMAND
US ARMY TRANSPORTATION TERMINAL SERVICE CO. CONTAINER (CONT)

ASSIGNMENT
TTBN

MISSION
Discharge, backload, and transship container cargo at water terminals.

CAPABILITIES
Discharge and backload containers.
Container loading, unloading, stuffing, and unstuffing.
Cargo accountability.
Limited in-transit storage.
BB ship discharge.

COMMAND
TTSCO (BB AND CONT)

ASSIGNMENT
TTBN

MISSION
Discharge, backload, and transship BB and container cargo at water terminals.

CAPABILITIES
Discharge and backload containers and BB.
BB and container sorting, loading, stuffing, and unstuffing.
Receive and process containers for retrograde.
Limited in-transit storage.

Figure M-17. Organization Mission Summary (cont'd)

Organization Mission Summary (cont'd)	
COMMAND US ARMY TRANSPORTATION TERMINAL TRANSFER CO.	ASSIGNMENT TAACOM, COSCOM
MISSION Transship cargo at air, rail, motor, and inland barge terminals. CAPABILITIES 24-hour terminal operation. Transshipped cargo redocumentation. Container stuffing and unstuffing.	
COMMAND US ARMY TRANSPORTATION MEDIUM BOAT CO.	ASSIGNMENT TTBN
MISSION Provide and operate landing craft for movement of personnel and cargo in water terminal operations, waterbourne tactical operations, and augment Navy craft in joint amphibious operations. CAPABILITIES Transport BB cargo, containers, and troops via landing craft.	
COMMAND US ARMY TRANSPORTATION HEAVY BOAT COMPANY	ASSIGNMENT TTBN
MISSION Provide and operate landing craft for transportation of personnel, containers, and outsized cargo in offshore discharge operations and for augmenting lighterage service. CAPABILITIES Transport BB cargo, containers, personnel, and rolling stock via landing craft.	

Figure M-17. Organization Mission Summary (cont'd)

Organization Mission Summary (cont'd)

COMMAND	ASSIGNMENT
US ARMY TRANSPORTATION WATERCRAFT TEAMS	Watercraft Unit; Trans Termin Hdqtrs; TTSBN; TTSCO

MISSION

Transport cargo other than bulk liquid; provide water transportation for patrol, command, inspection, and general utility services in support of terminal or inland water systems; transport deck-loaded dry cargo or bulk liquid cargo; load and discharge heavy-lift cargo beyond ship's capability; provide amphibious lighter service for heavy, outsized, or bulky equipment; dock deep-draft oceangoing vessels, provide firefighting services, make tows of barges and vessels; intratheater line haul of cargo; provide a temporary beach site lighterage discharge facility; provide RO/RO ship interface; move rolling stock cargo and containers from ship-to-shore.

CAPABILITIES

Transport deck cargo under tow.
Transport personnel.
Transport liquid cargo.
Make crane lifts.
Transport heavy, outsized, and bulky cargo.
Make inland and coastal tows.
Assemble, maneuver, and secure floating causeway to the beach.
Install, retrieve, operate, and maintain RRDF.
Provide LOTS interface.

Figure M-17. Organization Mission Summary (cont'd)

Organization Mission Summary (cont'd)	
COMMAND US ARMY TRANSPORTATION TERMINAL SERVICE TEAMS	ASSIGNMENT Trans Term Svce Co.
MISSION Cargo documentation; transportation contract supervision; personnel and equipment provision. CAPABILITIES Perform loading and discharge documentation. Administer contracts for cargo load, discharge, transport and terminal clearance. Provide personnel and equipment for cargo handling. Operate cargo marshalling area.	
COMMAND ENGINEER COMBAT BATTALION, HEAVY	ASSIGNMENT Engr Brgd Corps, Airborne Corps, JTF and/or CTF; TAACOM
MISSION Construct, repair, and maintain main supply routes, landing strips, building structures, and utilities; reinforce divisional engineer units and infantry combat missions. CAPABILITIES General engineering tasks. Limited reconstruction of RRs, RR bridges, electrical systems, sewage and water facilities. Field engineering assistance and equipment support. Engineer reconnaissance. Create and clear obstacles. Prepare demolition targets. Perform combat infantry operations. Supervise contract construction, skilled and unskilled labor. Damage clearance and restoration operations.	

Figure M-17. Organization Mission Summary (cont'd)

Organization Mission Summary (cont'd)

COMMAND	ASSIGNMENT
ENGINEER PORT CONSTRUCTION COMPANY	TTG, TAACOM, and/or JLOTS

MISSION
Provide specialized engineer support in developing, rehabilitation, and maintaining port facilities.

CAPABILITIES
Construct, rehabilitate, and maintain offshore facilities.
Construct, rehabilitate, and maintain piers, wharves, ramps and cargo load and unload structures.
Install and maintain tanker discharge facilities.
Limited dredging and obstacle removal.
Equipment operation.

COMMAND	ASSIGNMENT
ENGINEER PIPELINE CONSTRUCTION SUPPORT COMPANY	Engineer Command

MISSION
Provide technical personnel and equipment to assist construction and combat engineering units in construction, rehabilitation, and maintenance.

CAPABILITIES
Provide advisory personnel to engineer companies engaged in:
- Pipeline construction.
- Pipe stringing.
- Pipe coupling.
- Storage tank erection.
- Pump station and dispensive facility construction.

Figure M-17. Organization Mission Summary (cont'd)

Organization Mission Summary (cont'd)

COMMAND	ASSIGNMENT
CONTROL AND SUPPORT DETACHMENT (C&S DET)	TAACOM; Diving Dets, Teams

MISSION
Provide diving asset control and support.

CAPABILITIES
Liaison and dive mission planning and control.
Diving expertise support.
Specialized diving equipment and medical support.
I-level maintenance of diving support systems.

COMMAND	ASSIGNMENT
LIGHTWEIGHT DIVING TEAM	C&S Det, TTG, and/or TAACOM JLOTS CDR

MISSION
Underwater construction, light salvage, repair, and maintenance to diving systems.

CAPABILITIES
Scuba and lightweight surface diving for:
- Light salvage.
- Harbor clearance.
- Underwater pipeline.
- Fixed bridge.
- Port construction, repair, and maintenance.

Ship underwater repair.

Figure M-17. Organization Mission Summary (cont'd)

Organization Mission Summary (cont'd)

COMMAND	ASSIGNMENT
QUARTERMASTER PETROLEUM AND WATER UNITS	TAACOM and/or TTG

MISSION
Bulk petroleum planning and operations; water supply and distribution.

CAPABILITIES
C2 for petroleum units.
Distribution system maintenance.
Petroleum quality surveillance program.
Petroleum receipt, storage, and distribution planning.
Coordinates and provides petroleum to all Services.
Implements host-nation support procedures.
Nonpipeline fuel distribution.
Bulk potable water production and distribution.

COMMAND	ASSIGNMENT
TRANSPORTATION FLOATING CRAFT GENERAL SUPPORT MAINT Co	TTG

MISSION
Maintenance support for Army marine craft and navigational equipment.

CAPABILITIES
Marine craft maintenance and repair.
Receipt, storage, and issuance of repair parts.

COMMAND	ASSIGNMENT
FSSG (Marine Corps)	MAGTF CDR

MISSION
Responsible for providing overall combat service support to the landing force (MEF-level MAGTF).

CAPABILITIES
Full spectrum of logistic support beyond MAGTF unit's organic capabilities.
Management and operation of ports, railheads, airheads, and other cargo terminals.
During an amphibious assault operation, provides organized elements to form the landing force support party.

Figure M-17. Organization Mission Summary (cont'd)

Organization Mission Summary (cont'd)	
COMMAND PORT SECURITY UNIT (USCG)	ASSIGNMENT JLOTS CDR
MISSION Ensure security for sensitive port areas and ensure safe movement of explosives, POL, and other dangerous cargoes between vessel and dock.	
CAPABILITIES Establish and enforce waterfront exclusionary areas. Advisory and inspection functions on transfer of dangerous cargoes. Surveillance of sensitive waterfront areas.	

Figure M-17. Organization Mission Summary (cont'd)

APPENDIX N
LIGHTERAGE SALVAGE OPERATIONS

1. Overview

A certain amount of casualties among supporting lighterage and other discharge support assets is inevitable while conducting JLOTS operations. Lighterage salvage is the salvage, emergency repair, and clearing of damaged, inoperative, broached, or stranded lighterage, including discharge facilities and other off-load support craft and equipment. The primary objective of salvage operations is to assist, as appropriate, in maintaining the continuous flow of cargo ashore. In accomplishing this objective, salvage includes keeping the beach and sea approaches clear, assisting discharge facilities and supplementary equipment when required, and moving or assisting incapacitated lighterage to designated repair sites.

2. Salvage Tasks

a. The salvage of lighterage used in the ship-to-shore movement of cargo is accomplished by one or a combination of three distinct salvage elements.

- Afloat heavy salvage for surf zone operations;
- Beach salvage for surf zone and dry beach operations; or
- Afloat light salvage for offshore, non-surf zone operations.

b. Salvage is not normally conducted using definite rules and procedures. Rather, salvage operations must be adaptable to variable and unpredictable circumstances (e.g., weather; sea state; tempo of operations; and bottom, surf, and beach characteristics). The primary tasks of the salvage organization are as follows.

- Assist broached lighterage in retracting from the beach.
- Assist floating causeway facilities and other discharge facilities when required.
- Move hull-damaged lighterage to the high water mark.
- Effect simple repairs, such as clearing fouled propellers.
- Clear heavy obstacles.
- Deadman landing craft or floating ferries.
- Help raise inoperative boat ramps.
- Assist vehicles that have become inoperative in the water or beach areas.

c. When a loaded craft grounds offshore, any practical system that will expedite unloading cargo from the craft will be used. Amphibians may be able to moor alongside or at the lowered ramp to permit transferring small items of cargo by hand. Cargo too heavy to be moved by hand will be lifted by RT crane. The crane is driven to the stranded craft if intervening depths and surf conditions permit.

d. The primary aim of beach and surf salvage operations is to keep the working beach clear. Craft that can be repaired or removed quickly are given priority, and craft that cannot be salvaged readily are anchored securely and left at the beach until traffic eases and more time can be devoted to them.

3. Organization

The Navy will provide personnel and equipment to meet beach, surf zone, and offshore salvage requirements. The OCO is designated as the senior salvage officer and is responsible for overall salvage operations. However, this responsibility is normally delegated to the beach party element in cases involving lighterage in the surf zones and to the assistant salvage officer as designated by the JLOTS commander in cases seaward of the surf zone. This organization is depicted in Figure N-1. The OCO will be advised of all lighterage casualties, estimated repair times (if known), or repair services required. The OCO and the lighterage repair officer will coordinate the location of post-salvage repair facilities.

4. Equipment

a. **Beach Salvage Party.** The beach salvage party is stationed ashore and is equipped with one bulldozer rigged with a fendered blade and a rear winch; two LARC-Vs, each equipped with a reinforced pusher plow; and a de-watering and firefighting pump, cargo truck, and light trailer.

- **Free Salvage Bulldozer.** This bulldozer is fitted with a fendered blade and has a single driving winch capable of 120,000-lb line pull using 150 feet of 1 1/4-inch wire. It is used to (a) winch disabled craft out of the water; (b) deadman causeways when they first arrive at the beach; (c) deadman landing craft; (d) snake stalled vehicles out of the water; (e) perform earth moving tasks; and (f) in emergencies, push grounded landing craft off the beach. The bulldozers can also be used for limited beach improvement or construction of beach exits.

- **Cargo Truck.** This vehicle provides means for the salvage detachment to tow trailers and stow personnel support equipment, repair parts, and mechanic tools for the salvage team.

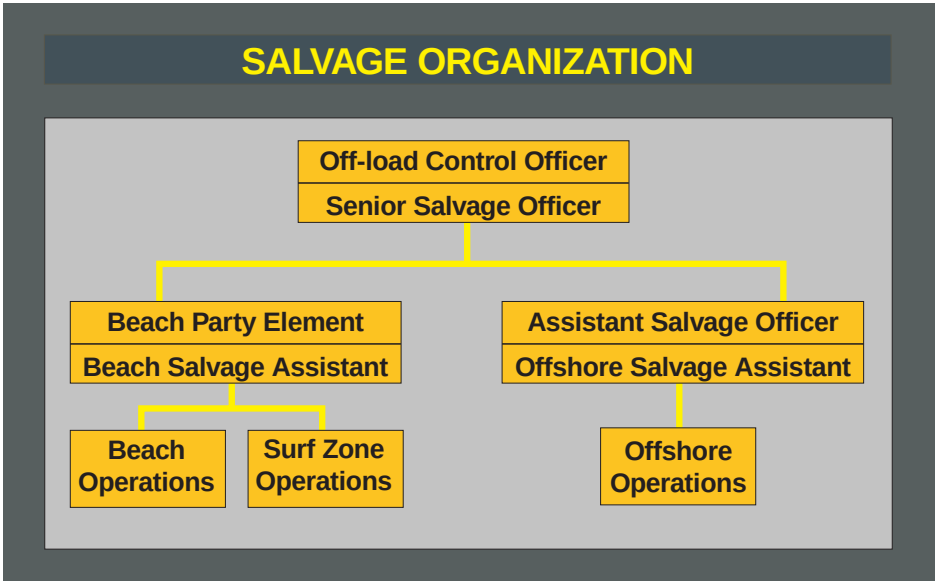


Figure N-1. Salvage Organization

- **Light Trailer.** This trailer provides the salvage team with its own lighting capability for working at night, if necessary.

b. **Surf Salvage Boat.** The heavy salvage boat is normally an LCM-8 that has been converted to meet specific salvage requirements. The boat is stationed outside the surf zone but close enough to maintain good visibility of the beach and its approaches. Warping tugs may be used in heavy salvage operations in place of LCM-8s. Army watercraft units normally use sister vessels for salvage operations. The Army's LARC-LX is considered the most useful in beach salvage operations and is stationed ashore.

c. **Light Salvage Boat.** A light salvage boat can be a landing craft or warping tug and is stationed seaward of the surf zone in proximity to lighterage routing lanes. Normally, the light salvage boat assists in towing and carries de-watering and firefighting equipment.

d. **Bulldozer.** A bulldozer will be used to push stranded craft back into the water. The blade of the bulldozer will be padded by fenders, salvaged tires, or similar material to prevent damage to the hulls or ramps of the craft. Where possible, one bulldozer will be readily available to each operational beach to provide maximum salvage capability.

e. **Lighter, Amphibious Resupply Cargo V.** The primary mission of the Navy's LARC-V is surf and salvage. The LARC-V's ability to transport men and cargo is very limited and is only recommended as a last resort.

5. Craft Manning

No craft is ever left on the beach unattended or unwatched. The operator will remain constantly at the controls within the constraints of safety.

6. Salvage Operations

Salvage personnel and equipment will be stationed as directed by the OCO or the designated salvage assistant in the beach party element. Salvage operations will be initiated by signal flags or radio. The salvage element will then proceed to the appropriate lighterage and conduct operations in accordance with good practice and procedures and the rules of good seamanship. For joint operations, salvage procedures should be reviewed by both Navy and Army personnel to ensure compatibility and consistency of operations. The Navy's "Joint Surf Manual" (COMNAVSURFLANT/PACINST 3840.1B) is an excellent guide for surf and salvage operations.

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APPENDIX O
REFERENCES

The development of Joint Pub 4-01.6 is based upon the following primary references:

1. DOD Directives and Regulations

a. 4140.25, "Management of Bulk Petroleum Products, Storage, and Distribution Facilities."

b. 4140.25M, "Procedures for the Management of Petroleum Products (MILSPETS)."

c. 4500.32-R, "Military Standard Transportation and Movement Procedures (MILSTAMP) VOL I and II."

d. 4500.9-R-1, "Management and Control of the DOD Intermodal Container System."

e. 5100.1, "Functions of the Department of Defense and Its Major Components."

f. 5100.3, "Support of the Headquarters of Unified, Specified, and Subordinate Joint Commands."

g. 5160.10, "Single Manager Assignment for Ocean Transportation."

h. 5160.53, "Single Manager Assignment for Military Traffic, Land Transportation, and Common User Ocean Terminals."

2. Joint Publications

a. 0-2, "Unified Action Armed Forces (UNAAF)."

b. 1-01, "Joint Publication System, Joint Doctrine and Joint Tactics, Techniques, and Procedures Development Program."

c. 1-02, "DOD Dictionary of Military and Associated Terms."

d. 1-03, "Joint Reporting Structure (JRS) General Instructions."

e. 3-0, "Doctrine for Joint Operations."

f. 3-02, "Joint Doctrine for Amphibious Operations."

g. 3-02.1, "Joint Doctrine for Landing Force Operations" (In Development).

h. 3-02.2, "Joint Doctrine for Amphibious Embarkation."

i. 4-0, "Doctrine for Logistic Support of Joint Operations."

j. 4-01.2, “Joint Tactics, Techniques, and Procedures for Sealift Support to Joint Operations.”

k. 4-01.3, “Joint Tactics, Techniques and Procedures for Movement Control.”

l. 4-01.5, “Joint Tactics, Techniques, and Procedures for Water Terminal Operations.”

m. 4-01.7, “Joint Tactics, Techniques, and Procedures for Use of Intermodal Containers in Joint Operations.”

n. 4-03, “Joint Bulk Petroleum Doctrine.”

o. 5-00.2, “Joint Task Force Planning Guidance and Procedures.”

3. Allied Publications

a. ATP-2, “Allied Naval Control of Shipping Manual.”

b. ATP-8, “Doctrine for Amphibious Operations.”

c. ATP-39, “Amphibious Embarkation.”

4. Army Regulations

a. AR 55-41, “MSC Passenger Documentation and Traffic Information.”

b. AR 55-176, “Logistics Over-the-Shore Operations in Overseas Areas.”

c. AR 56-4, “Management of Army Intermodal Container Systems.”

d. AR 220-10, “Preparation of Overseas Movement of Units (POM).”

5. Army Publications

a. FM 5-100, “Engineer Combat Operations.”

b. FM 5-104, “General Engineering.”

c. FM 9-38, “Conventional Ammunition Unit Operations.”

d. FM 10-18, “Petroleum Terminal and Pipeline Operations.”

e. FM 10-52, “Field Water Supply.”

f. FM 10-67, “Petroleum Supply in Theater of Operations.”

g. FM 10-70, “Inspecting and Testing Petroleum Products.”

h. FM 10-115, “Quartermaster Water Supply Units, GS.”

i. FM 10-207, “Petroleum Pipeline and Terminal Operating Company.”

j. FM 24-1, “Combat Communications.”

k. FM 31-12, “Army Forces in Amphibious Operations (The Army Landing Force).”

l. FM 44-8, “Small Unit Self-Defense Against Air Attack.”

m. FM 54-11, “Container Movement and Handling in the Theater of Operations.”

n. FM 55-1, “Transportation Operations.”

o. FM 55-15, “Transportation Reference Data.”

p. FM 55-17, “Terminal Operations Coordinators Handbook.”

q. FM 55-50, “Army Water Transportation Operations.”

r. FM 55-60, “Army Terminal Operations.”

s. FM 55-65, “Strategic Deployment.”

t. FM 55-80, “Army Container Operations.”

u. FM 55-500, “Marine Equipment Characteristics and Data.”

v. FM 55-501, “Marine Crewman’s Handbook.”

w. FM 55-501-1, “Landing Craft Operator’s Handbook.”

x. FM 55-501-2, “Harbor Craft Crewman’s Handbook.”

y. FM 55-509, “Marine Engineman’s Handbook.”

z. FM 55-511, “Operation of Floating Cranes.”

aa. FM 90-14, “Rear Battle.”

bb. FM 100-5, “Operations.”

cc. FM 100-10, “Combat Service Support.”

dd. TB 55-46-1, “Standard Characteristics, Dimension, Weight, and Cube for Transportability of Military Vehicles and Other Outsized Overweight Equipment.”

ee. TM 5-343, “Military Petroleum Pipeline Systems.”

ff. TM 5-725, “Rigging.”

gg. TM 55-607, “Loading and Storage of Military Ammunition and Explosives Aboard Breakbulk Merchant Ships.”

hh. MTMC 56-1, “Marine Terminal Lifting Guidance.”

ii. MTMC 700-1, “Logistic Handbook for Strategic Mobility Planning.”

6. Naval Warfare Publications

a. NWP 1-01, “Naval Warfare Publications System.”

b. NWP 1-02, “Naval Supplement to the DOD Dictionary of Military and Associated Terms.”

c. NWP 3-02.1, “Ship-to-Shore Movement.”

d. NWP 3-02.3, “Maritime Prepositioning Force Operations.”

e. NWP 3-02.12, “Employment of Landing Craft Air Cushion (LCAC).”

f. NWP 3-02.14, “The Naval Beach Group.”

g. NWP 3-02.21, “MSC Support of Amphibious Operations.”

h. NWP 3-07.12, “Naval Control and Protection of Shipping.”

i. NWP 3-10, “Naval Coastal Warfare.”

j. NWP 3-10.3, “Inshore Undersea Warfare.”

k. NWP 4-01, “Naval Transportation.”

l. NWP 6-00.1, “Command and Control.”

7. Navy Directives

a. SECNAV Instructions

(1) 4620.8 series, “Single Manager for Ocean Transportation Accessorial and Other Miscellaneous Services Related to Dry Reefer Cargo; Responsibilities for.”

(2) 5430.11 series, “Military Sealift Command; Prescribing Channels of Responsibility for.”

b. OPNAV Instructions

(1) 3120.5 series, "Services of US Flag Merchant Vessels Required by Naval Commanders in Emergencies."

(2) 3450.14 series, "Control of MSC Ships and Merchant Ships Under MSC Authority During Contingency Situations."

(3) 4620.4 series, "Navy Policy Regarding Fleet Operating Forces and Military Sealift Command Forces, and Other Related Matters."

(4) 4620.6 series, "Logistics Over-the-Shore Operations in Overseas Areas."

(5) 4670.7 series, "Operational and Logistic Support for (MSC) Tankers."

(6) 5410.16 series, "Support for the Headquarters of Unified, Specified, and Subordinate Unified Commands."

(7) 5440.20 series, "Single Manager Assignment for Ocean Transportation (SEALIFT)."

(8) 5440.73 series, "US Navy Cargo Handling and Port Group; Mission, Capabilities, and Emergency Augmentation of."

(9) 5720.2 series, "Embarkation in US Naval Ships."

(10) 10580; draft 1989; "Direction of Navy Containerization Program."

c. MSC Directives

(1) 2011.1 series, "Contingency Communications with the US Flag Merchant Fleet."

(2) 3090.1 series, "MSC Command, Control and Communications (C3)."

(3) 3120.19 series, "Administrative Procedures for Embarkation, Carriage, and Debarkation of Supercargo Personnel in MSC Ships."

(4) 3121.1 series, "Operational Control Procedures for MSC-Controlled Ships (less tankers)."

(5) 4622.9 series, "Policy and Conditions Governing MSC Use of Foreign Flag Ships."

(6) 5030.1 series, "MSC Abbreviated Titles and Symbols."

(7) 5100.17 series, "MSC Safety Manual."

(8) 5440.1 series, “MSC Command Organization.”

(9) 5440.2 series, “Boundaries of MSC Area and Subarea Commands.”

(10) 5440.8 series, “Organization of Commander, Military Sealift Command Headquarters.”

d. COMNAVSURFLANT/COMNAVSURFPAC Instructions

(1) 3840.1 series, “Joint Surf Manual.”

(2) NCOP 3-59.3, “Surf Zone Operations.”

8. Marine Corps Orders

4620.6 series, “Transportation and Travel: Logistics Over-the-Shore Operations in Overseas Areas.”

9. Marine Corps Publications

a. FMFM 3-1, “Command and Staff Action.”

b. FMFM 3-3, “Helicopterborne Operations.”

c. FMFM 4, “Combat Service Support.”

d. FMFM 4-5, “Medical and Dental Support.”

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f. OH 1-5, “Maritime Prepositioning Force (MPF) Operations.”

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h. OH 4-3, “Landing Support Operations.”

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b. AFR 75-28, “Air Force Intermodal Systems Development Group.”

11. Code of Federal Regulations

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12. Memorandum of Agreement

a. "Memorandum of Agreement on US Navy and US Army Joint Strategic Mobility Program Development and Coordination," 8 December 1986.

b. Joint Army and Navy Memorandum of Agreement between Vice Chief of Staff, Army and Vice Chief of Naval Operations, Navy, "Development of Joint Logistics Over-the-Shore (JLOTS) Systems," August 1996.

13. Miscellaneous

a. Army and Navy JLOTS Master Plan, December 1997.

b. NAVFACENGCOM Pub 460, September 1981, "Elevated Causeway Facility Installation and Retrieval."

c. Naval Civil Engineering Laboratory Technical Note N-1796, July 1989, "Lateral Stability of Flexible Submarine Hoseline."

d. Naval Facilities Engineering Command, January 1982, "Initial Definition Amphibious Logistic System (ALS)."

e. Naval Facilities Engineering Command TM-9-CE-023.02 and Army TM-55-1945-20114, "Installation/Retrieval and Operation/Maintenance Instructions for the RO/RO Discharge Facility."

f. Naval Sea Systems Command, PMS 377 various, December 1984, "T-ACS Class Mission Operations Handbooks."

g. US Army Quartermaster School, Fort Lee VA, October 1984, "Letter Report (LR) of the Independent Evaluation of the ROWPU Barge System During Initial Sea Trials and the JLOTS II Demonstration."

h. Joint Logistics Over-the-Shore II, Joint Test Director, Little Creek Naval Amphibious Base, Norfolk VA promulgated the following test guidance and evaluations:

(1) "JLOTS II Test Design" (January 1983).

(2) "JLOTS II Roll-On/Roll-Off Ship Operations" (March 1984).

(3) "JLOTS II Field Test Plan, Throughput Phase" (August 1984).

(4) "JLOTS II Operational Test Report, Throughput Test" (March 1985).

(5) "JLOTS II Deployment Test Report" (August 1985).

(6) "JLOTS II Analysis and Evaluation Report, Throughput Test" (August 1985).

i. Joint Logistics Over-the-Shore III, Joint Test Directorate (JTD, Office of the Under Secretary of Defense (Acquisition and Technology), Office of the Director, Test and Evaluation), promulgated the following test guidance and evaluations:

(1) "JLOTS III Feasibility Study" (March 1990).

(2) "JLOTS III Field Test Plan" (July 1991).

(3) "JLOTS III - Display Determination 91 Test Report" (18 Nov 1992).

(4) "JLOTS III - Ocean Venture '93 - Field Test Plan" (January 1993).

(5) "JLOTS III - Technical Report (OPDS)" (February 1993).

(6) Independent Summary and Analysis of JLOTS III, Phase II Test Results. "Off-Shore Petroleum Discharge System (OPDS) JT&E Operations" (December 1993).

(7) "JLOTS III Throughput Test - Summary Report" (May 94).

(8) "JLOTS III Technical Report Volume I" (June 1994).

(9) "JLOTS III Technical Report Volume II" (June 1994).

j. David Taylor Research Center, 3 September 1986, "LASH Ship Deployment of Cantilever Elevated Causeway."

k. Commander, Naval Surface Forces, Atlantic/Pacific Instruction 3840.1 series, "Joint Surf Manual."

l. Commander, Naval Sea Systems Command, Technical Manual T9540-AE-OMI-020/ OPDS, "Offshore Petroleum Discharge System Technical Manual II, General Operations and Maintenance."

m. Navy Training Plan (NTP X-OO-8301B) August 1989, "Cargo Offload and Discharge System (COLDS) Container Offloading and Transfer System/Offshore Bulk Fuel System (COTS/OBFS)."

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p. Center for Naval Analysis (CNA) Study CRM 89-262, February 1990, Ship-to-Shore Movement of the Assault Follow-on Echelon."

q. Naval Civil Engineering Laboratory Technical Note N-1795, July 1989, “Spans for the Advanced Cargo Transfer Facility.”

r. Fleet Hospital Program Office (PML-500), January 1987, “Operational Logistics Support Summary (OLSS) for the Fleet Hospital Program.”

s. Center for Naval Analysis (CNA) Study CRM 91-101, April 1991, “The Maritime Prepositioned Force Offload Model.”

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APPENDIX P
ADMINISTRATIVE INSTRUCTIONS

1. User Comments

Users in the field are highly encouraged to submit comments on this publication to the United States Atlantic Command Joint Warfighting Center, Attn: Doctrine Division, Fenwick Road, Bldg 96, Fort Monroe, VA 23651-5000. These comments should address content (accuracy, usefulness, consistency, and organization), writing, and appearance.

2. Authorship

The lead agent for this publication is the United States Transportation Command (USTRANSCOM). The Joint Staff doctrine sponsor for this publication is the Director for Logistics (J-4).

3. Supersession

This publication supersedes Joint Pub 4-01.6, 22 August 1991, "Joint Tactics, Techniques, and Procedures for Joint Logistics Over-the-Shore (JLOTS)."

4. Change Recommendations

a. Recommendations for urgent changes to this publication should be submitted:

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Marine Corps:	Marine Corps Logistics Base Albany, GA 31704-5000
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GLOSSARY

PART I — ABBREVIATIONS AND ACRONYMS

AABFS	amphibious assault bulk fuel system
ABFC	advanced base functional components
ACU	assault craft unit
ACV	air cushion vehicle
ADP	automated data processing
ADS	amphibian discharge site
AE	assault echelon
AFOE	assault follow-on echelon
AMC	Air Mobility Command
AOA	amphibious objective area
AOR	area of responsibility
ATF	amphibious task force
BCU	beach clearance unit
BLCP	beach lighterage control point
BMU	beachmaster unit
BTU	beach termination unit
C2	command and control
C4	command, control, communications, and computers
CAA	command arrangement agreement
CATF	commander, amphibious task force
CESE	civil engineering support equipment
CF	causeway ferry
CHB	Navy cargo handling battalion
CINC	commander of a combatant command
CJCS	Chairman of the Joint Chiefs of Staff
CLF	commander, landing force
COCOM	combatant command (command authority)
COLDS	cargo offload and discharge system
COMSAT	communications satellite
COMSC	Commander, Military Sealift Command
COSCOM	corps support command
CPX	command post exercise
CSNP	causeway section, nonpowered
CSNP(BE)	causeway section, nonpowered (beach end)
CSNP(I)	causeway section, nonpowered (intermediate)
CSNP(SE)	causeway section, nonpowered (sea end)
CSP	causeway section, powered
CSS	combat service support
CW	continuous wave
CWP	causeway pier
CWR	calm water ramp

DCD	data collection device
DOD	Department of Defense
DWMCF	double-wide modular causeway ferry
ELCAS	elevated causeway system
ELCAS (M)	elevated causeway system (modular)
ELCAS (NL)	elevated causeway system (Navy lighterage)
FC	floating causeway
FLO/FLO	float-on/float-off
FM	Field Manual
FSSG	force service support group (USMC)
FSW	feet of seawater
GPM	gallons per minute
IDZ	inner defense zone
IPDS	inland petroleum distribution system
ISO	International Organization for Standardization
ISOPAK	International Organization for Standardization Package
JFC	joint force commander
JLCC	joint lighterage control center
JLOTS	joint logistics over-the-shore
JMAT	joint mobility assistance team
JTF	joint task force
LARC-LX	lighter, amphibious resupply cargo 60 ton
LARC-V	lighter, amphibious resupply cargo 5 ton
LASH	lighter aboard ship
LCAC	landing craft, air cushion
LCC	lighterage control center
LCM	landing craft, mechanized
LCO	lighterage control officer
LCP	lighterage control point
LCU	landing craft, utility
LFSP	landing force support party
LOA	logistics over-the-shore operation area
LOGMARS	logistics applications of automated marking and reading symbols
LOTS	logistics over-the-shore
LST	landing ship, tank
LSV	logistics support vessel
LT	long ton
MAGTF	Marine air-ground task force
MCS	modular causeway section
MDSS II	MAGTF Deployment System II

MEF	Marine expeditionary force
MHE	materials handling equipment
MILSTAMP	military standard transportation and movement procedures
MIUW	mobile inshore undersea warfare
MIUWU	mobile inshore undersea warfare unit
MLW	mean low water
MOA	memorandum of agreement
MPF	maritime pre-positioning force
MPS	maritime pre-positioning ships
MSC	Military Sealift Command
MSCO	Military Sealift Command Office
MT	measurement ton
MT/D	measurement tons per day
MTMC	Military Traffic Management Command
MV	motor vessel
NAVCHAPGRU	Navy Cargo Handling and Port Group
NAVSAT	navigation satellite
NBC	nuclear, biological, and chemical
NBG	naval beach group
NCHF	Navy cargo handling force
NL	Navy lighterage
NRCHB	naval reserve cargo handling battalion
NRCHTB	naval reserve cargo handling training battalion
NSSCS	non-self-sustaining containership
NWP	Naval Warfare Publication
OBFS	offshore bulk fuel system
OCO	off-load control officer
ODZ	outer defense zone
OIC	officer in charge
OPCON	operational control
OPDS	offshore petroleum discharge system
OPLAN	operation plan
OPORD	operation order
OTC	officer in tactical command
OUB	OPDS utility boat
PBCR	portable bar code recorder
PHIBCB	amphibious construction battalion
PSU	port security unit
QM	quartermaster
RO/RO	roll-on/roll-off
ROWPU	reverse osmosis water purification unit
RRDF	roll-on/roll-off discharge facility
RRF	Ready Reserve Force

RT	rough terrain
RTCC	rough terrain container crane
RTCH	rough terrain container handler
SALM	single anchor leg mooring
SEABEE	sea barge
SLCP	ship lighterage control point
SLWT	side loadable warping tug
SPM	single port manager
SPOD	seaport of debarkation
SPOE	seaport of embarkation
ST	short ton
SUROBS	surf observation
TA	theater Army
TAACOM	Theater Army Area Command
TACON	tactical control
T-ACS	transport auxiliary crane ship
TC-AIMS	Transportation Coordinator's Automated Information for Movement System
TCC	transportation component command
TCMD	transportation control and movement document
TEU	twenty-foot equivalent unit
TM	Technical Manual
TOA	table of allowance
TOE	table of organization and equipment
TPT	tactical petroleum terminal
TWDS	Tactical Water Distribution System
UCT	underwater construction team
USCINCTRANS	Commander in Chief, United States Transportation Command
USTRANSCOM	United States Transportation Command
VHF	very high frequency
WPA	water jet propulsion assembly
WPS	Worldwide Port System

afloat pre-positioning force. Shipping maintained in full operational status to afloat pre-position military equipment and supplies in support of combatant commanders' operation plans. The afloat pre-positioning force consists of the three maritime pre-positioning ships squadrons and the afloat pre-positioning ships. Also called APF. (This term and its definition modify the existing term and its definition and are approved for inclusion in the next edition of Joint Pub 1-02.)

afloat pre-positioning operations. Pre-positioning of ships, preloaded with equipment and supplies (including ammunition and petroleum) that provides for an alternative to land based programs. This concept provides for ships and onboard force support equipment and supplies positioned near potential crisis areas that can be delivered rapidly to joint airlifted forces in the operational area. Afloat pre-positioning in forward areas enhances a force's capability to respond to a crisis resulting in faster reaction time. (Approved for inclusion in the next edition of Joint Pub 1-02.)

amphibian. A small craft, propelled by propellers and wheels or by air cushions for the purpose of moving on both land and water. (Approved for inclusion in the next edition of Joint Pub 1-02.)

amphibious assault bulk fuel system. The petroleum, oils, and lubricants discharge system used to support USMC amphibious assaults and maritime pre-positioning force operations. It consists of 5,000 or 10,000 feet of buoyant 6-inch hose deployed from a landing ship, tank in amphibious assaults or a maritime pre-positioning ship in maritime pre-positioning force operations. (Approved for inclusion in the next edition of Joint Pub 1-02.)

amphibious construction battalion. A permanently commissioned naval unit, subordinate to the commander, naval beach group, designed to provide an administrative unit from which personnel and equipment are formed in tactical elements and made available to appropriate commanders to operate pontoon causeways, transfer barges, warping tugs, and assault bulk fuel systems, and to meet salvage requirements of the naval beach party. (This term and its definition modify the existing term and its definition and are approved for inclusion in the next edition of Joint Pub 1-02.)

amphibious objective area. A geographical area, delineated in the initiating directive, for purposes of command and control within which is located the objective(s) to be secured by the amphibious task force. This area must be of sufficient size to ensure accomplishment of the amphibious task force's mission and must provide sufficient area for conducting necessary sea, air, and land operations. (Joint Pub 1-02)

amphibious operation. An attack launched from the sea by naval and landing forces, embarked in ships or craft involving a landing on a hostile or potentially hostile shore. As an entity, the amphibious operation includes the following phases: a. planning — The period extending from issuance of the initiating directive to embarkation. b. embarkation — The period during which the forces, with their equipment and supplies, are embarked in the assigned shipping. c. rehearsal — The period during which the prospective operation is rehearsed for the purpose of: (1) testing adequacy of plans, the timing of detailed operations, and the combat readiness of participating forces; (2) ensuring that all echelons are familiar with plans; and (3) testing communications.

d. movement—The period during which various components of the amphibious task force move from points of embarkation to the objective area. e. assault—The period between the arrival of the major assault forces of the amphibious task force in the objective area and the accomplishment of the amphibious task force mission. (Joint Pub 1-02)

amphibious task force. The task organization formed for the purpose of conducting an amphibious operation. The amphibious task force always includes Navy forces and a landing force, with their organic aviation, and may include Military Sealift Command-provided ships and Air Force forces when appropriate. Also called ATF. (Joint Pub 1-02)

anchorage. A specified location for anchoring or mooring a vessel in-stream or offshore. (Approved for inclusion in the next edition of Joint Pub 1-02.)

assault craft unit. A permanently commissioned naval organization, subordinate to the commander, naval beach group, that contains landing craft and crews necessary to provide lighterage required in an amphibious operation. (Joint Pub 1-02)

assault echelon. The element of a force that is scheduled for initial assault on the objective area. In an amphibious task force, it consists of Navy amphibious ships and the assault troops, vehicles, non-self-deployable aircraft, equipment, and supplies required to initiate the assault landing. Also called AE. (Joint Pub 1-02)

assault follow-on echelon. In amphibious operations, that echelon of the assault troops, vehicles, aircraft equipment, and supplies which, though not needed to initiate the assault, is required to support and sustain the assault. In order to accomplish its purpose, it is normally required in the objective area no later than five days after commencement of the assault landing. (Joint Pub 1-02)

backshore. The area of a beach extending from the limit of high water foam lines to dunes or extreme inland limit of the beach. (Approved for inclusion in the next edition of Joint Pub 1-02.)

backwash. An even layer of water that moves along the sea floor from the beach through the surf zone and caused by the pile-up of water on the beach from incoming breakers. (Approved for inclusion in the next edition of Joint Pub 1-02.)

bar. A submerged or emerged embankment of sand, gravel, or mud created on the sea floor in shallow water by waves and currents. A bar may be composed of mollusk shells. (Approved for inclusion in the next edition of Joint Pub 1-02.)

barge. A flat-bed shallow-draft vessel with no superstructure that is used for the transport of cargo and ships' stores or for general utility purposes. (Approved for inclusion in the next edition of Joint Pub 1-02.)

beachmaster unit. A commissioned naval unit of the naval beach group designed to provide to the shore party a Navy component known as a beach party which is capable of supporting the amphibious landing of one division (reinforced). (This term and its definition modify the existing term and its definition and are approved for inclusion in the next edition of Joint Pub 1-02.)

berm, natural. The nearly horizontal portion of a beach or backshore having an abrupt fall and formed by deposition of material by wave action. A berm marks the limit of ordinary high tide. For air

cushion vehicles, berms (constructed) are required to protect materials handling equipment operations. (Approved for inclusion in the next edition of Joint Pub 1-02.)

bight. A bend in a coast forming an open bay or an open bay formed by such a bend. (Approved for inclusion in the next edition of Joint Pub 1-02.)

breaker. A wave in the process of losing energy where offshore energy loss is caused by wind action and nearshore energy loss is caused by the impact of the sea floor as the wave enters shallow (shoaling) water. Breakers either plunge, spill, or surge. (Approved for inclusion in the next edition of Joint Pub 1-02.)

breaker angle. The angle a breaker makes with the beach. (Approved for inclusion in the next edition of Joint Pub 1-02.)

broach. When a water craft is thrown broadside to the wind and waves, against a bar, or against the shoreline. (Approved for inclusion in the next edition of Joint Pub 1-02.)

bulk cargo. That which is generally shipped in volume where the transportation conveyance is the only external container; such as liquids, ore, or grain. (Joint Pub 1-02)

cantilever lifting frame. Used to move Navy lighterage causeway systems on to and off of lighter aboard ship (LASH) vessels. This device is suspended from the Morgan LASH barge crane and can lift one causeway section at a time. It is designed to allow the long sections to clear the rear of the ship as they are lowered into the water. Also called CLF. (This term and its definition modify the existing term and its definition and are approved for inclusion in the next edition of Joint Pub 1-02.)

causeway. A craft similar in design to a barge, but longer and narrower, designed to assist in the discharge and transport of cargo from vessels. (Approved for inclusion in the next edition of Joint Pub 1-02.)

combatant command (command authority). Nontransferable command authority established by title 10 ("Armed Forces"), United States Code, section 164, exercised only by commanders of unified or specified combatant commands unless otherwise directed by the President or the Secretary of Defense. Combatant command (command authority) cannot be delegated and is the authority of a combatant commander to perform those functions of command over assigned forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction over all aspects of military operations, joint training, and logistics necessary to accomplish the missions assigned to the command. Combatant command (command authority) should be exercised through the commanders of subordinate organizations. Normally this authority is exercised through subordinate joint force commanders and Service and/or functional component commanders. Combatant command (command authority) provides full authority to organize and employ commands and forces as the combatant commander considers necessary to accomplish assigned missions. Operational control is inherent in combatant command (command authority). Also called COCOM. (Joint Pub 1-02)

combat service support. The essential capabilities, functions, activities, and tasks necessary to sustain all elements of operating forces in theater at all levels of war. Within the national and theater

logistic systems, it includes but is not limited to that support rendered by service forces in ensuring the aspects of supply, maintenance, transportation, health services, and other services required by aviation and ground combat troops to permit those units to accomplish their missions in combat. Combat service support encompasses those activities at all levels of war that produce sustainment to all operating forces on the battlefield. (Joint Pub 1-02)

combat service support elements. Those elements whose primary missions are to provide service support to combat forces and which are a part, or prepared to become a part, of a theater, command, or task force formed for combat operations. (Joint Pub 1-02)

command, control, communications, and computer systems. Integrated systems of doctrine, procedures, organizational structures, personnel, equipment, facilities, and communications designed to support a commander's exercise of command and control across the range of military operations. Also called C4 systems. (Joint Pub 1-02)

commander, amphibious task force. The US Navy officer designated in the initiating directive as commander of the amphibious task force. Also called CATF. (Joint Pub 1-02)

commander, landing force. The officer designated in the initiating directive for an amphibious operation to command the landing force. Also called CLF. (Joint Pub 1-02)

common-user sealift. The sealift services provided on a common basis for all Department of Defense agencies and, as authorized, for other agencies of the US Government. The Military Sealift Command, a transportation component command of the US Transportation Command, provides common-user sealift for which users reimburse the transportation accounts of the Defense Business Operations Fund. (Joint Pub 1-02)

containership cargo stowage adapter. Serves as the bottom-most SEASHED and precludes the necessity of strengthening of tank tops or the installation of hard points on decks, thereby accelerating containership readiness. (Approved for inclusion in the next edition of Joint Pub 1-02.)

corps support command. Provides corps logistic support and command and control of water supply battalions. (Approved for inclusion in the next edition of Joint Pub 1-02.)

coxswain. A person in charge of a small craft (in the Army, a Class B or smaller craft) who often functions as the helmsman. For a causeway ferry, the pilot is in charge, with the coxswain performing helmsman functions. (Approved for inclusion in the next edition of Joint Pub 1-02.)

current. A body of water moving in a certain direction and caused by wind and density differences in water. The effects of a current are modified by water depth, underwater topography, basin shape, land masses, and deflection from the earth's rotation. (Approved for inclusion in the next edition of Joint Pub 1-02.)

current, offshore. Deep water movements caused by tides or seasonal changes in ocean water level. (Approved for inclusion in the next edition of Joint Pub 1-02.)

current, rip. A water movement that flows from the beach through the surf zone in swiftly moving narrow channels.

(Approved for inclusion in the next edition of Joint Pub 1-02.)

cusps. Ridges of beach material extending seaward from the beachface with intervening troughs. (Approved for inclusion in the next edition of Joint Pub 1-02.)

davit. A small crane on a vessel that is used to raise and lower small boats, such as lifeboats, an LCM-8 on landing ship, tanks, side loadable warping tugs, or causeway sections. (Approved for inclusion in the next edition of Joint Pub 1-02.)

Defense Transportation System. That portion of the Nation's transportation infrastructure which supports Department of Defense common-user transportation needs across the range of military operations. It consists of those common-user military and commercial assets, services and systems organic to, contracted for, or controlled by the Department of Defense. Also called DTS. (Joint Pub 1-02)

draft. The depth of water which a vessel requires to float freely; the depth of a vessel from the water line to the keel. (This term and its definition modify the existing term and its definition and are approved for inclusion in the next edition of Joint Pub 1-02.)

dwell time. The time cargo remains in a terminal's intransit storage area while awaiting shipment by clearance transportation. (Approved for inclusion in the next edition of Joint Pub 1-02.)

elevated causeway system. An elevated causeway pier that provides a means of delivering containers, certain vehicles, and bulk cargo ashore without the lighterage contending with the surf zone. (Approved for inclusion in the next edition of Joint Pub 1-02.)

expeditionary force. An armed force organized to accomplish a specific objective in a foreign country. (Joint Pub 1-02)

fairway. A channel either from offshore, in a river, or in a harbor that has enough depth to accommodate the draft of large vessels. (Approved for inclusion in the next edition of Joint Pub 1-02.)

fender. An object, usually made of rope or rubber, hung over the side of a vessel to protect the sides from damage caused by impact with wharves or other craft. (Approved for inclusion in the next edition of Joint Pub 1-02.)

flatrack. Portable, open-topped, open-sided units that fit into existing below-deck container cell guides and provide a capability for container ships to carry oversized cargo, and wheeled and tracked vehicles. (Joint Pub 1-02)

Fleet Marine Force. A balanced force of combined arms comprising land, air, and service elements of the US Marine Corps. A Fleet Marine Force is an integral part of a US Fleet and has the status of a type command. (Joint Pub 1-02)

floating craft company. A company-sized unit made up of various watercraft teams such as tugs, barges, and barge cranes. (Approved for inclusion in the next edition of Joint Pub 1-02.)

force module. A grouping of combat, combat support, and combat service support forces, with their accompanying supplies and the required nonunit resupply and personnel necessary to sustain forces for a minimum of 30 days. The elements of force modules are linked together or are uniquely identified so that they may be extracted from or adjusted as an entity in the Joint Operation Planning and Execution System data bases to enhance flexibility and

usefulness of the operation plan during a crisis. Also called FM. (Joint Pub 1-02)

foreshore. That portion of a beach extending from the low water (datum) shoreline to the limit of normal high water wave wash. (Approved for inclusion in the next edition of Joint Pub 1-02.)

gear. A general term for a collection of spars, ropes, blocks, and equipment used for lifting and stowing cargo and ships stores. (Approved for inclusion in the next edition of Joint Pub 1-02.)

gradient. The rate of inclination to horizontal expressed as a ratio, such as 1:25, indicating a one unit rise to 25 units of horizontal distance. (Approved for inclusion in the next edition of Joint Pub 1-02.)

gross weight. 1. Weight of a vehicle, fully equipped and serviced for operation, including the weight of the fuel, lubricants, coolant, vehicle tools and spares, crew, personal equipment and load. 2. Weight of a container or pallet including freight and binding. (Joint Pub 1-02)

hatch. An opening in a ship's deck giving access to cargo holds. (Upon approval of this revision, this term and its definition will be included in Joint Pub 1-02.)

headquarters and service battalion of the force service support group. The headquarters and service battalion of the force service support group provides command, control, and communications, security, and automated data processing for the force service support group. It provides supporting services to the Marine air-ground task force, including general support data processing, disbursing, postal, and exchange services. Also called H&S. (This term and its definition are applicable only in the context of this pub and cannot be referenced outside this publication.)

heavy-lift cargo. 1. Any single cargo lift, weighing over 5 long tons, and to be handled aboard ship. 2. In Marine Corps usage, individual units of cargo that exceed 800 pounds in weight or 100 cubic feet in volume. (Joint Pub 1-02)

hinterland, far. That region surrounding a beach or terminal operation to the extent that it has characteristics that affect the operation--normally within 100 miles. (Approved for inclusion in the next edition of Joint Pub 1-02.)

hinterland, near. The area of land within an operational area of a specific beach or terminal operation--usually within 5 miles. (Approved for inclusion in the next edition of Joint Pub 1-02.)

hold. 1. A cargo stowage compartment aboard ship. (Joint Pub 1-02)

inland petroleum distribution system. A multi-product petroleum pipeline designed to move bulk fuel forward in a theater of operation. (Approved for inclusion in the next edition of Joint Pub 1-02.)

issue control group. A detachment that operates the staging area, consisting of holding areas and loading areas, in an operation. (Approved for inclusion in the next edition of Joint Pub 1-02.)

joint logistics over-the-shore commander. The joint logistics over-the-shore (JLOTS) commander is selected by the joint force commander (JFC) and is usually from either the Army or Navy components that are part of the JFC's task organization. This individual then builds a joint headquarters from personnel and equipment in theater to organize the efforts of all elements participating in accomplishing the JLOTS mission having either wet or dry cargo or both. JLOTS commanders will usually integrate members from each participating

organization to balance the overall knowledge base in their headquarters. (Approved for inclusion in the next edition of Joint Pub 1-02.)

joint logistics over-the-shore operations. Operations in which Navy and Army logistics over-the-shore (LOTS) forces conduct LOTS operations together under a joint force commander. Also called JLOTS operations. (This term and its definition modify the existing term "joint logistics-over-the-shore" and its definition and are approved for inclusion in the next edition of Joint Pub 1-02.)

landing craft. A craft employed in amphibious operations, specifically designed for carrying troops and equipment and for beaching, unloading, and retracting. Also used for logistic cargo resupply operations. (Joint Pub 1-02)

lighterage. A small craft designed to transport cargo or personnel from ship to shore. Lighterage includes amphibians, landing craft, discharge lighters, causeways, and barges. (Joint Pub 1-02)

lightweight amphibious container handler. A USMC piece of equipment usually maneuvered by a bulldozer and used to retrieve 20-foot equivalent containers from landing craft in the surf and place them on flatbed truck trailers. (Approved for inclusion in the next edition of Joint Pub 1-02.)

logistics marking and reading symbology. A system designed to improve the flow of cargo through the seaport of embarkation and debarkation using bar code technology. (Approved for inclusion in the next edition of Joint Pub 1-02.)

logistics over-the-shore operations. The loading and unloading of ships with or without the benefit of fixed port facilities, in friendly or nondefended territory, and, in time of war, during phases of theater development in which there is no opposition by the enemy. Or as a means of moving forces closer to tactical assembly areas dependent on threat force capabilities. Also called LOTS operations. (This term and its definition modify the existing term "logistics-over-the-shore operations" and its definition and are approved for inclusion in the next edition of Joint Pub 1-02.)

logistics over-the-shore operation area. That geographic area required to successfully conduct a logistics over-the-shore operation. Also called LOA. (Approved for inclusion in the next edition of Joint Pub 1-02.)

main deck. The highest deck running the full length of a vessel (except for an aircraft carrier's hanger deck). (Approved for inclusion in the next edition of Joint Pub 1-02.)

Marine air-ground task force. A task organization of Marine forces (division, aircraft wing, and service support groups) under a single command and structured to accomplish a specific mission. The Marine air-ground task force (MAGTF) components will normally include command, aviation combat, ground combat, and combat service support elements (including Navy Support Elements). Two types of Marine air-ground task forces which can be task organized are the Marine expeditionary unit, and Marine expeditionary force. The four elements of a Marine air-ground task force are: a. command element (CE) — The MAGTF headquarters. The CE is a permanent organization composed of the commander, general or executive and special staff sections, headquarters section, and requisite communications and service support facilities. The CE provides command, control, and coordination essential for

effective planning and execution of operations by the other three elements of the MAGTF. There is only one CE in a MAGTF. b. aviation combat element (ACE) — The MAGTF element that is task organized to provide all or a portion of the functions of Marine Corps aviation in varying degrees based on the tactical situation and the MAGTF mission and size. These functions are air reconnaissance, antiair warfare, assault support, offensive air support, electronic warfare, and control of aircraft and missiles. The ACE is organized around an aviation headquarters and varies in size from a reinforced helicopter squadron to one or more Marine aircraft wing(s). It includes those aviation command (including air control agencies), combat, combat support, and combat service support units required by the situation. Normally, there is only one ACE in a MAGTF. c. ground combat element (GCE) — The MAGTF element that is task organized to conduct ground operations. The GCE is constructed around an infantry unit and varies in size from a reinforced infantry battalion to one or more reinforced Marine division(s). The GCE also includes appropriate combat support and combat service support units. Normally, there is only one GCE in a MAGTF. d. combat service support element (CSSE) — The MAGTF element that is task organized to provide the full range of combat service support necessary to accomplish the MAGTF mission. CSSE can provide supply, maintenance, transportation, deliberate engineer, health, postal, disbursing, enemy prisoner of war, automated information systems, exchange, utilities, legal, and graves registration services. The CSSE varies in size from a Marine expeditionary unit (MEU) service support group (MSSG) to a force service support group (FSSG). Normally, there is only one combat service support element in a MAGTF.) (This term and its definition modify the existing term and its definition and are approved for inclusion in the next edition of Joint Pub 1-02.)

Marine expeditionary brigade. None. (This term and its definition are approved for removal from the next edition of Joint Pub 1-02.)

Marine expeditionary force. The Marine expeditionary force, the largest of the Marine air-ground task forces, is normally built around a division/wing team, but can include several divisions and aircraft wings, together with an appropriate combat service support organization. The Marine expeditionary force is capable of conducting a wide range of amphibious assault operations and sustained operations ashore. It can be tailored for a wide variety of combat missions in any geographic environment. Also called MEF. (Joint Pub 1-02)

Marine expeditionary unit. A task organization which is normally built around a battalion landing team, reinforced helicopter squadron, and logistic support unit. It fulfills routine forward afloat deployment requirements, provides an immediate reaction capability for crisis situations, and is capable of relatively limited combat operations. Also called MEU. (Joint Pub 1-02)

maritime pre-positioning force operation. A rapid deployment and assembly of a Marine expeditionary force in a secure area using a combination of strategic airlift and forward-deployed maritime pre-positioning ships. (Approved for inclusion in the next edition of Joint Pub 1-02.)

maritime pre-positioning ships. Civilian-crewed, Military Sealift Command-chartered ships which are organized into three squadrons and are usually forward-deployed. These ships are

loaded with pre-positioned equipment and 30 days of supplies to support three Marine expeditionary forces. Also called MPS. (This term and its definition modify the existing term and its definition and are approved for inclusion in the next edition of Joint Pub 1-02.)

Military Sealift Command. The US Transportation Command's component command responsible for designated sealift service. Also called MSC. (Joint Pub 1-02)

Military Sealift Command force. The Military Sealift Command (MSC) force common-user sealift consists of three subsets: the Naval Fleet Auxiliary Force, common-user ocean transportation, and the special mission support force. These ship classes include government-owned ships (normally civilian manned) and ships acquired by MSC charter or allocated from other government agencies. (Approved for inclusion in the next edition of Joint Pub 1-02.)

Military Traffic Management Command. The US Transportation Command's component command responsible for military traffic, continental United States air and land transportation, and common-user water terminals. Also called MTMC. (Joint Pub 1-02)

mobile inshore undersea warfare unit. A Navy surveillance unit that provides seaward security to joint logistics over-the-shore operations from either a port or harbor complex or unimproved beach sites. The mobile inshore undersea warfare unit is equipped with mobile radar, sonar, and communications equipment located within a mobile van. Also called MIUW. (Approved for inclusion in the next edition of Joint Pub 1-02.)

moored. Lying with both anchors down or tied to a pier, anchor buoy, or mooring buoy. (Approved for inclusion in the next edition of Joint Pub 1-02.)

motor transport battalion. A pool of medium and heavy tactical cargo-type vehicles to augment the elements of the Marine air-ground task force. Combat support and combat service-support augmentation is provided by either general or direct support missions in support of Marine air-ground task force operations. Also called MT Bn. (This term and its definition are applicable only in the context of this pub and cannot be referenced outside this publication.)

nautical mile. A measure of distance equal to one minute of arc on the earth's surface. The United States has adopted the international nautical mile equal to 1,852 meters or 6,076.11549 feet. (Joint Pub 1-02)

naval beach group. A permanently organized naval command, within an amphibious force, comprised of a commander and staff, a beachmaster unit, an amphibious construction battalion, and an assault craft unit, designed to provide an administrative group from which required naval tactical components may be made available to the attack force commander and to the amphibious landing force commander to support the landing of one division (reinforced). (Joint Pub 1-02)

Navy cargo handling battalion. A mobile logistics support unit capable of worldwide deployment in its entirety or in specialized detachments. It is organized, trained, and equipped to: a. load and offload Navy and Marine Corps cargo carried in maritime pre-positioning ships and merchant breakbulk or container ships in all environments; b. to operate an associated temporary ocean cargo terminal; c. load and offload Navy and Marine Corps cargo carried in military-controlled aircraft; d. to operate

an associated expeditionary air cargo terminal. Also called CHB. Three sources of Navy Cargo Handling Battalions are: a. Navy Cargo Handling and Port Group — The active duty, cargo handling, battalion-sized unit composed solely of active duty personnel. Also called NAVCHAPGRU. b. Naval Reserve Cargo Handling Training Battalion — The active duty, cargo handling training battalion composed of both active duty and reserve personnel. Also called NRCHTB. c. Naval Reserve Cargo Handling Battalion—A reserve cargo handling battalion composed solely of selected reserve personnel. Also called NRCHB. (Joint Pub 1-02)

Navy cargo handling force. The combined cargo handling units of the Navy, including primarily the Navy Cargo Handling and Port Group, the Naval Reserve Cargo Handling Training Battalion, and the Naval Reserve Cargo Handling Battalion. These units are part of the operating forces and represent the Navy's capability for open ocean cargo handling. (Joint Pub 1-02)

officer in tactical command. In maritime usage, the senior officer present eligible to assume command, or the officer to whom he has delegated tactical command. (Joint Pub 1-02)

offshore bulk fuel system. The system used for transferring fuel from points offshore to reception facilities on the beach. It consists of two subsystems: amphibious assault bulk fuel system and the offshore petroleum discharge system. (Approved for inclusion in the next edition of Joint Pub 1-02.)

offshore petroleum discharge system. Provides a semi-permanent, all-weather facility for bulk transfer of petroleum, oils, and lubricants (POL) directly from an offshore tanker to a beach termination unit (BTU) located immediately inland from the high watermark. POL then is either transported inland or stored in the beach support area. Major offshore petroleum discharge systems (OPDS) components are: the OPDS tanker with booster pumps and spread mooring winches, a recoverable single anchor leg mooring (SALM) to accommodate tankers of up to 70,000 deadweight tons, ship to SALM hoselines, up to 4 miles of 6-inch (internal diameter) conduit for pumping to the beach, and two BTUs to interface with the shoreside systems. OPDS can support a two line system for multiproduct discharge, but ship standoff distance is reduced from 4 to 2 miles. Amphibious construction battalions install the OPDS with underwater construction team assistance. OPDS's are embarked on selected ready reserve force tankers modified to support the system. Also called OPDS. (Approved for inclusion in the next edition of Joint Pub 1-02.)

operational control. Transferable command authority that may be exercised by commanders at any echelon at or below the level of combatant command. Operational control is inherent in combatant command (command authority). Operational control may be delegated and is the authority to perform those functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission. Operational control includes authoritative direction over all aspects of military operations and joint training necessary to accomplish missions assigned to the command. Operational control should be exercised through the commanders of subordinate organizations. Normally this authority is exercised through subordinate joint force commanders and Service and/or functional component commanders. Operational control normally provides full authority to organize

commands and forces and to employ those forces as the commander in operational control considers necessary to accomplish assigned missions. Operational control does not, in and of itself, include authoritative direction for logistics or matters of administration, discipline, internal organization, or unit training. Also called OPCON. (Joint Pub 1-02)

outsized cargo. A single item of cargo, too large for palletization or containerization, that exceeds 1090 inches long by 111 inches wide by 105 inches high. Requires transport by sea or use of a C-5 or C-17 aircraft for transport by air. (Approved for inclusion in the next edition of Joint Pub 1-02.)

oversized cargo. Large items of specific equipment such as a barge, side loadable warping tug, causeway section, powered, or causeway section, nonpowered. Requires transport by sea. (Approved for inclusion in the next edition of Joint Pub 1-02.)

palletized unit load. Quantity of any item, packaged or unpackaged, which is arranged on a pallet in a specified manner and securely strapped or fastened thereto so that the whole is handled as a unit. (Joint Pub 1-02)

Pierson-Moskowitz scale. A scale that categorizes the force of progressively higher wind speeds. (Approved for inclusion in the next edition of Joint Pub 1-02.)

ready reserve force. A force composed of ships acquired by the Maritime Administration (MARAD) with Navy funding and newer ships acquired by the MARAD for the National Defense Reserve Fleet (NDRF). Although part of the NDRF, ships of the Ready Reserve Force are maintained in a higher state of readiness and can be made available without mobilization or congressionally declared state of emergency. Also called RRF. (Joint Pub 1-02)

reduced operational status. Applies to Military Sealift Command ships withdrawn from full operational status (FOS) because of decreased operational requirements. A ship in reduced operational status is crewed in accordance with shipboard maintenance and possible future operational requirements with crew size predetermined contractually. The condition of readiness in terms of calendar days required to attain full operational status is designated by the numeral following the acronym ROS (i.e., ROS-5) Also called ROS. (Joint Pub 1-02)

refraction. The process by which the direction of a wave is changed when moving into shallow water at an angle to the bathymetric contours. The crest of the wave advancing in shallower water moves more slowly than the crest still advancing in deeper water, causing the wave crest to bend toward alignment with the underwater contours. (Approved for inclusion in the next edition of Joint Pub 1-02.)

roll-on/roll-off discharge facility. Provides a means of disembarking vehicles from a roll-on/roll-off ship to lighterage. The roll-on/roll-off discharge facility consists of six causeway sections, nonpowered assembled into a platform that is two sections long and three sections wide. When use of landing craft, utility, as lighters, is being considered, a seventh “sea end” causeway section, on-powered, fitted with a rhino horn, is required. The roll-on/roll-off discharge facility assembly includes fendering, lighting, and a ramp for vehicle movement from ship to the platform. Also called RRDF. (Approved for inclusion in the next edition of Joint Pub 1-02.)

rough terrain container handler. A piece of materials handling equipment used to pick up and move containers. Also called RTCH. (Approved for inclusion in the next edition of Joint Pub 1-02.)

safe haven. 3. A protected body of water or the well deck of an amphibious ship used by small craft operating offshore for refuge from storms or heavy seas. (This term and its definition modify the existing term and its definition and are approved for inclusion in the next edition of Joint Pub 1-02.)

SEASHED. A temporary deck in containerships for transport of large military vehicles and outsized breakbulk cargo that will not fit into containers. (Approved for inclusion in the next edition of Joint Pub 1-02.)

sea state. A scale that categorizes the force of progressively higher seas by wave height. This scale is mathematically co-related to the Pierson-Moskowitz scale and the relationship of wind to waves (Approved for inclusion in the next edition of Joint Pub 1-02.)

secondary wave breaker system. A series of waves superimposed on another series and differing in height, period, or angle of approach to the beach. (Approved for inclusion in the next edition of Joint Pub 1-02.)

Service component command. A command consisting of the Service component commander and all those Service forces, such as individuals, units, detachments, organizations, and installations under the command, including the support forces that have been assigned to a combatant command, or further assigned to a subordinate unified command or joint task force. (Joint Pub 1-02)

shoal. A sandbank or bar that makes water shoal; i.e., a sand-bank that is not rocky and on which there is a water depth of 6 fathoms or less. (Approved for inclusion in the next edition of Joint Pub 1-02.)

significant wave height. The average height of the third of waves observed during a given period of time. Significant wave height is used for evaluating the impact of waves and breakers on watercraft in the open sea and surf zones. (Approved for inclusion in the next edition of Joint Pub 1-02.)

single anchor leg moor. A mooring facility dedicated to the offshore petroleum discharge system. Once installed, it permits a tanker to remain on station and pump in much higher sea states than is possible with a spread moor. Also called SALM. (Approved for inclusion in the next edition of Joint Pub 1-02.)

single port manager. USTRANSCOM, through its transportation component command, Military Traffic Management Command, is designated as the single port manager for all common-user seaports world-wide. The single port manager performs those functions necessary to support the strategic flow of the deploying forces' equipment and sustainment supply in the sealift port of embarkation and hand-off to the geographic commander in chief (CINC) in the sealift port of debarkation (SPOD). The single port manager is responsible for providing strategic deployment status information to the CINC and to workload the SPOD Port Operator based on the CINC's priorities and guidance. The single port manager is responsible through all phases of the theater port operations continuum, from a bare beach deployment to a commercial contract supported deployment. Also

called SPM. (This term and its definition modify the existing term and its definition and are approved for inclusion in the next edition of Joint Pub 1-02.)

spreader bar. A device specially designed to permit the lifting and handling of containers or vehicles and breakbulk cargo. (Approved for inclusion in the next edition of Joint Pub 1-02.)

strategic mobility. The capability to deploy and sustain military forces worldwide in support of national strategy. (Joint Pub 1-02)

strategic sealift. The afloat pre-positioning and ocean movement of military material in support of US and allied forces. Sealift forces include organic and commercially acquired shipping and shipping services, including chartered foreign-flag vessels. (Joint Pub 1-02)

strategic sealift forces. Composed of ships, cargo handling and delivery systems, and the necessary operating personnel. They include US Navy, US Marine Corps and US Army elements with Active and Reserve components. Merchant marine vessels, manned by civilian mariners, may constitute part of this force. (Approved for inclusion in the next edition of Joint Pub 1-02.)

strategic sealift shipping. Common-user ships of the Military Sealift Command (MSC) force including pre-positioned ships after their pre-positioning mission has been completed and they have been returned to the operational control of MSC. (Approved for inclusion in the next edition of Joint Pub 1-02.)

surf line. The point offshore where waves and swells are affected on by the underwater surface and become breakers. (Approved for inclusion in the next edition of Joint Pub 1-02.)

surf zone. The area of water from the surf line to the beach. (Approved for inclusion in the next edition of Joint Pub 1-02.)

swell. Ocean waves that have traveled out of their fetch. Swell characteristically exhibits a more regular and longer period and has flatter crests than waves within their fetch. (Approved for inclusion in the next edition of Joint Pub 1-02.)

tagline. A line attached to a draft of cargo or container to provide control and minimize pendulation of cargo during lifting operations. (Approved for inclusion in the next edition of Joint Pub 1-02.)

tactical control. Command authority over assigned or attached forces or commands, or military capability or forces made available for tasking, that is limited to the detailed and, usually, local direction and control of movements or maneuvers necessary to accomplish missions or tasks assigned. Tactical control is inherent in operational control. Tactical control may be delegated to, and exercised at any level at or below the level of combatant command. Also called TACON. (Joint Pub 1-02)

terminal. A facility designed to transfer cargo from one means of conveyance to another. (Conveyance is the piece of equipment used to transport cargo; i.e., railcar to truck or truck to truck. This is as opposed to mode, which is the type of equipment; i.e., ship to rail, rail to truck.) (Approved for inclusion in the next edition of Joint Pub 1-02.)

ton. A unit of weight. (This term and its definition are applicable only in the context of this pub and cannot be referenced outside this publication.)

ton, displacement. A unit approximately equal to a long ton weight of sea water used

in determining the displacement of ships; approximately 35 cubic feet. (This term and its definition are applicable only in the context of this pub and cannot be referenced outside this publication.)

ton, long. A unit of weight used aboard vessels; 2,240 pounds. (This term and its definition are applicable only in the context of this pub and cannot be referenced outside this publication.)

ton, measurement. A unit of volume for cargo freight, also called freight ton; 40 cubic feet. (This term and its definition are applicable only in the context of this pub and cannot be referenced outside this publication.)

ton, metric. 1,000 kilograms (2,204.6 pounds). (This term and its definition are applicable only in the context of this pub and cannot be referenced outside this publication.)

ton, register. A unit of volume of capacity of ships used for vessel registration, pilot charges, etc.; 100 cubic feet. (This term and its definition are applicable only in the context of this pub and cannot be referenced outside this publication.)

ton, short. A unit of weight used on land; 2,000 pounds. (This term and its definition are applicable only in the context of this pub and cannot be referenced outside this publication.)

tophandler. A device specially designed to permit the lifting and handling of containers from the top with rough terrain container handlers. (Approved for inclusion in the next edition of Joint Pub 1-02.)

topography. The configuration of the ground to include its relief and all features. Topography addresses both dry land and the sea floor (underwater topography). (Approved for inclusion in the next edition of Joint Pub 1-02.)

transportation component command. The three component commands of USTRANSCOM: Air Force Air Mobility Command, Navy Military Sealift Command, and Army Military Traffic Management Command. Each transportation component command remains a major command of its parent Service and continues to organize, train, and equip its forces as specified by law. Each transportation component command also continues to perform Service-unique missions. Also called TCC. (Joint Pub 1-02)

trim. The difference in draft at the bow and stern of a vessel or the manner in which a vessel floats in the water based on the distribution of cargo, stores and ballast aboard the vessel. (Approved for inclusion in the next edition of Joint Pub 1-02.)

unified command. A command with a broad continuing mission under a single commander and composed of significant assigned components of two or more Military Departments, and which is established and so designated by the President, through the Secretary of Defense with the advice and assistance of the Chairman of the Joint Chiefs of Staff. Also called unified combatant command. (Joint Pub 1-02)

United States Transportation Command. The unified command with the mission to provide strategic air, land, and sea transportation for the Department of Defense, across the range of military operations. Also called USTRANSCOM. (Joint Pub 1-02)

warp. To haul a ship ahead by line or anchor. (Upon approval of this revision, this term and its definition will be included in Joint Pub 1-02.)

watercraft. Any vessel or craft designed specifically and only for movement on the surface of the water. (Approved for inclusion in the next edition of Joint Pub 1-02.)

wave. 2. An undulation of water caused by the progressive movement of energy from point to point along the surface of the water. (Upon approval of this revision, this term and its definition modify the existing term and its definition and will be included in Joint Pub 1-02.)

wave crest. The highest part of a wave. (Approved for inclusion in the next edition of Joint Pub 1-02.)

wave height. The vertical distance between trough and crest, usually expressed in feet. (Approved for inclusion in the next edition of Joint Pub 1-02.)

wave length. The horizontal distance between successive wave crests measured perpendicular to the crest, usually expressed in feet. (Approved for inclusion in the next edition of Joint Pub 1-02.)

wave period. The time it takes for two successive wave crests to pass a given point. (Approved for inclusion in the next edition of Joint Pub 1-02.)

wave trough. The lowest part of the wave between crests. (Approved for inclusion in the next edition of Joint Pub 1-02.)

wave velocity. The speed at which a wave form advances across the sea, usually expressed in knots. (Approved for inclusion in the next edition of Joint Pub 1-02.)

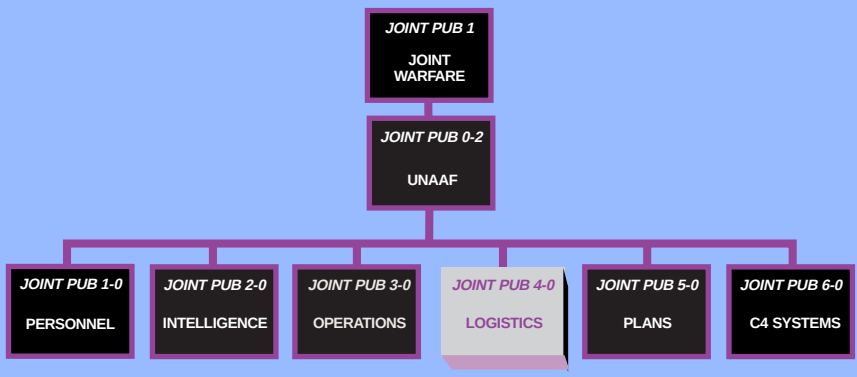
weather deck. A deck having no overhead protection; uppermost deck. (Approved for inclusion in the next edition of Joint Pub 1-02.)

white cap. A small wave breaking offshore as a result of the action of strong winds. (Approved for inclusion in the next edition of Joint Pub 1-02.)

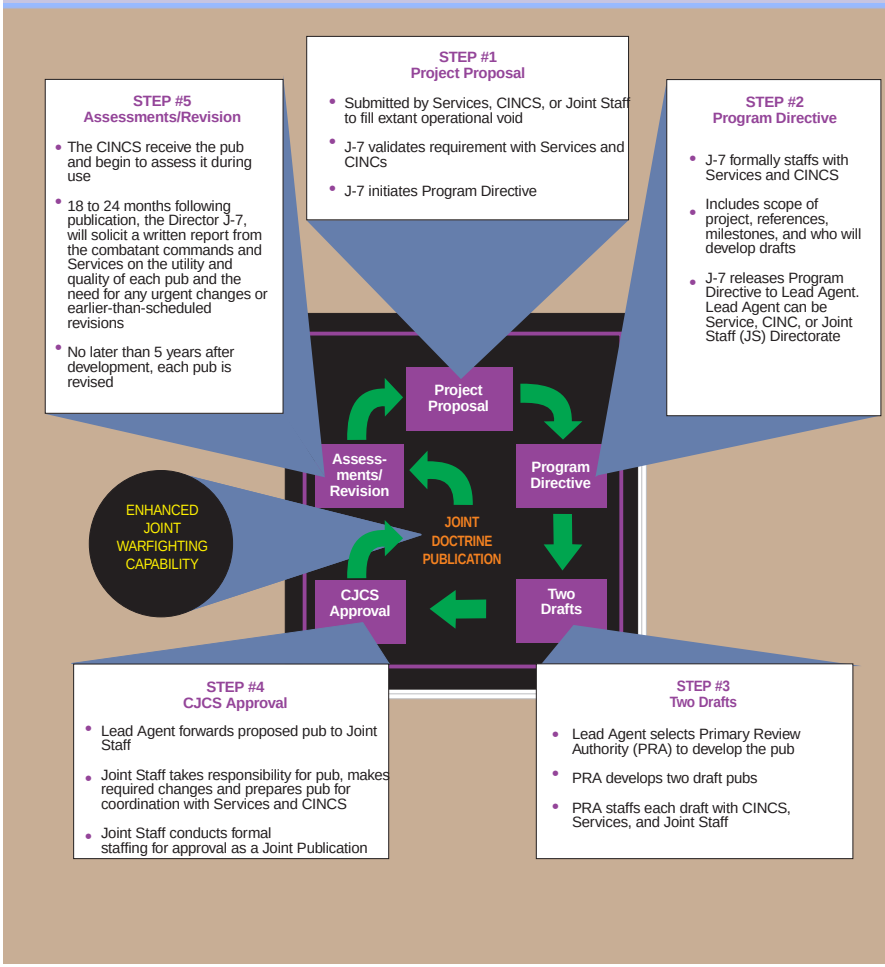
winch. A hoisting machine used for loading and discharging cargo and stores or for hauling in lines. (Approved for inclusion in the next edition of Joint Pub 1-02.)

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JOINT DOCTRINE PUBLICATIONS HIERARCHY



All joint doctrine and tactics, techniques, and procedures are organized into a comprehensive hierarchy as shown in the chart above. **Joint Pub 4-01.6** is in the **Logistics** series of joint doctrine publications. The diagram below illustrates an overview of the development process:




JOINT
CHIEFS OF STAFF