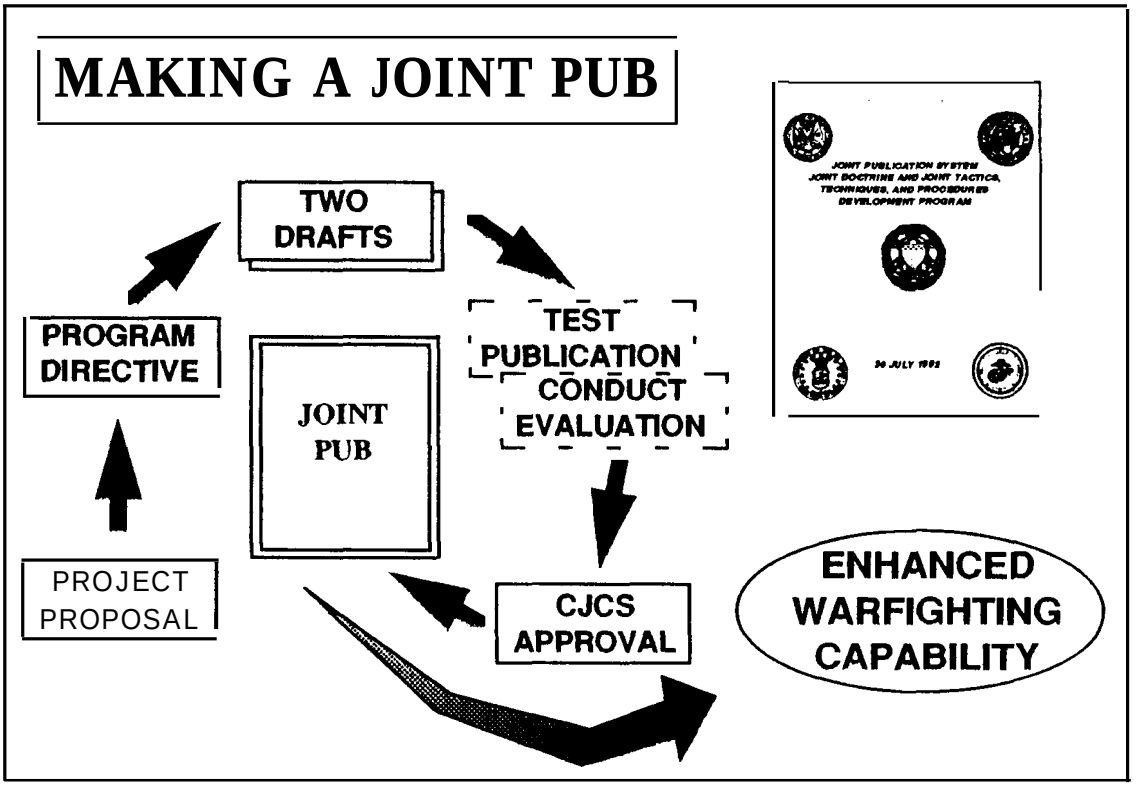
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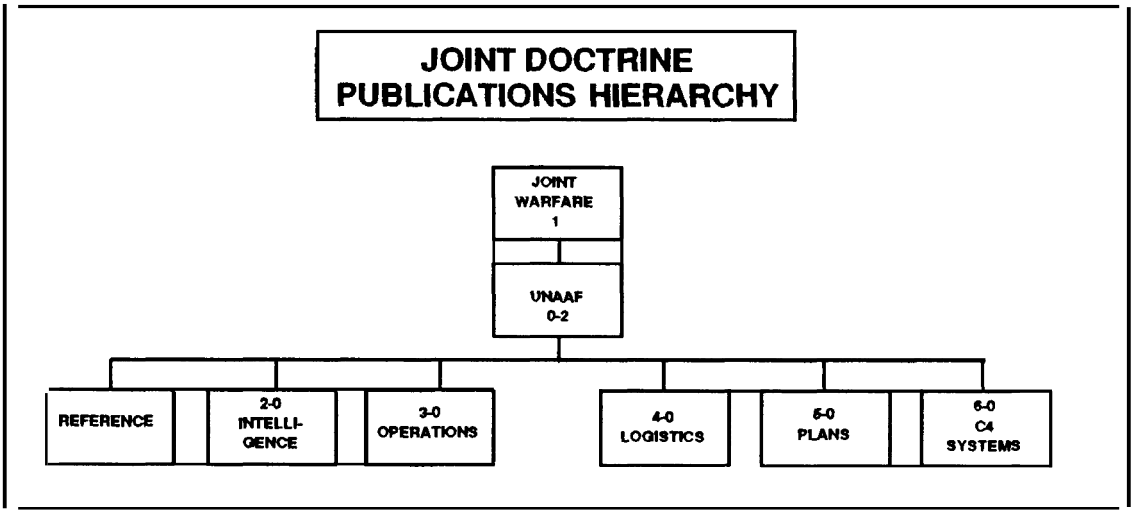


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PREFACE

1. Purpose. This publication sets forth joint doctrine and joint tactics, techniques, and procedures for conducting Joint Logistics Over The Shore (JLOTS) operations by the US Military Services during the conduct of joint operations. It provides basic doctrine concerning command relationships, responsibilities, and procedures for JLOTS operations.

2. Application. Doctrine, principles, and guidance established in this publication are applicable to each of the Military Services, unified and specified commands, and the subordinate elements of these commands. Doctrine, principles, and procedures may also 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 under criteria set forth in Joint Pub 0-2, UNAAF.

3. Scope. This publication includes procedures concerning the transition from amphibious operations to a JLOTS operation. This publication does not include doctrine for rear area security, maritime pre-positioning force operations, or amphibious operations, all of which are the subject of separate publications.

4. Background. The requirements to deploy and sustain military forces worldwide in support of national strategy are basic to US strategic mobility objectives. The US Army, US Navy, and US Marine Corps have developed Logistics Over The Shore (LOTS) procedures to transport and discharge cargoes over the shore. Operational tests of these procedures preceded the development of this publication's previous editions.

a. 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, LOTS I tests in 1977, and JLOTS II tests conducted in three phases from 1983 through 1984. Subsequent joint Service exercises, including Solid Shield 89 and Display Determination 89, contributed to the development of doctrine, procedures, and planning factors.

b. Publication Development. The Services recognized the need for a document that addresses the development of LOTS doctrine and provides guidance and procedures for movement of dry and liquid military cargoes. An outline for this

document was proposed at a multi-Service conference in February 1986. The US Army Transportation School at Fort Eustis, Virginia, has taken the lead for the Army. The Military Sealift Command and Chief of Naval Operations for Logistics (OP-42) directed the development for the Navy. The following documents preceded this publication:

(1) Army FM(J)55-999A, May 1986, "Strategic Sealift Offshore Discharge Operations."

(2) Draft Navy Review of NWP-81, 18 September 1986, "Joint Strategic Sealift Offshore Discharge Operations."

(3) Consolidated Draft Review, 20 October 1986, "Joint Strategic Sealift Offshore Discharge Operations."

(4) Coordinating Draft of FM 55-64/NWP-81, 15 January 1987, "Joint Strategic Sealift Offshore Discharge Operations."

(5) Coordinating Draft, 15 January 1988, "Joint Logistics Over the Shore."

(6) Final Draft, 31 August 1988, "Joint Logistics Over the Shore."

(7) Test Publication, Joint Pub 4-01.6 (formerly JCS Pub 4.03), 20 March 1989, "Joint Logistics Over the Shore."

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CHAPTER I

AN OVERVIEW OF LOGISTICS OVER THE SHORE OPERATIONS

1. Purpose

a. This publication establishes joint doctrine and procedures for use by the Military Services and for operations conducted within unified commands in accordance with Joint Pub 0-2, Unified Action, Armed Forces (UNAAF). JLOTS operations are conducted in support of the joint force commander (JFC) campaign plan to achieve assigned objectives.

b. This publication:

(1) Outlines the missions and responsibilities of the JFC and Service component commanders relative to JLOTS operations.

(2) Describes the C3 of cargo discharge organizations, whether temporary or permanent in nature.

(3) Provides planning guidance for the planning of cargo discharge operations, whether routine or emergency.

(4) Provides guidance for preparation of both the strategic sealift assets involved and the receiving beach or underdeveloped port area.

(5) Describes lighterage control, movement, and concepts of employment.

(6) Describes shoreside components of the cargo discharge systems, their installation, capabilities and limitations, equipment, and special considerations.

(7) Describes the equipment, techniques, and procedures used in the ship-to-shore movement of liquid cargoes.

(8) Defines cargo documentation requirements.

2. Applicability. 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.

4. Definition and Scope of LOTS Operations

a. LOTS is the loading and unloading of ships without the benefit of fixed port facilities in either friendly or undefended territory and, in time of war, during phases of theater development. LOTS operations are conducted over unimproved shorelines, through fixed ports not accessible to deep draft shipping, and through fixed ports that are inadequate without the use of LOTS capabilities.

b. Both Navy and Army may conduct LOTS operations.

(1) In an amphibious operation, the Navy may conduct LOTS operations in conjunction with the Marine Corps as a naval operation. 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 marshaling areas.

(2) An Army LOTS operation may be conducted as part of the base, garrison, or theater development that immediately follows an amphibious operation or as a separate evolution when no amphibious operation precedes it. It is supported and/or coordinated with other Services. During Army LOTS operations, supplies and equipment are moved ashore and transferred to a transportation agency for onward movement.

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.

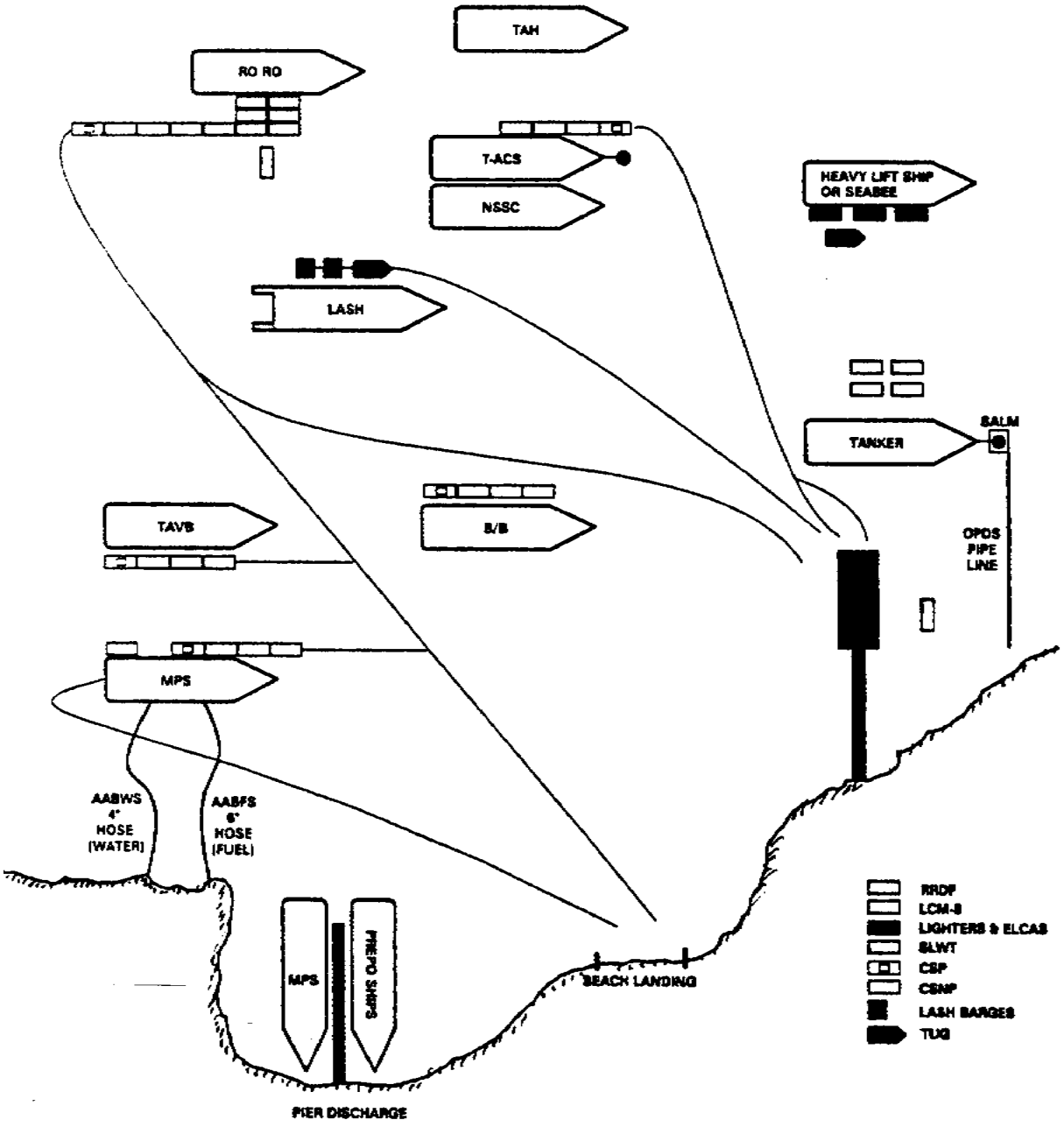


Figure I-1. LOTS Operation Area.

5. Definition and Scope of JLOTS Operations

a. JLOTS operations are defined as LOTS operations conducted jointly by two or more Service component forces of a commander of a unified command. Generally, JLOTS will exist in all but limited support operations.

b. The scope of JLOTS operations extends from acceptance of ships for offload through the arrival of equipment and cargo at inland staging and marshaling areas.

CHAPTER II

ORGANIZATION AND COMMAND

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 (PHIBOP) 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 a PHIBOP where initial ship-to-shore control is vested with the naval component and is ultimately passed to Army forces for LOTS operations.

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, UNAAF. (The term "joint force" used in this publication refers to unified commands, subordinate unified commands, or a joint task force.) The JLOTS forces are normally organized along functional lines with Service elements integrated under the operational control 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 concerns or unique administrative requirements. In order to conduct effective JLOTS operations when called on to do so, JLOTS training and exercises need to be periodically conducted.

3. Responsibilities of Commanders of Unified Commands. Commanders of unified commands have overall responsibility for JLOTS operations in their area of responsibility (AOR). The commander of a unified command may delegate authority to sub-commanders or joint task force (JTF) commanders in the conduct of their assigned missions. To accomplish this, the supported and supporting commanders of unified commands should have the following responsibilities:

a. Supported CINC

(1) Develops JLOTS concept of operation and initiating directive.

(2) Exercises combatant command (COCOM) of assigned forces.

(3) Ensures security of JLOTS operations within his AOR.

(4) Allocates resources.

(5) Designates the component to provide the JLOTS commander.

(6) Performs intelligence threat assessment during planning phase and develops indications and warnings (I&W) intelligence during execution of JLOTS operations.

(7) Provides necessary transportation intelligence on available means of inland communication, including roads, railroads, airfields, inland waterways, and pipelines.

b. Supporting CINCs

(1) Provide input to supported CINC regarding concept of operations.

(2) Provide forces to the supported CINC as directed.

c. USCINCTRANS. Maintains oversight for JLOTS.

4. Responsibilities of Component Commanders. Component commanders normally support JLOTS operations as follows:

a. Provide recommendations to the JFC on JLOTS operations.

b. Provide, equip, and train forces to conduct JLOTS operations.

c. Develop implementing plans for JLOTS operational contingencies.

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

5. 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 operation plan (OPLAN) and operation order (OPORD). Table M-1 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 may be to:

(1) Provide forces for and conduct JLOTS operations.

(2) Provide lighterage, tugs, small craft, other discharge equipment, and trained operators for use in JLOTS operations and provide the common Service assets required to supplement amphibious operations, as available.

(3) In accordance with JFC priorities, provide lighterage or watercraft to support Navy offshore petroleum discharge system (OPDS) installation or emplacement operations and provide diving support and assistance in final deployment of ship-to-ihore pipeline to the shoreside high water mark where it interfaces with land forces inland petroleum distribution systems (IPDS).

(4) Select air cushion vehicle (ACV) routes from ships to inland rail and road networks.

(5) Provide transport to remove and distribute cargo moving from LOTS sites to staging areas at airfields or helicopter pick-up zones and inland rail and road nntworks.

(6) In accordance with JFC directives, provide general water support purification operations, diving support, and assistance in deployment of barge-to-shore pipeline to the shoreside high watermark where the pipeline connects with the potable water storage and distribution system of the land forces.

(7) Select, in conjunction with the naval component commander, JLOTS landing sites.

(8) Prepare unimproved beach surfaces and backwater surfaces to enhance trafficability of material and equipment to major rail and road networks.

(9) Prepare marshaling areas for the storage of containers, breakbulk cargo, and rolling stock.

(10) Emplace IPDS to support bulk fuel discharge operations.

(11) Provide communications between the OPDS tanker and the shore.

(12) Erect cargo discharge facilities--such as the elevated causeway system--in support of dry cargo discharge.

b. US Navy. The primary responsibilities of US Navy forces in JLOTS operations may be to:

(1) Provide, as may be required by the JFC, appropriate naval forces and equipment for support of US Army LOTS operations and JLOTS for the Marines.

(2) Exercise command of Navy ships and boats to ensure safe and proper operation and to take action against the enemy, if necessary.

(3) Exercise a minimum of tactical control (TACON) over the disposition and operation of other participating ships as necessary to protect them.

(4) Provide for offshore petroleum discharge to the shoreside high watermark.

(5) Provide lighterage, tugs, small craft, other discharge equipment, and trained operators for use in JLOTS operations and those common-service assets required.

(6) Provide potable water as directed by the JFC.

(7) Select, in conjunction with a land component commander, the LOA and LOTS landing sites.

(8) Erect cargo discharge facilities, such as the elevated causeway system (ELCAS), in support of dry cargo discharge operations.

(9) Conduct beach party operations, including control and salvage of lighterage and control of the beach transit of disembarked vehicles and cargo.

(10) Provide Mobile Inshore Undersea Warfare (MIUW) units for seaward surveillance in support of JLOTS security.

c. US Marine Corps. USMC forces require JLOTS support for sustained logistics buildup ashore. Marine forces possess limited capability to augment JLOTS operations with shore-based tactical motor transport, material handling, bulk liquid, and C2 assets. The responsibilities of the Marine Corps in the conduct of JLOTS may be to:

(1) Provide the material handling and motor transport personnel and equipment to receive and transport cargo moving from the beach support area (BSA).

(2) Provide potable water and its storage facilities.

(3) Prepare unimproved beach surfaces and backwater surface to enhance movement of materials and equipment to marshaling areas.

(4) Prepare marshaling areas for containerized and breakbulk cargo and rolling stock.

(5) Emplace amphibious assault fuel distribution systems to support bulk fuel discharge operations.

d. US Coast Guard. The US 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 harbor and port security are covered in NWP 39, "Naval Coastal Warfare." If requested, the Coast Guard may provide as a unit or as individual

components port security units, port safety details, and/or port security details. 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 and the safety of cargo operations during outload and offload operations. Coast Guard forces, when operating under the Department of Transportation, must be obligated through a memorandum of understanding (MOU), inter-Service agreement (ISA), memorandum of agreement (MOA), etc., and be included in the respective CINC OPLAN in order to provide support to LOTS and JLOTS forces, unless the Coast Guard has been placed under command of the US Navy by Executive Order. Coast Guard forces work in conjunction with MIUW units to provide surveillance and interdiction (S&I) in the seaward AOR in accordance with naval coastal warfare doctrine contained in NWP-39 and NWP-40. 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 CONUS.

6. Responsibilities of the JLOTS Commander. The JLOTS commander is responsible for detailed planning and execution of JLOTS offload operations. This will be accomplished through a central planning team composed of representatives from participating Service 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 operational control (OPCON) and describes procedures for the conduct of the JLOTS operation.

b. Handle JLOTS execution, beginning with acceptance of ships for offload, through the arrival of equipment and cargo at inland staging and marshaling areas.

c. Coordinate over-the-shore liquid cargo operations. For the offshore bulk fuel system (OBFS), responsibility includes acceptance of OBFS vessels and the installation and operation of OBFS to its termination point on the beach, where it

interfaces with the inland petroleum systems.

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. OPCON is usually delegated to the Commander, Military Sealift Command (COMSC), or his 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. The MSC area representative, in addition to his normal duties, 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 area of operations. 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.

8. C2 Relationships. C2 relationships are as prescribed by Joint Pub 0-2. The following conditions apply:

a. In an amphibious operation, command and inter-Service relationships will be guided by Joint Pub 3-02.

b. In JLOTS operations, Service elements must be integrated under one JLOTS commander who normally

has OPCON authority to task organize elements as necessary. Service elements should be employed in a manner consistent with their training and 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 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 naval 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 naval 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 OPCON of the offload site(s) and logistics landing force from the naval component 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 ndirective or OPORD. Offload assets that are at the site of an amphibious operation would normally be retained by the on-scene naval component 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) offload assets be diverted to subsequent LOTS and JLOTS operations as the offload 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:

(1) During a PHIBOP, the Commander, Amphibious Task Force (CATF) is responsible for OPCON of the ship-to-shore movement. CATF exercises this control through a Navy control group. See Figure II-1.

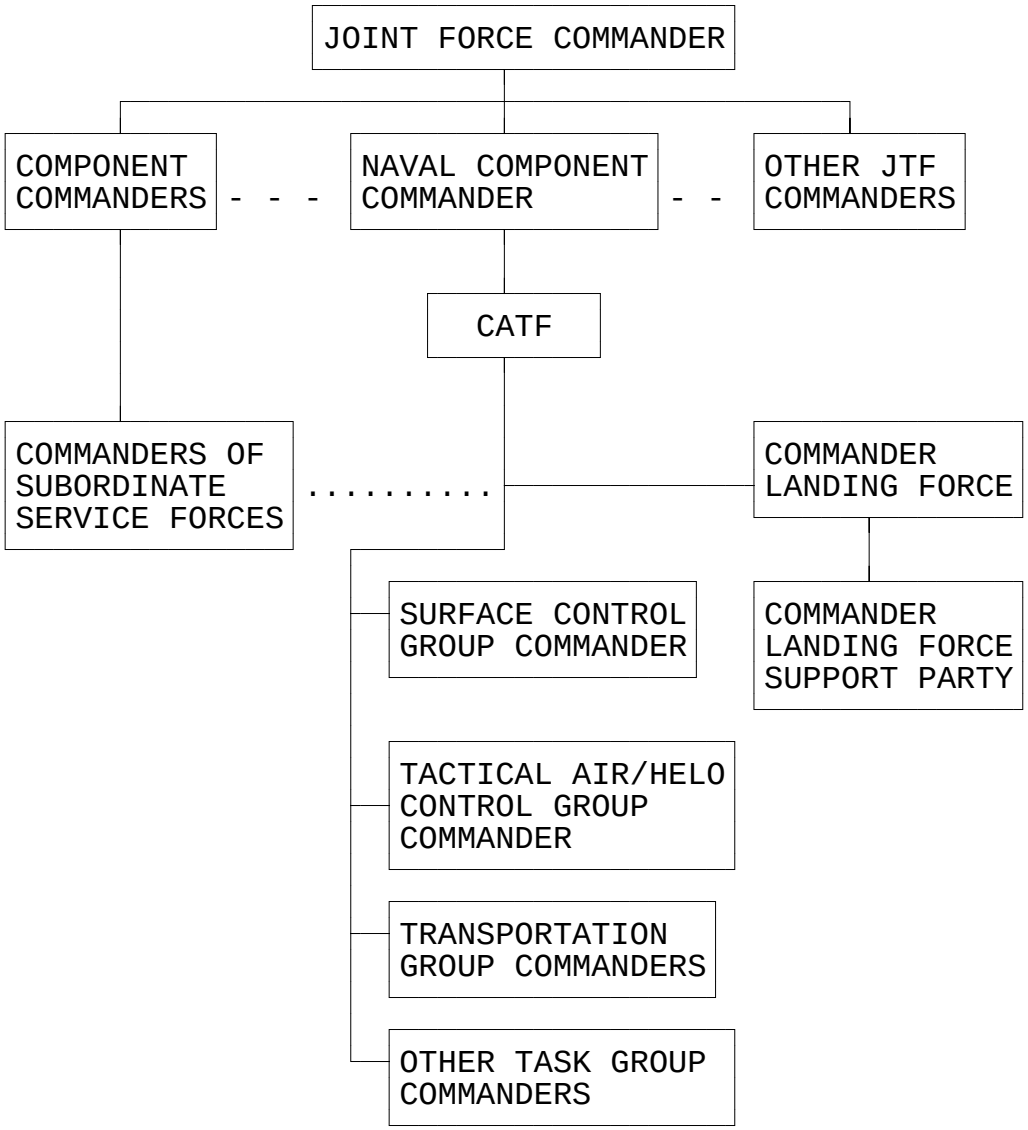
(2) With the termination of the PHIBOP, the ATF is disestablished and a transition is made from PHIBOP to LOTS or JLOTS. Normally, this transition involves a period in which the Navy and supported USMC or Army forces continue to conduct ship-to-shore movement using the basic control organization and procedures used for the PHIBOP. 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 Force Commander, will assume operational control of the JLOTS operation. Control of all ship-to-shore assets is transferred from the naval component commander to the JLOTS organization. Navy ship-to-shore assets not already withdrawn will remain under the OPCON 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-2.

9. Amphibious Operations

a. Definition. The 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 shore (JCS Pub 1-02). 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 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 follow:

(1) Amphibious operations may be conducted to:

(a) Obtain a lodgment for the initiation of a land campaign.



LEGEND

———— OPCON
- - - - Coordination
..... In support of OPCON or as directed (Joint Pub 0-2)

JTF--Joint Task Force
CATF--Commander Amphibious Task Force

Figure II-1. Command Relations During PHIBOP Ship-to-Shore Movements. Page II-10.

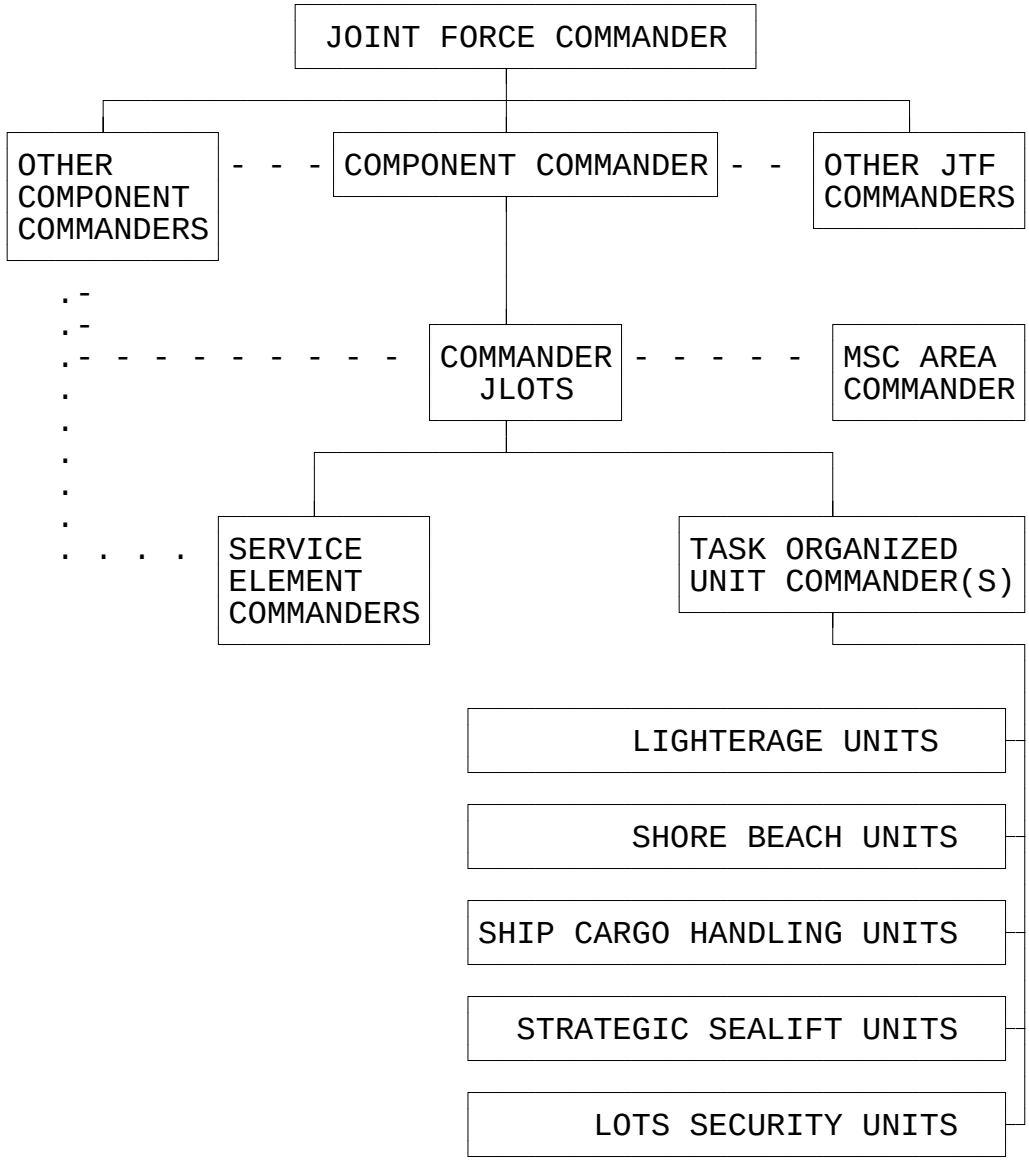


Figure II-2. Command Relationship During JLOTS Ship-to-Shore Movement. Page II-11.

(b) Obtain an advanced base for naval, air, or logistics operations.

(c) Deny the use of an area to the enemy.

(d) Maneuver ground forces incident to continuation of a land campaign.

(e) Create deception.

(f) Gain information.

(g) Destroy installations or forces.

(h) Effect a show of force.

(2) The amphibious operation is separate and distinct, but is also usually part of a campaign of larger 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, Military Airlift Command (MAC) 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 landing force commander. 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 unimpedid discharge of personnel and cargo.

(3) 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 Air Force units when appropriate. The CATF is designated by hinher authority based on the mission and composition of the ATF. CATF plans and executes the deployment of forces by all transportation modes and the landing of all forces and supplies in accordance with the requirements of the Commander, Landing Force (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 assault follow-on echelon (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. Prestaged 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/AFOE Considerations. Considerations pertaining to the AE/AFOE include:

(1) Loading and unloading of the AE and AFOE are the responsibility of the CATF. Units and unit equipment are marshaled at their home stations and staged at ports of embarkation (POEs) 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

(CCO), Helicopter Direction Center (HDC), Tactical Logistic Group (TACLOG), and the Landing Force Support Party (LFSP). CATF exercises overall control of the ship-to-shore movement. CATF is responsible for debarkation and offload until termination of the PHIBOP when the responsibilities for debarkation or offload are passed to another offload organization designated by higher authority. The PHIBOP would not normally be terminated until the AFOE is ashore. The CLF informs the CATF of his requirements for units, materials, and supplies and specifies the time at which they will be required. The CLF is responsible for the movement of cargo within the BSA and into inland combat service support areas. Since most MSC-provided ships have neither the organic offload capabilities nor the organic ability to control debarkation of embarked troops or cargo, their offload is conducted by the ATF with Navy or landing force personnel and equipment.

(2) Shipping used to resupply the ATF or to transport additional units, supplies, and equipment required for the buildup of the beachhead is called follow-up shipping. Essentially, follow-up 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-up shipping within the AOA. The CATF orders shipping forward, as necessary, to fulfill the needs of the landing force for units, materials, and supplies. Upon unloading, empty follow-up 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-up 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 offload:

a. Before termination of the amphibious operation, some Army offload 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-3.

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 naval component commander. The same basic control organization exists as during the PHIBOP. See Figure II-4. 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-4. Whether the JLOTS commander is from the naval or Army component, naval offload and applicable USMC LFSP personnel and equipment need to be OPCON to the JLOTS commander and assimilated into appropriate task organizations until the CINC releases Navy and Marine forces to reembark aboard amphibious shipping to prepare for a future potential PHIBOP. Army offload elements associated with the ship-to-shore movement need to be integrated into the JLOTS organization, OPCON to the JLOTS commander. The JLOTS commander’s responsibility for cargo and/or equipment delivery extends from ship acceptance for offloading through arrival of cargo and/or equipment at inland staging and marshaling areas.

d. As required in the CINC’s OPORD, the naval offload personnel and equipment may phase out of the specific operation being supported by the JLOTS commander to be available for support of

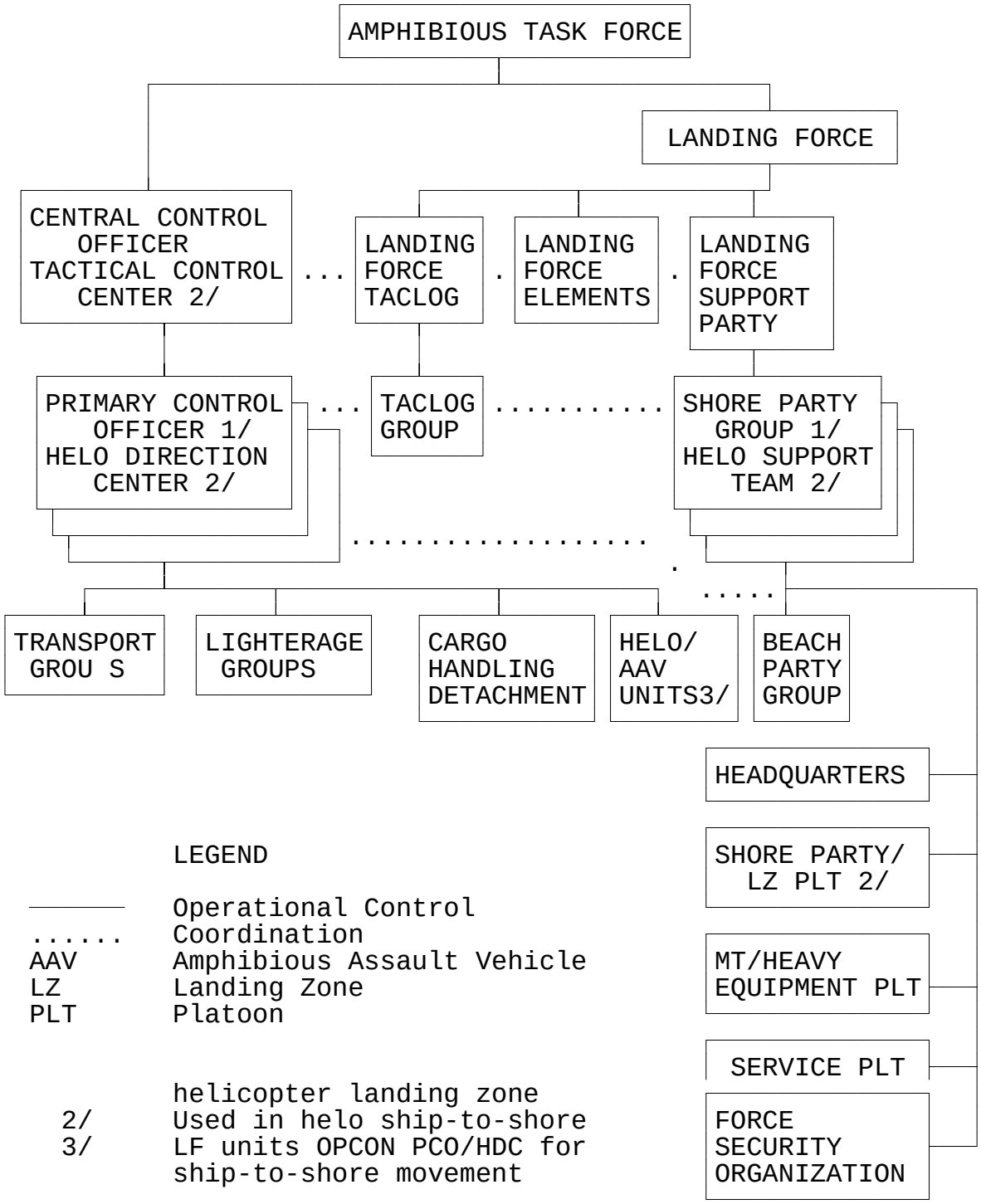
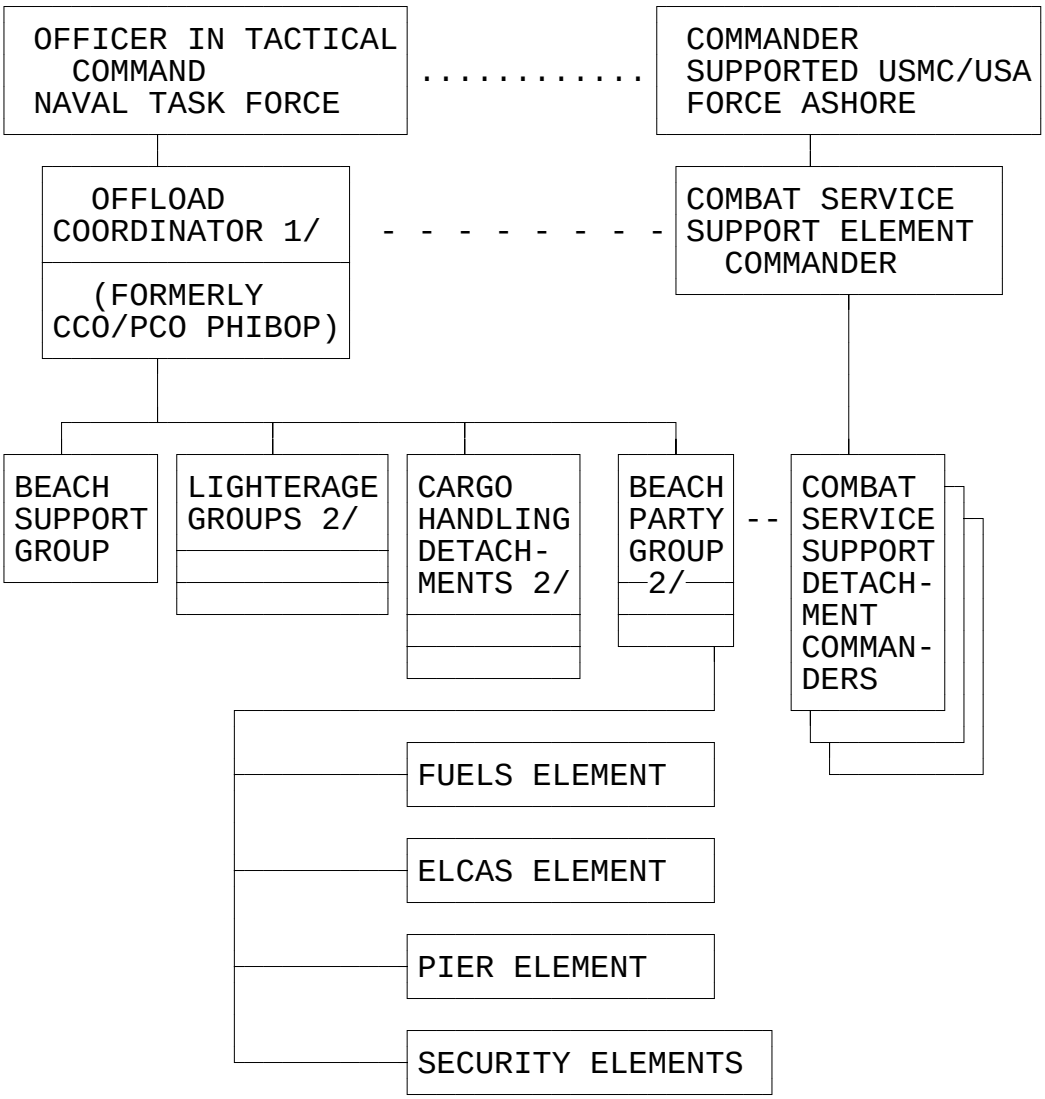


Figure II-3.Figure II-3. Organization for Amphibious Ship-to-Shore Operations.
Page II-16.



LEGEND

———— OPCON
- - - - Coordination
..... Supportive (Joint Pub 0-2)

1/ Controls surface movement only. Helicopter movement addressed on a case-by-case basis.
2/ Per colored beach.

Figure II-4. Organization for Navy LOTS subsequent to PHIBOP.
Page II-17.

other operations. When released from the OPCON of the JLOTS commander, OPCON of the naval elements will revert to the naval component commander. Ultimately, the JLOTS operations will transition to Army LOTS.

CHAPER III

PLANNING JLOTS OPERATIONS

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, and other peculiar operational factors. JLOTS tests reveal the need for complete and detailed planning. This chapter discusses considerations for deliberate and crisis planning of JLOTS.

2. Responsibilities. Planning responsibilities are outlined in Chapter II.

3. Operational Planning

a. Planning Procedures. In order to keep all commands fully informed during planning, the JLOTS commander must provide early and continuous dissemination of planning data to his senior, subordinate, and corresponding commanders.

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. Geography, weather, beach capacity, beach throughput, and clearance capacity are all major factors of JLOTS throughput planning. Throughput capacity is determined by evaluating the effect that the weather, hydrographic aspects, and hinterland have on the tonnage or the number of containers that can be brought into the area, discharged, and cleared from the beach each day. (See Appendix A for detailed planning factors.) JLOTS throughput capacity depends on the following:

(1) The number of suitable anchorages and maneuvering spaces available for offload systems in the offload area is a factor and is based on an evaluation of the weather, water depth, underwater obstacles, and surf conditions.

(2) 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 of bulk liquid cargo or short tons of breakbulk cargo 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 floating and cargo-handling equipment and personnel available for the discharge operation.

(3) Beach throughput depends on both the offload and clearance rates. The offload capacity rate is the rate that cargo is discharged from lighterage. The clearance capacity rate is the rate at which cargo can be moved from beach discharge points to inland staging and marshaling areas. Beach throughput is a major consideration of JLOTS operations.

(4) 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 to initial inland locations. It is based on transportation furnished by supporting highway, rail, inland waterway and airlift units.

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

a. Sequence of Work. The following is typical:

(1) Consider strategic sealift requirements necessary to deploy selected outsize military equipment needed to conduct over-the-shore operations for discharge or loading of

designated ships. See Appendix B for lighterage characteristics.

(2) Deploy over-the-shore systems and equipment for sustained container, roll on/roll off (RO/RO), breakbulk, vehicle, and bulk fuel operations.

(3) Install and prepare over-the-shore systems and equipment.

(4) Transition, if necessary, from an amphibious operation to a LOTS or JLOTS operation.

(5) Manage and control movement of cargo in sustained operations over the shore.

(6) Achieve an established throughput rate during the execution of the JLOTS operation.

b. General Considerations. The following should be considered:

(1) Concept of operations ashore that the JLOTS operations will support.

(2) Anchorage areas, including number of anchorages suitable for offload operations and adequate maneuvering room for offload systems to be effectively employed.

(3) Landing sites, including staging areas, trafficability, beach gradient or width, surf, tides or current, and sandbars.

(4) Geographic and hydrographic natural obstacles and constrictions adjacent to the beach operating area for canalizing hostile forces without restricting JLOTS operations.

(5) 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.

(6) Type and quantity of cargo to be deployed and landed.

(7) Separation of OPDS/IPDS from other cargo operations to minimize risk or loss or damage due to enemy action and to reduce interference with dry cargo operations.

(8) Personnel and equipment required to conduct operations.

(9) Types of ships to be worked and their sequence of arrival. (See Appendix C for Ship Characteristics.)

(10) Numbers and types of offload systems that must be installed.

(11) Proximity and nature of camp support.

(12) Logistic support.

(13) Engineer support.

(14) Security threat.
(15) Meteorological support.

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

(1) 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.)

(2) Offload Plans. Offload or discharge plans must be drafted and available for all participants. The offload plan and loading sequence must consider tactical requirements of the supported forces and the JLOTS organization.

(3) Lighterage Repairs and Supply Support. Planning must provide for the repair and maintenance of lighterage during the operation. (See Appendix E.)

(4) Safe Haven Plan. A safe haven for lighterage should be designated. (See Appendix F.)

(5) 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.

(6) Weather Support Plan. Appendix G contains information on weather conditions.

(7) Retrograde Cargo Operations. Eventually, repairable materiel 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 (CONUS).

(8) Security Planning. (See Appendix J.)

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CHAPTER IV

FACILITY INSTALLATIONS AND PREPARATIONS

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. 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 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.

c. The major naval system for offshore discharge is divided into the Container Offloading and Transfer System (COTS) and the Offshore Bulk Fuel System (OBFS). The COTS 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.

d. Army JLOTS equipment includes lighterage, a RO/RO Discharge Facility, causeway systems, Terminal Service Unit materials-handling equipment, barge-mounted Reverse Osmosis Water Purification Unit (ROWPU), shore-based water storage systems, and the Tactical Petroleum Terminal (TPT). The majority of construction equipment will be provided by supporting engineer units.

2. Cargo Offload and Transfer System

a. COTS. The COTS 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- by 21- by 5-feet. Nonpowered units weigh about 67 tons and powered units weigh up to 106 tons. Figure IV-1 shows the components and how they are assembled in various combinations to make up systems. Other COTS considerations follow:

(1) The joint Army-Navy modular lighterage program, currently in its infancy, will introduce a second system called the Modular Causeway System. The basic causeways are made up of 40- by 8- by 4.5-foot modules that are fitted with standard container fittings so they can be stowed aboard containerships and handled with standard container handling equipment. The weight of these units will conform closely to the weights of their Navy standard equivalent units. Figure IV-2 shows the components of this system.

(2) Components of COTS are deployed on Navy amphibious shipping and strategic sealift ships. The Navy’s landing ship tank (LST) carries causeways side loaded. Strategic sealift shipping carries Navy standard causeways deck loaded. Modular causeways can be carried either preassembled and deck loaded or as modules in containerships’ container cells. Navy standard and preassembled modular units require heavy lift capability to get them off the shipping. Navy amphibious construction battalions (PHIBCBs) and Army floating craft and port construction companies assist in deployment of the systems from strategic sealift shipping and assemble the systems in theater.

(3) Once assembled, Navy standard causeways and modular causeways have nearly identical operating procedures and characteristics. They are interchangeable in many applications (such as causeway ferries and causeway piers). Unless specified, the descriptions in subsequent sections of this subparagraph apply to both the Navy standard and modular systems.

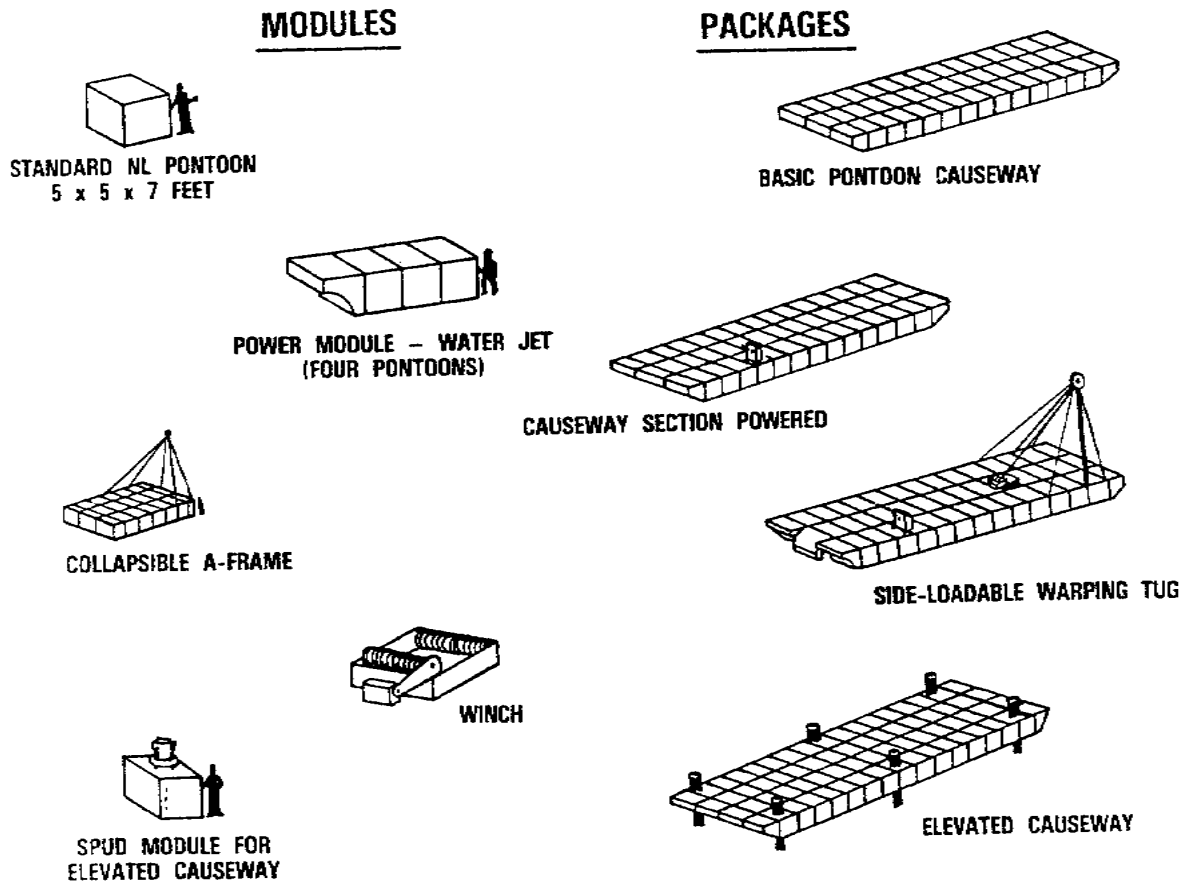
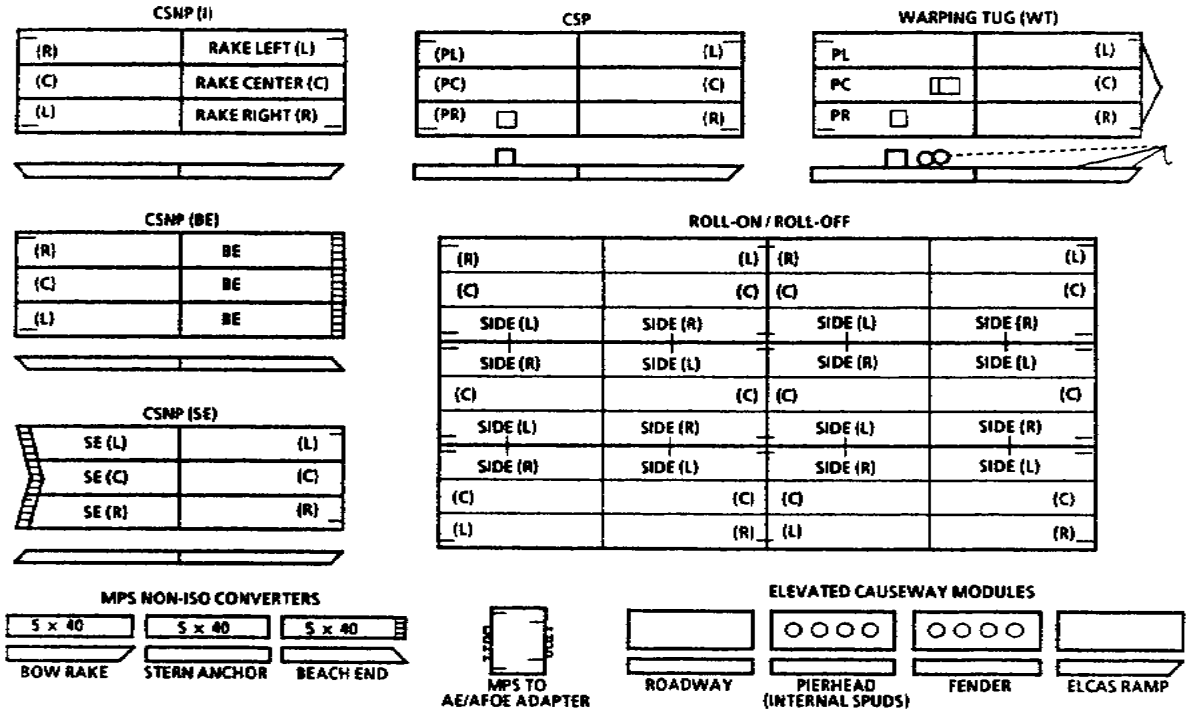


Figure IV-1. COTS Components and Systems. Page IV-3.



LEGEND 1/

(C) Center Rake Module
(R) Right Rake Module
(L) Left Rake Module
PL Left Power Module
PR Right Power Module
PC Center Module For Use Between Power Modules
- Does not contain power unit
- Provides equipment storage

BE Beach End Module
SE(R) Right Sea End Module
SE(C) Center Sea End Module
SE(L) Left Sea End Module
SIDE(L) Rake (with side connector) Module Left 2/
SIDE (R) Rake (with side connector) Module Right 2/

1/ Components are ISO compatible 8 ft x 40 ft x 4.5 ft modules except as indicated.
2/ For RO/RO Applications.

Figure IV-2. Modular Causeway System.

b. Side Loadable Warping Tug (SLWT). The SLWT, the workhorse of the COTS system, is the craft used to install, tend, and maintain other causeway system components. The SLWT currently exists only in the Navy standard configuration; however, development of a modular warping tug is planned (this version will not be side loadable). 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 LST class ships when the A-frame is in the stowed position. The SLWT is propelled by two waterjet 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 ELCAS, OPDS, and RO/RO Discharge Facilities (RRDF) systems and perform a wide variety of other functions such as powering causeway ferries, emplacing anchors, and performing surf salvage. (See Figure IV-3.)

c. Causeway Section, Powered (CSP). The CSP (see Figure IV-4) 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:

(1) Causeway Section, Nonpowered (Intermediate) (CSNP-I). The CSNP-I has flexor units at both ends to permit coupling with other powered or nonpowered causeway sections. Some sections also have side-mounted flexor slots to permit assembly into the three-causeway wide by two-causeway long RRDF. A further variant has side connector slots and internal spud wells and is used in the pierhead of the elevated causeway system

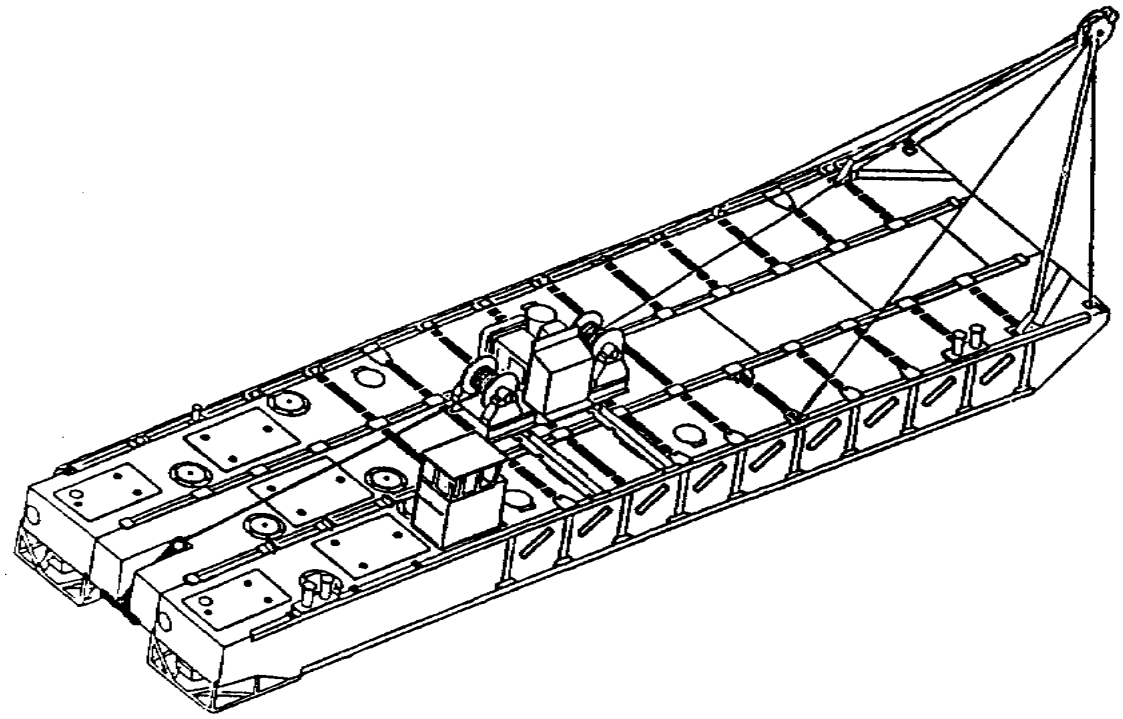


Figure IV-3. Side Loadable Warping Tug (SLWT)

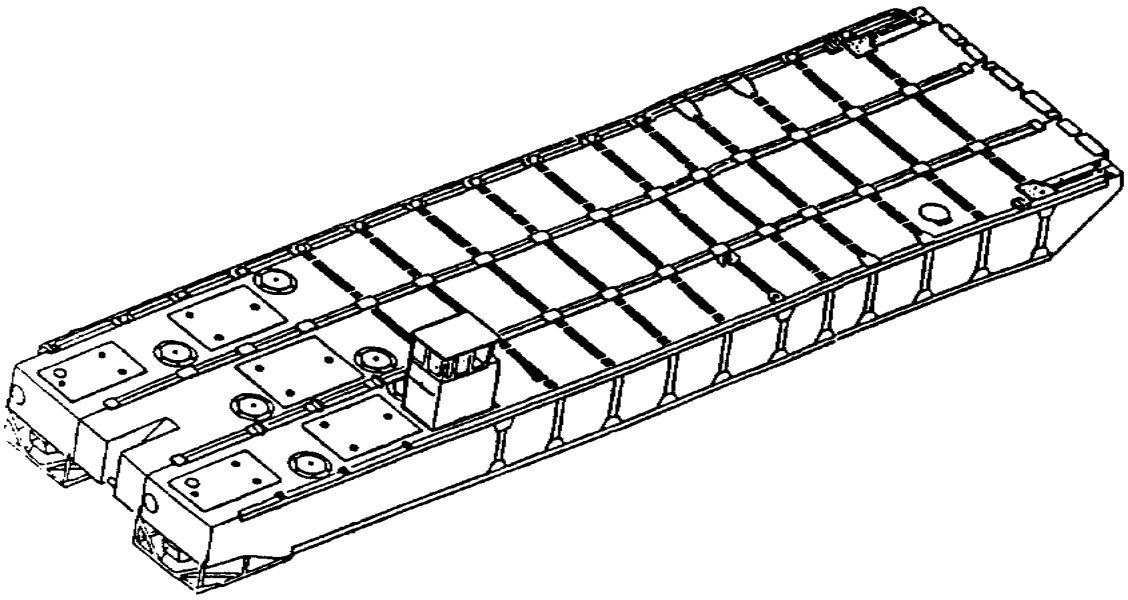


Figure IV-4. Causeway Section, Powered (CSP)

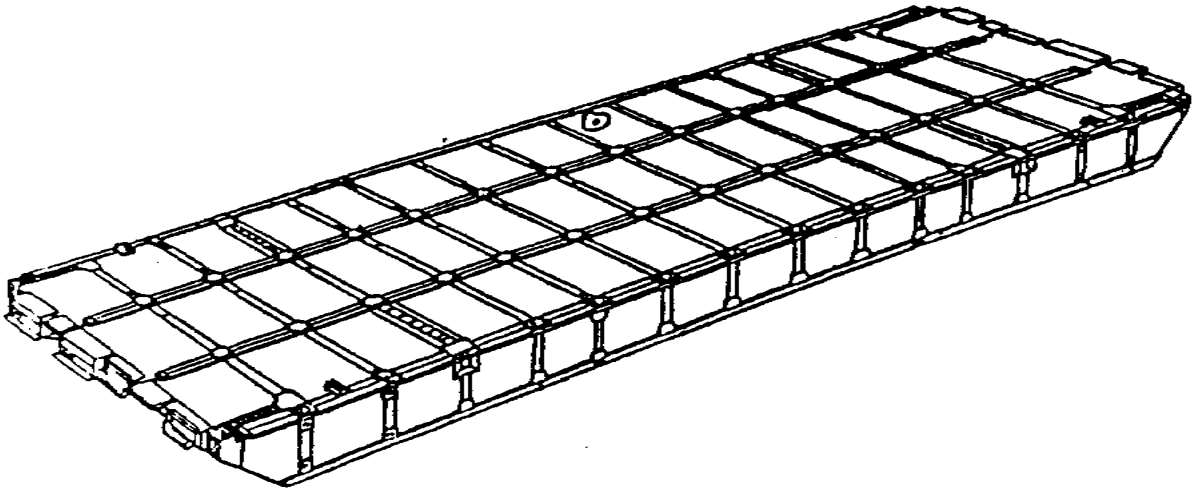


Figure IV-5. Causeway Section, Nonpowered (Intermediate)

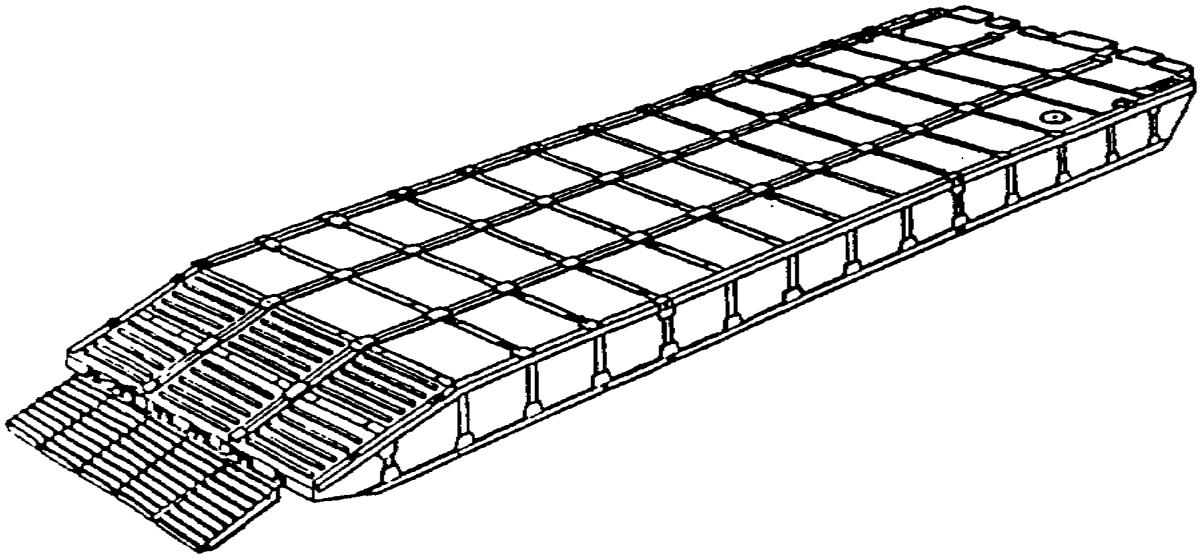


Figure IV-6. Causeway Section, Nonpowered (Beach End)

(ELCAS). The CSNP-I is shown in Figure IV-5.

(2) 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 over the shore causeway of 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 by the Navy assault forces during JLOTS operations (see Figure IV-6).

(3) 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 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, a landing craft utility (LCU), or an Army landing craft mechanized (LCM-8). The rhino horn slips through a hole in the bow ramp of the LCU or 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-7.

e. RO/RO Discharge Facility. The RRDF provides a means of debarking vehicles from a RO/RO ship to lighterage as shown in Figure IV-8. It consists of six CSNP-I joined together in a two-long, three-wide configuration to form a 65- by 182-foot Navy standard or 72- by 160-foot modular RO/RO platform. The Army configures its platform with an additional CSNP-SE to permit loading LCUs. (The Navy has the capability to make this addition also; however, the seventh section is not considered part of the RRDF.) The platform becomes a base on which to set the ramp of a self-sustaining RO/RO ship. Vehicles can be driven from the ship onto the platform and then onto causeway ferries or LCUs for delivery to the beach. In addition to the mooring fittings, lighterage, and fendering equipment of the facility, an optional offloading ramp may be used with non-self-sustaining RO/RO ships (RO/RO ships that do not have their own ramp). The RRDF requires the services of one SLWT and one CSP for assembly, operation, and maintenance; and a 6,000 pound forklift is required during assembly.

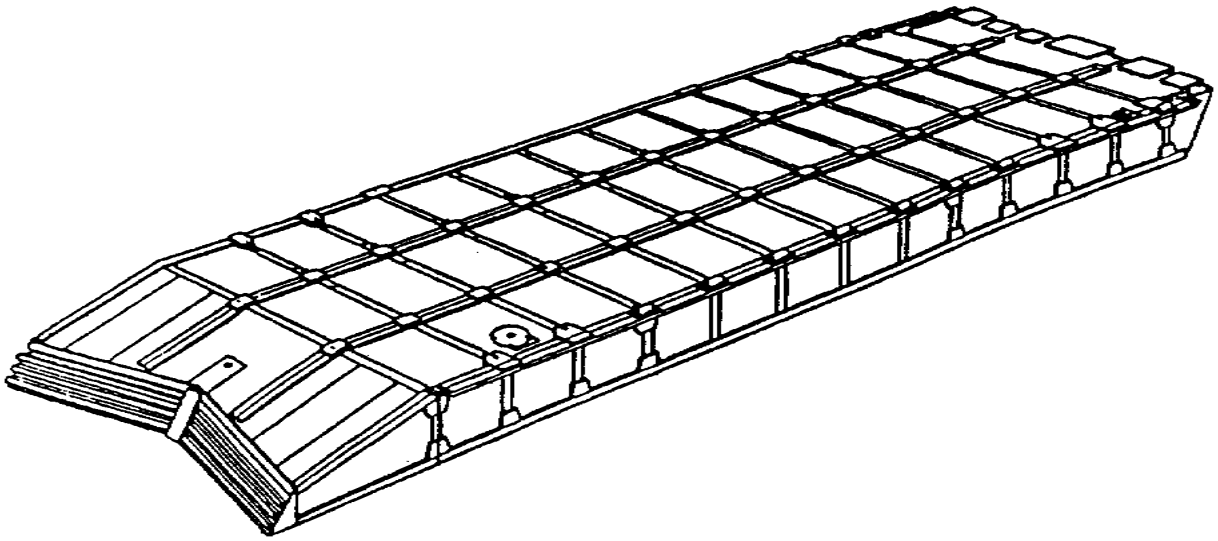


Figure IV-7. Causeway Section, Nonpowered (Sea End)

Figure IV-7. Causeway Section, Nonpowered (Sea End).

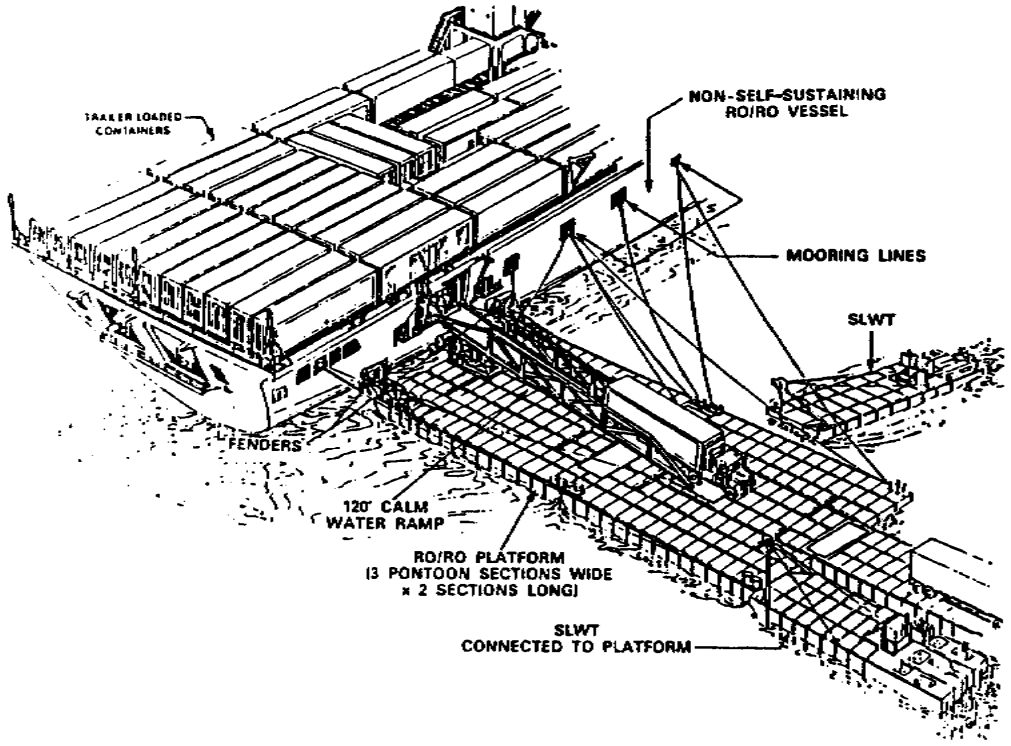


Figure IV-8. RO/RO Discharge Facility and Transfer System

Figure IV-8. RO/RO Discharge Facility and Transfer System.

Assembly time is approximately 6 to 8 hours. RRDF considerations include the following:

(1) 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.

(2) 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:

(a) 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.

(b) As shown in Figure IV-8, 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.

(c) The CWR, also shown in Figure IV-8, 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.

(d) 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 Naval Facilities Engineering Command (NAVFAC) TM-9-CE-023.02 and Army TM 55-1945-20114.

f. Elevated Causeway System (ELCAS). ELCAS is a rapidly installable pier facility designed to provide the capability to deliver containers across the beach. The ELCAS is also capable of removing rolling stock (within the capacity of the container crane) and breakbulk cargo from lighterage. The ELCAS is a key element in the movement of containerized cargo ashore. It provides the capability to offload lighterage from beyond the surf zone and difficult beach gradients, such as sandbars, that may cause conventional lighterage to ground far from a dry beach.

(1) The ELCASs currently operational in the Navy inventory are Navy standard systems designated as training ELCAS, 810-feet long and elevated from the surf by hydraulic jacking gear. Installation, operation, maintenance, and retrieval of the ELCAS are covered extensively in NAVFAC publication P-460. The operational section will describe ELCAS operations applicable to either the Navy standard system or its successor (see Figure IV-9).

(2) The Army and Navy have jointly embarked on the procurement of the improved ELCAS, which is made up of containership-compatible components constructed from the beach out to a point in the ocean by cantilevering

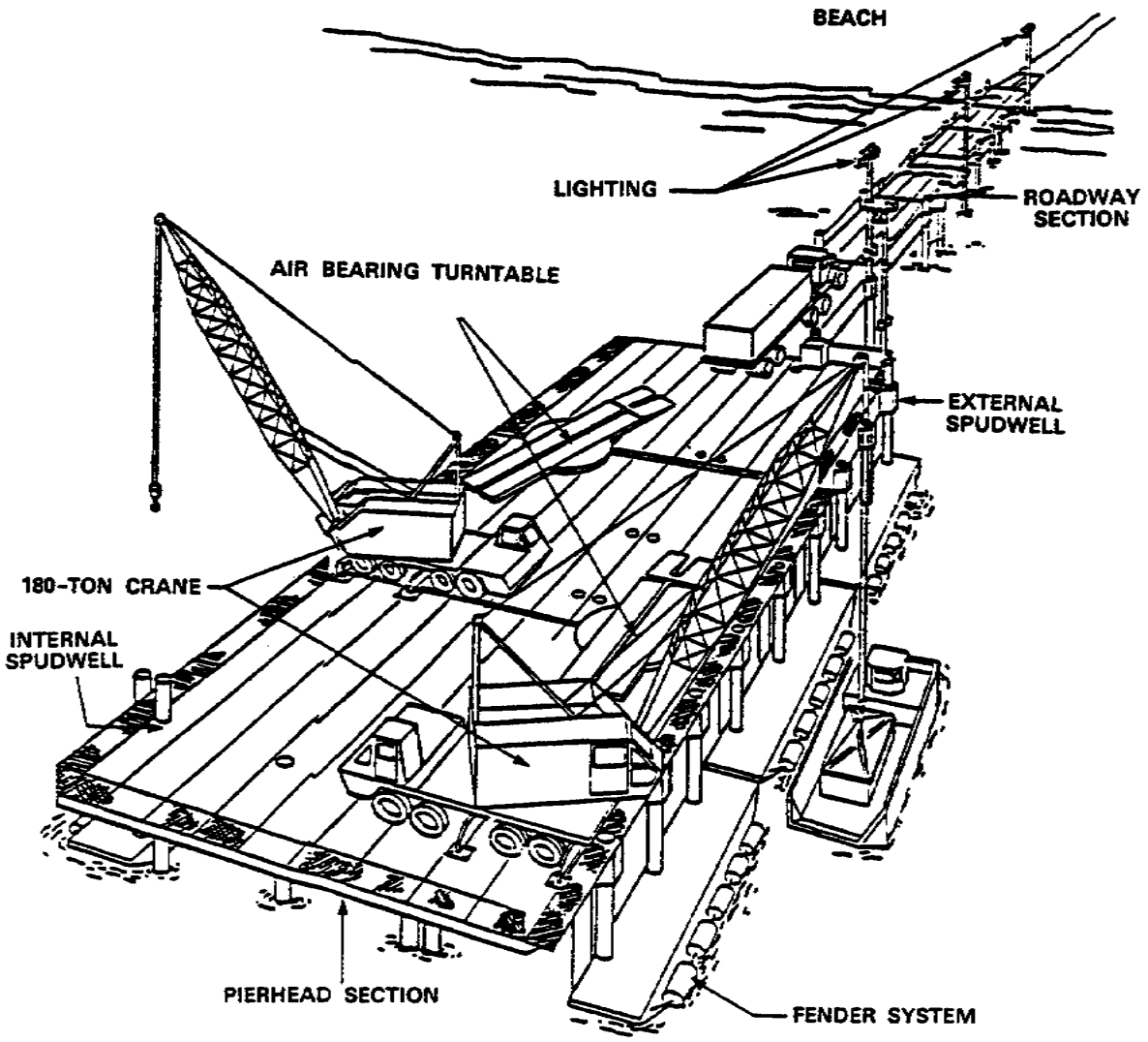


Figure IV-9. Double Pierhead Elevated Causeway System

Figure IV-9. Double Pierhead Elevated Causeway System.

successive sections of the ELCAS on previously installed sections. This improved installation technique will eliminate many of the weather-related delays incurred in Navy standard ELCAS operations by moving the pile driving evolution from a floating platform to a stable platform. The ELCAS for Army and Navy operational use will be the improved modular ELCAS, which will be procured as a 3,00-foot system. The amount of roadway actually used in an operation is dependent on the amount needed to reach 12 feet of depth at mean low water (MLW) at the end of the pierhead. This provides adequate depth to accommodate all military lighterage, as well as most commercial barges.

(3) The roadway section, which is of variable length to a maximum of 2,760 feet, is 24 feet wide and permits two-way vehicular traffic. The 240-foot long pierhead section is 72 feet wide and equipped with two 180-ton container cranes, two vehicle turntables, lighterage fendering systems, and lighting generators. The function of the turntables is to reverse the direction of container hauling trucks. The turntables are necessary because of the limited room for maneuvering vehicles on the pierhead.

(4) Installation of the ELCAS starts with the arrival of the containership at the JLOTS site (other ships are capable of delivering ELCAS but the system is optimized for the containership). Causeway lighterage, if it is modular and carried in the same ship, would be assembled first or already standing by on-station lighterage. If the containership is non-self-sustaining, an auxiliary crane ship (T-ACS) will have to be available to offload the modules to awaiting lighterage. The modules are delivered from the ship to the shore by causeway ferries, offloaded by rough terrain container handlers (RTCHs), and stockpiled on the beach. As soon as the installation cranes are ashore along with sufficient components to commence installation, construction begins. Because installation can continue beyond the point where weather might prevent further lighterage operations, the maximum amount of ELCAS components should be delivered to the beach as soon as possible. This will permit

construction to continue even if the surf is too rough for lighterage operations.

(5) ELCAS is critical to the movement of containers. The 7-day installation time makes it imperative that installation begins as early as possible and continues uninterrupted until completed so that it does not become a critical operational bottleneck.

(6) ELCAS installation considerations follow:

(a) Installation Requirements

1. Installation of the ELCAS requires the use of 4 warping tugs and 2 powered causeway sections. Continued operations and maintenance of ELCAS requires 2 dedicated warping tugs with crews. The 3,000-foot ELCAS will require 7 days for installation. A shorter causeway pier will require less installation time. Detailed procedures for Navy standard ELCAS installation are provided in NAVFAC P-460. A future NAVFAC publication will detail procedures for the modular ELCAS, which is installed in a cantilevering technique. Operation of the modular ELCAS will be essentially the same as for the Navy standard ELCAS.

2. Installation of a 3,000-foot ELCAS requires 2 PHIBCB crews of 116 enlisted personnel (58 per shift) for Navy standard components, plus 4 SLWTs and 2 CSP crews of 88 personnel (44 per shift). Modular ELCAS requires 90 enlisted personnel (45 per shift), plus 4 SLWT crews of 64 personnel (32 per shift). Thirty-eight NL and 31 modular personnel are required per shift for continuous operation of the installed ELCAS.

(b) Site Considerations

1. The ELCAS site choice requires that the pierhead be located beyond the surf zone and at MLW depth of 12 feet. Also, the ELCAS deck should be 20 feet above MHW to survive high storm tides.

2. 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 or clay seafloors are the most desirable. After selecting the general area, soundings from the beach out to the 20-foot water depth will be taken within a week of the ELCAS installation. Usually, the same type of bottom density will not be found from the beach to the pierhead. In addition to seafloor investigation, the type of beach is important. A gentle slope is desirable 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.

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 Materials Handling Equipment. 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 area of operation. Construction equipment organic to breakbulk 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 (RTCH). Marine Corps landing support units and Army terminal units with container-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 causeway ferries. For more information on Army operations in this area, see FM 55-15 and FM 55-60. Figure IV-10 shows the RTCH and various other materials handling equipment.

c. Lightweight Amphibious Container Handler (LACH). Marine Corps landing support units are equipped with LACHs. The LACH is maneuvered by using a bulldozer with a maneuvering bar attached. It is designed to retrieve standard 20-foot containers from landing craft in the surf. It works most efficiently in tandem with a second LACH on the beach or with an RTCH for faster movement of containers to a staging or storage area. The LACH is capable of removing a container from or placing a container on a flatbed truck trailer.

d. 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. Yard 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 M-872 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:

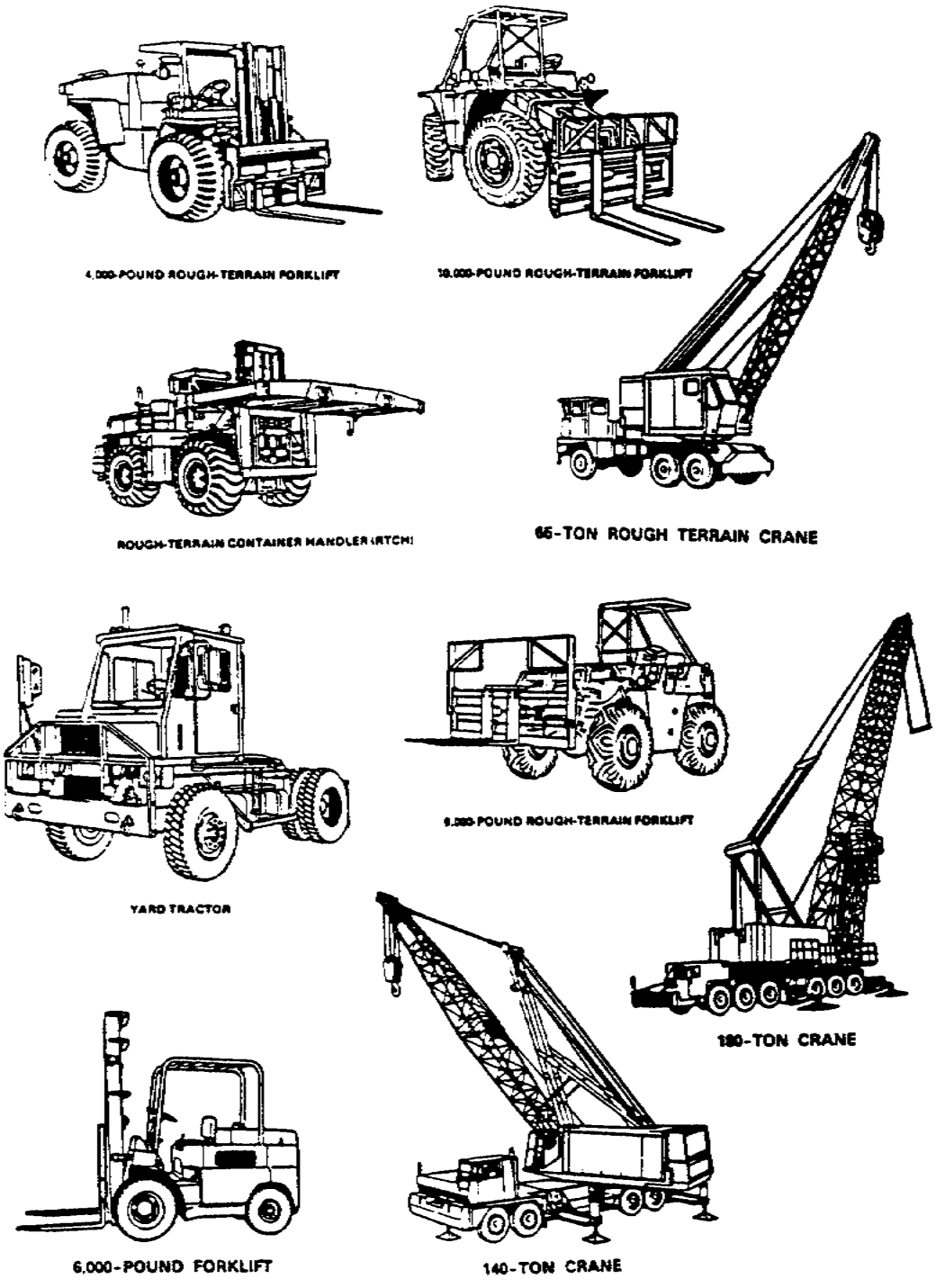


Figure IV-10. Terminal Materials Handling Equipment

Figure IV-10. Terminal Materials Handling Equipment.

(1) Beach Reconnaissance. This task locates a site for JLOTS systems that meet the following criteria:

(a) Accessible to main supply routes.

(b) Accessible for lighterage and suitable for ELCAS installation.

(c) Suitable for beach crossing roads and beach hard stands.

(2) 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.

(3) 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.

(4) Air Cushion Amphibian Discharge Berms. Where Army air cushion vehicles are discharged at inland air, rail, and/or road network terminals or on an unprepared beach, berms will be constructed to facilitate ease of maneuverability for these craft. The berms will be constructed by bulldozers organic to the transportation terminal service company or supporting engineer units. Navy landing craft air cushions (LCACs) do not require this preparation.

(5) Amphibian Water Entry and Exit Points. Water entry and exit points may be prepared with berms for air cushion vehicles or debris removal for wheeled amphibians.

(6) Beach Roadways. Beach roadways will be constructed where the bearing capacity of the beach surface is less than the ground pressure of the materials handling equipment (MHE) or

RO/RO cargo. Roadways may be constructed by using beach expedients including mobility matting (MOMAT), sand grid, or local materials such as gravel or crushed coral. Beach roadways must be wide enough for the largest vehicle and must be constructed with areas for passing and turning.

(7) 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.

(8) Bulk Fuel/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.

(9) 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. Required preparations are detailed in technical manuals for the systems involved.

(10) Ammunition Stowage. Temporary stowage facilities must be provided in order to segregate ammunition from other cargo.

(11) 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:

(1) Wheeled Amphibians. The US Army currently uses the LARC-LX wheeled amphibian. This 200,000-lb 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.

(2) Army Air Cushion Amphibians. Because of the operating characteristics of air cushion vehicles, substantial preparation is required for both discharge sites and traffic routes for these craft. At the discharge site, berms may have to be constructed to improve the turning radius of the craft and to reduce the effects of windblown debris on crane operators. At inland discharge sites, sufficient area must be cleared for large radius turns. Traffic routes must be cleared of debris that may damage the craft's skirt and, if necessary, close any ditch wider than 9 feet and reduce any incline to 6 degrees or less.

(3) 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.

(4) Materials Handling Equipment 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 marshaling area:

(1) Container Marshaling Area. With more military oceangoing 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 marshaling 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 adminsitrative functions required to marshall 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.

(2) 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 and FM-55-60 contain further information on Army operations in this area. In-transit considerations follow:

(a) 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.

(b) 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.

(c) 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 the division of shore discharge points by type of cargo is efficient or necessary. If personnel are not thoroughly familiar with military markings, clear language is added to the signs.

(3) Bulk Fuel or Water Tank Farm. Construction of a road network, berms for bag farms, and tank farms will be an engineer responsibility.

(4) 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, ASP 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 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:

(1) Support services are located in areas that do not interfere with operations.

(2) 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.

(3) First aid facilities are centrally located in the operational area to permit ease of access when required.

(4) Refueling and maintenance of watercraft may be accomplished at the safe haven, at the beach from ELCAS, or from other lighterage. (See appendix E.) These processes should be designated in the OPORD and done ashore, if possible.

(5) 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.

(6) As with most combat service support units, a terminal group’s subordinate units are disbursed over a wide area. Support is provided to these disbursed units by the designated area support group.

e. A summary of responsibilities and operational conditions for JLOTS facilities and equipment is shown in Table IV-1.

Table IV-1. Responsibilities and Maximum Conditions for Installations and Operations. Page IV-25.

	Installed By	Operated By 1/	Max Sea 4/ State for Installation	Max Sea 4/ State for Operations	Remarks
Lighterage	NA		NA	3	2/
LCM-8		ACU/MB Co			
LCU		ACU/MB Co			
LCAC		ACU			
LARC-V		BMU/UCT			
LARC-LX		TEAM-H			
CSNP/CSP SLWT		PHIBCB/ TEAM-N			
LACV-30		ACV Co			
RO/RO Discharge Facility	PHIBCB/ Team-M	PHIBCB/ Team-M	2	2	3/
OPDS	PHIBCB/UCT/ Army Engineers and divers 5/	Tanker Crew	3	5/7 for survivability	
ELCAS	PHIBCB/Army Engineers	PHIBCB/BMU/ Army Terminal Service Co	3	3/5 for survivability	3/
AABFS	PHIBCB	PHIBCB	3	3	
Causeway Pier	PHIBCB/ FC Co	PHIBCB/Terminal Service Co	3	3	

1/ Assault Craft Unit (ACU), Medium Boat (MB). Heavy Boat (HB), Beachmaster Unit (BMU), Amphibious Construction Battalion (PHIBCB), Underwater Construction Team (UCT); Team(s) H, M, and N are Army Transportation Watercraft Teams.
2/ There are no mandated sea state limits for lighterage operations; these are recommendations only.
3/ Installation and operation above sea state 2 may be hazardous and/or inefficient.
4/ Sea state refers to Pierson-Moskowitz scale as shown in Appendix G.
5/ During JLOTS, Army component units assist PHIBCB/UCT in deployment of OPDS.

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CHAPTER V

OCEAN TRANSPORT

1. Overview. 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 MSC common-user and pre-positioning ships. These ships are capable of conducting over-the-shore and port operations from anchorage. These ships deliver cargo in accordance with requirements based on cargo required delivery dates (RDDs), 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:

a. A position in latitude and longitude.

b. Bearing and range to a prominent land feature.

c. The intersection of two or more bearings on land features.

Because other anchoring considerations are suitable, distance off the beach of approximately 2,000 yards is good for anchoring ships and conducting an efficient offload. 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 ship’s arrival in the offload area. Anchorage planning factors in Appendix A will be considered. Additionally, anchorage assignment should consider the lighterage mix to be used to offload that ship’s particular cargo. For example, causeway ferries are efficient for vehicles and containers, and LCM-8s are efficient to offload ships with pallets. 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 offloading 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:

(1) Oceanographic features of offshore areas.

(2) Configuration of the coastline.

(3) Weather, climate, tidal, swell, and current conditions.

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

c. 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 provides utilization considerations of lighterage by type for various types of cargo.

d. 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 Appendixes H and J, if tasked, as specified in Chapter I.

e. Procedures. Ships arriving for discharge will be directed to an anchorage by the supporting naval 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. The manifest provides detailed information on the quantity, type, and location of the cargo aboard the ship.

b. On ship arrival, appropriate JLOTS commander representatives will coordinate with ship personnel, including the Chief Mate, to determine if any unusual conditions or circumstances exist that will affect discharge operations. Appendix K addresses command and working relationships with civilian crew members. A shipboard control point is established to monitor and control discharge operations. Using one or more of the off-ship transfer systems, available cargo is then discharged onto lighterage.

c. Safety and security considerations should be discussed at the ship arrival meeting. (See Appendixes J and L.)

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CHAPTER VI

SHIP DISCHARGE OPERATIONS

1. Overview. Cargo offloading is an essential element of the strategic sealift mission. Cargo offload of strategic sealift ships may be conducted by Navy or Army forces augmented by civilian ship crews, depending on the scenario. Alternatively, subject to the requirements of the appropriate CINC, either Service may be directed to provide forces and equipment to augment the other Service for JLOTS operations. The Navy has the primary responsibility for providing forces and equipment and conducting strategic sealift cargo offload operations incident to amphibious operations and MPF deployments. The Army has primary responsibility for providing forces and equipment and conducting strategic sealift offload operations incident to base, garrison, or theater development operations. This chapter addresses those ship discharge operations pertaining to preparation, cargo type, and offload system limitations.

2. Preparation for Discharge

a. Command Preparations. The JLOTS commander, in conjunction with his support forces, must ensure that the offload systems (lighterage, cranes, hatch kits, winches, auxiliary crane ships, etc.) and embarked vehicles for discharge are prepared for discharge operations. Ship and cargo configuration and ship loading plans must be considered when developing offload equipment and personnel requirements. The JLOTS commander will designate an offload preparation element to ensure that appropriate preparations are made. These personnel will accomplish the following:

(1) Prepare lighterage, rolling stock, and cranes for discharge.

(2) Activate the ship-to-shore movement control system.

(3) Review offload plans, manifests, or cargo plans, as appropriate, with ships' representatives and/or supported force representatives.

(4) Recommend lighterage assignments and commencement of discharge.

Appendix A provides representative preparation times by ship types and cargo offload systems.

b. Lighterage. Lighterage for the offload of strategic sealift ships consists of landing craft, amphibians, and causeway ferries. The availability of amphibious lighterage is dependent on the scenario, postamphibious operation commitments, and the direction of the CINC or JTF commander. Therefore, all lighterage belonging to the ATF or MPF may not be available for general offloading 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.

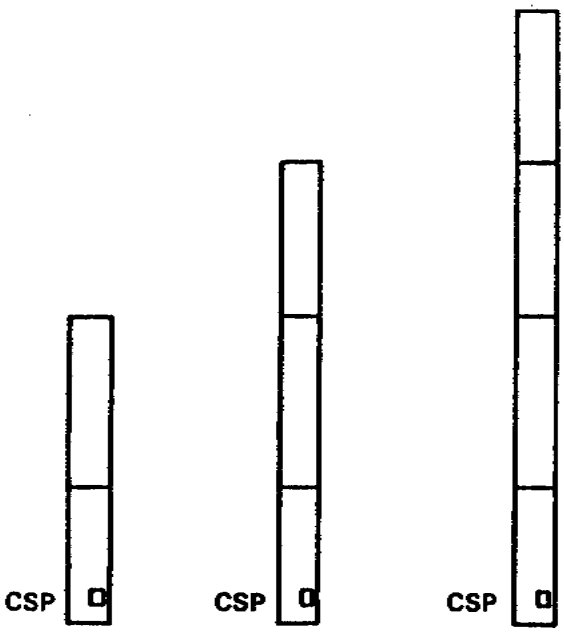
(1) Causeway Ferries. Ferries will be constructed in a ratio of powered to nonpowered sections based on weather conditions and load requirements. (See Figure VI-1.) The minimum size ferry is one powered section with one non-powered beach end.

(2) 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 offloaded. Table VI-1 displays types of lighterage that can be expected to be assigned to specific types of ships for cargo discharge.

c. Equipment. The offload preparation element is responsible for equipment preparation efforts and overseeing the support requirements, coordinating support, and realigning personnel to perform specific functions and prioritize efforts as necessary. Essentially, equipment preparation involves:

(1) Ship cargo handling systems (e.g., cranes, winches, elevators, ramps, cargo documentation and tracking).

(2) Lighterage (fenders, boat hooks, steadying lines, emergency equipment).



DESIGNATION:	1+1	2+1	3+1
CONFIGURATION:	CSP PLUS 1 CAUSEWAY	CSP PLUS 2 CAUSEWAYS	CSP PLUS 3 CAUSEWAYS
LENGTH (FT)	180	270	360
OVERALL WIDTH (FT):	21	21	21
CREW:	6	6	6

Figure VI-1. Causeway Ferry Configurations

Figure VI-1. Causeway Ferry Configurations.

Table VI-1. Lighterage Utility for Different Types of Ships

SHIP TYPE	LIGHTERAGE
BREAKBULK	LCU, LCM-8, LARC-LX
CONTAINERSHIP LARC-LX, LACV-30	CAUSEWAY FERRY, LCU 1/,
RO/RO	CAUSEWAY FERRY, LCU, LCM-8 2/
LASH	CRAFT FOR BARGE TOWING 3/
SEABEE	CRAFT FOR BARGE TOWING 3/

1/ For containers, LCUs are only usable if ELCAS is available for offload beyond the surf zone.
2/ Army rhinohorn-equipped LCM-8s only.
3/ LASH and SEABEE barges can only be offloaded by ELCAS or shoreside cranes.

(3) Inspection and preparation of all rolling stock for offload readiness.

(4) MHE.

(5) Sea painters, dunnage, fenders, and camels.

(6) Communications equipment.

(7) Additional fire-fighting equipment, etc.

(8) Night lighting and combat-portable lighting systems.

d. Equipment Availability. Material and equipment aboard most strategic sealift ships are limited to what is normally provided aboard merchant ships for commercial maritime operations. Such ships are generally equipped to meet normal pierside offload requirements. However, strategic sealift ships originating from commercial sources most likely will not be equipped to conduct prolonged JLOTS operations. The offload preparation element must be prepared to provide necessary cargo discharge support equipment necessary for the expedient and safe offload operations. Such equipment

augmentation is available from pre-positioned war reserve stocks as explained in NWP 22-8. However, this program may not be sufficient to extend to all ships involved in general offload operations.

e. 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, etc. The supported unit (such as US Army or USMC forces will provide unskilled labor, as necessary, in loading or unloading ships and in the preparation thereof. A ship arrival meeting of ship's crew, NCHF, and/or terminal service operations representatives will determine sequence for equipment positioning and individual Service responsibilities.

f. Movement of Personnel. Within the beach area, the movement of personnel must be controlled to ensure noninterference with offload operations, the safety of transients, and security considerations. The JLOTS commander will establish a plan for movement and control of personnel within the immediate offload 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, stevedores, shipboard personnel, military authorities, reliefs, and working parties) and their small items of equipment should be included in such a plan. The plan should also address the monitoring by security personnel of personnel movements. Further details are contained in Appendixes H and J.

3. Container Discharge. Discharge of containerships, both self-sustaining and non-self-sustaining ships, will be conducted as an integral part of JLOTS. Characteristics of various ship classes are in Appendix C.

a. Self-Sustaining Ship. The numbers of self-sustaining containerships are diminishing. Most are a combination of breakbulk container-ships

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 (T-ACS) Operation. Logistic support for military operations requires offloading 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.

(1) 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.

(2) 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.

(3) Self-Offload. 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 offloaded by the T-ACS cranes using the 20- or 40-foot spreader bars. Outside support is not required except for 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-offload 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 offloaded, hatch covers should be replaced in preparation for containership cargo offload.

(4) 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 the mooring of containerships to T-ACS, MSC may provide a mooring master experienced in offshore mooring alongside. Nonetheless, 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 (NSSCs) and lighterage. 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 under way. Factors that could influence the decision include:

(a) Sea state.

(b) Weather conditions.

(c) Current set and drift.

(d) Availability of tugs to assist in mooring the two ships together.

(e) Maneuvering room or lack thereof.

(f) Experience of ship handlers.

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

(5) 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 debark officer and the containership and T-ACS officers and crews is shown in Figure VI-2.

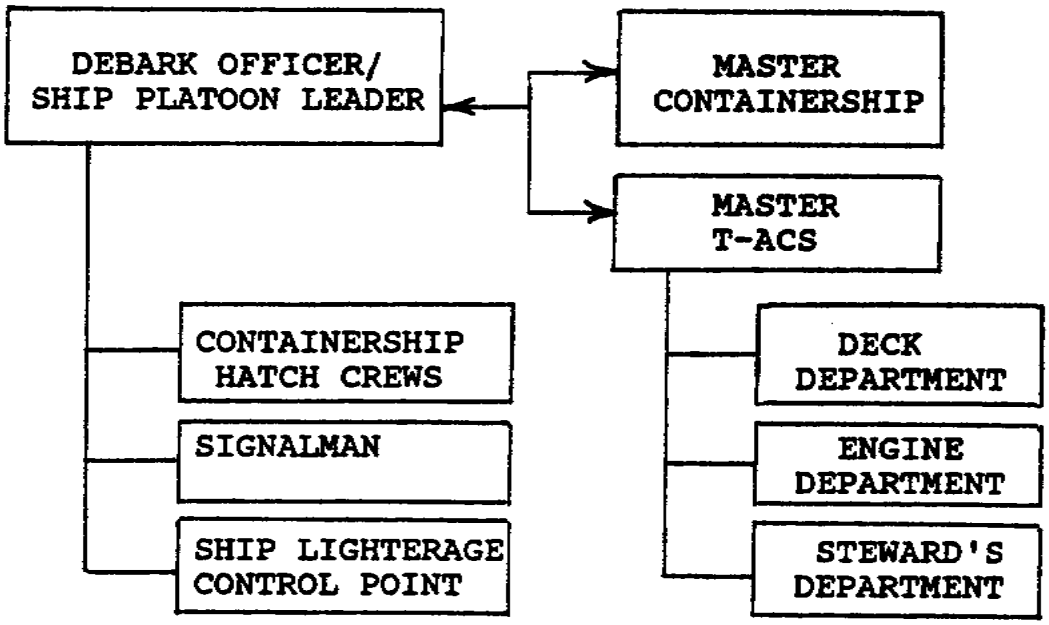


Figure VI-2. Typical T-ACS Organization Relationships

Figure VI-2. Typical T-ACS Organization Relationships. Page VI-8.

Factors affecting these operations include:

(a) Cranes should be manned and cargo teams stationed, as required, to maintain maximum container throughput. 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.

(b) Lighterage will be called alongside by the JLOTS commander's representative, the ship lighterage control point (SLCP). The T-ACS crew must be alert to lighterage movements and prepared to pass sea painters or provide other assistance to the lighters. The T-ACS crew is responsible for attaching 20- or 40-foot spreader bars to the cranes as required. Night operations will normally be conducted in white light.

(c) When the containers within reach of the crane have been offloaded, 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, offload operations may resume.

(d) T-ACS container discharge operations are affected by windward sea conditions and should be terminated in winds exceeding 30 knots. T-ACS container offload operations are also affected by rolling while at anchor.

(e) 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.

(6) 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 a theater of operations. They have the distinct advantage of a fast turnaround (load and offload) when equipment can be driven on and off the ships. To take advantage of their inherent ramp discharge capability, the Navy has developed a RO/RO discharge facility for use in low sea state to provide a means of placing vehicles aboard lighterage. 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.

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 and LCUs for transit ashore. However, if the sea conditions exceed the safe working limits of the facility (sea state 2), in some cases vehicles may be lifted onto causeway ferries by ship cranes or by T-ACS and then driven off at the beach. Provision for vehicle drivers will be designated in the operation order.

c. RRDF. The RRDF requires a 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. 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.

e. Non-Self-Sustaining Ship. The RRDF provides a ramp for those RO/RO ships that do not have self-servicing ramps. The offloading ramp, shown in Figure IV-8, is 120-feet long and composed of three 40-foot welded sections that are fastened together on the platform.

5. Breakbulk Discharge

a. Breakbulk discharge operations involve the offloading 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 outsize 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 non-self-sustaining containerships with breakbulk cargo stowed in installed SEASHEDs or flatracks, or RO/RO ships with breakbulk cargo, may require the offload 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 NCHF or Army stevedore personnel. 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 offloaded.

d. One of the commodities most frequently shipped breakbulk is ammunition. Class V materials often involve handling requirements for items as varied as projectile skids and missiles, requiring the use of various slings and forklifts that stevedore personnel will need to provide.

6. Barge Ships. Two types of barge-ship systems are currently in operation, the lighter aboard ship (LASH) and the sea barge (SEABEE). These ships are unique in ship discharge operations because they carry the largest of unitized cargo and are self-sustaining. Protected waterways usually are required for barge handling and towing services; furthermore, extensive barge-marshaling 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.

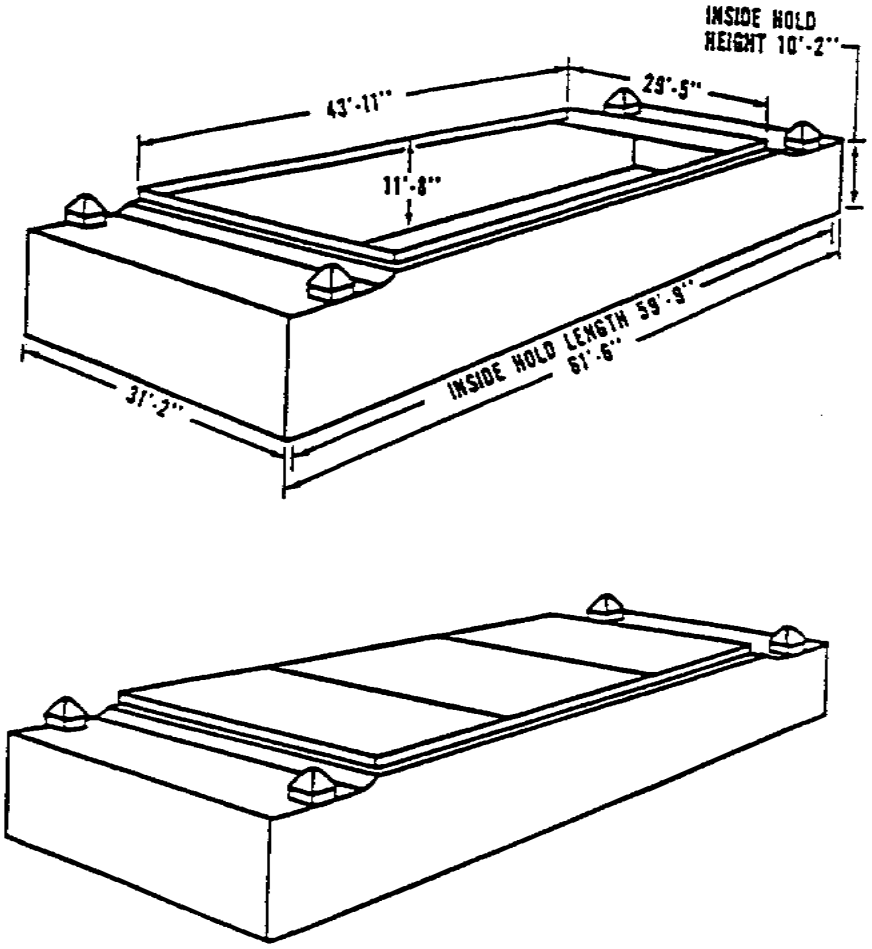
a. LASH. The LASH is a single-decked vessel with large hatches, wingtank arrangements, and a clear access to the stern. The LASH has a gantry crane for cargo handling with capacities from 446 to 455 long tons (LT). The function of this crane is to convey lighterage from the stowed location aboard the 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.

b. SEABEE. The SEABEE is arranged much differently from the LASH in that it has three decks on which the cargo barges or container flats are stowed. Barges are brought to each deck level by a stern elevator and are moved internally within the ship by a barge transporter. Two barges can be loaded or offloaded in a cycle of about 40 minutes. SEABEE barge ships can carry up to 38 barges. The capacity of the elevator is 2,000 long tons. The SEABEE ship is the preferred ship to transport LCUs and lighter amphibious resupply, cargo 60 ton (LARC-LX).

c. LASH or SEABEE Barges. The LASH barge, as shown in Figure VI-3, 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-4 and VI-5).

d. Barge Ship Operations. On arrival in the JLOTS area, the barge ship drops its anchor in a river, bay, or semisheltered harbor or ties up to a pier. Upon discharge, barges are towed to a marshaling area by lighterage assigned by the joint lighterage control center and then offloaded. Once offload is complete, they may be towed back to the ship for reembarkation.

(1) Offshore discharge, when sheltered or protected water is not available, is a difficult operation. Although the barge ship must be discharged in deep water (40 feet), its

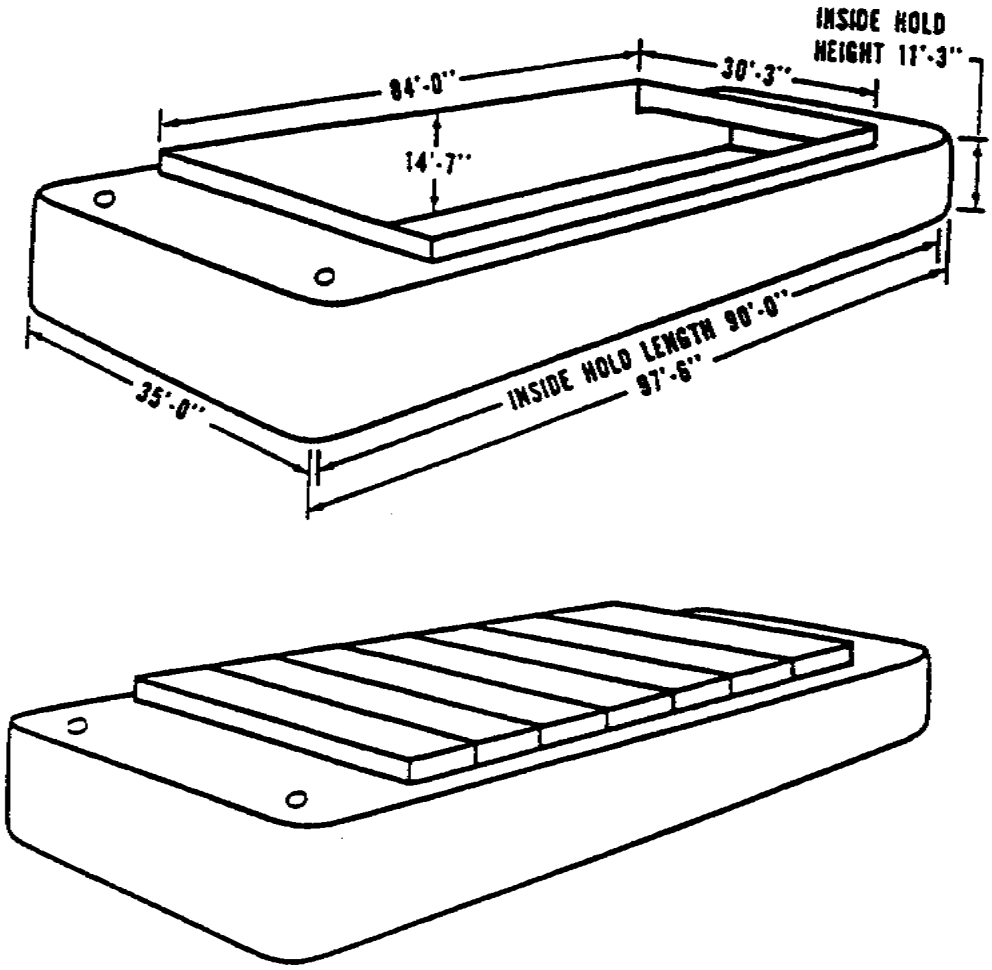


NOT TO SCALE

Hatch Panels: 3 EACH, APPROX 6,000 LB PER PANEL
Cargo Capacity: 369 LTON/18,500 CUFT/490 MTON
Empty Draft: 2′ 1/2"
Fully Loaded Draft: 8′ 7"
Lighter Empty Weight: 80 LT

Figure VI-3. LASH Lighter Characteristics

Figure VI-3. LASH Lighter Characteristics. Page VI-3.



NOT TO SCALE

Hatch Panels: 7 EACH, APPROX 5,800 LB PER PANEL
Cargo Capacity: 834 LTON/39,140 CUFT/978.5 MTON
Empty Draft: 1' 9"
Fully Loaded Draft: 10' 7"
Lightweight Barge: 150 LTON

Figure VI-4. SEABEE Barge Characteristics

Figure VI-4. SEABEE Barge Characteristics. Page VI-14.

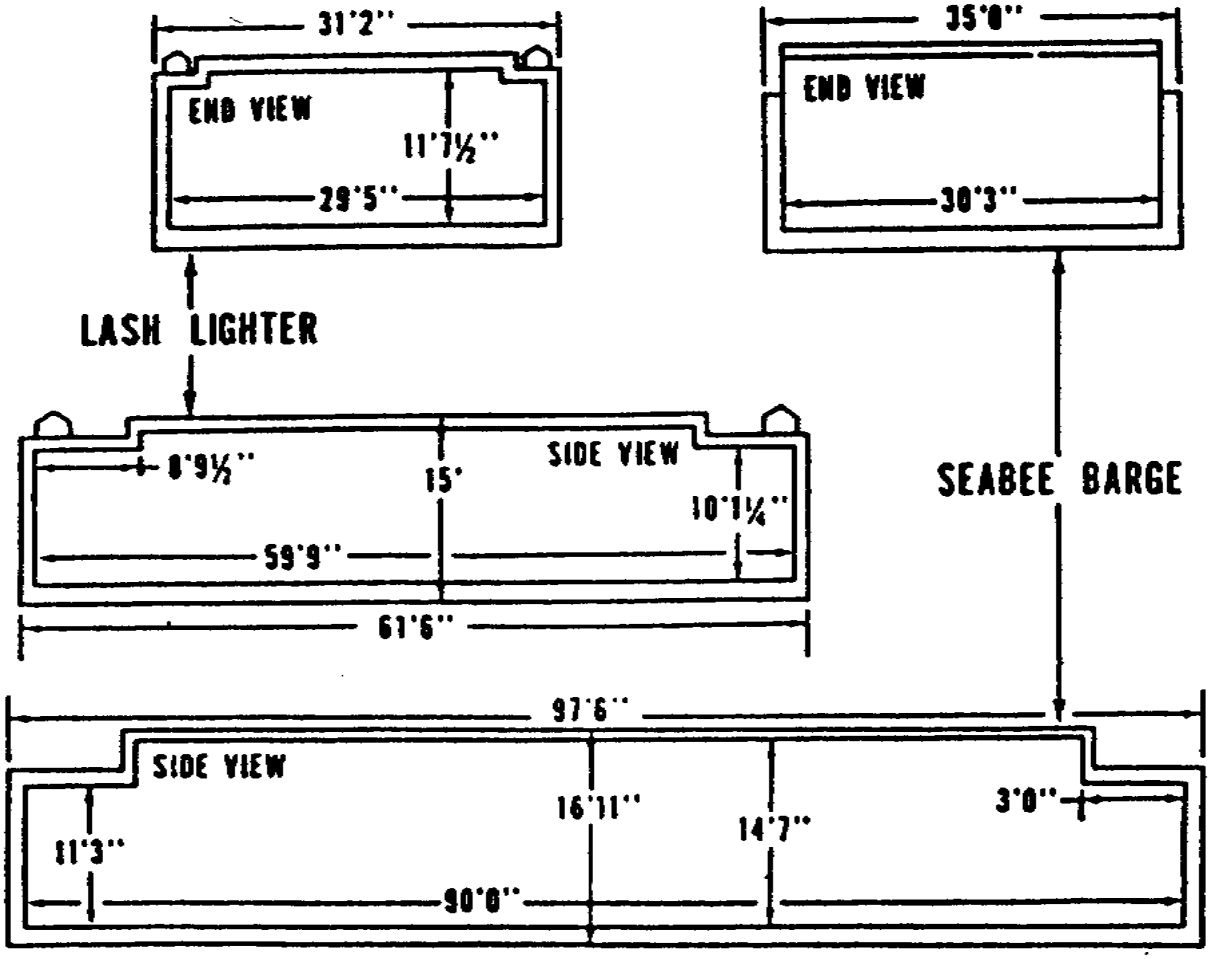


Figure VI-5. Size Comparison of LASH Lighter and SEABEE Barge.

barges can be towed to a cove, river, or lagoon. Fully loaded LASH lighters and SEABEE barges draw 8.2 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.

(2) The SEABEE may carry tugs, stacked causeway sections, LCUs, LACV-30s, and other watercraft or heavy lift equipment to better support JLOTS operations. Addition of these items will offset the numbers of barges carried. Similarly, LCMs and causeway sections will be carried on the LASH ship.

(3) Discharge from a LASH ship in a seaway is done while at anchor. The minimum water depth for anchoring should be about 50 feet. 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.

(4) The SEABEE must load or discharge its barges in protected or calm water (sea state 0-2) because the barge elevator cannot be subjected to motion-induced stresses. Virtually no differences in barge handling, mooring, towing, loading, and discharging methods exist between LASH and SEABEE barges except the SEABEE’s larger size and method of offloading its barges. For these reasons, the discussion below is confined to LASH capabilities.

(a) 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 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.

(b) 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 variations of cantilever lift frames 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:

(1) Tug operations to move barges from ship to barge marshaling areas and from barge marshaling areas to a discharge point.

(2) Barge marshaling areas for holding loaded barges awaiting vacant discharge berth and empty barges awaiting return to ship.

(3) Pierside discharge points at either developed or undeveloped facilities. Operators will allow 100 feet for each SEABEE barge to be discharged or 65 feet for each LASH barge to be discharged.

f. Empty Boxes. A prime planning challenge for barge ship operators is the 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 sea ports of embarkation (SPOE).

7. Semisubmersible 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, floating cranes, single anchor leg mooring systems, and others. Lifts could range from approximately 50 to 2,252 long tons. These types of cargoes can be quickly loaded and discharged using float-on/float-off (FLO/FLO) methods. Currently the three different commercial semisubmersible ship design types are converted tankers, flat-deck ships with a forward deckhouse and no stern, and well-deck types.

a. 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 classed as the world's largest heavy-lift ship. 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.

b. Flat-Deck Semisubmersibles. The flat-deck ships with a forward deckhouse and no stern are also very capable semisubmersibles. 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 long tons. The maximum submerged draft of these ships approaches 72 feet; the ships' service speed is approximately 14 knots.

c. Well-Deck Semisubmersibles. The well-deck semisubmersibles are perhaps inherently the most flexible because they are easily adapted to a varied number of roles. These roles include:

(1) Transport of containers (up to 932 TEUs).

(2) Drydock facilities.

(3) FLO/FLO cargo.

(4) LO/LO cargo.

(5) RO/RO cargo.

(6) Piggyback cargo.

These ships have lengths up to 556 feet and a maximum cargo capacity of up to 14,283 tons, which can be transported at speeds approaching 16 knots.

d. Semisubmersible Barge. A fourth type of semisubmersible is not a ship; it is a semisubmersible barge. Such barges can carry up to 24,000 LT loads but have to be towed wherever they go. Their lack of self-sustainability, plus their inherently slow speeds (about 6 knots maximum), make them less desirable for the

transportation of outsized military cargoes, especially during times of crisis.

e. Semisubmersible 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 semisubmersibles are capable of a four-point moor. Anchorages should be in sheltered waters with minimal currents because semisubmersible operations are normally calm-water evolutions. Environmental conditions exceeding sea state 3 and/or currents of 6 knots normally will prohibit semisubmersible load or discharge operations.

(1) To conduct safe semisubmersible 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.

(2) Semisubmersible ships should be of large 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 semisubmersibles can carry liquid cargoes (water, bulk fuel) in some of their ballast tanks.

8. System Limitations

a. JLOTS operations are weather dependent and currently can be conducted in a maximum of sea state 3, and then only marginally. Unless there are further technological advances in discharge systems and procedures and training of personnel, discharge operations should be limited to sea state 3 and below. T-ACS container handling operations are limited to sea state 3.

b. The sea state also affects the lengths of causeway ferries and the effective use of all

lighterage in the ship discharge area. The higher the sea state, the lower the productivity. Lighterage can usually sustain operations into a sea state 3 condition. Personnel proficiency must be considered.

c. JLOTS equipment is also limited in the ability to transfer outsized cargo. Such operations may be limited to a single discharge method or site. Further, the combination of slow crane operations and transit times for lighterage may impose other limitations. These limitations result in slow discharge rates and cargo delays in arriving at the shoreside discharge points. 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.

CHAPTER VII

LIGHTERAGE OPERATIONS

1. Overview. This chapter addresses those aspects of JLOTS operations involving lighterage.

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. 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 (JLCC). The JLCC is established to provide overall guidance, supervision, and control of lighters throughout the operation. The center operates under and reports to the JLOTS commander or designated representative; e.g. the Army/Navy component commander. The JLCC function parallels those of the Offload Control Officer (OCO) in a Navy LOTS operation and the Lighterage Control Center (LCC) in an Army LOTS. Established and operating under the control of the JLCC are the beach and ship lighterage control points.

b. Ship Lighterage Control Point (SLCP). The SLCP directs lighterage to the correct location alongside the discharging vessel. Once the lighterage is loaded, the SLCP issues instructions for return of the lighterage to beach control. The SLCP is normally collocated with the debarkation officer but may be positioned anywhere aboard to maximize lighterage control at multiple discharge points. The SLCP functions in the same role as the ship’s lighterage control officer (LCO) in a Navy LOTS operation.

c. Beach Lighterage Control Point (BLCP). The BLCP is responsible for directing lighterage to correct discharge points on the beach and then returning the vessels to the appropriate SLCP for directions to receive another load. The BLCP is

located wherever necessary on the beach to control lighterage waiting to come ashore or departing the beach en route to a cargo ship offshore. Depending on the length of beach receiving lighterage and the use of other discharge structures (e.g., ELCAS or floating causeway), more than one BLCP may be established. Responsibilities for the BLCP are similar to the Navy's BPT.

d. Debarkation Officer. The ship's debarkation officer is responsible for unloading cargo in accordance with the unloading plan and maintains close coordination with the SLCP to ensure that the proper landing craft is at the designated station when needed. The debarkation officer performs essentially the same functions as the ship's platoon leader in an Army LOTS operation.

3. Lighterage Control. The JLCC is established to provide overall lighterage control and will normally include personnel staffing from Army Harbormasters and/or Navy Beachmasters. The JLCC has a location ashore that provides the best visibility and control of lighterage operations without interfering with shoreline transfer points. Once the JLCC is established, SLCPs and BLCPs are emplaced as necessary.

a. The JLCC, BLCP, and SLCP communicate with lighterage by tactical radio. The JLCC, as the overall control organization, ensures safe lighterage operations, resolves disputes, manages available craft, and controls lighterage entry and exit from the operational area. Actual ship-to-shore movement of lighterage is monitored by the JLCC but, under normal circumstances, is performed by the BLCPs and SLCPs. When lighterage is required at the ship, the SLCP directs it from the queuing circle to the correct location alongside the vessel. Once the lighterage is loaded, the SLCP directs it toward another queuing circle to contact the appropriate BLCP for instructions. The BLCP will direct lighterage from the queuing circle to the correct lane or discharge point on the beach. Once the lighterage is discharged, the BLCP hands it off to the appropriate SLCP for direction to the appropriate queuing circle or directly alongside the vessel for another load.

b. Traffic patterns are established for lighterage to minimize the risk of collisions and allow for an unhampered flow of traffic. The two primary

elements of the traffic pattern are beach lanes and queuing circles. Queuing circles are holding patterns used by lighterage waiting to move alongside the discharging vessel. Beach lanes are lanes that lead to transfer points on the beach. Beach lanes, other fairways, and hazards to navigation are marked by flags in the daytime and by lights at night.

c. When amphibians are used to move cargo over the beach, lanes for the amphibians are separated from those of other lighterage. Under these circumstances, amphibians also use dual lanes. One lane is used to enter the beach, and the other is used to exit it.

d. No established routes exist between the queuing circle and the vessel, or the vessel and the beach. Lighterage normally uses the shortest route to move between these locations. Rules of the road are followed to prevent collisions. Once lighterage approaches the beach, it comes ashore under the strict control of the beachmaster personnel who direct the vessel to the exact landing location.

4. Transition. Transition of lighterage assets from dedicated Service support (Navy or Army) to joint operations is largely scenario dependent. However, in a representative contingency 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 begin to withdraw, if required, to support other contingency operations. Control would then shift to the Army, using an agreed phased-transition procedure. See Table VII-1.

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--one afloat on the Boat Haven ship and one ashore as the

Table VII-1. Transition Functions and Control For LOTS and JLOTS Operations

FUNCTION	PHIBOP	NAVY LOTS	JLOTS	ARMY LOTS
COMMANDER	CATF	OTC	JLOTS COMMANDER	ASSIGNED
IN CHARGE OFFLOAD	ASSAULT GROUP COMMANDER	OFFLOAD COORDINATOR	OFFLOAD COORDINATOR	TERMINAL COMMANDER
CONTROL ORGANIZATION	PRIMARY CONTROL OFFICER (PCO)	OCO	JLCC	LCC
SHIP	COMMANDING OFFICER	DEBARKATION OFFICER/ SHIP'S PLATOON	DEBARKATION OFFICER	SHIP'S PLATOON LEADER
LIGHTERAGE CONTROL (AT SHIP)	COMBAT INFORMATION CENTER (CIC)	LCO	SLCP	SLCP
BEACH	BEACH PARTY TEAM (BPT)	BPT	BLCP	BLCP

Lighterage Repair Element--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:

(1) 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.

(2) Reporting lighterage casualties immediately to the 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

epeditious 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 deployment through the DOD Logistics Civilian Augmentation Program (LOGCAP).

c. Single-Service Support. Normally, boat maintenance will be Service-oriented, i.e., Navy lighterage will be repaired or maintained by the Navy. During phasein or phaseout 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

a. The effective use of lighterage in support of the ship-to-shore movement of cargo is primarily weather dependent. As sea state increases or temperature decreases dramatically, lighterage productivity decreases. Currently, as discussed in Chapter VI, the ship-to-shore movement of cargo is limited by the capabilities of the discharge facilities to handle the cargo. This can be done marginally up to sea state 3. Breakbulk cargo discharge can be conducted in sea state 3 to 4 if there are adequate lees. However, sustained throughput will be greatly reduced because of limited discharge stations (one side of the ship)

and to less stable conditions of the ship and the alongside lighterage.

b. Lighterage and their maximum surf beach offloading capabilities are shown below. Lateral current and type breakers can further limit surf operations. The limits below pertain to bare-beach operations only and not to such beach offload systems as ELCAS. Appendix G and the Joint Surf Manual (Commander, Naval Surface Force, Pacific and Commander, Naval Surface Force, Atlantic Instruction 3840.1) provide additional information.

Lighterage	Maximum Effective Surf (feet)
Causeway Ferry	6
LACV-30	8
LCM-8	8
LARC-V	9
LCU	12
LARK-LX	10
LCAC	9

7. Lighterage Types and Operational Characteristics. The lighterage assets organic to naval LOTS include landing craft and causeway ferries. The type of lighterage will be dependent on the weather, sea state, surf conditions, beach gradient, and characteristics of the onload 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. A lighterage cargo capabilities chart is in Appendix A.

a. Landing Craft, Mechanized (LCM-8). Navy LCM-8s are attached to assault craft units (ACUs) and to the LKA class amphibious attack cargo ships. Army LCM-8s are assigned to transportation medium boat companies. They are propelled by two main diesel engines driving twin screws. LCM-8s 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 offloaded to a beach. They 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. They are capable of transporting containers, breakbulk cargo, RO/RO cargo, outsized cargo, and personnel from offshore offload 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-1466 Class). Army 1466-Class LCUs are assigned to transportation heavy boat companies and are capable of carrying personnel, containers, and outsized cargo in offshore discharge and loading operations. It is a self-sustaining vessel that can operate on extended missions based on provisions and fuel carried. The 1466 Class LCU is the oldest of the three LCU types. The engine room and crew quarters are located in the aft section of the vessel. As a result, cargo must be loaded and discharged via the bow ramp or by crane. The vessel is capable of beaching and retracting under its own power and is equipped with a stern anchor to assist in retracting.

d. Landing Craft, Utility (LCU-2000 Class). Army 2000-Class LCUs are assigned to transportation heavy boat companies and are used to move personnel, containers, and other cargoes. It is a self-sustaining and self-deliverable vessel that performs 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.

e. Landing Craft, Air Cushion (LCAC). The Navy has procured LCACs for assignment to ACUs. The LCAC employs ACV technology with gas turbine propulsion. The LCAC delivers cargo from a seaward launch point at speeds in excess of 40 kts. 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 contains LCAC characteristics and a diagram.

f. 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-3 and IV-4.) Other CSP and SLWT considerations include:

(1) 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.

(2) The CSP can be used with other causeway sections to transport and offload initially required equipment, including vehicles such as trucks, jeeps, 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.

g. Causeway Section, Nonpowered (CSNP). 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, RRDF, or the landing ship, tank, beach discharge causeway. The versatility of these CSNPs makes them useful in many forms, limited usually only by weather (sea state 3).

h. Causeway Ferry. Causeway ferries are composed of powered causeway sections joined together to multiple nonpowered sections. 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 OCO, 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).

i. Lighter Air Cushion Vehicle, 30 Ton (LACV-30). The Army LACV-30 is a fully amphibious high-speed craft designed to transport cargo in support of JLOTS. This craft uses aircraft turbine engines to provide lift and forward thrust for its hollow aluminum hull. As a result, it is very maintenance and fuel intensive. The LACV-30 is capable of crossing 70 percent of the world’s beaches and is most suited to the carriage of containers from vessels moored offshore. When operating the LACV-30, the load and other associated equipment must be protected from sand and water blown up by the air cushion. Separate water entry and exit points should be established for ACVs.

j. Lighter, Amphibious, Resupply, Cargo, 60 Ton (LARC-LX). 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.

k. 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.

l. 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.) 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 Table of Organization and Equipment (TOE) 55-500, Headquarters Units.

m. Logistics Support Vessel (LSV). The logistics support vessel transports approximately 2,000 ST of dry cargo in coastal, harbor, and inland waterway missions. The craft possesses a beaching capability that will permit use in LOTS missions. In LOTS operations, beach gradient variations can limit LSV carrying 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-deliverable to the objective area.

8. Container Operations. Twenty-foot containers are transported to the beach by causeway ferries, LACV-30s, LCUs, LCM-8s, and LARC-LX. The method of stowing the containers aboard lighterage is determined by the weather, swell conditions, and method of discharge used on the beach. Lighterage capacity varies according to the cargo weight limitations and container stacking constraints. Planning factors for lighterage container capacity are displayed in
Appendix A. Containers on landing craft are offloaded at the water's edge by use of a lightweight amphibious container handler (LACH). Containers on a causeway ferry can be offloaded by a LACH if loaded with the long axis parallel to the center line of the ferry or by a rough terrain cargo handler (RTCH) if loaded perpendicular to the center line of the ferry. Container operations using lighterage are described below.

a. Causeway Ferry Operations. The causeway ferry is an excellent platform for lightering containers. Its effectiveness and capacity vary with the configuration previously described. Because of their ability to change configurations, causeway ferries are flexible and adaptable to operational requirements, weather conditions, beach conditions, and theater-offload capability. They can operate in shallower beach gradients than other lighterage. When loading from the T-ACS, two causeway ferries can nest alongside and be loaded simultaneously, reducing T-ACS crane waiting time. Athwartship stowage is recommended for ELCAS crane offloading. Fore and aft stowage significantly reduces ferry capacity but is required when carrying 40-foot containers and when using LACH equipment to offload 20-foot containers at the beach. Containers are offloaded from causeway ferries by crane at an ELCAS.

b. LCU Operations. Containers can be stowed aboard LCUs either athwartships or fore and aft, dependent on the class of LCU and the method of discharge at the beach. The same LACH offload constraints exist as for causeway ferries mentioned above. Twenty-foot containers are offloaded from LCUs over a bare beach by LACH and from an ELCAS by crane. LCUs can only load 40-foot containers fore and aft and, therefore, must use a crane for discharge.

c. LCM-8 Operations. An LCM-8 can only stow a 20-foot container fore and aft. It is, therefore, restricted to offloading at the beach with LACH equipment or at an ELCAS by crane.

d. LACV-30 Operations. The LACV-30 is capable of crossing most of the world’s beaches and is best suited to transport containers from the ship to transportation mode terminal. Containers must be lifted off by crane.

e. 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 (LO) method: e.g., by a ship's cranes. However, only 1600-Class LCUs, converted 1466-class LCUs, Army convertible LCM-8s, and causeway ferries can receive vehicles directly over a ramp from a RO/RO discharge facility. 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 a bow ramp onto the rhino horn of the seventh 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 that 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, 1600-class LCUs, 1466-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 backloading, 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.

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

(1) Vehicles will be loaded with the front of the vehicle facing the bow for ease of drive off at the beach.

(2) Where cargo on chassis is loaded onto lighterage, the tractor coupling will be kept toward the bow.

(3) 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.

(4) 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 or causeway lighterage would be able to accommodate such cargo. Breakbulk cargo is loaded aboard lighterage by ship's cranes. The lighterage is prepared by providing dunnage, where appropriate, and cargo securing equipment. Depending upon the sea state, cargo type, distance to the lighterage offload 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 offload 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 offloaded to a bare beach or over a floating causeway by 4,000-, 6,000-, and 10,000-lb. capacity rough-terrain forklift trucks and at the ELCAS by cranes.

b. Landing Craft Operations. 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 offload at the beach. Stacking of palletized cargo is dependent on weather, swell, and surf conditions. Breakbulk cargo is offloaded in the same manner as from causeway ferries. Average bare beach offload times are shown in Appendix A.

c. Breakbulk Cargo 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 travelling long distances in rough weather or crossing a surf line. The following procedures are followed when loading breakbulk cargo onto lighterage:

(1) Palletized cargo is loaded directly onto the deck with little or no dunnage.

(2) 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.

(3) 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 offloading their complement of barges, but the barges themselves are not self-sustaining. Once offloaded from the barge ship, the barges are completely dependent on towing and discharge services, marshaling, maintenance, sheltering from the weather, and backloading. Usually, these operations are conducted in sheltered waters. Many facets of the two-barge ship systems are addressed in Chapter VI, 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 following:

(1) Sixty-five feet or greater in length.

(2) Twin screws.

(3) Adequate horsepower.

(4) Raised bridge (helmsman’s eye level at least 15 feet above water).

(5) Helmsman-operated powered winches with wire rope.

(6) Four-man crew.

(7) Towing bitt.

(8) PA system for helmsman to direct deckhands.

(9) Ample lights for night operation.

(10) Direct helmsman control of engines.

Push-towing barges with pointed-bow tugs require considerable skill for proper barge maneuvering. In open waterways, barges are towed either singly or in arrays. In confined waters or when approaching a cargo discharge site, it is necessary to rerig 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 in unusual situations when other assets are not available.

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

(1) Barge Hatch Covers. LASH barges have two types of hatch covers, pontoon and folding; SEABEE barge 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.

(2) Barge Preparation. Preparations should include predetermining stowage location and handling of hatch covers and providing a bilge pump to de-water barges, forklifts, lights, and Jacob's ladders within the barges, as appropriate, to facilitate load and offload operations.

(3) 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 offload facility.

(4) 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 marshaling, staging, or dump areas.

(5) 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 materials handling equipment 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 Marshaling. Clustering, fendering, and retrograde sequencing are discussed in this section.

(1) Marshaling and Clustering. When a barge is discharged from a bargeship, it may be moved into a barge marshaling area or directly to the point of cargo discharge. A marshaling 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-1 depicts some methods for barge clustering in a marshaling or safe haven area. All methods require ancillary hardware, maintenance, and space.

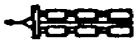
Type of Clustering	Evaluation					
	Ancillary Hardware	Maintenance	Performance	Cluster Emplacement	Barge Selectivity	Space Requirement
Barge String	Low	Low	Excellent	Excellent	Poor	High
 Alongside Causeway	High	Moderate	Good	Fair	Fair	Moderate
 Causeway Camel	Moderate	Low	Poor	Fair	Poor	Moderate
 Barge Matrix	Low/ Moderate	High	Fair	Poor	Poor	Low
 Christmas Tree	Moderate	Low	Excellent	Good	Excellent	High

Figure VII-1. LASH Barge Marshaling Comparison

Figure VI-1. Causeway Ferry Configurations.

(2) Other Marshaling Techniques. Another barge-marshaling 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 that 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.

(3) 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.

(4) Retrograde Sequencing. Upon completion of cargo offload, empty barges must be held in a marshaling area to await backloading to a subsequent barge ship. Such marshaling can consume a significant amount of the offload 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, backloading 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, backloading or retrograding barges must be accomplished expeditiously. A two-barge-per-hour backload rate could be maintained in a sea state 3, assuming that this is the limit of tugboat service 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.

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).

a. Salvage Operations. The OCO or LCC is responsible for the salvage of lighterage throughout an operation. That responsibility is delegated to the beach party element for lighterage within the surf zone. The OCO 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 (PKP) bottles and a P-250 (with de-watering and firefighting attachments) will be positioned for rapid response to seaward emergencies. This same equipment will be available with the beach party element for use in the surf zone. If a boat haven or pier is not available, the OCO and the Lighterage Repair Officer will coordinate the location of post-salvage repair facilities.

b. Salvage Unit. The salvage unit will vary in size according to the scope of the operation. Normally, an LCM is rigged as a heavy salvage boat; however, an SLWT or other self-powered lighterage with adequate shaft power will suffice. Other craft may be rigged for light salvage operations. Surf and beach salvage operations are addressed in Appendix N.

c. Lighterage Salvage. Unless otherwise directed, salvage of broached, fouled, or other afloat craft 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 OCO or LCC.

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CHAPTER VIII

SHORESIDE CARGO DISCHARGE OPERATIONS

1. Overview

a. The mission to conduct cargo discharge operations includes the interfacing of transportation modes in the surf zone, seaward of the surfline 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 offload 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. Amphibians, on the other hand, are capable of transporting cargo directly to a marshaling 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 offload 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 offload systems so that 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 and surf conditions impose the primary limitations on shoreside cargo discharge operations. The ability to support beach offload operations from beyond the surf has improved beach reception capability. However, such beach offload operations are limited because of the lack of capability to discharge most cargo from ships in a

sea state greater than 2 and the minimal capability to transport cargo in sea state 3.

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 1-1/2 knots, wave heights of 3 feet or more, or winds in excess of 20 knots.

c. Specific limitations on beach discharge capabilities are discussed in the appropriate sections in this chapter. Other system limitations include:

(1) 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.

(2) Deployability. The 65-, 140-, and 180-ton wheeled cranes are heavy lifts and are restricted in their deployability. They require special ships for movement.

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. Navy causeway piers are installed by the PHIBCBs. Army causeway piers are installed by the floating causeway detachment under TOE 55-530. The floating causeway pier is normally employed in initial amphibious operation support and will be relied upon for offload until the more permanent ELCAS is operational. Once beached, the causeway piers require tending and occasional repair as they are used to discharge landing craft.

b. Causeways are maneuvered by specifically designed causeway tenderboats or SLWTs and CSPs. The pontoon causeway pier is designed primarily to form a floating bridge for landing ships and craft when ships and craft are not able to approach close enough to the beach to load and offload wheeled or

tracked vehicles and equipment. The characteristics of a typical floating causeway pier are:

(1) Components. 1 CSNP (BE), 1 CSNP (SE), and the required number of CSNP to meet required depth.

(2) Draft. 2 feet.

(3) Capacity. 105 short tons distributed or one 62-ton tank.

(4) Operational Capabilities. Resist a wave height of 4 feet and ride a wave length of 80 feet. The pier is further designed to resist a lateral, 40-knot wind and a 3-knot current, assuming adequate anchors are provided.

c. 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.

d. Normally, RO/RO cargo is discharged from lighterage directly to a beach. However, causeway ferries and LCUs are capable of discharging RO/RO cargo over the seaward end of a floating causeway.

4. Elevated Causeway Operations. The ELCAS provides a means of delivering containers, some vehicles, and bulk cargo ashore without the lighterage contending with the surf zone. The ELCAS was described in Chapter VI. Breakbulk and/or rolling stock (within crane lift capacity) can also be handled by the ELCAS from 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.

(1) 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.

(2) For mooring LCM, LCU, and causeway ferries alongside an ELCAS, only the causeway ferry must be shifted to keep the containers within the range of the crane boom.

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. The ELCAS cranes are not capable, however, of lifting all equipment. Extremely heavy cargo, such as some tanks, exceed crane capacity. 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 on to the beach is more efficient.

d. Limitations. Operations are conducted up to and through sea state 3. The limiting conditions are related to the lighterage capabilities for unrestricted operations.

5. Amphibious Operations. Three types of amphibians are currently in the inventory--ACVs, wheeled amphibians, and tracked amphibians.

a. Navy Amphibian Operations. The following amphibians are available for Navy or Marine Corps ship-to-shore operations:

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

(2) Wheeled Amphibians. The Navy does not normally use wheeled amphibians in the transfer of cargo. They are normally used to transfer personnel and as emergency vehicles to and from the beach.

(3) USMC Tracked Assault Amphibian Vehicles (AAV). AAVs are primarily designed for transporting assault troops to the beach. They can be used for logistic support since cargo may be carried directly from the ship to an inland beach dump.

b. Army Amphibian Operations. Army amphibian wheeled and air-cushion operations are based on the concept of minimizing total cycle time, thereby moving the most cargo in the shortest possible time.

(1) Lighter, ACVs. Air cushion vehicles, because of their operating characteristics, require a separate beach entry or exit point. Air cushion vehicles must not travel across the beach near any other operation. Their high level of noise and wind-blown sand will disrupt personnel and equipment operations. ACVs will usually only carry containers or light wheeled vehicles and will be discharged by crane or pre-position ramps. Berms may be constructed to assist in turning ACVs.

(2) Wheeled Amphibians. Wheeled amphibians will normally be employed to carry breakbulk cargo or bulky and outsize 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.

(3) 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 and, where possible, separate parks should be allocated to wheeled and air cushion amphibians. Because of the high maintenance rates of air cushion amphibians and the complexity of their engines, the best possible maintenance area should be allocated to these craft.

6. Bare Beach Operation. 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 offloaded 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, such as RTCH or LACH, is used to discharge containers from beached causeway ferries and LCUs. An RTCH is the most efficient method of offloading causeway ferries (CFs). They pick the container up while on the ferry and place it aboard the container trailer ashore, eliminating double handling on the beach. The LCU can be offloaded only by the LACH. The containers are then transported to a marshaling area well clear of beach operations or directly

cleared from the beach and marshaling areas altogether. Stuffing and unstuffing of containers will not occur at the discharge point. This activity will occur at the marshaling area.

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 a rough terrain 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 MARSHALING OPERATIONS

1. Overview

a. The ability to clear cargo from a beach depends on the physical features of the beach, weather, oceanographic features, the tactical situation, and the organization and equipment of the units assigned to the operation. To obtain throughput effectiveness from available forces, a maximum rate of discharge must be reached and maintained.

b. Beach throughput is dependent on both the discharge and clearance rates. The discharge rate is the rate that cargo is offloaded from lighterage. The clearance rate is the rate at which cargo can be moved from beach discharge points to inland staging and marshaling areas. Beach throughput is a major consideration to JLOTS operations.

c. Details of beach clearance and marshaling 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 Operations and Control

a. Beach Organization. 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 (billeting, messing, maintenance, services, C2, etc.). These locations should ease local security requirements. Vehicle traffic lanes and ACV routes connecting landing sites and staging areas, dumps, etc., must be selected and clearly marked. One-way traffic patterns should be established whenever possible. 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 and amphibious assault fuel systems, including connecting lines, must be considered when preparing

the beach for offload. Chapter XI details liquid cargo operations. (See Figure IX-1 for general beach area organization.)

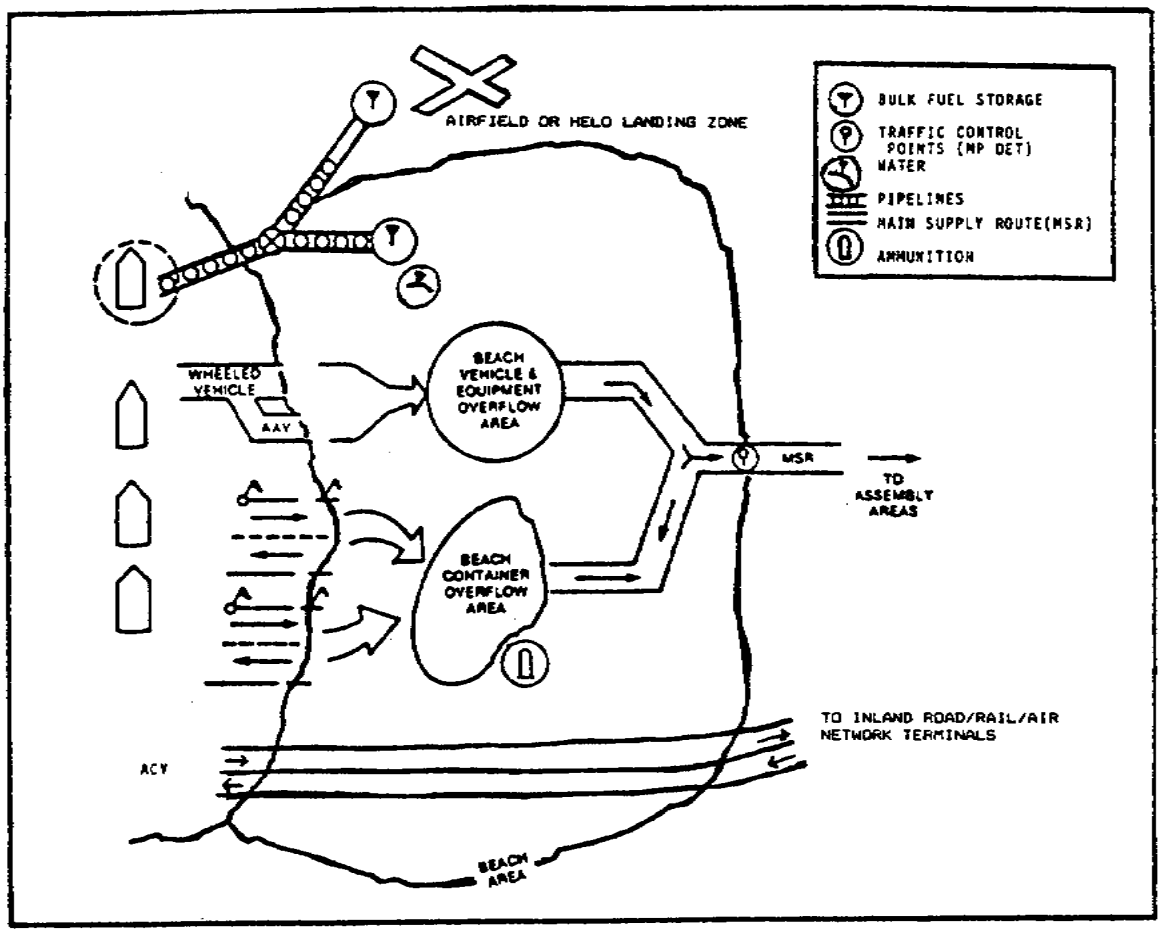


Figure IX-1. LOTS Operation Area

Figure IX-1. LOTS Operation Area. Page IX-2.

b. Marshaling Area. A large inland staging or marshaling area is the key to continuous throughput. The selection of this area should consider distance from the beach and road network, drainage, and soil conditions. Hard surface is essential if rain is probable. The staging or marshaling area is operated by a supported forces detachment and is organized into holding areas and loading areas. The loading areas are located near beach and staging area exits to load cargo onto

trucks for transportation inland. 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 issue points. Containers, vehicles, and equipment moving off the beach into the staging or marshaling area are identified and recorded by the supported force's detachment. This detachment directs each load to the proper holding or loading area.

c.Beach and Port Operational Organizations. Operational organizations to conduct beach and port clearance operations are specified in the supported commander's OPORD. Although supported forces have organizational differences, their responsibilities for beach and port operations are similar and discussed below.

(1) Beach Operations and Control. The beach operations organization is task-organized around a nucleus from the supported forces. The beach area is controlled by either a Navy beach master or an Army shore platoon leader. Beach discharge and amphibian transfer points have a designated OIC or noncommissioned officer-in-charge (NCOIC) who is responsible for the operations at that site. Clearance vehicles will be directed by the OIC or NCOIC of each site when the vehicle arrives at that site. Movements between sites and the staging areas are controlled by the JLOTS commander. A typical beach operation is shown in Figure IX-2. The function of the beach operations organization includes:

(a) Providing the beach area C2 necessary to control and coordinate cargo throughput.

(b) Organizing and developing the beach area as necessary to support the throughput, including designation and establishment of overflow areas.

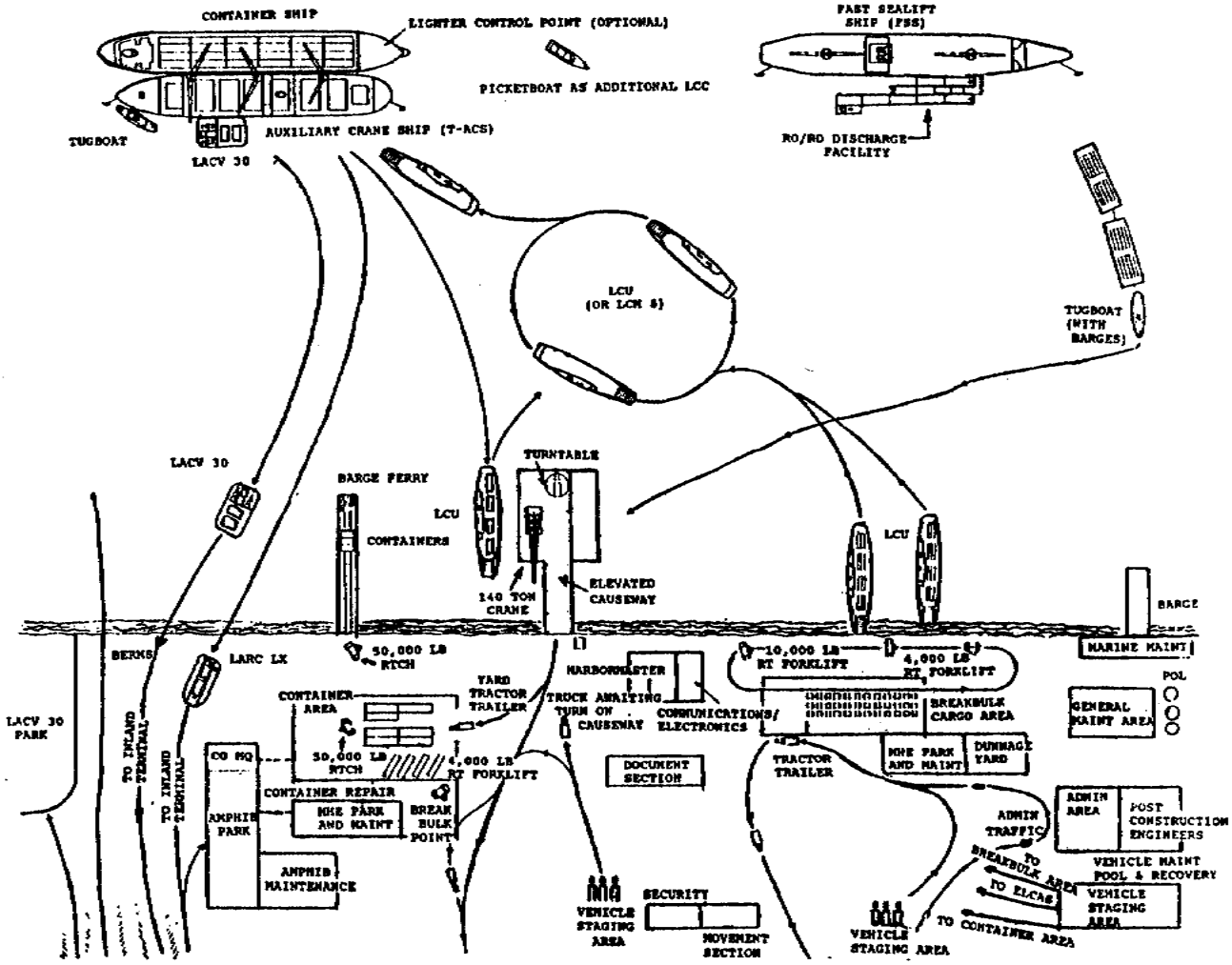


Figure IX-2. LOTS Operation Area (Bare Beach)

Figure IX-2. LOTS Operation Area (Bare Beach).

(c) Coordinating the initial bulk fluid transfer.

(d) Offloading lighterage at the beach.

(e) Providing direction for drivers to move vehicles from the lighterage.

(f) Providing command support.

(g) Providing local security.

(h) Providing vehicles for assignment to lighterage.

(i) Preparing to continue beach operations for continuous resupply or reinforcement.

(j) Accomplishing required documentation.

(k) Providing required medical support.

(l) Providing required beach, channel, and road maintenance.

3. Port Operations. JLOTS operations, as noted in Chapter I, 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 offloaded from the ships. The port operations organization operates under the overall direction of the JLOTS commander in coordination with the ship's LCP or debarkation officer. A typical port operation is shown in Figure IX-3. 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 materials

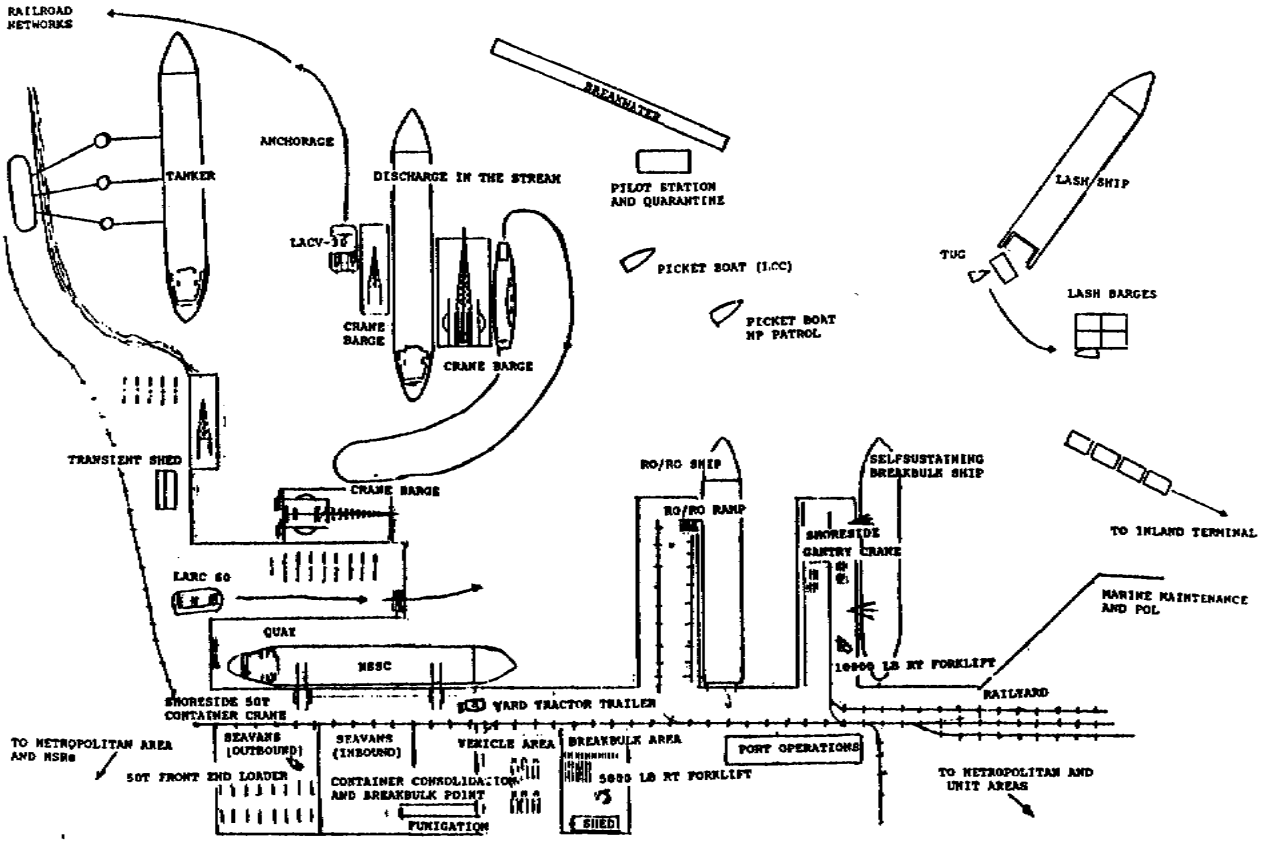


Figure IX-3. LOTS Operation Area (Port Operations)

Figure IX-3. LOTS Operation Area (Port Operations).

handling equipment, operations and longshoremen support, drayage, and dunnage.

e. Operating cargo and materials handling equipment, including shore-based cranes, forklifts, tractors, dollies, lighting, etc.

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

g. Providing direction to drivers detailed to move vehicles from the port to assembly areas.

h. Providing local security assisted by supported force augmentation.

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

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. Marshaling Area Operations and Control. Cargo will be turned over to the separate Service organizations in the marshaling area and prepared for onward movement in accordance with established Service procedures.

a. Control Operations. The marshaling area will be controlled by the USMC combat service support element or Army terminal transfer company personnel who are responsible for the following marshaling area functions:

(1) Offering containers to the movement control agency for assignment to clearance mode.

(2) Transferring containers from amphibians or from intraterminal vehicles to clearance mode.

(3) Marshaling other containers by destination, forwarding mode, priority, and commodity.

(4) Recording receipt, condition, and location of container.

(5) Maintaining current container inventory using automated or manual techniques.

(6) Loading containers onto chassis or transporter for movement to destination or to railhead, airhead, or inland waterway terminal.

(7) Accomplishing necessary documentation for accounting and onward movement.

(8) Carrying out limited maintenance, repair, servicing, and inspection of containers.

(9) Stuffing and unstuffing containers.

(10) Retrograding of containers.

b. Equipment. RTCH and LACH are most commonly used at the beach discharge point and the marshaling area. They are used to move containers from crane side or causeway ferries to waiting clearance trailers or to relocate containers within the marshaling 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. RTCH are used at the container marshaling area to place containers on clearance vehicles. Some containers are removed from the JLOTS site or from yard tractor-trailers to the marshaling area for temporary storage.

c. Breakbulk and Vehicle Operations. A marshaling area for temporary storage of breakbulk and vehicles is also designated. Such cargoes or vehicles arrive at the marshaling area from the discharge point and are met by cognizant marshaling 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.

CHAPTER X

CARGO CONTROL AND DOCUMENTATION

1. Overview. This chapter provides information on specific Service cargo control and documentation systems such as the Marine Air-Ground Task Force (MAGTF) Logistics Automated Information Systems (LOG AIS) and the Department of the Army Standard Port System--Enhanced (DASPS-E). Additionally, information is provided on the introduction of automated data capture methods in JLOTS by the logistic applications of automated marking and reading symbols (LOGMARS) technology and cargo documentation requirements as outlined in the Military Standard Transportation and Movement Procedures (MILSTAMP).

2. MAGTF Logistics Automated Information Systems. MAGTF LOG AIS is a family of logistic application systems and supporting data base management systems developed for MAGTF support. It provides an on-line real-time cargo monitoring and managing capability with which landing force logistic personnel may track or control cargo from the point of origin in CONUS to distribution to consumers and users in the amphibious objective area (AOA).

3. Department of the Army Standard Port System-- Enhanced

   a. DASPS-E is a standard Army multicommand management information system (STAMMIS) that was developed to provide automated data processing capabilities necessary 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. DASPS-E is a menu-driven computerized system that operates on a Decentralized Automated Service Support System (DASSS) with a van-mounted minicomputer and 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 4500.32R (MILSTAMP). DASPS-E has incorporated the use of LOGMARS to further automate data capture in the water terminal environment.

c. Features of LOGMARS include:

(1) The use of bar code technology is designed to improve the flow of cargo through the seaports of embarkation and debarkation and to eliminate the need for hard copy transportation control and movement documents (TCMDs). Portable bar code readers (PBCRs) will be used to track cargo through the water terminal or developed beach from receipt to clearance.

(2) The standard equipment consists of 16 PBCRs, 2 label printers, 3 personal computers with acoustic couplers, a printer, 6 printer cables, 6 PBCR microconnector cables, and 2 modems. The PBCRs, which read the bar code labels, transmit data to the computer and receive indications that a record is present. These PBCRs will be located in the cargo receiving areas. A microcomputer will be located at the control station so that cargo data or discharge information can be received from all PBCRs.

(3) Bar code labels will contain the coded transportation control number (TCN) plus clear descriptive data for ease of matching labels and equipment. Two identical bar code labels will be affixed on each piece of equipment. One label will be attached to the left side of the vehicle mid-height on the driver’s door or in a corresponding location on equipment without doors. The other label will be placed on the left front hood or side of the equipment. Labels will normally be placed on cargo prior to arrival at the JLOTS operation area.

(4) Cargo will be receipted using a PBCR to read the TCN label, location label, and function code. The location label and function code will usually be bar coded and mounted on the operator’s clipboard.

(5) The PBCR is periodically returned to a cathode ray tube (CRT) station where data are transmitted to the personal computer for recording and transmission. Any time cargo is moved from one location to another, the bar code label will be read and a new location code entered. Damaged cargo will be recorded by entering the appropriate code in the PBCR upon receipt.

(6) LOGMARS can provide the following informative reports on cargo:

(a) Report 1--Selective Cargo Status by Unit Identifier Code.

(b) Report 2--Selective Cargo Status by Receiving Station (where the cargo is within the terminal).

(c) Report 3--Selective Cargo Status by Commodity.

(d) Report 4--Selective Cargo Status by Location.

(e) Report 5--Selective Cargo Status by Stow Location.

(f) Report 6--Selective Cargo Status by Received and Lift.

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

a. All cargo moving through military transportation systems is documented in accordance with DOD Regulation 4500.32R, "Military Standard Transportation and Movement Procedures (MILSTAMP)." This regulation serves primarily to outline the documentation used in accounting for the condition and controlling the movement of cargo.

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. Other information about these documents follows:

(1) Transportation Control and Movement Document (TCMD). A TCMD is prepared for each shipment unit, as 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.

(2) Ocean Cargo Manifest. Ocean cargo manifests are made for each port of call of 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 supply ship should receive a copy of the cargo manifest data base on computer magnetic media (floppy disc) prior to sailing in order to provide it to documentation personnel at the JLOTS site.

(3) 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 MILSTAMP system.

(4) 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 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.

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

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CHAPTER XI

LIQUID CARGO OFFSHORE OPERATIONS

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. Beac storage area operations.

2. JLOTS Commander's Responsibility. The JLOTS commander is responsible for offshore bulk fuel system (OBFS) operation, beginning with the reception of OBFS 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 inland petroleum distribution and storage systems. Military units operating the inland petroleum and water distribution systems may or may not be under operational control of the JLOTS commander, depending on C2 arrangements identified in the joint task force commander's JLOTS directive. In any case, close coordination is required between the JLOTS commander and inland petroleum and water 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 on dry cargo ship arrival.

   b. Assigning Anchorages. The three most critical 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 offload area. The assigned offload control authority is responsible for assigning anchorages.

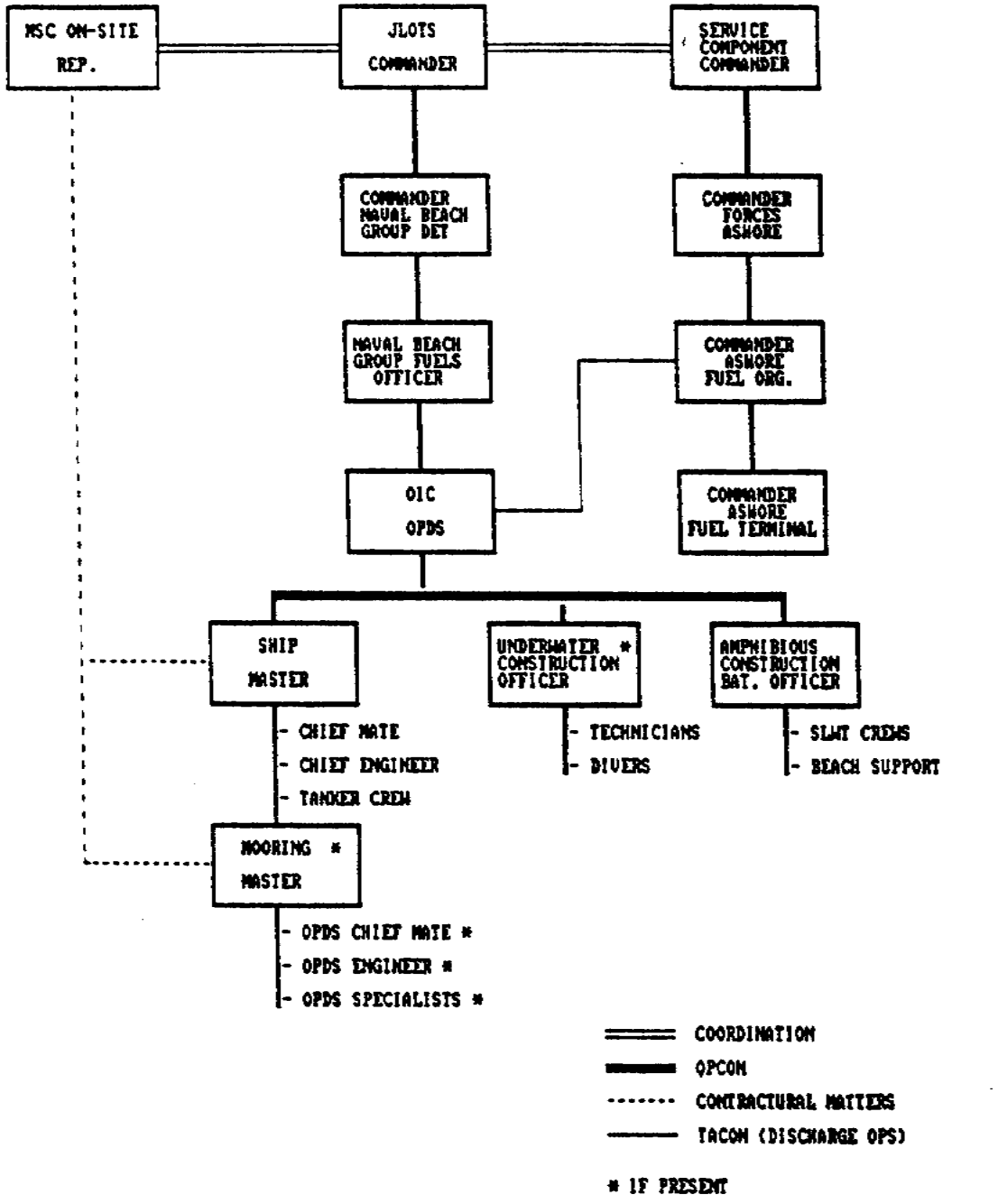


Figure XI-1. Organization for JLOTS Bulk Fuel Operations

Figure XI-1. Organization for JLOTS Bulk Fuel Operations.

4. Cargo Transfer Operations. This section describes the amphibious assualt bulk fuel system (AABFS), offshore petroleum discharge system (OPDS), and Army fuel system operations. The 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. 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 USMC amphibious assaults and MPF operations is the AABFS. It consists of 5,000 or 10,000 feet of buoyant 6-inch hose deployed from an LST in amphibious assaults or from each maritime pre-positioning ship (MPS) in MPF operations, respectively. The AABFS is an integral part of the LST or 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-gallon-per-minute 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 demand 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 an Armed Service expeditionary force in the objective area with large volumes of fuel products ashore over a sustained period of time. This Navy system will deliver fuel products for all Services to the high water mark. The OPDS consists of (1) a tanker modified to transport, deploy, and operate the system in water depths of 35 to 190 feet; (2) the single anchor leg mooring (SALM); (3) 4 miles of 6-inch internal diameter conduit; (4) reels for conduit storage; and (5) booster pumps and associated mooring and handling equipment. The arrangement of tanker components is shown in Appendix C. Figure XI-2 shows the arrangement of components when installed. If sufficient water depth is available within 2 miles of shore, a double pipeline can be installed for simultaneously

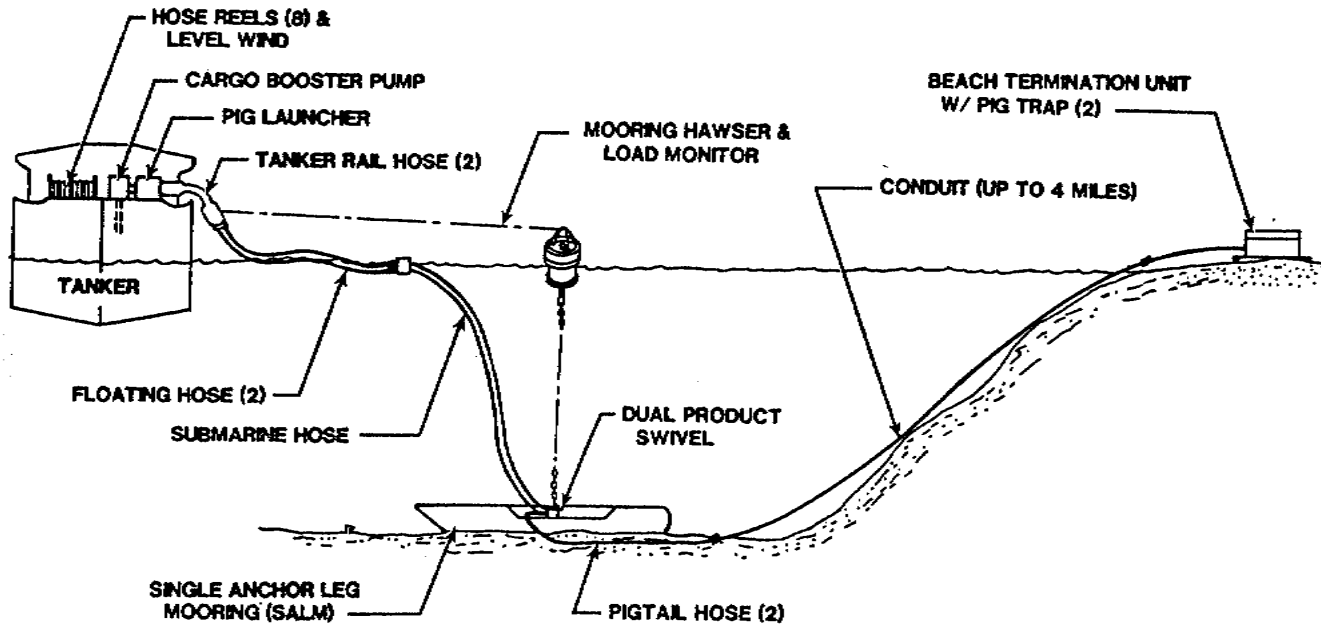


Figure XI-2. Offshore Petroleum Discharge System

Figure XI-2. Offshore Petroleum Discharge System.

pumping dual products. The mooring accommodates tankers ranging from 25,000 to 70,000 deadweight tonnage (DWT) and can be operated in sea state 3. It can survive in sea state 5. Civilian merchant marine personnel operate the OPDS tanker following installation. Once OPDS is installed, the original OPDS tanker will remain connected to the system as a "station ship" and receive, store, and discharge additional products as required. Replenishment of the "station ship" tanker would be by skin-to-skin transfer from other product tankers. Full details of OPDS installation and operation are found in the OPDS general operations and maintenance manual listed in Appendix O.

c. OPDS System Capabilities and Components. OPDS was designed to deliver fuel at 1,000 gallons per minute, providing 1.2 million gallons (28,600 barrels) per 20-hour period. It is capable of sustained performance over a period of at least 180 days. A downtime of 4 hours per day was permitted in the operational requirement to allow for corrective and preventive maintenance of the system; however, the OPDS is capable of 24-hour-per-day operation for extended periods of time when needed. The system has a single-hose capability to pump one product 4 miles from the SALM, or a dual-hose capability to pump 2 products 2 miles from the SALM, depending on the desired configuration to meet requirements. The OPDS will deliver petroleum to the beach in inclement weather conditions up to and including 40-knot winds, 4-knot currents, and 12-foot waves. The mooring and conduit portion will survive winds of 55 knots, and the conduit will also survive these same geophysical forces in a surf zone that may include coral. The substitution of one OPDS tanker for another can be accomplished in 4 hours or less when significant wave heights do not exceed 3 feet, using no more than 4 SLWTs to handle mooring hawsers and fuel hoses. Specifics of OPDS capabilities and employment procedures follow:

(1) Two types of pipeline have been procured. OPDS Number 1 (SS POTOMAC) has a steel-reinforced flexible float-sink pipeline configured in eight 2,640-foot sections.

Subsequent systems have a vulcanized elastomeric hoseline reinforced with steel cord much like that of a steel radial automobile tire. This hoseline is configured in 24 1,014-foot sections of pipeline (4 nautical miles). Both conduits float when filled with air for ease of deployment and sink to the bottom when filled with water or petroleum.

(2) The SALM type of single-point mooring permits the tanker to swing freely in the wind and current and will hold a 70,000-deadweight-ton tanker in sea state 5. The product swivel permits the tanker to weathervane without damaging the pipeline and to pump two products simultaneously where the distance to shore is less than 2 miles. A tensionometer on the mooring hawser permits the tanker master to judge when conditions dictate leaving the mooring or taking other measures to ride out bad weather.

(3) OPDS is designed to be installed as a coordinated effort involving the tanker crew, underwater construction team (UCT) divers, Navy ACUs (LCM-8/LCU), PHIBCB SLWT, and beach crews. All operations performed on board the tanker are under the overall control of the tanker master. Although the tanker master is ultimately responsible for any operation aboard ship and may exercise authority to stop, alter, or authorize any action, control of OPDS operations will normally be vested in an OPDS OIC specifically tasked and authorized to install and operate the OPDS. OPDS installation efforts external to the tanker are the responsibility of the NBG Fuels Officer. A minimum of four support craft, preferably SLWTs, and a dive platform are required for OPDS installation. At an absolute minimum, two SLWTs, one configured as a lay repair barge and one modified as a towing SLWT, may be sufficient if other support craft suitable for OPDS operations are available. Tugs must be on station when the tanker arrives at the installation site. On arrival, the tugs assist the tanker in setting the spread moor. The tugs then deploy the pipeline and deliver the BTU to the beach. System requirements call for the capability to pump at a 1,000-gpm capacity from this configuration within 48 hours of tanker arrival.

(4) The spread moor is a rigid moor that holds the tanker in one position relative to the sea floor. It cannot hold the tanker when wind and current forces impose anchor chain tensions in excess of 160,000 lbs (when the anchor is set in ideal sandy bottoms), thus requiring that the mooring be closely observed as conditions change. It is designed only to permit the system to meet the 48-hour criteria to begin delivery of fuel and can only sustain 12-knot winds, 1-1/2-knot current and 3-foot seas (because of SLWT limitations in setting thesmoor). If it is not critical that fuel delivery commences within 48 hours of tanker arrival, a preferred option is to deploy the SALM immediately upon tanker arrival, eliminating the steps required to set the spread moor and providing a better sustained operation capability in fewer than 7 days.

(5) The tanker crew conducts the SALM launch. When the SALM is waterborne, the SLWTs posi ion it over the sink site. Divers deploy and hook up the pigtail, submarine, and floating hoses to the SALM. Details of storage and deployment of these hoses vary, and the OPDS operations manual covers specific requirements for installation. The SALM base, when ready, is sunk, the mooring buoy floats free, and the SALM is ready to receive the tanker. The SALM is deployable in 35 to 190 feet of water. In planning the OPDS installation, particular attention should be allocated to the location of the SALM. Colder water, deeper depths, and greater currents will have significant impacts on diver and diving equipment requirements. Extreme conditions greatly increase the difficulty of recovery of the SALM. At water depths of 35 to 60 feet, a small auxiliary buoy is used in place of the large 60-ton buoy that must be towed clear after the SALM base is sunk.

(6) After the SALM has been prepared and sunk in place, the tanker ceases pumping from the spread moor. The tanker passes the end of the pipeline to the SLWT for hookup to the SALM pigtail hose. The tanker then retrieves the four-point spread moor and moors using the SALM

buoy hawser. The floating hose is delivered to the side of the tanker that takes up the hose to its manifold and recommences pumping fuel. The changeover time requirement is 10 hours downtime on pumping operations. SALM design criteria calls for the single-point moor installation to be completed within 7 days of tanker arrival.

d. OPDS Organizations and Responsibilities. Once the ship is on site, the OPDS installation or retrieval operation is executed under the NBG by the Fuels Officer with detailed direction provided by an OPDS OIC. Both are normally assigned from the supporting PHIBCB but may be the same individual, depending upon operational size and scope. Under the Fuels Officer/OPDS OIC are three primary supporting operating units: the PHIBCB fuels element, tanker, and UCT detachment. The Fuels Officer/OPDS OIC (in addition to overall system installation) is responsible for all installation and retrieval operations external to the tanker. The tanker master is responsible for all shipboard operations and for the safety of the ship. The UCT OIC is responsible for installation of the SALM and all diving operations related to the SALM and to conduit installation, stabilization, retrieval and repair. Figure XI-1 shows the OPDS organization.

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 by the respective CINC from the supporting PHIBCB and UCT. Installation of OPDS is very labor-intensive, requiring a major portion of 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.

(1) 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.

(2) Military Personnel. The naval 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 tug 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 (BTU); Marine Corps and/or Army forces have the responsibility for installation of the terminal and distribution system inland. It is likely that a USMC AAFS will be installed in conjunction with the PHIBOPS. Initially interfacing with the Navy AABFS, the USMC inland distribution system consists of bag storage assemblies and associated hoses. As theater operations mature and distribution requirements become more widespread, AABFS can no longer provide necessary theater-wide fuel support and must be replaced by the Army IPDS. An Army component element, either the petroleum group or the petroleum pipeline and terminal operating battalion, is responsible for installation of IPDS which begins at the juncture of the OPDS BTU and the Army's Tactical Petroleum Terminal (TPT) beach interface unit (BIU). 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. USMC Fuel Systems. The USMC AAFS is normally employed to receive bulk fuel over the beach for storage and use ashore in support of the USMC amphibious assault and MPF operations. The major components of the AAFS are one beach unloading assembly, two booster pump assemblies, five tank farm assemblies (120,000-gallon capacity each), and dispensing assemblies. AAFS is capable of receiving fuel from ship to shore at a rate of 1,250 gallons per minute 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 TPT. Physical interface will be made with the Navy OPDS and the Army TPT at the OPDS beach termination unit and the TPT beach interface unit, which provides the shore side terminals for Navy bulk petroleum deliveries. 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. The OPDS is used to deliver the bulk petroleum to the high water mark.

i. Tactical Petroleum Terminal. 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 gallons per minute and has a 3.78-million-gallon storage capacity. The major components of the TPT are:

(1) Eighteen bulk fuel tank assemblies, each with a capacity of 5,000 barrels (210,000 gallons).

(2) Fifteen trailer-mounted 600-GPM pumps.

(3) Beach interface unit.

(4) Fire suppression system.

(5) Associated valves, manifolding, and 42,000 feet of hoseline to connect the terminal for efficient fuel movement into and out of the terminal.

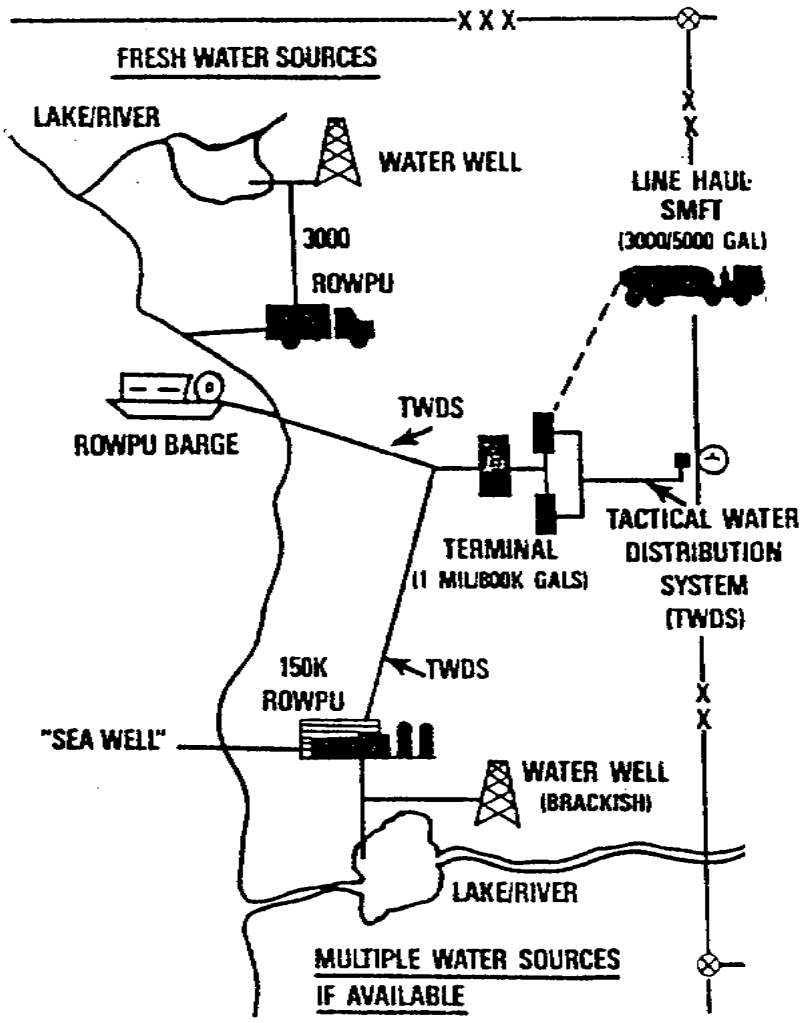
The facility requires nearly 40 acres of unobstructed land for installation and operation.

j. Liquid Cargo Barges. To supplement the above capabilities, the Army 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.

a. ROWPU Barge Operations. To support bulk over-the-shore tactical water operations, the barge-mounted (BC231A) ROWPU must be employed. Barge operations will include deploying and maintaining the 2,500-foot barge-to-shore water delivery system, purifying sea water, and delivering the water to the beach-based water storage systems. The barge will be operated by a barge-mounted ROWPU team (TOE 10-570LA). 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 (sWDS) (TOE 10-470LG) and/or semitrailer-mounted fabric tanks (SMFT) (TOE 55-018). In a theater of operations, JLOTS barge-mounted ROWPU operations will be conducted in coordination with land-based ROWPU operations and may also support the other Services. (See Figure XI-3.)

b. Barge Deployment and Employment. The ROWPU barge will normally be deployed on strategic sealift shipping, either semisubmersible barge o heavy lift ship (SEABEE). Intended to be pre-positioned at designated overseas locations, the barge is maintained by a commercial contractor until movement to an area of operations is directed and the system is turned over to the government upon arrival. The ROWPU system will be activated



NOTE: SMFT = Semitrailer Mounted Fabric Tank
TWDS = Tactical Water Distribution System

Figure XI-3. Water Supply Support System

Figure XI-3. Water Supply Support System.

by a contractor for subsequent operation by US forces.

c. Operational Locale. The barge-mounted ROWPU systems provide a rapidly employable capability to produce large quantities of potable water from sea water. The barge system must be employed either in

a port facility or adjacent to a JLOTS area in order to provide security from attack and the availability of powered watercraft to move the barge, tow it to safety from rough seas, and resupply the barge with fuel and other supplies. Operation in a protected harbor is the least difficult situation, offering the advantage of not moving the barges as a result of inclement weather. Operation in a JLOTS area will require a capability to employ a barge-to-shore water transfer system and movement of the barge to a safe haven or in tow during inclement weather. The characteristics of these two types of locations are:

(1) Protected Harbor. Water depths at mean low tide can vary from 15 to 60 feet while at anchor and from 7 to 30 feet while secured to a wharf. While at anchor, the barge will normally be less than 1,000 feet from the high water mark. In exceptional circumstances in a harbor, the distance may be as much as 2,500 feet. The average maximum sea state in the harbor will usually be sea state 3.

(2) LOA. Many of the areas contemplated for ROWPU barge employment have bottom gradients as low as 1:1000. The barge will be required to operate at sea conditions up to sea state 3. Above sea state 3, operations will be halted and the barge will be placed in tow or moved to a safe haven until the weather subsides. In the JLOTS area, the barge-to-shore distance may be as far as 2,500 feet.

d. System Description. The purpose and intended use of the ROWPU barge is to process sea water to holding or storage facilities ashore. The water delivery capacity of the ROWPU barge is rated at 300,000 gpd of fresh water and approximately 225,000 gpd of salt water.

(1) The ROWPU barge is equipped with redundant major equipment such as diesel-engine-driven generator sets and high-pressure diesel engine pumps to minimize downtime in case of failures. Processed water is chlorinated in holding tanks within the barge before being pumped ashore.

Fuel storage tanks hold 7,200 gallons, which is sufficient fuel to operate the diesel engine generator sets for a week. A sludge oil tank for holding spilled engine oil and contaminated liquids from the bilges is included in the design.

(2) Support equipment installed on board the barge includes the bridge crane, a four-point anchoring system, a workboat (used to deploy the shore discharge hose), a folding crane for launching and retrieving the workboat, firefighting and lifesaving equipment, and assorted tools and machinery located in the barge workshop.

(3) ROWPU principle characteristics follow:

(a) Length overall--120 feet.

(b) Beam molded--33 feet.

(c) Depth molded--10 feet 6 inches.

(d) Displacement--light (all tanks empty), 323.7LT.
--loaded, 417.6 LT.

(e) Draft--light (all tanks empty), 4 feet 1 inch.
--loaded, 5 feet.

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. 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 lots 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 tests; references are cited in Appendix O. Additional data were supplied by the CNO Strategic Sealift Division (OP-42) and from the US Army Transportation School at Fort Eustis, Virginia. Average distance offshore for shipping to be offloaded was assumed to be 2 miles.

2. Planning Considerations

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

(1) Offload Assumptions. The following are specific offload assumptions used in developing offload plans:

(a) Naval personnel and equipment will be initially available in conducting the offload. Navy personnel may be phased out as the operation is transferred to Army Control.

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

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

(d) LASH or SEABEE barges will be offloaded at an ELCAS. Load planning must consider the need for an operational ELCAS in prioritizing LASH or SEABEE ship loads. Emergency offload of LASH or SEABEE barges to lighterage could be carried out by a T-ACS.

(e) Vehicles will be offloaded from an RRDF to causeway ferries or LCUs or by lift-on/roll-off (LO/RO) from breakbulk or modified containerships to lighterage.

(f) The 3,000-foot ELCAS requires 7 days of double shift work to install. If shorter lengths are required, installation time may be less.

(g) Crane cycle times will be considered the critical point in offload productivity. Sufficient auxiliary equipment such as lighterage and transport equipment will be necessary to achieve the planned throughput.

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

(2) Personnel Requirements. The following personnel are required for the successful execution of JLOTS operations:

(a) Double shift crews must be available for causeway ferry and certain other operations to permit around the clock offloading of unit equipment and cargo.

(b) Lighterage repair capability will be available around the clock.

(c) Crews required for major system installation (ELCAS, RRDF, etc.) will be available for double-shift facility operations following installation.

(d) Personnel requirements for LASH or SEABEE barge offloading are:

1. The NCHF is responsible for unloading if it is done by T-ACS.

2. The PHIBCB/TS Co is responsible for unloading if it is done at the ELCAS.

3. Participating Services must provide stevedore support in both cases.

(3) Logistic Support. In the LOTS operation area (LOA), logistic support of personnel participating in LOTS operations is normally a Service responsibility. The OPORD for the LOTS 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 LOTS equipment and offloaded vehicles/equipment), maintenance, and health service-support.

b. Offloading Site Selection. Site selection and preparation is just as important to the success of LOTS 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 LOTS equipment must be considered in selecting the landing site. A typical offload discharge site is depicted in Figure A-1.

c. Anchorage Selection. The following planning data are used for anchorage at a LOTS site:

(1) Depth. For cargo ships, a minimum water depth of 6 fathoms is required.

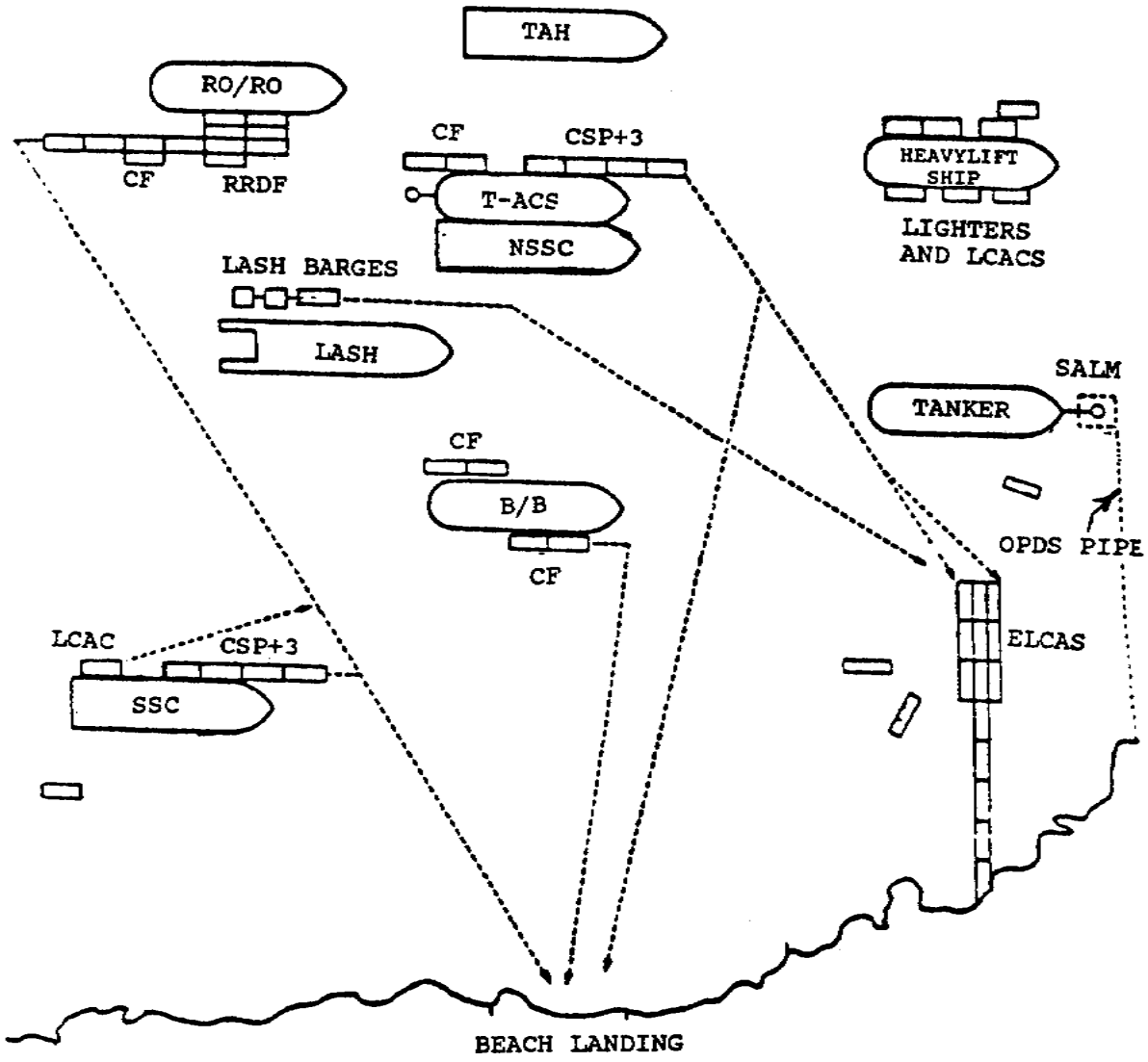


Figure A-1. LOTS Operations Area (Ship-to-Shore)

Figure A-1. LOTS Operations Area (Ship-to-Shore).

(2) Size. Adequate safe sea room must be provided for ships to enter and depart the LOTS 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 offload are shown in Table A-1.

Table A-1. Offload Systems Preparation Times 1/

SYSTEM	TIMES
T-ACS	10 hours 2/
Containership mooring to T-ACS	2 hours (with tugs)
ELCAS	5-7 days
Breakbulk Ship	2 hours
RRDF assembly	6-8 hours (SS) 3/
	12 hours (NSS)
RRDF positioning alongside ship	2-1/2 hours (SS)
	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 offload lighterage and then begin general cargo discharge.
3/ SS indicates self-sustaining RORO ship; NSS indicates non-self-sustaining RORO ship.

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 offload. Throughput is based on times necessary to execute the events of a LOTS operation. Such events may include:

(1) Cast off and clear time from the beach.

(2) Transit time to the ship.

Table A-2. Offload System Throughput Planning Factors 12-Hour Shift 1/, 2/

	VEHICLES		CONTAINERS			PALLETS			CAPACITY
	LO/RO	RO/RO	LIGHT	HEAVY	AVG	BEACH	ELCAS	PERS	S/T
3/									
1+1	24	40	27	18	23	85	65		125
2+1	42	68	39	26	32	110	90		215
3+1	58	96	50	34	43	135	120		305
TACS	100				75	4/			
NCHF HATCH TEAM	58				36	120	120		
ARMY TS Co					100		800		800
RRDF		220	5/						
LCM-8	12	12	6/		6	80	70	600	60
LCU	24	28			12	190	150	1400	180
ELCAS (1 SIDE)					62		62		
ELCAS (2 SIDE)					185		185		
RTCH (PAIR)					200				
LACH (PAIR)					66				
LACV-30	36		96	48	66				22
LCAC									75

1/ 12-hour shift consists of 10 hours operations and 2 hours maintenance.
2/ Assume 2 mile ship standoff distance.
3/ Causeway Ferry configurations: 1+1 is a CSP + 1 CSNP
2+1 is a CSP + 2 CSNPs
3+1 is a CSP + 3 CSNPs
4/ Average based on less than ideal weather conditions and decreased crane use as ship is emptied; maximum under ideal conditions is 140 containers per 12-hour shift.
5/ Capability using 3+1 causeway ferries.
6/ Army rhino-horn-equipped LCM-8s only.

Table A-3. Lighterage Interface Capabilities With Other Cargo Discharge Systems and Equipment

Cargo Type Lighterage	SHIP OR DISCHARGE SYSTEM T-ACS	Breakbulk Ship	RO/RO Ship	ELCAS
Vehicles				
CF	3	3	4	3
LCU	3	3	4	2
LCM-8	2	2	0/2 1/	2
LARC-LX	2	2	0	1
LACV-30	4	3	0	1
LCAC	1	1	0	1
Containers				
CF	4	4	0	4
LCU	3	4	0	4
LCM-8	2	2	0	3
LARC-LX	2	2	0	2
LACV-30	4	4	0	1
LCAC	1	1	0	0
Breakbulk				
CF	0	3	4	2
LCU	0	3	4	2
LCM-8	0	4	0/2 1/	2
LARC-LX	0	4	0	2
LACV-30	0	3	0	1
LCAC	0	1	0	1

Lighterage to ship/discharge system compatibility code:
0 = No capability
1 = Emergency--not recommended
2 = Marginal
3 = Good
4 = Optimal

1/ Army rhino-horn-equipped LCM-8s are capable of marginal vehicle offload operations from an RRDF.

Table A-3 (cont'd)

CARGO TYPE Lighterage	SHIP OR DISCHARGE SYSTEM RTCH	LACH	BEACH SELF-DISCHARGE	AMPHIBIAN SITE	ROUGH TERRAIN FL
Vehicles					
CF	0	0	4	0	0
LCU	0	0	4	0	0
LCM-8	0	0	4	0	0
LARC-LX	0	0	4	4	0
LACV-30	0	0	0	3	0
LCAC	0	0	4	3	0
Containers					
CF	4	2	0	0	0
LCU	0	3	0	0	0
LCM-8	0	3	0	0	0
LARC-LX	0	3	0	4	0
LACV-30	0	0	0	4	0
LCAC	0	0	0	4	0

Lighterage to ship/discharge system compatibility code:
0 = No capability
1 = Emergency--not recommended
2 = Marginal
3 = Good
4 = Optimal

(3) Approach and moor time at the ship.

(4) Load time at the ship.

(5) Cast off and clear time from the ship.

(6) Transit time to the beach.

(7) Approach and moor time at the beach.

(8) Offload time at the beach.

b. Another factor that determines the throughput rates is the capability of the lighterage; i.e., cargo type carried or weight capacity. Table 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. All tables will be updated as additional data are accumulated from ongoing tests and exercises. Additional lighterage characteristics can be found in Appendix B.

(1) Lighterage Interface Capability. The effective interface of multiple types of lighterage with various LOTS discharge systems and/or ships will determine throughput rates. Table A-3 shows a prioritized match of lighterage with various ships or discharge systems for the offload of vehicles, containers, and breakbulk cargo. Table A-4 shows recommended priority of cargo type vs. lighterage and/or discharge system including the rough terrain forklift (RTFL).

(2) Lighterage Capacity. Table A-5 displays lighterage capacity planning factors.

(3) Lighterage Planning Factors. The information in Table A-6 is based on the expected effective operating speed of loaded lighterage in calm water and provides typical lighterage transit times. It does not include lighterage maneuvering and/or beaching time.

Table A-4. Cargo Discharge and Lighter System Compatibility

System	Vehicle	20-foot Container	40-foot Container	Breakbulk
T-ACS	3	4	4	2
RRDF	4	0	0	0
LASH/SEABEE BARGE	4 1/	3	4	2
CF	4	4	4	2
LCU	4	4	4	4
LCM-8	2	2	0	4
LACV-30	2	4	2	2
LCAC	1	1	1	1
ELCAS	2	4	4	2
RTCH	0	4	4	2 2/
LACH	0	3	0	0
RTFL	0	0	0	4
LARC-LX	3	4	0	3

Lighterage to ship and discharge system compatibility code:
- 0 = No compatibility
- 1 = Emergency--not recommended
- 2 = Marginal
- 3 = Good
- 4 = Optimal

1/ Only if prioritized to arrive after ELCAS is available to offload from barge.
2/ When configured with forks.

Table A-5. Lighterage Capacity

LIGHTERAGE	AVERAGE CONTAINER	20-FOOT CONTAINER MAXIMUM 1/	40-FOOT CONTAINER MAXIMUM 1/	PALLETS	SHORT TONS MAX
1+1 2/	9	10	4	100	125
2+1	16	20	8	170	215
3+1	26	30	12	240	305
LCM-8	1	1	0	40	60
LACV-30	2	2	1	24	23
LARC-LX	2	2	1	70	60
LCU-1600	4	5	2	216	188
LCU-1466	6	8	3	224	187
LCU-2000	6	8	3	224	187
LCAC	2	3	2	60	75

1/ Number of containers cannot exceed cargo weight capacity.
2/ Causeway ferry configurations: 1+1 is 1 CSP + 1 CSNP; 2+1 is 1 CSP + 2 CSNPs; 3+1 is 1 CSP + 3 CSNPs.

Table A-6. Transit Times (Minutes)

Lighterage	1 Mile	2 Miles	3 Miles	4 Miles
1+1	15	30	90	150
2+1	18	35	105	175
3+1	20	40	120	200
LCU 1466	20	30	70	110
LCU 1600	20	28	58	88
LCU 2000	20	28	58	88
LARC-LX	15	25	65	105
LACV-30	3	5	13	21
LCM-8	6	12	40	67
LCAC	2	4	9	15

(4) Lighterage Maneuvering Times. Contained in Table A-7, these events include "Approach and Moor" (AM) and "Cast off and Clear" (CC). In the cases of lighterage arriving at the RTCH, LACH, and amphibian discharge sites, AM IS NOT an event because "transit" is continued to the container unloading location. For the RTCH and LACH sites, however, a short period of time is used to prepare for the offloading.

Table A-7. Lighterage Maneuvering Time at the Beach (Minutes)

	ELCAS		RTCH BEACH 1/		LACH BEACH 1/		AMPHIBIAN DISCH. SITE 1/	
Lighterage	A/M	C/C	A/M	C/C	A/M	C/C	A/M	C/C
1+1			3	17				
2+1			4	40				
3+1			5	40				
LCU 1466	4	4			5	7		
LCU 1600	4	3			5	7		
LCU 2000	4	3			5	7		
LARC-LX	4	4					1	1
LACV-30	4	4					1	2
LCM-8	4	4			1	2		

1/ At these sites, A/M times are to "Prepare for Offload."

4. Container Handling and Transportation Planning Factors. This section presents demonstrated planning factors that can be used under favorable weather conditions to estimate offload times in a LOTS operation.

a. T-ACS Container Handling Factors. Lighterage maneuvering times at the Auxiliary Crane Ship are shown in Table A-8. Container discharge times by T-ACS cranes to various lighterage are dependent on whether one or two crane booms are in operation at each lighterage loading station. Table A-9 shows expected discharge times.

Table A-8. Lighterage Maneuvering Times At T-ACS (Minutes)

Lighterage	Approach and Moor	Castoff and Clear
1+1	10	8
2+1	10	14
3+1	10	18
LCU 1466	6	5
LCU 1600/2000	9	5
LARC-LX	5	4
LACV-30	5	4

Table A-9. T-ACS Container Discharge Times (Minutes per Container Per Boom)

Lighterage	2-BOOM OPERATIONS 1/	1-BOOM OPERATIONS
1+1	16	12
2+1	16	12
3+1	16	12
LCU 1466	12	9
LCU 1600/2000	12	9
LARC-LX 2/	6	6
LACV-30 2/	5	4

1/ 2-boom operation times reflect 2 containers being discharged; i.e., for the 1+1 ferry, 2 containers will be discharged in 16 minutes.

2/ The short times allocated for the LARC-LX and LACV-30 consider that the boom is lifting a container out of the hold while these craft are in the castoff and clear/approach and moor modes, resulting in a discharge time that is less than the boom cycle time.

(1) Table A-10 shows a combination of lighterage, handling equipment, and beach vehicles or facilities that can be used in transporting containers.

Table A-10. Equipment Combinations for Transporting Containers

LIGHTERAGE TYPE	BEACH FACILITY HANDLING EQUIP	TRUCK TYPE	MARSHALING YARD HANDLING EQUIP
Causeway Ferry	ELCAS/crane or Beach/RTCH	40 foot or 20 foot	Unspecified Crane, RTCH, or other
LCH 1466, 1600 or 2000	same	same	same
LACV-30	Amphibian Beach/crane	same	same
LARC-LX	same	same	same
LCM-8	ELCAS/crane or Beach/RTCH	same	same

b. 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 180-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. Table A-11 presents the time required to transfer a container from lighterage to beach clearance vehicle (truck) at a lighterage berth.

LIGHTERAGE SITE	RTCH ELCAS	RTCH BEACH	LACH BEACH	AMPHIBIAN DISCHARGE
1+1	5	3		
2+1	5	3		
3+1	5	3		
LCU 1466	9			
LCU 1600	9		9	
LCU 2000	9		9	
LARC-LX	20			8
LACV-30	30			5
LCM-8			9	

(1) The container transfer time in a marshaling yard is shown in Table A-12. Trucks arriving in a marshaling yard are generally unloaded by RTCHs. The expected time to unload trucks (per container) is given below.

Table A-12. Container Transfer Rate in Marshaling Yard (Minutes per Container)

Truck Type	20 Foot	40 Foot
USMC 20 foot	3	N/A
Army 40 foot	2	3

c. ELCAS Container Discharge Rates. Table A-13 displays lighterage requirements to maintain various container discharge rates over a double pierhead ELCAS.

Table A-13. Container Discharge Rates at ELCAS

TYPE OF LIGHTERAGE	RATE (Containers per hour)	LIGHTERAGE REQUIREMENTS (Miles Offshore) 1	2	3
LCU (4 containers)	8	3	4	4
	12	4	5	5
	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

d. 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 marshaling yard. Table A-14 lists the expected times. If the transit distance is longer, additional time should be calculated at 10 miles per hour unless road and vehicle conditions are known to permit higher speeds or require lower speeds.

Table A-14. Transit Times at the Beach to Marshaling Yard

Truck Type	Transit Time (Minutes)
USMC, 20 foot	10
Army, 40 foot	14

5. Breakbulk Handling and Transportation Planning Factors. Limited information is available on breakbulk handling times. The data gathered are limited to lighterage offloading and truck loading at the beach. Table A-15 summarizes breakbulk lighterage offloading times. In general, breakbulk operations at the beach should not interfere with container operations.

Table A-15. Breakbulk Offload At Beach

Lighter	Avg Time per Pallet (Minutes)
LCU 1600	1.0
LCU 1466	1.0
LCM-8	1.2
LARC-LX	1.5

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 Table A-16.

Table A-16. Mean Loading and Unloading Times of RO/RO Cargo (Minutes per Vehicle)

	LOADING AT RRDF 1/		UNLOADING AT BEACH	
	Causeway Ferry	LCU	Causeway Ferry	LCU
Self-Sustaining	1.5	5.9	1.0	1.2
Non-Self-Sustaining	1.9	4.0	1.0	1.2

1/ RRDF rates were developed from tests with sea conditions varying from calm to 2-1/2-foot waves.

b. Vehicle Per Lighterage Trip. JLOTS test data have identified the number of vehicles carried aboard lighterage per lighterage trip as:

(1) Causeway Ferry--19.8 vehicles.

(2) LCU--3.9 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 Table A-17.

Table A-17. Daily RO/RO Throughput Planning Factors (24-Hour Period)

Lighterage	Vehicle Throughput 1/ 1 Mile	2 Miles	3 Miles
3 Causeway ferries	535	335	255
3 LCUs	220	210	200
3 Causeway ferries & 3 LCUs	670	500	410

1/ Distance from shore to RO/RO ship anchorage.

7. Barge Planning Factors

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

(1) Nonpropelled deck or liquid knockdown barge, capacity: 20 LT or 225 barrels.

(2) Nonpropelled deck cargo sectionalized barge, capacity: 180 LT.

(3) Nonpropelled deck cargo ocean towing barge, capacity: 585 LT.

(4) Nonpropelled deck or liquid barge, capacity: 578 LT.

(5) Nonpropelled refrigerator barge, capacity: 14,200 cubic feet.

b. ROWPU Water Production. The water delivery capacity of the ROWPU barge is rated at 300,000 gpd for fresh water and about 225,000 gpd for salt water.

8. Elevated Causeway. The ELCAS is composed of NL causeway sections jacked up on piles. A follow-on modular and cantilevered design, known as ELCAS (M) or CANTELCAS, is under development. CANTELCAS pontoons can be carried in container cells and connected together into the desired configuration at the operations area, thus eliminating the difficulty of transporting assembled causeway sections. The most efficient transport of this system will be on craneships (T-ACS) or non-self-sustaining containerships (NSSCs).

9. NCHF Discharge Rates. Various discharge rates achievable by the Navy Cargo Handling Force (NCHF) are in this section.

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

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

(a) All cargo is palletized.

(b) Some delays are encountered because of mechanical difficulties.

(c) Requirement exists to open hatches or shift hatch covers.

(d) Seven stevedores are available to support each hatch team.

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

(f) Where lighterage is involved, some delays will be encountered because of lighterage moves.

(g) The sea state is not greater than 2.

(h) Yard and stay rigs are used.

(2) Pierside Operation Factors

(a) One pallet is offloaded every 4 minutes per hatch team.

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

(c) Above means eight pallets are offloaded every 4 minutes (120 per hour).

(d) Two shifts, each working 12 hours, equal 24 hours.

(e) 24 x 120 = 2,880 pallets per battalion per day.

(3) In-Stream Operations Factors

(a) One pallet is offloaded every 6 minutes per hatch team.

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

(c) Above means eight pallets are offloaded every 6 minutes (80 per hour).

(d) Two shifts, each shift working 12 hours, equal 24 hours.

(e) 24 x 80 = 1,920 pallets per battalion per day.

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

(1) Assumptions. The following assumptions were used to derive these rates:

(a) Cranes are available to work four hatches simultaneously per ship.

(b) Containers will occasionally require respotting on truck or lighterage.

(c) Some delays are encountered because of mechanical difficulties.

(d) Time will be required to unlash or move containers within cells.

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

(f) Five stevedores are available to support each hatch team.

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

(h) The sea state is not greater than 2.

(2) Pierside Operations Factors

(a) Four containers are offloaded per hour per crane.

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

(c) Above means 32 containers are offloaded per hour.

(d) Two shifts, each working 12 hours, equal 24 hours.

(e) 24 x 32 = 576 containers per battalion per day.

(3) In Stream Operations Factors

(a) Three containers are offloaded each hour per crane.

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

(c) Above means 24 containers are offloaded per hour.

(d) Two shifts, each working 12 hours, equal 24 hours.

(e) 24 x 24 = 576 containers per battalion per day.

10. Army Discharge Rates. Appendix M 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 Table 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 table. 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. Table 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 table 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 Table B-1.

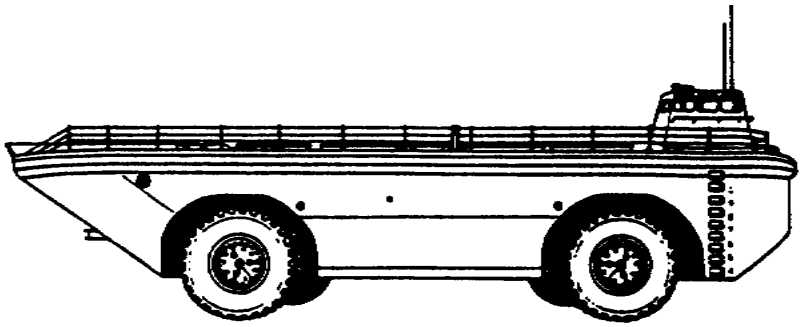
d. Within the LCU-1610 class, LCUs 1627 and 1646 have been considered separate classes at various times. The ArmyApril 8, 1992April 8, 1992 refers to this class as the 1600-class.

e. Various lighterage classes are shown in Table B-1. The LCAC is shown in Figure B-2, and the LCU 2000 is shown in Figure B-3.

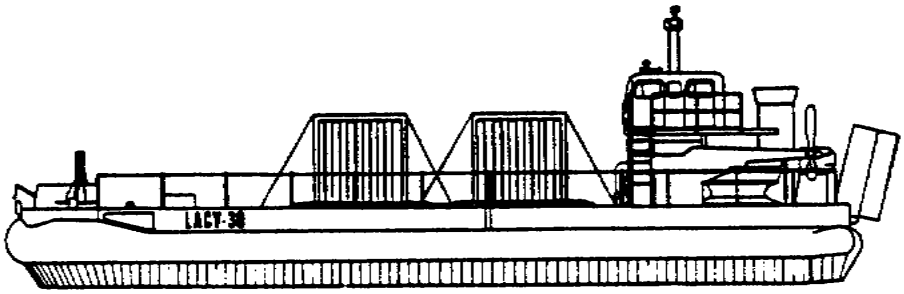
Table B-1. Representative Lighterage Characteristics

Class	Capacity (tons)	Crew	Length	Beam	Draft (Full Load)	Speed	Troops	Cargo Area L x Max W (x Min W)	Light Displacement (tons)	Ramp (Width)
LCU 1466	168.0	14	115'0"	34'0"	3' fwd 4' aft	8 kts lt 6.5 kts full	300	52'x 29'6"	201.6	14'4"
LCU 1610	160.0	12	135'3"	29'0"	3'2" fwd 6'5" aft	12 kts lt 11 kts full	350 375	121'x 25' (x 14')	191.5	Bow 14' Stern 18'
LCU 2000	350.0	12	175'0"	42'0"	4'0" fwd 9'0" aft	12 kts lt 10 kts full	375	---	550.0	---
LCM-8 (Steel)	65.0	5	73'7"	21'0"	3'10" fwd 5'2" aft	12 kts full 9 kts full	150	42'9"x 14'6"	67	14'6"
LCM-8 (Alum.)	65.0	5	74'3"	21'0"	3' fwd 4'8" aft	12 kts full	200	42'9"x 14'6"	37.8	14'6"
CSNP	90.0	N/A	92'0"	21'0"	4'	N/A	N/A	92'x 21'	70	N/A
CSP	35.0	6	85'0"	21'0"	40"	7 kts lt	N/A	60'x 21'	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'x 10'	10.5	N/A
LARC-LX	60.0[1/]	8	61'1"	26'7"	8'2" fwd 8'8" aft	6.5 kts lt 5.6 kts full	125 200	37'x 13'8"	56	14'6"
LACV-30	30.0	6	79'5"	36'11"	0	50 kts lt 30 kts full	N/A	51'6"x 32'6"	27.2	N/A
LCAC	60.0[1/]	5	87'11"	47'0"	0-3'	40 kts full	24	71'x 27'	99	Bow 27' Stern 15'

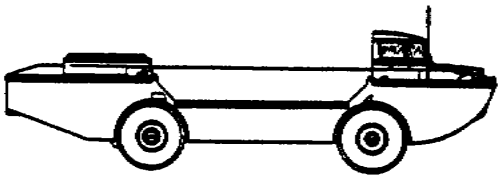
1/ Overload condition is 75 tons.



Lighter, Amphibious Resupply, Cargo - 60 tons (LARC-LX)



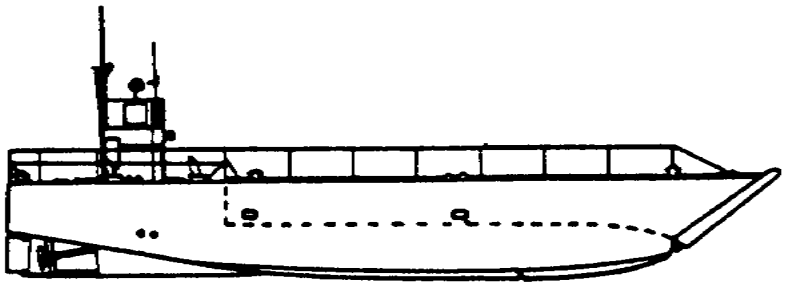
Lighter Air Cushion Vehicle - 30 ton (LACV-30)



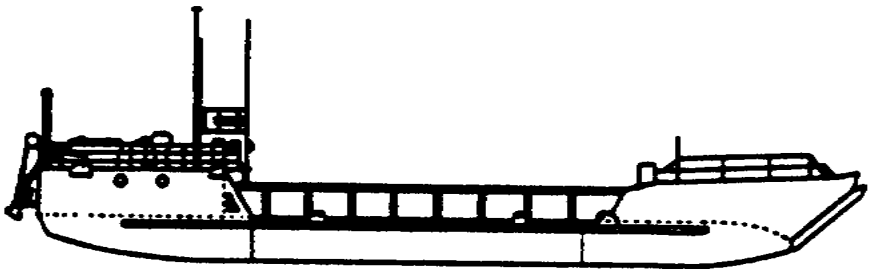
Lighter, Amphibious Resupply, Cargo (LARC-V)

Figure B-1. Lighterage

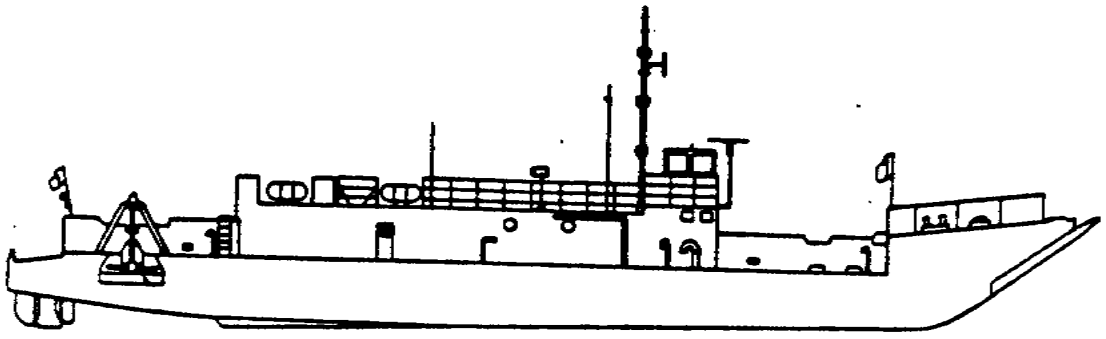
Figure B-1. Lighterage.



Landing Craft, Mechanized (LCM-8)



Landing Craft, Utility (LCU-1466 Class)



Landing Craft, Utility (LCU-1600 Class)

Figure B-1 (Cont'd)

Figure B-1 (Cont'd).

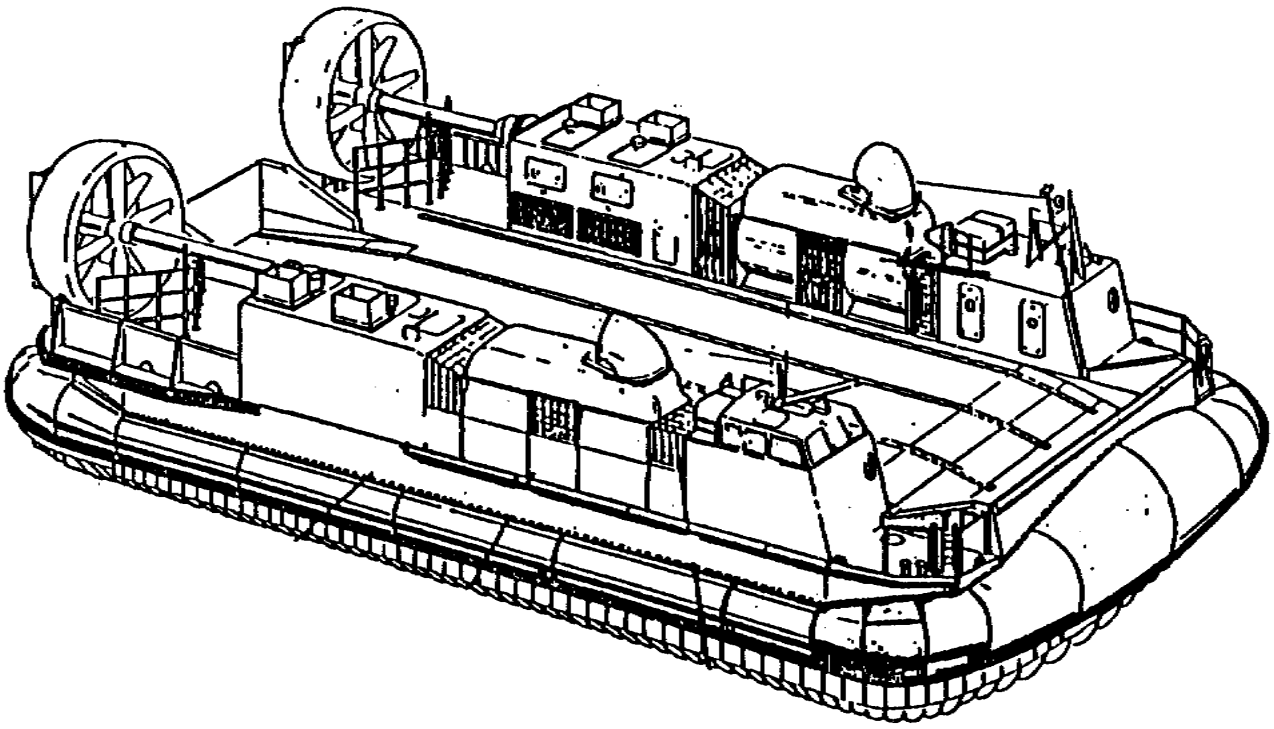


Figure B-2. LCAC

Figure B-2. LCAC.

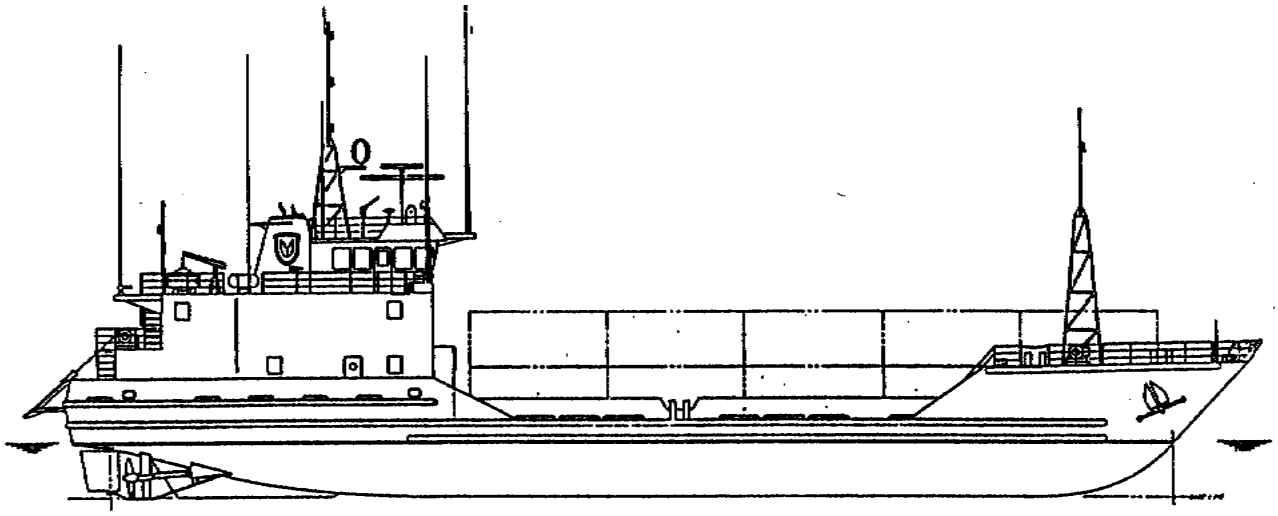


Figure B-3. Landing Craft, Utility (LCU 2000-Class)

Figure B-3. Landing Craft, Utility (LCU 2000-Class).

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 Table C-1. OPDS tanker configurations are shown in Figures C-1 and 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 TEU containers. Ships currently in the Ready Reserve Force (RRF) are included in Table 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 tiedown. 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.

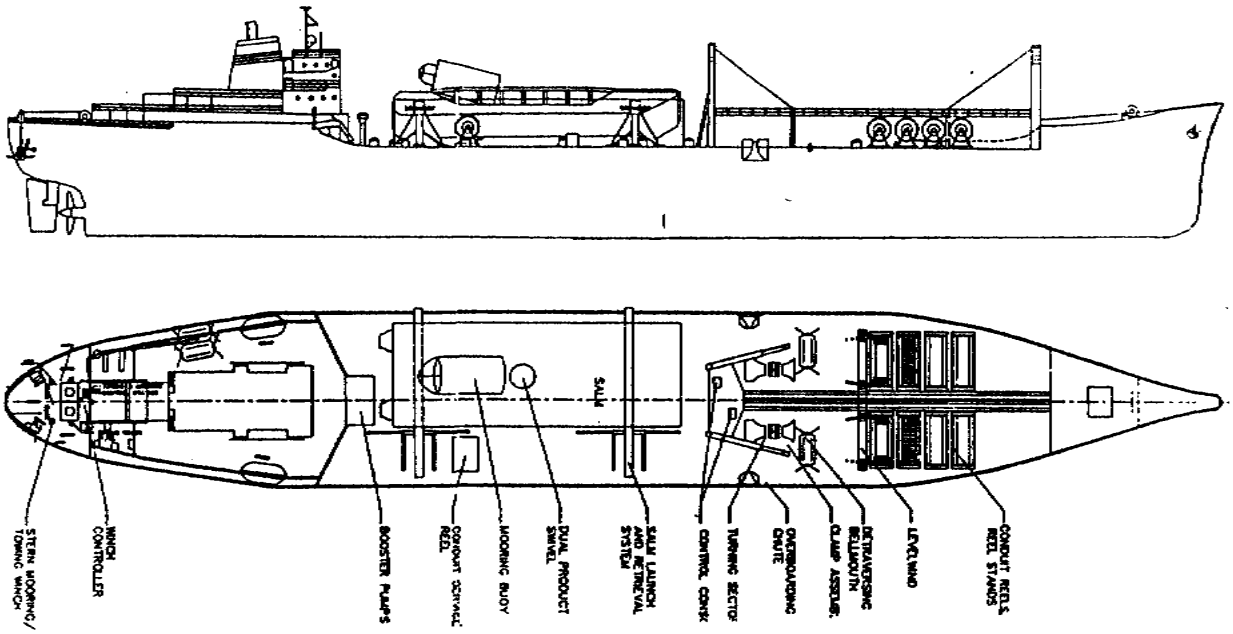
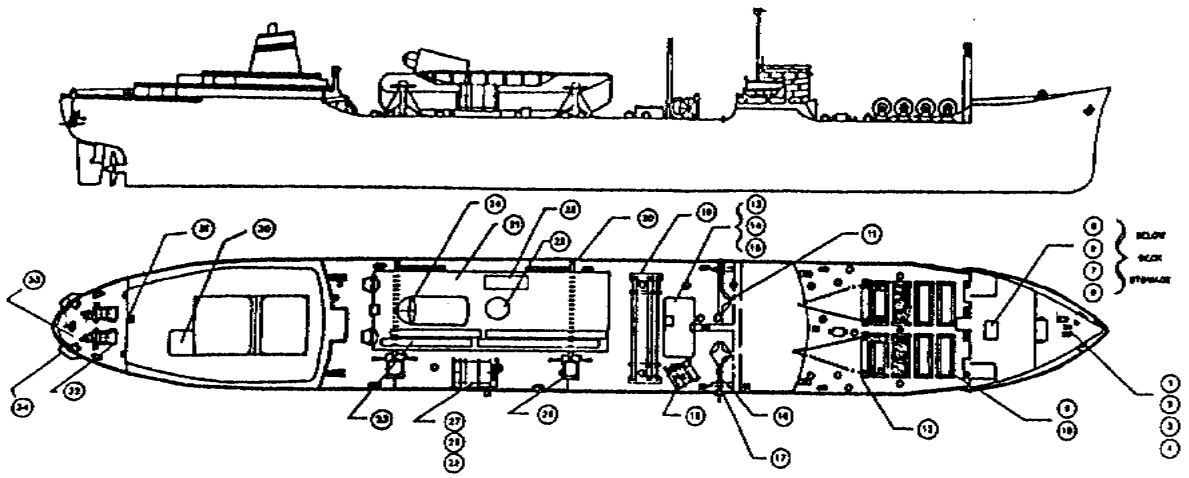


Figure C-1. OPDS Layout Onboard SS POTOMAC (OPDS 1)

Figure C-1. OPDS Layout Onboard SS POTOMAC (OPDS 1).



SUBSYSTEM COMPONENTS

1. SPM MOORING BRACKET
2. MOORING HAWSER
3. INSTRUMENTED PIN
4. MOORING HAWSER TENSION READOUT
5. OPDS STORAGE HOLD
6. BTU
7. SLWT FITTINGS
8. CONDUIT REPAIR FITTINGS
9. CONDUIT REELS
10. CONDUIT
11. TURNING QUADRANT (P/S)
12. LEVELWIND (P/S)
13. OPDS DECKHOUSE.
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. SALM
22. DUAL PRODUCT SWIVEL
23. SUBMARINE HOSE
24. MAIN MOORING BUOY
25. AUXILLARY 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)
34. STERN ANCHOR (P/S)

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

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

Table C-1. Strategic Sealift Ship

Table C-1. Strategic Sealift Ship Characteristics

SHIP CLASS	TYPE	LENGTH OVERALL	BEAM	DRAFT FULL LD	DEADWEIGHT LONG TON	CAPACITY 1/ KSF	KCF	TEU	CARGO HANDLING &SPECIAL EQUIP	REMARKS
ALGOL T-AKR (FSS-Fast Sealift Ship)	RO/RO Contr	946'	106'	37'	26,927	217		44	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			70		
KEYSTONE STATE T-ACS 1-3 C6-S-lqd	Aux. crane ship; Contr	669'	76'	33'	17,502			90	3 twin boom cranes;30LT per boom;60LT per pair	3 ships in RRF;carry 6 causeways & 4 LCM-8's 2/
GOPHER STATE T-ACS-4-6 C6-S-73c	Aux. cane ship; Contr	610'	78'	32'	16,442			47	2 twin boom cranes;30LT per boom;60LT per pair	same as KEYSTONE ST.
DIAMOND STATE T-ACS-7-8 C6-S-lxb	Aux. crane ship; Contr	668'	76'	33'	19,867			98	Same as KEYSTONE ST.	2 ships in RRF; same as KEYSTONE ST.
PVT FRANKLIN PHILLIPS TAK (Maersk Conversn)	MPS	756'	90'	33'	18,209	122		332	3 twin tandem cargo cranes; helo dck;stbd slewing stern ramp; 3 pt mooring sys	5 ships in class

Table C-1 (Cont'd).

SHIP CLASS	TYPE	LENGTH OVERALL	BEAM	DRAFT FULL LD	DEADWEIGHT LONG TON	CAPACITY 1/ KSF	CAPACITY 1/ KCF	CAPACITY 1/ TEU	CARGO HANDLING SPECIAL EQUIP	REMARKS
PFC DWAYNE T WILLIAMS TAK (AMSEA const)	MPS	671'	106'	30'	30,000	152		522	5-40T pedestal cranes;helo dk; 4pt mooring sys	5 ships in class
PFC EUGENE A OBREGON TAK (Waterman conversn)	MPS	821'	106'	33'	23,653	152		540	Helo dk; 30T gantry; twin 50T&twin 35T cranes; 4pt mooring sys	3 ships in class
AMERICAN EAGLE	RORO	635'	92'	30'	20,399	1,853				MSC charter
GREEN WAVE	BBlk	505'	70'	27'	12,923	676				MSC charter
LYRA	RORO	634'	89'	28'	14,634	121				2 ships in class (US flag)
CAPE GIRARDEAU	BBlk Contr	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 (C8-5-82a)	SEABEE	876'	106'	39'	38,410	4/				3 in RRF

Table C-1 (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-81d)	LASH	893'	100'	38'	40,391	5/		2 in RRF
NODAWAY (T1-M-812)	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	OPDS	620'	84'	34'	27,467	6/	SALM; 4pt moor sys; needs 4 SLWTs to deploy	1 in RRF
AMERICAN EXPLORER	Product tanker	615'	80'	36'	22,526			1 in RRF
PATRIOT STATE	Troop/ Trng ship	547'	79'	29'	9,380			2 in RRF; 598 troop cap.
MAINE	Vehicle carrier	560'	68'	27'	12,115	793	2 cranes; 92LT cap.	2 in RRF
CAPE DECISION	RORO	680'	97'	33'	23,800	166 1,796	Strn ramp	5 in RRF
CAPE EDMONT	RORO	635'	92'	30'	20,223	166	Strn ramp	1 in RRF
CAPE HENRY	RORO	750'	106'	35'	31,035	220	Strn ramp	3 in RRF

Table C-1 (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	RORO	694'	92'	29'	13,500	168	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		8 in RRF
GULF FARMER (C3-S-37d)	BBulk	495'	69'	32'	11,367	564		5 in RRF
AMBASSADOR (C3-S-46a)	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)	RORO	499'	78'	27'	9,949	86		1 in RRF
CALIFORNIA (C4-S-1u)	BBulk Contr	565'	76'	32'	14,349	748		4 in RRF

Table C-1 (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)	RORO	540'	83'	29'	12,326	99		1 in RRF
CAPE INSCRIPTION (C7-S-95a)	RORO Contr	685'	102'	32'	18,989	151		3 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.

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 Navy NWP-4, "Basic Operational Communications Doctrine," Army FM 24-1, "Combat Communications," and 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 COMSAT and NAVSAT, walkie-talkies (preferably with 3 to 4 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 (LCC), lighterage control point (LCP), maintenance elements, and Navy and USMC stations will use these nets. Control of the lighterage net would be vested in the Harbormaster or Beachmaster, 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 marshaling areas, maintenance elements, administrative areas, Army/Navy/USMC commands, higher headquarters, and the LCC.

c. In an electronic countermeasures (ECM) environment or 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 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 compatible 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 compatibility with the OPDS tanker. If OPDS communications equipment is not compatible, 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 a VHF transceiver as a minimum.

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, compatible 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 (COMSEC) materials.

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

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

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 semisubmersible 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 surfline from alongside the ELCAS, although this use of the ELCAS will detract from its normal cargo-transfer functions.

3. Camp Support. Army 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 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 maintenace 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.

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, RO/RO ship discharge facility, 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 RO/RO discharge facility, 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.

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. Continued cognizance of existing weather and surf conditions is imperative to the successful execution of a JLOTS operation.

2. Wind and Sea States. The Pierson-Moskowitz sea state scale, as shown in table G-1, provides a concise and sequential listing of both wind scale and sea states as well as the effects upon the environment. It should be used as the reference guide in determining wind and sea states.

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 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 offload of strategic sealift ships.

4. Weather Forecasting

   a. A meteorological team must be assigned throughout the duration of a JLOTS operation. This team will provide effective and timely on-the-scene weather forecasts to the JLOTS commander once every 4 hours or as he requires in the event of rapidly changing weather conditions. Advance hardcopy forecasts are available through the local Naval Oceanographic Center. Weather forecasts are also continuously provided on VHF radio (Channel 1).

   b. Conditions beyond the range of synoptic forecasts are estimated by the statistical method. Synoptic forecasts show such information as the strength and direction of prevailing winds, average temperatures, and average precipitation. Army units will primarily depend on Navy meteorological and oceanographic data.

Table G-1. 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

5. Surf. Surf can be predicted by using meteorological data to predict weather and by examining meteorological data in conjunction with the underwater topography. 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 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 RPM 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.

(1) Steep--more than 1:15.

(2) Moderate--1:15 to 1:30.

(3) Gentle--1:30 to 1:60.

(4) Mild--1:60 to 1:120.

(5) 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 (COMNAVSURFPAC)/Commander, Naval Surface Force, Atlantic (COMNAVSURFLANT) Instruction 3840.1, "Joint Surf Manual." The elements of the surf forecast or surf observation report are as follows:

(1) ALPHA--Significant Breaker Height. The mean value of the first and third highest breakers on the beach measured to the nearest half foot.

(2) BRAVO--Maximum Breaker Height. The highest breaker observed or forecast during the period measured to the nearest half foot.

(3) CHARLIE--Period. The time interval between breakers measured to the nearest half second.

(4) DELTA--Breaker Types. Plunging, spilling, or surging preceded by the numerical percentage of each as applicable.

(5) 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.

(6) FOXTROT--Lateral Current. The alongshore current, measured to the nearest 10th knot. Also given is the direction toward which a floating object is carried, RIGHT flank or LEFT flank.

(7) HOTEL--Additional Remarks. Forecast and other information important to landing operations (wind direction and velocity, visibility, debris in the surf zone, secondary wave system if present, dangerous conditions, etc.).

APPENDIX H

PERSONNEL MOVEMENT IN THE LOTS OPERATION AREA

1. Overview

a. The movement of personnel must be controlled within the beach area to ensure noninterference with offload discharge operations, the safety of transients, and security considerations. The offload coordinator or terminal commander will establish a plan addressing the movement of personnel within the immediate offload 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 area, and the movement of personnel involved in the LOTS operation.

2. Transient Troop Movement. Because of the large concentration of equipment in the offload area, the movement of transient personnel into and through the area must be minimized and closely controlled. The planning for and organization of the offload area should include a separate area, as feasible, within the offload area for the debarkation of personnel and units. The movement of personnel through the offload area will be under the control and coordination of the offload 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. The JLOTS commander, in planning for personnel movement, will allocate to the OCO or LCC dedicated lighterage and crews. Lighterage designated for personnel move-ment will be assigned by the OCO to the control of one designated Lighterage Control Officer (LCO) or ship lighterage control point (SLCP). 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 (if any) moving with the group, 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 his 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.

APPENDIX J

SECURITY OF OFFLOAD ANCHORAGE OR BEACH AREAS

1. Overview

a. The supported commander of a unified command is responsible for overall security in the JLOTS AOR. He 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 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. Chemical, biological, or radiological (CBR) 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:

(1) Active and passive surface patrol and interdiction operations.

(2) Active and passive antiswimmer 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 naval component commander. MIUWUs are surveillance and C3 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 C3 functions of an MIUW are analogous to an Army tactical operations center (TOC) or rear area operations center (RAOC) having UHF-, VHF-, and HF-covered and clear communications equipment.

(1) 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 MIUWs with reduced TOA can be constituted from organic USN 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.

(2) 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. 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 (SDV) 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, seal team support may be required.

(4) An MIUW TOA includes the AN/BPQ-108 Radar-Sonar-Surveillance Center (RSSC) 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/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 (LOFAR) capabilities and directional (DIFAR) capabilities from information provided by either moored or free-floating sonobuoys. The installed communications equipment is primarily compatible with fleet and USCG vessels, although the units do have AN/PRC-77 FM 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 POL cargoes.

(1) 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, liason officer, port safety detail, and engineering (deployed boat and light vehicle maintenance), weapons, electronics, communications, subsistent, medical and administrative support teams.

(2) The PSU's major equipment consistes of six trailerable patrol boats and parts. The commander receiving the PSUs will be responsible for providing strategic lift support forces. He or she 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:

(1) Security of strategic sealift forces during operations conducted in the AOR.

(2) Requests for additional security support from other unified and specified commands and national or international agencies through the Chairman, Joint Chiefs of Staff.

b. Officer in Tactical Command (if assigned). Responsibilities include:

(1) Security of the objective area to the high waterline.

(2) Coordination of security operations with supporting and adjacent commands and country team.

(3) Requests for additional security support or forces from higher authority.

c. Commander of the Supported Forces Ashore. Responsibilities include:

(1) Conducting active and passive security measures throughout all phases of operations ashore beyond the high waterline, as directed by higher authority.

(2) Requests for additional security support or forces from higher authority as required.

(3) 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 a system are clanking of metal to indicate a chemical, biological or radiological 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 motor pool 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 defense for which plans are developed are attack from naval warships, air strikes, ground attack, and CBR attack.

(1) 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.

(2) 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.

(3) 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.

(4) CBR Attack. CBR 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 CBR 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, the Korean War, and the Vietnam 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. NWP-80 contains additional information.

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 Commander, Military Sealift Command (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 USCG 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 USCG 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 (an MPS squadron commander and staff, an offload preparation party, etc.) may be aboard.

a. The Master. The master's inherent authority stems from his responsibility for the safety and navigation of his ship and the safety of all embarked personnel in carrying out his assigned tasks. This authority is defined by maritime law, applicable federal statutes, and US Navy regulations. In addition, the master's authority stems from his 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 operational control. 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:

(1) Safety of the ship, all persons on board, and the cargo.

(2) Navigation and operation of the ship.

(3) Maintenance of discipline among the civilian mariner crew.

(4) Providing the commanding officer or OIC of any embarked military unit with:

(a) Every reasonable facility and assistance required for the safety, well being, and efficiency of the embarked military detachment.

(b) 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. In the absence or disability of the master, the chief mate will assume responsibility and command authority of the 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. He is usually a nonwatchstander and in most cargo discharge operations, will be the principal interface point between the military offload 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 extending the work shift to support emergent discharge 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 Offload Units. The most common type of military offload unit is the offload preparation element. This unit will conduct the offload 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 absence, the JLOTS commander for resolution. The ship's master, however, is ultimately responsible for the overall safety of his 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 Navy Department has 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, 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 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:

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

b. Who will:

(1) Operate what equipment, such as ship hatches and cranes.

(2) Provide drivers for vehicles.

(3) Prepare vehicles for startup.
(4) Provide safety observers.

(5) Conduct maintenance.

(6) Provide cargo handling gear, such as cargo nets.

c. Functions that military personnel are 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).

f. Mooring and fendering systems.

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, over-sized 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 P-460, COMSCINST 5100.17 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. 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 judgement, 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 it responds correctly to appropriate commands.

f. Ensure 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.

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 and OPDS beach termination units. 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 on board ship in accordance with USCG 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, respon-sible 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 cigarettess, or any electrical apparatus that has 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:

(1) 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.

(2) 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:

(1) 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.

(2) Crew members and terminal service personnel should watch for projections and loose bandings of cargo, frayed wire, or cargo to be recoopered 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 ship 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 operation orders and plans.

(1) An NBG is a commissioned Navy organization consisting of a commander, his staff, and four Navy units--an amphibious construction battalion (PHIBCB), a beachmaster unit (BMU), and two assault craft units (ACUs). The mission of the NBG is to put landing force equipment and supplies ashore during and following an amphibious assault or an MPF offload. 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.

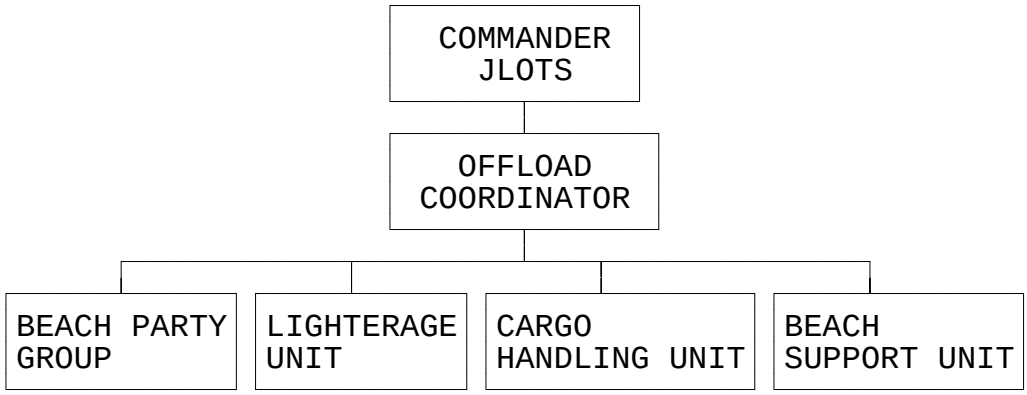


Figure M-1. The Naval Organization in JLOTS Operations

(2) Specific information follows:

(a) 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.

(b) Assignment. To JLOTS commander.

(c) 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.

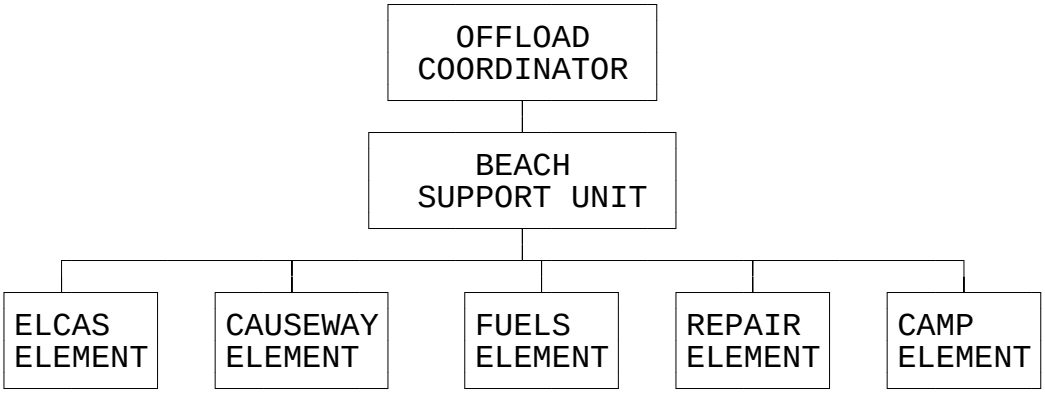


Figure M-2. Beach Support Unit

(1) Mission. To provide elements to support the operation.

(2) Assignment. To NBG.

(3) Capabilities

(a) Install and operate causeway piers, RRDF, and ELCAS.

(b) Support limited construction and camp support elements.

(c) Operate pontoon lighterage elements.

(d) Install bulk liquid systems.

(e) Provide salvage support.

(f) Provide security and beach defense.

(g) Provide lighterage repair function.

(4) Major Equipment. General construction equipment (cranes, bulldozers, front-end loaders, etc.); 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.

(1) Mission. To conduct beach party operations to facilitate landing and moving of cargo across the beach.

(2) Assignment. To NBG.

(3) Capabilities

(a) Control landing ships, lighterage, and amphibious vehicles in the vicinity of the beach from surf line to high watermark.

(b) Determine and advise of suitability for landing of amphibious vehicles, craft, ships, and beaching causeways.

(c) Control salvage of lighterage.

(d) Provide limited assistance in local security and beach defense.

(e) Install causeway and LST beaching range markers and lights.

(f) Maintain observation of wind and surf conditions.

(g) Coordinate surf transit portion of reembarkation of equipment, troops, and supplies.

(4) Major Equipment. Lighter, Amphibious Resupply, Cargo V (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. Specific information follows:

(1) 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.

(2) Assignment. To NBG.

(3) Capabilities

(a) LCU, LCM, and LCAC support for ship-to-shore movement.

(b) Maintenance and support elements for intermediate-level craft repair ashore.

(c) Administrative control of LCU, LCM, and LCAC lighterage.

(4) 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.

(1) 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 cargo handling battalion 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 cargo handling battalions.

(2) The following units have the capability of being assigned to the ABFC F1 functional mission.

(a) The Navy Cargo Handling and Port Group (NAVCHAPGRU).

(b) The Naval Reserve Cargo Handling Training Battalion (NRCHTB).

(c) Naval Reserve cargo handling battalions (NRCHBs).

(3) 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.

(4) The specific tasks of a CHB include, but are not limited to:

(a) 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.

(b) Heavy Lift Marine Crane Operators. Providing shipboard heavy lift crane operators for MPS, containership, Auxiliary Crane Ship (T-ACS) and other specialized operations.

(c) 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.

(d) 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.

(e) 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.

(f) Self-Supporting. Providing own services to sustain the administration, messing, berthing, limited construction, organizational level maintenance and repair requirements of the F1 ABFC unit.

(5) 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 (MT/D) discharge rate alongside the pier and a 1,920-MT/D discharge rate in stream. If the cargo handling battalion is not augmented, the discharge rates must be reduced by 50 percent (1,440 MT at pierside and 960 MT in stream).

(6) The required number of cargo handling battalion (ABFC F1) units is directly dependent on:

(a) Tonnage to be handled.

(b) Discharge scheduling and discharge rate desired.

(c) Number of vessels and aircraft to be discharged and loaded.

(d) Available pier and related facilities (pierside operations).

(e) Lighterage and related facilities (in stream operations).

(f) Available indigenous labor.

(g) Available unskilled labor augmentation.

(h) Available mechanized cargo handling equipment (may be attained by utilizing a supplemental equipment package or combination of packages (F1A through F1G)).

(7) 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 (NR CHF 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:

(a) 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 CESE Package. This package provides the civil engineering support equipment (CESE) (trucks, trailer, etc.) 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 (NAVSUP) materials handling equipment (forklifts, etc.) 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 cargo-handling battalion offload and load container ships and operate a container marshaling 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 civil engineer support equipment (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.

(8) 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:

(a) 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 MAC as part of the fly in echelon (FIE) of the naval support element (NSE) 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 Marine Expeditionary Brigade (MEB). Hatch boxes with cargo handling equipment are pre-positioned onboard each of the ships. Each MPS squadron requires two F1 CHB to

provide discharge of the cargo instream or pierside within the currently required timeframes. Each F1 CHB must be augmented with 112 USMC personnel if the discharge timeframes are to be met. Upon completion of the MPS offload, 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).

2. A total of 224 personnel from the supported USMC unit to augment the CHBs.

(b) Assault Follow-On Echelon Mission Support. Each F1 CHB is capable of discharging cargo to support one half of a MEB within the required timeframes when augmented by the F1A expanded core equipment package. The required multiples of the F1 CHB (two each CHBs for a MEB level AFOE and four each CHBs for a Maritime Expeditionary Force (MEF) level AFOE) plus the required quantities of the supplemental equipment packages (two each F1A packages for the MEB level AFOE mission and 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 USMC assault operations (MEB and 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. USMC personnel will augment the F1 CHB in the unskilled positions at the level of 224 augmentees for the MEB and 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 table of allowance 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:

1. MEB-level AFOE requires two F1 CHBs, two F1A expanded core equipment packages, and 224 personnel from the supported unit.

2. MEF-level AFOE requires four F1 CHBs, four F1A expanded core equipment packages, and 448 personnel from the supported unit.

(c) Port or Terminal Operation Augmentation of Establishment. The F1 CHB, when provided with the necessary supplemental equipment packages based on the specific environment and the required personnel, provides the unit equipment, skilled stevedores and C2 personnel to augment or establish a port operation with a basic palletized cargo discharge rate of 2,880 MT/D. Specific tasks of the CHB include, but are not limited to:

1. Cargo Handling. Providing stevedores and C2 personnel capable of offloading 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 MT/D. When all cargo handling operations are instream, the discharge rate will be 1,920 MT/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 MT 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 MT/D pierside and to 1,800 MT/D instream. The establishment of a limited air cargo terminal requires one FIE 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 instream.

5. Mobile Shore/Container Crane Operations. Providing 12 mobile shore crane operators to offload containers pierside or to operate a terminal marshaling 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 MT of cargo desired discharged daily instream:

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).

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).

(9) Assignment. To NBG.

(10) Capabilities

(a) Table M-1 provides CHB productivity factors.

Table M-1. 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
Instream Ship Discharge		
Palletized Cargo	10.0 MT	120 MT
Breakbulk Cargo	5.6 MT	70 MT
Mixed Cargo	7.8 MT	95 MT
Instream 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
One Way (Receive and Issue)	40 MT	480 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.

(b) Tables M-2 through M-5 are the CHB Utilization Tables. Note the following: First, 16 Hatch teams (HTs) 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).

Table M-2 Ship Discharge of Palletized Cargo 1/

	Pier Side	Instream	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.

Table M-3. Ship Loading of Palletized Cargo

	Pier Side	Instream	Pier Team	Ocean Terminal	Air Terminal
2 ship	1,680 (16 HT)	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.

Table M-4. Container Loading and Discharge Using T-ACS, MPS, Shore Cranes, etc. 1/

	Pier Side	Instream	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.

Table M-5. Personnel Assignments

Available = 145 (CHB) + 112 (Augmentees) = 257 (2 ships, 2shifts)		
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/ 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

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:

(1) Perform underwater SALM site surveys and pipeline installation route survey.

(2) Assist PHIBCBs in the installation and stabilization of the flexible submarine product pipeline for all joint units.

(3) Ballast SALM, connect product hoses, and set product valves.

(4) Disconnect product pipelines 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, etc.), a recompression chamber is required.

(5) De-ballast SALM, reset product valves underwater, and unfoul SALM before blowing voids, if necessary.

3. Army Units

a. US Army Transportation Terminal Group (TOE 55-112H and TOE 55-822L). Group organization is shown in Figure M-3. Specific information follows:

(1) Mission. To command units employed in the operation of water terminals and to perform staff planning for water terminal operations.

(2) Assignment. To a theater transportation command. The group is normally attached to a transportation terminal brigade.

(3) 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.

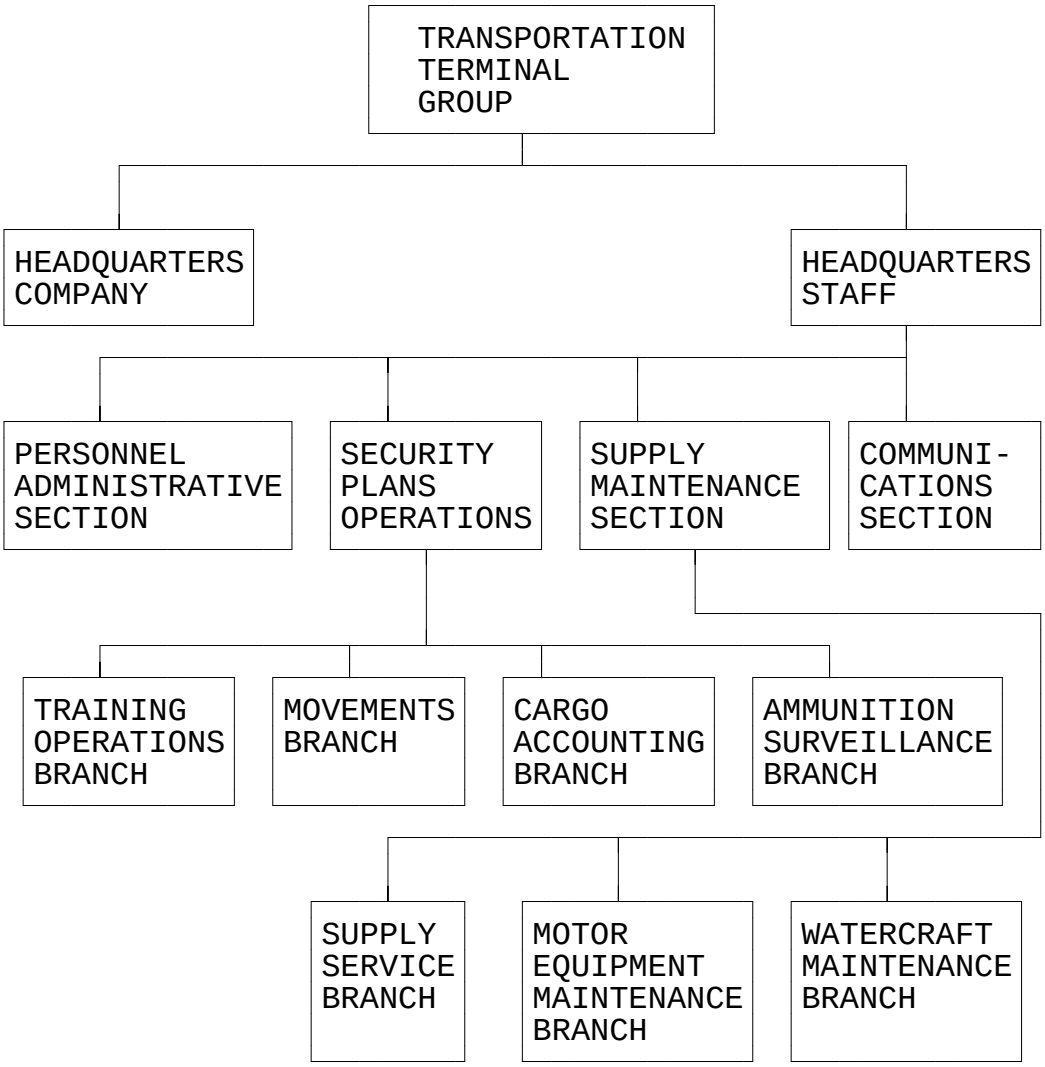


Figure M-3. Transportation Terminal Group

b. US Army Transportation Terminal Battalion (TOE 55-116H2 and TOE 55-816L). Specific information follows:

(1) Mission. To command units employed in the operation of water terminals.

(2) 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.

(3) 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 instream.

c. US Army Transportation Terminal Service Company (Breakbulk) (TOE 55-117H5 and TOE 55-818L). Company organization is shown in Figure M-4. Specific information follows:

(1) Mission. To discharge, backload, and transship breakbulk cargo at water terminals located at ports or beaches.

(2) Assignment. To a transportation command, normally attached to a transportation terminal battalion or may operate separately under an appropriate commander.

(3) Capabilities. For planning purposes, operating on a 24-hour basis, with 75 percent availability of equipment, the operational capabilities of the unit as indicated. At full strength, this unit:

(a) Is capable of discharging one breakbulk ship in a fixed port or over the beach at the daily rate of 1,000 ST of cargo per day or can backload 500 ST of cargo per day.

(b) Sorts cargo by destination and loads cargo from the marshaling yards on land transportation.

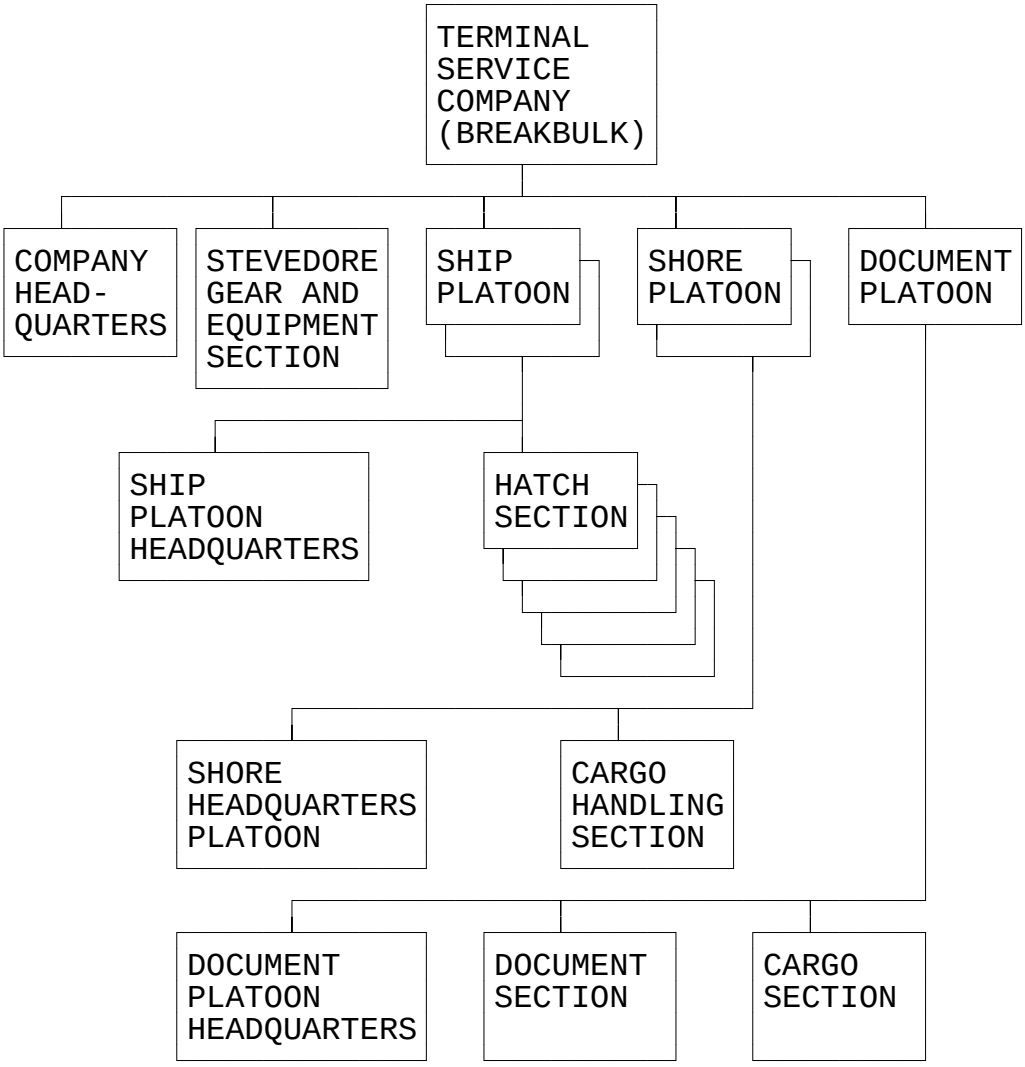


Figure M-4. Terminal Service Company (Breakbulk)

(c) Accounts for all cargo handled as required by MILSTAMP procedures and prepares necessary transportation documentation.

(d) Provides limited in-transit storage as required.

(4) Major Task Equipment

(a) Two full-track, low-speed tractors with bulldozers.

(b) Nine 10,000-lb rough terrain (RT) forklifts.

(c) Seven 4,000-lb electric forklifts.

(d) Seven 4,000-lb gas forklifts.

d. US Army Transportation Terminal Service Company (Container) (TOE 55-119J2). Company organization is shown in Figure M-5. Specific information follows:

(1) 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.

(2) 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).

(3) 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.

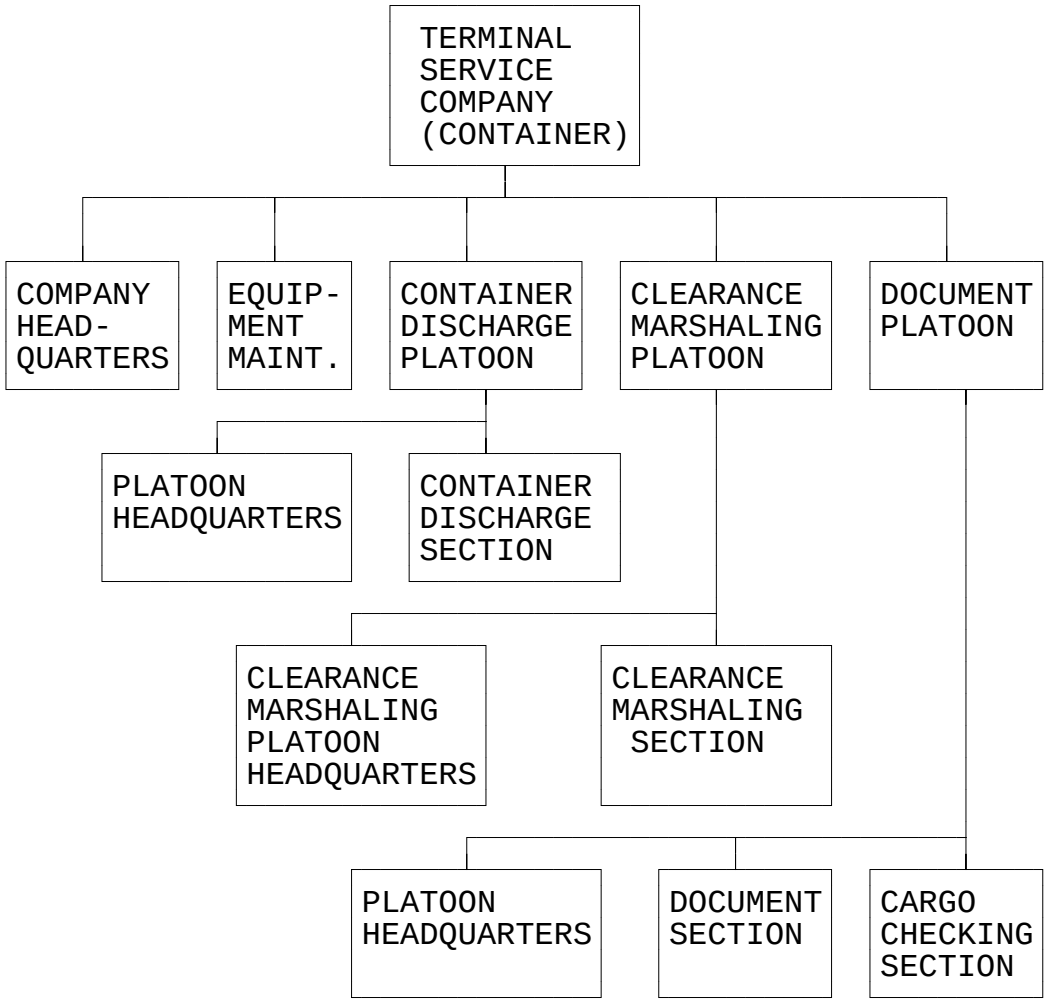


Figure M-5. Terminal Service Company (Container)

(a) In offshore discharge operations, this unit can discharge 300 containers or backload 300 containers or simultaneously discharge 150 containers and backload 150 containers.

(b) In a fixed-port operation, this unit can discharge 600 containers or backload 600 containers or simultaneously discharge 300 containers and backload 300 containers.

(c) This unit can sort containers by destination, load containers from the marshaling yards on land transportation, and perform limited stuffing and unstuffing of containers. This unit can receive and process containers for retrograde movement.

(d) This unit can account for all cargo handled as required by MILSTAMP procedures and prepare necessary transportation documentation.

(e) This unit can provide limited in-transit storage.

(f) 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.

(4) Major Task Equipment

(a) Two truck-mounted, 140-ton container handling cranes.

(b) Two truck-mounted 250- to 300-ton container handling cranes.

(c) Twenty-two commercial 34-ton flat-bed, semitrailer, breakbulk/container transporters.

(d) Ten DED 50,000-lb RTCH forklift trucks.

(e) Four DED 4,000-lb RT forklift trucks.

(f) 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-6. Specific information follows:

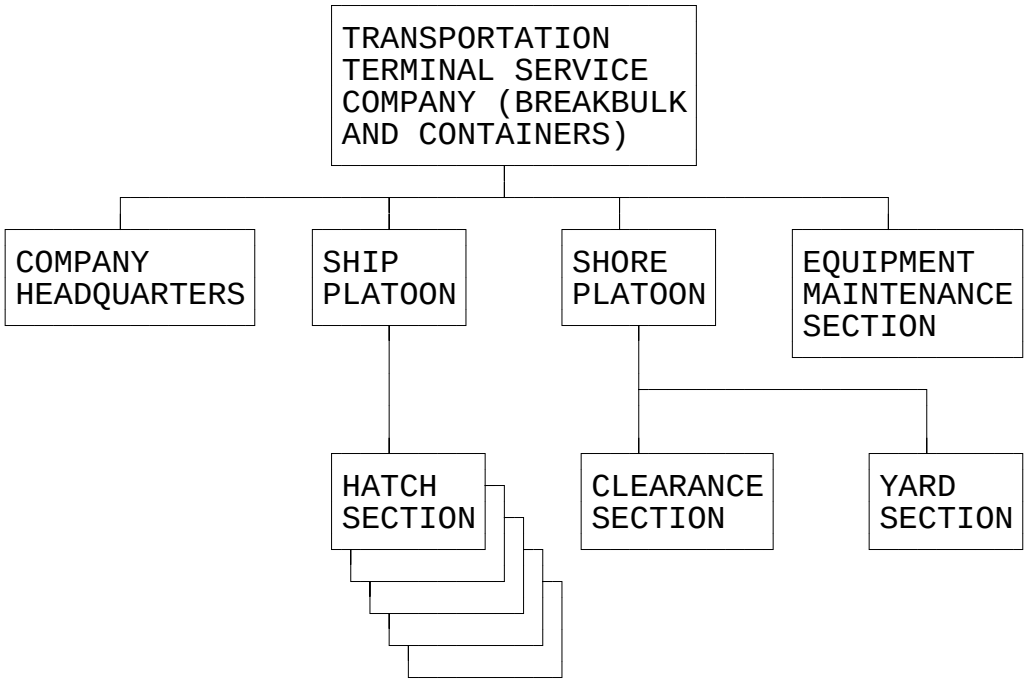


Figure M-6. Transportation Terminal Service Company (Breakbulk/Container)

(1) Mission. To discharge, backload, and transship breakbulk and containerized cargo at water terminals located at fixed ports or in LOTS operations.

(2) Assignment. To a theater transportation command or to a COSCOM when employed to support independent corps operations, normally attached to a transportation terminal battalion.

(3) Capabilities. Applies to units operating at level 1, on a two-shift basis, with 75 percent operational availability of all mission equipment:

(a) LOTS Operation

1. Discharge 200 containers or backload at the same rate or simultaneously discharge 100 containers and backload 100 containers when supported bc a heavy crane platoon (Team JJ, see subparagraph 3k(8)).

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 desoination, load breakbulk cargo and containers from the marshaling 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.

(b) 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 marshaling 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.

(4) Major Task Equipment

(a) Ten 4,000-lb diesel forklift trucks.

(b) Ten 4,000-lb electric forklift trucks.

(c) Two 5-ton dump trucks.

(d) Eighteen 5-ton tractor yard trucks.

(e) Twenty-two 34-ton semitrailers.

(f) Two 140-ton truck-mounted cranes.

(g) Ten RTCH 50,000-lb forklift trucks.

(h) Eight RT 10,000-lb forklift trucks.

(i) Ten RT 4,000-lb forklift trucks.

(j) Two bulldozers.

f. US Army Transportation Terminal Transfer Company (TOE 55-118H7 and TOE 55-817L). Unit organization is shown in Figure M-7. Specific information follows:

(1) Mission. To transship cargo at air, rail, motor, and inland barge terminals.

(2) 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.

(3) Capabilities

(a) 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.

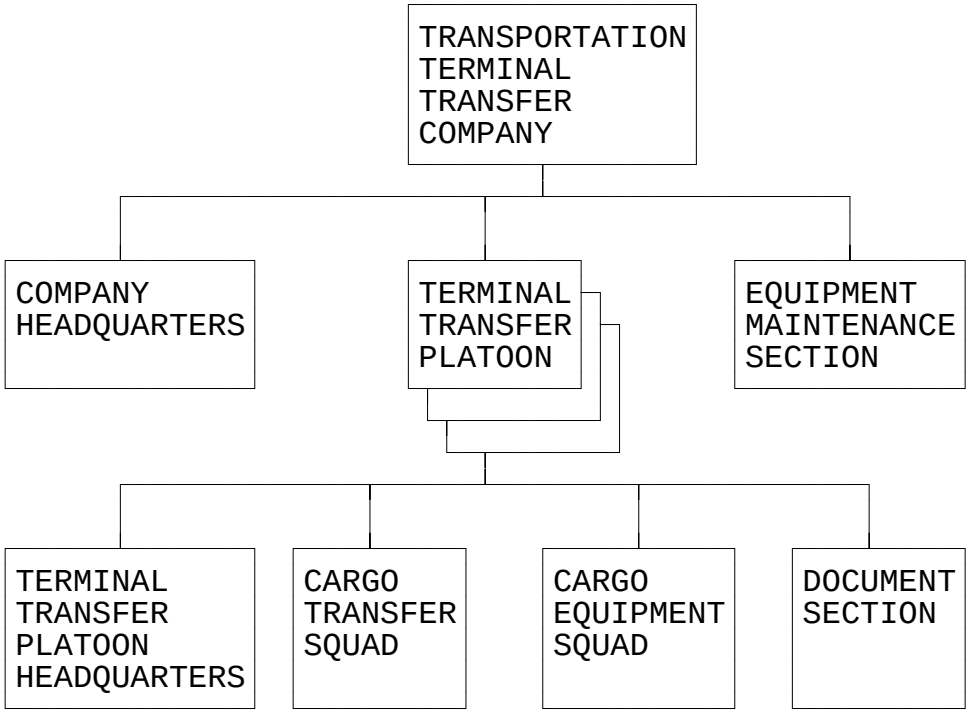


Figure M-7. Transportation Terminal Transfer Company

(b) 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.

(c) Under both variations, this unit is capable of redocumenting transshipped cargo or containers as required.

(d) This unit is capable of stuffing or unstuffing containers on a limited basis.

(4) Major Task Equipment

(a) Three 140-ton truck-mounted container handling cranes.

(b) Twelve 22-1/2-ton flatbed breakbulk/container transporter semitrailers.

(c) Six DED 50,000-lb RTCH forklift trucks.

(d) Nine DSL RT 10,000-lb forklift trucks.

(e) Six DSL RT 4,000-lb forklift trucks.

(f) Nine 2-1/2-ton dropside cargo trucks.

(g) Two 5-ton dropside cargo trucks.

(h) Six 5-ton tractor trucks.

(i) Two 10-ton tractor trucks.

g. US Army Transportation Medium Boat Company (TOE 55-128H5). Company organization is shown in Figure M-8. Specific information follows:

(1) 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.

(2) 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).

(3) Capabilities. For planning purposes, operating on a 24-hour basis, with a 75-percent availability of equipment, operational capabilities of the unit as indicated. At full strength, this unit is capable of:

(a) Transporting an average of 1,000 ST of noncontainerized cargo with 12 landing craft, each carrying an average of 42 ST twice daily.

(b) Transporting 240 TEU containers per day with 12 landing craft, each carrying 1 container and making 20 trips daily.

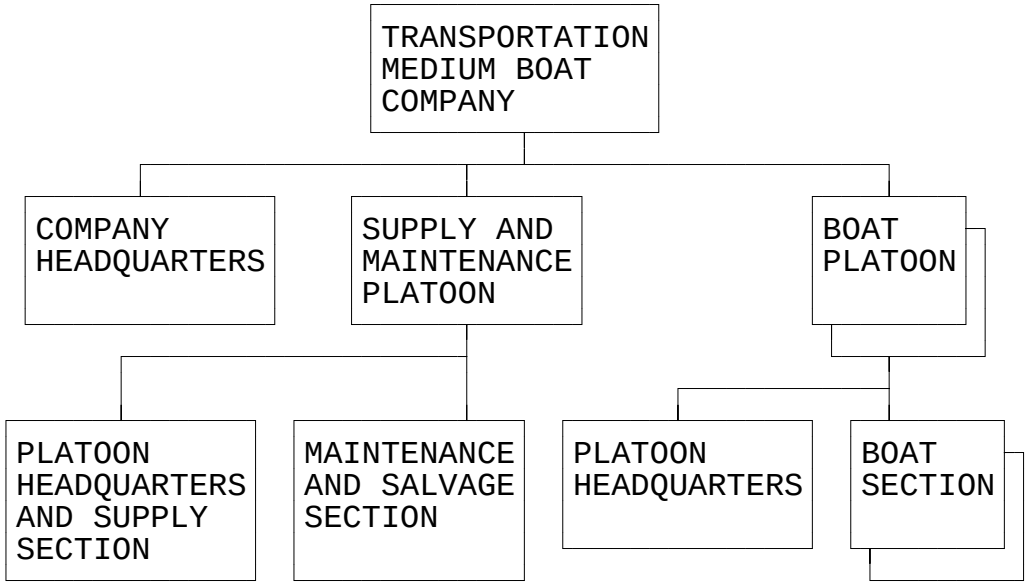


Figure M-8. Transportation Medium Boat Company

(c) Transporting 960 ST of non-containerized cargo or transporting 3,200 combat-equipped troops, based on 16 landing craft in a one-time lift.

(4) Major Task Equipment: Nineteen LCM-8, Landing Craft, Mechanized.

h. US Army Transportation Heavy Boat Company (TOE 55-129H5 and TOE 55-829L). Company organization is shown in Figure M-9. Specific information follows:

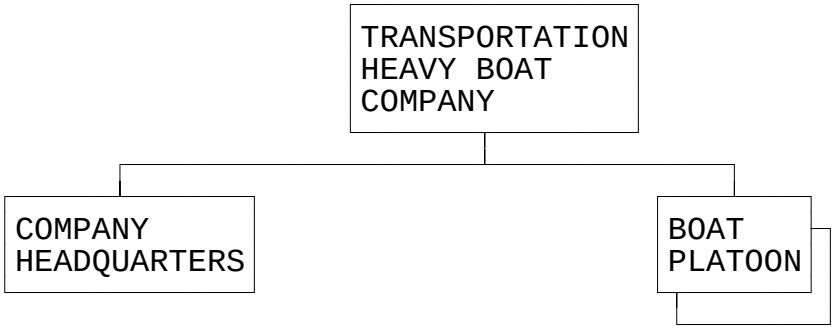


Figure M-9. Transportation Heavy Boat Company

(1) Mission. To provide and operate landing craft for transporting personnel, containers, and outsized cargo in offshore discharge operations and for augmenting lighterage service.

(2) 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.

(3) Capabilities. At full strength, operating on a 24-hour basis, this unit:

(a) Transports an average of 1,500 ST of noncontainerized cargo, 4,000 troops with individual equipment, 540 ST of vehicles, or 1,5c0 ST of medium tanks. These figures are based on an availability of 10 landing craft, each making one trip daily.

(b) Transports an average of 160 TEU containers based on an availability of 10 landing craft, each making four trips daily.

(c) Transports, in a one-time maximum lift, 1,800 ST of noncontainerized cargo or 4,800 troops with 12 oraft, 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.)

(4) Major Task Equipment

(a) One picket boat, 36 to 47 feet long.

(b) Twelve LCUs.

i. US Army Transportation Medium Lighter Company (ACV) (TOE 55-137H0 and TOE 55-837L). Company organization is shown in Figure M-10. Specific information follows:

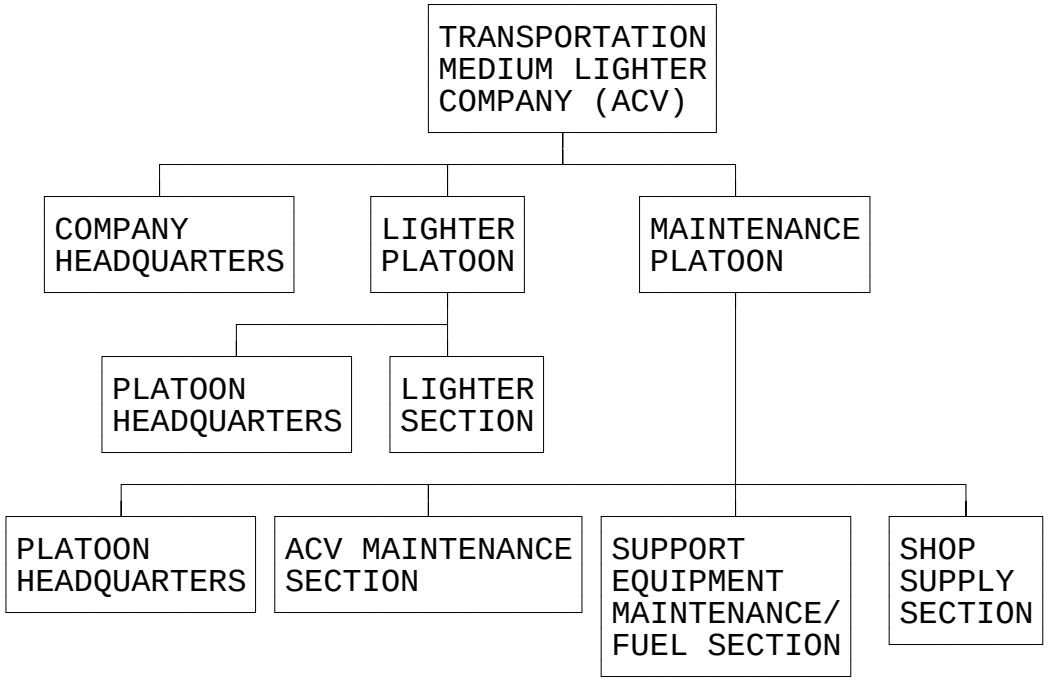


Figure M-10. Transportation Medium Lighter Company (Air Cushion Vehicle)

(1) Mission. To provide lighterage for the movement of general cargo and light-wheeled vehicles between ships at anchorage and inland transfer and segregation areas in JLOTS operations or amphibious operations.

(2) Assignment. To a transportation command. The company is normally attached to a transportation terminal battalion or may operate separately under the supervision of an appropriate headquarters.

(3) Capabilities. Daily average transport of 300 containers or 3,900 ST of unitized cargo, operating around the clock and with 67 percent of the equipment operational. The company can operate inland over hastily prepared trails and barriers that are impassible to most cargo vehicles and materials handling equipment.

(4) Major Task Equipment. Twelve LACV-30s.

j. 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. Specific information follows:

(1) Team A, Deck Cargo Barge, Nonpropelled

(a) Mission. To transport cargo other than bulk liquid.

(b) Assignment. To a watercraft unit organized under TOE 55-500 or to a transportation terminal headquarters.

(c) Capabilities. Transporting 579 tons of deck cargo when under tow.

(2) Team B, Picket Boat, 46 Foot

(a) Mission. To provide water transportation for patrol, command, inspection, and general utility services in support of terminal or inland water operations.

(b) Assignment. Same as subparagraph 3j(1)(b) above.

(c) Capabilities. Can carry up to 10 passengers at average speed of 14 knots.

(3) Team C, Deck or Liquid Cargo Barge, 120-Foot, Nonpropelled

(a) Mission. To transport deck-loaded dry cargo or bulk liquid cargo.

(b) Assignment. Same as subparagraph 3j(1)(b) above.

(c) Capabilities. Transporting up to 4,160 barrels of liquid cargo or up to 587 ST of dry cargo when under tow.

(4) Team E, Barge Crane, 100-Ton

(a) Mission. To load and discharge heavy-lift cargo that is beyond the capability of ship’s gear.

(b) Assignment. Same as subparagraph 3j(1)(b) above.

(c) Capabilities. Making individual lifts up to 100 ST.

(5) Team H, Amphibious Lighter, LARC-LX

(a) Mission. To provide amphibious lighterage service primarily for items of heavy, outsized, or bulky equipment.

(b) Assignment. Same as subparagraph 3j(1)(b) above.

(c) 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.

(6) Team I, Inland Waterway and Coastal, Large Tug, 143-Foot

(a) Mission. To dock deep-draft ocean going vessels, provide firefighting services, and make tows of barges and vessels.

(b) Assignment. Same as subparagraph 3j(1)(b) above.

(c) Capabilities. Makes inland and coastal tows.

(7) Team J, Logistics Support Vessel (LSV)

(a) 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).

(b) Assignment. Same as subparagraph 3j(1)(b).

(c) Capabilities. Transports 1,500 to 2,000 ST of cargo consisting of vehicles, containers and general cargo; has a RO/RO capability.

(8) Team K, Floating Causeway

(a) Mission. To provide a temporary beach site discharge facility for military lighterage.

(b) Assignment. To a transportation terminal service battalion or to a transportation terminal service company (TOE 55827L000).

(c) Capability. Assembling, maneuvering, and securing the floating causeway to 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.

(d) Basis of Allocation. As required.

(9) Team M, RO/RO Discharge Platform.

(a) Mission. To provide the interface between RO/RO ships and Army lighterage for rapid discharge of cargo.

(b) Assignment. The team is assigned to a transportation terminal service battalion or to a transportation terminal service company (TOE 55827L000).

(c) 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 offloaded from it onto lighterage at a daily rate of 200 vehicles/20-hour day in sea state zero. The system will be capable of operation in sea state 1 at a rate of 150 vehicles/20-hour day.

(d) Basis of Allocation. As required.

(10) Team N, Causeway Ferry

(a) Mission. To move rolling stock cargo and containers from ship to shore.

(b) Assignment. The team is assigned to a transportation terminal service battalion or to a transportation terminal service company (TOE 55827L000).

(c) Capabilities. To provide a LOTS interface between RO/RO and container vessels instream and the shore, or engineered extension of the shore, for transfer of cargo. It will work between the RO/RO discharge platform, offloading RO/RO ships, or the auxiliary crane ship (T-ACS) offloading containerships, and the beach for transfer of the cargo directly ashore, to the floating causeway, or to the elevated causeway as appropriate.

(d) Basis of Allocation. As required.

k. US Army Transportation Terminal Service Teams (TOE 55-56052). Specific information follows:

(1) Team JB, Cargo Documentation

(a) Capabilities. Performs documentation required in the loading and discharging of 500 ST of general cargo or 480 containers daily in a water terminal,
c railhead, truckhead, or airhead.

(b) Basis of Allocation. One per 500 ST of general cargo or 480 containers to be documented daily.

(2) Team JD, Transportation Contract Supervision

(a) Capabilities. Arranges for the loading or discharging of cargo from ships or barges and the clearance of discharged cargo from the terminal by contract ando 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.

(b) Basis of Allocation. One or more per transportation terminal brigade or group or area command, as required.

(3) Team JE, Cargo Hatch Gang

(a) Capabilities. Provides personnel and equipment to handle 100 ST of cargo daily on a one-shift basis in a water terminal.

(b) Basis of Allocation. As required.

(4) Team JF, Container Handling, Ship

(a) 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.

(b) Basis of Allocation. As required.

(5) Team JG, Container Handling, Shore

(a) 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 marshaling area and to operate

the container marshaling area on a 1-shift basis.

(b) Basis of Allocation. As required.

(6) Team JH, Breakbulk Augmentation (Container)

(a) 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).

(b) Basis of Allocation. As required.

(c) Major Task Equipment.

1. Four 20-ton wheel-mounted cranes.
2. Five RT DSL 10,000-lb forklift trucks.

3. Three electric commercial 4,000-lb forklift trucks

(7) Team JI, Automated Cargo Accounting Detachment

(a) Capabilities. Capable of documenting by DASPS-E 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.

(b) Basis of Allocation. As required.

(8) Team JJ, Heavy Crane Platoon

(a) 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.

3. Organizational maintenance on organic equipment, less communication and electronic equipment, and direct support maintenance on container handling equipment.

(b) Basis of Allocation. As required.

(c) Major Task Equipment

1. Two 140-ton container-handling truck-mounted cranes.

2. Two 250- to 300-ton container-handling truck-mounted cranes.

l. Engineer Combat Battalion, Heavy (TOE 5-415L). Specific information follows:

(1) 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.

(2) Assignment. To engineer brigade, corps, airborne corps, joint or combined task force.

(3) Capabilities

(a) 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.

(b) Provides limited reconstruction of railroads, railroad bridges, electrical systems, and sewage and water facilities.

(c) 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.

(d) Conducts engineer reconnaissance.

(e) Creates obstacles to degrade enemy mobility.

(f) Clears obstacles as part of area clearance operations (not as part of assault beaching operations).

(g) Prepares demolition targets.

(h) When required, performs infantry combat operations limited by organic weapons and equipment.

(i) Provides the capability to supervise contract construction, skilled construction labor, and unskilled indigenous personnel.

(j) Conducts area damage clearance and restoration operations.

(4) 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.

m. Engineer Port Construction Company (TOE 5-603L). Specific information follows:

(1) Mission. To provide specialized engineer support in developing, rehabilitating, and maintaining port facilities, including TPT and JLOTS operations.

(2) Assignment. Normally assigned to the engineer command for further attachment to an engineer brigade or engineer group.

(3) Capabilities. At full strength, this unit:

(a) Constructs, rehabilitates, and maintains offshore facilities, including mooring systems, jetties, breakwaters, and other structures required to provide safe anchorage for ocean-going vessels.

(b) Constructs, rehabilitates, and maintains piers, wharves, ramps, and related structures required for cargo loading and offloading. This unit constructs facilities for RO/RO, breakbulk, and containerized cargo handling.

(c) Installs and maintains tanker discharge facilities, including bulk petroleum jetties and submarine pipelines.

(d) Provides limited dredging and removal of underwater obstructions.

(e) Provides operators for two-shift operation of selected items of equipment.

n. Engineer Pipeline Construction Support Company (TOE 5-177). Specific information follows:

(1) 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.

(2) 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.

o. Control and Support Detachment (TOE 5-530LA). Specific information follows:

(1) Mission. To provide TA with control of and support to all TA diving assets.

(2) Capabilities. Provides responsive liason 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.

(3) Basis of Allocation. Normally, one per theater in control and support of from one to six lightweight teams.

p. Lightweight Diving Team (TOE 5-530LC). Specific information follows:

(1) Mission. To provide underwater construction, light salvage, repair, and maintenance to TA missions.

(2) 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.

(3) Basis of Allocation. Assigned to the C&S Detachment at EAC and further attached to

organizations that require habitual diving support. Those organizations have been identified as the Transportation Floating Craft (GS) Maintenance Company, the Engineer Port Construction Company, and the Quartermaster Pipeline Company assigned to major submarine pipelines.

q. Quartermaster Petroleum and Water Units

(1) Petroleum Group. The Petroleum Group (TOE 10-202, 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.

(a) The Petroleum 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 liason 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.

(b) A Petroleum 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/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 (TAMMC).

6. Implements host-nation support operational procedures as directed by the TAACOM and provides liason 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.

(2) 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 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 command and control 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.

(3) 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. The company 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 area of operations. 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.

(4) Quartermaster (QM) Water Purification Team (Barge Mounted) (TOE 10-570LA). The QM Barge-Mounted ROWPU Team is normally assigned to a water supply company (TOE 10-468L) or HHD, water supply battalion (TOE 10-416L) and may also be attached to a corps support command or other service, as required. Water purification team (barge mounted) has the mission to produce bulk quantities of potable water from any water

source and to distribute the water to the water supply company. This unit, which is composed of two teams, is capable of operating the barge-mounted ROWPU on a two-shift basis to produce 225,000 gallons of water per day from a salt water source and 300,000 gallons per day from a fresh water source. It provides the means for rapid development of a large-scale, onshore, potable water storage and distribution system.

(5) Quartermaster (QM) 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 (TWDS) as well as store 1.6 million gallons of water in collapsible tanks. When required, the company can operate eight direct support (DS) water issue points. The company can also run a TWDS system up to 80 miles when augmented with an appropriate number of TWDS teams.

r. Transportation Floating Craft General Support Maintenance Company (TOE 55-157). The capability of this Army company to provide general support (GS) and maintenance are as follows:

(1) The mission of the marine maintenance company is to provide maintenance support for US Army marine craft and their organic navigational equipment.

(2) The maintenance company is normally assigned to a transportation command or terminal group, although it may be attached to a transportation terminal battalion.

(3) 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.

(4) The unit receives, stores, and issues approximately 9,000 line items of marine-peculiar repair parts and items and performs marine salvage operations.

(5) The unit is authorized 230 personnel and approximately 533,600 lbs (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 lbs (136,000 cubic feet) of equipment and supplies. All equipment is transportable by air, except:

(a) Deck cargo barge.

(b) 20-ton wheeled crane.

(c) 100 psi recompression chamber.

(d) Mechanized landing craft.

(e) Utility landing craft.

(f) Nonpropelled (towed) marine floating repair shop.

(6) 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.

(7) 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.

(8) 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.

(9) 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 (LFSP). 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 Marine Air-Ground Task Force (MAGTF) commander to support or assist in LOTS operations. The landing support battalion of the FSSG (see Figure M-11) 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.

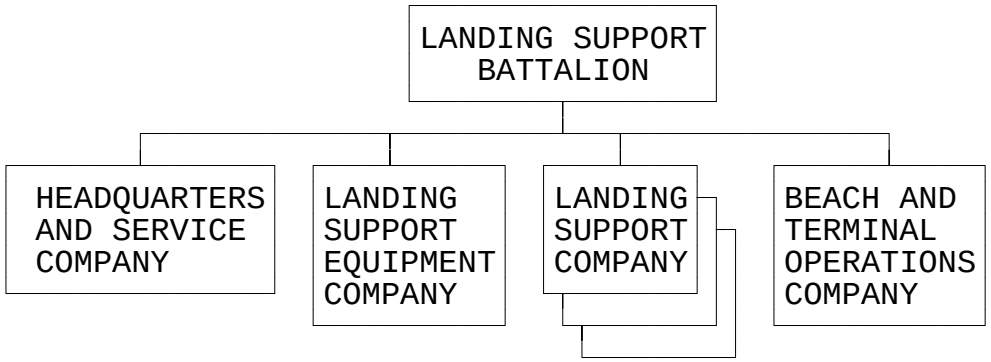


Figure M-11. Landing Support Battalion, FSSG

5. Service Functions. The Services conduct several JLOTS tasks and functions of an identical nature with different units in each Service responsible for their accomplishment. Table M-6 shows multiple tasks with the Army and Navy units responsible for those functions.

Table M-6. 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	Beachmaster Unit
Lighterage Operations		
LCM	Med Boat Co	ACU
LCU	Heavy Boat Co	ACU
LCAC		ACU
CSP	Fltng Craft Co	PHIBCB
CF	Fltng Craft Co	PHIBCB
LARC-V		BMU
LARC-LX	Heavy Amphib Co Watercraft Team	
Barges/Tugs/SLWT	Fltng Craft Co Watercraft Team	PHIBCB
Repair/Maint	Fltng Craft General Support Maint. Co	ACU/PHIBCB
LACV-30	ACV Co	
Fuel		
Offshore-bulk (OPDS)	Engineer Dive Det	PHIBCB/UCT
Inland-Inland pipelines (const)	Engineer Pipe-line Const Co	NMCB
Inland-Inland pipelines (oper'n)	Petrol Pipeline and Term Oper'n Battalion	
Construction		
Causeway Pier Inst'ln	Fltng Craft Co	PHIBCB
RRDF Inst'ln	Fltng Craft Co	PHIBCB
ELCAS Inst'ln	Eng Prt Const Co	PHIBCB
Road Inst'ln	Eng Battln (Hvy)	

Table M-6 (cont'd)

TASK/FUNCTION	ARMY	NAVY
Salvage		
Support	Terminal Battln/ Fltng Craft Maint Co	PHIBCB/BMU
Control	Boat Co	BMU
Camp Support	Internal (Co) Area Support Gp HHC Term Bn/Gp	PHIBCB
Communications		
Ashore (admin)	Internal (Co)/ Terminal Bn/Gp C&E HQ & HQ Co	NBG
Shipboard	Trmnl Service Co	NBG
Lighterage Cntrl	Trmnl Battalion	NBG
Beach Security	MPs	PHIBCB/BMU
Reembarkation of NBG/NCNF	Trmnl Battalion	NBG
Cargo Offload		
Shipboard Ops (breakbulk)	Trmnl Service Co	NCHF unit
Shipboard Crane Ops	Trmnl Service Co (brkblk/cntnrs)	NCHF unit
Supervisors/ Hatch Teams	Transportation Co Trmnl Service Co (brkblk/cntnrs)	NCHF unit
Stevedores	Trmnl Service Co	NCHF unit
Unskilled Labor	Host Nation Suppt	Spprtd unit
Shoreside Cranes	Trmnl Service Co (containers)	NCHF unit/ PHIBCBs
Container Offload	Trmnl Service Co (containers)	NCHF unit

Table M-6 (cont'd)

TASK/FUNCTION	ARMY	NAVY
Terminal Ops/Cntrl	Terminal Bn	Supptd unit
4/6/10K RTFL	Trmnl Service Co (Breakbulk)	Supptd unit
RTCH	Trmnl Service Co (Containers)	Supptd unit
140 T Crane	Trmnl Service Co (Containers)	
Yard Tractor	Trmnl Service Co (Containers)	
Cargo	ACD Det	Supptd unit
Documentation	Trmnl Service Co (Breakbulk)	
Breakbulk Marshaling Yd	Trmnl Service Co (Breakbulk)	Supptd unit
Container Marshaling Yd	Trmnl Service Co (Containers)	Supptd unit
Container Stuff/ Unstuff Yd	Trmnl Service Co (Containers)	Supptd unit
Water		
Offshore Bulk	Barge Water Purification Team	
Inland	Water Supply Co	
LOTS C2	Terminal Bn/Gp	NBG

Table M-7. Organization Mission Summary

COMMAND	ASSIGNMENT
NAVY BEACH GROUP (NBG)	JLOTS commander

MISSION
Provide Navy elements to support LOTS 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 BMU, PHIBCB and ACU components.

COMMAND	ASSIGNMENT
AMPHIBIOUS CONSTRUCTION BATTALION (PHIBCB)	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	ASSIGNMENT
BEACHMASTER UNIT (BMU)	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.

Table M-7 (cont'd)

COMMAND	ASSIGNMENT
ASSAULT CRAFT UNIT (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
NAVY CARGO HANDLING FORCE (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
NAVY UNDERWATER CONSTRUCTION TEAM (UCT)	COMCBLANT/PAC; 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.

Table M-7 (cont'd)

COMMAND	ASSIGNMENT
MOBILE INSHORE UNDERSEA WARFARE UNIT (MIUW)	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	ASSIGNMENT
US ARMY TRANSPORTATION TERMINAL GROUP (TTG)	TT Brgde

MISSION
Command units employed in operation of water terminals and perform operations planning.

CAPABILITIES
Command and supervision of operations, training, and administration of TTBs.

COMMAND	ASSIGNMENT
US ARMY TRANSPORTATION TERMINAL BATTALION (TTBN)	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 instream.

Table M-7 (cont'd)

COMMAND	ASSIGNMENT
US ARMY TRANSPORTATION TERMINAL SERVICE CO. (BB) (TTSCO(BB))	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	ASSIGNMENT
US ARMY TRANSPORTATION TERMINAL SERVICE CO. (CONT) (TTSCO(CONT))	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	ASSIGNMENT
US ARMY TRANSPORTATION TERMINAL SERVICE CO. (BB AND CONT) TTSCo(BB & CONT))	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.

Table M-7 (cont'd)

COMMAND	ASSIGNMENT
US ARMY TRANSPORTATION TERMINAL TRANSFER CO. (TTTCO)	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	ASSIGNMENT
US ARMY TRANSPORTATION MEDIUM BOAT CO. (TMBCO)	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	ASSIGNMENT
US ARMY TRANSPORTATION HEAVY BOAT COMPANY (THBCO)	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.

Table M-7 (cont'd)

COMMAND	ASSIGNMENT
US ARMY TRANSPORTATION MEDIUM LIGHTER CO. (ACV) (TMLCO)	TTBN

MISSION
Provide lighterage for movement of general cargo and light-wheeled vehicles between ships at anchor and inland transfer and segregation areas in JLOTS and amphibious operations.

CAPABILITIES
24-hour BB and container cargo transport.
Can operate inland over hastily prepared routes and barriers.

COMMAND	ASSIGNMENT
US ARMY TRANSPORTATION WATERCRAFT TEAMS (TWT)	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.

Table M-7 (cont'd)

COMMAND	ASSIGNMENT
US ARMY TRANSPORTATION TERMINAL SERVICE TEAMS (TTST)	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 marshaling area.

COMMAND	ASSIGNMENT
ENGINEER COMBAT BATTALION, HEAVY, (ECBH)	Engr Brgd Corps, Airborne Corps, JTF/CTF

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.

Table M-7 (cont'd)

COMMAND	ASSIGNMENT
ENGINEER PORT CONSTRUCTION COMPANY (EPCCO)	Engineer Command

MISSION
Provide specialized engineer support in developing, rehabilitating, 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 (EPCSCO)	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.

Table M-7 (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 (LDT)	C&S Det

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.

Table M-7 (cont'd)

COMMAND	ASSIGNMENT
QUARTERMASTER PETROLEUM AND WATER UNITS (QP&WU)	TAACOM

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 (TFCGSMCO)	Trans. Cmd.

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
FORCE SERVICE SUPPORT GROUP (FSSG) (USMC)	MAGTF CDR

MISSION
Responsibile 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, rail-heads, airheads, and other cargo terminals.
During an amphibious assault operation, provides organized elements to form the LFSP.

Table M-7 (cont'd)

COMMAND	ASSIGNMENT
PORT SECURITY UNIT (USCG)	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.

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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 offload 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:

(1) Afloat heavy salvage for surf-zone operations.

(2) Beach salvage for surf-zone and dry beach operations.

(3) 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:

(1) Assist broached lighterage in retracting from the beach.

(2) Assist floating causeway facilities and other discharge facilities when required.

(3) Move hull-damaged lighterage to the high-water mark.

(4) Effect simple repairs, such as clearing fouled propellers.

(5) Clear heavy obstacles.

(6) Deadman landing craft or floating ferries.

(7) Help raise inoperative boat ramps.

(8) 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 rough-terrain 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.

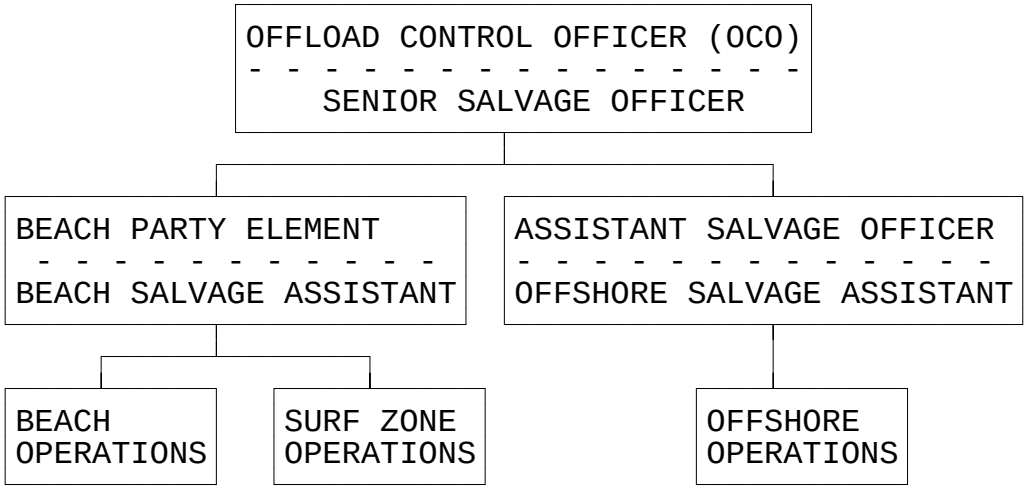


Figure N-1. Salvage Organization

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 fire-fighting pump, cargo truck, and light trailer. The description of some of this equipment follows:

(1) 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.

(2) 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.

(3) 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-6/8 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-6/8s. Army watercraftunits 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. To provide maximum salvage capability, one bulldozer, where possible, will be readily available to each operational beach.

e. Lighter, Amphibious, Resupply, Cargo V (LARC-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 naval 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

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GLOSSARY

PART I--ABBREVIATIONS AND ACRONYMS

AABFS	amphibious assault bulk fuel system
AABWS	amphibious assault bulk water system
AAFSF	amphibious assault fuel supply facility
AAV	assault amphibian vehicle
ABFC	advanced base functional components
ABFS	amphibious bulk fuel system
ACU	assault craft unit
ACV	air cushion vehicle
ADCON	administrative control
AE	assault echelon
AFOE	assault follow-on echelon
A/M	approach and moor
AOA	amphibious objective area
AOR	area of responsibility
APF	afloat pre-positioning force
APO	afloat pre-positioning operations
ATF	amphibious task force
BB	breakbulk
BIU	beach interface unit
BLCP	beach lighterage control point
BMU	beachmaster unit
BN	battalion
BPT	beach party team
BSA	beach support area
BTU	beach termination unit
C3	command, control, and communications
CAM	crisis action module
CATF	Commander, Amphibious Task Force
CBR	chemical, biological, and radiological
C/C	cast off and clear
CCO	central control officer
CCSA	containership cargo stowage adapter
CESE	civil engineering support equipment
CF	causeway ferry
CFR	Code of Federal Regulations
CHB	cargo handling battalion
CINC	commander of a unified or specified command
CJATF	Commander, Joint Amphibious Task Force
CLF	Commander, Landing Force
CNO	Chief of Naval Operations

CO	commanding officer
COCOM	combatant command
COLDS	cargo offload and discharge system
COMNAVSURFLANT	Commander, Naval Surface Force, Atlantic
COMNAVSURFPAC	Commander, Naval Surface Force, Pacific
COMSC	Commander, Military Sealift Command
COMSEC	communications security
CONUS	continental United States
COSCOM	corps support command
COTS	cargo offload and transfer system
CPX	command post exercise
CSNP	causeway section, nonpowered
CSNP(BE)	causeway section nonpowered (beach end)
CSNP(SE)	causeway section, nonpowered (sea end)
CSNP(I)	causeway section, nonpowered (intermediate)
CSP	causeway section, powered
CSS	combat service support
CSSE	combat service support element
CTG	Commander, Task Group
CW	continuous wave
CWR	calm water ramp
DASPS-E	Department of the Army Standard Port System--Enhanced
DASSS or DAS3	decentralized automated service support system
DET	detachment
DOD	Department of Defense
DOT	Department of Transportation
DTS	Defense Transportation System
DWT	deadweight tonnage
ECM	electronic countermeasures
ELCAS	elevated causeway system
FC	floating craft
FIE	fly-in echelon
FLO/FLO	float-on/float-off
FMF	Fleet Marine Force
FSS	fast sealift ship
FSSG	Force Service Support Group
FSW	feet of seawater
GPD	gallons per day
GS	general support
H&S Bn	headquarters and service battalion

HB	heavy boat
HDC	helicopter direction center
HWM	high water mark
HQ	headquarters
HT	hatch team
IPDS	inland petroleum distribution system
ISA	inter-Service agreement
JCS	Joint Chiefs of Staff
JLOTS	joint logistics over the shore
JTF	Joint Task Force
LACH	lightweight amphibious container handler
LACV	lighter air cushion vehicle
LARC	lighter amphibious resupply, cargo
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	LOTS operation area
LOGAIS	logistics automated information system
LOGCAP	logistics civilian augmentation program
LOGEX	logistics exercise
LOGMARS	logistics applications of automated marking and reading symbols
LO/LO	lift-on/lift-off
LO/RO	lift-on/roll-off
LOTS	logistics over the shore
LSB	landing support battalion
LST	landing ship, tank
LSV	logistics support vessel
LT	long ton
LZ	landing zone
MAC	Military Airlift Command
MAGTF	Marine Air Ground Task Force
MARAD	US Maritime Administration
MB	medium boat
MEB	Marine Expeditionary Brigade
MEF	Marine Expeditionary Force
MEU	Marine Expeditionary Unit
MHE	materials handling equipment

MHW	mean high water
MIUW	mobile inshore undersea warfare
MILSTAMP	military standard transportation and movement procedures
MLW	mean low water
MOA	memorandum of agreement
MOMAT	mobility matting
MOU	memorandum of understanding
MPF	maritime pre-positioning force
MPS	maritime pre-position ship
MSC	Military Sealift Command
MSNAP	Merchant Ship Naval Augmentation Program
MSR	main supply route
MT	measurement ton
MT Bn	motor transport battalion
MTMC	Military Traffic Management Command
MV	motor vessel
NAVCHAPGRU	Naval Cargo Handling and Port Group
NAVFAC	Naval Facilities Engineering Command
NAVSUP	Naval Supply Systems Command
NBG	naval beach group
NCHF	Navy cargo handling force
NCOIC	noncommissioned officer-in-charge
NL	Navy lighterage
NR CHB	naval reserve cargo handling battalion
NR CHF	naval reserve cargo handling force
NR CHTB	Naval Reserve Cargo Handling Training Battalion
NSE	naval support element
NSS	non-self-sustaining
NSSC	non-self-sustaining containership
NWP	naval warfare publication
OBFS	offshore bulk fuel system
OCO	offload control officer
OIC	officer-in-charge
OPCOM	operational command
OPCON	operational control
OPDS	offshore petroleum discharge system
OPLAN	operation plan
OPS	operations
OTC	officer in tactical command
PBCR	portable bar code recorder
PCO	primary control officer
PHIBCB	amphibious construction battalion
PHIBOP	amphibious operation
PKP	purple k powder
PLT	platoon
POD	port of debarkation

POE	port of embarkation
POL	petroleum, oil, lubricants
QM	quartermaster
RBE	remain-behind equipment
RDD	required delivery date
RO/RO	roll-on/roll-off
ROWPU	reverse osmosis water purification unit
RRDF	RO/RO discharge facility
RRF	ready reserve force
RT	rough terrain
RTCH	rough terrain container handler
RTFL	rough terrain forklift
SALM	single anchor leg mooring
SEABEE	sea barge
SEF	sealift enhancement feature(s)
SLCP	ship lighterage control point
SLWT	side loadable warping tug
SMFT	semitrailer mounted fabric tank
SPOE	sea port of embarkation
SPM	single point mooring
SS (number)	sea state (number)
ST	short ton
STAMMIS	standard Army multi-command management information system
STREAM	standard tensioned replenishment alongside method
SUROBS	surf observation
T	ton (short)
TA	theater Army
TAACOM	Theater Army Area Command
TACLOG	tactical logistical group
TACON	tactical control
T-ACS	tactical auxiliary crane ship
TAK	cargo ship
T-AKR	fast logistics ship
TAMMC	Theater Army Material Management Command
TC	transportation corps
TCC	transportation component command
TCMD	transportation Control and Movement document
TCN	transportation control number
TEU	twenty-foot equivalent unit
TML	terminal

TOA	table of allowance
TOE	table of organization and equipment
TPFDD	time phased force deployment data
TPT	tactical petroleum terminal
TRANSCOM	US Transportation Command
TS	terminal service
TT	terminal transfer
TWDS	tactical water distribution system
UCT	underwater construction team
UNAAF	unified action armed forces
USCG	United States Coast Guard
USCINCTRANS	Commander-in-Chief, US Transportation Command
USMC	United States Marine Corps
USNS	United States Naval Ship
WPA	water jet propulsion assembly
WT	warping tug

PART II--DEFINITIONS*

Afloat Pre-Positioning Force. Shipping maintained in a full operational status to afloat pre-position military material in support of unified commanders operations plans. The APF is the functional successor to the Near Term Pre-Positioning Force, which was disestablished with the deployment of Maritime Pre-Positioning Squadron TWO. The APF consists of the MPS and the pre-positioning (depot) ships, and is deployed worldwide.

Afloat Pre-Positioning Operations. Pre-positioning of ships, preloaded with equipment and supplies (including ammunition and petroleum), that provides for an alternative to landbased 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 theater of operations. Afloat pre-positioning in forward areas enhances a force's capability to respond to a crisis resulting in faster reaction time.

amphibian. A small craft, propelled by propellers and wheels or by air cushions for the purpose of moving on both land and water.

amphibious assault bulk fuel system. The POL discharge system used to support USMC amphibious assaults and MPF operations. It consists of 5,000 or 10,000 feet of buoyant 6-inch hose deployed from an LST in amphibious assaults or an MPS ship in MPF operations.

Amphibious Construction Battalion. A commissioned unit of an NBG that provides, installs, and operates causeway ferries, causeway piers, elevated causeways, RO/RO platforms, warping tugs, AABFS, OPDS, and the Navy support camp.

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* Unless identified as extracted from Joint Pub 1-02, terminology herein is not standardized within the Department of Defense and is applicable only in the context of this document

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 shore.

Amphibious Task Force. A task organization that is established for the purpose of conducting an amphibious operation. The ATF consists of a landing force, assault shipping, and supporting naval units that may include strategic sealift assets. An ATF is always commanded by a naval officer, the CATF.

anchorage. A specified location for anchoring or mooring a vessel instream or offshore.

Assault Craft Unit. A commissioned unit of an NBG that provides, operates, and maintains assault craft. The unit may provide lighterage for a LOTS operation as directed by higher authority.

assault echelon. The element of a force that is scheduled for initial assault on the objective area. (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 longer than five days after commencement of the assualt 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.

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.

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.

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.

Beachmaster Unit. A commissioned unit of the naval beach group designed to provide to the shore party a naval component known as a beach party which is capable of supporting the amphibious landing of one division (reinforced). (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 ACVs, berms (constructed) are required to protect MHE operations.

bight. A bend in a coast forming an open bay or an open bay formed by such a bend.

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.

breaker angle. The angle a breaker makes with the beach.

broach. When a water craft is thrown broadside to the wind and waves, against a bar, or against the shoreline.

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)

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.

Combatant Command (command authority). Non-transferrable command authority established by title 10, United States Code, section 164, exercised only by commanders of unified or specified combatant commands. Combatant Command (command authority) 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 the Service component commander. Combatant Command (command authority) provides full authority to organize and employ commands and forces as the CINC considers necessary to accomplish assigned missions. Also called COCOM. (Joint Pub 1-02)

combat service support. The essential logistic functions, activities, and tasks necessary to sustain all elements of an operating force in an area of operations. Combat service support includes but is not limited to administrative services, chaplain services, civil affairs, finance, legal service, health services, military police, supply, maintenance, transportation, construction, troop construction, acquisition and disposal of real property, facilities engineering, topographic and geodetic engineering functions, food service, graves registration, laundry, dry cleaning, bath, property disposal, and other logistic services. (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 and communications (C3). The facilities, equipment, communications procedures, and personnel essential to a commander for planning, directing, and controlling operations of assigned forces pursuant to the missions assigned.

Commander, amphibious task force. The Navy officer designated in the initiating directive as commander of an amphibious task force.

Commander Landing Force. The officer designated in the initiating directive to command the landing force.

common-user sealift. The sealift service provided on a common basis for all DOD agencies and, as authorized, for other agencies of the US government. Military Sealift Command provides common-user sealift for which users reimburse the Navy Industrial Fund.

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.

corps support command. Provides corps logistic support and C2 of water supply battalions.

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.

crisis action module. A grouping of combat, combat support, and combat service-support forces, together with their appropriate nonunit-related personnel and accompanying supplies committed in response to a condition of social, political, or military instability.

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.

current, offshore. Deep water movements caused by tides or seasonal changes in ocean water level.
current, rip. A water movement that flows from the beach through the surf zone in swiftly moving narrow channels.

cusps. Ridges of beach material extending seaward from the beachface with intervening troughs.

davit. A small crane on a vessel that is used to raise and lower small boats, such as lifeboats or a LCM-6 on LSTs.

Defense Transportation System. Consists of military-controlled terminal facilities, MAC-controlled aircraft, MSC-controlled sealift, and government-controlled air or land transportation.

Deterrent Force Module. Those forces available to the CINCs for the pupose of discouraging the commission of hostile acts. DFMs are linked together or uniquely identified so that they may be extracted from, or adjusted as an entity in, the TPFDD to enhance flexibility and usefulness of the operation plan during a crisis.

draft. The depth of water which a vessel requires to float freely; the depth of a vessel from the water line to the keel; a sling load of cargo.

dwell time. The time cargo remains in a terminal's intransit storage area while awaiting shipment by clearance transportation.

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.

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.

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.

flatrack. Portable, open-topped, open-sided units that fit into existing below-deck container cell guides and provide a capability for containerships to carry oversized cargo, and wheeled and tracked vehicles.

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.

Force Service Support Group. The primary logistic agency organic to the FMF. As the combat service- support element for the MEF and the source of combat service-support elements for smaller Marine Air-Ground Task Forces, its mission is to provide sustained combat service support above the organic capabilities of supported MAGTF units.

foreshore. That portion of a beach extending from the low water (datum) shoreline to the limit of normal high water wave wash.

gear. A general term for a collection of spars, ropes, blocks, and equipment used for lifting and stowing cargo and ships stores.

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.

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.

Headquarters and Service Battalion (H&S). H&S battalion provides C3, security, and automated data processing for the FSSG. It provides supporting services to the MAGTF, including general support data processing, disbursing, postal, and exchange services.

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, near. The area of land within an AOR of a specific beach or terminal operation--usually within 5 miles.

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.

hold. A cargo stowage compartment aboard ship.

inland petroleum distribution system. A multi-product petroleum pipeline designed to move bulk fuel forward in a theater of operation.

issue control group. A detachment that operates the staging area, consisting of holding areas and loading areas, in an operation.

Joint Logistics Over the Shore. LOTS operations conducted jointly by two or more Service component forces of a unified commander.

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. (Also lighter.)

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.

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.

Logistics Over the Shore Operations. The loading and unloading of ships 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. (Joint Pub 1-02)

LOTS operation area. That geographic area required to successfully conduct a LOTS operation.

main deck. The highest deck running the full length of a vessel.

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). Three types of Marine Air Ground Task Forces which can be task organized are the Marine Expeditionary Unit, Marine Expeditionary Brigade 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 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 ground combat element 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, 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. (Joint Pub 1-02)

Marine Expeditionary Brigade. A Marine Expeditionary Brigade is a task organization which is normally built around a regimental landing team, a provisional Marine aircraft group, and a logistics support group. It is capable of conducting amphibious assault operations of a limited scope. During potential crisis situations, a Marine Expeditionary Brigade may be forward deployed afloat for an extended period in order to provide an immediate combat response. Also called MEB. (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. The Marine Expeditionary Unit is 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 4-01.6)

Maritime Pre-positioning Force operation. A rapid deployment and assembly of a Marine Expeditionary Brigade in a secure area using a combination of strategic airlift and forward deployed maritime pre-positioning ships.

Maritime Pre-positioning Ships. Civilian-crewed, Miltary 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 Brigades. Also called MPS. (Joint Pub 1-02)

Military Sealift Command. A major command of the US Navy. Under operational command of USTRANSCOM, MSC provides common-user sealift transportation services to deploy, employ, and sustain US forces on a global basis. Outside the purview of USTRANSCOM, MSC retains Service-specific responsibilities that include: Naval Fleet Auxiliary Force (Ammunition, Oilers, Tugs); special missions (Oceanographic, Cable Laying); and MPS.

Military Sealift Command force. The 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.

Military Traffic Management Command. A major command of the US Army. Under operational command of USTRANSCOM, MTMC provides common-user ocean terminal services and CONUS commercial air and land transportation service to deploy, employ, and sustain US forces on a global basis. Outside the purview of USTRANSCOM, MTMC retains Service-specific responsibilities that include the DOD Personal Property Program and Transportation Engineering Agency.

Mobile Inshore Undersea Warfare unit. A Navy surveillance unit that provides seaward security to JLOTS operations from either a port or harbor complex or unimproved beach sites. The MIUW unit is equipped with mobile radar, sonar, and communications equipment located within a mobile van.

moored. Lying with both anchors down or tied to a pier, anchor buoy, or mooring buoy.

Motor Transport Battalion (MT Bn). MT Bn provides 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.

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, his 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 logistic support unit capable of worldwide deployment in its entirety or in specialized detachments. It is organized, trained, and equipped to load and offload Navy and Marine Corps cargo carried in MPS, merchant breakbulk and/or containerships in all environments; operate an associated temporary ocean cargo terminal; load and offload Navy and Marine Corps cargo carried in military-controlled aircraft; and operate an associated expeditionary air cargo terminal. Also called CHB. Three sources of a Navy cargo handling battalion are:

a. NAVCHAPGRU. The active duty, cargo handling battalion-sized unit composed solely of active duty personnel.

b. NRCHTB. The active duty, cargo handling training battalion composed of both active duty and reserve personnel.

c. NRCHB. A reserve cargo handling battalion composed solely of selected reserve personnel.

Navy Cargo Handling Force. The combined cargo handling units of the Navy, primarily consisting of the NAVCHAPGRU, the NRCHTB, and the NRCHBs. These units are part of the operating forces and represent the Navy's capability for open ocean cargo handling.

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: the AABFS and the OPDS.

offshore petroleum discharge system. Provides a semipermanent, all-weather facility for bulk transfer of POL directly from an offshore tanker to a BTU located immediately inland from the high watermark. POL then is either transported inland or stored in the beach support area. Major OPDS components are: the OPDS tanker with booster pumps and spread mooring winches, a recoverable 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. PHIBCBs install the OPDS with UCT assistance. OPDS's are embarked on selected RRF tankers modified to support the system.

operational control. The authority delegated to a commander to perform those functions of command over subordinate forces involving the composition of subordinate forces, the assignment of tasks, the designation of objectives, and the authoritative direction necessary to accomplish the mission. Operational control (OPCON) includes directive authority for joint training. OPCON should be exercised through the commanders of assigned normal organizational units or through the commanders of subordinate forces established by the commander exercising operational control. OPCON normally provides full authority to organize forces as the operational commander deems necessary to accomplish assigned missions and to retain or delegate operational control or tactical control (TACON) as necessary. OPCON may be limited by function, time, or location. It does not, of itself, include such matters as administration, discipline, internal organization, and unit training.

outsized cargo. Large items of breakbulk-type cargo that are too large for palletization or containerization.

oversized cargo. Large items of specific equipment such as a barge, SLWT, CSP, or CSNP.

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.

Ready Reserve Force. An element or subset of the National Defense Reserve Fleet (NDRF) that is maintained by MARAD in the state of increased readiness (above that of the NDRF) to meet common user lift requirements of the armed services in a contingency. All ships in the RRF are crewless, but will be maintained by MARAD in class with current certificates as approved by the American Bureau of Shipping and the USCG. A ship in MARAD RRF-5 status should be shipyard activated and ready for sea at the end of 5 calendar days. Also called RRF.

reduced operational status. Applies to MSC ships withdrawn from full operational status (FOS) because of decreased operational requirements. A ship in ROS 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 FOS is designated by the numeral following ROS (i.e., ROS-5).

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.

RO/RO Discharge Facility. Provides a means of disembarking vehicles from a RO/RO ship to lighterage. The RRDF consists of six causeway sections, non-powered assembled into a platform that is two sections long and three sections wide. When use of LCUs, as lighters, is being considered, a seventh "sea end" causeway section,
non-powered, fitted with a rhino horn, is required. The RO/RO discharge facility assembly includes fendering, lighting, and a ramp for vehicle movement from ship to the platform.

rough terrain container handler. A piece of materials-handling equipment used to pick up and move containers.

safe haven. 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.

Seashed. A temporary deck in containerships for transport of large military vehicles and outsize breakbulk cargo that will not fit into containers.

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.

secondary wave breaker system. A series of waves superimposed on another series and differing in height, period, or angle of approach to the beach.

service component command. A command consisting of Service component commander and all those individuals, units, detachments, organizations and installations under the command that has been assigned to the unified command. (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.

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.

single anchor leg moor. A mooring facility dedicated to OPDS. Once installed, it permits a tanker to remain on station and pump in much higher sea states than is possible with a spread moor.

specified command. A command that has a broad continuing mission and that is established and so designated by the President through the Secretary of Defense with the advice and assistance of the Joint Chiefs of Staff. It normally is composed of forces from but one Service. (Joint Pub 1-02)

spreader bar. A device specially designed to permit the lifting and handling of containers or vehicles and breakbulk cargo.

strategic mobility. The capability to deploy and sustain military forces worldwide in support of national strategy. (Joint Pub 1-02)

strategic sealift. The pre-positioning and ocean movement of cargo and personnel, including ship-to-shore cargo handling systems and personnel.

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.

strategic sealift shipping. Common-user ships of the 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.

surfline. The point offshore where waves and swells are affected on by the underwater surface and become breakers.

surf zone. The area of water from the surfline to the beach.

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.

tagline. A line attached to a draft of cargo or container to provide control and minimize pendulation of cargo during lifting operations.

tactical control. The detailed and, usually, local direction and control of movements or maneuvers necessary to accomplish missions or tasks assigned. 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.)

ton. A unit of weight.

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.

ton, long. A unit of weight used aboard vessels; 2,240 pounds.

ton, measurement. A unit of volume for cargo freight, also called freight ton; 40 cubic feet.

ton, metric. 1,000 kilograms (2,204.6 pounds).

ton, register. A unit of volume of capacity of ships used for vessel registration, pilot charges, etc.; 100 cubic feet.

ton, short. A unit of weight used on land; 2,000 pounds.

tophandler. A device specially designed to permit the lifting and handling of containers from the top with rough terrain container handlers.

topography. The configuration of the ground to include its relief and all features. Topography addresses both dry land and the sea floor (underwater topography).

Transportation Component Command. Each of the three Service component commands of USTRANSCOM, which include: the Air Force’s MAC, the Navy’s MSC, and the Army’s MTMC.

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.

unified command. A command with a broad continuing mission under a single commander and composed of significant assigned components of two or more Services, and which is established and so designated by the President, through the Secretary of Defense with the advice and assistance of the Joint Chiefs of Staff, or, when so authorized by the Joint Chiefs of Staff, by a commander of an existing unified command established by the President. (Joint Pub 1-02)

USTRANSCOM. The unified command with the mission to provide global air, land, and sea transportation to deploy, employ, and sustain military forces to meet national security objectives.

warp. To haul a ship ahead by line or anchor.

watercraft. Any vessel or craft designed specifically and only for movement on the surface of the water.

wave. An undulation of water caused by the progressive movement of energy from point to point along the surface of the water.

wave crest. The highest part of a wave.

wave height. The vertical distance between trough and crest, usually expressed in feet.

wave length. The horizontal distance between successive wave crests measured perpendicular to the crest, usually expressed in feet.

wave period. The time it takes for two successive wave crests to pass a given point.

wave trough. The lowest part of the wave between crests.

wave velocity. The speed at which a wave form advances across the sea, usually expressed in knots.

weather deck. A deck having no overhead protection; uppermost deck.

white cap. A small wave breaking offshore as a result of the action of strong winds.

winch. A hoisting machine used for loading and discharging cargo and stores or for hauling in lines.