ATP 4-13

Army Expeditionary Intermodal Operations

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***This publication supersedes FM 55-60 dated 15 April 1996.**

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Preface

This Army Techniques Publication (ATP) introduces Army expeditionary intermodal operations as a capability and describes the roles, responsibilities, and command relationships for planning, executing, and supporting Army terminal operations in a theater. This publication applies to the range of military operations and supports Army doctrine publication (ADP) 3-0 and ADP 4-0.

The principle audience for ATP 4-13 is all members of the profession of arms. Commanders and staffs of Army headquarters serving as joint task force or multinational headquarters should also refer to applicable joint or multinational doctrine concerning the range of military operations and joint or multinational forces. Trainers and educators throughout the Army will also use this manual.

Commanders, staffs, and subordinates ensure that their decisions and actions comply with applicable United States, international, and in some cases host-nation laws and regulations. Commanders at all levels ensure that their Soldiers operate in accordance with the law of war and the rules of engagement. (See Field Manual [FM] 27-10.)

ATP 4-13 uses joint terms where applicable. Selected joint and Army terms and definitions appear in both the glossary and the text. Terms for which ATP 4-13 is the proponent publication (the authority) are italicized in the text and are marked with an asterisk (*) in the glossary. Terms and definitions for which ATP 4-13 is the proponent publication are boldfaced in the text. For other definitions shown in the text, the term is italicized and the number of the proponent publication follows the definition.

This ATP applies to the Active Army, the Army National Guard, and the United States Army Reserve unless otherwise stated.

The proponent for this ATP is the United States Army Transportation School. The preparing agency is the United States Army CASCOM G3 Training and Doctrine Development Directorate. Send written comments and recommendations on DA Form 2028 (*Recommended Changes to Publications and Blank Forms*) to Commander, United States Army Combined Arms Support Command, ATTN: ATCL-TS, Fort Lee, Virginia 23801 or submit an electronic DA Form 2028 by e-mail to: usarmy.lee.tradoc.mbx.leee-cascom-doctrine@mail.mil.

Introduction

ATP 4-13, *Army Expeditionary Intermodal Operations* replaces FM 55-60, *Army Terminal Operations.* This manual provides the framework for commanders and their staff at all levels on the employment of Army expeditionary intermodal capability to include aerial/sea port operations. The conversion and update of this manual is in compliance with the Army's Doctrine 2015 initiative, aligns Army terminal operations roles and responsibilities with the current force structure, and incorporate lessons learned from operations and significant events since publishing of FM 55-60. The fundamentals of Army Expeditionary Intermodal Operations and general terminal operation techniques tie together various transportation competencies to enhance deployment, redeployment, and distribution operations for the end-to-end movement of personnel, equipment, or forces. ATP 4-13 uses the theater environment as the focus of organizations, events and activities that are integral to plan and execute terminal operations that enables expeditionary intermodal operations.

Other intermodal components and transportation competencies that support Army expeditionary intermodal operations are covered in the following manuals:

- FM 3-35, *Army Deployment and Redeployment Operations.*
- FM 4-01.41, *Army Rail Operations.*
- ATP 4-11, *Army Motor Transport Operations.*
- ATP 4-12, *Army Container Operations.*
- ATP 4-16, *Movement Control.*
- ATTP 4-15, *Army Water Transport Operations.*

The specific execution of a terminal operations mission is dependent on the situation or environment. Army doctrinal reference publication (ADRP) 3-0 states that any operational environment consists of many interrelated variables and sub-variables, as well as the relationships among those variables and sub-variables. How the many entities and conditions behave and interact with each other within an operational environment is difficult to discern and always results in differing circumstances. Different actor or audience types do not interpret a single message in the same way. Therefore, no two operational environments are the same. Consequently, ATP 4-13 provides a foundation for commanders to tailor terminal operations as necessary to meet the demands of any operational environment.

Summary of significant changes to this ATP include:

- Introduction of Army Expeditionary Intermodal Operations
- Roles and responsibilities for theater sustainment command, its mission command forces as well as the Surface Deployment and Distribution Command and its mission command forces.
- Introduction of the rapid port opening element.
- Introduction of the transportation expeditionary brigade.
- Discussion of port opening and operations.
- Introduction of the centralized receiving and shipping point.
- Appendix for list of automated systems that support terminal operations.

ATP 4-13 contains six chapters:

Chapter 1 discusses intermodal operations and its components, introduces Army expeditionary intermodal operations as a capability.

Chapter 2 describes the types of terminals and ports. It discusses planning considerations and organizational roles and responsibilities and port opening.

Chapter 3 discusses air terminal operations, port opening and organizations involved in air terminal operations. It further discusses the role of the joint task force-port opening unit and its organizational structure. Included in this chapter are graphics of a notional lay out of an air terminal and organizational structure / chart of units involved in air terminal operations.

Chapter 4 discusses water terminal and port operations and the roles and responsibilities of units involved that includes the Transportation Brigade Expeditionary. It further discusses the Rapid port opening element of the

joint task force - port opening, other units and organizational structure that supports it. Further the process of transitioning from port operations to port management is discussed.

Chapter 5 describes the different types and functions of land terminal operations and the organizations that support them. Specifically, this chapter includes a description of the centralized receiving and shipping point terminal.

Chapter 6 discusses logistics over-the-shore operations and units that support it.

Based on current doctrinal changes, certain terms have been added or modified for purposes of this manual. The glossary contains acronyms and defined terms. See introductory table-1 and introductory table-2 for specific term changes.

Introductory table – 1. New Army terms

Terms	*Remarks*
multimodal	New term and definition

Introductory table – 2. Modified Army terms

Terms	*Remarks*
beach capacity	Modified for Army only definition
intermodal operations	Modified, for Army only definition

Chapter 1

Intermodal Overview

Intermodal operations **is the process of using multimodal capabilities (air, highway, rail, sea) and conveyances (truck, barge, containers, pallets) to move troops, supplies and equipment through expeditionary entry points and the network of specialized transportation nodes to sustain land forces.**

This chapter provides the foundation for the Army expeditionary intermodal operations capability and how it is shaped by intermodal operations to support maneuver forces.

ARMY EXPEDITIONARY INTERMODAL OPERATIONS (AEIO)

1-1. Army expeditionary intermodal operations (AEIO) incorporates intermodal operations using deployed or commercial assets during contingency operations to support decisive actions. AEIO provides flexibility for the geographic combatant commander to deploy, employ, and sustain land forces to extend the commander's operational reach, freedom of action and endurance (see figure 1-1).

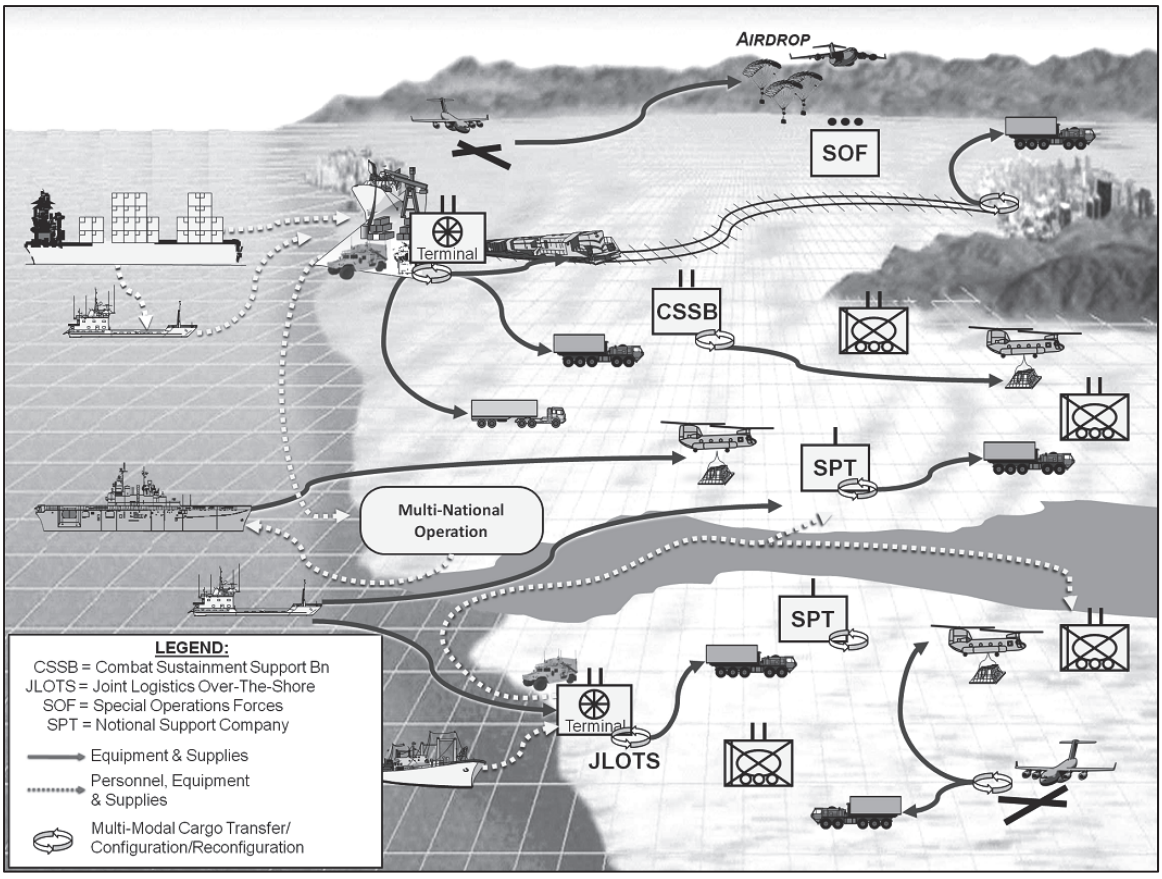


Figure 1-1. Army expeditionary intermodal operations capabilities

1-2. AEIO is a multi-faceted operation that uses terminal and mode operations as well as movement control to balance transportation requirements and capabilities against terminal capacities to synchronize and ensure an uninterrupted flow of personnel and cargo across the operational area. AEIO capabilities enable deployment, movement and sustainment operations from a sea base, intermediate support base, seaport, aerial port, inland water and land-based terminal, to include austere and degraded access nodes and points of entry in all operating environments.

1-3. Through a coordinated process, AEIO integrates the tasks and systems that operate water, rail, air, and land terminals and synchronizes those functions with the Joint Deployment and Distribution Enterprise and the geographic combatant commander's concept of support. Additionally, AEIO enables the following:

- The transfer of forces and cargo from nodes and between movement modes in a manner that meets the commander's operational requirements.
- Rapid cargo configuration, reconfiguration, and transfer.
- Multimodal cargo transfer between land, air, waterborne, rail, and sea based platforms.
- Surface movement and in-transit support of personnel, to include combat-ready force elements and civilian populations.
- Real-time management information systems that establish and maintain in-transit visibility of cargo.
- Advanced mission command systems to establish and maintain visibility and accountability, and enable in-transit visibility and management of movement assets.

1-4. The capabilities of AEIO are employed in all operational environments where Army and joint maneuver forces operate. This includes the ability to move from, to, and through multimodal nodes in the continental United States (CONUS), forward-stationed outside-CONUS (OCONUS) locations, and within theaters of operation. The requirement to support dispersed and prolonged operations increases the challenge faced by sustainment forces. This reinforces the need for sustainment formations to be just as agile, flexible and responsive as the formations they support.

AEIO SUPPORT TO OPERATIONS

1-5. AEIO capabilities play a key role in all phases of Army and joint operations. The following paragraphs describe the functions during the six phases of an operation. Figure 1-2 illustrates levels of effort for each phase of an operation and thereby a proportioned reliance on AEIO to conduct support and sustainment across each phase of an operation. AEIO operations increase throughout the first 4 phases (0-3) of an operation to sustain and stabilize in phase 4 and remain present in phase 5 (to include retrograde activities).

SHAPING (PHASE 0)

1-6. During the shaping phase, AEIO capabilities are positioned to provide the greatest flexibility and response to a rapidly changing global situation. AEIO capabilities are employed in support of the geographic combatant commander's deter-forward posture by providing direct support to security force assistance and stability operations. AEIO capabilities enable movement and sustainment support to maneuver forces, including movement of equipment and personnel from their forward-deployed stations to remote training sites, and provide immediate response for support to natural or manmade disasters, foreign humanitarian assistance and disaster relief operations. Furthermore during the shaping phase, AEIO capabilities are employed to support and sustain multinational and multi-agency operations, including movement and support for civilian populations as part of foreign humanitarian assistance and disaster relief operations. AEIO capabilities are a key element of the United States government to influence diplomatic and economic efforts by providing the ability to support heavy logistics operations through air and seaports, during joint logistics over-the-shore operations, and directly from strategic shipping to forces and agencies operating ashore in remote, austere, or degraded operating sites. During this phase, AEIO capabilities are also employed to move and sustain Army and joint force elements in theater security cooperation and training operations that are intended to influence both adversaries and allies.

DETERRENCE (PHASE 1)

1-7. AEIO capabilities provide movement of force elements, personnel, equipment, and supplies in support of security force assistance. However, during the deterrence phase, AEIO capabilities will begin to prepare for potential transition to limited or major military operations. This will include movement and repositioning of tailored force elements and support to preparatory actions that specifically support or facilitate the execution of subsequent phases of the joint operations. AEIO capabilities are capable of rapid response from locations around the world. Actions during the deterrence phase will include repositioning of AEIO capabilities from stations in CONUS and other theaters to place them in locations to support seizing the initiative phase. These will include coordinating with geographic combatant commander planners to position AEIO capabilities to optimize support to Army prepositioned stock deployment and to provide rapid deployment of, and support to, decentralized combined arms operations.

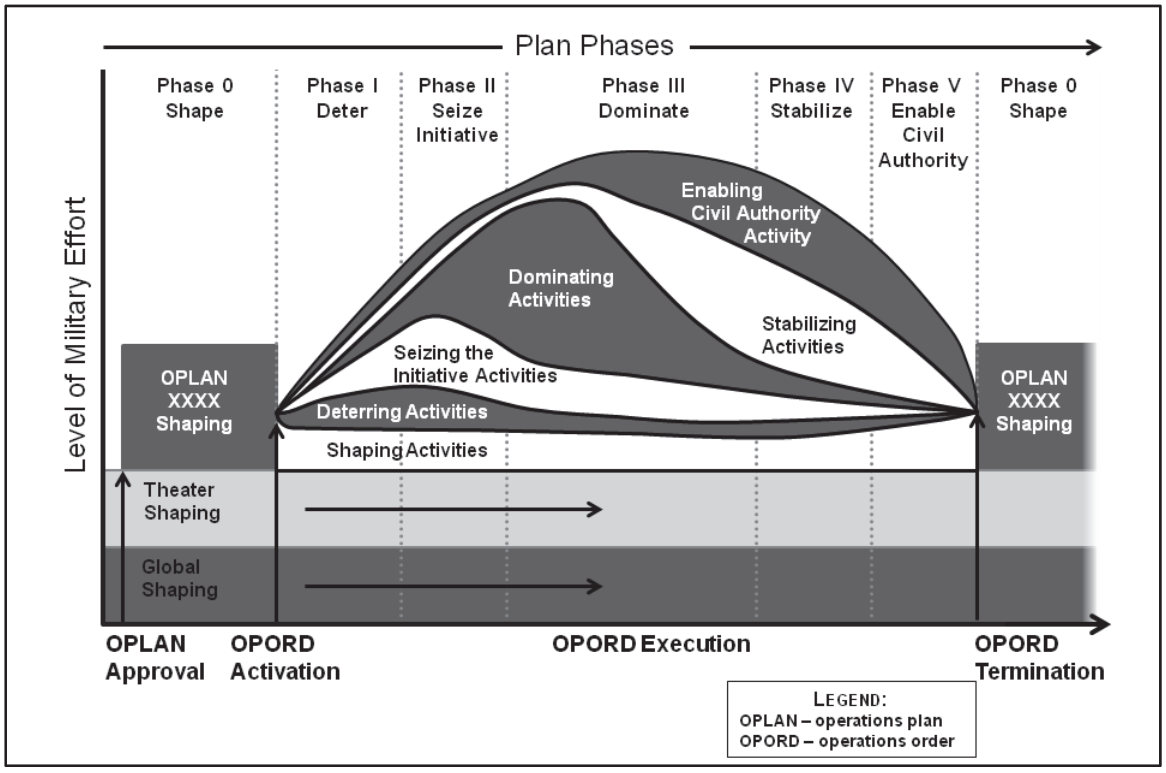


Figure 1-2. Levels of effort across phases of an operation

SEIZING THE INITIATIVE (PHASE 2)

1-8. During the seizing the initiative phase, AEIO capabilities are employed to support rapid deployment of combat-ready force elements, personnel, equipment, and supplies from the CONUS, forward deployed stations OCONUS, land and sea based staging and support bases, and pre-positioned equipment sites. Simultaneously, AEIO capabilities are positioned to enable movement and support of tailored maneuver force elements to distributed points of employment throughout the operational environment. AEIO capabilities are employed to support maneuver force elements at the point of the tactical commander's choosing. This includes moving heavy and light force elements and conducting heavy and light sustainment operations through multiple access points, including degraded and austere environments. AEIO capabilities enable tactical force elements to close from extended distances to dispersed operating points with a fight off the ramp configuration even in austere geographical environments. Tactical commanders employ AEIO capabilities to take advantage of alternatives to traditional entry points and lines of communication. This mitigates anti-access and area denial capabilities, gains freedom of maneuver, and maintains operational tempo. AEIO cargo transfer and lift capabilities are employed to overcome the challenges presented by degraded or destroyed port and airfield infrastructure, allowing maneuver and support commanders to

bypass obstructions. AEIO primary roles and missions during the seizing the initiative phase is support to decentralized operations by conducting and supporting movement and maneuver of ready-to-fight force elements; providing immediate resupply to widely distributed forces; and enabling forces to shift between operations to meet rapidly changing operational requirements.

DOMINANCE (PHASE 3)

1-9. AEIO capabilities are employed to support full employment by delivering and supporting Army forces at critical times and places. AEIO capabilities enable movement of personnel, equipment, and supplies over extended distances in large quantities needed to sustain prolonged operations. AEIO capabilities enable movement and maneuver, support, and sustainment operations similarly as seizing the initiative phase. However, in the dominance phase, operations focus on extending the tactical commanders' reach and enabling joint and Army forces to begin the transition to stability operations. AEIO's primary mission during this phase is to:

- Support rapid transition between tactical operations.
- Support and sustain operations at multiple widely dispersed geographical locations.
- Provide commanders the ability to conduct heavy sustainment support from land and sea bases to widely distributed force elements over extended distances.

STABILIZATION (PHASE 4)

1-10. During the stabilization phase, AEIO capabilities are employed to support movement and maneuver, and heavy sustainment of decentralized force elements in the same manner as earlier phases. AEIO operations are also employed to provide key support to multi-national or multi-agency efforts to support the local government in providing and/or re-establishing basic services. AEIO primary roles and missions during the stabilization phase include movement of equipment and supplies from land and sea bases to Army and joint elements, and multi-national and multi-agency operations. AEIO capabilities are employed to support the transition to the final phase of joint operations, by supporting heavy logistics operations, to include movement of support to forces deployed to perform the functions of local governmental and non-governmental agencies. Major retrograde activities begin this time as maneuver forces enter in redeployment phase. AEIO supports retrograde of cargo and equipment to depots and home station and can also position equipment as leave behind/theater provided equipment or foreign military sales.

ENABLE CIVIL AUTHORITY (PHASE 5)

1-11. This phase is characterized by a return to joint force support to legitimate civil government. The enabling civil authority phase is essentially a return to shaping phase operations for AEIO capabilities. Also in this phase, AEIO capabilities are once again employed to support nation-building and ongoing stability operations, as well as support for security force assistance and training missions.

COMPONENTS OF INTERMODAL OPERATONS

1-12. Intermodal operations take into consideration mission command of sustainment units, the operational environment, and the use of multimodal capabilities. ***Multimodal*** **is the movement of cargo and personnel using two or more transportation methods (air, highway, rail, sea) from point of origin to destination.**

TERMINAL OPERATIONS

1-13. Terminal operations are vital to movement and sustainment of expeditionary forces and are also divided into the strategic, operational and tactical levels. Terminal operations enable transfer of equipment, cargo, and forces from one mode and/ or conveyance to another. Particularly with containerized cargo, it is transferred in most situations without opening the container that helps maintain cargo integrity and can shorten the movement time line because of fewer times the cargo is handled. Terminals are vital to distribution that enables sustainment throughout an area of operation. As a result, terminals are a key component to enable intermodal operations.

MODE OPERATIONS

1-14. Air and surface modes (sea, highway, rail and pipeline) of transportation are integral to intermodal. Mode operations are divided into strategic, operational and tactical levels. Regardless of the level, adaptable packages of aircraft, vehicles, watercraft, and rail assets are factored into plans for movement of forces and cargo. The mode of transport used is dictated by geography, terrain, environment, and type/condition of available infrastructure in the operational area. The mode selection is also influenced by the type of military operation and political factors.

CONTAINER OPERATIONS

1-15. Intermodal is the international freight system that permits transshipping cargo between sea, highway, rail, and air modes of transportation through use of American National Standards Institute (ASNI)/International Organization for Standardization (ISO) containers, line-haul assets, and handling equipment. Intermodal assets used at Army terminals include intermodal containers, non-ISO and 463L equipment, container/material handling equipment and enablers.

Intermodal Containers

1-16. DOD owned and leased (carrier owned or controlled ISO configured containers) are designed to facilitate and optimize the carriage of goods by one or more modes of transportation without intermediate handling of the contents. ISO containers may be fully enclosed with one or more doors, end or side opening, open top, refrigerated, tank, open rack, gondola, flat rack or other designs. The 20-foot ANSI/ISO container serves as the standard for class V (ammunition) and intermodal shipment. The 40-foot container can also be used, when available, for intermodal operations. The size of container depends on the receiving unit's ability to handle 40 foot containers.

Container/Material Handling

1-17. Container-handling equipment and materials handling equipment (MHE) include fixed and deployable assets required to assist intermodal operations. Types of container-handling equipment and MHE employed throughout the Defense Transportation System (DTS) include straddle cranes, chassis, rough terrain container handlers, top loaders, container cranes, spreader bars, forklifts, 463L, 25K, and 60K aircraft cargo transporter/loaders, roller bed or flat-bed trailers and prime movers, and wide-body (aircraft) elevator loaders.

Enablers

1-18. To track and identify the volume of cargo moving throughout the DTS, enablers are used to facilitate asset management. Enablers include radio frequency identification (RFID) tags, bar code labels, satellite tracking devices, readers, and information systems and data bases to include portable, deployable and wireless systems.

Chapter 2

Terminals / Ports

The United States depends more than ever on rapid and effective force deployments to accomplish national objectives. The Army stands ready to fulfill global responsibilities and must always be ready and able to rapidly deploy and conduct operations at a pace and in sufficient numbers to achieve rapid mission success. Its credibility, however, depends on getting the right equipment, right personnel, and right supplies to the right place, at the right time. Terminals serve as that vital link to enable mission success while in pursuit of our national objectives.

This chapter provides an overview of Army terminal operations. Its focus includes types of terminals, roles and responsibilities, and planning considerations to include port opening operations.

TERMINAL OPERATIONS

2-1. *Terminal operations* is the reception, processing, and staging of passengers; the receipt, transit storage and marshaling of cargo; the loading and unloading of modes of transport conveyances; and the manifesting and forwarding of cargo and passengers to destination (JP 4-01.5). It also includes transferring between modes and discharging unit and non-unit equipment and cargo.

2-2. Terminals are essential nodes to the total distribution network that support the commander's concept of operation. When linked by modes of transport (air, highway, rail and water), terminals define the transportation structure. Force projection missions require the early identification and establishment of terminals to support early entry operations.

2-3. Crucial to the execution of terminal operations is the assignment of organizations with personnel, unit equipment, material handling equipment, and container-handling equipment sufficient to meet the workload requirements at each terminal. Staff planners at all levels must provide for the adequate manning of terminals. In cases where terminal facilities are insufficient for necessary throughput, they must plan for workable solutions. In addition, automated information systems capable of supporting in-transit visibility (ITV) requirements for the movement of the personnel, equipment, and material moving through the DTS are important. These systems provide the geographic combatant commands with information pertaining to location and final destination of all cargo.

2-4. The loss of space-based communications is a concern for Army forces conducting terminal/port operations. Whether the interruption of the communications is caused by enemy action against satellites or through the use of intermittent jamming, the resulting black-out will require AEIO forces to adapt and adjust until the capability is restored. Short term losses or disruptions of satellite communications can be mitigated through alternative communications methods and courier networks.

TYPES OF TERMINALS

2-5. Terminals are generally classified based on the following attributes: physical characteristics; type of transport assets used, type of cargo handled, and the methods used for cargo handling. The primary types of terminals operated by the Army include water, land, and air. Determining the cargo capacity of terminals is a critical factor in the planning process of military operations.

WATER TERMINALS

2-6. Water terminals can be located at fixed-port facilities, unimproved port facilities, or bare beach facilities. Ports can be classified as general cargo (does not include ammunition and bulk liquids), container, roll-on/roll-off (RO/RO) or combination; for example, container and RO/RO. Bare beach facilities or logistics over-the-shore (LOTS) operations is defined as the loading and unloading of ships without the benefit of deep draft-capable, fixed port facilities; or as a means of expeditionary access nearer to tactical assembly areas.

Fixed Port Facilities

2-7. Fixed port facilities are generally worldwide, large, commercial facilities comprised of sophisticated cargo handling systems specifically designed for transfer of oceangoing freight; vessel loading/discharge operations; reception and staging operations; and port clearance. These facilities have sufficient water depth and pier length to accommodate deep-draft vessels. At these facilities, deep-draft oceangoing vessels come alongside a pier and discharge cargo directly onto the apron of the wharf or pier. Most cargo moves into open or covered in-transit storage facilities to await terminal clearance or is discharged directly to land transport. Fixed port facilities are the most capable terminals for military operations of any meaningful size, handling large volumes of equipment and containerized cargo.

Unimproved Port Facilities

2-8. Unimproved port facilities are not particularly designed to handle the same volume of cargo as improved port facilities. These terminals can include naturally austere or damaged ports where the cargo handling capacity is changed because of reduction of port infrastructure. Characteristics of these types of terminals include lack of material handling equipment, reduced sources of labor, and insufficient water depth and pier length to accommodate oceangoing cargo vessels. Therefore, use of shallow-draft lighterage can enable discharging ocean going vessels that are anchored in stream. This method of handling cargo involves using self-propelled watercraft to carry cargo between a ship and unimproved port facility. When Army units are the only Service involved, it is a LOTS operation. In most instances, Army cargo transfer units employ organic assets to operate an unimproved port facility. Operations at this type of facility are established when fixed water terminals are not available or an alternate discharge location is desired. LOTS operations can also be performed for bulk liquid supplies such as fuel and water.

Bare Beach Facilities

2-9. Bare beach facilities best fit the definition of a LOTS operation as there are no facilities, equipment, or infrastructure available to conduct cargo discharge or port clearance operations. Bare beach facilities should be established when no other terminal facilities are available, additional throughput is required or an alternate discharge site is desired. When a bare beach is the only option available for transferring cargo from strategic sealift assets to the theater or area of operations, Army personnel and equipment will be brought in to set up systems to allow cargo to be offloaded from the ships at anchor and discharged across the beach. These include setting up causeway piers (sometimes configured as trident piers), laying matting across the beach to support movement of wheeled/tracked vehicles, and having rough terrain container handlers or cranes for moving containers. Army watercraft such as landing craft utility, landing craft vessels, and modular causeway system lighterage will be employed to move cargo from sealift ships to the beach or causeway piers for discharge and reception, staging, onward movement and integration (RSOI) operations. Beach terminals require specifically selected sites to support delivery of cargo by lighterage across the beach and movement into marshaling yards or onto waiting clearance transportation.

LAND TERMINALS

2-10. Land terminals include, centralized receiving and shipping points (CRSP), trailer transfer points (TTP), rail, petroleum, and inland water terminals. Petroleum terminal operations are covered in FM 10-67. Land terminals are established at points along air, rail, river, canal, pipeline, and motor transport lines of communication to provide for the transshipment of cargo and personnel carried by these modes. Inland

terminals are key enablers or links between modes when terrain and operational requirements cause a change in type of conveyance.

AIR TERMINALS

2-11. An *air terminal* is a facility on an airfield that functions as an air transportation hub and accommodates the loading and unloading of airlift aircraft and the in-transit processing of traffic (JP 3-17). The airfield may or may not be designated an aerial port. An *aerial port* is an airfield that has been designated for the sustained air movement of personnel and materiel as well as an authorized port for entrance into or departure from the country where located (JP 3-17). Aerial ports provide the most expeditious method for rapid force deployment and normally serve as a link to theater land transportation systems in the theater.

ORGANIZATIONAL ROLES AND RESPONSIBILITIES

2-12. Strategic and theater/operational level organizations provide resources in the form of information, personnel, equipment, other assets and mission command of subordinate units to enable the establishment of terminals and the movement of cargo in a theater.

UNITED STATES TRANSPORTATION COMMAND (USTRANSCOM)

2-13. USTRANSCOM, as the Distribution Process Owner oversees the overall effectiveness, efficiency, and alignment of DOD-wide distribution activities, including force projection, sustainment, and redeployment/retrograde operations. The Distribution Process Owner supports the strategic flow of deploying forces, equipment and sustainment to seaport of debarkation/aerial port of debarkation (SPODs/APODs) in the joint area of operations. These services are provided through use of common user airlift, sealift, surface transport and terminal traffic management activities. USTRANSCOM, through its component commands Air Mobility Command, Military Sealift Command (MSC), and Military Surface Deployment and Distribution Command (SDDC) provide aerial port and seaport terminal management and services in support of the supported geographic combatant commander.

AIR MOBILITY COMMAND

2-14. Air Mobility Command is the United States Air Force component of USTRANSCOM and serves as the single port manager for air mobility. Air Mobility Command aircraft provide the capability to deploy the Army anywhere in the world. Air Mobility Command provides military and chartered, civilian airlift aircraft for transporting passengers and cargo, and also provides aircraft for aerial refueling operations. Air Mobility Command also administers the Civil Reserve Air Fleet program in which the DOD contracts for the services of specific aircraft, owned by a United States entity or citizen, during national emergencies and defense-oriented situations when expanded civil augmentation of military airlift activity is required. As follow-on forces to USTRANSCOM's joint task force–port opening (JTF-PO) APOD, Air Mobility Command performs single port management functions necessary to support the strategic flow of the deploying forces' equipment and supplies from the aerial port of embarkation (APOE) to the theater.

MILITARY SEALIFT COMMAND (MSC)

2-15. MSC is the United States Navy component of USTRANSCOM. The mission of the MSC is to provide ocean transportation of equipment, fuel, supplies, and ammunition to sustain U. S. forces worldwide. MSC provides sealift with a fleet of government-owned and chartered vessels. MSC executes voluntary intermodal sealift agreement contracts for chartered vessels. Sealift ships principally move unit equipment from the United States to ports in theaters of operation all over the world. In addition to sealift ships, MSC operates a fleet of prepositioned ships strategically placed around the world and loaded with equipment and supplies to sustain Army, Navy, Marine Corps, Air Force, and Defense Logistics Agency operations. These ships remain at sea ready to deploy on short notice to deliver urgently needed equipment and supplies to a theater of operation, or joint operations area.

MILITARY SURFACE DEPLOYMENT AND DISTRIBUTION COMMAND (SDDC)

2-16. SDDC is an operational level Army force designated by the Secretary of the Army as the ASCC of USTRANSCOM and a major subordinate command of United States Army Materiel Command. SDDC exercises administrative control authority and responsibility on behalf of Commander, United States Army Materiel Command and exercises operational control (OPCON) over Army forces, as delegated by the Commander, USTRANSCOM. The mission of SDDC is to provide global deployment and distribution capabilities to meet the Nations' objectives. The objective of the transportation system is to move the force, its equipment and supplies within the Continental United States (CONUS), between CONUS and outside continental United States (OCONUS) theaters, and between OCONUS theaters. SDDC coordinates CONUS movements of mobilizing units and equipment in cooperation with installation transportation offices and various state and local agencies. SDDC is responsible for CONUS line-haul and common user terminal operations. As the single port manager, SDDC acts as a liaison between government shippers and commercial carriers and is responsible for the establishment and maintenance of contracts, solicitations and agreements with the carrier industry to deploy and distribute DOD supplies, personal property and personnel worldwide. See appendix A for more information about SDDC.

UNITED STATES ARMY MATERIEL COMMAND (USAMC)

2-17. USAMC is designated an Army Command by the Secretary of the Army to manage the Army's logistics mobilization and contingency capability and capacity. USAMC equips and sustains the Army. USAMC provides technology, acquisition support in support of unified land operations to ensure dominant land force capability for United States forces and our allies.

GEOGRAPHIC COMBATANT COMMANDER

2-18. Geographic combatant commands are allocated forces by the Secretary of Defense to meet assigned missions. Some responsibilities include:

- Exercise combatant command (command authority) over forces.
- Exercise directive authority for logistics to ensure the effective execution of approved operation plans.
- Coordinate with USTRANSCOM and supporting combatant commands in executing the time-phased force and deployment data and assuring the availability of transportation resources to support force deployment and redeployment.
- Establish a transportation system to support the forward presence or deploy forces within the joint operations area.
- Establish priorities to move deploying units and to provide for their sustainment.
- Validate strategic movements.
- Establish a theater joint transportation board to act as the executive agent for transportation.
- Ensure that theater movement data processing systems and communications infrastructure supports the timely exchange of ITV data between theater field activities and communications systems.
- Ensure the proper force flow to support port and theater opening.

JOINT DEPLOYMENT AND DISTRIBUTION OPERATIONS CENTER (JDDOC)

2-19. The JDDOC is designed to support the geographic combatant commander's operational objectives by synchronizing multimodal theater resources to maximize deployment, distribution, and sustainment capabilities. Its goal is to maximize geographic combatant commander combat effectiveness through improved total asset visibility, enabling more effective deployment and distribution. The JDDOC, under the control and direction of the geographic combatant commander, directs, coordinates, and synchronizes deployment, distribution, and redeployment operations to enhance the geographic combatant commander's ability to effectively and efficiently build, sustain, and redeploy combat power. The JDDOC in coordination with the theater sustainment command (TSC) provides visibility of strategic distribution and deployment. A JDDOC may be located in the TSC command distribution management center to facilitate

this effort. When deployed, a forward team from the medical logistics management center collocates with the distribution management center of the TSC/expeditionary sustainment command (ESC) and the JDDOC (if established). The medical logistics management center forward team is subordinate to the medical command (deployment support) and serves as a link between national-level medical logistics support and theater-level distribution. The TSC also establishes links with SDDC, MSC, and Air Mobility Command to coordinate seaport and aerial port operations, respectively, and to maintain in-transit visibility of movements in and throughout a geographic combatant commander's specified area of responsibility. The JDDOC is an integral component of the geographic combatant commander staff, normally under the staff supervision of the geographic combatant command Director of Logistics (J/G-4). The JDDOC provides the geographic combatant commander with the capability to:

- Exercise centralized control for deployment and distribution that reliably and rapidly communicates, as well as satisfies, logistics requirements.
- Provide effective management of the transition between strategic and intra-theater segments of the distribution system.
- Effectively link deployment and distribution process owners and other agencies to better shape support and services for military operations.
- Provide a link between the theater and the Joint Deployment Distribution Enterprise.

ARMY SERVICE COMPONENT COMMAND (ASCC)

2-20. Each GCC has Service component commanders from each service-level organization (Army, Navy, Marines, and Air Force.) To fulfill the requirement to provide a Service component commander, the combatant commander activates an Army Service component command (ASCC) headquarters.

2-21. The ASCC commander is specifically responsible for service-related title 10, United States Code, tasks to prepare, train, equip, administer, and provide supplies and services to Army forces assigned or attached to combatant commands. The ASCC may also have many lead service responsibilities, which entail common-user logistics support to other services, multinational forces, other government agencies, and/or nongovernmental organizations. See ATP 4-94, *Theater Sustainment Command*, for more details.

2-22. The ASCC requests deployment of a TSC, or elements of a TSC, to open lines of communications (LOC) in the theater. LOC components include terminals and facilities required to move, maintain, and sustain theater forces. LOC components are used to build an intermodal distribution network that includes:

- Aerial ports of embarkation and debarkation.
- Seaports of embarkation and debarkation.
- Water, rail, and route networks.
- Host nation resources.

THEATER SUSTAINMENT COMMAND (TSC)

2-23. The TSC is the senior Army logistics (less medical) headquarters in a theater of operations. It is regionally focused and globally employable. It is also a multifunctional logistics (less medical) organization, tailored and task organized according to mission, enemy, terrain and weather, troops and support available, time available and civil considerations (METT-TC). Under this construct, the TSC plans, prepares, executes, and assesses logistics operations and synchronizes operational level Army deployment/redeployment and sustainment for the ASCC or Joint Force Commander. The core competency of the TSC is mission command of sustainment units executing theater distribution to include terminal operations. The TSC executes its mission through the use of expeditionary sustainment command, sustainment brigades, combat sustainment support battalions (CSSB), and other forces. Expeditionary sustainment commands are designed to extend the operational reach of the TSC into specified areas of operations to provide more responsive support to Army forces. They can serve as forward headquarters for the TSC and provide mission command for theater opening, theater distribution, and theater sustainment within the area of operations (AO). Although a near mirror image of the TSC, it does not possess the same degree of capabilities as the TSC due primarily to differences in manning levels. When an expeditionary sustainment command is deployed into an AO/joint operations area, its role is to provide forward-based

mission command of TSC forces; providing the TSC commander with the regional focus necessary to provide effective operational-level support to Army forces or joint task force missions.

TERMINAL PLANNING CONSIDERATIONS

2-24. When planning support for military operations, military planners and operators at the joint and service level must consider the diversity and challenges of managing and operating Army controlled terminals and commercial or host-nation controlled terminals where an Army presence is not available. In most force projection operations, land, air, and water terminals will be required. The capabilities of these terminals to support the various modes of transportation are vital and foremost to planning considerations. Terminal planning is part of the transportation plan that is developed to support the geographic combatant commander's operations plan.

2-25. Early planning considerations include evaluating all aspects of operating Army terminals. A physical assessment is not always necessary if adequate information is available during pre-deployment planning about the available facilities, provisions for host-nation support, and the immediate AO to minimize the risk to operations. When a physical assessment is conducted, the purpose of the assessment is to gather information to:

- Acquaint the commander with the layout.
- Recon the area to determine the physical layout and placement of units, support equipment, and automatic identification technology hardware.
- Determine if the distribution infrastructure is capable of supporting the stated mission.
- Determine the availability of resources (or recommends additional assets) to accomplish the defined tasks.
- Plan for host-nation support and contract labor.

2-26. Terminal planning includes:

- Estimate the existing terminal capacity. This is the estimated total tonnage and numbers of personnel and containers that can be received, processed, and cleared through the terminal in a day.
- Compute the terminal workload needed to support the operation. The workload is expressed as numbers of personnel, vehicles, containers/twenty-foot equivalent units (TEU), and short tons (STON) for non-containerized cargo. This computation includes the total tonnage and numbers of personnel and containers that must be received, processed, and cleared through the terminal.
- Determine repair and rehabilitation costs of existing facilities and/or new construction needed to increase existing terminal capacity to equal computed terminal workload. (Existing terminal capacity maybe insufficient to support the operational workload.)
- Estimate the materials handling equipment and container-handling equipment needed to process the required workload to include equipment such as pallets, forklifts, tugs, barges, cranes, and the operators required to operate them.
- Estimate the units, personnel, civilian augmentation support, host-nation support, and supervisory and command requirements needed to operate the terminal.
- Identify and estimate security personnel requirements in case military police (MP) or host-nation support is not available.

2-27. Once the AO is assigned and the mission is understood, the commander should consider the following planning factors to establish successful terminal operations:

- Physical characteristics and layout of the terminal area:
  - Physical restrictions of working space and parking space (may impact capacity.)
  - Availability of hard surfaces in transfer areas.
  - Existing facilities for storage and maintenance of material handling equipment and other equipment.
  - Proximity to exit routes to transfer points.
  - Distances between loading and unloading points and temporary holding areas.

- Security and safety standoff distances.

- Transportation equipment planning factors:
  - Number of commercial carriers that can be handled simultaneously.
  - Delivery turnaround times.
  - Loading and unloading rates for various type of transportation.
  - Effects of size and maneuverability of carriers at transfer points within the terminal.
  - Types of and requirements for material handling equipment/container-handling equipment.
- Types of cargo to be handled:
  - Size and type of packaging.
  - Average weights of cargo units.
  - Requirements to break down into smaller lots or consolidate for reloading.
  - Fragile and perishables.
  - Hazardous cargo, ammunition net explosive weight and compatibility.
- Identify automated identification technology requirements in support of ITV:
  - Develop ITV plan to obtain, install, and maintain software and hardware to enable ITV at fixed and temporary terminals.
  - Determine egress and entrance points and number of interrogators required to capture and report ITV data.
  - Ensure sufficient automated identification technology media to enable ITV is available and applied to unit equipment, cargo and sustainment shipments to enable reporting of information.
  - Ensure terminal ITV plan is consistent with and supports the theater ITV plan.
- Temporary in-transit storage facilities:
  - Type and size facilities required.
  - Security protection requirements.
  - Distances from transloading points.
  - Documentation requirements.
  - Requirements for material handling equipment in storage areas.
  - Capacity to transfer cargo from point of discharge to storage.
- Policy and procedures:
  - Provide standard operating procedures and guidelines for terminal operations to ensure compliance with safety, documentation, communications, ITV, distribution, and maintenance of equipment requirements.
  - Policy and guidelines to comply with applicable federal, state, local, Standardization Agreement, North Atlantic Treaty Organization, and host-nation laws and regulations to include environmental regulations.
- Other considerations:
  - Anti-terrorism and force protection considerations.
  - Procedures for complying with applicable federal, state, local, and host-nation environmental regulations, including but not limited to oil spill contingency planning, waste disposal, and site specific environmental concerns.
  - Weather/environment.
  - Administration and communications.
  - Refueling.
  - Dining and billeting.
  - Latrines.
  - Laundry and showers.
  - Vehicle recovery and maintenance.
  - Medical.

PORT OPENING

2-28. *Port opening* is the ability to establish, initially operate and facilitate throughput for ports of debarkation to support unified land operations. It is also a function of theater opening (ADRP 4-0). The port opening process is complete when the port of debarkation (POD) and supporting infrastructure is established to meet the desired operating capacity for that node. Supporting infrastructure can include the transportation needed to support port clearance of cargo and personnel, holding areas for all classes of supply, and the proper in-transit visibility systems established to facilitate force tracking and end to end distribution.

2-29. Port opening is a joint process that is normally performed by the geographic combatant commander and supported by USTRANSCOM. Support can also include a mix of joint and service specific forces to accomplish the mission. For example, depending on METT-TC a geographic combatant commander could use one of the following packages to open an APOD also see figure 2-1 for a notional Joint early entry structure for port opening:

- Air Mobility Command's contingency response group and an army arrival/departure airfield control group (A/DACG).
- USTRANSCOM's JTF-PO APOD element.

2-30. To open a SPOD, also METT-TC dependant, one of the below force packages can be used:

- SDDC elements contracting stevedore and other terminal functions.
- USTRANSCOM's JTF-PO SPOD element.
- SDDC elements in conjunction with transportation brigade expeditionary (TBX) and/or attached subordinate units.

Note: Refer to Chapters 3 and 4 of this manual for more details on the port opening process for APODs and SPODs.

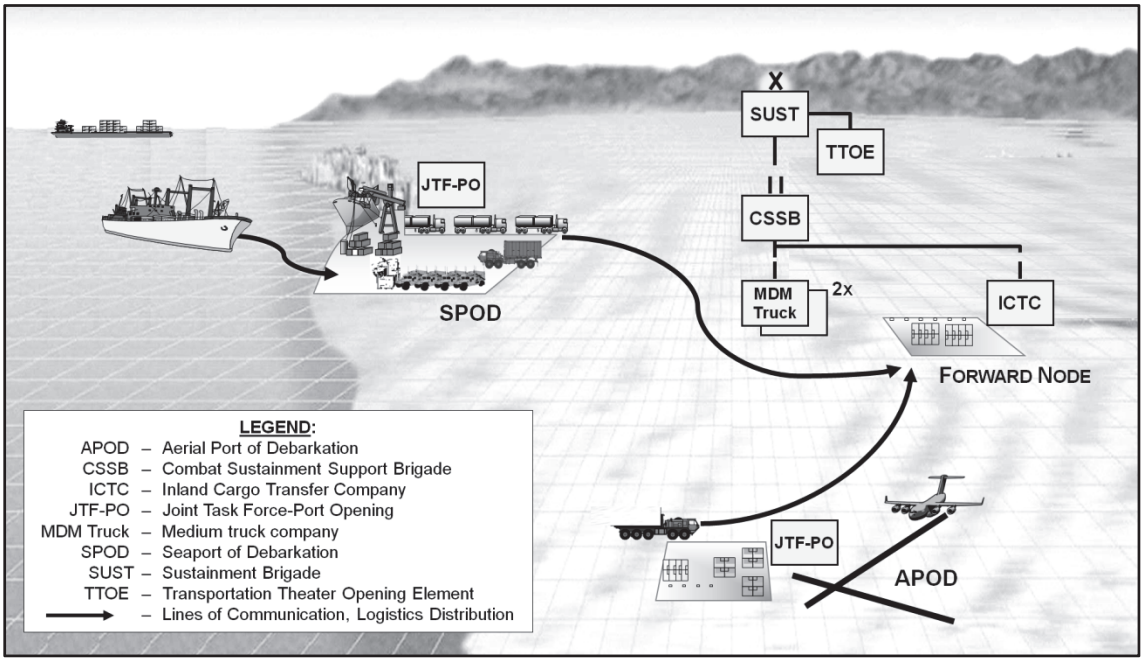


Figure 2-1. Notional joint early entry structure for port opening

2-31. The TSC has the responsibility to execute theater opening which port opening supports, but theater opening also includes the establishment of communications, intelligence, civil-military operations, services, human resources, financial management, Roles 1 and 2 medical support, engineering, movement

(air/land/water transport, inland terminal operations), materiel management, maintenance, and operational contract support coordination.

2-32. The TSC is the vital link for successful theater opening and must establish command and control infrastructure early in the theater opening process to support not only port opening but reception, staging, onward movement, and integration (RSOI) and initial distribution operations (at forward distribution nodes) as well. Establishing this infrastructure early is especially critical when supporting an operation that leaves little time for the theater to build up and/or is part of a rapid deployment to support a foreign humanitarian assistance and disaster relief effort as an example. Whether it is USTRANSCOM or TSC forces opening a port, elements of a sustainment brigade, a CSSB, a transportation theater opening element (TTOE), and a TBX are needed to provide command and control for the distribution and sustainment operations supporting port and theater opening. If host-nation or contract truck transportation is not available then light/medium or medium truck transportation is needed. A sustainment brigade(-) with an attached TTOE(-) and a CSSB(-) can provide the core mission command structure for sustainment early entry operations to support port clearance, initial distribution operations, initial movement control with highway regulation, RSOI, while setting the conditions to expand the sustainment footprint. Multiple ports can open within a short window of one another such as an APOD to bring in troops and an SPOD for the equipment. It is important that TSC units arrive early in the force flow, see figure 2-2, to coordinate and synchronize the various port activities with RSOI and theater distribution plans.

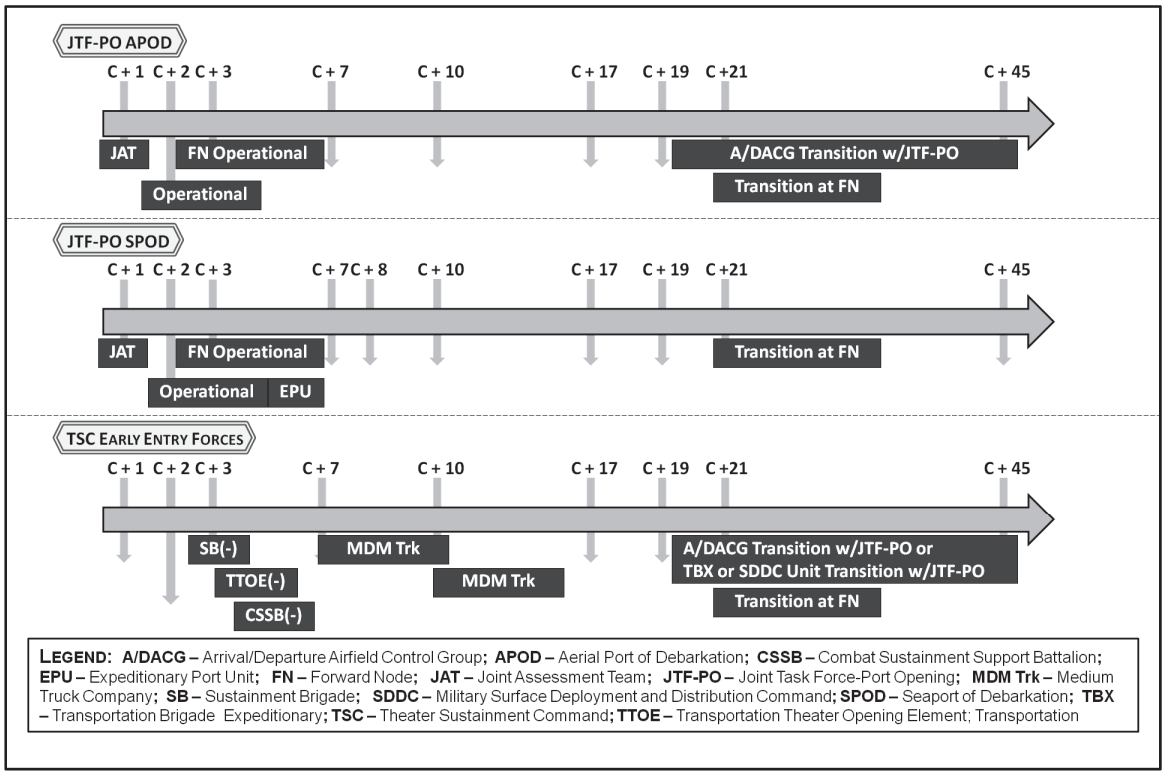


Figure 2-2. Notional force flow time line

Chapter 3

Air Terminal / Port Operations

An air terminal is a facility for loading and unloading aircraft and the in-transit handling of traffic for example, passengers, unit equipment, sustainment cargo, and mail. This chapter will focus on the procedures in a theater during unified land operations and outline the Army's roles and responsibilities as well as the supporting relationships. Air terminals may be established on airfields of a military service other than the Air Force. For strategic air movements supporting deployment, redeployment and sustainment operations, certain airfields are designated as aerial ports. An aerial port can be designated as an APOE and/or APOD or a combination of both. At an air terminal, which may be a military airfield or civilian airport, the airfield and the entire system of supporting facilities required to handle inbound and outbound passengers and cargo is collectively known as a joint aerial port complex. The joint aerial port complex containing an air terminal is a key node in any deployment/redeployment or sustainment operation. During these operations, the aerial port complex handles flows in both directions operating as both an APOE and APOD including the reception of unit personnel and equipment, replacement personnel, sustainment cargo, as well as the retrograde movement of noncombatants, wounded personnel, enemy prisoners of war, human remains, and equipment requiring repair.

ORGANIZATIONS

3-1. Air terminal operations function at the strategic, operational, and tactical levels. At each level there are organizations and units that coordinate the flow of cargo.

AIR MOBILITY FORCE

3-2. Air mobility forces include Air Force organizations capable of operating airfields where airlift command, control, and mission support are required but nonexistent. The Air Force's primary capabilities to execute these missions are contingency response forces normally deployed as a contingency response group, contingency response element, or contingency response team. The preponderance of contingency response forces resides within the Air Force Air Mobility Command capability, as well as, within the Air Reserve Components. Contingency response forces are designed to rapidly deploy to establish and initially operate an APOD. They provide a geographic combatant commander with additional capabilities to operate an APOD and can include command and control, aerial port, aircraft maintenance, and other limited airbase support functions. A contingency response group is led by and O-6 and can:

- Provide airlift focused command, control, communications, aerial port, aircraft maintenance, aircraft security, weather, limited finance and contracting, intelligence, and personnel services for a maximum-on-the ground of two aircraft for a 24 hour period.
- Coordinate all aspects of the airlift mission.
- Provide continuous liaison with all responsible parties to inform on airlift operations status.
- Assume (Contingency Response Group Commander) senior airfield authority responsibilities.

3-3. Contingency response elements are normally deployed to locations where airlift command, control, and mission support is required but either nonexistent or insufficient and where the capabilities of a full contingency response group are not required. The contingency response element can provide airlift command and control, communications, aerial port and aircraft maintenance for a maximum-on-ground of

two aircraft for a 24 hour period. Contingency response teams are deployed to support smaller scale airlift operations. They are capable of providing airlift command and control, communications and aerial port for a maximum-on-ground of one aircraft for a 12 hour period.

SUSTAINMENT BRIGADE

3-4. The sustainment brigades are task organized with multiple functional units to accomplish three major missions; theater opening, theater distribution, and sustainment. Units performing an air terminal mission could be under the command of this unit during the early entry operations of theater. The sustainment brigades may be augmented with a TTOE to assist with staff oversight and management of air terminal operations to support port opening, RSOI, or the ongoing distribution operations if the mission dictates. Regardless of the command relationship the sustainment brigades and its subordinate units are part of the distribution process for the timely movement of cargo to and from the air terminal. During early entry operations the sustainment brigades may be the senior logistics headquarters and must have the ability to coordinate movement from the terminal.

TRANSPORTATION THEATER OPENING ELEMENT (TTOE)

3-5. The TTOE enhances the SB's ability to conduct theater opening that includes opening and operating air terminals. When a TTOE augments a sustainment brigade, by design it integrates into the support operations section of the sustainment brigades and gives the organization the added ability to control terminal operations during all phases of an operation if necessary. If a movement control battalion is in place and the sustainment brigade no longer has air terminal responsibilities, all or part of the TTOE could remain with the sustainment brigade to assist with additional missions, assist the TSC/expeditionary sustainment command (ESC), or redeploy.

MOVEMENT CONTROL BATTALION (MCB)

3-6. The MCB controls the movement of all United States forces, their equipment, materiel, and sustainment into, within, and out of its assigned AO. It commands between four and ten movement control teams (MCT) and is responsible to the TSC/ESC for the execution of the TSC movement program and performance of the theater transportation system. The MCB provides transportation asset visibility and coordinates the use of common user transportation assets, intermodal container assets such as International Organization for Standardization (ISO) containers, 463L pallets, and flat racks. The MCB also provides in transit visibility (ITV) of unit moves and convoy movements. Since MCTs are normally positioned at airfields as part of the Arrival/Departure Airfield Control Group (A/DACG) mission, MCBs can be the battalion level Army command for airfield operations in the theater. MCBs provide a link between the strategic, operational, and joint movement community. The MCB also provides interconnectivity with the various intermodal lines of communication which will enhance theater distribution and deployment operations.

3-7. MCTs are attached to the MCB to provide decentralized execution of MCB movement responsibilities throughout a specified AO. MCTs may be employed on an area basis or at critical to facilitate effective movement control. MCTs have five primary operational functions which are to provide area support, port (air and sea) support, movement regulating, divisional support, and cargo documentation. The port support mission at an air terminal is part of the A/DACG mission to process inbound and outbound personnel and cargo as well as terminal clearance. The size and role of movement control at a terminal is determined by the tasks to be accomplished. MCTs could be responsible for operating the passenger terminal, air load planning, the inbound/outbound marshaling yards, as well as for arranging transportation to move passenger and equipment.

INLAND CARGO TRANSFER COMPANY (ICTC)

3-8. The ICTC's mission is to discharge, load, and transship cargo at air terminals; to supplement cargo/supply handling operations to alleviate cargo backlogs; and to operate cargo marshaling area as required. Though it depends on the capacity of the airfield, an entire ICTC is usually not needed at an air terminal, but rather a squad or platoon sized element. The whole ICTC can transship 1,500 short tons of

break bulk cargo or 600 containers at an air terminal. Elements of the ICTC perform joint inspections, provide minor maintenance for equipment to be loaded or cleared from the terminal, provide handling of palletized or containerized cargo, and provide transportation to assist with terminal clearance.

TRANSPORTATION DETACHMENT - RAPID PORT OPENING ELEMENT (RPOE)

3-9. The Army contribution to the joint task force-port opening (JTF-PO) Air is the RPOE, which deploys within hours to establish and provide the surface element for aerial port of debarkations in contingency response operations. RPOE is OPCON to USTC and administrative control to SDDC. The RPOE also provides deployment and distribution support including in-transit visibility, cargo transfer and clearance, movement control, and cargo documentation similar to certain capabilities of a MCT or ICTC.

ARRIVAL/DEPARTURE AIRFIELD CONTROL GROUP (A/DACG)

3-10. The A/DACG is an ad hoc organization established to control and support the arrival and departure of personnel, equipment, and sustainment cargo at airfields. Elements of a movement control team and an inland cargo transfer company typically operate the A/DACG however the mission can be performed by any unit with properly trained personnel and the appropriate equipment. The base organization of an A/DACG consisting of a 21 person MCT and a squad from an ICTC gives similar capabilities as the JTF-PO RPOE. An MCT acts as the Army liaison with the Air Force and can provide a detachment level mission command structure, passenger processing, air load planning, loading coordination, cargo documentation, and the onward movement for cargo and passengers. Elements of an ICTC can augment an MCT to provide the personnel and equipment to load and off-load aircraft as needed, transport cargo for airfield clearance, process outbound equipment, and provide minor maintenance support. If elements from multiple organizations make up the A/DACG then forming a provisional detachment for better mission command should be considered, see figure 3-1 on page 3-4. At a minimum, memorandums of agreement should be established to outline task responsibilities to include what battalion has oversight.

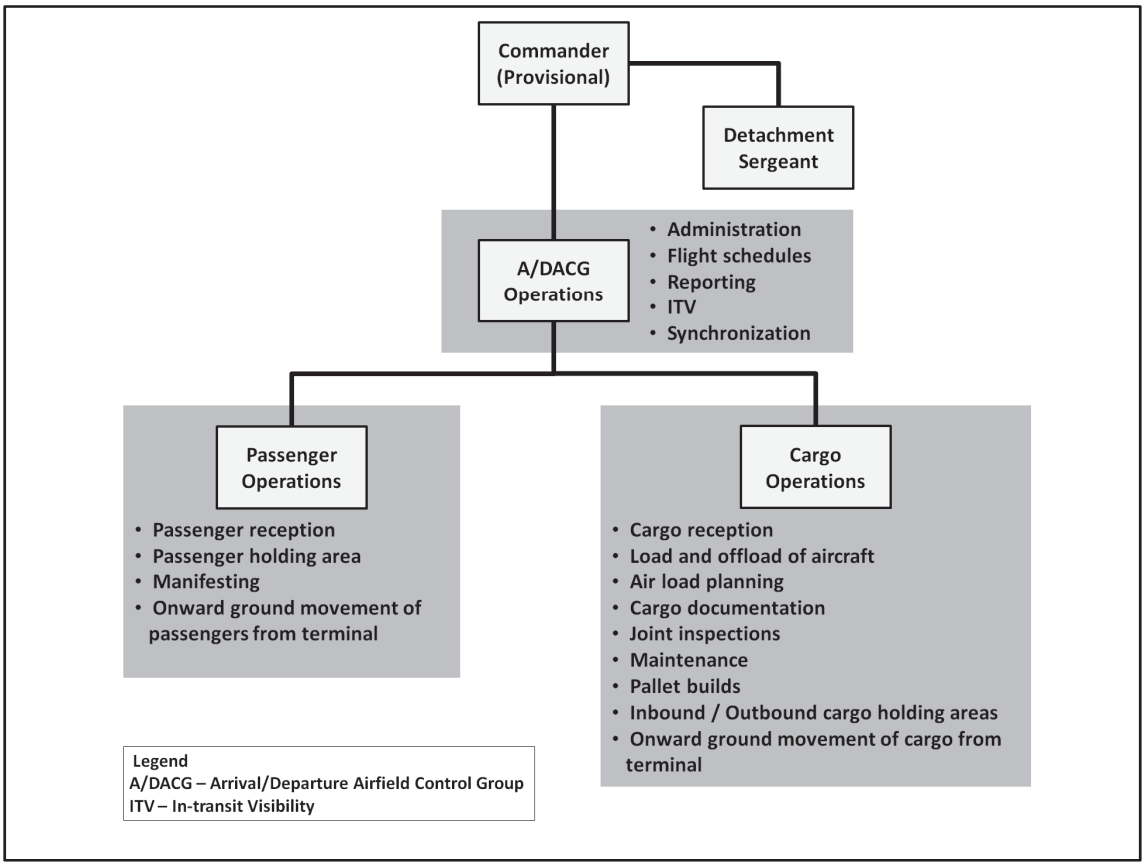


Figure 3-1. Notional A/DACG structure

PORT OPENING

3-11. Except in the case of forcible entry, port opening elements should precede the arrival of deploying combat forces. In the context of this chapter port opening is the process of establishing an air terminal at an APOD to receive deploying forces, their equipment and/or cargo for sustainment, foreign humanitarian assistance or disaster relief operations. There are two different elements that could be used to accomplish the Army's mission associated with opening an air terminal depending on the time from identifying the requirement to execution of the mission.

3-12. JTF-PO can be used when there is insufficient time to request enduring force structure through the request for forces process such as port opening associated with a crisis action plan supporting foreign humanitarian relief or combat operations. An A/DACG is used when the request for forces process allows enough time for the unit(s) comprising the A/DACG to assemble and deploy. Actions taken to open and operate the APOD and forward distribution node include the establishment of command and control, communication systems, security, cargo and passenger handling and transfer operations, and operational ITV and Radio Frequency Identification (RFID) networks.

3-13. JTF-PO will establish communication with the appropriate combatant command and/or joint task force staff to tie in with the theater distribution plan, but may be asked to coordinate with the TSC for specific theater distribution requirements. Upon the arrival of a sustainment brigade with a theater opening mission, the JTF-PO (specifically the RPOE) should coordinate with the sustainment brigade's TTOE for the disposition of cargo and passengers. The JTF-PO will go through the sustainment brigade for highway regulation and march credit procedures and the coordination for additional land transportation as needed.

3-14. Unlike JTF-PO, units identified to operate the A/DACG will be part of a time-phased force and deployment data and must arrive early enough to establish operations to set the stage for the reception of

personnel, equipment and sustainment cargo. An A/DACG should take direction from the sustainment brigade during the initial phases of port opening until the supporting MCB arrives in theater. Once the supporting MCB establishes operations, it can assume mission command of the A/DACG and will coordinate with the sustainment brigade and TTOE as needed.

3-15. Upon arrival, the A/DACG coordinates with the Air Force contingency response group/contingency response elements to establish communications, passenger/cargo discharge procedures, locations for the off-load ramp and cargo holding areas, and to set a general land usage arrangement for the aerial port layout. Depending on the size of the Air Force element and/or airfield, A/DACG personnel may be required to off-load equipment, cargo and passengers. It is important to establish the systems necessary to collect and transmit ITV information and set the procedures to forward closure reports to the TSC.

3-16. A sustainment brigade with an attached TTOE is not needed to open an aerial port, but elements of these organizations should arrive shortly after the port is open to establish distribution and RSOI operations. A sustainment brigade will provide oversight, guidance and initial mission command of TSC forces during expeditionary theater opening. The TTOE provides the sustainment brigade commander with the staff capability to properly supervise operations at aerial ports as well as initial movement control to execute distribution operations. Though the RPOE element of JTF-PO would not normally fall under the mission command of a sustainment brigade, the RPOE should receive its distribution instructions and route clearance through the sustainment brigade.

TERMINAL OPERATIONS

3-17. Once the A/DACG or RPOE is in place and synchronized with their air mobility force counterparts, then air terminal operations can begin. See figure 3-2 on page 3-6 for a notional air terminal layout. Air terminal operations can be separated into two functions which are arrival and departure operations. Regardless of whether an airfield is designated as an APOE or APOD the process of receiving and dispatching passengers, equipment, and supplies remains the same. Airfields designated as either an APOE or APOD may have a larger throughput capacity and will require additional resources compared to other air terminals in the AO.

3-18. An arrival operation at an air terminal is the process of receiving passengers and/or cargo via airlift. Numerous functions occur during this process to include off-load, marshaling, providing essential field services, clearing personnel/equipment/cargo from the terminal, and maintaining ITV. The main areas of the airfield for debarkation are the off-loading ramp, holding area, and unit marshaling area. The A/DACG and air mobility force will ensure that arriving aircraft are off-loaded in a timely manner and equipment, supplies, and personnel proceed immediately to the holding area. Normally the air mobility force is responsible for the unloading of aircraft but for small airfields or airfields supporting a brigade combat team or smaller size unit, the A/DACG could be responsible for the physical off-load of the aircraft. Additionally, the air mobility force is responsible for passenger reception but the A/DACG can be responsible to meet arriving passengers at the aircraft and process them through the terminal if that air mobility force capability is not available.

3-19. The off-load ramp activities are controlled by the air mobility force. Each load will be released to the A/DACG for return to unit control at the holding area; the cargo holding area is sometimes referred to as the inbound yard. Arrival of personnel and equipment can coincide with arrival or draw of equipment, either at the APOD, SPOD, or at the prepositioned stock sites. When unit personnel arrive, they may move:

- Directly to a unit marshaling area if the unit moves with its equipment.
- To prepositioned stock sites to receive equipment.
- To aircraft for intra-theater air movement (air-to-air interface).
- To the SPOD to receive unit equipment off-loaded from ships.
- To holding areas, if equipment arrival is delayed.

3-20. The JTF-PO or A/DACG will request transportation for passenger onward movement if the movement was not programmed. It is important for the JTF-PO or A/DACG to pass pre-arrival passenger and cargo data to the RSOI proponent. This information may be redundant but it provides the needed revalidation for movement requirements and is critical in the synchronization for RSOI and terminal

clearance. Terminal clearance should be incorporated into the movement program to ensure resources are allocated to support a force deployment or daily distribution requirements.

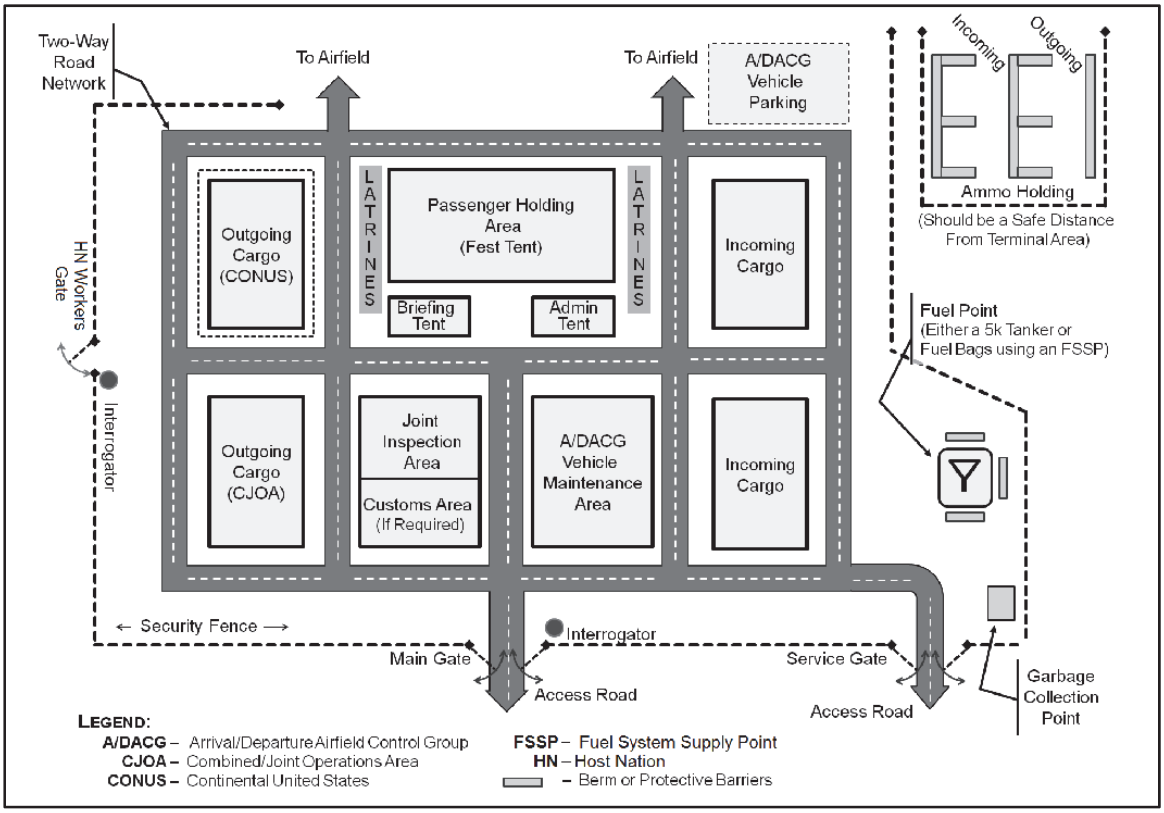


Figure 3-2. Notional air terminal layout

3-21. The A/DACG will coordinate with the deploying unit and arriving passengers to provide off-load teams for baggage pallets and vehicles. The A/DACG will establish procedures to ensure accountability of pallets, nets and shipping containers is retained throughout the reception process and that shipping equipment is returned to the air mobility force for retrograde as soon as practical.

3-22. In the holding area the A/DACG will assemble personnel, cargo, and equipment for movement to the units' marshaling areas, maintain accountability of cargo until local unit pickup or until requested transportation arrives. A/DACG will inbound clear departing cargo to the destination MCT when it is not a unit pickup. Other holding area tasks include:

- Maintain and report cargo and passenger arrivals in the appropriate information automation system.
- Collect and return all aircraft pallets, nets, shipping containers, and dunnage to the air mobility force.
- Accept, inventory, and control the aircraft loads.
- Establish a discrepancy correction area for cargo and documentation.
- Inspect documentation for accuracy and completeness.
- Ensure passengers are accounted for.
- Provide emergency maintenance, petroleum, oil, and lubricants (including defueling capability), and related services.
- Establish a traffic flow pattern.

3-23. Unit marshaling or forward node areas should be established to allow for rapid terminal clearance thus reducing port congestion and the potential for slowdowns or work stoppages in off-loading operations. These areas could be located on the same base as the airfield or on another base in close proximity but they

are important to free up the limited staging space at air terminals. The A/DACG should have organic trucks to assist in moving cargo from the terminal but additional truck support is needed for terminal clearance to support RSOI or increased sustainment cargo flows.

3-24. A departure operation at an air terminal is the process of preparing and loading personnel and equipment for air movement from the terminal. The process includes manifesting and air load planning, preparing and inspecting equipment, and the loading of aircraft. As with the debarkation process, the tasks for the A/DACG will vary depending on the air mobility force capabilities. Below are some additional functions the A/DACG may be required to:

- Coordinate and establish a passenger processing/holding area.
- Determine passenger eligibility.
- Brief passengers on departure times.
- Weigh troops and baggage.
- Manifest passengers or coordinate manifesting procedures.
- Escort passengers to and from the aircraft.

3-25. The departure airfield is organized around four separate activities: marshaling area, holding area, call forward area, and the ready line and loading ramp area. These areas may or may not be located on a contiguous piece of ground.

3-26. The marshaling area is where units move to complete vehicle and cargo preparations for aircraft loading for redeployment or an intra-theater movement. The marshaling area can include the temporary, fixed, or field facilities for transportation, communication, and lodging and the areas that support those functions. The unit is responsible for activities conducted within the marshaling area. In this area, the unit prepares for air movement by assembling vehicles, equipment, supplies, and personnel into chalks.

3-27. The holding area is the vehicle, equipment, cargo, and personnel control area. It is used to assemble, inspect, hold, and secure aircraft loads; this area is also referred to as the outbound yard. The A/DACG is responsible for activities conducted within the holding area. If the air mobility force has the responsibility for passenger manifesting, the A/DACG will not be required to establish a holding area for passengers. Control of chalk is transferred to the A/DACG upon completion and acceptance of vehicles, equipment, cargo, and personnel and the A/DACG calls for movement from the holding area to the call forward area.

3-28. The activities conducted within the call forward area are the responsibility of the A/DACG with assistance from the air mobility force. In this area the unit, A/DACG, and air mobility force members conduct a joint inspection and correct discrepancies. This is the final check to ensure that all cargo and equipment is properly prepared and documented for safe and efficient air shipment.

3-29. The air mobility force controls activities conducted within the ready line and loading ramp area. In this area, the air mobility force receives vehicles, equipment, cargo, and personnel from the call forward area; directs aircraft loading in conjunction with aircraft load masters; supervises the supported Service while loading and restraining cargo aboard aircraft; conducts additional briefings; and performs inspections, as required, to facilitate loading of the aircraft. At some air terminals the A/DACG may perform this function if the air mobility force capability is not present.

Chapter 4

Water Terminal / Port Operations

Water terminals provide a vital link between strategic and operational movement supporting deployment, sustainment and redeployment operations. This type of terminal provides the largest operational capacity to bring equipment and supplies into a theater of operation. This chapter will focus on the procedures in a theater during unified land operations and outline the Army's roles and responsibilities as well as the supporting relationships with joint partners primarily at fixed port facilities. Procedures at unimproved ports and bare beach facilities are more accurately covered in chapter 6 (Logistics Over-the-Shore) of this manual. Terminal activity at a seaport supports both the debarkation and embarkation process, and may do so simultaneously within a port complex.

ORGANIZATIONS

4-1. To establish, operate and sustain Army water terminals, it requires several organizations and units that must adapt to theater requirements. Each theater has requirements that determine size, type and duration of each organization and unit's involvement in establishing a water terminal, operating a water terminal or accomplishing both. See figure 4-1 on page 4-6 for an organization chart of organizations and units involved with water terminal operations.

TRANSPORTATION BRIGADE EXPEDITIONARY

4-2. The transportation brigade expeditionary (TBX), provides mission command of Army watercraft and water terminal capabilities and organizations. The TBX deploys to a theater of operation to provide mission command for port opening and operation at inland waterway, bare beach, degraded, and improved sea terminals. The headquarters is organized to provide the ability to rapidly deploy minimum capabilities to meet rapid port opening operations and small-scale contingencies. The support concept for the TBX is located in Appendix B.

SUSTAINMENT BRIGADE

4-3. When TBX is not available, a sustainment brigade is task organized with multiple functional units to accomplish three major missions, theater opening, theater distribution and sustainment. The sustainment brigade should be augmented with a TTOE to assist with staff oversight and management of water terminal operations to support port opening, RSOI, or the ongoing distribution operations if the missions dictates. A sustainment brigade, when assigned water terminal units and augmented with a TTOE, is capable of conducting the following functions:

- Mission command of Army Terminal Battalions.
- Provides brigade level support for Army water terminal operations and units.
- Ensures execution of the movement program supporting port clearance.
- Ensures the loading and off-loading of ships is in accordance with geographic combatant commander's priorities.

Transportation Theater Opening Element (TTOE)

4-4. The TTOE enhances the sustainment brigade's ability to conduct theater opening that includes opening and operating one or more water terminals. When a TTOE augments a sustainment brigade, by design, it integrates into the sustainment brigade's support operations section and gives the organization the

added ability to control port operations during all phases supporting unified land operations. After port operations have been established, all or part of the TTOE could remain with the sustainment brigade. The TTOE water terminal functions include:

- Provides advice on use and implementation of assigned, contracted, and host-nation terminal and water craft operations.
- Provides terminal infrastructure assessment.
- Monitors and coordinates operations and positioning of all water terminal operations in the AO.
- Monitors and maintains status of terminal assets in the AO to ensure efficient and effective use.

Transportation Battalions (Terminal)

4-5. Terminal battalions are normally attached to a TBX. Terminal battalions can command three to seven transportation terminal operations or watercraft companies that are required to load/unload up to four ships simultaneously at an established water terminal or up to two ships simultaneously at a LOTS site. Terminal battalions operate at both sea and inland water terminals and work closely with the local transportation movement teams. Terminal Battalions ensure that variations from the vessel discharge plan are coordinated with clearance mode operators. Proper coordination prevents unnecessary delays in port clearance.

Seaport Operations Company

4-6. A seaport operations company's mission is to discharge and load containerized cargo and wheeled/tracked vehicles at seaports. Also, it can administer and supervise contracts for stevedore and related terminal services in support of water port reception and clearance activities. A seaport operations company is normally assigned to a port or joint logistics over-the-shore complex operating under the TSC or a sustainment brigade conducting theater opening. Its capabilities include:

- In a fixed port: discharge or load up to 375 containers, 750 wheeled/tracked vehicles, or 1,875 STONs of break bulk cargo per day.
- In a LOTS operation: discharge or load up to 150 containers, or 750 STONs of break bulk cargo, or 450 wheeled/tracked vehicles per day.

Automated Cargo Documentation Teams

4-7. Automated cargo documentation teams are table of organization and equipment units employed at fixed ports, inland waterways and LOTS water terminal operations for ocean cargo accounting and documentation. These teams have the capacity to provide documentation for break bulk, container, and RO/RO cargo being discharged from up to two ships in fixed ports; documentation for unloading one ship in a LOTS operation; and documentation for loading one ship in a fixed port or LOTS operations. Automated cargo documentation teams are attached to terminal battalions or could augment SDDC units.

SDDC Transportation Brigades

4-8. SDDC's transportation brigades are table of distribution and allowances units. The mission of the transportation brigade is to manage strategic maneuver of deploying/redeploying forces and sustainment moving in the DTS. They command, control and supervise assigned and attached transportation battalions and deployment and distribution support battalions engaged in terminal operations, terminal supervision and management operations and other mobility support operations. The Active Army transportation brigades differ in organization design, size, and capability. All were designed to meet geographic and/or commodity specific mission requirements.

4-9. SDDC's Active Army and United States Army Reserve transportation brigades can perform the following functions:

- Command, control, and technically supervise assigned or up to five attached subordinate transportation battalions performing terminal services and traffic management.
- Arrange and provide ocean terminal services for import/export cargoes sponsored by DOD.
- Direct and manage SDDC common user water port terminals.
- Administer contracts for liner services and stevedore and related terminal services.

- Develop and implement programs, plans, and policies for assigned and attached units and contract/wartime host-nation support providing surface mobility support.
- Open a seaport to support deploying forces for a theater opening.
- Serve as a nucleus transportation organization during early stages of a build-up of an immature theater.
- Serve as the primary command element for implementing container management policies and processes in an AO.

SDDC Transportation Battalions

4-10. SDDC has two types of battalions, active duty transportation terminal battalions (TTB), and deployment and distribution support battalions resourced by the Army Reserve, which when deployed are OPCON to SDDC to provide augmentation to SDDC's terminal management mission.

Transportation Terminal Battalions (TTB)

4-11. TTBs were designed to meet global mission requirements at the strategic level to support SDDC's port management and container management missions. Although the TTB missions vary, common elements include:

- Arranging and providing contracted ocean terminal services for import/export cargoes sponsored by DOD.
- Providing military common-user water terminal service.
- Synchronizing DTS surface cargo movements and providing traffic management and single port management for DOD in peace and crisis.

4-12. The TTBs' functions and capabilities vary but all of them can perform the following:

- Monitoring contractor performance related to stevedore and related terminal services contracts and executing basic ordering agreements with ocean carriers and motor carriers.
- Performing manifesting, customs clearance, RFID processing, and cargo outturn reporting at a water port.
- Performing assigned water clearance authority responsibilities.
- Providing DTS container management and accountability.
- Training and deploying Deployable Port Management Teams supporting deploying units at posts, camps, and stations.

Deployment and Distribution Support Battalion

4-13. Upon mobilization, the mission of deployment and distribution support battalions are to command, control and technically supervise assigned and attached military units engaged in terminal operations or to manage civilian and contractor terminal operators in a single water port.

4-14. The deployment and distribution support battalions have capabilities to perform the following functions:

- Mission command and technically supervise attached modified table of organization and equipment terminal, units, movement control units, or deployment/distribution support organizations when required.
- Serve as single port manager for a strategic seaport.
- Perform Container Management operations in support of SDDC's end-to-end distribution mission.
- Manage multiple contracts supporting terminal operations within the port. This includes the capability to:
  - Plan, establish and conduct port operations to include cargo reception, staging, load planning, vessel load/discharge operations, and port clearance.
  - Provide documentation services to facilitate ITV and total asset visibility.
  - Monitor stevedore contractors and provide timekeeping services.

- Provide guidance and supervision for all cargo handling.
- Coordinate with various outside agencies such as deploying units, MSC, United States Coast Guard, and Port Authorities.

4-15. The deployment and distribution support battalion in addition to its mission command and technical supervision capability has two types of teams embedded within its structure. Those teams are:

- Deployment and distribution support teams.
- Terminal management team

4-16. Deployment and distribution support teams work both deployment and redeployment. Deployment and distribution support teams normally deploy to the post, camp, or station from which an Army unit is initiating a deployment. Upon arrival, the deployment and distribution support teams will assist the unit and the servicing installation transportation office (in CONUS but directly assist redeploying units in theater) with the technical aspects (to include documentation) of loading the unit's equipment onto conveyance for movement to the seaport of embarkation (SPOE).

4-17. The terminal management team provides capability to manage all the activities associated with a single berth in a water port, around the clock. Terminal management teams when augmenting the sustainment brigade provide management of port operations and works in coordination with the Port Management Team (PMT).

Terminal Supervision Team (TST)

4-18. A TST is a table of organization and equipment unit that deploys to a theater of operation to provide organic, multimodal, single ship, dual shift, 24 hour supervision of contract labor hired to receive, clear, and move forward cargo and personnel from conveyances and terminals located at ports or inland cargo transfer points. A TST provides cargo documentation and in-transit visibility services in support of contracted terminal operations. The TST's mission is to manage port or inland terminal operations services by administering and supervising contracts for stevedore and related terminal services in support of port or terminal reception and clearance activities. When operating at an inland water port, the TST will normally be augmented with a PMT. When combined, this enhanced unit will operate primarily at water terminals ranging from degraded to improved commercial ports.

Port Management Team (PMT)

4-19. A PMT is a table of organization and equipment unit that augments SDDC to supervise, manage, administer, or monitor contract labor or host-nation support at a sea or inland-water port area in a theater of operations for stevedore and related terminal services. A PMT's mission is to manage, supervise, administer, and/or monitor vessel and seaport operations performed by contractor and/or other labor forces. A PMT can:

- Perform single ship, dual-shift support vessel upload or off-load operations on a 24 hour basis.
- Provide limited documentation capability for single ship operations (ships smaller than large, medium speed roll-on/roll-off (LMSR) for example, conventional RO/RO ship).
- Perform vessel manifesting, stow planning, and tracking of cargo entering or leaving a port or terminal.
- Provide the capability to process unit equipment lists for redeployment unit equipment and cargo.

4-20. When attached to a TST, the PMT can:

- Open and operate multiple berths at up to two terminals in one port with contract labor.
- Provide automated cargo documentation, vessel and port reception/clearance, stow-planning, organic automation maintenance, and ITV of all cargo flowing through the port.
- Receive and document one LMSR class vessel on a continuous, sustained basis.
- For short periods of duration, this combined unit can be reconfigured to accommodate two simultaneous ship operations.

4-21. Port support activity (PSA) is an ad hoc organization consisting of military, civilian, and/or contracted personnel with specific skills to aid port operators in receiving, processing, staging, and loading /discharging unit cargo at water terminals in CONUS or in a theater of operations. Port support activity responsibilities can include licensed operators to drive wheeled and/or tracked vehicles and provide maintenance for those vehicles. SDDC has responsibility to provide a port support activity and in CONUS SDDC requests augmentation from FORSCOM, IMCOM or USAMC, as appropriate, to provide personnel to augment the port operator. OCONUS, SDDC requests augmentation from the geographic combatant commander. Since the port support activity is generally used in support of Army forces, the geographic combatant commander may delegate the responsibility to the TSC/ESC. As tasked, the TSC/ESC will coordinate the port support activity as part of the RSOI and redeployment process and may delegate responsibility to the sustainment brigade with the theater opening mission or providing support to the area for redeployment. The TSC/ESC will coordinate with SDDC for the port support activity requirements based on the unit, type of equipment, and vessel load/discharge window. Using personnel from the owning unit is preferred but may not be practical to meet various mission timelines. The operational environment could allow the use of contracted labor to perform the port support activity mission which allows for continuity operation and decreases the number of tasks for deploying/redeploying units. SDDC is responsible for contracting port support activity support in theater for a contingency operation.

Rapid Port Opening Element

4-22. Rapid port opening element (RPOE) is the surface element of both the SPOD and APOD mission. The RPOE is an Army unit that CDRUSTRANSCOM has OPCON that when required can enhance a joint expeditionary capability to rapidly establish and initially operate a seaport of debarkation. The JTF-PO SPOD capability is designed to handle at least one ship at one berth in a fixed port, 24 hours a day, and 7 days a week. Minimum desired throughput is one vessel with 250,000 square feet (minus broken stowage) discharged every 72 hours. It may also establish joint ITV and RFID networks at the SPOD and forward node, with the goal of capturing 100 percent ITV of arriving cargo at both the SPOD and forward node. The RPOE facilitates the movement of cargo from the pier to a forward node no further than 10 kilometers from the POD.

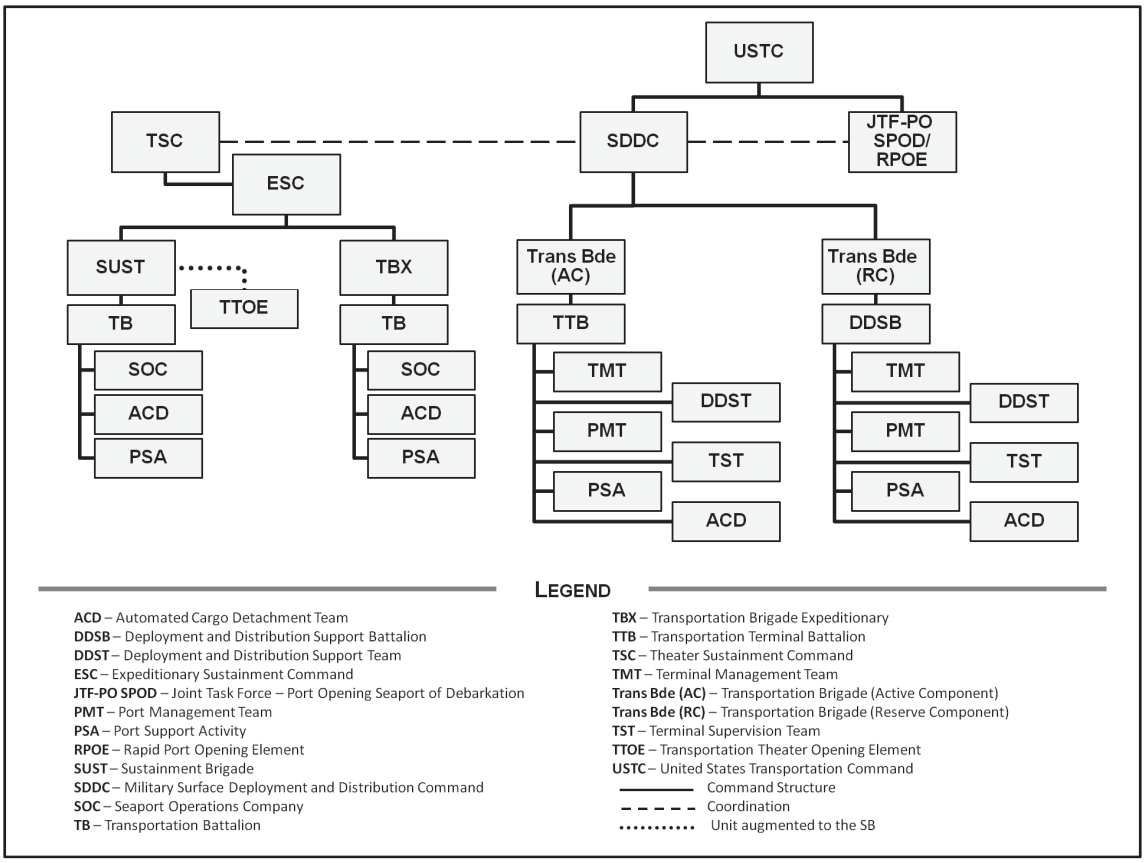


Figure 4-1. Water terminal organizations and units

RESPONSIBILITIES

4-23. Water terminal operations require planning, coordination, and execution between several organizations. These organizations have different responsibilities that are critical to the overall success of water port operations. Key functions of water terminal operations and the responsible organizations include:

- Seaport of debarkation selection for deployments is the responsibility of the supported geographic combatant commander in coordination with USTRANSCOM.
- Port Management is a responsibility of USTRANSCOM who has designated SDDC as single port manager for seaports of debarkation.
- Port Operations. Army units and SDDC's contracted labor perform as port operator.
- Reception, staging, onward movement and integration is the responsibility of the TSC.

PORT MANAGEMENT

4-24. Port management is the process of planning, directing, and controlling the flow of cargo through water ports (CONUS and outside the CONUS [OCONUS]) to support United States Military deployment and sustainment operations. Port management has a different focus from port operations. Port management focuses on flow (throughput and adjusting workload between ports) as compared to port operations, which focuses on cargo handling/transfer activities within a port. In laying the groundwork for the port management concept, the following must be considered:

- Military capability is required to manage and possibly operate port(s) in theater.

- Geographic combatant commander determines command and control relationships between units with responsibilities at theater ports.
- METT-TC provides the geographic combatant commander information and data for consideration in determining water terminal force structure and command relationships.
- SDDC is single port manager for SPOE and SPODs and can delegate single port manager to its transportation brigade for a specific SPOE or SPOD

4-25. Port Management has two levels of detail – strategic and operational. Strategic port management focuses on the DOD's capability to manage flow of unit equipment and sustainment cargo to and from water port critical nodes in DTS. Operational port management focuses on physical activities at the SPOD.

STRATEGIC PORT MANAGEMENT

4-26. SDDC is the only DOD activity that executes strategic port management that focuses on managing the flow of deployment, redeployment, and sustainment cargo through the DTS. SDDC's primary functions with respect to strategic port management include:

- Policy development. SDDC develops and implements policies and procedures for water port management, worldwide.
- Port Selection. It is the process to identify candidate ports to support deployment and sustainment throughput requirements. SDDC provides expert advice and recommends the port, or combination of ports, to meet the geographic combatant commander's operational requirements. The supported geographic combatant commander has final authority on port selection based on mission needs and regional political considerations.
- METT-TC analysis. METT-TC affects the numbers and types of water terminal personnel, units, and equipment necessary to meet deployment, redeployment, and sustainment throughput requirements.
- Port workload distribution. During an ongoing deployment/sustainment operation with multiple ports available, SDDC will constantly monitor the workload status in each port within the AO. SDDC will coordinate with any agencies (MSC, commercial shipping companies, and military or commercial land transportation organizations) to match throughput requirements to available port capabilities.

4-27. As single port manager, SDDC supports the joint task force/commander, task force/geographic combatant commander's staff and performs the following functions:

- Participate in geographic combatant commander operations plan development and analysis.
- Conduct assessments of contingency ports to include a transportation engineering assessment.
- Advise geographic combatant commander of the appropriate mix of military and civilian personnel/units and equipment required for a given contingency based on METT-TC.
- Establish liaison with designated host-nation port authorities for acquiring water terminal facilities and related services.
- Develop statement of work and contract for available stevedoring and related terminal services.
- Operate Global Air Transportation Execution System (GATES) Surface, integrated computerized deployment system (ICODES), Integrated Booking System (IBS), and other theater water terminal transportation/logistics automated data processing systems.
- Book inter- and intra-theater surface cargo on MSC controlled common-user ships and liner service.
- Provide common-user container management services.
- Administer the Universal Services Contract for intermodal sealift service for DOD activities worldwide.
- Arrange for transition of military personnel and units to a commercial contract or host-nation support.
- Participate in planning and execution of redeployment.
- Workload the port, such as provide vessel discharge priorities, ship schedules, and manifest data to the port operator based on the geographic combatant commander's priorities.

- Provide inter-theater documentation oversight, documentation services for MSC negotiated commercial liner contracts, and other documentation services as determined by METT-TC.
- Provide communication/automated data processing technical support for transportation/logistics automated data processing systems related to theater water terminals.

OPERATIONAL PORT MANAGEMENT

4-28. Operational port management focuses on planning, organizing, and directing the operations and functions in a single port or in the small number of relatively contiguous ports supporting operations within an AO. SDDC's Transportation Brigades and Battalions execute Operational Port Management. Operational Port Management includes:

- Technical supervision of military units during cargo operations at a port.
- Managing contracted civilian organizations conducting cargo operations at a port.
- Provide/coordinate establishment of the PSA.
- Perform vessel loading/discharge planning.
- Provide documentation/ITV.

PORT OPERATIONS

4-29. The port operator manages all activities involving physical movement of cargo. As port operator of a contingency SPOD, the sustainment brigade, TBX, or TTB will perform various functions. These functions include:

- Port preparation and improvement.
- Cargo discharge and upload operations.
- Harbor craft services.
- Ship-to-shore movement of cargo and lighterage control.
- Heavy lift services.
- Port clearance control.
- Marshaling yard activities.
- Cargo documentation for reception, staging, and onward movement of personnel, equipment, and supplies to provide ITV to the supported geographic combatant commander.

4-30. A sustainment brigade and SDDC's units can operate at the same port. SDDC always has the port manager responsibilities but both organizations can have units responsible for the load and off-load of ships at different berths. For example, a sustainment brigade's units can conduct terminal operations for an intra-theater lift vessel on a berth while SDDC units conduct operations for an inter-theater lift vessel on another berth.

PORT OPENING

4-31. Except in the case of forcible entry, port opening elements should precede the arrival of deploying Army forces. In the context of this chapter port opening is the process of establishing an SPOD to receive deploying forces, their equipment and/or cargo to accomplish unified land operations. The processes outlined can also be used to establish additional water terminals during contingency operations.

4-32. There are three different force packages used to accomplish the Army's mission associated with port opening and operations depending on the time from identifying the requirement to execution of the mission and/or if contracted labor is available. If contract labor is available for stevedoring and other transportation services, the RPOE can be used when there is insufficient time to request enduring force structure through the request for forces process, such as a crisis action plan supporting foreign humanitarian assistance or disaster relief operations. If contract labor is available the enduring SDDC units also provide port opening capability when they have the requisite time to assemble and deploy their force. If contract labor is not available then an Army terminal battalion, seaport operations company and automated cargo documentation team are needed to conduct the port operations task associated with port opening. Regardless of the forces

used to conduct/supervise port operations, SDDC elements are needed for the port management responsibilities related to port opening. The port opening element needs the capability to:

- Perform port, transportation network, and forward distribution node assessment and surveys.
- Open the SPOD and begin Seaport clearance operations.
- Prepare for SPOD management operations.
- Establish ITV and RFID network on the port and at the forward distribution node if necessary.
- Initiate intermodal platform management procedures.
- Establish initial movement control capability if necessary.
- Establish staging areas.
- Facilitate the unit's ability to receive and re-assemble / organize the cargo for operations.
- Manage PSA for discharge operations as required.
- Facilitate and enable the geographic combatant commander's joint RSOI operations.
- Establish and provide interface for operational and host-nation contracting.

4-33. JTF-PO and SDDC forces may be directed by the combatant command or joint task force to establish communications with the TSC or one of its designated subordinate units to facilitate the theater distribution plan/movement program supporting the port clearance operation. JTF-PO forces may clear the port to their designated forward node but could be instructed by the TSC or its designated subordinate unit to redirect cargo to a more permanent distribution hub once established. If the TSC directs movement to a distribution hub outside of 10 kilometers from POD, JTF-PO forces may need additional augmentation. If contract support is limited or nonexistent, early entry TSC forces maybe needed to augment SDDC capabilities or perform the entire port operations mission. Required theater sustainment command force structure can include:

- A terminal battalion to provide the appropriate level Mission command.
- A seaport operations company for the off-load of vessels.
- An Automated Cargo Documentation Team; an MCT to facilitate the onward movement of cargo and the staging of outbound convoys.
- Heavy to medium truck transportation assets to move both containerized and break-bulk cargo.

4-34. Early entry TSC headquarters units such as elements of a sustainment brigade with an attached TTOE and elements of a CSSB should be in place by a ships arrival to execute their theater opening mission by coordinating and synchronizing initial distribution operations in support of port clearance and RSOI. Additionally, if an MCT is not in place during the early stages of the port opening process, SDDC and JTF-PO forces can request additional military truck assets through the sustainment brigade and request any march credits as needed for any JTF-PO organic transportation used for port clearance.

TERMINAL OPERATIONS

4-35. Water terminal operations are conducted at a port, bare beach or off-shore anchorage. Terminal operations include planning and conducting activities to load and unload vessels, whether Army watercraft (organic), Military Sealift Command ships and commercial ships.

SHIP ARRIVAL PLANNING

4-36. Ship arrival at the port involves key organizations that are responsible for making all necessary plans for berthing, port operations and customs clearance in accordance with defense transportation regulation (DTR) 4500.9-R, Part V. Moreover, surface shipping destined for a major overseas theater may move in Navy-controlled convoys or under Navy supervision. This results in wide fluctuations in terminal workloads as ships arrive in groups rather than individually. Careful advance planning and constant coordination are required to determine where each ship should be discharged and to what destinations its passengers and cargo should be shipped.

4-37. Before moving or unloading cargo, a boarding party boards the ship to coordinate with the vessel master. In small operations or when the vessel calls on the port frequently, the boarding party may consist of only the boarding officer, normally the battalion operations officer or seaport operations company

commander. During this visit and inspection of the ship and cargo, the boarding party may decide to alter the discharge plan made before the ship arrives. Unforeseen conditions such as damage to the ship's gear, unexpected priority cargo, or oversize or heavy lifts not noted on advanced stow plans, may change the initial discharge plan. In more complex operations or when the ship calls on the port infrequently, the boarding party may be composed of any or all of the following personnel:

- Seaport operations officer determines and reports the general condition of the ship's equipment and facilities and delivers pertinent terminal regulations and the terminal commander's orders to the vessel master and to the military troop commander. The seaport operations officer obtains copies of the ship's papers when advance copies have not been received and determines major damage to or pilferage of cargo and obtains other information pertinent to unloading the vessel's cargo.
- Customs representative check for clearances, narcotics, weapons, and contraband and performs other necessary customs activities according to theater directives and host-nation laws.
- MSC representative determines from the ship's officers the requirements for repairs, fuel, and storage and delivers MSC instructions to the vessel master.
- Surgeon and/or veterinarian checks for communicable diseases, sanitary conditions of personnel spaces and facilities, and condition of perishable cargo.
- Harbormaster coordinates matters on berthing, tug assistance, and employment of floating cranes and other harbor craft assigned.
- Vessel master coordinates the detailed plans for cargo loading and unloading.
- Watercraft unit representatives coordinate plans using watercraft to unload vessels at anchorage berths.
- Troop movement officer coordinates plans to move troop units or casuals through the terminal.
- MP representative determines the needs and plans for providing MP support required during unloading and debarkation operations.

4-38. Although the boarding party coordinates with the vessel master when the ship first arrives, the vessel master normally designates one or two of his officers for coordinating operational matters. Frequently, the vessel master may direct that his representative be notified of changes in stow plans, when ship's gears are rigged or spotted, when hatches are opened or closed, when heavy lifts are rigged, or when the vessel sustains any damage. It is not unusual for vessel masters to insist that the ship's personnel rig the ship's gear, open and close hatches, or even operate winches. These requirements should be coordinated early in operational planning and the special requirements noted in the ship's files so planning for subsequent discharge operations is easier.

PORT OPERATIONS PLANNING

4-39. Incoming ships are directed to specified terminals for discharge based on the workloads of theater terminals, the relative location of depots for inbound cargo, throughput cargo, and the capabilities of segments of the transportation system. Terminals will vary in size and capability that are considered during port operations planning. Furthermore, terminal layout can facilitate movement of cargo in and out of the port. See figure 4-2 for a layout of a notional water terminal.

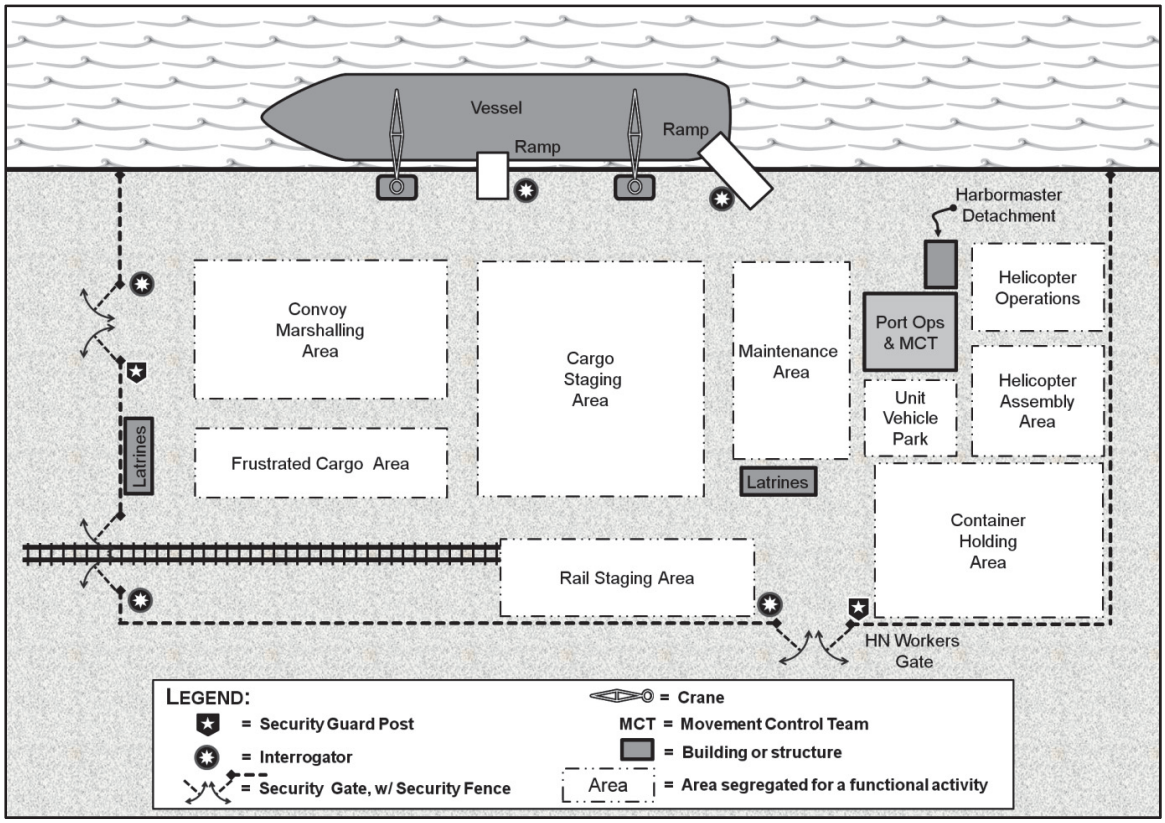


Figure 4-2. Notional water terminal

TERMINAL ACTIVITIES

4-40. Key terminal activities include cargo loading, discharging, disposition, clearance, documentation and marshalling.

Discharge Operations

4-41. The cumulative amount of cargo that can be discharged from each type of berth is the terminal discharge capacity. This is an evaluation of discharge facilities and equipment found on the berths as well as on the type of ship to be docked on the berths. It is expressed in short tons, containers, measurement tons, square feet, or numbers of personnel.

4-42. Estimated discharge capacity for break-bulk berths operating on a 24-hour basis at 75 percent availability of container-handling equipment is 1,875 STONs of break-bulk cargo discharged each day per berth.

4-43. For lighters berth using one crane per lighter during discharge operations, the berth can discharge 300 STONs of break-bulk, 450 STONs of ammunition, or 200 containers per day.

4-44. A RO/RO berth's loading and discharging areas for various classes of RO/RO vessels vary greatly. Since MSC vessels are loaded under conditions more likely to be encountered during a military contingency, their short-term rate of 600 measurement tons or 3,898 square feet of cargo per hour is recommended for planning purposes. A RO/RO terminal should have 10 acres of open hard surface space with at least a 100-foot apron.

4-45. Underdeveloped container berths have a discharge rate of 300 containers per day that applies when off-loading or loading containers using Army heavy lift cranes working at anchor alongside a ship in an underdeveloped fixed port. If back-loading is conducted at the same time as off-loading, the back-loading

rate equals about one-half of the discharge rate for off-loading only. This berth should have at least a 100-foot apron.

4-46. Developed fixed container terminals using container-handling cranes have a simultaneous discharge and loading rate between 700 and 800 containers per 24-hour period. The rate of discharge at any container terminal depends on the type of container-handling equipment, type of ship being worked, and the number of container cranes used. The number of cranes per terminal and berth often varies between terminals. The size of the container does not affect the rate of discharge. If container-handling and transport equipment is available, all containers can be handled at the same rate. Also, barges have a set discharge rate at a developed fixed container terminal of two barges every 25 minutes and one container ever 3 minutes (if containers are carried in lieu of barges on the main deck).

4-47. Many factors affect production during discharge operations. Weather, sea state, visibility (fog and darkness), crew experience, the type of lifting gear (shore crane or ship's gear), cargo stow tactical situation, and terminal congestion and packaging all affect discharge productions. The sum of these positive and negative influences results in the number of lifts that can be obtained per hour. Lift capacity can be computed by hatch or for the entire vessel. It can be obtained by timing the lifts for a specified period or by computing information from tally sheets at the end of a shift.

4-48. Unit discharge productivity specified in applicable table of organization and equipment is adequate for general planning purposes. However, it should not be used to measure unit efficiency. The fact that a unit does or does not discharge 1,875 STONs per day may have little relationship to real efficiency without adequately considering the factors mentioned in the previous paragraph. These factors and others promote or detract from actual productivity. Unit efficiency must be judged on the basis of factors and conditions as they affect a specific discharge operation. Attaining 1,875 STONs of production is insufficient if a majority of the unit was idle or less than gainfully employed, or if the operation was inefficient as reflected by unnecessary or excessive nonproductive time. On the other hand, attaining a lesser tonnage production might be considered exceptional if accomplished under less than ideal circumstances (such as operational variables and difficulties and insufficient table of organization and equipment.) Personnel responsible for managing cargo discharge and port clearance operations must constantly evaluate those operations to improve efficiency and productivity. Assigning a seaport operations company to work a general cargo vessel would waste manpower if all hatches were not scheduled to be worked. On the other hand, an extra gang or shift on a long hatch might result in the ship sailing a day earlier than normal operations might allow. In the case of unit moves on RO/RO vessels, productivity may increase if personnel from the moving unit unlash rolling stock (wheeled vehicles) and drive vehicles off the ship under the supervision and direction of terminal service personnel. This procedure allows the bulk of the terminal service personnel to work, in total or in part, another vessel. Unit productivity and efficiency is vastly improved.

Cargo Disposition

4-49. Upon determining the terminal of discharge and based on cargo destination information, the TSC issues cargo disposition instructions and determines the mode of transport to move cargo from the terminal of discharge to its destination through its' movement program. This information, along with vessel manifest information, is relayed to the terminal battalion responsible for the terminal where the vessel is to be discharged. Extracts are furnished to the consignee and to interested transportation movement control activities that use them to plan receipt of the cargo. Based on cargo disposition instructions, the terminal battalions plan and give specific assignments to terminal units for discharge of vessels and terminal clearance. After the disposition of the incoming ship is decided, the terminal brigade or group must coordinate a number of actions before ship discharge and port clearance operations can commence. These actions mainly consist of the following:

- Receive detailed cargo disposition instructions for military and civilian aid cargo, including diversions and detailed routing instructions from the TSC.
- Arrange clearance of personnel and cargoes directly forward, bypassing rear area facilities.
- Assign individual ship berths. Ship berth assignments require coordination with local MSC representatives and may also involve local host-nation authorities. The assignments are usually made at the terminal battalion level. Detailed disposition and routing instructions for personnel, U. S. multinational military cargo and military aid cargo, require coordination with the TSC.

Any liaison officers attached to the TSC may coordinate the latter. Disposition of civilian aid cargoes requires liaison with government representatives of the recipient nation. Foreign liaison officers and U. S. civil affairs personnel may assist in this matter. The TSC provides detailed routing instructions for U. S. military cargo and has MCTs at each discharge site to assist terminal personnel.

4-50. The single port manager has overall responsibility for terminal operations at a SPOE/SPOD. Specifically, four areas of port operations when accomplished enable onward movement of cargo to build combat power. Automated systems, see appendix C, marshaling, terminal activities and documentation make up the four areas with each having multiple tasks that are performed by terminal organizations and units.

Cargo Clearance

4-51. The MCT representative coordinates with the terminal and mode operators for placement of appropriate transport at locations and times necessary to clear cargo from the terminal. This is based on the location of and the requirements for transport. Cargo clearance is the act of moving cargo from shipside or temporary storage to its first destination outside the terminal operating area. This first destination may be the final destination or it may be a rear area depot. Destinations will be identified in the cargo disposition instructions.

4-52. Prompt clearance of cargo is important. It is essential to the efficiency and success of the total theater logistics systems. It is also necessary to avoid congestion in the terminal area. A continuing cargo backlog feeds on itself and slows operations to a point that the entire terminal effort collapses. Also as cargo builds in the terminal, it reduces the amount of dispersion that can be achieved. This increases the security risk. It also increases the requirements for camouflage and deception schemes to provide operational security.

4-53. The most efficient method of clearance is to discharge cargo directly from the ship to clearance transport. However, operating conditions often do not permit this. The following conditions may prevent direct clearance from shipside:

- Cargo that cannot be segregated without delaying operations.
- Special situations that require segregation by time, lot, or weight.
- Lack of proper transport.
- Inability of receiving installations to accept cargo.
- Delays in receiving cargo disposition instructions.

4-54. When such conditions exist, cargo should be moved to temporary in-transit storage areas. Temporary in-transit storage areas are usually next to or very near the pier discharge area. Cargo should never be placed in temporary in-transit storage areas until every effort has been made to clear it from the terminal. If temporary holding is necessary, the cargo held should not exceed one day's discharge. It should be cleared from the terminal at the earliest possible time. If the amount of cargo in the temporary in-transit storage areas becomes excessive, a terminal transfer element (platoon or company) should be attached to the seaport operations company to load clearance transport equipment as it becomes available. The number and location of temporary in-transit storage areas within the terminal depend on many factors. Some of these factors consist of the following:

- Availability of suitable sites.
- Type and quantity of cargo to be discharged.
- Equipment and personnel available.
- Location and modes of transportation used in the terminal clearance operation.

4-55. The areas should have a hard, all-weather surface and should be located between the discharge points and the inland transportation net. This would permit efficient use of material handling equipment to move cargo from shipside to the area, within the area, and from the area to the transportation net. Emergency supplies and equipment for containing hazardous material spills should be readily available at or near temporary storage areas.

Vessel Loading

4-56. The main function of a terminal operation organization in a theater is the reception, off-load, and transshipment of personnel and material. However, sometimes personnel and supplies must be loaded aboard vessels. These outbound movements may vary from small- to large-scale shipments of cargo and/or personnel. The terminal commander's responsibility for outbound cargo is essentially the same as for inbound cargo. The main difference is that the operation is performed in reverse order. It includes initiating port release; booking, receiving, and stowing cargo; and preparing necessary documentation. SDDC assigns the loading mission to a terminal battalion and coordinates as necessary with the MSC.

4-57. The TSC sets up procedures to move freight from points within the theater to the terminal for further movement to CONUS or other destinations outside the theater. These procedures generally provide for the shipping agency to submit a request through its supporting MCT. Once the TSC receives the request, it then coordinates the necessary shipping actions at the periodic ship destination meeting.

4-58. SDDC issues cargo booking information to the terminal battalion operating the selected terminal. This information is used to preplan vessel stowage, storage requirements, and operational workload. When the berthing time of the vessel is definitely established, the battalion assigns the loading mission and sends the subordinate units information on the following:

- Location of the loading berth.
- Time that loading is scheduled to begin.
- Time that cargo is to be received.
- Estimated departure date of the vessel.
- Special cargo to be loaded and material handling equipment required.

4-59. Plans are made for the receipt, temporary holding, and movement of cargo to the loading area. The terminal battalion forwards port releases to the shipping agency. Port releases are carefully scheduled to prevent interference with the terminal clearance program and to avoid delays in loading.

4-60. When the nature of the cargo has been determined, the battalion prepares a prestowage plan for loading the particular vessel with the cargo. The appropriate vessel authority receives the prestowage plan for approval. Upon the vessel's arrival, the ship's master or his representative receives the plan for final approval. When the vessel is berthed, the holds, hatches, and the ship's gear are thoroughly inspected for any difficulty that might arise during loading operations.

4-61. The prestowage plan becomes the basis on which to call cargo forward to the terminal area. In calling the cargo forward, the battalion commander must consider planned loading time aboard ship and the area available for temporary holding if the cargo arrival time and loading time do not coincide. It is desirable to have enough cargo on hand to sustain one day's loading before starting loading operations. This ensures continuous loading in case some shippers cannot meet the planned port call date. Cargo received before the loading time must be moved into temporary intransit storage areas so as not to interfere with any clearance operations.

4-62. Retrograde cargo, such as containers, trucks, tanks, aircraft and military-owned re-mountable containers (MILVANs), being returned to CONUS are prepared and processed for CONUS Department of Agriculture quarantine inspection. This is done before cargo is loaded aboard aircraft or vessels. Plans should be made in advance to have adequate cleaning equipment and appropriate insecticide chemicals and rodent poison on hand. This ensures that retrograde cargo can be promptly and properly processed.

MARSHALING

4-63. The loading and discharging of vessels are dedicated to rapid, efficient, and controlled movement of cargo between ship and shore. Improvements in cargo packaging, particularly containerization add greatly to ship and cargo-handling productivity. The cargo marshaling yard is an essential part of this shore side operation. It provides a place to hold and process cargo pending further movement. See appendix D for marshaling yard operations. Also see appendix E for information about terminal capacities that are key to determining marshaling requirements.

DOCUMENTATION

4-64. Cargo moving through Army terminals is documented according to DTR 4500.9-R, Part II. The basic document for all cargo movements under these procedures is DD Form 1384 (Transportation Control and Movement Document [TCMD]). This form and its use are described below.

DD Form 1348

4-65. This multipurpose form can be prepared in a manual format or automated format. The manual version of the form is a seven-part document. Originated by the shipper for each transportation unit, the TCMD data (not necessarily the document) accompanies the shipment from the origin to the consignee. Detailed procedures for preparing and processing the transportation control and movement document (TCMD) and multinational documents are in DTR 4500.9-R, Part II. The TCMD is used for the following:

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

Note: While all of the DD Form 1348 formats contain the same basic information about a shipment, the automated format is used whenever both the preparing and receiving activities are able to prepare, transmit, and receive automated data.

Inbound Movements

4-66. For ships loaded in CONUS, SDDC transmits information to the discharge terminal and the JDDOC. The JDDOC provides a copy of the manifest to the TSC to incorporate into the movement program. The terminal battalion reproduces the incoming data in a format and in the number of copies needed to actually discharge the ship. The TSC provides detailed cargo disposition instructions. Upon the ship's arrival, the reproduced manifest is the basis for checking the cargo off the ship. The data on the quantity, identity, and condition of incoming cargo developed by the unloading terminal service unit are used to prepare the cargo outturn message and to reconcile the manifest. Upon reconciliation of the ship discharge data with the manifest, the terminal battalion prepares a cargo outturn report. The terminal battalion forwards the report to brigade headquarters for transmission to SDDC and other interested agencies listed in DTR 4500.9-R, Part II.

4-67. The TCMD is normally the basic document for checking and documenting incoming cargo. However, other forms, such as tally sheets, may be used for internal accountability. When drafts of cargo are moved away from the ship, the cargo checkers begin internal accountability. Throughout the terminal, cargo checkers check the cargo in and out and direct cargo to its next destination. When cargo is put into the intransit storage area and/or loaded aboard the clearance conveyance, the TCMD is properly annotated. The unit commander is responsible for the checkers. He determines how often the cargo must be checked and is accountable for all cargo. The system must be sound and must allow a smooth and constant flow of the cargo with an accurate accountability.

4-68. Except when cargo is moved directly from shipside to a local consignee, cargo must be reconstituted into transportation units, such as railcar loads or line-haul truckloads, before clearing the terminal area. These units may differ from those in which the cargo left shipside and may require new TCMDs. A copy of these new and more complete TCMDs accompanies the cargo to destination. The TCMD forms the basis for preparing bills of lading, freight warrants, and train manifest as required. The documentation section of the terminal battalion uses the hatch checker's partial TCMDs or tally sheets and the TCMDs prepared to cover onward movement to reconcile the ship's manifest. They are also used to prepare cargo outturn messages and outturn reports. Movement control personnel use them to notify consignees (report of shipment) in advance that shipments are en route and to follow the shipment's progress to destination.

Outbound Movements

4-69. Determination of what moves and its priority is coordinated by the TSC. Procedures for offering cargo for shipment, handling movement releases, and documenting outbound cargo are coordinated between the TSC or MCB and the ocean cargo clearance authority. Procedures are subject to theater regulations, as well DTR Regulation 4500.9-R, Part II.

4-70. The TCMD covers outbound movements in either manual or automated form. Freight warrants and/or bills of lading cover the cargo if it is shipped to the loading port by commercial means. The TCMD serves as backup for these documents. When planning for outbound cargo handling, the terminal commander must consider the size of the shipment and the type of cargo. These affect the choice of loading berth, equipment, and personnel. He must also consider the volume and schedule of inbound traffic and clearance requirements. The terminal service unit actually charged with loading the cargo prepares prestowage plans (which are subject to approval by the MSC) and the ocean shipping documents (manifest, stowage plan, and, if required, hatch lists). Integrated Computerized Deployment System (ICODES) is used to determine proper cargo placement and ship's stability while loading dry cargo ships. Upon receipt of ship loading data from the terminal concerned, SDDC transmits the cargo traffic message to the discharge port. It also forwards the ship's manifest data to destination by electronic means, airmail, or courier, as appropriate. If more than one loading terminal is involved, each must notify the next terminal of the ship's departure and must manifest the cargo loaded. The last loading terminal prepares the ship's departure message, cargo traffic message, and ship's manifest.

Daily Operations Report

4-71. In addition to the documentation required by existing regulations, SDDC or the sustainment brigade will normally require each terminal battalion operating a port or beach terminal to prepare a daily operations report. This report usually includes the following:

- Number of passengers embarked, debarked, and awaiting embarkation and debarkation; and the number of passengers to be handled during the next 24 hours.
- Number of tons (weight and measurement ton) of cargo by major category (general, vehicles, and petroleum, oil, and lubricants) that have been discharged, loaded, cleared (by mode) and awaiting discharge, loading, and clearance; and the number of tons booked and expected in the next 24 hours.
- Number of ships which have arrived, departed, remain in port, and are expected to arrive and depart during the next 24 hours; and the status of ships in port, such as discharging, loading, awaiting orders, and under repair.
- Workload for the previous months and anticipated for the next month.
- Summaries of available ship berths, number and capacity of lighters and trucks, number of gangs for ship and pier work, covered and open storage space, number or railroad cars that can be accommodated and cleared, and material handling equipment availability.

TRANSITION FROM PORT OPERATIONS TO PORT MANAGEMENT

4-72. For the Army to sustain a long-term operation there must be at least one large, highly capable water port available in the theater and it is vital that the Army be able to conduct operations within that port. While using the TSC's terminal units is appropriate when contract labor is not readily available or the environment is nonpermissive which would limit civilian assistance from contracting or Logistics Civil Augmentation Program, at some point during the overall operation, the situation within the port area will become less intense. At this time TSC terminal units can begin transitioning to a SDDC civilian contract labor capability. Figure 4-3 illustrates that the TSC terminal unit capability can deploy to open and operate a water terminal, and if the operational environment dictates these units can remain in place for an extended period of time. At some point during the operation, the environment may become sufficiently benign such that civilian contractor capability can be used. This is illustrated by figure 4-3, starting with units on the far left then moving right toward the small arrow labeled as transition. This transition point is significant for two reasons. They are:

- Transitioning to civilian contractor operational capability releases the TSC terminal units for use elsewhere. They can be deployed back to home station or to open and begin operating another water terminal within the AO.
- Transitioning to civilian contractor operations reduces the force structure constraint on water terminal operations capability. Contractor capability is primarily limited by funding but funding may be less restrictive than increased force structure. Once transition has occurred, the most significant force structure constraint becomes SDDC's organizational capability to manage individual vessel berths in the port. Transitioning from TSC capability to civilian contractor capability may not be necessary. If the operational environment allows, SDDC units can deploy directly to the port at the outset of the operation and begin managing the contracted labor force. Additionally, water terminal operations using TSC terminal units and SDDC and their contracted labor force are not mutually exclusive. Both activities can operate simultaneously in a terminal.

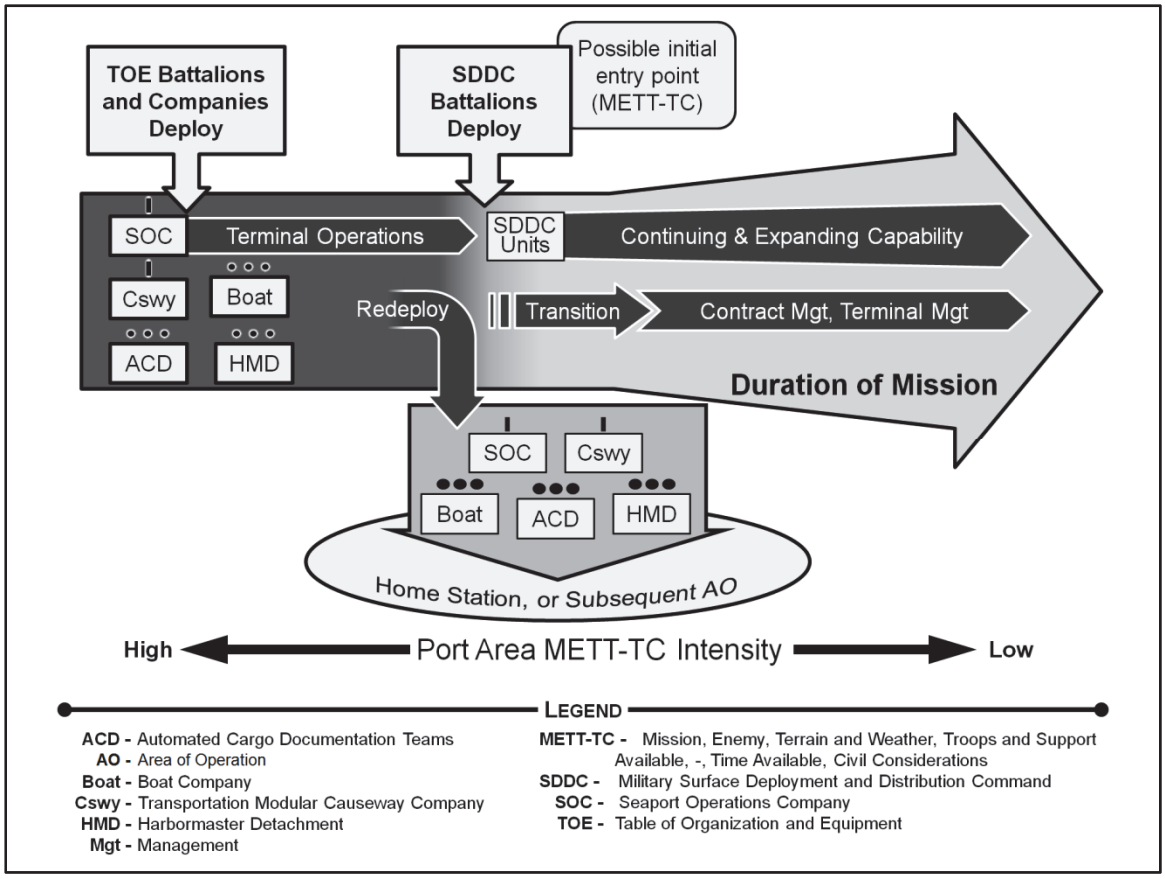


Figure 4-3. Transition from port operations to port management

Chapter 5
Land Terminal Operations

Land terminals tie the strategic to the tactical level providing distribution to the designated point of need. Land terminals are established at interchange points along theater air, sea, inland waterway, rail, and motor transport systems. The mission of the terminals is to transship cargo and personnel carried by these modes and maintain asset visibility. Determining the location of these is highly dependent on the physical and threat characteristics of the operational area. Operations at these terminals require transportation and cargo transfer capabilities. Efficient terminal operations greatly reduce congestion and serve to better facilitate the distribution process. Land terminals also provide facilities for connecting links of the same modes when the situation dictates a change in carrier or when force protection or manpower considerations dictate shorter line-hauls. Land terminals include a centralized receiving and shipping point (CRSP), inland waterways, and TTPs. For Army rail terminal operations see FM 4-01.41. The Army's capability to conduct rail and inland waterway operations is highly dependent on host-nation infrastructure and geographical features and limitations of the area of operation and also areas contiguous to the AO.

ORGANIZATIONS

5-1. Two brigade level units designed to provide mission command of land and inland waterway units are the sustainment and transportation expeditionary brigades. These brigades can be task organized to establish and operate Army land terminals.

SUSTAINMENT BRIGADE

5-2. The sustainment brigades are tasked organized with multiple functional units to accomplish three major missions: theater opening, theater distribution, and sustainment. Army transportation inland terminal operations will play a vital role in those missions. The sustainment brigade will not have direct command of CRSPs, inland waterways, or TTPs, but influences these operations through subordinate battalions. The sustainment brigade should ensure the battalion(s) with responsibility for the inland terminal operations is tasked organized to have the adequate organic resources to accomplish these missions, this includes additional transportation units for the onward movement of cargo. The sustainment brigade will coordinate with the supporting MCT to establish a standing transportation movement release to cover daily ongoing movements and for movement requirements that exceed the SB's capacity or capability. The sustainment brigade is the common brigade level organization that has mission command over the various land terminal operations. The specific battalion and below organizations associated with the different type of land terminals are covered in the following sections.

TRANSPORTATION BRIGADE EXPEDITIONARY

5-3. The transportation brigade expeditionary (TBX) provides mission command of Army watercraft and water terminal capabilities and organizations. The TBX deploys to a theater of operation to provide mission command for port opening and operation at inland waterway, bare beach, degraded, and improved sea terminals. The headquarters is organized to provide the ability to rapidly deploy minimum capabilities to meet rapid port opening operations and small-scale contingencies. The support concept for the TBX is located in appendix B.

CENTRALIZED RECEIVING AND SHIPPING POINTS (CRSP)

5-4. The CRSP is an effective and efficient type of inland terminal operation. The overall advantage of the CRSP is that theater trucks move in and out of the AO quickly, providing faster throughput. CRSPs provide centralized distribution node operations within an AO where cargo is delivered and backhaul is picked up. This mission is accomplished using regular sustainment deliveries between other distribution nodes and the CRSP employing a hub and spoke concept. The intent is to maximize vehicle loads, minimize trans-loading time, minimize time spent at the CRSP, and reduce the number of convoys moving in the AO. As a result, movement of cargo should flow as quickly and efficiently as possible, the exception being frustrated cargo, cargo destined to low volume consignees, or battle damaged equipment which might require inspection and processing.

5-5. Advantages of using a CRSP include:

- Increase transportation efficiency by shortening distribution routes between nodes and the CRSP hub, creating racetracks of continuous movement.
- Centralize use of material handling equipment /container-handling equipment at CRSP by cross-docking cargo to pallets, flat racks, flatbeds.
- Maximize transportation assets through the use of standing transportation movement release, total asset visibility, and in-transit visibility.
- Minimize driver idle time at CRSP by continuously uploading trailers while drivers are involved in precombat checks, precombat inspections, and rest.
- Allow convoys to operate over the same terrain where the threats are familiar to the convoy team, which enhances the security and force protection of the convoy.

CRSP ORGANIZATIONS

5-6. When task organized, a combat sustainment support battalion can provide theater distribution capabilities to operate a CRSP. These capabilities include subordinate units, inland cargo transfer companies and quarter master supply companies, that are designed for specific missions involving establishing and operating a CRSP.

Combat Sustainment Support Battalion (CSSB)

5-7. The CSSB is a tailored, multifunctional logistics (less medical) organization. It is a flexible and responsive team that executes logistics on an area basis throughout the depth of their assigned AO. The CSSB subordinate elements may consist of functional companies providing supplies, ammunition, fuel, water, transportation, cargo transfer, mortuary affairs, maintenance, field services, and could be customers of the CRSP as well. The CSSB ensures the CRSP has the resources needed and provides the truck transportation necessary for the onward movement of cargo. If transportation requirements exceed the CSSB's capacity or capability the battalion will request assistance from their SB.

Inland Cargo Transfer Companies (ICTC)

5-8. The ICTC's mission is to discharge, load, and transship cargo at inland transportation terminals; to supplement cargo handling operations to alleviate cargo backlogs; to operate cargo marshaling areas as required. Normally attached to a CSSB, it is the preferred unit to conduct the CRSP mission and has the capabilities to operate inland transportation terminals on a 24-hour per day basis and to operate intermodal terminals in a theater hub or theater distribution center. The ICTC can transship 1,500 STONs of break-bulk cargo or 600 containers at a terminal.

Quartermaster Supply Company

5-9. The quartermaster supply company provides mission command for two to four subsistence or area supply platoons that can be organized to meet the requirements at a CRSP. The quartermaster supply company is attached to a CSSB. When task organized with one subsistence platoon and three area support platoons, the unit can receive, store, issue, and account for 148.52 STONs of Class I, II, III(P), IV, VII, IX supplies, handle break-bulk cargo, provide limited configured loads, and sort retrograde items. This unit

can be used in lieu of an ICTC but needs to be augmented with elements of an MCT to provide additional convoy and transportation support.

Movement Control Teams (MCT)

5-10. MCTs are attached to the MCB in order to provide decentralized execution of MCB movement responsibilities throughout a specified AO. MCTs may be employed on an area basis or at critical nodes in order to facilitate effective movement control. The MCT will coordinate movement that exceeds the capability or capacity of the sustainment brigades which may include additional trucks or movement by fixed/rotary wing aircraft. Additionally, elements of the MCT may collocate at the CRSP to provide better ITV, convoy assistance, or other transportation services as needed. The MCT can provide:

- Validation of transportation requirements, coordination of transportation support, highway clearance and inbound clearance for moving units, personnel, and cargo.
- Coordination of transportation movements, diversions, reconsignments, and transfers of units, cargo, and personnel.
- Technical expertise to transportation users within its assigned area of responsibility.
- ITV of unit equipment and sustainment cargo movements.
- Observation, assessment, and reporting progress of tactical and non-tactical transportation movements along main supply routes (MSR), alternate supply routes and through the CRSP.
- Adjustment of movement schedules as necessary to coordinate the movement of authorized traffic.

CENTRALIZED RECEIVING AND SHIPPING POINT (CRSP) OPERATIONS

5-11. A CRSP can be established near air and water terminals to support theater opening operations. The CRSP can fall in on or function as the forward node supporting JTF-PO operations. Strategic cargo arrives at a port, is off-loaded, and is moved forward to a CRSP for further movement inland or to support local units. This procedure clears the APOD or SPOD and enhances the theater opening process.

5-12. As the theater expands, CRSPs are located at critical nodes to support distribution. CRSPs can be located near air terminals supporting intratheater movements, support inland waterway terminals, or be positioned to shorten ground lines of communications or to enhance the distribution effort for an operating base. Once a CRSP is established, assigning a routing indicator code is recommended. Assigning a parent routing indicator code to a CRSP (with the RICs in that AO associated with the parent) provides a visible shipping location for theater cargo. All cargo arriving at the CRSP using a routing indicator code that falls under the parent routing indicator code is sorted by CRSP personnel, who identify the customers and line cargo up by supply support activity for distribution within the AO.

5-13. The CRSP distributes supplies in an AO by ground and air. The CRSP moves cargo to the A/DACG or operates a pickup zone, prioritizes the cargo and moves it forward on Chinooks to forward operating bases to reduce the volume of trucks on the road. This technique is only limited by availability of Chinooks and the threat.

5-14. The unit operating the CRSP has three main categories of cargo operations which are palletized, containerized, and retrograde. In addition to cargo, the CRSP will manage empty containers and establish an administrative section for centralized data entry and reporting.

Palletized Cargo Operations

5-15. The palletized cargo operations section receives and issues palletized cargo, accurately documents inbound and outbound cargo, and builds pallets as required for air delivery. General responsibilities include:

- Ensures there are appropriate number of empty 463L pallets with tie-down straps, top nets, and side nets in the breakdown area at all times.
- Knowledgeable of 463L pallet construction using top and side nets and trains palletized cargo operations section personnel on building 463L pallets.

- Ensures section personnel understand how to identify and document cargo correctly by transportation control number (TCN), Department of Defense activity address code, radio frequency tag, and transportation movement release (TMR) or Ground Lines of Communication.
- Ensures all cargo documentation is completed to standard and includes required information.
- Maintains records of the numbers of pallets in the yard, by customer, as well as major assemblies and oversized items.
- Inventories pallet lanes routinely to ensure on-hand status accurately reflects computer-based tracking system. Convoys are based on pallet count information, so accuracy and organization are the keys to success of the CRSP yard.
- Builds pallets within the specifications of the truck or aircraft designed to carry it.

5-16. When inbound palletized cargo is being processed, the information must be documented with TMR, TCN, radio frequency tag number, Department of Defense Activity Address Code, and a pallet description. Accurate outbound procedures must be ensured by labeling pallet descriptions and all other documents on each piece of cargo. Cargo not already on a 463L pallet when coming into the yard must be placed on a 463L pallet immediately. Once a pallet is complete and built to standard, the pallet should be placed in the appropriate customer lane according to DODAAC. The inbound cargo worksheet is provided to the administrative section for computer-based manifesting and cargo tracking.

For local customers:

- Ensure all outbound cargo is properly documented using the inbound cargo information.
- Document cargo leaving the CRSP on outbound cargo worksheet and provide to the data entry clerk for tracking.
- Ensure end-of-day reports reflect data received by the outbound radio frequency interrogator system (once installed).
- Supervise loading procedures for safety and ensure loaded cargo is going to the right location.
- After each outbound shipment, update information to ensure 100 percent ITV and accountability.
- Ensure all cargo stated on the TMR is loaded and annotate additional cargo on the TMR or standing transportation movement release.

Containerized Cargo Operations

5-17. The containerized cargo operations section receives and issues customer containerized cargo, appropriately documents and tracks inbound and outbound containers, and provides a continuous and accurate on-hand status of containerized cargo. General container cargo functions include ensuring all containers are staged in appropriate customer lanes or miscellaneous lanes (if a lane does not exist for the customer); organizing and staging container lanes appropriately to allow regular inventories of the containers; accounting for all mis-shipments resulting from inaccurate documentation or misread shipping data; and maintaining inventory of containers that are on hand by customer.

5-18. An empty container collection point can be established to consolidate empty containers for issue to units, to transport refrigerated containers to the class I yard, or to retrograde detention containers. A key task is to immediately reference Integrated Booking System Container Management Module to identify the container status (government-owned container or detention container).

Retrograde Operations

5-19. Retrograde operations at the CRSP identify serviceable and nonserviceable retrograde and prepare that cargo for onward movement using government owned containers first and then empty carrier-owned containers, detention containers, and 463L aircraft pallets. Priority for loading containers is hazardous material, oversized items, followed by all other retrograde. Maintaining separate pallets and containers for retrograde operations is recommended.

5-20. The administrative section has the responsibility for data entry and report procedures. Other responsibilities include:

- Track all cargo using the appropriate automated information system.

- Serve as a customer service representative for the CRSP yard.
- Provide inventory charts as needed to ensure automated information reflects actual yard on-hand status.

TRAILER TRANSFER POINT (TTP)

5-21. Trailer transfer points are established along the line haul system to divide the line haul into legs. At TTPs, semitrailers or flatracks are exchanged between line haul vehicles operating over adjoining legs of a line haul route. TTP functions also include reporting, vehicle and cargo inspections, documentation, and dispatching. TTPs are often co-located at hubs or operating bases. Based on the availability of local support or if functioning independently, TTPs may provide mess, maintenance, and other support for TTP personnel and line haul drivers

TTP ORGANIZATIONS

5-22. A TTP team is a table of organization and equipment organization that operates a TTP or Convoy Support Center. The TTP is assigned to a TSC and normally further attached to either a Transportation Motor Transport Battalion or a CSSB. There are two sections in the TTP. The TTP Operations Section provides command, control, and supervision of unit movement plans and routine specialized operations. The Maintenance Section provides field maintenance to organic wheeled vehicles and emergency maintenance for up to 10 percent of transit vehicles. The unit cannot be broken down to smaller elements. The TTP is dependent upon a support maintenance company for all field level maintenance except automotive. The unit provides emergency refueling and repair of vehicles transiting the TTP. The TTP provides inspection and emergency repairs of up to 10 percent of transit vehicles and semitrailers with organic mechanics. The unit also provides area recovery of disabled vehicles operating in the line haul operation. The team prepares and maintains operational records and reports on organic equipment. This unit performs field level maintenance on wheeled vehicles. The TTP requires 20 percent mobility of its table of organization and equipment supplies and equipment to be transported in a single lift using organic vehicles.

TTP OPERATIONS

5-23. Line haul tractors arriving from rear areas deliver loaded semitrailers at a TTP and pick up empty or retrograde semitrailers for return movement. Line haul tractors coming in from forward areas drop their empty or return-loaded semitrailers and pick up the forward-moving loads for further movement toward ultimate destinations. Shuttle tractors may be used within the TTP to spot and prepare semitrailers for movement. This action reduces turnaround time of line haul tractors and makes the operation more efficient. The distance of a line haul leg is based on a 10-hour shift per driver and 1 hour of delay. Therefore, the optimum one-way travel time between TTPs is 4.5 hours. Using this planning factor, each driver can complete one round trip per shift. This eliminates the need for billeting drivers away from their assigned unit, provides rested drivers for each trip, and allows for vehicle maintenance.

5-24. General responsibilities of the TTP team are:

- Provides a central headquarters for all movement regulating points.
- Normally operates at echelons above brigade, but may be required to operate in a brigade area.
- Receives segregates, assembles, and dispatches up to 250 loaded or empty semitrailers and 125 tractors per day.
- Provides emergency refueling and repair of vehicles transiting the TTP.
- Provides inspection and emergency repairs of up to 10 percent of transit vehicles and semitrailers with organic mechanics.
- Provides area recovery of disabled vehicles operating in the line haul operation.
- Prepares and maintains operational records and reports on organic equipment.
- Individuals of this organization can assist in the coordinated defense of the unit's area or installation.
- This unit performs field level maintenance on wheeled vehicles.

PHYSICAL CONSIDERATIONS

5-25. The distance between TTPs is calculated by using the 10-hour shift and 1-hour delay, factoring the march rate into the equation. See table 5-1. In this example, the planners determine that 20 mph march rate can be sustained on the route:

Table 5-1. Trailer transfer point (TTP) distance formula

TTP Distance Formula
Distance = ([10 hours per operating shift - 1 hour delay] x 20 mph)/(2 trips per day) = ((10 - 1) x 20)/2 = 90 miles between the TTPs

5-26. The same formula is used to determine the distance between each successive TTP. The distance will change if the sustained march rate over the segment increases or decreases from the segment before it. If the march rate over the entire route is the same, then the distance between TTPs will be relatively equal. There will be variations because of finding suitable sites for the TTPs. When there is a leftover distance or short leg, the short leg should be placed forward. This is to allow for rapid expansion of the operation.

PHYSICAL LAYOUT

5-27. Consider the following factors in selecting terminal sites, also see figure 5-1 for notional TTP layout:

- The size, complexity, and duration of the operation.
- The number and type of vehicles to be employed in the operation.
- Facilities required at the terminals and transfer points.
- Any anticipated backlog of semitrailers at these sites.

5-28. The smooth flow of cargo through the area is key consideration for layout of this area. The area should be large enough and have an acceptable internal road net to allow space for parking and marshaling incoming and outgoing semitrailers and prime movers. The area should be level and well-drained. It should have a suitable hardstand that can withstand heavy vehicular traffic. The truck park should be located near supported activities and the MSR. Space requirements may make it infeasible to establish TTPs adjacent to the MSR. If this is the case and if good feeder routes are available, they may be established off the MSR. Security must be provided for both the operating area and the vehicles and cargo handled within the area. The TTP team at the location provides security for level I threats. When the terminal is part of a base or base cluster, the base or base cluster commander coordinates added security based on the threat level. Guidelines follow for setting up the physical layout of a TTP. There is no standard length of time a TTP will be operational; it could operate for a short period or throughout the duration of an operation.

5-29. Requirements for initial set up:

- Prepare site for proper run off and drainage especially in the area of the Fuel Point.
- Use packed aggregate (1”-2”) for tents and hardstands. Use rocks (2”-4”) for roadways.
- For perimeter security of force and stock, use at a minimum triple strand rapid deployment Unit which is razor wire that could be used with or instead of barbed wire.
- Locate and place latrines.
- Erect flood lights for staging, marshaling, and maintenance areas and provide power to flood lights and to tent areas.
- Place a T-wall in the marshaling area to separate the Class V vehicles from unit and other cargo vehicles.
- Prepare road network within site.
- Provide force protection for operations, unit, and drivers tents by using HESCOs.
- Establish Force Provider for life support locations.

5-30. Follow-on physical improvements:

- Pave site marshaling and staging areas and the road network within TTP.

- Improve perimeter defense from wire to fencing with wire.
- Upgrade latrines to buildings with running water.
- Adjust flood lights for staging, marshaling, and maintenance areas; provide power to flood lights and to tent areas.
- Repair and replace T-wall in the marshaling area to separate the class V vehicles from unit and other cargo vehicles.
- Prepare road network within site.
- Renovate force protection for operations, unit, and drivers tents by using HESCOs.

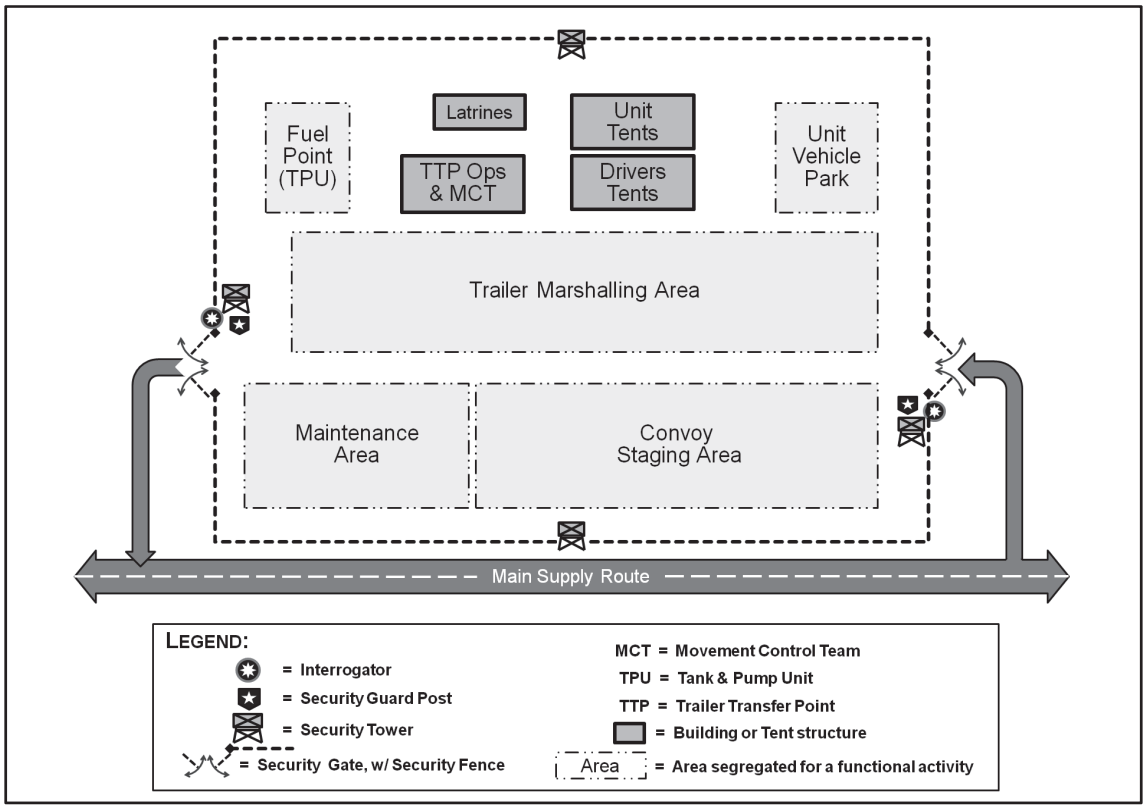


Figure 5-1. Notional trailer transfer point

RAIL OPERATIONS

5-31. Rail is primarily a strategic and operational level of war asset. Rail plans can be integrated in a Combatant Command's war plans. When sufficient rail infrastructure exists for movement of cargo and personnel in a theater, it can enable the reception, staging, onward movement and integration (RSOI) process. Rail is the preferred mode to move track vehicles to ports of embarkation or debarkation. Army units designed to primarily support rail operations are in the Army Reserve that includes a rail battalion and railway operating companies. Specifically, railway operating companies operates railway locomotives and trains, maintains and repairs railway tracks, and performs running inspections on rolling stock and diesel-electric locomotives. Other units that can support railway operations include movement control teams and inland cargo transfer companies that are capable of staging and marshaling equipment, uploading and downloading rail cars and onward movement of passengers and equipment. Host-nation support in most situations is needed to support these operations.

RAIL TERMINALS

5-32. To conduct rail operations requires establishment of rail terminals that in most cases involves designation of commercial or foreign military rail terminals for use by the Army or Joint forces. Rail terminals enable intermodal and can be critical to theaters as are other types of land terminals. When rail terminals are established in theater, host-nation support and or civilian support becomes integral to rail operations. Most rail terminals are located at the start and end of rail lines. Rail terminals include rail yards, freight stations, passenger stations, and repair and service facilities. Each type of rail terminal can differ in size, location and primary function. A common function rail terminals share is the capability to load and unload cargo or personnel. Rail yards have sufficient track lines for forming trains. Trains are formed by switching and spotting rail cars. Freight stations are structures (building, shed, and/or warehouse) for receiving, loading and unloading cargo. Passenger stations allows for spotting passenger trains.

ARMY RAIL TRANSFORMATION

5-33. The Army's employment of its rail capability to administrate railways in a theater is limited because the capability does not include equipment needed to conduct a railway operation. Therefore the Army is dependent largely on the resident capability. To effectively administrate railways, an approved capability to transform the Army, starting in 2015, is the Expeditionary Railway Center. The expeditionary railway center, also within the Army Reserve, includes a headquarters element and five deployable railway planning and advisory teams. Furthermore, the expeditionary railway center consists of Army rail experts that perform six major functions:

- Provide rail network capability and infrastructure assessments.
- Perform rail mode feasibility studies and advise on employment of rail capabilities.
- Coordinate rail and bridge safety assessments.
- Perform and assist with rail planning.
- Coordinate use of host-nation or contracted rail assets.
- Perform contracting officer's representative duties to oversee contracts and provide quality assurance of contracts.

INLAND WATERWAYS

5-34. Inland waterways include all rivers, lakes, inland channels, canals deep enough for waterborne traffic, and protected tidal waters. In a theater of operations, an inland water-way is normally operated as a complete system. It includes the locks, dams, bridges, and other structures that contribute to or effect movement of vessels carrying passengers and freight. Inland waterways are primarily used for the civilian economy. Military use depends on the degree of waterway development; necessary rehabilitation or upgrades required for military use, the tactical situation, and the impact military use of the waterway will have on the civilian economy. It is an extremely efficient method for moving liquid, bulk or heavy or outsized cargo where there is an abundance of navigable rivers and canals and lack of good and/or available roads and railroads.

INLAND WATERWAY ORGANIZATIONS

5-35. The establishment and operations of inland waterway terminals requires the same type of organizations and units that establish water terminals and conduct operations at water terminals. These units must adapt to theater requirements. Each theater has requirements that determine the scope of each organization's involvement in establishing inland waterway terminals and operating inland waterway terminals.

Terminal Battalion

5-36. Terminal Battalions are assigned to a TSC and are then normally further attached to a sustainment brigade or TBX. The terminal battalion is an echelon above corps asset employed in fixed ports, unimproved ports, and bare beach facilities to provide mission command to three to seven subordinate transportation companies or equivalent units performing cargo handling operations and boat operations on

inland waterways. Subordinate units may include ICTC, medium boat company, heavy boat company, port operations cargo company, modular causeway company, floating craft marshaling company, harbormaster detachment, landing craft utility, logistics support vessel, and theater support vessel.

Inland Cargo Transfer Company (ICTC)

5-37. ICTCs are employed only at small intermediate cargo transfer points on the inland waterway system (IWWS). Limitations on their use at these points are the size and configuration of the waterway craft and capabilities and capacities of the unit's material handling equipment/container-handling equipment. When the waterway delivery is composed largely of barges, landing craft, and similar types of floating equipment, the ICTC may be used in the transshipping process. ICTCs operate on a 24-hour, two shift basis. When larger, ocean-type shipping is conducted, a seaport operations company must be assigned for loading and discharge.

Seaport Operations Company

5-38. Seaport operations companies perform seaport terminal service operations to discharge and load containerized/break-bulk cargo and wheeled/tracked vehicles in fixed seaports or in LOTS operation sites. These units coordinate seaport clearance and onward movement with supporting movement control and motor transport units. A seaport operations company is dependent on a combat heavy equipment transporter company for the relocation of heavy equipment and a medium truck company for movement of 40 ft containers if the marshaling area is located more than 5 miles from the port. A support maintenance company provides for small arms and electronic maintenance.

Harbormaster Detachment

5-39. The harbormaster detachment employs the harbormaster command and control center (HCCC) to provide mission command of Army watercraft assets and provides situational awareness to the maneuver commanders. The HCCC equipped harbormaster detachment may, as directed by the commander, be employed to supplement and/or expand the port manager's reach. The HCCC can maneuver to and employ at a geographic location that maximizes its capabilities to visually and electronically monitor the terminal area, watercraft operating within the terminal, and the waterway lines of communication.

Terminal Supervision Team (TST)

5-40. A TST is a table of organization and equipment unit that deploys to a theater of operation to provide organic, multimodal, single ship, dual shift, 24 hour supervision of contract labor hired to receive, clear, and move cargo from water ports. When the TST is augmented with a port management team they will operate primarily at water terminals ranging from degraded to improved commercial ports.

Port Management Team (PMT)

5-41. A PMT is a table of organization and equipment unit that augments SDDC to supervise, manage, administer, or monitor contract labor or host-nation support at a sea or inland-water port area in a theater of operations for stevedore and related terminal services. The PMT will normally be attached to and operate under the control and direction of, and be fully integrated into a TST.

INLAND WATERWAY SYSTEM (IWWS)

5-42. The Army corps of engineers operates and maintains the IWWS in an underdeveloped theater or in CONUS. In overseas theaters that have developed IWWSs, the host-nation operates and maintains them. The Army's use of the system must be granted by the host-nation. Once the host-nation has approved integration of the Army into its IWWS, equipment requirements, including equipment allocated by the host-nation, must be determined.

5-43. Three separate functional components; the ocean reception point (ORP), the inland waterway, and the inland waterway terminal (IWWT); make up the IWWS. The distribution planner must estimate the capacity of each of these functional components. The lesser capacity becomes the capacity for the IWWS.

5-44. When required, an IWWS may be formed to control and operate a waterway system and to formulate and coordinate plans for using inland waterway transport resources. It may also be formed to provide for integrating and supervising local civilian facilities used to support military operations. Depending on the requirements, this operational organization may vary in size from a single barge crew to a complete IWWS. It may consist entirely of military personnel or may be manned by local civilians supervised by military units of the appropriate transportation staff section.

INLAND WATERWAY TERMINAL (IWWT)

5-45. An IWWT normally includes facilities for mooring, cargo loading and unloading, dispatch and control, and repair and service of all craft that can navigate the waterway. Terminals either exist or are established at the origin and terminus of the inland water route. Intermediate terminals are located along the way wherever a change in transportation mode is required.

5-46. Terminals on an IWWS can be classified as general cargo, container, and liquid or dry bulk commodity shipping points. Terminals of the three latter types usually include special loading and discharge equipment that permits rapid handling of great volumes of cargo.

OPERATIONS PLANNING

5-47. The distribution planner is interested in an inland waterway's capability to move cargo. Consequently, also of interest is the affect of the waterway's physical features on its ability to carry cargo.

PHYSICAL PLANNING CONSIDERATIONS

5-48. Among physical features that determine what can be moved over a waterway are the following:

- Restricting width and depth of the channel.
- Horizontal and vertical clearance of bridges.
- Number of locks, their method of operation, and the length of time required for craft to clear them.
- Freeze-ups, floods, and droughts also affect a waterway's capacity. The distribution planner must know when to expect these seasonal restrictions and how long they can be expected to last.
- Also of concern are speed, fluctuation, and direction of water current; as well as the availability of craft, labor, terminal facilities, and maintenance support.

5-49. Seldom are enough craft or barges available to fill or exceed the capacity of an inland waterway. However, if there are enough, the daily capacity can be estimated. This is done by determining the number of craft per day that can be passed through the most limiting restriction, such as a lock, lift bridge, or narrow channel. This will give a passage capability. Deduct the civilian passages and that leaves the passages allowed the military. (A percentage may be allowed instead).

5-50. Turnaround time is the length of time between leaving and returning to a point. Since barges are being picked up at a wharf or stake barge, barge loading time is not part of the computation. If barges are picked up at shipside without marshaling at a wharf or stake barge, loading time of the barge would become a factor of turnaround time. The paragraphs below discuss items that must be known to calculate turnaround time.

- Speed is influenced by the wind, current, power of craft, and size of load. If the craft's speed cannot be determined, assume it is 4 miles per hour in still water (6.4 kilometers per hour). Speed and direction of current can frequently be discounted since resistance in one direction may be balanced by assistance in the other direction. However, this is not always the case.
- Loading and unloading time is the time to load and unload a craft at origin and destination.
- Time consumed in the locks is the time taken by a craft and its tow to pass through a lock. When exact data is lacking, lock time is assumed to be 1 hour per single lock.
- Planning factor for hours of operation per day is usually 20. Dropping barges from the tow, refueling, taking on stores, rigging up, and maintenance consume the remaining 4 hours.

- Transit time is the time to move the craft the length of the haul and return to its origin. Transit time equals the distance divided by the speed of the craft. It does not include stops or delays of any kind. Due to possible damage to the inland waterway, a speed control may be in force. To determine transit time, add the following:
  - The time to make up the tow.
  - The distance divided by the speed of the tow.
  - The time consumed passing through the locks.
  - The time to break up the tow.

5-51. When determining the number of barges, tugboats, or craft required, always round up to the nearest whole number, then apply maintenance factor and round up again. See table 5-2 for determining number of barges, tugboats, or craft.

Table 5-2. Determining factors for number of barges, tugboats, or craft

Factors	
• Daily barge loading rate at the ORP: A = B x C • Barges loaded daily at the ORP: D = A/E • Daily barge requirement at the ORP: F = D + G • Daily barge discharge rate of the IWWT: H = J x K • Barges discharged daily at the IWWT: L = H/E • Daily barge requirement at the IWWT: M = L + G	• Daily tows required at the ORP: N = F/Q • Daily tows required at the IWWT: P = M/Q • Turnaround time of tugboat: R = 25 • Number of tows a tugboat can deliver daily: T = U/R • Number of tugboats required to deliver tows: V = (N or P*)/(T+W)
LEGEND: A = daily barge-loading rate at the ORP B = number of barge-loading berths at the ORP C = daily loading rate per barge berth at the ORP D = barges loaded daily at the ORP E = average barge cargo capacity F = daily barge requirement at the ORP G = barge maintenance factors (round up)	M = daily barge requirement at the IWWT N = daily tows required at the ORP ORP - ocean reception point P = daily tows required at the IWWT Q = barges per tow R = turnaround time of a tugboat in hours S = transit time for tugboat T = number of tows a tugboat can deliver daily U = operational hours per day

Table 5-2. Determining factors for number of barges, tugboats, or craft

Factors	
H = daily barge discharge rate at the IWWT IWWT - inland waterway terminal J = number of barge discharge berths at the IWWT K = daily discharge rate per barge berth at the IWWT L = barges discharged daily at the IWWT * Largest of the two (N or P)	V = number of tugboats required to deliver tows W = tugboat maintenance factor (round up)

IWWT CAPACITY

5-52. Appropriate terminal units or teams staff IWWTs. The number of units required depends on the results of an IWWT throughput analysis. An analysis is conducted for each IWWT in the IWWS. The combined capacity of the IWWTs is the cumulative total of the restricting capacity (reception capacity, discharge capacity, or clearance capacity) for each IWWT. There may be a requirement for tugboats stationed at the IWWTs to make up/breakup tows and to shift barges between terminals and an additional mooring area. The additional mooring area may be required to allow a buildup of barges to keep an even flow of barges at the terminals.

IWWS CAPACITY

5-53. After estimating the capacity of the three functional components of the IWWS, the least of the three capacities is used as the estimated capacity for the entire system, see table 5-3. Once the capacity of the IWWS has been determined, personnel requirements for each component of the IWWS can be determined. If host-nation personnel are to support part of the IWWS, only the Army personnel augmentation must be determined. If the capacity does not meet the requirements, adjustments can usually be implemented.

Table 5-3. Daily IWWS capacity

Ocean Reception Point	*Inland Waterway*	*Inland Waterway Terminal*
3,000 tons	2,000 tons	2,500 tons

5-54. To determine equipment needed to support the IWWS, the planner must first determine the numbers and capabilities of barges and tugs that the host-nation will allocate to the Army. This will allow determination of the Army equipment augmentation requirement. Numbers of barges and tugs to support the IWWS can be computed by using the formulas given in this chapter.

5-55. During hours of darkness, an expanded use of radars is normally required. Searchlights and floodlights are also of great assistance. Operational radars should be on all vessels and at terminals and bridges as well as at locks. Expanded use of radars and lights should be carefully weighed during blackout conditions as these systems have a greater vulnerability to enemy detection and attack.

OCEAN RECEPTION POINT (ORP)

5-56. An ORP consists of mooring points for ships, a marshaling area for barges or other lighterage, and a control point. At least two stake barges should be at each ORP, one for import cargo and one for export cargo. Container and general cargo vessels may discharge at an ORP. Under the stake barge system, the

ORP should have water space with enough stake barges to accommodate the same amount of barges as the wharf space. Barges can be of the preloaded from container or general cargo vessels.

5-57. The reception capacity, discharge capacity, and clearance capacity of an ORP are computed in the same way as for a marine terminal with a few minor differences. ORP clearance capacity is the number of personnel, containers, barges, or STONs of cargo that can be moved from the ORP via any mode. Terminal transfer and storage capacity influences terminal discharge capacity. Tugs and barges (terminal transfer) and wharfs or stake barges (storage) also influence ORP discharge capacity. Careful analysis must be made to determine the space required and available for stake barges and space required to move barges to and from the stake barges. Transit time between the ship and the stake barge or wharf and other factors incidental to cargo, barge, and/or lighterage transfer and storage must also be determined.

Chapter 6

Logistics Over-The- Shore (LOTS) Operations

To execute a Joint logistics over-the-shore operation requires a coordinated effort between the United States military services. See JP 4-01.6 for details about joint logistics over-the-shore operations. For one service to execute a LOTS operation requires the organic organizations with specialized equipment to accomplish this intricate task. This chapter outlines the Army's capability to plan and conduct a LOTS operation.

ORGANIZATIONS

6-1. The TBX, sustainment brigade, and the organizations in chapter 5 (Land Terminal Operations) Inland Waterway section of this ATP are the organizations with the capability to plan and execute an Army LOTS operation. Additional Army organizations that support LOTS operations such as Army watercraft units, harbormaster detachments, and dive teams are discussed in ATTP 4-15.

TERMINAL OPERATIONS

6-2. The theater sustainment command must continually plan and be prepared to provide distribution operations over a bare beach and/or at degraded or unimproved ports. This allows for additional access points to support movement, maneuver, and sustainment as well as off-set capacity requirements due to enemy port anti-access threats. Plans should include the proposed location and layout of the area, the type of lighterage to be used, and the task organization needed to meet the capacity requirements. See figure 6-1 on page 6-2 and figure 6-2 on page 6-3 for diagrams of a LOTS operation. Additionally, the plan should also include the route and methods of movement to the area, the construction effort required, communications requirements, and sustainment support procedures. LOTS operations will depend on geographic, tactical, and time considerations that extend from initial operation planning through the deployment of LOTS forces and equipment to ensure the off-load and delivery of cargo.

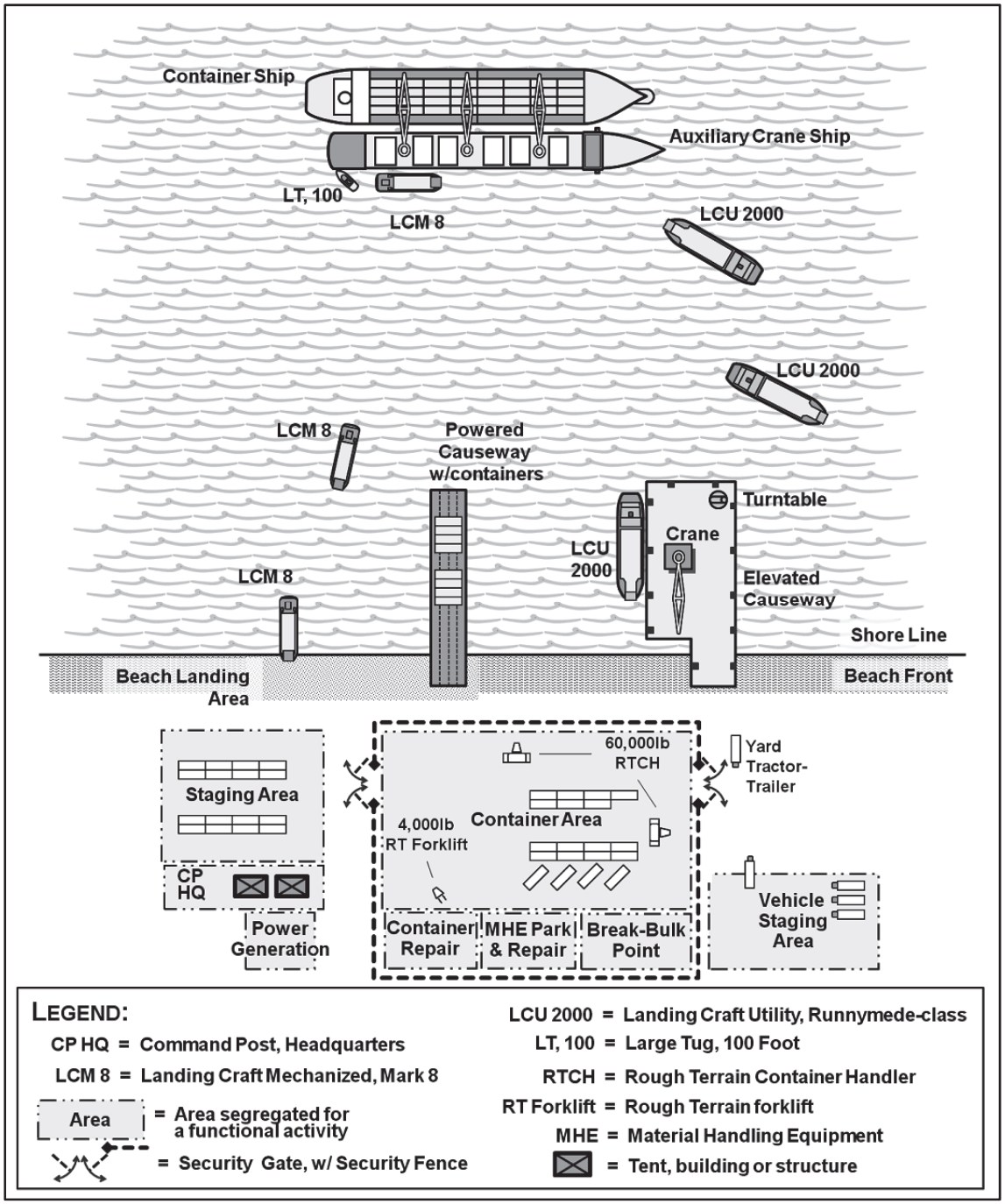


Figure 6-1. LOTS operation

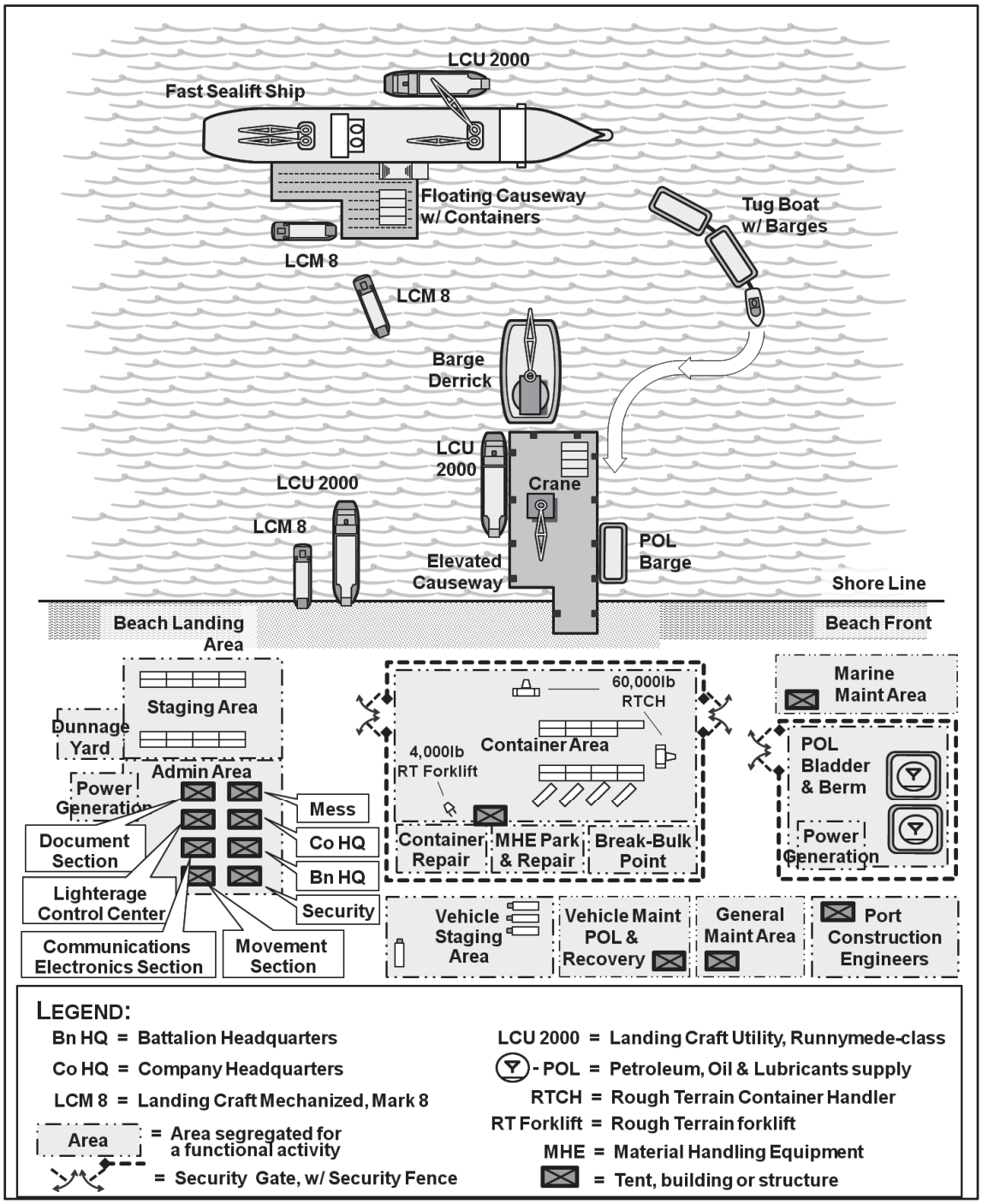


Figure 6-2. LOTS operation

TYPES OF LOTS OPERATIONS

6-3. LOTS provides the geographic combatant commander the option to choose which off-load locations, such as bare beach, austere port, or a damaged fixed port in order to achieve port access. Using LOTS allows for cargo to be delivered and off-loaded closer to the point of need. LOTS enablers will allow them to create pier facilities, conduct salvage, or provide floating crane support capabilities alongside ships and fixed facilities.

Bare Beach or Degraded Port

6-4. Lighterage is used during this operation to off-load ships in stream (at anchor), and cargo is moved over a degraded port/beach or onto the shore. Bare Beach operations are utilized when port facilities are not available, damaged, have been denied, or cannot accommodate adequate throughput. LOTS operations require secure routes that are established to and from the beach. Engineers will ensure movement can occur through the surf zone, across the beach, and into marshaling yards or onto clearance transportation. The first step when planning to open new bare beach LOTS sites is to determine the potential landing sites. The degree of dispersion that can be attained, directly relates to the daily tonnage requirement and the size and nature of the assigned area. After the limiting points have been designated, reconnaissance should be completed to determine the sites most suitable for operations. Whenever possible, hydrographic surveys should be conducted at each of the proposed beach landing sites. The selection of these sites should be based primarily on the existing capability to accommodate the desired tonnage. Major factors considered in selecting beach discharge sites include tide, surf, beach gradients, bars, characteristics of the bottom and beach surface, anchorage areas, weather, topographic features, and distance from required infrastructure such as road networks and staging areas.

Unimproved Facility

6-5. An unimproved water terminal site is not specifically designed for cargo discharge. The site lacks facilities, equipment, or the infrastructure of a fixed water terminal. The site may lack sufficient water depth, pier length and material handling equipment. Additionally, the port may have sustained damage, making it equivalent to an unimproved facility.

Augmenting a Fixed Port

6-6. An undamaged or functional port facility with modern equipment will generally allow for a smooth transaction period for both up-loading and downloading cargo at relatively inexpensive costs. In some circumstances, the scale of operations will exceed the port's capabilities and resources. LOTS operations will provide augmentation.

LOTS Operating Area

6-7. A LOTS operating area is the geographic area where all movements will be conducted. Ideal conditions should be a secure, non-threat environment with the ability to conduct both current and future operations.

6-8. Within a LOTS operating area, each two-ship terminal is under the direct operational supervision of a terminal battalion. Each terminal is manned by one seaport operations company and lighterage units commensurate with the workload and environment. One or more medium truck companies may also be attached for intra-terminal transportation and clearance assistance. Terminal transfer elements may be needed to clear excessive cargo backlogs in discharge areas. Harborcraft teams may also be attached as required. A sustainment brigade coordinates the functions of a number of these terminals, dispersed along a maximum of 150 miles of shoreline. Maintenance for the employed lighterage and other Army watercraft is provided by the floating craft maintenance company.

6-9. In addition to the environmental factors outlined in this chapter, the same planning considerations and operational functions and procedures described in chapter 4 must be provided for and carried out by the terminal organizations assigned to conduct LOTS operations.

Reconnaissance and Site Selection

6-10. Normally, the terminal commander in consultation with local or geographic command authorities initially selects possible beach sites for LOTS operations. This is done from an extensive study of maps and hydrographic charts and from an analysis of aerial reconnaissance reports. A detailed ground and water reconnaissance of the selected area, as thorough as time and the situation permits, determines the feasibility of operations at these sites. Aerial reconnaissance helps to verify information obtained from the map reconnaissance. Road networks shown on the map may have been destroyed or made impassable. New

roads may have been built. Bridges may have been destroyed or structures may have been built on the beach. Local or geographic command authorities must be consulted early in the study so that advice about possible anchorage areas and difficulties and hazards to navigation will be available as early as possible.

6-11. The commander should not forget that conducting a LOTS operation almost fully depends on favorable weather. Lighterage operations along with working conditions are dangerous if more than a moderate sea is running. A meteorological team should be assigned throughout the operations of LOTS, who will provide 24-hour weather forecast to the LOTS commander. Heavy surf reduces the amount of cargo brought directly to the beach by lighters and could suspend the entire operation. Surf zone considerations are mitigated by use of modular causeway system floating piers which allow cargo discharge beyond the surf zone. The type of surf will determine the effect on operations as follows:

- Breaker period is the time elapsed between each successive wave crests. It is a significant factor used to determine the type of breaker, its height, refraction, and velocity. The adverse affects of breaker period on lighterage is the frequency in which waves impact the craft.
- Type of Breaker. The type of breaker that a lighter navigates will have an impact on the operations. Both plunging and surging breakers have steep angles, from trough to crest.

6-12. The party that conducts the ground and water reconnaissance must include personnel that can advise the terminal commander of various matters. These matters include the following:

- Access to MSRs.
- The engineering effort required to prepare and maintain the area.
- Signal construction and maintenance required for communication within the beach area and between the beach area and the terminal headquarters.
- Environmental considerations include the location of beach dumps, transfer points and maintenance areas.
- The type of lighterage that could be employed most effectively.
- The location and desirability of anchorage areas.
- The possibility of using spud (self-elevating, non-propelled) piers and other special equipment. connections with the interior.
- The proximity and capacity of road and rail networks.

6-13. The typical reconnaissance party should consist of, but not be restricted to the following:

- Representatives of the terminal commander to coordinate or supervise the reconnaissance team and to recommend task organization.
- Harbormaster Detachment Commander and Maintenance Officer.
- The terminal battalion commander and appropriate members of staff.
- An engineer officer, preferably from the supporting engineer unit.
- A signal officer, preferably from the supporting signal unit.
- Representatives of landing craft units to select beach areas, anchorages, maintenance areas, and navigation aids.
- Representatives of units with special equipment to be used.
- Military divers to conduct underwater reconnaissance of port facilities.
- An MP representative to determine the needs and plan for providing MP support required for traffic control and beach management.
- Explosive Ordnance and Demolition officer to advise on force protection measures, ammunition supply points, as well as assess possible unexploded explosive ordnance and improvised explosive device mitigation measures.

6-14. In addition to gauging beach area characteristics, the reconnaissance party must determine if the beach area selected has enough anchorage to accommodate the number and types of ships required to support the planned beach operations. Typically, the numbers of anchorages required are based on weather conditions, water depth, underwater obstacles, surf conditions, tidal ranges, and currents. Approximately 2000 yards is acceptable to anchor and conduct efficient discharges. For example, sandbars or reefs just

offshore may preclude the use of landing craft, mechanized, landing craft, utility, or barges in certain areas. Among the salient features to be considered are the following:

- Depth. For large cargo ships, a mean low water of 30 feet and a maximum of 210 feet are required. A Fast Sealift Ship requires a mean low water of 37 feet. The maximum draft of ships to be discharged and the ground swells dictate the minimum depth.
- Size. For planning purposes, the anchorage area should be a circle with an 800-foot radius to provide a safe, free-swinging area. This is required for the standard five-hatch vessel. Use the following formula if larger vessels are anticipated in the operation.

  2(7D+2L) = diameter in feet

  Where:

  D = depth of water in feet

  L = length of vessel in feet.

Note: A much larger radius maybe required for dispersion if operations are being conducted under threat of nuclear warfare or if hazardous materials are included. Bow and stern mooring is not considered desirable in tidal areas because athwart ship currents excessively strain mooring gear. An appreciable change in depth also requires continuous watching of the anchored vessels. The type of offshore bottom also significantly affects how close ships can be anchored to each other. A ship will drag anchor if the bottom is too rocky or soft.

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

6-15. During the reconnaissance, the terminal battalion commander also selects and assigns company areas and frontages, indicates areas of defense responsibilities, and tentatively organizes the AO. Upon completion of the reconnaissance, the findings are analyzed and the most desirable beach areas are selected. Alternate beaches are chosen and listed in order of suitability. The battalion commander submits the selected sites to the sustainment brigade commander with a written plan for implementing operations at the selected beach.

6-16. After the initial reconnaissance is completed and the terminal battalions have been assigned to dispersed sites along the coastline, the sustainment brigade commander must ensure that each battalion has the units, equipment, and other support needed for the assigned mission. Beaches ideally suited for LOTS operations are seldom found without prior preparation or alteration. Therefore, engineering support is required to enable landing craft to beach and to provide exits from the beach to discharge areas and the clearance transportation network.

6-17. At each bare beach LOTS discharge point, the beach area operations require close attention and supervision. The success of each beach operation depends on the efficiency of cargo operations on the beach itself. Supplies and equipment being brought to the beach must be kept moving across it toward inland destinations as rapidly as possible. A cluttered beach offers a lucrative target to the enemy and hinders cargo movement.

6-18. Employing terminal units over widely separated distances along a coastline requires careful evaluation of the maintenance system supporting a scattered operations complex. When operations are conducted in a dispersed situation, emphasis on field maintenance must be increased. Every effort must be made to fix minor troubles to prevent costly equipment break-downs. The sustainment brigade standard operating procedure should establish the procedure for maintenance support. Floating craft maintenance units supporting terminal operations over an extended length of coastline require mobile marine repair facilities for on-site repair service.

6-19. In dispersed beach terminal operations, all terminal units, operating equipment, cargo, and facilities are separated as operational efficiency permits. Personnel, materials, establishments, and activities are spread over a wide area to avoid offering the enemy a concentrated target.

6-20. Dispersion of terminal units greatly increases reliance on radio communications for effective command, control, and coordination. Ensuring adequate communications equipment maintenance support is available is critical to mission success.

BEACH CAPACITY

6-21. ***Beach capacity*** **is the per day estimate expressed in terms of measurement tons, weight tons, or cargo unloaded over a designated strip of shore.** Several factors must be considered to determine the capacity of a particular discharge site. These factors can be divided into the following three groups:

- Those that limit the discharge rate from the vessel in-stream.
- Those that limit the cargo-handling capacity of the beach.
- Those that restrict the flow through the area because of the nature of the beach and the adjacent operational area and infrastructure.

6-22. The group of factors that most limit the quantity of supplies that can be handled determines the capacity of the beach. Beach terminal planning requires making a beach capacity estimate. It involves the same steps that are used in planning for a fixed marine terminal. Table 6-1 and figures 6-3 and 6-4 on page 6-8 provide essential information and definitions relative to this estimation.

FACTORS AFFECTING HANDLING CONSIDERATIONS

6-23. Factors affecting cargo-handling capacity include the following:

- Numbers and experience of personnel available for discharging ships and handling cargo on the beach and in the discharge areas.
- Type and availability of material handling equipment and transportation equipment for beach clearance.
- Types and amounts of lighterage available for operations.
- Enemy's ability to interrupt operations.

Table 6-1. Beach gradients

Description	Grade (in feet)
1-19. Steep	1-20. More than 1 IN 15
1-21. Moderate	1-22. 1 IN 15 to 1 IN 30
1-23. Gentle	1-24. 1 IN 30 to 1 IN 60
1-25. Mild	1-26. 1 IN 60 to 1 IN 120
1-27. Flat	1-28. Less than 1 IN 120

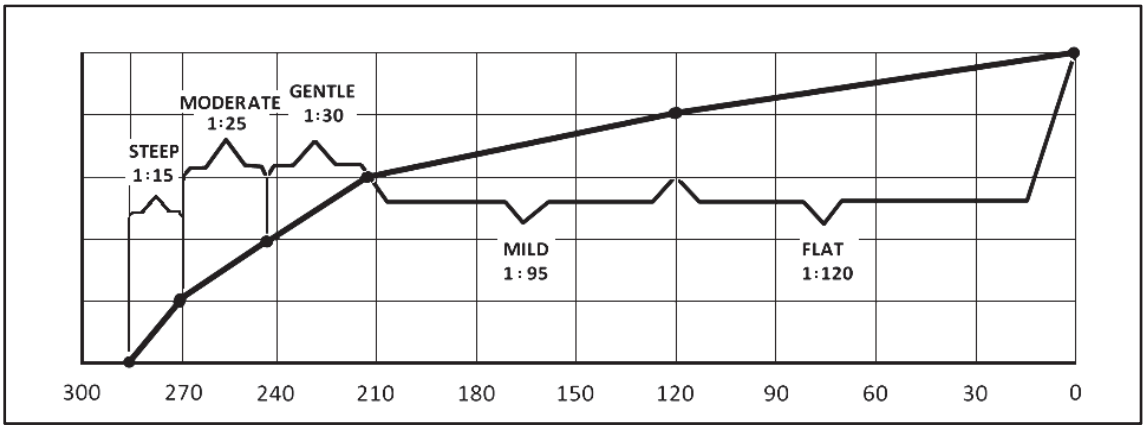


Figure 6-3. Profile of underwater gradient

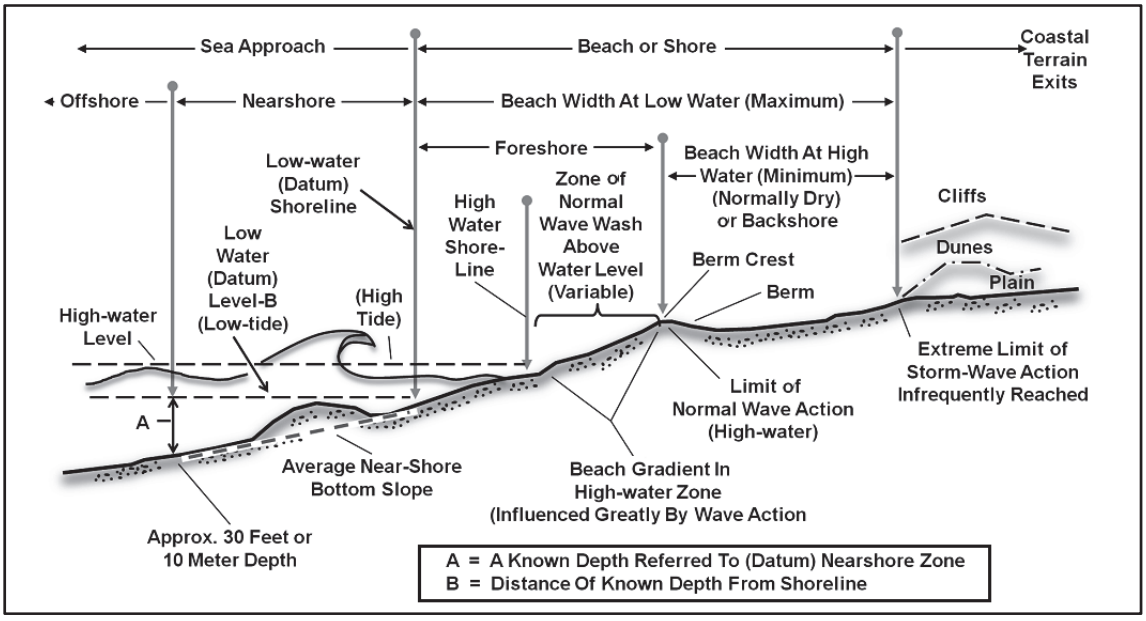


Figure 6-4. Marine beach profile diagram

LIMITATIONS IMPOSED BY TERRAIN

6-24. Most of these factors are self-explanatory, but since beach exits and the nature of the adjacent operational area and infrastructure play important roles in beach capacity, they are discussed in detail. Possible limitations include the following:

- The length and width of the beach.
- Underwater obstacles.
- The tidal range.
- The strength and direction of the tidal stream (rip currents and littoral currents).
- The surf.
- The gradient of the beach as it affects the landing of lighterage and the movement of supplies across the beach proper.
- The bearing surface of the beach.
- The availability and nature of beach exits.
- The nature of the adjacent operational area and infrastructure.

- The weather.

BEACH EXITS

6-25. Often the capacity of the road net, from the beach to principal inland areas, limits the capacity of a beach to discharge and clear supplies and personnel to inland destinations. The useful capacity of the beach can never exceed the capacity of the road net. Therefore, an early and detailed analysis must be made to determine the capacity of the existing road net. If the capacity is inadequate, new roads must be built. This requires additional engineer support for construction and maintenance.

6-26. The number of exits required varies according to the physical characteristics of the roads, the type and amount of cargo to be handled, and the type of conveyance to be used in beach clearance. Tracked and wheeled vehicles should have separate routes.

6-27. The nature of the area next to the beach may limit the number of possible exits from the beach. An otherwise ideal beach may be backed by sand dunes, seawalls, swamps or obstacles that hamper beach clearance operations.

ADJACENT OPERATIONS AREAS AND INFRASTRUCTURE

6-28. In selecting a beach for unloading cargo, the reconnoitering officer must consider more than the beach and its exits. The reconnoitering officer must consider the availability of a road or rail networks or the possibility of building one to tie the beach exits to the main transportation network. The reconnoitering officer must also consider the existence of or need for telephone and telegraph lines, radio stations, and power lines. Finally, the availability of inland waterways must be evaluated. If suitable roads exist, thorough reconnaissance should be made to determine their exact physical characteristics. The strength and width of any bridges in a road net are of prime importance in evaluating capabilities or limitations. Since helicopters may be used for clearance operations, the reconnoitering officer should consider a suitable area for establishing a heliport.

BEACH TRANSFER POINT

6-29. The requirement for beach transfer points must be considered during the reconnaissance and their locations should be designated. A desirable beach transfer point should include the following:

- Be located to the rear of the beach so as not to interfere with shoreline operations.
- Be near the clearance route for the beach where cargo trucks moving in the traffic pattern can receive their load without interference with other traffic and still have access to and exit from the transfer points.
- Be near a railhead if rail is an active mode.
- Have room for a roadway on either side of the material handling equipment operating at the transfer point so that there is no interference between the amphibian and the cargo truck.
- Have cranes located on firm, level ground. The crane's longer axis should be parallel to the direction or movement of the vehicles. With the crane in this position, loads can be transferred with the least amount of movement of the boom.

TEMPORARY HOLDING AREA

6-30. In general, the problems of cargo clearance in beach operations are the same as for conventional port terminals. However, differences in the physical characteristics of the operating areas may require the modification of procedures and the use of different types of equipment. In an ideal situation, clearance transportation capacity equals the discharge capability and cargo is moved through and out of the terminal area as fast as if is unloaded from the ships. However, this balance seldom occurs. Some cargo backlog must be anticipated and provided for by establishing temporary staging areas. Cargo unloaded from landing craft that cannot be immediately cleared should also be brought to these staging areas to avoid congestion and cargo pileup on the beach.

6-31. When clearance transportation later becomes available to move this cargo from the staging areas, terminal service companies will clear the cargo. If staged cargo become excessive, any effort diverted by these units to handle this cargo would impair the unit's ability to keep the lighters moving. If this practice continues, the entire operation stagnates. This problem is solved by temporarily assigning terminal transfer elements (squads, platoons, or companies) to load backlogged or frustrated cargo onto clearance transportation. This maintains the flow of cargo out of the terminal without disrupting the discharge operations at the ship by slowing lighter turnaround.

6-32. Temporary staging areas should be located away from main clearance roads to minimize road congestion and to present less lucrative targets. Roads leading from the main clearance roads to the staging areas must be kept in good condition. Each area should have a separate entrance and exit. If tracked vehicles are to be used as well as trucks, separate traffic nets may be needed. The ground should be level, firm, and dry. The surrounding area should be large enough so that in-transit storage facilities can be expanded to meet anticipated maximum requirements.

TRAFFIC CONTROL

6-33. Traffic control is vital to preventing congestion in the terminal area and promptly clearing cargo to its initial destination. To control vehicle traffic in a beach area, make sure of the following:

- A sufficient number of drivers, material handling equipment, and supervisors should be available for around-the-clock operations.
- A one-way traffic system should be established to alleviate congestion.
- Use of motor transport equipment should be carefully planned for maximum use.
- Vehicles should be loaded to capacity whenever this practice is consistent with cargo segregation requirements.
- Control procedures should be set up to provide readily available information on the location and current employment of all motor transport facilities. This is done so that equipment or units can be promptly diverted with minimum disruption of the overall operation.

BEACH MANAGEMENT

6-34. The requirements for clearing personnel, supplies, and equipment from beaches usually exceed available capacity. Careful planning and close supervision are needed to maximize the use of available equipment, personnel, and facilities. Some measures that help to clear supplies and equipment from the beach area include the following:

UNLOADING OPERATIONS

6-35. During unloading operations, seaport operations company personnel should be alert for new ways to expedite cargo movement. Each site should have at least one truck dispatcher when clearance is being done by trucks. Two practical expedients are discussed as follows:

- Normally, rough terrain cranes are needed at the shoreline when cargo must be lifted from landing craft and placed in highway transport equipment.
- Floating causeways, RO/RO platforms, and causeway ferries are used to ensure motor vehicles safely reach the beach. They will also eliminate the possibility of drowning out because vehicles can roll ashore without passing through the water.

SHORE-TO-SHORE OPERATIONS

6-36. Tactical and logistical shore-to-shore operations may be conducted across or along rivers, between islands, along a coastline, or between a continental land mass and an offshore island. Except for the fact that ocean shipping is not involved, terminal unit functions in these operations are the same as described for bare beach operations. The units provide the same support as described in previous chapters. Command elements and relationships in logistical shore-to-shore operations are the same as in conventional marine terminals and in ship-to-shore bare beach LOTS operations. The seaport operations company ship platoons work in the loading area on the near shore, and the shore platoons operate discharge points in the objective

area. Landing craft units provide the lighterage service. Terminal transfer elements may be assigned to clear cargo backlogs.

Appendix A

Military Surface Deployment and Distribution Command (SDDC) Supplemental Information

The SDDC is the ASCC of the USTRANSCOM. SDDC is also a major subordinate command of United States Army Materiel Command. SDDC is the DOD's single port manager and the DOD's global container manager. It is the only DOD organization with fully developed capability to perform port management and container management – strategic or operational/tactical - in CONUS or OCONUS on a long term basis. SDDC is staffed and organized to manage commercial transportation organizations world-wide. Since commercial surface transportation is a significant part of the Defense Transportation System (DTS), this is a significant aspect of SDDC's strategic port management and container management capability.

This appendix highlights SDDC Headquarters' G-3 responsibilities for port management. Additionally, SDDC's force structure/organizational charts for both active and reserve units are shown in figures A-1 on page A-2 and A-2 on page A-3.

SDDC HEADQUARTERS G-3 RESPONSIBILITIES

A-1. Within SDDC headquarters, the action element exercising staff responsibility for port management is the SDDC G3 which:

- Provides oversight and support to SDDC terminals and strategic ports (CONUS and OCONUS).
- Plans and coordinates vessel operations supporting DOD shipments worldwide.
- Manages movement of hazardous materials ammunition throughout the DTS.
- Establishes and maintains the policies, regulations, and procedures related to SDDC terminal management.
- Establishes policies and procedures for stow planning and central stow capability.
- Serves as the Department of Defense program manager for the Worldwide Cargo Loss and Damage Prevention Reporting and Analysis System. Those responsibilities include:
  - Ensures published regulatory guidance meets the needs of the military and federal agencies involved with the transportation discrepancy report program.
  - Assists finance centers and claims offices in obtaining shipment and discrepancy information to resolve transportation discrepancies.
  - Monitors the transportation discrepancy report (TDR) performance of field activities which fail to respond to Request for information tracers and takes action to ensure prompt and accurate replies in the future.
  - Provides installation transportation officers with timely, adequate training and assistance in preparing and submitting TDRs.
  - Takes necessary measures to determine the effectiveness of and weaknesses in the system and provides recommendations to DOD Components for improvement or corrective action(s).
  - Provides data, analysis, information, and reports to DOD components, Defense Finance and Accounting Service, and General Services Administration to determine trend, changes required for claims prevention, and procedures to reduce loss and damage.

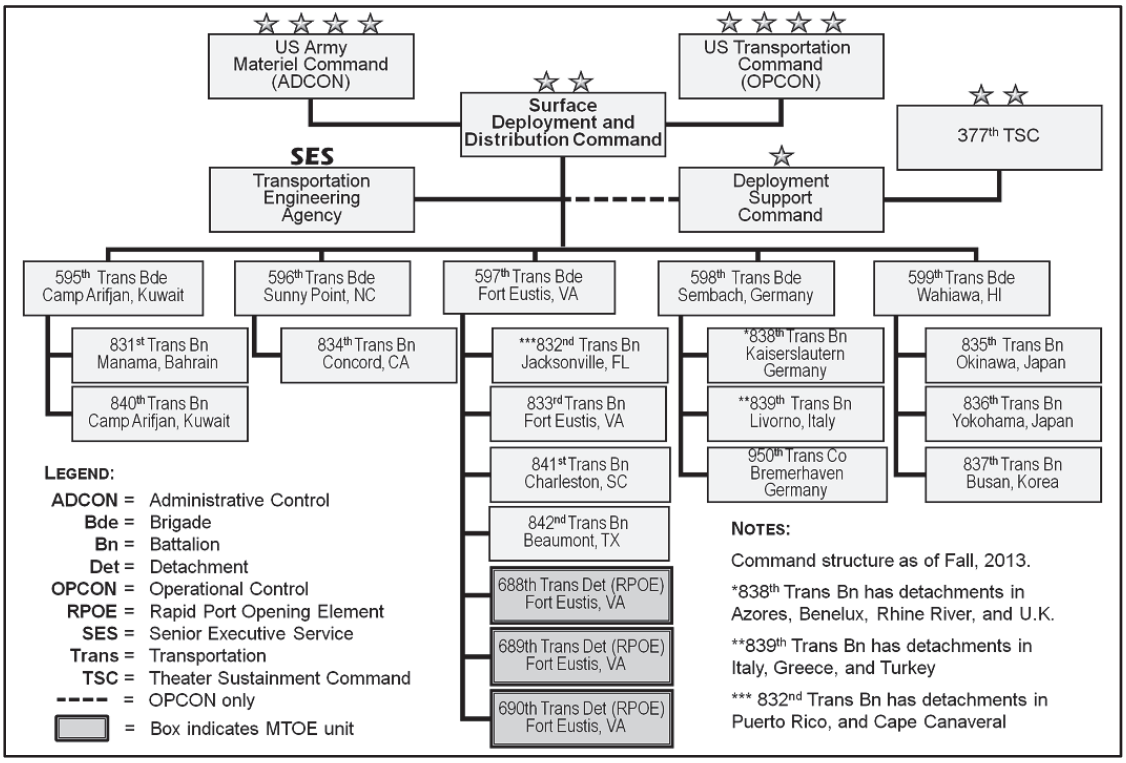


Figure A-1. SDDC active units

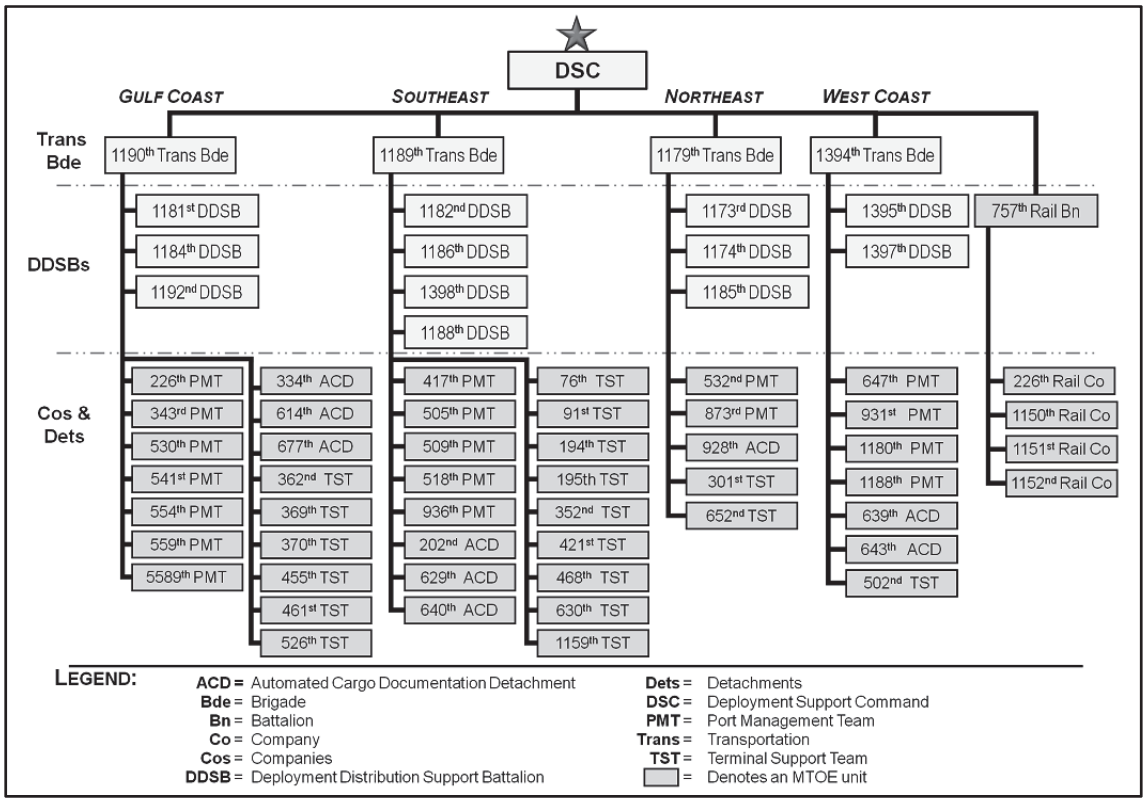


Figure A-2. SDDC reserve units

Appendix B

Transportation Brigade Expeditionary

This appendix is an overview of the transportation brigade expeditionary.

MISSION

B-1. The transportation brigade expeditionary (TBX) provides global mission command of Army watercraft and water terminal capabilities and organizations. This unit is normally assigned to the Army Forces Command and OPCON to a geographic combatant command.

CONCEPT OF OPERATIONS

B-2. The TBX is a brigade-level headquarters capable of providing mission command of assigned and attached water terminal and watercraft units engaged in conducting deployment, redeployment and distribution support (see figure B-1).

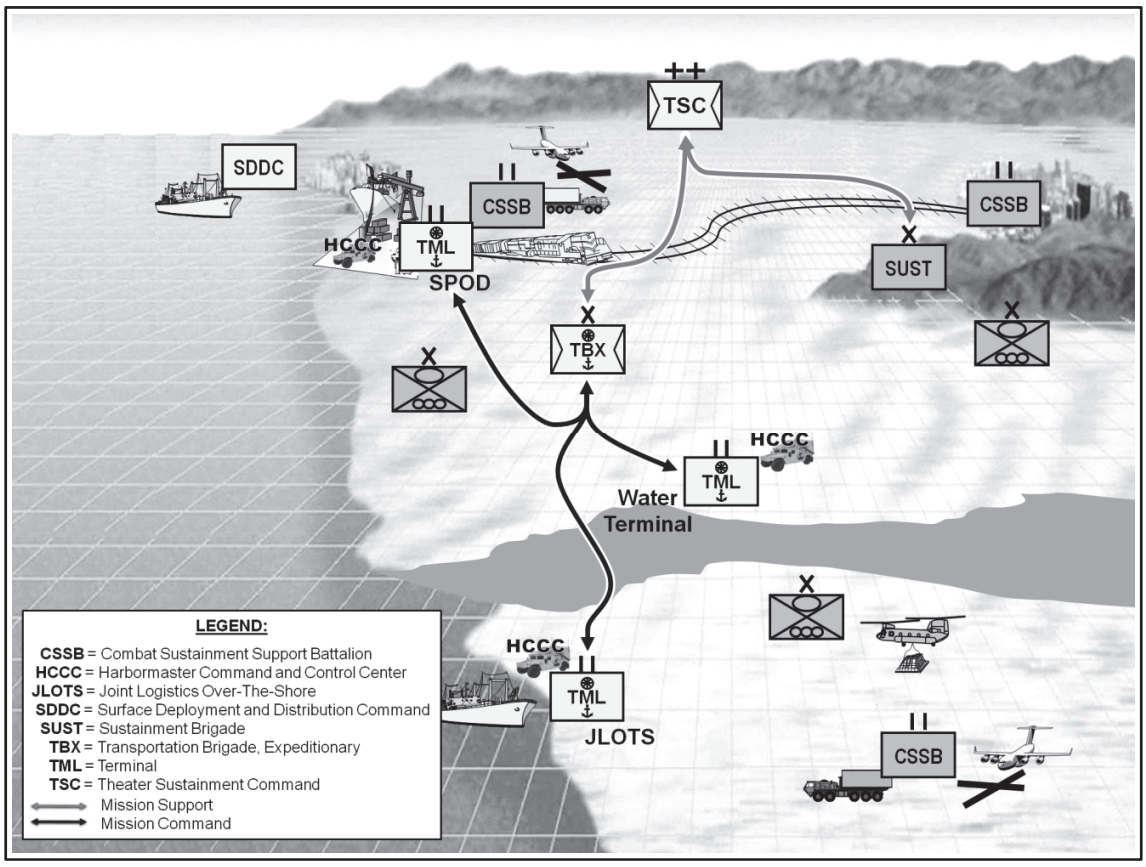


Figure B-1. TBX employment

B-3. The TBX deploys to a theater of operation to provide mission command for port opening and operation at inland waterway, bare beach, degraded, and improved sea terminals in support of combatant command (command authority) theater opening operations. The headquarters is organized to provide the ability to rapidly deploy minimum capabilities to meet rapid port opening operations and small-scale

contingencies, while maintaining a stay-back structure to maintain ongoing peacetime planning and mission command functions. In the event of large-scale, sustained operations, the TBX can be fully deployed to provide mission command for Army water terminal and watercraft operations in any operational environment. Regardless of the operational environment or scale of operation, TBX primary tasks are to rapidly deploy, establish and maintain port operations, establish and coordinate terminal protection operations; conduct waterborne distribution and logistics over-the-shore (LOTS) operations; conduct Joint reception, staging and onward movement of cargo; establish and or coordinate life support services and contract management for terminal operations; and provide conduct container management and Joint documentation oversight. The TBX is capable of providing mission command of units organized under tables of organization and equipment and tables of distribution and allowances.

MISSION COMMAND

B-4. The TBX is an Army asset that will normally be OPCON to an ASCC and attached to the appropriate headquarters for mission command. The TBX mission is to provide mission command for Army organizations engaged in port opening and operation of inland waterway, bare beach, degraded, and improved sea ports. Regardless of mission command alignment, water terminal and watercraft units assigned to the TBX conduct deployment, redeployment and distribution support in accordance with combatant command (command authority) operational requirements, and the TBX commander and staff serve as the geographic combatant commander's primary experts on port operations and management. The TBX and its subordinate battalions establish and maintain close coordination with the theater sustainment command, or expeditionary sustainment brigade, and the sustainment brigades responsible for executing the theater distribution mission. When attached to a theater sustainment command/expeditionary sustainment command, the TBX will establish the same close mission coordination with the SDDC single port manager and port commanders. The TBX's ability to maintain close mission coordination between SDDC and the theater sustainment command/ expeditionary sustainment command will ensure a seamless strategic-to-tactical transition from port opening to distribution operations in a manner that meets geographic combatant commander operational priorities.

REQUIRED CAPABILITIES

B-5. Transportation brigade expeditionary (TBX) provides mission command of units engaged in water terminal and waterborne distribution operations, planning and management of water terminal and watercraft capabilities. The TBX staff is capable of providing:

- a scalable, rapid deployable command team capable of providing mission command for rapid port opening operations;
- mission command of up to seven terminal battalions when fully deployed; and

B-6. During the buildup of combat forces in a theater of operations, the TBX rapidly deploys sufficient command and staff capability to support theater opening, by providing mission command for port opening operations, see figure B-2. The organizational structure required to execute the theater opening function is METT-TC dependent and the size and makeup of the TBX command team must be tailored to meet the operational requirement during early deployment operations. The TBX rapid port opening command team must be capable of establishing the port operating site; holding, staging, and marshaling areas; life support; and distribution operations. The command team must also be sufficient to control multiple battalions engaged in port opening, water terminal, and watercraft operations. TBX critical wartime and implied missions include the ability to:

- Deploy to a theater of operations;
- Establish the TBX operational area;
- Plan and manage watercraft and water terminal support for theater opening operations; conduct port opening operations; and
- Conduct water terminal and watercraft operations.

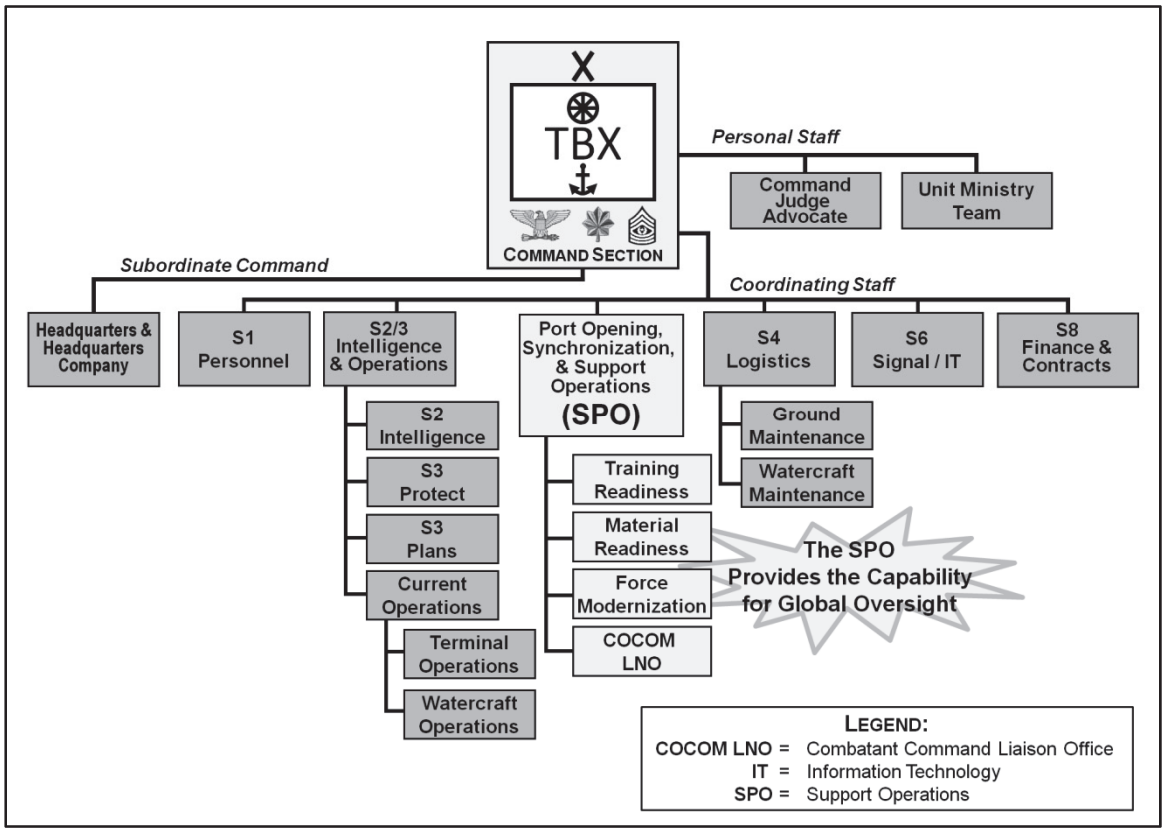


Figure B-2. Transportation Brigade Expeditionary (TBX) organization

B-7. The TBX is capable of providing mission command and technical supervision of up to seven terminal battalions when fully deployed. The TBX staff is specifically trained to conduct port opening operations, to include receiving, loading/discharging, stage, maintaining control and in-transit visibility (ITV), and releasing equipment and materiel to the receiving unit or command. The TBX is capable of deploying to and operating in all sea ports of embarkation/debarkation (SPOE/SPOD). Ideally the SPOE/SPOD is a well-equipped, fixed facility capable of discharging large medium speed roll-on/roll-off ships (LMSR), however, the port can be a fixed facility capable of discharging a variety of vessels, an austere port requiring ships to be equipped with the capability to conduct their own offloading, or beaches requiring the conducting of logistics over the shore (LOTS) operations. TBX critical wartime and implied missions include the ability to:

- Plan and manage watercraft and water terminal support for a theater of operations.
- Conduct water terminal and watercraft operations.
- Implement and monitor theater port operations.
- Commit terminal and watercraft assets in support of theater deployment and movement operations.
- Monitor and maintain status of terminal and watercraft assets to ensure they are properly employed and not over-tasked.
- Provide terminal infrastructure assessment.
- Monitor and coordinate operations and positioning of water terminal and watercraft assets in theater.
- Provide operational control, administration, logistics, and supervision of assigned and attached units.
- Assist in the coordinated defense of the unit's area or installation.
- Plan and conduct redeployment operations.

- Redeploy to another contingency or home station.

B-8. The TBX staff has the mission to provide oversight of the Army's globally-dispersed water terminal and watercraft organizations and capabilities, including those not directly under the TBX command. The TBX must develop relationships and communications with the various commands to which Army water terminal and watercraft units and assets are assigned or attached in order to maintain visibility of current status and operational readiness. In this role, the TBX becomes the repository of subject matter expertise on the current status, capabilities, and proper employment of Army water terminal and watercraft capabilities. The TBX staff will establish and maintain relationships and communications with geographic combatant commander operational planners, exercise executive agents, global force providers, and Army pre-positioned fleet managers, in order to understand and to provide operational advice in planning for and employing these assets and capabilities in exercises and contingency operations. The key functions performed by the TBX in this role include:

- Knowing the capabilities and current status of water terminal and watercraft units in the Army.
- Knowing the capabilities of water port complexes worldwide (infrastructure and civilian workforce capabilities).
- Seeing, early on, requirements for these capabilities that are identified by geographic combatant commands.
- Assisting geographic combatant commands in determining the true requirement in the technical area of water terminal operations/watercraft employment.
- Quickly matching requirements to available capabilities.
- Making timely recommendations for force allocation, including use of non-Army capabilities.
- When given the authority, allocating Army forces or procuring non-Army water terminal and watercraft capabilities.

B-9. Unless fully deployed, the TBX staff must provide a stay behind command team to maintain mission command and technical supervision of assigned and attached units that are not deployed. The organizational structure required to execute the stay behind mission will be partially dependent on the staffing requirements for the deployed command team. However, the TBX commander must ensure sufficient staff expertise is retained to maintain mission command of non-deployed units. The TBX stay behind command team will also provide reach back capability for the deployed command team, enabling staff rotations and planning support for changing operational requirements in theater.

Appendix C

Terminal Management Automated Systems

There are several automated systems used in the deployment process at strategic, operational, or tactical levels. Each system has a purpose to plan, execute, or monitor cargo movement. Some automated systems have more than one purpose. The single port manager and port operator use a combination of automated systems for port management, container management, ITV, and deployment support operations. Each automated system is vital to successful deployment and port operations.

ARMY CONTAINER ASSET MANAGEMENT SYSTEM (ACAMS)

C-1. Army Container Asset Management System (ACAMS) is the Army's designated system of record for lifecycle management of intermodal devices. ACAMS provides de facto, a durable hand receipt for accountability purposes. Additionally, ACAMS is the primary reference for all DOD owned and leased containers. Army Container Asset Management System is used at two CONUS ports, Military Ocean Terminal, Sunny Point and Military Ocean Terminal Concord.

GLOBAL AIR TRANSPORTATION EXECUTION SYSTEM – AIR (GATES-AIR)

C-2. GATES automates support for receipt, movement and billing of cargo and passengers. GATES provides the Air Mobility Command, DOD, and commercial partners with an automated management system to process and track cargo and passenger information, support management of resources, provide logistical support information, generate standard and ad hoc reports, and provide message routing and delivery service for virtually all aircraft movement data. In the force projection scenario, GATES is the automated information system that sends aircraft arrival and departure ITV data to Integrated Data Environment/Global Transportation Network Convergence (IGC).

GLOBAL AIR TRANSPORTATION EXECUTION SYSTEM – OCEAN (GATES – OCEAN)

C-3. GATES – Ocean (formerly Water Port System – WPS) is the SDDC worldwide unclassified system for managing export and import of DOD cargo at water ports. It provides detailed data concerning items of cargo arriving, departing, and on-hand at the water terminal. GATES – Ocean collects cargo data for surface movements; captures receipt, staging, and loading data at ports; and generates the ship manifest/booking upon completion of vessel loading. GATES – Ocean supports ITV for both general cargo and unit moves. It produces those reports necessary for terminal operations and generates the defense transportation regulation ocean cargo manifest. GATES – Ocean produces and reads/interrogates Automated Information Technology data storage devices (bar code and RFID) through a business process server. GATES – Ocean receives advanced data from TC-AIMS II and IBS and provides ITV data to IGC. For other than CONUS movements, GATES – Ocean receives the deployment cargo requirements from TC AIMS II to assist the Military Cargo Ocean Booking Office with scheduling ships.

GLOBAL FREIGHT MANAGEMENT (GFM)

C-4. GFM provides DOD transportation officers with the ability to automatically and electronically procure commercial freight transportation services and provide the real-time data feeds essential to support our nation’s warfighting efforts. GFM applications provide tools which can significantly enhance users' ability to conduct business efficiently by supporting day-to-day processing of DOD shipments. Benefits of the GFM applications include:

- Reduced shipment document preparation time.
- Reduced paperwork.
- Reduced processing errors.
- Provides system access from any personal computer with Internet access.

C-5. The GFM application suite consists of shipper programs, carrier programs, and support tools. It supports:

- Shipper Programs. This is a set of programs that use the GFM database to support freight traffic shipments, billing, rate quotations, small shipment traffic, and spot bids for unusual shipments. It also supports export cargo documentation and generates statistics for export control purposes.
- Carrier Programs. Commercial carriers use this set of programs to enter web-based tenders, to electronically submit and update mandatory DOD registration information. These programs manage the registration of carriers requesting approval to transport freight for the DOD. It also provides for ITV of cargo being carried by DOD-approved carriers along with the ability to submit in-transit status information on DOD shipments to the IGC.
- Support Tools for Shippers and Carriers. This set of programs supports the Discrepancy Identification System, which records and tracks shipment discrepancies.
- Customer Added Value Suite. This set of programs provides shippers, receivers, carriers, defense finance and accounting service personnel, and other government representatives the ability to view carrier tender bids, completed shipments stored on the GFM Host and historical details about bills of lading.

INTEGRATED BOOKING SYSTEM (IBS)

C-6. IBS is an execution and ITV system. It provides a single, worldwide, automated liner booking system to support peacetime and wartime movement of unit and sustainment cargo. IBS supports SDDC's business practices by automating the cargo booking process between DOD shippers and ocean carriers. IBS provides an automated capability for overseas shippers and ordering officers to enter export traffic release requests and offer the requests to commercial carriers. Other capabilities of IBS include:

- Increases visibility of shipments within the DTS surface pipeline.
- Provides information to facilitate managing the DTS surface pipeline.
- Facilitates standard practices and, therefore, establishes consistency of booking processes among the theaters of operations.
- Facilitates surge.

C-7. Integrated Booking System-Container Management Module is the primary tool used in an area of responsibility for container management. This system was developed and is managed by SDDC. It is used for:

- Maintaining visibility of container ownership.
- Tracking container location.
- Tracking container usage, free-time, and in-transit information.
- Estimating detention charges.

INTEGRATED COMPUTERIZED DEPLOYMENT SYSTEM (ICODES)

C-8. ICODES is a stow planning tool used at the strategic level for feasibility analysis of sealift solutions and at the operational level to plan, execute, and document actual ship loading operations. ICODES has interface agreements with numerous other Army information technology systems including TC-AIMS II, and GATES that allow it to receive cargo data from systems. ICODES also incorporates yard management functions that allow users to track and display cargo throughout a seaport and it includes modules for rail loading, air loading, and container stuffing.

INTEGRATED DATA ENVIRONMENT /GLOBAL TRANSPORTATION NETWORK CONVERGENCE (IGC)

C-9. The Global Transportation Network (GTN) is an automated command and control information system that provides transportation users and providers with an integrated view of transportation information. GTN previously was a stand-alone system providing USUSTRANSCOM the ability to perform command and control operations, planning and analysis, and business operations, to meet customer requirements. GTN has been merged with the DLA Integrated Data Environment to form IGC (Integrated Data Environment /Global Transportation Network Convergence).

C-10. IGC provides ITV for the DTS. IGC collects and integrates transportation information from selected DOD systems for use by transportation data customers, the Joint Staff, Combatant Commanders, and the Services. The system provides the ability to monitor movement of forces, cargo, passengers, and patients and the movement of military and commercial airlift, sealift and surface assets.

C-11. Some, but not all, of the systems that exchange information with IGC are listed below.

- Cargo Movement Operating System
- Commercial Electronic Data Interchange
- Computerized Movement Planning and Status System
- GATES – Air
- GATES – Water
- IBS
- Joint Operation Planning and Execution System
- RFITV
- TCAIMS II

SINGLE MOBILITY SYSTEM

C-12. Single Mobility System is a Secret Internet Protocol Router and Non-Secure Internet Protocol Router web-based software application which provides visibility of air and surface DTS assets. Single Mobility System provides functional users and mission planners a single integrated view of cargo and passenger movements reported to USTRANSCOM and the mobility systems of the transportation component commands.

SUSTAINMENT SYSTEM MISSION COMMAND (S2MC)

C-13. Sustainment System Mission Command (S2MC) is the primary component within the MC Collapse framework that provides near-real-time tracking and status of military and commercial assets at sea, in the air and on the ground, conveying significant military cargo. As part of the Mission Command Collapse Strategy, S2MC is merging and migrating existing critical logistics/sustainment capabilities from Battle Command Support and Sustainment System and Battle Command Support and Sustainment System Node Management onto the collaborative environment of the Mission Command Workstation, including logistics reporting, commander's dashboard, in-transit visibility and asset visibility. In addition, S2MC is leveraging the flexibility of Mission Command Web to expand user access to an enhanced set of S2MC capabilities.

TRANSPORTATION COORDINATOR AUTOMATED INFORMATION MOVEMENT SYSTEM (TC-AIMS-II)

C-14. TC-AIMS-II is a critical deployment and transportation system which provides transportation agents and deploying units:

- Automated support to assist unit commanders in creating, maintaining, managing, and updating unit equipment, personnel, deployment information and databases. It also facilitates planning and execution of organic movements. TC-AIMS II incorporates the mechanism for identifying assets and requirements for force deployment/redeployment during deliberate and crisis action planning.

- The Theater Operations module is designed to facilitate movement control and enable the functions of reception, staging, onward movement, and integration (RSOI) to be performed over the entire spectrum of military operations, at all levels of war; strategic, operational, and tactical. It also a highway regulation and convoy planning, de-confliction, and scheduling tool that will be used in CONUS or OCONUS.

C-15. TC-AIMS-II links all functionality for DOD component unit movement and Installation Transportation Officer/Traffic Management Office into one consolidated system that moves personnel, unit equipment, and supplies.

Appendix D

Marshaling Yard Operations

Use of a marshaling area allows rapid clearing of the beach or pier. It makes vessel working space available for its primary purpose. It reduces pier congestion, thus reducing the potential for work slowdowns or stoppages in discharge operations.

CARGO OPERATIONS

D-1. Ideally, containers and other cargo should go from ship's hook directly onto line-haul equipment for movement inland. In most cases this is not possible except for selected containers or other cargoes. Conceptually, all cargo should move through the terminal without delay. However, this is not always possible because of the following:

- The consignee's reception capacity may be limited.
- The movement plan causes delays in clearance.
- Damaged containers may require repair or stowing of contents before further movement.
- The consignee may move, causing some delay.
- Containers may require segregation by destination or priority.
- Containers occasionally require redocumentation before further movement.
- Some retrograde containers must be cleaned and fumigated.
- Containers found with broken seals or apparent pilferage must be inventoried and a new seal applied before onward movement.

D-2. The container (cargo) marshaling yard is a temporary, in-transit storage area. It expedites discharge operations by facilitating rapid and continuous movement of cargo and/or containers to or from the beach or pier. Marshaling cargo allows leveling of line-haul peak workloads that result from discharge operations. Concurrently, marshaling cargo allows selective, controlled, and flexible phasing of container or cargo movement to destination or vessel. In container operations, the terminal provides an area for the containers for the following:

- The consignee's reception capacity may be limited.
- The movement plan causes delays in clearance.
- Damaged containers may require repair or stowing of contents before further movement.
- The consignee may move, causing some delay.
- Containers may require segregation by destination or priority.
- Containers occasionally require re-documentation before further movement.
- Some retrograde containers must be cleaned and fumigated.
- Containers found with broken seals or apparent pilferage must be inventoried and a new seal applied before onward movement.

ORGANIZATIONS AND FUNCTIONS

D-3. A marshaling yard has no set organization or physical layout. It is organized to meet operational requirements within available space. By grouping related functions, the design of the marshaling yard will eliminate lost motion, reduce container and cargo handling requirements, and permit a logical flow of containers and cargo through the terminal. Cargo can be subdivided into any number of categories. The most widely used categories are general (break-bulk), containerized, RO/RO (vehicles and containers on chassis), and special (oversize, heavy lift, hazardous, and security) cargo. These categories and the volume of cargo in each category play a significant role in marshaling yard organization. All terminals should provide for the following activities and functions:

- A central control and inspection point with multiple lanes for cargo and containers entering or leaving the marshaling yard.
- Auxiliary internal checkpoints for containers and cargo entering the yard from a beach, from a rail spur, or by helicopter to a heliport within the yard.
- A traffic circulation plan depicting movement flow into, through, and out of the marshaling area.
- Segregation of inbound containers and cargo by size and type. Within these groupings, further segregation by destination, priority, and special handling (security, mail, and hazardous) requirements.
- Segregation of retrograde cargo and containers by type and size with empty and loaded containers further segregated.
- Running inventory of containers by location and status within the yard.
- Security area for break-bulk or containerized sensitive and high-dollar-value cargo.
- External power source for refrigerated containers. (In an unimproved or bare beach LOTS environment, self-contained refrigeration units may be needed. This mandates separate propane or diesel refueling areas.) Refrigeration maintenance must also be provided.
- Sheltered facilities for inventory and control, documentation, and movement control elements.
- Covered facilities for stowing and unstowing containers and repairing cargo.
- Cleaning and/or decontamination of retrograde containers and vehicles.
- Minor repair of damaged containers.
- Equipment parking.
- Unit maintenance of equipment.
- Messing and comfort facilities.
- Spill contingency plans including emergency supplies and equipment for containing and disposing of hazardous material spills.
- Disposal of hazardous and special waste in accordance with federal, state, local, and host-nation environmental regulations.

D-4. Yard surfacing requirements of existing ports and those under construction is intended to support commercially operated equipment. The load-bearing capacities will meet foreseeable requirements.

D-5. Fixed and semi port surfacing has essentially the same load-bearing capacities as those of the fixed port. The type and quantities of cargo are essentially identical.

D-6. A suggested general scheme for a container marshaling yard in an unimproved or bare beach LOTS environment is shown in figure D-1.

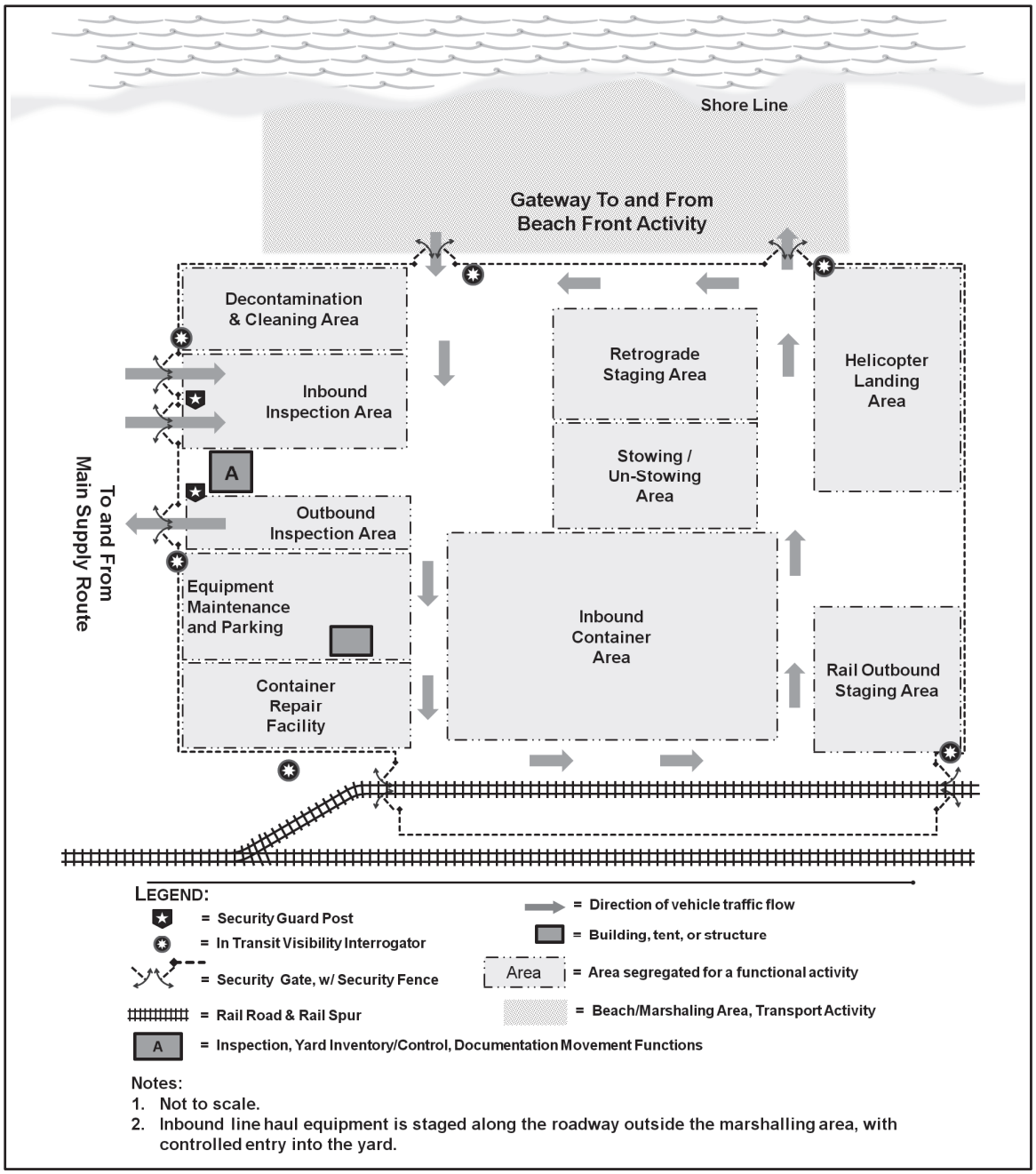


Figure D-1. Suggested organization for a container marshaling yard in a LOTS environment

LOGISTICS OVER-THE-SHORE (LOTS) OPERATIONS

D-7. LOTS Operations (unimproved facility or bare beach). In a LOTS environment, the marshaling yard surface may be subjected to loads of about 218,000 pounds (50,000-pound front loader with a 40-foot container). Normally, beach movement of containers would be restricted to 20-foot containers or less. However, containers up to 40 feet may be used. An unimproved or bare beach facility does not normally have any surfaced area. Such surfacing must be provided comparable to that in a fixed or semi fixed facility. A minimum surface would consist of 9 inches of rock or shell sub grade covered with an equal thickness of blacktop. Time constraints would prevent this type of construction in a LOTS environment. The materials that follow may prove useful to support limited loads in LOTS operations:

- Matting, AM-2. This is a Navy-developed, extruded aluminum airfield mat. It is designed to support jet aircraft over soft, fine-grained soil. Because of limited stocks, high cost, and high priority for airfield use, this material will probably not be available for marshaling area use.
- Matting, XM-19. This Army-developed, aluminum honeycomb-core, sandwich-type airfield landing mat is intended to support cargo and selected aircraft over soft soils. Limited stocks and priority for airfield use also restrict availability of this product.
- Matting, M8A1. This is a corrugated steel airfield mat. It supports container-loaded trailers over sand, other granulated soils, and most relatively dry, fine grained soils (clay and silt).
- MO-MAT. This fiberglass-reinforced plastic is laid in sections that may be bolted together or overlapped. It is less susceptible to water penetration and more easily placed than metal matting. It is effective over beach sand, granular soils, and some fine-grained soils (clay and silt). It relies on the support provided by underlying soils.
- ON-FAST. This is fiberglass cloth, hand sprayed with polyester resin for reinforcement. Unless broken, it does not allow water penetration. It achieves support from underlying soils and is effective over beach sand, granular soils, and some fine-grained soils (clay and silt). Increasing the thickness and fiberglass reinforcement increases the matting strength.

LOCATION OF MARSHALING YARD

D-8. Location of the marshaling yard is key to terminal operations and cargo throughput. The objectives of loading and discharging focuses on rapid, efficient, and controlled movement of cargo between ship and shore. Therefore, the closer a marshaling yard is to the water terminal the greater chance to maximize throughput.

CONTAINER MARSHALING AREA

D-9. The marshaling area (general cargo or container, or both) is located as near the vessel, rail, air, or truck discharge or load site as practicable. Enemy capabilities and activities may require dispersion of activities or may otherwise effect the selection of the marshaling yard location.

FIXED AND SEMI-FIXED PORTS

D-10. The marshaling yard in an existing port is normally next to the pier area with a sufficient pier apron (100 to 500 feet) between the yard and ship-side. These distances accommodate container discharge and container clearance activities and are more than adequate for general cargo operations. Rail spurs, warehouses, and similar facilities usually exist but may require rehabilitation. The semi-fixed port is constructed to replace an unimproved or bare beach LOTS site when a suitable fixed port is not available. Layout and construction of the semi fixed port parallels that of the fixed port. Construction of the marshaling yard should encompass any existing hardstand, structures, and rail lines.

LOTS TERMINAL (UNIMPROVED FACILITY/BARE BEACH OPERATIONS)

D-11. The LOTS marshaling yard should be approximately 1/4 to 1/2 mile (.4 to .8 kilometers) inland from the beach or dune area to allow an acceptable rate of beach clearance. The maximum distance should not exceed that needed for operations. LOTS operations are inherently inefficient. They should be used only until fixed facilities can be placed in operation or until semi-fixed facilities can be constructed. Port operational considerations and construction details dictate the length of time LOTS operations continue. Engineers assist in assessing the following factors that influence marshaling yard site selection in a LOTS environment (unimproved facility/bare beach) consist of the following:

- Accessibility. Is the area readily accessible from the MSR and from the beach? Are internal road nets adequate? If helicopter operations are anticipated, are there any flight obstructions? Is the proposed site next to existing rail facilities?
- Physical facilities. Are usable physical facilities available? Are they served by more than one entrance and exit? Are usable hardstands, airfields, railways or rail spurs, buildings, storage sheds, or warehouses in the area?

- Adequacy of space. Will available space hold the type, size, and quantity of cargo and containers programmed for the area? Is there adequate area for working and intersecting aisles? Will available space accommodate administrative activities; repair, maintenance, and decontamination operations; retrograde staging; and storage of handling equipment? Is there sufficient area to stage line-haul equipment pending entry into the marshaling yard for loading?
- Gradient, drainage, and soil characteristics. Is the marshaling area sufficiently level, with minor grading, to permit general cargo stacking and two-high container stacking without toppling? Are surface and subsoil drainage adequate? What is the depth and type of subsoil? Is the surface soil compatible? Does the soil need compaction, stabilization, or surface matting?

CONTAINER OPERATIONS

D-12. The configuration of the marshaling yard is determined by container stacking operations. More specifically, the configuration of the marshaling yard considers key factors such as space available, type of surface (bare beach, asphalt), material handling equipment, container-handling equipment and desired throughput.

STACKING CONFIGURATION

D-13. Containers may be placed in the marshaling yard either on chassis or stacked off chassis. Keeping containers on chassis reduces container handling and accelerates operations. However, when containers stay on chassis throughout the system, one chassis for every two to three containers is needed to support the system. Storing containers on chassis also increases space requirements in the marshaling area.

D-14. The Army operational concept is to stack load containers off chassis, with a maximum of two high, using the turret stacking method. Retrograde empty containers can be stacked five high if this height is within the capability of container-handling equipment. Other space considerations include stacking collapsed flat racks. Flat racks should be stacked as high as possible by available container-handling equipment in an area that facilitates retrograde for eventual back-loading. Although stacking containers increases handling, it requires fewer chassis and reduces requirements for marshaling yard space. The primary configurations of off chassis stacking are ribbon stacking, block stacking, and turret stacking.

RIBBON STACKING

D-15. Use this configuration; see Figure D-2 on page D-6, when selective extraction of containers from the stack is not needed. This method requires more space than block stacking but is more space efficient than turret stacking. Use the ribbon stacking method if selective extraction is not required.

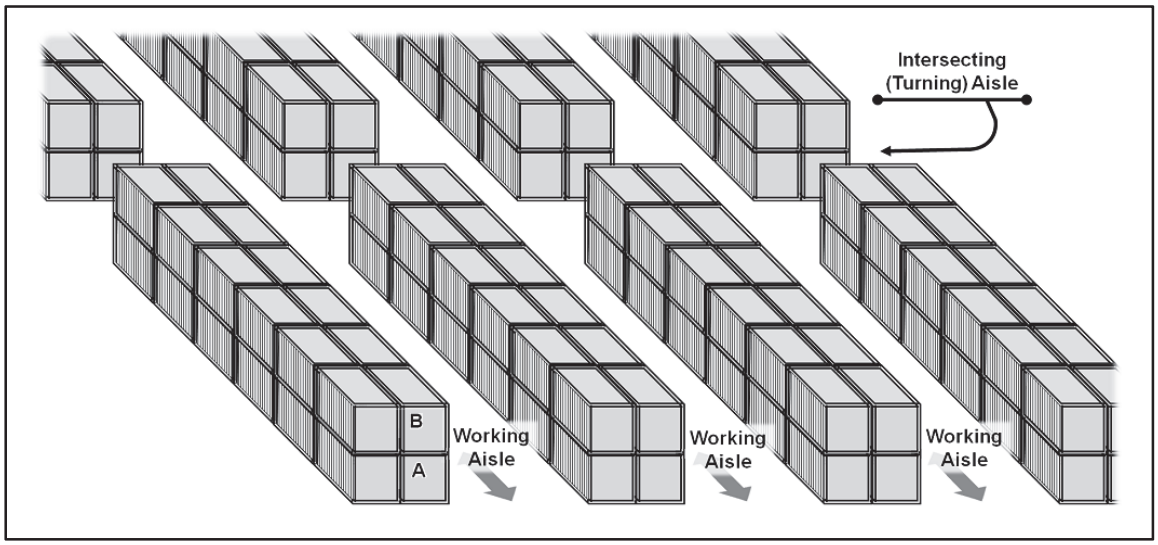


Figure D-2. Ribbon stacking of containers

Note: Ribbon stacking may be used when all containers in the stack must be reached from the working aisle (the aisle between ribbons) but extraction of a particular container in the stack is not required. To illustrate, extraction of container A requires that container B first be removed and placed in the working aisle or carried completely out of the block. At best, this results in increased handling requirements and traffic congestion.

BLOCK STACKING

D-16. Use block stacking, see figure D-3, when the containers have a common destination or when selective extraction of containers from the stack is not needed. This method is particularly suited to stacking (either empty or loaded) identical retrograde containers. It is the most effective use of marshaling yard space.

Note: Block stacking is ideal for identical retrograde containers, containers with a common destination, and in other cases where selective extraction is not required. Of the three stacking methods, block stacking uses space most economically.

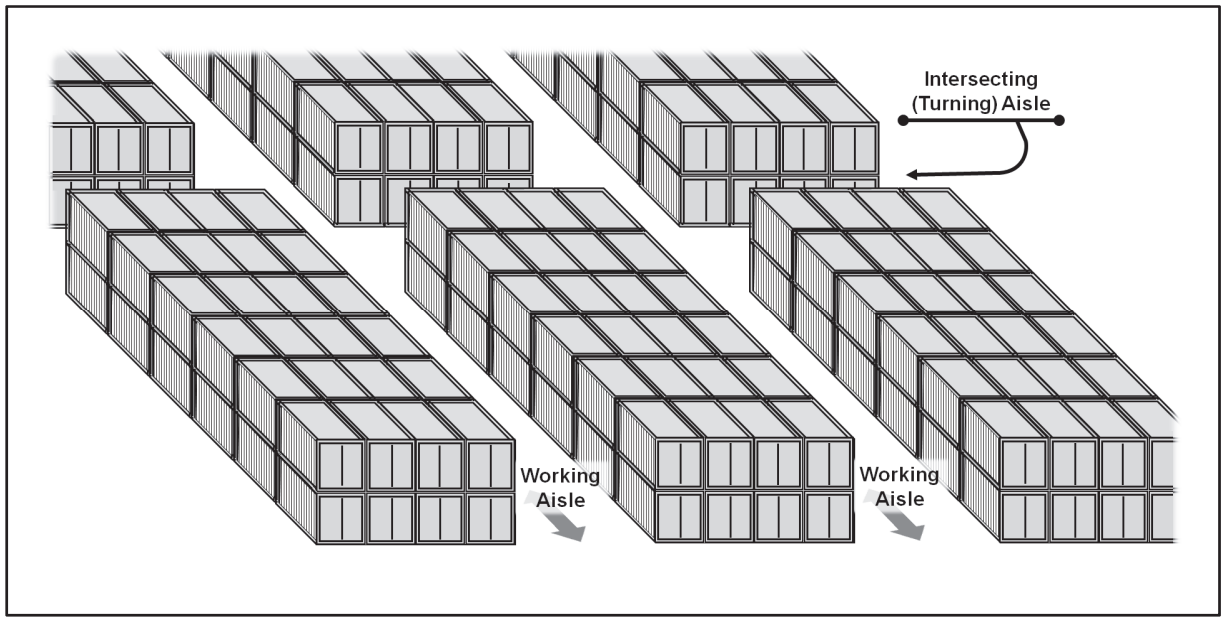


Figure D-3. Block stacking of containers

TURRET STACKING

D-17. Turret stacking, see figures D-4 and D-5 on page D-8, requires less container-handling for selective container extraction than does ribbon or block stacking. Of the three off chassis configurations, turret stacking least effectively uses space. However, it greatly enhances the marshaling yard's throughput or retrograde operations where selective container-handling is necessary. Although three-high turret stacking is shown in figure D-5 the Army concept is to stack-loaded containers only two high.

Note: Figure D-4 on page D-8. Although the least economical in space, turret stacking is recommended when containers must be selectively extracted from the stack. As illustrated, one in three spaces in the second tier remains vacant. Any container in the stack can be removed with no more than two movements. For example, to get to container C, simply place container B over container A, thus exposing container C.

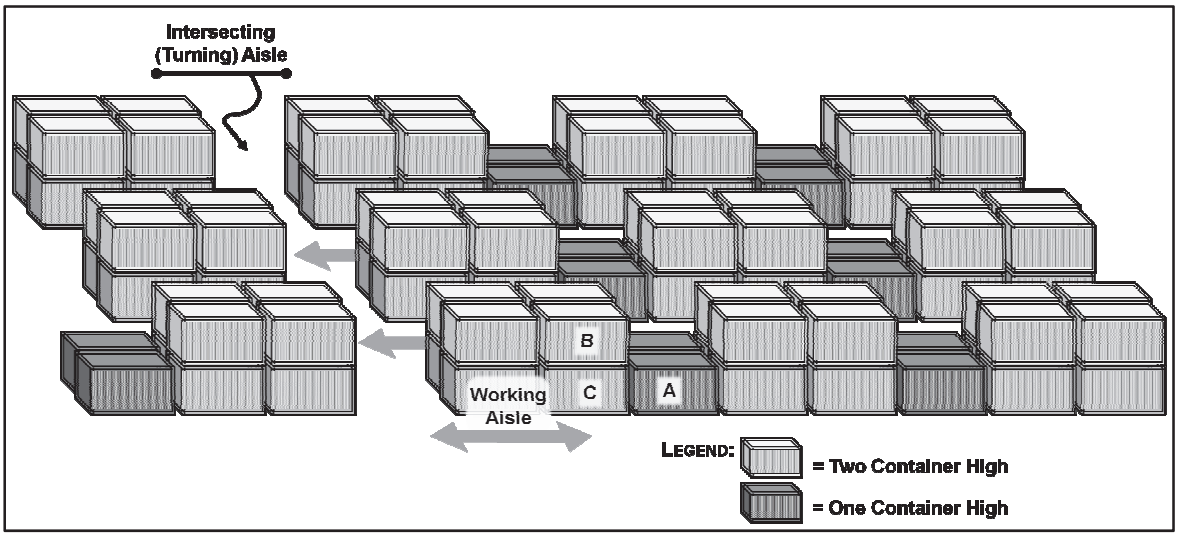


Figure D-4. Turret stacking of containers (two-high)

Note: Figure D-5. Two spaces out of four remain vacant in the third tier. Any container can be extracted in three or less movements. The method can be used in Army operations only when empty identical containers are being handled.

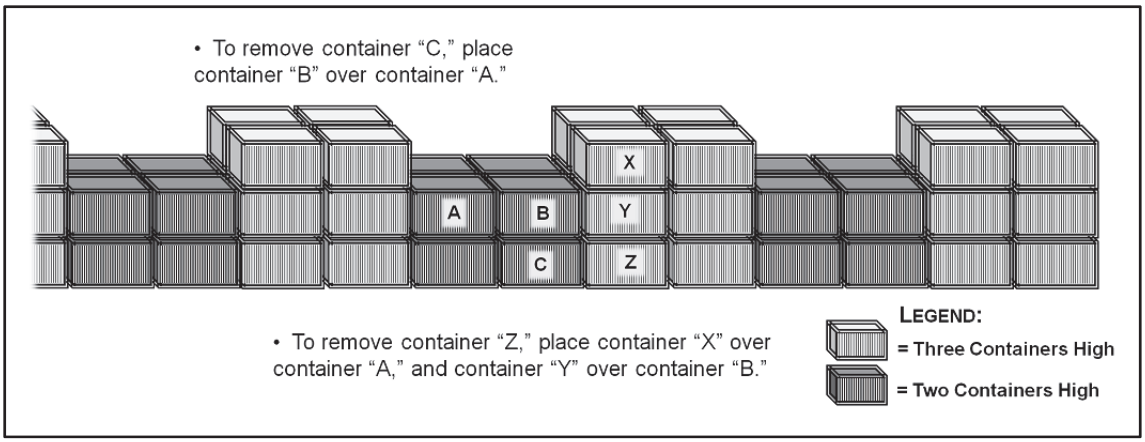


Figure D-5. Turret stacking of containers (three-high)

D-18. The container-on-chassis marshaling system (see figure D-6) is most often used in commercial operations. Container-on-chassis marshaling is normally used in marine terminal operations where the container is lifted off the containership directly onto land transport or in RO/RO operations where the container-on-chassis rig is towed ashore from the RO/RO ship. Marshaling containers on chassis reduces container-handling and increases mobility and flexibility of operations. This method increases marshaling yard space requirements. It dictates a 2 to 1 or 3 to 1, or better, container-to-chassis ratio.

Note: Shown here are two patterns of container-on-chassis (also referred to as container-on-wheels) marshaling: herringbone (pattern A) and straight-in (pattern B). A commercial operator can significantly reduce container damage in the marshaling area by changing from pattern A parking to pattern B. The same operator using pattern B can also, in the case of blacktop surfacing, install a narrow, hardened strip to support the legs of parked chassis. This keeps the legs from sinking into the blacktop.

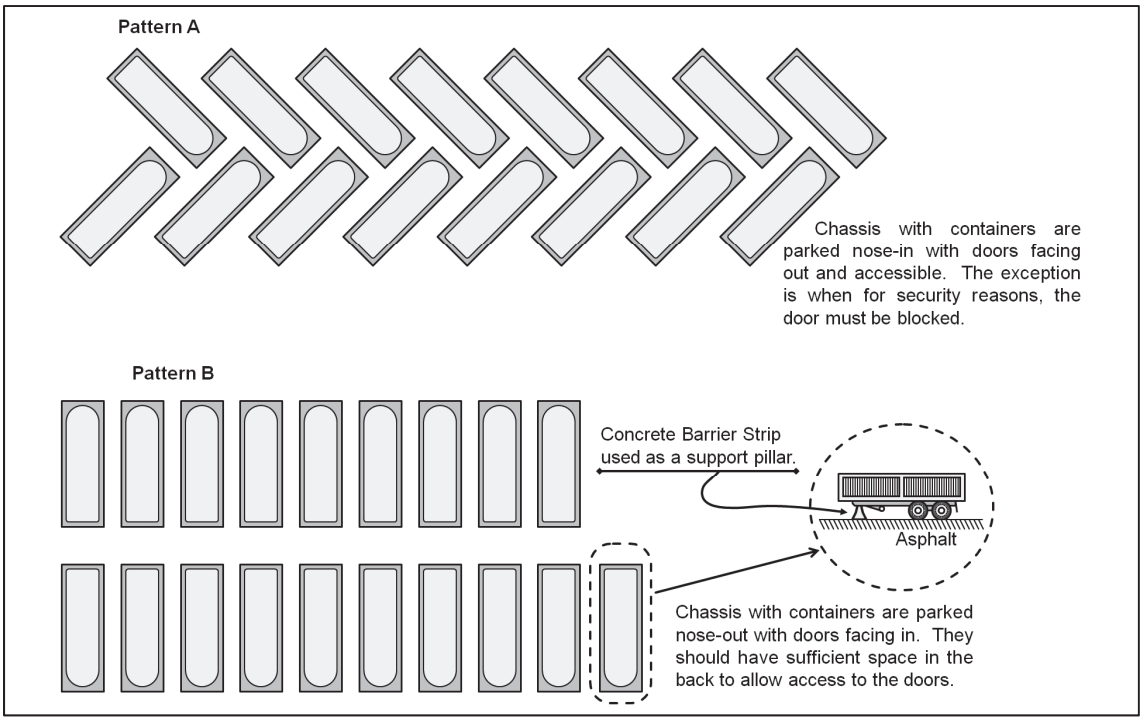


Figure D-6. Container on-chassis marshaling system

SPACE REQUIREMENTS

D-19. Numerous factors and combinations of factors dictate container stacking space requirements. Primary factors include stacking configurations: skill of operator, physical characteristics of container-handling equipment and container size and container cluster concept.

Stacking Configuration

D-20. Ribbon stacking requires more space than block stacking; turret stacking, more than ribbon stacking. Concurrently, one-high stacking requires about twice the space of two-high stacking for the same number of containers. The relative space requirements of on chassis versus off chassis stacking are obvious.

Skill of Equipment Operators

D-21. Less skilled operators require more time to operate equipment. As operating skills increase, the need for more time decreases.

Physical Characteristics of Container-handling Equipment and Container Size

D-22. The recommended minimum operating space is a 15-foot working aisle with a 50-foot intersecting (turning) aisle when using side loaders. When using a front loader, the overall length of the container being carried determines the effective width of the front loader. For example, with a 20-foot container, the width of the vehicle is 20 feet. In a 90-degree stacking operation, a typical frontloaded carrying a 20-foot container has a 45-foot turning radius. Aisle width must be adjusted to accommodate different container lengths.

Container Cluster Concept

D-23. Figures D-7 through D-11 pages D-10 through D-12 present conceptual procedures for computing space requirements to stack containers in a marshaling yard. The concept envisions making clusters of

containers grouped as needed to accommodate specific operational requirements or environments. Clusters are developed for turret stacking, block stacking, and on chassis parking for 20-foot, and 40-foot containers. Variations accommodate turret front loader or side loader stacking. The intersecting aisles are omitted in figures D-7 through D-10 through page D-11.

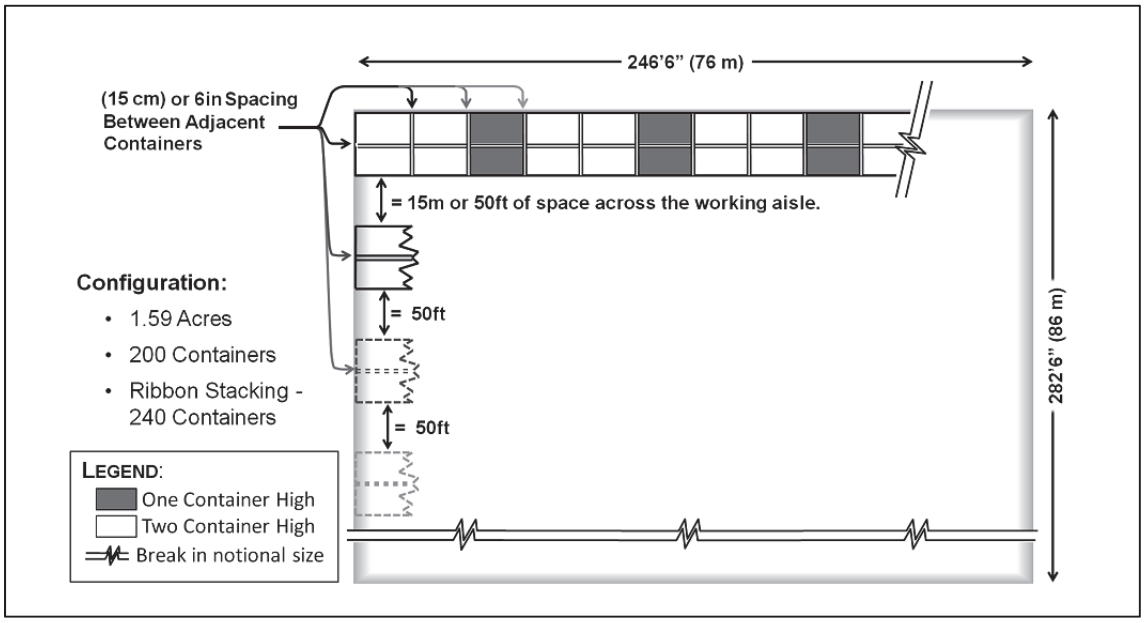


Figure D-7. Cluster plan for front loader turret stacking of 20' containers (50' working aisles)

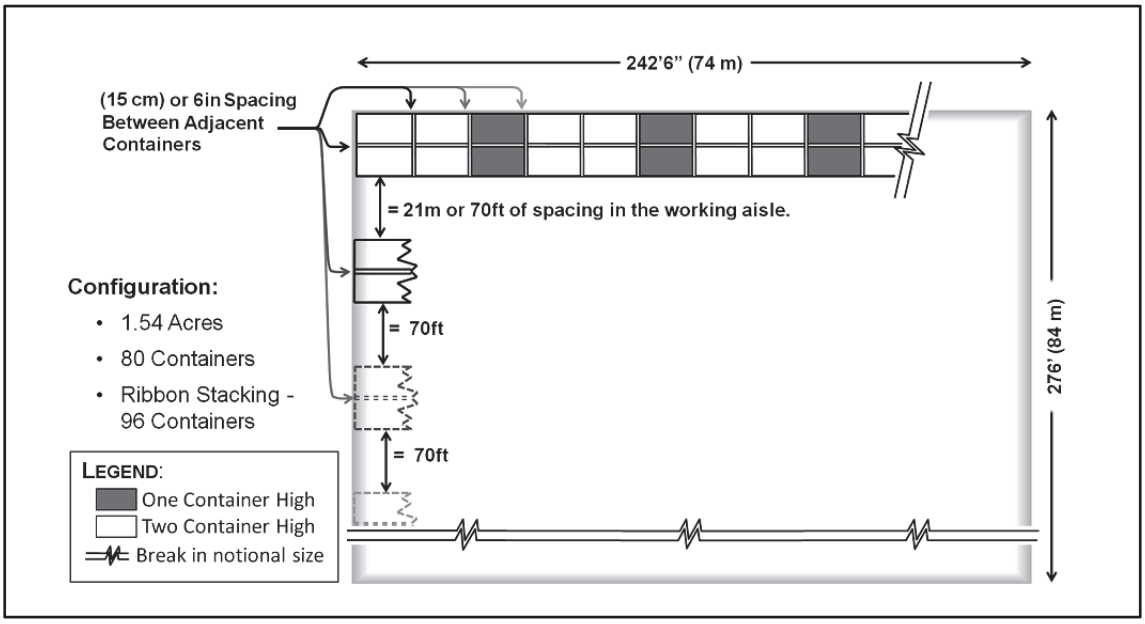


Figure D-8. Cluster plan for front loader turret stacking of 40' containers (70' working aisles)

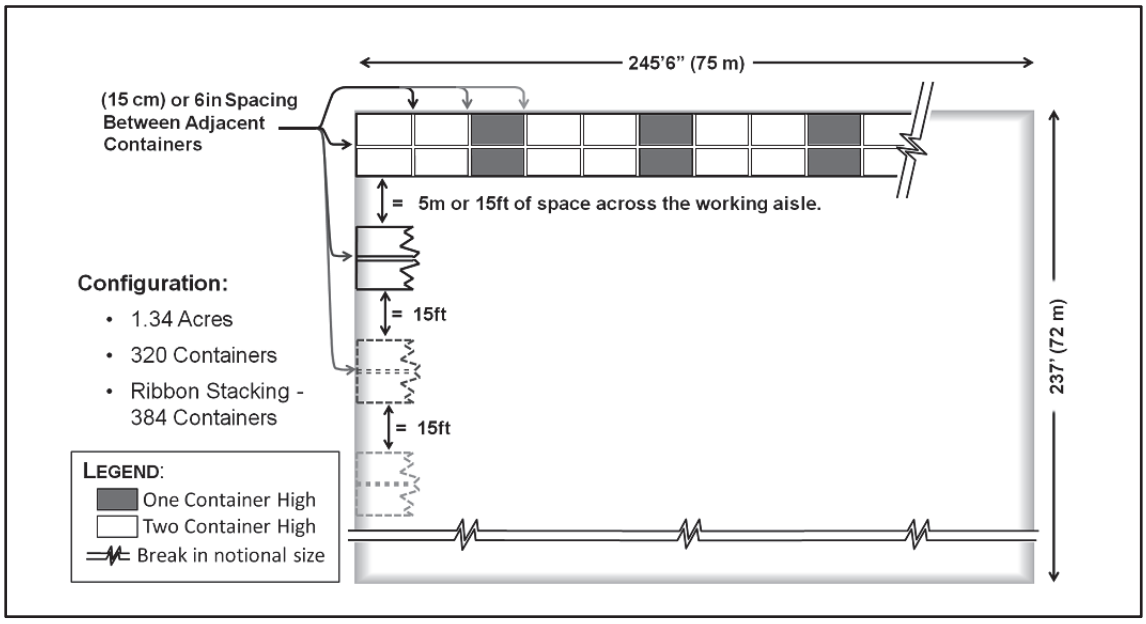


Figure D-9. Cluster plan for side loader turret stacking of 20' containers (15' working aisles)

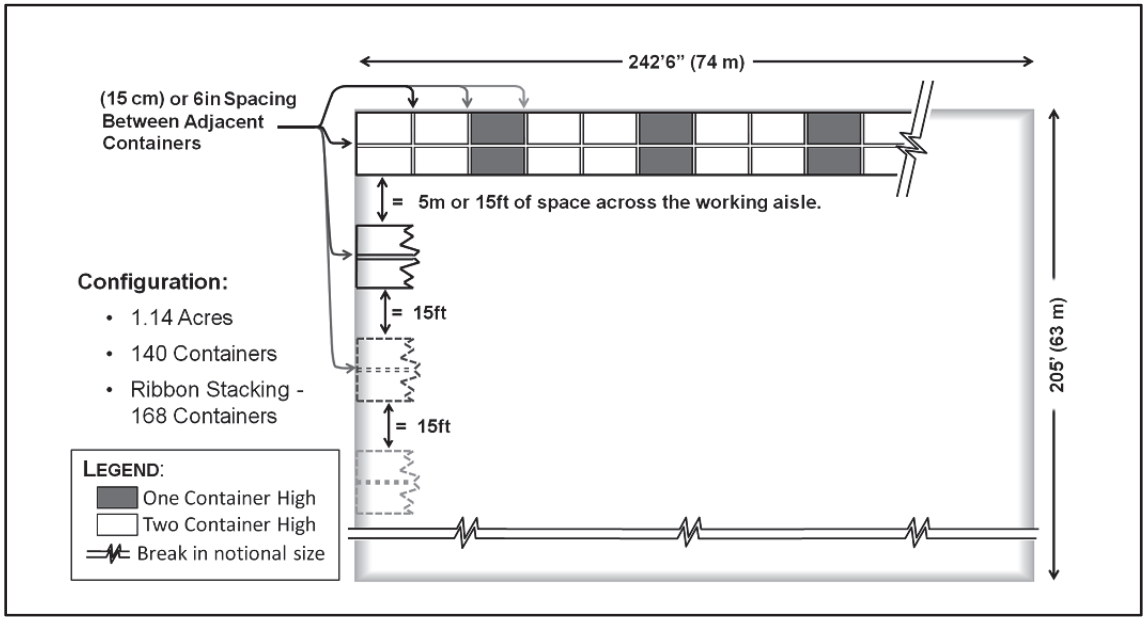


Figure D-10. Cluster plan for side loader turret stacking of 40' containers (15' working aisles)

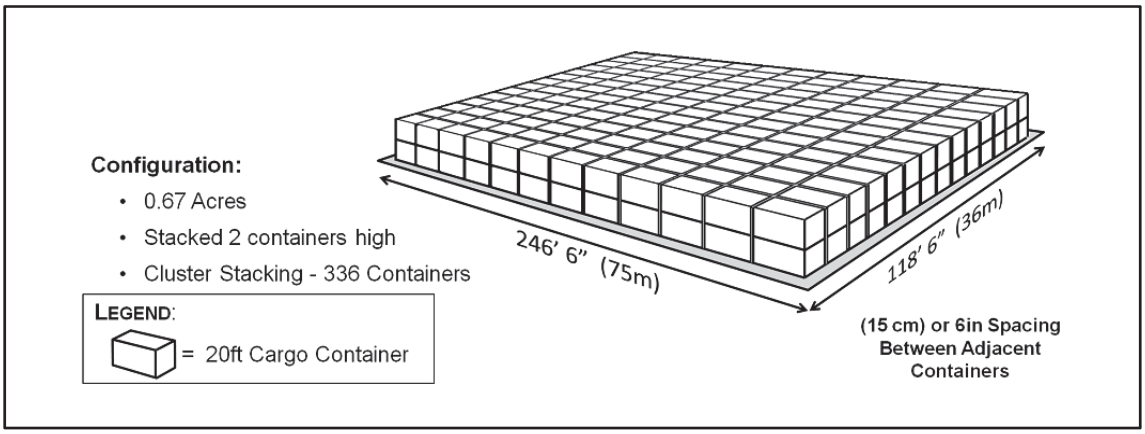
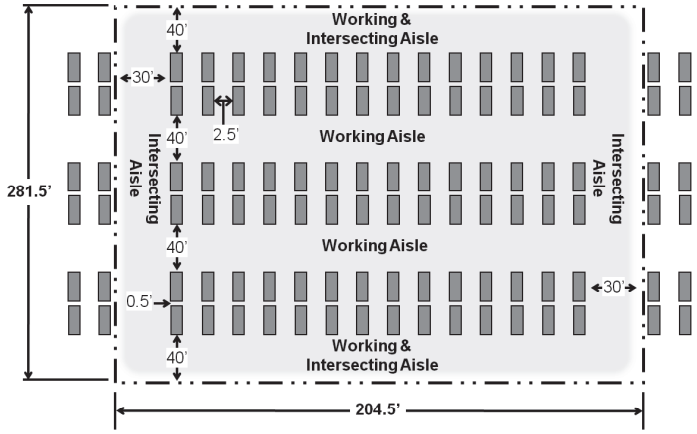


Figure D-11. 20' container cluster

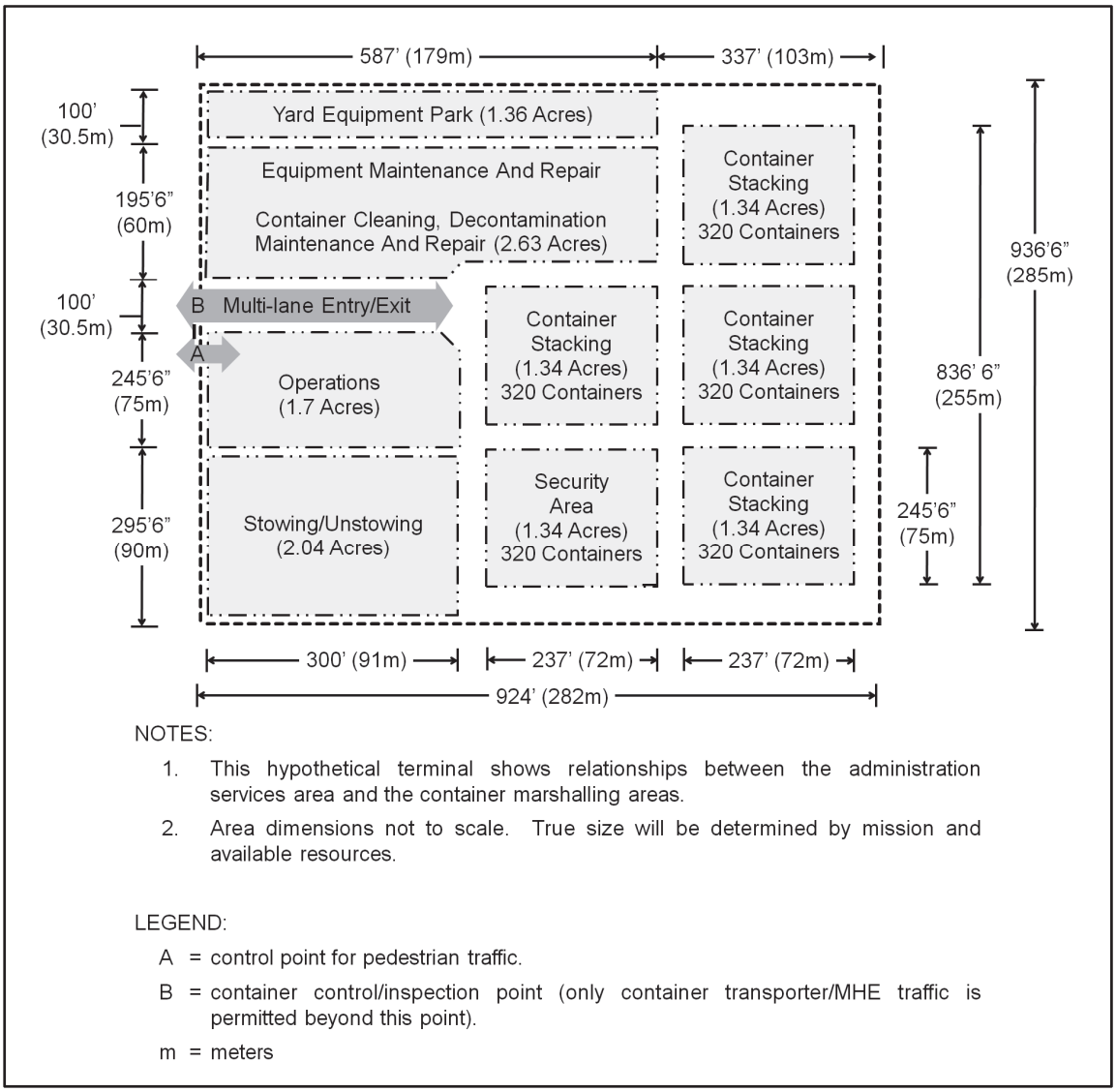
D-24. Using the container cluster concept provides a relatively uncomplicated means of developing a marshaling yard commensurate with the needs of a specific operation or environment. This is done by grouping clusters within available real estate, modifying cluster dimensions where necessary, and adding areas to provide the related activities. Figure D-12 shows a traffic pattern in on chassis marshaling area. Figure D-13 on page D-13 shows a hypothetical marshaling area developed within the cluster grouping concept. It is designed to support simultaneous discharge and/or back-load of one container ship in a fixed marine terminal operation. Intersecting aisles of the required width are placed around each separate container cluster. When two clusters are adjacent, they use a common intersecting aisle of the required width, see figure D-13 on page D-13. Figure D-14 on page D-15 shows a pattern using one-way traffic.



1.32 Acres with 84 Container/Chassis units based on the 20 foot chassis

Chassis & Aisle Spacing:	20-foot	35-foot	40-foot
Intersecting Aisle	30	30	30
Working Aisle	40	55	60
Combination (spacing between clusters)	40	55	60
Between Containers	2.5	3.0	3.5

Figure D-12. Traffic pattern in on chassis marshaling area



NOTES:

1. This hypothetical terminal shows relationships between the administration services area and the container marshalling areas.
2. Area dimensions not to scale. True size will be determined by mission and available resources.

LEGEND:

A = control point for pedestrian traffic.

B = container control/inspection point (only container transporter/MHE traffic is permitted beyond this point).

m = meters

Figure D-13. Notional marshaling area

TERMINAL ACTIVITIES

D-25. The objective in any ship discharge operation is to minimize the turnaround time of the ship. One way to do this is by always having the terminal tractors available and positioned properly at the cranes working the ship. To do this efficiently, with minimum congestion, the tractors should travel the least distance possible. The stacking areas should correspond directly behind the crane's current working position at shipside. Hence, the two-deep stacking area can accommodate boxes from either crane as they work their way amidships. Each stacking area should be divided for import and export containers. Areas are divided to ease the drop-off of import containers and the pickup of export containers in one counterclockwise trip around the stacking area. One transportation company, terminal service works each container ship. Operating on a 24-hour basis, the unit should handle (load and/or unload) 600 containers per 24-hour period.

Container Off-load and/or Back-load Operations

D-26. To off-load and/or back-load a containership, a minimum of two cranes will work each end of the ship in a coordinated effort. Each crane follows these steps in sequence for each hatch:

- Discharges all the containers on the hatch covers.
- Removes hatch covers.
- Discharges all containers from one cell.
- While discharging the next cell, back-loads the empty cell at the same time.
- Repeats all of the previous steps until all cells of that hatch are completed.
- Replaces hatch covers.
- Back-loads containers on hatch covers.

D-27. The seaport operations company must maintain records of the stacking areas. These records give the specific location of each container within the terminal. Also, as each container comes off the ship, a predetermined storage slot must be known. The actual space (numbers of clusters) required per ship berth depends mostly on the average dwell time of containers in the terminal. Potential bottlenecks in a marine terminal are as follows:

- The dwell time of containers.
- Frustrated containers.
- Processing of containers at entrances and/or exits.
- Stuffing and/or unstuffing of containers.
- Cleaning and/or maintenance of containers.
- Method for container accountability.
- Vehicle delay and congestion.

MARSHALING AREA CLEARANCE OPERATIONS

D-28. Marshaling area clearance operations ensures containers flow rapidly and uniformly between dockside and the adjacent operational area and infrastructure. To minimize terminal congestion and work stoppages, marshaling area clearance operations are tailored to port unload and/or back-load output. An inbound container should not remain in the marshaling area longer than 24 hours. This also holds true for retrograde containers, provided a containership is available for back-loading. The normal procedure in clearance operations is to designate specific medium truck units to support a specific container unload and/or back-load operation.

D-29. The following paragraphs discuss motor transport requirements for marshaling area clearance support of one terminal service operation. In all cases, medium truck units operate around the clock (two shifts) with 75 percent equipment availability. The seaport operations company unloads and, at the same time, back-loads 300 containers per day (two 10-hour shifts). Ideally, inbound containers should be cleared within 24 hours. If this is the case, a minimum of 300 containers per day must be cleared from the marshaling area. (For planning purposes, it is assumed that for each container moved from the marshaling area a retrograde container is returned.)

D-30. The traffic patterns within the terminal must be designed to support the cranes servicing a ship, see figure D-14. Traffic patterns should be counterclockwise: up one side of the cluster when dropping off a container and down the other side when picking up a container.

Note: Figure D-14 on page D-15. 1) Traffic patterns are designed to offer one-way traffic where possible, to minimize distance to travel and to eliminate congestion. 2) Area dimensions not to scale.

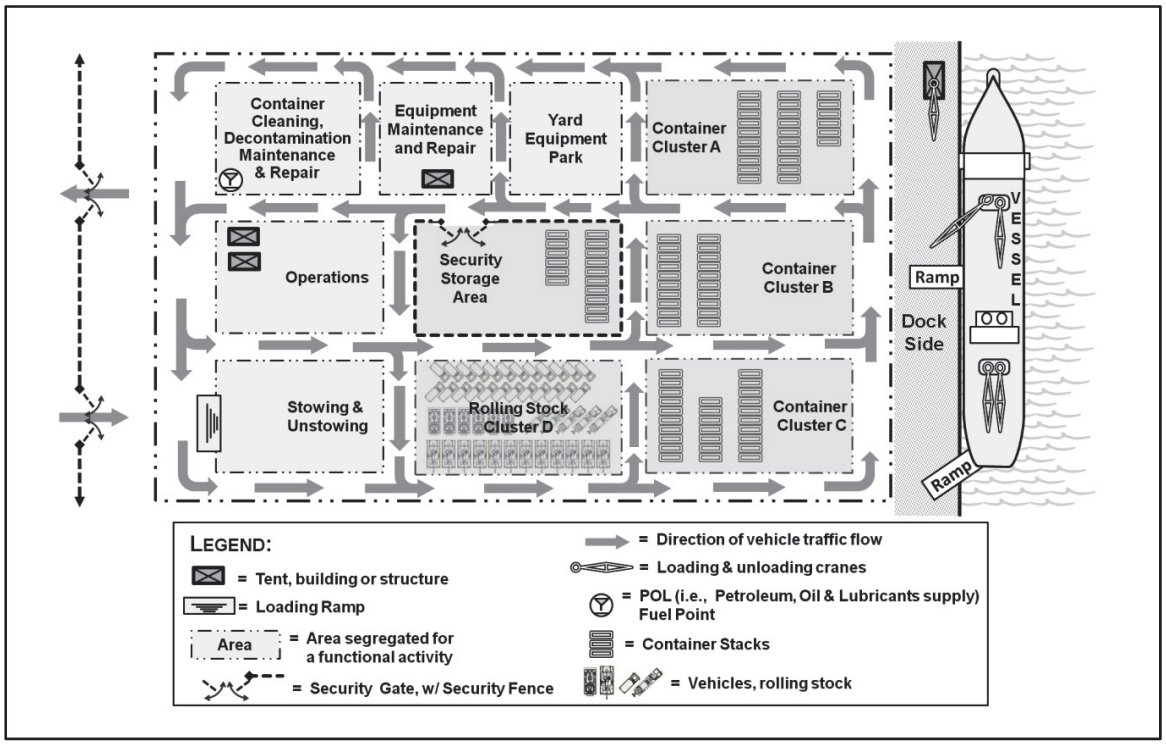


Figure D-14. Suggested traffic flow in fixed terminal marshaling area

RELATED SUPPORT

D-31. A headquarters and headquarters company (HHC), transportation terminal battalion provides the basic operating headquarters for theater terminal operations. It is the normal command element for each two- to four-ship marine terminal.

D-32. If it is a two-ship operation, a terminal battalion would operate the terminal. The battalion operations officer supervises consolidated battalion operations for documentation, inventory, and control functions. The battalion also controls operations of areas such as stowing and/or unstowing, inspection, maintenance and repair activities, cleaning and decontamination, equipment parking, and security at battalion level. Thus the terminal service companies can devote their efforts to container handling. Figure D-15 on page D-16 is a suggested design for security storage in a container marshaling yard.

Note: Figure D-15 on page D-16. Ideally, the entire terminal is enclosed. As a minimum, however, the security area should be enclosed, preferably with a cyclone fence topped with several strands of barbed wire. Concertina wire may be used as an expedient. If circumstances permit, a double fence should be installed. A 24-hour military guard should be placed on the gate. The perimeter should be patrolled periodically. Door-to-door placement of containers further strengthens security measures. Sensors, protective lighting, high security locks, and access control procedures should be considered to help secure high-priority cargo. Adequate lighting and a sophisticated and constantly changing pass system greatly enhances security operations

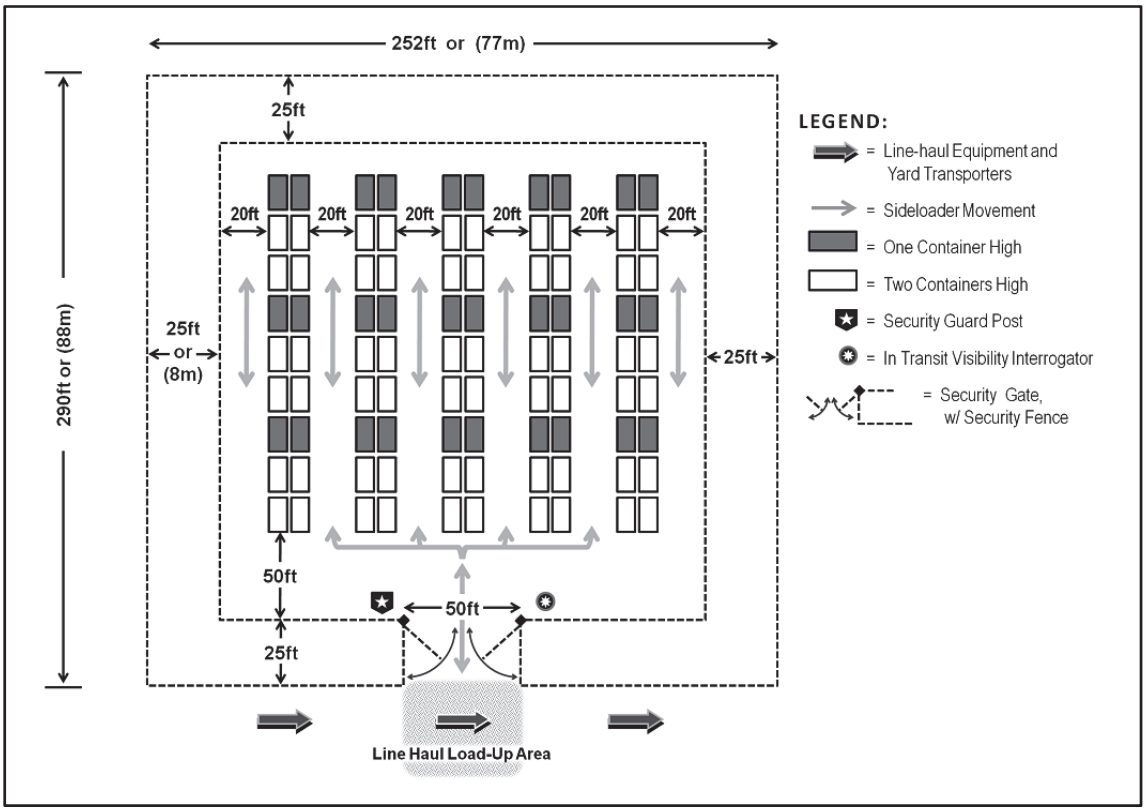


Figure D-15. Suggested design for a security storage area

MARSHALING FOR RAIL MOVEMENT

D-33. Container movement by rail is used wherever possible. Rail presents a mass movement capability with little interference from weather or refugee traffic. Except for inland waterway, rail is the most economical mode for moving Army containers. Figure D-16 presents a procedure for marshaling, loading, and/or unloading containers for a rail movement when the rail facilities are not a part of or adjacent to the marshaling yard.

Note: Figure D-16. Retrograde containers are being exchanged for loaded containers, which will be moved inland. Before flatcars arrive, truck-transporters move loaded containers to trackside, where they are prestacked two-high as shown. After the flatcars are positioned, loading and/or unloading proceeds as follows: Container 1 moves to position B-1. Container A-1 is loaded in position 1. Container 2 moves to position B-2. Container A-2 is loaded in position. The process is repeated for the next flatcar. As the procedure continues, road C is used to remove retrograde containers to the marshalling area. This system is only used in certain circumstances. When other equipment or circumstances prevail, other systems are used.

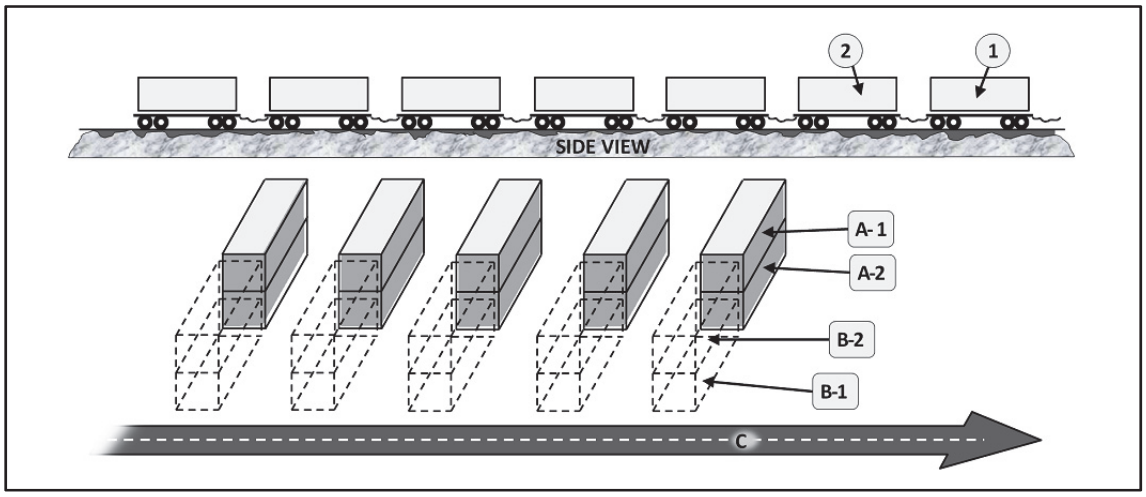


Figure D-16. Procedures for marshaling/loading/unloading containers for rail movements when rail facilities are not a part of or adjacent to the marshaling yard

DOCUMENTATION PROCESS

D-34. The marshaling yard documentation process is keyed to automated documentation procedures or, if automated data processing equipment is not available, to manual procedures.

Import Cargo

D-35. For import cargo, the shipping port transmits an advance manifest to the receiving port via GATES formerly worldwide port system. Hatch summaries, preprinted from the advance manifest, provide the operator with advance notice of the types (cargo or refrigerated) by size and quantity of incoming containers, movement priorities, and ultimate destinations. This information permits the operations officer to preplan marshaling yard space requirements and to predetermine where each off-loaded container will be stacked. This is particularly important in the planning of onward movement of outsize and/or overweight cargo. Figure D-17 shows a system for identifying containers by number and location within the marshaling yard.

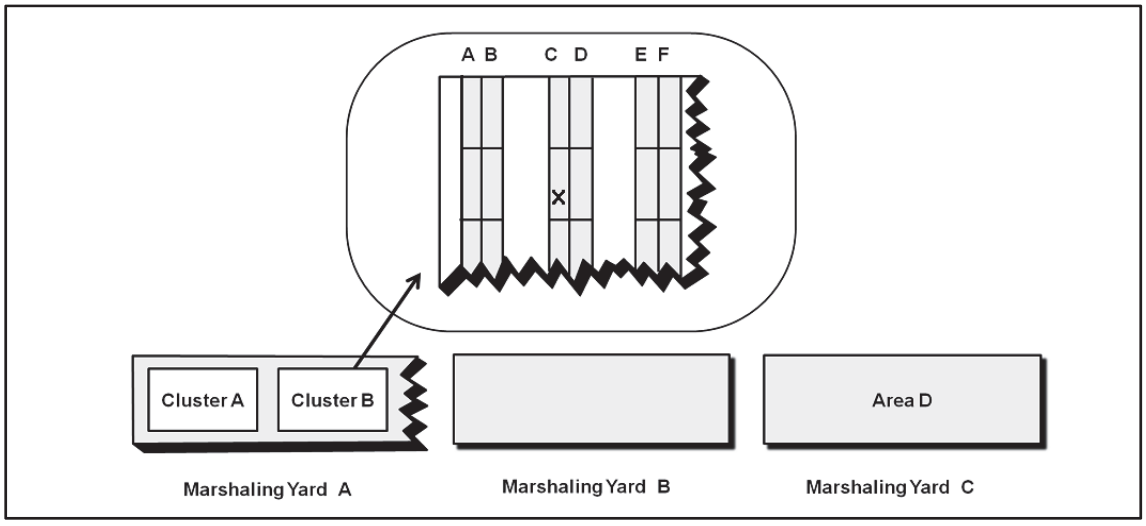


Figure D-17. Automated system for container identification by row location within the marshaling yard

Stacking Location

D-36. Since the stack location of the container is planned, the cargo checker can receive a printout for the containers he will be tallying. Using this as containers are unloaded from the ship, he can direct the yard transporter to the designated stacking area. Radio communication between the cargo checker and the marshaling yard is the only way to ensure adequate control of the operation, especially in a large yard or in a highly flooded situation. If computer equipment is not available, a visual display board of the stacking area is kept by operations to provide container identification and location. A manual system requires appropriate internal communications.

Cargo Disposition Instructions

D-37. These are used as a consignee advance notification document. Based on the cargo disposition instructions, the port's servicing MCT coordinates with the consignee's MCT to ensure that the consignee can receive the shipment. They arrange delivery dates and transportation to move containers from the marshaling area to final destination.

RETROGRADE MOVEMENT

D-38. When a retrograde container enters the marshaling yard, the container transporter driver presents the TCMD at the entry point and has the container inspected. He gets a receipted copy of the TCMD (proof of the delivery) and is directed to the point where the container is to be unloaded. (He also gets a TCMD for the container that he will pick up for movement out of the yard.) A TCMD is required each time cargo is moved from the area of responsibility. No container can be moved out of the marshaling yard exit or entry point without proper documentation and inspection. The container, the container transporter, and the container seal numbers must all agree with those shown on the TCMD. If not, the container will not be moved until proper documentation is prepared. When the container departs the marshaling yard, a copy of the TCMD is retained for entry into the central processing unit. It must be retained to show that the container has been shipped to the consignee and to update the computerized marshaling yard inventory.

SECURITY

D-39. Losses under containerization are growing. These losses have become of major concern to industry and government alike. Reduction of cargo theft and pilferage is a significant benefit of containerization. Compared to losses suffered in break-bulk operations, the reduction is indeed noteworthy.

Inbound/Outbound Traffic Control

D-40. Strict control of incoming and outgoing traffic is a key factor in marshaling yard security. Restricting vehicular traffic entering or exiting the container stacking area to container transport equipment, material handling equipment, and mobile scanning equipment is essential. Also essential is the establishment of a single control point (gate) for vehicular traffic entering or exiting the container stacking area. U. S. military personnel assisted as necessary, by foreign national police and/or interpreters, man and operate this point. Military personnel, assisted as necessary, by foreign national police and/or interpreters should operate a separate gate for pedestrian traffic. Surveillance and control functions of the vehicular control point include preventing entry of unauthorized vehicles and inspecting inbound and outbound containers. This is a thorough physical inspection including container condition; presence and condition of container seal and/or lock; evidence of illegal entry (such as tampering with or removal of door hinges); and, particularly for outbound containers, stolen items (look on top of and under the container and inspect the transporter cab).

- Verifying documentation for correctness, completeness, and legibility. (Ensure that transporter, container, and container seal numbers match those shown on the TCMD.)
- Operating scanning equipment. (If there is no scanning capability, container numbers are reported manually to operations so that the yard inventory may be updated.)
- For outbound containers, entering the departure time and date on the TCMD and retaining copy for terminal files.
- For inbound containers, signing one copy of the TCMD for the transporter operator to keep as a delivery receipt.

D-41. Surveillance and control functions of the pedestrian control point include the following:

- Permitting only authorized personnel to enter the container marshaling area.
- Maintaining, controlling, and safeguarding the pass system for foreign national personnel authorized to be in the area.

Perimeter

D-42. Security of the marshaling yard perimeter backs up gate security in keeping unauthorized persons out. Such persons may engage in sabotage, petty theft, and large-scale theft operations and may establish inside contacts with foreign nationals or other persons working in the yard. While it may not be possible to fence the entire yard perimeter, the security (sensitive, classified, or high-dollar-value cargo) area should be fenced with its own military-guarded gate and MP control. Perimeter defense measures may include one or a combination of the following:

- Chain-type fencing topped by three strands of barbed wire. (Inspect fence daily to ensure there are no holes or breaks.)
- Concertina wire.
- Use of a sensor, when feasible.
- In LOTS, mined strips on the land side.
- Use of patrols.

Container Transporter Operator

D-43. Drivers of the line-haul and local-haul container transporters are required to remain in the cab of their truck when operating within the container stacking area.

Cargo

D-44. As already stated, security cargo should be stored separately from other cargo and should have its own secured area. Whenever possible, security cargo should also be unloaded from the ship during daylight hours. If possible, MP security personnel should observe unloading operations.

TRANSPORTATION CONTROL MOVEMENT DOCUMENT (TCMD)

D-45. No containers are allowed to move through the marshaling yard entry or exit control point without a valid and legible TCMD. When the MCT determines that a container is to be forwarded to the consignee, it informs the documentation section and the control point. The MCT gives the date of the movement, the container number, and the name of the consignee to the documentation section. The documentation section then prepares the TCMD and informs the MCT and the control points of the actions, giving the container number, the transportation control number, and the transporter number. These coordinating procedures prevent removal (either accidentally or purposely) of containerized cargo from the yard. At the gate, the container number is verified against the information provided by the movement and the documentation sections. The container, seal, and transporter numbers are verified for agreement with those entered on the TCMD. The container's seal is examined for breakage or evidence of tampering. Finally, before the container is released, it is inspected for damage. When the control people release the container, they notify the MCT. It in turn notifies the consignee MCT that shipment has been made. A TCMD must also accompany retrograde containers. After control people verify TCMD entries (such as container and seal numbers) and inspect the container, they give the driver a receipted copy of the TCMD. They also give directions to where the container is to be unloaded.

VERIFICATION OF CARGO ARRIVAL

D-46. Upon receipt of the container, the consignee returns a copy of the TCMD to the shipping terminal activity. The TCMD contains the consignee signature, date of receipt, and condition of cargo, container, and seal.

CONTAINER SEALS

D-47. Normally TCMDs are not accountable documents. However, local procedure may serially number TCMDs. This is an excellent procedure to deter their use in organized thievery. Regardless, blank TCMDs should be secured. One individual should be responsible for safeguarding and issuing them. A container seal is a device applied to the container door fastening. It indicates whether the door has been opened or the fastening tampered with, and if so, at what point in the movement system it happened. Seals are serially numbered to help identify the person who applied the seal and to provide a means of control. Failing to strictly account for seals from receipt to application defeats their purpose (to pinpoint unauthorized entry into containers). Container seal control and accountability are promoted by the following procedures:

- Maintain a record, by serial number, of seals received by the port operations officer and issued to authorized personnel for applying to containers.
- Store seals under lock. Designate one person to be responsible for the safekeeping, issuing, and recordkeeping of seals applied at the port.
- Designate specific persons (keep the number to a minimum) on each shift to apply seals and enter the serial number of the seal on the TCMD.
- Conduct periodic inventory of seals. Apply seals as soon as the container has been stuffed and as soon as a loaded (unsealed or improperly sealed) container is detected.
- Supervise the seal application. Failure to supervise or allow a yard hustler to move an unsealed container to the stacking area offers an opportunity for pilferage of cargo before seals are applied. It also affords the opportunity to apply a bogus seal, to break the seal later, and to remove cargo and then apply a legitimate seal.

COMPUTING CONTAINER SPACE REQUIREMENTS

D-48. The following is a sample problem for computing container space requirements in a marshaling area: your unit has been tasked to operate a container terminal with a total marshaling area of 830 feet wide and 886 feet long. The area must be designed for a one-ship operation using the side loader in the stacking clusters. To satisfy operational requirements, the stacking method must be used to enhance selective extraction. You are to determine the intrinsic capacity of the marshaling area using Figures D-18 and D-19. Also use the same Figure D-18 on page D-21 and figure D-19 on page D-22 to perform the following steps:

- Step 1. Layout a plan of the area.
  - Draw a rectangle representing the area.
  - Draw in surrounding intersecting aisles.
  - Draw in through intersecting aisles.
  - Determine measurements of clusters.
- Step 2. Determine the number of 20-foot containers in each row.
  - Determine how many 20-foot containers will fit into each row, by dividing 340 (feet) by 20.5 (.5 equals half foot space allowed between containers for working room). This equals 16.58 containers per row. Any fraction is not counted a container; therefore, .58 is lost space (.58 x 20.5 = 11.89 feet). To provide more aisle space, move containers 10 feet to the left or right.
  - Stack containers (turret stacking) in two-/two-/one-high sequence in any given row. Every three ground slots have a five-container capacity. To determine the number of containers in a row, divide the number of columns by 3. Multiply that product by 5. If 3 does not divide evenly into the number of columns, the remainder is multiplied by 2 and added to the previous product. For example:

    16 columns divided by 3 = 5 (with a remainder of 1)

    5 x 5 = 25

    1 (remainder) x 2 = 2

    25 + 2 = intrinsic capacity of 27 TEUs per row in areas A and B

    Add the 10 feet of unused space to areas C and D.

Repeat the calculation set forth in the previous paragraphs. For example:

350 (feet) divided by 20.5 = 17.073 containers per row

0.073 x 20.5 = 1.5 feet

17 divided by 3 = 5 (with a remainder of 2)

5 x 5 = 25 containers

2 (remainder) x 2 = 4

25 + 4 = 29 TEUs per row with 1.5 feet of unused space in areas C and D

- Step 3. Determine the number of rows.
  - Stacking 8-foot wide containers side by side in double rows with a rolling space of .5 feet between the rows would occupy 16.5 feet. The side loader requires a 15-foot working aisle. So in every 30.5 feet are stacked two rows. The length of this area is 368 feet, divided by 30.5 feet equals 11.65 or 11 double rows, with 21 feet remaining between a working aisle and an intersecting aisle.
  - Using the intersecting aisle to work from would allow 16.5 feet of the 21 to be used for a further double row, for a total of 12 double rows.

Note: Each double row in A and B has 64 TEUs. Each double row in C and D has 68 TEUs. A and B each contain 64 TEUs multiplied by 12 double rows. This equals 646 TEUs in each quadrant. A and B together contain 1,296 TEUs. C and D each contain 68 TEUs multiplied by 12 rows. This equals 696 TEUs in each quadrant. C and D together contain 1,392 TEUs. A and B (1,296 TEUs) plus C and D (1,392 TEUs) equals and intrinsic capacity of 2,688 TEUs. The optimum operating capacity is 66 percent of 2,688 or 1,478 TEUs.

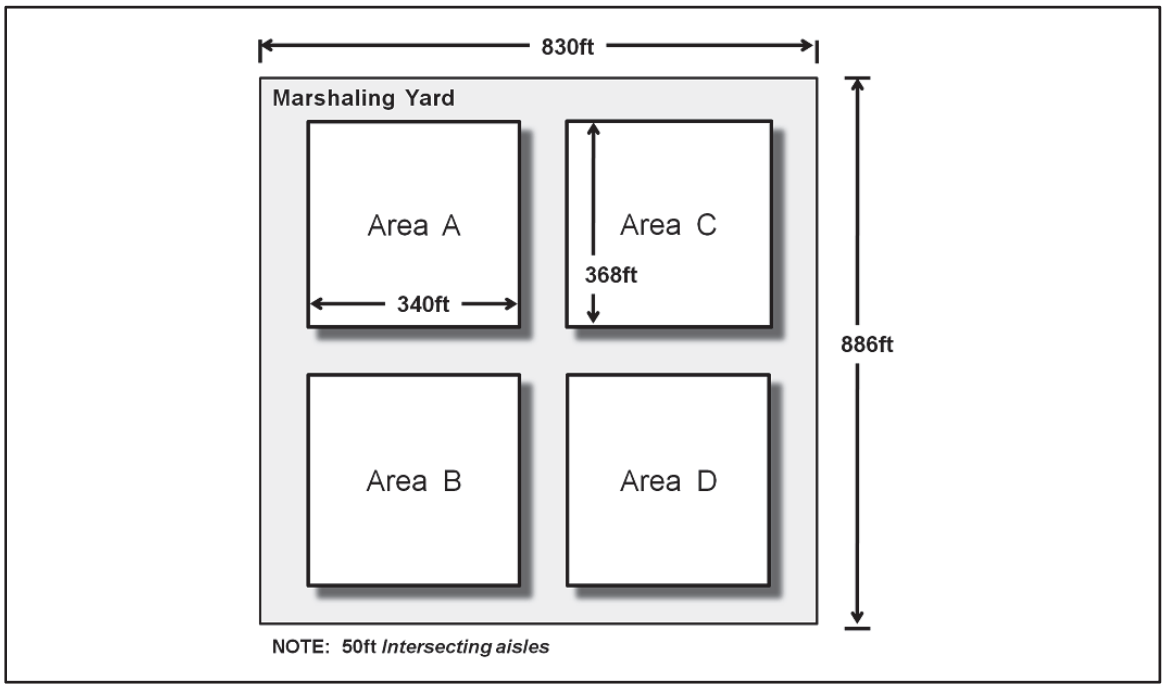


Figure D-18. Sample layout plan for container space requirements in a marshaling yard

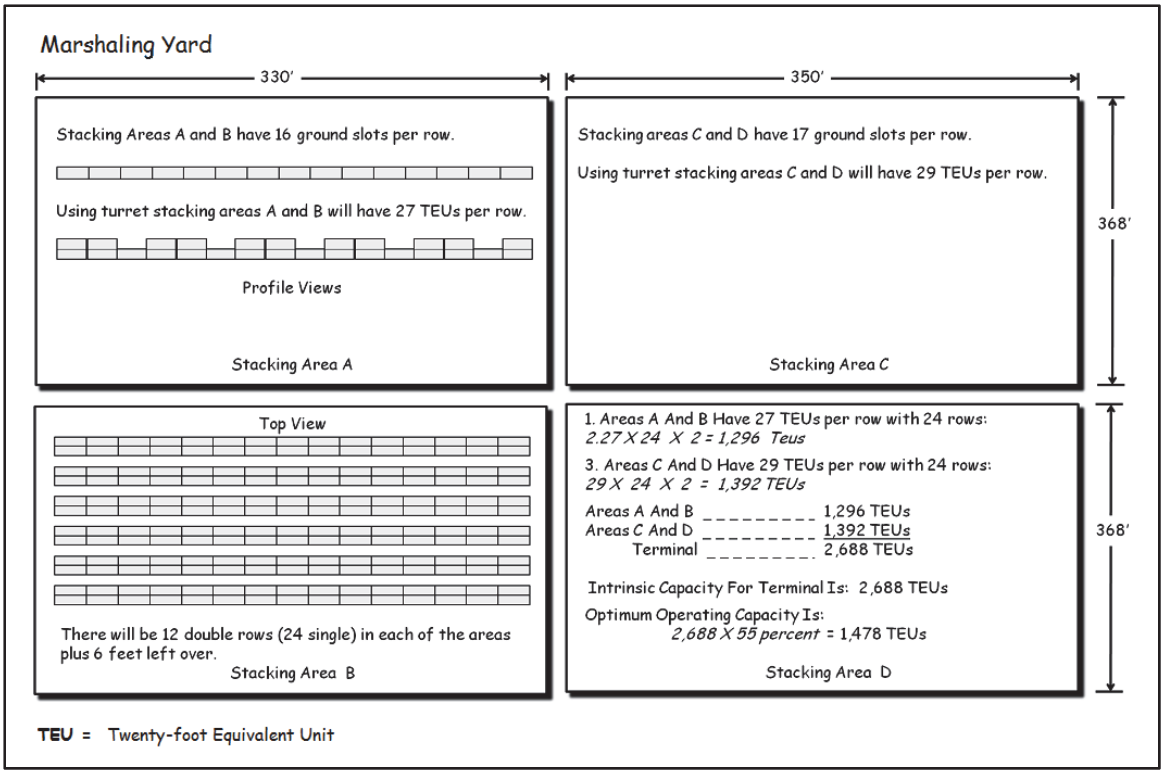


Figure D-19. Partial layout plan for container space requirements in a marshaling yard

Appendix E

Terminal Capacity

There are seven basic types of dry cargo, non-bulk terminals. They differ drastically in their intended purposes and layout. Matching a terminal with the right type of ship and cargo packaging facilitates cargo movement in and out of a port. Note, terminals can also be classified by method of cargo handling. This classification includes container, 463L palletized, roll-on/roll-off (RO/RO), lift-on/lift-off and lighterage. Lastly, terminal throughput capacity is linked to five functional areas that are also based on capacity.

TYPE OF TERMINALS

E-1. The seven types of terminals include the following:

- Break-bulk.
- RO/RO.
- Container.
- Container and/or RO/RO.
- Combination.
- Lighter.
- Passenger.

THROUGHPUT CAPACITY

E-2. Terminal throughput capacity estimation is a very careful evaluation of five functional areas, see table E-1. These areas included reception, discharge, transfer, storage and clearance. Threat, weather, labor, and other factors that are not functions of the estimation process must also be considered. The five functional areas are described below.

Table E-1. Terminal throughput capacity estimation checklist

Collect These Data	*Compute These Factors:*	*To Determine*
• Channel depth • Channel width • Length of berths • Type of berths (such as wharf, quay and pier) • Diameter of anchorages • Depth of water at berth • Type of berth	(1) Marine terminal reception capacity	
• Discharge equipment on board • Discharge equipment ashore • Width of apron • Special lift equipment	(2) Marine terminal discharge capacity	Marine terminal throughput capacity importing cargo only.

Table E-1. Terminal throughput capacity estimation checklist

Collect These Data	*Compute These Factors:*	*To Determine*
• Number of discharge equipment • Type of cargo • Type of cargo-handling equipment • Round-trip-distance • Number of cargo-handling equipment	(3) Marine terminal transfer capacity	(Retrograde operations will reduce the import capacity.)
• Intrinsic capacity • Average dwell time • Operating capacity • Terminal facilities • Stacking methods • Equipment used	(4) Marine terminal storage capacity	
• Clearance conveyance by mode • Terminal equipment and personnel • Gate capacity	(5) Marine terminal clearance capacity	

Note: Once all of the above evaluations are completed, evaluate the following: threat assessment, affect of the elements, and training level of labor.

- Reception. This capacity is a based on the number of ships (by type, length, and draft) that can be berthed in a harbor or at a terminal.
- Discharge. This capacity is based on the capability of discharge methods and equipment used. Historical reports, shipper's reports, and realistic evaluations help in the estimation. The shortage of personnel must also be considered.
- Transfer. This is an evaluation of the capacity to move cargo from the discharge point to the storage point. It can be a time, equipment, and motion study that considers the number of moves available. For example, transfer capacity is the time it takes to move a pallet of cargo from the ship's side to the storage area, deposit it, and return to the ship's side. It is measured the same as the discharge capacity. When discharging ships at LOTS sites or anchored in the stream, transfer capacity is used twice, once for the lighterage and once with the material handling equipment on the beach.
- Storage. This is the amount that can be stored at any one time. Storage capacity is given as an intrinsic capacity to obtain the operating capacity. The operating capacity depends greatly on the average dwell time of the cargo. Some cargo space must be left empty so that space is available to move cargo. Experience shows that congestion in the storage area begins at about 60 percent and is complete at 80 percent of the intrinsic cargo capacity of the terminal. See figure D-19 on page D-26 (note section) from appendix D.
- Clearance. This is the ability, measured like discharge capacity except by mode, to clear cargo from the terminal. The terminal clearance capacity may be limited by either of the number of clearance conveyances or the ability of terminal equipment and personnel to load clearance

conveyances. Clearance conveyances for military purposes include, but are not limited to, trucks, railcars, lighters, and helicopters.

FIXED BERTHS

E-3. The best type of ship and an alternate for this berth depend on the type of terminal at the berth; for example, container, break-bulk, and RO/RO.

E-4. Vessels require 75 to 100 linear feet of berth length in addition to their measured length overall. Therefore, the longest vessel or combination of vessels must be 75 to 100 feet less than the length of the berth. The minimum water depth alongside the berth at mean low tide determines the maximum allowable draft for vessels at that berth. A ship should always have at least 2 feet under its keel for safety of the vessel.

ANCHORAGE BERTHS

E-5. For military planning, ships anchor either offshore or in-the-stream (harbor). Other methods exist, but these two are used for military purposes so the ship can get underway quickly. Use the following formulas to determine the required size (diameter) of an anchorage site for a ship:

Offshore: $D = 2(7d + L)$

In-the-stream: $D = R(4d + 2L)$

Where:

D = diameter

d = depth of water

L = length of ship

R = reserve factor (1.1)

Use the following formulas to determine the largest ship that will fit properly in a given area:

Offshore: $L = (D – 7d)/2$

In-the-stream: $L = (D – 4d)/R/2$

Glossary

SECTION I – ACRONYMS AND ABBREVIATIONS

A/DACG	arrival/departure airfield control group
ACAMS	Army Container Asset Management System
ADP	Army doctrine publication
ADRP	Army doctrine reference publication
AEIO	Army expeditionary intermodal operations
AO	area of operations
APOD	aerial port of debarkation
APOE	aerial port of embarkation
ASCC	Army Service component command
ATP	Army techniques publication
CONUS	continental United States
CRSP	centralized receiving and shipping point
CSSB	combat sustainment support battalion
DOD	Department of Defense
DTR	defense transportation regulation
DTS	Defense Transportation System
ESC	expeditionary sustainment command
FM	field manual
GATES	Global Air Transportation Execution System
GFM	Global Freight Management
GTN	Global Transportation Network
IBS	Integrated Booking System
ICODES	integrated computerized deployment system
ICTC	inland cargo transfer company
IGC	Integrated Data Evironment/Global Transportation Network Convergence
ISO	International Organization for Standardization
ITV	in-transit visibility
IWWS	inland waterway system
IWWT	inland waterway terminal
JDDOC	joint deployment and distribution operations center
JP	joint publication
JTF-PO	joint task force-port opening
LMSR	large, medium speed roll-on/roll-off
LOTS	logistics over-the-shore
MCB	movement control battalion
MCT	movement control team
METT-TC	mission, enemy, terrain and weather, troops and support available, time available and civil considerations

MP	military police
MSC	Military Sealift Command
OCONUS	outside continental United States
OPCON	operational control
ORP	ocean reception point
PMT	port management team
POD	port of debarkation
PSA	port support activity
RFID	radio frequency identification
RO/RO	roll on/roll off
RPOE	rapid port opening element
RSOI	reception, staging, onward movement, and integration
S2MC	Sustainment System Mission Command
SDDC	Surface Deployment and Distribution Command
SPOD	seaport of debarkation
SPOE	seaport of embarkation
STON	short ton
TBX	transportation brigade expeditionary
TC AIMS II	Transporation Coordinator Automated Information Movement System II
TCMD	transportation control and movement document
TEU	twenty-foot equivalent unit
TMR	transportation movement release
TSC	theater sustainment command
TST	terminal supervision team
TTB	transportation terminal brigade
TTOE	transportation theater opening element
TTP	trailer transfer point
U.S.	United States
USAMC	United States Army Materiel Command
USTRANSCOM	United States Transportation Command

SECTION II – TERMS

aerial port

(Joint) An airfield that has been designated for the sustained air movement of personnel and materiel as well as an authorized port for entrance into or departure from the country where located. See also port of debarkation; port of embarkation. (JP 3-17)

air terminal

(Joint) A facility on an airfield that functions as an air transportation hub and accommodates the loading and unloading of airlift aircraft and the intransit processing of traffic. (JP 3-17)

assessment

(Joint) Determination of the progress toward accomplishing a task, creating a condition, or achieving an objective. (JP 3-0)

***beach capacity**

(Army) The per day estimate expressed in terms of measurement tons, weight tons, or cargo unloaded over a designated strip of shore.

combat power

(DOD) The total means of destructive, constructive, and information capabilities that a military unit or formation can apply at a given time. (ADRP 3-0)

container management

(Army) The process of establishing and maintaining visibility and accountability of all cargo containers moving within the Defense Transportation System. (ADP 4-0)

Defense Transportation System

(Joint) That portion of the worldwide tranportation infrastructure that supports Department of Defense transportation needs in peace and war. Also called DTS. (JP 4-01)

facility

(Joint) A real property entity consisting of one or more of the following: a building, a structure, a utility system, pavement, and underlying land. (JP 3-34)

intermodal

(DOD) Type of international freight system that permits transshipping among sea, highway, rail, and air modes of transportation through use of American National Standards Institute Organization for Standardization containers, line-haul assets, and handling equipment. (DTR 4500.9-R, Part VI)

***intermodal operations**

(Army) The process of using multimodal capabilities (air, highway, rail, sea) and conveyances (truck, barge, containers, pallets) to move troops, supplies and equipment through expeditionary entry points and the network of specialized transportation nodes to sustain land forces.

joint deployment and distribution enterprise

(Joint) The complex of equipment, procedures, doctrine, leaders, techincal connectivity, information, shared knowledge, organizations, facilities, training, and materiel necessary to conduct joint distribution operations. (JP 4-0)

lighterage

(Joint) The process in which small craft are used to transport cargo or personnel from ship-to-shore using amphibians, landing craft, discharge lighters, causeways, and barges. (JP 4-01.6)

logistics

(Army) Planning and executing the movement and support of forces. It includes those aspects of military operations that deal with: design and development, acquistion, storage, movement, distribution, maintenance, evacuation, and disposition of materiel; acquistion or construction, maintenance, operation, and disposition of facilities; and acquisition or furnishing of services.

(ADP 4-0)

measurement ton

(Joint) The unit of volumetric measurement of equipment associated with surface-delivered cargo equal to the total cubic feet divided by 40. Also called MTON. (JP 4-01.5)

mode operations

(Army) Execution of movements using various conveyances (truck, lighterage, railcar, aircraft) to transport cargo. (ADRP 4-0)

movement control

(Army) Dual process of committing allocated transportation assets and regulating movements according to command priorities to synchronize distribution flow over lines of communications to sustain land fources. (ADRP 4-0)

***multimodal**

(Army) The movement of cargo and personnel using two or more transportation methods (air, highway, rail, sea) from point of origin to destination.

planning

(Army) The art and science of understanding a situation, envisioning a desired future, and laying out effective ways of bringing that future about. (ADP 5-0)

port of debarkation

(Joint) The geographic point at which cargo or personnel are discharged. Also called POD. (JP 4-0)

port of embarkation

(Joint) The geographic point in a routing scheme from which cargo or personnel depart. Also called POE. (JP 4-01.2)

port opening

(Army) The ability to establish, initially operate and facilitate throughput for ports of debarkation to support unified land operations. (ADRP 4-0)

quay

(Joint) A structure of solid construction along a shore or bank that provides berthing and generally provides cargo-handling facilities. (JP 4-01.5)

responsibility

(Army) The obligation to carry forward an assigned task to a successful conclusion. With responsibility goes authority to direct and take necessary action to ensure success. (ADRP 6-0)

seaport

(Joint) A land facility designated for reception of personnel or material moved by sea, and that serves as an authorized port of entrance into or departure from the country in which located. See also port of debarkation and embarkation. (JP 4-01.2)

single port manager

(Joint) The transportation component, designated by the Department of Defense through the United States Transportation Command, responsible for management of all common-user aerial and seaports worldwide. See also Surface Deployment and Distribution Command; transportation component command; United States Transportation Command. (JP 4-01.5)

staging

(Joint) Assembling, holding, and organizing arriving personnel, equipment, and sustaining materiel in preparation for onward movement. (JP 3-35)

sustainment

(Army) The provision of logistics, personnel services, and health services support (HSS) necessary to maintain operations until successful mission completion. (ADP 4-0)

terminal

(Joint) A facility designed to transfer cargo from one means of conveyance to another. (JP 4-01.6)

terminal operations

(Joint) The reception, processing, and staging of passengers; the receipt, transit storage and marshaling of cargo; the loading and unloading of modes of transport conveyances; and the manifesting and forwarding of cargo and passengers to destination. (JP 4-01.5)

theater opening

(Army) The ability to establish and operate ports of debarkation (air, sea, and rail), to establish a distribution system, and to facilitate throughput for the reception, staging, and onward movement of forces within a theater of operations. (ADP 4-0)

throughput

(Joint) In transportation, the average quanity of cargo and passengers that can pass through a port on a daily basis from arrival at the port to loading onto a ship or plane, or from the discharge from a ship or plane to the exit (clearance) from the port complex. (JP 4-01.5)

wharf

(Joint) A structure built of open rather than solid construction along a shore or a bank that provides cargo-handling facilities. See also quay. (JP 4-01.5)

References

REQUIRED PUBLICATIONS

These documents must be available to intended users of this publication.

ADRP 1-02, *Terms and Military Symbols*, 24 September 2013

JP 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 8 November 2010

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16 April 2014

By order of the Secretary of the Army:

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