CHAPTER 3

LOGISTICS OVER-THE-SHORE OPERATIONS

INTRODUCTION

In overview, an ocean vessel can anchor in the stream or offshore. In-the-stream anchor means the vessel is anchored in protected deep water, such as a harbor. Offshore anchor is an anchorage off the shoreline in unprotected deep water. From either anchorage location, the ship can discharge to lighterage for subsequent discharge to a freed-port facility or to an unimproved facility or bare beach. Figure 3-1 depicts this type of operation.

Existing port capacities in many areas will probably be insufficient to support theater tonnage requirements. This and the possibility of enemy insurgent activities require that plans emphasize widely scattered beach operations instead of large port complexes. The senior terminal commander in the theater must continually plan for and open new beaches to accommodate increased tonnages to replace the tonnage capacity of a port or unimproved facility made untenable by enemy actions. Plans should include the proposed location and layout of the area, type of lighterage to be used, task organization needed to attain the desired tonnage capacity, route and methods of movement to the area, construction effort required, communications requirements, and logistical support procedures [Figure 3-1].

When planning to open new bare beach LOTS sites, the first step is to determine the beach areas available. The degree of dispersion that can be attained directly relates to the daily tonnage requirement and the size and nature of the assigned area. As soon as practicable after the limiting points of the area have been designated, reconnaissance should determine the sites most suitable for operations. These sites should be selected based primarily on the existing capability to accommodate the desired tonnage. Major factors to consider when selecting beach discharge sites include tide, surf, beach gradients, bars, characteristics of the bottom and beach surface, anchorage areas, weather, and topographic features.

The commander should not forget that LOTS almost wholly depends on favorable weather. Also, lighterage operations alongside a vessel are particularly hazardous if more than a moderate sea is running. Heavy surf reduces the amount of cargo brought in by lighters and can suspend the entire operation.

After the initial reconnaissance is completed and the terminal battalions have been dispersed to sites along the coastline, the terminal group commander must ensure that the battalions have the units, equipment, and other support needed for the assigned mission. Beaches ideally suited for LOTS without prior preparation or alteration are rare. Therefore, some engineering support is usually required to enable landing craft to beach and to provide exits from the beach to discharge areas and the clearance transportation net.

At each bare beach LOTS discharge point, the beach area operations require the closest attention and the greatest supervision. The success of each beach operation depends to a great extent on the efficiency of cargo operations on the beach itself. Supplies and equipment being brought to the beach must keep moving as rapidly as possible across it toward inland destinations. A cluttered beach is a lucrative target for the enemy and hinders cargo movement. Using amphibians or LACV-30s for lightering general cargo and containers helps to significantly reduce beach congestions.

Using water transport units over widely separated locations along a coastline requires careful evaluation of the maintenance system supporting a complex of scattered operations. When operations are conducted in a dispersed situation, increased organizational maintenance must be emphasized. Unit maintenance personnel should be well trained. Every effort must be made to fix minor troubles to prevent costly equipment breakdowns. The terminal group standing operating procedure (SOP) should establish the procedure for providing maintenance support. Floating craft maintenance units supporting army water transport units over an extended length of coastline require mobile marine repair facilities and on-site repair service.
Dispersing water transport units greatly increases reliance on radio communications for effective command, control, and coordination. Therefore, communications security (COMSEC) and electronic countermeasures (ECCM) are even more critical to maintaining reliable communications.

**BEACH SITE**

The first step in planning beach operations is to select a beach site. The terminal group or brigade headquarters selects the general operational area in coordination with the Navy and the Military Sealift Command.

**NOTE:** In follow-on amphibious operations, the Army takes over beaches selected by the Navy and/or the US Marine Corps (USMC).

A beach reconnaissance party determines the exact location of the site. The reconnaissance party consists of representatives of the terminal group and the military police; the commander and the operations officer of the terminal battalion that will operate the site; and the commanders of the terminal service, boat, and amphibian companies involved. During the reconnaissance, the terminal battalion commander selects and assigns company areas and frontages, indicates areas of defense responsibilities, and tentatively organizes the area of operations. [Appendix C] contains additional information on beach reconnaissance.

The water transport unit commanders provide advice and recommendations on factors and conditions that affect their units’ use. These recommendations bear directly on the final choice of the exact operational sites.

When nuclear, biological, and chemical (NBC) operations are suspected, the beach reconnaissance party conducts radiological monitoring, surveys, and chemical agent detection activities to determine possible contamination of prospective beach sites.

**BEACH CHARACTERISTICS**

When selecting a specific area for beach operations, the water transport unit commander is particularly interested in the following physical and environmental characteristics:

- Composition of the beach.
- Beach gradient at various tide stages.
- Length and width of beach.
- Depth of water close inshore.
- Tidal range and period (duration and variation of high and low water) effect of tides on the beach width.
- Wind and weather conditions in the area.

**OPERATIONAL PLANNING**

Using lighters in beach operations must be planned to achieve a balanced operation. The turnaround time of the lighters must match (as closely as possible) the unloading and loading cycle of the terminal service units involved. Balance cannot be maintained unless craft are unloaded at discharge points at least as fast as they are loaded at shipside. Every effort must be made to ensure that enough lighters are available to accept and deliver all the cargo that the terminal service personnel can handle. Undue delays at loading and unloading points must be minimized. The operation should be such that a lighter is alongside the hatch each time the cargo hook is ready to lower. This is done by having one or more craft stand by at shipside while one is being loaded, and dispatching others from the beach at intervals equal to the loading time at the hatch. Information obtained from actual operating experience should be used when planning for lighter employment in beach operations. If information is not available, factors noted in this manual and in FMs 101-10-1/1 and 55-15 maybe substituted.

Throughout the planning phase, the terminal commander appraises the situation. He bases the appraisal on directives and information from higher headquarters and on studies made by his staff. The appraisals decide the most effective use of the boat units. On the commander’s final decision, the staff members prepare a detailed plan of operation. After the plan is approved and incorporated into the terminal battalion’s operational plan for that particular site, it is forwarded to the terminal higher headquarters. The plan is in the form of a standard operation order.

The operation plan covers all units assigned or attached to the terminal. It details the preparation and actual movement of boat units to the terminal sites. The appropriate terminal command or battalion plans the operations of the attached boat units at the site.
However, the watercraft unit’s operation plan provides for operational items such as fuel and maintenance support. The operation order includes—

- Assignment of boat companies to ships providing transportation to the far shore.
- Far shore assignments.
- Probable bivouacs and anchorages.
- Refueling and resupply plans and facilities, to include hazardous waste disposal.
- Communications instructions.
- Location and operations of the floating craft depot maintenance company.

The operation order and the overlays that accompany it must be in a clear and simple form. The mission and responsibilities of the unit should be clear.

Detailed alternate plans are prepared in case the operation plan proves infeasible when the unit arrives at the objective area. Alternate plans consider such possibilities as adverse weather and surf conditions, the loss of ship and craft, changes in the enemy situation, and possible changes in the beach landing area.

The terminal command or higher headquarters provides subordinate boat units with various aids useful in planning and operations. These may include—

- Aerial photographs. Photographs maybe vertical, low oblique (preferably 1:3,000 at shoreline), high oblique, and stereopairs. Photographs taken at low tide are preferred when showing the foreshore.
- Beach reports based on interpretation of aerial photographs. They detail information about the length and width of the beach and offshore approach conditions. These include landmarks and anchorages; inshore hydrography, including tidal range, underwater obstructions, gradient, and nature of bottom; and suitability of the beach for various types of landing craft and craft maintenance.
- Photographic surface models. These photographs are printed on a molded plastic relief model of the area. They serve the same purpose as a conventional relief map and can be distributed more conveniently.
- Shoreline photographs taken through submarine periscopes.
- Relief maps, preferably with grids, about 1:5,000 with at least a 2:1 exaggeration in vertical relief. Maps should be as completely detailed as possible.
- Special studies prepared by theater intelligence agencies or other agencies.

Appendix D is an example of what essential elements of information (EEI) may be for terminal or beach operations.

- Reports from interrogations of prisoners-of-war, from former residents of the area of operations, and from underground sources.
- Terrain studies.
- Geographical annex.
- Maps, charts, shoreline sketches, and photographs of the beach area.

Commanders of boat units and their staffs carefully study these aids. Staffs study the beach approaches, hydrography, and terrain as they affect boat operations. The operations officer of the boat battalion secures or prepares additional aids, if required.

As soon as the mission is received, the intelligence officer (S2) determines the requirements of the battalion commander and staff for additional information. The S2 immediately initiates requests
to the appropriate headquarters to secure information, as well as any maps, charts, or other planning aids that may be required.

The commander of the boat unit must secure as much detail as possible about the proposed landing beaches and how to approach them. Reconnaissance provides much of this information. Additional information is in intelligence documents and various publications distributed by higher headquarters. Any additional data must be secured by requests to higher headquarters or through studies made by the battalion staff.

The battalion headquarters must ensure that all units are adequately supplied with maps and charts about the area of operations. The following types of nautical charts are used:

- Sailing charts are used to fix a position in long-distance navigation. They usually employ Mercator’s projection. Scales are 1:6,000,000 and smaller.
- General charts of the coast are used the same as sailing charts and also for near-shore navigation. They employ Mercator’s projection. Scales are from 1:150,000 to 1:600,000.
- Coast charts are used for coastwide navigation and to approach a shore from a long distance offshore. They show details of land formations and artificial landmarks which help fix positions. Scales are 1:50,000 to 1:150,000.
- Harbor charts are used to navigate harbors and their approaches. They greatly detail terrain and artificial objects. Scales are usually larger than 1:50,000.

Two general types of hydrographic charts are used to operate a boat unit: coastal charts and harbor/approach charts. Coastal charts show limited terrain contour lines and details of natural and artificial features. Harbor/approach charts show greater detail of harbor natural and artificial features as well as the existence of hazards and/or routes of safe approach to the harbor.

**TURNAROUND TIME**

Turnaround time is the basic factor to determine lighterage capabilities and requirements. It is used to compute the number of craft for a specific operation or the amount of tonnage that a given number of craft can deliver. Turnaround time is the total elapsed time that a single lighter takes to load, travel to the discharge point, unload, and return to shipside ready to be loaded again. The elements involved are average speed in the water and on land (for amphibians), distance to be traveled, loading time, unloading time, and predictable delays. An estimated turnaround time must be worked out for each new operational site and mission and for each change in any of the elements given above. Sea and terrain conditions affect speed, and variations in loads alter loading and unloading times. Average turnaround time is computed by using the following formula:

\[
\text{Turnaround time in hours} = \frac{\text{water distance (round-trip)}}{\text{water speed (knots)}} + \frac{\text{land distance (round-trip)}}{\text{land speed (mph)}} + \text{loading time in hours} + \text{unloading time in hours} + \text{delays in hours}
\]

**NOTE:** Land distance only applies when computing turnaround time for amphibians or air-cushion vehicles.

**LIGHTER REQUIREMENTS**

Once an average turnaround time is established the number of lighters required to deliver an assigned daily tonnage can be computed by using the following formula:

\[
\text{Number of lighters required} = \frac{\text{daily tonnage}}{\text{average tons per lighter} \times \text{turnaround time in hours}}
\]

**DAILY TONNAGE CAPABILITIES**

Sometimes it is necessary to forecast the amount of tonnage that the available craft can transport over
a specified period of time under existing conditions. Daily tonnage capabilities are computed by using the following formula:

\[ \text{Daily tonnage capability} = \frac{\text{hours per operational day}}{\text{turnaround time per lighter in hours}} \times \text{average tonnage per lighter} \times \text{number of lighters available} \]

**CONTROL SYSTEM**

The operations of the lighterage companies must respond to the needs of the terminal service units handling the cargo at shipside and at the beach. To maintain a smooth and continual flow of cargo over the beach, the lighterage unit commander must be aware of the status and location of his craft. Having this knowledge allows him to relocate platoons, sections, and individual lighters or to assign new or additional missions as rapidly as possible.

Flexibility of operations requires a responsive, closely monitored control system. Control, maintained mainly by radio communication, is exercised through a lighter control center and various control points on the beach, at shipside, and in the discharge areas (for amphibians). The extent of the control system depends on the size of the operational area, the dispersion required, the ship-to-shore distance to be traveled, and the type of lighter being used. In average situations, particularly when working two ships simultaneously, decentralizing operations to platoon level gets the best results. Decentralizing operations reduces communication problems and simplifies overall control. The greater the dispersion, the more important decentralization is.

Under decentralized platoon operation and maximum dispersion, a typical control system includes—

- A lighter control center.
- A shipboard control point on each ship being worked.
- A discharge control point (for amphibians).

**SHIPSIDE PROCEDURE**

Loading cargo into a lighter from a vessel anchored in the stream is difficult and somewhat dangerous. The shipboard control point noncommissioned officer (NCO) must consider the conditions under which the ship is being unloaded. He must constantly coordinate with the lighter crews at shipside to ensure safety precautions are being followed.

If the NCO determines that continuing the discharge operation is dangerous, he must immediately notify the ship’s captain, the lighter control center, and the various unit commanders supporting the operation. The terminal commander or vessel master will decide whether to continue operations or suspend them until conditions improve.

The following factors influence the ship discharge rate:

- Type of cargo to be unloaded (mobile, containerized, unitized, or loose).
- Characteristics of the cargo ship.
- MHE available.
- Experience of the cargo handling personnel on the ship and ashore.
- Weather conditions.
- Distance cargo ships are from the beach.
- Beach characteristics.
- Distance amphibian discharge points are from the beach.
- Enemy air, ground, and naval action.

Unless unusual wind or tidal currents exist, the ship normally anchors bow to either the wind or current, whichever is stronger. If all hatches are being worked, lighters may receive cargo over both sides of the ship. For example, the cargo from Hold 1 may be discharged over the starboard side and cargo from Hold 2 over the port side.

If sea and weather conditions prevent cargo discharge from both sides of a ship at anchor, the method of discharge must be changed. The vessel must be moored both bow and stern to avoid swinging to the tide or wind. The lighters should come along the lee side of the vessel and be moored to the vessel to receive cargo. This operation reduces the discharge rate about 50 percent.

Beach control personnel or the shipboard control point NCO direct lighter operators to the number of the hatch and the side of the ship where they should moor.
Detailed procedures for coming alongside, mooring, and clearing shipside are in FM 55-501.

Drafts of nonunitized small items of cargo are usually handled in cargo nets, which are unhhooked and left in the craft. Empty nets are returned to the ship each time the lighter comes alongside for another load.

**USE OF JUMPERS**

Aboard small lighters, crew members normally perform all shipside cargo-handling operations. If one or more crew members are operating or maintaining their craft and cannot be spared for cargo handling duties, the unit commander may provide extra crewmen, called jumpers, to position and secure cargo in the lighter for movement to the beach. When available, extra crewmen are taken from deadlined or standby lighters. Otherwise, the terminal service company may provide them.

Aboard larger lighters, such as LCUs, a forklift is the most prompt method to position and stack unitized or palletized cargo. The terminal service company provides and operates forklifts. Because transferring personnel from one craft to another alongside the ship is potentially hazardous, jumpers and forklift operators should board and debark the lighter at the beach.

**SALVAGE OPERATIONS**

The main objective of salvage operations is to keep the beach and sea approaches clear. Experienced salvage men never lose sight of this mission; even when freeing a single stranded or disabled craft they do not impede beach or offshore operations. To keep the beach clear, craft that can be repaired or removed quickly are given priority. Boats that cannot be salvaged readily are anchored securely and left at the beach until traffic eases and more time can be devoted to them.

When a landing craft broaches to and is stranded, salvage crews must act quickly. Speedy assistance often prevents serious damage to boats, especially in heavy surf. Fast recovery from seaward is usually the best procedure for salvaging broached-to boats. Methods of recovery are in FM 55-501.

When a loaded craft is aground offshore, any practical system to expedite the unloading of cargo from the craft should be used. Amphibians may be able to moor alongside or at the lowered ramp to permit the transfer of small cargo items by hand. Cargo in small, packaged containers up to 40 pounds can be handed over the side. Cargo boxes placed at the rail of the craft may serve as steps and facilitate cargo handling. Rough-terrain cranes may lift cargo too heavy to be moved by hand. The crane is driven to the stranded craft if intervening depth and surf conditions permit.

A bulldozer may push stranded craft back into the water. The blade of the bulldozer must be padded by fenders, salvaged tires, or similar material to prevent damage to the hulls or ramps of the craft. To maximize salvage capability, one bulldozer should be readily available to each operational beach.

No craft is ever left on the beach unattended or unwatched. The operator must remain constantly at the controls while beaching, loading, unloading, and retracting.

**ANTIBROACHING MEASURES**

The best insurance against broaching to is an alert, skilled operator who knows the capabilities and limitations of his craft. Normally, antibroaching aids are not used if the craft is to be unloaded quickly and retracted from the beach immediately. Under most conditions, antibroaching lines from the bow or stern of the beached craft are impractical. In extreme surf conditions where a crosscurrent may cause broaching, antibroaching lines may be used. However, the operator must keep in mind that this method is time-consuming, severely restricts the number of craft that can be off-loaded along a specific sector of the beach, and is an ineffective method to prevent broaching.

The master of an LCU or an LCM-8 keeps his craft in position on the beach by properly using engines, rudders, and stern anchors. (The LCM-8 is not equipped with a stern anchor.) If the LCU and LCM-8 are beaching on the same sector of beach, the LCM-8 is somewhat protected if it is beached leeward of the LCU. For example, if three LCUs are on the same beach, one or two LCM-8s can be beached and discharged in the partially protected zone on the lee side of each LCU. When the LCM-8 and LCU are loaded with similar cargo, two or more LCM-8s can usually be unloaded in the time required to discharge an LCU. Preventive and recovery procedures for broached-to craft are in FM 55-501.
DOCUMENTATION

Cargo documentation is a function of the terminal service company. The commander of the lighterage unit determines from the commander of the terminal service company if there is a requirement to document the cargo in the ship-to-shore operation. If the requirement exists to assure in-transit visibility and to protect the audit trail, the commander of the lighterage is responsible for the cargo loaded aboard lighterage until it is unloaded at the discharge point.

If required, cargo is documented according to DOD Regulation 4500.32-R. The basic document for cargo movements under these procedures is DD Form 1384 (Transportation Control and Movement Document [TCMD]). This form is used as a dock receipt, a cargo delivery receipt, an accountability document during temporary holding, and a record of all cargo handled.

The lighter operator receives copies of the TCMD at shipside. The number of copies depends on command requirements for each particular discharge operation. The lighter operator signs for the cargo at shipside and delivers all copies, except one, to the shoreside checker at the discharge point. The retained copy is initialed by the shore checker to indicate receipt of the cargo. At the end of the shift, the lighter operator turns in all initialed copies of the TCMD to the lighter control center. The information from these TCMDs provides the lighterage company with throughput evaluation data.

Cargo accountability may also be accomplished electronically using computer hardware and a 2½-by-2-inch logistics applications of automated marking and reading symbology (LOGMARS). A handheld portable bar code reader scans the cargo as it comes aboard the lighterage. The scanner works like an automated supermarket checkout counter. The cargo is scanned again when it is discharged. No paper documents the move, but the lighter operator can use the LOGMARS label to identify cargo.

BEACH AREA SECURITY

The terminal commander is responsible for local defense of his portion of the beach area. Commanders of all units have their normal responsibility for the security of men and equipment. Each unit is assigned a mission in the defense system. Emergency assembly areas are designated. An alert warning system is established. An overlay of the beach defense is circulated to all units in the area.

General security measures taken by lighterage units within their bivouac areas include—

- Dispersing all vehicles, equipment, and personnel.
- Posting guards, patrols, and sentries.
- Constructing individual fighting position crew-served weapons, emplacements, communication trenches, and bunkers.
- Designating specific defense positions for all personnel and conducting alert drills to ensure personnel are familiar with their duties in an emergency.
- Organizing definite defense groups under leaders specifically designated in a published defense plan.
- Organizing communication systems to be used during defense operations.
- Constructing obstacles to prevent the advance of attacking forces.
- Planning for integrated fields of fire.

In an emergency, all members of the lighterage units, including crews, may need to occupy defense positions. Accordingly, weapons must be kept handy at all times and checked frequently to ensure they are in serviceable condition.

Defense plans for beach areas are coordinated with higher headquarters and integrated with the theater Army rear battle plan and other existing base defense plans to ensure mutual support. The responsible terminal headquarters establishes and coordinates normal passive and active security measures to protect the beach in an air attack. These measures consist mainly of concealment, dispersion, early warning, and weapons firing. Personnel are provided shelters. A system of alert warning signals is set up, and installations are camouflaged.

Military police advises commanders on ways to secure and protect beaches against enemy threat. Exposed as they are to pilferage and sabotage, beach areas become even more vulnerable to both enemy and criminal activities because of the accumulation of supplies. Military police become proactive to security requirements as threat activity increases.
Mines are one of the greatest threats watercraft may encounter in any type of operation. Of main concern to Army watercraft are the many varieties of shallow water, magnetic influence, and bottom mines. Surface ships, submarines, or aircraft can deliver these mines. With current capabilities including delayed arming devices and ship counters, the bottom mine poses a threat to watercraft during any phase of a waterbound operation. The bottom mine is also extremely difficult to detect on rocky bottoms or when buried in mud or silt. A buried mine loses none of its target acquisition or destruction capability. Mine hunting or sweeping platforms are intensively managed resources in any theater of operations. Potential sources for mine clearance services include the US Army divers, the US Navy, and the host nation.

BIVOUACS

Whenever possible, bivouac areas are established in the vicinity of the beach perimeter so defensive positions can be readily manned in an enemy attack. The bivouac area should be as close to the boat mooring area as possible to allow ready access to the craft, particularly when storms arise. The first sergeant usually supervises the organization and development of company bivouac areas. The company commander and, usually, the battalion executive officer inspect daily to ensure proper standards of cleanliness and sanitation are maintained. The improvement of bivouac areas continues as long as the units occupy them.

In the bivouac area, it is essential to have good bathing facilities an adequate mess, and, in inclement weather, a place where soldiers can warm themselves and dry their clothing.