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CHAPTER 1

INTRODUCTION

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1. BACKGROUND.--The present conflict differs strategically in one great particular from World War I. In the last war the United States had available to her ample harbor facilities to land men and materiel. Our troops disembarked at French channel ports and proceeded by rail or truck to the front lines. In sharp contrast, in this war we will have to fight for our ports. In order to gain those ports we will have to land on the enemy's beaches and capture beachheads-- areas large enough to enable our infantry, artillery, tanks, and other combat units to land, form for attack, and move inland. Those beachheads will have to be held and developed as openings and supply bases through which men and materiel can be poured into enemy territory. One of our first objectives will be to capture a port or ports to which these base facilities will be shifted as early as possible.

2. NECESSITY FOR SHORE ENGINEERS.--The responsibility for holding and developing the beach area belongs to engineer shore troops. It is a job which requires a soldier to be both a builder and a fighter. To hold the beach, engineer shore troops are prepared to fight. They work with their rifles slung, or within easy reach, and frequently suspend their work long enough to repel an attack. They are equipped to defend the beach from attacks by land or air with .30 and .50 caliber machine guns and 37-mm antitank guns. They are responsible for the removal of obstacles on the beach and must, therefore, be skilled in the use of demolitions. They must first of all be good engineer soldiers.

The job of developing the beach is one for builders. Beach roads must be developed and improved to permit rapid unloading and movement across the beach. Dumps must be established, command posts set up. Everything possible must be done to permit as many men and as much materiel as possible to move rapidly across the beach and inland. Until more highly developed port facilities are captured, the work of engineer shore troops on the beach must continue.

The importance of the mission of engineer shore troops cannot be overemphasized. If there is one lesson that modern war teaches, it is that the battlefield is at the forward end of the supply line. The particular supply problem for which engineer shore troops are

responsible is tremendous. An Engineer Special Brigade is normally attached to a reinforced infantry division. In order that that division may carry out its mission at least 1500 tons of supplies and equipment must pass across the division beach daily-- 15,000 tons over a period of 10 days. These figures may well increase depending on the nature of the operation. They are too low rather than too high. These supplies must be moved rapidly. Battle experience on the beaches of North Africa and Sicily proved that victory is dependent upon a continuous flow of all types of supplies and equipment across the beaches to the assault troops ahead. Unnecessary congestion at a critical stage of the attack means disaster. There is no place where the lives of men depend more upon the coordinated activities of their fellow soldiers than in the movement of men and supplies across a hostile beach. When the time comes, it will not matter how well the tactical commander has planned, nor how skillfully the Boat Companies have brought their waves in to the right beach at the right minute-- if the beach organization breaks down, the battle is lost.

work in close harmony and cooperation. From the Communication Platoon of the Shore Battalion Headquarters Company, communication personnel will be attached to the Shore Companies to assist them in carrying out their communication functions; likewise from the Combat Platoon of the Headquarters Company .50 caliber machine gun squads will be attached for antiaircraft protection of the Shore Company's beach and 37-mm gun squads for protection of the beach area against tanks, armored vehicles, and, if necessary, against attacks by small boat patrols from the sea. In addition to these 2 platoons, each Shore Battalion Headquarters Company has a Company Headquarters for administrative functions within the company, and a Headquarters Platoon which furnishes the enlisted personnel who work in Battalion Headquarters. The organization of the Headquarters Company is shown in the following chart.

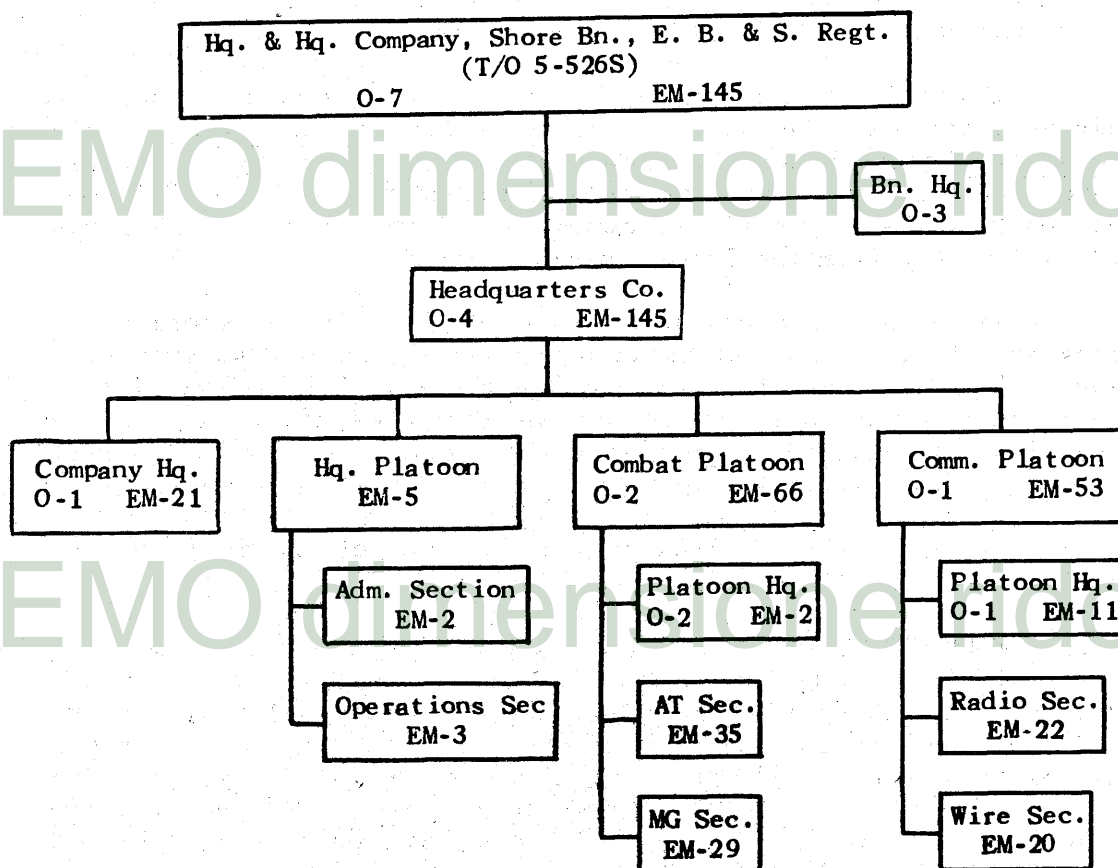


Fig. 2.--Organization of Hq. & Hq. Co., Shore Bn.

10. OTHERS WITH WHOM SHORE ENGINEERS WILL HAVE TO WORK.--Working in the same beach area with shore engineers, but performing different duties, will be a group of engineer boatmen known as the Boat

Control Section, and a group of medical men from the Boat and Shore Regimental Medical Detachment. These groups will play a most important part in the success of the shore engineer's work. Consequently he should learn what their duties are and what he must do to assist them.

11. BOAT CONTROL SECTION.--The work of the Engineer Shore Company is closely related to that of the Boat Control Section. The Boat Control Section is the descriptive name given the Boat Maintenance and Salvage Section of the Engineer Boat Company while it is functioning on the far shore. Organically this section is part of the Boat Company, and on the near shore prior to embarkation it performs second echelon maintenance on the boats of the Boat Company. On the far shore, however, it works with the shore units.

Generally speaking, the task of the Boat Maintenance and Salvage Section on the far shore is to control boats and boat traffic at the beach; hence the name Boat Control Section. While assigned to this duty this section is attached to the Shore Company, and the Boat Control officer, commander of the section, takes his orders directly from the Shore Company commander.

It cannot be emphasized too strongly that the shore engineers and the Boat Control Section must work shoulder to shoulder. Many will be the times that the shore engineers will have to suspend the performance of some job to aid the Boat Control Section in the execution of a more vital one; many will be the times when the Boat Control Section will pitch in to assist the shore engineers.

For a detailed discussion of the work of the Boat Control Section see pars. 27-33.

12. ATTACHED MEDICAL PERSONNEL.--The attached medical personnel, 1 medical officer and 9 medical enlisted men, will establish an aid station in the Shore Company area and will assist not only the injured among shore engineers, but also those of the combat troops injured on and near the beach area. The shore engineers will frequently be required to assist these "medics" in the handling of the injured. (For detailed duties of this section see par. 44 and Tentative Training Guide No. 4).

13. ASSIGNMENT OF PERSONNEL TO BOATS.--Of foremost importance to the shore engineer is the matter of boat assignment. He frequently has this question in mind: "If I am to work on the far shore, how and when do I arrive there?" To say that the shore engineer is transported in waves of boats operated by the Boat Company is only a partial answer to the how part of the question. In what boats of what waves and at about what stage of the operation is quite another

and much more complicated matter. Every shore engineer who is really interested in his job should have read enough of Tentative Training Guide No. 2, *A Manual for Boat Crews*, to understand that the Engineer Boat Company lands a battalion landing team on the far shore in "waves", and that a "wave" is a number of boats hitting a given beach at approximately the same time. He should understand further that it takes 60 boats to land a battalion landing team and that a battalion landing team is generally landed in 7 waves of not less than 6, nor more than 10, boats. He should know also that H-hour is the time the first wave of boats "hits" the far shore and that it is generally about H plus 90, or about 90 minutes after the first wave hits the beach, that the last wave of boats arrives at the far shore. The shore engineer should remember, of course, that his company is a vital part of the battalion landing team, and that somewhere in that 7 waves of boats (with a few minor exceptions) there will be a "boat space" for him and for each member of his company.

Boat assignment, or the assignment of personnel and equipment to boats, is the responsibility of the battalion landing team commander. He prepares the Boat Assignment Table showing what personnel and equipment is carried in each boat of each wave, and the time when that wave is to arrive on the far shore. This table not only assigns combat troops and their equipment to boats, but also provides for the assignment of the shore engineers and their equipment. The assignment of personnel and equipment to craft must necessarily depend upon the tactical situation, and no one can say positively that a certain section or platoon of shore engineers will be assigned to a given wave any more than one can say that certain elements of the combat troops will be transported in a given wave. This much, however, is known: that the shore engineer has many tasks to perform which are vital to the success of the operation; that these tasks must be performed on the far shore; that there is an approximate time at which these tasks must be performed; that the shore engineer must be present on the far shore in time to perform them; and that this time will depend upon the assignment to waves of other elements of the battalion landing team.

It therefore becomes necessary to determine about what stage of the operation the various combat elements of the battalion landing team will arrive on the far shore in order to approximate the time at which elements of the Engineer Shore Company should arrive. To do this we presume a normal situation in which the enemy has in its favor a fairly well defended shore line, and we have in our favor either the element of surprise or air and naval superiority, or both. In that case the battalion landing team commander would probably assign the combat elements of his command to waves as follows:

<u>Number</u>	<u>Name of Wave</u>	<u>Principal Combat Elements in Wave</u>
Wave I	Assault Wave	Assault Elements of 2 Assault Rifle Companies
Wave II	Support Wave	Support Elements of 2 Assault Companies
Wave III	Fire Power Wave	Heavy Weapons Company
Wave IV	Reserve & Command Wave	Infantry Bn. C. O. and Bn. Hq. and Reserve Rifle Company
Wave V	Antitank Wave	AT Platoon, Bn. Hq. Co., and AT Platoon, Regt'l AT Co.
Wave VI	Field Artillery Wave	Field Artillery Battery (105-mm howitzer)
Wave VII	Ammunition and Supply Wave	Essential transportation and ammunition for elements al- ready landed.

14. ASSIGNMENT OF SHORE ENGINEERS TO WAVES.--If the Shore Company is to perform its mission of facilitating the landing, the movement inland, and the resupply of the combat elements of the battalion landing team listed above, when then must elements of the Shore Company be transported to the far shore? In general terms the answer is this: it is essential that command, reconnaissance, and communication details be landed early in the operation; that defense units be landed early enough to protect the beach area from infiltrating personnel or vehicles and from attack from the air; that obstacle removal and gas decontamination personnel land prior to road building elements; that road building units land prior to vehicles and artillery; that longshoremen with their transportation and other equipment be landed before the landing of resupply; and that remaining shore personnel be landed as soon as their use is essential. Therefore, one suggested method of assignment of shore personnel and principal items of equipment to waves and to boats is as given in Figure 3 below:

Fig. 3.--Assignment to Waves and Boats.



WAVE I - ASSAULT
H

BOAT 14 LCVP
ENGINEER BOAT COMPANY
Boat Control Section 1

BOAT 15 LCVP
ENGINEER BOAT COMPANY
Boat Control Section 1

WAVE II - SUPPORT
H plus 5

(none)

WAVE III - FIRE POWER
H plus 15

BOAT 34 LCVP
ENGINEER SHORE COMPANY
Hq. Platoon 1
Captain, C. O. 1
1st Sergeant 1
T/S, Reconnaissance 1
T/S, Clerk 1
Beach Marking Team
(Utility Platoon) 3
Message Center Men 3
.30 Caliber Machine Gun Crews 6
SHORE EN. HQ. COMPANY
Communication Platoon
Enlisted Men 2
ENGINEER BOAT COMPANY
Boat Control Section 1
Boat Control Officer 13
Boat Control EM 13
Total 32

BOAT 37 LCVP
ENGINEER SHORE COMPANY
Hq. Platoon 1
Reconnaissance Officer 1
2nd in Command 1
Weapons Officer 1
T/S, Reconnaissance 1
Clerk 1
Reconnaissance Team
(Utility Platoon) 3
Message Center Men 4
.30 Caliber Machine Gun Crews 5
SHORE EN. HQ. COMPANY
Communication Platoon
Enlisted Men 3
ENGINEER BOAT COMPANY
Boat Control Section EM 13
Total 32

WAVE IV - RESERVE AND COMMAND
H plus 40

BOAT 44 LCM(3)
ENGINEER SHORE COMPANY
Pioneer Platoon 1
First Lieutenant 1
Bulldozer Operator 1
Decontamination Equipment
Operator 1
Demolition Man 2
Laborers 2
SHORE EN. HQ. COMPANY
Combat Platoon
(.50 Caliber Machine Gun)
Sergeant 1
Corporal 1
Privates 3
Medical Detachment
Officers 1
Aid Men 4
Total 16

BOAT 45 LCVP
ENGINEER SHORE COMPANY
Pioneer Platoon 1
Demolition Foreman 1
Decontamination Equipment
Operator 2
Demolition Men 2
Laborer 1
SHORE EN. HQ. COMPANY
Combat Platoon
(.50 Caliber Machine Gun)
Corporal 1
Privates 3
Medical Detachment
Aid Men 5
Total 15

Tractor, with Angledozer, Road Building
Materials, and Equipment

WAVE V - ANITANK
H plus 50

BOAT 53 LCM(3)
ENGINEER SHORE COMPANY
Pioneer Platoon 12
1 Pioneer Section 6
1/2 Pioneer Section 1
Bulldozer Operator 1
Total 19

BOAT 51 LCM(3)
ENGINEER SHORE COMPANY
Pioneer Platoon 1
Platoon Sergeant 12
Pioneer Section 6
1/2 Pioneer Section 1
Bulldozer Operator 1
Total 20

Tractor, with Angledozer, Road Building
Materials, and Equipment.

WAVE VI - FIELD ARTILLERY
H plus 70

BOAT 61 LCM(3)
SHORE COMPANY
Utility Platoon 1
Platoon Leader 10
Enlisted Men 1
DUKW Operator 1
DUKW Engineman 1
SHORE EN. HQ. COMPANY
Combat Platoon
1-37-mm Crew 5
Total 18

BOAT 66 LCM(3)
ENGINEER SHORE COMPANY
Utility Platoon 10
Enlisted Men 1
DUKW Operator 1
DUKW Engineman 1
SHORE EN. HQ. COMPANY
Combat Platoon
1-37-mm Crew 4
Total 16

1 - 2 1/2 Ton Amphibian Truck
1 - 37-mm AT Gun in Truck

1 - 2 1/2 Ton Amphibian Truck
1 - 37-mm AT Gun in Truck

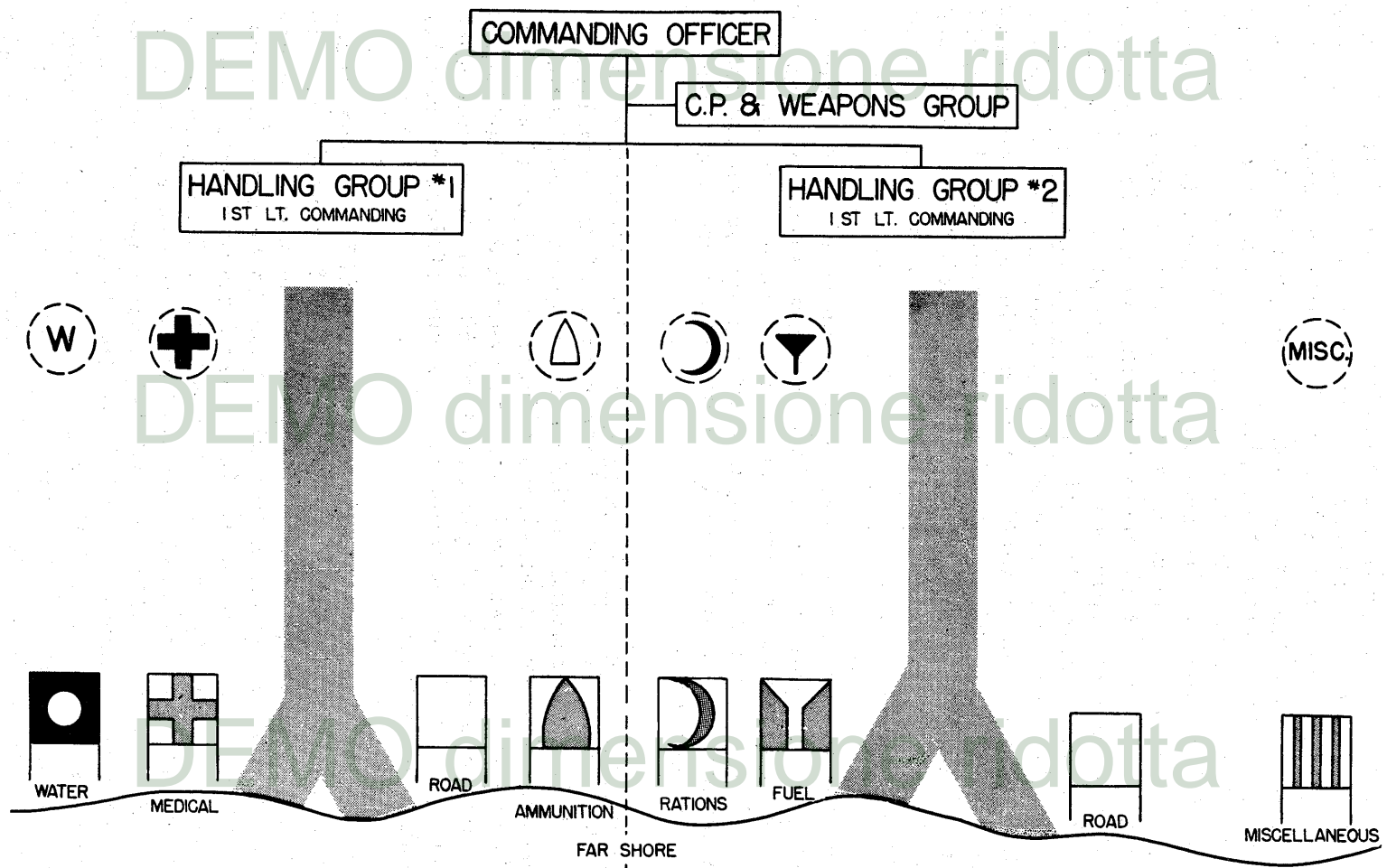
WAVE VII - AMMUNITION AND SUPPLY
H plus 90

BOAT 74 LCM(3)
ENGINEER SHORE COMPANY
Utility Platoon 9
Enlisted Men 9

BOAT 72 LCM(3)
ENGINEER SHORE COMPANY
Utility Platoon 9
Enlisted Men 9

BOAT 71 LCM(3)
ENGINEER SHORE COMPANY
Utility Platoon 10
Enlisted Men 10

BOAT 75 LCM(3)
ENGINEER SHORE COMPANY
Utility Platoon 10
Enlisted Men 10



NOTE: DISTANCES AND PROPORTIONS NOT TO SCALE

Fig. 34.--The Beach Reorganized for Resupply.

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improvised or made from standard floating bridge equipment, are capable of rapid construction, and greatly facilitate unloading operations on shallow beaches. (For use of the DUKW in the movement of supplies, see Chapter 7).



Fig. 35.--Cargo Handling in Resupply. Use of Beach Sleds.

g. Unloading of Craft Stranded Off the Far Shore. The unloading of landing craft which have run aground or are out of commission off the far shore presents a definite problem for shore engineers. Such craft must be unloaded, and their contents moved to dumps. Cargo of such stranded craft may fall into one of 3 categories: light packaged cargo, heavy equipment, or vehicles. The unloading of each of these types of cargo presents a separate and distinct problem.

The LCT(5), being a deeper draught vessel than any other assigned to or ordinarily attached to engineer amphibian units, will



*Fig. 36.--Cargo Handling in Resupply. Use of Beach Sleds.
A Capacity Load.*

The above sled is loaded with 18 boxes of 90-mm ammunition, each box weighing 237.5 pounds, a total weight of 4275 pounds. In this case the ammunition dump is located 150 yards from the shore line.

normally be expected to present the most serious unloading difficulties, as it is likely to run aground at greater depths of water than smaller craft. For unloading small packaged cargo (weights up to 237.5 pounds-- 90-mm ammunition), an LCM(3) may be moored alongside the LCT(5) and cargo may be handily unloaded over the side of the LCT(5) into the LCM(3). To facilitate this operation "stairs" should be improvised from cargo boxes at the rail of the LCT(5) to shorten the distance which packages must be lifted. When the sea is relatively calm, it is preferable to moor the LCM(3) to the LCT(5) "ramp to ramp" with the ramp of the LCM(3) resting on the ramp of the larger boat. Mooring is effected by fastening lines from forward cleats on LCM(3) to main bitts on LCT(5) as shown in Fig. 48. When the boats are so moored together, unloading across the ramps is highly practical and effective (see Fig. 38).



Fig. 37.--Where no crane is available small packaged cargo may be unloaded over side of stranded LCT(5) into LCM(3) moored alongside. Here 90-mm ammunition is being unloaded from LCT(5). "Stairsteps" have been constructed of the ammunition boxes.



Fig. 38.--Unloading ration boxes from LCM(3) to LCT(5) across lowered ramps of both boats.

h. Unloading of Heavy Cargo from Stranded LCT(5). One very efficient method of unloading cargo which is too heavy to be moved by hand is by means of a truck mounted crane which can be mounted in an LCM(3). For reasons of safety the crane is lashed securely to the lifting rings of the LCM(3), otherwise a relatively rough sea will upset both the crane and the boat. The LCM(3) carrying the crane is moved alongside and moored to the LCT(5) and unloading is effected as shown in the following photographs.



Fig. 39.--Small cargo may be handily unloaded from stranded LCT(5) by crane mounted in LCM(3).

Fig. 40.--Cargo is reloaded into another LCM(3). →

Fig. 41.--Here 2800 pounds is being moved at one time, showing the practicability of unloading heavy equipment in this manner. →



Fig. 40.



Fig. 41.

*Fig. 42.**Fig. 43.*

← Fig. 42.--In Bureau type LCM(3) cab of crane rides above sides allowing boom to swing freely in any direction.

← Fig. 43.--When crane is mounted in Higgins type LCM(3), cab sits low in boat preventing boom from maneuvering.

Fig. 44 (below).--Cargo must be lifted from directly over bow of Higgins boat, the boom being moved into position by maneuvering boat.





Fig. 45.--Further evidence that when crane is mounted in Bureau type, boom has much freedom of movement.

Fig. 46.--For operation in rough water crane must be lashed to lifting eyes of LCM(3). As a safety precaution lashing should always be effected regardless of the sea.

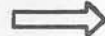


Fig. 47.--This 1400 pound block was picked up from star-board side of LCT(5) and is being moved to LCM(3) moored to the opposite side of LCM(3) with crane.





Fig. 46.



Fig. 47.

i. Unloading of Vehicles from Stranded LCT(5). Even in a relatively rough sea, vehicles may be readily moved from an LCT(5) to an LCM(3) across the lowered ramps of the 2 boats. The boats are moored in accordance with instructions contained in the preceding paragraph. When vehicles are transferred from one boat to the other in this manner, however, to keep the ramps in place and to keep the mooring taut, the engines of the LCM(3) are set from slow speed to full speed astern depending upon the condition of wind and sea.



Fig. 48.--LCM(3) is moored to LCT(5) "ramp to ramp". Method of mooring should be noted.

Fig. 49.--2 1/2-ton truck is moved across lowered ramps of the 2 craft. Here 2 1/2-ton truck is loaded to full capacity. →

Fig. 50.--In tests recently conducted the heaviest vehicle moved across lowered ramps from LCM(3) to LCT(5) was truck mounted crane (weight 30,000 pounds). →

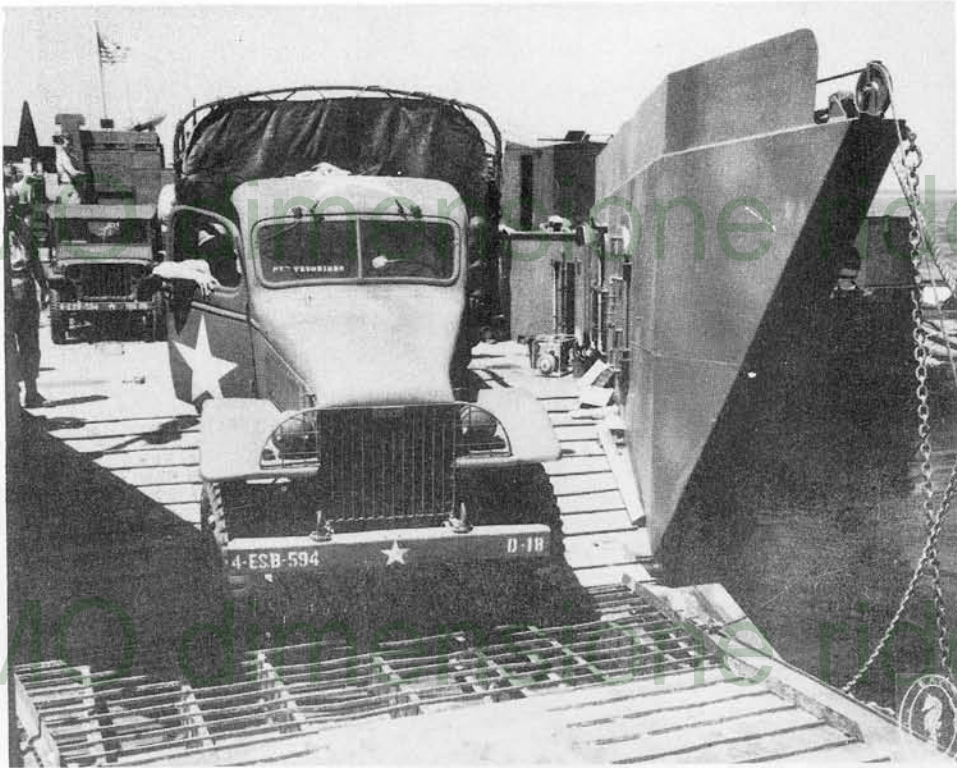


Fig. 49.



Fig. 50.



Fig. 51.--Boom is placed in forward position to equalize distribution of weight. Note that ramp chains and cables on both boats are completely relaxed.



Fig. 52.--After crane is moved aboard LCT(5), it may be effectively used in unloading cargo into DUKW or LCM(3). Crane need not be lashed when mounted in LCT(5) unless sea is exceptionally rough.

APPENDIX I

BEACH AND HYDROGRAPHIC MARKINGS

1. The following system of hydrographic and beach markings is hereby prescribed as standard for all Engineer Special Brigades. This system is in accordance with that laid down by the Navy for use in combined operations.

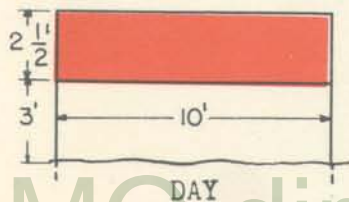
2. BEACH MARKINGS.--Beaches will be marked by shore units in accordance with the following:

a. Each beach will be designated by a color. ("Beach Red", "Beach Blue", "Beach Green", "Beach Red-2", etc.) The examples below are for "Beach Red" and "Beach Red-2".

b. Left Flank (from seaward):

Day - A solid color rectangular panel mounted horizontally. Size: 10 feet long by 2½ feet wide.

Night - A single steady colored light and a steady white light, mounted horizontally, the colored light to inboard (toward the center of the beach). Lights must be hooded to be invisible from the air.



Left Flank
"Beach Red"

Fig. 101(i).



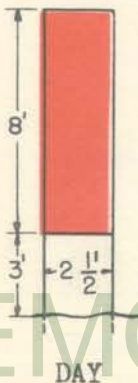
NIGHT



c. Right Flank (from seaward):

Day - A solid color rectangular panel mounted vertically. Size: 8 feet high by 2½ feet wide.

Night - Two steady colored hooded lights, mounted horizontally.



Right Flank
"Beach Red"

Fig. 101(ii).



NIGHT

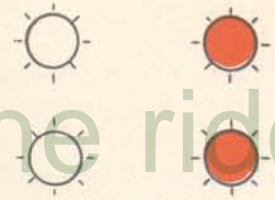


THE ORGANIZATION OF THE FAR SHORE

d. The following examples indicate the use of the markers when the color name of the beach is duplicated.

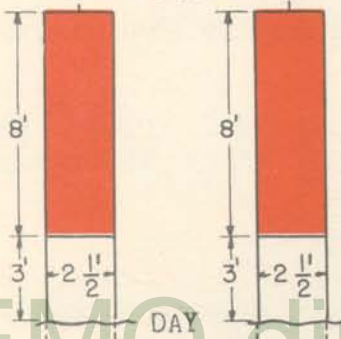


Left Flank
"Beach Red-2"

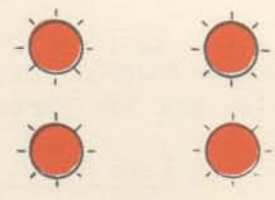


NIGHT

Fig. 101(iii).



Right Flank
"Beach Red-2"



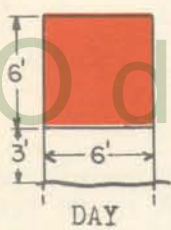
NIGHT

Fig. 101(iv).

e. Beach Center Marking. When it is desired to mark the center or other interior point of a beach, the following markings (of the same color as the beach) are to be used, either alone or in conjunction with the flank markings.

Day - A solid color square panel. Size: 6 feet square.

Night - A single steady colored light.

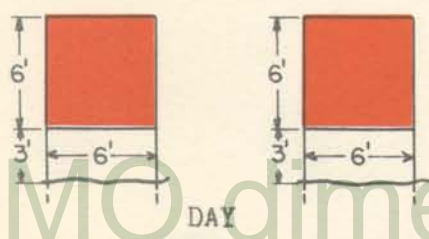


Center
"Beach Red"



NIGHT

Fig. 101(v).



Center
"Beach Red-2"



NIGHT

Fig. 101(vi).

3. LANDING POINT MARKINGS.--Landing points are marked on the beach as required in order to indicate to coxswains the points at which boats will land according to the load which is carried. The prescribed markings are shown below. Size of markers: 6 feet square.

a. Beach Roadway. The beach inland from the point so marked is passable for wheeled vehicles. This marker should always be placed with the center approximately 10 feet to the right of the right edge of the beach roadway as seen from seaward.

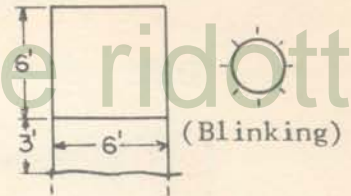


Fig. 101(vii).

b. Ammunition.

c. Rations.

d. Water.

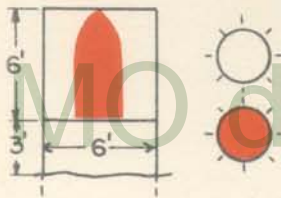


Fig. 101(viii).

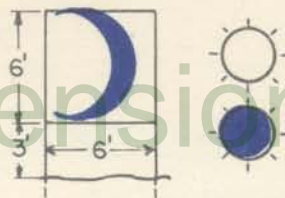


Fig. 101(ix).

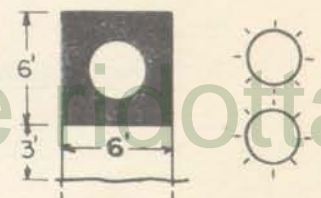


Fig. 101(x).

e. Gasoline and Oil.

f. Tracked Vehicles.

g. Miscellaneous Supplies.

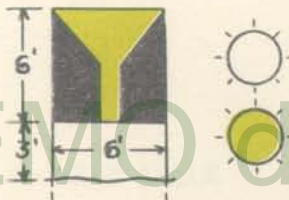


Fig. 101(xi).

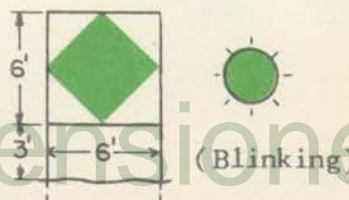


Fig. 101(xii).

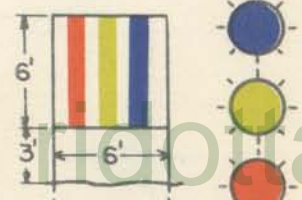


Fig. 101(xiii).

h. Medical. Medical supplies landed or casualties evacuated.

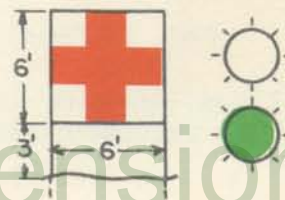


Fig. 101(xiv).

4. HYDROGRAPHIC MARKINGS.

a. Rocks, Shoals, and Submerged Obstructions:

Day - A red and black vertically striped pennant on buoy or stake.

Night - Blue light over red light.



Fig. 101(xv).

b. Boat Channel:

(1) Right side of channel (from seaward):

Day - Red pennant on buoy.

Night - A red light.

(2) Left side of channel (from seaward):

Day - Black pennant on buoy.

Night - White light.



Left Side



NIGHT



Right Side



NIGHT

Fig. 101(xvi).

5. For actual operations, markers will be made of fluorescent cloth; for training, painted salvage canvas will be used.