AMPHIBIOUS TRAINING COMMAND • • • • • • • U S PACIFIC FLEET

LANDING CRAFT

AND THEIR EMPLOYMENT

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FOREWORD

This pamphlet revises and supersedes Landing Craft and their Employment of February 1962, promulgated by Commander Amphibious Training Command, U. S. Pacific Fleet.

The purpose of this pamphlet is to compile in a convenient form the basic information required to efficiently operate and maintain landing craft and to control them during the ship to shore movement.

Personnel responsible for the operation, maintenance, and control of landing craft should be thoroughly familiar with the information and procedures contained in this pamphlet to carry out a ship to shore movement efficiently. This pamphlet also contains information valuable to the Commanding Officer, Executive Officer, Operations Officer, and Debarkation Officer engaged in off loading during an amphibious assault.

This publication has been reviewed and approved in accordance with SECNAVINST 5600.16.

H. S. MONROE
Rear Admiral, U. S. Navy
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U. S. Pacific Fleet

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101. Description of the LCVP

The LCVP (Landing Craft Vehicle Personnel) is a seaworthy 36 foot boat with a 10-1/2 foot beam and draft of about 1 foot forward and 3-1/2 feet aft. It carries a crew of three: coxswain, engineer, and bowhook. Wartime complement calls for an additional deck hand. It is capable of transporting 8100 pounds of cargo or 36 combat equipped troops with a boat crew of 3 men. A single Gray Marine Diesel engine delivering 225 horsepower will give the LCVP a speed of approximately 11 knots with no load, or a speed of 9 knots when loaded. The single screw and rudder are protected by a skeg. The 180 gallon capacity of the two fuel tanks will provide a cruising endurance of about 110 miles at 9 knots.

Armor plate covers the forward 30 feet of the above-water portion of the hull and provides protection against small arms fire for crew and cargo. In combat, two .30 caliber machine guns are mounted in circular steel gun wells in the transom. These wells are sealed over for peacetime use.

102. Crew of the LCVP

The coxswain is the man in charge of the LCVP and must be highly skilled in boat handling. He ensures that the other members of the crew perform their duties smartly. He must supervise the daily boat check and see that his boat is kept shipshape. He must know and apply the principles of piloting and be familiar with the role of his particular boat in a landing operation. In beaching and retracting operations, he directs the operation of the ramp. In coming alongside and in getting underway, he directs the handling of lines and fenders. Complete requirements for qualification as Assault Boat Coxswain are contained in COMPHIBPACINST 1510.4 (series).

The engineer, a trained engineman, is responsible for the operation of the engine and sea strainers ("sand traps"), bilge pumps, etc. Supervised by the coxswain, he makes the daily engine checks. He should be able to make minor repairs and spot engine trouble before it has a chance to cause damage. He operates the ramp winch in lowering and raising the ramp, and handles the stern line and after fenders in coming alongside or getting underway.

The bowhook acts as bow lookout and handles the bow line and forward fenders in coming alongside or getting underway. He is responsible for operation of the ramp latches, for the cleanliness of the ramp and the ramp gasket prior to hoisting the ramp. He also assists the engineer in hoisting the ramp. He may also be ordered to perform visual signalling, radio communications, gunnery, net tending, and other deck jobs. In addition, he should become qualified to relieve the coxswain. The fourth crew member (when assigned) will assume the duties of tending after fenders, handling stern lines, signalling, manning the port machine gun, and assisting the engineer in hoisting the ramp.

103. Boat Equipment

A daily check should be made by the boat coxswain to ensure the presence of required boat equipment. See Appendix C for LCVP equipment list and diagram showing recommended stowage of equipment in the boat.

104. Inspection and Maintenance

In addition to ensuring that required equipment is present, the boat crew, prior to commencing the day's operations, must make daily boat and engine checks in order to keep their boat in the highest possible state of material readiness,

and to bring to light, hull and engineering discrepancies which need correction. See Appendix D for check-off lists to be used in making these daily inspections.

105. LCVP Operation

Slight differences exist in the procedures for maneuvering single-screw and twin-screw boats; however, the basic principles involved are the same for all landing craft (see Chapter V). Since it is a single screw boat, the LCVP starts a turn more easily while going ahead by the use of left rudder rather than right rudder in a no-wind situation. However with the large amount of freeboard forward, it will be found that a turn can be started more quickly by turning away from the wind, letting the wind "help" the rudder in making the turn. In a sudden start with a rapid application of "ahead" throttle, the stern tends to swing temporarily to starboard (the screw turning clockwise). Likewise, when backing down suddenly, the stern tends to swing to port (the screw then turning counterclockwise). It is difficult to prevent the LCVP from backing into the wind due to the large amount of freeboard forward. To back in a straight line with the wind coming from the port side it will probably be necessary to periodically stop backing, put the rudder hard left, and straighten the boat by "blasting" ahead with the throttle briefly.

106. The LCVP Ramp

a. Lowering

The LCVP ramp winch is hand-operated. It is manned by the engineer just prior to "touch-down" on the beach. The engineer ensures that the ramp is ready to drop when the order is given by the coxswain. The following procedure is to be used in lowering the ramp.

(1) The coxswain ensures that the LCVP is firmly beached and that no one is standing in front of the ramp. He then orders "Lower the ramp."

(2) The engineer fits the winch crank to the winch shaft as soon as the boat touches down, and turns the crank slightly so that the safety pawl can be disengaged from the gear teeth. He then sets the brake to hold the weight of the ramp so that the crank handle can be removed.

(3) The bowhook unhooks the ramp latches.

(4) The engineer removes the pawl from the gear teeth.

(5) The engineer removes the crank handle.

(6) The engineer relieves the pressure on the brake slightly so that the ramp descends to the beach swiftly and smoothly leaving some slack in the ramp cables.

(7) The engineer re-engages the safety pawl immediately.

b. Raising

The ramp should be raised as soon as the boat is unloaded. However, before raising it, remove sand and other foreign matter with a broom. This prevents such matter from being pressed between the ramp and the gaskets or watertight seals where the ramp meets the hull. Sweeping the ramp also helps to keep the interior of the hull clean. The following procedure is to be used in raising the ramp.

(1) The engineer places the winch crank on the shaft.

(2) The engineer ensures that the safety pawl is in place.

(3) The bowhook sweeps the ramp and gasket, and ensures that they are free of dirt, sand, coral, shells, etc.

(4) The engineer, assisted by the bowhook, cranks the ramp up into position.

(5) The bowhook hooks the ramp latches.

(6) The engineer removes the winch crank and secures it to a lanyard near the winch.

c. Emergency Operation

Occasionally something goes wrong in the ramp operating system after the ramp has been lowered. Since the LCVP cannot leave the beach safely with the ramp down, special emergency gear must be carried aboard the LCVP to raise the ramp. This gear usually consists of two tackle rigs (ramp jiggers) which are attached to the ramp when the need arises. Beach Party members may assist the crew in hoisting a faulty ramp.

d. Care of the LCVP Ramp Assembly

Some of the steps which must be taken by the boat crew to keep the ramp functioning properly are as follows:

(1) Ensure that the ramp latches (hooks or dogs) hold the ramp securely in position. Ensure that the ramp fits snugly against the gasket, and that the hook is positioned firmly in the eye, so that a sudden blow or jolt cannot jar the ramp loose.

(2) Ensure that the latches will not "freeze" because of corrosion or excess paint.

(3) Ensure that the ramp cables are well greased and serviceable.

(4) Ensure that cables move smoothly on the sheaves (pulleys).

(5) Ensure that the ramp winch and ramp cable sheaves are kept properly lubricated.

(6) Ensure that the ramp window cover hinges and ramp window cover securing pins are properly lubricated. Special attention should be paid to these after each painting of the ramp to ensure that excess paint does not cause them to freeze.

(7) Ensure that the ramp window cover is secured properly when it is closed. This cover is made of heavy steel plate, and can injure personnel in the cargo space if it comes unbolted and falls.

(8) Ensure, when it is freshly painted, that the ramp is left open until thoroughly dry. Paint will deteriorate the ramp gasket. If the paint is allowed to dry with the ramp closed, it will bind and the ramp cannot be lowered.

e. Servicing the LCVP Ramp Assembly

The ramp assembly of the LCVP consists of three main parts: (1) the winch or windlass which includes the frame, gears, winch crankshaft, ramp cable drum, brake drum, band brake control lever, the pawl, and pawl control lever; (2) the cable system which includes the ramp cable and sheaves; and (3) the ramp including the ramp hinges, window cover and securing pins, ramp latches (or dogs) with their hooks and levers, and the ramp gasket. The procedure for servicing the ramp assembly is as follows:

(1) Drop the ramp all the way down, removing all strain from the ramp cable.

(2) Remove the screws holding the pawl control lever.

(3) Remove the windlass frame bolts, taking care that the windlass does not fall.

(4) Remove the U-bolt, releasing the cable from the drum.

(5) Carry the windlass forward in the boat in order to facilitate the work.

(6) Remove the cotter pin and bolt that secure the brake band.

(7) Remove the cotter pins and tapered pin in the pawl and pawl control lever.

(8) Scrape, wire brush, and clean the entire windlass unit. Open all oil holes with a pin or wire, and thoroughly clean all bushings.

(9) When the unit is completely clean, inspect for breaks, cracks, and worn lining.

(10) Grease all sliding surfaces.

(11) Force grease into all lubricating holes, making certain that all gears operate freely. Apply grease to the gear teeth.

(12) Check the cable sheaves. They should be free of rust, well oiled, and operate freely.

(13) Clean the ramp cable and securing pad-eyes and check them for weaknesses.

(14) Grease the ramp cable.

(15) Check and lubricate the ramp latches.

(16) Check and lubricate the ramp window cover securing pins and hinges.

(17) Check ramp gaskets for deterioration. Renew the gaskets if necessary.

(18) Remove any grease from the windlass brake drum, and roughen the brake band with emery paper.

(19) Reassemble the windlass.

(20) Replace all cotter pins.

(21) Attach the ramp cable to the cable drum prior to mounting the windlass on the boat frame. Every precaution must be taken to ensure that the cable is secure and in no danger of slipping on the drum.

(22) Mount the windlass on the boat frame; secure all bolts and nuts firmly.

(23) Take the slack out of the ramp cable, remove kinks, and ensure that the ramp cable winds evenly on the drum.

(24) Raise and lower the ramp several times to ensure that it functions properly.

II. THE LCM

201. Description of the LCM

There are three basic models of the LCM: LCM(3), the LCM(6), and the LCM(8). The LCM(3) and LCM(6) are both found in shipboard boat allowances and are similar, the essential difference being that the LCM(6) is six feet longer than the LCM(3). The LCM(8) differs considerably from the other two types and is not included in any shipboard allowance; it is assigned only to Assault Craft Units.

The LCM(3) is 50 feet long, 14 feet wide, and weighs approximately 26 tons. It has a cargo space 31 feet 3 inches long, 9-1/2 feet wide and will carry a 30-ton tank, 60,000 pounds of cargo, or 100 combat equipped troops.

The LCM(6) is 56 feet long, 14 feet wide, and weighs approximately 28 tons. It has a cargo space 37 feet 6 inches long and 9-1/2 feet wide and will carry a 35-ton tank, 68,000 pounds of cargo, or 120 combat equipped troops. A modification was made to the LCM(6) - (LCM(6) Mod 1). The only change was to increase the width of the cargo space to 11 feet.

The LCM(8) is 73-1/2 feet long, 21 feet wide, weighs approximately 73 tons when fully equipped and fueled. The deck of its cargo space is 45-1/2 feet long and 14-1/2 feet wide, and it will carry a 60-ton M103A1 tank, M51 tank retriever, 120,000 pounds of cargo, or 150 combat equipped troops.

The LCM(3) and LCM(6) are powered by twin Gray Marine Diesel engines, each producing 225 horsepower. The LCM(8) is powered by four Gray Marine Diesel engines, each producing 160 horsepower. (Smaller injectors are used than in the

LCM(3) and LCM(6).) All parts of the LCM(3) and LCM(6) engines are interchangeable, and the majority of these parts are interchangeable with those in the engines of the LCM(8). All LCM have two screws and twin rudders protected by skegs. Both rudders are controlled by one wheel in the pilothouse. In the LCM(3) and LCM(6), the screws turn clockwise with engines going ahead; in the LCM(8), the starboard screw turns clockwise and the port screw turns counterclockwise. Normal speed for the LCM is 10 knots. Fuel and range data are as follows:

	LCM(3)/(6)	LCM(8)
Fuel capacity (gallons)	450	1146
Endurance at 10 knots (miles)	130	190

202. Crew of the LCM

The crew of an LCM consists of five men: Coxswain, engineer, bowhook, sternhook, and an extra deck hand; however, manning levels in amphibious ships generally preclude the assignment of more than four men as crew for the LCM, manning all stations except that of the extra deck hand.

The coxswain must be well coordinated and skilled in boat handling. He should be experienced in the handling of single-screw boats prior to being assigned as coxswain of an LCM, which has two screws and two combination throttle control and clutch control levers. The coxswain is the man in charge of the LCM; the man who gives all the orders. He ensures that the engineer, bowhook, and sternhook perform their duties smartly. He must know and apply the principles of piloting and be familiar with the role of his particular boat in a landing operation. He also directs and controls the operation of the ramp.

The engineer, a trained engineman, is in charge of the engines and engineroom under the supervision of the coxswain. He is responsible for the operation of the engines, sea strainers, bilge pumps, ramp winch, etc. Supervised by the coxswain, he makes the engine checks that precede and follow each day's operations. He should be able to make minor repairs and spot engine trouble before it has a chance to cause damage. He stands by the port engine, which powers the ramp, while it is being operated to ensure that it functions properly.

The bowhook acts as bow lookout and handles the bow line and forward fenders in coming alongside and getting underway. He is responsible for the operation of one of the two ramp safety chains or preventers in lowering or raising the ramp and for the cleanliness of the ramp and ramp gasket prior to hoisting the ramp.

The sternhook handles the stern line and after fenders in coming alongside and getting underway. He is responsible for the operation of one of the two ramp safety chains or preventers in lowering or raising the ramp. The bowhook and sternhook may also be ordered to perform visual signalling, radio communications, gunnery, and other deck jobs. They will jointly tend the debarkation net during debarkation in an amphibious operation until relieved by the first troops to board the boat. In addition, they should each become qualified as coxswains in order to be ready to take over if circumstances require it.

203. Boat Equipment

A daily check should be made by the boat coxswain to ensure the presence of required boat equipment. See Appendix C for LCM equipment list and diagram showing recommended stowage of equipment in the boat.

204. Inspection and Maintenance

To keep their boat in the highest possible state of material readiness, and to bring to light hull and engineering discrepancies which need correcting, the boat crew must make daily boat and engine checks. These should be accomplished prior to commencing the day's operations. See Appendix D for check-off lists to be used in making these inspections.

205. LCM Operation

Handling of the twin-screw LCM is initially more difficult than handling of a single-screw boat, because of the relative complexity of the controls (two combination throttle control and clutch control levers). However, once the mechanics of control are mastered through practice, it will be found that the LCM is much more maneuverable than the LCVP because of these twin screws and the twin rudders. The two screws can be used together (that is, in the same direction) for greater power, or they can be used in opposite directions (one ahead, and one astern). This latter characteristic, coupled with the shallow draft forward, enables the coxswain to turn the LCM almost in its own length. As in the LCVP, the large amount of freeboard forward makes the LCM much easier to turn out of the wind than into it; however, turns of the LCM into the wind can be readily accomplished because the screws are offset from the centerline. Basic principles of operation may be found in Chapter V.

The pilothouse contains two identical instrument panels which supply information on each engine. Each instrument panel includes a water temperature gauge, oil temperature gauge, oil pressure gauge, ammeter, and tachometer. Normal readings for these gauges are given in Chapter V. Also located in the pilothouse are the two engine control levers--

one set on each side of the box housing the steering mechanism. Setting the levers ahead places the engines in forward gear. To place them in reverse, the levers are pulled back. Hand grips (the throttle controls) set at the top of the levers are turned to regulate engine speed. One of the skills required of an LCM coxswain is that of regulating the RPM of the two engines. Until the coxswain learns how to do this, the bow of the boat veers either to port or starboard depending upon which engine is turning over at the higher speed. The experienced man at the wheel has both a feel for his boat and an ear for the engines.

206. The LCM Ramp

The power-operated ramp of the LCM is another way in which the LCM differs from the LCVP. Powered by the port engine, the ramp is raised and lowered by the coxswain from the cockpit. The controls consist of: (1) a foot ramp latch release pedal, and (2) a ramp clutch control. Small metal instruction plates placed near the control indicate the direction in which it should be moved to raise or lower the ramp.

a. The steps to take in operating the LCM ramp are as follows:

(1) The coxswain ensures that the LCM is firmly beached, and that no one is standing in front of the ramp.

(2) The coxswain then tightens the ramp hoist cable slightly by engaging the ramp clutch control in the "raise" position (this will allow the ramp latch to be freed easily).

(3) The coxswain orders the bowhook and sternhook to release the ramp safety chains or preventers.

(4) The coxswain presses down on the ramp latch release pedal (on the deck to port of the wheel housing) to release the ramp latch.

(5) The coxswain engages the ramp clutch control in the "lower" position to lower the ramp. If the ramp falls too fast, he eases the control lever back toward the "neutral" position to brake the speed of the descent.

(6) When the ramp is down, the coxswain continues to pay out some ramp cable allowing some slack so that the cable will not be subjected to a strain while cargo is being unloaded.

(7) When unloading has been completed, the bowhook sweeps off the ramp and ramp hinge gasket. This prevents debris from being pressed between the ramp and the gaskets with a subsequent destruction of the water-tight seal.

(8) The coxswain then engages the ramp clutch control in the "raise" position to hoist the ramp. The speed of the port engine will determine the rate at which the ramp rises.

(9) When the ramp is fully raised the coxswain orders the bowhook or sternhook to insure that the ramp latch is engaged and to secure the ramp safety chains or preventers to the ramp.

b. For a better understanding of his function, it is highly recommended that the student LCM coxswain climb down into the engineroom to observe the working of the clutch and windlass while a regular LCM coxswain raises and lowers the ramp. Throughout each ramp operation, the engineer must be in the engineroom checking the ramp windlass, being ready to take immediate action in case of a frozen clutch or slipping "V" belt. If any slippage is noted, the engineer signals to the coxswain to

cease ramp operation, and then changes the belt. Having done this, he notifies the coxswain, and operations can be resumed.

c. Emergency Operation of the LCM Ramp

(1) Emergency equipment should be carried in the LCM for use if the ramp operating gear fails. Each crew member must be familiar with his part in using this emergency gear. The equipment consists of 2 - 3/4" wire straps about two feet long, 1 - 3/4" wire strap 15 feet long, 1 - 3/4" wire strap 20-25 feet long, 1 metal snatch block, several shackles and a 3-fold tackle.

(2) In the method of raising the LCM ramp called the "jump method," the snatch block is secured as high and as far forward on the coaming as possible. The 20-25 foot wire strap is secured around the most solid part of the down ramp as far aft on the ramp framework as possible. It is then led through the snatch block. A vehicle on the beach or another LCM can pull on the wire strap and raise the ramp. In some instances the wire strap can be led over the ramp wire sheave and the snatch block will not be needed. If a vehicle on the beach is used, the wire strap must be fairlead around a cleat or bitt and then led to the beach. Some slack must be left in the wire strap to allow the assisting boat or vehicle to get a "jump" on the wire. The boat with the ramp down must use his screws to hold his boat firmly on the beach while the ramp is being raised.

(3) In the method called the "mechanical advantage method" the snatch block is rigged in the same manner as the jump method and the fifteen foot wire strap is rigged instead of the 20-25 foot wire strap. The 3-fold tackle is secured to the wire strap and to the midships cleat or bitt.

The hauling part of the tackle is then led to a vehicle, personnel on the beach or to another boat. Power is then applied and the ramp raised.

(4) Another method, called the "ramp to ramp method" may be used if conditions are favorable. Another LCM drops his ramp alongside the down ramp and the two ramps are secured together at the top. The assisting boat then raises his ramp, bringing the other ramp up with it. If the other ramp is not closed when the assisting boat's ramp is latched, he then secures his ramp and backs down to completely close the other ramp.

(5) In some instances, with a broken ramp wire, there may be a sufficient length of the wire on the ramp to allow a vehicle on the beach or an assisting boat to take the broken wire over the ramp wire sheave. In this case, the wire strap and snatch block will not be needed.

(6) If the boat engine is operative, it may be possible to bend another wire to a broken ramp wire and take turns around the ramp winch drum and raise the ramp.

(7) The ramp jacking lever may be operated manually to raise a ramp if the wire is not broken but the boat engine is inoperative.

d. Care of the LCM Ramp Assembly

Steps which should be taken by the LCM crew to keep the ramp functioning properly are essentially the same as the measures to be taken in maintaining the LCVP ramp as set forth on pages 5-6. In addition, the engineer must pay particular attention to the condition of the windlass and its clutch assembly.

e. Servicing the LCM Ramp Assembly

The procedure for servicing the LCM ramp assembly is as follows:

(1) Drop the ramp all the way down removing all strain from the ramp cable.

(2) Remove the ramp hoist cable from the ramp and from the windlass drum.

(3) Clean the ramp hoist cable, and check it for weak places including splices and the securing padeyes.

(4) Check the sheaves for the ramp hoist cable and ramp latch cable to see that they are free of rust, well oiled, and operate freely.

(5) Check and lubricate the ramp latch and safety chain or preventer fittings.

(6) Grease the ramp hoist cable and ramp latch cable where needed.

(7) Check ramp gaskets for wear and cracks. Renew the gasket where necessary. Gaskets are to be kept free of oil, grease, and paint.

(8) Disengage the ramp clutch control from the clutch shifting ring.

(9) Remove the windlass frame bolts and hold-down bolts from the Conway Multidisc clutch and reduction gear housing.

(10) Scrape, wire brush, and clean the entire windlass unit. Open all oil holes, and thoroughly clean all bushings.

(11) Grease all moving and contacting parts except

the clutch discs (these must remain dry).

(12) Check the multidisc clutch for the appearance of oil on the discs. If oil film is found on the clutch discs, or if they are found to be corroded or frozen, replace the discs.

(13) Renew the grease in the grease cups. Grease all zerk or alemite fittings.

(14) Check the gear oil in the gear housing. Add or renew oil as required.

(15) Reassemble the clutch and reduction gear housing and the windlass unit.

(16) Attach the ramp hoist cable to the windlass drum before securing the winch frame to the base. The portion of the ramp hoist cable which winds onto the windlass drum should be well greased.

(17) Reinstall all winch frame bolts and hold down bolts.

(18) Reconnect the ramp clutch control to the clutch shifting ring.

(19) Attach the ramp hoist cable to the ramp.

(20) Check the "V" belt on the port engine to the ramp winch for slippage. Adjust or replace the belt as necessary.

(21) Check to see that the jacking bar is in place for emergency manual operation of the ramp.

(22) Start the port engine and engage the ramp clutch control, alternately raising and lowering the ramp slowly.

(23) Check for binding of the cable, sticky sheaves, clutch slippage, cable slippage, and cable slippage on the windlass drum.

III. OTHER LANDING CRAFT

301. The LCPR

Although no longer being manufactured, a few LCPR are still in use in the fleet. Having lower freeboard than the LCVP or LCM, the LCPR is an excellent utility boat, still performing well in UDT work and in general in-port details. The LCPR once was used in salvage work, and some may still be employed as light tow boats.

The LCPR was formerly used for transporting troops in the ship to shore movement. It has a personnel capacity of 36 (plus a crew of 3), or a cargo capacity of 8,100 pounds. It is 36 feet in length with a beam of about 11 feet. Like the LCVP, the LCPR is powered by a single 225 HP Gray Marine Diesel engine which gives it a maximum speed of about 10 knots. Due to its tapering bow, small ramp, and lower freeboard, it is more maneuverable than the LCVP.

302. The LCPL MK I

This boat is used extensively in port as a barge, gig, or officers' motorboat. In amphibious operations, it is not used to carry troops but is used for control purposes such as boat group commander's boat, or a tender. The LCPL MK I has the same hull dimensions, power plant, and speed as the LCPR, but it is usually fitted with a permanent canopy. A slightly blunted bow and low freeboard combine to make it a very maneuverable boat.

303. The LCPL MK IV

This boat is the newest of the small landing craft and it is replacing the MK I in the fleet. It is a steel boat with a well designed hull, 36 feet in length with a beam of 11 feet. Although not intended

as a troop or cargo carrier, it does have a cargo capacity of 4,000 pounds. It is equipped with a 300 HP turbocharged diesel engine which gives it a maximum speed of 19 knots, making it by far the fastest landing craft. It is designed for use in amphibious control work and for light tow boat. The boat is equipped with a plastic canopy to be installed over pipe frames. Highly maneuverable, the MK IV is excellent for conventional boat purposes. Many of the parts in the MK IV's engine are interchangeable with those used in the Gray Marine installed in the LCVP, LCM, and LCPL MK I.

IV. CARE OF THE LANDING CRAFT HULL

401. The Maintenance Function of the Boat Crew

The hulls of both the LCVP and the LCM receive rough treatment in many operations. Breakers, stones, rocks, sandbars, collisions, and broaching all take a toll on these sturdy boats. They are built to resist such punishment, but they will last longer if they are handled intelligently.

To prolong the life of a hull and to keep it in good condition, there is no substitute for smart seamanship. In caring for the hull, "An ounce of prevention is worth a pound of cure." Every boat crew member should make a personal effort to avoid damage before it occurs and eliminate the need for costly repairs. Go alongside skillfully with your fenders out beforehand, not after two or three jarring bumps against a pier; hit the beach correctly.

Crew members can do much for the hull by preventive maintenance; that is, by locating and repairing minor damage before it becomes serious. The ramp hinges, for instance, may require attention, or ramp gaskets may require replacement. A steady accumulation of bilge water may indicate a leak; the magnetic compass mounting may be loose. A minute of work with a screwdriver may prevent a cleat or chock from being torn free when placed under a strain. Evidence of deterioration in the hull or fittings should always be noted and corrected.

Both wood and metal deteriorate rapidly unless protected from the "elements." It is better in the long run to keep your boat hull free of both rust and rot and well painted, than to wait until rust and rot make extensive repairs necessary. When fresh patches are installed in your boat's hull, be sure to paint over the repaired section as soon as possible.

Think before you paint! If you are to paint moving parts, make sure that the paint will not cause the parts to bind. Do not paint the threads on shackle pins, ramp gaskets, or LCM hatch gaskets. Always keep your boat clean and your fight against rust and rot will be much easier.

V. OPERATION OF THE LCVP AND LCM

501. General

The Gray Marine Diesel engine in landing craft is controlled by a combined clutch and throttle lever. The LCVP has one to the right of the steering wheel, and the LCM has one on either side of the wheel. With the clutch lever in the forward position, the engine is engaged ahead. With the lever in the after position, the engine is engaged in reverse. The middle position is "neutral." The throttle is controlled by turning the handle of the clutch lever clockwise to increase RPM and counterclockwise to decrease RPM. Turning the throttle handle fully counterclockwise will cut the RPM down to idling speed. For securing the engine, see paragraph 504.

502. Starting the Engine

Before starting the engine(s), the usual daily boat and engine checks should be made as described in Appendix D. Further, the equipment listed in Appendix C should be checked. When the coxswain is sure that all is in order, he is ready to start the engine(s).

The starting procedure for the LCM is identical to that for the LCVP, with the exception that it must be repeated for the second engine. (The engines are started one at a time.)

a. The normal starting procedure is as follows:

(1) Position the clutch control in "neutral."

(2) Set the throttle on idling speed.

(3) Press the starter button. Never use the starter for a period longer than 30 seconds. If the

engine fails to start, allow the starter to cool for 2 minutes before trying again.

(4) Engage the clutch control in either the ahead or astern position for warming up (boat must be tied up securely).

b. The cold weather starting procedure is as follows:

(1) Position the clutch control in "neutral."

(2) Open the throttle wide.

(3) Simultaneously, press the starter and heater buttons, and push in on the handle of the flame primer (all three must be pressed at the same time or serious engine damage may result). If pressure primer is installed in lieu of flame primer, position clutch in neutral and throttle at full speed. Load capsule into capsule firing chamber. Press starter and rupture capsule simultaneously. When engine starts, position throttle at engine idle speed. If the engine fails to start after 30 seconds, allow the starter to cool for two minutes, then try again.

(4) After the engine starts, throttle it down to idling speed and shift into either ahead or astern gear for warming up (boat must be tied up).

c. Warming up

The engine is warmed up with the clutch engaged (either ahead or astern). Do not run the engine in neutral for any length of time as this will cause the clutch plates to heat up and warp. Accomplish the following during the warm up period (never by-pass the warm up; it is essential to the life of your engine):

(1) Watching the tachometer, increase RPM to between 800 and 1,000 RPM (with clutch engaged).

(2) Maintain this RPM range until the water temperature gauge shows at least 130°.

(3) Meanwhile, check the following:

(a) Oil pressure: 40 to 50 pounds is normal. Except for very short periods, never operate the engine if the pressure falls below 20 pounds. 4 pounds pressure at idle speed is permissible.

(b) Oil temperature: Normal operating range is 180° to 215°.

(c) Battery charge: The ammeter readings will vary, but it should show about 16 to 18 amperes at 950 RPM. If the ammeter indicates no charge or if it shows a high positive reading for an extensive period, return to your unit for the assistance of the duty electrician.

(d) Sand traps: See that water is bubbling through on its way into the salt water cooling system. If it is not, check the strainers for cleanliness. It may be necessary to prime the salt water pump with sea water to gain sea suction. If this last measure is not effective, repair or replacement of the salt water pump will probably be necessary. (This can be accomplished while alongside the ship.)

(e) Bilge pump strainers: Clean them if necessary.

(f) Sea water exhaust: Check for flow of sea

water. Lack of water discharge through this "overboard discharge" indicates loss of sea suction.

Once the engine is warm (water temperature of at least 130°), do not let it continue idling. Shut it off until you are ready to leave the ship or dock by throttling down first, then shifting. (Always throttle down to idling before shifting gears.)

503. Operating the Engine

Although not a perpetual motion machine, the Gray Marine Diesel engine is a very reliable machine. Given the proper care in handling, proper warming up, proper lubrication, and proper amounts of fuel, cooling water, and air, it will last a long time and operate dependably. However, it will be up to the coxswain to keep his eyes and ears always open if the engine is to continue to give its best performance. While operating the engine, he must continually check the gauges to ensure that temperatures and pressures remain within the normal range. When leaving the side, avoid "race horse" starts. The landing craft is not renowned for its sprinting. Build up speed slowly and evenly, and bring it down the same way. Check the engine control rack occasionally to ensure that your boat is not set on "battle speed". This setting is to be reserved for amphibious operations: for that last 1000 yards down the boat lane when that extra speed is really needed. Battle speed is not to be used for in-port operations.

Remember! Before shifting gears, throttle down to idling speed; when you shift, shift all the way. That is, don't try to get a "slow ahead" by pushing only slightly forward on the clutch control. You'll damage the clutch plates.

The normal readings for your instrument dials are found in paragraph 502. You will notice that you have no fuel gauge on the instrument panel. Don't hesitate to make use of the fuel stick now and then, particularly if you "take over" the duty boat at noon. Presumably it was fueled by the crew before their first run that morning, but it never hurts to be sure.

504. Securing the Engine

a. The following procedure should always be carried out when securing the engine:

(1) Raise the engine cover (LCVP), or open the engineroom hatch (LCM).

(2) Run the engine at 800-1000 RPM with the clutch engaged until the water temperature drops to 130^{o}.

(3) Throttle down to idling speed, then place the clutch control in "neutral."

(4) Lift the throttle pin and turn the throttle handle to the "off" position. This shuts off the fuel.

(5) Check fuel and water lines for breaks or leaks.

(6) Make minor repairs as necessary.

505. Beaching and Retracting

Beaching and retracting LCVP and LCM call for skilled boat handling even in calm water. While operating in the bay, work hard to develop this skill at every opportunity. It will pay off when you start training in the surf.

a. Beaching

(1) In all beaching operations, keep the boat at right angles to the surf (not necessarily at right angles to the beach itself).

(2) Ride in to the beach on the back of the crest of the wave (it's harder to see the beach this way, but immeasurably safer).

(3) Drive the boat well up on the beach. If the boat isn't firmly beached, throttle down till a wave lifts the stern, then gun the engine(s) ahead.

(4) Run the engine(s) ahead with enough speed to keep the boat firmly beached at right angles to the surf.

(5) When you have been ordered to pick up a load at the beach, do not beach too high up on the beach because you will be carrying more weight when you retract.

b. Retracting

(1) Gun the engine(s) ahead as waves recede. This will clear out a trough through which to retract.

(2) Put rudder(s) amidships. In the LCVP, this can be done by running the engine about half-speed ahead.

(3) Line up the bow with an object on the beach. It will then be easier to note any swing of the boat's bow or stern soon enough to correct the movement and keep the boat at right angles to the surf.

(4) Keep the engine(s) going ahead to wash sand away from the stern until just before a wave comes in to give flotation to the stern; then, quickly shift into reverse gear accelerating

the engine(s) when you have flotation. Nearly always the boat will move back a short distance.

(5) When the wave recedes, slow the engine(s). This keeps the engine(s) from racing needlessly when the screw loses its bite in the water and prevents the rudder(s) and skeg(s) from digging into the sand (resulting in bent screw or rudder).

(6) Do not turn your rudder while backing until your boat is well clear of any existing sandbar. If your bow begins to swing and you have not yet retracted beyond the outer sandbar, hold your position away from the beach until the next breaker passes. Use rudder and engine ahead to correct the movement of the bow of an LCVP. When the LCVP is again at right angles to the surf, put the rudder amidships and resume backing down. If you are clear of all sandbars and the bow starts to swing, merely turn the wheel rapidly in the direction of the swing and continue to back down. This should bring the bow back into position. If it does not, stop and shift into ahead to correct the alignment before proceeding with the retraction. In the LCM, one engine can be kept astern and the other engine shifted to ahead to correct the bow movement with no fore-and-aft movement; the rudders of the LCM should not be used to correct bow movement unless the screw alone will not do so.

When the boat is again at right angles to the surf, resume backing with both engines until your bow begins to swing again. The engine going ahead on the side the bow is swinging toward, should stop the bow movement and correct the boat angle. If the bow movement cannot be stopped with screw going ahead, then the rudders should be used with the screw

going ahead, to correct the angle. The rudders should be returned to amidships as soon as angle is corrected.

(7) Once the boat is floating free, continue to back her at right angles to the surf until outside of the surf line. Slow down for each incoming breaker and take it with caution.

(8) When outside the surf line, wait until the boat is on the crest of a wave; then put the rudder over hard, shift into ahead, and accelerate the engine. This action will cause the boat to pivot quickly and take the next wave on the bow. In the LCM, this pivot can be made with one screw still backing. In this case, use the rudder to favor the "ahead" engine, and throttle up on the "ahead" engine. Remember! - ALWAYS clear the surf line before turning out to sea. Don't get discouraged if wind and seas keep throwing off your alignment with respect to the surf. Take your time. It's better to use up some extra energy in keeping that boat at right angles to the surf than to take the chance of having your boat flipped over by a breaker that catches it broadside.

506. Correcting a Broach

a. Broach Due to the Stern Swinging

While beached, if the stern begins to swing to the right or left tending to broach the boat, put the rudder over in the direction the stern is swinging, and speed up the engine(s) in the ahead direction to drive higher onto the beach. This should bring the stern back around. In the LCM, the engine on the side in which the stern is swinging can be backed, while the other engine is going ahead to expedite straightening up.

b. Broach Due to the Bow Swinging

If the bow is swinging to the right or left tending to broach the boat, put the rudder over in the direction opposite to the direction of bow swing, and drive higher onto the beach. In the LCM, the engine on the side opposite to the direction of bow swing can be backed, while the other engine is going ahead to expedite the maneuver.

c. Use of Anti-broaching Lines

When the boat shows the first tendency to broach, the bowhook and sternhook should be ready to cast off the bitter ends of the anti-broaching lines to members of the beach party as directed by the beachmaster. The rigging of these lines by the boat crew is accomplished as soon as possible after the boat has been lowered into the water.

d. Procedures When Salvage Assistance is Necessary

(1) If the boat is firmly broached well up on the beach and cannot come off under its own power, idle the engine(s) ahead, and ask the beachmaster for the assistance of a salvage boat.

(2) The bowhook and sternhook (or engineer) should then stand by to receive the towline from the salvage boat. Have boat hook(s) ready to catch the heaving line!

(3) In the LCVP, the eye of the towline or both legs of the bridle, if attached, are placed over the Samson post on the transom. In the LCM, a towing bridle must be fitted to both port and starboard quarter mooring bitts or cleats.

(4) Keep the engine(s) going ahead at half speed while being towed off the beach. This tends to dig a trough through which to retract. Keeping

a strain on the towline will help to keep the stern of the towed boat up so that it will not dig into the sand, and the towline will not be caught in the screws.

(5) As directed by the salvage officer, cast off the towline when out past the surf line.

507. Docking and Undocking

a. The LCVP

(1) The LCVP may be brought alongside a dock or ship as follows:

(a) Approach at an angle of 20-30 degrees with just enough speed to keep steerageway.

(b) When about one boat length away from the mooring position, put the rudder over to shear the bow out slightly. Have your fenders ready!

(c) Shift into reverse and throttle up engine, at the same time shifting the rudder to swing the stern in toward the ship or dock.

(d) Throttle down and shift into neutral. You should be in position. The coxswain should direct the use of lines and boat hook by the bowhook and engineer to assist him in final positioning of the boat. Don't forget the proper use of fenders!

(2) The LCVP may clear the dock or ship's side as follows:

(a) Turn the rudder toward the dock or ship.

(b) Gun the engine ahead very briefly. This will swing the stern out. Use your fenders!

(c) Cast off, place the rudder amidships, and back out watching carefully to ensure that the corner of the ramp does not "hang up" on any object, such as the accommodation ladder.

(d) When clear, throttle down, shift to ahead, and proceed. Stow fenders and coil down the lines.

b. The LCM

(1) The LCM may be brought alongside as follows:

(a) Approach at an angle of about 20 degrees with just enough speed to keep steerageway. (The inboard engine may be used for the approach if desired keeping the outboard engine idling in the forward gear.) Have your fenders ready!

(b) When about one boat length away from the mooring position, put the rudder hard over away from the dock or ship's side to swing the bow out.

(c) Reverse the outboard engine and throttle up on it to swing the stern in; then reverse the inboard engine as well to stop the headway and check the swing of the stern.

(d) Throttle down and shift into neutral on both engines. You should now be in position. The coxswain should direct the use of lines, fenders, and boat hooks by the bowhook and sternhook to assist him in final positioning of the boat.

(2) The LCM may clear the dock or ship's side as follows:

(a) Let go the stern line.

(b) Put the rudder over toward the dock or ship.

(c) Shift into ahead on the outboard engine and into reverse on inboard engine (be alert to order proper use of fenders and boat hooks). The stern should now swing out with very little throttling up being necessary.

(d) When the stern has swung out to the proper angle, put the rudder amidships; cast off the bow line and back both engines (watching carefully to ensure that the ramp does not "hang up" on an object such as the accommodation ladder).

(e) When clear, shift into ahead on both engines or first on the inboard engine, and proceed. Stow fenders and coil down lines, and station the bow lookout.

c. Use of the Sea Painter Alongside a Ship

(1) With the ship at anchor: Boats may be warped alongside by backing down slowly with the sea painter on the inboard forward cleat, at the same time turning the rudder toward the ship. Enough sternway should be maintained in order to hold the boat in position alongside.

(2) With the ship underway, boats may be warped alongside by slowing until being towed by the sea painter which is secured to the inboard forward cleat, then turning the rudder toward the ship to sheer in and come alongside.

508. Anchoring

The anchor line, with its 10 foot length of anchor chain connected, is kept coiled down in the sternsheets of the LCVP and in the lazarette of the LCM.

In the LCVP, the anchor is stowed between the frames on the starboard side of the engine housing; in the LCM, it is usually stowed in special brackets on the side of the pilothouse. All that remains to be done to ready the anchor for use is to connect the bending shackle (already bent on to the chain) to the anchor. This bending shackle should be inspected periodically to ensure that the shackle pin turns freely. The eye in the anchor line should be fitted with a thimble to prevent the shackle from chafing and wearing through the eye when the anchor is in use. If available, an anchor buoy is secured to the anchor prior to dropping. The anchor buoy marks the position of your anchor.

a. Use of a Stern Anchor

(1) Drop the anchor over the stern, allowing about 7 feet of line for each foot depth of water. Avoid fouling the screws with the line. With the proper amount of line payed out, secure the line to the Samson post or quarter mooring bitt.

(2) To raise the stern anchor, back slowly toward the anchor; at the same time, haul in the line carefully, avoiding any slack that might foul the screw(s). When the line is straight up and down, the coxswain shifts to "neutral," and the other members of the boat crew haul in the anchor.

b. Use of a Bow Anchor

(1) Head the boat into the wind until you lose all headway. With the anchor at the stern, lead the line along the deck to a forward bitt or cleat. Take a running turn around the fitting, then signal for the man standing by the anchor to drop it over the side. When the proper amount of line is payed out, the boat will ride into the wind.

VI. THE BOAT GROUP AND THE SHIP TO SHORE MOVEMENT

601. The Boat Group (Administrative)

When we speak of a ship's boat group, we are referring to the ship's allowance of boats, the crews who are assigned to man them, and the officers and petty officers necessary to administer them. The senior of these officers is usually assigned the billet of boat group commander. He is at all times responsible for the training and activities of the men in his boat group and the material condition and operations of the boats assigned to the boat group, whether they be on in-port boat runs or on amphibious operations.

602. The Boat Group (Tactical)

When we speak of a boat group with respect to an amphibious operation, we are using the term in its tactical sense. This meaning of "boat group" denotes the basic organization of landing craft used to transport a battalion landing team (BLT) in a ship to shore movement from the attack transport in which the BLT has been embarked to a hostile shore.

The landing craft which compose this boat group are those assigned to the assault transport in which the BLT has been embarked, plus a number of other landing craft from other amphibious shipping anchored in adjacent anchorages.

This boat group lands the BLT in waves of boats and is commanded and led in to the beach by a boat group commander who usually is the boat group commander (administrative) of the assault transport in which the BLT was embarked. The boat group commander is assisted in his control of the boat group by an assistant boat group commander and a boat wave commander for each boat wave.

The number and types of landing craft in a boat group varies with the number and strength of the elements in the assault infantry battalion. Approximately 40 LCVP and 6-8 LCM are usually required.

Amphibian vehicles (LVT and DUKW) are a part of the Landing Force (troops). However, when employed in the ship to shore movement, they are, while waterborne, technically a part of the boat group and Attack Force (naval) and are therefore subject to naval control. Usually the first few waves to land over each beach are composed of amphibian vehicles: usually LVTH, LVTA, or LVTP-5. When LVT are employed, the number of landing craft required in the boat group is reduced. Amphibian vehicle wave guide officers, subordinate to the boat group commander and in communication with the control officer in charge of the landing over that particular beach, provide navigational assistance to the wave commanders of the LVT waves. Amphibian vehicles assigned to the initial assault waves are usually carried to the objective area in LST and LSD.

After the scheduled waves have landed in the ship to shore movement, the boat group as an organization is dissolved. During the unloading phase which follows, it may be advisable, at night or in low visibility, to retain loaded boats at the loading ship and send them to the beach as a group or waves with an officer in charge.

603. Boat Group Commander

The discussion henceforth will relate to the tactical organization of the boat group rather than the administrative. The boat group commander covered here will be the one responsible for leading the boat group in a landing over a numbered beach (e.g., RED-1, BLUE-2). If the dispersed concept

is used and a BLT lands over a colored beach which is not divided into two boat lanes, he will be responsible for the landing over a colored beach.

The boat group commander is in command of his boat group from the time the boats and amphibian vehicles are placed in the water (or report to his ship in the case of boats assigned to the boat group by ships other than the assault transport for that particular beach) until the last organized wave of the boat group has landed. There will be a separate boat group commander for each numbered beach (or colored beach, when using the dispersed concept).

The boat group commander (BGC) is embarked in a fast boat (preferably an LCPL). His boat carries the following in addition to the regular boat equipment and crew:

Equipment:

Two portable radio sets
One portable signal (Aldis) lamp
One set of semaphore flags
Two heaving lines
Electric hand lantern, and two flash lights with lucite wands
One ZERO flag, and BEACH flag on a staff
Pair of binoculars
Portable loudspeaker, electric
Hand megaphone
The best compass available
Radar reflector
Wake lights and NANCY beacon (for night or low visibility operations)

Personnel:

Signalman
Radioman
Extra deckhand

The boat group commander's boat is the first to be lowered on receipt of the signal "Land the Landing Force," and displays the ZERO flag over the appropriate beach flag on a staff when such display will not draw hostile fire.

With the aid of the assistant boat group commander, he controls the movement of all boats after they are lowered from the transport and arrive from other ships. He ensures that boats join the proper assembly circles, that these assembly circles maintain their proper position relative to the ship as the ship swings or moves, and that boats leave their assembly circles promptly when called alongside for debarkation of troops (see Chapter VII).

After the initial wave of boats is loaded, the boat group commander leads it to the rendezvous area. There he supervises the wave commanders in the formation of the wave circles and in the maintenance of their proper position relative to the parent ship or the sector dispatching ship. He usually leads the first boat wave to the beach in accordance with the Approach Schedule, turning off just short of the surf line to supervise the landing of subsequent waves. After the last scheduled wave on his beach has landed, the boat group commander becomes the traffic control officer off the beach where his group has landed (see Chapter XI).

604. Assistant Boat Group Commander

The assistant boat group commander (ABGC) will be embarked in an LCPL, LCVP, or LCPR. This boat will carry the following, in addition to the regular boat equipment and crew:

Equipment:

150 fathoms of 5" manila or 3-1/2" nylon line

One line throwing gun
Three heaving lines
Two portable radios
One portable loudspeaker, electric
One hand megaphone
WHISKEY, SIERRA, and BEACH flags with staff
Pair of binoculars
Compass (the 2nd most reliable)
Radar reflector
Wake lights and NANCY beacon (for night or low visibility operations)
One portable signal (Aldis) lamp
Two boat hooks and extra fenders
Repair parts and engine spares
3" Wisconsin salvage pump and hose
Three buckets; bag of wood plugs
Battery jumper cable 22' in length
Wire bridle, 1/2", or 5/8" wire, Legs approximately 15' long, with swivel
Manila bridle, 4-1/2", legs 10' long, with swivel
Fid and marlinespike for line repair
Buoy for tow line (ammo case)

Personnel:

Signalman
Radioman
Electrician
Engineman
Hospitalman
Boatswain's Mate (Salvage rigger)
Extra deckhand

The assistant boat group commander, under the direction of the boat group commander, is responsible for keeping assembly circles organized, closed up, in proper location in relation to the ship, and maneuvering at the slowest speed practicable.

The assistant boat group commander expedites boats leaving the assembly circles, loading at and clearing from debarkation stations, and proceeding to the rendezvous area.

The assistant boat group commander should be alert to assist boats in need of repair in the immediate vicinity of the ship and should dispatch the salvage boat to assist those boats more distant. While engaged in a salvage effort, the assistant boat group commander should remain always in the vicinity of the ship.

The assistant boat group commander should be prepared to assume the boat group commander's duties in event of the absence or incapacity of the latter.

The assistant boat group commander usually assists in organizing the trailing boat waves and conducting them to the beach.

The assistant boat group commander is responsible for rendering salvage, fire fighting, and medical assistance to the boats of his boat group during the assault. He ensures that disabled boats are towed back to their parent or other designated ship; however, salvage operations are not to be allowed to hinder the assault.

The assistant boat group commander's boat displays the WHISKEY flag over the appropriate beach flag when such display will not draw hostile fire.

After the last assault wave has landed, the assistant boat group commander becomes the beach salvage officer and operates under the orders of the beachmaster. Additional assigned salvage boats operate under the supervision of the beach salvage officer. The beach salvage officer flies the WHISKEY flag; other salvage boats fly the SIERRA flag.

605. Boat Wave Commanders

The boat wave commander, under the supervision of the boat group commander and his assistant, is responsible for organizing his boat wave and conducting it to the beach. He may be preloaded with his radio (at the rail) or he may debark over the debarkation net with the first boat team of his wave. He places his wave number flag under the appropriate beach flag on a staff in the boat so that it is clearly visible to the other boats of his wave. He sends maneuvering orders to the boats of his wave by means of hand signals or semaphore in daylight, flashlights fitted with lucite wands at night (see Appendix E).

The boat wave commander's boat is usually located at the apex of a wedge formation, the lead in a column formation, and in the center of a line abreast (right center if a wave has an even number of boats).

Primary duties of the wave commander are: organizing his wave in the rendezvous area; leading it to the line of departure and to the beach in formations prescribed; controlling the speed and course of the wave in accordance with the Approach Schedule and grid positions received from the Primary Control Ship; general supervision over boats assigned to his wave until the wave is disbanded, or, if directed by the operation order, resuming control of his boat wave after retraction, and leading it as a wave back to either the Primary Control Ship (PCS) or the Secondary Control Ship (SCS) at the LOD.

The boat wave commander guards the Boat Common net until he reaches the rendezvous area with his wave; at this time he reports to the Primary Control Ship, on the Boat Control net, that his wave is present in the rendezvous area. (The operation

order may call for him to shift to the Boat Control net at some time other than at the rendezvous area and report to an approach lane marker ship prior to reporting to Primary Control.) He will guard the Boat Control net until the first boat of his wave beaches, at which time he will shift back to the Boat Common net. Unless otherwise directed by the operation order, he will report the "touch down" of his wave to Primary Control on the Boat Common net.

As preceding waves depart for the LOD from the rendezvous area, the boat wave commander must reorient his wave to occupy the space formerly occupied by the wave with the next lower number. At the scheduled time for the departure of his wave from the rendezvous area, his wave should be circling in the water formerly occupied by the first boat wave.

606. Amphibian Vehicle Wave Guide Officers

Wave guide officers are embarked in wave guide boats (usually LCPL or LCVP) to guide amphibian vehicles in the ship to shore movement. It is desirable to have two wave guide boats for each wave of amphibian vehicles: one for the wave guide officer and one for the assistant wave guide officer. The wave guide officers should be equipped with a radio to communicate with other wave guide officers, the boat group commander, and the primary control officer. Wave guide boats will display the appropriate beach flag over their wave numeral flag.

The wave commander of the amphibian vehicle wave is an officer of the troop organization of which the vehicles are an organic part. He is embarked in one of the vehicles in his wave. During the period the amphibian vehicle wave is waterborne, it is subject to the orders of the naval control organization.

The wave guide officer will assist in the formation of the vehicles into waves as they are discharged from the carrier (LST or LSD) in the immediate vicinity of the LOD. The vehicles will be led by the wave guide officer into a "maneuver area" immediately to seaward of the LOD where they will maneuver, in column, following a rectangular path until time to form up for crossing the LOD. The wave guide officer will lead them in a column on a course parallel to the LOD. At the proper time, he will direct a flank movement which will leave them in line abreast. They will cross the LOD in this formation.

The wave guide officer will bring the wave to the LOD on time in order to cross the LOD on schedule. He will ensure that his wave is complete and properly formed and report to the primary control officer when ready to be dispatched.

He will report any casualties and causes for delay to the Primary Control Officer with an estimate of the time required to complete repairs. In the event of delay in the scheduled time for crossing the LOD, he will supervise the maneuvering of his vehicle wave in the maneuver area to seaward of the LOD.

When dispatched by the primary control officer, the wave guide officer will lead his wave across the LOD and to the beach. He will remain with his wave until reaching a point just to seaward of the surf line where he will turn off, allowing the vehicles to proceed on in. He should exercise care at this point not to use excessive speed and create a large wake which will be hazardous to the vehicles.

He will have due regard for the grid positions received from the primary control officer, to the end that his wave will hit the proper beach at the scheduled time. He will notify the wave commander

of any straggling or poor distance-keeping of the vehicles.

After his vehicle wave has hit the beach, he will take station on the designated flank of the boat lane to rally returning vehicles and guide them to a transfer line or transfer area (if such areas and procedure are required by the operation order).

Wave guide boats will take station, in accordance with one of the following as specified in the operation order: (1) one on each wave flank, or (2) one about 50 yards in advance of the center of the wave, and one to the rear of the center.

VII. DEBARKATION

701. General

When the order "Away All Boats" is given, the assault transports, anchored off the beach in the transport lanes, lower away their assault craft. Those boats which were rail-loaded with troops before launching are directed to a forward assembly circle for formation into a wave, and then they are dispatched to the rendezvous area. The wave commander will lead his wave to their rendezvous area. Boats not preloaded with troops will proceed to assembly circles as shown in Diagrams II and III to await being called alongside a debarkation station to pick up troops and equipment. The Boat Group Commander (and Wave Commander when preloaded) keep the boats in the proper assembly circles, moving at speeds to maintain steerageway, and in a tight circle. Each crewmember should be alert for a signal to leave the assembly circle and go alongside for loading. The boat nearest the transport at the time of sighting the signal is the one that pulls out of the circle to come alongside. Several boats may be called simultaneously from the same circle, in which case the required number of boats will leave the circle individually as they reach the "pull out" position.

Boats arriving from other ships will receive their orders from the bridge of the assault transport. The debarkation control officer will direct them to the appropriate assembly circle. The boat group commander and assistant boat group commander will supervise to ensure orderly movement within the assembly circles and prompt action to go alongside for debarkation when signalled.

While the boats are joining up and moving in assembly circles, the boat crews will be readying their boats for the landing: rigging their splash-

boards and antibroaching lines, unrigging the slings, clearing the well deck of all gear, and checking each other for proper battle dress (helmet straps fastened, all lifejacket tie-ties tight, sleeves rolled down and buttoned, and pant legs tucked in socks). The ramp window may be left open for better visibility until just before reaching the LOD.

As soon as the boats are lowered, debarkation station personnel rig debarkation nets and hand rails at their stations and check to ensure that all steadying lines and handling lines are on hand. In addition, they rig a sea painter at each station, of the proper length to fit the first landing craft to be called to that station (the length of the sea painter appropriate for the LCVP will not be proper for the LCM). Ball fenders are also rigged at the forward and after ends of the net at a height such as to bear on the boat hull.

As the individual boat approaches the debarkation station, the net tenders on deck on the ship haul up on the net retrieving lines until the net is clear of the boat. The bowhook places the sea painter on the forward inboard cleat. The debarkation net is then lowered into the boat and the bowhook and engineer (or sternhook in LCM) tuck the end of the net under and pull out on the net to keep it taut.

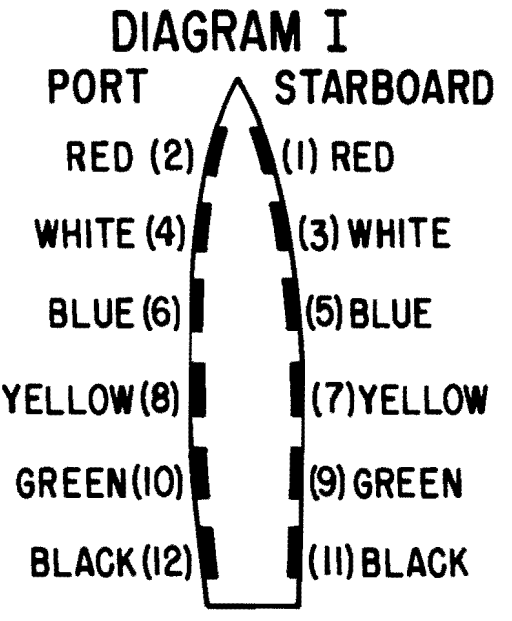
When ordered by the debarkation station officer, troops commence debarkation in groups of four. The spacing between groups should be such that twelve men are on the net at all times: four at the top, four half-way down, and four at the bottom, just boarding the boat. After the first four have boarded the boat, they relieve the crew members in handling the net. Troops use the vertical lines in the net for hand holds and the horizontal lines for their feet; thus, stepped on hands are kept to a minimum.

Simultaneously with troop loading, the boat paddle and extra equipment are passed down to the boat by means of hand lines. The bowhook places the boat paddle in the bracket provided in the bow of the boat. While alongside, radio antennas (and NANCY beacons when used) should be unrigged to avoid damaging them.

When the boat is loaded, the debarkation net is retrieved (to clear the boat). The debarkation station officer will then give the coxswain orders as to his destination. This will be usually to an assembly circle on the bow where he will join with the rest of his wave before proceeding to the rendezvous area. The coxswain will then order the bowhook to cast off the sea painter. He will then expedite clearing the side and stowing his fenders. For identification of boats in a wave by means of their boat paddles, see Chapter XIII.

702. Debarkation Stations

These are designated by a color and a number as shown on the following diagram:



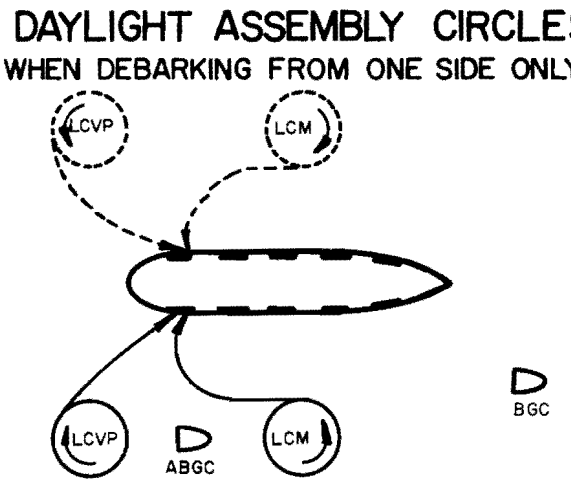
NOTE: USS PAUL REVERE (APA-248) and USS TULARE (AKA-112) have BLACK stations; all other ships have ten stations or less.

703. Assembly Circles

a. During Daylight (High Visibility)

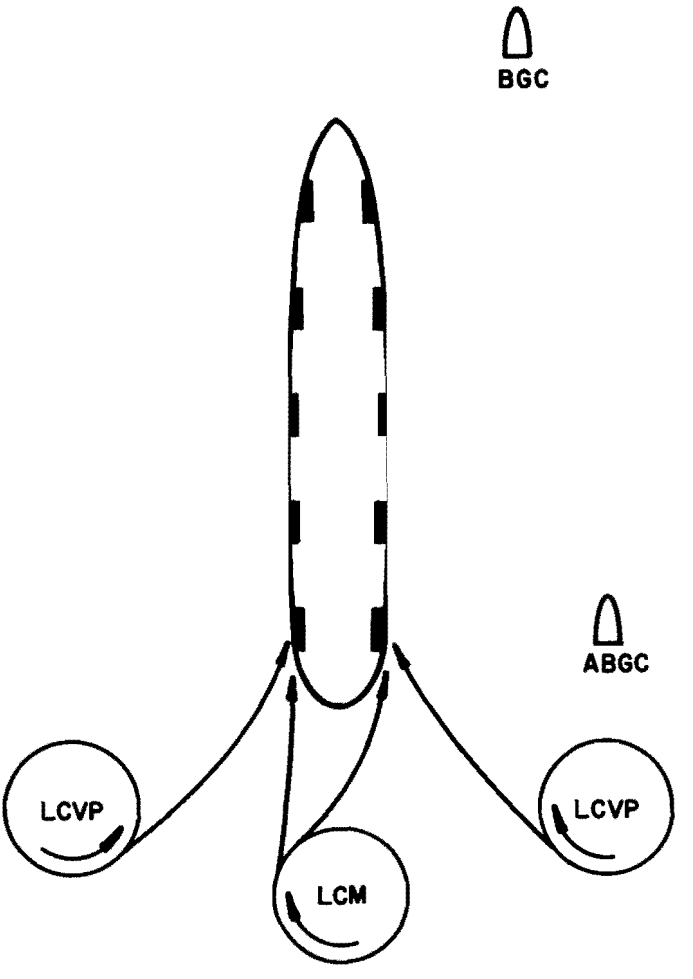
During periods of high visibility, boats will form in assembly circles, as indicated in the following diagram, as soon as they are launched (circles are 250 yards from ship):

DIAGRAM II



Debarkation from starboard side only is indicated by solid lines; from port side only by dotted lines.

WHEN DEBARKING FROM BOTH SIDES:

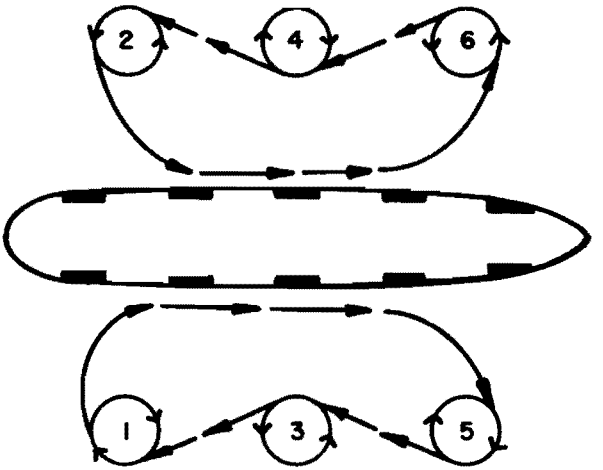


b. During Low Visibility

During periods of low visibility, boats will form in assembly circles by waves, as soon as launched, as indicated in the following diagram (assembly circles are to be located close aboard for visual contact with parent vessel):

DIAGRAM III

LOW VISIBILITY ASSEMBLY CIRCLES



Waves are called alongside one at a time for debarkation. Succeeding waves make a "figure 8" and take the station vacated by preceding wave. Additional waves follow the same pattern.

704. Debarkation Signals

a. During Daylight (High Visibility)

(1) The following signals are flown at the debarkation signal station (usually the after signal station) to call boats from assembly circles to debarkation stations during daylight:

Flag	Type Called
LIMA Flag	LCPL
PAPA Flag	LCVP
ROMEO Flag	LCPR
THREE Flag	LCM(3)
SIX Flag	LCM(6)
EIGHT Flag	LCM(8)

(2) Example of hoist: If the debarkation control officer desires a LCM(6) at BLUE and GREEN debarkation stations on the port side and a LCVP at RED and BLUE stations on the starboard side, he orders the following hoists:

(a) SIX over BLUE over GREEN on port halyard.
(b) PAPA over RED over BLUE on starboard halyard.

b. During Low Visibility (Night)

(1) During low visibility, debarkation is accomplished by calling an entire wave alongside at one time rather than calling boats individually. To carry out this method, individual boats within each wave must be assigned a particular debarkation station.

(2) Each wave is called alongside by screened directional light flashes (GREEN to starboard, RED to port). To ensure that there is no mis-

understanding, the number of flashes is to correspond to the number of the wave being called.

(a) Examples: 3 GREEN flashes call boats of wave 3 to starboard debarkation stations. 2 RED flashes call boats of wave 2 to port debarkation stations.

c. Loudspeaker equipment may be used for calling boats alongside the transport debarkation stations. It provides an excellent supplementary means of communications with the boats. In night operations, loudspeaker equipment is essential for control of boats.

705. As waves are loaded and formed up, they are led by the boat group commander to the rendezvous area; the individual wave commanders direct the maneuvering of boats within their waves. Generally, the waves are in column formation for the movement to the rendezvous area.

VIII. THE RENDEZVOUS AREA

801. General

a. Use of a rendezvous area will generally be prescribed in the operation order for ship to shore movements other than those conducted in daytime low visibility operations (where the low visibility is a result of fog, rain, snow, etc.). In the latter case, waves will usually be held at the loading ship and dispatched together to the LOD direct.

b. The rendezvous area is usually located at a distance of from 500 to 1000 yards from the assault transport or sector dispatching ship in the direction of the line of departure (LOD).

802. Arrival in the Rendezvous Area

a. The boat group commander, leading the first boat wave to the rendezvous area, is positioned by the CIC of the assault transport in the rendezvous area utilizing the Boat Common net.

b. Upon arrival of individual waves in the rendezvous area, the boat wave commander of each wave shifts from Boat Common net to the Boat Control net and reports his wave is present, and in the rendezvous area to the primary control officer.

c. The boat group commander, assisted by the assistant boat group commander, is responsible for maintaining the boat waves in their proper positions in the rendezvous area and preventing their drifting due to wind and current. Occasional vectors from the CIC of the assault transport may be necessary to accomplish this. In the rendezvous area, boat wave commanders form their waves into circles; odd numbered waves circle clockwise; even numbered waves circle counterclockwise. The waves may be aligned either parallel or perpen-

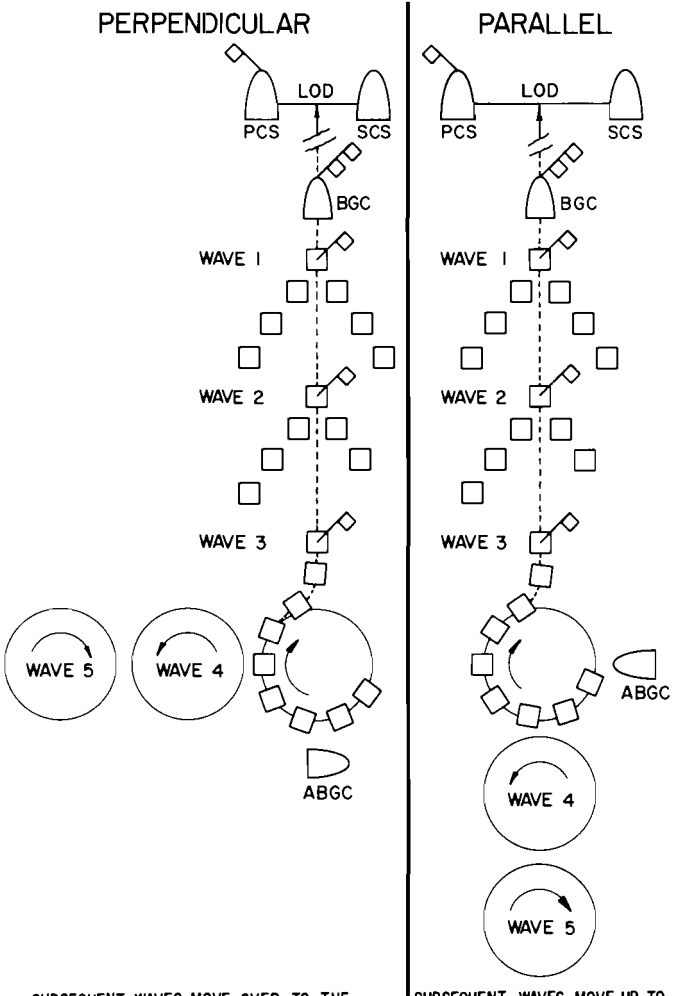
dicular to the approach lane leading to the LOD. The choice of these procedures will probably be indicated in the operation order. Regardless of which alignment procedure is used, as waves move out of the rendezvous area toward the LOD in accordance with the approach schedule, subsequent waves should move up (or over) to occupy the spaces occupied by the preceding waves. However, they will retain their original direction of rotation (based on whether their wave number is odd or even).

803. Departure from the Rendezvous Area

a. The boat group commander will lead boat waves from the rendezvous area with wave commanders forming their waves first into column, then, when clear of the rendezvous area, into wedge formation. The departure of waves and the two methods of wave alignment in the rendezvous area are shown in the following diagram:

DIAGRAM IV

RENDEZVOUS AREA



SUBSEQUENT WAVES MOVE OVER TO THE RIGHT TO OCCUPY THE SPACES FORMERLY OCCUPIED BY PRECEDING WAVES.

SUBSEQUENT WAVES MOVE UP TO OCCUPY THE SPACES FORMERLY OCCUPIED BY PRECEDING WAVES.

IX. THE APPROACH TO AND DISPATCH FROM THE LOD

901. Rendezvous Area to the Line of Departure (LOD)

a. The first wave of boats usually follows the boat group commander when he departs for the LOD, using the wedge formation.

b. In good visibility, the second and succeeding waves follow at the interval indicated on the approach schedule.

c. During periods of low visibility, boat waves may proceed directly to the LOD without utilization of the rendezvous area or in accordance with the operation order. Prior to reaching the LOD the wave commander will shift his wave into a closed wedge formation with himself at the apex, maintaining approximately 25 yards spacing between boats, and proceed down the boat lane toward the beach. When approximately 1000 yards from the beach the wave commander will form his wave into a line abreast formation using the normal 50 yard interval between boats and proceed at battle speed into the beach.

d. During periods of darkness a rendezvous area may be utilized for individual waves. To proceed from the rendezvous area to the LOD and then to the beach waves should be formed into a wedge formation utilizing the same procedure as for low visibility.

e. Prior to reaching the LOD ramp windows will be closed in the LCVP. Flags and wave paddles will be taken down, and unnecessary personnel will remain out of sight upon crossing the LOD. This is not to relieve the bowhook of his function of bow lookout. He should carry out this duty until just before the boat touches down, exposing himself as little as possible.

902. Control Ships at the LOD

a. Control ships have Control Parties and their respective Tactical Logistics Parties (TacLog) embarked during the ship to shore movement. APD, LSD, and LST are used for this purpose. They are equipped with efficient navigational and communication equipment to guard assigned channels and handle all necessary visual traffic. They are large enough to comfortably accommodate the above parties.

b. A primary control ship is assigned to control the landing over each colored beach (e.g., RED beach, BLUE beach). The primary control officer who is embarked may be assisted by one or more secondary control officers embarked in the secondary control ships (also APD, LSD, or LST). This assistance is especially desirable when the beach is a Regimental Landing Team (RLT) Beach composed of two numbered BLT boat lanes (e.g., RED-1, RED-2, or BLUE-1, BLUE-2). For a BLT beach (single lane colored beach), the primary control ship will be anchored on one flank of the LOD with the secondary control ship (a buoy or landing craft when no secondary control ship is assigned) anchored on the opposite flank. With control over an RLT beach, the primary control ship will normally be located in the center of the LOD (separating the two boat lanes), and the secondary control ships located on the outer flanks of each boat lane.

c. Duties of the Primary Control Ship

(1) Display a solid color flag (or a single steady light at night) corresponding to the color of the beach. The light is to be directed seaward until H-hour at which time the light will become an all around light.

(2) Take station on the LOD well in advance of H-hour. (H-hour is the time the first wave of amphibian vehicles is scheduled to touch-down).

(3) Drop marker buoys or station a marker boat on the flank(s) of the LOD if secondary control ships are not available for this purpose.

(4) Dispatch scheduled waves to the beach in accordance with the schedule contained in the operation order.

(5) Advise Central Control Officer or Attack Force Commander of any circumstances that will delay H-hour.

(6) After all scheduled waves have been dispatched, dispatch all subsequent boating according to plan or as requested by proper authority.

(7) Dispatch empty boats to transports in types and numbers as required to offload serials in accordance with the Landing Sequence Table.

d. The secondary control ship should be prepared to relieve the primary control ship at any time. The secondary control ship will frequently be assigned duty as a boat haven.

903. Procedure for Dispatching Waves from the LOD

The following procedures will be employed by the primary control ship in the dispatch of scheduled waves from the LOD.

a. By Day:

(1) Numeral ONE flag is hoisted at the dip (meaning: Wave 1 is scheduled to cross the LOD in 5 minutes).

(2) Numeral ONE flag is closed up (meaning: Wave 1 is scheduled to cross the LOD in 2 minutes).

(3) Numeral ONE flag is hauled down (meaning: Wave 1 should now be crossing the LOD).

(4) All succeeding waves are given only the "two minute standby"; that is, their numeral flag is not raised at the dip but is closed up two minutes before they are scheduled to cross the LOD, and hauled down when they should be crossing the LOD. However, knowing the time interval between waves, each wave commander can use the signals intended for the preceding wave as a "time check" for his own wave and ensure that they arrive at the LOD for dispatching on time.

b. By Night:

(1) At departure time minus 5 minutes, a steady RED light will be displayed in the direction of the approaching first wave for a period of 30 seconds.

(2) At departure time minus 2 minutes, a steady AMBER or ORANGE light will be displayed in the direction of the first wave for a period of 30 seconds.

(3) At departure time minus 1 minute, a flashing BLUE light will be displayed in the direction of wave 1 for a period of 50 seconds, followed immediately by a steady BLUE light of 10 seconds duration, the end of which will be the signal of execution.

(4) When the steady BLUE light is extinguished, the first wave should be crossing the line of departure.

(5) For second and subsequent waves:

(a) At departure time minus 2 minutes, an ORANGE or AMBER light will be displayed in the direction of the approaching wave for a period of 30 seconds, flashing the number of dashes equivalent to the wave number.

(b) At departure time minus 1 minute, a BLUE light will be displayed in the direction of the wave, flashing the number of dashes equivalent to the number of the wave for a period of 50 seconds, followed immediately by a steady BLUE light of 10 seconds duration, the end of which will be the signal of execution.

(c) When the steady BLUE light is extinguished, the appropriate wave should be crossing the LOD.

c. Use of Voice Radio

Voice radio is used to parallel each of the foregoing methods of dispatching. The wording used by radiotelephone over the Boat Control net will be that of the first method (e.g., "ONE flag at the dip," "FOUR flag close up," "SEVEN flag hauled down").

X. BOAT CONTROL AND THE GRID REFERENCE DIAGRAM

1001. General

a. The primary control ship will control each wave from the LOD to the proper beach by following the waves on radar, plotting them, and giving the amphibian vehicle wave guide officers and boat wave commanders "grid posits" (and vectors when necessary) by radiotelephone on the Boat Control Net, or visually, by semaphore or flashing light.

1002. The Grid Reference Diagram

a. The grid diagram is an approximate picture of the boat lane from the LOD to the beach. Longitudinal lines in the reference system divide the lane into three sections (L-Left, C-Center, and R-Right) (see Diagram V). The L (left) and R (right) sections are each twice the width of the C (center) section. Lateral lines at 200 yards intervals are numbered to indicate the distance to go in hundreds of yards. The area outside the boat lane is indicated by a double letter: LL to the left and RR to the right.

b. The gridded boat lane diagrams are distributed to boat group officers and are used for plotting the progress of the boat waves in the CIC of the primary control ship. The CIC of the secondary control ship should also be maintaining a plot of the waves in the event that the secondary control officer should have to take over control of these waves because of casualty to the primary control ship.

c. Upon departure of each boat wave from the LOD, the CIC of the primary control ship tracks the wave by radar (using visual bearings when obtainable) and plots its position on the grid. A

separate grid is used for each wave. A "grid posit" is then transmitted over the Boat Control net (or by flashing light) to the wave commander. In addition to the position, the "grid posit" will be supplemented with vectors and "early" or "late" information if necessary. This information is arrived at by CIC by comparing the wave's plotted (actual) position with its "scheduled" position (where it should have been at that instant). The wave commander upon receipt of the "grid posit" changes the course and/or speed of his wave as indicated by the information received. If "early," he should slow down; if "late," he should speed up; if "Romeo" (right), he should steer further to the left; if "Lima" (left), he should steer further to the right; if "Lima Lima" (outside the boat lane to the left), he should steer quite a bit to the right of his present course. A new vector (magnetic course to steer) from the primary control ship would be appropriate in this case.

d. A grid position is normally transmitted to each wave every thousand yards (more frequently if necessary). Each wave must be notified when it is 1,000 yards from the beach. This is the point at which speed is increased to "battle speed."

e. Grid positions transmitted will be preceded by the wave number, color of beach, and beach number (if any) in that order (e.g., to call the wave commander of the 3rd wave to land on Beach GREEN-TWO, the call "Three GREEN Two" would be used). The grid position may be followed by "early" or "late" information or vectors if required (vectors should be used only when other orders are failing to produce the desired results).

f. Sample Grid Posit Transmissions (Radiotelephone):

FOUR RED GRID POSIT LIMA THREE TWO EARLY ONE AND A QUARTER (meaning: Wave 4 on RED Beach; you are in the left side of the boat lane, 3,200 yards from the beach, and are 1-1/4 minutes ahead of schedule).

SEVEN RED ONE GRID POSIT ROMEO ROMEO TWO FIVE LATE ONE HALF VECTOR LEFT TEN (meaning: Wave 7 on Beach RED-1; you are outside of boat lane to the right, 2,500 yards from the beach, and 1/2 minute behind schedule. Alter course 10 degrees to the left of present course).

g. Visual Grid Posit Procedure:

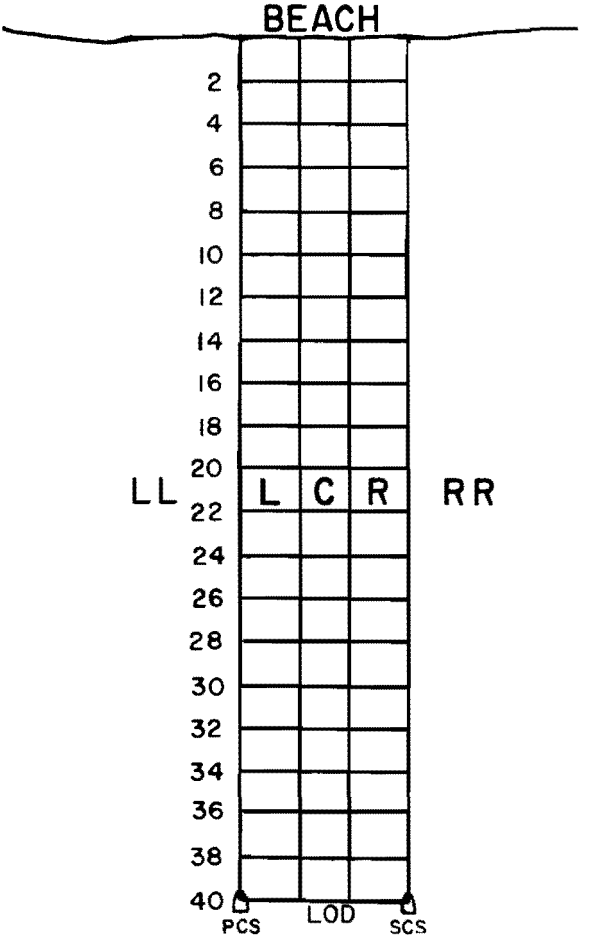
(1) Visual grid positions (by flashing light or NANCY) will normally be preceded only by flashing the wave number as a call. However, if confusion would result by transmissions being projected into different numbered boat lanes or into different colored beach lanes, it will be necessary to modify the call accordingly. For example, to call the wave commander of Wave Three on Beach BLUE-2, the normal call-up would be ". . . --". If confusion resulted, it would be necessary to transmit the complete call ". . . -- BLUE . . ---". The control ship, after establishing communications with the wave commander (receiving a "T"), transmits the grid position. The wave commander should receipt for each group by flashing a "T" (-) with his signal equipment, and "R" (.-.) for the entire message on its completion.

(2) Sample Visual Grid Posit:

GP LL30 T31 SSSS VR 10 (meaning: You are outside of boat lane to the left, 3,000 yards from the beach at time 31. Speed up; you are late. Alter course 10 degrees to right of present course).

DIAGRAM V

GRID REFERENCE DIAGRAM



XI. TRAFFIC CONTROL

1101. General

a. After the assault waves have landed, the boat group is usually dissolved, and empty boats are assigned individually to ships, for further unloading, by the primary control officer. The boat group commander then becomes traffic control officer of that beach, operating under the primary control officer in cooperation with the beach party commander. Following the landing of the assault waves, the primary control officer dispatches the on-call waves (bearing serial paddles) on request of the TacLog Party. Some on-call waves, such as those composed of division elements, may be ordered to report to the central control officer. He dispatches them to the designated primary control officer, when requested by the division commander through the division TacLog Party, for further dispatch to the beach. The landing of floating dump supplies will usually begin after the landing of the last scheduled wave and continue for an unspecified period. Floating dump supplies are dispatched to the proper beach by the primary control officer when requested by the appropriate troop commander. The shore party commander is informed of the supplies to be landed. When the landing craft arrives at the beach, it is unloaded by the shore party and returns to its parent ship or other designated ship to replenish its load and return to the floating dump area.

b. Initial unloading of supplies will commence when requests are initiated by the landing force to land supplies and build up beach dumps to prescribed levels. The shore party group commander initiates requests for the landing of required supplies to the appropriate TacLog group. The TacLog group locates the requested supplies and advises the control officer of the location. If supplies are

in the floating dump category, the control officer will cause them to be boated (if not already loaded) and landed. If floating dump supplies do not meet the requirements of the request, the control officer requests the appropriate transport commander to land the supplies.

1102. General Unloading

a. The control organization for the ship-to-shore movement generally ceases to operate and remains substantially intact in a standby status when the order is given to commence general unloading. The following specific actions usually occur at this time:

(1) The control ships (primary control and secondary control) may move in closer to the beach and function as additional traffic control vessels to regulate the flow of traffic to the beach.

(2) Transports may be moved into unloading berths off appropriate beaches (as assigned by the amphibious task force commander).

(3) Disregarding class or type of cargo, transports are unloaded as rapidly as beach capacities permit.

(4) Landing craft move directly to and from the unloading ships and beach as regulated by traffic control officers.

(5) Landing ships move in to the beach or otherwise discharge cargo as ordered.

1103. Traffic Control Vessel

a. When general unloading has been commenced and the primary control ship has assumed the function

of traffic control vessel, it will assume the following specific duties:

(1) Regulate the flow of traffic in the boat lanes and off the beaches in order to avoid congestion or delay.

(2) Direct boats to land at appropriate landing point markers.

(3) Conduct evacuation of casualties according to plan.

(4) Assure that requests of the shore party group are met without delay.

1104. Traffic Control Officer

a. After the assault waves have landed, the boat group commander becomes traffic control officer for his beach. As such, he will control traffic in the immediate approaches to the unloading points and will send in boats as called for by the beachmaster. He will station himself outside the surf line as directed by the operation order; however, if such direction is absent, his location should be such as will enable him to best control traffic of landing craft. He will control all boat movements in his area and direct landing craft to designated unloading point markers on the beach as requested by the beachmaster.

1105. Cargo Rendezvous Areas

a. Cargo rendezvous areas may be established to seaward of the traffic control vessel to avoid congestion of landing craft close to the beach and to assemble those which cannot be promptly unloaded at a safer distance from the beach. Separate cargo rendezvous areas may be established if deemed necessary for the three types of cargo, namely:

bulk cargo, self-propelled cargo, and palletized cargo.

1106. Identification of Cargo

a. Boats carrying Category II (on callwaves) or III (non-scheduled units) serials and free boats will display boat paddles on which will be attached or legibly written the serial number of the embarked serial. These serial numbers will be constantly displayed until the landing craft has beached. In addition to these paddles, boats carrying various types of cargo will display distinctive flags so that the control and beach party personnel can readily identify the type cargo embarked. Color flags may be used to identify the various types of cargo as follows:

(1) Red - bulk cargo requiring personnel and/or crane equipment to unload.

(2) Blue - self-propelled vehicles. If further identification between tracked and wheeled vehicles is necessary, numeral flags can be included.

(3) Yellow - cargo requiring assistance of a prime mover to unload.

(4) Green - cargo assigned to floating dumps.

b. Boats carrying casualties display the MIKE flag.

1107. Beachmaster Signals

a. In addition to megaphone, radio, and blinker messages, the following visual signals are used by personnel on the beach:

(1) To call in boats for beaching:

(a) Day - yellow flag waved back and forth above the head in a plane perpendicular to the boat lane.

(b) Night - a flashlight with a lucite wand fitting waved in a vertical line.

(2) To wave off boats from beaching:

(a) Day - NEGATIVE Pennant waved back and forth above the head in a plane perpendicular to the boat lane.

(b) Night - two flashlights with lucite wand fittings waved in a horizontal line.

(3) To signal the salvage boat to effect salvage:

(a) Day - SIERRA flag waved horizontally over head in immediate vicinity of craft to be salvaged.

(b) Night - a blue light with a lucite wand fitting waved in a vertical line.

XII. SALVAGE ORGANIZATION AND OPERATIONS

1201. Salvage Organization

a. Each APA or AKA will organize a Salvage Boat Party for the purpose of conducting landing craft salvage operations when so ordered. These salvage parties may be assigned specific duties in the operation order or may be on call.

b. Generally, the operation order will direct ships other than those transports carrying a BLT to furnish this type of salvage party. The transports carrying the Headquarters Troops probably will be called on to furnish salvage boats for early salvage operations, and transports embarking a reserve BLT will probably be assigned to furnish the reserve or "on call" parties.

c. LCM Salvage Boat Crew

In addition to the regular crew of the boat, the following should be assigned duty in each LCM salvage boat:

(1) Salvage officer (in charge)
(2) One BMC or BM1 (salvage rigger)
(3) One EN1 or EN2
(4) One DC2 or DC3 (qualified in shallow water diving)
(5) One RM3 or RMSN
(6) One SM3 or SMSN
(7) One to three SN

d. LCM Salvage Boat Equipment

Each LCM salvage boat should carry, in addition to regular boat equipment, the following items:

(1) 150 fathoms of 5" manila line or 150 fathoms of 3-1/2" nylon line
(2) Line-throwing gun
(3) Three extra heaving lines
(4) Portable radio equipment (at least 2 sets)
(5) Portable loudspeaker, electric
(6) Hand megaphone
(7) Electric signal (Aldis) lamp
(8) 3" power-operated salvage pump
(9) Extra buckets
(10) Damage control plugs
(11) Battery jumper cable, 22 feet long
(12) Wire bridle, legs approximately 15 feet long equipped with swivel
(13) 150 fathoms of 21-thread messenger
(14) Oxyacetylene welding outfit (damage control kit)
(15) Wire cutters
(16) Fire-fighting equipment
(17) Miscellaneous repair and replacement parts
(18) Shallow-water diving equipment
(19) Two geiger counters (500 MR/hr.)
(20) Two high-range instruments (500 R/hr.)
(21) Pocket dosimeter (two per team)
(22) Film badge or accumulative (crystal) device (one for each team member)
(23) Buoy for tow line (ammo case)

e. Use in the Ship to Shore Movement

Initially, the salvage officer of the beach is the assistant boat group commander of the boat group landing the BLT on that beach. The salvage boats assigned to his beach operate under his supervision. A heavy salvage boat (LCM) should be assigned to each colored beach and such other assistant salvage boats as necessary.

The salvage officer's boat and other salvage boats as assigned will follow designated waves of the boat group enroute to the beach for the purpose of transferring troops and equipment from disabled

boats to the beach and to keep disabled boats clear of the boat lanes.

The salvage officer flies the WHISKEY flag from his boat. All assistant or standby salvage boats fly the SIERRA flag.

The salvage officer assists the beachmaster of his beach by:

(1) Hauling off all stranded boats that can be retracted. Boats that can be repaired or otherwise used are towed clear and anchored or returned to parent vessels. Others are stripped, hauled clear, and sunk in deep water.

(2) Towing disabled boats, still adrift, clear of beach approaches. When practicable, such boats will be delivered to the parent ships.

f. Proficiency, Training, and Qualification of Salvage Crews

(1) Promptness in commencing salvage operations is of the utmost importance. To this end, all assistant boat group commanders of APA and AKA and all salvage boat crews should be trained in salvage operations. The salvage boat crews must be alert at all times to initiate action immediately without waiting for orders when any landing craft appears to be in distress. The normal station for the salvage boat is on a designated flank of the beach, immediately outside the line of breakers, where it is in good position to observe the beach party flagmen and the beached landing craft.

(2) Directives pertaining to the training and qualification of assault and salvage boat crews are contained in COMPHIBPACINST

1510.4 (series). Of particular note is the requirement therein that each ship maintain on board, as a minimum, qualified and designated assault boat coxswains and salvage riggers in number sufficient to man allowed assault and salvage craft.

1202. Salvage Operations

a. The general principles of towing any vessel apply to the towing of landing craft. When approaching the stranded or disabled boat, take into consideration the state of the sea, direction and velocity of the current, and the direction and speed of the wind. The approach should be made with caution to prevent the salvage boat from crashing into the stranded boat, broaching itself or being swamped by the breakers.

b. When the salvage boat has approached to within a reasonably safe distance to seaward of the stranded boat and if possible slightly up wind or up current (which ever is stronger), a heaving line should be passed from the salvage boat to the stranded boat.

A shot line should not be used without first obtaining the permission of the beachmaster. The heaving line with bridle (if towing LCM) and the towing line attached to it are hauled aboard the stranded boat (the stranded boat should have boat hook(s) ready to receive the heaving line, and shall have engine(s) running ahead slowly to keep screw(s) free of tow line). The crew of the stranded boat should remain forward of the splashboard of an LCVP if dangerous conditions exist. The crew of the stranded boat then secures the towline to the Samson post of the LCVP (or the bridle to the quarter mooring bitts of the LCM). The salvage boat should then back out through the breakers, paying out the towline as

it backs down. As it continues to retract through the surf, the towline should be payed out carefully to avoid fouling the screws of either boat. The salvage boat's towline should be secured on the towing bitts, at the desired length, prior to making the approach to the stranded boat. When the salvage boat is beyond the surf line, it continues to back until there is a strain on the towline. This will start the salvage boat to head to seaward. The salvage boat then heads to seaward, maintaining a slight strain on the towline while turning. Done in this manner, the towline does not have to be handled out on the open deck by hand and there is no chance of fouling the towline in the salvage boat's screw. If the towline length needs to be adjusted, it can be payed out or retrieved after the salvage boat is headed to seaward.

c. A steady strain is now put on the towline. The slack should be taken up by going ahead slowly without jerking. Once the strain is put on the tow line, the stranded boat should come off the beach a few inches as each incoming breaker raises her. The stranded boat should keep her engine(s) ahead throughout the operation until he is directed to stop engine(s) by the salvage officer, when preparing to cast off the tow line. Attempts to tow the boat off the beach should continue until the operation is completed or until ordered by the beachmaster to secure operations.

d. Once the boat is in tow, the crew of the salvage boat should keep a close watch on her while moving through the surf, slowing to ease the strain on the towline when the towed boat starts to come into a breaker. After the disabled boat has been towed clear of the surf line, further attempts may be made to get the boat under its own power, or it may be towed to its parent ship for repairs. If practicable, the towing should be turned over to a

boat which is returning to that ship, thus freeing the salvage boat for further service off the beach.

e. When a heavy surf is breaking far out, the use of a line throwing gun may be necessary to pass the towline. Once permission has been given by the beachmaster to use the gun, care must be taken to see that personnel are clear of the projectile. Regardless of the method the salvage boat uses to pass the line, the beachmaster should be informed before time so that beach party personnel can be in position to assist. Normally, all salvage operations are directed by the beachmaster, and he will determine whether or not the salvage boat should pass its towline from outside or inside the breaker line. Under no circumstances will the salvage boat beach without the permission of the beachmaster. Beaching of the salvage boat is to be discouraged at any time, because it decreases the maneuverability of the boat, placing it at the mercy of the surf and in the same dangerous situation as the boat it is trying to salvage from the beach. Few sights are so dismaying as the sight of a salvage boat broached on the beach. If the salvage boat must transfer personnel to the beach, it should transfer men to a beach-bound boat, remaining clear of the beach herself to remain available for other salvage work.

f. The beach party normally tends anti-broaching lines which are passed from the stranded boat. These lines are manned when a boat shows a tendency to broach. Their purpose is to help keep the boat at right angles to the surf.

XIII. STANDARD IDENTIFICATION FLAGS, LIGHTS AND MARKERS

1301. General

a. Appendix F contains a pictorial representation of the standard identification flags, lights and markers employed in the ship to shore movement.

b. Where not otherwise specified, the size of all flags flown from boats should be size 8 signal flag or larger. Special beach marker flags or panels for which no dimensions have been given shall approximate a number 4 signal flag in size. Cloth having fluorescent characteristics will be used in beach flags and markers wherever possible for greater ease of identification under all weather conditions.

c. All signal or marker lights should be of sufficient intensity to be visible at a distance of at least 1,000 yards. Special boat lights, except for boat wave commanders' wake lights, will be all-around lights.

1302. Boat Wake Lights

a. During darkness or low visibility conditions each boat will display a shielded wake light as follows:

1st wave - red	6th wave - 2 red*
2nd wave - white	7th wave - 2 white*
3rd wave - blue	8th wave - 2 blue*
4th wave - yellow	9th wave - 2 yellow*
5th wave - green	10th wave - 2 green*

* Two lights to be mounted horizontally, 3 feet apart.

1303. Boat Identification

a. Boat Team Paddles

A designated member of each boat team carries in his assigned boat or amphibian vehicle a boat team paddle provided by the troops, upon which is prominently displayed the boat team number. This paddle will be set in a bracket in the bow of the boat or vehicle, where it is visible all-around. Upon crossing the line of departure, the boat crew should remove and lower this paddle.

The number on the paddle indicates both the wave number and the position of the boat or amphibian vehicle in that wave. The first digit(s) indicates the wave, and the last digit(s) indicates the position within that wave (e.g., paddle 7-3 indicates the 3rd boat or amphibian vehicle in the 7th wave). Each coxswain should be furnished with a copy of the landing diagram showing the number of the wave in which he belongs and his position in the wave. Boat wave paddles are to be constructed and painted in accordance with paragraph B-101.c, Appendix B of NWIP 22-6.

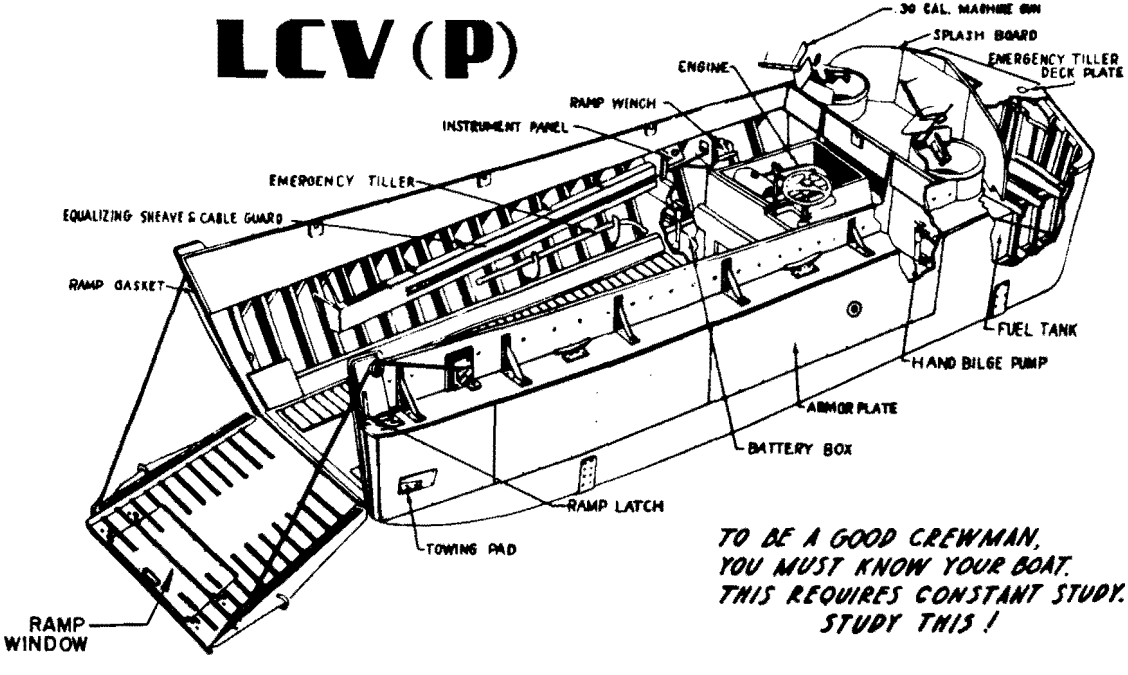
b. Serial Paddles

These paddles are constructed in the same manner as the boat team paddles but are used only to show the number of Category II and III serials carried in boats. These paddles shall be displayed throughout the movement to the beach, being taken down only to facilitate unloading at the beach.

1304. Cargo Identification (see page 70)

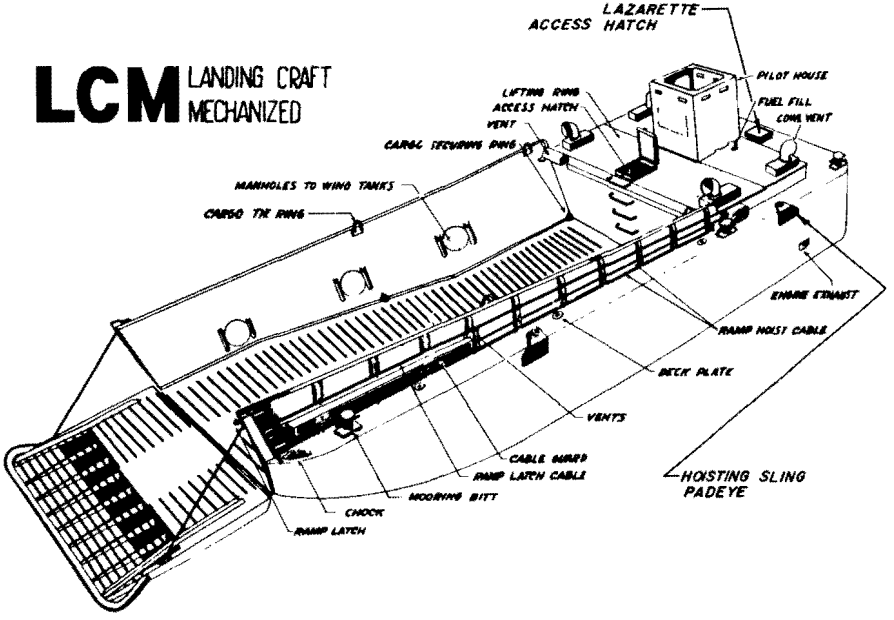
1305. Beaching, Wave Off, and Salvage Signals Used by the Beachmaster (see page 70)

LCV (P)



TO BE A GOOD CREWMAN,
YOU MUST KNOW YOUR BOAT.
THIS REQUIRES CONSTANT STUDY.
STUDY THIS !

LCM LANDING CRAFT MECHANIZED



APPENDIX C

LCVP/LCM EQUIPMENT LISTS AND STOWAGE DIAGRAMS

1. General

It is the coxswain's responsibility to see that all equipment is aboard and properly stowed. He should make a routine check of the deck equipment each day and supervise the engineer as he checks the engineering equipment. Merely looking at the equipment is not enough. The equipment must be inspected to ensure that it is in working condition. Will the emergency tiller fit the rudder stock? Is the fire extinguisher properly charged? Is the anchor chain and line free for running? Is the pin in the bending shackle easily turned, and will it fit into the hole in the shank of the anchor? Are the life jackets in good condition? Does the battle lantern work?

2. LCVP and LCM should be equipped as follows:

ITEM	LCVP	LCM
Anchor, Danforth	30 lb. (1)	70 lb. (1)
Anchor line, with 10' of 3/8" chain, thimble, and shackles	50 fms of 3"	75 fms of 4"
CO^2 Fire extinguisher	15 lb. (1)	15 lb. (1)
Potable water	10 gal.	20 gal.
Battle Lantern	1	1
Boat bell and bracket	1	1
Medical kit	1	1

ITEM	LCVP	LCM
Life jacket, with light and whistle	4	5
24" Life ring buoy, with 10 fms 21 thread	2	2
4 lb. Grapnel with 15 fms of 21 thread	1	1
Bow and stern lines	1 ea (8 fm 3")	1 ea (8 fm 4")
Fenders	6	6 size A
Anti-broaching lines (2)	15 fms 3" ea	15 fms 3½" ea
Ramp hoisting jiggers, set	3-fold purchase, 20 fm of 1½" line	3-fold purchase, 40 fms of 3" line, two ¾" wire straps 2 feet long, one ¾" wire strap 15 feet long, one ¾" wire strap 20-25 ft. long, 1 metal snatch block, four ¾" shackles
Boat hooks (2)	8'	12'
Boom hoisting slings	1	1
Welvin davit slings, set	1	0
Emergency tiller	1	1

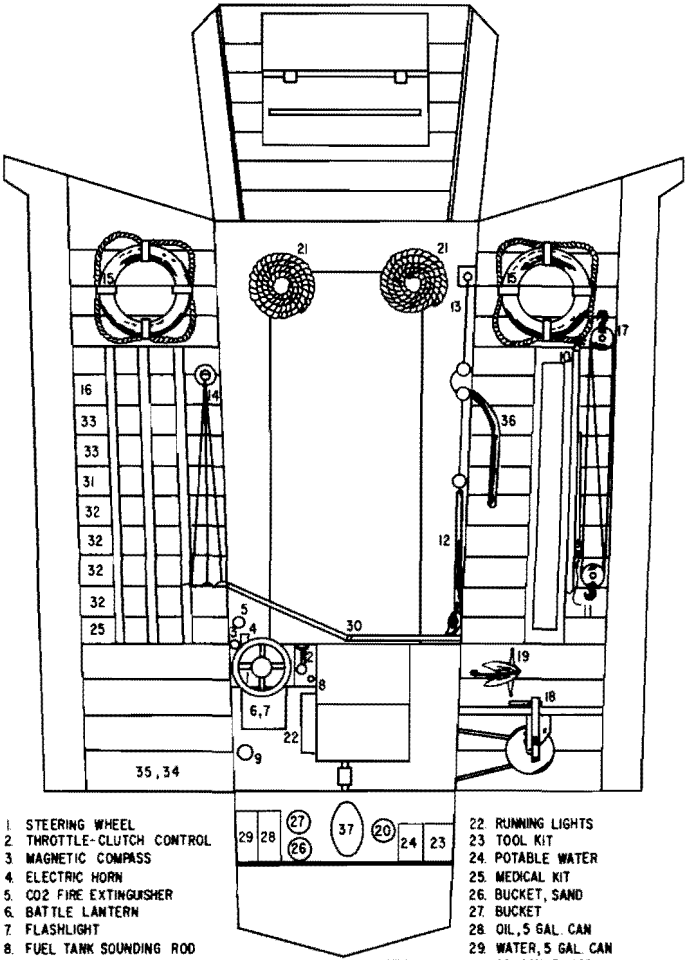
ITEM	LCVP	LCM
Electric horn	1	1
Magnetic compass (#5)	1	1
Running lights (set of 4)	1	1
Semaphore flags, type 1	1 set (1¼x1¼)	1 set (1¼x1¼)
Semaphore flags, type 2	1 set (1½x1½)	1 set (1½x1½)
Foghorn	1	1
Cargo flags	1 set	1 set
Splashboard	1	0
Fuel tank sounding rod	1	1
Ramp jacking lever	0	1
Ramp winch crank	1	0
5-gallon can	1 oil 1 water	2 oil 2 water
Flashlight	1	1
Buckets (1 for sand)	2	2
Swab and broom	1 ea	1 ea
Bag of tapered wood plugs	1	1
Tool kit	1	1

The following items are to be carried in the kit. Gray Marine part numbers are noted where applicable:

Push rod wrench 1/2"-9/16" (W1618)
Push rod wrench 5/16"-3/8" (W1012)
Fuel line nut wrench (EQ203)
Cylinder head wrench-12 points (EQ205)
Feeler gauge (KMO-233B)
Water pump wrench (EQ425)
Adjusting wrench (EQ410)
End wrench set 5/16"-7/8" (EQ416)
Pliers, 8" (EQ417)
Screwdriver, 9" (EQ422)
Ball peen hammer, 24 oz. (EQ424)
Fuel pump wrench (KMO-326A)
Bilge pump belt (D6-104)
Generator belt (D346-136)
Friction tape (1 roll)
Soft iron wire, 1/16" (approx. 25 feet)
Cranking bar assembly (D346-389)
Sump pump (EQ-131)
Sump pump hose (EQ-244)
Alemite grease gun (C-600)
Alemite grease gun hose (A-1039)
Transmission grease (1 lb.)
Pump grease (1 lb.)
Propeller shaft packing gland wrench
2 15-amp midget fuses (4 for LCM)

DIAGRAM VI

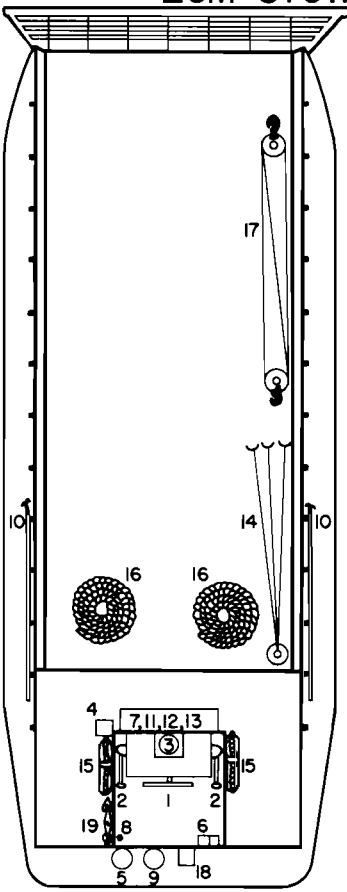
LCVP STOWAGE PLAN



1. STEERING WHEEL
2. THROTTLE-CLUTCH CONTROL
3. MAGNETIC COMPASS
4. ELECTRIC HORN
5. CO2 FIRE EXTINGUISHER
6. BATTLE LANTERN
7. FLASHLIGHT
8. FUEL TANK SOUNDING ROD
9. BOAT BELL
10. BOAT HOOKS
11. BROOM
12. SWAB
13. WELIN DAVIT SLING
14. BOOM SLING
15. LIFE RING BUOYS W/LINE
16. BOW AND STERN LINES
17. RAMP JIGGER
18. RAMP WINCH CRANK
19. ANCHOR
20. ANCHOR LINE AND CHAIN
21. ANTI BROACHING LINES
22. RUNNING LIGHTS
23. TOOL KIT
24. POTABLE WATER
25. MEDICAL KIT
26. BUCKET, SAND
27. BUCKET
28. OIL, 5 GAL. CAN
29. WATER, 5 GAL. CAN
30. SPLASH BOARD
31. GRAPNEL W/LINE
32. LIFE JACKETS
33. FENDERS
34. SEMAPHORE FLAGS
35. CARGO FLAGS
36. EMERGENCY TILLER
37. TOWLINE

DIAGRAM VII

LCM STOWAGE PLAN



1. WHEEL
2. THROTTLE-CLUTCH CONTROL
3. MAGNETIC COMPASS
4. ELECTRIC HORN
5. CO2 FIRE EXTINGUISHER
6. BATTLE LANTERN
7. FLASHLIGHT
8. FUEL TANK SOUNDING ROD
9. BOAT BELL
10. BOAT HOOKS
11. CARGO FLAGS
12. SEMAPHORE FLAGS
13. RUNNING LIGHTS
14. BOOM SLING
15. LIFE RING BUOYS W/ LINE
16. BOW AND STERN LINES
17. RAMP JIGGER
18. MEDICAL KIT
19. ANCHOR

STOWED IN ENGINEROOM:

- RAMP JACKING LEVER
- OIL, 5 GALLON CANS (2)
- WATER, 5 GALLON CANS (2)
- BUCKET, SAND
- BUCKET
- TOOL KIT

STOWED IN LAZARETTE:

- GRAPNEL W/LINE
- LIFE JACKETS
- FENDERS
- EMERGENCY TILLER
- BROOM AND SWAB
- ANTI BROACHING LINES
- POTABLE WATER
- ANCHOR LINE AND CHAIN

APPENDIX D

LCVP/LCM DAILY BOAT & ENGINE CHECK OFF LISTS

1. Hull and Steering Check Off List: The following check off list should be carried out at least weekly by the coxswain, and will be helpful in bringing to light deficiencies of the hull and steering equipment which need correction.

ITEM	LCVP	LCM
Check sides for holes, unsound wood at edges, loose screws.	X	
Check sides and bottom for punctures and electrolysis (condition of zincs).		X
Check beading for cracked or broken wood and wood torn loose and whether metal facing beading is bent or missing.	X	
Check transom for open seams, breaks, and softness at chines.	X	
Check strakes for soundness, open seams, and looseness at bottom frames.	X	
Check scuff boards for soundness of wood and worn edges at garboard boards.	X	
Check coaming for broken sections, unsound wood, and presence of metal facing.	X	
Check engine cover for missing sections, security of hinges, broken or unsound parts, and bad lining.	X	

ITEM	LCVP	LCM
Check skeg for soundness of wood and tightness to keel. Check keel for cracks and rotting.	X	
Check chine for soundness of wood, open seams, leaks, and faulty metal stripping.	X	
Check splash board to see that it is secured tightly to brackets and is not broken.	X	
Check ribs and frames for unsound wood, breaks, and cracks.	X	
Check floor boards for missing and unsound boards.	X	
Check chocks, bitts, and cleats for evidence of strain or tearing loose.	X	X
Check lifting pads for evidence of strain.	X	X
Check slings for evidence of strain.	X	X
Check emergency tiller for fit.	X	X
Check limber holes for obstructions. All transverse bulkheads should have check valve fittings which should be cleaned at frequent intervals.	X	X
Check tunnel plate for loose and missing sections.	X	
Check inner bottom for soundness of wood, loose screws, and oil saturation, which causes seams to open and leak.	X	

ITEM	LCVP	LCM
Check ramp block for cracks and rotten wood.	X	
Check condition of ramp, ramp gasket, and hinges.	X	X
Check ramp for proper fit. Check for condition of ramp cable, latches, and sheaves.	X	X
Check condition of ramp safety chains/preventers.		X
Check condition of ramp hoist, linkage, latch releasing system, and foot pedal.		X
Check ramp winch for proper lubrication and action.	X	X
Check condition of the engine-room and lazarette access covers, knife edges, gaskets, and dogs. (Gaskets and knife edges should be clean and unpainted.)		X
Check cargo securing rings and tie rings in cargo well and on coaming.		X
Check deck plates and tank manhole covers for sheared and missing studs and condition of gaskets.		X
Check condition of cowl ventilators.		X
Check engine-removal access cover (forward of pilothouse) for presence and security of securing studs. (All studs should be replaced after any engine change.)		X

ITEM	LCVP	LCM
Check rudder shaft packing. (If found to be hard and dry, it must be renewed.)	X	X
Check rudder and rudder shaft for alignment.	X	X
Check rudder and pilot rudder for alignment.	X	
Check to see if rudder quadrant is properly keyed on shaft.	X	X
Check rudder stops, and look for excessive rudder swing. (If found to be bowed or sheared, they must be straightened or renewed.)	X	X
Turn steering wheel hard right and hard left, note any binding. Also check to see if rudder turns the same amount left as right.	X	X
Check the condition of steering cable and associated sheaves for free running.	X	X
Check rudder crosshead connection bar (lazarette) and steering shaft connecting arm (engine room). (If found to be bent, they must be straightened or renewed.)		X
Check compass action against calibration card on compass by swinging boat when waterborne.	X	X

2. Engine and Piping System Check Off List. The boat engineer, supervised by the coxswain, should carry out the following checks daily.

ITEM	LCVP	LCM
Check sea strainers or sand traps and clean as necessary.	X	X
Check the batteries (the battery solution should stand 3/8" above top of plates). Connections should be clean and tight.	X	X
Check the fresh water supply. (See that surge tank is full to 1" from top and that 5 gallon can(s) of fresh water are aboard.)	X	X
Check the fuel supply. (Fuel each morning, full.)	X	X
Check all fuel, oil, and water lines for leaks.	X	X
Open the valves in the fuel lines, and open the vents on the primary filter until the fuel begins to flow, then close the vents.	X	X
Check the lube oil supply for quality and quantity. Be sure both the engine and reverse gear dip-sticks show a safe amount of oil, and see that a 5-gallon can of lube oil is aboard.	X	X
Turn all grease caps down 1/2 turn on the salt water, fresh water, and bilge pumps.	X	X

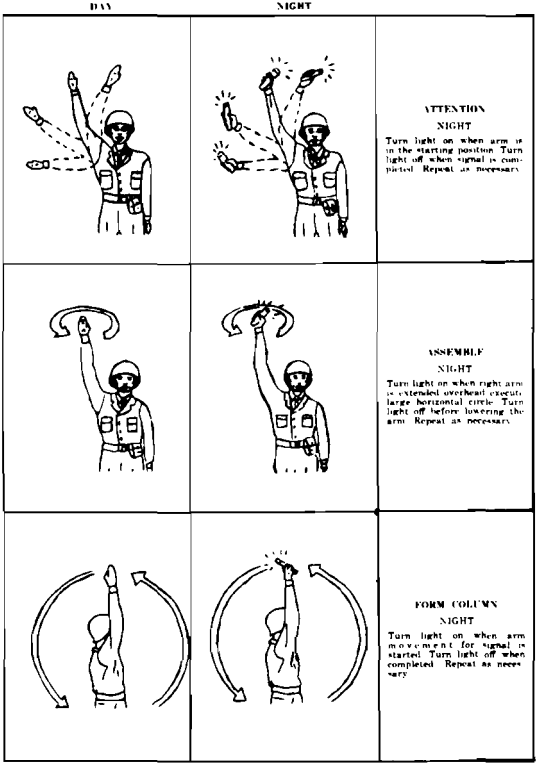
ITEM	LCVP	LCM
Make sure all engine belts are tight.	X	X
Check condition and action of hand bilge pumps.	X	
Give the scraper handle in the primary fuel strainer two full turns.	X	X
See that ramp hoist cable is free, sufficiently coated with grease, and shows no signs of fraying.	X	X
Ensure that all bilge plugs are secure. Pump out any oil or excessive water in the bilge.	X	X
Check salt water suction (sand strainer) selector lever for free action.	X	X
Check salt water suction line to suction side of salt water pump for corrosion.	X	X
Check salt water circulating pump for freeness, and check packing for hardness and deterioration.	X	X
Check salt water cooling line from discharge side of pump to heat exchanger for corrosion.	X	X
Check salt water overboard discharge lines and flanges for corrosion.	X	X
Check exhaust line from exhaust manifold and salt water flange jumper line to exhaust line for corrosion.	X	X

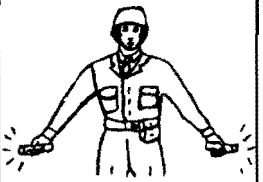
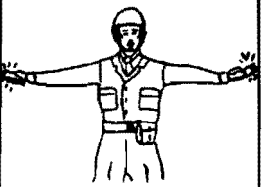
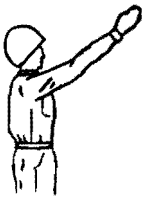
ITEM	LCVP	LCM
Check bilge suction strainers for cleanliness and three-way bilge suction valve for freeness.	X	X
Check other bilge valves for freeness.		X
Check bilge suction lines, hand bilge pump lines, and overboard discharge lines for corrosion.	X	X
Check bilge pump, packing, and "V" belt for proper tension, hard packing, and deterioration.	X	X
Check exhaust pipes, mufflers, and salt water spark arresting lines for corrosion.	X	X
Check fuel tanks and fittings for leaks, holes, and corrosion.	X	X
Check fuel lines and valves noting any fuel spots on deck near fittings. This is a good sign of an oil leak. Check condition of tank filler caps.	X	X

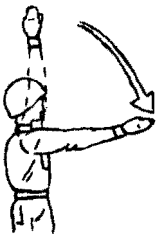
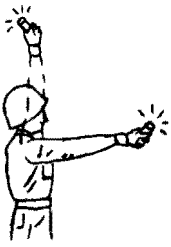
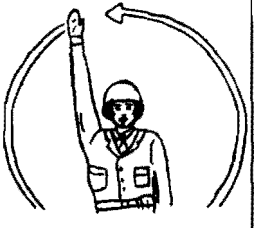
CHAPTER XIII

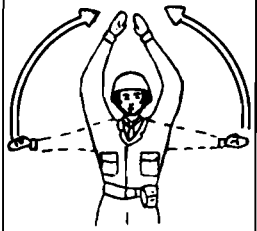
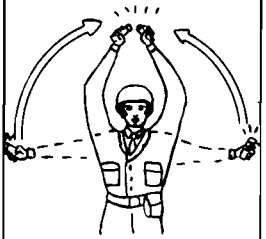
MANEUVERING SIGNALS

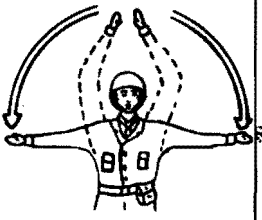
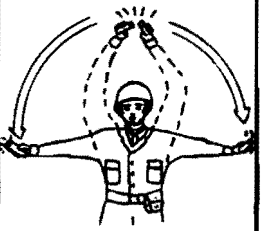
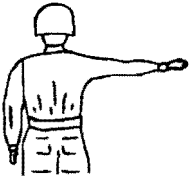
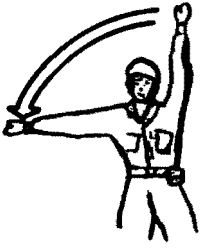
1. It is important that each member of the crew know the following hand signals for controlling boats. The following drawings represent the standard hand signal for controlling boats.



DAY	NIGHT	
		**WEDGE** **NIGHT** Turn light on as arms are extended; hold in signal position until understood, executed, or acknowledged. Turn light off while arms are still in signal position. Repeat as necessary.
		**LINE ABREAST** **NIGHT** Turn light on as arms are extended; hold in signal position until understood, executed, or acknowledged. Turn lights off while arms are still in signal position. Repeat as necessary.
		**READY** **NIGHT** Turn light on when arm is in correct position; hold until acknowledged. Turn light off. Repeat as necessary.

DAY	NIGHT	
		FORWARD NIGHT Turn light on in starting position; blink light several times at end of movement. Repeat as necessary.
		SPEED UP NIGHT Turn light on when arm is in the starting position. Turn light off when signal is completed. Repeat as necessary.
		MAN OVERBOARD NIGHT Turn light on when arm is in the vertical position. Execute complete circle; turn light off when arm is returned to vertical position. Repeat as necessary.

DAY	NIGHT	
		**STOP** **NIGHT** Turn light on when arm is in the signal position. Blink light several times. Turn light off before lowering the arm.
		**VEE** **NIGHT** Turn light on as arms are extended; hold in signal position until understood, executed, or acknowledged. Turn lights off while arms are still in signal position. Repeat as necessary.
		**CLOSE UP** **NIGHT** Turn light on when arms are in starting position; execute signal, turning lights off when hands touch overhead. Repeat as necessary.

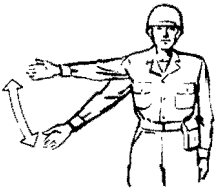
DAY	NIGHT	
		**OPEN UP** **NIGHT** Turn lights on when arms are in starting position. Turn lights off when arms are horizontal. Repeat as necessary.
		**COLUMN** **NIGHT** Turn light on as arm is extended; hold in position until understood, executed, or acknowledged. Turn light off while arm is still extended. Repeat as necessary.
		**FLANK RIGHT OR LEFT** **NIGHT** Turn lights on as movement of arms is started; hold in horizontal position until understood, executed or acknowledged. Repeat as necessary.

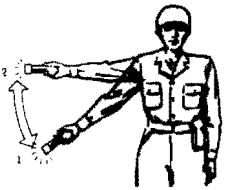
DAY NIGHT

I DO NOT UNDERSTAND

NIGHT

Turn lights on as hands are brought down across the face hold in position, parallel, horizontal, until acknowledged, or executed. Turn lights off while still in front of the face.

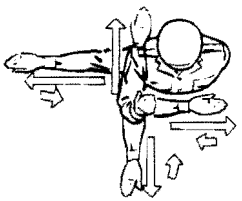


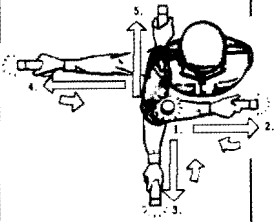


DECREASE SPEED,

NIGHT

Turn light on when arm is in the starting position. Turn light off when signal is completed. Arm does not move above the horizontal. Repeat as necessary.

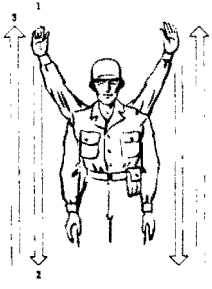




DISPERSE

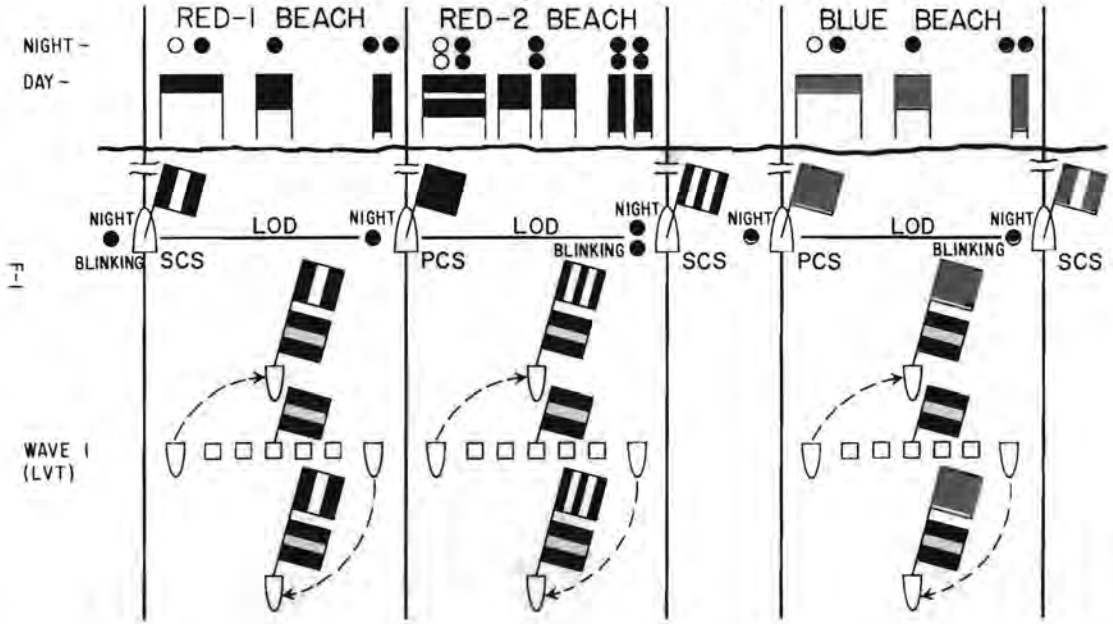
NIGHT

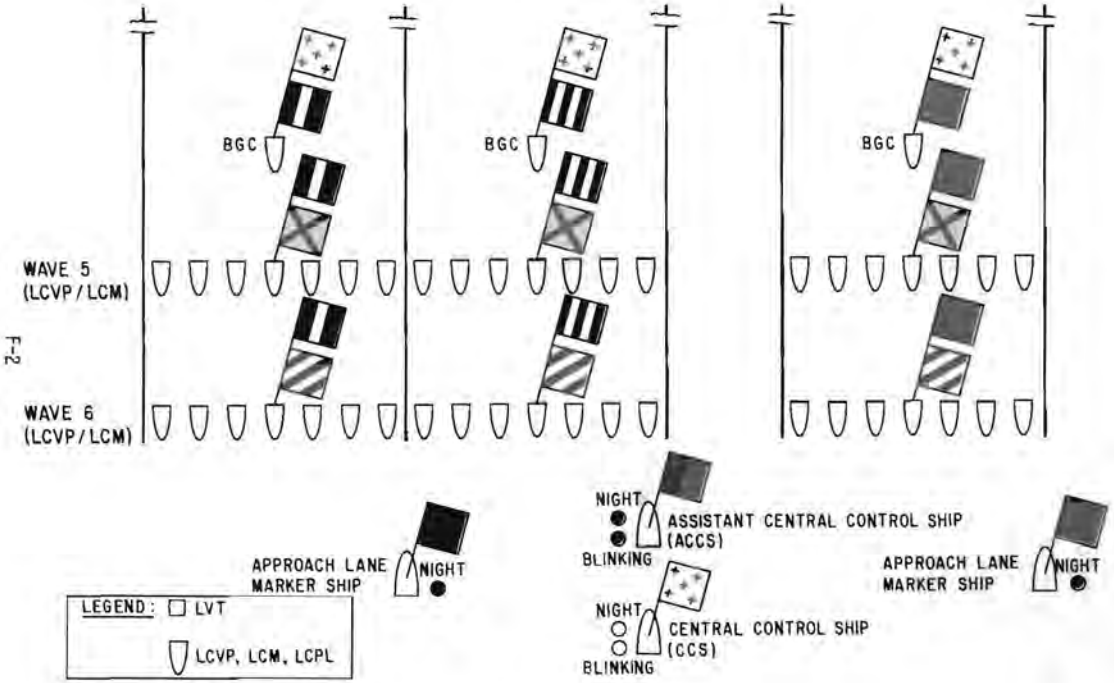
Turn light on when arm is in starting position. Return the arm to starting position after each movement in a given direction. Turn light off after arm has been moved to the rear.

DAY	NIGHT	
		**DISREGARD PREVIOUS COMMAND, AS YOU WERE** NIGHT "Lucite Hand Wands" are crossed instead of the hands. Turn lights on when wands are in position overhead. Turn lights off when understood, or acknowledged.
		**BREAKDOWN** NIGHT Turn light on with arms extended overhead. Swing arm forward and down to knees. Swing arms forward and upward from knees to overhead. Continue motion till signal is understood.

APPENDIX F

STANDARD FLAGS, LIGHTS AND MARKERS




BGC
BGC
BGC
WAVE 5
(LCVP/LCM)
WAVE 6
(LCVP/LCM)
F-2
APPROACH LANE
MARKER SHIP
NIGHT
LEGEND: LVT
LCVP, LCM, LCPL
NIGHT
ASSISTANT CENTRAL CONTROL SHIP
(ACCS)
BLINKING
NIGHT
CENTRAL CONTROL SHIP
(CCS)
BLINKING
APPROACH LANE
MARKER SHIP
NIGHT

ALPHABET FLAGS


ALFA


BRAVO


CHARLIE


DELTA


ECHO


FOXTROT


GOLF


HOTEL


INDIA


JULIETT


KILO


LIMA


MIKE


NOVEMBER


OSCAR


PAPA


QUEBEC


ROMEO


SIERRA


TANGO


UNIFORM


VICTOR


WHISKEY


XRAY


YANKEE


ZULU

NUMERAL FLAGS


1


2


3


4


5


6


7


8


9


0

UNLOADING POINT MARKERS

HYDROGRAPHIC MARKERS (FROM SEAWARD)

STANDARD IDENTIFICATION FLAGS

SENIOR BEACHMASTER

BOAT GROUP COMMANDER

TRAFFIC CONTROL OFFICER (BGC, AFTER WAVES HAVE LANDED)

ASST. BOAT GROUP COMMANDER (SR. SALVAGE OFFICER EACH BEACH)

SALVAGE BOAT

CHANNEL CONTROL BOAT

LVT BEACH DESIGNATION (RED - 2)

LVT EMERGENCY FLAG

BOAT TEAM PADDLE (3RD BOAT-2ND WAVE)

AMPHIBIAN VEHICLE POOL CONTROL OFFICER

TRANSFER LINE CONTROL OFFICER

CARGO FLAG – SELF-PROPELLED VEHICLES EMBARKED

CARGO FLAG - BULK CARGO REQUIRING PERSONNEL OR CRANE TO UNLOAD

CARGO FLAG - CARGO REQUIRING ASSISTANCE OF PRIME MOVER TO UNLOAD

CARGO FLAG – BOAT ASSIGNED TO FLOATING DUMP

BEACH FLAGS (FLOWN FROM SHIP OR LANDING CRAFT ONLY)
a. BACKGROUND - COLOR OF BEACH
b. NUMBER OF WHITE STRIPES - NUMBER OF BEACH

LST(H) NIGHT ● BLINKING

MEDICAL BOAT NIGHT ● BLINKING

BOWSER BOAT

APPENDIX G

SPECIAL EMERGENCY SIGNALS

1. Special emergency signals for training exercises may be found in FXP 3(A).