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29 JUN 1999

COMNAVSURFLANT/COMNAVSURFPAC INSTRUCTION 3340.3C

Subj: WET WELL OPERATIONS MANUAL

1. Purpose. To issue a consolidated COMNAVSURFLANT/ COMNAVSURFPAC Wet Well Operations Manual.

2. Cancellation. COMNAVSURFLANTINST 3340.3B/COMNAVSURFPACINST 3340.3B. This instruction has been completely revised and should be read in its entirety.

3. Discussion. The Wet Well Operations Manual is a single source document that discusses in detail all facets of Wet Well operations. It provides a base of information for the officers and crew assigned to amphibious ships and describes in detail those evolutions required to properly and safely execute Wet Well operations. The following procedures are representative and are not to be considered as covering all situations which might occur. As with any operation with a great number of variables, common sense, sound basic seamanship and on-scene decision making will be required, based on the circumstances as they occur.

4. Action

a. Commanding Officers will use the information contained in this manual as the basis for developing a Wet Well, Ballasting and Deballasting Operations Bill.

b. Recommendations for improvements to this manual are solicited. Proposed changes should be submitted via the chain of command to COMNAVSURFLANT or COMNAVSURFPAC as appropriate.

"Signed"	"Signed"
G. M. ERICKSON	R. P. PERRY
Deputy and	Deputy and
Chief of Staff	Chief of Staff

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RECORD OF CHANGES

CHANGE NUMBER	DATE OF CHANGE	DATE ENTERED	ENTERED BY

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INTRODUCTION

The purpose of this manual is to provide one document that addresses all facets of Wet Well operations. The necessity for a single volume is evident in the number of accidents and minor incidents which could have been prevented if all personnel were familiar with and followed proper operating procedure. This manual is not meant to replace or supersede technical manuals or manufacturer’s operating procedures, which should be referred to whenever specific hull, equipment, or safety issues arise.

This Wet Well Operations Manual has been developed as an aid not only for the Commanding Officer, but for the entire wet well team. It is intended as a ready reference and training manual for officers and crew assigned to amphibious ships.

Changes in ship design, standard operating procedure, equipment, and craft mandate nearly continuous update of this manual. Proposed changes should be submitted via the Immediate Senior In Command (ISIC) to the Type Commander (TYCOM) for change or addition in the next revision.

CHAPTER 1

GENERAL WELL DECK SAFETY

1.1. Safety. Wet well operations may take place pierside, at anchor, or underway. Regardless of location, any wet well operation is potentially dangerous to personnel, craft, and equipment. Well deck ballasting and deballasting and craft launching and retrieval operations require a high degree of coordination and precision, leaving little room for personnel error or equipment failure. Therefore, safety considerations are of paramount importance and all personnel involved in these operations must be constantly alert to identify and report unsafe conditions. Additionally, Well Deck Control Officers (WDCO) must ensure that assigned safety observers are present throughout well deck operations; are qualified in the positions they are observing; are assigned in sufficient numbers to observe all aspects of the operation; and are able to quickly communicate any unsafe condition or practice to the control station. If an unsafe condition arises, the evolution must be suspended and immediate action taken to rectify the problem and prevent reoccurrence. Any team member may use their life jacket whistle to indicate an emergency or developing unsafe condition.

This chapter provides a summary of safety precautions to be followed during wet well operations in order to reduce the potential for injury to personnel or damage to equipment, craft, and machinery. Safety precautions for conducting LCAC operations are addressed in the LCAC Safe Engineering and Operations (SEAOPS) Manual.

1.2. General Well Deck Safety

a. A thorough safety and operations brief should be given to all assigned personnel concerning the upcoming evolution, specifying their duties and responsibilities and applicable safety precautions.

b. Once Condition 1A is set, ensure all personnel don and maintain proper battle dress. Proper battle dress consists of an authorized personal flotation device with a whistle and light, protective headgear, hearing protection as appropriate, long sleeve shirt, trousers tucked into socks or boots, and steel-toed foot gear. The use of auto inflated life preservers is authorized. The Petty Officer In Charge (POIC) and Ramp Marshall will wear yellow helmets and may wear yellow auto

inflated MK-I life vests for ease of identification. Safety observers will wear white helmets and white lifejackets if available. Personnel involved in well deck operations shall remove all jewelry, gloves, key rings, or objects hanging from belts or pockets which may become dislodged and fall or hamper an individual’s timely and safe performance of duty.

c. Ensure all well deck ventilation blowers are operating according to the ship’s ventilation plan; normally 30 minutes prior to commencement of, during, and 30 minutes after securing craft/vehicle handling operations. The accumulation of carbon monoxide and other toxic fumes is of primary concern but vehicle exhaust also affects visibility. Tattletales will be rigged on all ventilation ducts to indicate the direction and volume of flow.

d. Use of standard terminology and proper phone procedures when communicating between control stations is required. Standard terminology eliminates confusion and ambiguity even in the most stressful and difficult situations.

e. Only authorized personnel are allowed in the well deck, catwalks, ballast control station, or wing walls during well deck operations.

f. Establish a preferred method of loading/off-loading boat crews; e.g. via the boat's ramp in a dry well. Boat crews will not embark/debark craft from rung ladders or batter boards.

g. Ensure all ballasting and deballasting operations are conducted strictly in accordance with the ship's ballast bill. Short-cuts for use in high-volume operations or short-notice evolutions are prohibited without the approval of the Commanding Officer.

h. Ensure loose gear is properly stowed and secured to prevent fouling of boat screws, chaffing of lines, or personnel trip hazards.

i. Ensure communications between the Well Deck Control, Ballast Control, Debark Control Officer, and the Officer of the Deck are established early and maintained throughout the evolution. Redundant means of voice communication will always be a benefit, especially when conducting multi-ship evolutions where radio frequencies are at a premium.

j. Identify and assign only qualified personnel to operate or direct rolling stock if necessary to load/off-load landing craft in the well deck. To afford better control, visibility, and more power, **fork trucks will climb all ramps driving forward and drive down all ramps in reverse whenever feasible**. No vehicles, regardless of use, will be ungriped, started, or moved without the Well Deck Control or Combat Cargo Officer's permission. All material handling equipment will be secured with brakes and lashing when the operator is not with the equipment.

k. Coordinated flight and well deck operations are authorized for LHD, LHA, LPD 4, LSD 41, and LSD 49 classes, but not for LSD 36 class ships which have exposed aft wing walls. During these evolutions all effort must be made to reduce the incidence of low-level over flight of landing craft by aircraft. Rotor or jet wash can damage exposed cargo and vehicles, injure boat crews, and cause difficulties in craft handling during the critical phases of launch and recovery. Aircraft should not be allowed to approach or operate near the stern of the ship during wet well operations unless their movement is coordinated with Well Deck Control.

l. Passengers in assault craft will remain in the craft until directed to debark by the POIC. Boat crews in a forward nest of boats shall be positioned in the boat well while the after nest is being recovered or launched (weather conditions may require the partial closure of the stern gate). All personnel in assault craft must be in battle dress and wear authorized personal flotation devices.

m. Safety observers and line captains will ensure line handlers tend lines a minimum of 18 inches away from cleats and 24 inches from T-bitts.

n. Ensure landing craft lower masts, radar and radio antenna and light posts, and dog all watertight doors/hatches prior to entering or operating in the well.

o. Before operating landing craft in the well, all wing wall cleats and bitts will be clear of obstruction.

p. Under no condition shall the external draft of the ship aft be permitted to exceed that point where sea water can rise through the "ballast tank vent valves" and into the vent air piping. Sufficient overhead room for a light-loaded LCU to

enter the well is also a consideration in deciding maximum allowable draft.

q. At no time will the ship maneuver while craft are alive in the well or operating near the sill.

r. The following shall be enforced to reduce the threat of fire hazards:

(1) Properly stow and protect all combustibles.

(2) Prevent the stock piling of excess or unauthorized flammable materials in landing craft or the well deck.

(3) Inspect and test operate flammable liquid systems after repairs.

(4) Educate all well deck and landing craft personnel in the reduction of fire hazards and perform frequent fire drills.

(5) When flammable liquid leaks occur, immediately secure operations in the well, isolate the leak, contain the spill, and begin clean up. Operations should not be continued until the hazard has been removed.

(6) Ensure organic fire fighting equipment on all craft is in good operating condition and crew members are familiar with proper operating procedures.

(7) Ensure hatches and fittings are secured when not in use.

CHAPTER 2

BALLASTING/DEBALLASTING OPERATIONS

2.1. Background. This chapter specifically addresses the safety precautions associated with ballasting and deballasting the ship. Effective ballasting enables the efficient and safe embarkation or launch of LCUs, LCMs, amphibious vehicles or LCACs. Unless otherwise stated, the contents of this chapter and Appendix C are written with the LPD 4 class in mind and if not applicable, should be tailored prior to implementation.

2.2. General. The clean ballast system is designed and normally used to ballast and deballast ships to increase or decrease draft, list, and trim. Primarily for wet well operations, it also supports ballasting for stability and damage control. In general, the normal ballasting procedure is to gravity flood ballast tanks below the third deck, and fill the ballast tanks above the third deck (if installed) using firemain. The well deck is flooded by opening the stern gate and well deck drains when the deck is below sea level. The normal deballasting procedure is to gravity drain the ballast tanks above the third deck and to empty the tanks below the third deck by pumping, eductors, or blowing them clear of water with low pressure air.

2.3. The Principal Conditions of Operation

a. Phase I - Operating Condition. The ship is at the draft which affords the best stability. This condition is dependent on quantities of cargo, fuel, ammunition, water, supplies, and troops embarked. This condition is also referred to as steaming draft.

b. Phase II - Ballasted Condition. The depth of water available in the well during this condition is dependent on the ship class and the evolution being conducted but in general is sufficient to operate all types of landing craft including LCU. The term "STEEP WEDGE" refers to a ballasted condition which provides a dry well forward and eight feet of water at the sill. A "STEEP WEDGE" is useful for conducting limited wet well operations while protecting cargo or vehicles in the forward section of the well deck from salt water damage. A “STEEP WEDGE” does not normally allow large craft such as LCU, to have a dry ramp.

2.4. Requirements

a. All ships capable of ballasting must have a comprehensive ballast bill which defines personnel assignments and responsibilities, equipment and procedures, communications procedures, and precautions during ballasting operations.

b. A pre-ballasting brief shall be conducted with the Commanding Officer, Executive Officer, Officer of the Deck, Well Deck Control Officer (WDCO), Ballasting Officer, Combat Cargo Officer, Debark Control Officer, Engineer Officer, Damage Control Assistant, and all other personnel assigned to key positions. The brief will, at a minimum, include the following:

(1) The current distribution of the ship's liquid load and what liquid management procedures must take place before the start of ballasting. If redistribution of the ship's liquid load is required before ballasting down for well deck operations, it is essential to allow sufficient time to complete the transfer prior to the well deck evolution.

(2) The status of all ballasting equipment including pumps, air compressors, valves, controllers, and associated equipment.

(3) The sequence, number, loading, and type of craft and equipment to be embarked or debarked.

(4) The type and quantity of cargo to be moved ashore or brought aboard.

(5) The target depth of water at the sill to which the ship will be ballasted for each segment of the evolution. List of ballast tanks to be filled/emptied during each segment of the evolution. The material status of tanks, indicators, and ballast control equipment.

(6) The personnel requirements for the main and supporting equipment stations and other ship evolutions which impact on the ballasting operation.

(7) The maximum draft and minimum depth of water when ballasted.

c. The Commanding Officer, via debark control, will continually be informed of the progress and status of well deck operations.

d. Ballasting will be done only at Condition 1A unless the Commanding Officer has approved procedures which allow ballasting under modified Condition 1A or a specific ballasting detail.

e. The WDCO will have overall control of the ballasting operation with the Ballasting Officer reporting directly to the WDCO for proper ballast control. Once ballasting operations begin, the WDCO will keep the Debark Control Officer informed of depth of water at the sill.

f. Normal communications will be by sound-powered telephone (IVCS for LHA class). Communication shall be maintained continuously between the bridge, debark control, well deck control, and ballast control. Additionally, Man On the Move (MOMS) radios will also be used (EMCON permitting) for LCAC operations. Other wireless systems (e.g., HYDRA) may be used if installed. All personnel involved in ballasting will be familiar with and will use the standard terminology listed in Appendix A.

g. Liquid load management procedures must be put in place for fuel and water to minimize the number of partially loaded tanks, reducing free-surface effect. Before starting well deck operations, verify the liquid load and take action to consolidate tank loading if necessary.

2.5. Responsibilities

a. Debark Control Officer is the officer in charge of embark/debark operations (per NWP 50-10(D)); normally the ship’s Executive Officer, unless another officer has been appointed in writing by the Commanding Officer. That officer will control the entire debark evolution under the direction of the Commanding Officer.

b. The Well Deck Control Officer (WDCO), normally the First Lieutenant, supervises all well deck operations. The WDCO is responsible for the safe handling, embarkation and debarkation of all boats and vehicles in the well deck. The WDCO will monitor and report the level of the water in the well deck to the Ballasting Officer, and direct the operation of the

stern gate as pre-briefed. The WDCO reports directly to the Debark Control Officer.

c. The Ballasting Officer, normally the Damage Control Assistant (DCA), is stationed in ballast control. The Ballasting Officer supervises the actual ballasting/deballasting operation and provides the wet well conditions as specified by the Well Deck Control Officer in the pre-ballast brief. The Ballasting Officer shall:

(1) Ensure the safe operation of all ballasting equipment including the control console, valves, and pumps. In addition, the Ballasting Officer shall ensure all ballast tank accesses are closed and secured, and all applicable tag outs are considered in the ballasting plan.

(2) Maintain direct communications with the WDCO and keep the WDCO advised of the approximate time required for the various ballasting operations.

(3) Be familiar with the technical manuals for the operations of the ballasting system and ensure personnel assigned to operate systems are qualified in accordance with the applicable PQS.

(4) Be familiar with the capacities and limitations of the ballasting system and monitor the status of all tanks and the material condition of all parts of the system.

(5) Be proficient in calculating stability data and in using functions of form and liquid loading diagrams.

(6) Maintain direct communications with topside lookout(s) who will keep watch for any fuel or other hazardous material leakage into the water during ballasting operations.

d. The Officer of the Deck (OOD) will obtain permission from the Commanding Officer to commence ballasting operations.

(1) The OOD must keep all stations aware of the ship's maneuvers or evolutions which could affect ballasting operations and embarkation/debarkation of the vehicles and craft.

(2) Use bridge and/or aft lookout when underway or post topside lookout(s) in best position to observe any fuel or other

hazardous material. Ensure lookout(s) are in direct communication with Ballasting Officer.

e. The Engineer Officer is responsible for the maintenance and upkeep of all engineering equipment associated with ballasting.

f. The Combat Cargo Officer, if assigned, is responsible for the planning and movement of cargo and vehicles for embarkation or onload.

2.6. Considerations. The depth of water at the sill and the type of wedge required for an evolution is determined using the following factors:

a. The number, type, and loading of vehicles and craft to be embarked/debarked and the effect on the ship's draft by gain or loss of their combined weight.

b. The sea state, wind, and size and direction of swells. Heavy swells have a tendency to push boats further into the well deck than desired. Cross swells cause craft in the well deck to lose control and should be minimized by creating a lee in the well by maneuvering the ship. Most conditions of heavy swells can be minimized by using the ship's engines to keep the head into or within a few points of the swells. Close and continuous coordination between Debark Control Officer, OOD, and WDCO is essential.

c. Frequent adjustments to the ballast condition may be required to optimize the depth of water in the well for the evolution or type of craft in operation. Example: An LPD 4 is embarking four LCMs in married nests of two each in a rough well. The proper procedure is to bring the first nest in to the forward spot and ground them quickly. The stern gate is then raised and deballasting commences. The second two LCMs are directed to stand off until the ship is deballasted. When they are called into the well, the deballasted condition allows for a quick grounding and securing of the craft. This procedure is much safer than bringing in the second nest immediately after the first and holding the first nest in place with lines while the ship fully deballasts.

2.7. Precautions

a. Water in any fuel oil tank that returns after a stowage tank is stripped could be a result of structural damage. Immediately report presence of water in fuel oil stowage tanks to the MPA, DCA and Chief Engineer and aggressively pursue the contamination source. All ballast tanks sharing a bulkhead with fuel oil tanks, and ballast tanks with fuel oil piping transiting them shall be tagged out of service until the source(s) of contamination is/are determined.

b. Safety precautions must be taken (i.e., warning signs posted, observer stationed at accesses, use the two-man rule) when manning air compressor rooms while compressors are in operation. Failure to properly align ventilation could result in a vacuum formed in the deballasting equipment room and could result in damage and/or personnel injury or death.

CHAPTER 3

OPERATIONS OF STERN GATE

3.1. General. The stern gate provides ready access to the well deck during amphibious operations and protects the contents of the well deck from wind and weather. The stern gate is raised and lowered by hydraulically-operated equipment. The power unit generally consists of a reservoir, two main pumps, two hand pumps for use in the event of power loss, and a hydraulic manifold (valve block) with directional, check, and counterbalance valves. These components are connected through high pressure piping. The hydraulic cylinder system supplies pressurized hydraulic fluid for operation of hydraulic rams which cause the gate to open or close. Two electric motors each drive a vane type, constant volume pump which draws fluid from the reservoir through suction strainers, located in the reservoir. The fluid is discharged from pumps, through check valves, to relief valves which limit the system pressure to prevent damaging system components by overpressure. The relief valve is connected to the system so fluid normally passes from the check valve, through the horizontal passage of the relief valve, and on to the manifold. The large vertical passage at the bottom of the valve is connected to the reservoir. The purpose of the valve block is: (a) to control the direction of fluid flow to the hydraulic cylinders for opening and closing the gate and (b) to maintain control of the gate when it is fully or partially open and is being acted upon by sea forces. During opening and closing operations, the valve block is operated by a remote control receiver, which receives a signal from the remote control transmitter, located at the control station.

a. Auxiliary Hydraulic Pump Operations. An auxiliary hydraulic pump may be provided for emergency operation of the stern gate. When electrical power is lost or both main pumps are inoperable, a portable low pressure, air-driven motor can be attached to the auxiliary pump to supply hydraulic pressure. Instead of a portable low pressure motor, a hand pump can be used.

b. Hand-Powered Operations. The differences in hydraulic system line-up for hand-powered operation vice pump operation are in the flow path from the service tank to the manifold. For each pump, an isolation valve for pump discharge is located on the outlet side of the relief valve along with a relief valve

return line isolation valve. For hand-powered operations, both of these valves must be closed. The pump discharge valves are mechanically interlocked to power cut-off switches for the pump motors. Two hand pumps are provided. The pumps may be used either independently or in parallel. The hand pumps are for use in case of failure of the electrically-driven pumps.

c. Ram Valving. Bypass valve systems for each ram assembly may be used to lower the gate in situations when power is not available. The bypass valves isolate the ram assembly from the main hydraulics system. When the bypass valve is opened, the ram assembly inlet and outlet valves must be secured. The ram assembly may be hydraulically locked in any desired position by closing the inlet and outlet valves and leaving the bypass valves closed. This procedure should be used only in the event of failure of the counterbalance valve and emergency situations. In the event of battle damage, proper use of the bypass and isolation valves will allow the gate to be lowered on one cylinder power operation or no power available and on either cylinder.

d. Ram Markings. Both stern gate operating arms will be marked to indicate 45 degree, 90 degree, and stop position. Markings will be 6-inch wide white bands. The 90 degree marking will have a 1-inch black band in the center, the stop marking will have two 1-inch black bands in the center and a 3 inch yellow band marked to indicate 10 degrees below horizontal position for LCAC operations.

CHAPTER 4

WELL DECK COMMUNICATIONS

4.1. General. The success or failure of any operation is keyed to the level of expertise in planning and communications. Amphibious operations are by nature complex and span every phase of command, communication, and control spectrum. Accordingly, each officer and crew member must be trained and prepared to use all available communications systems. Adding to the complexity of effective communications during assault craft operation is the inherent high level of noise from ventilation and engines in the well deck. The noise level dictates uniformity in procedures and communications during these operations. Three primary methods of communication are available: Visual (hand and arm signals, lights and flags), general announcing systems and bull horns, and sound-powered phone circuits. Additionally, and unique to the LHA 1 Class and LHD 1 Class, is the Internal Voice Communications System (IVCS). The Man-on-the-Move System (MOMS) hand-held radio system has been adopted for use with LCAC, which also provides communications with the craft.

4.2. Procedures. Specific general announcing systems or sound-powered circuits are not designated for well deck operations; different circuits are utilized on different classes of ships. But in general, the following communications systems are used for the specified operations:

a. Launch/recovery of landing craft. Flags are used during daylight hours only; red and green wands are used at night or in reduced visibility in conjunction with the red and green traffic control lights attached to the ship. The flags to be used are:

(1) Signal flags:

(a) Red flag triangular in shape 36 inches across.

(b) Green 3-foot by 3-foot cloth flag.

(2) The well deck traffic control lights, signal flags, signal wands shall be prominently displayed by the well deck signalman as far aft on the wing wall as possible. The signalman will abide by the following:

(a) The green signal flag or wand shall be hand held and waved indicating a green or ready well.

(b) The red signal flag or wand shall be hand held and held motionless indicating a red or unready well.

(c) The red and green signal wands shall be used in conjunction with the traffic control lights during night or foul weather operations.

(d) Neither red and green flags nor red and green signal wands will be displayed simultaneously from the wing wall.

b. Loading and unloading of vehicles and cargo from landing craft and controlling the movement of AAVs and vehicles is accomplished by hand and arm signal. Figures 4-1 and 4-2 show various signals used in the well deck. Amber lighted wands will be used at night or in reduced visibility for controlling craft in the well deck.

c. In ships other than LHA 1 Class, sound-powered telephones are the primary means of communications between the WDCO, Debark Control Officer, Ballasting Officer, and Officer of the Deck. The general announcing system may be used in emergencies as a secondary means of communications. The LHA 1 Class utilizes the IVCS system as a primary circuit and sound-powered telephones as a secondary system.

d. All personnel including craft and amphibious vehicle crews, shall be trained in standard terminology per Appendix A. Clear and concise communications between control stations are paramount to safe well deck operations and vital during emergencies.

DAY AND NIGHT ENGINE CONTROL SIGNALS

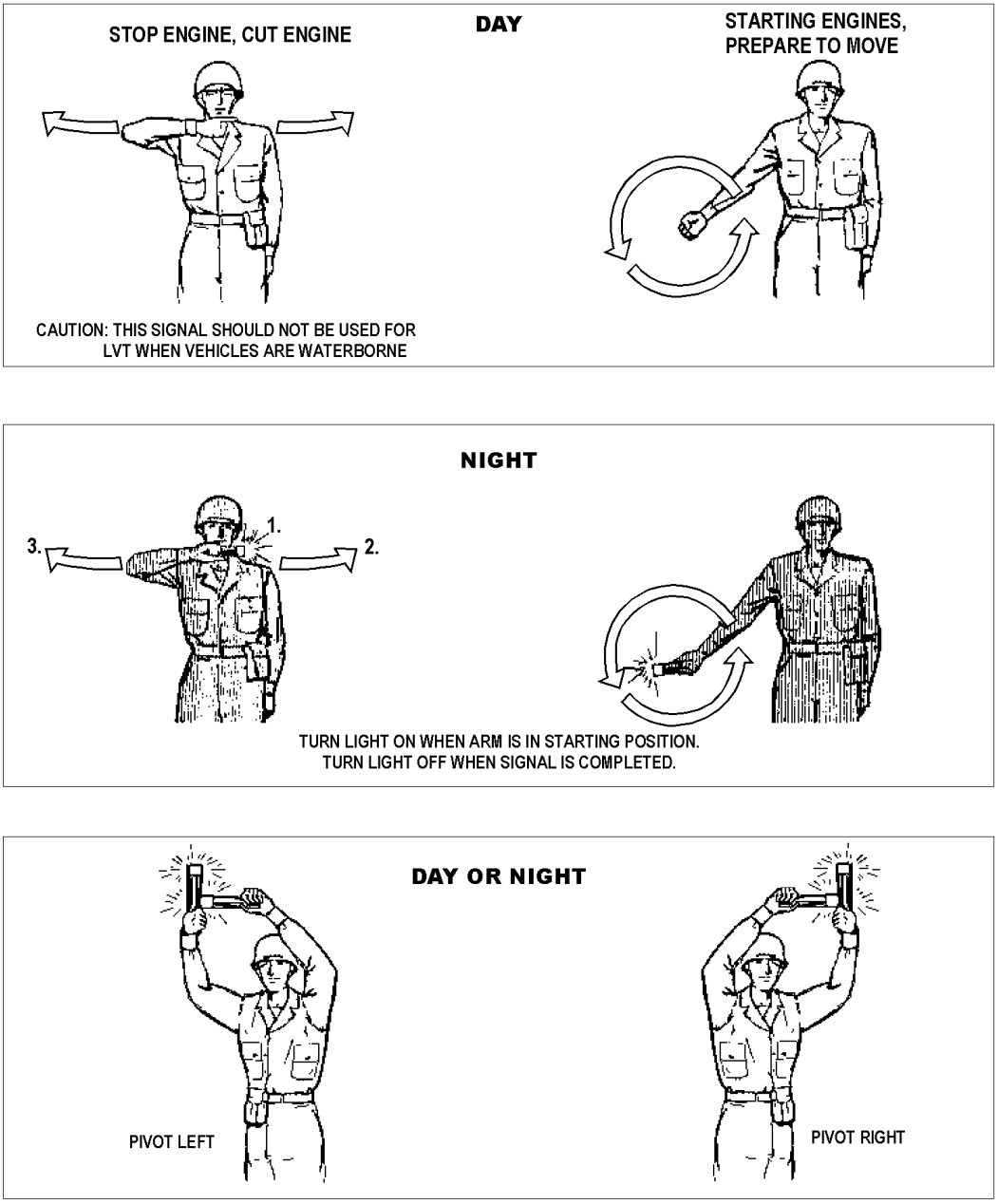


Figure 4-1
Day and Night Engine Control Signals

DAY AND NIGHT RAMP CONTROL SIGNALS

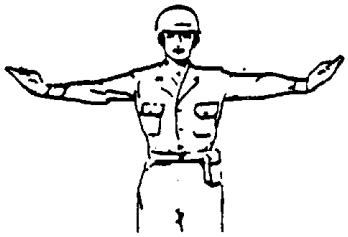
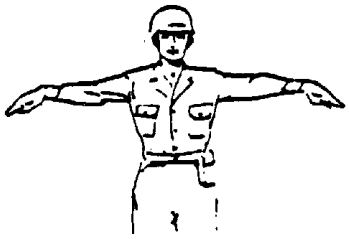
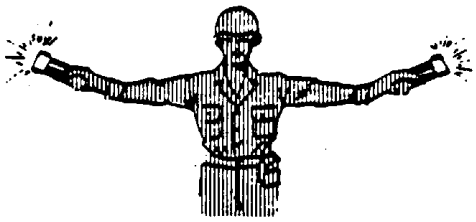
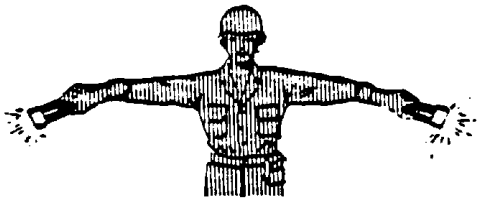
	RAMP UP AND DOGGED	RAMP DOWN
DAY	 ARMS HELD OUT PARALLEL TO THE DECK WITH HANDS HELD DOWN AND POINTED UP. (COXSWAINS ACKNOWLEDGE WITH SAME SIGNAL TO INFORM TRAFFIC CONTROLMAN RAMP IS UP AND DOGGED).	 ARMS HELD OUT PARALLEL TO THE DECK WITH HANDS HELD OPEN AND POINTED DOWN. (COXSWAINS ACKNOWLEDGE WITH SAME SIGNAL).
NIGHT	 ARMS HELD OUT PARALLEL TO THE DECK WITH WANDS POINTED STRAIGHT UP. (COXSWAINS ACKNOWLEDGE WITH SAME SIGNAL TO INFORM TRAFFIC CONTROLMAN RAMP IS UP AND DOGGED).	 ARMS HELD OUT PARALLEL TO THE DECK WITH WANDS POINTED DOWN. (COXSWAINS ACKNOWLEDGE WITH SAME SIGNAL).

Figure 4-2
Day and Night Ramp Control Signals

CHAPTER 5

EMBARKING AND DEBARKING LANDING CRAFT

5.1. Purpose. Well deck loading is the movement to or stowage of assault craft and amphibious vehicles in the well deck. The danger of salt water damage normally prevents stowage of items other than assault craft and amphibious vehicles in the well deck. Well Deck loading and unloading may be accomplished while the ship is pier side, in a protected anchorage, or underway. Operational necessity may not allow Commanding Officers to conduct operations under optimum conditions. Regardless of locale, weather, or sea state, well deck operations must be viewed as inherently dangerous operations requiring careful planning and execution. This chapter will provide loading and unloading guidance for assault craft and amphibious vehicles, and is applicable to the LSD, LPD, LHD, and LHA classes.

5.2. Control of Well Deck Evolution

a. The Debark Control Officer (DCO) is the overall control officer for all embark/debark evolutions.

b. The Well Deck Control Officer (WDCO) is in charge of all well deck operations.

c. The Ballasting Officer and Ramp Marshall/Petty Officer-in-charge (POIC) are responsible for carrying out the instructions of WDCO.

5.3. Planning and Preparation

a. Prior to commencing any well deck evolution, the POIC and Well Deck Safety Officer will conduct a safety and procedural brief. The ship's First Lieutenant and ship's Bos'n shall ensure these briefs are conducted prior to every evolution. The brief will include as a minimum:

(1) The requirement for complete battle dress, inherently buoyant or automatically inflating life preservers, safety shoes, protective head gear, and hearing protection.

(2) The sequence of planned or anticipated well deck evolutions.

(3) Expected conditions in the well when the ship is on station including swell and depth of water at the sill.

(4) Ship's speed.

(5) Communications circuits, signals, and standard commands.

(6) Anticipated craft orders after entering or when alive in the well.

(7) Line handling intentions.

(8) Man overboard or man in the well procedures.

(9) Procedural changes at darken ship (if applicable).

b. All communications systems shall be tested prior to commencing any well deck evolution. These systems include sound-powered phone circuits, general announcing circuits, powered megaphones, MOM radios, and ship's telephone.

c. The ship's ballasting bill is the primary reference for determining the proper depth of water in the well to meet operational requirements. Sea state and cargo stowed in well are major factors.

d. Ensure positioning lines are properly made up. A minimum of four lines will be used for positioning individual craft and eight lines for positioning boats nested together. Spare positioning lines will be readily available, on station, for emergent use. Four to five-inch, double-braided, nylon lines with an 18-inch eye splice shall be used for all well deck positioning lines.

e. Test traffic control lights and engine order light display.

f. Ensure all red and green signal flags are on station and well deck control lights are tested.

g. Energize well deck ventilation systems 30 minutes before the evolution.

h. Ensure all personnel working in the well are in proper battle dress including an inherently buoyant or auto inflatable life preserver and protective helmets are properly color coded.

i. Ensure all wingwall or catwalk cleats and t-bitts are properly color coded (from aft to forward red, white, blue, yellow and green; repeat the sequence as necessary).

j. While moving vehicles or cargo to or from craft in the well, ballast and adjust lines as necessary to ensure craft are grounded in the well. No movement of personnel or vehicles is authorized until the craft is sufficiently grounded to reduce the possibility of damage or injury.

k. General Craft Preparations

(1) Early in the evolution conduct radio checks on the primary and secondary radio control frequencies. Difficulties in establishing communications while craft are in the well are often symptoms of antenna masking or equipment problems; when circuit testing is conducted early in the evolution, technicians have the opportunity to attack the problem prior to launch. If still unable to establish communications in the well, conduct radio checks when the craft departs the well.

(2) Secure all gear adrift above and below decks.

(3) Ensure embarked personnel, not assigned as crew, are given a safety brief.

(4) Ensure all craft are equipped with current navigation and tide information for the operating area. This information should be included in the craft's boat book.

l. LCU Specifics

(1) Lower the mast, radar dome, search light, davit, jack staff, and railings which extend over 17-feet 9-inches above the keel (all items must be lowered to the same level as the conning platform).

(2) Ensure any cargo or vehicles embarked do not exceed 17-feet 9-inches above the keel.

(3) Ensure all MOGAS containers are properly secured in jettison-able racks topside or with direct access to over-the-side jettison.

(4) Ballast craft to minimize list and trim.

(5) Ensure all internal navigation equipment is operating correctly.

m. LCM Specifics

(1) Ensure the coxswain flat is clear of lines and gear which pose a trip hazard.

(2) Secure the mast and radio antenna.

(3) Ensure the compass is operating correctly.

n. Planning for an Underway Launch. Navigation, in particular water depth, is the greatest factor to be considered when planning an underway launch. The launch should avoid large variations in water depth, especially in depths less than 100 feet. When conducting underway launches in 60 feet of water or less, significant squat will occur at ship's speed in excess of 10 knots. Squat will cause abrupt changes in draft when passing over shallow areas. Squat not only affects the ship but also assault craft crossing the sill. In some cases, squat will double when increasing speed from 15 to 20 knots.

5.4. Wet Well Operating Procedure

a. Set Condition 1A. The WDCO will immediately man the well deck control station and commence review of the wet well operations checklist. The line captains will check on all line handling stations to see that they are properly manned, personnel are in full battle dress, and lines are on station, faked out, and free for running.

b. Once ballasted to the sill, open the stern gate to an approximate 45 degree angle (LPD/LHD/LSD) or open the stern closure (LHA), and continue ballasting to required depth. This allows for the gradual flooding of the well vice a surge if the stern gate was opened after ballasting was complete.

c. Lower stern gate to the stops when ballasted to proper depth.

d. Keep a favorable heading for embarking/debarking craft (normally into the seas).

e. Ensure assault craft set "ZEBRA" main deck and below prior to entering or exiting the well.

f. Make maximum use of control lines in conjunction with the craft’s engines to position craft.

g. While craft are waterborne, all lines will be manned. It is extremely important to ensure an adequate number of personnel are standing by lines in the event the craft shifts position before grounding. A single line handler per line is required to man the lines until the craft is secured in place.

h. When the landing craft are in position and the well dry, craft should be immediately secured for sea.

i. The Debark Control Officer will be kept abreast by the WDCO of the movement of assault craft in or near the well.

5.5. LCM Operations

a. Embark in LHD/LPD/LSD Class Ships

(1) LCMs may be embarked individually or nested in pairs. Craft will be called in by signal flag or by light as appropriate.

(2) Line handling sequence:

(a) Number 3 lines are passed around the forward outboard bitts or cleats on the craft as soon as practical after the craft crosses the sill. Number 3 lines are then tended as required for positive control from the wing wall catwalks. These lines should lead aft from the craft controlling the forward movement of the craft. If number line 3 misses, immediately pass number 4 line.

(b) The craft are maneuvered in the well using a combination of line handling and engine/rudder orders. For forward and aft movement, the craft should use its engines until properly positioned.

(c) Once the craft is in position, secure line 3 while keeping craft's engines going ahead.

(d) Pass over lines 2, 1, and 4 as displayed in figures 5-1 and 5-2.

(3) Sterngate may be raised to 45 degrees to minimize wave action.

b. Embark in LHA Class Ships

(1) LCMs may be embarked individually or in nests. Craft will be called into the well via well deck control flags, lights, or well deck announcing system.

(2) Line handling sequence:

(a) Lines will be set up on the port/starboard wing walls adjacent to a predetermined position to spot the LCM (only four lines will be used for each craft). These lines will then be walked aft about 60 feet from cleats or bitts from which the lines will be tended.

(b) When the LCM enters the well deck, the positioning lines will be passed to the LCM in the following sequence: 3, 2, 1, and 4, and secured to the LCM as indicated in Figures 5-1 and 5-2.

c. Debark from LHD/LPD/LSD Class Ships

(1) Debark craft individually or in nests, using the positioning lines to keep craft under positive control. Craft engines should not be started until ballasted to ensure proper engine cooling.

(2) Once craft is/are afloat and ready for debarkation, cast off Lines 1, 4, and 2.

(3) As the craft back out, take slack out of Line 3.

(4) Once Line 3 is up and down, cast off.

d. Debark from LHA Class Ships

(1) The positioning lines will be cast off in the following sequence: 1, 4, and 2.

(2) As the LCM backs out, take slack out of Line 3. When the Line 3 is up and down with the wing wall cleat/bitt, cast it off and let the LCM proceed out of the well deck.

(3) When the forward LCMs are afloat and ready to be debarked, cast off Line 1 then Line 2.

(4) As the LCMs start to move aft, take slack out of number 3 and 4 positioning lines. When Lines 3 and 4 are up and down cast off and let the LCMs proceed out of the well deck.

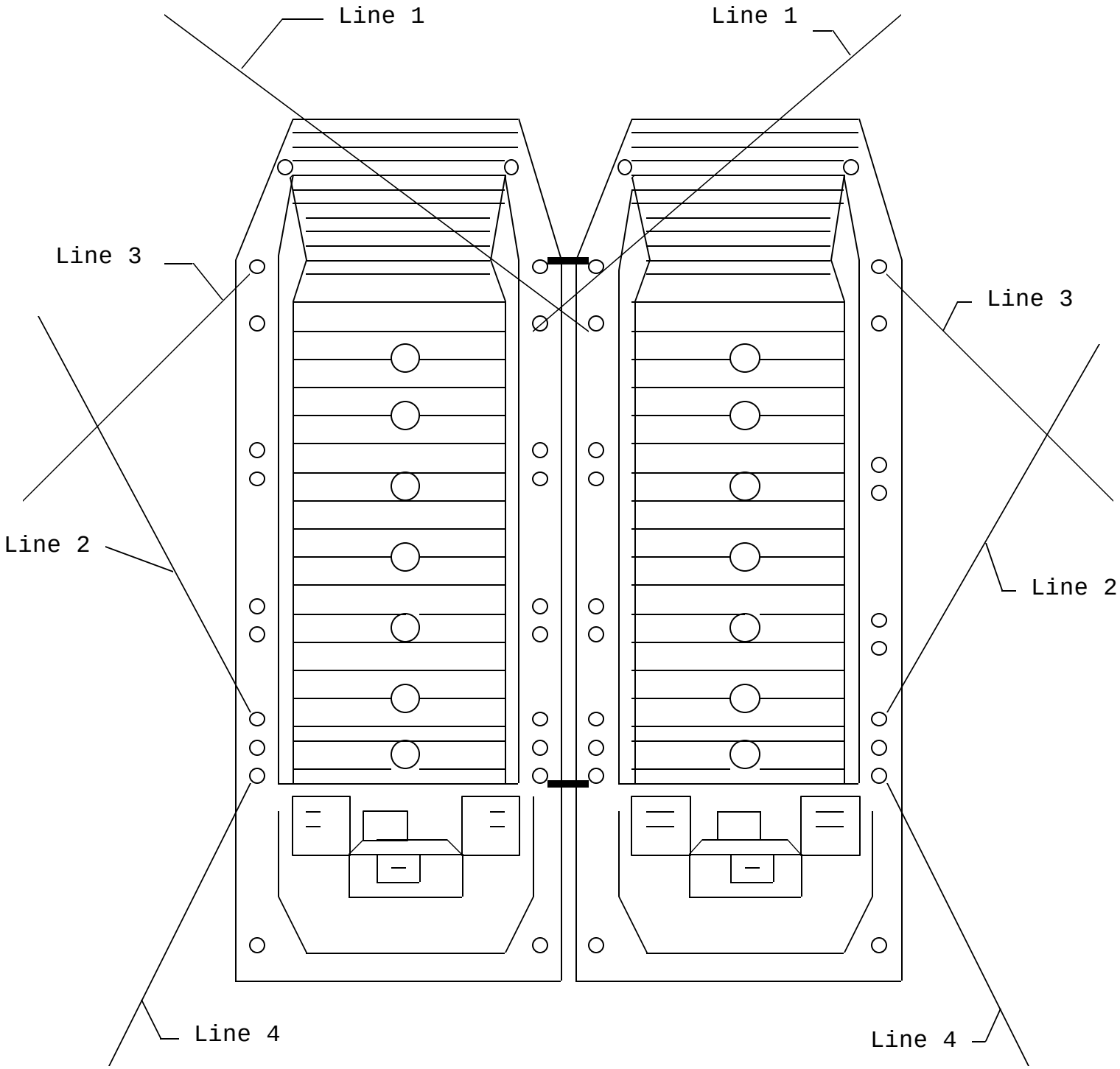


Figure 5-1

Line Handling Sequence for Married LCM 8

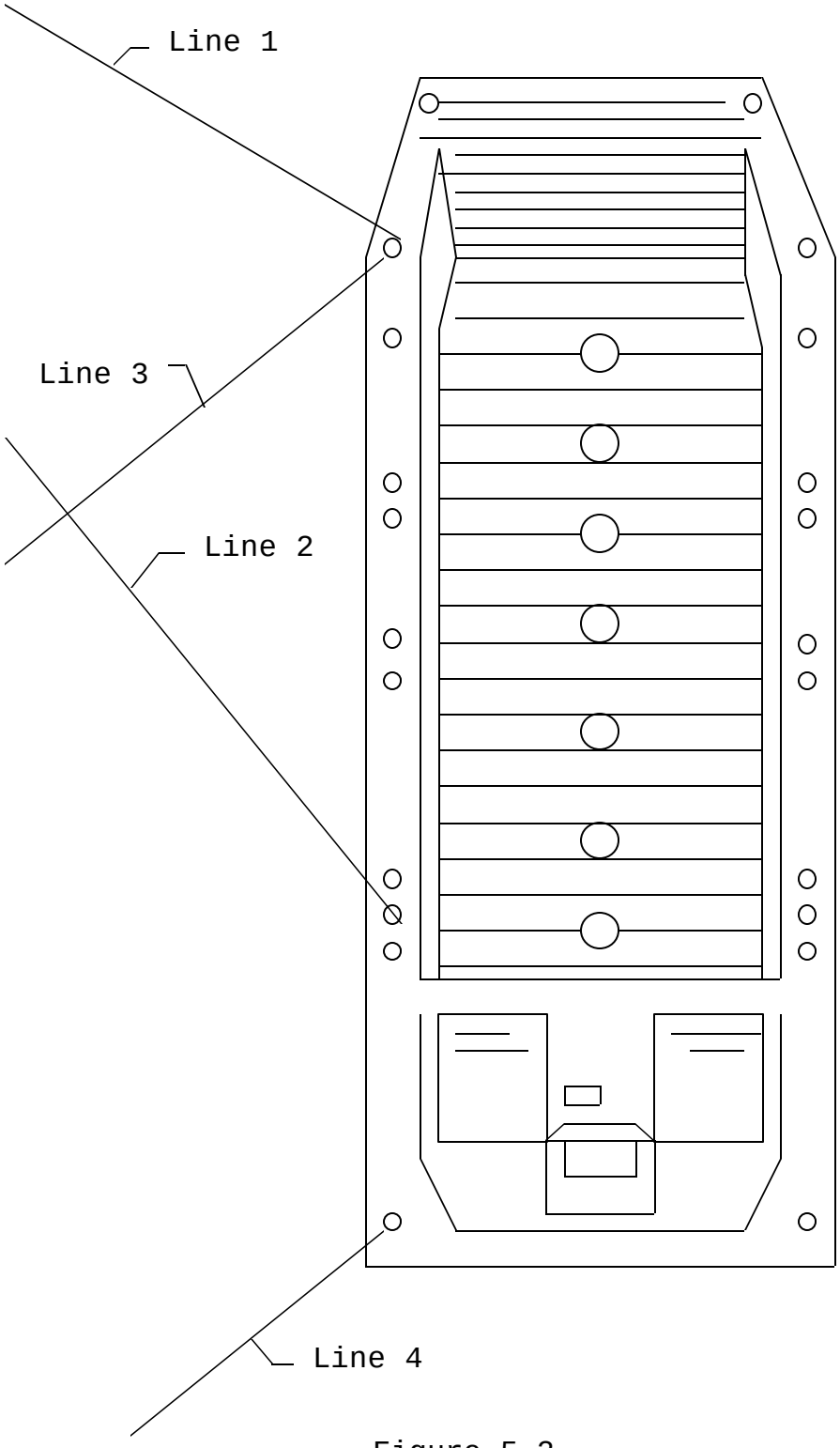


Figure 5-2

Line Handling Sequence for Single LCM 8

5.6. LCU Operations

a. Embark in LHD/LPD/LSD Class Ships

(1) LCU can only be embarked individually. When multiple craft are being operated together outside the well, those not embarking or debarking will stand off at greater than 500 yards to avoid impeding the maneuvers of the ship or the craft operating in the well.

(2) Line Handling Sequence:

(a) Lines will be set up on the port and starboard wingwalls adjacent to a predetermined position of the LCU. Line 2 will then be walked aft from cleats/bitts from which the line will be tended and passed around the forward bitts of the LCU as soon as practicable after the LCU crosses the sill. Line 2 is then tended as required for controlling forward movement of the craft.

(b) The craft is moved forward using its engines until Number 4 lines can be passed to the after bitts.

(c) Pass over lines 1 and 3 as indicated in Figure 5-3. Sterngate may be raised to 45 degrees to minimize wave action.

(d) As the craft moves forward to a predetermined position the lines can be shifted forward. Care must be taken to make sure that only one pair of lines are shifted at any given time.

b. Embark in LHA Class Ships

(1) Lines will be set up on the port/starboard wingwalls adjacent to a predetermined position to spot the LCU (only four lines will be used for each craft). These lines will then be walked aft about 60 feet from cleats/bitts from which the lines will be tended.

(2) When the LCU enters the well deck, the positioning lines will be passed to the LCU in the following sequence: 2, 4, 1, 3, and secured to the LCU as indicated in Figures 5-3 and 5-4.

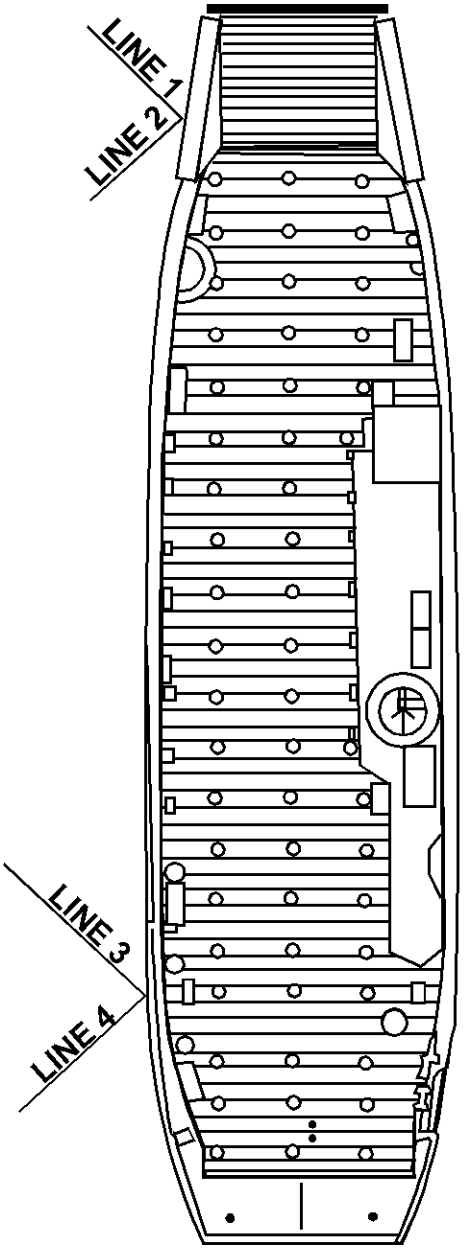


Figure 5-3
Line Handling Sequence for
Single LCU

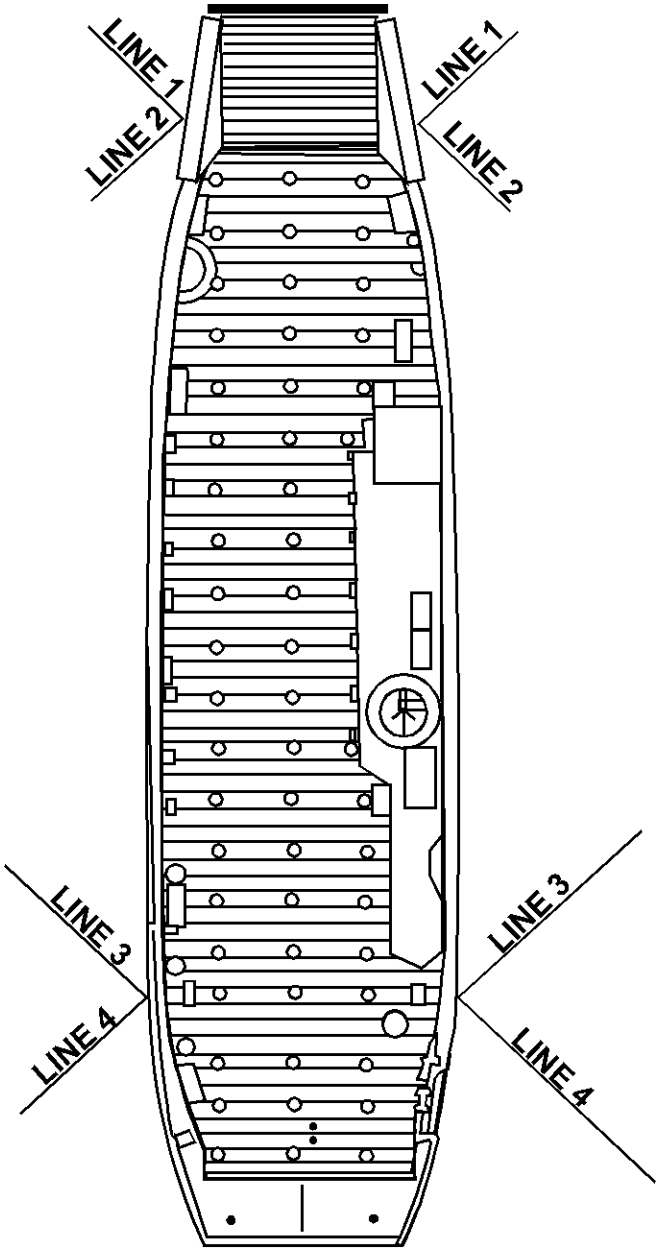


Figure 5-4
Line Handling Sequence for
Single LCU

c. Debark from LHA/LPD/LSD/LHD Class Ships

(1) When the LCU is afloat and ready to be debarked, cast off lines 1 and 3.

(2) As the LCU backs out, work the slack out of the number 2 and 4 lines. When the lines are up and down with the wingwall cleats/bitts, cast them off and let the LCU proceed out of the well deck.

d. For more guidance in advance planning, preparation procedures refer to FXP-5, Chapter 5.

5.7. LARC V Operations

a. Background. The LARC V is an aluminum-hulled, four-wheel, amphibious vehicle used by Beach Master units (BMU) for salvage operations in shallow water, surf zone, and beach. The LARC V is capable of operating from a wet well but extreme care must be taken to prevent bumping by other craft. The LARC V has no watertight integrity and is subject to severe hull damage and flooding if not properly controlled in the well. Wave action and improper line handling while moving craft in the well can result in significant damage to a LARC V. The loss of one LARC V seriously degrades the salvage capability of the BMU.

b. LARC-V Go/No-Go Criteria. The following information is provided to help decision makers plan a course of action when LARCs are used during open ocean operations. As a quantitative value for open ocean launches and transits, the following information should be as closely adhered to as pos sible keeping prudent seamanship skills in mind:

GO:
Ocean current - less than 4 knots
Swell height - less than 6 feet
Chop height - less than 4 feet
Wind speed - less than 25 knots if combined wave height is less than 3 feet

NO GO:
Ocean current - ship to shore movement greater than 4 miles should not be attempted at night or in conditions of low visibility, or when current is greater than 4 knots
Swell height - swell heights greater than 6 feet or

any combination of chop and swell heights greater than 6 feet.

Chop height - Chop height greater than 4 feet regardless of swell height.

Wind speed - wind speed greater than 25 knots regardless of wave height.

c. Embark and Debark of LARC V

(1) During embarkation, LARC V can be brought into either a dry well deck or up to 4 feet of water at the sill, depending on sea conditions and, providing that there are no other craft alive in the well. With the stern gate lowered to the stops, the LARC V is less susceptible to damage. Once the LARC V is in land drive, it can maneuver as any wheeled vehicle. When operational commitments allow, LARC V should be brought into the well first to reduce the chance of bumping with other craft. If the LARC V is brought into a wet well with boats already in the well, the boats must be grounded to prevent damage to the LARC.

(2) During debark of LARC V, the well should have no more than 4 feet of water at the sill and the stern gate lowered to the stops. This allows the LARC V to remain in land drive and drive down the well deck and launch as it crosses the sill. The LARC V should be launched individually.

(3) During the embark or debark of LARC V, steadying lines should be used only in extreme sea states and at the discretion of the Well Deck Control Officer. Extreme care should be taken when using steadying lines, since they restrict the LARC V's ability to maneuver and may foul the craft’s propellers if improperly tended.

(4) Although LARC V are amphibious, they should be treated as boats during well deck operations. The ship must use proper flag and light signals when directing the LARC V to enter or exit the well.

(5) **The underway launch of LARC V is extremely dangerous and not recommended**. Although amphibious, the LARC V is not designed to enter the water at speeds in excess of 5 knots. LARC V have no watertight integrity and cannot be subjected to submersion as AAV (LVTP-7) can. If an underway launch is absolutely necessary, avoid ship speeds exceeding 4 knots. The

draw of the ship's propeller wash at greater speeds will cause the LARC V to submerge after clearing the sill and sink.

(6) The ship retains responsibility for the operation and safety of LARC V within the ship. The Beach Master Element OIC, however, is generally more experienced in the capabilities of the vehicles and should be consulted and make positive recommendations to the ship to prevent any difficulties in launching or recovering the LARC V.

d. Securing LARC V In the Well of LPD/LSD Class Ships

(1) The LARC V will be embarked and stowed according to the load plan, and secured for sea using eight 70K gripes as shown in figures 5-5 and 5-6. On LSD 41 and 49 class ships, LARC V may be stowed in the after portion of the well deck once all landing craft are grounded out. This will require embarking the LARC V last but the landing craft already in the well should be grounded out before the LARC V embarks.

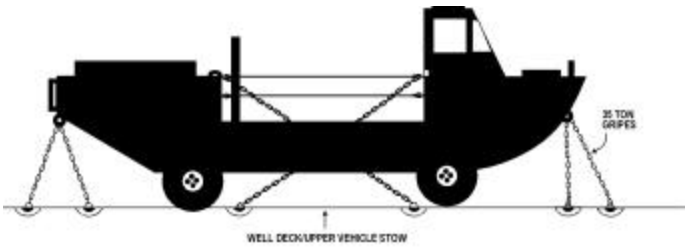


Figure 5-5
Lashing Requirements for LARC V
(side view) Aboard LPD/LSD

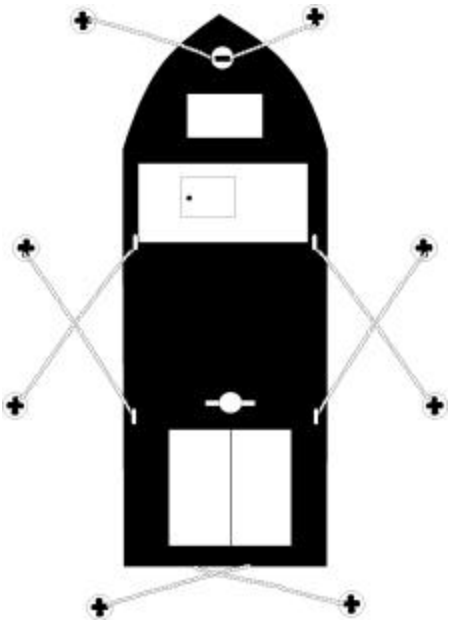


Figure 5-6
Lashing Requirements for LARC V
(top view) Aboard LPD/LSD

(2) All lashing must be tight. However, the LARC V does not have shock absorbers and any vibration transmitted through the deck can cause the vehicle to bounce. If the lashings are not tight, the LARC V could work itself loose from the lashing and damage cargo or vehicles stowed in the vicinity. If a heavy strain is put on the lashing, the vehicle can not absorb deck vibrations which will cause damage to the tires and hub seals.

e. Securing LARC V in LPD Class Ships on the Well Deck Incline

(1) Securing Procedure:

(a) Ballast for embarking the LARC V.

(b) Upon receiving a green well, the LARC V will individually enter the well and proceed as far forward as possible without climbing the incline.

(c) The LARC V is turned around and backed up to the bottom of incline ramp.

(d) All personnel except the driver and mechanic disembark via stern and proceed to the upper vehicle stowage deck.

(e) Keep all personnel clear and aft of the LARC V. At no time should anyone be in front of a LARC V maneuvering on the incline.

(f) The LARC V then backs up the incline ramp to a point where BMU personnel can connect two 70K gripes to the stern of the LARC V according to Figure 5-7.

(g) The LARC V will then be eased forward until both gripes take an even strain. All unnecessary personnel must be kept clear of the area in case a gripe breaks.

(h) The LARC V wheel brake will be set and the engine secured. No one, except the driver and mechanic, will embark or debark the vehicle in this position.

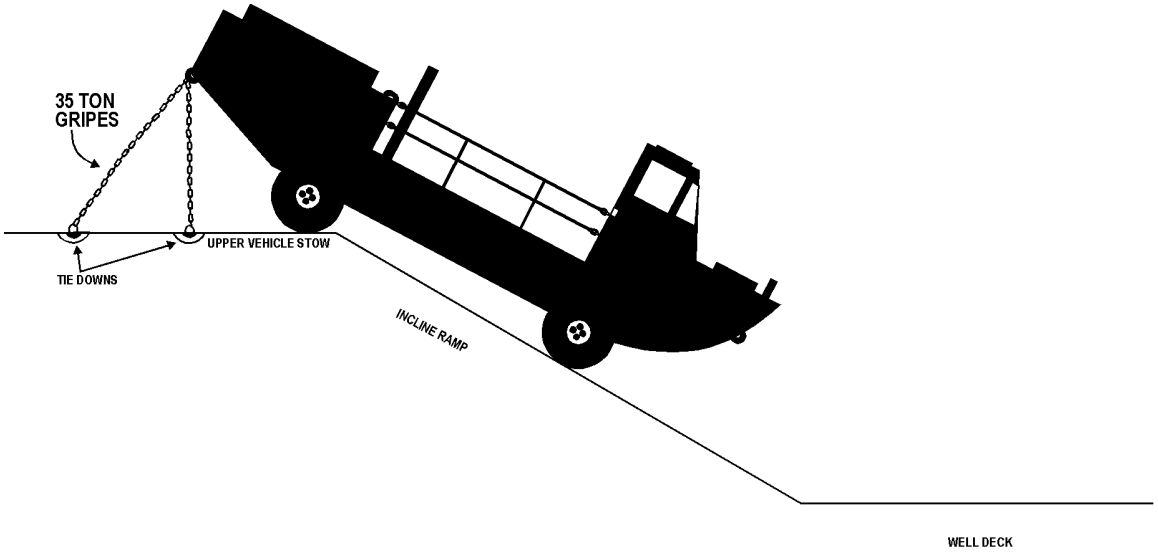


Figure 5-7
Lashing Requirements Aboard LPD for Temporary Stowage of LARC V (sideview) on Incline Ramp

(2) Unlashing a LARC V on an incline.

(a) If operating assault craft from the well, ballast down, debark the craft, and ballast up to a dry well before attempting to move a LARC V on the incline.

(b) Embark the driver and mechanic on the vehicle and back the LARC V sufficiently to slack the gripes.

(c) Before removing the gripes the driver should engage the brake and keep the vehicle in reverse.

(d) Remove the gripes and clear all personnel away from the vehicle.

(e) Disengage the brake and move the LARC V to the bottom of the incline (onto a flat surface).

(f) Embark personnel and equipment only when the LARC V is on a flat surface.

5.8. Combat Rubber Raider Craft (CRRC) and Rigid Raiding Craft (RRC) Operations. Planning and preparations for RRC and CRRC operations are discussed in FXP-5 Chapter 5. Guidance on

specific procedures for CRRC operations is given in COMNAVSURFPAC/LANT Instruction 3000.15 and Fleet Marine Force PAC/LANT Order P3000.15 (Standard Operating Procedures for Raiding Craft).

5.9. Underway Launch of Assault Craft

a. Launch Procedures. Although well deck launch of craft is normally accomplished at anchor or while at bare steerage way, there is a significant tactical advantage to conducting underway launch of these craft at speeds in excess of 10 knots. The procedures for underway launch of craft are identical to those discussed for static launch. Of the greatest importance is maintaining a steady course until craft are clear of the well and safe to maneuver on their own.

b. Launch Speed. The major limitations to launch speed are safe navigation, craft limitations, and sea conditions. **The maximum allowable speed for launching LCU is 12 knots and 16 knots for LCM, at a maximum sea state of 4.** A launch speed of over 8 knots for LCU and 10 knots for LCM requires a highly trained crew and operational necessity.

c. Stern Gate Angle: Ideally horizontal (90 degrees) and in no case should it be more than 5 degrees below the horizontal.

d. Draft Changes During Underway Launch. When a ship increases speed, particularly in shallow water, an appreciable amount of hull sinkage occurs; the term for which is squat (Fig 5-8). As the ship's speed increases, the crest of the bow wave moves aft along the ship and the bow rides up on the bow wave (Fig 5-9). Squat is even more pronounced when operating in shallow water in a ballasted condition. Commanding officers are cautioned to be alert to problems in stability and control when passing from deep to shallow water due to squat. Because squat causes a dramatic increase in draft (up to 8 feet), all openings above the ballasted water line (which could allow water to enter the ship) should be secured to reduce the possibility of inadvertent flooding. At higher speeds, abrupt changes in draft aft will occur when passing over shallower areas. In some cases squat will double when increasing speed from 15 to 20 knots.

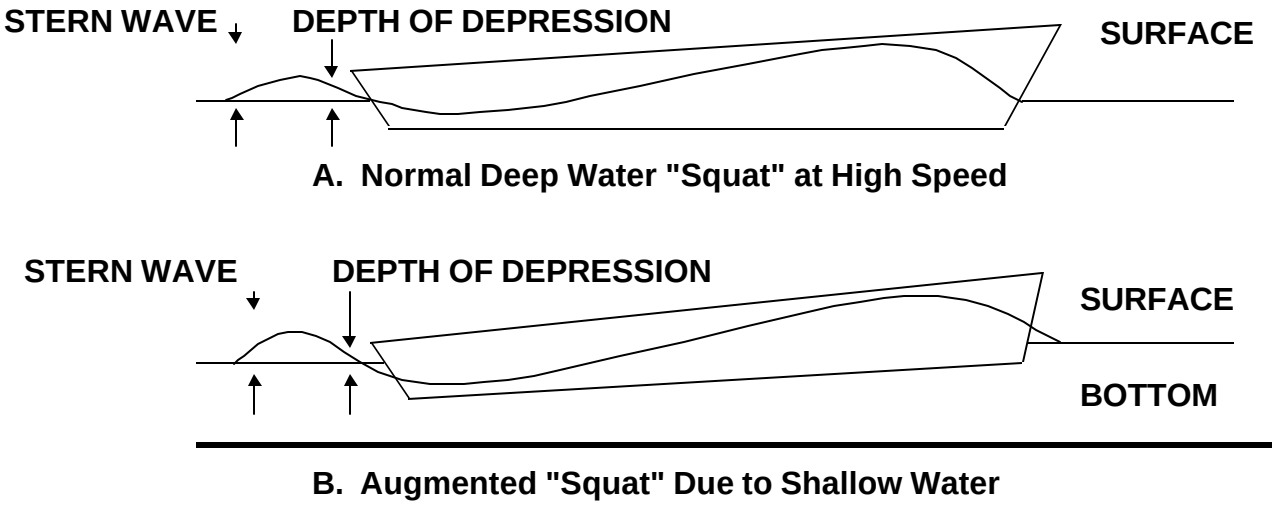


Figure 5-8
Normal and Augmented "Squat"

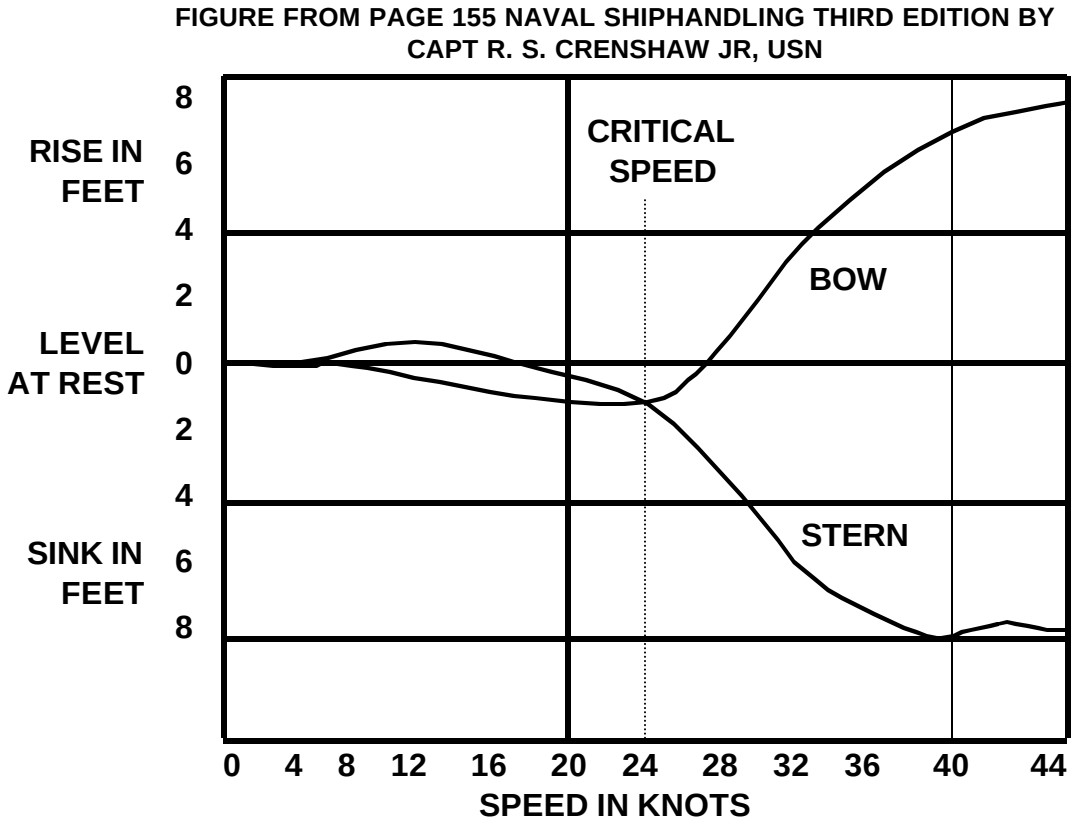


Figure 5-9
Changes in Level of Bow and Stern as Ship Increases Speed

5.10. Heavy Weather Operations

a. Safety is always paramount. The most serious threat to safe wet well operations is heavy weather. Wet well operations in conditions of high winds and seas shall not be conducted unless operational necessity dictates. This decision can only be made by the Commanding Officer or by higher authority. There are steps, however, which should be taken to ensure that safety is maximized while conducting wet well operations during heavy weather.

b. For the purpose of this instruction, heavy weather is defined as any sea condition which, because of swell or wave action, causes the depth of water over the sill to vary 6 feet or more (+/-3.0 ft from nominal depth). In these conditions, the risk of injury or damage to ship or craft becomes sufficiently high that well deck operations should be suspended unless necessary to meet tactical requirements.

c. Special Considerations

(1) As previously stated, wet well operations in heavy seas are dangerous and should be conducted only when operational necessity dictates. The violence of surf and white water in the wet well, which occurs when sea conditions worsen, is substantial. Heavy weather operations should be conducted by experienced shipboard and craft crew personnel only. Following seas greatly affect the surf height in the well. The ship must be headed into the seas to minimize this effect.

(2) Craft positioning upon crossing the sill can be critical. If the craft is not centered when crossing the sill, it increases the chance of hitting the catwalk overhang.

(3) Timing is critical. Timing can mean the difference between surfing into the well or into the overhead of the well deck. Once given a green well, timing must be controlled by the craftmaster/coxswain for entering the well deck.

(4) If the ship is yawing so as to make it difficult to conduct well deck operations at anchor, consideration should be given to getting underway.

(5) As weather conditions deteriorate, the ship should get underway and maintain bare steerageway and a heading into the seas. Note that once the craft has been taken into the

well, an increase in ship's speed can be beneficial. Not only does the additional speed help stabilize the ship, it also aids in deballasting by allowing water to siphon out of the well while hindering water from entering the well due to swell action. Speed at this time would be determined by gauging the wave length, direction, and interval. Ships with air deballast systems should take care not to blow centerline ballast tanks dry with way on the ship to prevent the possibility of air-locking condensers and vital pump sea suction.

(6) Stability of the ship in heavy weather wet well operations must be considered. Putting water into a well obviously affects hog and sag stresses placed on the ship. The DCA must advise the Commanding Officer before the evolution as to the effect on the stability of the ship in heavy seas with added water weight in the well.

(7) Proper lashing and securing of all craft in the well must be accomplished quickly by the boat crews and others to speed the evolution. In the case of heavy weather, this evolution must be accomplished before turning the ship out of the seas.

(8) Normal craft embarkation procedures as discussed previously in this chapter will be used.

d. Craftmasters and Coxswains Considerations

(1) If the craftmaster or coxswain considers the ship's position or sea state a potential hazard to craft or personnel, this information should be relayed directly to the ship's Commanding Officer.

(2) The craftmaster of an LCU is appointed in writing as an Officer in Charge (OIC) and is responsible for the craft's operations and safety. If weather or operational considerations necessitate a well deck ship to either embark or conduct well deck operations against the specific recommendations of the craftmaster, the matter and circumstances will be entered in the ship's and craft's deck logs.

(3) The radar typically installed on landing craft (including LCU) operate at low power and poor weather conditions further reduce their range. They are normally limited to an effective range of about 10 miles. Therefore, if visibility is reduced to 1/2 mile, the OIC of the LCU will evaluate the

situation, taking into account the navigation and surface contact pictures. If unable to safely operate in reduced visibility, the OIC is authorized to terminate the evolution and will make appropriate entries in the craft's deck log.

(4) LCM-8 coxswains suffer limited visual observation range due to the low elevation of the coxswain flat. When visibility drops to 1/2 mile or less, operation of LCM-8s should be secured. The Primary Control Ship (PCS) should take positive control of all craft in low visibility and guide them via radio to the closest safe haven.

5.11. Water Barrier Operation on LSD 41 Class Ships

a. Background. LSD 41 class ships have a single water barrier extending across the well at frame 73. It is 12 feet 3 inches high, constructed from steel I beams, covered with well deck planking, which normally lies flush with the deck. A molded gasket is fitted on the forward edge of the deck recess and port and starboard bulkheads to provide a watertight seal when the water barrier is in the raised position. Three batter board panels on the side of the well are hinged at the top and can be pulled out of the way of the barrier. The water barrier is hoisted into position using the well deck bridge crane alone or main deck cranes in tandem.

b. Method of Operation

(1) The primary method of raising the water barrier is using the main deck cranes to hoist the hinged batter boards and the bridge crane to hoist the water barrier into position.

(a) Two strongbacks or spreader bars are attached to the bottom of the three-hinged batter board panels and attached to a three-legged sling which is hooked to the main deck crane per NAVSEA DWG 634-4800892. The retainer pins are removed from the bottom of the hinged batter boards which are then hoisted to a horizontal.

(b) The bridge crane is then spotted forward of the water barrier (about Frame 63) over the fairlead attachment points. Remove the securing device holding the water barrier flush to the well deck. The hoisting wire rope is attached to the “D” rings at the sides of the barrier, run through fairlead sheaves in the overhead of the well deck, and aft through fairlead blocks to the bridge crane’s port and starboard hooks.

The bridge crane trolleys are spotted directly above the fairlead snatch blocks. The water barrier is hoisted into the upright position and locked in place by dogging bolts on both sides of the well. Once secured in the up position, the water barrier is ready for use.

(2) The bridge crane may also be used to move the hinged batter board panels vice using the main deck cranes. Two strongbacks or spreader bars are attached to the hinged batter boards. A fairlead snatch block is attached to each strongback. The hoisting wire rope is dead-ended at a padeye in the overhead above the set of batter boards to which it is attached. The wire runs through the snatch block on the strong back, across the well deck to a snatch block in the overhead, down to a fair lead sheave with the eye, and to the hook on the bridge crane's in-haul system. This configuration allows the starboard carriage to hoist the port batter boards and port carriage to hoist the starboard batter boards. The securing devices are removed from the bottom of the hinged batter boards and the power carriages run forward, hoisting the batter boards to a horizontal.

5.12. Operation of Boat Ramps in a Wet Well

a. During embarkation, bow ramps may be lowered when the craft is grounded out. For debarkation, bow ramps should be raised before flooding the wells. LCM engines may be started and ramps raised in a dry well. Once ramps are raised and dogged, engines will be secured until there is enough water in the well for cooling.

b. Operational requirements may prohibit completely grounding craft. Therefore, one exception may be when a craft partially grounds on a "false beach" developed by ballasting to a "steep wedge." This procedure allows for rapid embark/debark while safely taking the craft completely inside the well. An additional exception is when the sea state is such that the LCU/LCM-8 does not move when the well has water in it and therefore the embarkation can be accomplished without pumping the well completely dry.

CHAPTER 6

WELL DECK CARGO AND VEHICLE HANDLING

6.1. Planning and Preparation

a. Before the initial loading of cargo and vehicles, the Combat Cargo Officer and/or First Lieutenant will establish advance liaison with the embarking unit and review load plans, to be submitted by the embarking unit, for approval by the Commanding Officer. Load plans should be provided no later than two weeks prior to scheduled onload/embarkation.

b. Vehicles and cargo will be loaded according to the “approved” load plan.

c. All cargo and vehicles will be inspected by the First Lieutenant and/or Combat Cargo Officer to ensure safe handling conditions (e.g., pallets not broken, lifting pads intact on vehicles, etc.).

d. Ship’s personnel will ensure the ship’s allowance of lashing assemblies, cargo nets, slings, and material handling equipment, etc., is on hand and operational. Procuring lashing gear, wheel chocks, dunnage, and shoring for securing of vehicles and cargo is the responsibility of the ship. Further, any shoring required for assault craft is the responsibility of the ship in which the assault craft is embarked.

e. The ship will ensure proper cargo handling equipment is readily available and in good operating condition, and that all monorails, bridge cranes, conveyor sections, turn tables, cargo elevators, and forklifts are operationally tested before beginning the evolution. A review of the load plan will assist in determining the required handling equipment.

f. Ensure all cargo handling personnel are briefed in the methods, procedures, signals, and equipment used for the various lift types for their station. All personnel will be briefed on the appropriate safety measures to be taken and the required personal protective devices to be worn. Particular attention should be taken to discuss the safe operation of yellow gear and cargo elevators and hoists.

g. Ensure vehicle chocks are stationed and readily available where required (e.g., on deck, on board landing craft, etc.).

h. Ensure all cargo areas are clear of unnecessary gear and are properly roped off/posted to prevent unauthorized personnel traffic.

i. Based on the loading plan, ensure supervisors are aware of staging and yellow gear requirements. Supervisors should be briefed on and have in their possession an approved loading plan prior to commencing any cargo evolution.

j. Ensure all well deck ventilation is energized prior to commencing operations and telltales are rigged on vent ducting.

6.2. General Safety and Operating Procedures

a. When positioning landing craft in the well, attention should be made as to the location and accessibility of cargo handling equipment (monorails, bridge crane, yellow gear, etc.) have easy access, limiting the necessity of man-handling loads into position.

b. Cargo will be loaded according to the load plan; cargo will be serialized and prioritized prior to commencing any onload or offload and loaded as planned unless operational or tactical requirements dictate otherwise.

c. Personnel assignments will be made in accordance with the ship’s Battle Bill. Personnel not assigned duties in the well deck during cargo handling operations shall stand clear. Cargo handlers will be provided by embarked troops and available ship’s company and coordinated by the Combat Cargo Officer/ First Lieutenant. All cargo handlers will be briefed in the proper procedures, signals, and equipment to be used during the evolution.

d. Cargo slings will be inspected before use for frays, cuts, and current test data. Supervisors will confirm that the proper type and capacity slings are available to handlers.

e. Equipment operators will take orders from landing craft personnel when loads are suspended above their craft.

f. Cargo will be secured for sea in accordance with NSTM Chapter 9120.

g. Self-propelled wheeled vehicles will operate in low range and engage four-wheel drive when embarking or debarking landing craft or operating in the well.

h. Monorail operators will only board their cranes at designated stations using boarding ladders or platforms.

i. Ensure all cargo handling equipment (bridge cranes, monorails, yellow gear, etc.) have proper safety devices installed and are in good working order (i.e., fire extinguisher, escape line, extender pole for tripping the locking cylinder release, dead man switches, etc.). Escape lines on overhead cargo handling equipment must be long enough to reach the deck anywhere in the well.

j. Yellow gear, monorail, and bridge crane operators must use seat belts when equipped and wear authorized personal flotation devices and helmets during cargo handling operations.

k. Personnel will never stand or move under suspended loads. If it is necessary to “man” handle a load into position, tending lines will used to move the load.

6.3. LPD 4 Class Monorail Hoist System

a. General. The overhead cargo handling system consists of monorail hoist units and three concentric horseshoe tracks. Each electric tractor can support up to four trolley hoists for cargo handling, but normally only operates with two hoists. The three parallel tracks curve around the aft of the well and are open at the second deck platform for tractor maintenance.

b. On LPD 4 class ships, do not operate monorails aft on inside track until flight deck vehicle ramp is fully raised and dogged.

c. Specifics

(1) Capabilities. The monorail reaches from frame 91 to frame 261, the entire length of the well deck. The system is capable of moving 80 pallets per hour per tractor, up to 2 tons per load, between the cargo staging area on the third deck and landing craft in the well.

(2) Documentation. Specific operating and maintenance instructions for the monorail system can be found in LPD 4 Class Technical Manual 0378-040-8002.

(3) Safety. The following safety devices shall be checked per established PMS requirements prior to conducting cargo handling operations.

(a) Lighting. A 4-watt dome light is located in the top of the cab to light the cab interior. A flood light is located in the floor of the cab for lighting the area under the tractor.

(b) Fire Extinguisher. A dry chemical fire extinguisher will be mounted on a bracket inside the cab where it is accessible by the operator.

(c) Horn. A motion indicator horn is provided to warn personnel of tractor movement. The horn is energized from the cab.

(d) Brake. The drive motors are equipped with a magnetic brake. The brake will set automatically in the event of a loss of power. A manual release is installed in the cab.

(e) Limit Switches. Over travel, cam operated, limit switches are installed to prevent the traveling unit from running into the stops at either end of the rail system. Limit switches are also installed to shut off the hoist motor at the upper and lower limits of travel of the hook.

(f) Speed Control. Slow down cams are installed to slow or speed up the unit when entering and leaving the loading area.

(g) Electric Power Pickup. The pickups are mounted in a spark-proof enclosure to prevent igniting volatile fumes in the well area.

(h) Track Clamps. Tractors and hoist trolleys are equipped with a locking device to secure each hoist or tractor individually when not in service. The clamp crank is stowed in the cab.

6.4. LSD 36 Class Electric Hoist

a. General. An electric, wire rope hoist is installed onboard LSD 36 Class ships.

b. Specifics

(1) Capabilities. The hoist is capable of lifting 3 tons to a height of 28 feet and traversing the entire length of the mezzanine deck.

(2) Documentation. Operating and maintenance guidance is found in NSTM 0920-047-0010.

(3) Safety. The following safety devices shall be checked per established PMS requirements prior to conducting cargo handling operations.

(a) Brake. In the event of a power failure during the raising, lowering, or traversing operations, the brake on the hoist motor will automatically energize. Restoration of power releases the brake only when the operator actuates the push button on the control pendant. Should there be a power failure while a load is on the hoist, this load may be lowered using the manual override.

(b) Track Clamps. Clamps are installed to keep the hoist in a fixed position on the traverse rail for stowage and during hoisting and lowering operations.

(c) Wire Rope Guides. Installed guides keep the wire rope in its groove on the drum, preventing “bird caging” and kinks in the wire which may cause the wire to break.

(d) Electrical Power Cord. A reel is installed on the hoist to automatically take up the hoist’s power cord. The reel is equipped with roller cable guides and a spring for retrieving the cable. This reel is mounted on a swivel base.

(e) Manual Hoist Controls. A manual lowering mechanism is mounted on the hoist gearbox to safely lower the load in the event of power failure.

(4) Emergency Operation. There are two emergency controls installed on the hoist; one is electric to override the hoist and traverse motor overload cutouts, the other is manual

and used to safely lower the load in the event of a complete power failure. A qualified electrician should examine the hoist after the electric override is used.

6.5. LSD 41 Class Traveling Bridge Crane

a. General. A 15-ton traveling bridge crane is installed onboard LSD 41 Class ships. The crane has two 7.5-ton electric hoists, each with a single hook. The bridge crane travels along two guide rails which are attached to the wing wall.

b. Specifics

(1) Capability. The bridge crane can reach the area from frame 38 (stowed) to the center of LCAC spot 2 (frame 86).

(2) Documentation. Operating and maintenance information may be found in LSD 41 Class Bridge Crane Technical Manual SG-812-AG-MMA-010.

6.6. LHA 1 Class Monorail System

a. General. The monorail system is located in overhead of the well and vehicle decks. It can transfer palletized cargo between the longitudinal conveyor system on the center pier and the cargo deck of landing craft. Three tracks on each side of the center island service the port and starboard well deck frames 85 and 127. A single track runs forward on the centerline from the crossover unit to frame 80; it services the internal combustion shop on the port side. The crossover unit allows monorail tractor units to be transferred between the starboard and port loops.

b. Specifics

(1) Capability. The monorail system employs diesel engine powered tractors, each with two hoists. The tractors are capable of lifting 3,000 lbs. per hoist and may be operated in tandem increasing lift capacity to 3 tons. The track system supports up to nine tractor units. Utilizing all nine units, the system has the capability of delivering 10 pallets per minute. The maximum sustained delivery rate is expected to be 8 1/2 pallets per minute.

(2) Documentation. Specific operating, maintenance, and safety guidance may be found in LHA 1 Class Technical Manual SG-815-AA-MMA-010.

(3) Safety. The following items are safety concerns and should be reviewed prior to operating the monorail system.

(a) Deck Crew. Two crewmen are required to hook two pallet groups to the hoist, one at each side of the group. Only when the hoists are in a no-load condition will each cargo handler disconnect the hoisting strongback, by pulling the lanyard. The lanyards should provide simultaneous quick release of both hooks on the strongback.

(b) Hoist. When lifting, the operator should continue hoisting until the pallet makes contact with the tractor's anti-sway frame; a limit switch on each hoist unit prevents over travel.

(c) Track System. Track switch lights, mounted in the tractor, indicate the switches ahead are properly positioned for through passage. Interlocks are provided to prevent remote switch operation when the unit is passing over this section of track.

(d) Operation. The monorail can safely travel at speeds up to 300 feet per minute through curves and up to 500 feet per minute on straight tracks.

6.7. LHD 1 Class Monorail System

a. General. The cargo monorail system moves palletized cargo from the staging areas on the third deck to the well deck, traveling on tracks suspended from the overhead of the well. The monorail is also utilized to lift and transport landing craft engines to the internal combustion engine (ICE) repair shop for repair and maintenance. The track system runs between frames 54 and 129. Monorail tractors are stowed along the centerline catwalk between frames 62 and 79, and one tractor is stowed on the maintenance spur track between frames 54 and 61 on the port side. The track is divided into two interconnected port and starboard loops. The port and starboard ovals are comprised of 2700 feet of I-beam. Each loop is divided into three functional legs: the well deck leg, the vehicle deck leg, and the return leg. The vehicle deck leg provides a single track route through the cargo area to the forward end of the

well deck. At frame 85, the vehicle deck leg branches into parallel legs via a diverging hydraulic switch. These legs are referred to as the middle and inboard well deck legs. At the aft end of the well deck (frame 129), the inboard and middle well deck leg reconnect to the outboard return leg by means of a converging switch. The outboard return leg runs the entire length of the well and vehicle decks. The two loops normally operate independently, but may be connected by manually operated switches at frames 62 and 95. A spur on the port return leg between frames 54 and 64 provides access to the ICE shop for engine maintenance. A maintenance spur is also accessible from the port return leg, located between frames 82 and 85.

b. Specifics

(1) Capability. The monorail car is capable of hoisting two 3000-pound pallets for a total payload of 6000 pounds maximum. The cargo must be palletized and not exceed 54 X 54 X 48 inches in size.

(2) Documentation. Specific operating, maintenance and safety information may be found in LHD 1 Class Technical Manual SG-815-AE-MMA-010 and SG-815-AE-MMA-020.

(3) Safety. The following items are safety concerns and should be reviewed prior to operating the monorail system.

(a) Shock Absorbers. Each tractor has two shock absorbers to protect the operator from injury due to impact with other tractors. The forward shock absorber is a hydraulic cylinder and return mechanism hung from a separate trolley. The aft shock absorber consists of five die springs hung from a separate trolley at the rear of the tractor.

(b) Cargo Sensors. When hoisting pallets, the operator should continue lifting the cargo until it contacts the four pallet stop sensors at the base of the hoist. A fifth sensor indicates an empty strongback is two blocked. The sixth sensor indicates a slack cable.

(c) Operation. The train speeds are limited to 600 feet per minute on straight track or 300 feet per minute on curves. Traversing curves at greater than 300 feet per minute is extremely unsafe and will cause the red “unsafe curve speed” indicator on the operator’s instrument panel to light.

CAUTION

To prevent possible injuries or equipment damage, tractors should not approach each other (stopped or moving) at high speeds.

CAUTION

Attempting to change the direction of travel while the tractor is moving may cause equipment damage. The joystick must be centered (in the neutral position) and the tractor stopped before changing the direction of travel.

(d) Personal Protective Devices. The tractor produces high noise levels and operators and cargo handlers should wear appropriate hearing protection. Due to the inherent hazards associated with overhead cargo movement, cargo handlers must wear hard hats and safety shoes. Tractor operators will always utilize the seat belt and safety harness installed in the operator’s cabin.

(e) Tractor Brake. The tractor’s handbrake should not be released unless the tractor is secured with stowage bars, coupled to another tractor, or under the control of a trained operator.

(f) Heat Build Up. Both the tractor engine and hydraulic hoist system will get extremely hot after prolonged operation. Operating and maintenance personnel should allow tractors to cool down before any physical contact with the engine or hydraulic system.

(g) Indicator Lights. Operating a tractor with a malfunction is extremely dangerous. If any red indicator lamp on the operator's instrument panel is lit, the tractor must be returned to the maintenance area for corrective action.

(h) Hoisting Gear. Swinging strongbacks or cargo may cause personal injury or equipment damage. The strongbacks must be in the fully raised position before the tractor is moved. Slack hoist cable may cause cable damage, bird caging, or reverse rewind conditions; if the cables become slack, cease hoisting.

(i) Emergency Brake. To engage the emergency brake, the joystick is centered and the engine idle button depressed. If this doesn’t produce the desired effect, depress the engine stop button.

CHAPTER 7

WELL DECK FUEL AND AMMUNITION HANDLING

Ref: (a) OPNAVINST 5100.19C
(b) NSTM 0901-LP-583-0000
(c) OPNAVINST 8023.2C
(d) NAVSEA OP 4, Volumes I & II
(e) NAVSEA OP 4550
(f) NSTM 0901-LP-700-0000
(g) NAVSEA OP 3347, 2nd Revision
(h) CG 108
(i) SEAOPS, Volumes I & III

7.1. General. References (a) through (i) provide specific guidance on the safety precautions to be taken when fueling or arming assault craft. This section is intended as a supplement to the above references. Where conflicts exist, the referenced document shall govern. In any case, advance planning and strict observance of safety precautions will reduce the potential for accidents while handling fuel or ammunition in the well deck.

7.2. Fueling Procedures

a. The most important condition when refueling assault craft in the well is a stable deck. Reducing pitch and roll to acceptable limits allows for refueling while the well is wet. Otherwise the well must be cleared of water and the craft griped in place, severely impacting craft readiness time and movement ashore.

b. Although craft will not be operating their engines during refueling, well deck ventilation must be maintained to draw flammable vapors away from the fueling station. Well deck ventilation will be energized 30 minutes prior to fueling operations and will not be de-energized until 30 minutes after securing.

c. The smoking lamp will be secured prior to and during fueling evolutions. Additionally, no cargo handling machinery or vehicles should be operated in the immediate vicinity of refueling. Electric motors, brakes, or accidental metal to metal contact could cause a spark and ignite fuel vapors.

d. Fuel passing through a fuel hose can cause a static build up and discharge which could ignite fuel vapors. To reduce static, the fuel hose nozzle is provided with a grounding wire fitted at one end with a spring clip. Before removing the fuel tank cap, this clip should be clamped onto ground. Usually a ground is installed in close proximity to the fuel port. When fueling is complete, the nozzle should be removed and the tank cap secured in place before breaking the ground.

e. All non-essential personnel will debark the landing craft before fueling. One member of the boat crew will stand by with a portable extinguisher (PKP, HALON, or AFFF) for the duration of refueling. Supervisory personnel, from the ship's fuel lab, will oversee the fueling operation to ensure compliance with established safety procedures.

f. The fueling detail will establish communications with well deck control and/or the bridge prior to commencing fueling operations. The WDCO will authorize all fuel transfers.

g. An oil spill containment kit will be kept on station during all fuel or lube oil handling operations. Fueling team members must be trained in the deployment of oil spill kits routinely.

h. Although refueling of AAVs or rolling stock on board is done infrequently, the same precautionary measures taken during any refueling evolution must be rigidly enforced for these vehicles as well.

i. The fueling team supervisor should employ a checklist drawn from the above and references (a) and (b). The supervisor will report to the WDCO that the fueling checklist is complete prior to commencing any fuel handling evolution.

j. Refer to SEAOPS for procedures/precautions to be taken when refueling LCAC.

k. Although not recommended, Commanding Officers may grant authorization to Well Deck Control Officer for concurrent refueling, cargo loading and off-loading during tactical operations. Where concurrent refueling/loading/offloading operations are authorized, Commanding Officers shall establish procedures to ensure safety.

7.3. Ammunition Handling

a. Discussion

(1) Amphibious ships routinely carry large amounts of ammunition to support the landing force ashore. Coupled with the capability to transport this ammunition is the ability to safely transfer it ashore via helicopters or assault craft.

(2) Whether in a tactical environment, routine operations, or pierside, advance planning and knowledge of ground rules are essential to conducting an efficient and safe evolution. References (c) through (h) discuss ammunition handling in great detail; reference (e) is specific to each class of ship. Safety regulations are discussed in reference (g) and ammunition compatibility in reference (h). This section is intended to supplement these references and act as a ready reference when conducting ammunition handling in the well deck.

b. Procedures

(1) As in fueling evolutions, reducing pitch and roll should be the highest priority. This will allow craft to be loaded in a wet well and lessen the chance of pallets impacting with equipment and craft. Otherwise the well must be cleared of water and craft lashed down prior to loading, severely impacting on/offload timelines.

(2) If pierside or at anchor, early liaison with fire inspectors, base officials, or civilian authorities will ensure compliance with local regulations and procedures.

(3) Condition 1A or a modified Condition 1A shall be set ensuring all stations are properly manned.

(4) Fire hoses will be faked out and charged in and around the immediate vicinity of the well deck. A modified repair party (two fire teams) will dress out to provide fire fighting support.

(5) The smoking lamp will be secured prior to removing any ammunition from magazines. If ammunition has been pre-staged on deck, the smoking lamp must be secured and the ammunition protected from heat or excessive moisture.

(6) Ammunition handlers must be briefed by the weapons officer concerning their responsibilities, standard safety precautions, emergency procedures, and the schedule of events.

(7) Ammunition handlers will don proper battle dress, wear steel-toed shoes or boots, and remove all metallic items from their person, including jewelry, watches, and rank insignia.

(8) Safety observers will be posted at each handling station and will be thoroughly briefed on the schedule of events.

(9) An officer or senior enlisted from the embarked unit should be present in the well deck to aid the ship's First Lieutenant, CCO, and weapons officer as needed. He should be well versed in loading priority and pallet identification. He will also advise ship’s company on the proper lashing and dunnage to be used for securing ammunition in the landing craft. Dunnage will be used if loads are not palletized.

(10) At no time will cargo handling equipment carry more than one pallet of ammunition.

(11) Authorized ordnance handling equipment is specified in reference (e). Nylon cargo nets should be used to secure pallets once inside the assault craft. Pallets will not be stacked on each other; only a single layer is authorized.

(12) Personnel not involved in ammunition handling will keep clear. Observers must comply with battle dress and metal-free requirements.

(13) The Debark Control Officer is responsible for the safe movement of all cargo and must be kept informed of the situation in the well. The WDCO must exercise firm control over the entire evolution and ensure compliance with standard safety precautions.

CHAPTER 8

STERN GATE MARRIAGES

8.1. General. The most widely used method for loading vehicles and cargo is wet well operations as previously described. Other viable methods include partial grounding with steadying lines, sill marriage (LHA 1 class only), and stern gate marriage. Although these methods are even more dependent on calm seas and winds, each marriage decreases craft turnaround time, because continuous ballasting operations are not required.

8.2. Planning and Preparations

a. All personnel in the well deck or the vicinity of the stern gate will be in proper battle dress and properly briefed on the operation, safety precautions, and their responsibilities by position. Well deck traffic controllers and supervisors must have an intimate knowledge of the loading plan and expected schedule of events.

b. Ensure signal equipment (wands and flags) is readily available to traffic controllers.

c. Vehicle operators will be briefed on standard safety precautions such as turning off electric cabin heaters, rolling down windows, wearing seat belts, and engaging four wheel drive. Vehicle operators must stay with their vehicles until the vehicle is griped into place onboard the ship or landing craft.

d. Communications must be established between all controlling stations (e.g., well deck control, bridge, debark control, etc.) and landing craft.

e. Craftmasters, craft POICs, and vehicle operators must be briefed on signals which they can expect to see and planned responses to emergency situations.

f. Ensure marriage blocks, handling lines, and bull chains (rated to 35 tons) are on hand and in good condition. Bull chains must be used to hold the landing craft against the marriage blocks, particularly when loading tracked or wheeled vehicles.

g. Any passengers in the craft or vehicle will debark before vehicles are ungriped or started.

h. The craftmaster or craft POIC will ensure their crew is thoroughly briefed on marriage procedures and is in proper battle dress prior to an approach on the stern of the ship. Radio and visual communications should be established prior to the craft reporting on station and ready to commence the marriage.

8.3. Procedure. In general, stern gate or sill marriage procedure does not change with craft and ship type.

a. LCU Stern Gate Marriage with LHD 1, LPD 4, LSD 41, LSD 49, and LST 1179 Class Ships (See Figure 8-1)

(1) Prior to the craft arriving on station, the ship will set Condition 1A, place the sill at 1 to 2 feet above the water’s edge, and lower the ship's stern gate to the stops.

(2) Line handlers will position the marriage blocks, lines, and marriage chains in the well.

(3) On the LCU, a line handler will be stationed on each wingwall of the craft to receive the positioning lines from the ship.

(4) When the craft and ship are ready, the WDCO will signal by flags or lights for the craft to make the approach.

(5) The LCU will lower its bow ramp to approximately 90 degrees and make its approach on the stern of the ship in a slow and controlled manner.

(6) As soon as possible, the ship will pass positioning lines from the port and starboard wingwalls of the ship to the LCU and fairlead the positioning lines to the wingwall capstans.

(7) On LST 1179 class ships, the positioning lines will be crossed and made up to the bitts on the opposite bow from the wingwall supplying the line to assist in aligning the ramp with rhino horn.

(8) The LCU will use engines and rudders in conjunction with the ship's positioning lines to bring the bow ramp of the LCU up against the marriage blocks.

(9) Once the LCU is in position against the marriage blocks, the ship shall pass the marriage chains to the LCU.

(10) The ship will take the slack out of marriage chains using turnbuckles, ensuring an even strain on both chains.

(11) Although the craft is being held in place with lines and chains, the LCU will use ahead engines as required to hold its bow ramp in the marriage blocks.

(12) At this point, embarkation or debarkation into the well deck can begin.

(13) Upon the completion of loading evolution, the ship will remove the marriage chains and positioning lines, during which the LCU will use its engines to hold position on the marriage blocks.

(14) When line handlers and lashing gear are clear, the LCU will back away from the ship's stern, simultaneously raising its bow ramp. When free to maneuver, the LCU will proceed as instructed by the Primary Control Ship.

(15) Prior to conducting wet well operations, remove and stow all sterngate marriage blocks.

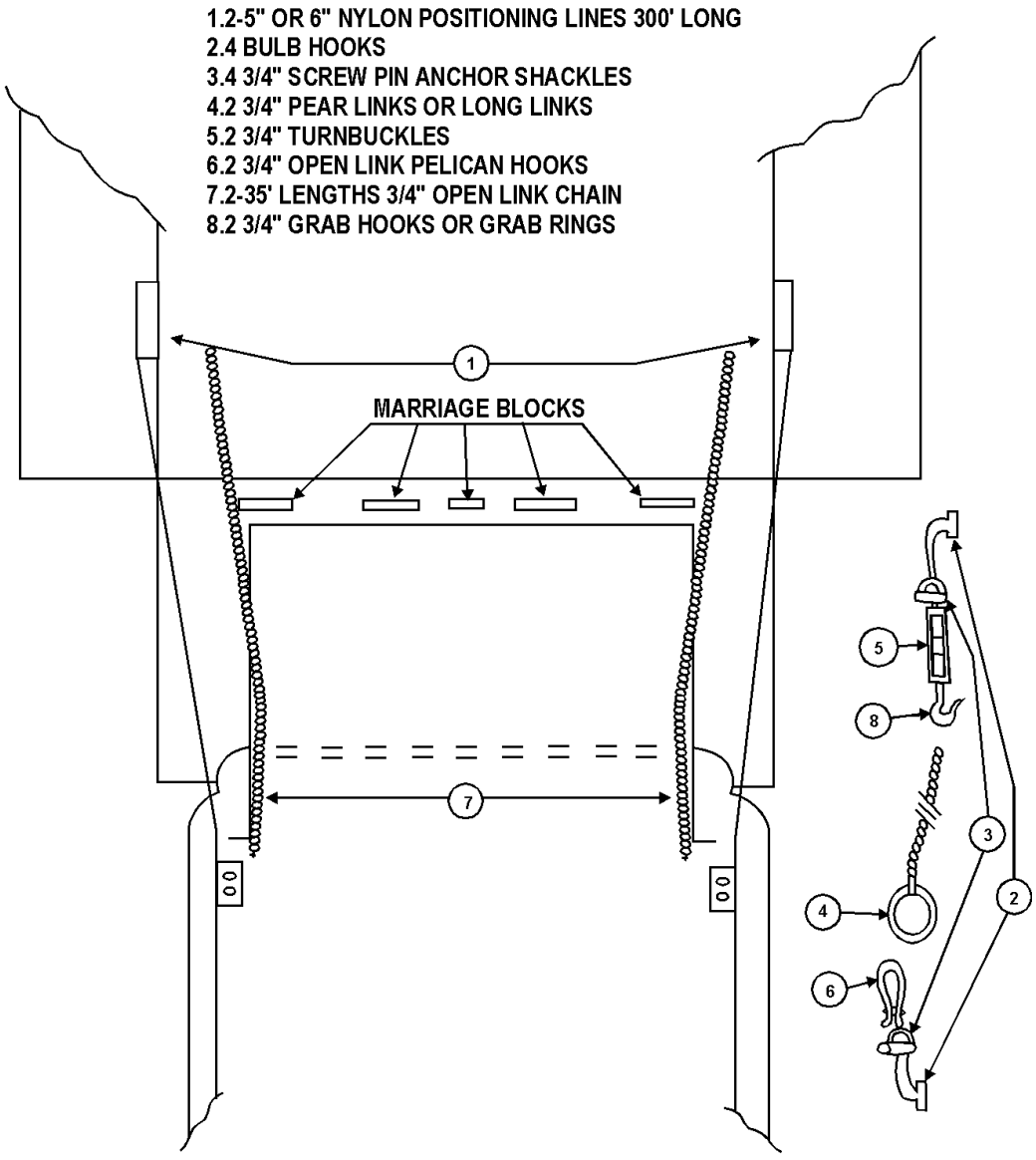


Figure 8-1
LCU Stern Gate Marriage to LSD/LPD

b. LCU Sill Marriage with LHA 1 Class Ships. (See Figures 8-2 and 8-3). This procedure is approved for wheeled vehicles weighing 5 tons or less. Once a vehicle has begun moving, it will not be allowed to stop unless its entire weight is in the craft or in the well.

(1) Prior to the craft arriving on station, the ship will set Condition 1A, raise the stern gate, and ballast to the sill.

(2) Once line handlers, fenders, positioning lines, and marriage chains are in position, the ship will signal by flags or lights that the ship is ready to begin stern gate marriage, and the LCU may begin its approach.

(3) On the LCU, a line handler will be stationed on each wingwall of the craft to receive the positioning lines from the ship.

(4) The LCU will lower its bow ramp to approximately 90 degrees and make its approach on the stern of the ship in a slow and controlled manner.

(5) When the craft’s bow ramp is approximately 8 to 10 feet inside the well, the ship will pass the bitter end of the positioning lines to the LCU.

(6) The positioning lines will be led through a padeye assembly to wingwall chocks and will be tended by the craft’s crew.

(7) The craft will slowly back away from the well while checking the positioning lines and lowering the bow ramp. Approximately 3 to 5 feet from the sill block (deck edge), the positioning lines will be held. The LCU will continue backing keeping an even strain on positioning lines until the bow ramp drops into the sill block.

(8) The craftmaster will shift his engines to an ahead bell and push the bow ramp against the sill block.

(9) When the LCU is ready, the ship will pass the marriage chains to the LCU. Once secured to padeyes in the craft’s well, turnbuckles will be used to take the slack out.

(10) When there is an even strain on both chains and lines, loading or unloading may begin.

(11) Upon completion of the loading evolution, the craft will cast off the marriage chains and positioning lines while maintaining an ahead bell to hold its position at the sill.

(12) When ordered by the WDCO, the LCU will back away from the sill and simultaneously raise its bow ramp.

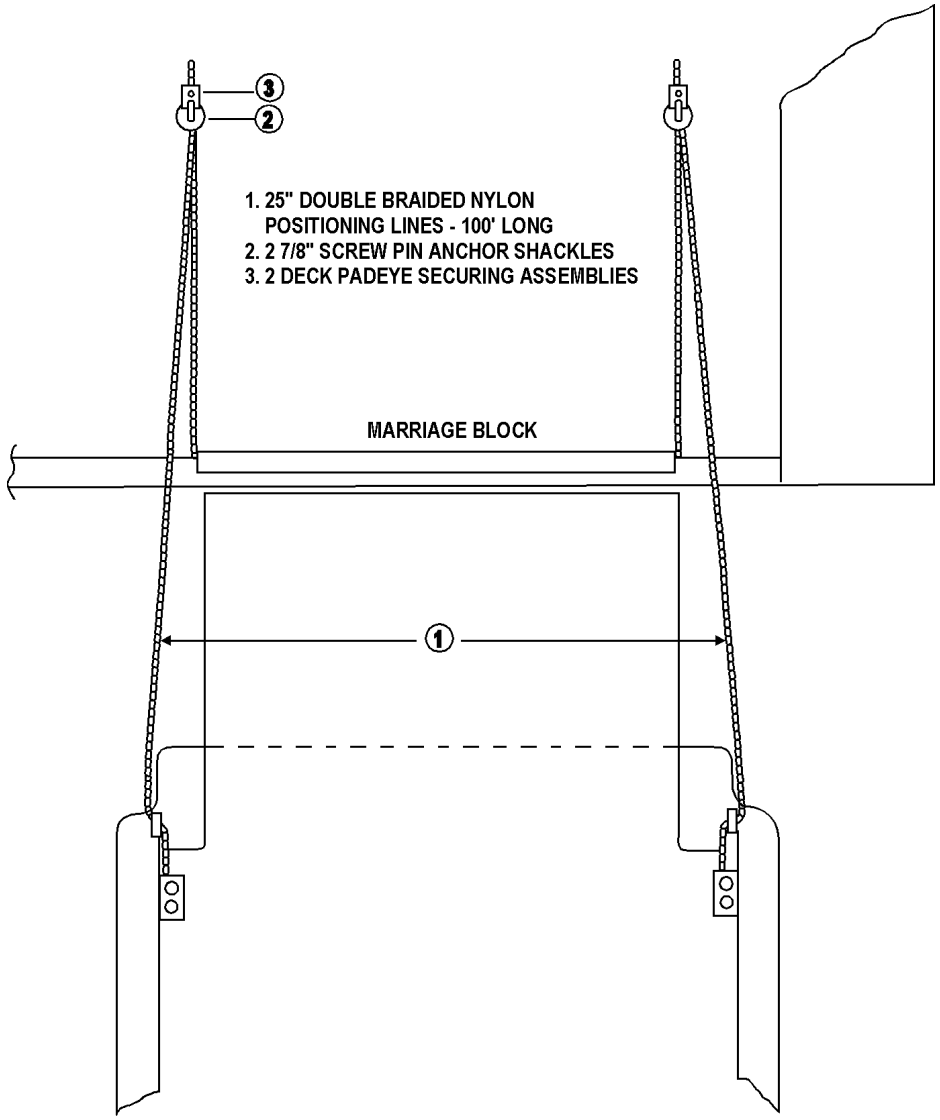


Figure 8-2
LCU Bow to LHA Stern Marriage

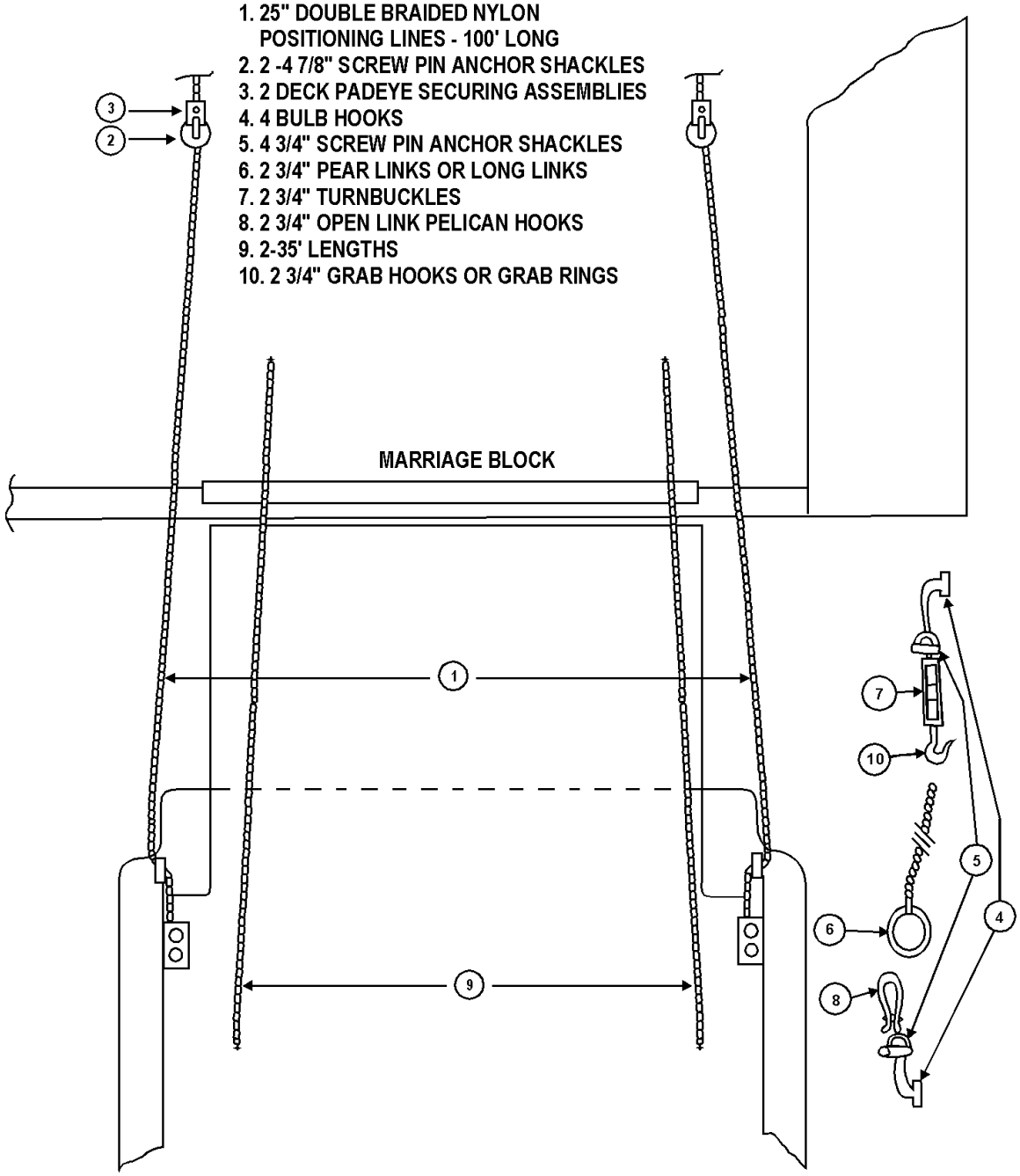


Figure 8-3
LCU Stern Gate Marriage to LHA

CHAPTER 9

AMPHIBIOUS ASSAULT VEHICLE OPERATIONS

Ref: (a) MCWP 3-13
(b) NWP 22-3
(c) NSTM Chapter 9120
(d) FMFM 9-2

9.1. General Safety

a. An important factor when operating with Amphibious Assault Vehicles (AAV) is visibility. Due to the vehicle's height and length, the driver's visibility is severely reduced, particularly when objects are close to the vehicle. When the hatches are secured and the driver is looking through 2 inches of bullet proof glass, their visibility is reduced even further.

b. The AAV will not to be loaded to a point reducing reserve buoyancy to under 5,000 pounds. The OIC of the AAV unit is responsible to ensure vehicle loading is safe and meets this requirement.

c. If an underway launch is planned, consideration must be given to not exceed maximum swim distance listed in reference (a).

d. Safety boats are mandatory during all waterborne evolutions. One safety boat is required for five or less vehicles; two safety boats when six or more vehicles are waterborne. Safety boat crews shall be manned by a standard boat crew (coxswain, boat engineer, bow hook) and a boat officer. If deemed necessary by the commanding officer, a rescue swimmer should accompany the boat crew. Safety boats will be employed per reference (b). The senior boat officer is designated Boat Group Commander (BGC).

e. The AAV detachment OIC will designate one AAV as the primary safety and recovery vehicle.

f. The Boat Group Commander(BGC)is responsible for the safe navigation of the safety boats and AAV. The BGC must stay vigilant to other surface craft operating in the launch area or navigation hazards not briefed.

g. All safety boat personnel are to be alert for the AAV distress signals when AAV are waterborne. The following standard signals will be used:

MESSAGE	LIGHT CONDITION	SIGNAL
Vehicle is sinking, in danger of sinking, or serious injury	Day	Wave flag November from a boat hook
Vehicle is sinking, in danger of sinking, or serious injury	Day or night	Red star shell or blinking headlights
Vehicle is disabled	Day	Flag November on a boat hook (not waving)
Vehicle is disabled	Night	Spotlight or battle lantern shown vertically (pointed up)

h. All personnel onboard safety boats or embarked in AAV will wear authorized personal flotation devices.

i. Safety observers should be assigned in sufficient numbers to ensure the safe handling of AAV within the well and vehicle decks.

j. No AAV is to be spotted or left stationary on an energy absorbing ramp or vehicle ramp; there is no safe or approved way of securing an AAV on an incline.

k. AAV detachment personnel should provide advice and be involved in staging craft for launch.

l. Before launching AAV, all vehicle hatches and vents will be secured and telltales checked. Under no circumstances will an AAV splash unless complete watertight integrity has been confirmed by the vehicle commander.

m. AAVs are not equipped with navigation lights for night or low visibility operations. To reduce the potential hazard to both AAV and shipping, the use of chemical lights (chem lites) attached to the AAV's antenna is recommended. Any color but

green may be used, green has been designated by the Navy and U.S. Coast Guard for man overboard.

9.2. Operations

a. Advance Planning and Preparation. While the Ship's Loading Characteristics Pamphlet (SLCP) and the Regulations for Embarked Troops published by each amphibious ship will provide AAV units with essential information, there is no substitute for personal liaison before joint AAV/amphibious ship operations. Advance liaison will ensure that both ship and AAV unit are in agreement concerning the sequence of events and objectives. Specific operational, embarkation, or personnel requirements should also be discussed. Additional guidance for advance planning and preparation is available in FXP-5, Chapter 5, Embarking and Debarking Amphibious Assault Vehicles (AAVs) from Amphibious Ship Well Deck.

b. Communications. Early liaison between the ship and the AAV unit will ensure that the required frequencies for a joint operation are included in the OPORD or OPTASK and ship’s Communications (COMM) Plan. In some operating areas (OPAREAs), frequency requests must be made several weeks prior to using those circuits. Early liaison will ensure deadlines are met.

c. Prior to conducting any shipboard AAV training, a safety and operations brief will be held for participating ship’s company and embarked personnel. Junior Operations and Deck personnel and vehicle commanders and drivers should attend. The brief will include the following information:

(1) Evolution timeline

(2) Navigation hazards and aids

(3) Weather, sea, and calculated surf conditions

(4) Visual and radio communication procedures

(a) Primary and secondary control frequencies

(b) Call signs

(c) Authentication procedure

(d) Required reports

(e) Grid positioning (GRID POSIT) system

(f) Lost communications procedures

(5) Standard safety precautions and emergency procedure

(6) Vehicle formations or tactics

d. Securing AAV in the Well Deck

(1) The AAV crew will lash down their AAV (with ship's force supervision) using the lashing gear furnished by the ship. Four clevises, 1-1/8 inch screw-pin anchor shackles provided by the AAV crew, are attached to each towing eye to receive lashing cable eyes.

(2) Per reference (c), AAVs will be secured in place with a minimum of four 70,000-pound lashing assemblies. Combat-loaded AAV weighing in excess of 43,000 pounds shall be secured with additional lashing assemblies and shoring to meet the criteria listed in reference (c).

(3) Lashing assemblies will not be attached to the vehicle tracks, sprockets, or idler assemblies. An AAV will never be secured by passing lashing gear around the tracks.

(4) Rubber track pads will normally alleviate the necessity for dunnage when embarking AAV, but these are sometimes lost or loosened in transit.

(5) Although the AAV unit commander will inspect all lashing gear prior to securing the handling evolution, this does not relieve the Commanding Officer of his responsibility for the proper securing of all embarked cargo and vehicles.

e. Security

(1) Procedure for vehicle security will be contained in the Regulations for Embarked Troops. Should the AAV unit’s Standard Operating Procedures conflict with Troop Regulations, the Commanding Officer will determine security requirements.

(2) The AAV unit commander may provide additional personnel for vehicle security from organic personnel as desired. These additional personnel will not be employed in a

manner which interferes with the function of the standing security watch, as established by the ship’s commanding officer.

f. Vehicle Operation Testing

(1) The AAV Unit Commander must gain permission from ship's appointed representative when desiring to test run or move an AAV. Normally the ship's representative will be the OOD while underway and the CDO while in port.

(2) The ship's representative will ensure that all cognizant ship's personnel are notified of the intended AAV operations and that all safety precautions have been taken.

g. Fuel

(1) AAVs use diesel fuel but are capable of operating with JP-5 or DFM fuel. The utilization of particular diesel fuel grades is dependent on operating environment temperature. Although some of these fuels are not normally available on amphibious ships, they are normally included as bulk onload items in drums (LFORM). The careful addition of lubricating oil to DFM or JP-5 may also provide the desired effect.

(2) AAV units drawing bulk POL during exercises are required to provide the ship with the appropriate supply documentation (DD-1149) within 10 days.

(3) The AAV unit commander must request permission from the ship’s Commanding Officer prior to commencing fueling. During the evolution, the AAV commander will keep the OOD or CDO informed of the status of fueling operation.

9.3. Embarkation. AAV may be embarked at anchor, while lying to or at bare steerageway, or by ramp from a quay wall while the ship is moored.

a. Considerations

(1) The embarkation of AAVs requires close coordination between debark control, well deck control, vehicle drivers, and vehicle handlers. The use of proper signals is essential in maintaining positive control over vehicle movement, ensuring complete understanding between handlers and drivers.

(2) To ensure maximum visibility and available power, AAV will always be driven aboard bow first, never backed onboard.

b. Standard Procedures

(1) Well deck ships should ballast to a steep wedge with 3 to 6 feet of water at the sill and dry well forward. This creates a false beach which lets the AAV transition from waterborne to track drive inside the well.

(2) When all preparations in the well are complete, by signal flag or lights from the control station the ship will order the lead AAV to make its approach.

(a) A green light or waving a green flag indicates "Ready to receive AAV." A red light or motionless red flag indicates "Not ready to receive AAV."

(b) For daylight operations, control lights and flags will be used. For night or low visibility operations, control lights and light wands will be used.

(3) The POIC will control craft from the aft end of wingwall catwalk on LHD 1, LSD 41 and LSD 49 class or on top of the energy absorbing ramp on LPD 4 and LHA 1 class ships.

(4) The POIC will continue to direct the AAV in the well until the AAV has grounded out. On LSD 41 class ships, control will be passed to a traffic director stationed further forward on the wingwall catwalk for positioning in designated vehicle parking area. On all other ship classes, where the available stowage area is more confined and vehicle positioning is not as time consuming, the POIC will control the craft until spotted. When the AAV is in the proper position, the vehicle controller will signal the AAV driver to pivot 180 degrees and face the vehicle toward the stern. At no time will any personnel, including traffic directors, be allowed in the well deck while AAVs are being positioned.

(5) As soon as the AAV has cleared the sill or is spotted with brakes set, another AAV may enter the well deck.

(6) As directed by the POIC, platoon commanders, platoon sergeants, and the Commanding Officer of Troops may be allowed to disembark the AAV once it has been spotted; all other

personnel must stay in the vehicle until the embarkation evolution is complete. Then, as directed by the POIC, troops and crew may disembark. Troops will proceed to assigned berthing and vehicle crews will secure their vehicles. The ship will have a gripe detail available to assist in griping AAVs if needed. AAVs will not be spotted for securing or left stationary on an incline including vehicle ramps and energy absorbing ramps.

(7) Disabled or damaged vehicles may require assistance to maneuver in the well.

9.4. Debarkation. AAV may debark by either of two methods: administrative or tactical launch. Administrative launches may be conducted at anchor, pierside, or while lying to. Tactical or underway launches are conducted while the ship is making way, normally between 5 and 15 knots.

a. General

(1) Before starting AAVs, the well deck ventilation blowers must be energized and set to operate at high speed. Only after ventilation has been verified will AAV crew be allowed to start their vehicles.

(2) When conducting preliminary vehicle engine checks, AAV should be operated in groups of no more than three at any time to ensure exhaust fumes are fully evacuated from the well by the exhaust blowers. Once the AAVs have been warmed up and shut down, the crews will stand by to embark troops.

(3) Troops should be embarked 20 to 40 minutes prior to launch time. Tight spacing between AAVs may prevent the opening of AAV cargo hatches. The debarkation schedule should be designed to allow for such delays.

(4) Before the AAVs debark, all hatches, ramps, and vents must be closed. Under no circumstances will an AAV be splashed unless complete watertight integrity has been attained. Water tight integrity will be confirmed by the vehicle platoon leader and reported to the WDCO.

(5) If a casualty occurs during the launch phase, push or pull the disabled AAV to one side and drive the remaining AAV around it and off the stern gate.

b. Standard Procedure

(1) In addition to the safety and operations brief, conduct a formal brief for well deck and AAV personnel of all visual signals to be used and where they will be displayed.

(2) Set Condition 1A for wet well operations.

(3) Ballast the ship to approximately 1 foot of water at the sill. Sill depths in excess of 1 foot will produce noticeably adverse effects on the vehicle's controls. These effects become more pronounced as water depths over the sill increase.

(4) Lower the stern gate to the horizontal position; the stern gate should not deviate from the horizontal more than three degrees during the launch.

(5) Ensure that all ventilation blowers are operating.

(6) Start, warm, and secure AAV engines before the arrival of troops in the well deck area. AAV crews will conduct all pre-launch operation checks at this time.

(7) The WDCO will order the unlashing of vehicles by AAV crewmen and ship's personnel prior to embarking troops.

(8) When all personnel going ashore are embarked in the vehicles, the AAV unit commander will collect manifests from all AAV and submit them to the WDCO for transfer to the Debark Control Officer.

(9) At the direction of well deck control, the first wave of AAVs will start engines, approximately 5 minutes prior to launch. All other crews (successive waves) will wait until ordered to start their vehicles.

(10) The AAV wave commander often has difficulty determining when the last vehicle in the wave has entered the water. A prearranged signal from the ship may be useful.

c. Tactical Launch Specifics

(1) General

(a) Although they possess the endurance and water tight integrity necessary for extended waterborne operations, AAV were not intentionally designed for maneuvers at sea. When correctly employed, there is a minimum amount of time devoted to wave assembly prior to crossing the line of departure (LOD). Prolonged waterborne employment increases the possibility of mechanical failure, vehicle casualties, and troop fatigue. Of primary concern is troop effectiveness, which degrades rapidly when AAV are waterborne 30 minutes or more; as sea state increases, fatigue increases.

(b) Underway launch tactics combine the elements of speed, surprise, and relative stealth. It represents the first major improvement in the surface ship-to-shore assault since World War II. The technique is considered doctrine and is used whenever minimum exposure time is desired, even to combat poor weather conditions. By utilizing underway launch tactics, it is possible to eliminate congested, vulnerable anchorages near the LOD and allow ships to freely maneuver close ashore.

(2) Considerations. The decision to conduct an underway launch rests with Commander Amphibious Task Force (CATF). The following factors must be considered when conducting underway AAV launch:

(a) Launch Speed. The launch will be designated either "High Speed" (ship's speed in excess of 10 knots) or "Low Speed" (ship's speed 10 knots or less). The exact speed at which the launch will occur is the decision of the Commanding Officer of the ship concerned. In the event of launches by more than one ship, launch speeds will be coordinated by CATF or the Officer in Tactical Command (OTC). Launch speed is a factor of:

1. Tactical situation (e.g., enemy concentration of shored-based artillery or tactical aircraft).

2. Sea conditions at the LOD.

3. LOD length (will affect vehicle spacing and individual launch time).

4. Navigation and hydrography of the area.

5. Distance from the launch point (ship’s track) to the LOD.

6. Number of vehicles being launched.

7. Depth of water relative to squatting.

(b) Launch Track. The launch track will normally parallel the beach; however, tracks may be U-turns or echelons. By design, the AAV LOD will normally be as close to the beach as is possible, and need not coincide with the LOD for landing craft. In any case, distance from the ship to the LOD and from the LOD to the beach should not exceed parameters listed in reference (a). The launch track should, if possible, avoid large variations in water depth, especially at depths less than 100 feet.

(c) Launch Interval. Spacing between AAVs during underway launch is most important. After the Commanding Officer of the ship has determined the launch speed, the launch interval can be calculated to provide sufficient distance between craft to avoid collision once waterborne. When calculating the launch interval, the number of vehicles in each wave and the width of the LOD and beach should also be considered. The minimum interval, per reference (d), is five seconds. Longer intervals should be considered at speeds less than 10 knots to ensure a safe distance between vehicles (approximately 50 meters).

(3) Underway Launch Procedures

(a) Debarkation during an underway launch is done in the same manner as debarkation when a ship is at anchor or lying to. Note that during an underway launch, the precision in launching individual AAVs in terms of time and position is critical, since these factors will drastically affect the wave’s formation and overall tactical effectiveness of the landing.

(b) The major limiting factor in terms of shiphandling is the requirement for adequate water depth to avoid undesirable bottom effects while steaming at high speed, ballasted down, and the stern gate lowered. Before conducting the launch, a careful examination of reliable hydrographic charts is essential.

(c) The major limiting factor relative to AAVs is the driver’s ability to maintain steering control and effect a breakaway from the ship's wake once launched. Proper ballasting and positioning of the stern gate will alleviate this problem.

(d) If the stern gate mechanism is capable of withstanding the stress, underway launch is feasible and safe at any speed up to a maximum of 21.5 knots under the following conditions:

1. The stern gate is lowered and locked in a position level with the well deck.

2. The ship is properly ballasted to a depth of 1 foot over the sill, which provides the best conditions for a fast exit and rapid gain of vehicle control once waterborne. Wave action in the well should be reduced to a minimum by ship maneuvers and speed.

3. Vehicles are not loaded beyond reserve buoyancy conditions.

(e) While the control and execution of the underway launch is a ship function, AAV unit commanders are inherently responsible for coordinating with the ship's personnel to ensure all the above factors which affect the launch are addressed.

9.5. Emergency Procedures for Disabled or Sinking AAVs. The direction of rescue efforts for any stranded vehicles is the responsibility of the CATF, normally delegated to the Primary or Secondary Control Ships.

a. Assistance Procedures

(1) The designated safety boats will provide the initial support to an AAV in distress. Unless specifically called to assist, all other AAVs will continue on their current mission. Again, it is important that AAVs not be operated for extensive periods at sea; the chances of a second vehicle becoming disabled increases with time.

(2) When providing assistance, **it is imperative the boat crew not secure the boat in any way to the AAV**. Any lines which are used to lash the two vehicles together will be hand tended and have no more than one turn on a cleat. If an AAV must be towed to safety, a second AAV will provide the tow. If a second AAV is not available, an LCM or LCU may be used.

(3) If an AAV is swamped by waves or begins sinking for any other reason, the safety boat will immediately cast off lines and stand off to the windward to rescue evacuees.

(4) Vehicles disabled in the surf zone are the responsibility of the AAV unit commander or his representative directing operations at the beachhead. At no time will a safety boat attempt to enter the surf zone to affect a rescue.

b. Emergency distress signals for disabled vehicles are provided in paragraph 9.1(g).

c. Vehicle Evacuation Procedures. The vehicle commander is responsible for the safe evacuation of all crew and embarked personnel. It is imperative all embarked personnel are briefed on evacuation procedures prior to embarking onboard an AAV. This brief should include:

(1) Standard safety procedures

(2) Evacuation procedures

(3) Proper escape routes

(4) Wearing and employing personal flotation devices

(5) Importance of following the instructions of the crew chief in an emergency.

d. Recovering Disabled Vehicles. The following procedure describes the actions required to recover a disabled AAV to a well deck.

(1) Ballast down to a minimum of 5 feet at the sill, allowing the towing vehicle to operate freely in the well.

(2) Tow the disabled AAV to a safe distance from the stern of the recovery ship using a second AAV.

(3) When ordered by the WDCO, the towing vehicle will tow the disabled vehicle as far forward in the well deck as possible.

(4) Once the embarked personnel and equipment are removed from the disabled vehicle, it should be towed to a location safe from wave action.

(5) As a last resort, the disabled AAV may be secured in the well deck in such a position that it offers the least interference with well deck operations.

(6) Safety of personnel will be the primary consideration when retrieving a disabled AAV.

(7) To debark a disabled AAV, it should be transported ashore in the well deck of an LCM, LCU, or LCAC.

CHAPTER 10

LANDING CRAFT-AIR CUSHION (LCAC) OPERATIONS

10.1. LCAC Well Deck Operations. The primary reference for LCAC operations is S9LCA-AA-SCM-010 Safe Engineering and Operations (SEAOPS) Manual for Landing Craft-Air Cushion (LCAC) Well Deck Operations (Vol III). This manual includes specific interface and support information for LCAC capable amphibious ships, Assault Craft Units (ACUs), and staffs while planning for or engaged in the embark, transport, launch, and recovery of LCAC.

10.2. Craft Characteristics and Capabilities

a. LCAC are high speed, ship-to-shore and over-the-beach amphibious landing craft capable of transporting equipment, personnel, and weapons systems from ships located over the horizon, through the surf zone, and across the beach to hard landing points above the waterline. LCAC are supported on a pressurized cushion of air and travel at speeds much higher than conventional (waterborne) landing craft. Since LCAC are not displacement hull craft, they are less susceptible to submerged mines and underwater ordnance, and operate unrestrained by tides, currents, and underwater topography which restrict the maneuverability of conventional landing craft.

b. LCAC have a compartmented flotation hull fabricated of welded aluminum alloy plates and beams forming watertight compartments. The port and starboard super-structures house equipment, machinery, and crew stations. The cargo deck accommodates palletized and non-palletized items, and roll-on, roll-off vehicles and wheeled equipment up to the M1A1 Abrahms main battle tank. Troops are carried in designated seating in the cabin modules (16 port and 8 starboard) to avoid exposure to wind and spray during craft operations.

c. Approximately 80 percent of craft propulsion is provided by two ducted propellers and double-entry centrifugal fans which provide air for air cushion. A bag-and-finger seal around the sides of the craft and stability seals under the hull retain cushion shape. The variable pitch propellers, rudders, and bow thrusters make the LCAC highly maneuverable compared to conventional displacement hull vessels. The craft is capable of entering and exiting ship well decks either on-cushion or

hullborne. It is compatible with six classes of amphibious ships: LHA 1, LPD 4, LSD 36, LSD 41, LSD 49, and LHD 1 classes.

10.3. Launch and Recovery

a. LCAC will normally be launched and recovered from the ship that has ballasted to a sill level between 0 to 6 inches at the sill. This creates a dry well condition necessary for a normal LCAC entry or exit on-cushion. If it becomes necessary to launch or recover LCAC in the hullborne mode either self propelled or under tow, the ship will be ballasted to produce a wet well condition.

b. Normal launch and recovery operations are conducted with the ship underway. However, operations may be conducted with the ship at anchor if the operational situation so dictates.

10.4. Procedures

a. The ship shall be headed into the wind and sea for LCAC launch and recovery. When wind and sea are from different directions, the ship shall head into the sea. Ship speed of 10 to 12 knots through the water (5 knots for LHA class ships) for dry well operations underway is the recommended launch and recovery speed for wave heights up to 5 feet. If operational or environmental conditions require slower speeds, ship speed from bare steerage way to 10 knots may be safe in minimum sea conditions provided the ship is headed into the seas.

b. Final approach to the well deck is controlled by the Ramp Marshal who will direct (by hand signals) the LCAC into the well. Various lighting and visual aids are also installed in LCAC capable ships.

CHAPTER 11

SECURING ASSAULT CRAFT IN THE WELL

11.1. Background. The Naval Ships Technical Manual (NSTM), Chapter 9120, provides general guidance on assault craft securing techniques and the proper selection of shoring and lashing gear. This chapter is intended as a supplement to the NSTM.

11.2. General. Securing of landing craft in the well is the responsibility of the ship, not the embarking unit or craft OIC. Detailed planning is required prior to the craft entering the well. The positioning of craft in the well, the total weight of craft and preloaded cargo, and the required quantities of lashing gear and shoring should be determined as early as possible to ensure availability.

11.3. Restraining Material. When securing landing craft in the well, the use of both shoring and lashing gear, in combination, is **mandatory**, as neither provides adequate restraint alone.

a. Lashing Gear

(1) Lashing gear is used to secure cargo, equipment, and vehicles from the effects of ship's motion. All ship classes have an allowance for 17,000 (minus LHA-1 class), 35,000, and 70,000-pound capacity lashing gear assemblies for the specific use of securing landing craft and other cargo. Smaller capacity assemblies are also available as allowance; however, they are not normally used for securing landing craft. LCAC capable ships will also maintain required LCAC lashing assemblies, authorized for use only with LCAC, in accordance with SEAOPS, Volume III.

(2) The selection of lashing gear is dependent on availability, the number and rating of deck fittings, position and orientation of the vehicle, friction factors, and expected sea conditions.

b. Shoring. Shoring is fire retardant wooden supports installed between the hull of the craft and the adjacent ship’s bulkheads to provide greater stability of the craft as related to ship’s movement. The load which shoring can support depends on its material composition, length, thickness, and the direction of the applied load. In general, the length of the

shore should never exceed 30 times its minimum thickness. To prevent the craft from shifting in adverse weather (even when the required number of lashings are used), it is mandatory to have at least 150 square inches of shoring installed. Shoring may be applied using single or multiple members using hard points or strong backs to support the load where it contacts the bulkhead.

c. Chains. Chains provided by the Assault Craft Unit (ACU) may be used in addition to lashing gear for securing craft.

11.4. Procedure. Unless navigation or tactical conditions dictate, the ship is not free to maneuver until all landing craft are secured for sea. If landing craft have not been properly secured in position and the ship is required to maneuver, all non-essential personnel will stand clear of the well deck and all vehicle crews still embarked will seek shelter in their vehicles. Only when the OOD can ensure steady conditions will personnel be allowed to reenter the well and continue securing craft. To assist in the embark and lashing effort, the following guidelines are provided:

a. Determine as early as possible, through coordination with embarking unit and ISIC, the craft, equipment, or cargo assigned for stowage onboard.

b. When the type of craft to be embarked is determined, ensure adequate numbers of lashing assemblies are available for the initial embark and a reserve in case of casualty.

c. Prepare a stowage diagram showing the prospective positioning of craft as well as the deck fittings and lashing assemblies to be utilized.

d. For each craft, determine the total weight of the craft and preloaded cargo. From this information, calculate the vertical distance between the ship’s water line and the craft’s center of gravity. This will prove useful in determining the quantity and type of lashing gear necessary.

(1) Use the tables and formula in NSTM Chapter 9120 to calculate the minimum required lashing to hold the craft in position.

(2) Additionally, plan to incorporate a minimum of 150 square inches of shoring, port and starboard, for added protection.

(3) If there are an insufficient number attachment points on the craft or well deck, if the strength of an attachment point is suspect or unknown, or if adequate lashing gear is not available, the ship will substitute additional shoring. When the vertical angle of the transversely oriented shoring does not exceed 45 degrees, the following apply:

(a) Shoring totaling 50 square inches in cross section may be used to replace one 70,000-pound lashing

(b) Shoring totaling 25 square inches in cross section may replace one 35,000-pound lashing

(c) Shoring totaling 13 square inches in cross section may replace one 17,000-pound lashing

(4) The maximum angle between lashing gear and the deck shall be no greater than 45 degrees.

(5) Shoring shall be evenly distributed about the center of gravity of the craft.

e. Upon determining the proper lashing gear and shoring required, the ship will use the craft stowage diagram to indicate relative position and attachment points for the shoring and lashing. The lashing and shoring crew should be briefed using this diagram on the plan for securing the landing craft.

11.5. Responsibilities

a. Landing Craft

(1) The craftmaster or coxswain has the responsibility for securing cargo, equipment, and vehicles on the craft.

(2) Once the craft enters the well of the ship, the ship assumes responsibility for ensuring the preloaded cargo, vehicles, and equipment are properly secured in the craft.

b. Ship

(1) When craft are embarked in a well, the ship is responsible for making sure the craft is properly secured. The craftmaster will provide personnel and technical expertise as needed.

(2) If craft are embarked for shipment as an opportune lift, the shipper has the responsibility for providing lashing or shoring not normally available on the ship.

(3) The ship will advise the ISIC of lashing and shoring deficiencies before embarking craft. Unless directed by the ISIC, ships shall not embark craft if adequate lashing and shoring are not available.

(4) Ships shall keep a supply of shoring on board to support unexpected embarkation of landing craft. Procurement of shoring is the ship's responsibility.

(5) A shoring watch will be set during periods of heavy weather.

11.6. Prominent Factors in Well Deck Incidents. The following items are major contributors to accidents involving landing craft in well decks:

a. Assuming the weight of the craft is enough (without lashing and shoring) to prevent movement.

b. Allowing the craft to "ground out" on a slippery surface (such as seaweed or spilled oil).

c. Failure to periodically check lashing and shoring for slack.

d. Allowing well deck personnel to work without personal protective devices (e.g., inherently buoyant flotation devices, hard hats, safety shoes, and battle dress).

e. Failure to have an adequate supply of shoring on board for contingencies.

f. Failure to conduct prior planning, prepare a well deck lashing diagram, or coordinate with craftmaster.

g. Failure to take into consideration preloaded cargo, vehicles, and/or equipment on the landing craft.

11.7. Securing LCU

a. Information provided in the NSTM for securing an LCU is general in nature. It assumes the availability of 22 70,000-pound lashing assemblies for securing the LCU, which is not supported by the number of craft attachment points. Numerous attachment points are positioned too high on the LCU hull to accommodate lashing assemblies. On LHA 1 class ships, the well deck was not constructed with sufficient hard points to support 22 lashing assemblies.

b. Recommended Method. Until SHIPALTS or BOATALTS improve the lashing capability of ships and LCUs, ships must secure craft with available assets. With the proper utilization of shoring and the skillful use of lashing and wire pendant extensions, an LCU can be secured safely for sea. Additionally:

(1) Plan for stowing the LCU near the centerline of the bulkhead. This allows access to a grater number of cloverleaves and facilitates lashing both sides of the craft to the deck. This also provides a fire lane on both sides of the craft.

(2) Have mooring lines, lashing assemblies, and shoring prestaged in the quantities required by the lashing plan.

(3) Once the craft is grounded, position the lashing assemblies on the craft. In addition to the LCU’s deck fittings, use deck cloverleaves, lifting pads, mooring fittings, and the rhino horn as necessary. Although not specifically designed for this purpose, these attachment points are the "best available."

(4) Lower the LCU ramp to permit use of the LCU deck fittings as attachment points for fore and aft restraints.

(5) Position the LCU, if feasible, to permit the lashing to maintain a 45 degree angle (or less) with the deck.

(6) Use wire pendants as extensions to the 70,000- pound lashing assemblies. A one-inch wire strap with shackles is recommended.

(7) After the lashings are installed, position the shoring, and ensure it is evenly distributed about the craft's center of gravity. Shoring wedges should be used liberally to ensure a tight fit.

c. By maximizing use of all available attachment points on the LCU with 70,000-pound lashing assemblies, the ship can have in excess of 30 lashings securing the craft. As all attachment points, other than lifting pads, may not be rated for 70,000 pounds, the use of shoring is critical and required to supplement the lashing gear. A typical lashing and shoring scheme for the LCU is provided in Figure 11-1.

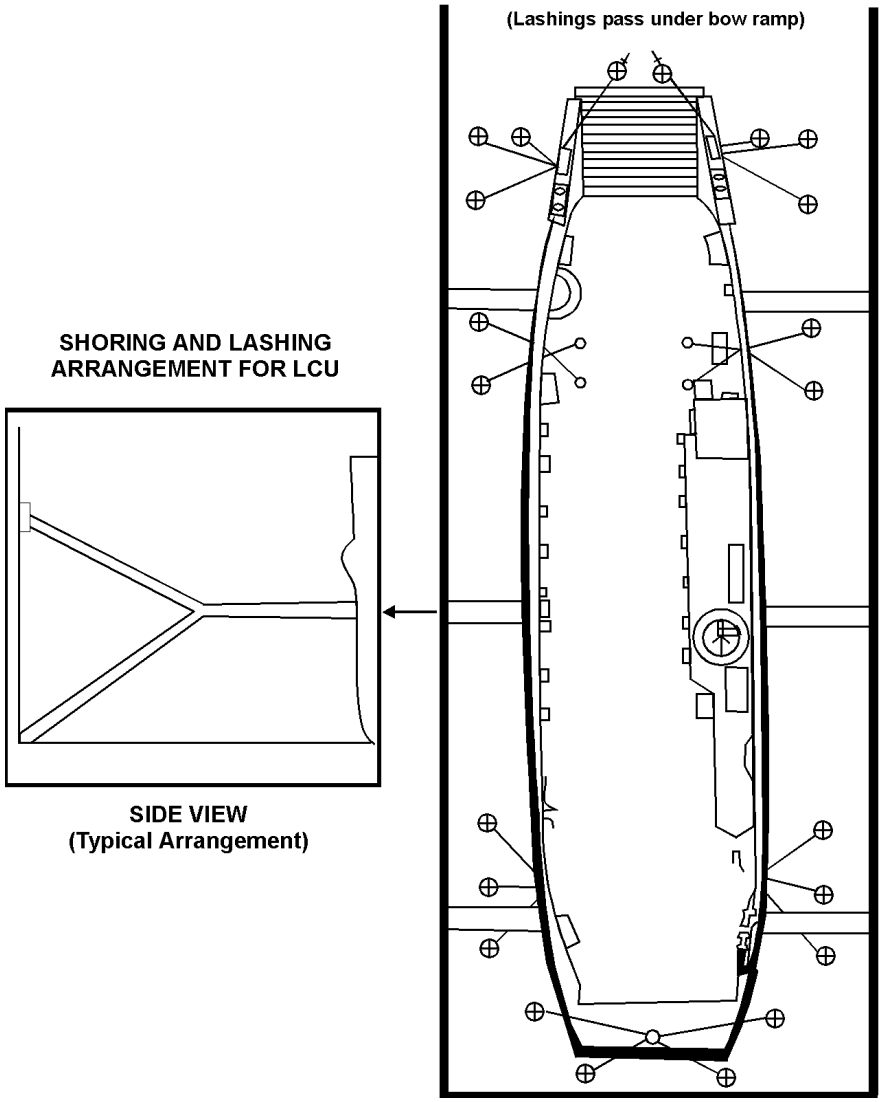


Figure 11-1
Shoring and Lashing Arrangement for LCU

11.8. Securing Armored Vehicles. NSTM Chapter 9120 has guidance on the selection and proper utilization of lashings for securing armored vehicles. Additionally, standard operating procedure manuals for AAVs are also available on the subject. The weight of both the AAV (22 tons) and M1A1 Main Battle Tank (72 tons) require that careful consideration be given to stowage and securing as well as their impact on ship's stability.

a. Restraining Material. Due to their weight and high centers of gravity, armored vehicles require considerable lashing and shoring for their apparent size. Dunnage is also used to reduce wear and tear on the well and vehicle deck.

(1) Lashing Gear. For purpose of securing armored vehicles, only 70,000-pound lashings will be used.

(2) Shoring. A shoring with a cross section totaling 50 square inches may be used to replace one 70,000-pound lashing.

(3) Dunnage. Cordwood, planks, or other material may be used as dunnage. The purpose of dunnage is to protect cargo stowed adjacent to the vehicle, it does not increase stability.

b. Procedure. The procedure for securing any armored vehicle is essentially the same:

(1) The vehicle must be stowed and secured in a fore and aft position to limit ship imposed dynamic forces in the direction of least restraint. The stowage diagram must allow for fire lanes between vehicles and bulkheads.

(2) When the vehicle is correctly spotted, the crew chief will secure power. The vehicle should be spotted to best utilize available deck fittings (cloverleaves).

(3) Ship's personnel will provide the appropriate lashings, shoring, and dunnage to the vehicle crews to secure their vehicles. Unlike boats, vehicle crews are responsible for securing their vehicles, under the supervision of well deck personnel.

(4) Once the vehicle crew's have secured their vehicles, well deck personnel will check all lashings and shoring for proper employment and safety.

(5) Periodic checks will be conducted to ensure lashings and shoring are not excessively stressed or slack. This watch is not a security watch: which is provided from vehicle unit personnel.

c. AAV Specifics

(1) AAV weighing less than 43,000 pounds shall be secured with a minimum of four 70,000-pound lashing assemblies.

(2) AAV weighing in excess of 43,000 pounds shall be secured with additional lashing assemblies and/or shoring to meet the criteria in NSTM Chapter 9120.

(3) AAV have four specified attachment points (two on the front and two on the rear). Lashings are crossed athwartships from these points as in Figure 11-2. These points may be used for one additional lashing each or an additional lashing may be attached to the mooring bitts and cross lashed to minimize forward or lateral movement.

(4) In any situation in which lashings alone are inadequate, shoring dunnage not to secure vehicle will be used to provide additional restraint.

d. M1A1 MBT Specifics

(1) Excessive damage to wood and metal decks is common whenever maneuvering the vehicle onboard ships; dunnage shall be used to reduce wear and tear when the vehicle is not operating on an incline. At no time shall dunnage be used on an incline.

(2) Attachment points are available on sides, front, and rear of the tank, allowing a total of eight lashings.

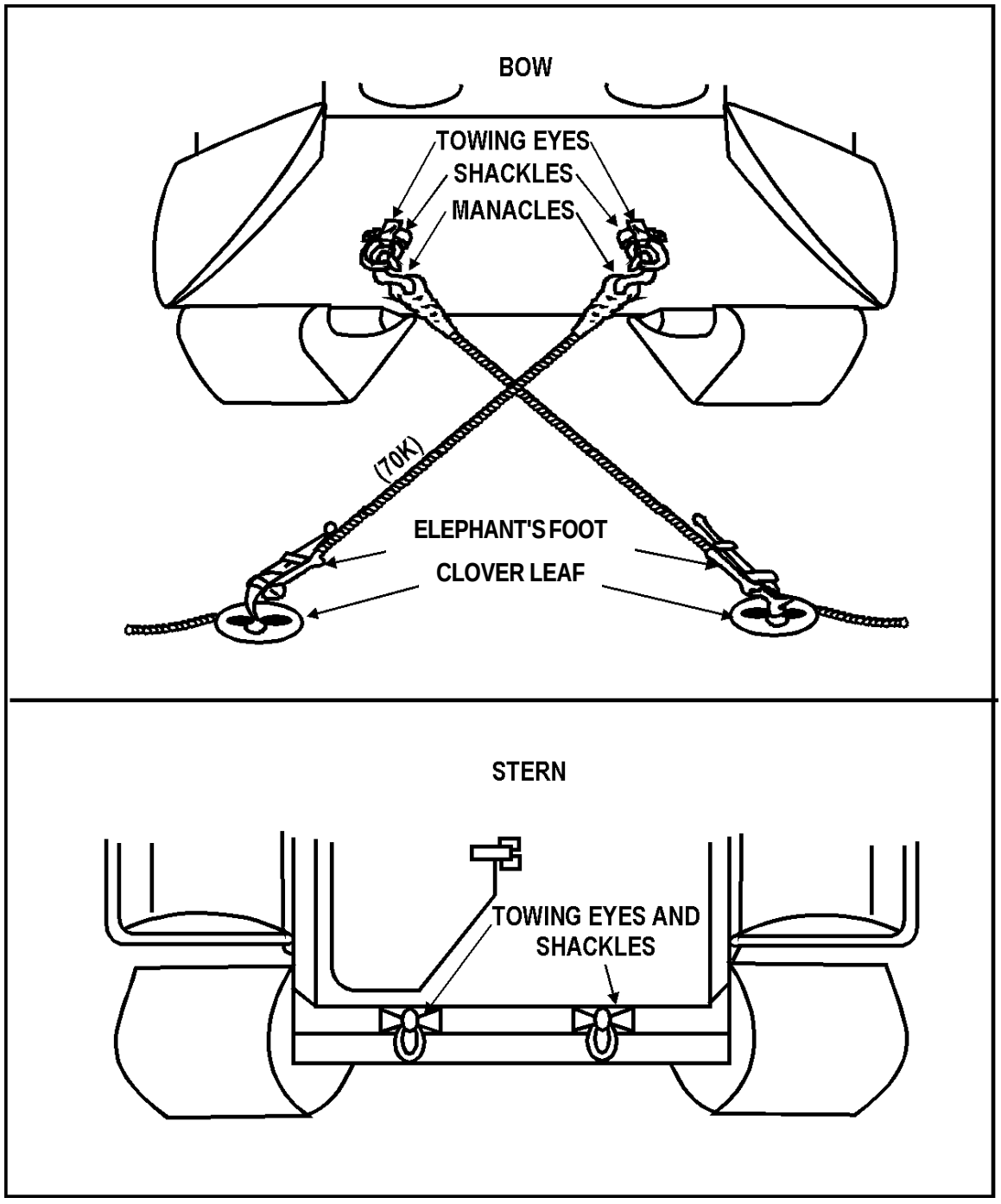


Figure 11-2
AAV Stowage

CHAPTER 12

WELL DECK CASUALTY CONTROL PROCEDURES

12.1. Discussion. Although this chapter is devoted to well deck emergencies, it will focus predominately on fire fighting. Several conditions inherent to well deck and landing craft operations contribute to fire hazards. These include bulk containers of flammable liquid meant for transport ashore, fuel spilled during refueling operations, and fuel and lube oil leaks from vehicles and assault craft. Additionally, due to the nature of well deck operations, when an emergency does occur, circumstances may prevent immediate access by fire fighters or emergency personnel. Well decks are equipped with water curtains and overhead smothering foam systems to minimize this problem, but without constant training of fire fighting personnel in the well deck and enforcement of fire prevention policies and practices, these systems will only provide cursory protection.

12.2. Effective Fire Fighting. In order to effectively combat emergencies in the well, the ship must be aware of the various conditions and situations which could complicate an emergency in the well deck. These include but are not limited to:

a. Fire in or on the wing walls.

b. Fire on a congested mezzanine, vehicle stowage, or cargo deck.

c. Fire in a landing craft alive in the well.

d. Flooding in a landing craft alive in the well.

e. Major flammable liquid leak in a wet or dry well.

f. Fire in a landing craft loaded with ammunition.

The ship’s repair party instruction should address the responsibility for combating situations such as those listed above. Plans of action and training scenarios must be developed to exercise Condition 1A watch standers, repair parties, and inport fire parties in the specific procedure and equipment to be utilized. Frequent drills and familiarization with installed fire fighting equipment are necessary to train not only repair party personnel but also Condition 1A watch standers and those

personnel who are assigned other watch stations in the area of the well deck.

12.3. General Guidelines. As a minimum requirement for combating a major fire in the well deck or in an embarked landing craft, Condition 1A personnel should be assigned specific immediate actions and fire fighting team positions. Immediate actions include:

a. Report the emergency, its location, the current status of casualty control, and required assistance.

b. Man a fire fighting team, preferably two complete hose teams with a team leader.

c. Remove or isolate the flammable liquid source.

d. Contain and control the fire.

e. Investigate all cargo handling equipment or landing craft in the vicinity. Move vehicles and cargo away from the emergency when possible.

f. Evacuate unnecessary personnel to a safe area out of the well deck.

g. Establish fire boundaries to protect cargo, vehicles, and the ship.

h. Take positive control of ventilation systems to clear smoke and fumes from the well.

12.4. Specific Situations. In addition to the general immediate actions listed above, specific emergency situations may dictate further action. Below is guidance for combating specific well deck emergencies:

a. Fire in a Dry Well with Landing Craft Embarked

(1) Muster vehicle or boat crews and embarked personnel in an area designated by ship to ensure accountability. Evacuate non-essential personnel to an area outside the well deck.

(2) Fight the fire using the ship’s fire fighting doctrine and practiced procedure.

(3) Set negative ventilation to reduce the concentration of smoke and fumes.

(4) Set the ballast detail and prepare to ballast down.

(5) Unlash unaffected vehicles and move them away from the emergency, e.g., AAVs and LARC Vs.

(6) Flood the well if that will aid in extinguishing the fire.

(7) If conditions permit, launch unaffected craft and amphibious vehicles.

(8) When operating LCAC in a dry well, unless the craft can be launched immediately, it should be shut down to avoid feeding oxygen to the fire.

(9) If the fire is out of control, remove the source from the ship by whatever means possible (e.g., launch the affected boat or vehicle and call away the Rescue and Assistance Detail or a salvage boat to fight the fire away from the ship).

b. Fire in a Wet Well with Landing Craft Embarked

(1) Evacuate non-essential personnel to an area away from the well deck.

(2) Make every attempt to fight the fire on a craft embarked in a ship using the ship’s fire fighting doctrine and well deck smothering systems.

(3) Set negative ventilation to reduce the concentration of smoke and fumes.

(4) If possible, launch those craft which are not involved with the fire. If unable to launch, position craft as far from the affected area as possible.

(5) Maneuver the affected craft to take advantage of installed fire fighting equipment (i.e., overhead smothering systems).

(6) Should the fire prove uncontrollable, launch the affected craft by whatever means possible and call away the

Rescue and Assistance Detail or a salvage boat and fight the fire away from the ship.

c. Fire on Landing Craft While Married to Stern Gate

(1) Fight the fire utilizing landing craft personnel and equipment.

(2) Assist as necessary with the ship's well deck and repair party personnel.

(3) Should the fire prove uncontrollable, evacuate the craft, cast it off, and call away the Rescue and Assistance Detail or a salvage boat and fight the fire away from the ship.

d. Landing Craft Flooding

(1) If the craft is still in the well, cease ballasting, and deballast to ground out the craft. Care should be taken with handling lines in case the craft heels from added weight.

(2) If the craft is out of the well and near the ship, ballast down and bring it into the well deck. Then deballast as previously stated.

(3) If time and distance do not allow prompt recovery of the craft, send the craft to the nearest beach or shallow water area and ground it out to prevent loss.

(4) Any time a craft out of the well begins to flood, an assist craft should rendezvous with it and evacuate all non-essential personnel to safety.

e. Major Fuel Leak in the Well Deck

(1) Isolate the source of the fuel leak.

(2) Contain the fuel within the well deck using the stern gate and fire hoses to reduce the environmental impact.

(3) If a fire hazard exists, cover the spill with AFFF or flush the spilled oil from the well deck using fire hoses. Flushed oil should be contained in the vicinity of the ship for recovery.

(4) Clean up the fuel using oil spill containment kits.

f. Heavy Equipment Adrift in the Well Deck

(1) Change course or speed of ship to minimize pitch and roll.

(2) Attempt to secure equipment using dunnage and lashing gear; never send personnel into the well to secure adrift equipment.

(3) If conditions do not permit lashing or shoring, use available soft material, such as mattresses and fenders, as wedges between equipment and non-movable objects to inhibit movement and enable personnel to properly secure the equipment.

g. Fire in an LCAC Compartment or Module

(1) The craftmaster is responsible for fire fighting efforts aboard their craft, utilizing organic fire fighting equipment and systems. If the craftmaster deems it necessary, they may request the assistance of well deck or repair party personnel to combat the fire.

(2) SEAOPS, Vol. III, Chapter 7, contains specific guidance for fire fighting and utilizing installed fire fighting systems onboard LCAC.

Appendix A

STANDARD TERMINOLOGY

Alive - The movement of a craft when the minimum depth required to float it is reached; i.e., craft is not grounded.

Ballast - Adding water to ballast tanks in order to increase a ship's draft.

Crack the Stern Gate - Open the stern gate to approximately 5 to 10 inches from the closed position at the top of the stern gate.

Debarkation Control Officer - The officer in charge of the embarkation and debarkation of all craft, cargo, and personnel from the ship during amphibious operations. This includes ballasting, stern gate operations, craft entering and leaving the well, and air operations (when they are part of the amphibious operations).

Depth at the Sill - Depth of water at extreme aft section of the well.

Dry Well - A condition where there is no water in the well.

Green Well - When preparations in the well deck are completed and assault craft entry/exit is authorized. Ordered by the Commanding Officer or his designated representative.

Grounded - When a craft's hull comes to rest on the well deck.

Red Well - When conditions in the well are not conducive to safe operations and/or craft are prohibited from entering or departing the well.

Sea to Sea - When ballast pump is aligned to take suction from and discharge to the sea. This mode of operation is used to warm up or hold a pump in stand-by without securing it.

Secure Ballasting - Stop ballasting or deballasting and keep the present level of water in the well.

Sill - The extreme aft portion of the well deck.

Stern Gate at 45 Degrees - Open or close stern gate to 45 degrees from closed position.

Stern Gate at 90 Degrees - Open or close the stern gate to 90 degrees from the closed position (parallel with the deck).

Stern Gate to the Stops - Stern gate fully opened and resting on its braces (stops).

Wedge - The physical shape of the water in the well measured by the depth over the sill and depth at a point further into the well deck such as:

Steep wedge - Large difference in depth at sill and forward part of well.

Shallow wedge - Small difference in depth at sill and forward part of well.

Well Deck Control Officer - Officer in overall charge of well deck operations.

Wet Well Operations - Embarking or debarking of craft/vehicles from the well deck with a predetermined amount of water in the well and any operations involving the use of the stern gate.

Water at the Sill - Ballasted to where the water level is even with the lip of the sill.

Appendix B

MINIMUM MANNING FOR WET WELL OPERATIONS

1. Debark Control.
   Debark Control Officer (DCO) (normally the Executive Officer)
   Phone Talker

2. Well Deck.
   Well Deck Control Officer (normally the First Lieutenant)
   Well Deck Safety Officer
   Petty Officer in Charge (at well deck control station)
   Phone Talker
   Port and Starboard Line Captains
   Port and Starboard Line Handlers

3. Ballast Control.
   Ballasting Officer (normally the DCA)
   POIC
   Phone Talker

4. Stern Gate Control.
   Operator
   Phone Talker
   Ram Room Maintenance Person

5. Fwd & Aft Ballast Compressor Rooms.
   Pump Operator
   Phone Talker

6. Sea Ballast Control Stations (SBCS).
   Operator at each station
   Phone Talker at each station

7. Cargo Control.
   Combat Cargo Officer
   Phone Talker
   Traffic Controllers
   Monorail/Bridge Crane Operators
   Securing Detail

8. Repair Locker.
   Locker Officer
   Locker Leader
   Locker Phone Talker
   On-Scene Leader
   Fire Party

Appendix C

SAMPLE BALLAST BILL

1. Purpose. To outline the procedures for ballasting and deballasting and the responsibilities for safe ballasting operations.

2. General. The clean ballast system is designed and normally used to ballast and deballast the ship to control the draft, list, and trim or to improve stability in the event of flooding or hull damage. The clean ballast system also allows well deck equipped ships to embark and debark landing craft and amphibious vehicles. The clean ballast and control system consists of ballast tanks located below the _____ deck, tanks located above the _____ deck, associated piping, deballast air compressors, sea ballast control stations, and a central ballast control room.

The ship is ballasted by flooding selected below _____ deck ballast tanks with sea water through sea ballast valves installed in each tank. The tank must also be vented to allow any air in the tank to escape. The remote operated sea ballast and vent valves can be controlled from the sea ballast control stations and ballast control. Deballasting is accomplished by blowing water from the tanks with low pressure (LP) air. LP air is provided by rotary type compressors discharging to a common LP air main. The LP air supply valve and vent valve for each tank are interlocked to prevent both sets of valves being simultaneously opened or closed.

The clean ballast tanks above the _____ deck are filled from the fire main and deballasted by gravity through drain valves. The fire main flooding and drain valves are controlled at the sea ballast control stations. A forward peak tank can also be filled from the fire main and pumped dry with an eductor connected to the secondary drainage system.

3. Responsibilities

a. Engineer Officer. Responsible for maintenance of this bill.

b. Debarkation Control Officer (DCO). Normally the Executive Officer, the DCO is in overall charge of the

embark/debark evolution. The Commanding Officer may appoint another officer as DCO if required.

c. Well Deck Control Officer (WDCO). Normally the First Lieutenant, the WDCO is responsible for all well deck operations including the safe handling, embarkation, and debarkation of all boats and vehicles in the well deck and the operation of the stern gate. The WDCO will order all changes to the water level in the well through the Ballasting Officer. The WDCO will utilize the Well Deck Control Phone Talker to communicate with debark control, reporting well deck status to the DCO.

d. Ballasting Officer. Normally the Damage Control Assistant (DCA), the Ballasting Officer is stationed in Ballast Control and is responsible for the accurate ballasting or deballasting of the ship, providing the exact well conditions specified by the WDCO. The Ballasting Officer shall:

(1) Ensure the safe operation of all ballasting equipment including the control console, valves, pumps, and the stern gate.

(2) Maintain direct communications with the WDCO and keep the WDCO advised of the depth of the water in the well.

(3) Be familiar with the technical manuals for the operations of the ballasting system and ensure all required personnel are qualified per applicable PQS to operate the system.

(4) Be familiar with the capacities and limitations of the system and keep informed as to the liquid load status of all tanks and the material condition of all parts of the system.

e. Officer of the Deck (OOD). Due to his responsibility for the safe navigation of the ship, the OOD will authorize, with the Commanding Officer’s permission, all ballasting and deballasting operations. The OOD must keep all stations aware of ship's maneuvers or evolutions which would effect the well deck evolution and the embark or debark of vehicles and landing craft.

f. Engineer Officer. The Engineer Officer is responsible for the maintenance and upkeep of all engineering equipment associated with ballasting, for the proper management of the liquid load, the distribution of the load before and during ballast operations, and for the training and qualification of

all engineering personnel in the proper procedures for equipment operation.

g. Engineering Officer of the Watch (EOOW). The EOOW will ensure there is adequate fire main pressure and flow and electrical power for efficient ballasting or deballasting. The EOOW will also control the alignment of cooling systems to account for changes in list and trim.

h. Combat Cargo Officer (CCO). The CCO is responsible to the Debark Control Officer for ensuring designated and on call serials are ready to embark or debark landing craft or assault vehicles.

i. Cargo Control Officer. Normally the ship's Boatswain, the Cargo Control Officer will conduct cargo and vehicle handling operations as directed by the WDCO.

4. Communications. Clear and concise communications between internal control stations are essential for safe and efficient well deck operations. For ballasting operations, the following internal communications circuits will be utilized:

a. The following stations will be on the ____ sound-powered or IVCS phone circuit:

(1) Ballast Control Room

(2) Air Compressor Control Room

(3) Damage Control Central

(4) Stern Gate Ram Room

(5) Stern Gate Operating Station

b. The following stations will be on the ____ sound-powered or IVCS phone circuit:

(1) Debark Control

(2) Well Deck Control

(3) Pilothouse

6. Conditions of Operation. The two principle conditions in which wet well equipped ships operate are:

a. Phase I - Operating Condition. The ship is at normal operating draft and the well deck is dry. The exact depth of draft is dependent on cargo, fuel, ammunition, water, supplies, landing craft, and embarked troops and vehicles onboard.

b. Phase II - Ballasted Condition

(1) The ship is ballasted so the well deck is flooded. Normally the well deck is not flooded uniformly throughout but is flooded in such a manner that a "wedge" of water is formed. The term “steep wedge” refers to a ballasted condition which provides a dry well forward and sufficient water at the sill to conduct boat operations.

(2) Numerous factors must be considered when determining the depth of water at the sill and the type of wedge required for various operations. These factors include:

(a) Number, type, and loading of vehicles or landing craft to be embarked or debarked and their affect on ship's draft.

(b) Sea state and direction of swells and winds. Heavy swells have the tendency to push boats further into the well than desired. Cross swells cause craft in the well deck to become uncontrollable and should be decreased by maneuvering the ship whenever possible. Heavy swells can also be reduced by utilizing engine and rudder orders to keep the ship’s head into the seas. Close and continuous coordination between Debark Control, the OOD, and Well Deck Control is essential.

(c) Frequent adjustments to the ballast condition may be required to optimize the depth of water for the evolution or type of craft in operation. For example: An LSD is embarking four LCM in married nests of two each in a rough well. The proper procedure is to bring the first nest in forward and ground them quickly. The remaining LCM are directed to stand off until the ship is deballasted. When they are called into the well, the deballasted condition allows for a quick grounding and securing of the craft. This procedure is safer than bringing in the second nest immediately after the first and holding them with lines while the ship fully deballasts.

7. Precautions

a. Ballasting operations require a degree of coordination and accuracy which leaves little room for error. Correct procedures and safety considerations are of paramount importance and all personnel involved in these operations must be constantly alert to note and report any improper or unsafe conditions. Additionally, the Well Deck Control Officer must ensure qualified safety observers are present throughout the operation in sufficient numbers to observe all proceedings and quickly report any dangerous situations. When an unsafe condition exists, the evolution should be brought to a halt and action taken to correct the discrepancy and prevent recurrence.

b. All sea ballast valves, ballast tank vent valves, and well deck drain valves in the ballast system should be closed when the system is not in use. This is necessary to maintain maximum protection against flooding in the event of damage.

c. Under no conditions shall the external draft of the ship's stern be permitted to exceed _____ feet when ballasted. This is necessary to prevent sea water from rising through the air blow-vent valves and into the vent and air piping. The corresponding maximum depth of water at the sill is _____ feet.

d. Wing tanks will be flooded and drained in pairs to avoid a list. When filling wing tanks in pairs, closely observe the angle of heel and tank level indicators to determine if the tanks on opposite sides of the ship are being filled at the same rate.

e. The rate of ballasting for any one tank can be slowed by securing the vent valve for the tank. This will cause the air in
the tank to be compressed by the incoming sea water, eventually exerting enough pressure to stop flow. However, to quickly and positively stop filling, the sea ballast valve should be closed.

f. The clean ballast tanks on the _____ deck are provided with sea valves which must be secured when tanks are not in use to prevent inadvertent flooding of these tanks during normal ballasting operations.

g. All tanks that have been filled to the desired amount must have their sea ballast valves secured so as to reduce free

surface effect on the liquid in the tanks, and to eliminate a potential source of list in case of damage.

h. Ballasting alongside the pier or at anchorage shall only be conducted when there is sufficient water depth to accommodate the ship's expected ballasted draft, providing enough bottom clearance to prevent fouling condensers and sea chests.

i. During ballasting operations, a minimum of _____ compressor room(s) must be manned to operate air compressors.

j. When cargo susceptible to salt water damage is positioned in the cargo or vehicle storage area, extreme care must be taken to prevent damage from spray or immersion. The depth of water in the well shall be continuously managed to prevent damage to the equipment or vehicles.

k. Safety observers will be positioned by the WDCO to optimize their coverage of the evolution at hand. Regardless of the evolution, one observer will be stationed to observe the forward portion of the well deck and will be in direct communications with the WDCO.

l. Before flooding the _____ deck ballast tanks, the Ballasting Officer will notify the EOOW and Damage Control Central (DCC). The EOOW will determine the need for additional fire pumps to maintain fire main pressure. While tanks are being filled, the DCC watch will closely monitor fire main pressure, ensuring a minimum of 90 psi. Should pressure drop below 90 psi, ballasting operations will be secured until additional fire pumps can be brought on line.

m. Before deballasting, the Ballasting Officer will request permission from the EOOW to start the deballast air compressors at 15-second intervals to prevent causing a surge in power demand.

n. After deballasting operations, vent residual air pressure from each tank. As the majority of tanks vent into the well deck area, venting all tanks simultaneously may cause excessive noise levels in the well. Vent tanks in groups and ensure personnel receive ample warning prior to opening vent valves.

o. Precautions should be taken not to blow down the forward ballast tanks beyond what is necessary to clear them of water.

Air blowing through the sea valve from these tanks can go into the main space sea chests and cause engineering casualties. When all other tanks have been deballasted, advise the EOOW to vent main space machinery. When this is completed, the forward ballast tanks may be blown dry with reduced air pressure.

p. Water in any fuel oil tank that returns after stowage tank is stripped could be a result of structural damage. Immediately report presence of water in fuel oil stowage tanks to the MPA, DCA and Chief Engineer and aggressively pursue the contamination source. All ballast tanks sharing a bulkhead with fuel oil tanks, and ballast tanks with fuel oil piping transiting them shall be tagged out of service until the source(s) of contamination is/are determined.

8. Procedures

a. Ballasting Plan. The WDCO and the Ballasting Officer will meet prior to any ballasting operation and formulate a ballasting plan. They will discuss the following items:

(1) The sequence, number, location, type, and draft of landing craft or vehicles to be embarked or debarked.

(2) The sequence, type, quantity, and location of the equipment and cargo to be offloaded or loaded during each operation.

(3) The depth at the sill and mid-well to which the ship must be ballasted for each segment of the operation.

(4) How far forward it will be necessary to flood the well to allow craft to safely ground out.

(5) The time required to ballast and deballast to the necessary depth.

b. Pre-Ballast Brief. Before commencing ballasting evolutions, a ballast brief will be conducted with the Commanding Officer, Executive Officer, OOD, WDCO, Ballasting Officer, CCO, and the Engineer Officer. They will review and discuss the ballasting plan drawn up by the WDCO and the Ballasting Officer, and will make final changes to the plan as necessary to support the operation. The Ballasting Check-Off List will then be issued.

c. Unscheduled Ballasting. If necessary to deviate from the ballast plan, the WDCO and the Ballasting Officer will discuss the necessary changes and formulate a revised ballasting plan for the situation and start ballasting or deballasting as required, with concurrence of the Commanding Officer.

d. Ballasting to Phase II. The number and location of tanks to be ballasted to achieve the desired wet well conditions (Phase II) depends upon the ship's current operation condition (Phase I). In general, all tanks selected are flooded simultaneously to the external water line. The following sequence will be used:

(1) One hour before ballasting, energize the ballast control console and start the hydraulic stations. Fill the _____ deck tanks, as required. Ensure the gravity drain valves for the _____ deck tanks are closed.

(2) Immediately before ballasting, open well deck drain valves. Opening these valves expedites both ballasting and deballasting. The LP air main will be checked and properly aligned before ballasting.

(3) Condition 1A will be set and all stations manned before starting and during any ballasting operation, unless specifically authorized by the Commanding Officer to deviate from normal procedures.

(4) The Ballast Control Officer will start ballasting down when directed by Well Deck Control. The ballasting plan will be followed as closely as possible. The Ballast Control Phone Talker will log all actions which occur during the evolution. The Ballasting Officer will control the cycling of sea ballast valves and vent valves to selected tanks to most effectively avoid unequal flooding of tanks.

(5) While ballasting, Ballast Control will closely observe tank level indicators and the ship's trim and heel to correct any extreme conditions by changing the ballasting rate to various tanks. The Ballasting Officer should utilize both vent valves and sea ballast valves to throttle the ballasting rate. If an emergency arises, the Ballasting Officer may be required to immediately blow tanks to stop flooding.

(6) The Ballasting Officer will cease ballasting when directed by Well Deck Control. The console operator will secure

the sea ballast valves and vent valves to each tank. Ballast Control will also cease ballasting when ordered by the Commanding Officer or Debark Control.

e. Ballasting while in Phase II. Additional ballasting may be necessary to compensate for changes in draft or trim from cargo movement.

f. Deballasting

(1) Well Deck Control will notify Ballast Control when to start deballasting and to what depth the ship will be deballasted.

(2) The Ballasting Officer will request the EOOW's permission to start deballast air compressors at 15 second intervals (if the compressors are started simultaneously or without adequate electric power available, the surge will overload the generators).

(3) Before starting the compressors, the ballast console operator will turn the vent valve controllers to the tanks to be deballasted to the blow position. The operator will first ensure the appropriate number of compressors is started and a build up of air pressure in the tanks has begun. When a minimum pressure of 10 psi is reached, the operator will open the sea ballast valves and start deballasting to the required depth.

(4) Ballast Control personnel must closely monitor the ship's draft, angle of heel, trim and tank level indicators to correct any excessive list or trim which may result. Ballast Control personnel may keep abreast of how fast the ship is being deballasted by watching the draft marking at the stern and mid-well and the tank level indicators.

(5) As the tanks are emptied, secure the sea ballast valves and then the air blow valves. This is done to prevent air from bubbling through an open sea ballast valve and thus increase the deballasting time.

(6) The Ballast Control Operator will watch the air main pressure gauges and keep the system pressure between 10 and 20 psi. As the pressure reaches 20 psi, the Console Operator can reduce the pressure in two ways.

(a) Secure one or more air compressors.

(b) Use other ballast tanks which are not being used to move air by opening the air blow valve to a tank and leaving the sea ballast valve closed.

(7) The _____ deck tanks may be emptied to speed up deballasting. An exception occurs when the ship is light loaded, and to keep a proper trim, all or some of the third deck tanks must be filled.

(8) Ballast Control will cease deballasting in the following instances:

(a) When directed to cease by Well Deck Control.

(b) When directed to cease by Debark Control.

(c) When directed to cease by the Commanding Officer.

(d) When Main Control reports the loss of a generator or main engine.

(e) When the ship is at or above navigational draft (_____ feet) with as many tanks as possible pumped dry and keeping a proper list and trim.

(9) After the deballasting operation is complete, the Ballasting Officer will secure the air compressors and vent air pressure from each tank by setting the air blow vent valve to the vent position. The Ballasting Officer will secure the air blow vent valve upon completion. The Ballasting Officer will have all valves in the deballast air main returned to their closed position, have all well deck drain valves closed, and will make sure forward and aft deballast and ballast control stations are properly secured.

Before venting tanks, Ballast Control will request the following word be passed over the 1MC, "All hands stand clear of well deck vents while venting ballast tanks." Then sound the well deck horn.

9. Own Ship’s Systems. A useful Ballast Bill must include a complete description of the ship’s ballasting system. These include, but are not limited to:

a. Tank numbers, locations, and capacity.

b. Valve numbers, function, location, and location of actuator.

c. Control stations, functions, and locations.

d. Schematic diagrams of the system.

10. Required Tabs. The following tabs are required in the Ballast Bill. Samples are provided but must be tailored to each ship.

TAB 1

CONDITION 1A AND BALLASTING DETAIL

SAMPLE PERSONNEL ASSIGNMENTS

* Ships must tailor the following personnel assignments to requirements by hull type and ship's operating procedures prior to use.

1. Required Officer Assignments

a.	Debark Control Officer	Executive Officer (XO)
b.	Well Deck Control Officer	First Lieutenant (1ST LT)
c.	Ballasting Officer	Damage Control Assistant (DCA)
d.	Cargo Control Officer	Ship's Boatswain (BOSN)

2. Station Assignments

a. Ballast Control

(1) Ballasting Officer	Damage Control Assistant (DCA)
(2) Ballast Console Operator	Qualified HT1/HT2
(3) Phone Talker	Qualified HT3/FN
(4) Log Keeper	FN (may be Phone Talker)

b. Bridge

(1) Officer of the Deck	Per Condition 1A Watchbill
(2) Phone Talker	Qualified SN (X Div)

c. Compressor Room

(1) Operator	Qualified PO3/FN
(2) Phone Talker	Qualified FN (may be Operator)

d. Debark Control

(1) Debark Control Officer	XO
(2) Phone Talker	Qualified PO3/SN (X Div)
(3) Log Keeper	SN (X Div)
(4) Messenger	SN

e. Damage Control Central

(1) DCC Watch	Qualified PO2/PO3
(2) Phone Talker	Qualified FN
(3) Sounding and Security	Qualified PO3/FN

f. Sea Ballast Control Stations

(1) Operator	Qualified PO3/FN
(2) Phone Talker	Qualified FN (may be Operator)

g. Sterngate

(1) Operator	Qualified PO3/FN
(2) Phone Talker	Qualified FN (may be Operator)

h. Well Deck Control

(1) Well Deck Control Officer	1ST LT
(2) Well Deck Safety Officer	Senior PO
(3) Line Captains	BM2/BM3 (as required)
(4) Line Handlers	SN (as required)

TAB 2

SAMPLE BALLASTING PLAN

* This is only an example and must be tailored to each ship's systems and operating procedures prior to use.

1. Operation/Exercise/Evolution:_____ Date:_____
2. Expected Schedule of Events:

_____
_____
_____
_____
_____

3. Landing Craft Movement:

Type and Number	Working Draft	Tie Down Area	Effect on Draft After Move
a.			
b.			
c.			
d.			
e.			

4. Vehicle or Cargo Movement:

Serial Number	Type	Weight	Current Location	Destination	Effect on Draft
a.					
b.					
c.					
d.					
e.					

5. Desired Water Depths:

Phase of Evolution	Desired Mid Well Depth (ft)	Target Sill Depth (ft)	Required Action
a.			
b.			
c.			
d.			

6. Selected Ballast Tanks:

Tank Number	Current Load (gal/ton)	Target Load (gal/ton)	Remarks
a.			
b.			
c.			
d.			
e.			

7. Estimated depth of water at maximum ballasted condition:

a. At the sill: _____ft
b. Mid well: _____ft
c. Forward: _____ft
d. Draft (aft): _____ft

8. Remarks:

Submitted: _____
Ballasting Officer

Reviewed: _____
First Lieutenant

Reviewed: _____
Engineer Officer

Reviewed: _____
Debark Control Officer

Approved: _____
Commanding Officer

TAB 3

SAMPLE BALLASTING CHECKLIST

* This is only an example and should be tailored to your ship's systems and procedures prior to use.

Operation/Exercise/Evolution: _____ Date: _____

Item		Complete
1.	24 hours prior to well deck operations:	
	a. Inspect hydraulic stations for proper fluid levels and system alignment.	Y / N
	b. Inspect stern gate hydraulic system for proper fluid level and system alignment.	Y / N
	c. Inspect deballast air compressors for proper fluid levels and system alignment.	Y / N
2.	One hour prior to well deck operations:	
	a. Ensure all ballast tank accesses are closed and secured.	Y / N
	b. Ensure all applicable tag outs have been properly cleared or considered in ballast plan.	Y / N
	c. Open well deck drain valves.	Y / N
	d. Fill third deck ballast tanks.	Y / N
	e. Set Condition 1A for wet well operations.	Y / N
	f. Set the ballast detail.	Y / N

3. Immediately prior to commencing well deck operations:

Item		Complete
a.	All stations manned and ready:	
	(1) Debark Control	Y / N
	(2) Well Deck Control	Y / N
	(3) Ballast Control	Y / N
b.	Align deballast air compressors to LP air main.	Y / N
c.	Align power to the ballast control console.	Y / N
d.	Align power to the stern gate control room.	Y / N
e.	Inform EOOW and WCO, “Ready to commence ballasting."	Y / N
f.	When given permission, commence ballasting.	Y / N

TAB 4

SAMPLE WELL DECK COMMUNICATIONS CHECKLIST

* This checklist is only an example and should be tailored to your ship's systems and operating procedures prior to use.

Operation/Exercise/Evolution: _____ Date: _____

Item	Complete
1. Check sound powered and radio communications systems for operability (may require manning Condition 1A watches).	Y / N
2. Check traffic control lights for operability.	Y / N
3. Ensure traffic control stations are equipped with the required number of flags and operational light wands.	Y / N
4. Conduct general announcing system (MC circuit) tests.	Y / N
5. Conduct a communications brief for phone talkers, traffic controllers, and radio operators on proper procedure, signals, and phraseology.	Y / N
6. Conduct a test of the well deck horn.	Y / N
7. Report communications readiness to the Well Deck Control Officer.	Y / N

TAB 5

SAMPLE STERN GATE OPERATING CHECKLIST

Note: Stern gate operations are an integral part of almost all amphibious operations. Failure of the stern gate hydraulic system during operations can lead to unsafe conditions and severely reduce a ship's capability. Most operating casualties can be prevented through planned maintenance (PMS) and pre-operation checks. The following checklist has been developed from applicable technical manuals, PMS documentation, and input from Naval Sea Systems Command. The checklist is generic in nature and must be tailored to your ship prior to use.

Operation/Exercise/Evolution: _____ Date: _____

Item	Complete
1. Check the hydraulic oil level in the reservoir	Y / N
a. Prior to Start Up (Cold): _____	
b. After Warming Up: _____	
2. Check for proper system alignment of all discharge, suction, by-pass, and replenishment valves.	Y / N

Valve Number	Function (suct/ disch/bypass/repl)	Position (open/closed)
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

3. Start hydraulic pump(s). Ensure the proper (target) operating pressures are achieved. Y / N

Pump Desig	Min Press	Max Press	Target Press	Recorded Press
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

4. Visually inspect the hydraulic system for leaks. Y / N

5. Check the temperature of the hydraulic oil to ensure the system is operating within parameters. Y / N

Min Sys Temp	Max Sys Temp	Recorded Sys Temp
_____	_____	_____

6. When the hydraulic oil has reached the required operating temperature (____ deg. F), record the pump pressures again for the pumps listed in Item 3. Y / N

Pump Desig	Min Press	Max Press	Target Press	Recorded Press
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

If the target pressure cannot be met, secure the pump and immediately notify the Ballasting Officer.

7. Check the differential pressure indicators on the suction strainers and discharge filters. The system must be operating at its required operating temperature, otherwise the indicators will not provide accurate readings. Y / N

Strainer or Filter	Sys Temp	Suction Press	Discharge Press
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

8. Align the hydraulic oil replenishment system for automatic operation. The replenishment system should start automatically when the gate has opened 5 degrees. Y / N

9. Remove all locking dogs. Y / N

10. Obtain permission to open the stern gate to check the replenishment system. Y / N

11. Open stern gate to actuate replenishment system, not to exceed 10 degrees. Once replenishment system starts operating, check replenishment system suction strainer and discharge filter pressures at operating temperature. Y / N

Strainer or Filter	Sys Temp	Suction Press	Discharge Press
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

12. Report to the Ballasting Officer, ”The stern gate is ready for operation." Y / N

CAUTION

If the stern gate is not operated shortly after the system is aligned for operation, excessive pump idling will result in a heat build up in the hydraulic system. If well deck operations are delayed, the pumps should be secured. During periods of heavy use, the stern gate operator must continuously check the hydraulic oil temperatures and inform the Ballasting Officer if temperatures exceed system parameters.

TAB 6

SAMPLE CARGO HANDLING CHECKLIST

* This sample checklist is generic in nature and should be tailored to your ship's systems, operating procedures, and cargo handling capacity prior to use.

Operation/Exercise/Evolution: _____ Date: _____

Item	Complete
1. Determine the cargo type, dimensions, weight, and compatibility by serial or lot number.	Y / N
2. Determine the availability of cargo handling equipment and vehicles.	Y / N
3. Determine the staging, access, and stowage areas for:	
a. Cargo	Y / N
b. Cargo handling and securing equipment (slings, gripes, shoring, and dunnage)	Y / N
c. Cargo handling vehicles (yellow gear, hoists)	Y / N
4. Discuss with the Ballasting Officer the movement of cargo as it affects the stability of the ship.	Y / N
5. Ensure all handling equipment has been properly maintained and weight test data is current (if applicable).	Y / N
6. Brief all involved personnel on the scope of, stowage plan and safety precautions in accordance with OPNAVINST 5100.19C.	Y / N
7. Ensure the following personnel are on station.	
a. Cargo Control Officer	Y / N
b. Safety Observers (as required)	Y / N
c. Petty Officer in Charge	Y / N
d. Riggers (as required)	Y / N
e. Vehicle or Hoist Operators	Y / N
8. Energize well deck ventilation (if operating diesel powered vehicles or hoists).	Y / N
9. Station safety observers to provide the best visual coverage of the handling area.	Y / N