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Homeland Security

United States
Coast Guard

COAST GUARD CUTTER SEAMANSHIP MANUAL

COMDTINST M3120.9
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United States Coast Guard

Commandant
United States Coast Guard

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Subj: COAST GUARD CUTTER SEAMANSHIP MANUAL

Ref:
(a) Risk Management (RM), COMDTINST 3500.3 (series)
(b) Rescue and Survival Systems Manual, COMDTINST M10470.10 (series)
(c) Cutter Organization Manual, COMDTINST M5400.16 (series)
(d) Naval Engineering Manual, COMDTINST M9000.6 (series)
(e) Naval Ships' Technical Manual (NSTM), Wire and Fiber Rope and Rigging, Chapter 613
(f) Naval Ships' Technical Manual (NSTM), Mooring and Towing, Chapter 582
(g) Cutter Anchoring Operations Tactics, Techniques, and Procedures (TTP), CGTTP 3-91.19
(h) Cutter Training and Qualification Manual, COMDTINST M3502.4 (series)
(i) Shipboard Side Launch and Recovery Tactics, Techniques, and Procedures (TTP), CGTTP 3-91.25 (series)
(j) Shipboard Launch and Recovery: WMSL 418' Tactics, Techniques, and Procedures (TTP), CGTTP 3-91.7 (series)
(k) Naval Ships' Technical Manual (NSTM), Boats and Small Craft, Chapter 583
(l) Naval Ship's Technical Manual (NSTM), Cranes, Chapter 589
(m) Cutter Astern Fueling at Sea (AFAS) Tactics, Techniques, and Procedures (TTP), CGTTP 3-91.20
(n) Helicopter Hoisting for Non-Flight Deck Vessels, Tactics, Techniques, and Procedures (TTP), CGTTP 3-91.26
(o) Flight Manual USCG Series MH-60T Helicopter, CGTO 1H-60T-1 (series),
(p) Flight Manual USCG Series MH-65D Helicopter, CGTO 1H-65D-1 (series)
(q) Naval Engineering Technical Standard 582, Mooring and Towing
(r) Shipboard Regulations Manual, COMDTINST M5000.7 (series)
(s) The Vessel Environmental Manual, COMDTINST M16455.1 (series)

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NON-STANDARD DISTRIBUTION:

1. PURPOSE. This Manual promulgates the Cutter Seamanship Manual for all United States Coast Guard (USCG) cutters.

2. ACTION. All Coast Guard Areas, Districts, Sectors, Commanding Officers (CO), Officers-in-Charge (OIC), Deputy/Assistant Commandants, and Chiefs of Headquarters staff elements will comply with the provisions of this Manual. Internet release of this Manual is authorized.

3. DIRECTIVES AFFECTED. Coast Guard Astern Fueling At Sea (AFAS) Procedures Manual, COMDTINST M3120.8; Shipboard Launch and Recovery Procedures Manual, COMDTINST M3120.6; and Cutter Surface Swimmer Program, COMDTINST 16134.2D are hereby cancelled.

4. DISCUSSION. This Manual prescribes policy and doctrine for cutter seamanship (deck operations / evolutions). Some chapters also touch on high level bridge / engineering functions when directly related to a deck evolution. Corresponding Tactics, Techniques, and Procedures (TTP), if available, are listed as references.

5. DISCLAIMER. This guidance is not a substitute for applicable legal requirements, nor is it itself a rule. It is intended to provide guidance for Coast Guard personnel and is not intended to, nor does it, impose legally binding requirements on any party outside the Coast Guard.

6. ENVIRONMENTAL ASPECT AND IMPACT CONSIDERATIONS.

   a. The development of this Manual and the general policies contained within it have been thoroughly reviewed by the originating office in conjunction with the Office of Environmental Management, Commandant (CG-47). This Manual is categorically excluded under current Department of Homeland Security (DHS) categorical exclusion DHS (CATEX) A3 from further environmental analysis in accordance with the U.S. Coast Guard Environmental Planning Policy, COMDTINST 5090.1 and the Environmental Planning (EP) Implementing Procedures (IP).

   b. This Manual will not have any of the following: significant cumulative impacts on the human environment; substantial controversy or substantial change to existing environmental conditions; or inconsistencies with any Federal, State, or local laws or administrative determinations relating to the environment. All future specific actions resulting from the general policy in this Manual must be individually evaluated for compliance with the National Environmental Policy Act (NEPA) and Environmental Effects Abroad of Major Federal Actions, Executive Order 12114, Department of Homeland Security (DHS) NEPA policy, Coast Guard Environmental Planning policy, and compliance with all other applicable environmental mandates.

7. DISTRIBUTION. No paper distribution will be made of this Manual. An electronic version will be located on the following Commandant (CG-612) web sites. Internet: https://www.dcms.uscg.mil/directives/ , and CG Portal: https://cgportal.uscg.mil/library/directives/SitePages/Home.aspx.

8. RECORDS MANAGEMENT CONSIDERATIONS. This Manual has been thoroughly reviewed during the directives clearance process, and it has been determined there are no further records scheduling requirements, in accordance with Federal Records Act, 44 U.S.C. 3101 et seq., National Archives and Records Administration (NARA) requirements, and Information and Life Cycle

Management Manual, COMDTINST M5212.12 (series). This policy does not create significant or substantial change to existing records management requirements.

9. FORMS/REPORTS. None.

10. REQUEST FOR CHANGES. Commandant (CG-751) will coordinate changes to this Manual. This Manual is under continual review and will be updated as necessary. Time-sensitive amendments will be promulgated via message, pending their inclusion in the next change. All users are urged to provide recommendations for improvement to this Manual via the chain of command and an email to hqs-smb-cg-751-cmd@uscg.mil.

/JOHN W. MAUGER/
Rear Admiral, U.S. Coast Guard,
Assistant Commandant for Capability

RECORD OF CHANGES			
CHANGE NUMBER	DATE OF CHANGE	DATE ENTERED	BY WHOM ENTERED

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(1) LIST OF ACRONYMS AND ABBREVIATIONS
(2) LINE HANDLING COMMANDS
(3) DAVIT INFORMATION TABLE
(4) STANDARD HAND SIGNALS (SHIPBOARD LAUNCH AND RECOVER)

CHAPTER 1. INTRODUCTION

A. Purpose of this Manual. This Manual provides policy and doctrine for deck operations / evolutions on all Coast Guard cutters. This Manual compliments References (a) through (p) and other pertinent directives and publications for deck operations / evolutions. Tactics, Techniques, and Procedures (TTP), if available, for these evolutions are listed as references.

B. Introduction. Deck evolutions are inherently dangerous operations. The safe and efficient deck operation of Coast Guard Cutters requires a high degree of skill, training, and standardization between cutters. A thorough understanding of the policies and doctrine involved is necessary if missions are to be accomplished and mishaps avoided.

C. Acronyms / Abbreviations. A list of acronyms and abbreviations is included as Enclosure (1).

D. Deviations. Adherence to the provisions of this Manual is essential to the safety of cutter deck operations. Where mission urgency dictates, deviations from the provisions of this Manual are authorized with CO/OIC and Operational Commander approval.

1. If a deviation occurs, Commandant (CG-751) shall be advised via the chain of command of the nature of the deviation and the prevailing circumstances.

2. Cutter CO/OICs may request waivers to specific provisions of this Manual from Commandant (CG-751), via the chain of command. Each request must contain justification for issuing the waiver, including an analysis of its impact on mission safety. Waivers will be considered on a case-by-case basis, and will only be granted when mission safety is not jeopardized.

CHAPTER 2. SHIPBOARD TERMINOLOGY AND CONSTRUCTION

A. Introduction. Knowledge of shipboard terminology and construction is important for Coast Guard deck personnel to understand. This knowledge is foundational for Coast Guard deck personnel to perform their duties related to the various deck operations / evolutions outlined in this Manual.

B. Structural Parts of the Hull.

1. Introduction. The hull is the main body of the ship below the main exterior deck. The hull consists of an outside covering (or skin) and an inside framework to which the skin is secured. The skin and framework are usually made of steel and secured by welding. The steel skin may also be called shell plating or hull plating. See Figure 2-1.

a. The main centerline structural part of the hull is the keel, which runs from the stem at the bow to the sternpost at the stern. The keel is the backbone of the ship. To the keel are fastened the frames, which run athwartship. These are the ribs of the ship and give shape and strength to the hull. Deck beams and bulkheads support the decks and give added strength to resist the pressure of the water on the sides of the hull.

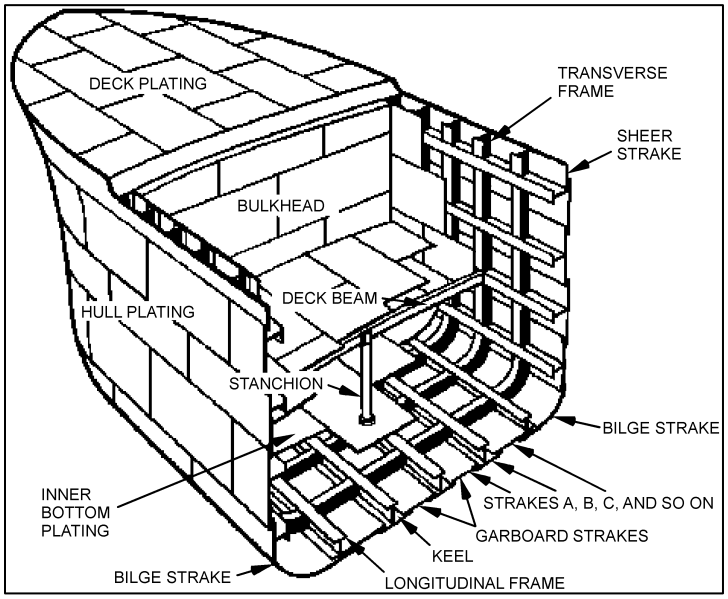

Figure 2-1: Construction of a Hull

b. Any line which runs lengthways in the ship is said to run fore-and-aft, and the line joining the middle of the stem to the middle of the stern is called the fore-and-aft center line (middle line or center line in ship's plans and drawings). See Figure 2-2.

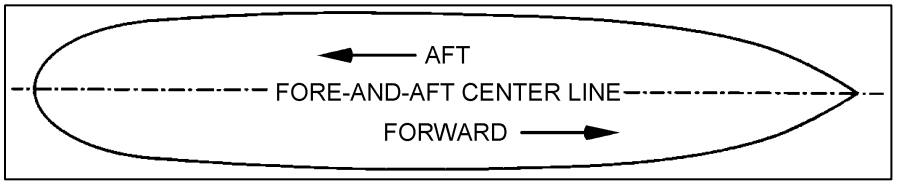

Figure 2-2: Hull Directional Lines

2. Skin. The skin, or hull plating, provides watertight integrity. The plates, the principal strength members of a ship, have various thicknesses. The heaviest plates are put on amidships. The others are put on so that they taper toward both ends of the ship (from the keel toward the bilge and from the bilge toward the upper row of plates). Using plates of various thickness reduces the weight of the metal used and gives the ship additional strength at its broadest part. The plates, put on in rows from bow to stern, are called strakes. They are lettered consecutively, beginning at the keel and going upward.

3. Strake Names. The bottom row of strakes on either side of the keel are called garboard strakes. The strakes at the turn of the hull, running in the bilge, are called bilge strakes. The strakes running between the garboard and bilge strakes are called bottom strakes, and the topmost strakes of the hull are called sheer strakes. The upper edge of the sheer strake is the gunwale.

4. Bulkheads. The interior of the ship is divided by bulkheads and decks into watertight compartments (see Figure 2-3). A ship could be made virtually unsinkable if it were divided into enough small compartments. However, too many compartments would interfere with the arrangement of mechanical equipment and the operation of the ship. Engine rooms must be large enough to accommodate bulky machinery. Cargo spaces must be large enough to hold large equipment and containers.

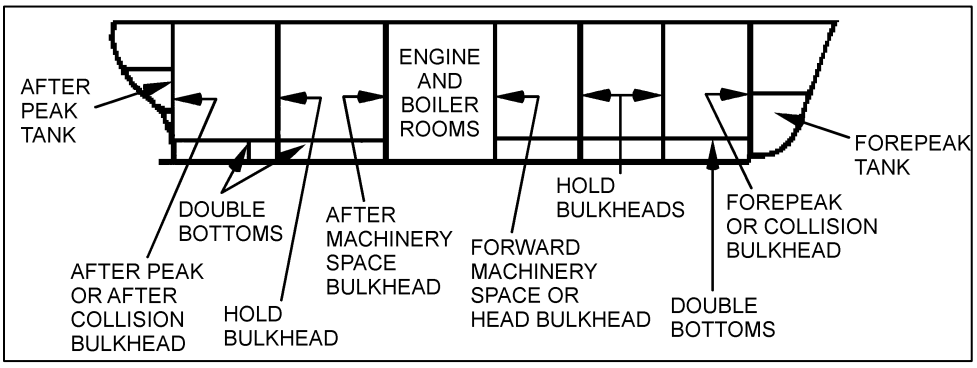

Figure 2-3: Bulkheads

5. Decks. The decks aboard ship (see Figure 2-4) are similar to floors in a house. The main deck is the first continuous watertight deck that runs from the bow to the stern. In many instances, the weather deck and the main deck may be one and the same. At the bow, it is called a forecastle deck and at the stern, it is called the fantail. The term weather deck includes all decks exposed to the weather. Any structure built above the weather deck is called superstructure.

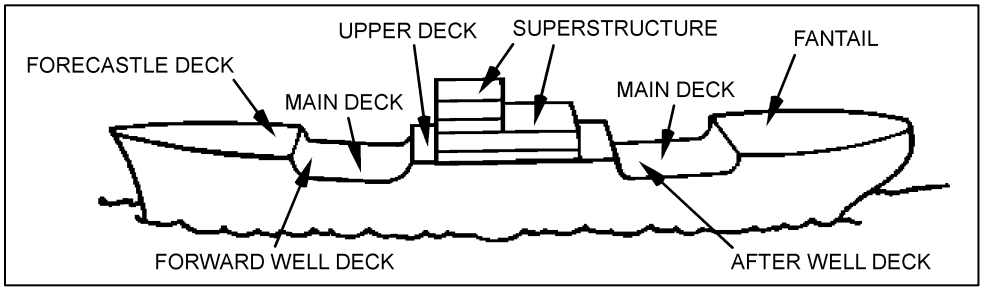

Figure 2-4: Decks

6. Engine Room. The engine room is a separate compartment containing the propulsion machinery of the ship. Depending on the size and type of propulsion machinery, other ship machinery may be located there (such as generators, pumping systems, evaporators, and condensers for making fresh water). The propulsion unit for most Coast Guard Cutters is a diesel engine. The "shaft" or rod that transmits power from the engine to the propeller leads from the aft end of the engine, through the hull, to the propeller.

7. External Parts of the Hull. Figure 2-5 shows the external parts of the hull for a ship with traditional propulsion. The waterline is the water-level line on the hull when afloat. The vertical distance from the waterline to the edge of the lowest outside deck is called the freeboard. The vertical distance from the waterline to the bottom of the keel is called the draft. The waterline, draft, and freeboard will change with the weight of the cargo and provisions carried by the ship. The draft of the ship is measured in feet and inches. Numbered scales are painted on the side of the ship at the bow and stern.

   a. The relationship between the drafts at the bow and stern is the trim. When a ship is properly balanced fore and aft, it is in trim. When a ship is drawing more water forward than aft, it is down by the head. If the stern is too far down in the water, it is down by the stern. If the ship is out of balance laterally or athwartship (leaning to one side – port or starboard) it has a list. Both trim and list can be adjusted by shifting weight or transferring the ship's fuel and water from one tank to another in various parts of the hull.

   b. The part of the bow structure above the waterline is the prow. The general area in the forward part of the ship is the forecastle. Along the edges of the weather deck from bow to stern are stanchions and light wire ropes, called life lines. Extensions of the hull plating above the deck are called bulwarks. The small drains on the deck are scuppers. The uppermost deck running from the bow to the stern is called the weather deck. The main deck area over the stern is called the fantail. The bottom of the ship is called the bilge. The curved section where the bottom meets the side is called the turn of the bilge.

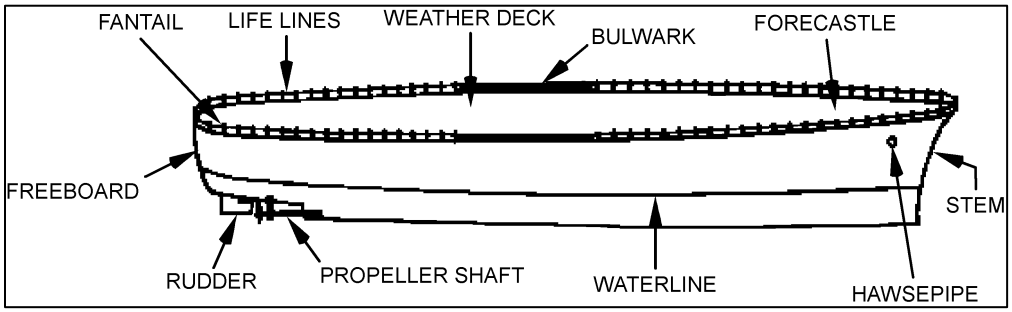

Figure 2-5: External Parts of the Hull

C. Shipboard Directions and Locations. The following are common terms used for location, position and direction aboard a cutter. Figure 2-6 provides a diagram of a cutter with the more common terms noted.

1. Amidships. The central area of a cutter is amidships. The right center side is the starboard beam, and the left center side is the port beam.

2. Athwartships. A line, compartment, or anything else running from side to side is athwartships.

3. Bow. The front end of a cutter is the bow. When facing the bow, the front right side is the starboard bow, and the front left side is the port bow.

4. Fore and Aft. A line, or anything else, running parallel to the centerline of a cutter is fore and aft.

5. Going Aft. Moving toward the stern.

6. Going Aloft. Going up into the cutter's rigging.

7. Going Below. Moving from an upper deck to a lower deck.

8. Going Forward. Moving toward the bow.

9. Going Topside. Moving from a lower deck to a weather deck or upper deck.

10. Inboard. From either side of the cutter toward the centerline. However, there is a variation in the use of outboard and inboard when a cutter is tied up alongside something (e.g., pier or another vessel). In this example, the side tied up is inboard; the side away is outboard.

11. Leeward. Direction away from the wind, toward which it is blowing.

12. Outboard. From the centerline of the cutter toward either port or starboard side. (See Inboard for variation in use.)

13. Port. Looking forward, port is the entire left side of a cutter, from bow to stern.

14. Starboard. Looking forward, starboard is the entire right side of a cutter, from bow to stern.

15. Stern. The rear of a cutter.

16. Weather Deck. All decks exposed to the elements (weather).

17. Windward. The side from which the wind is blowing; toward the wind.

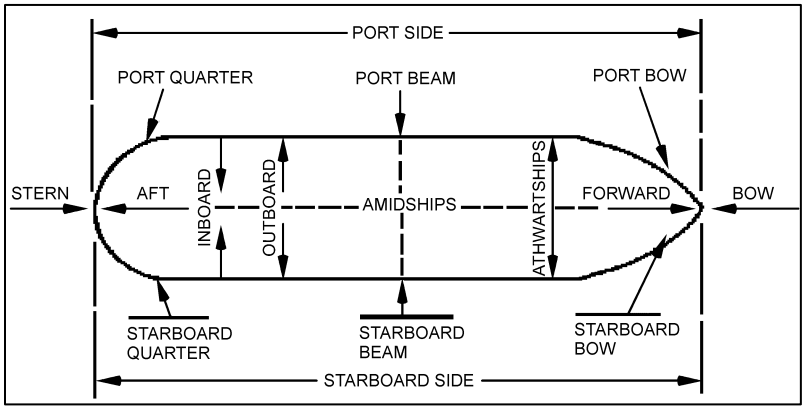

Figure 2-6: Directions and Locations Aboard Ship

D. Terms Defining Direction and Position Outside a Ship. Directions to an object's location outside the cutter are usually given in relation to the cutter (relative bearing). See Figure 2-7.

1. Ahead. Object's location is in front of the cutter.

2. Astern. Object's location is in behind the cutter.

3. Abeam. Object's location is to either side of the cutter.

4. Bear on the bow. Object's location is midway between ahead and abeam.

5. Bear on the quarter. Object's location is midway between abeam and astern.

6. Alongside. When a ship is lying stationary next to another ship or to a dock wall.

7. Abreast. When two ships are moving on the same course and are level with each other.

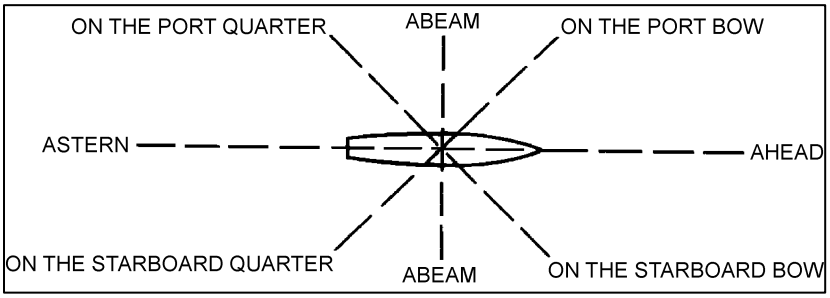

Figure 2-7: Relative Bearings

E. Types of Ship Motion. The following describes the different types of ship motion. See Figure 2-8.

1. Yaw. Rotation about the vertical axis of the cutter.

2. Pitch. Rotation about the lateral axis of the cutter causing the bow to raise and lower in opposition to the stern.

3. Roll. Rotation about the longitudinal axis of the cutter.

4. Heave. Up and down motion of the entire cutter along its vertical axis.

5. Surge. Forward and backward motion of the entire cutter along its longitudinal axis.

6. Sway. Side to side motion of the entire cutter along its lateral axis.

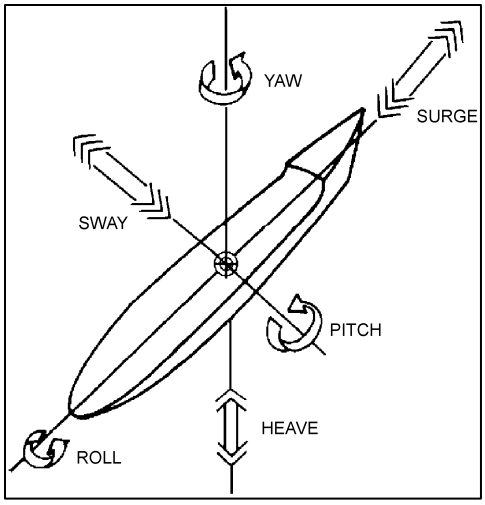

Figure 2-8: Types of Ship Motion

F. Terms Defining the Directional Movement of a Ship. Below is a list of terms that define the movement of a ship:

1. Adrift. A cutter is said to be adrift when without a means of propulsion.

2. Underway. A cutter is underway when not at anchor, or made fast to the shore, or aground.

3. Gathers Way. A cutter gathers way when it begins to move through the water.

4. Steerage Way. A cutter has steerage way when speed is sufficient for steering (i.e. the rudder is effective).

5. Making Headway. When moving ahead, a cutter is said to be going ahead or making headway.

6. Making Leeway. A cutter that is making headway and at the same time being blown sideways by the wind, is said to be making leeway.

7. Making Sternway. When moving astern, a cutter is said to be going astern or making sternway.

8. Windward. When the wind is blowing from one side of the cutter, that side is called the windward.

9. Leeward. The sheltered side of a cutter is called the leeward (opposite side from the windward side).

10. Broadside-on. A cutter moving sideways is said to be moving broadside-on (to port or starboard).

G. Shipboard Measurement Terminology. A ship's size and capacity can be described in two ways, linear dimensions or tonnage. Each is completely different, yet interrelated.

1. Linear Measurements. A ship's linear dimensions are expressed in feet and inches. A ship is a three-dimensional structure having length, breadth, and depth. See Figure 2-9.

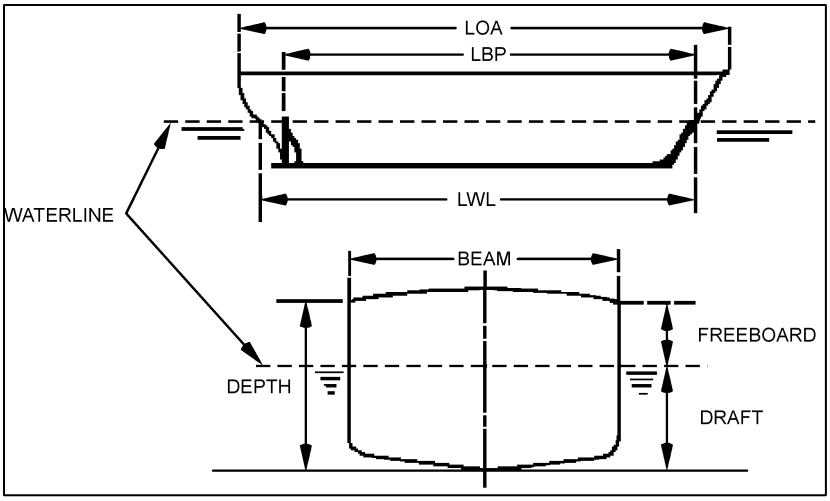

Figure 2-9: Ship Linear Measurements

2. Length. A ship's length is measured in different ways for different purposes. The more commonly used length measurements are discussed below:

3. Length Overall (LOA). A ship's Length Overall (LOA) is measured in feet and inches from the extreme forward end of the bow to the extreme aft end of the stern. The top portion of Figure 2-9 shows how the LOA is measured. Cuttermen must be familiar with this and similar dimensions to safely maneuver the ship. The dimension is commonly found in lists of ship's data for each ship.

4. Length Between Perpendiculars (LBP). A ship's length is sometimes given as Length Between Perpendiculars (LBP). It is measured in feet and inches from the forward surface of the stem, or main bow perpendicular member, to the after surface of the sternpost, or main stern perpendicular member. On some types of ships this is, for all practical purposes, a waterline measurement.

5. Length on Load Waterline (LWL). A ship's Length on Load Waterline (LWL) is an important dimension because length at the waterline is a key factor in the complex problem of speed, resistance, and friction. On ships with a counter stern, the LWL and LBP can be the same or about the same. On a ship with a cruiser stern, the LWL is greater than the LBP, as shown in the top portion of Figure 2-9.

6. Width (Beam). A Ship's width or, more properly, a ship's breadth is expressed in a number of ways and, like length, for a number of reasons. A ship's extreme breadth, commonly called beam, is measured in feet and inches from the most outboard point on one side to the most outboard point on the other at the widest point on the ship, as shown in the bottom portion of Figure 2-9. This dimension must include any projections on either side of the ship. Like length overall, this measurement is important to a ship's officer in handling the ship.

7. Depth. The depth of a ship involves several important vertical dimensions. They involve terms like freeboard, draft, draft marks, and load lines. The ship's depth is measured vertically from the lowest point of the hull, ordinarily from the bottom of the keel, to the side of any deck that you may choose as a reference point. Therefore, it has to be stated in specific terms such as depth to

upper deck amidships. It is impractical to measure depth in any other way, since it varies considerably from one point to another on many ships. For example, the depth is greater at the stern than amidships. A ship's draft or maximum allowable draft must be known when selecting a berth for loading or discharging operations.

8. Tonnage. Tonnage is a measure of the size or cargo carrying capacity of a ship.

   a. Gross Tonnage. Gross tonnage is a measure of the ship's overall internal volume. Gross tonnage is calculated based on the molded volume of all enclosed spaces of the ship.

   b. Net Tonnage. Net tonnage is the volume of cargo the vessel can carry. It represents the volume of the ship available for transporting freight or passengers.

   c. Displacement. Displacement is the mass of water that a ship displaces while floating.

CHAPTER 3. SAFETY BRIEFS, RISK MANAGEMENT, AND PERSONAL PROTECTIVE EQUIPMENT

A. Introduction. This section outlines policy and doctrine for integrating risk management with personal safety. All evolutions on board Coast Guard Cutters involve inherent risks to personnel on deck and possibly the cutter itself. These evolutions require a high degree of skill, training, efficiency and coordination on the part of the deck personnel as well as communications and coordination with the bridge. The CO/OIC is ultimately responsible for the safety and efficiency of the overall evolution. A thorough understanding of all aspects of each evolution is necessary if the mission is to be accomplished and mishaps avoided.

B. Safety Briefs and Debriefs.

1. Introduction. A command brief and individual team safety brief must be conducted before and after each deck evolution on the WQSB. These briefs shall discuss risk assessment, a clear sequence of events, and mission specific safety procedures. Briefs should also create a climate for learning and encourage feedback by constructive critique. Briefs may be combined at the CO/OIC's discretion depending on the complexity of the mission.

2. Command Brief. The command brief should include, at the CO/OIC's discretion, the CO/OIC, the Engineer Officer, First Lieutenant, Safety Observer, Officer of the Deck, each Petty Officer in Charge (POIC), Boat Deck Captain (if applicable), Coxswain (if applicable), and any other essential personnel the CO/OIC deems necessary.

3. Individual Team Briefs. Individual team briefs shall consist of personnel assigned to any station of the particular evolution. At a minimum, the POIC from the command brief, along with each member assigned to a station, must participate in the team brief. Boat crew "team" briefs (if applicable) shall, at a minimum, include the coxswain and boat crew members.

4. Debriefs. Debriefs must include lessons learned and should be focused on improvement of the evolution. Topics discussed should include both positive and negative results of the completed evolution.

C. Risk Management.

1. Introduction. Per Reference (a), deliberate and real-time risk assessments, using appropriate risk management models for each evolution, shall be conducted and updated as conditions change and new hazards are identified.

   a. Treat each element of the risk assessment separately.

   b. Mitigate identified risk accordingly. Implement mitigating strategies as appropriate.

   c. Actively implement the five step process that is applied continuously to make informed decisions regarding risk.

2. Risk Management Models. Risk management models must be a part of evolution planning and shall be included during the required safety briefings. All members attending a briefing shall have input on risk assessment models. The ultimate decision to conduct the evolution rests with the CO/OIC with input from the persons included in the brief. Risks shall be re-assessed as situations change.

3. Error Trapping. Safety briefings must empower subordinates to monitor circumstances and report situations that differ from planned evolutions, hazardous conditions, or are unclear. By discussing risk, personnel will be better aware of potential hazards and how to control them. It is extremely important for a system of notification to be in place and known by every team member.

4. Proper Watch Atmosphere. All hands must ensure that the team observes proper TCT practices, and that team members refrain from frivolity or loud, boisterous behavior. The Safety Observer and POIC will provide team oversight. Teams should be enthusiastic to conduct operations, but must avoid undue excitement to eliminate confusion in order for the mission to be carried out safely. In the event that confusion does exist by any member of the team, members must be empowered to ask questions to remove uncertainty. Well-trained, motivated and properly informed personnel need only well-articulated, standard voice commands to conduct operations.

D. Personal Protective Equipment.

1. Introduction. Cutter deck evolutions are inherently dangerous. The use of Personnel Protective Equipment (PPE) by all personnel on deck is the first line of defense against injury. Reference (b) provides guidance when selecting PPE.

2. Personal Flotation Devices. Personal Flotation Devices (PFD) shall be worn by topside personnel involved in all deck evolutions. Only U.S. Coast Guard approved PFDs, as approved in Reference (b), shall be worn. Inflatable PFDs must NOT be worn by mooring station, towing, shipboard launch and recovery, and astern fueling at sea personnel.

3. Hard Hats. Hard hats must:

   a. Be worn for all deck evolutions in accordance with Reference (r).

   b. Meet American National Standards Institute (ANSI) standard Z89.1-2014 or newer.

   c. Be outfitted with a chin strap that is worn at all times.

   d. Be kept clean and free of unauthorized paint and stickers to allow for inspection for cracks and other deformities. Only wearer's name or rank on the back of the shell is authorized.

   e. Be color coded to quickly identify the wearer's assignment on deck. Hard hat color codes are as follows:

      (1) White: Safety Supervisor (SO)
      (2) Yellow: Boat Deck Captain (BDC), Petty Officer in Charge (POIC)
      (3) Brown: Deck Machinery Operator (Davit Operator (DO), Capstan Operator, etc)

(4) Blue: Qualified Deck Seaman / Line Handler / Deck Rigger
(5) Green: Break-In (BI) Deck Seaman / Signalman
(6) Red: Line Throwing Gun / Bolo Heavers
(7) Purple: Fueling Team (AFAS Ops)

5. Safety Footwear. The wearing of safety footwear is mandatory when conducting evolutions that involve a crushing hazard to the feet. Footwear should be comfortable and well-fitting with non-skid soles. It is recommended that boots be worn for better ankle support.

6. Gloves. Gloves must fit snuggly to help reduce the possibility of becoming fouled and should not have loose appendages. Gloves may be worn when environmental conditions make it prudent and may be required for certain evolutions. Gloves worn while handling lines should be specifically designed for line handling.

7. Eye Wear. Members of any detail where there is the possibility of flying debris, such as paint chips, fuel spray, rust, or grit, or those members in the vicinity of the evolution, shall wear safety glasses/goggles. Safety glasses/goggles shall meet ANSI standard Z87.1. Personnel with corrective lenses should be issued prescription safety glasses (both clear and tinted).

8. Jewelry / Loose Articles. When working on or near machinery or handling lines, avoid wearing jewelry or clothing with loose ends or loops that might catch moving equipment, lines or mooring fittings.

9. Additional PPE. Additional PPE requirements, specific to each evolution, are outlined in the following chapters.

CHAPTER 4. MOORING

A. Introduction. This section outlines policy and doctrine for cutter mooring evolutions.

B. Mooring Types. Mooring systems are used to secure a ship to a pier, wharf, mooring buoy, or another ship. Mooring systems include the lines, fenders, ship/pier fittings and related machinery used to bring a ship into a moored configuration. In addition to the standard mooring configurations, a variety of at-sea mooring configurations can be employed which often utilize a ship's anchors. Most moorings are provided in harbors to provide a safe haven, reduce exposure to waves, reduce ship motions, and reduce dynamic mooring loads.

1. General Mooring Arrangements. Ship mooring arrangements and shipboard mooring practices have long been based on traditions that have remained unchanged over the years. Studies have shown that some mooring system components, thought to be within their design parameters, may in fact be overloaded. An understanding of mooring dynamics is needed to ensure effective mooring arrangements for both standard and heavy weather moorings.

2. Standard Mooring Arrangements. Standard mooring arrangements are developed and issued for each class of ship and are often found in Ship's Information Books. The initial mooring arrangement is usually based on preliminary system design and may need to be modified based on practical experience.

3. Mooring Station Capacity. Bitt strength determines mooring station capacity. Mooring arrangements for most ships deploy mooring lines in three parts to develop full mooring design capability.

4. Heavy Weather Mooring. During repair periods when a ship cannot get underway, they should have provisions in place to execute heavy weather mooring (Mooring Service Type III – for 90-knot winds and higher). Some ship classes have extra ship fittings available that can be used to moor for heavy weather. To obtain needed holding power, it is often necessary to run lines to pier fittings that are in the traffic area, or across the pier. Placement of lines into the pier may require pier operations to be restricted or secured. Upon notification of a major storm approaching, ship and facility personnel must coordinate a heavy weather mooring plan.

5. Nested Moorings. Not all ports offer pier side berthing accommodations to each ship. When port loading is congested, ships may be required to moor outboard to similar ship hulls (nested).

6. Mediterranean Mooring (Med Moor). In a Med Moor, the stern of the ship is secured perpendicular to a pier or fixed structure with mooring lines or anchor chains. The bow of the ship can be secured to mooring buoys or by its own anchors. A typical Med Moor arrangement is shown in Figure 4-1. Med Moors are used where there is insufficient berthing facilities for mooring ships parallel to piers, such as in the Mediterranean Sea. Ships planning a Med Moor on deployment should practice this maneuver prior to deployment.

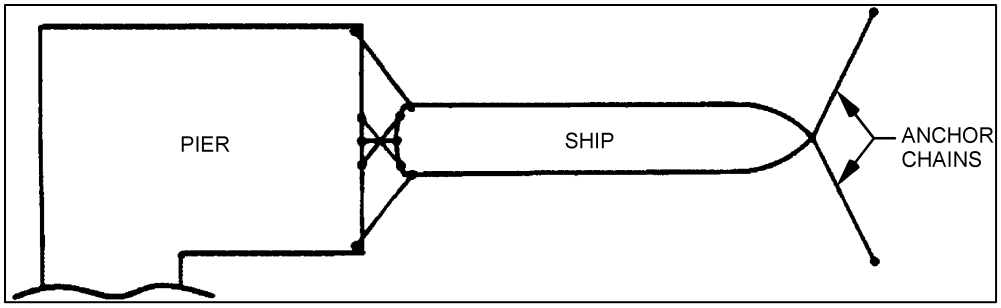

Figure 4-1: Med Moor

C. Mooring Equipment. The majority of mooring systems aboard ships are relatively simple consisting of the mooring lines, a few accessories and deck fittings, and two speed capstans. Larger ships may have variable speed capstans for improved line handling capability and/or constant tension mooring machinery for ease of tending mooring lines.

1. Mooring Machinery. Mooring machinery facilitates the handling and securing of mooring lines and includes a windlass, capstan, and winches.

a. Windlass. The anchor windlass is installed on vessels primarily for handling and securing the anchor and anchor chain. Windlasses are provided with capstans or catheads, which are used for handling mooring lines when docking and undocking. The two general types of windlasses are the horizontal shaft windlass and the vertical shaft windlass.

(1) Horizontal Shaft Windlass. This type of windlass is usually a self-contained unit with the windlass and windlass motor mounted on the same bedplate. It handles both the port and starboard anchors and is normally found aboard larger vessels. See Figure 4-2.

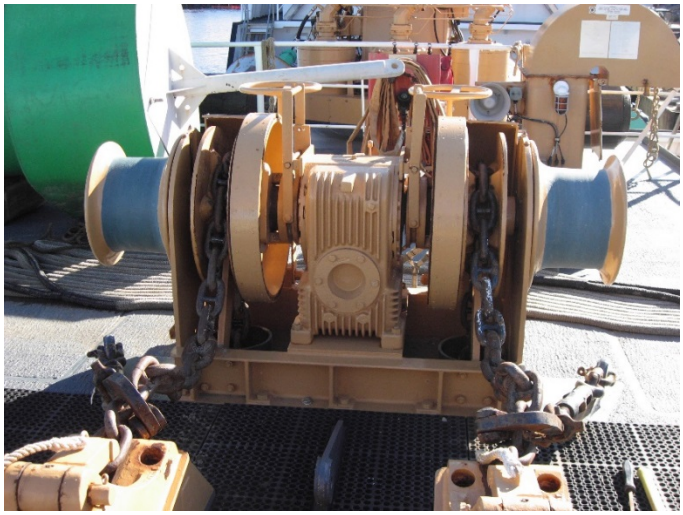

Figure 4-2: Horizontal Shaft Windlass

(2) Vertical Shaft Windlass. This type of windlass is normally found on medium to small vessels. With the vertical shaft windlass (Figure 4-3), the power source is located below the deck with only the wildcat and capstan showing above the deck. The controller for the windlass is also above deck. This type of windlass can handle only one anchor.

Figure 4-3: Vertical Shaft Windlass

b. Capstan. A capstan is a revolving device with a vertical axis, used for heaving in mooring lines (mooring and warping).

c. Winch (Gypsy Head). A gypsy head is the drum of the winch, around which a line is turned, for heaving in the anchor.

2. Deck Fittings. Typical deck fittings are listed below.

a. Cleats. Cleats are twin horned shaped devices used for securing lines. Figure 4-4 shows a typical welded horn type cleat.

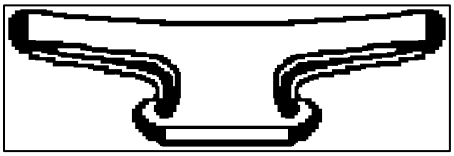

Figure 4-4: Welded Horn Type Deck Cleat

b. Bitts. Bitts are made of vertical cylinders, called barrels, usually arranged in pairs, which are used for securing mooring lines or towing lines. The bitt barrel is fitted with a top plate and in certain designs, a line guard to keep lines from riding up the barrel. Usually there is a set of bitts forward and after each chock.

(1) Standard Fixed Bitts. The most common bitt in use is the double barrel fixed bitt as shown in Figure 4-5.

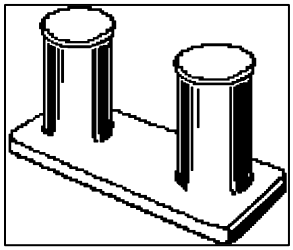

Figure 4-5: Double Barrel Fixed Bitt

(2) Recessed Shell Bitts. Recessed shell bitts are designed for use with 3-inch circumference, 3 strand nylon line (maximum BS 23,200 lbs.).

(3) T-Bitts. Used for small boat handling as in well decks for moving landing crafts into position.

(4) H-Bitts. Towing or H-bitts are heavy castings or weldments secured to the deck structure and are generally located near the cutter's pivot point where they provide the hard point that sustains the athwartship loads imposed by the towline when it sweeps the fantail. In cutters fitted with a towing machine, the H-bitts prevent transverse strain on the level wind mechanism and are used to stop-off the tow wire when necessary. See Figure 4-6.

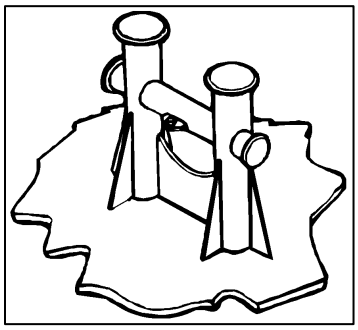

Figure 4-6: H-Bitts

c. Chocks. Chocks (Figure 4-7) are heavy fittings secured to the deck. Lines are passed through them to bollards on the pier. The types of chocks are closed, open, roller, and double roller.

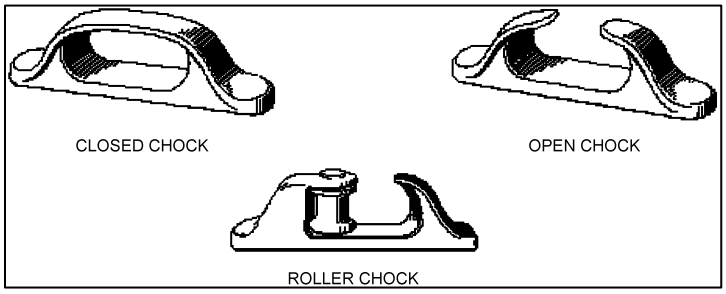

Figure 4-7: Open, Closed and Roller Chocks

(1) Mooring Ring. A mooring ring is basically a standard chock built into a bulk-head. They are usually found in larger ships that have the forward mooring station in the anchor chain handling room.

(2) Bullnose. The bow chock is sometimes called a bullnose.

d. Fairleaders. Fairleaders (Figure 4-8) are used to lead mooring lines around obstructions and provide proper alignment with winches or capstans.

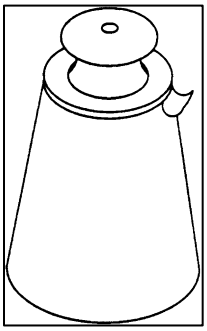

Figure 4-8: Fairleader

e. Pad Eyes. Pad Eyes are fixtures welded to a deck or bulkhead. They have an eye to which lines or tackle are fastened and are used for securing or handling cargo. See Figure 4-9.

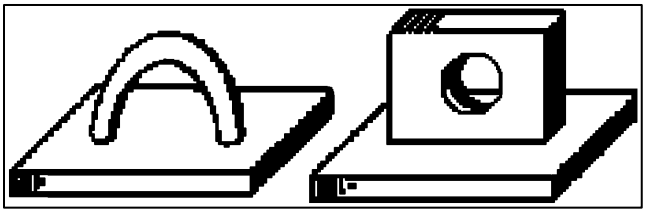

Figure 4-9: Pad Eyes

3. Pier Fittings. Typical pier fittings are listed below.

a. Cleats. Pier cleats are identical to deck cleats as described earlier.

b. Bitts. Pier bitts are identical as deck bitts as described earlier.

c. Bollards. Bollards are single posts secured to a wharf or pier, used for mooring vessels via lines extending from the vessel.

d. Fenders. Fenders (Figure 4-10) are frequently obtained as self-contained units, which are often portable. Fenders can be constructed from resilient rendering material combined with structural members to form separators.

Figure 4-10: Fender

e. Camels. Floating log fenders which are devices used between the ship and the pier or wharf structure. They provide a vessel standoff from a pier or wharf. Composite fender camels also spread berthing loads across many fender pilings or footprint of pier or wharf structure. These floating fenders are usually allowed to float with the tide.

f. Dolphins. A dolphin is a man-made marine structure that extends above the water and is not connected to shore. Dolphins are usually installed to provide a fixed structure for mooring.

4. Mooring Lines and Mooring Accessories.

a. Mooring Lines. Mooring lines are used to secure a ship to a wharf, pier, dock or another ship. They shall be fitted in accordance with Reference (q), and deviations from this requirement are only authorized by the Product Line and ESD Technical Authority via an approved TCTO.

(1) Bow and Stern Lines. The forward most lines on the ship are referred to as bow lines. Mooring lines at the aft of the ship are called stern lines. On smaller ships, the bow line is usually run through the bull nose. Bow and stern lines are important lines for holding the ship in position since they are run from fittings furthest from the pier.

(2) Breast or Spring Lines. Mooring lines are considered to be breast or spring lines, depending on the angle the line makes with the pier (as viewed from overhead).

(a) Breast Lines. Breast lines are run perpendicular to the centerline or keel of the ship and hold the ship next to the pier (less than 45-degree angle from perpendicular).

(b) Spring Lines. Spring lines lead diagonally from the ship to the dock and limit forward and aft movement of the ship (greater than a 45-degree angle).

b. Mooring Line naming. Mooring lines are also named according to their position and how they lead from the ship. For example, in Figure 4-11 the number two line is called an after bow spring line because it is located on the bow and it is a spring line leading aft.

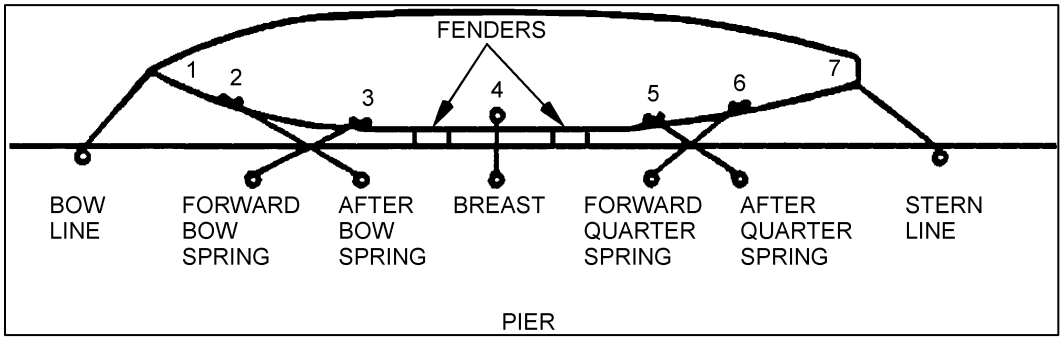

Figure 4-11: Mooring Line Nomenclature

c. Storm Lines. Storm lines are used when a cutter encounters storm or heavy weather conditions while moored to a pier. Early planning to determine the best strategy to ride out a storm will yield the best chance of minimizing the damage to the cutter or pier. Figure 4-12 shows additional storm lines and their placement.

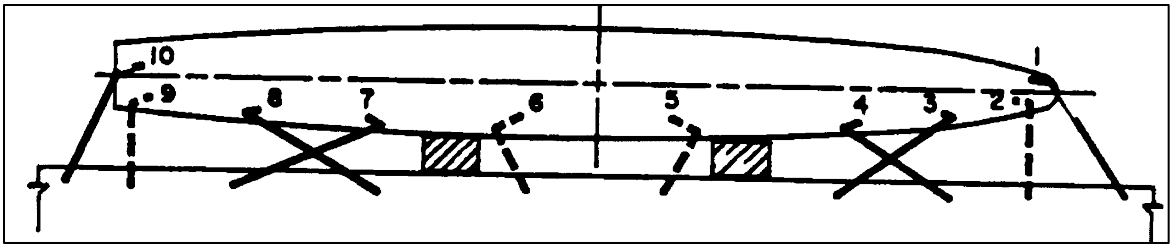

Figure 4-12: Storm Line Placement

d. Messengers. Messengers are sometimes used as an intermediate between heaving lines and mooring lines.

e. Heaving Line. Heaving lines are light weight floating synthetic lines that are attached to mooring lines or messengers and are used to pass the mooring lines to the pier.

f. Rattail. A rattail is a type of stopper knot that is used to temporarily take the load while a mooring line is shifted to a mooring bitt.

g. Criss cross. A criss cross is a method of stopper knot used similarly to a rattail stopper knot.

h. Line Throwing Devices. Line throwing devices are used to pass mooring lines to the pier or another ship.

(1) Heaving Ball. The NAVSEA approved projectile is a four and one-half inch diameter fluorescent orange heaving ball made of soft vinyl latex. Figure 4-13 shows the end of a standard heaving line passed through the heaving ball and secured.

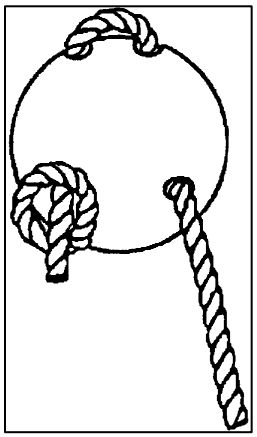

Figure 4-13: Line Throwing Device - Heaving Ball

(2) Monkey's Fist Heaving Line. A monkey's fist heaving line is made of at least 75 feet of cotton sash cord or six thread manila line. Due to its weight, a monkey's fist heaving line can be dangerous. See Figure 4-14.

(3) Bolo. A bolo is a nylon line or orange shot line, with a well-padded lead weight sewn into a leather sheath with a grommet attached to one end. Approximately 4 to 5 feet from the lead weight a wooden toggle is tied to the nylon line. The padded lead weight is swung in

a circle horizontally overhead and thrown once momentum is built up. An experienced seaman can throw a bolo three times as far as a heaving line. Due to its size, weight, and speed of delivery, the bolo can be dangerous. See Figure 4-14.

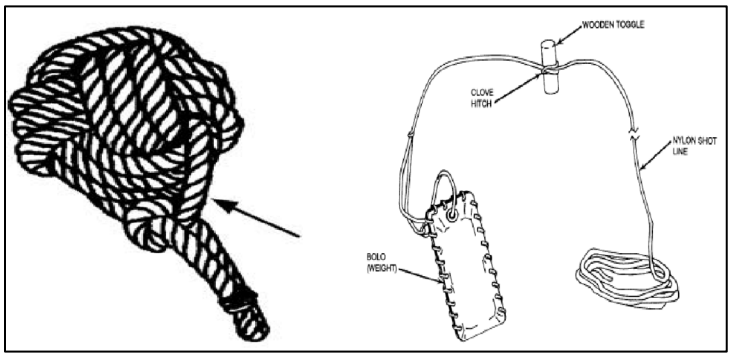

Figure 4-14: Monkey's Fist Heaving Line and Bolo

i. Line Throwing Gun and Projectile. Larger ships may be outfitted with line throwing guns to assist when docking at large distances from the pier or another ship. Prior to using the gun, line throwing gunners must be properly trained, may need permission from docking authorities, and must provide warning to pier-side individuals on chosen projectile.

j. Lead Lines. Lead lines are used to measure the depth of the water.

k. Tattletale. A tattletale (Figure 4-15) is a line attached to a synthetic hawser which is used to determine when the tension in a synthetic hawser is approaching the danger point. A tattletale for a traditional high stretch mooring line (nylon or polyester) is a piece of 6 thread manila line of predetermined length secured to the hawser at two points a specified distance apart. When the hawser is straight but not under tension, the tattletale hangs down. As the hawser stretches under load, the distance between the attachment points on the hawser increases, and the tattletale begins to straighten. At the point when the tattletale becomes taut, the working load limit of the hawser has been reached.

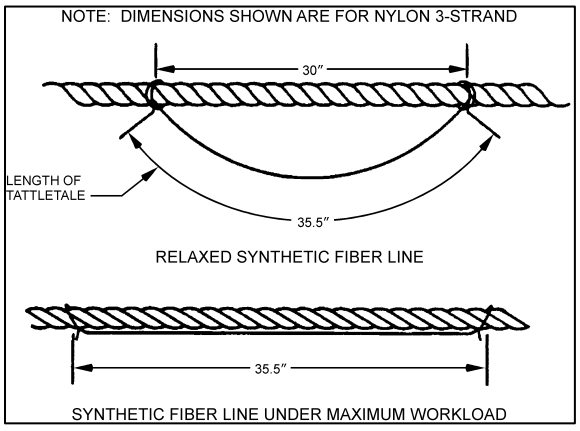

Figure 4-15: Tattletale

l. Chafing Gear. Chafing gear is a temporary covering used to protect a line.

m. Rat Guards. Rat guards are intended to prevent rats from boarding ships by way of the mooring lines.

n. Hawser Reels. Vertical and horizontal hawser reels for storing mooring lines and towing hawsers are provided according to line size and line length.

D. Planning

1. Briefings and Risk Management. Cutters shall complete briefings and risk management as part of evolution planning per Chapter 3.

2. Environmental Conditions. Mooring planning must include external influences on safe mooring as follows:

a. Effect of Tide and Ship Displacement on Mooring Line Loads. Mooring line loads are affected by changes in tide level and ship displacement (loaded vs. ballasted conditions). Variations in tide level and ship displacement can increase or decrease mooring line loads unless the lines are tended (let out or heaved in).

b. Effect of Wind and Current on Mooring Lines. Depending on the direction, wind and current may either ease or put more strain on the mooring lines. The loads in the ship's mooring lines increase approximately as the square of the wind speed increase. The force due to current is dependent on the hull form and draft of the ship, the depth of the water, and the direction of the current. Attention must be paid to shifting conditions, and appropriate action must be taken to prevent excessive ship movement. Of particular concern is movement that could make the brow unsafe or unstable.

E. Communications. Standard line handling commands are included as Enclosure (2).

F. Administration.

1. Cutter Bill. The Special Sea Detail/Anchoring/Mooring Bill is required per Reference (c).

2. Documentation. Mooring must be documented in the Smooth Log.

3. Preventive Maintenance Overview. Preventive Maintenance System (PMS) requirements should be carried out in accordance with instructions provided on applicable Maintenance Procedure Cards (MPCs) or other applicable instructions.

G. Personal Protective Equipment. See Chapter 3 for general PPE requirements.

H. Safety Requirements for all Cutters. General Safety Requirements for all cutters are listed below:

1. All mooring equipment shall be visually inspected prior to and after each use.

2. Machinery used in mooring evolutions shall be maintained IAW with the Reference (f).

3. All personnel should read and be familiar with References (e) and (f).

4. Mooring lines shall comply with Reference (q), Surface Forces Logistics Center (SFLC) Standard Specification 582 to ensure the proper stretch and composition.

5. Avoid using different types of mooring lines from the same pair of bitts.

6. Avoid stepping over or straddle lines, wires or chains while under tension or not. Go around!

7. Stay out of the bight of the line.

8. Do not stand directly in line of a line under a load or where a line changes direction.

9. Ensure all lines are free of kinks prior to use.

10. Listen to all lines under tension. Unusual popping or tearing sounds may mean the line is in danger of failing.

11. Tattletales shall be installed as required on mooring lines.

12. Never leave lines secured to gypsy heads or capstans.

13. When using the capstan ensure that three or more turns are used and position the line handlers perpendicular to the direction of pull.

14. Never take a strain on a line unless it is clear of obstructions.

15. Ensure line handlers stand well away from bitts under a load and perpendicular to that load when possible.

16. Every attempt shall be made not to exceed a bend of over 90 degrees with a mooring line under tension.

17. The use of weighted monkey fist heaving lines is discouraged. The preferred heaving line is a fluorescent heaving ball.

18. Under no condition shall the breaking strength of a doubled up mooring line exceed the load capacity of the bitts.

19. Extreme caution shall be exercised when mooring in a non-Coast Guard or Navy facility so as not to exceed the pier side fittings rated load.

20. Use the same type of material for stoppers as the mooring lines.

21. Change mooring lines in accordance with SFLC Standard Specifications.

22. Do not expose lines to excessive heat, cold, or sunlight unnecessarily.

23. Do not expose lines to chemicals.

24. Frozen mooring lines should not be used in mooring evolutions. The ice particles sheer the fibers embedded in the mooring lines. Lines which are subjected to freezing conditions should be replaced on a more frequent basis than those which haven't.

25. Do not drag lines on decks unnecessarily. Rough surfaces and the grit on deck will adversely affect the strands.

26. Use chafing gear.

27. Pay out lines on bitts, cleats or capstans slowly. These lines, when eased, may slip unexpectedly due to their rapid recovery and low drag coefficient of friction.

28. Lines under heavy strain should be doubled up in accordance with Reference (f).

I. Manning Guidelines. Positions shall be filled by qualified members per the Watch, Quarter, and Station Bill. The minimum manning requirement for all mooring stations is one line handler and one safety observer. The maximum oversight of a safety observer is two mooring stations. The following are typical deck mooring positions (varies by cutter class).

1. Safety Observer (SO). Responsible for the overall safety of the mooring detail.

2. Petty Officer in Charge (POIC). Responsible for the overall mooring operation at assigned mooring station(s).

3. Capstan/Brake Operator (CBO). Responsible for safe and efficient operations of the cutter windlass, wildcat(s) installed.

4. Deck Rigger (DR). Responsible for the maintenance and repair of non-mechanical mooring gear and serves as the leading seaman at each mooring station.

5. Line Thrower. Responsible for throwing line from the vessel to the shore.

6. Fender Detail. Responsible for ensuring appropriate fenders are in place.

7. Line Handler (LH). Responsible for handling lines, passing stoppers, passing heaving lines, rigging rat guards, tending mooring lines on capstan and making up mooring lines (etc.).

J. Qualification and Certification. The First Lieutenant is responsible for ensuring all mooring station personnel are certified per Table 4-1. Navy PQS is valid until superseded by Coast Guard PQS.

Mooring Station Certification Matrix						
		Mooring Station Billets				
		SO	**POIC**	**CBO**	**DR**	**LH**
	Deck Safety Observer (SO)	X				
	Petty Officer In Charge (POIC)	X (Note 1)	X (Note 1)			
	Capstan/Brake Operator (CBO)	X	X	X		
	Deck Rigger (DR)	X	X	X	X	
	Line Handler (LH)	X	X	X	X	(Note 2)
Notes: 1. Both the Special Sea and Anchor Detail Petty Officer in Charge PQS must be completed. 2. Must complete PQS for Line Handlers.						

Table 4-1: Mooring Station Certification Matrix

K. Watchstanding. Cutter watchstanders should inspect mooring lines during high and low tide/water, during periods of adverse weather, or as required/needed.

CHAPTER 5. ANCHORING

A. Introduction. This section contains deck seamanship policy for anchoring of Cutters. Reference (g) provides anchoring Tactics, Techniques, and Procedures (TTP).

B. Planning.

1. Briefings and Risk Management. Cutters shall complete briefings and risk management as part of evolution planning per Chapter 3.

2. Planning Factors. A successful anchoring evolution is dependent on several factors: the anchor's holding power, the size of the cutter, environmental conditions (wind, current, and tides), depth of water, and type of bottom. Each of these factors must be considered when planning the anchoring evolution to ensure that the anchor will adequately perform its function.

C. Communications. Communication among all involved parties, e.g. bridge, anchor watch, petty officer in charge (POIC), deck safety, etc., is critical to a successful anchoring evolution.

1. Primary and Secondary Communications. Primary and secondary communications shall be established between the bridge and the anchor detail and anchor watch.

2. Communications Schedule. A communications schedule shall be established between the bridge and the anchor detail and anchor watch.

3. Anchoring Commands. Reference (g) contains standard commands used during anchoring evolutions.

D. Administration.

1. Cutter Bill. The Special Sea Detail/Anchoring/Mooring Bill is required per Reference (c).

2. Anchor Log. This is a permanent record of ground tackle and its use. It includes the following basic information: serial numbers, weights, and types of all the anchors; serial numbers of the shots of chain and their position within the ground tackle; the length and diameter of each cable, in fathoms; serial numbers of each detachable link, both those in use and spares.

3. Preventive Maintenance. The periodicity for inspecting and preserving anchors, chain and appendages shall be in accordance with the Preventive Maintenance System (PMS) and is limited to that portion of the chain which has been used for anchorage based on the ship's anchor log. Maintenance shall include visual inspections of chain and detachable links, touch-up painting of the outboard swivel shot, first shot, shot markings and anchor, and lubricating of the chain stoppers and detachable links in accordance with PMS requirements. Per Reference (s), vessels shall routinely wash down anchors, anchor chains, and appendages with seawater when retrieving them to prevent on board collection of sediment, mud and silt. Detailed policy regarding coral reefs can be found in the Coast Guard Coral Reef Protection Implementation Plan, COMDTINST 16000.2 (series). Vessel's should avoid anchoring where coral is visible.

E. Personal Protective Equipment. See Chapter 3 for general PPE requirements. PFDs, hard hats, safety footwear, and eye protection shall be worn.

F. Safety Precautions. Anchoring is a dynamic and fluid evolution and presents inherent safety risks. A thorough understanding of anchoring policy, principles, and procedures, combined with an intimate knowledge of equipment capabilities and limitations, is essential to ensure safety.

G. Manning Guidelines. Positions shall be filled by qualified members per the Watch, Quarter, and Station Bill. The following are typical deck anchoring positions. More information is available in Reference (f).

1. Safety Officer. Responsible for team oversight to ensure personnel strictly adhere to risk management practices.

2. Petty Officer In Charge. Supervisor responsible for the deck anchoring evolution.

3. Phone Talker. Responsible for communications relay if hand held radios are not used.

4. Riggers. Qualified individuals acting under the direction of the POIC for assigned task(s).

H. Equipment Guidelines. Anchoring Equipment is dependent upon the ship's outfit list for that cutter class. Before anchoring, the anchor detail shall inspect each piece of equipment to ensure operability. Only the CO/OIC may decide to anchor using deficient equipment. See Reference (f) for more details / description of typical anchoring equipment.

I. Watchstanding. The anchor watch shall be set immediately after securing the anchor detail and stationed as required by the CO/OIC.

CHAPTER 6. TOWING

A. Introduction. This section outlines policy, doctrine and requirements for Coast Guard towing of commercial, recreational, and cutter to cutter towing operations. Most Coast Guard cutters are equipped to take another vessel in tow or be taken in tow and are furnished a towing and be-towed arrangement plan which provides detailed information on deck layout of equipment and gear availability. These plans shall be used or modified at CO/OIC discretion.

B. Phases of a Towing Operation. Towing operations can be divided into 6 phases:

1. Assessment Planning and Preparations for Towing.
2. Making the Approach.
3. Passing the Tow.
4. Starting the Casualty Making Way.
5. Towing in the Required Direction at the Required Speed.
6. Slowing Down and Recovering/Transferring the Tow.

C. Towing Distressed NATO Ships. Standardized NATO emergency towing procedures are found in the unclassified ATP-43, which was written for one combatant towing another. In this type of operation, each ship typically provides its own towing hawser as half of an entire rig of reasonable length. Cutters shall be familiar with ATP-43, which includes sections on:

1. Principles of Operations.
2. Organization and Command (including Communications).
3. General Consideration of Towing Operations.
4. Preparation, Approaching the Casualty, Passing and Connecting the Towing Rig.
5. Conduct of the Tow.
6. Emergency Release or Parting of the Rig.
7. Transferring the Tow.

D. Forces Involved in Towing. The towline provides the link through which towing forces are transmitted from the towing vessel to the vessel being towed. The towline and hull fittings on both vessels must be sturdy enough to withstand the static and dynamic forces acting on both vessels. If there is a failure in any part of the towing system, death or serious equipment damage may occur.

1. Total Tow Hawser Tension. Total tow hawser tension is determined by the static and dynamic tensions caused while conducting towing operations. Coast Guard cutters are designed to tow

like size vessels in moderate seas.

2. Static Forces. Static forces cause a vessel to resist motion. Static forces must be overcome before a vessel can be set in motion.

   a. Inertia. Inertia is a descriptive term for that property of a body which resists change in its motion. Displacement, hull form, and mass are attributes that keep a vessel at rest.

   b. Moment of Inertia. Moment of inertia is the property of an object associated with its resistance to changing course while at rest. It is dependent on the object's mass and the distribution of mass with respect to the axis of rotation. The larger the vessel, the more resistance there will be in turning the vessel.

3. Dynamic Forces. Dynamic forces are the forces that affect that vessel while moving through the water. Dynamic forces are dependent upon the vessel's unique characteristics such as draft, beam, tonnage, hull form, sail area, and how the waves and wind affect those characteristics.

   a. Displacement (Tonnage). Displacement is the weight or volume of a fluid displaced by a floating body, used especially as a measurement of the weight or bulk of ships.

   b. Linear Momentum. Linear momentum is a measure of the motion of a body equal to the product of its mass and velocity. The larger the vessel being towed and the faster it is being towed will increase its linear momentum making the vessel harder to stop or change its direction. Safe towing speed must consider the displacement of the vessel being towed.

   c. Angular Momentum. Angular momentum is the momentum of a vessel in a turn wanting to continue in that turn. It is the opposite of the static term, moment of inertia.

   d. Frictional Skin Resistance. Frictional skin resistance arises from water friction against the vessel's surface and is affected by speed, draft, length, shape, and beam of a vessel. Speed is the only variable which can be controlled. Frictional skin resistance increases with the square of its velocity, so even slight speed increases may cause undo strain on the towing system.

   e. Underwater Hull Form Drag. Like frictional skin resistance, underwater form drag plays a large role in the ability of a vessel to cut through the water. A sleek patrol boat will cut through the water much more easily than a buoy tender. The less water a hull has to push out of the way, the less force is necessary to move that object through the water. Speed and underwater hull form affect form drag. Speed is the only variable which can be controlled to reduce tow hawser tension. The underwater hull form drag is visually evident with a bow wave. The larger the bow wave of a vessel being towed, the larger the tow hawser tension.

   f. Propeller Resistance. Propeller size is also critical in underwater hull form drag. Several towlines have parted partially because of increased towline tension caused by fouled propellers and towing speed.

4. Wave and Spray Drag. The frictional forces of wave and spray drag act on vessels depending on the area of the vessel exposed to the waves above the waterline. There is no way to accurately determine the force a wave has on a vessel due to the varying angles of impact of the waves.

Wave drag can be affected by course and/or heading changes. As examples:

a. Running directly into a sea causes less wave friction than running with the seas broadside. However, running directly into the sea may cause significant shock loading of the towline if the towed vessel is caught and stopped, or slowed, by a large wave.

b. Running in the trough is effective to minimize tow hawser tension, but it may provide a less than comfortable ride for the crew.

c. Running down swell may minimize towline tension, but the vessel being towed may over-run the towing vessel. If this occurs, slack in the towline may catch in the towing vessel's propeller. As with running directly into the sea, running down swell may also cause significant shock loading.

5. Wind Resistance. Wind resistance is determined by wind blowing on a cross-sectional area of the vessel above the waterline. Course and/or speed changes may greatly change the towline tension. The resistance caused by wind blowing against the vessel depends upon:

a. Cross-sectional area of vessel above waterline subjected to wind.

b. Speed of wind.

c. Speed of tow.

d. Shape of vessel subjected to wind.

E. Personnel Responsibilities.

1. Commanding Officer. The CO/OIC shall:

a. Ensure that risk management and safety brief/debrief are completed.

b. Choose suitable tow connection procedures for current weather conditions.

c. Choose a suitable course and speed for approach of tow.

d. Operate under the Restricted Maneuvering Doctrine.

2. Operations Officer. The Operations Officer or Operations Petty Officer of either cutter shall:

a. Ensure communications are established with the vessel being towed.

b. Ensure both vessels agree on procedures for rigging the tow, breaking the tow, communications, and emergency breakaways.

c. Ensure all stations report manned and ready prior to passing the tow.

3. Engineer Officer. The Engineer Officer or Engineer Petty Officer of either cutter shall ensure all

engineering personnel receive brief/debrief.

4. First Lieutenant. The First Lieutenant of either cutter shall ensure:

   a. All towing gear is maintained in accordance with Reference (f).

   b. The towing rig is properly prepared for transfer.

   c. The deck is properly prepared, manned, and rigged for towing.

   d. Safety briefs/debriefs are completed.

   e. Deck communications checks are complete with other cutter.

   f. The cutter boat is ready for launch with the cutter surface swimmer.

   g. All deck personnel receive a brief on the evolution.

   h. The life buoy watch is manned.

5. Safety Observer Responsibilities. The Safety Observer shall be responsible for the overall safety of the evolution.

F. Planning.

1. Briefings and Risk Management. Cutters shall complete briefings and risk management as part of evolution planning per Chapter 3.

2. Environmental Conditions. CO/OICs shall also consider the specific operating characteristics of their cutter in relation to the prevailing weather/sea conditions when making risk assessment decisions. The environmental conditions and factors listed below shall be considered in determining go, or no go, for the towing operations.

   a. Sea State

   b. Precipitation

   c. Darkness

   d. Pitch/roll

   e. Winds

   f. Sea spray

   g. Visibility

   h. Icing

3. Preparation. Towing is an evolution requiring the coordinated teamwork of several different departments for safe and efficient execution. Circumstances requiring knowledge of these subjects may arise only when there is little or no time to consult plans and instructions. Each person involved in the towing operation must have a detailed knowledge of pertinent arrangements, instructions and drawings of their ship.

4. Strength of Towing Fittings/Equipment. The strength of towing fittings/equipment and the tonnage of the casualty in relation to the towing ship are important when considering whether the towing ship has the capabilities required to conduct a particular towing operation.

G. Communications. The following communications items shall be completed:

1. Communications Gear. Ensure communications gear is on station.

2. Primary and Secondary Communications. Ensure primary and secondary means of communication checks.

3. Signals. Ensure signalman is familiar with the correct signals, if utilized.

H. Administration.

1. Cutter Bill. The Towing Bill is required per Reference (c).

2. Mooring and Towing Hawser Log. All units conducting mooring and towing operations are encouraged to keep a Mooring Line and Towing Hawser Log. This log provides the First Lieutenant and the CO/OIC a documented reference to use when determining readiness of the hawser and mooring lines.

3. Log Entries. The towing hawser log records data about the cutter's tow line or hawser, spring line, thimbles, shackles, bridles and pendants. Log entries are critical when evaluating the present condition of gear and making decisions concerning replacement. Recording of messenger information is optional but recommended. The Mooring and Towing Hawser Log may be disposed of after the contained equipment has been replaced.

4. Log Book Organization. The log book shall consist of four parts:

a. Part 1. New Material

b. Part 2. Operations

c. Part 3. Post Operations

d. Part 4. Inspection Results

I. Personal Protective Equipment. See Chapter 3 for general PPE requirements. In addition, the following PPE requirements shall apply:

1. General. Personnel involved in rigging and un-rigging towing gear and handling lines shall wear PFDs, hard hats, and safety shoes.

2. Personal Flotation Devices. PFDs shall be worn by all personnel topside during all towing operations.

3. Hard Hats. Hard hats shall be worn for all deck evolutions.

4. Safety Footwear. Safety footwear shall be worn when conducting towing operations.

5. Gloves. Gloves shall be worn when handling wire rope. Gloves, appropriate for handling lines, may be worn when handling messengers and synthetic tow lines.

6. Eye Wear. Eye protection shall be worn when splicing wire.

J. Safety Precautions. Personnel involved in towing operations must be thoroughly trained, disciplined, and equipped to not only perform routine duties, but also to react appropriately to unusual or non-routine situations. Due to the large inertia associated with the ships involved in the evolution, it can be extremely hazardous, particularly if excessive strain is placed on the towline and its parts.

1. System Loads. Coast Guard cutters are designed with a complete towing system which can be found in the cutter's outfit list. The system loads shall not be increased without higher technical authority. The towing system is designed so the tow system is the weak link, not the tow bitt.

2. General Safety Precautions.

a. Never exceed the cutter's rated bollard pull unless approved by the unit's operational commander.

b. Ensure scheduled preventative maintenance is completed on all towing equipment, wire rope, and lines.

c. Ensure a visual inspection is completed on all towing equipment prior to, and after, each towing evolution.

d. Make provisions for emergency release of the tow line.

e. When transitioning, build up turns slowly; never go from dead-in-the-water to standard speed. Do not shock load the towing system.

f. Unless sinking of the tow appears imminent, do not abandon the tow.

g. If the tow is sinking, disconnect the tow line immediately.

h. If the loss of the tow is imminent all effort should be made to mark the tow. Do not risk lives to save property.

i. Ensure all rigging is adequate. If questionable, over-rig, but never exceed the bollard pull of the tow bitt.

j. Keep lookout for small weather fronts. Sudden unexpected fronts can cause great damage.

k. Keep all unnecessary personnel away from the vicinity of the tow line.

l. If able, set a towing watch on both ships.

m. If the towing ship loses power, the course of the towing ship should be altered immediately to prevent being overrun by the towed ship.

n. Pay special attention to possible chafing points where the line passes over chocks, bitts, stern rollers, and so forth. Even though no particular wear may be noticed, it is advisable to freshen the nip at least once per watch to change the location of possible internal wear.

o. Never leave wires, ropes, or lines under strain on gypsy heads or capstans. The breaking strength of the lines often exceed the working load of the capstan and may cause severe damage to the equipment.

p. Do not straddle or stand on wires, ropes, or lines, whether under tension or not.

q. Do not place objects on wires, ropes, or lines.

r. Use chafing gear.

s. Avoid getting hands, feet, or clothing caught in bights formed by wires, ropes, or lines.

t. Do not stand directly in line with the point where wires, ropes, or lines change direction (i.e., around a bitt, capstan, or a chock).

u. Ensure all kinks are out of wires, ropes, or lines before use.

v. Never let the hawser be sprung so much that it straightens out clear of the water or be allowed to drag on the bottom.

w. Ensure that a sufficient catenary exists to absorb shock loading.

3. Safety Precautions for Synthetic Lines.

a. Personnel involved with towing should watch the training video available from the Naval and Education and Training Support Centers, titled “Synthetic Line Snap-back” (Order No. 82971DN, 1982), which shows the hazards associated with synthetic towlines.

b. Existing nylon line should be replaced on a size for size basis with 12 strand polyester. Nylon line is only approved for operations with craft of less than 600 tons displacements. The use of single and double braided polyester is approved for all routine towing applications; however, 12 strand polyester is the preferred tow line.

c. Do not expose lines unnecessarily to heat, sunlight, excessive cold, or chemicals.

d. Store nylon and polyester lines under cover tightly wound on reels.

e. Allow synthetic lines to recover and dry prior to stowing.

f. Install tattletale lines to gauge how far lines are stretching.

g. Payout lines on cleats, bitts, or capstans slowly. Exercise extreme care when easing out synthetic lines under heavy load. Due to their high extendibility under load, their rapid recovery, and their low coefficient of friction, these ropes may slip suddenly on easing out, thereby causing injury to line handlers. For control in easing out or surging, take two round turns on the bitts and then apply one or two figure eight bends. No more than two figure eight bends shall be used. Because these bends tend to lock under surge, use of more than two figure eight bends will cause difficulty in easing out operations.

h. The fiber line should be kept in excellent condition, protected against wear, and inspected regularly.

i. Never allow synthetic line to drag over rough surfaces since this will tend to abrade and cut the outer fibers.

j. Avoid exposing nylon line to rust, since it may cause a rapid reduction in strength.

k. Do not use frozen nylon or polyester lines. If the line becomes iced over, thaw it carefully and drain it before stowing. There is evidence the HMPE lines increase in strength when frozen.

4. Safety Precautions for Wire Pendants and Bridles.

a. Seize wire ends to prevent un-laying.

b. Store wire and spring lay rope away from weather, acid, and chemicals.

c. Inspect wire and spring lay rope in accordance with PMS procedures.

d. When using U-bolt clamps to form an eye, always put the U-bolt itself over the bitter end. Tighten clamps only after putting line under stress.

e. Inspect end fittings, such as sockets, connectors, and wire rope clips prior to use to determine if there is an area of break adjacent to the fitting. Remove clips after long use and examine rope for broken wires. Remove the damaged part, if broken wires are found, and make a new attachment.

K. Manning Guidelines. Positions shall be filled by qualified members per the Watch, Quarter, and Station Bill. Cutter manning requirements may be modified by the CO/OIC on an as needed basis. However, under no circumstance, shall the Safety Observer or Petty Officer in Charge act in any other capacity during one evolution. A typical manning structure is shown in Table 6-1. These billets are applicable to the towing cutter and the cutter to be towed as the situation dictates.

Example Towing Manning		
Title	**Number Assigned**	**Responsibility**
Safety Observer 1LT or BMC	1	Safety of evolution
POIC	1	Proper rigging and execution of tow
SN	Cutter specific (6)	As directed
PO	1	Comms w/bridge
ENG	1	Capstan Operator
WPO/GM	1	SLTG
Corpsman/EMT	1	First Aid Kit

Table 6-1: Example Towing Manning

L. Equipment Guidelines.

1. General. The towing equipment layout on deck shall be per the cutter's Towing Bill and cutter plans. The major components of the towing system are composed of a plaited 12-strand or double-braided polyester cordage constructed to commercial Cordage Institute standards and coated for marine service.

2. Towline Replacement Construction. Cutters shall not replace specified towing hawsers with different size, type or strength without permission from the responsible SFLC-Product Line and SFLC-ESD Technical Authority. Changes in cordage size, strength and material require an Engineering Change to ensure the decision gets full exposure, proper design review and logistics support. .

3. Towline Replacement Size and Length. Towlines shall be replaced on a size for size and length for length basis. For example, 600 feet of 5.5-inch DBN shall be replaced with 600 feet of 5.5-inch 12 strand polyester lines.

4. Towline Marking (Optional). If a unit desires to mark the towline, markings or temporary whippings shall be installed every 100 feet. Units shall mark 100 feet with one marking, two hundred feet with two markings and so forth. Marking of 300 feet is shown in Figure 6-1.

Figure 6-1: Towline Marking

5. Spring Lines. Spring lines are used as shock absorbers to reduce shock loading while towing with a non-elastic towline such as wire rope, aramid, or HMPE fiber rope. Spring lines should be of Double Braided Polyester construction if towing a vessel of over 600 Gross Tons.

6. Spring Line Thimbles and Connectors. Thimbles of appropriate size shall be spliced into each of the 12-strand polyester spring line or tow line. Approved thimbles are pictured in Figure 6-2 and Figure 6-3. The closed, or dog-eared, thimbles will prevent the thimble from capsizing out of the eye. The use of Newco and Nylite thimbles are authorized for use on bridle and pendant legs. More information concerning these thimbles and connectors may be found in Reference (f).

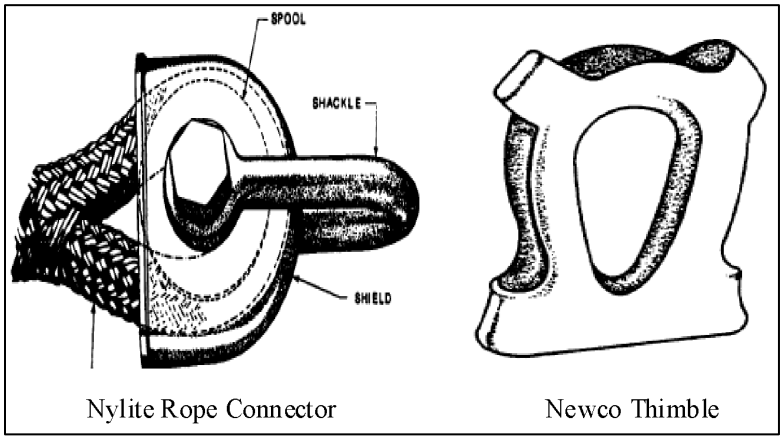

Figure 6-2: Spring Line Thimbles

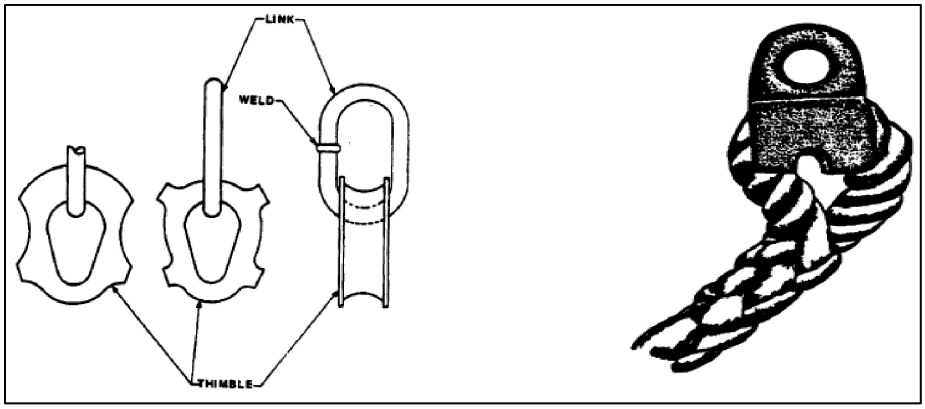

Figure 6-3: Spring Line Thimbles with Link Connectors

7. Flounder Plate (Optional). A flounder plate is a triangular steel plate (Figure 6-4) to which bridle legs are attached. It is designed to distribute the towing force of a towing vessels towline to separate the legs of a bridle.

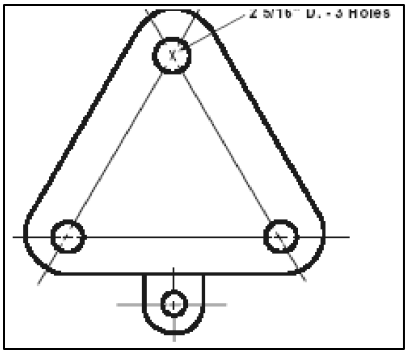

Figure 6-4: Flounder Plate

8. HMPE Bridle and Pendants. A bridle or pendant shall be used when conducting towing operations. The bridle or pendant shall have significant chafing protection to minimize chafe.

   a. Bridle. Each single leg of the bridle shall have the same breaking strength as the overall towing system. Bridles may be of the same diameter and construction as the towline unless it makes no sense, for example towing a 21-foot open boat. The minimum length of the cutter's bridle legs shall be 150 percent of the beam of the cutter itself. The positioning of the cutter's bitts shall also be considered when determining bridle leg length. One end of each leg of the bridle shall have an appropriately sized closed or dog-eared thimble to prevent the thimble from capsizing out of the eye. The other end of the bridle leg shall have a four-foot eye splice.

   b. Pendant**.** A pendant may be used for towing when there is a single point on the vessel to be towed which is on centerline and directional stability is not an issue. The pendant serves as a waster piece in the towing system.

   c. Double Thimble Pendant. The Double Thimble Pendant shall be used for connecting to the NATO link for towing/being towed by USNS and NATO vessels. Cutters shall confirm the type of rig being supplied by the towing vessel when being towed. Each end of the Double Thimble Pendant for the HMPE LWT system shall have an appropriately sized thimble. The length of the pendant shall be the same length as a bridle leg.

   d. HMPE Thimbles. HMPE thimbles shall be dog eared or closed thimbles to prevent the thimble from capsizing out of the eye.

9. Wire Bridles and Pendants. Some situations call for the use of wire bridles or pendants. Wire bridles and pendants are typically used for towing commercial fishing vessels which have rough fairleads. Cutters of over 1000 long tons at full load shall carry a wire bridle or pendant dependent on the cutters deck configuration. The bridle or pendant shall be of appropriate size for the cutter. The wire bridle or pendant shall be used in being towed operations in cases where fire or extreme damage to the cutter has occurred. Wire bridles and pendants shall be constructed of 6 x 37 Improved Plow Steel (IPS) or Extra Improved Steel (EIPS) and shall be hot dipped galvanized and shall have an Independent Wire Rope Core (IWRC). Stainless steel wire rope is not authorized. Wire rope found in the Catalog of Navy Material Stores Section, FSC Group 4010, and commercially available wire rope meeting Federal Specifications RR-W-410E or RR-

W-410D meet Coast Guard wire rope towing bridle and pendant requirements. One end of each leg of a wire bridle shall have a thimble appropriate to the wire rope's construction and size. The other end shall have a soft eye at least twice the size of the cutter bitt's barrel diameter. Wire bridles and pendants shall be maintained as per the appropriate MPCs.

a. Wire Bridle. Wire bridles shall be at least 150% of the beam of the cutter. Each leg of the bridle shall be able to support the entire weight of the tow and should be of equal length.

b. Wire Pendant. Wire pendants shall extend far enough forward of the vessel being towed to ensure that there is no possibility of damage to the tow line. A pendant is simply an extension of the towline to prevent damage to the towline.

11. Wire Rope Terminations for Wire Pendants and Bridles. The approved termination end fittings for Coast Guard operations are shown in Figure 6-5. Poured and swaged type fittings must be compliant with Federal Specifications in RR-W-410E or RR-W-410D and tested to at least 40 percent of the minimum breaking strength for a period of not less than 10 minutes. These fittings shall only be attached to wire rope by competent commercial vendors, who shall certify the fitting in writing that they are compliant with the Federal Specifications previously cited in this paragraph. For more information concerning wire rope terminations refer to Reference (e).

a. Poured Wire Rope Terminations. There are two primary types of material used in poured sockets for wire rope; zinc and resin. When assembled correctly, these fittings are rated at 100% efficiency of the wire rope and are authorized for all rigging applications.

b. Swaged Wire Rope Terminations. Pressed (swaged) fittings are typically used to permanently terminate an eye in wire rope. They are commercially manufactured by hydraulically pressing a steel sleeve on the throat of the eye. When assembled correctly, these fittings are rated at 97 to 100% efficiency of the wire rope.

c. Eye Splice Terminations. Wire rope eye splices are used for installing thimbles or soft eye splices (not pictured) permanently into the ends of the wire rope. When spliced properly, approximately 20 to 25 percent of the strength of the wire rope will be lost. For this reason, eye splice terminations are not typically used in Coast Guard towing operations, but may be needed in unexpected situations.

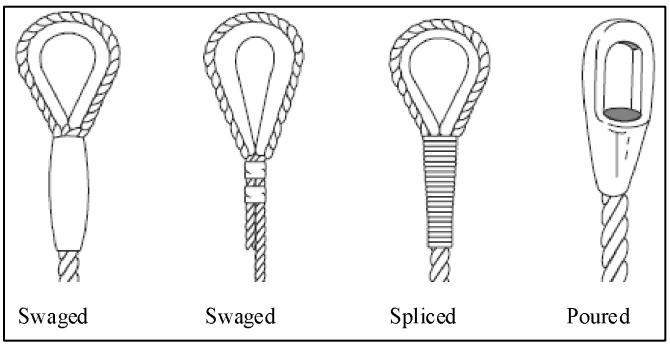

Figure 6-5: Wire Rope Terminations

12. Wire Rope Clips. Wire rope clips are not authorized for permanent towing connections. The

efficiency of a carefully made clip connection is approximately 80 percent of the minimum (acceptance) breaking strength of the wire rope used. The efficiency may be less than this amount if an insufficient number of clips are used, if the nuts are not properly set up, or if the base is not placed on the long end of the rope. Figure 6-6 shows the proper installation for wire rope clips.

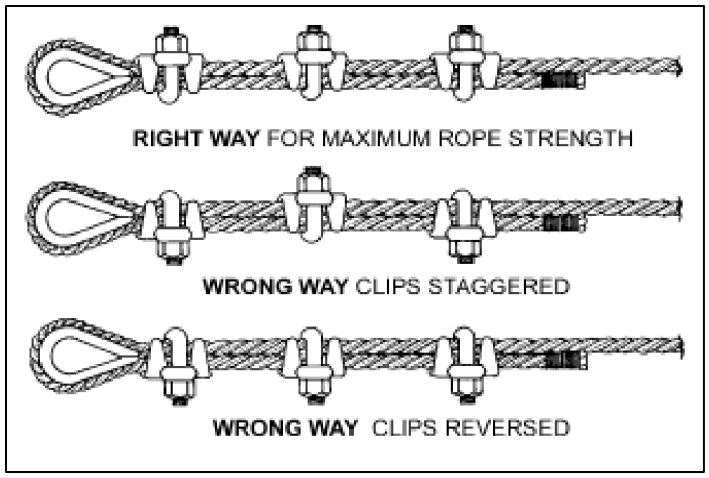

Figure 6-6: Wire Rope Clip Installation

13. Jewelry and Shackles.

    a. Jewelry. The selection of jewelry (connecting hardware, detachable links, special fittings, etc.) is critical in the buildup of the towing system. The size differences between the 12-strand polyester spring line and the significantly smaller diameter of the HMPE towline causes significant sizing mismatches of the associated jewelry.

    b. Shackles. Due to the construction of the towing system, a weak link is necessary to protect the vessels to be involved in the tow. The weak link in the system will be the shackle between the HMPE towline and the bridle or pendant. Shackles approved for Coast Guard towing are described in detail in RR-C-271D, Amendment 1, Federal Specifications, Chain Attachments, Welded and Weldless. Screw pin shackles are not authorized for Coast Guard towing of vessels over 600 tons. If screw pin shackles are utilized, they shall be properly moused.

14. NATO Standard Towing Link (STANAG 1289). The NATO Towing Link is a special link used to facilitate connection of towing rig with ships of other nations and the US Navy.

    a. Carriage Requirement. Cutters over 1000 tons full load shall have a NATO Towing Link on board.

    b. Procurement. The NATO Towing Link is available from Ship's Parts Control Center (SPCC) Mechanicsburg, PA. NICN 401-LL-HAL-6707 applies when ordering the NATO Towing Link.

    c. Characteristics. The USCG and USN NATO Towing Link has a breaking strength of 700,000 pounds. The breaking strengths of the NATO Towing Links provided by other member

nations is their responsibility and may be of greater or lesser breaking strength.

15. Messengers. Messengers are a length of line used to carry larger lines or wires to other vessels.

a. Graduated Messenger. Graduated messengers are used to transition from the size of a heaving line, bolo or shot line up to the size of the towline in use. An example of a graduated messenger is in Figure 6-7. HMPE fibers used for towing are buoyant and often lighter than the graduated messenger, thus eliminating the need for much of the graduated messenger's length. Major cutters attending Command Assessment of Readiness and Training shall have the Graduated Messenger described below.

(1) Cutters may carry graduated messengers of at least the length of their cutter. The two sizes of line shall be spliced together.

(2) Approximately one half of the graduated messenger shall be constructed of 1 ½ inch circumference line. Into the bitter end shall be a snap hook of appropriate size, for connection to the lead line messenger ring.

(3) At least one half of the graduated messenger shall be constructed of 3-inch circumference line. A snap hook is optional in the bitter end for quick release from the bridle or pendant. If the optional snap hook is not used, the graduated messenger shall be attached with either a bowline to the bridle or pendant or a series of half and a rolling hitch secured to the towline with 21 thread stops pictured in Figure 6-7.

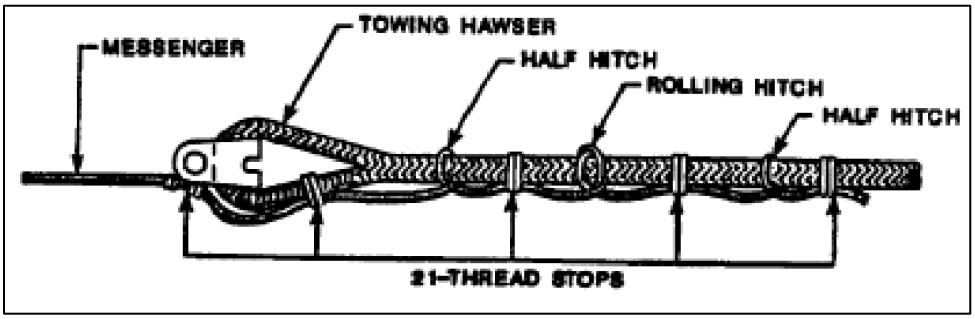

Figure 6-7: Graduated Messenger

b. Lead Line Messenger. Lead line messengers, or cheaters, are run from the fantail forward to an area designated by the command (Figure 6-8). Rigging the lead line messengers on both sides of the cutter will allow for last minute approach change decisions made by the conning officer. Lead line messengers should be 1½ inch in circumference.

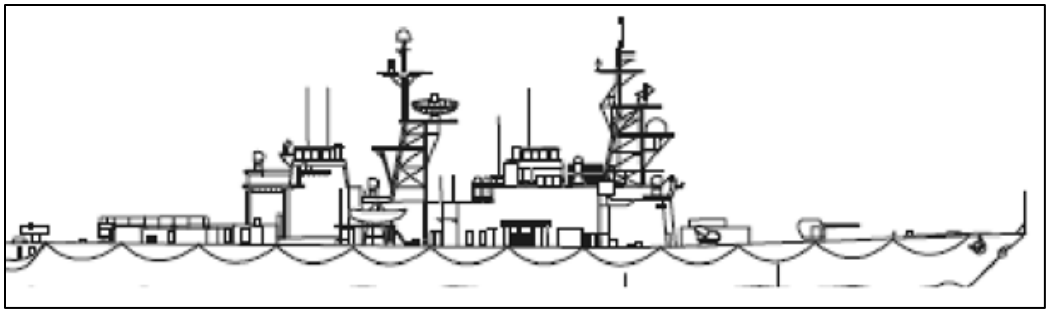

Figure 6-8: Side View of a Lead Line Messenger

c. Buoyant Float Messenger. To reach a vessel beyond the range of the cutter's line throwing devices, it may be necessary to float a line to the vessel in need of assistance.

16. Tattletale. Tattletales are used during towing to determine the load placed on the spring line. A tattletale for a traditional high stretch mooring line or tow line (nylon or polyester) is a piece of 6 thread manila rope of predetermined length secured to the synthetic line at two points at a specified distance apart (Figure 6-9). When the line is straight, but not under tension, the tattletale hangs down. As the line stretches under load, the distance between the attachment points on the hawser increases and the tattletale begins to straighten. At the point when the tattletale becomes taut, the working load limit of the line has been reached. Further loading on the line will break the tattletale, indicating that the line has become overloaded and could be in danger of breaking. Specific measurements for tattle length and build up procedures can be found in Reference (f).

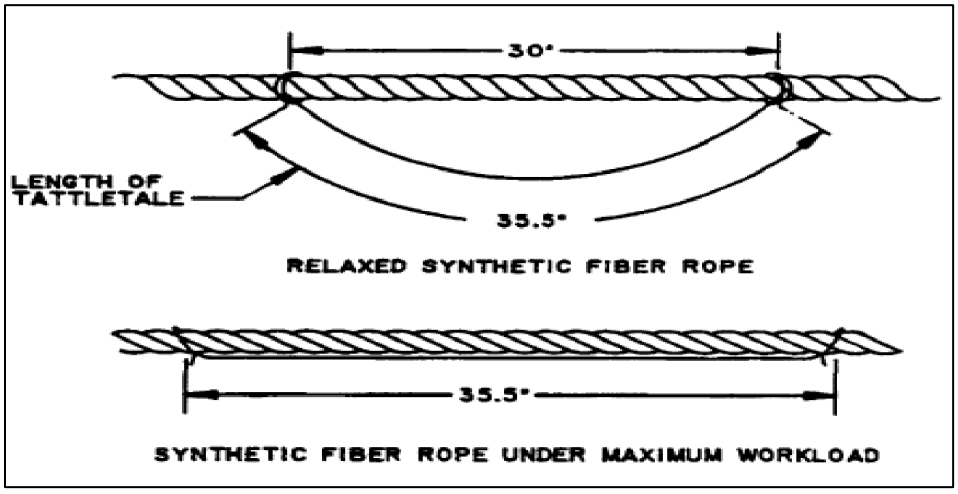

Figure 6-9: Tattletale

17. Towing Jack Stay. A jack stay, or strongback, is a wire, rope or chain designed for a certain purpose and is secured at each end by the use of padeyes (Figure 6-10). The towing jack stay is run athwart ship and is used to secure and control the running of the towline over the stern or through a closed chock while paying it out.

Figure 6-10: Towing Jack Stay

18. Chafing Gear. Chafing gear is a temporary covering used to protect a line. Old fire hoses, leather and heavy canvas wrapping can be used as chafing gear. Figure 6-11 shows chafing gear on the towing vessel.

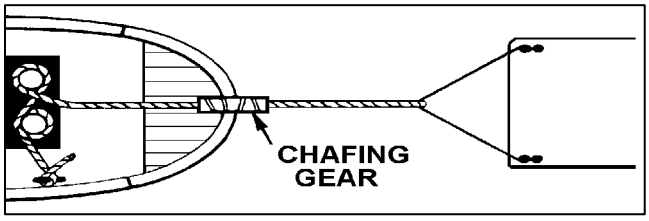

Figure 6-11: Chafing Gear

19. Lateral Control Line. A lateral control line, or hogging strap, is used to horizontally control the sweep of the towline. It prevents the towline from sweeping into other gear on deck. If used, the lateral control line moves the towing point further aft limiting maneuverability.

20. Heaving Line. A heaving line is made of light flexible line with a rubber ball at the throwing end. A heaving line must be in good condition, at least 75 feet long, and free of rot and weathering (Figure 6-12).

21. Monkey's Fist Heaving Line. A monkey's fist heaving line is made of at least 75 feet of cotton sash cord or six thread manila line. Two half hitches are then tied and whipped to the standing part of the line within a foot or so of the monkey's fist. A figure 8 knot is then added one or two inches from the whipping (Figure 6-12). Due to its weight, a monkey's fist heaving line can be dangerous and personnel on the vessel being towed must be made aware of the hazard. CO/OICs shall use their discretion in the use of monkey's fist heaving line depending on weather, distance to the vessel needing a tow, and the urgency of a hookup.

22. Bolo. A bolo is a nylon, orange shot line, with a well-padded lead weight sewn into a leather sheath with a grommet attached to one end. Approximately 4 to 5 feet from the lead weight a wooden toggle is tied to the nylon line. The padded lead weight is swung in a circle horizontally overhead and thrown once momentum is built up. An experienced seaman can throw a bolo three

times as far as a heaving line. A picture of a bolo is found in Figure 6-12. The bolo can also be dangerous due to its size, weight, and speed of delivery.

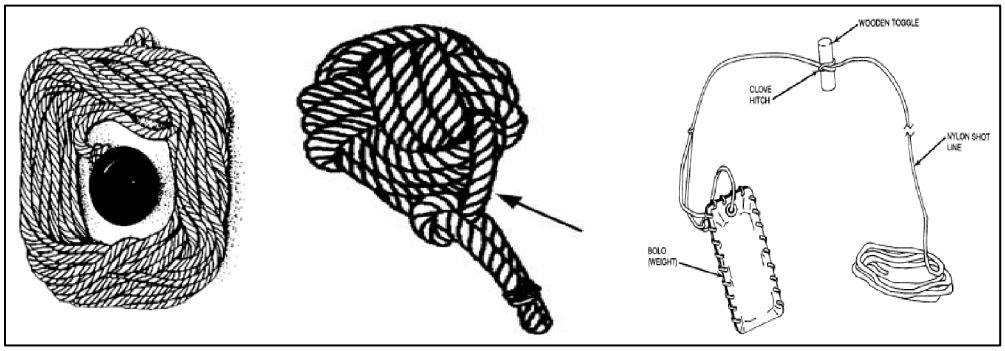

Figure 6-12: Example of Heaving Line, Monkey's Fist Heaving Line, and Bolo

23. Shoulder Line Throwing Guns. The Line Throwing Gun (LTG), used by the Coast Guard is the .30 Cal Shoulder Line Throwing Gun (SLTG) and associated equipment. There is also the Ml6 (series) rifle with the Line Throwing Adapter Kit (LTAK). Both shoulder line throwing guns and ammunition are shown below in Figure 6-13. More information about STLG may be found in the Ordnance Manual, COMDTINST M8000.2 (series).

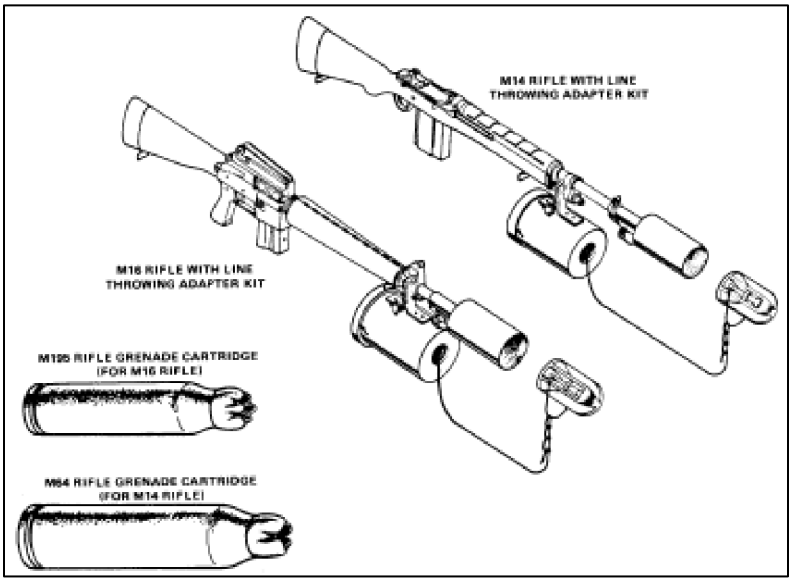

Figure 6-13: Shoulder Line Throwing Gun

24. Fire Axe. A fire axe is used to cut the towing jack stay.

M. Rigging to Tow. The steps outlined below pertain to setting up the towing cutter.

1. General Steps.

   a. Ensure personnel are properly manned and dressed.

   b. Launch cutter boat or place at the rail with boat crew standing by.

c. Brief the towing detail.

d. Make manned and ready reports.

e. Ensure emergency repair and working tools are at delivery station.

2. Towing Hawser.

a. Ensure the tow hawser length and size is appropriate.

b. Ensure the towing rig is inspected prior to use.

c. Fake out the appropriate tow hawser and ensure no evidence of breaks, chafing or deformation is present.

d. Prepare a heaving line and a short (approximately 100') lead line messenger.

e. Ensure bridle or pendant is free of breaks, chafing or deformation.

f. Ensure applicable jewelry is in working order and is not corroded.

g. Ensure all shackles are moused properly.

h. Ensure the fire axe is broken out and is on station.

N. Rigging to be Towed. In setting up the cutter to be towed, the following gear shall be broken out and on deck prior to beginning the evolution:

1. Fire axe.

2. Chafing gear.

3. Bridle, pendant, and NATO link (as applicable).

4. Test capstan as necessary.

O. Watchstanding.

1. Towing Watch. With the tow streamed, the towing watch must be set to observe the tow, towing loads, towing machine, towline, and the tow's seakeeping performance. The tow watch shall routinely advise the Officer of the Deck of conditions observed, including immediately reporting the following:

a. Too much tension is on the towline.

b. The tow is not weathering properly.

c. The bridles or other gear fail.

2. Periodic Inspection of Tow. Elements of the tow's material condition should be visually inspected and continuously monitored, even at night. They include:

   a. Flooding and fire alarms, navigation lights, draft marks, and trim.

   b. Sheer angle and seakeeping.

   c. Timing of roll period for stability.

   d. To supplement the flooding alarms, cutter watch personnel should be alert to signs of flooding such as list, excessive drag (increase in towline tension without a change in conditions), change in roll period, or unexpected trim in the tow. The towline should also be inspected frequently for chafing and damage during a tow.

CHAPTER 7. MAN OVERBOARD

A. Introduction. This section outlines cutter deck policy and doctrine for Man Overboard (MOB) operations.

B. Background. MOB is one of the worst alarms to hear while underway. Decisive action is of primary importance for a Person in the Water (PIW). The action taken in the first few seconds after a crewmember falls overboard may decide the success of the recovery.

C. Planning.

1. Briefings and Risk Management. Cutters shall complete briefings and risk management as part of evolution planning per Chapter 3.

2. Pre-Planning. Considering the number of potential problems that can occur, commands must assess all possible situations and conditions to pre-plan steps to take in case of an MOB emergency.

3. Time is Critical. With a man overboard, time is critical. All crew members must be fully aware of what is being done and how it is done. The ship's response to the situation is critical, as shown in Table 7-1. This table is only a guideline to emphasize the need for fast action and not a means of setting an arbitrary limit on the search effort.

Survival Times in the Water		
Water Temperature		
Centigrade	**Fahrenheit**	
Less than 2°	Less than 34°	Less than 45 minutes
2° to 4°	34° to 40°	Less than 90 minutes
4° to 10°	40° to 50°	Less than 3 hours
10° to 15°	50° to 59°	Less than 6 hours
15° to 20°	59° to 69°	Less than 12 hours
Greater than 20°	Greater than 70°	Indefinite (depends on physical condition)

Table 7-1: Survival Times in the water

4. Planned Means of Rescue. The cutter or rescue boat is the primary Search Rescue Unit (SRU), with the SAR helicopter, when available, as secondary. The goal is to use the fastest and most effective rescue platform for the given situation. Secondary platform(s) should remain outside the immediate area of the survivors so as not to hamper the rescue operation, and remain ready to assist if needed.

5. MOB Prevention Planning. Planning / preparation is required in order to prevent a MOB from occurring.

   a. Ensure a minimum of two people are used when conducting an evolution that might result in falling overboard (anchoring, towing, etc.).

   b. Ensure safety belts are worn during inclement weather.

   c. Reduce topside activity during periods of heavy weather.

   d. Ensure everyone onboard is wearing appropriate personal protective equipment (PPE).

D. Administration. The Man Overboard Bill is required per Reference (c).

E. Personal Protective Equipment: See general PPE guidance in Chapter 3.

F. Manning Guidelines.

1. Watch, Quarter, and Station Bill. Positions shall be filled by qualified members per the Watch, Quarter, and Station Bill

2. Basic Manning Requirements. The following provides the basic manning requirements for MOB.

   a. Table 7-2 lists the required J-Bar davit recovery crew.

   b. Table 7-3 lists the required rescue boat crew. While conducting a SAR mission, boats need to have a minimum crew of four personnel (three-person crew plus a rescue swimmer in order to safely recover a littered survivor). Cutter Surface Swimmer manning requirements are discussed in a separate section of this Chapter.

J-Bar Davit Recovery Detail Crew Requirements (if equipped)	
Quantity	**Description**
1	Safety Officer
1	Rig Captain
1	Rigger
6 (minimum)	In-Haul Line
8 (minimum)	Double Hoist
2	Forward/Aft Vangs
2	Swimmer Tending Line
1	Temporary Life Line
1	Rescue Swimmer
1	Corpsman
1	Shark Watch
4	Stretcher Bearers

Table 7-2: J-Bar Davit Recovery Detail Crew Requirements

Rescue Boat Crew Requirements	
Number of Personnel	**Duty**
1	Boat Officer/Bowhook
1	Coxswain
1	Engineer/Sternhook
1	Rescue Swimmer
1	Swimmer Tender
Notes: 1. Every member of the boat crew shall be at least a second-class swimmer. 2. The above minimum crew requirements may be amended by the CO/OIC. 3. Any or all members of the boat crew qualified to carry a pistol may do so at the discretion of the CO/OIC.	

Table 7-3 Rescue Boat Crew Requirements

G. Equipment Guidelines.

1. Deck Preparation to Prevent MOB.

   a. Ensure lifelines are up and in good condition.

   b. Keep decks clear of trip/slip hazards.

   c. Repair/replace cracked or damaged stanchions.

2. Other Deck Preparations. Deck preparations for responding to a MOB will follow established procedures based on the recovery method used.

H. Immediate Actions. Immediate deck functions upon seeing a crewmember fall over the side shall include:

1. Shout Man Overboard. Shout out the words “Man overboard!” to personnel on the bridge, along with the direction (starboard side, port side, at the bow, or at the stern)

2. Inform Bridge if Stern is near PIW. If the stern is near the PIW, inform the bridge so they can maneuver propellers away.

3. Post lookout(s).

4. Mark the Position. Do not throw objects directly at the PIW as it could cause injury if it hits the individual.

   a. During daylight:

      (1) Throw a life preserver or life ring immediately.

      (2) Drop a smoke float.

(3) Get anything that floats into the water near the person that they can hang onto.

b. During darkness:

(1) Immediately throw a life preserver or buoy ring with strobe light.

(2) Keep the cutter's searchlight trained on the victim.

I. Shipboard J-Bar Davit Recovery (if equipped).

1. Introduction. The recovery of survivor(s) directly by a cutter shall be accomplished when:

a. Helicopter assets are not available.

b. The sea state precludes lowering of a rescue boat.

c. The CO/OIC determines that the cutter can accomplish the rescue more expeditiously than any other means available.

2. General.

a. When directed from the bridge, every attempt should be made by the deck recovery detail to deploy life rings and international orange heaving lines to gain contact or positive control of the survivor. If the distance is too great, a surface swimmer shall be lowered into the water.

b. Use of a properly rigged J-Bar davit is the only approved way of hoisting a surface swimmer and/or survivor out of the water. See Figure 7-1.

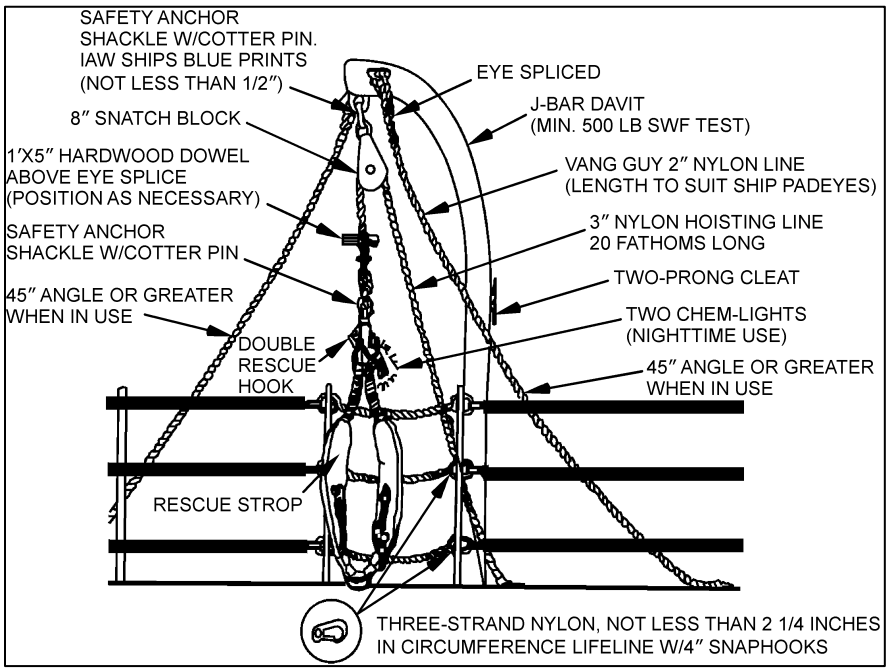

Figure 7-1: Forecastle J-Bar Davit Rig

3. Surface Swimmer Deployment from J-Bar Davit.

   a. During night operations, the surface swimmer, rescue strop, and rescue hook shall all be illuminated by chemical lights.

   b. The surface swimmer's tending line shall be attached for all J-bar davit deployments.

   c. The surface swimmer shall never jump over the side or get out of the rescue strop until rescue strop is in the water.

   d. The surface swimmer shall be prepared to fend off the ship with hands and feet, if the ship is rolling due to rough seas.

4. Hoisting.

   a. The hoisting line shall be a minimum of 120 feet in length with the rescue hook attached.

   b. The rig captain shall ensure the rescue hook is equipped with a rescue device that has inherent flotation (rescue strop, rescue litter, rescue seat, rescue basket) and chemical lights if needed (night).

      (1) Rescue Strop Recovery. The rescue strop is a quick and easy way to deploy/recover the surface swimmer or recover a survivor during a shipboard operation. The rescue stop arm retainer straps shall be used on all survivors being hosted to the ship's deck. Caution shall be taken by the recovery team and surface swimmer to ensure the survivor does not hit the side of the ship.

      (2) Rescue/MEDEVAC Litter Recovery. If the survivor is unconscious, has obvious severe injuries, or is complaining about head, back, or neck pain, the rescue/MEDEVAC litter shall be used when hoisting by the J-Bar davit. The surface swimmer shall use the hand signal indicating the need for the rescue/MEDEVAC litter immediately giving the rig captain an opportunity to rig the rescue/MEDEVAC litter for deployment.

J. Cutter Surface Swimmer. This Section provides policies, guidance, and minimum standards for the training, qualification, certification and employment of Cutter Surface Swimmers (CSS).

1. Introduction.

   a. Cutter search and rescue operations, such as rescue and assistance, person in the water or man overboard recovery might require the use of the CSS. The preferred method of recovering personnel from the water is by boat. However, deploying the CSS to aid tired, entangled, or injured survivors might be necessary.

   b. The equipment, health and fitness prerequisites noted are minimum requirements. Commands should fashion or engage in available training opportunities to enhance their unit's swimmer program.

c. Normally, cutters that operate primarily on the "Western Rivers" (defined in the Navigation Rules and Regulations Handbook) would not deploy a CSS because of river current risks. Therefore, compliance is optional for cutters operating on the Western Rivers. Any CSS deployed in the Western Rivers will be certified in accordance with this section.

2. Cutter Surface Swimmer Policy.

a. Flight deck equipped cutters will, at a minimum, have two outfitted and certified Cutter Surface Swimmers onboard when the cutter is underway. Non flight deck equipped cutters will, at a minimum, have one outfitted and certified Cutter Surface Swimmer onboard while the cutter is underway. If deploying a CSS from a cutter boat, the boat will be considered an extension of the cutter and the requirements of this Chapter will be applicable. A certified tender shall be assigned to each deployed cutter swimmer. Operational commanders have the discretion to increase these requirements.

b. The decision to deploy the swimmer(s) rests with the CO/OIC.

c. Follow the principles of Risk Management (RM) before and during swimmer deployments in both training and operations.

d. The CSS will not enter the water without permission from the officer of the deck, or if the cutter boat is deployed, the coxswain.

e. The CSS has the authority to decline deployment if they believe the situation is beyond their capabilities.

f. In accordance with Reference (b), if the water temperature is less than or equal to 50 degrees Fahrenheit, the swimmer shall wear a dry suit and appropriate thermal layering.

g. The CO/OIC must ensure drills are conducted in the cutter's open water environment to acclimate the CSS to actual conditions. If a CO/OIC chooses to execute a live "victim" man overboard recovery drill to train the CSS, ensure the following (at a minimum):

(1) Launch the cutter boat, which remains near the "victim."

(2) The "victim" dons flotation and hypothermia protective gear, appropriate for the present conditions, that meets or exceeds the hypothermia protective gear requirement of the CSS.

(3) The provisions of Chapter 2-60, Swimming, Shipboard Regulations Manual, COMDTINST M5000.7 (series) must be met.

(4) The cutter will not approach a live "victim" for drills.

(5) Never deploy the CSS or "victim" while the cutter is making way.

h. A certified tender will tend the swimmer by tending line at all times. The swimmer will only detach him or herself from the tending line for compelling reasons (e.g., entanglement in debris, embarking on a vessel, or other unforeseen circumstances.

i. Per U. S. Coast Guard Maritime Law Enforcement Manual (MLEM), COMDTINST M16247.1 (series), the CSS will not deploy for a person in the water (PIW) to compel compliance in a law enforcement role.

j. The cutter swimmer will not swim into or under a capsized or submerged vessel, aircraft, or vehicle. If deployed next to a capsized object, the CSS is permitted to search visually and reach inside while maintaining a grasp on a reference point on the exterior of the object. If the CSS determines that a person is trapped under or in the object and cannot be reached from the reference point, the CSS must request alternate assistance.

k. The vessel deploying the swimmer shall be constantly aware of the swimmer's position. Keep the vessel as stationary as possible to prevent dragging the swimmer. Keep the swimmer clear of the screw(s), auxiliary propulsion, rudder(s), suction/discharge openings, and other hazards.

l. Each cutter shall develop and maintain a CSS pre-deployment checklist and/or add checklist items to current MOB checklists. The checklist items will mitigate individual, unit-specific, and underwater hazards (i.e. only use the shaft closest to the swimmer as a last resort). At a minimum, the checklist will include securing sea suction/discharge valves and sonar if equipped. Destroy copies of the checklist when the drill or exercise is complete. Destroy the master when superseded, or obsolete.

m. Uncooperative or combative PIWs might require launching the cutter boat or second CSS, if available. Do not deploy the CSS independently for known combative PIWs.

n. When possible deploy the CSS with the cutter boat for multiple PIWs.

o. If deploying the CSS from the cutter boat, tend to the swimmer as if deployed from the cutter.

p. A unit's Health Services Technician (HS) and/or Emergency Medical Technician (EMT), particularly those on independent duty, will not normally be assigned as the CSS. Although possibly beneficial, the cutter surface swimmer need not be trained in life support beyond Commandant's Mandated Training. The CSS's primary function is initial assessment and transport of the victim to the cutter for medical assistance.

q. A designated Safety Observer shall be on deck at all times while a CSS is deployed. The Safety Observer should have no additional duties beyond safety. The Safety Observer will ensure that communications are facilitated with the bridge; this person will not be the Safety Observer.

3. Cutter Surface Swimmer Certification.

   a. Each unit is responsible for qualification and training. General procedures for the certification of personnel are found in Reference (g). Prior to initial certification, the prospective cutter surface swimmer must:

      (1) Complete the applicable sections of the Cutter Surface Swimmer PQS.

      (2) Demonstrate satisfactory knowledge of CSS policies and procedures to an oral examining board. Each unit's duty assignment Instruction must designate oral board members. The oral board recommends certification to the CO/OIC. **The CO/OIC will ensure that, upon certification, the appropriate competency code (OPSHY) is entered in TMT**.

   b. In addition to the initial certification requirements, cutter swimmers and tenders shall complete annual and semi-annual refresher training. This currency / proficiency requirement assures the command that the individual stays proficient. Skills must be practiced on a regular basis for cutter swimmers to retain required levels of expertise. A swimmer failing health or fitness requirements during the semi-annual re-certification period will not be re-certified until the failed requirement is successfully demonstrated.

4. Cutter Surface Swimmer Equipment.

   a. See Reference (b) for standard cutter surface swimmer gear, build-up, and maintenance.

   b. Individual class cutter requirements for deck equipment can be found in applicable Command Assessment Readiness and Training (CART) checklists and shipboard Allowance Equipage Lists (AEL).

   c. Swimmer tending lines will be 600ft, 3/8" diameter, yellow, polypropylene line (SPEC MIL-R-24049). Cutters less than 200 feet may size the tending line to three times the cutter length.

CHAPTER 8. SHIPBOARD LAUNCH AND RECOVERY

A. Introduction.

1. Purpose. This section outlines policies for the safe launch and recovery of U.S. Coast Guard boats carried aboard cutters. References (i) and (j) provide TTP for this evolution.

2. Background. Cutter boat operations are among the most inherently dangerous activities conducted in the Coast Guard. Most cutter boat mishaps occur during the launch or recovery phase. Mishaps have caused serious injuries to boat crew personnel and members of the boat launch and recovery detail. Many of these mishaps are preventable through the practice of prudent seamanship.

B. Planning

1. Risk Management. Cutters shall complete risk management as part of evolution planning per Chapter 3.

2. Briefings. Cutters shall complete briefings as part of evolution planning per Chapter 3.

   a. Recognizing that some cutters at times conduct their launch and recovery operations with only the watch on deck, the command brief may be conducted by those members of the watch so delegated by the CO/OIC.

   b. References (i) and (j) contain example formats for a boat launch and recovery evolution brief that may be amended to meet local needs. If several boat launch and recovery operations are planned over a short period of time, one brief and debrief may suffice at the CO/OIC's discretion.

   c. Time-critical evolutions do not provide relief from complying with the guidance in this Manual. Familiarity with this Manual ensures that boat evolutions, executed in a timeframe that supports operational tasking, remain both safe and effective.

   d. The OOD and coxswain shall deliberately discuss the loading/unloading of passengers and cargo to control the distribution of weight prior to transfer. Coxswains must control the movement of passengers and weight forward of the small boat console for stability and to prevent capsizing the boat.

3. Environmental Condition Risk Management Assessment. The CO/OIC Officer shall also consider the specific operating characteristics of each cutter boat in relation to the prevailing weather/sea conditions when making risk assessment decisions.

   a. Due to the many variances in shape, steepness and period for seas and swells, no policy can cover all the variables. The conditions during the launch and recovery portions of a cutter boat operation, as well as the size and reaction to sea/swell of any vessel that will be approached by the cutter boat, are limiting factors in the risk assessment. Sea state launch guidelines can be found in Enclosure (3). Individual cutter boat operating parameters are

found in applicable Boat Operator Handbooks or Non-Standard Boat Operators Handbook (COMDTINST M16114.28 (series)).

b. Cutters may encounter situations where a mission requirement exists in sea conditions exceeding the guidance given above. In these situations, the CO/OIC shall conduct a final launch/no launch risk assessment after the initial risk assessment. This final launch/no launch risk assessment shall include the 5-step RM process, and not be limited to such factors as: mission urgency, wave shape and period, seas, wind, icing, visibility, and temperature. Experience and proficiency of the boat launch and recovery detail as well as fatigue, duration of mission, improving vs. deteriorating weather conditions, and other factors will play a large role in the launch/no launch decision.

C. Administration.

1. Cutter Bill. The Cutter Boat Operations Bill is required per Reference (c).

2. Technical Publications. All applicable Technical Publications shall be maintained onboard the cutter and referred to for cutter davit type specifics, in addition to the information contained in Enclosure (3). Emergency operating instructions, general operating instructions, maintenance procedures, safety precautions, safe working load, and a wealth of other knowledge can be found in these publications. Another reference for information regarding davits and other equipment on cutters is the ship specific Ship Information Book (SIB).

D. Personal Protective Equipment. See Chapter 3 for general PPE requirements. In addition, the following PPE requirements shall apply:

1. Required PPE. PFDs, hard hats, safety footwear shall be worn.

2. Safety Harness or Belt. Certain circumstances may require launch and recovery personnel to mitigate the risk of falling overboard. In these cases, a full body safety harness found in the Tower Manual, COMDTINST M11000.4 (series) or a safety belt shall be used in conjunction with appropriate PPE.

E. Manning Guidelines. Positions shall be filled by qualified members per the Watch, Quarter, and Station Bill. Below are the described positions and responsibilities most commonly used during launch and recovery procedures.

1. Safety Observer (SO). The SO is responsible for the overall safety of the boat launch and recovery operation and shall be qualified as per Table 8-1.

2. Boat Deck Captain (BDC). The BDC is responsible for the overall launch and recovery operation of the cutter boat and shall be qualified as per Table 8-1.

3. Davit Operator (DO). The DO is responsible for safe and efficient operations of the installed cutter davit(s). This position requires the operator to be intimately familiar with applicable Technical Publications and PQS certified as per Table 8-1.

4. Deck Seaman (DS). The DS is proficient in the duties of Line Tender (LT) and Sea Painter Tender (SPT) to serve in either position as directed. He/she may also serve in other various deck positions as directed (i.e. tending fenders, fender boards, pulling pins, dropping outboard shoes, etc.).

5. Line Tenders (LT). LTs are responsible for tending frapping lines (attached to the falls) and tending lines (attached to the boat) to prevent the cutter boat from swinging wide as the ship rolls and to keep the cutter boat parallel to the cutter. The line tenders must be well trained and able to prevent their lines from slipping off of deck fittings.

6. Sea Painter Tender (SPT). Passes, recovers, and adjusts the sea painter as directed by the BDC.

F. Qualification and Certification Requirements.

1. Introduction. The First Lieutenant and the Engineer Officer/Engineering Petty Officer are responsible for ensuring all launch and recovery team personnel are certified in accordance with Reference (h). The required training is found in the matrix provided below. Launch and recovery personnel shall satisfactorily complete three day and one night launch and recovery every six months for the highest position held, per davit type, to maintain certification currency.

2. Certification Matrix Table.

		SO	BDC	DO	LT	SPT
REQUIRED PQS/JQR	**Deck Safety Observer (JQR)**	X				
	Boat Deck Captain		X	X		
	Boat Davit Operator (Luffing)		X	X		
	Boat Davit Operator (Slewing)		X	X		
	Deck Seaman		X	X	X	X

Table 8-1: Launch and Recovery Certification Matrix

3. Personnel Qualification Standards. The PQS for Boat Deck Captain, Davit Operator (multiple davit types), and Deck Seaman can be found on the Office of Cutter Forces, Commandant (CG-751) website: https://cg.portal.uscg.mil/units/cg751/IQP/SitePages/Home.aspx.Other boat launch and recovery personnel shall be qualified and currently certified in accordance with Reference (h), Deck Seamanship PQS, NAVEDTRA 43127, or unit Job Qualification Requirement (JQR).

G. General Safety Requirements. The following requirements are generic in nature and applicable to all cutters during launch and recovery operations.

1. Prior to a cutter boat launch or recovery the Engineer Officer and First Lieutenant shall ensure that all tests, load tests, inspections and routine maintenance are complete and up to date in accordance with references (d), (k), and (l), and the appropriate Technical Publications.

2. All weight handling equipment shall be maintained in accordance with references (d), (k), and (l). All slings, hoists, bails, davits and associated equipment shall be visually inspected immediately prior to, and after, every use. Improvised slings are not authorized for boat launch and recovery operations. Further sling and pad eye weight test information may be found at the Boat Forces Fleet Management Information System (FMIS) at http://www.boatforces.com.

3. The cutter boat, launch and recovery equipment, machinery, and stowage cradles operate as an integrated system. Any proposed change to this system would require an approved Time Compliance Technical Order (TCTO) and an approved Testing and Evaluation plan.

4. Boat gripes shall be installed in accordance with ship's plans or drawings.

5. Frapping lines and tending lines shall be constructed of fiber or a synthetic material that resists stretch or of significant diameter to reduce stretch.

6. Davit/Crane operational function checks shall be completed prior to use in accordance with specific cutter class davit/crane type technical publications or operating manuals.

7. Risk Assessment models shall be conducted for each evolution and updated as conditions change. The results of the risk assessment shall be retained at least as long as the boat operations checklist.

8. All members involved in Boat Launch and Recovery operations shall complete training prior to full qualification in accordance with Reference (a). The unit CO/OIC may defer this requirement until such time that approved training can be scheduled, but shall be completed within 6 months of arriving at the first Coast Guard unit.

9. Boat launch and recovery operations shall not commence without prior permission of the CO/OIC unless this authority is specifically delegated in writing (i.e., standing orders or night orders).

10. The SO and BDC shall be in their assigned positions prior to un-griping the boat.

11. Never un-gripe a cutter boat without the falls or a crane attached. Never release the falls without the gripes attached. The command to un-gripe the cutter boat shall not be given until the evolution calls for the release ensuring that all safety procedures have been followed.

12. Never exceed the Working Load Limit (WLL) of the davit in accordance with associated Technical Publications. (See Enclosure (3) and Reference (d))

13. Place the cutter on the course and speed that minimizes pitch and roll and provides the best available lee from the wind and seas. This optimizes safety of personnel and minimizes the possibility of damage to the boat during boat launch and recovery operations. For most cutters, safe speed is approximately 4– 6 knots.

14. At a minimum, units shall man the following three positions for all cutter boat launch and recovery operations: Safety Observer, Boat Deck Captain (BDC) and the Davit Operator (DO). BDC and DO may be combined when ship's configuration and construction allow for a full view of the evolution, davit/crane, and boat from the davit controls. **The SO shall have no other assigned duties for the duration of the launch or recovery evolution.**

15. Only authorized personnel involved in the evolution are allowed on the boat deck during launch and recovery operations.

16. The 1MC is the primary means of notification that a cutter boat launch or recovery evolution is taking place. Radios are acceptable provided that all necessary information can be passed.

17. Personnel shall not wear watches, jewelry, rings or baggy clothing, or other items which may be caught in rigging or machinery.

18. Personnel shall not place themselves under, or turn their back, to a suspended load.

19. When engaged in boat launch and recovery operations ensure all lines are properly staged and free from potential fouling.

20. Emergency cutter boat launch and recovery operations (i.e., Man Overboard) should be taught and reviewed during the certification process for BDC, DO and SO personnel.

21. Chemical lights may be attached to critical components (sea painter, blocks, etc.) for night operations or as appropriate.

22. Cutter boats when moored alongside, or cribbed at the rail (if authorized), shall be inspected hourly to ensure tending lines are secure and the boat is not getting damaged.

23. The cutter boat shall never be launched with a bow down angle.

24. A sea painter shall be used for launch and recovery evolutions when the cutter is making way. While the cutter is not making way, the sea painter is optional. The sea painter shall be attached to the boat’s trailer eye-bolt by means of a pendant connecting the trailer eye-bolt to the sea painter from the cutter. A lanyard should be attached to the pendant and tended from the bow of the cutter boat during launch and recovery operations.

25. Interface Testing & Evaluation (IT&E) shall be conducted on the cutter boat launch and recovery system anytime a component is altered from the original configuration. Components include: davits and associated equipment, the cutter boat, hoisting slings, or any other altered or trial piece of equipment. The IT&E team will consist of representatives from: the Office of Naval Engineering (CG-45), the Office of Cutter Forces (CG-751), the Office of Afloat Safety (CG-

1134), and the Office of Human Resources Strategy and Capability Development, (CG-1B3). IT&E will be conducted in accordance with the plan that is developed on a case-by-case basis.

CHAPTER 9. ASTERN FUELING AT SEA (AFAS)

A. Introduction. This section outlines standard policies for Coast Guard cutters conducting Astern Fueling at Sea (AFAS) between two Coast Guard cutters. When conducting astern fueling operations with USNS or Industry-Owned U.S. Flag Tankers, Underway Replenishment, NWP 4-01.4, shall take precedence over this Chapter. During Coast Guard fueling operations, the delivery cutter is the Tactical Commander from commencement of approach until completion of the AFAS evolution. These guidelines may be modified to conduct training evolutions such as towing. AFAS TTP is contained in Reference (m).

B. Personnel Responsibilities.

1. Commanding Officer/ Officer in Charge. The CO/OIC of either cutter shall:

   a. Ensure that a risk management model and safety brief/debrief are completed.

   b. Choose suitable tow connection procedures for current weather conditions.

   c. Choose a suitable course and speed for approach of tow and fueling.

   d. Operate under the Restricted Maneuvering Doctrine.

   e. Ensure full compliance with this Chapter.

2. Operations Officer. The Operations Officer or Operations Petty Officer of either cutter shall:

   a. Ensure communications are established with the receiving/delivery cutter.

   b. Ensure that both cutters agree on the procedures for rigging the tow, streaming the fuel hose, fueling, breaking the tow communications and emergency breakaways.

   c. Ensure all stations report manned and ready prior to passing the tow.

   d. Ensure the smoking lamp is secured for the duration of the evolution.

3. Engineer Officer. The Engineer Officer or Engineering Petty Officer of either cutter shall:

   a. Ensure the fueling rig is properly prepared for transfer.

   b. Ensure fueling station, pump room and sounding takers communications check complete.

   c. Provide the bridge with the rate of fuel transferred during the fueling and an approximate quantity at the end.

   d. Ensure compliance with Fuel Oil Spill Prevention.

   e. Ensure all AFAS fueling gear is maintained in accordance with Reference (d).

f. Ensure all engineering personnel receive brief/debrief.

g. Ensure proper blow down procedures are completed in accordance with ship's Instructions.

4. First Lieutenant. The First Lieutenant of either cutter shall ensure:

a. The deck is properly prepared, manned and rigged for AFAS.

b. Safety briefs/debriefs are completed.

c. Deck communications checks are complete with other cutter.

d. The cutter boat is ready for launch with the cutter surface swimmer. (delivery cutter)

e. All deck personnel receive a brief on the evolution.

f. The Life buoy watch is manned. (optional for receiving cutter)

g. Provide required PPE.

5. Supply Officer. The supply officer on the delivery cutter shall ensure that proper documentation of the fuel transfer (i.e. DD-1149) is completed and transferred to the receiving cutter.

C. Planning, Communications, and Briefings. Proper planning and communications prior to and during the AFAS are critical to the safe and expeditious completion of AFAS. The timelines below should be followed to allow ample preparation time for both cutters conducting fueling operations.

1. Briefings and Risk Management. Cutters shall complete briefings and risk management as part of evolution planning per Chapter 3. Reference (m) has a sample AFAS Internal Brief format for delivery and receiving cutters.

2. Additional Risk Management / Mitigation. Both cutters shall complete risk management models found in Reference (a) and share findings during the 'one hour plus' briefing. If either CO/OIC has reservations about the results of the model, fueling operations may be delayed and/or further risk mitigation may be necessary. Risk mitigation shall be a part of evolution planning and shall be included during the required briefings.

3. Environmental Condition Risk Management Assessment. CO/OICs shall also consider the specific operating characteristics of their cutter in relation to the prevailing weather/sea conditions when making risk assessment decisions. The environmental conditions and factors listed below shall be considered in determining go, or no go, for the AFAS operation:

a. Winds: AFAS should not be completed in winds greater than 30 knots.

b. Seas: AFAS operations should not be completed in wind driven seas greater than four to six feet.

c. Darkness: AFAS operations should not normally be conducted during hours of darkness.

d. Pitch/roll

e. Visibility

f. Sea spray

g. Precipitation

h. Icing

4. Preparation. Prior to deployment, cutters shall verify which operational units will be in their operations area and determine fueling at sea capabilities. All necessary actions shall be taken to improve the likelihood of successful fueling at sea.

5. 24 Hours until Evolution. Approximately 24 hours before, or soon as possible, prior to fueling operations an information exchange shall be conducted between delivery and receiving cutters. The receiving cutter shall initiate communications. Initial communications shall include the proposed location, time, forecasted weather, and type and amount of fuel requested. Cutters involved shall use an AFAS Cutter Agreement to eliminate confusion. A sample AFAS Cutter Agreement is available in Reference (m).

6. One Hour until Evolution. Approximately one hour prior to arriving before fueling the receiving cutter shall contact the delivery cutter to finalize the:

   a. Approach

   b. Communications

   c. On scene weather conditions

   d. Current fuel requested

   e. Length/size of tow

   f. Length of fuel hose

   g. Emergency breakaway procedures

7. Taking Station. Prior to the approach the receiving cutter shall request permission to take station off the delivery cutter in preparation for being towed. Both cutters shall be operating under their Restricted Maneuvering Bill.

8. Navigation Lights. Correct navigation lights and day-shapes shall be displayed.

9. Cutter to Cutter Communications. Cutter to cutter communications shall be bridge to bridge, station to station or safety observer to safety observer (if adequately manned). Bridge to bridge communications are the minimum requirement, shall be secure or clear voice communications, and/or flag hoists as the situation warrants. Station to station communications may be conducted

via paddles, signal wands and/or voice communications per this Manual. Safety observer to safety observer may be via radio communications. Optional cutter to cutter paddle and wand signals are found in Reference (m). In cases warranting emergency breakaway or man overboard at least six short blasts shall be sounded by either cutter.

10. Delivery Cutter Communications. Delivery cutter internal communications will be at a minimum: bridge to stern, stern to pump room, and pump room to bridge.

11. Receiving Cutter Communications. Receiving cutter internal communications will be at a minimum bridge to forecastle, forecastle to fueling station, and fueling station to sounding takers.

D. Administration. The Astern Refueling Bill is required per Reference (c).

E. Personal Protective Equipment. See general PPE requirements in Chapter 3. In addition, the following PPE requirements shall apply.

1. Required PPE. PFDs, hard hats, and safety footwear shall be worn. Splash goggles shall be worn by personnel around fuel stations during the transfer of fuel.

2. Fueling Stations. Personnel at fueling stations shall have the appropriate fuel spill PPE at the pumping station in the event of a spill in accordance with the Pollution Response / Spilled Oil Recovery Bill in their Cutter Organization Manual.

3. Lighting for Night Operations. In the event AFAS operations are conducted at night, all personnel on deck shall have an activated green chemical light on their PFD. When water temperatures are below 50 degrees, strobe lights shall be on each PFD in lieu of chemical lights.

F. Safety Requirements for all Cutters. Personnel assigned to transfer stations shall be thoroughly instructed in safety precautions. Safety precautions shall be reviewed during the pre-brief of the AFAS evolution.

1. All personnel on deck shall be provided, and wear, PPE in accordance with this Chapter.

2. Both cutters shall operate under their restricted maneuvering bill.

3. Both cutters shall test backing bells at all stations prior to commencement of AFAS.

4. Both cutters shall test steering prior to commencement of AFAS.

5. The delivery cutter shall have the cutter boat at the rail with the boat launch and recovery detail, boat crew and cutter surface swimmer in immediate standby.

6. Personnel assigned to transfer stations should remove rings, jewelry, watches, key chains, and other items that maybe be caught in the rig. Loose fitting clothing shall not be worn during fueling operations.

7. Only essential personnel shall be allowed at each transfer station during replenishment.

8. Only essential personnel shall be allowed on the working deck during AFAS evolutions.

9. Any safety hazards observed will be immediately brought to the attention of the Petty Officer In-Charge or Safety Observer. If necessary, the evolution will be halted until the safety violation is corrected.

10. Risk Assessment models shall be completed.

11. Safety briefings and debriefings shall be completed in accordance with this Manual.

12. Towing precautions shall be adhered to at all times. At no time shall personnel be closer than six feet to any rig with tension unless actually operating the piece of gear.

13. Lifelines should only be lowered as a last resort. If lowered, temporary lifelines shall be rigged.

14. For night operations attach chemical lights to critical components as appropriate.

15. The smoking lamp is extinguished during fueling operations.

16. Fuel hoses shall be constructed and in accordance with Reference (d).

17. Personnel must remain alert and never turn their backs on a pressurized hose or fittings.

18. If used, standard flag hoists, paddles and wand signals shall be in accordance with Reference (m).

19. AFAS operations should be conducted on the best available course and speed to minimize pitch and roll. Cutters should seek a lee from the wind and seas to optimize safety of personnel on deck.

20. Deck spaces in the vicinity of transfer stations must be covered with non-skid / anti-slip material.

21. Personnel shall stay out of the bights of lines and hoses.

22. Personnel shall stay inboard of all fuel hoses and towing hawsers.

23. Both the delivery and receiving cutters should have a life buoy watch. Manpower requirements on deck may preclude stationing a lifebuoy watch.

24. Necessary protective and firefighting equipment shall be readily accessible and ready for instant use. Personnel shall be thoroughly trained in the use of firefighting equipment.

25. Cigarette lighters and matches are not permitted on deck.

26. No unnecessary talking.

27. All involved hands must be thoroughly indoctrinated in the requirements for emergency breakaway.

G. Fuel Spill Prevention. It is imperative that all precautions be taken to prevent pollution of the sea. At a minimum, the following safeguards shall be taken into account during fueling operations.

1. Ensure that standard dockside transfer procedures are in effect. This includes scupper plugs being in place, drip pans, oil absorbent rags, proper tools at fueling stations, and so forth.

2. Do not exceed the receiving cutter's fuel transfer rate.

3. Do not overfill fuel tanks. Allow room for the fuel in the hose for draining.

4. Fuel hose lengths shall be adhered to per this Chapter.

5. Fuel hose end fittings shall be double bagged and taped.

6. The receiving cutter shall steer behind the delivery cutter on the course agreed or as modified during AFAS operations to limit the yaw of the receiving cutter affecting fuel hose tension.

7. CO/OICs should take any additional precautionary measures they deem necessary as per the Pollution Response / Spilled Oil Recovery Bill in their Cutter Organization Manual.

H. Administration.

1. DD-1149. A DD-1149 shall be completed prior to the evolution with all necessary accounting data except the fuel quantity. This will be wrapped in a watertight bag and sent over with the fueling rig. Upon completion of fueling, delivery cutter shall pass the amount of fuel transferred. The receiving cutter shall enter the amount of fuel received on the DD-1149, sign it, remove their copy and send the delivery cutter a copy back in the bag attached to the fuel rig.

2. Cutter Log Requirements. Cutter logs are permanent records. Cutters shall log all key steps/points in the Deck Log. In addition to noteworthy points in the evolution, cutters shall log any spills or other abnormal events.

I. Manning Guidelines. Positions shall be filled by qualified members per the Watch, Quarter, and Station Bill.

1. Receiving Cutter. Receiving cutter manpower requirements may be modified by the CO / OIC on an as needed basis. However, under no circumstance shall the Safety Observer or Petty Officer in Charge act in any other capacity during one evolution. The following personnel are the minimum required AFAS personnel:

a. Safety Observer

b. Petty Officer in Charge

c. Fuel Oil and Water King

d. Line and Hose Handlers (Quantity determined by CO/OIC)

2. Delivery Cutter. The delivery cutter manpower requirements may be modified by the CO / OIC on an as needed basis. However, under no circumstance shall the safety observer or petty Officer in Charge act in any other capacity during one evolution. The following personnel are the minimum required AFAS personnel:

   a. Safety Observer

   b. Petty Officer in Charge

   c. Technical Supervisor

   d. Fuel Oil and Water King

   e. Line and Hose Handlers (Quantity determined by CO/OIC)

   f. Towing detail as per Cutter Organization Manual

   g. Cutter Swimmer, Boat Crew, and launch and recovery personnel.

J. Equipment Guidelines. The towing equipment used on deck will be comparable to the Towing Bill found in the Cutter Organization and Regulations Manual. The equipment used in AFAS shall be as per the Delivery Cutters drawings and Ships Information Book.

1. Tow Hawser Size. The short scope of towing hawsers utilized during AFAS evolutions, light ship tonnage versus a full load tonnage ship, and elasticity of hawser versus fixed length of the fuel hose causes tow hawser selection to be carefully evaluated. The receiving cutter may require a wire pendant because of its deck configuration. In cases where the delivery cutter uses an Aramid type towing hawser, the available fuel hose shall be at least 120% of the tow hawser plus the distances necessary on deck for both the delivery and receiving cutter.

2. Scope of Tow. The scope of tow (from the stern of the delivery vessel to the bow of the receiving cutter) should be approximately 100-200 feet for all AFAS evolutions. Adjusting the scope of the tow to ensure the cutters are in step is important to minimize shock loads in both the hawser and the fuel hose. During night operations the tow hawser may be marked with white chemical marker lights. Double Braid Nylon Line (DBN) can stretch as much as 50 percent. A 200 foot tow hawser could stretch to 300 feet placing undue strain on the fuel hose. Several fuel hoses have been damaged due to this strain causing fuel spills

3. Chafing Gear. Both cutters shall provide and monitor chafing gear for all sharp edges on which the hawser or fuel hose may ride during fueling.

4. Fuel Hose Type. Hose meeting ABS NVR CG Appendix 5.6.1.3 shall be used for AFAS operations. Fuel hose selection shall be in accordance with ship's plans and Reference (d). All flexible hoses shall meet USCG Flexible Hose Standards. It is preferable to have a minimum of 400 feet of buoyant hose. Marathon Transfer hose is buoyant when full of fuel and is available in lengths of up to 400 feet eliminating the need for waterborne couplings.

5. Fuel Hose Length. At least 400 feet of fueling hose shall be available on board the delivery cutter. Available fuel hose length for AFAS shall be the sum of 150% of the scope of tow and the hose necessary on deck for both the delivery and receiving cutters. Minimal hose shall be waterborne. Excess hose shall be tended by the delivery cutter's crew. The fuel hose may be stopped off on either cutter with a belaying line. For night operations the fuel hose shall be marked every 50 feet with chemical marker lights or illuminated by the receiving cutter's spotlight so as not to jeopardize the night-vision of the delivery cutter's crew.

6. End Fittings. The basic fitting requirements are:

   a. Delivery cutters shall provide a 2.5" female cam lock coupler with dust plug as the end fitting.

   b. Receiving cutters shall provide a 2.5" male groove lock coupler with dust cap as the end fitting which is adaptable / reducible to their fill pipe.

   c. All fuel hose end fittings shall be in accordance with MIL-C-27487 and shall be 316 Stainless Steel.

7. Fuel Hose Messenger. The fuel hose messenger shall consist of a 6"x25" (minimum size) commercial grade twin eye fender with 300 feet of 5/8" diameter polypropylene line spliced to one end. A white chemical light shall be attached to the other end for night operations. A watertight bag may be taped to the fender for transfer of any necessary paperwork. The hose messenger shall be retrieved by the receiving cutter either by a boat hook or grapnel as necessary forward of amidships. The fuel hose messenger shall be bent to the fuel hose with a rolling hitch followed by half hitches and then duct taped at the end.

8. Water Borne Fittings. Water borne fuel couplings or fittings shall be taped securely to ensure against the inadvertent release of the coupling.

CHAPTER 10. HELICOPTER HOISTING FOR NON FLIGHT DECK VESSELS

A. Introduction. This section outlines standard cutter deck policies for helicopter-to-vessel operations aboard vessels without flight decks. Reference (n) provides TTP for this evolution.

B. Background. Helicopter hoisting for non-flight deck vessels is a frequent and complex task conducted by USCG helicopter aircrews and surface vessel crewmembers. Vessel operations with helicopters usually involve transfer of equipment, and occasionally transfer of a person, between a helicopter and a vessel.

C. Planning

1. Briefings and Risk Management. Cutters shall complete briefings and risk management as part of evolution planning per Chapter 3. The decision to conduct the evolution rests with the vessel CO and the aircrew. Emergencies and response procedures must be considered during safety briefs and, at a minimum, include initial actions for entanglement, snag, man overboard, equipment failure, and helicopter crash on deck or in the water.

2. Aircrew Vessel Hoist Brief. References (f) and (g) detail the aircrew vessel hoist brief conducted prior to hoist training and operations. The brief starts communication between the aircrew and vessel crew, and is updated or modified as required. Once the helicopter is over a vessel (depending on vessel size and the proximity of the bridge to the hoist area), voice communications between the aircrew and vessel crew are minimal or impossible due to noise.

D. Communications. Effective communication between the aircraft and vessel is paramount to a safe and successful hoisting evolution. Continuously re-assess and discuss RM among aircrew and vessel crewmembers as necessary. Hand Signal used by the deck-in-charge to communicate with the flight mechanic are contained in Reference (n).

E. Administration. The Helicopter Operations Bill is required per Reference (c).

F. Personal Protective Equipment. See Chapter 3 for general PPE requirements. PFDs, applicable hypothermic protection, safety footwear, hearing protection, goggles, and safety helmets shall be worn.

G. Safety. All cutter and boat crewmembers, and aviation aircrews must be extremely aware of the numerous hazards associated with helicopter hoisting operations. Vessel safety precautions shall be listed and followed as part of the Helicopter Operations Bill.

H. Manning Guidelines.

1. WQSB. Positions shall be filled by qualified members per the Watch, Quarter, and Station Bill.

2. Typical Positions. Under normal circumstances and at CO/OIC discretion, cutters have four assigned positions: Petty Officer in Charge (or Deck-in-Charge), Safety Observer (or Deck Safety), and two crewmembers. Cutter manning requirements may be modified by the CO/OIC

on an as needed basis. However, under no circumstance, shall the Safety Observer or POIC act in any other capacity during one evolution.

3. Duties. Typical position duties are found in Reference (n).

I. Equipment Guidelines.

1. References.

   a. Rescue equipment and hoist procedures across USCG airframes are standardized and described in References (o) and (p).

   b. TTP guidance for equipment and hoist procedures in found in Reference (n).

2. Rescue Equipment. Rescue equipment includes the sling, rescue basket, dewatering pump, hoistable litter, hoist hook, static discharge wand, and trail line. In addition to equipment, the rescue swimmer might be delivered to the vessel by hoist.

3. Deck Setup. Reference (n) contains deck setup TTP for selected vessels.

ENCLOSURE (1) LIST OF ACRONYMS AND ABBREVIATIONS

ACRONYM	DEFINITION
1LT	First Lieutenant (Deck Department Head)
ABS	American Bureau of Shipping
AEL	Allowance Equipage List
AFAS	Astern Fueling At Sea
ANSI	American National Standards Institute
AtoN	Aids to Navigation
BDC	Boat Deck Captain
BDSO	Boat Deck Safety Observer
BI	Break-In
BLRT	Boat Launch, Recovery, and Transfer
BS	Breaking Strength
C	Circumference
CART	Command Assessment Readiness and Training
CBO	Capstan/Brake Operator
CBR	Chemical, Biological, Radiological
CF	Comparison Factors
CIC	Combat Information Center
CO	Commanding Officer
CSS	Cutter Surface Swimmers
DBN	Double Braided Nylon
DC	Delivery Cutter
DF	Design Factor
DFT	Dry Film Thickness
DIW	Dead-in-the-Water
DO	Davit Operator
DPS	Dynamic Positioning System
DR	Deck Rigger
DS	Deck Seaman
DWO	Deck Watch Officer

ACRONYM	DEFINITION
ECDIS	Electronic Chart Display System
EMS	Emergency Medical Technician
EOW	Engineering Officer of the Watch
FBW	Flash-Butt-Welded
FOWK	Fuel, Oil and Water King
FRAM	Fleet Renovation and Modernization
GAR	Green, Amber, Red (Risk Assessment Tool)
GPS	Global Positioning System
HS	Health Services Technician
HWM	Heavy Weather Mooring
IAMSAR	International Aeronautical and Maritime Search and Rescue Manual
IAW	In Accordance With
JQR	Job Qualification Requirements
LBP	Length Between Perpendiculars
LCPL	Landing Craft, Personnel, Large
LH	Line Handler
LOA	Length Overall
LT	Line Tender
LWL	Length on Load Waterline
LWT	Lightweight
MCM	Manual for Courts-Martial
MDE	Main Diesel Engine
MEDEVAC	Medical Evacuation
MIL Spec	Military Specification
MOB	Man Overboard
MST	Mooring Service Type
NATO	North Atlantic Treaty Organization
NAVFAC	Naval Engineering Facilities Command
NAVSEA	Naval Sea Systems Command

NSC	National Security Cutter
NSS	National Search and Rescue Supplement
NSTM	Naval Ships' Technical Manual
NSWCCD-SSES	Naval Surface Warfare Center, Ship Systems Engineering Station
NVR	Naval Vessel Rules
NWP	Naval Warfare Publication
OATH	Oxygen Breathing Apparatus/Self Contained Breathing Apparatus
OIC	Officer in Charge
OOD	Officer of the Deck
OPAREA	Operational Area
OPCON	Operational Control
OPTEMPO	Operational Tempo
ORM	Operational Risk Management
OSC	On Scene Coordinators
OSHA	Occupational Safety and Health Administration
PFD	Personal Flotation Device
PIW	Person-in-the-Water
POIC	Petty Officer in Charge
PPE	Personal Protective Equipment
PQS	Personal Qualification Standard
RC	Receiving Cutter
RS	Rescue Swimmer
S	Qualified Seaman
SAR	Search and Rescue
SF	Safety Factor
SIB	Ship's Information Book
SLAD	Slewing Arm Davit
SO	Safety Observer
SPE	Severity, Probability, Exposure (Risk Assessment Tool)
SPT	Sea Painter Tender

SRU	Search and Rescue Unit
STBD	Starboard
SWL	Safe Working Load
TCT	Team Coordination Training
TLI	Tank Level Indicator
TP	Technical Publications
USNS	United States Naval Ship
WLL	Working Load Limit
WO	Winch Operator
WQSB	Watch, Quarter and Station Bill
XO	Executive Officer

ENCLOSURE (2) LINE HANDLING COMMANDS

This Enclosure provides a list of standard line handling commands to meet the requirements of this Manual.

COMMAND	ACTION
PUT OVER/PASS (line number)	Pass the specified line to the pier and provide enough slack to allow line handlers to place the line over the bit, cleat, or bollard.
HOLD (line number)	Do not let any more line out even though the risk of parting may exist.
CHECK (line number)	Hold heavy tension on the specified line but render it as necessary to prevent parting the line.
SURGE (line number)	Hold moderate tension on a line but render it enough to permit movement of the ship.
EASE (line number)	Let a line out until it is under less tension, but not slacked.
SLACK (line number)	Take all tension off a line.
TAKE THE SLACK OUT OF (line number)	Take all the slack out of a line, but do not take a strain.
SHIFT (line number)	Move a line to the specified location.
HEAVE AROUND ON (line number)	Take a strain on a line.
TAKE (line number) TO POWER	Take the specified line to the capstan or gypsy head and make ready to heave around (DO NOT heave around until told to do so).
SINGLE UP (line number)	Take in all but one bight so there remains a single part to the line. Can also be used to single up all normal mooring lines.
DOUBLE UP (line number)	Pass an additional bight on the specified line so there are three parts to the line. This can also be used to double up all normal mooring lines. Cutters without sufficient mooring line for three parts should just pass the bitter end of the single up to the pier.
AVAST or AVAST HEAVING (line number)	Stop taking a strain on a line with capstan.
CAST OFF (line number)	When using another ship's lines to secure your ship, it means to cast off the ends of their lines.
TAKE IN (line number)	Allow the pier line handler enough slack to take the line off the fitting and bring the line aboard. Used when secured with your own line.
STAND BY YOUR LINES	Man the lines, ready to cast off or moor.
BACK EASY	A command to the capstan operator to ease tension on the line once the stopper is passed. This command is given before up-behind.
UP-BEHIND	Cease hauling on the line and slack it quickly.

ENCLOSURE (3) DAVIT INFORMATION TABLE

This Enclosure provides davit information, including max sea wave conditions as discussed in Chapter 8, Shipboard Launch and Recovery. This table will be updated as needed at the Commandant (CG-751) CG Portal: https://cg.portal.uscg.mil/units/cg751/CommandantPolicy/Forms/AllItems.aspx

Cutter Length(1)	Ref.	Davit Manufacturer	Boat	Boat Weight (Outfit, No Crew)	Davit/Winch Capacity (lbs)	Max Crew/Gear Launch & Recovery Weight	Max Sea Wave Height (Feet)(3)
420’	TP 5232	Schat Harding Gravity	CB - L(Old / New)	3960 /	8,600	4640/	8
	TP 5245	ALLIED Model 100-55	38' ASB	17,500	38,000	20,500	Calm
			38' LCVP	17,500	38,000	20,500	Calm
418’	TP 7003	ALLIED DC-8600CTS	CB - OTH (Mk II)	5200	8,600	3400	13
			CB - OTH (Mk III)	5415	8,600	3185	13
399’	TP-3562	APPLETON RAD30-	CB - L(Old / New)	3960 /	6,000	2040/	13
	TP 5232	Schat Harding Gravity	CB - L(Old / New)	3960 /	8,600	4640/	8
378’	TP 3493	Welin - Lambie	CB - OTH (Mk II)	5200	11,020	5820	13
			CB - OTH (Mk III)	5415		5605	13
	TP-3485A	ALLIED D5700CT	CB - OTH (Mk II)	5200	5,700	500	13
282’	TP-3485A	ALLIED D5700CT	CBL (Old / New)	3960 /	5,700	1040/	13
270’	TP 3490	Welin - Lambie	CB-OTH (Mk II)	5200	11,020	5820	13
			CB-OTH (Mk III)	5415		5605	13
	TP-2838	Iowa Mold Tooling	CB - L (19’)	2220	3,000	780(2)	6
	TP-3414	Northern Line	CB - L (19’)	2220	3,000	780(2)	6
	TP-	Appleton 5000	CB - L (19)	2220	5,000	2780	6
240’	TP 3762	Welin - Lambie	23' CB - TANB	4854	9,900	5046	8
225’	TP 3762	Welin - Lambie	23' CB - TANB	4854	9,900	5046	8
	TP-3562	APPLETON RAD30-	CB - L(Old / New)	3960 /	6,000	2040/	8
210’	TP 3493	Welin - Lambie	CB-OTH (Mk II)	5200	11,020	5820	13
			CB-OTH (Mk III)	5415		5605	13
			26' MSB	5000		6020	13
	TP-3485A	ALLIED D5000CT	CB - L(Old / New)	3960 /	5,000	1040/	13
210'	TP-3485A	ALLIED D5700CT	CB - L(Old / New)	3960 /	5,700	1740/	13
			CB - OTH (Mk III)	5415		285	13
175'	TP-3632	ALLIED D6000FCT	CB - M	3700	4,000	300	calm
140	101-WTGB-	AURORA CRANE	CB - M	1070	2,000	930 (2)	calm
110'	TP-2937	APPLETON MARINE	CB - M	1400	1,750	350 (2)	8
87’	TP4625	PULLMASTER PL2	CB - M	3500	2204(5)	N/A(5)	6
65'	65 WYTL-8201-52	ACE DAVIT COMPANY	CB - S	900	120	300	calm
65'	Not in NE-TIMS	COLUMBIA WINCH & Hoist 1500	CB - S	900	120	300	calm

Note 1 - Construction Tenders, River Tenders, Inland Buoy Tenders, Harbor Tugs should not launch the cutter boat in greater than calm seas.

Note 2 - Personnel shall not be in the boat during launch and recovery operations, this weight is for gear only.

Note 3 – For all cutters, the maximum sea wave heights are wind generated waves and are based upon the American Bureau of Shipping Standards and Naval Vessel Rules. The Maximum Sea Wave Heights are based on cutter stability, constant tension and davit capabilities NOT the capabilities of the cutter boat. The operating parameters of the unit’s cutter boat may be found in the appropriate Boat Operators Handbook. These limits may be exceeded to prevent the loss of life at the CO’s/OIC’s discretion.

Note 4 – The davits on the ALEX HALEY and WLM class cutters are rated below their designed WLL due to structural concerns.

Note 5 – With stern-launch systems, the installed boat winch is not required to hoist the full weight of the CB.

Individual Cutter Boat Padeye/Sling hoist testing constraints may be found in the Fleet Management Information System website.

ENCLOSURE (4) STANDARD HAND SIGNALS (SHIPBOARD LAUNCH AND RECOVERY)

Note: All hand signals must be in addition to verbal direction.		
Boom Up	Boom Down	Heave around/up on the whip (single part)
		
Heave around/up on the main (two-part purchase)	Slack off(Pay out/down) on the main (two part purchase)	Slack off(Pay out/down) on the whip (single part)
		
Slew Left/Right (the direction the hand is pointed)	Extend Boom (for cutters equipped with telescoping booms)	Retract Boom (for cutters equipped with telescoping booms)
		
	Boom up and slack off together (this replaces the previous ‘load level’ signal)	Heave around/up slowly (thumb and fore-finger tapping together)