Chapter 3

Vessel Terms and Definitions

The watercraft operator must know and use the correct terms for following commands and instructions. He must also know the general layout of his vessel. Some terms, which are necessary to an understanding of structural and operational nomenclature, are not explained in this chapter. These terms are explained in their appropriate chapter or in the glossary. The terms used in this chapter are the same on all types and sizes of vessels.

NAUTICAL TERMINOLOGY

3-1. The floors of a ship are called decks, the walls are called bulkheads, and the stairs are called ladders. There are no halls or corridors in a ship, only passageways. There are no ceilings in a room, only the overhead in the compartment. Openings in the outside of the ship are ports, not windows. Entrances from one compartment to another are called doors. Openings from one deck to another are called hatches. The handles on the watertight hatch or door are called dogs.

3-2. When you close a door or watertight hatch, you secure it. If you close down the dogs on the door or hatch, you dog it down. You never scrub the floor or wash the walls, rather you swab the deck and scrub the bulkheads. When you get up to go to work, turn to. You never go downstairs, you lay below, and if you are going up from one deck to another, you lay topside. If you are going up the mast or into the rigging you are going aloft.

STRUCTURAL PARTS OF THE HULL

3-3. The hull (Figure 3-1, page 3-2) is the main body of the ship below the main outside 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. However, there may still be some areas where rivets are used. The steel skin may also be called shell plating.

3-4. 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 gives shape and strength to the hull. Deck beams and bulkheads support the decks and gives added strength to resist the pressure of the water on the sides of the hull.

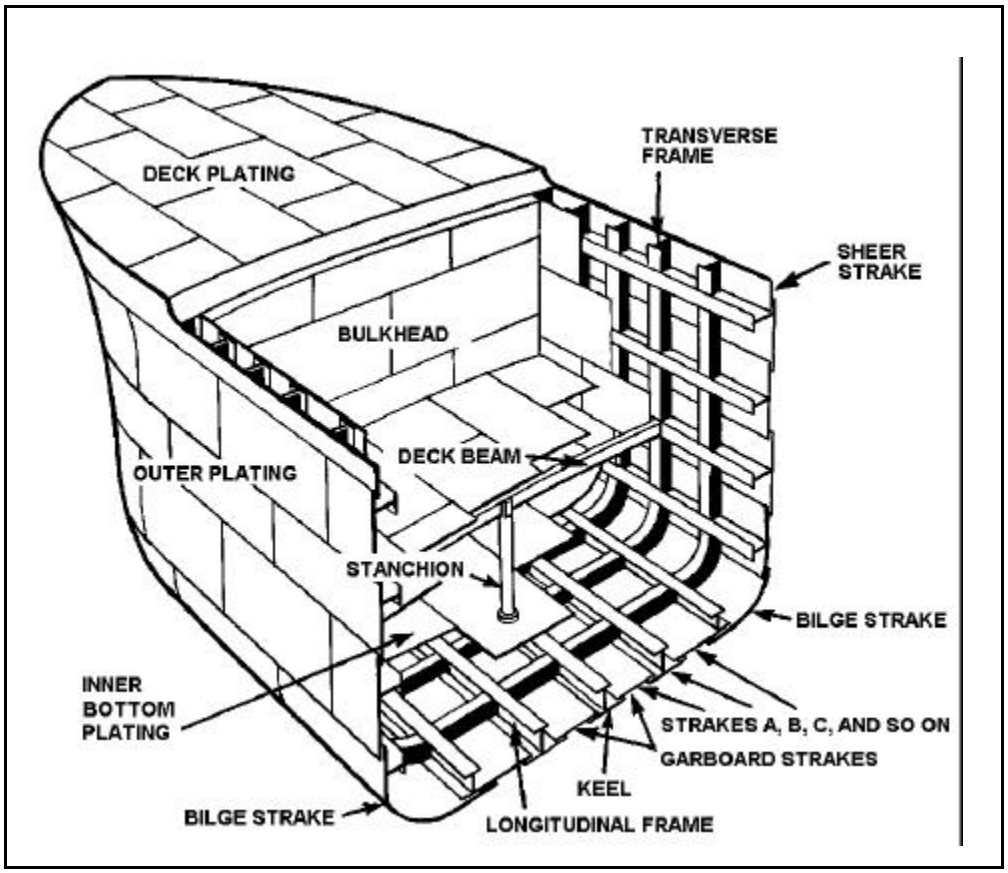

Figure 3-1. Construction of a Hull

SKIN

3-5. The skin, or shell plating, provides water-tightness. The plates, the principal strength members of a ship, have various thickness. 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 vessel 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.

STRAKE NAMES

3-6. 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 bilge strakes. The strakes running between the garboard and bilge strakes are called bottom strakes and the topmost strakes of the hull are sheer strakes. The upper edge of the sheer strake is the gunwale.

BULKHEADS

3-7. The interior of the ship is divided by the bulkheads and decks into watertight compartments (Figure 3-2). A vessel 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.

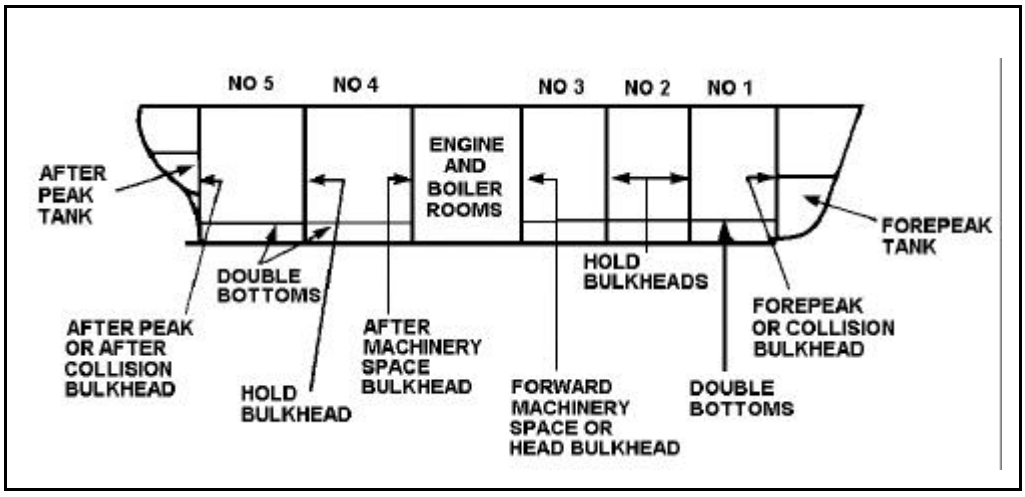

Figure 3-2. Bulkheads and Decks

ENGINE ROOM

3-8. The engine room is a separate compartment containing the propulsion machinery of the vessel. Depending on the size and type of propulsion machinery, other vessel machinery may be located there (such as generators, pumping systems, evaporators, and condensers for making fresh water). The propulsion unit for Army vessels 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 to the propeller.

EXTERNAL PARTS OF THE HULL

3-9. Figure 3-3 shows the external parts of the hull. 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.

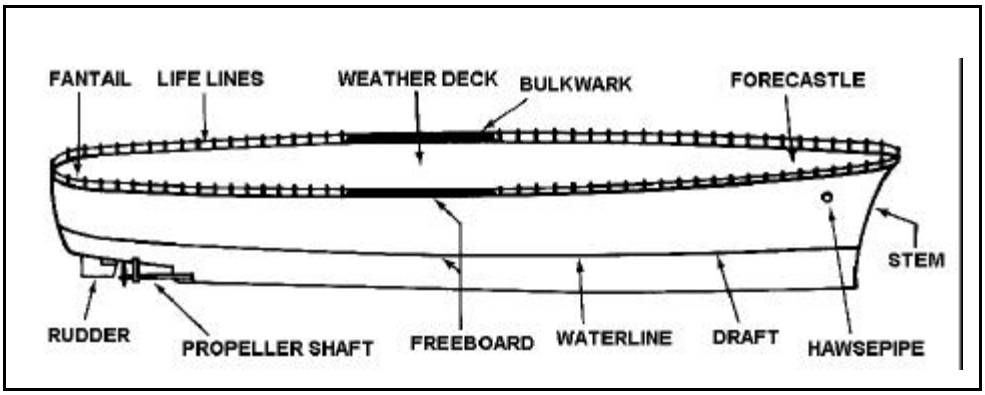

Figure 3-3. External Parts of the Hull

3-10. The relationship between the drafts at the bow and stern is the trim. When a ship is properly balanced fore and aft, she is in trim. When a ship is drawing more water forward than aft, she is down by the head. If the stern is too far down in the water, she is down by the stern. If the vessel is out of balance laterally or athwartship (leaning to one side) she has a list. She may be listing to starboard or listing to port. Both trim and list can be adjusted by shifting the weight of the cargo or transferring the ship's fuel and water from one tank to another in various parts of the hull.

3-11. 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 removable stanchions and light wire ropes, called life lines. Extensions of the shell 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 or poop deck. The flat part of 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.

3-12. Below the waterline are the propellers or screws which drive the ship through the water. The propellers are attached to and are turned by the propeller shafts. A ship with only one propeller is called a single-screw ship. Ships with two propellers are called twin-screw ships. On some ships (especially landing craft) there may be metal frames built around the propellers (called propeller guards) to protect them from damage. The rudder is used to steer the ship.

NAMES OF DECKS

3-13. The decks aboard ship (Figure 3-4) are the same as the 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. Any partial deck above the main deck is named according to its location on the ship. At the bow it is called a forecastle deck, amidships it is an upper deck, and at the stern it is called the poop deck. The term weather deck includes all parts of the forecastle, main, upper, and poop decks exposed to the weather. Any structure built above the weather deck is called superstructure.

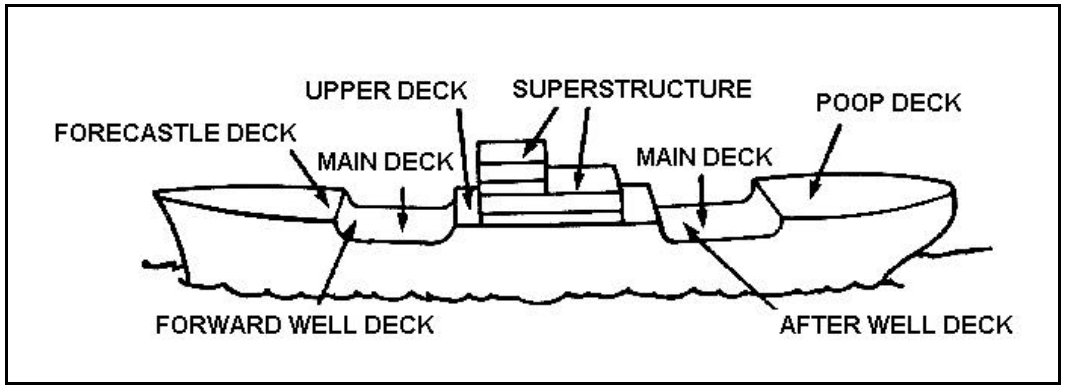

Figure 3-4. Weather Decks

SHIPBOARD DIRECTIONS AND LOCATIONS

3-14. You must be able to identify and locate stowage areas when involved in operations aboard ship. Refer to Figure 3-5, page 3-6, to locate the following:

Bow

3-15. The front end of the ship is the bow. When you move toward the bow, you are going forward, when the vessel is moving forward, it is going ahead. When facing toward the bow, the front-right side is the starboard bow and the front-left side is the port bow.

Amidships (Center)

3-16. The central or middle area of a ship is amidships. The right center side is the starboard beam and the left center side is the port beam.

Stern (Back)

3-17. The rear of a vessel is the stern. When you move in that direction you are going aft, when the ship moves in that direction it is going astern. When looking forward, the right-rear section is called the starboard quarter and the left-rear section is called the port quarter.

Other Terms of Location and Direction

3-18. The entire right side of a vessel from bow to stern is the starboard side and the left side is the port side. A line, or anything else, running parallel to the longitudinal axis or centerline of the vessel is said to be fore and aft and its counterpart, running from side to side, is athwartships.

3-19. From the centerline of the ship toward either port or starboard side is outboard and from either side toward the centerline is inboard. However, there is a variation in the use of outboard and inboard when a ship is on berth (moored to a pier). The side against the pier is referred to as being inboard; the side away from the pier as outboard.

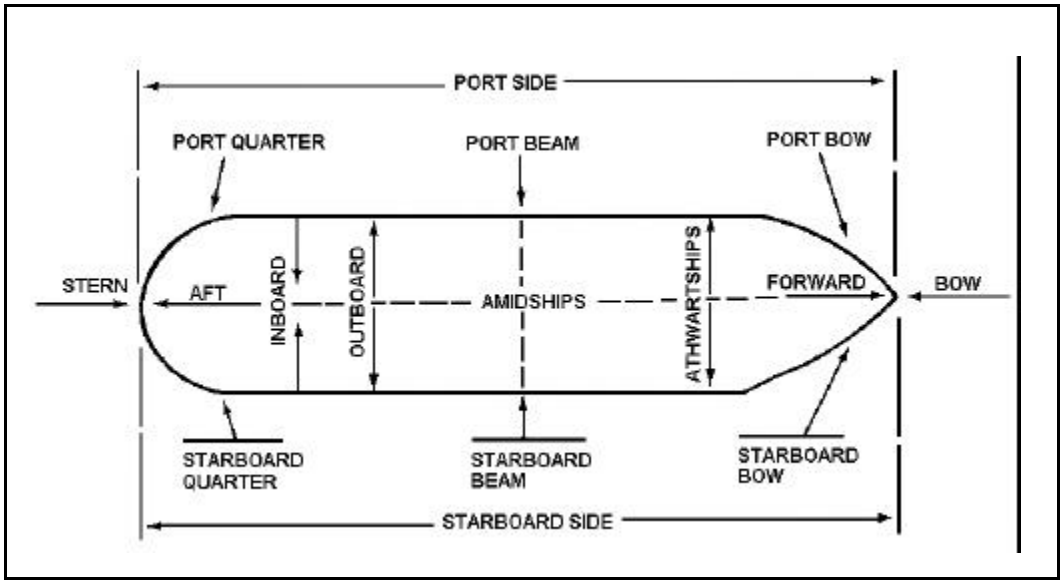

Figure 3-5. Locations and Directions Aboard Ship

SHIPBOARD MEASUREMENTS

3-20. A ship's size and capacity can be described in two ways--linear dimensions or tonnages. Each is completely different yet interrelated.

3-21. A ship's measurement is expressed in feet and inches--linear dimensions. A ship is a three dimensional structure having length, width, and depth (Figure 3-6).

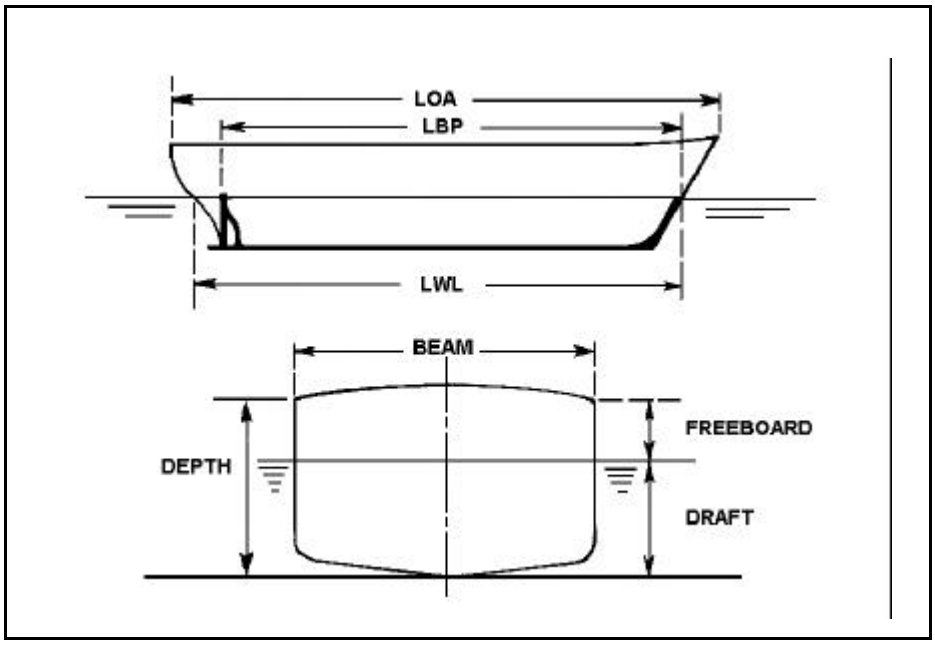

Figure 3-6. A Ship's Dimensions

LENGTH

3-22. A ship's length is measured in different ways for ship's officers, for architects and designers, and for registry. Terms used for technical or registry purposes include registered length, tonnage length, floodable length, and length by ABS rules. We mention these terms for familiarization only. The more commonly used length measurements -- length overall, length between perpendiculars, and length on load waterline are discussed as follows.

Length Overall

3-23. A ship's 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 3-6 shows how the LOA is measured. Watercraft operators 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 vessel.

Length Between Perpendiculars

3-24. A ship's length is sometimes given as 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 vessels this is, for all practical purposes, a waterline measurement.

Length on Load Waterline

3-25. A ship's LWL is an important dimension because length at the waterline is a key factor in the complex problem of speed, resistance, and friction. On vessels 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 3-6.

WIDTH

3-26. 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.

3-27. 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 3-6. This dimension must include any projections on either side of the vessel. Like length overall, this measurement is important to a ship's officer in handling the vessel.

DEPTH

3-28. The depth of a vessel involves several very important vertical dimensions. They involve terms like freeboard, draft, draft marks, and load lines. The vessel'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.

3-29. The term "depth" is where the measurement is taken from the bottom--from the keel upward. Ordinarily, if such a measurement were being made in a room of a building, taken from the floor to the ceiling, it would be called height.

Note: You must know a ship's draft or maximum allowable draft when selecting a berth for loading or discharging operations.

PROCEDURE FOR READING DRAFT MARKS

3-30. Draft marks are numbers marked on each side of the bow and stern of the vessel (Figure 3-7). Draft marks show the distance from the bottom of the keel to the waterline.

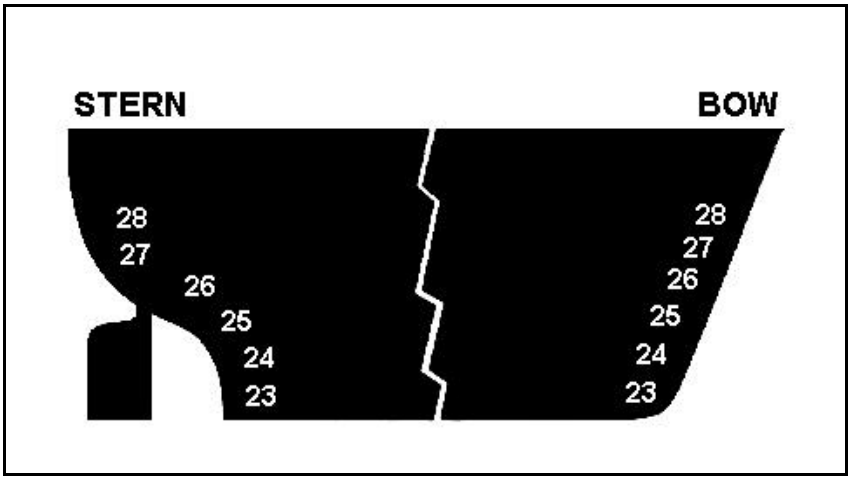

Figure 3-7. Draft Marks on Bow and Stern of Vessel

3-31. The draft numbers shown in Figure 3-8 are 6 inches high and 6 inches apart. The bottom of each number shows the foot draft mark.

Figure 3-8. Draft Numbers Showing Foot Draft Mark

3-32. Figure 3-9 shows four different draft readings.

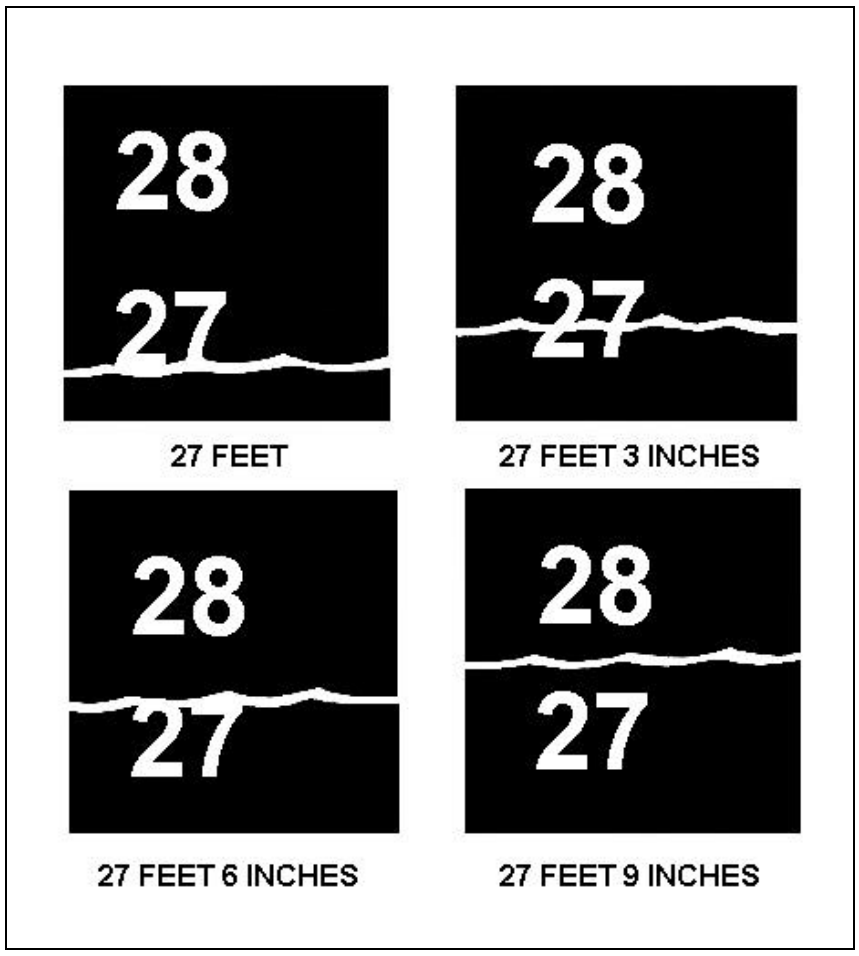

Figure 3-9. Various Draft Readings

WEIGHT TONNAGE TERMS

3-33. The word "ton" comes from the English "tun" meaning cask or barrel. To the English, it meant a wine barrel with a capacity of about 252 gallons. When Parliament imposed duties on the wine entering England in these barrels, the duty imposed on each tun eventually led to the use of tunnage in describing a ship's capacity to carry such barrels. The original use of tun meant a barrel of a particular size, the space that such a barrel would occupy, and a ship's capacity to carry a given number of such barrels. Tun was originally a figure for space--not weight. By law, Parliament fixed the tun at 252 gallons. Since this fixed tun weighed an average of 2,240 pounds, it brought into existence the weight term "long ton."

3-34. A long ton is used throughout the shipping business. It is not to be confused with the familiar ton of 2,000 pounds, the short ton, used so widely in the US in relation to so many things other than ships and shipping. The metric ton is 1,000 kilograms, the equivalent of 2,204.6 pounds. Tonnages throughout this manual refer to the long ton of 2,240 pounds.

CATEGORIES OF SHIP'S DECK GEAR

3-35. Watercraft operators must be familiar with ship's gear. The term "ship's gear" is used to describe that gear and equipment aboard ship that is used for cargo transfer activities and deck operations. Ship's gear can be divided into four categories:

- Standing rigging.
- Running rigging.
- Deck fittings.
- Deck machinery.

STANDING RIGGING

3-36. Standing rigging gear (Figure 3-10, page 3-12) includes the rigging that supports masts or king posts. This gear includes the following:

Shrouds

3-37. These are heavy wire ropes that provide athwartship support for the mast or king posts. Two or more shrouds are used on either side of a mast or king post. They are secured to the outboard side of the deck or to the bulwark to provide maximum support.

Turnbuckles

3-38. These are internally threaded collars turning on two screws threaded in opposite directions. They are used to secure and to take up the slack in the shrouds and stays.

Stays and Backstays

3-39. These are heavy wires similar to shrouds. The difference is that they will lead in a forward or aft direction. They are found at the mast where the jumbo boom (heavy lift boom) is located. When they support the mast from a forward direction, they are called stays. When they support the mast from an aft (back) direction, they are called backstays.

RUNNING RIGGING

3-40. This gear includes the moving or movable parts that are used to hoist or operate gear (such as cargo runners, topping lifts, and guy tackles).

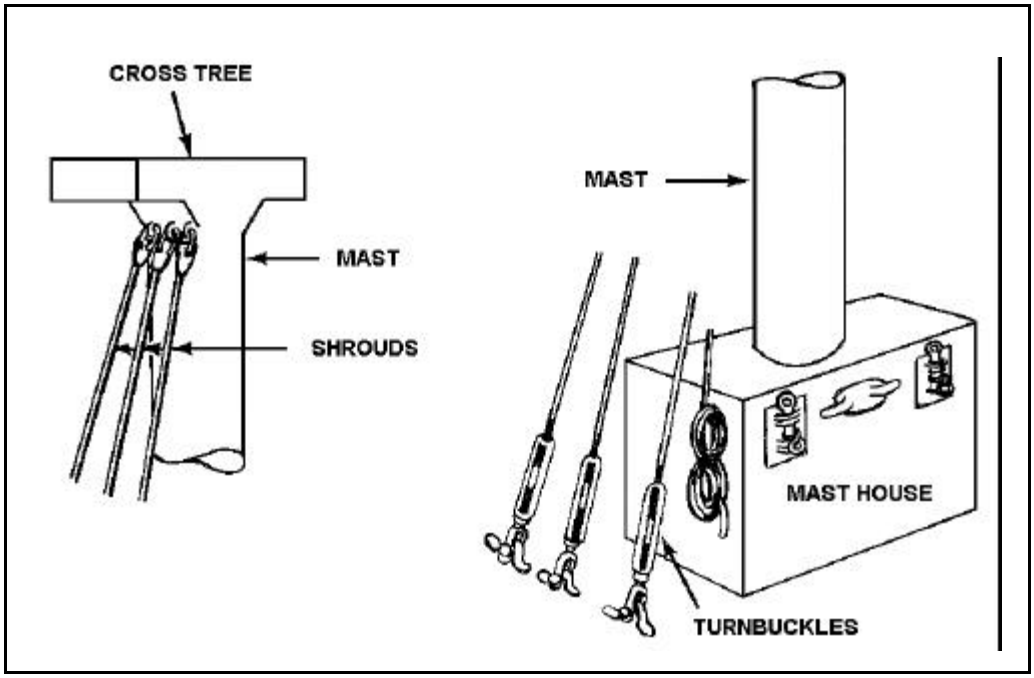

Figure 3-10. Standing Rigging Gear

DECK FITTINGS

3-41. These are the devices that are used to secure standing rigging, running rigging, and mooring lines. These devices (Figure 3-11) are described as follows:

Bitts

3-42. These are heavy metal bed plates with two iron or steel posts. They are used on ships for securing mooring or towing lines. Usually there is a set forward and after each chock.

Chocks

3-43. These are heavy fittings secured to the deck. Lines are passed through them to bollards on the pier. The types of chocks used are closed, open, roller, and double roller.

Cleats

3-44. These are metal fittings having two projecting horns. They are used for securing lines.

Pad Eyes

3-45. These 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.

3-46. A bulwark is the wall around any deck exposed to the elements. This includes the weather deck, the poop deck, the fore deck, and any deck on the superstructure. On top of the bulwark is a flat rail (or plate) called the rail. Pad eyes and cleats are often welded to the rail.

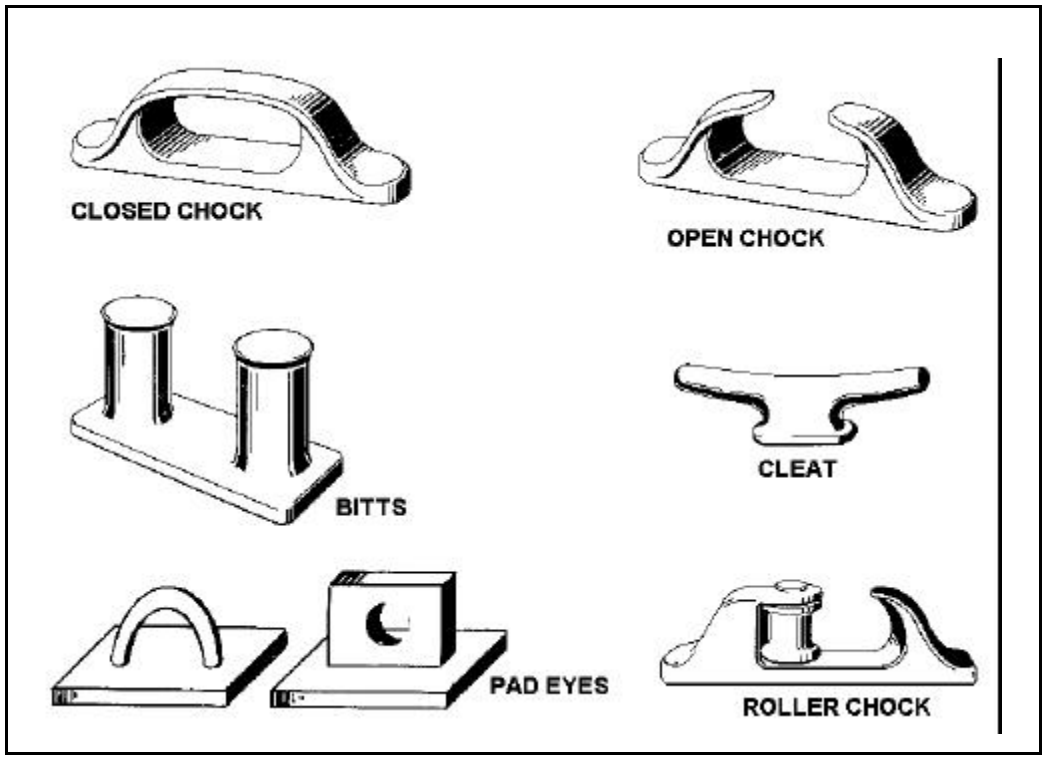

Figure 3-11. Deck Fittings

DECK MACHINERY

3-47. This includes the standard machinery that is found on the decks of Army watercraft. The size and shape of the deck machinery may vary depending upon type of vessel, but the operating principles remain the same.

Cargo Winches

3-48. These are power-driven machines used to lift, lower, or move cargo. Winches are classified according to their source of power Electric winches are standard equipment on most vessels. An electric winch (Figure 3-12) has a steel base on which the winch drum, motor, gears, shafts, and brakes are mounted. The drum, which has cable wound on it, is usually smooth with flanged ends. It revolves on a horizontal axis and is driven through single or double reduction gears by an electric motor (usually direct current). A solenoid brake and a mechanical brake are fitted to the motor shaft. The winch is located on deck or on a deckhouse. The winch controls consist of a master controller or switchbox located on a pedestal at the end of the hatch square and a group of relays, contactors switches, and resistors located near the winch motor.

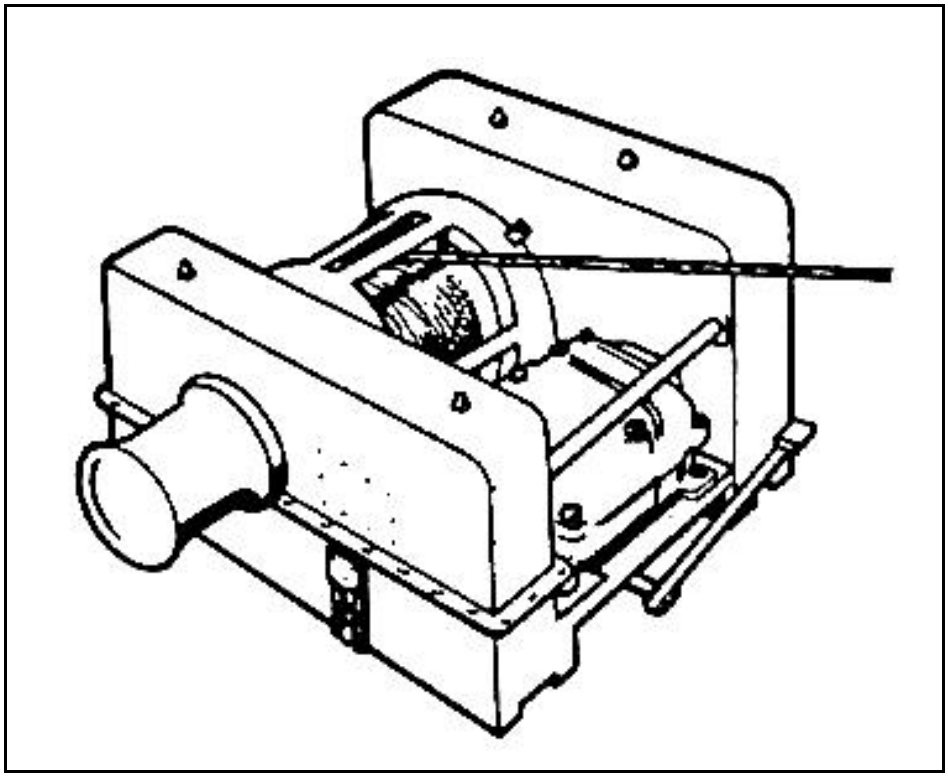

Figure 3-12. Electric Winch

Windlass

3-49. The windlass (Figure 3-13) is a special type of winch used to raise and lower the anchors and to handle the forward mooring lines. It consists of a wildcat (a steel casting in the form of a deeply grooved drum with projecting ribs [whelps]) used to grip the anchor chain, controls for connecting or disconnecting the wildcat from the engine, and a friction brake which can be set to stop the wildcat when disconnected. There are horizontal drums at each end of the windlass for warping.

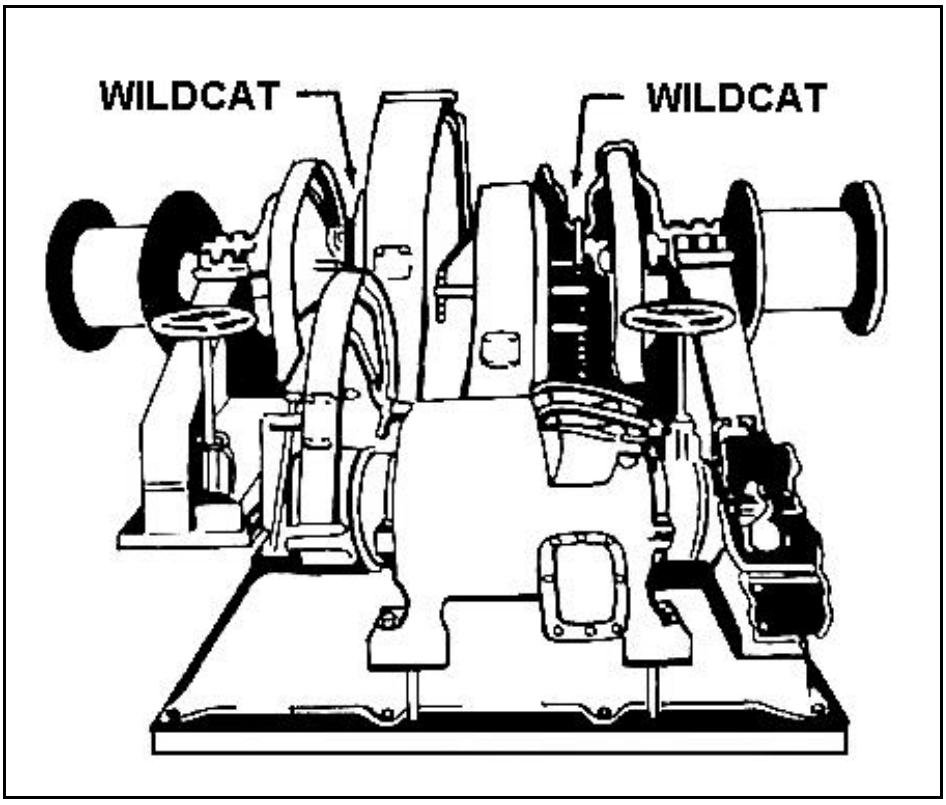

Figure 3-13. Windlass

Capstan

3-50. The capstan (Figure 3-14) is a vertically mounted winch head used aboard ship when mechanical power is required for raising anchor, lifting heavy weights, or for any similar work. It is a cast steel drum mounted on a vertical spindle with the largest diameters at top and bottom and the smallest in the middle to allow the rope around it to surge up or down as the number of turns are increased. The drum is fixed to the spindle by keys.

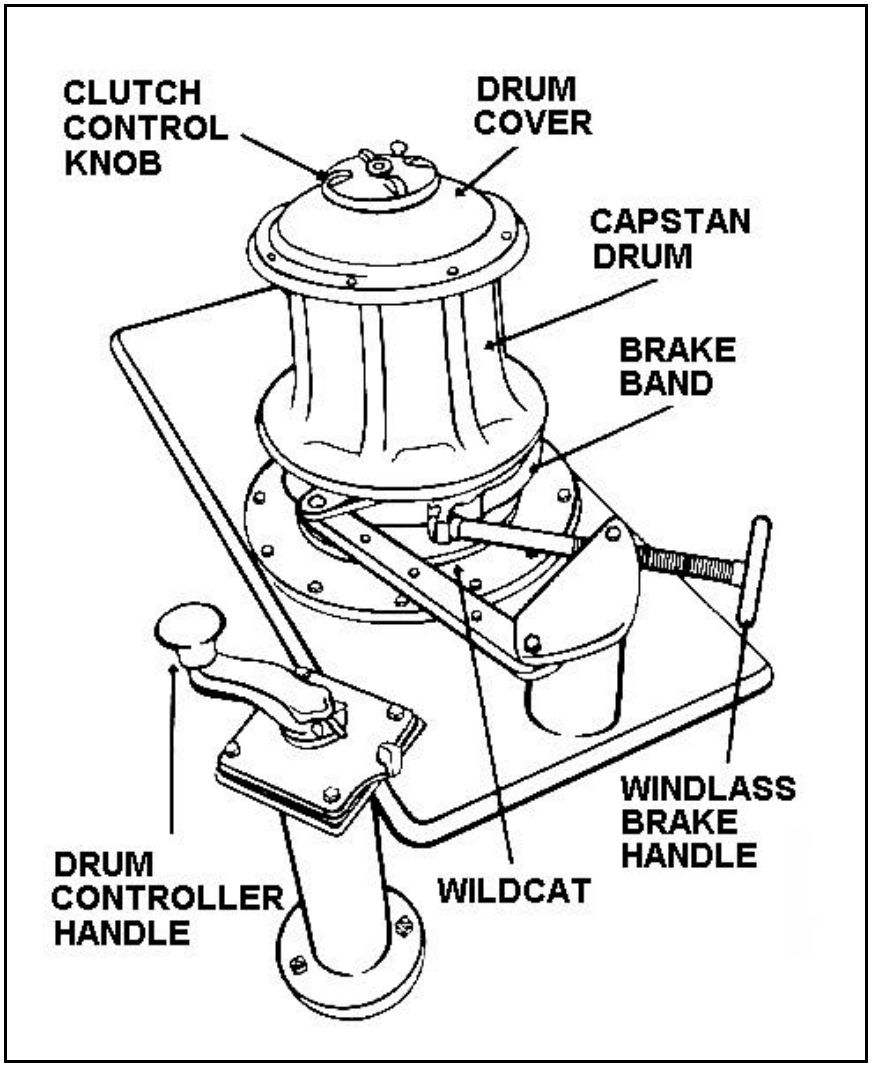

Figure 3-14. Capstan