

Unit 2

SHIPS AND SHIPS TERMS

STRUCTURAL MEMBERS OF A SHIP

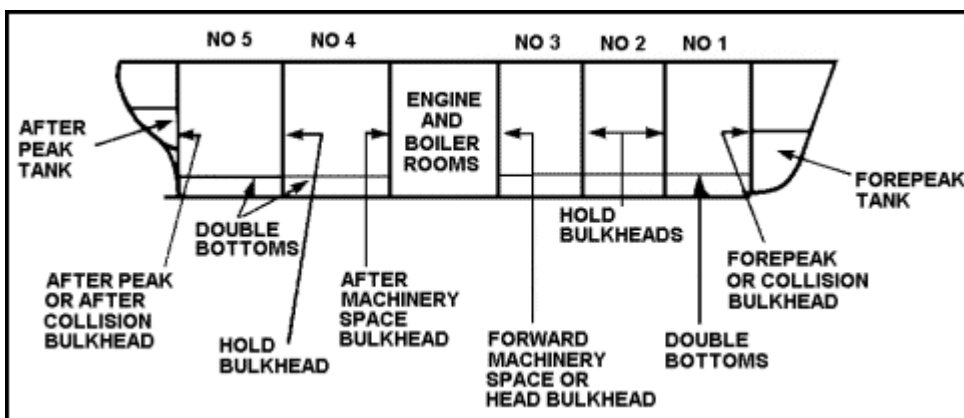
Basic terms

<p><i>shell plating</i> <i>strake</i> <i>keel</i> <i>deck</i> <i>tank top</i> <i>floor</i> <i>stringer buoyancy</i> <i>strength</i> <i>stability</i> <i>bulkhead</i></p>	<p><i>compartment</i> <i>stem</i> <i>frame</i> <i>beam</i> <i>bracket</i> <i>girder</i> <i>stern post</i> <i>hull</i> <i>angle bar</i> <i>stiffener</i></p>
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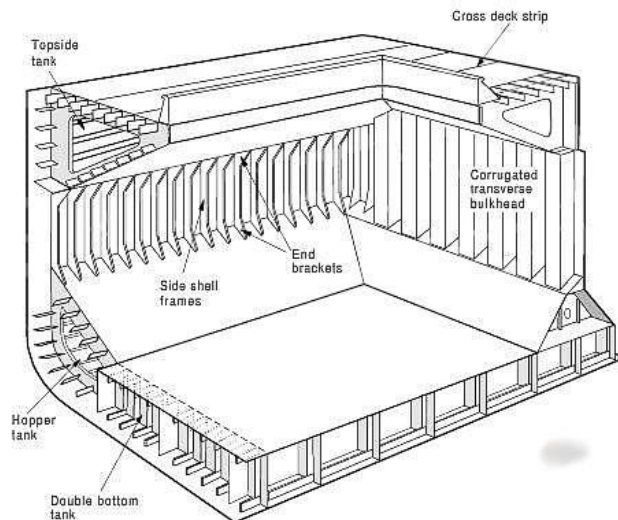
The forward end of the ship is called the **bow**, the after end is the **stern**, and halfway between the two is **amidships**. The **beam** of the ship is the distance between the two ship's sides.

The **hull** or the body of the ship includes the outer skin or shell, and all the **members** and parts which hold this shell together, divide it into compartments and give it strength and rigidity.

Three basic requirements of ships are the ability to float (**buoyancy**), the ability to stay together (**strength**), and the ability to stay right side up (**stability**).



The **shell plating** is the outer skin of the ship and is made up of a great many steel plates fastened together by welding. Each horizontal row of plating is called a **strake**. Strakes are usually lettered A-B-C-D, etc., beginning with the row next to the **keel**. This strake is called the **garboard strake** while the top strake is called the **sheer strake**. The two essentials of the shell are **watertightness** and strength.

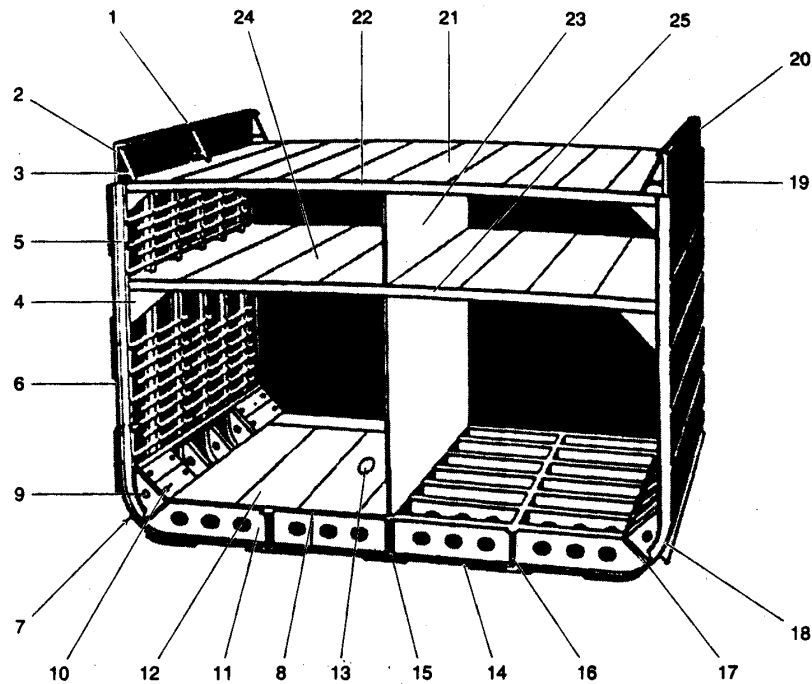


The flat **keel** of a ship is the row at the bottom of the ship extending from the bow to the stern along the centreline. **Decks**, corresponding to the floors of a house, are flat sections of steel plates. The deck constructed between three and four feet above the shell at the bottom is called the **inner bottom** or **tank top** plating, because between these two sections of steel plates are **double bottom tanks** used for carrying fuel oil, water ballast etc. The transverse vertical plates dividing these tanks into sections are called **floors**. **Stringers** are large beams or angles fitted in various parts of the vessel to give added strength. Depending upon their locations, stringers are known as bilge stringers, side stringers, hold stringers, etc.

Bulkheads are large partitions made of plates riveted or welded together and stiffened with **angle bars**, **tee bars**, etc. Depending on the type of ship there are transverse, longitudinal and side bulkheads. They divide the ship into **compartments** *fore-and-aft*, or *from port to starboard*, and they may run between two or more decks.

The **stem** is fastened to the forward end of the keel by a stem foot casting and extends up to the top of the hull at the bow. The **frames**, which are the ribs of the ship, serve to give the ship its form and at the same time support and stiffen the shell plating. They are fastened at the bottom to the outer ends of the floors by **brackets** and at the top to the **deck beams**

Mid section of a cargo ship

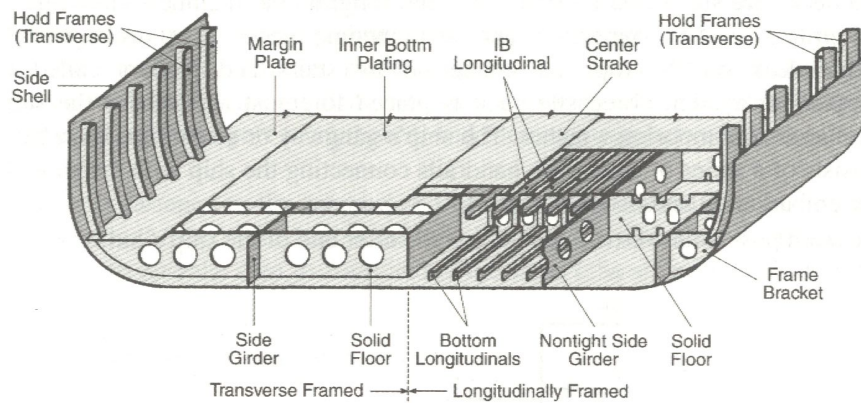


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|--|--------------------------|
| (1) Bulwark rail | (13) Manhole cover |
| (2) Bulwark stay | (14) Garboard strake |
| (3) Spur | (15) Keel plate |
| (4) Beam knees | (16) Intercostal |
| (5) Spar ceiling | (17) Margin plate |
| (6) Frame | (18) Bilge strake |
| (7) Bilge keel | (19) Sheer strake |
| (8) Reverse frame | (20) Bulwark |
| (9) Lightening hole in tank side bracket | (21) Upper deck plating |
| (10) Limber boards | (22) Upper deck beam |
| (11) Floor | (23) Centreline bulkhead |
| (12) Tank top plating | (24) Main deck plating |
| | (25) Main deck beam |

The **decks** are supported by transverse and longitudinal members called **beams** and girders, used as connections and strengthening pieces. **Poop decks**, with the bridge deck on the top, are connected by stairs and ladders called the **companionway**. The **forecastle deck** is placed foremost and carries the ship's windlasses and mooring winches. The ship's **gangway** or **accommodation ladder** consists of a series of steps with handrails connecting the ship with the shore for safe embarkation and disembarkation.

The **stern post** is the vertical member at the after end of the ship's hull.

Double bottom construction



Ship's Deck 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

Standing rigging gear includes the rigging that supports masts or king posts. This gear includes the following:

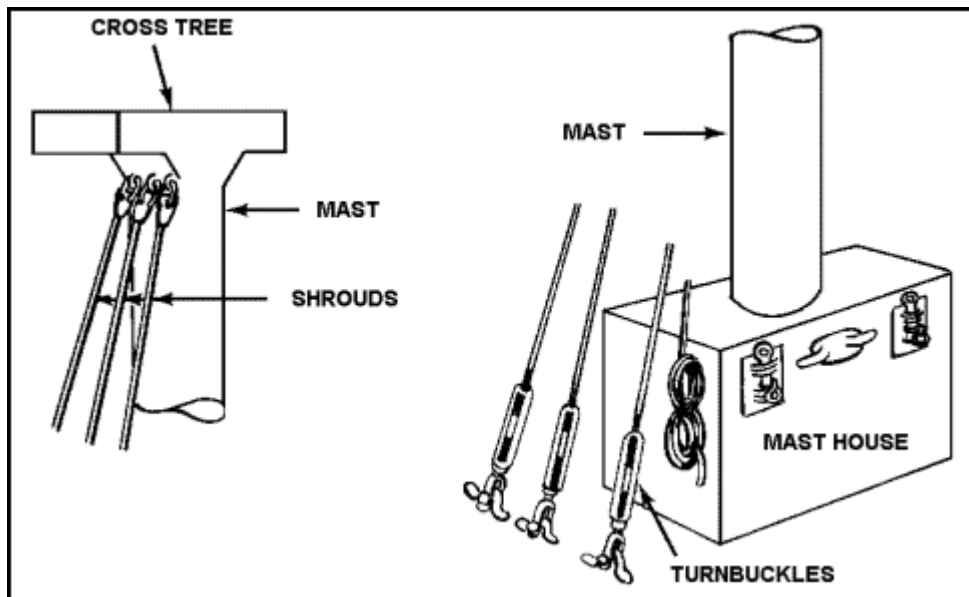
Shrouds are heavy wire ropes that provide athwartship support for the mast or king posts. Two or more shrouds are used on either side of a mast or king post. They are secured to the outboard side of the deck or to the bulwark to provide maximum support.

Turnbuckles 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 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

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).



Standing Rigging Gear

DECK FITTINGS

These are the devices that are used to secure standing rigging, running rigging, and mooring lines.

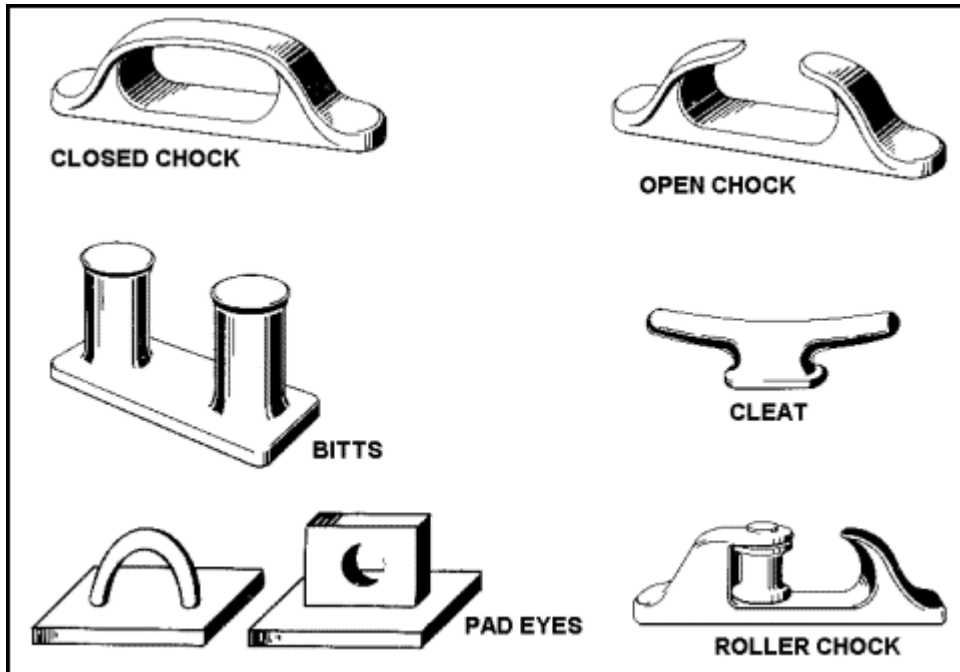
Bits are heavy metal bed plates with two iron or steel posts. They are used on ships for securing mooring or towing lines. Usually there is a set forward and after each chock.

Chocks 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 are metal fittings having two projecting horns. They are used for securing lines.

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.

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.

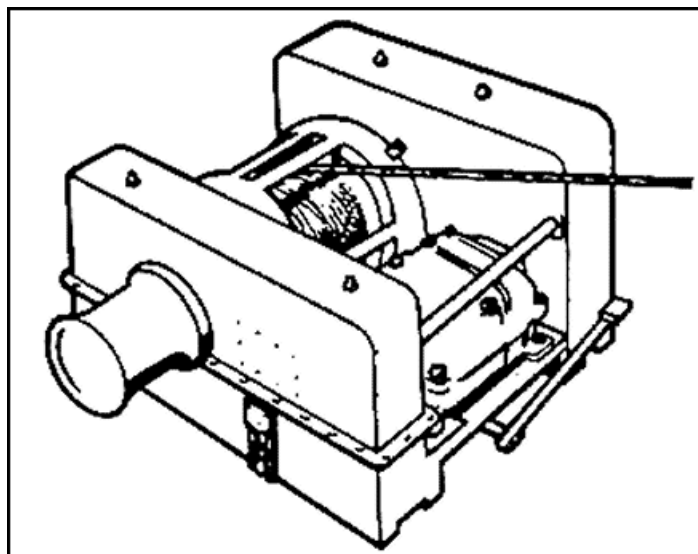


Deck Fittings

DECK MACHINERY

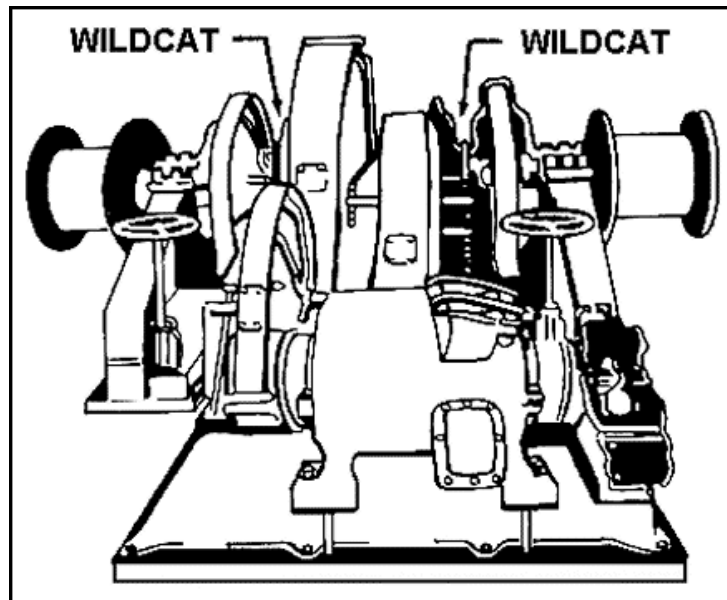
This includes the standard machinery that is found on the decks of Army watercraft. The size and shape of the deck machinery may vary depending upon type of vessel, but the operating principles remain the same.

Cargo Winches 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 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.



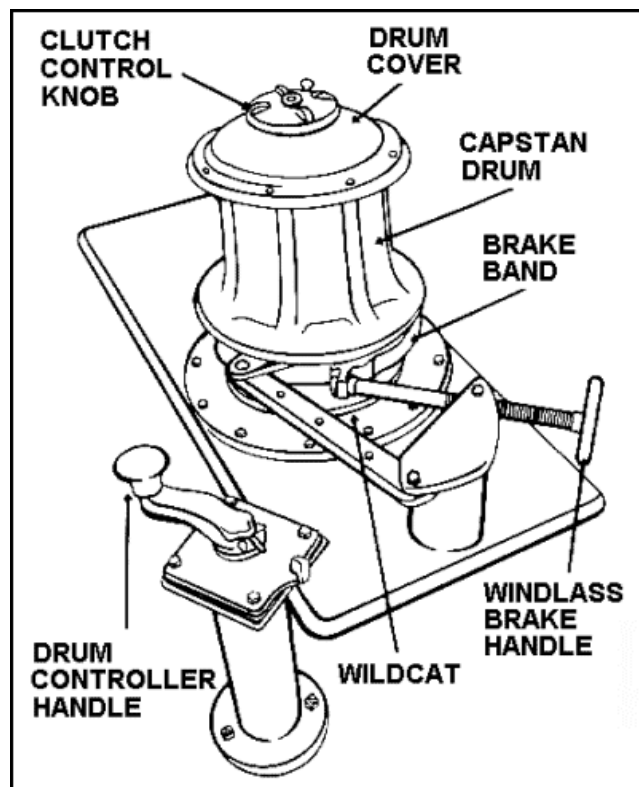
Electric Winch

The **Windlass** 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.

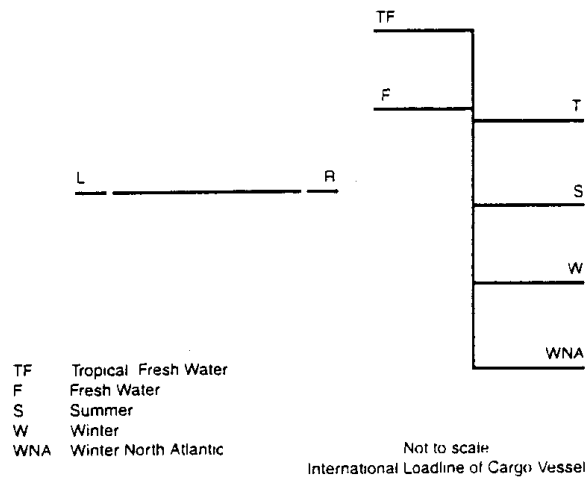


Windlass

The **Capstan** 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.



Capstan



A. Comprehension & vocabulary

A.1 Find definitions in the Reading Text for the following terms:

• *shell plating* • *strake* • *keel* • *deck* • *tank top* • *stringer* • *bulkhead* • *frame* • *stern* • *stern post*

A.2 Answer the following questions referring to the text:

1. What are the main parts of the shell plating?
2. What is a strake?
3. How are strakes marked?
4. What are the names of some of the ship's decks?
5. Where is fuel oil carried?
6. What are floors connected to at their extreme ends?
7. Where do stringers extend?
8. What do the bulkheads divide the ship into?
9. What are the two extreme ends of a ship called?
10. What are the main features of the ship's hold:
 - a. in a tramp vessel?
 - b. in a cargo liner?
 - c. in a timber carrier?
 - d. in a container ship?

A.3 Find and write down the instances where certain parts or members of the ship structure are compared to the human body.

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A.4 Which members of the ship's structure are described below?

1. _____ : shell or body of the ship.
2. _____ : the backbone of the ship.
3. _____ : athwart member of the vessel on which the decks are laid.
4. _____ : a compartment in the very forward part of the ship.
5. _____ : a fore and aft member of the ship's structure. May be bilge, hold or deck.
6. _____ : a row of plates running along the length of the ship.
7. _____ : the upper line of plates of the shell plating.
8. _____ : the opening of the ship's deck for access into the hold.
9. _____ : the structure raised around the hatchway to prevent water from getting into the holds and to accommodate covers.
10. _____ : a ladder in a ship leading from one deck to another.
11. _____ : the raised and enclosed deck in the bow.
12. _____ : space inside a ship for carrying cargo.
13. _____ : a short raised deck, right aft.
14. _____ : a large hinged plate at the stem which controls the ship's direction.
15. _____ : the machinery for turning the rudder.
16. _____ : after end of the vessel's hull.
17. _____ : the raised portions of the ship including the bridge, forecastle, and poop deck.
18. _____ : a space or deck below the main deck but above the hold.
19. _____ : the space between the top tank plating and the ship's bottom.
20. _____ : a vertical partition wall extending athwartships or fore and aft of a vessel.

A.5 Give your own language equivalents for the following terms:

1. after peak _____
2. bracket _____
3. beam _____
4. deck _____
5. bulkhead _____
6. floor _____
7. frame _____
8. hull _____
9. angle bar _____
10. keel _____
11. tank top/inner bottom _____
12. stringer _____
13. stem post _____
14. stiffener _____
15. bow _____
16. stern _____
17. stem _____
18. double bottom _____

B. Grammar

B.1 Supply the suitable preposition in the texts below:

Rudder

The rudder is carried 1. _____ the stem frame. Double plate rudders may be balanced or unbalanced, depending 2. _____ the size 3. _____ the vessel. The shape 4. _____ the rudder plays an important part 5. _____ its efficiency. The rudder stock connects the rudder 6. _____ machinery. An unbalanced rudder consists 7. _____ a number 8. _____ pintles and gudgeons. The top or locking pintle prevents any vertical movement 9. _____ the rudder. The rudder is supported 10. _____ the sole piece or rudder heel. On older ships the rudder turns 11. _____ the rudder post.

Propellers

A large bulb is incorporated 1. _____ the bow structure and just forward 2. _____ the collision bulkhead is a 1,200 hp thruster equipped 3. _____ a c.p. propeller. Manoeuvrability is further provided 4. _____ the LIAAEN controllable pitch main propeller and the installation 5. _____ a Schilling type rudder 6. _____ the open water stern frame. The rudder is actuated 7. _____ a steering gear s. _____ a maximum torque rating 9. _____ 1,552 kN.

B.2 Supply the article (*a, an, the*) or omit it where necessary:

Sounding the bilges

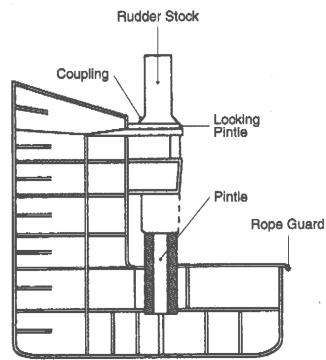
Sounding pipes. Sounding pipes extending above _____ load water-line are fitted in _____ each compartment and ballast tank. There is _____ thick doubling plate under _____ bottom end of _____ pipe for _____ sounding rod to strike upon. Air pipes are also fitted at each end of _____ ballast tanks. _____ caps of _____ pipes must be taken off before _____ tank can be filled with _____ water. It is _____ daily duty of _____ carpenter to sound all _____ compartments, tanks, and bilges. It is also _____ duty of _____ officer upon joining _____ new ship to become acquainted with _____ position on deck of all _____ sounding pipes, bilge pumps and _____ sluice valve connection.

B.2 Supply the article (*a, an, the*) or omit it where necessary:

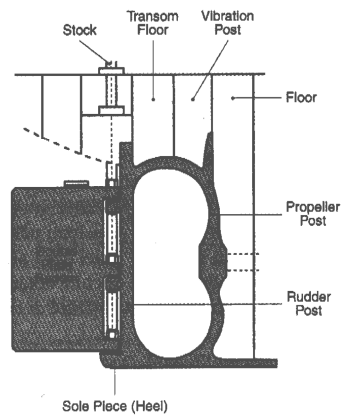
Sounding the bilges

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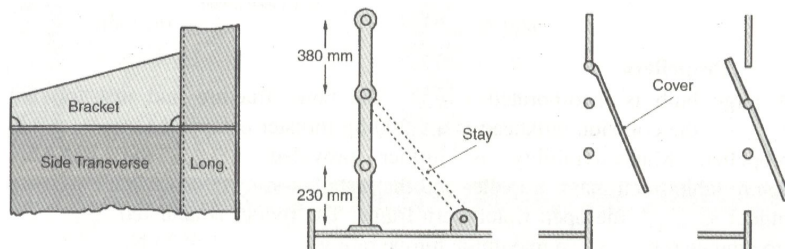
Balanced Rudder



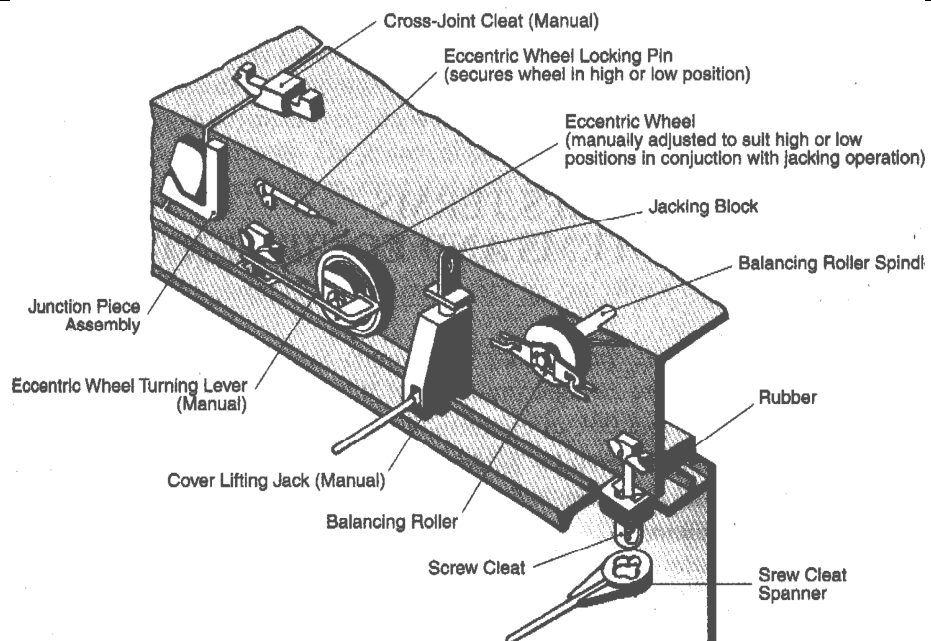
Stern Frame



Hinged Freeing Port



Detail of a Single Pull Cover Side Plate (The Lifting Jack is Portable and is Removed When Not in Use)



*Section Through a Traditional Hatch Coaming
Showing the Beam Landing and Tarpaulin Securing Arrangements*

