12. Low expansion foam: expansion rate 1: 20 (used on deck for fire fighting oil fire)
    Medium expansion foam: expansion rate 1: (20-200)
    High expansion foam: expansion rate 1: (200-1000) (used in enclosed space such as hangars)

13. Types of foam
    Ans. Synthetic foam
    - synthetic surfactants
    - aqueous film forming foam (AFFF)
    - alcohol resistant AFFF

    Protein foam
    - fluro protein foam
    - film forming fluro protein
    - alcohol resistant fluro protein
    - alcohol resistant film forming foam fluro protein.

14. How green sea is avoided?
    Ans. Camber
    Sheer
    Scuppers
    Freeing port
    Flare
    Freeboard

15. How do you implement company ism policy?
    Ans. By training, Interview, Drill, exercise, education
    After this mention about Part A of ism ( 12 chapters)

16. How do you make sure sms requirements' are being observed?
    Ans
    - Various checklist to verify shipboard operations
    - Every year sms is verified by using vessel audit checklist and deficiency is reported to dpa
    - Starting instruction posted near imporatant machineries
    - Circulation of safety information pamphlet from the company.
    - Articles and posters regarding Safe working practices posted on many places inside the accommodation.

17. Types of foam extinguisher
    Ans.
    Chemical foam extinguisher:
    Main container filled with sodium bicarbonate Na HCO3 sol: and longer inner polythene container filled with aluminium sulphate. Inner container sealed with cap held in place by plunger. When cap is released by turning plunger and extinguisher inverted so that chemical react and co2 is released.

    Mechanical foam extinguisher:
    Outer container contains water and inner container holds a co2 cartridge and a foam solution.

Normal calibration is performed using two different gases: a zero gas of low oxygen concentration (0% oxygen) and a span gas of high oxygen concentration ( 20.9% oxygen)

1. Apply pure N2 (99.9%) from calibration gas cylinders and see the display, if it is 0% OK. If not, then adjust from settings to make it ZERO.

2. Apply clean and fresh atmospheric air (NOT from an air conditioned room or confined space) and see the display it should be 20.9 or 21.0%, if not adjust SPAN setting to display it correctly.

3. Calibration is done and is ready for sampling enclosed space or any other space.

- If needed consult supplier to get it calibrated on test bench available with him.

50. Wet chemical system?

Ans. Used in galley fire fighting.

Extinguishing agent: Aqueous potassium carbonate
It extinguishes the galley fire by cooling, inerting effects of steam formation, interruption of chemical reaction.

Working:
Fire is detected by fusible link (at temp 182deg c) or activation of manual pull station. It will activate the control box CO2 cartridge valve which is connected to pressure operated actuator mounted on system cylinder. In doing so discharge the aqueous potassium carbonate agent through nozzles.

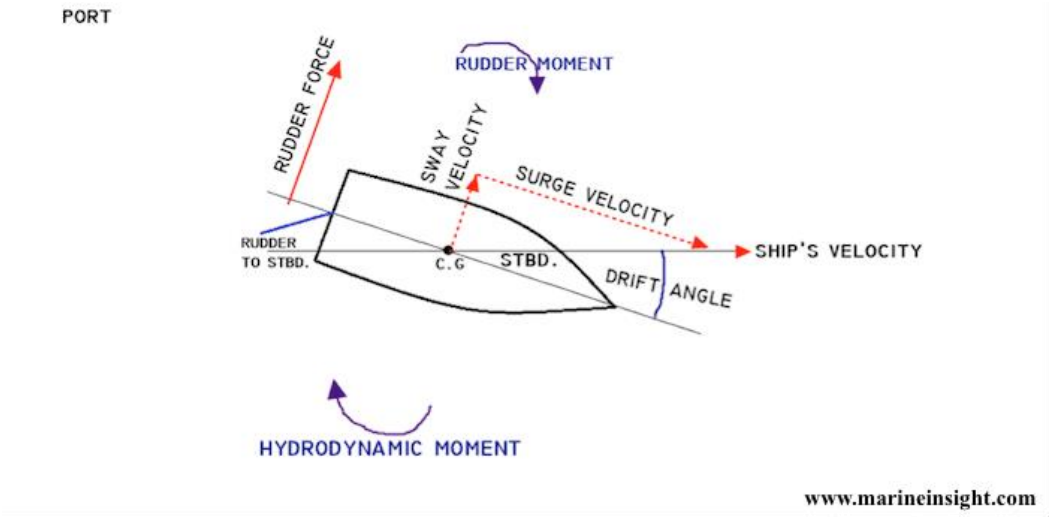
Manual operation:
Pull out the ring pin on mechanical remote manual release and pull hard on handle.



51. Docking plan:

Ans. Prepared by ship and given to yard which shows the strengthened areas of hull for supporting vessel in dock with minimum stess location of sea opening and double bottom tank plugs. Arrangement is made to ensure none of the blocks would cover sea opening, bottom plugs etc.

52. Shell expansion plan:
Ans. Illustrates both side and bottom plating as a continuous whole and shows the numbering of plates and lettering of plate strakes for reference purpose. Plan is essential for describing the location of damage of ship hull. Plan shows boundaries of each shell plate and thickness of each plate in mm.
Frame numbering counting from aft perpendicular as 0, 1, 2 etc. and strakes of plating are named with A, B, C etc. from midship and A being keel plate.




54. Why rudder is not placed in the forward part of ship?
Ans.

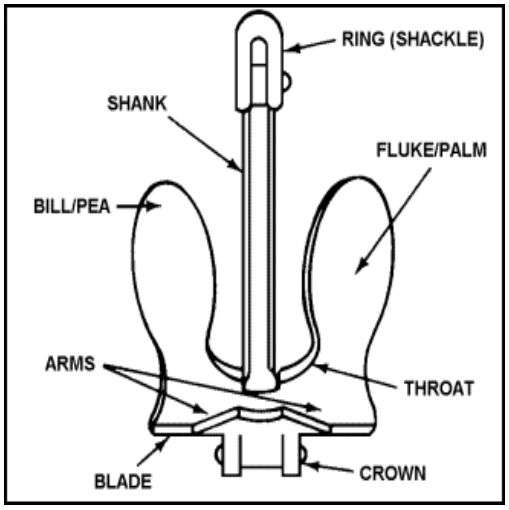
- The rudder, when turned to starboard, creates a force towards the port (which we named, the rudder force). Note the direction of rudder moment that was created about the CG by the rudder force. The direction of the rudder moment was towards the starboard (so as to create a drift angle towards the starboard). Now imagine placing the rudder at the ship's bow. Given a starboard angle to the rudder, the rudder force would still be in the port direction. But what about the moment about CG? Visualise this – The rudder moment would be towards the port causing a drift angle towards the port, and the net hydrodynamic moment would cause the ship to turn to port. Whereas, you turned the rudder starboard for a starboard turn. See the problem?
- There's another reason why rudders are never placed at the bow. It is to protect the rudder from collision damages. But this however, isn't a primary reason. The primary one, is what you just read above.
- Lastly, why is a rudder always placed behind a propeller? Well, the propeller does nothing but increases the velocity of the water that flows out of its slipstream. And the lift generated (rudder force) is proportional to the velocity of water falling on it. So if a rudder is placed at the aft of the propeller, the increased velocity of the propeller outflow results in a greater lift force. It is only for this reason that a rudder is placed aft of the propeller. However, if a rudder is placed just forward of the propeller, it will have the same turning effect with respect to direction, but the magnitude won't be the same, given the fact that the flow on the rudder is not as much as it would have been, had it been placed behind the propeller slipstream.



55. Materials which can be incinerated in incinerators are
    - Wood, cardboard, plastic.
    - Rubber, clothing, oily rag.
    - Paint scraping.
    - Food waste.
    - Sludge oil, lubrication oil (waste oil).
    - Hospital waste.

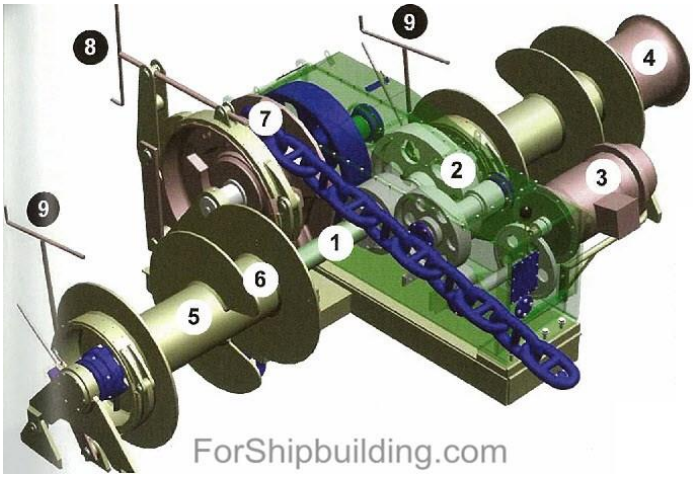
57. Anchor chain construction

Ans.

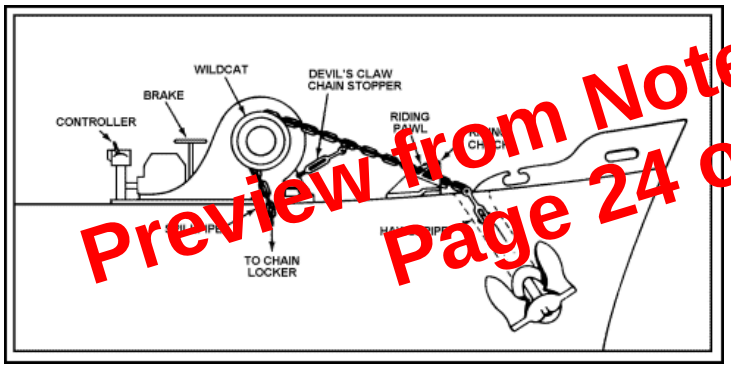




1.crown/ shackle
2. shank
3. flukes
4. crown pin
5. crown plate
6. anchor chain with swivel

- **Ring (Shackle).** Device used to shackle the anchor chain to the shank of the anchor. The ring is secured to the top of the shank with a riveted pin.
- **Shank.** The long center part of the anchor running between the ring and the crown.
- **Crown.** The rounded lower section of the anchor to which the shank is secured. The shank is fitted to the crown with a pivot or ball-and-socket joint that allows a movement from $30^{o}$ to $45^{o}$ either way.
- **Arms.** The parts that extend from each side of the crown.
- **Throat.** The inner curved part of an arm where it joins the shank.
- **Fluke or palm.** The broad shield part of the anchor that extends upward from the arms.
- **Blade.** That part of the arm extending outward below the fluke.
- **Bill or pea.** Tip of the palm or fluke.




1. Main shaft
   2. Gear box
   3. Electric motor
   4. Warping drum
   5. Drum (storage part)
   6. Drum (working part)
   7. Gypsy wheel
   8. Control lever for the band brake






- **Hawsepipe.** Openings in the eyes of forward part of the ship where the shank of the anchor is stowed.
- **Buckler plate.** A heavy steel plate that is "dogged down" by butterfly nuts when the vessel is at sea. The buckler plate covers the hawsepipe opening on deck and prevents water from rushing up the hawsepipe and spilling on deck.
- **Riding chock.** A metal fairlead for the anchor chain. It prevents the chain from fowling on deck and also holds the riding pawl.
- **Riding pawl.** A safety stopper, that works like a rocket on the links of the chain. It is lifted up to the "open" position when the anchor chain is run out. When heaving the chain in, the pawl is "closed" or dropped in the after side of the riding chock. The pawl bounces over the incoming chain. However, if an emergency occurs, such as the

*4*. **The auxiliary steering gear shall be:**

*.1*. of adequate strength and capable of steering the ship at navigable speed and of being brought speedily into action in an emergency;

*.2*. capable of putting the rudder over from 15° on one side to 15° on the other side in not more than 60 s with the ship at its deepest seagoing draught and running ahead at one half of the maximum ahead service speed or 7 knots, whichever is the greater; and

*.3*. operated by power where necessary and in any case when the Administration requires a rudder stock of over 230 mm diameter in way of the tiller, excluding strengthening for navigation in ice.

*5*. **Main and auxiliary steering gear power units shall be**:

*.1*. Arranged to restart automatically when power is restored after a power failure; and

*.2*. Capable of being brought into operation from a position on the navigation bridge. In the event of a power failure to any one of the steering gear power units, an audible and visual alarm shall be given on the navigation bridge.

*6.1*. **Where the main steering gear comprises two or more identical power units, an auxiliary steering gear need not be fitted, provided that:**

*.1*. in a passenger ship, the main steering gear is capable of operating the rudder while any one of the power units is out of operation;

*.2*. in a cargo ship, the main steering gear is capable of operating the rudder while operating with all power units;



*.3*. the main steering gear is so arranged that after a single failure in its piping system or in one of the power units the defect can be isolated so that steering capability can be maintained or speedily regained.

*6.2*. The Administration may, until 1 September 1986, accept the fitting of a steering gear which has a proven record of reliability for a hydraulic system.

*6.3*. Steering gears, other than of the hydraulic type, shall achieve standards equivalent to the requirements of this paragraph to the satisfaction of the Administration.

*7*. **Steering gear control shall be provided:**

*.1*. For the main steering gear, both on the navigation bridge and in the steering gear compartment.

*.2*. Where the main steering gear is arranged, by two independent control systems, both operable from the navigation bridge. This does not require duplication of the steering wheel or steering lever. Where the control system consists of a hydraulic telemotor, a second


66. Hongkong Convention for Safe and Environmentally sound recycling of ships 2009:
    Ans.
    Aim is to make sure ship at the end of operational life when being recycled do not pose any health hazard and affect safety of environment.

67. Green Passport?
    Ans. Document containing List of inventory of all materials potentially hazardous to human health or environment used in construction of ships which would accompany with the ship throughout its life.

68. NOx Technical file?

    Ans.

    Techincal file contain all the details regarding operational parameters including components and setting of engine which influences NOx emission and continued compliance. NOx file must be kept on board and well maintained by ship owner. IAPP compliance requires NOx technical file to be updated and well maintained.
    Technical file contains

    - Operational parameters, identifies components and setting of engine affecting NOx emission.
    - Any changes made on NOx components.
    - On board verification method of NOx compliance.
    - Engine group and Parent engine test data.
        - There are three on board verification procedures which can be used The method used is initially decided by the engine manufacturer, and is usually a specific chapter in the engine's Technical File.
            - Engine parameter check method
            - Simplified measurement method
            - Direct measurement and monitoring method