

ACCIDENTS



DRIFTING

- Bad engine installation
- Bad maintenance of engine
- Lack of trouble-shooting experience
- Lack of fuel



FIRE

- Careless use of open fire
- Bad installation of cooker
- Wrong location of gas bottle



SINKING

- Poor standard of construction
- Bad maintenance



COLLISION

- Lack of navigation and fishing lights
- Lack of radar reflector
- Careless crew



CAPSIZAL

- Poor stability
- Heavy loads on deck
- Water trapped on deck



WORK ACCIDENTS

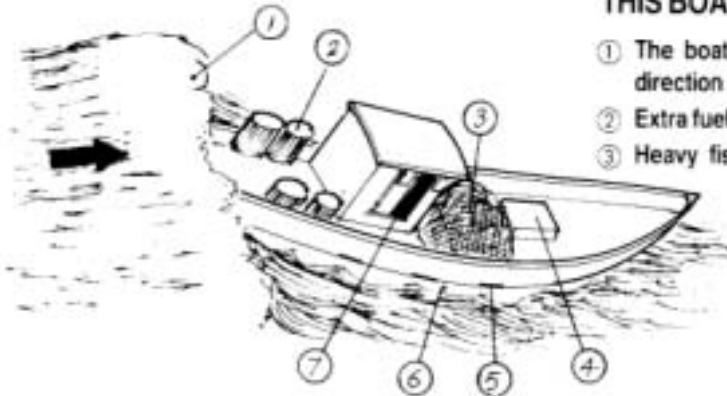
- Slippery decks
- Unprotected deck equipment and machinery
- Tired crew

THESE PEOPLE MUST LIFT TOGETHER TO AVOID ACCIDENTS



AUTHORITY	BOATBUILDER	BOAT-OWNER	BOAT CREW
<ul style="list-style-type: none"> - Regulations for construction and safety equipment 	<ul style="list-style-type: none"> - High quality in construction and equipment 	<ul style="list-style-type: none"> - Caring for good boats and equipment for safety of boat and crew 	<ul style="list-style-type: none"> - Good maintenance and safe operation

THIS BOAT IS IN DANGER OF CAPSIZING



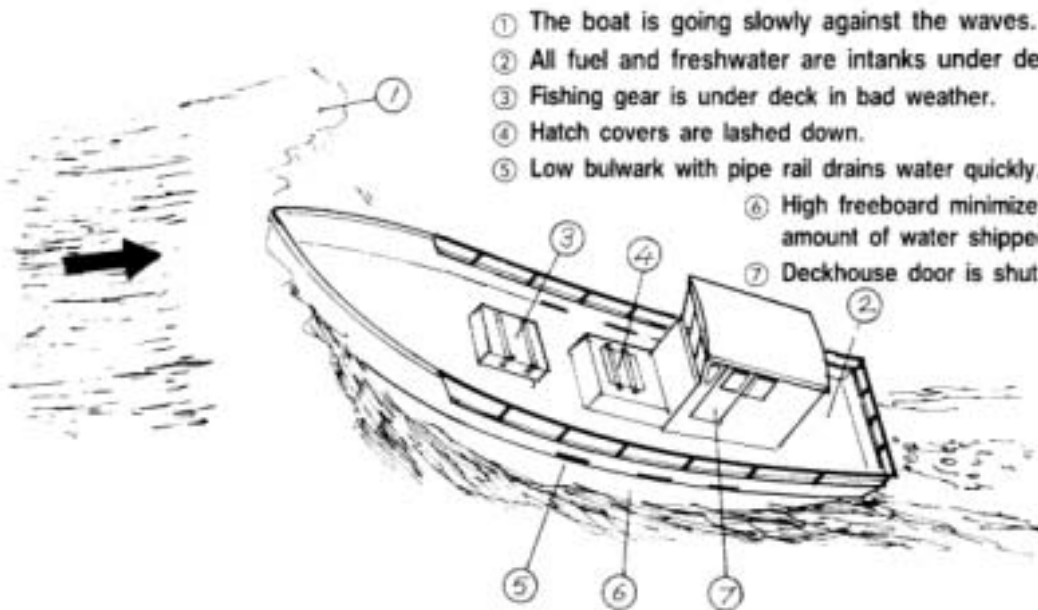
- ① The boat is going full speed in the same direction as the waves
- ② Extra fuel and fresh water are in drums on deck.
- ③ Heavy fishing gear is on deck.
- ④ Hatch covers are not lashed.
- ⑤ Freeing ports are small.
- ⑥ Freeboard is low.
- ⑦ Deckhouse door is open.

The boat is likely to be thrown broadside to the waves and the fishing gear and drums are likely to slide over the bulwark.

The boat is then likely to capsize with the next large wave.

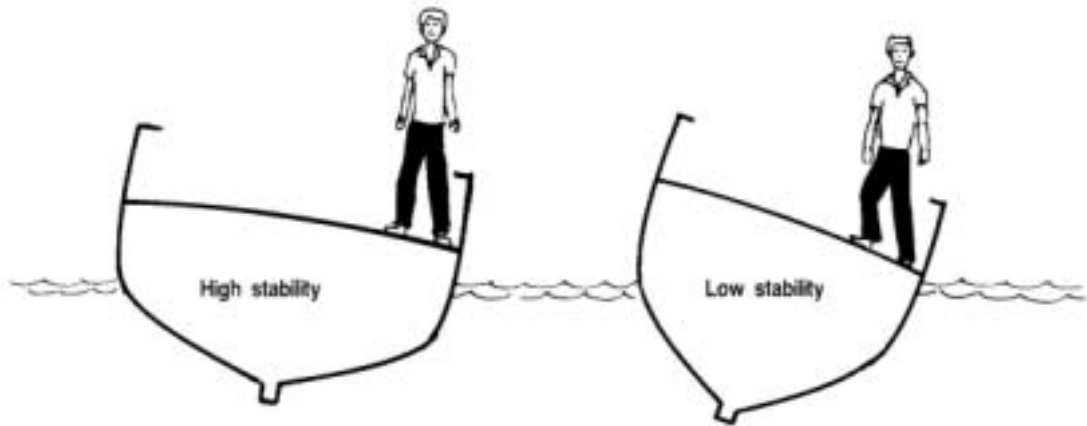


THIS BOAT IS BETTER PREPARED AGAINST CAPSIZING



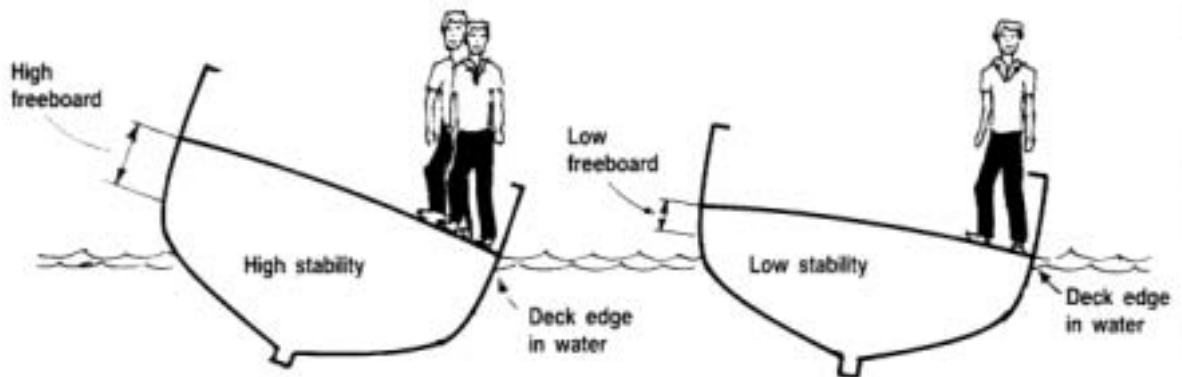
- ① The boat is going slowly against the waves.
- ② All fuel and freshwater are in tanks under deck.
- ③ Fishing gear is under deck in bad weather.
- ④ Hatch covers are lashed down.
- ⑤ Low bulwark with pipe rail drains water quickly.
- ⑥ High freeboard minimizes the amount of water shipped in.
- ⑦ Deckhouse door is shut.

BEAM

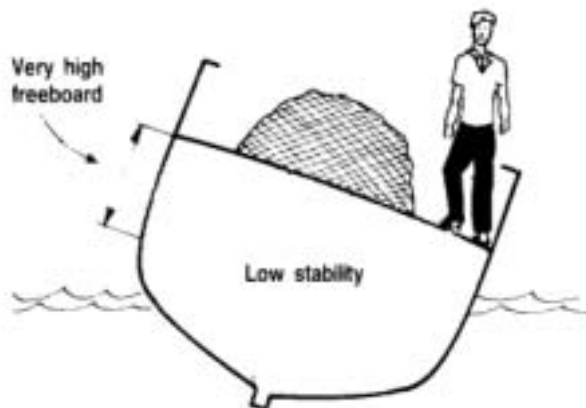


When you walk to one side of a broad-beamed boat, it will not heel over as much as a narrow boat. We, therefore, say a beamy boat has more stability.

FREEBOARD



Comparing two boats with the same beam but different freeboards, the one with the higher freeboard has more stability and is able to take more people at the deck edge before the deck touches the water.



The freeboard is, thus, very important for the safety of a fishing boat. However, if it is increased too much, the boat will lose stability more quickly than a boat with less freeboard. This will happen if heavy fishing gear is put on deck. So, a compromise has to be found to select the optimum freeboard.

HOW TO CHECK THE STABILITY

4

1. MINIMUM FREEBOARD

Measured with maximum load on board

Minimum $f=200\text{mm}$ $F=17 \times \text{LOA} + 700(\text{mm})$
 LOA = Length over all (in m)



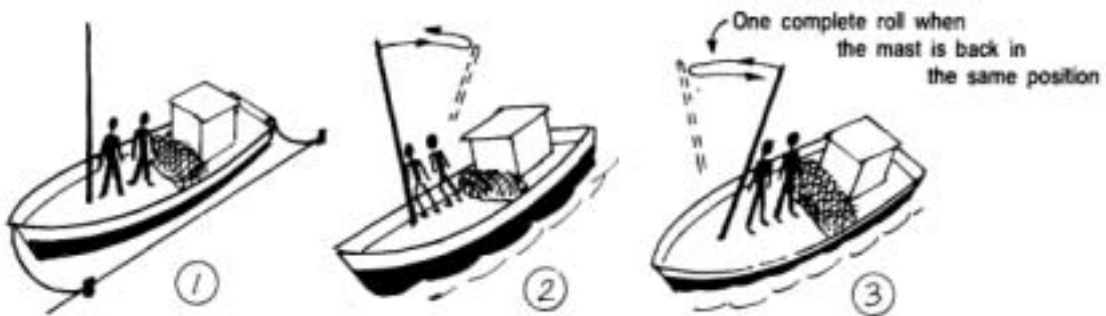
B is measured inside fenders

2. MAXIMUM ROLLING PERIOD

The rolling period, measured in seconds, is an indication of the boats' stability. Comparing two boats with the same beam, the one with the lower rolling period is more stable. The maximum rolling period acceptable for good stability is dependent on the beam and the freeboard of the boat. It is given in the table below.

It is based on the formula: $Tr = \frac{K \times B}{\sqrt{GM}}$

(where $K = 0.8$, Minimum $GM = 0.60 + 0.05B - 0.25f$)



How to measure the rolling period

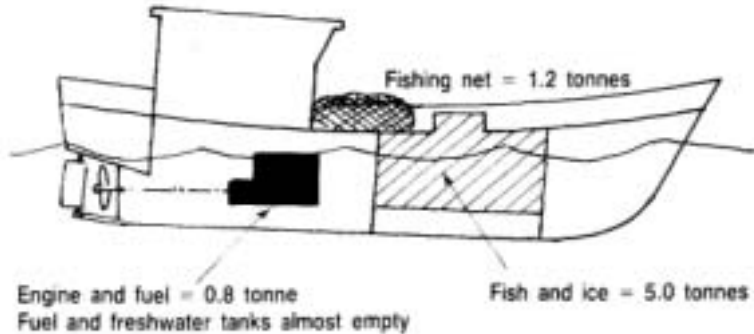
- Ⓐ The fish-hold must be empty but the boat must carry a normal amount of fuel and freshwater. The fishing gear and crew must be on deck. The boat must be away from the quay with the mooring lines slack.
- Ⓑ Start the boat rolling by making the crew run from side to side.
- Ⓒ When the boat is rolling freely, stop the crew amidships quickly and start the stopwatch when the mast is furthest to one side. Count five rolls and take the time. Divide this time by 5 to get the time for one roll. Repeat the same procedure three times and calculate the average time for one roll. Measure freeboard = f (mm) and beam = B (m). If the *measured rolling time is less than what is shown in the table below*, the stability is acceptable.

NOTE: This is only a check. If possible, a complete stability investigation should be done by a naval architect.

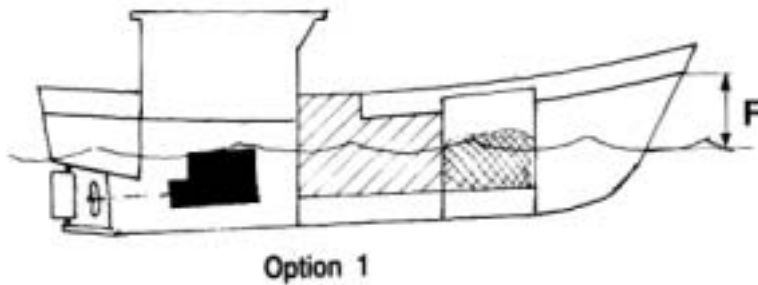
		BEAM "B" (in metres)										
		2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	4
		ROLLING PERIOD (in seconds)										
FREEBOARD "f" in mm	200	2	2.2	2.4	2.5	2.7	2.9	3.1	3.2	3.4	3.5	3.7
	400	2.1	2.3	2.5	2.6	2.8	3	3.2	3.3	3.5	3.7	3.8
	600	2.2	2.4	2.6	2.7	2.9	3.1	3.3	3.4	3.6	3.8	4
	800	2.3	2.5	2.7	2.9	3.1	3.3	3.4	3.6	3.8	4	4.2

GENERAL ARRANGEMENT

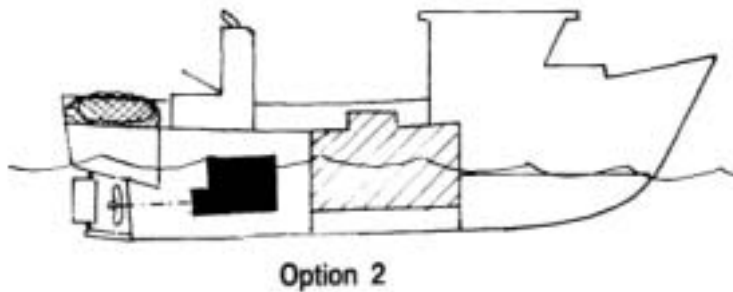
Example: 10 m driftnetter with heavy load of fish and ice



Fish-hold is too far forward. Boat is trimming by the bow and will be dangerous in rough seas. Heavy fishing gear (net) on deck gives poor stability.

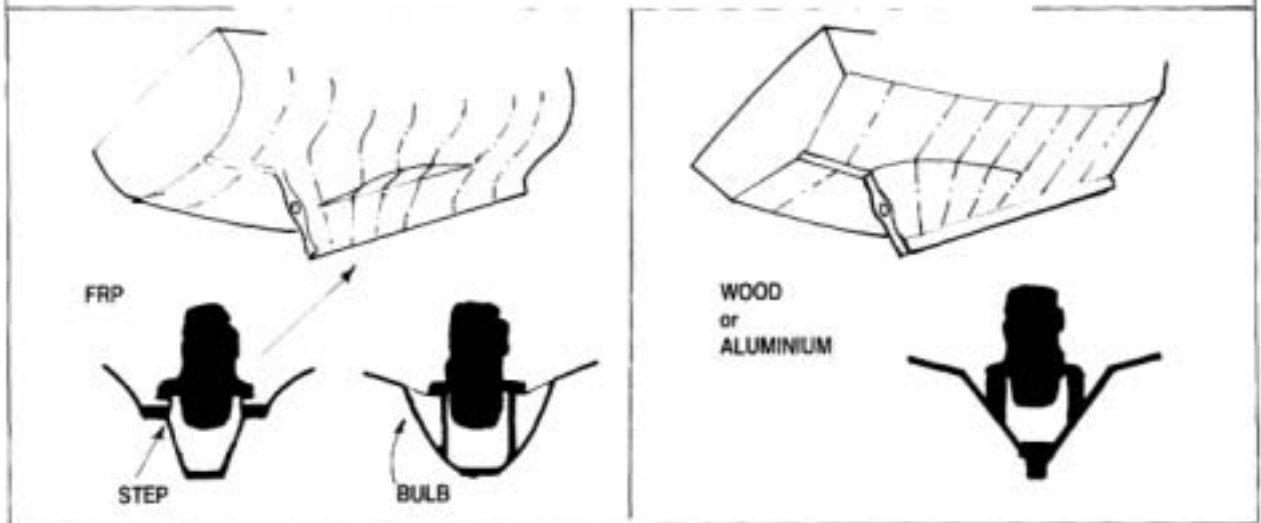


Fish-hold is amidship. Net is in fishing gear-hold during rough weather. Freeboard (F) at the bow should be at least equal to $17LOA + 700 \text{ mm}$ ($LOA = 10 \text{ m}$, $F = 870 \text{ mm}$) for acceptable safety

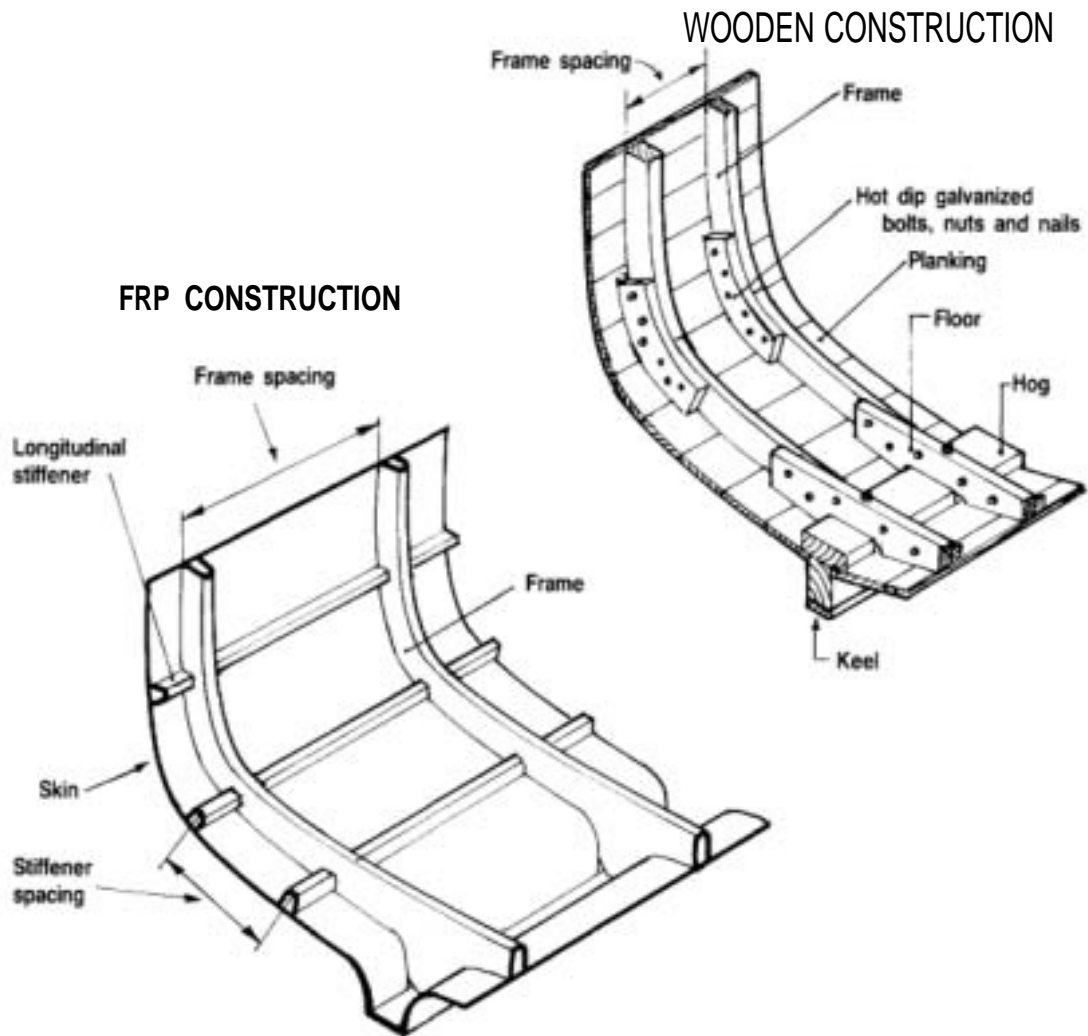


Deckhouse is forward. Access to engine is through a hatch with a high coaming on side. (Engine can be removed through a flush hatch bolted to deck.)

CHANGE OF HULL SHAPE TO MOVE ENGINE AFT



Shown below are the parts of the hull that give strength to a boat. It is advisable that the thickness and width of these parts is according to the rules of an internationally recognized classification society.

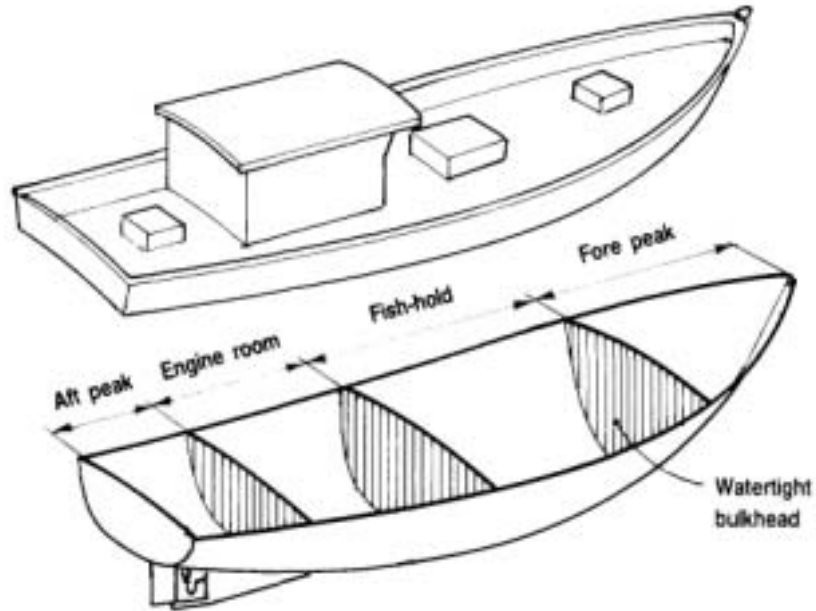


The following classification societies have rules for fishing boats under 12 m (40 ft) length:

- Sea Fish Industry Authority
Sea Fisheries House, 10 Young Street, Edinburgh EH2 4JQ, U.K.
- Det Norske Veritas
Postbox 300. 1322 HOVIK, Norway
(Nordic rules for boats under 15 m - 45 ft. length)

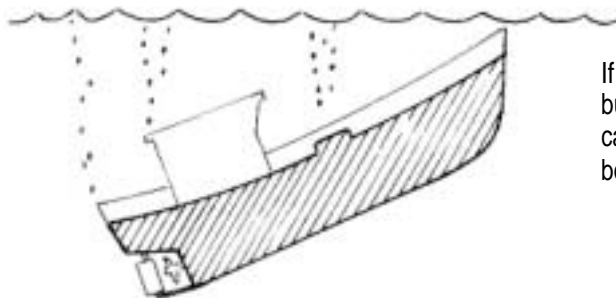
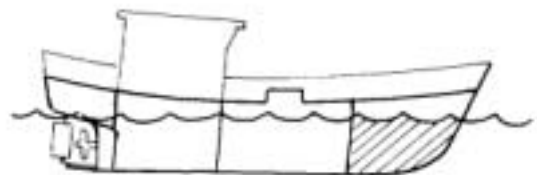
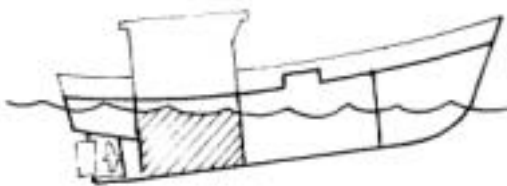
WATERTIGHT BULKHEADS

If a heavy leak develops, watertight bulkheads that divide the boat into compartments will prevent flooding of the whole boat. In a wooden boat, it is difficult to make the bulkheads watertight. In FRP boats, watertight bulkheads can be installed at little extra cost.



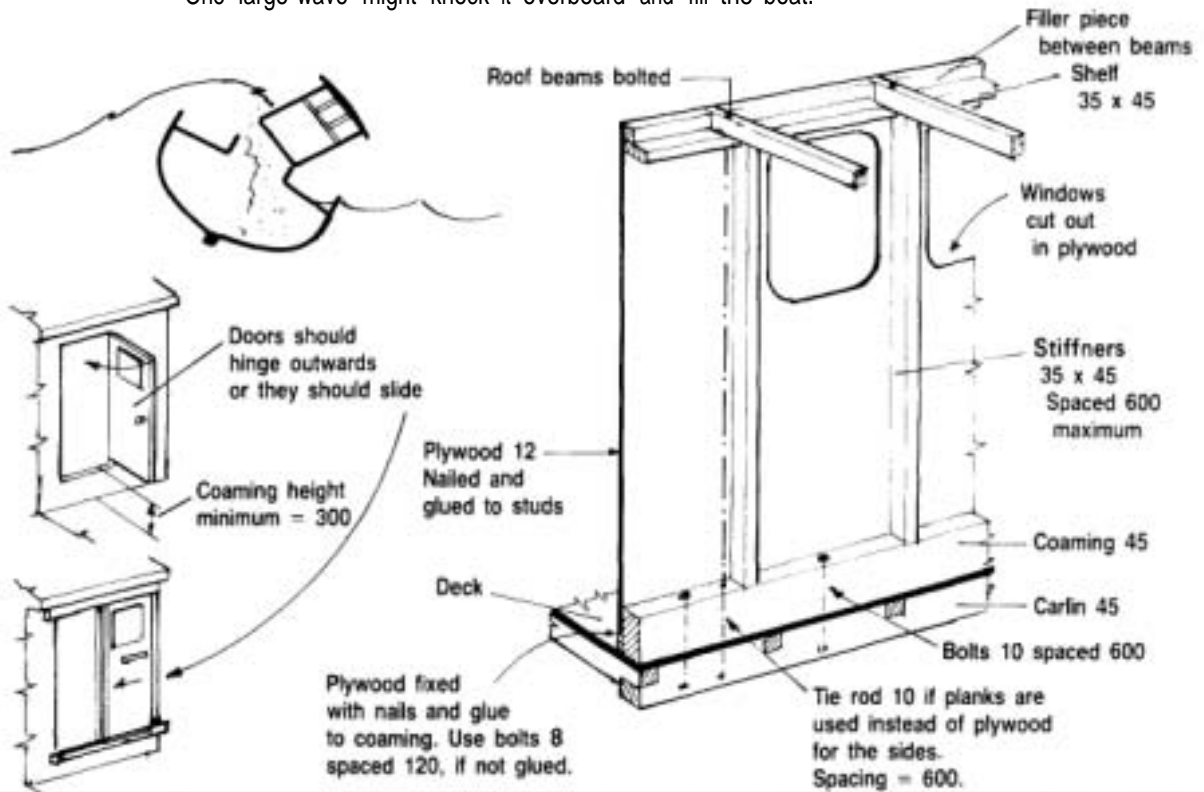
Leaks in the engine room are often caused by a corroded seacock, damaged seawater hoses, poor quality and installation of wet exhaust hose and a faulty stuffing box in the stern tube. If the buoyancy of the aft peak is sufficient, the boat will float.

A collision with a boat, a log or a rock could lead to flooding of the boat. A forward watertight bulkhead will prevent flooding of the whole boat.



If the boat has no watertight bulkheads and if the bilge pump cannot cope with the leak, the boat will certainly sink.

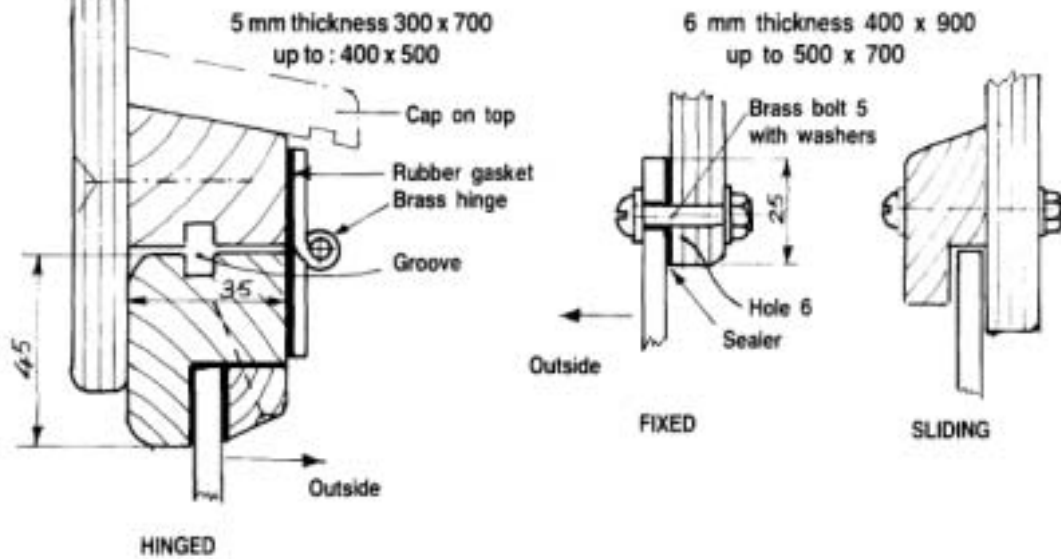
The deckhouse is often the weakest part of a boat.
One large wave might knock it overboard and fill the boat.



WINDOWS

Windows should be fixed outside the plywood for adequate strength.
Window panes should be made of safety glass, as used in automobiles, acrylic (Perspex) or polycarbonate.

The thickness should be according to window size (mm)



FREEING PORTS

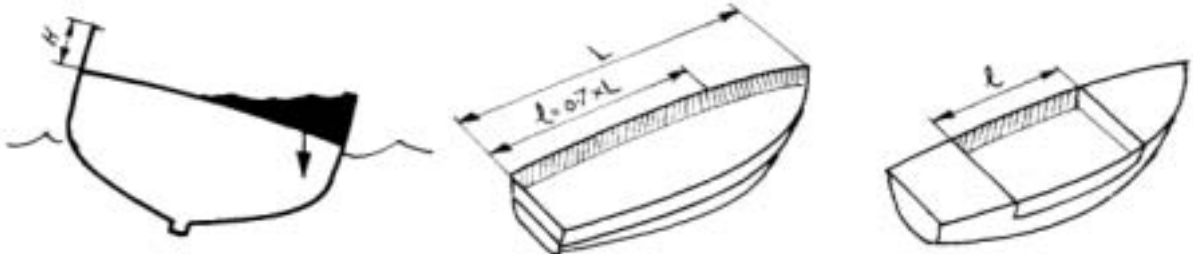
Why are freeing ports required?



When a big wave breaks on the deck, leaves it awash and does not drain quickly, the boat may capsize, depending on the amount of water left on the deck. The purpose of providing freeing ports is to drain the water quickly.

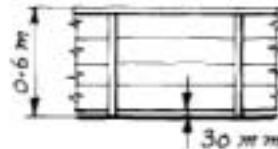
The amount of water trapped will increase with the height of the bulwark (H)...

...and the effective length (l) of the bulwark = 0.7 x L



The area of freeing ports on one side should be : $A = 0.04 H l$ in m^2 (H, l in m)

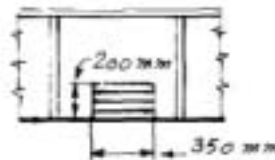
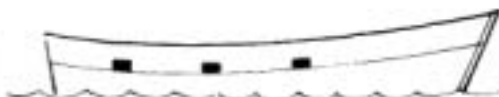
EXAMPLE : Boat L = 10.0 m, H = 0.6 m. Freeing port area: $A = 0.04 \times 0.6 \times 0.7 \times 10 = 0.17 m^2$



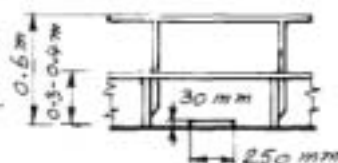
On a wooden boat, a gap of 30 mm will provide enough freeing port area.



A better way is to provide a gap of 10-15 mm between the bulwark planks.



Large freeing ports must have a grid to prevent fish on deck sliding overboard.



The best system is to have a low bulwark with a galvanized pipe rail.

WEATHERTIGHT HATCHES

A corked empty bottle will float as long as its cork is in place



Take the cork out and it will sink



A boat will float as long as its deckhouse is strong and weathertight and the hatch covers are lashed down



If the hatch covers are not secured the boat will fill and sink



Hatch cover washed away.

AN EXAMPLE OF A HATCH COVER LASHING FOR AN INSULATED FISH-HOLD THAT WILL NOT SNAG FISHING GEAR

