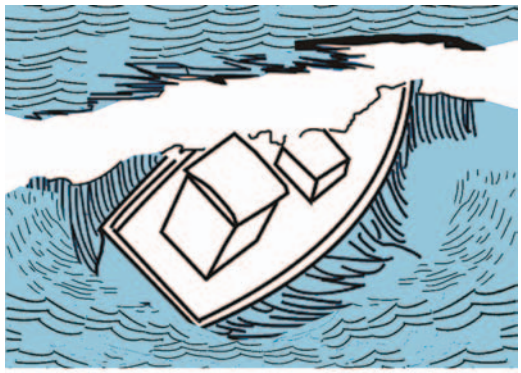
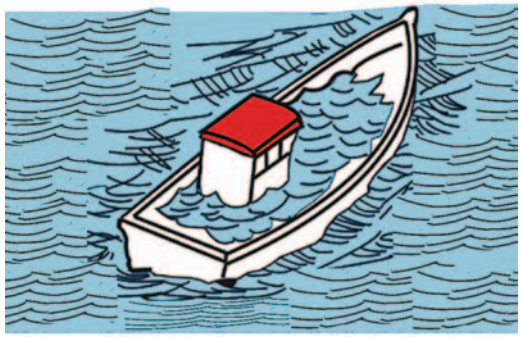
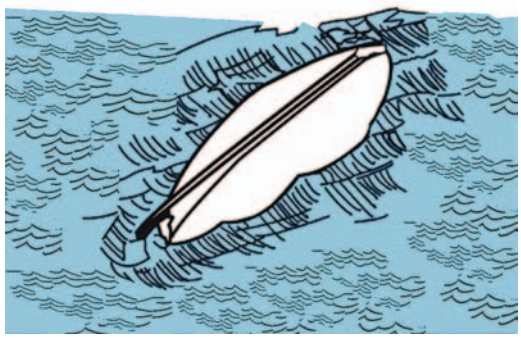
FREE SURFACE EFFECTS



Care should always be taken to ensure the quick release of water trapped on deck. Locking freeing port covers is dangerous. If locking devices are fitted, the opening mechanism should always be easily accessible. Before vessels depart into areas subject to icing, freeing port covers, if fitted, should be kept in the open position or removed.



When the main deck is arranged for carrying deck loads with dividing pound boards, there should be slots of suitable size between the boards to allow an easy flow of water to the freeing ports, thus preventing the trapping of water.



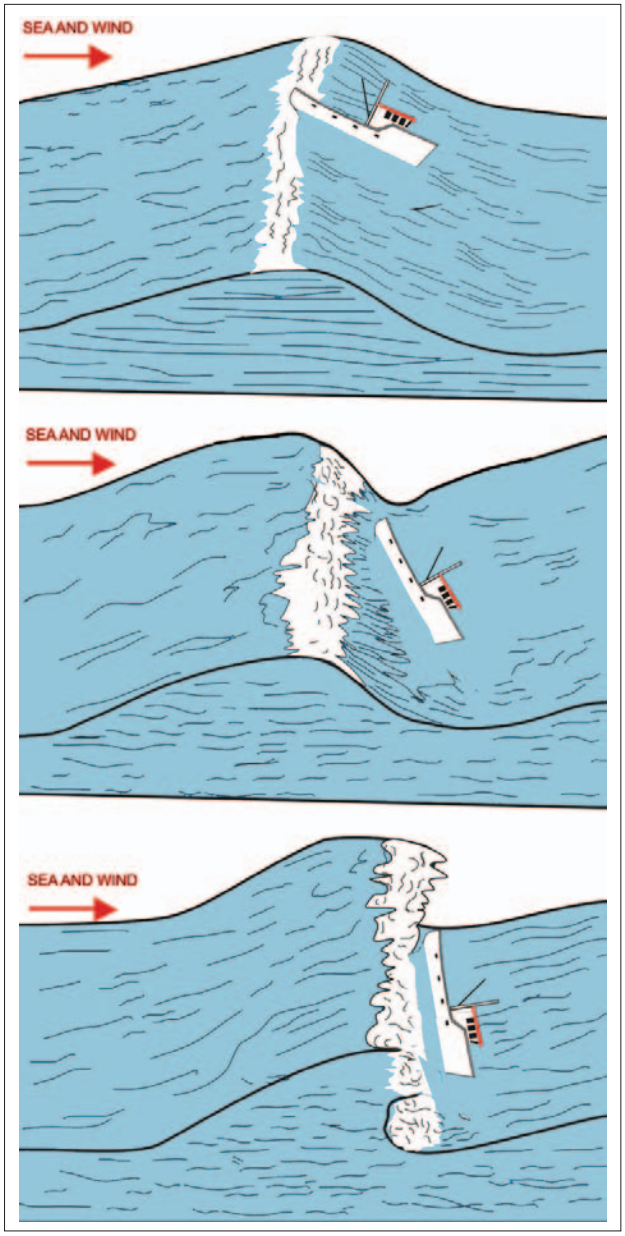
Partially-filled (slack) tanks can be dangerous; the number of slack tanks should be kept to a minimum.

Care should be taken when empty fish boxes are carried on the weather deck as water may become trapped in them and this will reduce the vessel's stability and increase the risk of capsizing.

FREEBOARD

Care should be taken to maintain adequate freeboard in all loading conditions and, when applicable, load line regulations should be strictly adhered to at all times. By reducing the freeboard, the values of the righting lever (**GZ**) will be smaller. The point of vanishing stability will also be at a smaller angle of heel, i.e. the vessel's ability to return to upright from large angles of heel will be less.

FOLLOWING AND QUARTERING SEAS



The crew should be alerted to all the dangers of following or quartering seas. Stability can be considerably reduced when the vessel is traveling at a similar speed and direction as the waves. If excessive heeling or yawing (change of heading) occurs, the speed should be reduced and/or the course changed.

CROSSING SAND BARS AND BEACH LANDINGS[1]

Operation of vessels from unprotected beaches requires special skills and special care should be taken in surf zones.

General

- Prior to crossing a bar, always contact the local authority for an update on conditions at the bar.
- Do not attempt to cross any bar without experience or local knowledge. Obtain advice from a local skipper or from the coastguard. Cross the bar with other experienced skippers before trying it yourself.
- Know the times of the tides and obtain an up-to-date weather forecast.
- Check the steering and throttle and gear controls and ensure that all watertight hatches are closed and scuppers are cleared before attempting to cross the bar.
- Secure all loose items of gear and equipment on board.
- Ensure that all crew are briefed and wearing lifejackets and that a sea-anchor is ready to be deployed in an emergency, if required.
- Once committed, keep going because trying to turn around in the middle of a bar can be dangerous.
- It is always preferable to cross on a slack or incoming tide and in daylight.
- Ensure that any other vessel is well clear of the bar before attempting to cross.

[1] Based on Part A of the FAO/ILO/IMO Code of Safety for Fishermen and Fishing Vessels, 2005

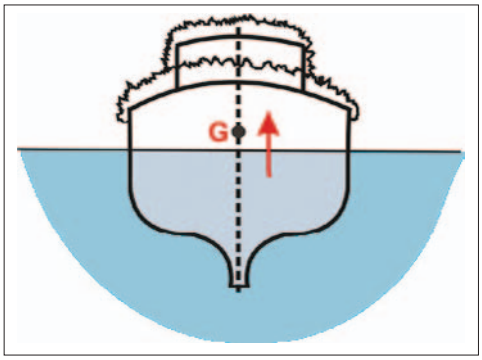
Proceeding to sea

- Request permission prior to leaving the port and inform the local authority of the time of the expected return of the vessel and the number of crewmembers aboard. The port authority should inform the vessel of any information relevant to the weather conditions and of any recent changes to the bar or expected weather conditions.
- Should the conditions for the exiting port deteriorate, identify an alternative port and ensure that there is enough fuel and supplies on board to undertake such an alternative plan.
- Ensure that all safety equipment required by the competent authority is on board and is fit for use.
- In crossing the bar, idle towards the breaking waves watching carefully for any lull. If a flat period occurs, apply the throttle and run through.
- If the waves keep rolling in, move to the surf zone and accelerate over the first wave and apply more power to run to the next wave.
- The outgoing vessel should meet the incoming wave energy at a moderate speed, because at high speed a vessel can become airborne, which can cause damage and loss of control. At a low speed the waves can break on board the vessel or the vessel can broach. Aim the vessel for the lowest part of the wave which will be the last to break and cross the wave at an angle of no more than 10°.
- Back off the power just before contact with the swell and as you come through or over the breaking wave accelerate again and repeat the process until clear.

Heading back to port

- Vessels should request permission to enter the port and the local port authority should advise of any changes to the bar.
- Approaching from the sea, increase the power of the vessel to catch up with the bigger set of waves.
- Position the vessel on the back of a wave and on no account attempt to surf down the face of a wave.
- Adjust the vessel's speed to match the speed of the waves and do not attempt to overtake the waves, nor allow the breaker behind to overtake you.
- If your vessel is not capable of keeping up with the incoming waves, then you will need to let the waves run under your vessel. It may be necessary to slow your vessel or use a sea-anchor to maintain steerage and avoid broaching in a following sea.

ICING



Icing significantly reduces the stability of the vessel.

Icing will increase the displacement of a vessel and reduce the freeboard. The centre of gravity **(G)** will rise and the metacentric height **(GM)** will decrease, causing a reduction in the stability of the vessel. Icing also leads to an increase of windage area due to ice formation on the upper parts of the vessel and, hence, an increase in the heeling moment due to the action of the wind.

Some causes of ice formation:

- deposit of water droplets on the vessel's structure: these droplets come from spray driven from wave crests and from vessel-generated spray;
- snowfall, sea fog including arctic sea smoke, a drastic fall in ambient temperature, as well as from the freezing of rain drops upon impact with the vessel's structure;
- water shipped on board and retained on deck.

Listen for weather forecasts and warnings of the possibility of ice accretion; such areas should be avoided if possible.

If in spite of all measures taken the vessel is unable to leave the dangerous area, all means available for removal of ice from the vessel should be used while it is subjected to ice formation.

The ice from large surfaces of the vessel should be removed, beginning with the upper structures – even a small amount of ice in these areas will cause a drastic worsening of the vessel's stability. Ice should be removed from the freeing ports and scuppers as soon as it appears in order to ensure free drainage of water from the deck.

When the distribution of ice is not symmetrical and a list develops, the ice should be removed from the lower side first. Bear in mind that any correction of the list of the vessel by pumping fuel or water from one tank to another may reduce stability during the process when tanks are slack.

DETERMINING STABILITY OF SMALL VESSELS WITH ROLLING PERIOD TESTS

As a supplement to the approved stability information, the initial stability can be determined approximately by means of a rolling period test.

Vessels with a high initial stability are "stiff" and have a short rolling period; while vessels with a low initial stability are "tender" and have a long rolling period.

The following describes a rolling period test which can be performed at any time by the crew of a small vessel.

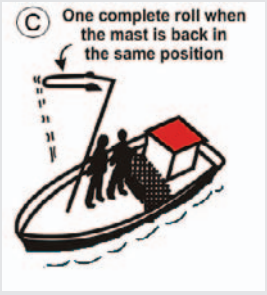
Test procedure

- The test should be conducted in smooth water with the mooring lines slack and the vessel "breasted off" to avoid making any contact with any vessel or harbour/port structure during the rolling test. Care should be taken to ensure that there is a reasonable clearance of water under the keel and the sides of the vessel.

- The vessel is made to roll. This can, for example, be done by crew running together from one side of the vessel to the other. As soon as this forced rolling has commenced, the crew should stop and place themselves amidships and the vessel allowed to roll freely and naturally.

- Timing and counting the oscillations should begin only when it is judged that the vessel is rolling freely and naturally and only as much as it is necessary to accurately time and count these oscillations (approximately 2°-6° to each side).

- With the vessel at the extreme end of the roll to one side (say port) and the vessel about to move toward the upright, one complete oscillation will have been made when the vessel has moved right across to the other extreme side (i.e. starboard) and returned to the original starting point and is about to commence the next roll.



- Using a chronometer, times should be taken for at least four complete oscillations. Counting should begin when the vessel is at the extreme end of a roll.
- After the roll completely fades, this operation should be repeated at least twice more. Knowing the total time for the total number of oscillations made, the time for one complete oscillation, say T seconds, can be calculated.

Determining whether the initial stability is sufficient

- If the calculated value of T, in seconds, is less than the breadth of the vessel, in metres, it is likely that the initial stability is sufficient, provided that the vessel carries full fuel, stores, ice, fishing gear, etc.

- The rolling period T usually increases and the vessel becomes "tenderer" as the weight of fuel, stores, ice, fishing gear, etc. decreases. As a consequence, the initial stability will also decrease. If the rolling period test is conducted under such circumstances it is recommended that, for the estimate of the initial stability to be considered satisfactory, the calculated value of T, in seconds, should not be more than 1.2 times the breadth of the vessel, in metres.

Limitations to the use of this method

This method may not be applicable to vessels with a hull shape that dampens the rolling, for example vessels with large bilge keels or vessels of an unconventional design, such as high-speed fishing vessels.