

Fishing vessel stability: Reducing the risk of capsizing and lives lost

In commercial fishing, loss of vessel stability increases the risk of capsizing and has led to many serious injuries and fatalities. This bulletin covers the key factors that affect vessel stability, the responsibilities of owners and masters, and safe work practices that can reduce the risk of capsizing.

Loss of vessel stability is one of the main hazards in commercial fishing. If stability is compromised, a vessel can founder or capsize in minutes.

Factors that can negatively affect vessel stability

- **Modifications** such as the following:
 - Changes to the gear type or fishery
 - Changes to the hull design
 - A larger drum or a raised drum for more deck clearance
 - Heavier nets
 - Larger winches
 - Extended stern ramps
 - Holds converted from dry to wet stowage
 - Weights added high on the mast or the superstructure
 - Changing from a dead skiff to a power skiff
 - A full load of traps on or above deck
 - Adding live tanks
- **Weight creep**, which can happen over time as equipment, spare parts, stores, and fishing gear accumulate.
- **Side loading**, which means lifting any load from a vessel's port or starboard side. (See Figure 1.)

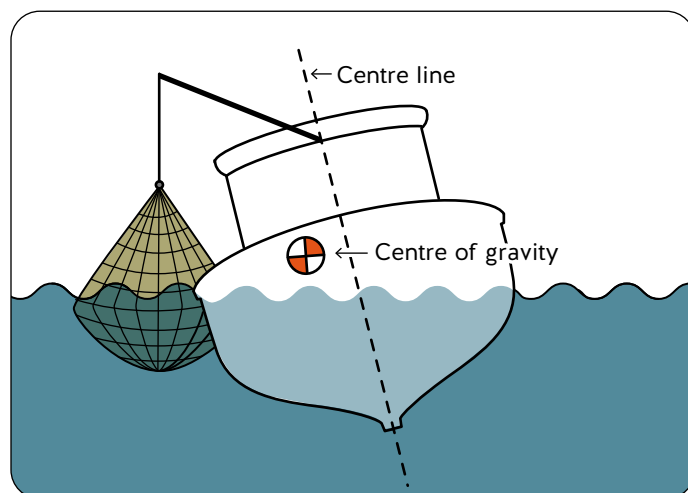


Figure 1. Lifting loads (e.g., fish or gear) from the port or starboard side can increase the risk of capsizing by shifting the boat's centre of gravity to the lower side of the vessel.

- **Extreme trim**, when weight is loaded at the stern or bow.
- **Added weight** when drying up a set or when travelling with skiffs on the stern, a net on the drum, or punts on board.
- **Reduced freeboard** — *Freeboard* is the distance between the waterline and the vessel's working deck. Adequate freeboard is crucial for stability. Reduced freeboard can occur due to the loading of fish, extra gear on board, and vessel modifications. (See Figure 2.)

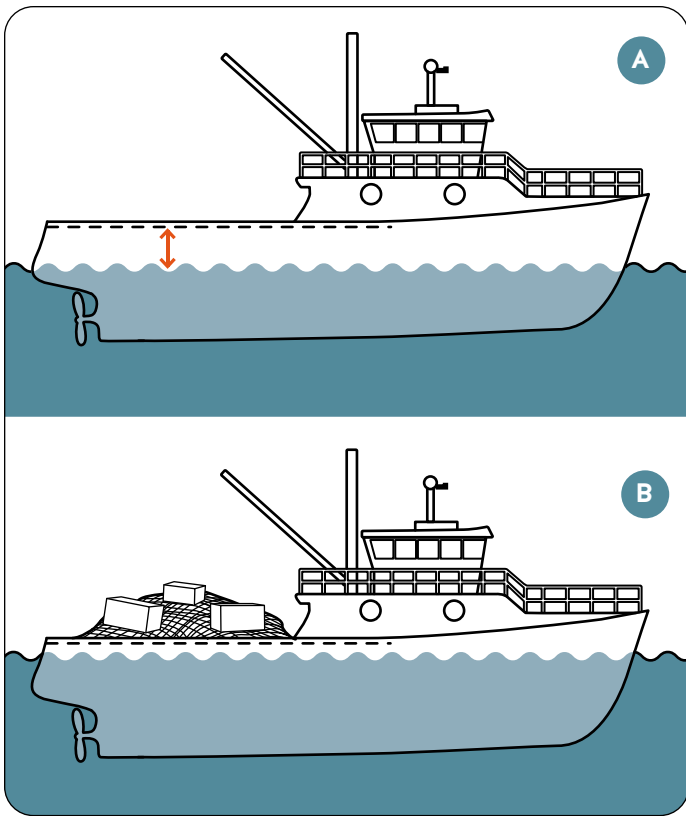


Figure 2. A vessel with adequate freeboard (A) and a vessel with reduced freeboard (B). Reduced freeboard increases the risk of capsizing.

- **Slack tanks and the free surface effect** — *Free surface* means there is freely moving liquid or cargo (fish) aboard a vessel. Free surface can shift a boat's centre of gravity. This reduces the boat's ability to right itself and increases the risk of capsizing. Slack (partly filled) tanks contribute to this effect. (See Figure 3.)
- **Loss of watertight integrity** — Water entering the hull or void spaces decreases freeboard and increases the free surface effect. Potential down-flooding points include doors, hatches, fish holds, and portholes.

Responsibilities

Many regulatory aspects of vessel stability, including construction standards and stability assessment requirements, fall under federal jurisdiction (Transport Canada). Some regulatory aspects, such as those listed below, fall under provincial jurisdiction (WorkSafeBC).

Under the *Workers Compensation Act*, owners and masters of fishing vessels are considered employers for the purposes of occupational health and safety. Responsibilities are shared between owners and masters.

Owners

The vessel owner must ensure the following:

- Any major modifications to the vessel do not adversely affect its stability.
- There is stability documentation on board. It must be readily accessible to the master and crew members and easy to understand.
- The vessel has the required sensors and alarms.

Masters

Masters are responsible for the safety of everyone on board and for the safe operation of the vessel and equipment. They must do the following:

- Ensure that the required equipment and supplies are on board and properly secured.
- Ensure the seaworthiness of the vessel.
- Properly stow and secure cargo, supplies, and equipment.
- Ballast the vessel.

Safe work practices

Masters are responsible for ensuring that safe work practices are in place. Examples of safe work practices include the following.

General

- Minimize slack tanks, lower the boom, and ensure weights (such as nets) are kept low.
- Be aware of current and forecast weather conditions.
- Keep fish holds closed and secured when they are not essential to the fishing operation.
- Ensure crew members know the characteristics of vessel stability and report conditions that could affect stability.

- Take an inventory, and periodically remove any equipment, gear, or other items that are not essential to the fishing operation.

Reduce the free surface effect

- Keep freeing ports (scuppers) clear to allow water to quickly drain from the deck.
- Avoid slack fish holds whenever possible, especially when in transit or when loading over the side. Fish holds should be either fully pressed or completely empty. (See Figure 3.)

Maintain watertight integrity

- Check doors, windows, and hatch covers regularly to ensure watertight integrity.
- Keep deck openings closed and secured except when they are being used.
- Inspect and maintain hatches according to the manufacturer's recommendations. Single crossbar-type manhole covers are susceptible to failure. This can result in leakage, down-flooding, and loss of stability.

Record and report modifications

- Record modifications to the vessel on Transport Canada's [Fishing Vessel Record of Modifications Affecting Stability](#) form. (For more information on this form, see [Ship Safety Bulletin No. 3/2019](#).)
- Major modifications or a series of modifications to a vessel can have a negative effect on its stability and should be reported to Transport Canada. Transport Canada defines a *major modification* as one that "substantially changes the capacity or size of a fishing vessel or the nature of a system on board a fishing vessel that affects its watertight integrity or its stability."
- If you are not sure whether any modifications have affected the stability of your vessel, contact Transport Canada.

OHS Regulation requirements

- [Section 24.71, Owner and master responsibilities](#)
- [Section 24.72, Documentation](#)
- [Section 24.76, Vessel preparation](#)

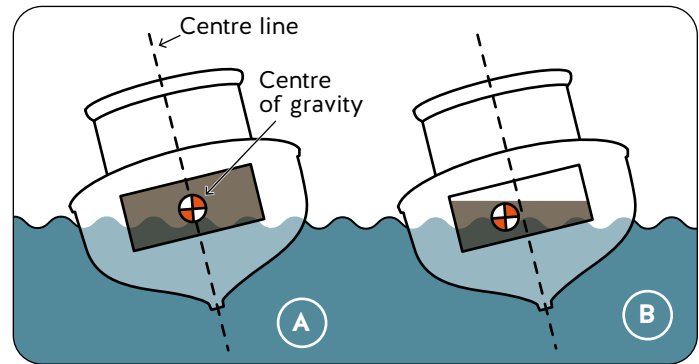


Figure 3. A vessel with fully pressed tanks (A), and a vessel with partly full or slack tanks (B). Slack tanks contribute to the free surface effect, which increases the risk of capsizing by shifting the centre of gravity.

- [Guideline G24.70, Compliance with standards](#)
- [Guideline G24.71, Owner and master responsibilities — Major modifications](#)
- [Guideline G24.72, Documentation](#)

For more information

The following resources are available on worksafebc.com:

- [Fish Harvesting Alert: Vessels Capsizing and Lives Lost](#)
- [Commercial Fishing](#)

See also the following Transport Canada resources:

- [TP 15392E — Guidelines for Fishing Vessel Major Modification or a Change in Activity](#)
- [TP 15393E — Adequate Stability and Safety Guidelines for Fishing Vessels](#)

Illustration credits

Figure 1 was adapted from [TP 15393E — Adequate Stability and Safety Guidelines for Fishing Vessels](#), produced by Transport Canada. Figures 2 and 3 were adapted from [TP 10038 E \(2003\) — Small Fishing Vessel Safety Manual](#), produced by Transport Canada. These adaptations were not produced in affiliation with, or with the endorsement of, Transport Canada.