Contents

INTRODUCTION

The skipper's general safety obligations (GSO)

- All boat owners and operators are responsible for safety and therefore should assess boating risks.

  The most important maritime safety principal is for operators to meet the "general safety obligation" or GSO, which encourages boat owners to achieve the highest level of safety.
- Operators can achieve this obligation by ensuring their boat is;
  - safe,
  - properly equipped and crewed and
  - operated in a safe manner.

Examples

Ensuring the boat is safe

- Suppose a boat is overloaded and swamped by a freak wave and a passenger drowns. The law may find the operator negligent, declaring the boat was unsafe as it was unstable with so many people on board.

Ensuring the boat was properly equipped and crewed

- If passengers have never been in a boat before, it is the skipper's responsibility to show them how to use safety equipment and how it is used. The skipper could be prosecuted if someone drowns and it could be proven in court that no safety briefing was done.

Ensuring the boat is operated in a safe manner

- If a boat is lost for a period of time and it is shown the skipper was unable to read a chart, plot compass bearings and use a compass, that person may be found to have operated unsafely.

Risks with using boats

If you are going to undertake safe boating you need to understand the hazards and methods used to control these risks.

Hazards

A hazard is something with the potential to cause harm. Hazards that may be encountered in handling small power craft involve:

- the water (tides, waves, currents, turbulence, depth, distance)
- the waterway (buoys/beacons, channels, bottom obstructions, nearby bar, flooding or strong currents after rain, other boats)
- the engine (moving parts, hot exhausts, propeller)
- the fuel (mixing, spills, fire, explosion)
- the boat (loose equipment, sharp edges, rocking/rolling, sun heated metal seats)
- the boat trailer (winch, wheels, towing vehicle)
- the boat ramp (slippery, rocks, broken glass, other boats)
- dangerous marine creatures (crocodile, stingers, oysters)
- the environment (sun, wind, radiation, glare)

Some hazardous situations that could develop are outlined below.

LIKELIHOOD	CONSEQUENCES				
	Insignificant	Minor	Moderate	Major	Severe
Almost certain	Medium	High	High	Very High	Very High
Likely	Medium	Medium	High	High	Very High
Possible	Low	Medium	High	High	Very High
Unlikely	Low	Low	Medium	Medium	High
Rare	Low	Low	Medium	Medium	Medium

Figure 4.1 One type of risk assessment table

Risks

Risk is the likelihood that harm will occur from exposure to the hazard. Figure 4.1 shows a table that is commonly used to determine the risk as either low, medium, high or very high, (note that some tables add extreme).

Control measures *(safety precautions)*

Control measures or safety precautions are actions that can be taken to reduce the potential of exposure to or removal from a hazard. They employ a six step process that employs elimination, substitution, isolation, using engineering, using administrative instructions and finally using personal protective equipment to reduce the risk of an accident.

The list is usually hierarchical, with elimination the most preferred, and issuing personal protection equipment - least preferred.

Modern control measures usually contain a combination at least two, with administrative instructions almost always included.

For example, a 25 hP outboard motor is a hazard when carrying it to the boat to mount it on the transom. The following sequence of control measures could be followed:

1. **Eliminate** the hazard. *Eg, Do not allow passengers to carry motors.*
2. **Substitute** the hazard with a lesser risk. *Eg, Use a 15 hp motor.*
3. **Isolate** the hazard. *Eg, Mount the outboard on the transom permanently.*
4. **Use engineering controls** - *Eg, Use a small hydraulic lift to position the motor when mounting.*
5. **Use administrative controls** - *Eg, Issue instructions - two passengers to carry the motor.*
6. **Use personal protective equipment** - *Eg issue gloves, steel capped shoes, high visibility shirts, protective overalls.*

So it's up to you as the skipper to determine the risks and put in place safety measures to reduce the risks. If you can show you did this, then the risk of breaching your GSO is significantly reduced. Let's look at the trailer and the boat ramp to see how these propose risks to boaties.

Some hazardous situations

- Person overboard
- Capsize
- Sinking
- Running aground
- Large wake from a passing vessel
- Collision with another boat
- Striking a submerged object
- Deteriorating weather conditions (rain, wind, rough seas)
- Starting a motor while someone is in the water near the propeller
- Slipping on the boat ramp
- Incendiary devices (flares) being used
- Uncontrolled rapid winding of a winch handle
- Handling and mixing fuels fire (motor or fuel)
- Coming into shore - passenger jumps up and off boat to "help" and gets run over
- Anchor left on ribs of tinny and passengers ankle gets badly cut

The trailer and boat ramp

Trailers have winches to pull the boat out of the water and back onto the trailer and can be electrical or mechanical. New winches have straps that are resistant to corrosion however older winches have galvanised cable which are prone to corrosion and need checking.

The winch cable has a shackle and eye bolt which connects to the boat, as well as a safety chain to hold the boat on the trailer while being towed. One hazard is the rapid unwinding of the winch if the boat is attached to the winch cable as the boat is launched.

Trailer fittings

Other fittings shown on a trailer in Figure 5.3 include a jockey wheel to help move the boat and trailer around; lights, registration plates, rollers and runners to allow the boat to slide off; brakes, grease seals, springs, axle and U bolts. Tie down straps keep the boat on the trailer while towing.

The towing vehicle

This has a tow bar and tow ball. The trailer has a towing coupling that connects with the tow ball to allow sideways and up and down movement of the trailer while it is being towed (Figure 5.3). A safety chain prevents the trailer coming loose if this mechanism fails accidentally. Figure 5.2 shows a support bracket that can be used to support the motor when towing and a clove hitch can be used to secure small items in a boat.

A brake and indicator system from the car connects to trailer lights by an electrical socket which must be checked every time it's connected.

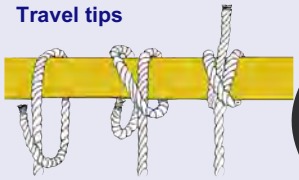
Wheel bearings need to be serviced at regular intervals according to the manufacturers handbook or just ask your dealer. It's a good idea to allow them to cool down before backing the trailer into the water.

Worksheet 1 is designed to summarise these points specific to launching the trailer and associated risks.

Wet Paper

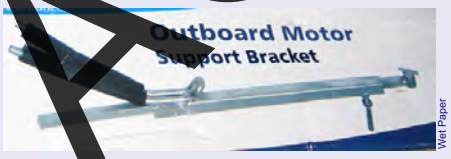
Figure 5.1 Check the lights and allow the bearings to cool

Travel tips



A clove hitch can be used to secure small items in a boat.

Use a bracket to support the motor - it stops the motor from bouncing up and down while towing and protects the tilt mechanism.

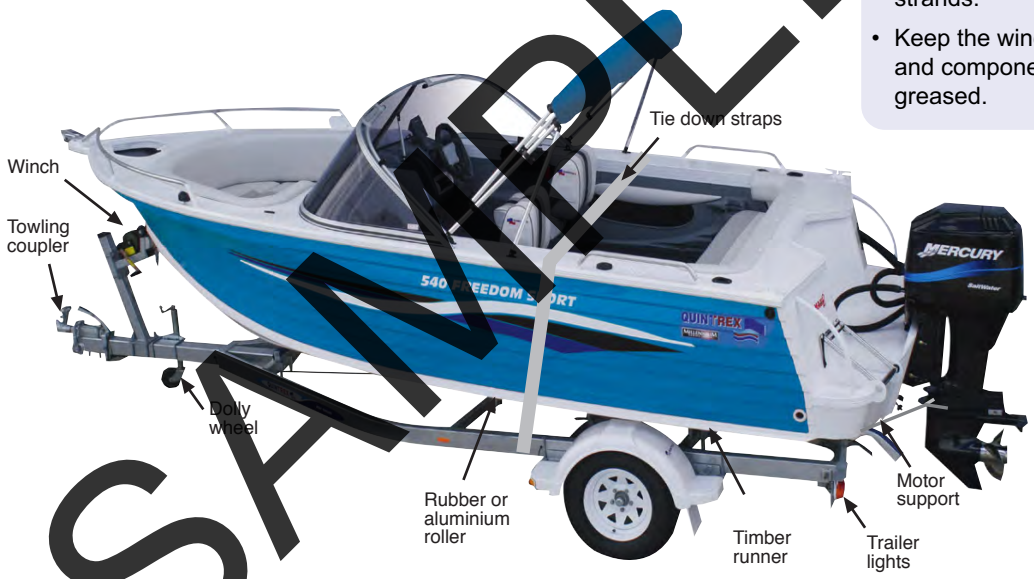


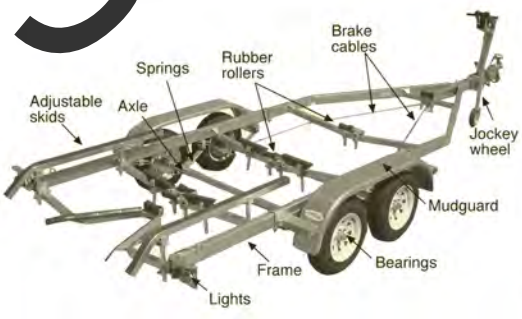
Wet Paper

Figure 5.2 Travel tips

Winch safety

- Check the condition of the winch cable and replace repair broken strands.
- Keep the winch cable and components greased.
- Unwind the winch cable so that it is ready upon return.
- Inspect the winch cable for damage to avoid breaking under strain.
- Never stand in line with the winch cable in case it breaks.





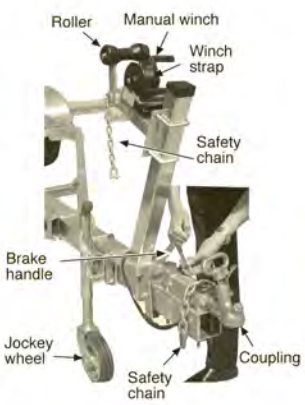


Figure 5.3 Parts of the trailer system
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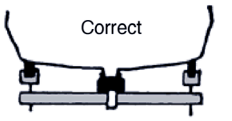
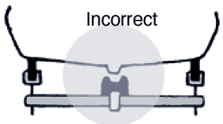


Skid pads correct height



Skid pads too high

Correct and incorrect adjustment of trailer rollers

Wet Paper

New innovation - Retriever-mate


Whitfords

Reference
Whitfords Online catalogue

WORKSHEET 1 AT THE BOAT RAMP

Launching

Q1. Explain the following terms:

Hazard

Risk

Safety precautions *(Control measures)*

Q2. Identify any three hazards that could be found on the boat ramp in the photograph above.

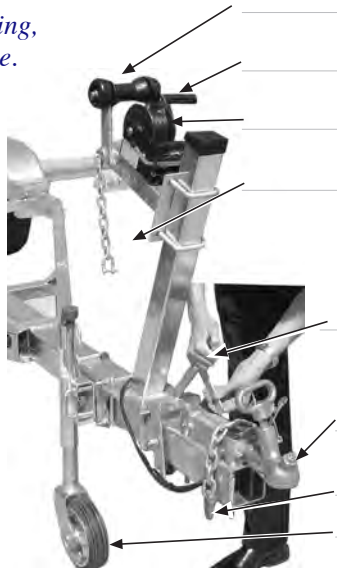
Q3. Describe any five safety control measures you could use to reduce risks while using the boat ramp shown above.

Q4 Justify four winch safety tips.

Q5. Explain how to protect an outboard motor while towing on a trailer behind a car.

Q6. Identify the following safety features on the trailer using the list of terms below.

Roller, manual winch, winch strap, safety chain, coupling, brake handle, jockey wheel, safety chain to towing vehicle.



Q7. Suggest a care and maintenance procedure for the following parts of a trailer.

Winch

Lights

Bearings

Jockey wheel

Propulsion

Every power boat will need some type of motor or propulsion mechanism. Most boats under 6 metres will have some type of outboard. While larger boats with keels and motor cruisers will have inboards or stern drives as shown in Figures 11.2 and 11.4.

The propeller

Marine propellers work by converting power produced by your boat's engine into thrust. As a propeller rotates it draws water from ahead (the suction side) and pushes it out astern (the discharge side) as shown in Figure 11.1. It is this resulting force that propels your boat.

Prop types

Props can be either right or left handed and affect the direction a boat turns under low power. For example a right hand prop, as shown below, is one that turns to the right when viewed from behind.

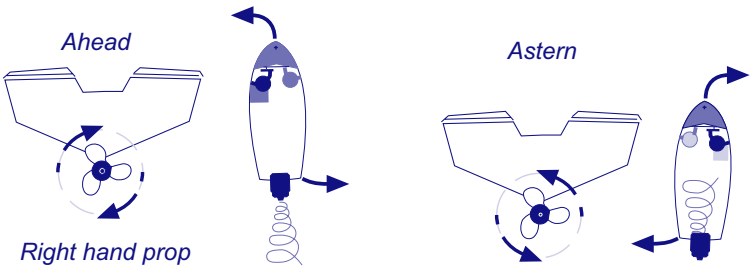



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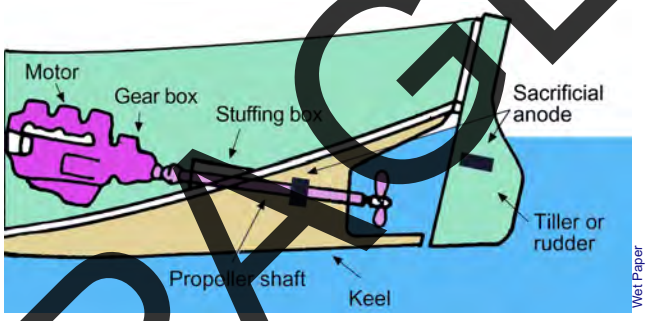
Figure 11.1 Propeller and exhaust



Wet Paper

Figure 11.2 Inboard single shaft engine propulsion

Advantages and disadvantages of engine types

Inboard (Single or twin shaft driven)

With an inboard drive, the shaft, rudder and propellers are beneath the boat leaving the transom clear. The boat is propelled forward by the motor and propeller and steered as the water flows over the rudder.

- The inboard is popular with commercial vessels such as trawlers and larger ships that require power and manoeuvring ability at slow speeds. In these ships, inboards are usually diesel engines and are heavy and slow revving. However diesel fuel is safer than petrol and generally provides better economy in these vessels.

Outboard leg

Outboard legged motors or outboards can come in a range of sizes ranging from small electric trolling motors, to large petrol fuel injected engines, two or four stroke engines.

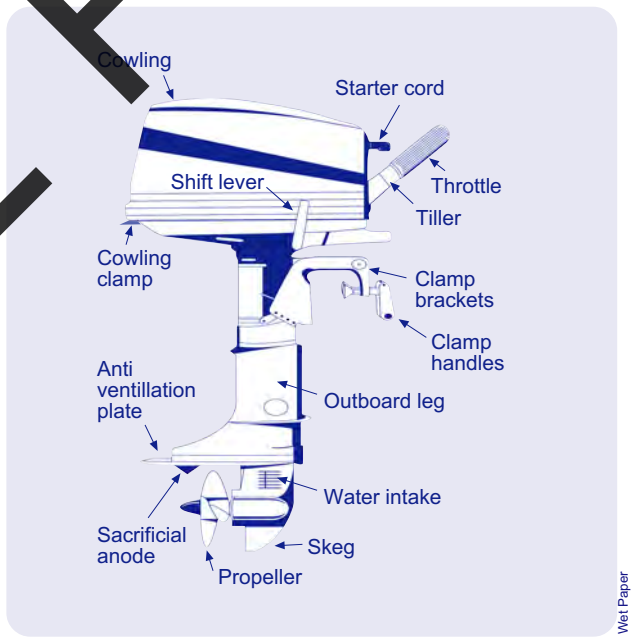
Here the propeller forces the boat forward and the boat changes direction as the steering swivels the leg from side to side. Under slow speeds, the propeller can also move the boat sideways. You will learn more of this in the boating skills that deal with *leaving and departing a dock*.

- Outboards move boats quickly and are easy to maintain. They suit a wide variety of small boats because they are light, powerful and can be stored with the boat. If they break down they can be transported easily to a service centre or taken indoors for repair.
- However outboard fuel is usually more expensive than diesel fuel.

Outboard leg stern driven

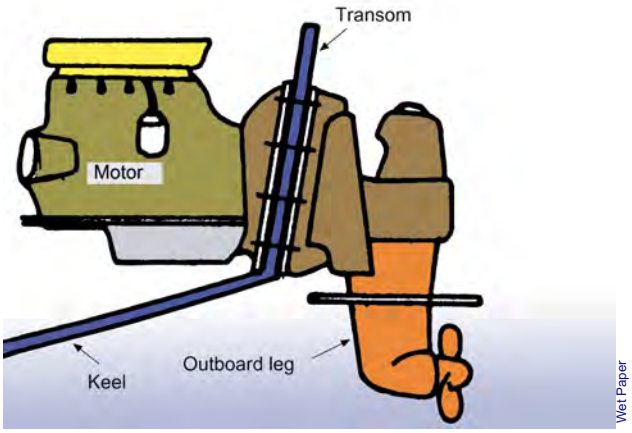
Stern drive motors consist of an engine mounted inboard and a drive unit mounted low on the transom as shown in Figure 11.4. The leg swivels about to provide easy steering while the propeller turns pushing the boat forward.

- Stern drives come in petrol or diesel and with the engine fitted inside the boat, they are more popular with larger vessels. The motor can be tilted up and down to provide trim while the boat is under way.
- However the motor is fixed and cannot be easily transported as a separate unit for maintenance or repairs.



Wet Paper

Figure 11.3 Outboard engine propulsion



Wet Paper

Figure 11.4 Stern drive propulsion