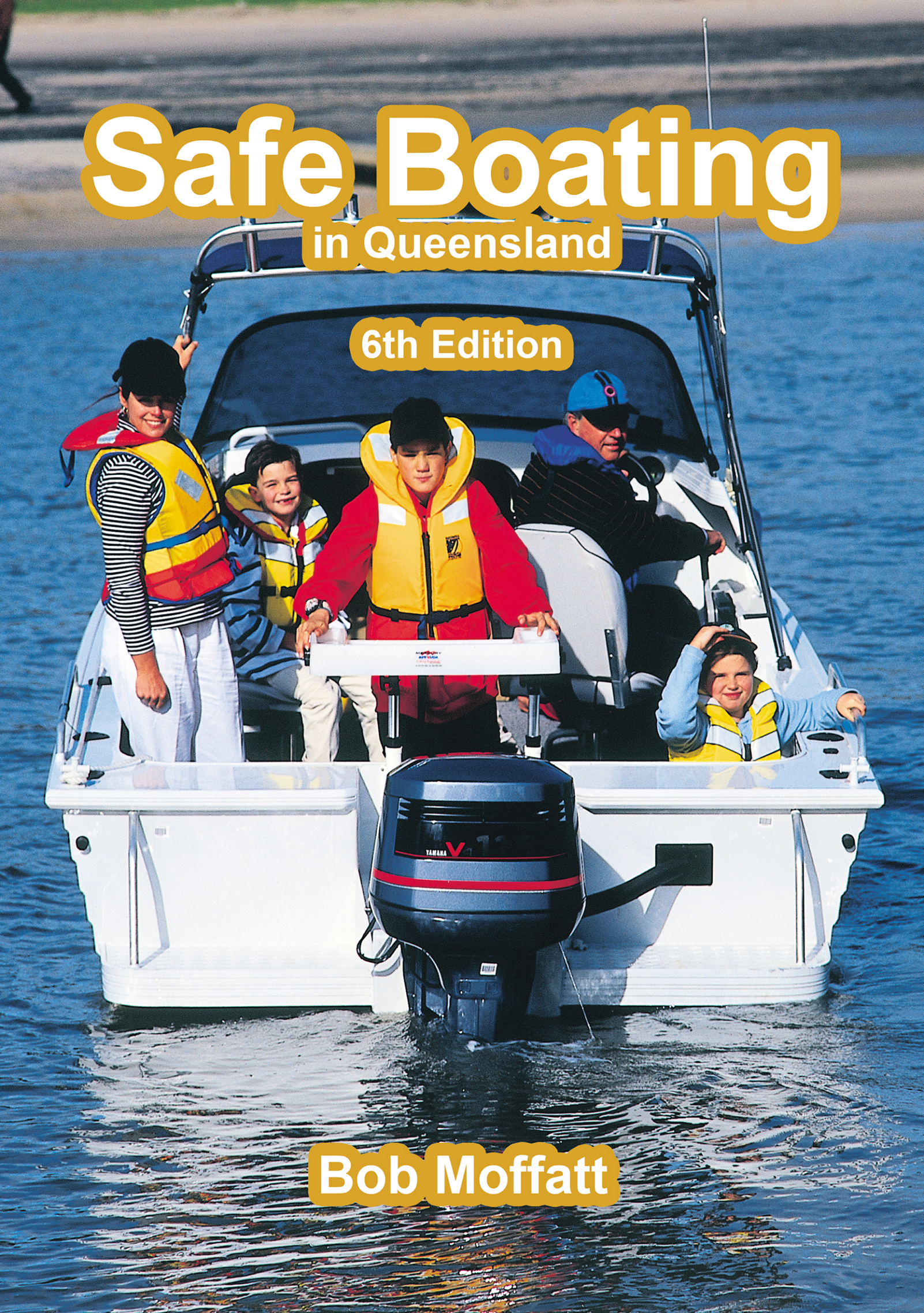
Safe Boating

in Queensland

6th Edition



Bob Moffatt

Course notes

ISBN 2025 E Pub
978-1-86283-180-3

6th Edition (Revised)
Published by Wet Paper
PO Box 540 Coolangatta 4225
www.wetpaper.com.au

Acknowledgements

The publishers would like to thank Graham Rogers, Josh Belsham, Don Jones, Michael Paddison, Luan Baldwin, Luke Stratton, Ray Norton, Shane Riley, John Wilson, Darryl Greentree, Rusty Gilbert, Bob Macdonald, Archie Harding, Kerry Kitzelman, Derrick Baan, Tony Menezes, Steve Maccheroni, John Wilson and Jeff Guinea for their critique of previous editions as well as the following for their assistance with photography and permission to use their illustrations as indicated - AllState Boat Licencing and Training, Bayside Boat Licensing, Bureau of Meteorology, AMSA, Chubb, Queensland Transport and Main Roads, John Armstrong, CALM, Lisa Taylor, Neil Oliver, Neil King, Telwater Marine, Qld Fisheries, Viewfinder, WA Transport, Century Yuasa Batteries, Benowa and Clontarf Beach State High Schools.

Disclaimer

Although all care has been taken to provide information, safety instructions, offers of training and advice, Wet Paper or any of its advertisers, sponsors, employees, advisors orconsultants accept no responsibility for any accident that may occur as a result of candidates performing any of these activities.

If students, teachers or instructors are unsure of any information or method, they are advised to contact their State Government Marine Safety Department. As this is a sixth edition and its getting much better, the publisher still welcomes all comments.

Printing

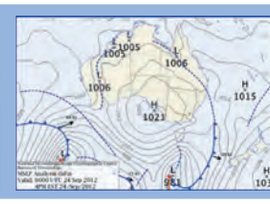
November 2019 Harding Colour, Brisbane.
Reprinted October 2020 and November 2021. E Pub 2025

General changes for Queensland regulated ships 2017 and 2019

- In line with national changes, the Australian Maritime Safety Authority (AMSA) EPIRB registration label will no longer need to be attached to the EPIRB. The EPIRB will still need to be registered with AMSA.
- A Ride Smart sticker will no longer need to be displayed on a personal watercraft (PWC).
- A Capacity Label will no longer be required to be displayed on a PWC or a Ship.
- Personal flotation devices (PFDs) will now be referred to as 'Lifejackets' for national consistency.
- You can now check the registration status of a ship, the ship's purpose of use and other details such as the description of the ship online.
- Registration labels will no longer be required on Queensland registered boats and personal watercraft from 1 October 2019.

Contents

Unit 1 Trip planning



1.1 Safety obligations

These course notes and worksheets follow the content sequence from the Transport and Main Roads, BoatSafe competency and BoatSafe Personal Watercraft Competency Standards - September 2016.

These standards detail the assessment criteria, course content, suggested allocated times as well as the necessary information required to obtain your boat licence. Further details including registered BoatSafe providers can be found at:

- *https://www.qld.gov.au/transport/boating/licences/boatsafe/Course completion statement*
- The Statement of Competency issued at the completion of this BoatSafe course is not a licence.

  The paperwork needs to be presented to a Queensland Main Roads service centre within 6 months of course completion or you *may* have to resit your assessment.

Licence

- You must have a recreational marine drivers licence (RMDL) to operate a boat that has an engine power greater than 4.5kW (over 6hp). In Queensland a boat (also known as a Queensland regulated ship) must only be used for recreational activities, or for school, surf lifesaving or community activities—not for business, trade or commerce. To operate a personal watercraft, you must have a recreational marine licence and a personal watercraft licence.
- To obtain a RMDL you must be 16 yrs or older, complete a medical fitness disclosure statement, provide satisfactory evidence of identity and pass theory and practical assessment.
- Unlicensed drivers may drive a boat provided a licenced driver is on board supervising and is able to take immediate control of the boat.

  Unlicened drivers must not operate boats while towing someone else by a line attached to the boat, for example someone waterskiing or riding a toboggan or tube.
- You can lend your boat, but it's your responsibility to make sure the operator is licensed, and meets all other safety obligations.

Things change

- Gaining a marine licence should not be considered the end to your learning. All boat owners should be vigilant and keep up to date with the latest boating information. Licence holders should be aware of changes to safety regulations and changes to navigation marks and channels.

  The best place to find out about change

  https://www.qld.gov.au/transport/boating

General safety obligation

- All boat owners and operators are responsible for safety. The most important maritime safety principal is for operators to meet the "**general safety obligation**" 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.

Breach of the GSO

Breach of the GSO is a charge laid after an incident due to failure of this general performance based requirement.

For example if your engine fails because it was not serviced according to the manufacturers instructions and your boat causes loss of life, you could be charged with breaching your GSO. It's recommended that you obtain a receipt from your service agent and file it, or, if you service your own motor, keep a written record of what you did and when.

The page over gives further examples.

Alcohol and drugs

- The blood alcohol limit of 0.05 applies at all times the boat is being operated, even at anchor. The limit does not change unless the boat is securely moored in a marina, to a jetty or wharf.

  In addition the skipper is also responsible for the safety of passengers and their alcohol consumption.
- However a responsible skipper should assess situations that may change such as an approaching storm or strong wind warning and decide not to drink at all as the boat may have to be moved or a generator may need to be started for safety.
- A master may be convicted of being in charge of a boat under the influence of liquor or a drug even though someone else is actually driving the boat. It's just like an car driving instructor would be liable if over the blood alcohol limit while the learner driver was sober.

This emphasises that the master (skipper) is at all times responsible for the safety of the boat and all people on board. Queensland has zero tolerance laws for driving a boat under the influence of illegal drugs.

Go to: *www.msq.qld.gov.au/Safety/Alcohol-and-drug-rules*

Symbols used in this book

- The **COLREGS symbol** is used to indicate the knowledge you must acquire so that you don't frustrate other members of the boating community or commit offences and or breach your general safety obligation.

- The **safety symbol** is used to indicate situations where marine incidents may occur.

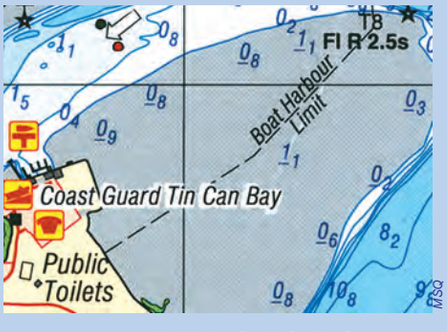
- The **marine enforcement symbol** is used to indicate what you may be asked to demonstrate or have inspected if you are stopped by any of the following enforcement agencies.
- The Queensland Boating and Fisheries Patrol and Water Police enforce marine safety regulations.
  - They regularly check boat users for licences, registration, sped limits, safety equipment, safety instructions given to crew and behaviour on the water.

    Water Police are responsible for crime prevention and facilitate search and rescue in conjunction with the Australian Maritime Safety Authority (AMSA). Web reference: *www.amsa.gov.au*

THE VESSEL MUST BE SAFE

UNSAFE OPERATION?

PROPERLY EQUIPPED AND CREWED



PRE TRIP CHECKING

General safety obligation examples

The vessel must be safe

A good example of this is the **basic pretrip check.** As a minimum it should include things like:

- Engine maintenance done regularly, keys and safety cut off lanyards in place, battery charged and adequate fuel.
- The engine starts, motor tilts, electric work, adequate sea water cooling on start up (if applicable).
- The drain holes at the base of the stern are plugged with rubber or plastic bungs. If you forget these the boat will fill with water!
- Providing all the information necessary (both orally and in writing), for others to find you if you fail to return. For example logging **on and off** with a voluntary marine rescue association such as the Volunteer Coast Guard (VCG) or Voluntary Marine Rescue (VMR).
- Checking where you are going (smooth, partially smooth or open waters) and equipping the boat with correct safety gear. Talking it over with your crew, checking how weather and the tides affect the area allows you to plan your trip. Local charts greatly assist in trip planning.
- Suppose a boat is overloaded and swamped by a freak wave and a passenger drowns. Queensland law may find the operator negligent, declaring the boat was unsafe as it was unstable with so many people on board.

The vessel must be properly equipped and crewed

Equipped examples

- Checking serviceability of safety equipment and stowage.
- Carrying equipment to use in emergencies.
- Calculating how much fuel you will need.

Crewed examples

- If you are towing a skier, you must ensure the skier is wearing the correct life jacket and you have a competent observer 13 years or older on board to watch the skier or towed person at all times.
- If you have a child under 12 years old and your boat is under 4.8 metres, the child MUST wear a life jacket appropriate to Queensland water safety limits.
- 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

The vessel must be operated in a safe manner

Three reasons for rescues and serious accidents often given are that the skipper:

- Did NOT check the weather forecast,
- Exceeded his or her level of confidence and
- Did not equip their boat adequately to meet emergencies.
- 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.

Unsafe operation examples

Recent examples in the news have included;

- The case of a PWC rider who killed a teenager while his friend was filming him with a mobile phone.
- The fatal wounding of a teenager in rural Queensland who was spun from a boat tow line on a tube into a tree on the river bank.
- The crew member who drowned at night after falling overboard from a small boat and was not wearing a life jacket.

Trailer responsibilities

Transport and Main Roads also require that you register your trailer and comply with regulations that apply to transporting boats and restraining gear and equipment while on the road. Further details:

- *http://www.tmr.qld.gov.au/safety/vehicle-standards-and-modifications/loads-and-towing/safetowing*

Marine parks

Bob Moffatt

Moreton Bay

There are specific rules for conservation of marine life in Moreton Bay and zoning plans such as the one shown opposite, show you where different activities can occur, eg, fishing, boats off the plane.

Go to: *www.npsr.qld.gov.au/parks/moreton-bay*

Great Barrier Reef Marine Park

When operating in the Great Barrier Reef you need to obey the zoning rules as well as comply with sewage regulations. Signs such as the one shown in the photograph below, are posted at boat ramps.

Go to: *www.gbrmpa.gov.au*

Waterways management plans and marine zones

Waterways Management Plans were introduced in 2001 to manage the increasing boating activity and general use of waterways. Plans are in place for the Sunshine Coast, Gold Coast and Yeppoon and covers activities such as anchoring and mooring and water skiing.

Go to: *www.msq.qld.gov.au /waterways*

Pollution

Under the Transport Operations (Marine Pollution) Act 1995 and its regulations, sewage, oil and garbage are classed as pollutants.

Vessel sourced pollution is handled by Department of Transport and Main Roads (TMR).

Go to: *www.msq.qld.gov.au/Marine-pollution*

Sewage

Sewage is prohibited from being discharged into any marina, canal or designated area under Queensland laws. The best solution to sewage is to have a holding tank installed on your boat so that when you get back to the marina, you can pump it out or use land based facilities.

Garbage, oil and chemicals

Garbage, bilge drainage, fuel, oil and sewage are all pollutants.

- Garbage means all kinds of domestic food, paper products, rags, glass, metal, bottles, crockery, fishing gear, nets, bait boxes, lining, packing materials, and operational waste deck sweepings, paints, wood products, wire residues and all plastics, generated during the normal operations of the boat.

  These must be disposed of on shore.
- The general rule is no discharge overboard. It should be stowed on board and disposed of responsibly once you are back on shore. A garbage label is required for vessels over 12m.
- Oil and chemicals can end up in waterways from maintenance procedures, accidents or deliberate dumping.
- Oil products include petrol, diesel, two stroke oil, motor oil, gearbox oil or hydraulic oil.
- Chemical products include cooling system additives, cleaning agents, degreasers, acids and paints.

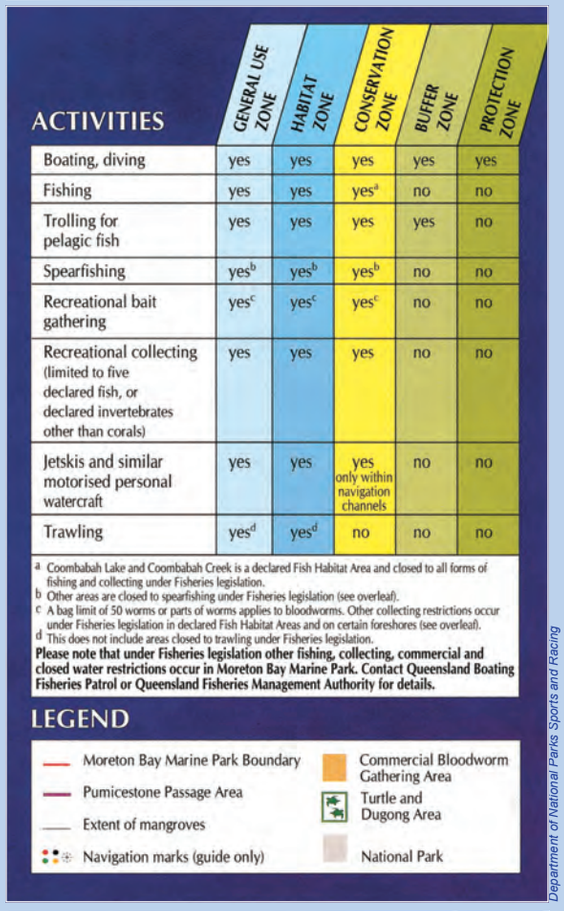
Noise

People who live on boats generally like to get to sleep early as they may have to sail with an early tide. Noise also disturbs wildlife and as a general guideline for all boats including PWC's the maximum level for engines is 85 dB at 30 metres away.

- Complaints regarding noise can be directed to the Department of Environment and Heritage Protection or the respective local government authority (Council).

Go to: *www.ehp.qld.gov.au*

Department of National Parks, Sports and Racing



Department of National Parks Sports and Racing

Bob Moffatt

MARINE PARK INFORMATION

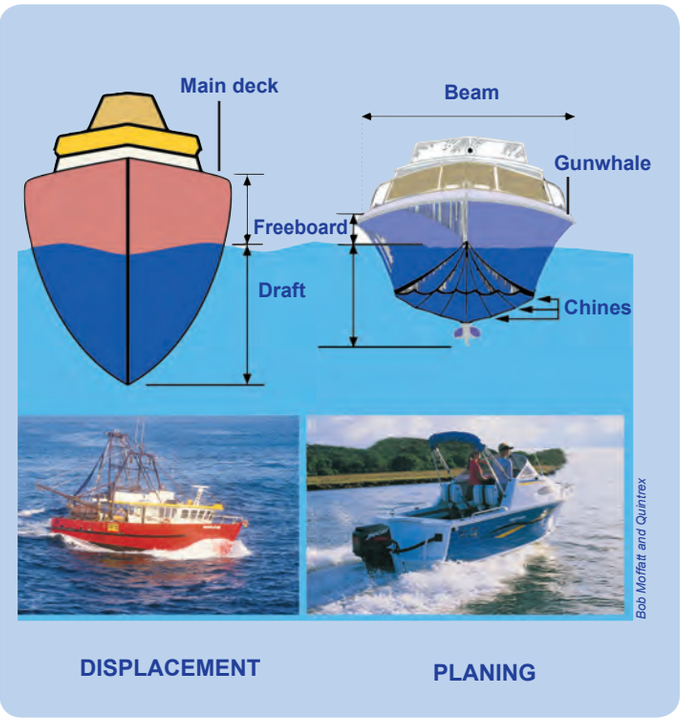
1.2 Main parts of a recreational vessel

Hull design

The hull is the main structural body or shell of the boat identified by a bow, stern, port and starboard sides.

- The freeboard is the distance between the lowest point of the main deck and the waterline and is an important safety consideration as it affects hull stability and flotation. The top edge of the side of a boat is called the gunwale.

  Stability and flotation are discussed later to highlight their importance under the GSO.
- Hulls can be made of a variety of materials ranging from fibreglass (glass-reinforced plastic), aluminium, rubber, steel, ferro cement and timber.
- The hull is also powered by a motor and a variety of fittings, electrical appliances and equipment which are used to maintain the safety of all those on board.



On the bow

- Here you will find the anchor, chain, shackles, line, bollards or cleats used to anchor the vessel. In smaller boats or tinnies you will also find the safety gear and storage crates. There may be a winch with a motor to raise or lower anchors on larger vessels.

On the stern

- On the stern you find the transom and a thickened plate where the motor is attached either by bolts or clamps.
  - At the bottom of the transom are drain holes for water that has entered the boat. These are plugged with bungs.
  - Make sure **"the bungs are in"**, before you go boating.
  - On boats with forward controls you will find the control cables for moving the motor as well as the fuel lines.
  - On boats with the throttle on the tiller you will find the fuel tank and fuel lines.

The figures on this page illustrate some of these points.

Ship's master's obligations

The illustrations and photographs to the right indicate terminology used in registering a boat in Queensland.

Vessel registration

In Queensland all vessels with an engine or auxiliary engine of 4 hp (3kw) or greater must be registered. The Department of Transport and Main Roads Regional Customer Service Centres have the forms or you can get a quote on-line.

Go to: *www.qld.gov.au/transport/boating/registration/recreational/*

Registration numbers

Once registered, you will get registration numbers allocated to your boat and a registration label. You must display registration numbers so they can be read from 30m away and in a contrasting colour to the hull of the boat.

The size of the registration numbers depends on the type of boat:

- Ships capable of planing—at least 150mm high on both sides.
- Ships not capable of planing—at least 75mm high on both sides or the stern.
- PWCs — must be at least l00mm high and on both sides.

Registration labels

Registration labels will no longer be required on Queensland registered boats and personal watercraft from 1 October 2019.

These changes to labels mean you still need to make sure your boat is registered or you may face a fine however you won't need to display a registration label.

You can get a registration certificate online - the registration renewal notice will be sent to the registered boat owner approximately 4 weeks before the boat registration expiry date.

Make sure your details are up to date and if you forget to pay your registration, MSQ will send you a reminder notice.

You will still be able to check your boat registration expiry date any time at www.qld.gov.au/checkrego or by downloading the QLD Rego Check app.

Vessels must be insured *(Ship insurance)*

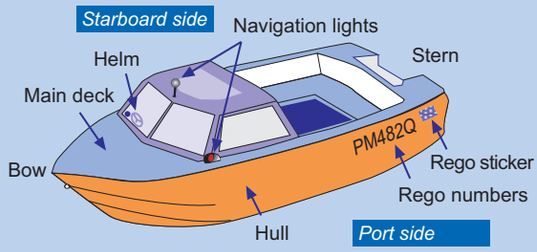
- Legislation requires all ships over 15 metres to have insurance sufficient to pay for potential pollution clean up, salvage and wreck removal.
- Third party insurance is not included in the cost of registering your vessel and independent advice should be obtained.

Go to: *www.msq.qld.gov.au/Marine-pollution/Ship-insurance*

Navigation lights must be fitted correctly

- For small power craft, navigation lights are starboard and port sidelights (or a combined light) and an all round white light.
  - Sidelights MUST be parallel with centre line of the boat so as to correctly identify a boat's position relative to other boats. They must not be aligned with a bow curves or the batter of the cabin.
  - The all round white light must be a metre above the coloured lights so that it can be seen from all directions.
  - You will be issued an infringement notice if your lights are incorrectly fitted.

Go to: *www.msq.qld.gov.au/Safety/Navigation-lights.aspx*



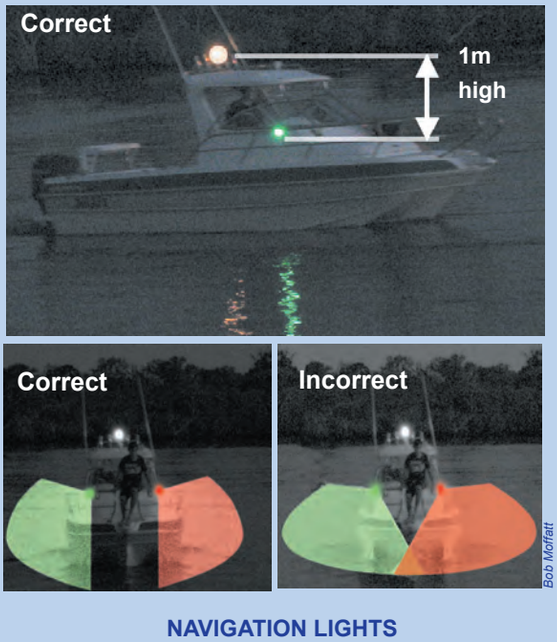
REGISTRATION TERMINOLOGY

Wet Paper

FOR FULL DETAILS ON REGISTRATION
www.qld.gov.au/transport/boating/registration/recreational

Bob Moffatt

PLANING AND NON PLANING



Bob Moffatt

NAVIGATION LIGHTS

Outboard motor

Outboard motors have seen considerable development in recent years. In fact, such has been the pace and scope of progress, computer microchip technology plays a exciting new role.

- If the manufacturers handbook is available, the service schedule must be followed. However if it has been misplaced, you should service the motor at regular intervals.
- The photographs, illustrations and short summary below may help you identify the important servicing issues.

The powerhead

- The powerhead is started with an ignition which can be a pull start or battery and starter motor in larger outboards.
- The cowling stops water from entering the powerhead while the motor is running at sea. A cowling clamp releases the cowling.
  - Make sure the cowling is properly clamped and use a water repellent spray to keep the spark plug connections clean/dry.

Engine cooling

- Water enters the engine in vents under the antiventillation plate and hot water exists the motor at the exhaust or tell tail opening. Water intakes must be kept clear to allow water to enter.

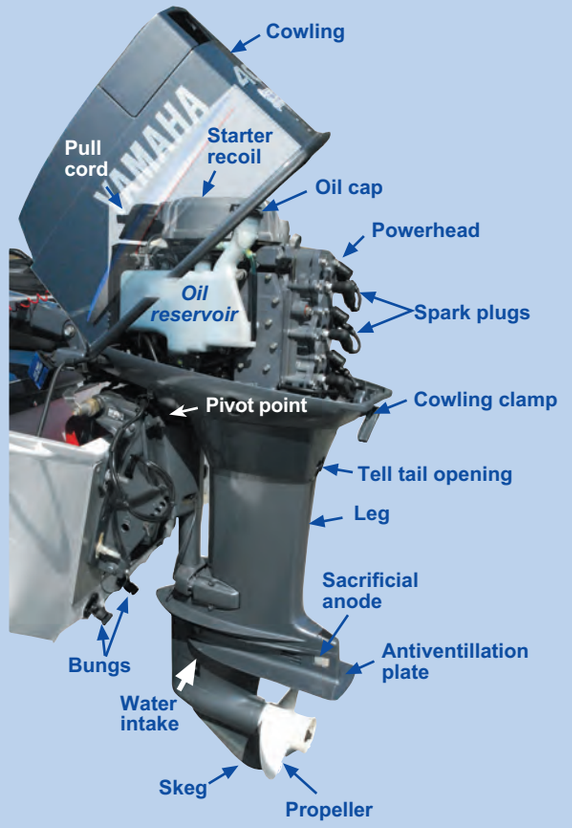
Movement

- In larger outboards, the motor is moved **up and down** by a hydraulic ram and from **side to side** by steering control arms. A series of pivot points allows this to happen. The page opposite shows how a tiller is used in smaller motors.
- The motor is clamped or screwed to the transom by bolts and must be supported when travelling, otherwise these control points will be damaged or seriously bent!

Forward and reverse controls

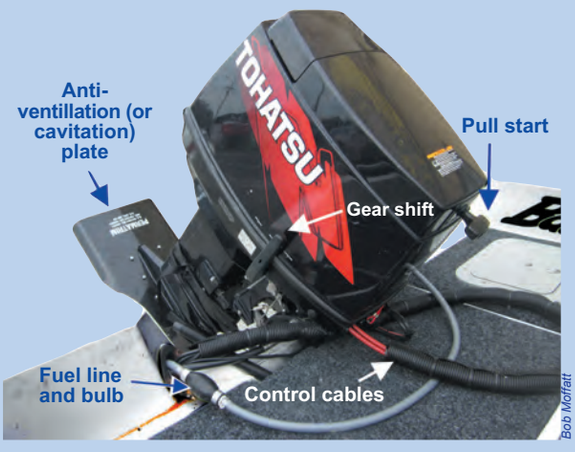
These are usually at the side of the cowling or at the helm.

- For larger motors the control cables are contained in a rubber housing as shown in the Tohatsu opposite.
- The propeller forces the boat forward and the boat changes direction as the steering control units swivel the leg from side to side.
- Under slow speeds, the propeller can also move the boat sideways by a process called transverse thrust. You will experience this in the practical sessions.
- The antiventillation (or cavitation) plate is a horizontal plate that stops a whirlpool forming at the surface which assists efficiency in the propeller.

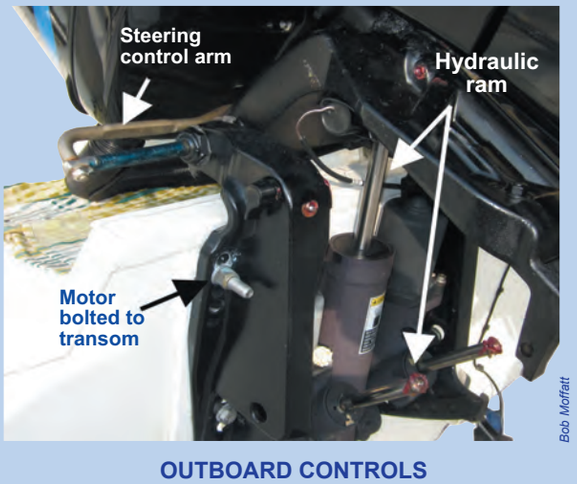


OUTBOARD MOTOR PARTS

Bob Moffatt

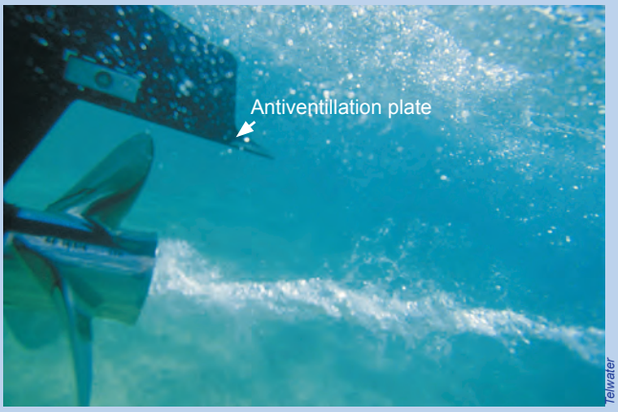


Bob Moffatt



OUTBOARD CONTROLS

Bob Moffatt



PROPELLER AND EXHAUST

Telwater

Controls and steering

A boat is controlled from the helm. For simplicity these notes refer to a helm with forward controls (like the one in the photograph opposite) and one with a tiller (shown with the person wearing the life jacket below).

Forward controls

The motor is started with an ignition key. This is connected to a safety lanyard which can be attached to the driver. A throttle is pushed to move the boat forwards or backwards. The motor can also be raised or lowered with an up/down button at the side of the throttle. This is important as the motor is raised when the boat is launched from a trailer, or coming into a beach. Navigation light switches, pumps and gauges are mounted close to the helm.

The photograph opposite shows some of these features.

The boat is steered with a steering wheel. A series of linkages, hydraulics and cables control the movement of the motor. By turning the steering wheel to port (the left), the boat will move to port.

Tiller controls

In this system the motor and tiller are combined and mounted on the transom of the boat. The controls for tilting this motor are on the motor itself and are adjusted manually.

The engine can be started manually with a choke applied when cold, and a starter cord pulled. The engine is then revved by turning the throttle. The gears can be on the tiller or mounted at the side. The motor must to be in neutral gear to change into forward or reverse gears so you don't damage the gear box. Note: The *Tohatsu motor* in the photograph on the previous page has a gear shift lever at the side of the cowling.

In this system the boat is steered with the tiller. By pulling the tiller to starboard (the right) the boat will turn to port (the left). By turning the throttle, the boat will either speed up or slow down. By changing gears you can go either forward or reverse.

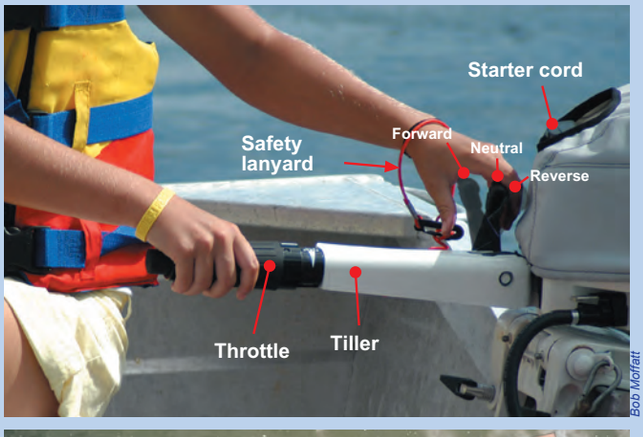
Lags in the helm

- When accelerating, the vessel does not respond instantly by turning the wheel or the tiller. This time difference is referred to as "a lag in the helm".
- You will have the opportunity to experience this in Unit 5 when you drive the boat.

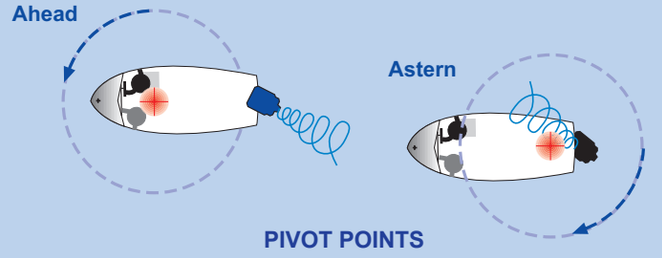
Pivot points

- When going ahead, boats steer from the stern and the pivot point is about one third back from the bow. When you pull the wheel hard over to the left (port) and engage forward gear, roughly one third of the vessel moves to port and the remainder to starboard.
  - When turning in forwards, the stern will swing much more widely than the bow.
- When going astern, the pivot point moves aft so when the wheel is hard over to the left (port) when going in reverse, one third moves to port and the remainder to starboard.
- All boats pivot at slightly different points and knowing where the pivot point is on your boat is one of the most important factors in the boat handling.

HELM: FORWARD CONTROLS



HELM: THROTTLE ON THE TILLER



PIVOT POINTS

Fuel tank and consumption

- The Johnson outboard motor opposite shows the parts of the fuel system it requires to operate. For example;
  - The fuel line transfers the fuel to the motor.
  - The primer bulb, with a one way valve, is used to fill the fuel lines prior to starting.
  - An air vent on top of the fuel tank is opened to allow fuel to flow when the motor is running. If the vent is closed, a vacuum will occur and stop the fuel supply or prevent the motor from starting.
  - The choke opens the carburetter to allow maximum fuel to start the engine. (If you pull too many times on the pull cord, you will "flood" the engine and the motor will not start). To fix this, the choke is then pushed in and the starter cord pulled a few more times.

Marine fuel filter

- A fuel filter in the fuel line is designed to screen out dirt and rust particles. The marine filter shown in the photograph opposite has been mounted on the transom. The bowl collects water and is drained by a plug at the base of the filter.

Importance of fresh fuel

- All fuel does go off, (ie the active components that are ignited by the spark plugs break down). In older two stroke outboards that use an oil:fuel mix, the oil/fuel mix also breaks down and fails to lubricate the motor, so it is recommended not to keep fuel for more than two months.

Some motors are two stroke

- Some fuels are 2 stroke - a mixture of oil and fuel.
  - For example it you have a 26L tank with an old mix ratio of 25:1. You need one litre of outboard oil to 25 litres of fuel.
  - So that you don't forget the mix at the fuel station, it is recommended that you write the fuel mix on the fuel tank with the grade of fuel required after checking the outboard motor's operation manual.
- Also check with the manufacturer's specifications about E10.

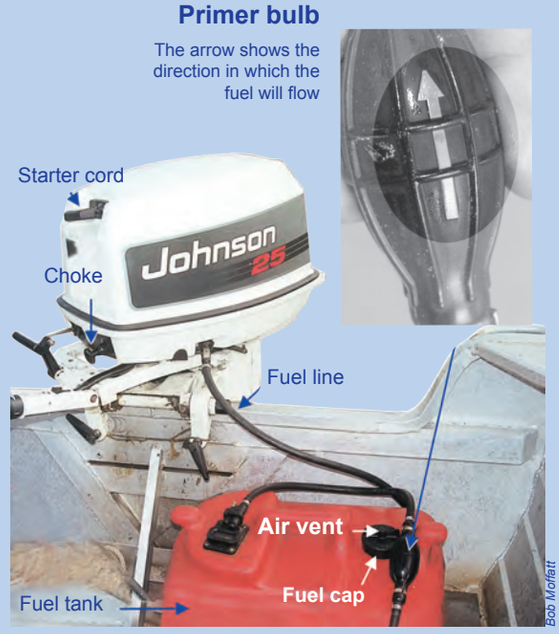
Fuel consumption

- Calculate your OWN burn rate at cruising speeds by completing a few short trips. For example:
  - Fill tank, operate for one hour and refill tank. Burn rate per hour = number of litres on the bowzer.

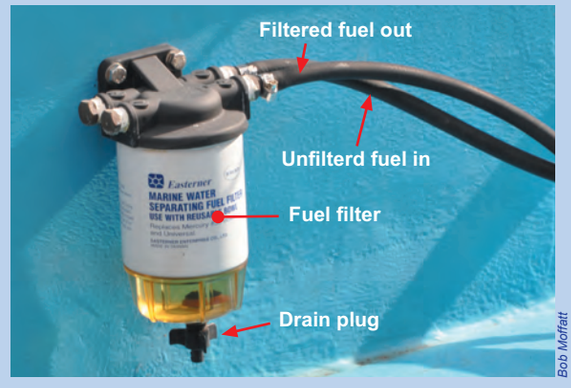
*How much should I take?**

- Suppose your burn rate is 15 litres per hour.
- Calculate how far you are travelling one way (eg 40 nautical miles).
  - You estimate your time at 2 hours from a cruising speed of 20 knots given the weather forecast and tides.
  - So multiply your burn rate by the time taken (eg 15L/hr x 2hrs = 30 L).
- THEN multiply the answer x 3 (eg 30L x 3 = 90 litres).

**These figures are based on optimum speed and there may be cases where you travel at a higher RPM (Revs per minute, eg 5000) depending on sea state. This needs to be factored into your calculations and there are plenty of manufacturers web sites that give detailed graphs and information. Just "google - marine engine fuel consumption graphs" if you want to learn more about your individual motor.*



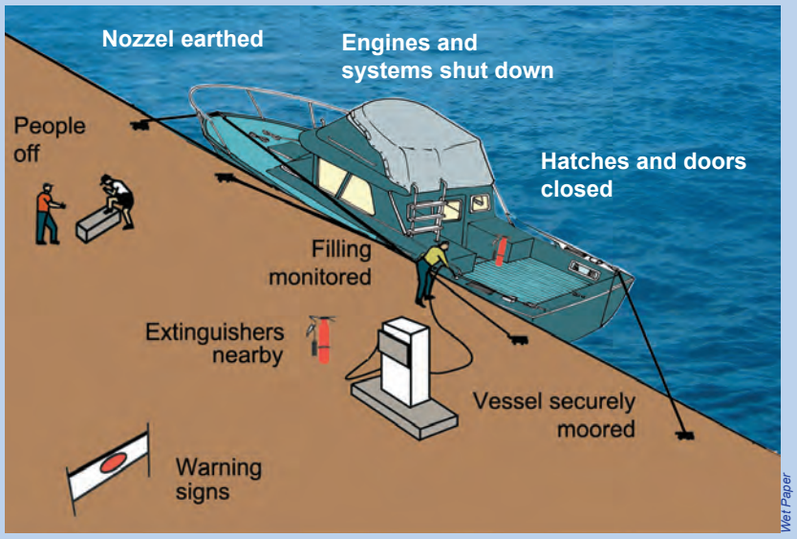
ENGINE AND FUEL SYSTEM



MAINTAIN CLEAN FUEL

One third out, one third back and one third in reserve.

CALCULATE THE BURN RATE



Wet Paper

AMSA

REFUELLING SAFETY

Refuelling

Proper refuelling procedures are very important in preventing on board fires.

Petrol vapours are heavier than air and can spread rapidly into enclosed spaces, so check the bilges and all closed compartments for petrol vapours. If you smell fuel, check for leaks.

- Never refill portable tanks in the boat. Take them ashore for filling and wipe off any spillage before replacing them on board.

Minimise fires and explosions

Fuel is a major cause of fires and explosions on a boat. Such fires general result when some component of the fuel system starts to leak and vapours trapped in the boat bilge are ignited.

Fuel systems comprise one or more tanks, valves, lines, pumps and filters. Each of these elements, if left unserviced, can be potentially hazardous.

- Regularly inspect and maintain fuel tanks and lines to ensure they are in good condition and do not leak. Check the tank often for potential corrosion that could cause leakage.
- Inspect the shut off valves, lines and pumps periodically for corrosion and wear. Urgently rectify any temporary or 'stopgap' solutions to fix leaks.

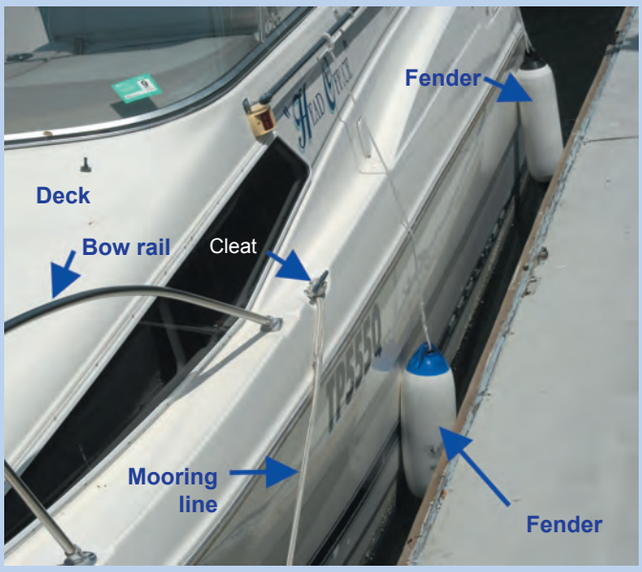
The most important tool you have to diagnose problems in the fuel system is your nose. If you smell fuel - find the problem and fix it.

TMR

UNSAFE REFUELLING OUTCOME

Deck

- The deck is often defined as a permanent covering over a compartment or hull as shown in the photograph opposite.
  - It would be difficult to define the deck in a tinny, however it could be the floor in a small runnabout or the area in front of the helm near the anchor well.
- Grab rails, like the one on the bow shown opposite, are there to help you move around the deck.
  - The deck will have cleats to which mooring lines are attached and used to secure the vessel to the wharf.
  - Fenders can also be manoeuvred from decks to protect the vessel from damage when tied up alongside a jetty (also shown).



COMMON TERMS ASSOCIATED WITH THE DECK AND JETTY

Wet Paper

1.3 Vessel maintenance

Vessel maintenance is part of your GSO, so a boat should be given a thorough pre-season check before heading out for the first day on the water. Lesser checks should be undertaken mid-season and also before every trip.

Here are some suggestions, and if you are unsure, have your boat checked by a service centre at regular intervals.

Hull

- Repair any damage to the hull that may have occurred since your last trip.
  - Inspect for corrosion, blisters, cracks or distortions. Touch up with paint and or wax.
- Check rubber seals/gaskets for cracks.
- Check transom for strength.
- Wash down the exterior of the boat and motor and dry.
- Keep aluminium and stainless steel parts clean and polished with a good metal wax. Metals on boats corrode quickly, especially in salt water.
  - Fibreglass should be cleaned with fresh water and non-abrasive soap. If necessary use a soft brush to help remove debris caught in crevices. Patch any cracks.
- Check all screws, bolts and other fittings to keep secure.
- Check that the bungs are in good serviceable condition.
- Make sure the self draining holes are clear and grease the flaps if necessary.
- Ensure bilges are clean and dry.
- Flush engine with fresh water to minimise formation of deposits that clog cooling passages.
- Take off the engine cover, check connections for sand, clean off the grime, and spray with water repellent.

Engine

- Check the manufacturers handbook for the service schedule.

Fuel system

- Check fuel tank for leaks or corrosion. Inspect fuel lines for dry rot, brittleness, cracking or loose connections.
- Check and change filters frequently to be assured of clean fuel entering your engine. Purchase a spare filter.
- Keep tanks topped up and close them when not is use to minimises the chance of condensation occurring and water getting into your fuel.

Water pumps

- Check the impeller regularly, especially if you have been operating in the shallows and stirring up sand. Water pump impellers can deteriorate quickly.
- Check thermostat is working properly.
- Test the bilge pump.

Propellers

- Remove the propeller to check that no rope has been caught between the propeller and the prop shaft.

  The bushing of the propeller can fail if it has hit sand or rocks. Older models have shear pins, so include spares in tool kit.
- Ensure propellers are then securely fastened and turn freely.

Gearbox

- Snagged fishing line is a common cause of leaking gearbox seals and water in the gearbox will cause it to fail.
- Check oil and service transmission and lower units according to the manufacturers specifications.

Electrical system

Corrosion

- A common cause of equipment failure is through corroded electrical systems.
- Keep all electrical systems clean, dry and corrosion free by frequent inspections.
- Spray terminals and electrical connections with corrosion retarding agents such as inox, petrox or CRC.

Spark plugs

- These can break down so clean spark plugs regularly with a wire brush, check the gap or replace with new ones.

Sacrificial anodes

- These are metal plates attached to outboards or other hull structures to prevent corrosion - see page 8.
- Check and replace if they are smaller than 60% their original size.

Belts, hoses and cables

- Check for cracks, brittleness, swelling or loose clamps.
- Belts around pulleys need to be taught.

LPG

- Ensure all LPG installations are carried out by a licensed gas fitter and make sure cylinders are professionally checked when your boat is serviced.
- Check that LPG cylinders and appliances are fixed in an upright position so they don't move.
- Ensure there is correct ventilation and that appliances have flame failure devices fitted or approved reliable gas detection equipment.

General check of boat after every trip

- Inspect safety gear for any deterioration or damage and replace or repair as necessary.
- Replenish water supplies and replace cheap plastic water containers that may have been left in the sun.

FLUSH THE ENGINE WITH FRESH WATER

- Inspect tool kit for additions or replacements.
- Clean the anchor, ropes, chain and shackles and check for corrosion.

Storage

- Keep the boat under cover or under a tarp to protect it from the sun, rain, leaves and general weather.

  Wooden plates on fibreglass transoms are notorious for rotting with rain water.

Battery

Large boat engines take considerable cranking to start. The battery will provide this, but every time you turn the motor over it draws power.

If your battery is weak, a few starts will drain the battery below the motor's ability to charge it. So check that your battery is fully charged.

Your dealer or a battery world service centre will be able to advise you on this.

- Marine batteries are made to cope with the movement and vibration found in the marine environment as they run critical electrical systems such as the fish finder, GPS, starter motor, radio, lighting, hydraulics and navigation instruments.
- The figure opposite shows an older type battery containing cells which is surrounded by an electrolyte of strong acid.
  - The battery is held in place with a storage strap and needs to be fixed in an acid proof case in a well ventilated compartment.
  - Check with your battery dealer, the manufacturer's web site or the manual that came with the battery to make sure this is the case.
  - Note that some marine batteries do not require the addition of water.

    In modern gel and deep cycle batteries, manufacturer's recommendations should be followed regarding, amongst other things, charging, storage and voltage levels.

Maintenance

- Check that the battery is tied down and the terminals are clean and tight.
- If the battery is in an enclosed space, make sure it is well ventilated.
- Keep idle batteries fully charged. Leaving a battery even partially discharged leads to loss of capacity.
- Keep terminals and cable clamps corrosion free. Use a wire brush or hot water to remove corrosion. Coat terminals with non flammable terminal protectant to prevent future corrosion.
- Keep idle batteries fully charged. Leaving a battery even partially discharged leads to loss of capacity.
- Disconnect and remove the battery from the boat when not in use.

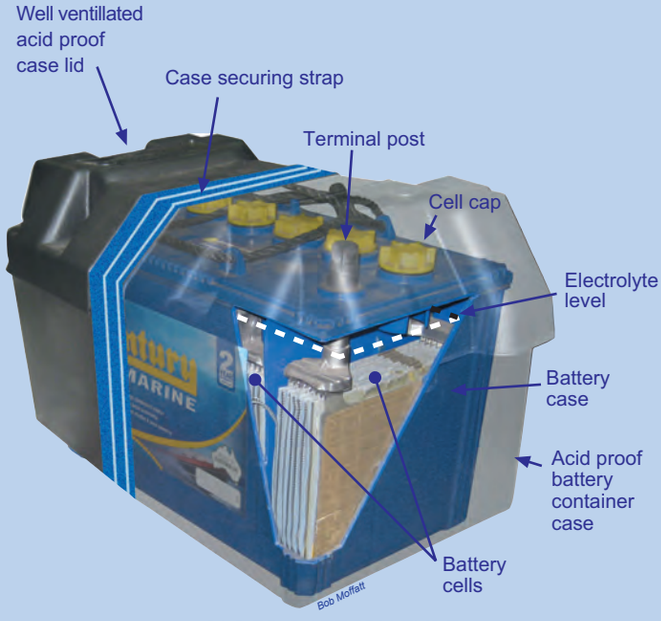
Safety with batteries

- Be careful of battery acid spills on hands and eyes.
- Use protective personal equipment such as acid resistant gloves and clothing when carrying batteries.

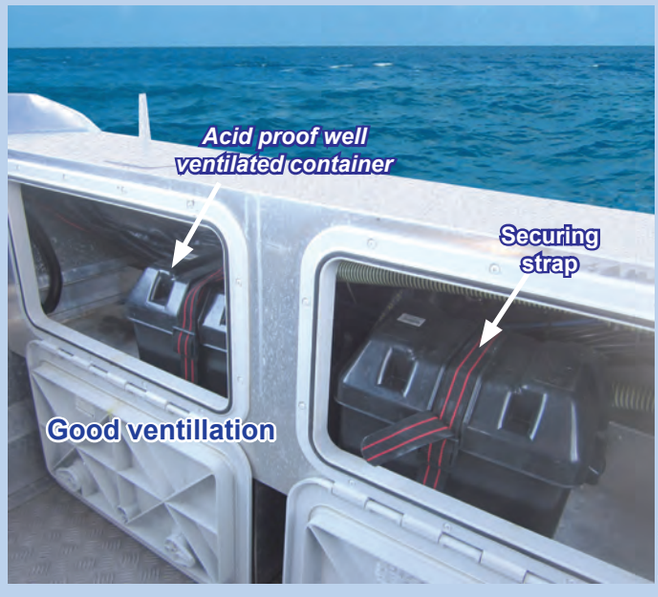
Battery testing

- Testing is designed to tell if the battery is in good condition and will hold a satisfactory charge. Retail outlets such as battery world can provide good advice.

MARINE BATTERY



OLDER BATTERY TYPE



BATTERIES NEED GOOD VENTILLATION

1.4 Seaworthiness of the vessel

Five key considerations of seaworthiness are:

- Physical condition of the boat and components
- Boat suitability and propulsion
- Vessel stability and freeboard
- Attachment of builders plates
- Compliance with safety equipment regulations

Physical condition of the boat

It is important to make sure that no cracks or damage have occurred since your last boat trip. A careful inspection of the hull and fittings will determine if repairs are necessary. Here are some suggestions:

- Inspect the hull. If there has been more bilge water than normal, find and fix the leak. When pumping bilges be aware of the environment as polluting the waterways is an offence.

  Use marine absorbent pads, double bag and dispose of it in the garbage bin.
- Keep bilges dry and the self draining holes clear of rubbish, sand or grit from your last trip.
- Check berthing and mooring lines are in good condition and replace if you think they will break under strain.
- Also check the welding around bollards to make sure rust or corrosion will not cause these also to break under strain.
- Check hatch fasteners, canopy clips and zips, transom bolts, battery straps, radio aerial, rod holders for serviceability.

CHECK THE PHYSICAL CONDITION OF THE BOAT

Boat suitability and propulsion

- Some hulls are more suitable for bar crossings while some give great fishing stability.

Deep V hulls and catamarans shown in the photographs below are suitable for bar crossings.

Others like shallow and moderate V's suit estuaries. Motor power is then matched to the boat and the area of operation.

CHECK THE SUITABILITY OF THE BOAT FOR ITS AREA OF OPERATION

Note: This rigid inflatable, deep and moderate V vessels shown above require registration.

Vessel stability and freeboard

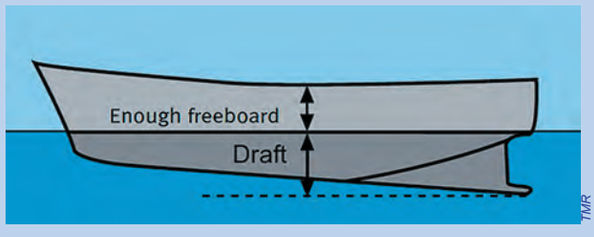
- **Freeboard** is the distance between the lowest point of the main deck and the waterline and is an important consideration in the stability of the vessel.

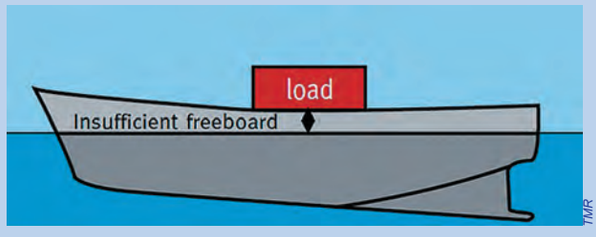
Centre of gravity and stability

- A boat floats because the weight of water displaced pushing up is greater than the weight of the boat pushing down, (see figure opposite). However a boat can sink easily if its not stable.
- So a boat must have "positive stability" to be seaworthy.
- When you move around a boat, the centre of gravity changes.
  - Notice how the arrows do not line up in the illustration to the right and if the centre of gravity is lower than the centre of buoyancy, the boat can tip allowing water to flood in.
  - When getting into a small boat, try to step into the centre and keep "one hand for yourself and one for the boat."

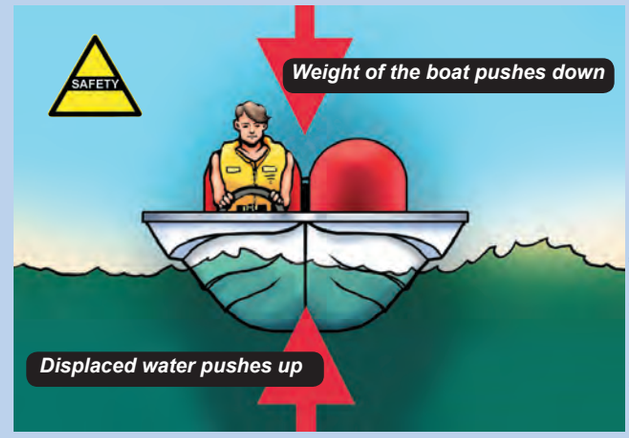
Proper loading and stability

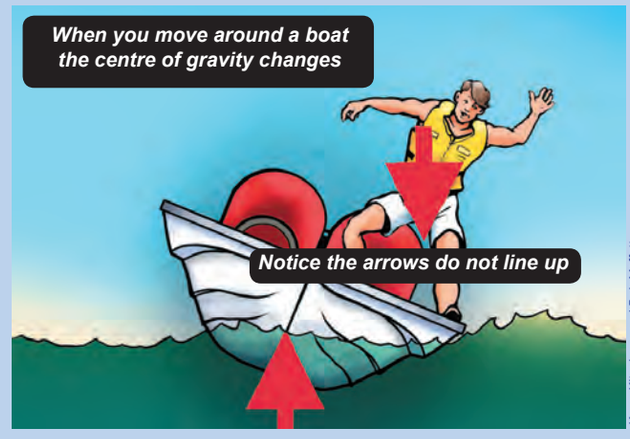
- When preparing for a trip, the skipper is responsible for assessing the load on board to maintain stability.
  - Heavy items should be stowed in a low and central place where they cannot move around.
  - Weight, including passengers, should be distributed evenly through the boat. Passengers who are heavier than normal (ie 80 kg) should be positioned to avoid flooding over the transom.
  - The weight of extra fuel, water and provisions should be accounted for and in rough conditions, secure the cargo.

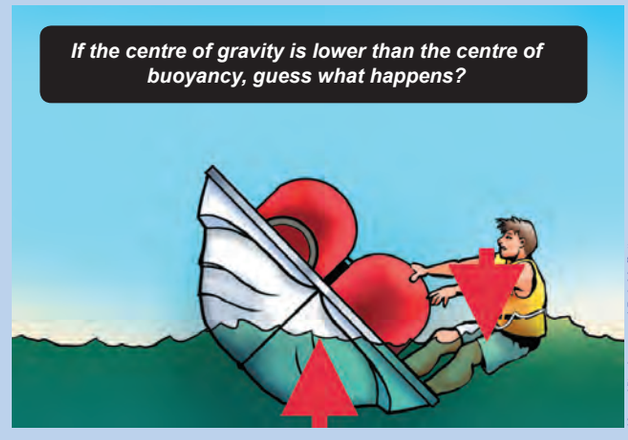




STABILITY AND LOADING







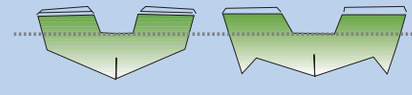
STABILITY AND CENTRE OF GRAVITY

Stability also means that there has to be enough freeboard to give the boat time to recover from sideways movement as it moves through the water.

- The overloaded tinny shown opposite would have little time to recover and is at risk of flooding.
- To enhance the problem of instability, the freeboard in many "tinnies", is measured from the top of the cut out section of the transom decreasing freeboard even further.

Free surface effect

Free surface effect is one of several mechanisms which can cause a craft to become unstable and roll over (capsize). It refers to the tendency of liquids to slosh about in the vessel and becomes more significant in larger vessels.



Lowest point of main deck on transom

Australian builders plate (ABP)

Stowage of all heavy items, positioning of passengers on board and water in the bilges all affect stability and freeboard. The Australian builders plate provides invaluable information on this.

Specifically, the ABP provides the following information for the skipper:

- Maximum outboard engine power and weight.
- Maximum number and weight of persons.
- Maximum load (includes the weight of the outboard motors, as these can be exchanged for heavier or lighter ones).
- The figure opposite also shows buoyancy performance (required only on vessels less than 6 metres in length), optional and warning statements, name of the standard used in determining the above information, boat builder and build year (or hull identification number-HIN).

All new recreational vessels manufactured or imported into Queensland since September 2006 are required to show an Australian Builders Plate (ABP) built to Australian Standard AS 17991 or other equivalent standard.

The ABP shall be readily visible to the operator of the boat when getting the boat underway, preferably in the cockpit or near the steering position.

If the boat goes into exposed waters or rough conditions, as a general rule, the operator needs to reduce the number of people on board by one-third to increase stability.

If a personal watercraft (PWC) capable of carrying 3 people or more is not fitted with a suitable manufactures label displaying the maximum number of people and the maximum mass (expressed in kilograms) the craft may carry, it must then be fitted with a builders plate.

Builders plates and average body mass

As the average size for passengers can now be 80kg or greater, skippers should compensate for this in load calculations.

Buoyancy flotation

Builders plates also describe the buoyancy flotation of the vessel if the vessel is swamped or capsizes.

Basic flotation

The boat will remain afloat either by the bow or upside down. This allows passengers to stay with the boat till help arrives and may provide some shelter and more time to activate emergency procedures.

Level flotation

The boat will remain in a level position as shown in the figure on the right. The advantage of level flotation is that it provides the opportunity to bail water out of the boat. This is why a bucket with a safety lanyard is recommended as part of safety equipment.

Inadequate flotation

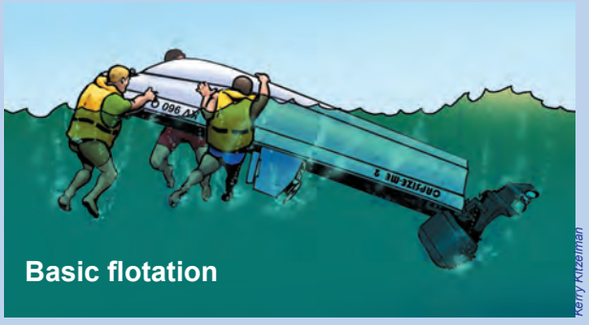
A boat with no flotation sinks quickly.

Inbuilt buoyancy

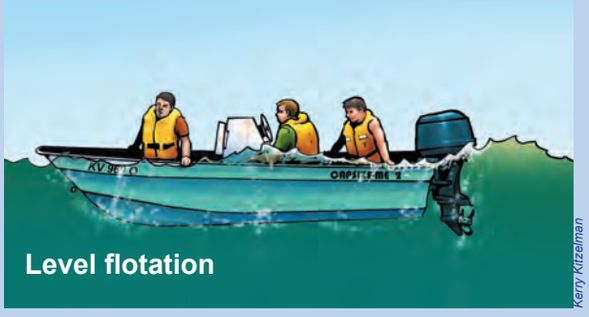
- Many smaller boats have built in buoyancy and are said to have positive flotation.
- Boats can get a positive flotation statement from an authorised marine surveyor or boat manufacturer. This can affect the requirement for boats to carry life jackets in smooth waters.

Bob Moffatt

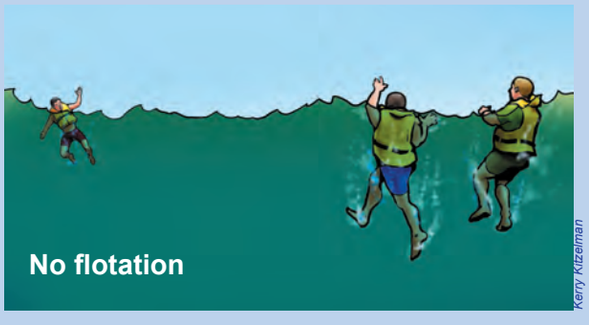
CHECK THE BUILDERS PLATE FOR BOAT LOADING AND FLOTATION



Kerry Kitzelman



Kerry Kitzelman



Kerry Kitzelman

LABELS AT THE HELM MUST INFORM THE OPERATOR ABOUT LOADING AND BUOYANCY

1.5 Safety equipment

Safety equipment MUST be able to be found in a timely manner

- The general safety obligation requires all boat owners and operators to make sure the boat is safe, appropriately equipped and crewed, and operated in a safe manner.
- Boats requiring registration must carry the regulated safety equipment (refer to the safety equipment regulations on page 23).
- In some circumstances, additional safety equipment should also be carried to satisfy the general safety obligation.

  This allows boat owners and operators to choose the equipment best suited for the type of boat and intended voyage.
- When deciding what to take on board, remember your obligation – if you fail to carry a piece of equipment that could have helped to prevent an accident, you could be prosecuted.

Safety briefing

- The owner or master must give each person on board information about where the safety equipment is kept.
  - The CREW must know where the life jackets and safety equipment are located.
  - The SKIPPER can receive ***an infringement notice*** if the crew cannot locate safety equipment in a timely manner.
- Items such as flares, torches or first aid kits, that can be affected by water must be kept in water tight containers.
- Other safety items such as anchors and lines should be stowed so as not to cause potential hazards while the boat is in motion.
- Life jackets must be stored where they are clearly visible or kept in a place readily accessible and indicated by a clearly visible sign with a white background marked with the word 'life jackets' in red letters or a red background with white letters.
- Wearing life jackets is strongly recommended to prepare for emergency situations. For example;
  - At the first sign of bad weather, at night, when visibility is restricted, when boating in unfamiliar waters or alone; or
  - When operating in a following sea, by persons who are poor swimmers or when boating alone.

Bar crossings

- It is compulsory to wear a life jacket when crossing the following designated coastal bars in open boats less than 4.8 metres.
  - *Currumbin Bar*
  - *Jumpinpin Bar*
  - *Caloundra Bar*
  - *Noosa Bar*
  - *Round Hill Creek.*
  - *Mooloolah River mouth*
  - *Tallebudgera Bar*
  - *South Passage Bar,*
  - *Maroochy Bar*
  - *Wide Bay Bar*
  - *Gold Coast Seaway*

Serviceability

- Safety equipment needs to be serviceable. So check for wear and tear and repair or replace so that it will work when required.
  - If life jackets are ripped, torn or faded they are no longer serviceable and should be replaced.
- One way to look after life jackets is to NOT use them as seat cushions.

UNDER 4.8m - UNDER 12 - UNDERWAY LIFE JACKET COMPULSORY

SAFETY EQUIPMENT LOCATION BECOMES OBSCURED WHEN HATCH IS CLOSED

Life jackets

Here are some important points to remember about life jackets to avoid getting a fine.

- Life jackets should be accessible at all times; if they aren't visible to passengers you must clearly sign where life jackets are stowed. The sign must have the words 'life jacket' in red text on a white background or white text on a red background.
  - They must be kept in good condition.
  - They must fit the wearer – ill-fitting life jackets won't meet the safety equipment requirement.
  - Make sure you know how to put them on quickly.
  - Do not use life jackets as a cushion.

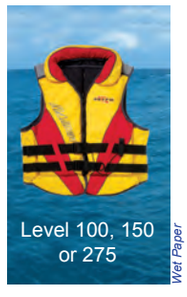
Life jackets must comply with standards

Life jackets should be marked correctly to ensure they comply with standards.

- For a life jacket to comply with a particular standard, certain information required under that standard must be displayed.
- The current standard for life jackets is Australian Standard 4758 (AS 4758). This standard has replaced Australian Standard 1512–1996, Australian Standard 1499–1996 and Australian Standard 2260–1996.
- You do not have to upgrade your current life jacket under the old standards – they will still be acceptable for use as long as they are in good condition. AS 4758 has a different rating system than the previous standards.

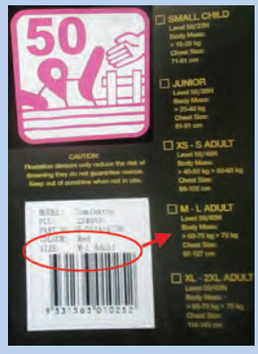
For use in smooth, partially smooth and open waters

- To comply with Australian Standard 4758 it must be marked 'Level 100', 'Level 150' or 'Level 275' and can be used by skiers or people being towed.
- To comply with Australian Standard 1512–1996 it must be marked 'Life jacket type 1'.
  - A level 100 or above cannot be used on personal watercraft (PWC).

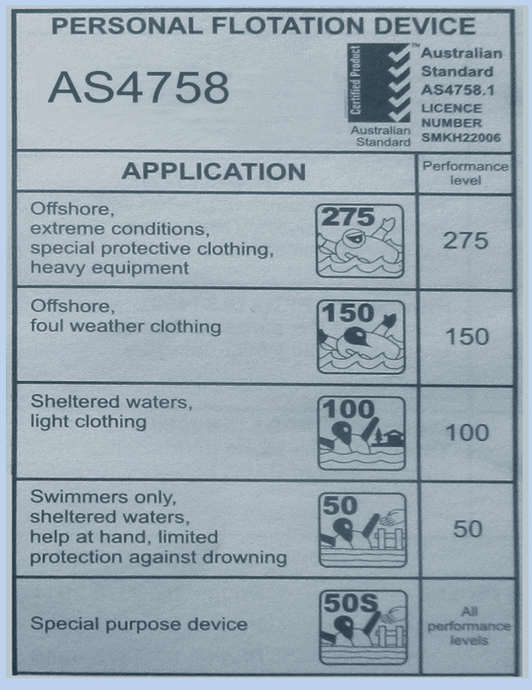


Level 100, 150 or 275

Wet Paper



Example of 2008 AS 4758 labels



The level stands for ***Newtons of Buoyancy*** (N) and is the amount of force or upthrust provided by a life jacket in water

Wet Paper

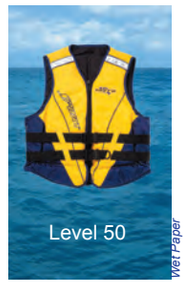
Level 100

- **Life jacket type and model identification**
- **Intended mass range**
- **Illustrated donning instructions**
- **Standards symbol**
- **Instructions for care and storage**
- **Manufacturer's name, date of manufacture, batch number**

CONSIDERATIONS WHEN SELECTING A LIFE JACKET

Bob Moffat

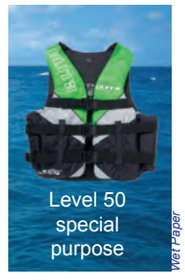
For use in smooth and partially smooth waters



Wet Paper

- To comply with Australian Standard 4758 it must be marked 'Level 50'.
- To comply with Australian Standard 1499-1996 it must be marked with 'Life jacket type 2'.
- Keeps you afloat but does not have a collar to keep the head above water.
- Can be used by skiers or people being towed in smooth or partially smooth waters.
- Can be used by PWC riders in smooth and partially smooth waters or beyond those waters.

For use in smooth waters



Wet Paper

- To comply with Australian Standard 4758 it must be marked 'Level 50 special purpose'.
- To comply with Australian Standard 2260-1996 it must be marked with 'Life jacket type 3'.
- May be a specified buoyancy wet suit.
- For use in smooth waters and only where the user is likely to be in the water for a short time.
- Can be used for skiers or people being towed in smooth waters.
- Can be used by PWC riders in smooth waters.

Inflatable life jackets

- Inflatable life jackets are approved equipment and must comply with the same standards that are applied to foam life jackets. They must be gas inflated and not rely on oral inflation only.
- Inflatable life jackets used on a recreational boat must show an expiry date and be serviced by the manufacturer or authorised service centre according to the manufacturers service requirements.
- Alternatively where the manufacturer has established a documented service program the owner or master can service the life jacket themselves provided they can produce documented evidence showing adherence to the service program.

Coastal and SOLAS

- These jackets have more flotation. They are bulky life jackets designed to keep the body afloat for long periods.
- They have reflective tape, a whistle and light to attract attention.
  - These jackets are designed for commercial boats and recommended to be carried by boats operating long distances offshore.

Life jackets on children

- When choosing a life jacket for a child (over 12 months of age), care must be taken to ensure it fits properly and the child will not slip out of it when in the water.
- If you are under 12 and the vessel is under 4.8 m and underway, you MUST wear a life jacket.

Further information at

www.msq.qld.gov.au/Safety/Life-jackets.aspx


Wet Paper

INFLATABLE LIFE JACKETS

The outer cover expands to reveal a inflation bladder with high visibility markings and signal whistle

SERVICE STICKER AND RECHARGE KIT

Bob Moffatt

COASTAL LIFE JACKET
Level 275 or 150

Bob Moffatt

SOLAS
Level 275, or 150

EPIRB's

An EPIRB is a *emergency position indicating radio beacon* and *w*hen activated in a life-threatening situation, assists rescue authorities in their search to locate those in distress.

- An EPIRB must comply with the Australian Standards (4280.1:2003) and must be:
  - Carried when boating in open waters more than 2 nautical miles from land, beyond partially smooth waters;
  - Registered with the Australian Maritime Safety Authority (AMSA). Registration is free and must be renewed every two years. You need to tell AMSA when the EPIRB ownership or boat details change.
- EPIRBs are designed to float in the water for up to 48 hours to optimise the signal to a satellite.
- 406 MHz EPIRBs come in two basic types: those that provide an encoded (GPS) location and those that do not.
  - The satellite system can calculate a beacon's location, but locating a distress site is usually much faster if the beacon signal provides a GPS location.
- A HexID or Unique Identity Number (UIN) is the unique code programmed into each 406 MHz distress beacon and transmitted when the beacon is activated. This is shown in the photograph above.

Use

- EPIRB's should only be used when there is a threat of grave and imminent danger. In the event of an emergency, communication should first be attempted with others close by using radios, phones and other signalling devices. Mobile phones can be used but should not be relied upon as they can be out of range, have low batteries or become water-damaged.
- **Operation:** Break the tamper seal and switch on. After three minutes a red light will flash indicating the EPIRB is transmitting. There are more expensive types that can be activated when they touch water.
- **Stowage**: In a boat, an EPIRB should be stowed in its mounting bracket where it is visible and easy to access in an emergency or in a grab bag along with flares, a torch or strobe and other safety equipment.
  - Water activated EPIRBs should always be stowed in their brackets correctly when not in use.

A 406 MHz EPIRB, and UI number

Wet Paper

GME

Unwanted EPIRBS must be disposed of responsibly. Dispose of your unwanted EPIRB at no cost by placing it in the collection bins of any Battery World store around Australia.

- **Batteries:** EPIRB batteries need to be replaced before the expiry date noted on the label of the beacon. This will ensure that the beacon will transmit for the minimum time required once activated.
- **Servicing:** The manufacturer or its agent should service batteries.

Registration

- EPIRBS have to be registered with AMSA (Australian Maritime Safety Authority) www.amsa.gov.au/beacons
- Documentation is required and their web site has all the details as things change too fast for this publication to keep up to date. Note that the expiry date is not the service date for the EPIRB.
  - When registering a distress beacon, this code must be included on the registration form as it is the only code that links the individual distress beacon to the registration database. Without the HexID, the beacon cannot be registered.
- For the latest information on EPIRB coding and decoding see: ***www.amsa.gov.au/beacons***

What if an EPIRB is accidentally activated?

The most important thing to do is to switch off the beacon and notify the Australian Rescue Coordination Centre as soon as possible by calling 1800 641 792 to ensure a search and rescue operation is not commenced. There is no penalty for accidental activation.

Carbon monoxide and boats

Carbon monoxide is a toxic gas made by incomplete ignition or burning of carbon-based fuels like petrol, propane, charcoal, wood and oil. You can't smell it, see it or taste it, but it can pose a real threat to the personal safety of those on board your boat. Sources of carbon monoxide on your boat include engines, gas cooking ranges gas space and water heaters.

Boats with partially-enclosed cabins, wheelhouses or passenger accommodation are at higher risk because exhaust fumes (including carbon monoxide) that are discharged overboard can be drawn back into, and accumulate in, these areas.

Xintex CMD-4MR CO Detector

Carbon monoxide alarms

Fitting and maintaining carbon monoxide detectors and alarms is a good way to minimise the risks of carbon monoxide poisoning. Carbon monoxide sensors monitor the level of the gas and make an alarm sound before carbon monoxide levels become hazardous.

You can read more at

http://www.msq.qld.gov.au/Safety/Carbon-monoxide-and-boats

Personal items

- A hat that does not blow off, sunnies and sunscreen are essential for Queensland conditions.
  - Make sure the sunscreen is not out of date as it is less effective after many years in a boat.
  - Make sure the water is fresh and not in an old plastic bottle that has been in the sun for a long time.
  - Carry two litres per person per day in summer.
  - Insect repellent, spare clothing and a first aid kit are essential if taking children.
  - A kitchen plastic "snap top" container with minimal packaging will minimise rubbish. Avoid chip packets and lolly wrappers as they easily blow away.

Bob Moffatt


Bob Moffatt

Bob Moffatt

Fire fighting equipment

- Every boat with fuel aboard should carry at least one dry-powder fire extinguisher, mounted in an easily accessible and dry position. Check the fill gauge, shake regularly to stop the powered compacting and service according to the manufacturers instructions.
- Remember all gear used on boats is subject to corrosion and can deteriorate quickly so check regularly and spray with water repellent anti – corrosion agent.


Bob Moffatt


Chubb

TAKE THE BIGGEST THAT IS SUITABLE FOR YOUR BOAT

Signalling equipment

- A torch is essential for emergency signalling. Don't forget to take spare batteries.


Bob Moffatt

Bob Moffatt

DON'T FORGET A SPARE BATTERY

V sheet

- A V sheet is one of the simplest ways to attract attention and indicates to other boaties that assistance is required.
- This sheet is required in partially smooth and open waters.


Bob Moffatt

Bob Moffatt

A V SHEET IS A SIMPLE WAY TO SIGNAL FOR HELP

Anchor, rope and chain

- The type of anchor selected depends on the size of the boat and the area of operation.
  - For boats under 5 metres, the cable can be 2 metres of chain plus rope.
  - For boats over 5 metres you need to check the safety table (see page 23).
- A simple rule for vessels under 5 metres is 1m of chain for every 1 m of boat.

TYPES OF ANCHOR

Danforth

General purpose, not suitable for reefs.

Plough

General purpose, not suitable for reefs.

Bruce

Good holding power

Sarca

Good holding power

Grapnel

Folding type may be suitable for PWC's

Reef

Specific purpose for reefs

Sea

For use in rough weather


Wet Paper

Pumping and bailing

- On smaller vessels, a 2 metre length of rope (a lanyard) attached to a bucket is recommended to remove water from waves that splash into the boat. A rectangular bucket can sometimes scoop water more efficiently than a round bucket.
- On larger vessels a bilge pump is required to remove water from the bottom of the boat.

Oars

- On smaller vessels a set of oars is recommended.

Flares and smoke signals

- Flares are used to attract attention in a distress situation. They should be stowed in a safe and preferably dry place on board ideally in water tight containers and must not exceed their expiry date.
- The table opposite shows when they should be carried.

Use

- Flares and signals, as shown below, are ignited by reading the instructions, unscrewing a cap, pulling a tab up and out quickly and holding the flare to leeward as shown in the figures below.
  - These flares are visible by aircraft for about 8.6 nautical miles at night and 4.3 nautical miles during the day.

Parachute flares

- Parachute flares are usually fitted with a firing mechanism located underneath the bottom cap. These flares are visible for about 20 nautical miles at night and a lesser distance during the day.

Notes

- Out of date flares can be disposed of at Fire Stations, Coast Guard and VMR bases.
- Consider having a set of gloves in your tool kit for hand protection if flares are required.

PUMPING/BAILING EQUIPMENT

Wet Paper

Bob Moffatt

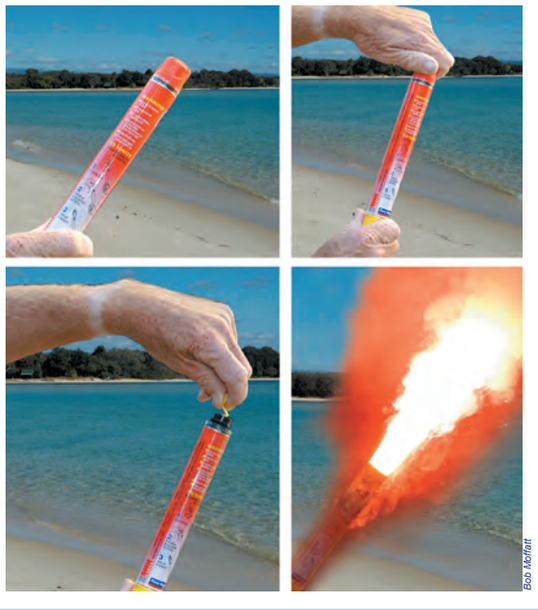
FOR VESSELS UNDER 6 METRES

Bob Moffatt

FLARES ARE COMPULSORY

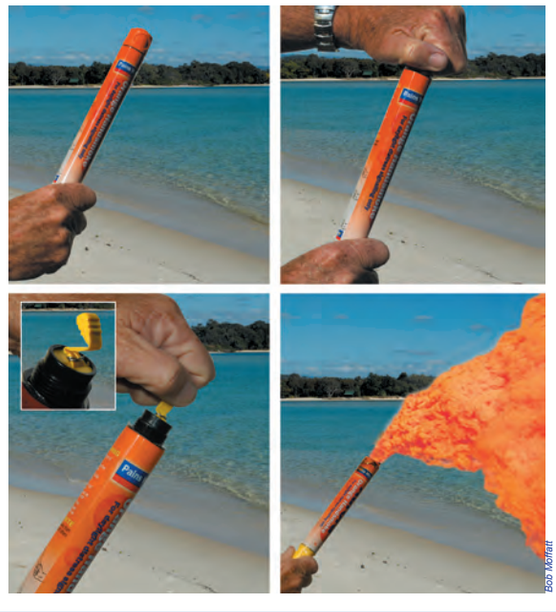
Safety suggestion

A pair of gloves in the tool kit can be a useful addition



Bob Moffatt

RED FLARE



Bob Moffatt

ORANGE SMOKE SIGNAL

Safety equipment for Queensland regulated ships

All equipment must be in good working order. For EPIRBs, fire extinguishers, flares and inflatable lifejackets, check the service expiry or replacement date. Make sure yours are current.

- Boats not requiring registration means Queensland regulated ships with an engine or auxiliary under 3 kW.
- Boats requiring registration means Queensland regulated ships with an engine or auxiliary of 3 kW or more. Requirements or recommendations listed also apply to international or interstate boats operating in Queensland.
- PWC means personal watercraft or a jet ski.
- Required means equipment that must be carried. Recommended means equipment that is suggested to be carried to meet the General Safety Obligation.
- Safety equipment and registration requirements for tenders to Queensland regulated ships SEE http://www.msq.qld.gov.au/Safety/Safety-equipment-recreational-ships

Item	Smooth water			Partially smooth waters			Beyond smooth and partially smooth waters		
	Not requiring registration	Registered*	PWC	Not requiring registration	Registered*	PWC	Not requiring registration	Registered*	PWC
EPIRB (406MHz): Emergency Position Radio Indicating Beacon. When operating more than 2nm from land. Must be registered with AMSA Registration must be renewed every two years.							Required	Required	Required
	EPIRBS must have a printed expiry date and be replaced or serviced by the manufacturer (or authorised service agent) by this date; must comply with Australian Standard AS/NZ 4280.1 - 2003; and must be registered in the name of the owner/master with AMSA. You need to tell AMSA when the EPIRB ownership or boat details change.								
Signalling device: For example a torch, fluorescent light, or lantern or cyalume stick. Required when operating between sunset and sunrise.	Required	Required	Required	Required	Required	Required	Required	Required	Required
Life jackets # • One of the appropriate size for each person (12 months and over) on board except if a person is wearing an inflatable diver jacket and the vessel is engaged in diving activities. • Children under 12 must wear a life jacket when underway in an open boat under 4.8m. • Skiers or people being towed + Level 50 or level 50 special purpose with the option of wearing a level 100 + Level 50 in partially smooth waters.	Level 275, 150, 100, level 50 or level 50 special purpose recommended	Level 275, 150, 100, level 50 or level 50 special purpose required	Level 50 or level 50 special purpose required	Level 275, 150, 100 or level 50 recommended	Level 275, 150, 100 or level 50 required	Level 50 required	Level 275, 150 or 100 recommended	Level 275, 150, or 100 required	Level 50 required
	• If the boat has positive flotation**, and grab handles, lines or a secure hold for each person on board, a life jacket is not required in a river, creek or stream, or waters contained within breakwaters or revetments.			• Life jackets must be worn when crossing designated bars in open boats under 4.8m. Page 17 lists current Queensland designated bars.			• Life jackets must be worn when crossing designated bars in open boats under 4.8m. Page 17 lists current Queensland designated bars.		
V sheet				Recommended	Required	Required>	Recommended	Required	Required>
Flares: Two red hand held flares and two hand held orange smoke signals.				Recommended	Required	Required>	Recommended	Required	Required>
Fire fighting equipment: All boats over 5 metres must be capable of extinguishing a fire quickly and effectively.	Recommended	Required		Recommended	Required		Recommended	Required	
Navigation: A chart and a liquid damped compass appropriate to the operational area, or other direction finding or positioning equipment. For a PWC without a chart or compass, an electronic navigation device appropriate to the operational area.				Recommended	Recommended	Recommended>	Recommended	Recommended	Recommended>
Anchoring: For boats less than 5 m, the cable can be chain or rope. For boats over 5m, the cable can be chain of at least 2m attached to anchor and rope. Length of chain/rope should be appropriate for the depth of water you are anchoring in. For PWC, and anchor and cable appropriate to the area of operation	Recommended	Recommended		Recommended	Recommended	Recommended>	Recommended	Recommended	Recommended>
	• less than 5m, one anchor with 18m cable • 5-8m, one anchor with 27m cable • over 8m, two anchors with 37m cable each			• less than 5m, one anchor with 27m cable • 5-8m, one anchor with 27m cable • over 8m, two anchors with 37m cable each			• less than 5m, one anchor with 27m cable • 5-8m, one anchor with 27m cable • over 8m, two anchors with 37m cable each		
Pumping bailing equipment	Recommended	Recommended		Recommended	Recommended		Recommended	Recommended	
	• less than 5m: suitable bailing equipment • 5-8m: bilge pump 45L/minute capacity • Over 8m : bilge pump 70L/minute capacity			• less than 5m: suitable bailing equipment • 5-8m: bilge pump 45L/minute capacity • Over 8m : bilge pump 70L/minute capacity			• less than 5m: suitable bailing equipment • 5-8m: bilge pump 45L/minute capacity • Over 8m : bilge pump 70L/minute capacity		
Manual propulsion Oars or paddles (boats under 6m)	Recommended	Recommended		Recommended	Recommended		Recommended	Recommended	
Drinking water: Enough for everyone on board	Recommended	Recommended		Recommended	Recommended	Recommended>	Recommended	Recommended	Recommended>

** A positive flotation statement is a certificate, in the approved for, from a manufacturer or an accredited marine surveyor. It is not required to be carried on board, but an enforcement agency may ask the owner to provide proof of its existence.

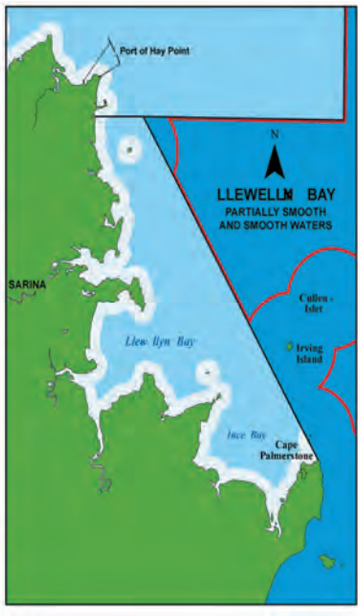
> Does not apply to a personal watercraft operating -
(a) as part of an aquatic event held in accordance with an aquatic event authority; or
(b) beyond partially smooth waters and within 0.5n miles from land

Owners/masters must give each person on board information about where the safety equipment is kept. Life jackets must be clearly visible to passengers or readily accessible and indicated by a clearly visible sign with a white background marked with the words "life jackets" in red letters or vice versa .

* Also includes boats that are required to be registered but are not

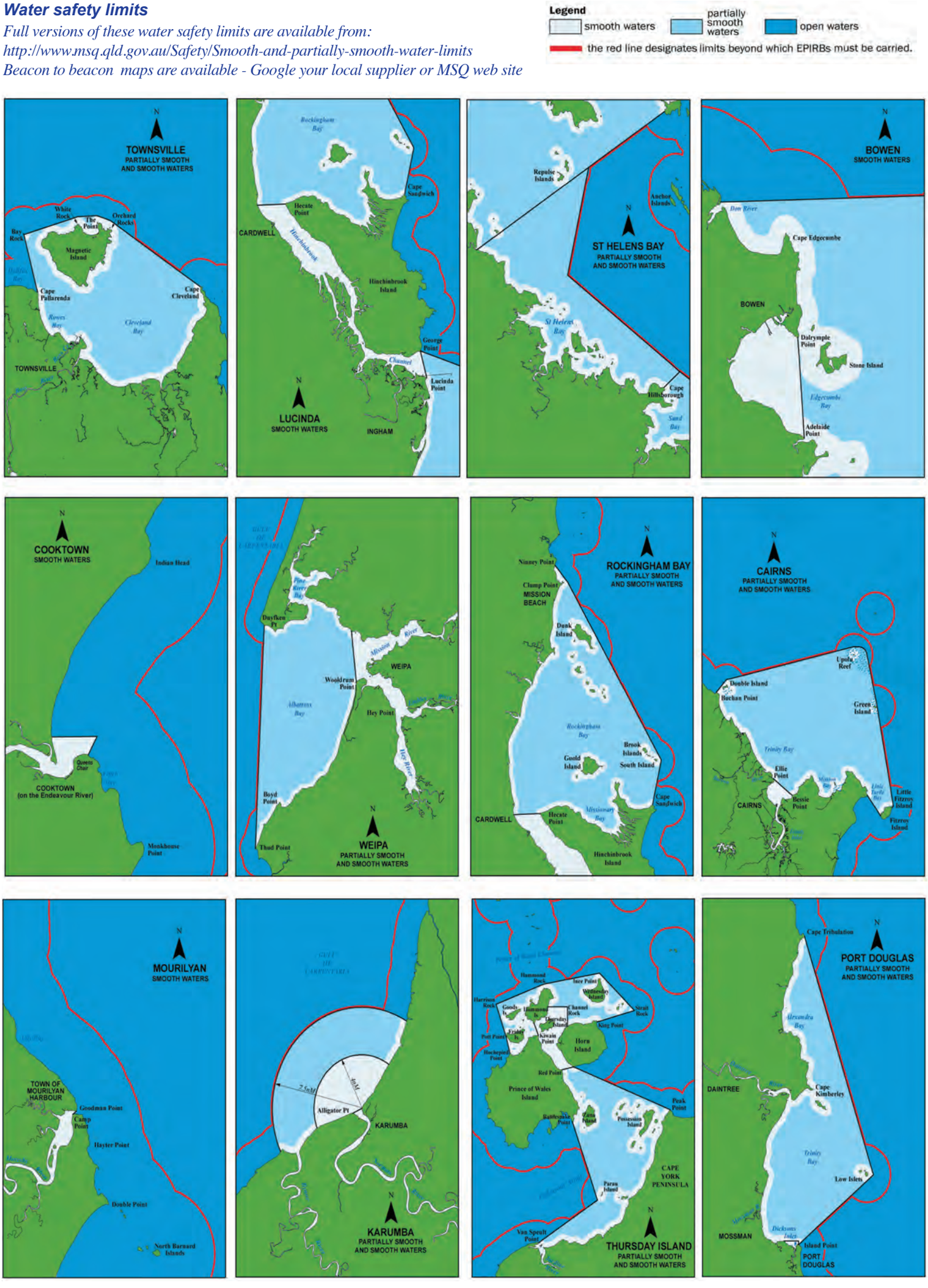
Water safety limits

Full versions of these water safety limits are available from:
http://www.msq.qld.gov.au/Safety/Smooth-and-partially-smooth-water-limits
Beacon to beacon maps are available - Google your local supplier or MSQ web site



Water safety limits

Full versions of these water safety limits are available from:
http://www.msq.qld.gov.au/Safety/Smooth-and-partially-smooth-water-limits
Beacon to beacon maps are available - Google your local supplier or MSQ web site



1.6 Pre-departure checks

A discussion of pre-departure checks is a good way to apply what you have learnt so far in this book.

These checks involve a trip plan, boat check, planning for emergencies, checking your radio, fish finder, navigation equipment and spares you need to carry.

Trip plan

Four essential things to do when developing your trip plan are;

- Study the chart and tides;
- Study the weather forecast;
- Work out how much fuel you will need and
- Leave your trip plan with someone reliable.

Study the chart and tides

As part of your GSO, you need to know where you are going, how to get there without running aground, how long it will take and how to get back.

[√] Download and print off local charts from the MSQ web site or buy the beacon to beacon manual by searching the internet for a supplier.

[√] Look at these charts and find out about safe channels, navigation marks, anchorages and sandbanks.

[√] Make sure you have up to date charts showing places where you can shelter if weather turns bad.

[√] Check tides, tidal flow and bar conditions.

Pages 50-52 have more details.

Study the weather forecast

As part of your (GSO) *General Safety Obligation* you have to check the weather before you go out.

[√] Check for wind speeds, wave heights and forecast changes that may occur from a reliable source. Check for warnings.

[√] Prepare contingency plans for shelter if you are going for longer periods.

Pages 48-49 have more details.

Work out how much fuel you will need

As fuel ages, active components that are ignited by spark plugs, break down causing the motor to stop.

It is recommended not to keep fuel for more than two months and especially check with the manufacturer's specifications about the use of E10 fuel.

[√] Empty the tank and mix fresh fuel next time the engine is used.

[√] Check there is enough for the trip (including the emergency reserve).

[√] For direct injection motors where oil is not mixed with the fuel, ensure that the oil reserves are kept full.

Leave your trip plan with someone reliable

Always let someone know your plans in plenty of detail. If your plans change, keep your contact person up to date and if you have logged with the VMR - don't forget to log OFF when you return.

Here are some suggestions.

[√] Where you intend launching, where you want to go and when you expected to return.

[√] Names and telephone numbers of people on board.

[√] Amount of fuel carried.

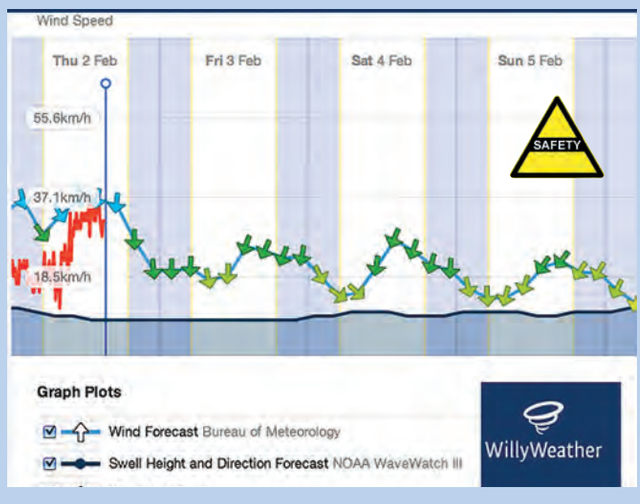
[√] A list of safety equipment carried as appropriate, eg EPIRB.

[√] Boat description, registration numbers or photo.

[√] Car a trailer registration numbers.

[√] What to do if you don't return by a certain time.

DOWNLOAD OR BUY LOCAL CHARTS



Courtesy WillyWeather

STUDY THE WEATHER FORECAST AND TIDES

Bob Moffatt

I'VE GONE FISHING ..Eg

Time .....
I'm departing from .....
I'm with .....
I'll be home at .....
Weather forecast .....
Vessel rego .....

Call sign .....
The car's at .....
I've taken .... L of fuel

LET SOMEONE KNOW BEFORE YOU GO

Boat check

The skipper should ensure that the boat is in a 'seaworthy' condition and that it is used within designed limitations.

Engine and fuel lines

[√] Check the engine starts and the water pump is working by running the motor with ear muffs and checking the tell tail.

[√] Check the tilt mechanism on the motor and battery strength.

[√] Check steering cables and connections are in good condition.

[√] Check propeller shaft for caught line (Eg fishing line).

[√] Check fuel filter is clean or has been replaced to prevent clogging.

[√] Inspect fuel lines, manual priming bulb, shut off valves, pumps and connections for cracks, corrosion, wear, hardening and or leaks.

[√] Review spare fuel container and filler funnel if there is a need to carry extra fuel.

[√] Before operating switches or engines, check for petrol and or/ LPG odours.

[√] Check that the bungs are secured and the spare in the tool kit.

Battery and electrical system

[√] Test the battery, recharge and renew if required. Don't use car batteries for boats.

[√] Examine terminals and ensure the connections are tight. Do the same for the second battery if carried.

[√] Make sure lights are in working order - it may be daylight on your way out but you could be delayed on returning.

[√] Test any other equipment operating from the battery such as radio, navigation equipment, bilge pump, gauges and power tilt.

Stability

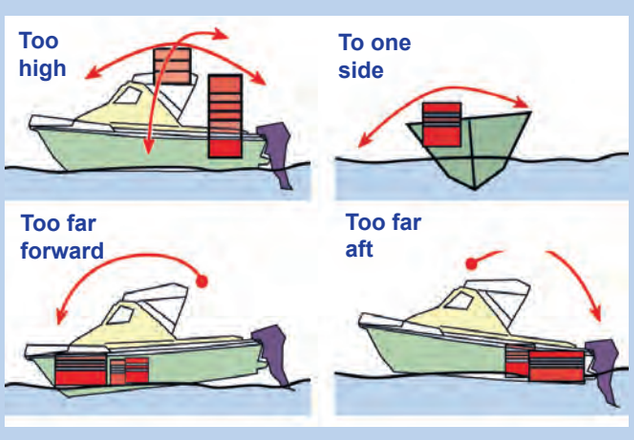
Overloading is illegal. Consider the weight you are going to load into the boat. Heavy loads such eskies, ice, larger passengers, fish as well as extra fuel and tackle all need to be considered.

[√] Look at the builders plate and determine how many passengers you can take in relation to the cargo.

[√] Check the weight of passengers.

Cargo

√] Stow all gear securely and distribute weight evenly to attain proper trim and no list.



DISTRIBUTE WEIGHT TO ATTAIN PROPER TRIM

Passengers

[√] Remember it is always colder on the water and the sun is stronger, so carry extra jumpers, waterproof jackets and sunscreen.

[√] Skin and eyes should not be overly exposed to sunlight, either direct or reflected, wind and water.

[√] Clothing should offer protection from the elements and avoid clothing that restricts your ability to move around the boat. Try to avoid clothing that will reduce buoyancy.

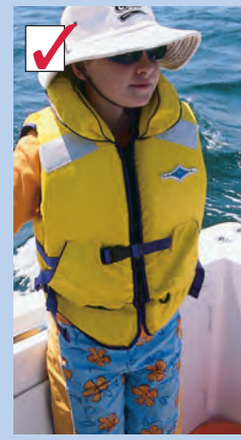
[√] Check how well crew can swim.

[√] Make sure children know how to call out for help if they are in trouble. Make sure everyone knows how to put on a life jacket, can swim or at least tread water.

[√] Make sure all children wear a life jacket and that it is the right size. Remember, in Queensland all children under 12, in a vessel under 4.8 metres, must wear a life jacket.

[√] Look at means of rigging life lines in open waters so children have enough handholds.

[√] One life jacket should be available for each person on board.



CHECK CLOTHING APPROPRIATE FOR CONDITIONS

MAKE SURE LIFE JACKETS FIT CHILDREN

Emergency planning

Being ready for an emergency means planning ahead, considering what could happen and taking measures to avoid being rescued.

Anchors and lines

[√] Check that the appropriate anchors are on board and properly rigged, stowed and ready for use.

[√] Check that the anchors are appropriate for where you are going (especially overnight).

[√] Replace any ropes and lines that are not in good condition

[√] Always stow an anchor so that it can be "ready" for an emergency.

First aid

[√] Ensure your first aid kit is complete.

[√] If travelling for a long time, check with passengers if medication needs to be carried.

Safety equipment

Ensure the correct safety equipment is on board for the area you intend to operate in and for any emergencies you may encounter.

[√] All safety equipment must be properly stowed, easily accessible and in good working order.

[√] Check expiry dates on EPIRBs and flares.

[√] Know how to use all the safety equipment and know how to explain it in your safety briefing.

[√] Know methods of emergency signalling.

[√] When cooking devices are installed, a fire extinguisher and blanket should be carried and stored within reach of the stove.

Charts

[√] Make sure you have up to date charts showing places where you can shelter if weather turns bad.

Radio and navigation equipment

[√] If you have a radio make sure it is on and working. The best way to do this is to do a radio check with the local voluntary marine rescue association. (See section 4.5).

You can register the details of your boat and voyage with a coast guard station or local base station. That way they can search for you if you don't return. In addition, boats going beyond smooth waters should log in with their local marine rescue association.

Having a marine radio to communicate with someone on shore will go a long way to solving problems. A VHF marine radio is highly recommended. (Note this requires a licence).

[√] Check instruments and calibrate if necessary, For example, check your GPS is working and calibrate it with datum points as described on page 46.

In general

[√] Keep a sharp knife in a handy place.

[√] Refresh all fresh water containers.

[√] Check the fire extinguisher is serviced, in good condition and ready for use. Read the instructions and know how to use it before an emergency.

[√] Ensure there is sufficient fresh water and food for the length of the voyage with some extra in case of an emergency.

[√] Develop a safety plan so everyone knows what to do in case of an emergency. Be prepared for any unusual situations by making your own "what if" checklist.

[√] Make sure everyone on board knows how to find and how to use essential safety equipment such as life jackets and fire extinguishers.

Show other adults how to operate the ships radio and how to deal with emergencies.

[√] Carry adequate wet weather gear for the trip you are planning.

Spare parts and tools

The following are suggestions for outboard and inboard motors. Consult your engine handbook for any additional spares and tools that may be required.

[√] Carry basic tools for emergency repairs. This depends on the type of boat and making the appropriate selection.

LOG ON WITH LOCAL VMR

If you are logged on by radio, then don't forget to log off.

Sparesandequipment

[√] Spark plugs

[√] Replacement fuses

[√] Fuel filters

[√] Starter cord

[√] Shear pins for propeller, spare nuts and bolts

[√] Propeller (not required for inboard motor)

[√] Spare fuel line

[√] Spare bung

[√] Spare oil and hydraulic fluid

[√] Shackel

[√] Duct tape

Tools

[√] Engine manual

[√] Sharp knife

[√] Hammer

[√] Spare lines

[√] Pliers

[√] De-watering spray

[√] Spark plug spanner that fits (injector spanner)

[√] Oil/fuel funnel

[√] Propeller spanner

[√] Gloves for handling hot materials

Misc

[√] Rags, cable ties, hex keys, hose clamps

CARRY SPARES AND TOOLS

Worksheet 1

See page 78 for answers

Q1. How do boat operators achieve their general safety obligation? *(Page 3)*

Q2. When is a RMDL required to operate a boat in Queensland? *(Page 3)*

Q3. Under what conditions can a unlicenced driver operate/cannot operate a boat in Queensland? *(Page 3)*

Q4. What is the responsibility of the skipper regarding alcohol? When does the blood alcohol limit of 0.05 apply, and under what conditions does it change? *(Page 3)*

Q5. When must vessels be registered in Queensland? *(Page 7)*

Q6. What rules apply to registration symbols on vessels that can plane? *(Page 7)*

Q7. What rules apply to registration labels on vessels? *(Page 7)*

Q8. List five key areas of vessel seaworthiness *(Pages 14-16)*

Q9. What are classed as pollutants under the Transport Operations (Marine Pollution) Act 1995? *(Page 5)*

Q10. What is your obligation if you are going into a marine park? *(Page 5)*

Q11. List the five important predeparture checks that need to be done before taking a boat out. *(Pages 26-28)*

Q12. Routine maintenance that must be done on the following areas of your boat. Use the notes to give an example of each. (Pages 12 - 13)

Example

Preventative maintenance (page 12)

- Give your boat a thorough pre-season check before heading out for the first day on the water.

Engine care (page 12)

Water pump (page 12)

Propellers (page 12)

Gearbox (page 12)

Fuel system (page 12)

LPG (page 12)

Batteries (page 13)

Electrical system (page 12)

Spark plugs (page 12)

Pumps (page 12)

General check of boat after every trip (pages 12 - 13)

Q13. Make a list of tools and spares for a small boat operating. (Page 28)

Project

Use the information on pages 26-28 to make up your own predeparture checklist for the boat you intend to use.

Unit 2 Navigation

2.1 The COLREGS

These rules are part of the International Regulations for the Prevention of Collisions at Sea (1972) COLREGS and ***apply to ALL vessels.***

Responsibility *(Rule 2)*

- It is the responsibility of the skipper to know the international rules and he or she cannot be excused for failing to know or adhere to them.

Proper lookout *(Rule 5)*

- This means that you should constantly look out and listen for any other vessel or obstruction.
  - You must use all available means to look out (including sight and sound). When available, other specialised equipment such as thermal imaging (FLIR), broadband radar as well web based ship tracking systems (eg, AIS) should be used.
  - Be particularly careful, especially in bad weather, restricted visibility, in darkness, at anchor, when sleeping or when the sun is shining into your eyes.

Safe speed rule *(Rule 6)*

- At all times you must proceed at a safe speed so as to avoid collision and be able to stop in an appropriate distance.
- You must take into consideration:
  - the state of visibility,
  - traffic density (including fishing or other vessels),
  - manoeuvrability and draft of the vessel,
  - at night the presence of background light and the state of the sea, and
  - your ability to manoeuvre in wind and current.
- Always keep a safe distance. Generally the faster the speed the greater the distance.

Risk of collision *(Rule 7)*

- You must at all times use all available means to determine if there is a risk of collision. This can be done by estimating the range and bearing of the other boat.
  - Such a risk shall be deemed to exist if the compass bearing of an approaching vessel remains steady while range is decreasing or does not appreciably change.
  - Risk may exist even when an appreciable bearing change is evident, when approaching a very large vessel, vessel in tow or when approaching a vessel at close range.

Action to avoid a collision *(Rule 8)*

- Any action to avoid a collision shall be positive, in ample time and with due regard to the observance of good seamanship.
  - This allows the other vessel to see your action and take this into account when determining their action.

Speed limit of 6 knots *(Rule 6)*

Wet Paper

Six knots is equivalent to a brisk walking pace. This is required:

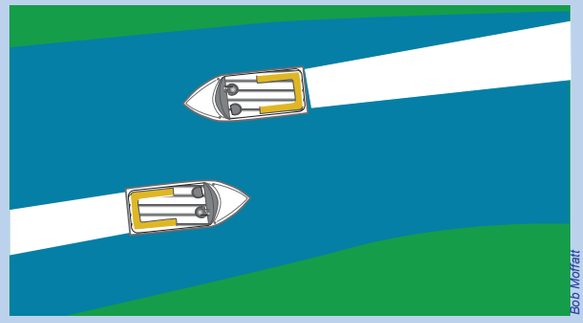
- within 30 metres (m) of
  - boats anchored, moored or made fast to the shore or aground
  - a jetty, wharf, pontoon or boat ramp
  - boat harbour, marina or anchorage area
  - persons in the water.
- within 60 m of the above and a bathing reserve and shoreline when operating a personal watercraft. Refer to Unit 6 of this book for additional information on PWC's.

Even at slow speeds your boat will create a wash. Look behind at your wash and be aware of the impact this can have on other boats, people in the water or the shore.

- When navigating near, in or through a mooring area drive slowly and keep wash to a minimum and keep a lookout for people in the water, small dinghies and trailing ropes.
- Unless otherwise gazetted or sign posted, the maximum speed you can travel in smooth waters, in Queensland, is 40 knots.

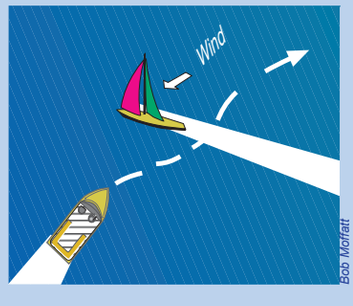
Rivers and channels *(Rule 9)*

- When navigating in narrow channels, all boats should travel on the starboard side or right hand side of the channel and pass oncoming boats on the port side.
  - vessels less than 20 m shall not impede the passage of a vessel which can only safely navigate in a narrow channel.
  - avoid anchoring in narrow channels.


Bob Moffatt

When power meets sail *(Rule 12)*

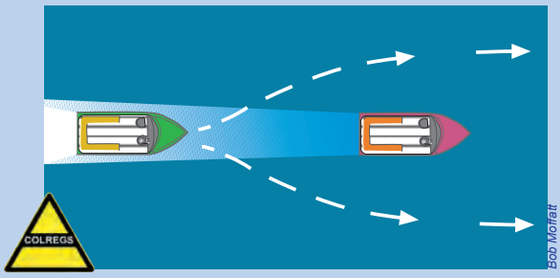
- The power boat as shown below, must give way to sailing boats, row boats, ferries and craft under tow.
  - This rule does not give a sailing vessel the right to hamper the safe passage of a power driven craft in a channel where the power craft can only navigate inside such channel.
- *Remember "If on your starboard side appears - it is your duty to keep clear".*



Bob Moffatt

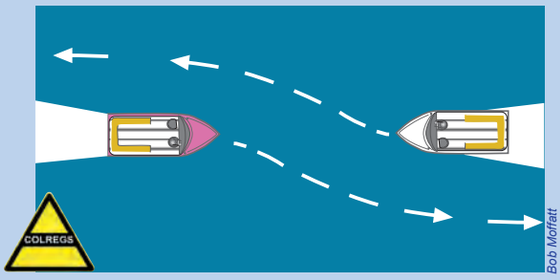
Overtaking *(Rule 13)*

- An overtaking vessel must keep clear of other vessels and pass on either side whichever is safe.



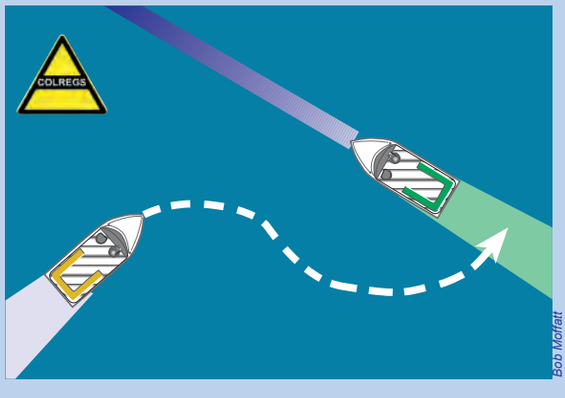
Approaching bow of another boat *(Rule 14)*

- When two power boats are approaching head on as shown below, or nearly head on, each must alter course to starboard and **pass port to port.**



Power driven boats crossing *(Rule 15)*

- When a vessel is crossing your bow from *starboard to port* you should stop or reduce speed and pass behind the stern.
- When a vessel is crossing your bow from *port to starboard* you should maintain course and speed **as you are the stand on vessel.**
  - If the other vessel does not give way, you should take all action to avoid collision.
- *Remember "If on your starboard side appears - it is your duty to keep clear".*



Action by give-way vessel *(Rule 16)*

- The vessel giving way shall keep well clear.

Action by stand-on vessel

- The stand-on vessel shall maintain course and speed until it is obvious that the other vessel is not giving way as shown below.
  - The stand-on vessel should then take whatever action as is necessary to avoid collision.

Responsibilities between vessels *(Rule 18)*

- Power driven vessels under way shall keep out of the way of a vessel sailing, engaged in fishing, constrained by her draft, restricted in her ability to manoeuvre, not under command or at anchor.

Here is an example of a hierarchy from Rule 18

- *Sea planes*
- *Power*
- *Sail*
- *Commercial fishing*
- *Constrained by their draft*
- *Restricted ability to manoeuvre*
- *Not under command*

At anchor or aground

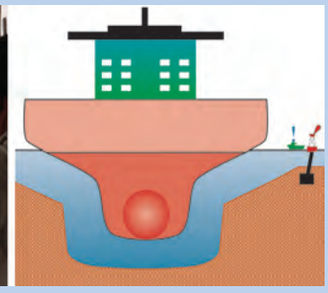
Slow to the gazetted speed but look at your wash and as a matter of courtesy you may have to slow even further.

Restricted visibility *(Rule 19)*

- This rule applies to vessels not in sight of each other when visibility is poor.
  - Reduce to a safe speed, have engines ready for manoeuvring, turn on navigation lights, sound appropriate signals, post additional lookouts and navigate with extreme care.
  - Have respect for the prevailing conditions.
- See also page 38.

Large ships in rivers and channels

- Large ships depending on their speed and load can take up to two nautical miles to stop. Their ability to see smaller vessels close to their bow is very limited.
- Power driven vessels, sailing vessels and fishing vessels shall not impede the passage of a ship (must give way) and should pass astern ships which can only safely navigate within a shipping channel. (See also rule 9)
- Large ships with the bridge at the stern will have a large blind spot for several hundred metres in front of the bow. This blind spot extends much further forward if deck cargo or containers are carried.



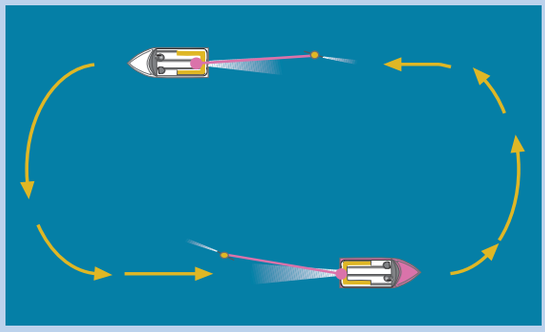
TMR and Wet Paper

- Large ships at maximum draft have minimal under keel clearance and can only manoeuvre within the designated shipping channel as shown above. When in a swing basin or alongside a berth, ships are accompanied by tugs and other vessels. Keep well clear.

Water skiing rules

- Skiing is permitted wherever it is safe to do so, provided it is not signed as prohibited.
- When skiing in narrow rivers and creeks it is common practice to travel in an anti-clockwise pattern.

Bob Moffatt



Water skiing safety obligations

- A life jacket appropriate to the area of operation, must be worn whilst skiing. Level 50 or Level 50 special purpose are recommended.
- Apart from ensuring the skier is wearing the correct life jacket, the safety actions required of a skipper require a competent observer on board, 13 years or older who should be watching the skier or towed person at all times.
- The observer's job is:
  - To immediately alert the driver if the skier falls.
  - Be familiar with the skiing signals as shown in the illustrations opposite.
- An unlicensed driver CANNOT drive a boat used for water skiing.

For further information including the latest on life jackets

See: www.msq.qld.gov.au/Safety/Water-skiing

Start: Nod the head

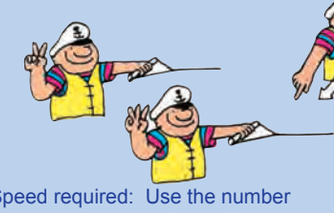
Turns: Palm vertical, curving motion of hand in direction required.

Faster: Open palm facing up - motion upwards or nod head if both hands are in use.

Whip off: Point to direction and then give quick circular motions with hand.

Slower: Open palm facing down - motion downwards or shake head if both hands are in use.

Stop: Hand up with fingers outstretched - policeman style.



Speed required: Use the number of fingers required. Thus, 23 — first two fingers then three fingers.

Back to beach: Point with downward swing of the arm.

Cut motor: Finger drawn across throat in cutting motion.

Speed OK: Arm up raised with thumb and forefinger making an "O" - the O.K. signal.

O.K. after fall: After a fall, skier should clasp hands over head if unhurt, until seen by the boat driver.

All illustrations TMR

Vessel definitions and terms

Reference: www.transport.wa.gov.au/imarine

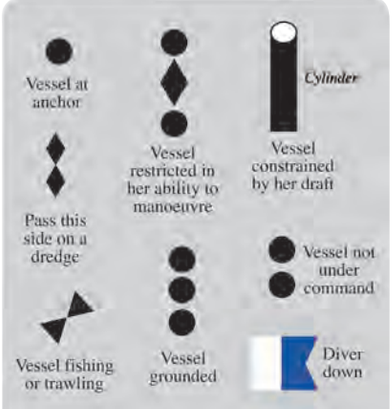
Vessel definitions and terms

- The word *vessel* includes every description of watercraft including non-displacement craft, seaplanes used or capable of being used as a means of transport on water.

  The length of a vessel also determines what lights and safety gear she must carry.
- The word *sailing vessel* means any vessel under sail, provided that a motor, if fitted, is not being used for propulsion.
- The term *power driven* means it is driven by a motor.
- The term *vessel engaged in fishing* means the boat has fishing gear that restricts its manoeuvrability.
- The term *vessel restricted in her ability to manoeuvre* applies to one which is working on a task that restricts her movement. Some examples could include:
  - a vessel towing, mine clearing, laying surveying or submarine cables, transferring cargo, picking up navigation marks, engaged in launching or recovery of aircraft, replenishment of stores or transferring cargo or passengers.
  - Eg, the vessel dredging as shown in the photograph opposite.
- The term *vessel constrained by her draft* is one which has to manoeuvre within a designated shipping channel or she will run aground.
- The term *vessel under way* means the vessel is not at anchor, aground, tied up at the dock or tied up at the shore.
- Vessels are said to be *in sight of one another* when they can be seen with the naked eye.
- The term *vessel not under command* means the vessel is unable to abide by the rules and cannot get out of your way due to exceptional circumstances.
- The term *restricted visibility* means you cannot see other vessels because of fog, mist, snow, sand or heavy rain.

Day shapes

- The day shapes shown opposite are used to indicate to other vessels the type of activity on board or in close vicinity of the vessel.



DAY SHAPES

Bob Moffatt

POWER DRIVEN LESS THAN 12 M

Bob Moffatt

ENGAGED IN FISHING
When fishing gear is lowered

Bob Moffatt

RESTRICTED IN ABILITY TO MANOEUVRE

TMR

CONSTRAINED BY HER DRAFT

Bob Moffatt

UNDERWAY
When the crew member lets go the line

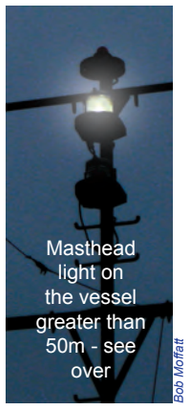
Viewfinder

UNDERWAY AND MAKING WAY

Lights and shapes *(Rule 20)*

- All vessels used at night or in periods of restricted visibility must carry lights so that the vessel can be seen.
  - This enables vessels at sea to identify other types of vessels, where they are, and the direction they are travelling.
- The figures and photographs on this and the following pages illustrate these points.

Definitions of lights *(Rule 21)*



This rule defines the types of lights.

- The *masthead light* is a white light placed over the fore and aft centre-line of the vessel showing an unbroken light over an arc of the horizon of 225 degrees and so fixed as to show the light from right ahead to 22.5 degrees abaft the beam on either side of the vessel as shown opposite.
- *Sidelights* mean a green light on the starboard side and a red light on the port side each showing an unbroken light and over the arc of the horizon of 112.5 degrees and so fixed as to show the light from right ahead to 22.5 degrees abaft the beam on its respective side.
  - In a vessel of less than 12 metres in length the sidelights may be combined into one lantern carried on the fore and aft centre-line of the vessel as shown above.

- The *stern light* means a white light placed as nearly as practical to the stern showing an unbroken light over an arc of 135 degrees and so fixed to show the light 67.5 degrees from right aft on each side of the vessel.
- A *towing light* is similar to the stern light except it is *yellow*.
- An *all round light* is made so that it can be seen all round the vessel.
- A *flashing light* means a light that is flashing at regular intervals of 120 flashes or more per minute.

How lights can be interpreted

- Lights are constructed and positioned on the boat at definite angles so that an observer can determine which direction the vessel is approaching as shown in the illustration below.

Visibility of lights *(Rule 22)*

The distances these lights can be seen is:

For small vessels (less than 12 metres)

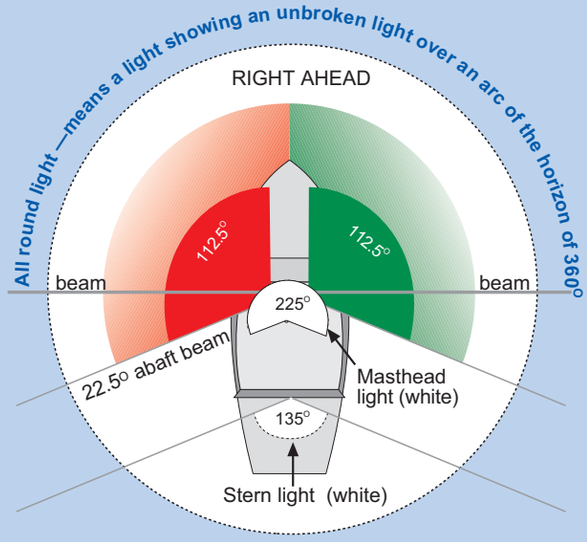
- Masthead light - 2 nautical miles
- Sidelights - 1 nautical mile
- Stern and towing lights - 2 nautical miles
- Any other lights - 2 nautical miles

For vessels (12 to 50 metres)

- Any light - 2 nautical miles (except where the length of the vessel is less than 20 metres - a masthead light visible for 3 nautical miles)

For vessels (50 metres or more)

- Masthead light - 6 nautical miles, Sidelights - 3 nautical miles, Stern and towing lights - 3 nautical miles and any other lights - 3 nautical miles.

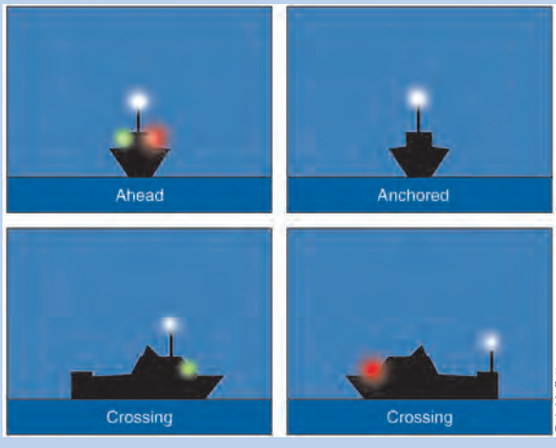


LIGHT DEFINITIONS

PORT SIDE LIGHT

COMBINED LIGHT

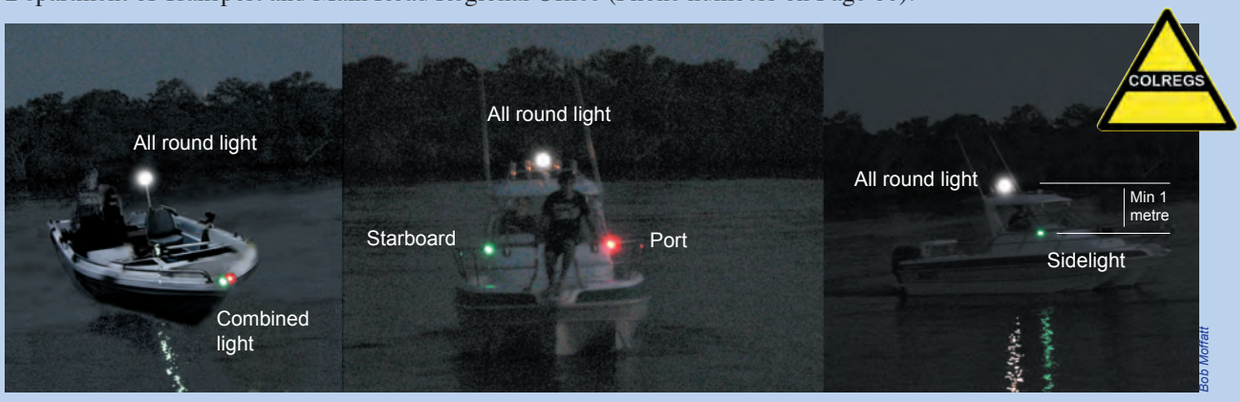
ALL ROUND LIGHT



HOW LIGHTS WORK

Lights for power driven vessels

Most power driven vessels of less than 12 metres in length exhibit an all-round light and side lights. Side lights can be combined as the one shown below. If you are unsure as to the correct fitting of your lights, you can contact the Department of Transport and Main Road Regional Office (Phone numbers on Page 80).



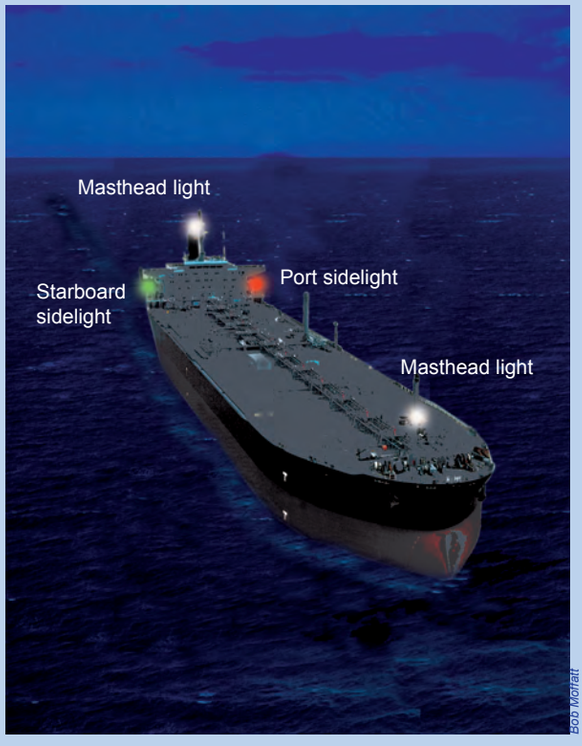
POWER DRIVEN LESS THAN 12m

(a) A power-driven vessel underway shall exhibit

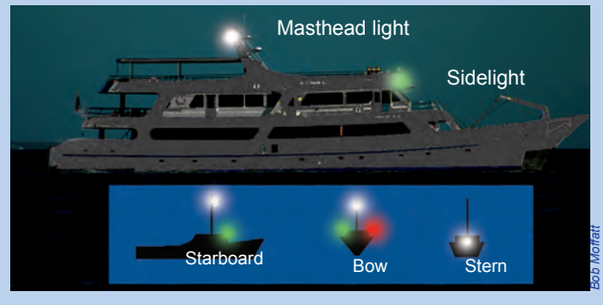
(i) a masthead light forward;

(ii) a second masthead light abaft of and higher than the forward one; except that a vessel of less than 50 metres shall not be obliged to exhibit such light but may do so.

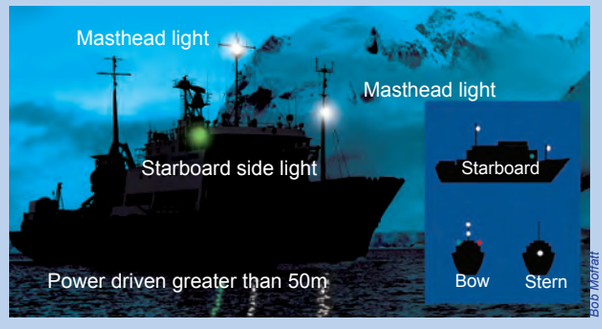
POWER DRIVEN



POWER DRIVEN > 50m



POWER DRIVEN > 20m BUT< 50m



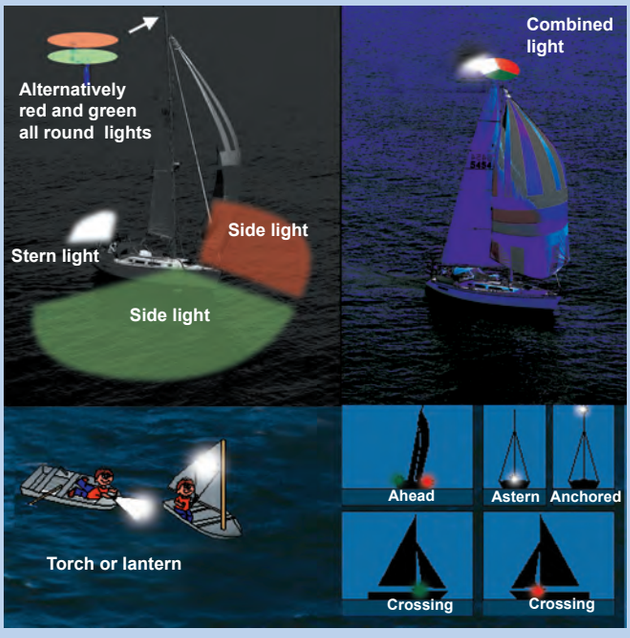
POWER DRIVEN > 50m

(b) An air-cushioned vessel when operating in the non-displacement mode, shall in addition to the lights as prescribed in (a) above, exhibit an all round flashing yellow light.

AIR CUSHIONED VESSEL

Sailing vessels under way and vessels under oars *(Rule 25)*

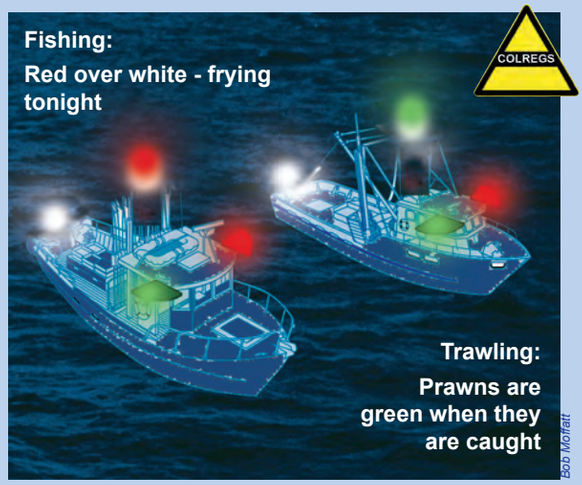
- While being driven (even with sails up), a sailing vessel must display the lights of a powered vessel.
- Boats < 7 m in length
  - The lights required for sailing vessels or
  - A torch or lantern showing a white light ready to display in order to avoid collision.
- Boats > 7 m and < 20 m can show a combined light at or near the top of the mast that incorporates sidelights and stern light or
  - Separate side lights and a stern light.
- More than 20 m - side and stern lights and in addition an all round red and green light.



Bob Moffatt

Fishing vessels *(Rule 26)*

- This rule is to enable you to see commercial fishing vessels at night.
  - **Commercial vessels** either fish by means of long lines, poles or nets, or trawl by means of nets that move along the ocean floor and are hauled up from time to time.
  - A vessel engaged in fishing shall display lights as follows:
    - If trawling - two all round lights in a vertical line, the upper green and the lower white, or a shape consisting of two cones with their apexes together in a vertical line one above each other.
    - A masthead light behind and higher than the green light but if less than 50 metres in length need not do so.
    - If under way sidelights and a stern light.
- Small craft should keep away from all commercial fishing vessels.



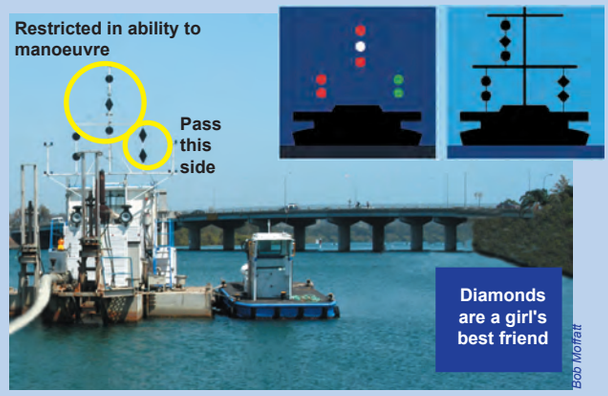
Bob Moffatt

Vessels restricted in their ability to manoeuvre *(Rule 27)*

The term *vessel restricted in her ability to manoeuvre* applies to one which is working on a task that restricts her movement.

Dredges

- Dredges are located in shallow waterways from time to time and will indicate which side to pass by green lights at night or two diamonds during the day.
  - Remember - "diamonds are a girls best friend in the day and green means go this side at night".



Bob Moffatt

Dive boats

- A dive flag warns others that scuba divers or snorkellers are in the area.
- The flag must fly from the dive boat if the divers are in the immediate vicinity of the boat, or on a line if the divers are some distance away as shown.
- During night diving, a boat must show the three lights for Rule 27 as shown.

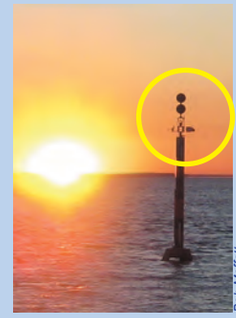
Lisa Taylor

2.2 Navigation at night and times of poor visibility

Important points to remember

- It is difficult to judge distance at night.
- Not all navigation hazards have lights eg oyster leases.
- Background lighting on shore can be confusing.
- All boats in approved moored areas are required to show lights.
- A safe speed is one at which sufficient action can be taken to avoid a collision.

Anchored vessel: Showing a white allround light blended in with city lights.



Isolated danger mark sunrise:

All you can see are the two spheres. Swing the vessel to starboard and you will see nothing.

It is recommended that if your vessel is travelling into the sun, you follow the restricted visibility rule ie;

Reduce to a safe speed, have engines ready for manoeuvring, turn on navigation lights, sound signals if appropriate, post additional lookouts and navigate with extreme care.

Dredge: Showing which sides to pass.

Flags

- Flags are used to communicate important information
  - Flag A is the code for:

I have a diver down, keep well clear at least 30 m and pass at a slow speed

- The two flags R over Y mean to slow down and pass with no wash as there is a vessel engaged in activities where a wash could cause danger

  For example - the crane on the barge below.

Boats at anchor *(Rule 30)*

- Boats less than 50 metres in length must display an all round white light where it can best be seen at anchor.
  - Boats over 50 metres should display two anchor lights - the higher one towards the bow.
- Anchor lights must be displayed from sunset to sunrise and if you are in a busy area use other lights eg cabin (except for navigation).

BOATS AT ANCHOR

Sound signals *(Rule 32)*

1 short blast	I am altering course to starboard (right).
2 short blasts	I am altering course to port (left).
3 short blasts	I am operating engines astern (reversing or stopping).
5 short blasts	I am unsure of your actions or intentions, or doubt whether sufficient action is being taken to avoid collision.

In restricted visibility

1 long blast - Power driven vessel underway.

1 long and 2 short - Sailing, fishing, working boats underway.

2.3 The IALA buoyage system A

- The buoyage system helps skippers navigate into and out of a port or an anchorage. The system uses five markers, namely -

  Lateral, cardinal, isolated danger, safe water and special marks.
- These marks can be shaped as cans, cones, spheres, pillars or spars.

Lateral marks

- These indicate port and starboard hand sides of the channel and are positioned in well established channels.
  - The port mark is coloured red and has the basic top shape of a can.
  - At night the port buoy may show a red light and flashes to any of the sequences as shown in the figure below.
- The starboard mark is green and has the basic conical top shape.

  At night the starboard buoy may show a green light and flashes to any of the sequences shown in the figure below.

Direction of buoyage

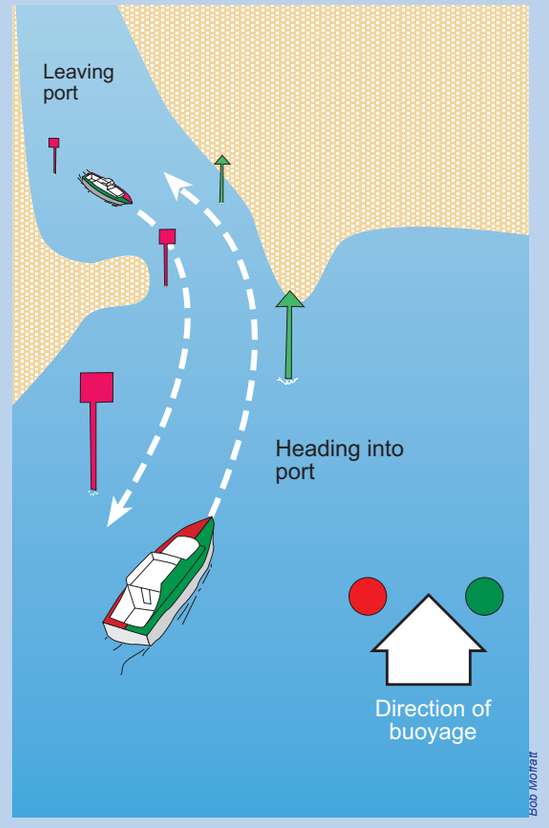
- Where there may be doubt, the direction of buoyage can be checked on charts as indicated by the symbol as shown in the figure opposite.

Leaving port

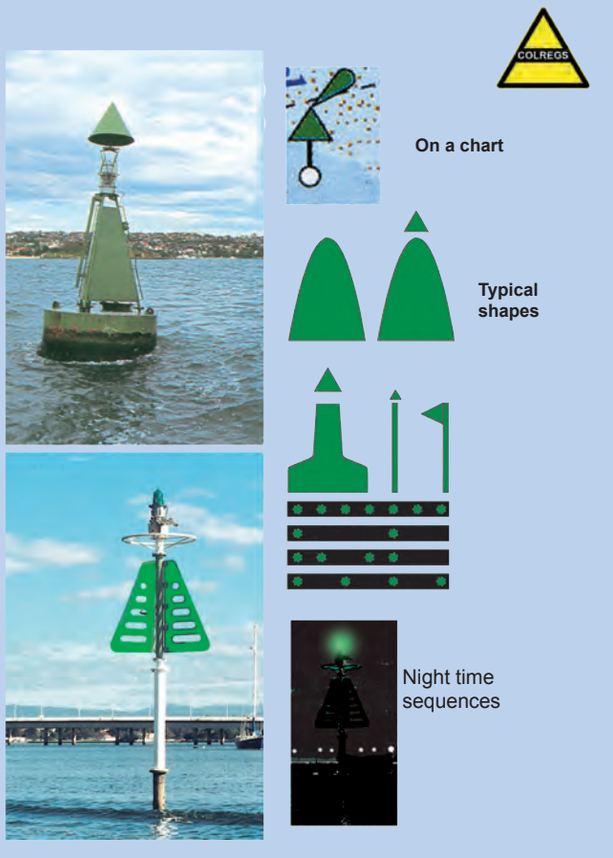
- When departing a port the port hand buoy (red) should be passed on the vessel's starboard side.

Heading into port

- Upon entering port, the port hand mark (red) should be passed on your vessel's port side.

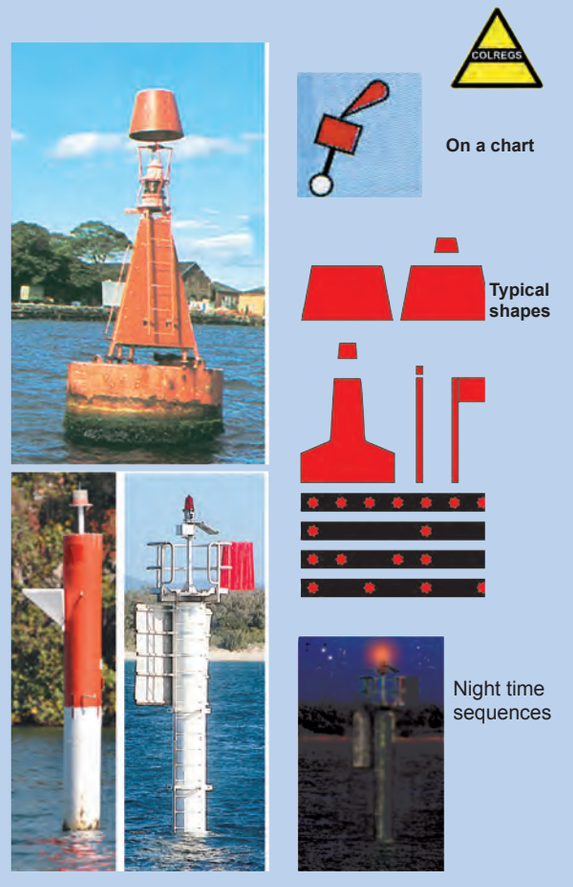


ENTERING AND LEAVING PORT



STARBOARD LATERAL MARKS

TAFE NSW and Wet Paper



PORT LATERAL MARKS

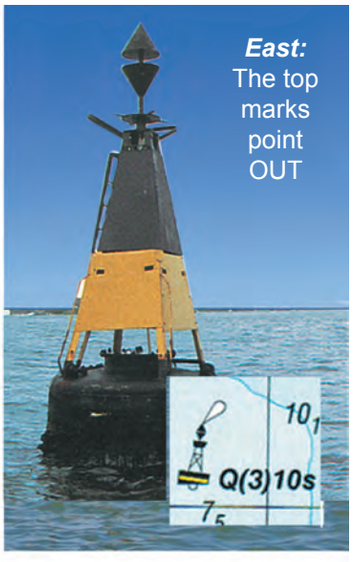
TAFE NSW and Wet Paper

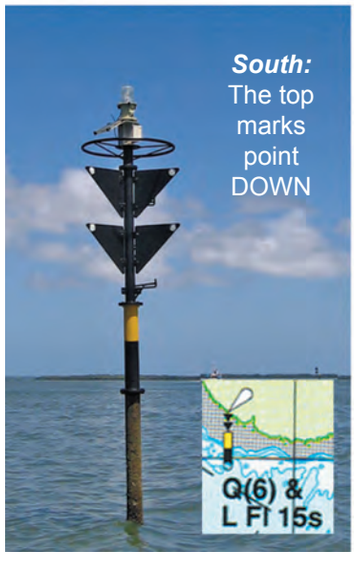
Cardinal marks

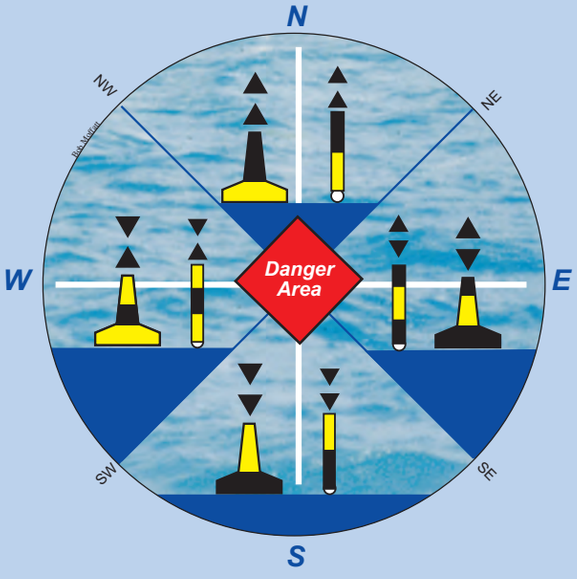
- A cardinal mark indicates where safest water may be found and is used in conjunction with a compass as shown in the figures and photographs below.

COLREGS

Some new mobile phones can load an application which shows either a true or magnetic compass. When used in conjunction with a chart and other navigation equipment, this could be a useful tool in interpreting safe water using cardinal markers.







During the day

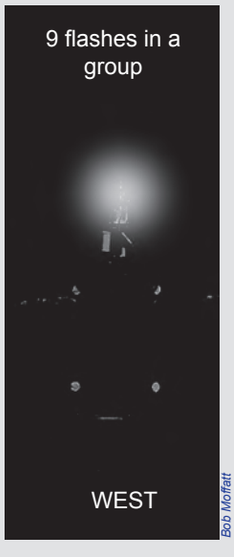
During the day, the colour scheme can be remembered by noting that the black segment is positioned where the cones point.

North: The top marks point UP

South: The top marks point DOWN

East: The top marks point OUT

West: The top marks point IN



At night

At night a white light flashes in a sequence that indicates the type of mark. The flashes in clockwise order are:

North

Uninterrupted continuous flash

South

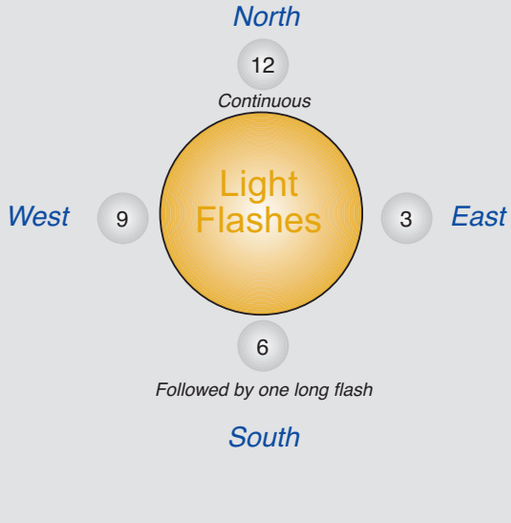
6 flashes in a group plus one long

East

3 flashes in a group

West

9 flashes in a group

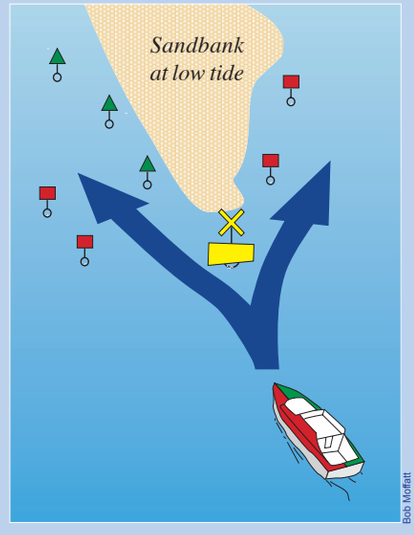


Special marks

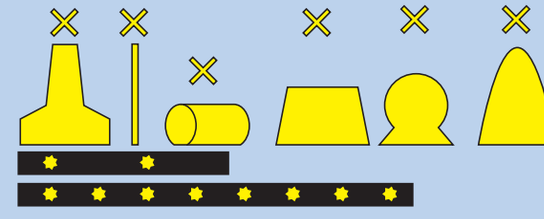
- These indicate a special feature such as a cable, outfall pipe, recreational diving area, ground marks or define a channel within a channel.
  - Generally they are used where no other mark can be, so the top of the mark carries a single yellow cross.
  - At night these show a yellow light with any light sequence (other than that used for the white lights or cardinal, isolated danger and safe water marks).

When you see a special mark - consult your chart.

- After consulting the chart, the special mark in the illustration to the right was one marking two different channels.
- The lateral marks then define these channels so as you approach you have a choice to avoid the sand bank at low tide.



SPECIAL MARK NAVIGATION



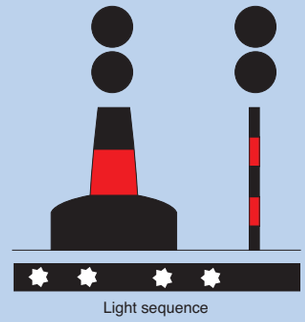
Isolated danger marks

These designate an isolated danger of limited extent which has navigable water all around it. For example an isolated shoal, rock or wreck.

These marks are black with one or more horizontal red bands. The top mark has two black spheres positioned vertically and clearly separated.

The light comprises a white flash showing groups of two flashes.

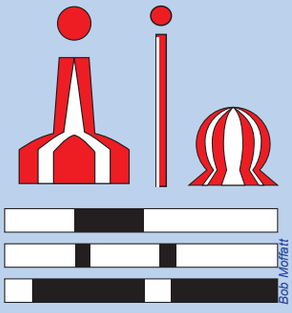
The best way to remember this is by associating the two flashes with the two spheres.



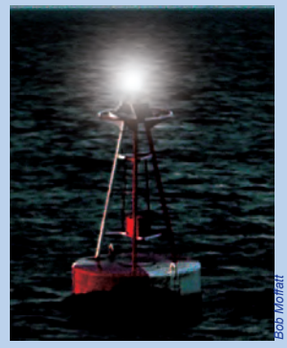
Light sequence

Safe water marks

- These are painted with red and white vertical stripes and have one red ball on the top.
  - They indicate that there is safe water beyond this point and are usually found at the end of a channel or when entering a port.
- At night they flash with a white light followed by a period of darkness.
- Beacons with spheres mean you can navigate all around the mark and consult your chart.

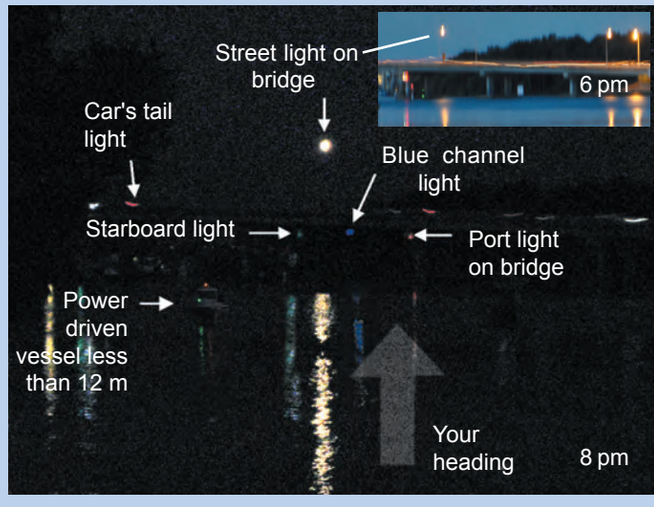


Light sequence



Middle channel marks

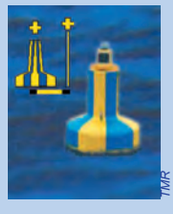
- In some states, fixed blue lights on a bridge are often used as leads to indicate the centre of a channel..
  - In other states red and green lights are used to indicate open or closed channels.
- The photograph to the right shows the blue channel markers on the Gateway Bridge.



NAVIGATION LIGHTS AT NIGHT

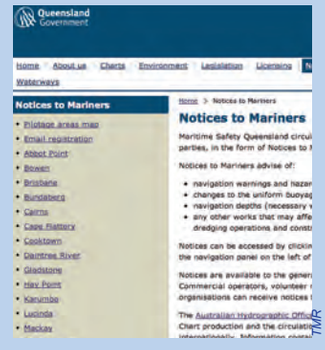
Emergency wrecks

- There has to be a way to quickly mark if a wreck is a shipping hazard as it obviously will not appear on a chart for some time.
- The emergency wreck marking buoy is designed to provide high visual and in some cases radio aid to assist in navigation.
- It is placed as close to the wreck as possible or in a pattern around the wreck.
- Information is then placed THAT night on the **Notice to Mariners** section of the Department of Transport and Main Roads (TMR) web site.



Notice to mariners

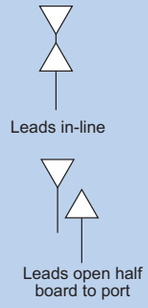
- Changes to shipping are contained in the notices to mariners which is also uploaded to the Department of Transport and Main Roads (TMR) web site. Common notices include:
  - navigation warnings and hazards (such as aids to navigation which may have been destroyed, missing or unlit).
  - changes to the uniform buoyage system (which assists with the correction and updating of marine charts).
  - navigation depths (necessary when navigating in channels with depth restrictions).
  - any other works which may affect the safe navigation of vessels in coastal waters and ports (such as dredging operations and construction works).



2.4 Other navigation directives

Lead lights

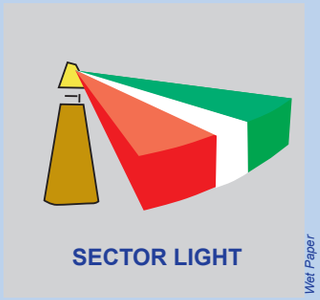
- Leads marked on a chart are used to guide boats into port or through restricted channels in waterways.
  - If following leads, keep them open "half a board" to starboard so that you stay on the starboard side of the channel and turn where the solid line ends.



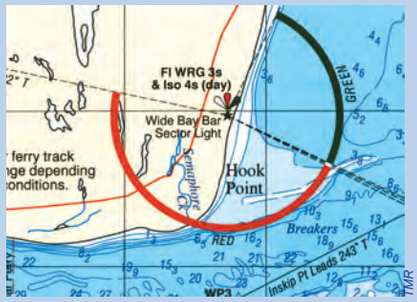
LEADS AND LEADING LIGHTS

Sector and directional lights

- These are also on charts to help you navigate inshore waters.
  - A directional light may only show a small arc, eg, 70 degrees and is similar to a leading light.
  - A sector light has different colours as shown in the illustration opposite.
- It is essential to consult the chart for information regarding these lights.



SECTOR LIGHT

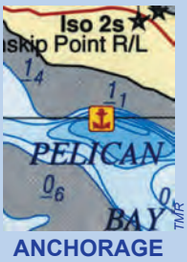


Cable crossings

- Often telecommunications companies run extremely expensive cables along the sea bed.
  - To protect these, warning signs like the one shown opposite are erected on shore to advise no anchoring or dredging.

Anchorages

- The little red anchor on the yellow background in the illustration opposite shows how anchorages are marked on a chart.



ANCHORAGE

Boat ramp signs

Datum checking - fixed points at boat ramps

- The Qld Government is erecting signs at boat ramps to assist people in checking their GPS.
  - It is advisable to switch the unit on and select the correct chart datum before departing. Many boat ramps have signs showing datum points.

Marine reserves

- These signs will show protected species, zones with navigation co-ordinates, closed seasons and marine environment protection information.

VMR/Coast Guard services

- The call sign and name of the local marine rescue service is shown with contact details and what and when the service is offered.

Water ski areas

- These will show designated zones and hours of operation, along with penalties for infringements.

DATUM CHECKING SIGN

CABLE CROSSING SIGN

BOAT RAMP SIGNAGE

2.5 GPS navigation system use and limitations*

How the GPS system works

Warning: Before using your new GPS, you are obligated to familiarize yourself with its strengths and weaknesses.

GPS stands for Global Positioning System which is composed a series of satellites orbiting above the earth.

- These satellites are spaced in orbit so that at any time a minimum of six satellites will be in view. Satellites continuously broadcast position and time data to users throughout the world.
- Using a portable or hand-held receiver unit that receives data from the closest satellites, the GPS unit triangulates the data to determine the unit's exact location (typically in latitude and longitude), elevation, speed, and time.
- However where a car's GPS will say to you, "At the next intersection turn right", unfortunately a marine GPS will not.
- It is recommended that GPS users undertake navigation and GPS courses currently offered by both Volunteer Marine Rescue (VMR) and the Australian Volunteer Coast Guard.

Operation of a chart plotter

- GPS units contain a chart plotter that provides a variety of functions too numerous to mention in these notes.

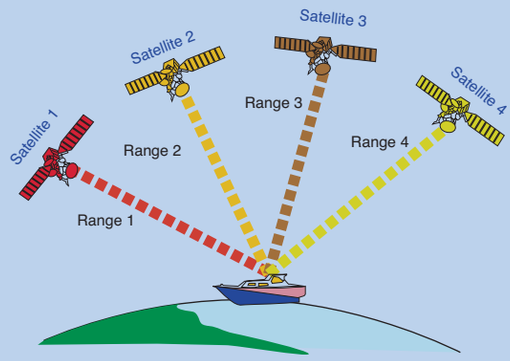
  However, as a starting point, it is recommended that GPS users undertake navigation and GPS courses currently offered by both Volunteer Marine Rescue (VMR) and the Australian Volunteer Coast Guard.
- The photograph to the right shows the boat's position on a nautical chart as well as other chart features such as latitude, longitude, ships heading and depth. A plotter also runs software that allows you to easily locate your position and plot courses. An interesting exercise is to remain stationary at a mooring and see the different positions your plotter locates you around that mooring over a few weeks.

Waypoints

- Waypoints are sets of coordinates that identify a position at sea. The letters WP, then show these points on the chart as shown in the illustration of the Wide Bay Bar opposite.
  - For example, you might want to cross this bar to avoid the South Spit breakers at the mouth of the bar.
  - The chart shows WP1 with true bearings on the Wide Bay Sector Light and WP2 with true bearings to the leads in the trees at Inskip Point camping ground.
  - If set correctly, you can use your GPS to safely navigate the bar provided that you use ALL other navigating means available to you.
  - For example local knowledge, notes from the Tin Can Bay Coastguard, tide tables, notice to mariners, chart, compass, sector light, Inskip Point leads, weather forecast and proper lookout. So its just not that simple as following your GPS.

Highway mode

- There have been a number of navigational incidents, where boats have run aground and into obstructions, attributed to people using GPS data alone as shown in the figure opposite.
  - Some positions given by GPS will need to be adjusted due to differing datum (see cautionary advice on charts).
  - As with all fixes, the GPS position should be checked against something else.

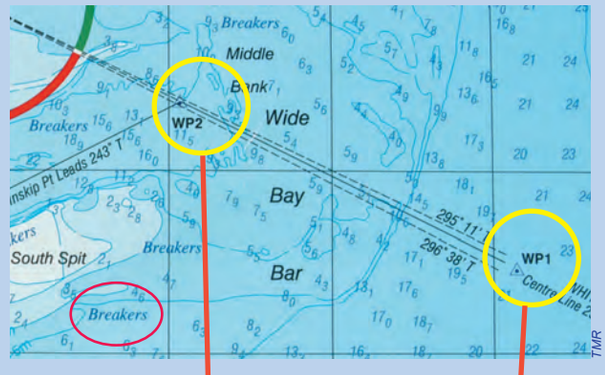


SATELLITES AND GPS

Bob Moffatt

GPS CHART PLOTTER

Bob Moffatt



Bob Moffatt

Waypoint 2: Gives you the true bearing to the Inskip leads which can be seen in the trees in Inskip Point

Waypoint 1: Gives true bearings to Waypoint 2.

WAYPOINTS ON A CHART

USING THE WRONG DATUM

Bob Moffatt

What you will learn in a GPS and navigation course

- At sea, where there are no visual indicators, it is easy to lose all sense of direction. Navigation equipment like charts, compass, radar and satellite position systems are needed to keep a boat on course, particularly in restricted visibility.
- At the most basic, a chart, watch and compass will enable you to plot a course. By noting the compass direction while heading out, you can tell the distance travelled by the speed of the boat and the time taken.

How long will it take?

A boat travelling at one knot will take one hour to travel one nautical mile. So how long will it take to travel 12 nautical miles at 6 knots? Using the magic triangle opposite, place finger over time and divide distance by speed.

ie 12/6 = 2 hours

Lines of latitude

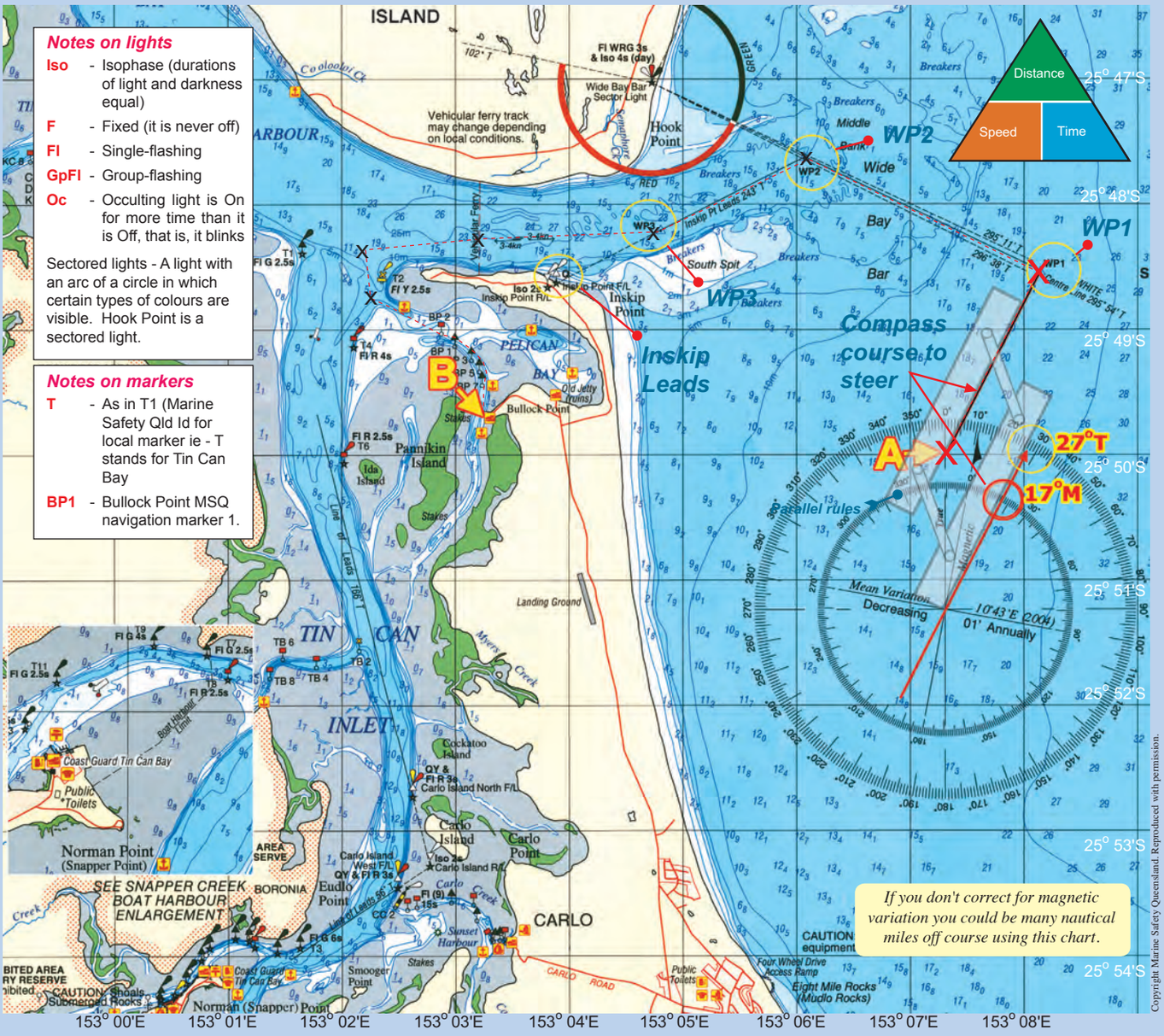
- These are the horizontal lines on a chart indicated by degrees north or south of the Equator, for example - 25°47'S to 25°54'S.

Lines of longitude

- These are the vertical lines on a chart indicated on the chart below ranging from 153°00'E to 153°08'E.

Plotting a course

- Suppose you are at A (25°50'S and approx. 153°07'E) on the chart below and you wanted to get to B Bullock Point boat ramp.
  - Take a pencil and plan a course as shown below. You want to make use of the known waypoints on your GPS to take you over the bar and then use the lateral marks to navigate the narrow channels in Pelican Bay.
  - Place a parallel rule over your desired course to WP1 then carefully move the rule over the compass rose to read a True bearing of 27°T. Subtract the 10° variation.
  - The compass course to steer your boat to WP1 is about 17° accounting for the 10° 50' variation since 2004.
  - Steer you boat on this compass bearing till the latitude and longitude of WP 1 comes up on your GPS.
  - Then use it, the sectored light, the Inskip Leads and all other navigation means available to get home.



Suitability of the chart plotter

- The GPS screen in the photograph to the right shows a boat entering a port in relation to the;
  - direction of buoyage;
  - port and starboard markers and
  - cardinal marks, coastal features, soundings and the depth of water under the keel.
- However a GPS is not a substitute for sound watch keeping and should be used only in conjunction with other aids to navigation.
  - Skippers should still maintain a proper lookout while the vessel is underway to identify any approaching hazards.

Use and abuse of zoom

- It is recommended that you zoom to the largest available accurate chart scale. If the zoom recommended exceeds the accuracy scale limit then a warning message is displayed on the screen.

Be aware of cheap imports

- Some cheap imports may have used cheap labour to interpret key chart features.
  - Soundings and chart features may be different to official charts.

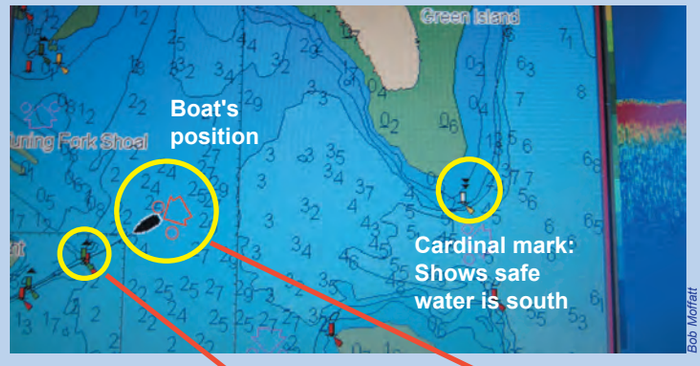
Pre-departure datum check

- It is advisable to switch the unit on and select the correct chart datum before departing.

  Many boat ramps have signs showing datum points.

  GPS units require time to initialize, and the skipper needs time to assess the accuracy of the position information prior to starting the voyage.
  - The accuracy of GPS units can be compromised by power failures or poor electrical connections.
  - Always ensure your electrical charts are updated with supplier upgrades. When going to a waypoint in a straight line, check what is in between your boat's initial location and the waypoint.
  - The figure below shows a GPS image of a track around a headland from A-B. One chart uses a datum called WGS 84 and the other AGD 66 (an out of date datum).
  - Use the wrong datum and you end up on the rocks.

ALWAYS USE WGS 84



Direction of buoyage: Shows direction to pass lateral marks

Starboard mark and advisory sign: Keep leads slightly apart so you know you are travelling down the starboard side of a channel

MSQ boating GPS video summary

Here is a summary of the main point of the MSQ video on GPS

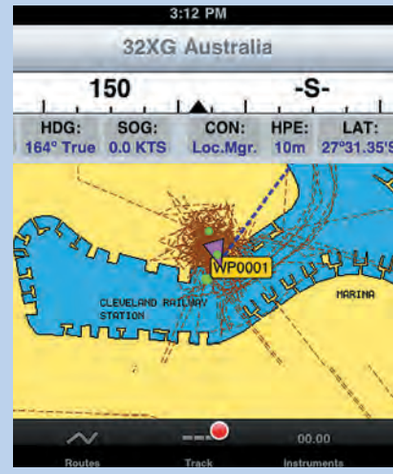
- You must always maintain a proper lookout and safe speed
- Check that you datum is set to WGS 84
- Allow time for your GPS to initialise and note the number of satellites it acquires
- Verify your position with a chart and coastal features
- Be aware of power failures and poor electrical connections
- Make sure your chart and GPS are up to date with system upgrades
- Check your chart between waypoints especially if you are travelling in a straight line
- Be aware of areas under construction or development

Reference given in video:

ww.hydro.gov.au

The photograph opposite shows the inaccuracy of a GPS on a charter boat over a 3 week period. According to the skipper the vessel maybe 100m away from its pontoon, some days it is on the other side of the canal, sometimes on the land and other times on the other side of the street.

Why not try this on your boat to see how your GPS varies?



Class discussion

Describe the skipper's responsibilities when coming into port in illustrations A - D below.

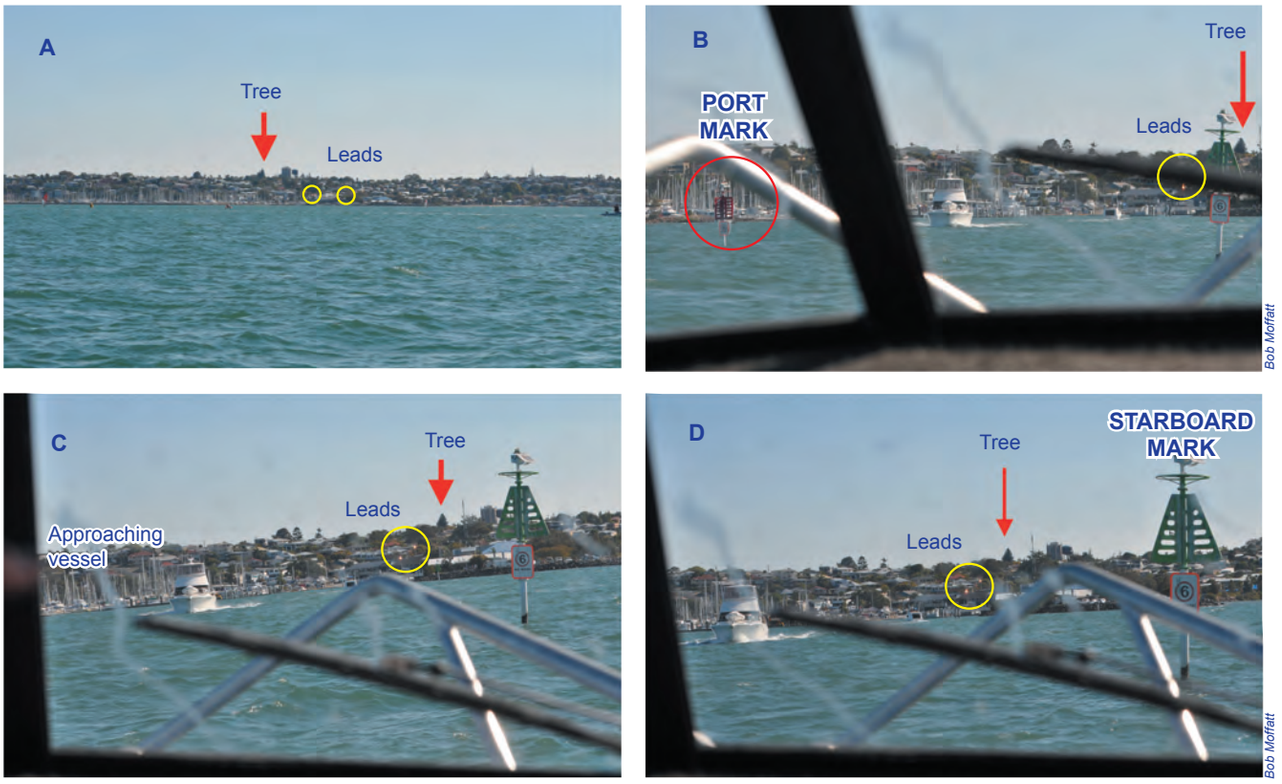


Figure 47.1 Example of what it looks like to enter a port from the helm of a small craft

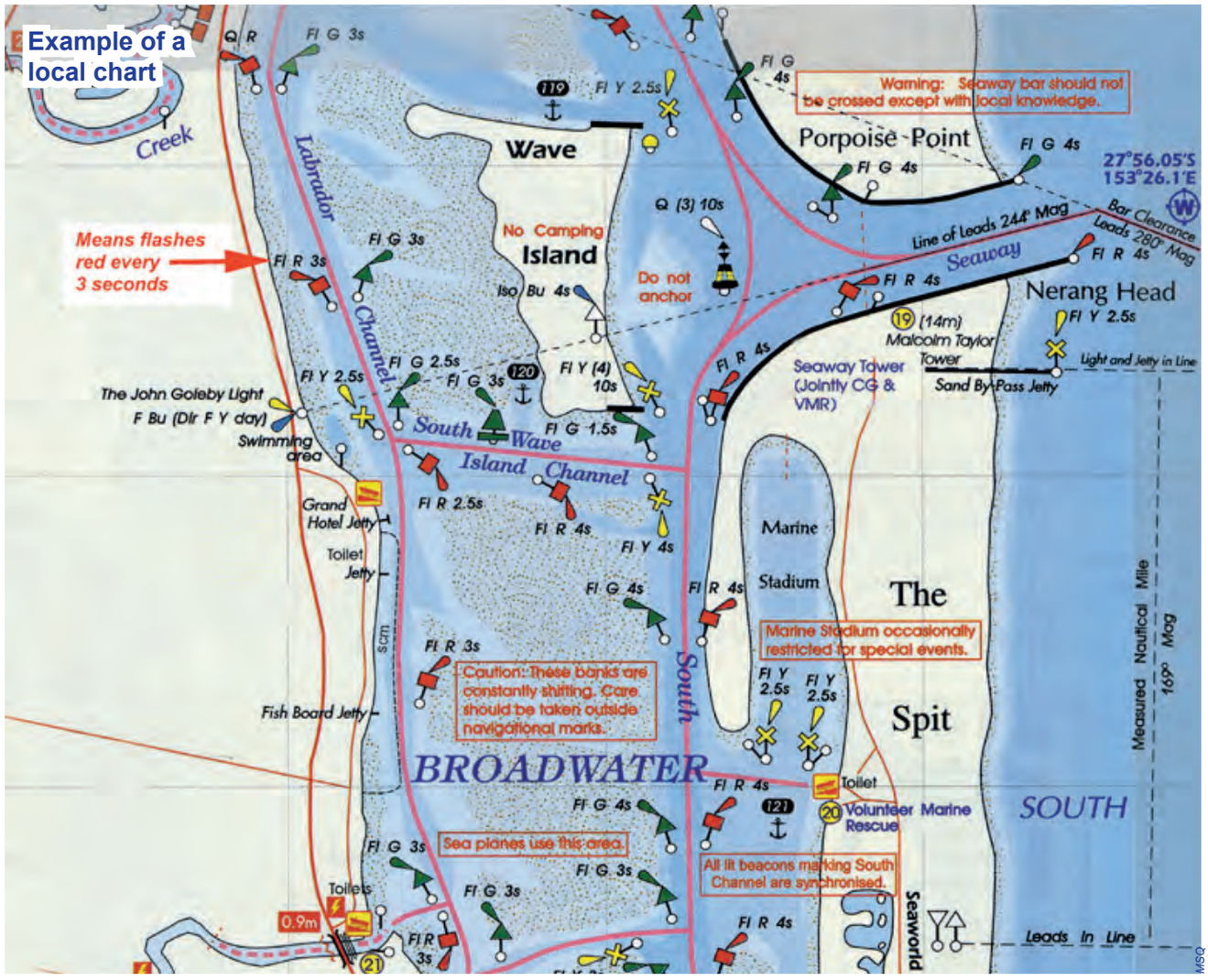


Figure 47.2 Example of a local chart with buoys, beacons and marks (Note the change in buoyage direction at Wave Island)

Unit 3 Weather and tides

FIVE VITAL CHECKS

1. Warnings current for your boating area.
2. Weather conditions affecting safe navigation and comfort.
3. Wind conditions.
4. Wave conditions.
5. Tide times.

Australian Government
Bureau of Meteorology

3.1 Weather

Sources of weather information

- The most accurate information on weather forecasts for your local area is the Bureau of Meteorology web site - www.bom.gov.au (see the forecast on the top of Page 49).
  - The best source of information is through your local volunteer marine rescue (VMR) and Australian volunteer coastguard (AVCG) stations.
- As the weather bureau records changes in the weather, information is relayed to transmission towers, where it is beamed on VHF or 27 Mhz frequencies.
- Because of the dependence of small boats on the weather, special forecasts are issued for pleasure boating on the "*Marine & Ocean*" section of the Bureau of Meteorology web site - affectionately know as "the BOM site" - **www.bom.gov.au**

Main features of a weather chart

- Australia is dominated by high and low pressure systems that are associated with storms, cyclones, fronts and ridges some of which are summarised in the chart shown below provided courtesy of the Bureau of Meteorology.

High and low pressure systems

- In Australia, winds blow out of highs anticlockwise, and into lows clockwise.
- High [H] and low [L] pressure systems move from west to east at various speeds.
- High pressure systems are found further north in winter allowing low pressure systems to sweep over southern Australia creating dangerous boating.
- High pressure systems bring the trade winds to Queensland and can blow for many weeks.

Isobars, pressure gradients and wind strength

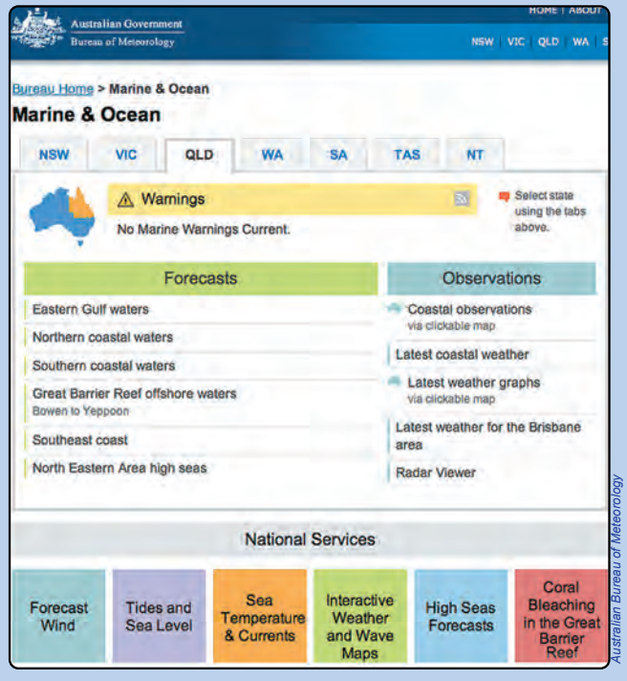
- Isobars are lines that join places of the same atmospheric pressure. When high and low pressure systems squeeze together, a pressure gradient forms.

Weather associated with highs and lows

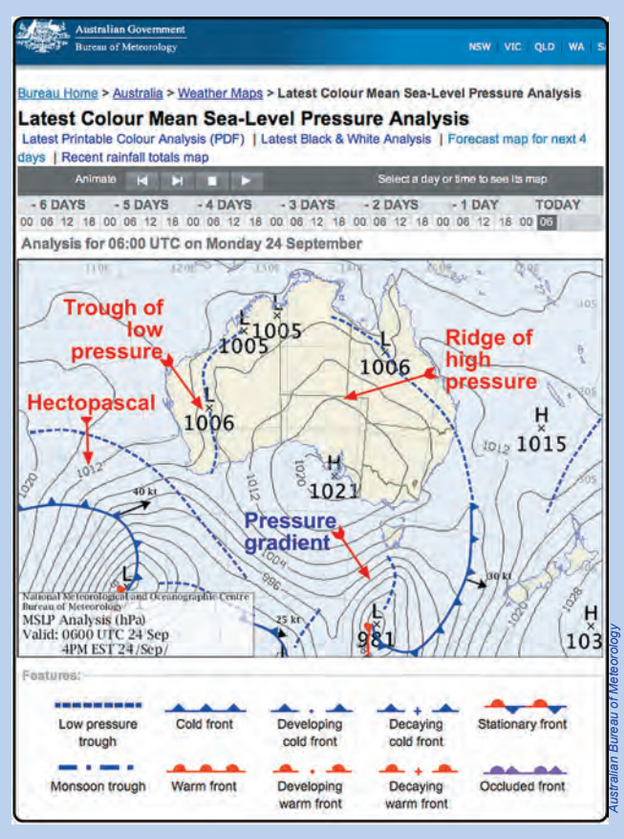
- Winds tend to blow out of a high pressure system and rotate anticlockwise tending to produce fine stable conditions.
- In winter low pressure systems cross the land and then form into systems at sea that whip up strong winds and rough conditions which can last for days.
- High pressure systems bring the south east trade winds and in North Queensland and can blow for many weeks frustrating the boating fraternity.

Troughs and ridges

- A ridge is an elongated area of high pressure extending out from a high. The map shown to the right shows a ridge of high pressure passing over southern Queensland.
- A trough is a elongated area of low pressure, extending south from a low, also shown on the map to the right.



MARINE AND OCEAN SECTION



MEAN SEA-LEVEL PRESSURE ANALYSIS

Weather associated with troughs and ridges

- A weak ridge extending out from a high usually means fine weather with ideal boating conditions.
- A trough of low pressure usually is associated with rain. In summer, troughs of low pressure called "*the monsoon*", sweep over Northern Australia.

Fronts

- A front is formed when a body of air of one temperature meets a body of air of another temperature.
  - A front is indicated on a surface chart by a line with either points or knobs along it.
  - High clouds are often the first sign that a cold front is approaching. As the front gets closer altostratus and altocumulus (middle height) clouds may be seen. These clouds are typical of slow moving cold fronts.

Weather associated with fronts

- A cold front is usually preceded by rain and warm air and then strong winds as the front moves through. Cold air then follows.
- Violent summer storms can also create dangerous weather situations involving lightening and strong winds. If you are able to, see if you can get under a bridge, into the lee of an island or make landfall, secure your vessel and seek shelter.

Land and sea breezes

- During the cool of the night, air above the sea, being warmer than that above the land, begins to rise. Cooler air moves seaward to replace the warm sea air creating a **land breeze**.
- During the heat of the day, air above the land warms, and becoming less dense, begins to rise. The air above the sea, being cooler and more dense replaces, the air on the land creating a **sea breeze**. This is why we have offshore winds and more favourable boating conditions early in the morning.

Effect of forecasting on trip planning

- Its is not recommended you go boating with forecast winds greater than 20-25 knots.

Boating tips for avoiding heavy weather conditions

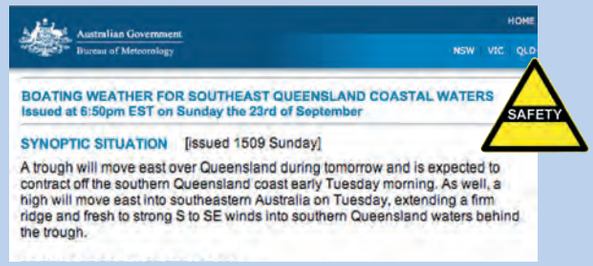
- Regularly monitor available sources of weather information (marine radio, broadcast band radio or mobile phones with internet access).
- Find out the local factors that influence sea conditions (including those for coastal bars).
- Know where to reach safe shelter (protected shore, harbour or lee of an island) and have alternate plans.
- Be flexible - change your plans (destination and route) if necessary and if conditions deteriorate, put on lifejackets and seek shelter. Then inform whoever holds the voyage plan of your new plans.

Wind against tide

- If the wind blows against the tide, steeper wave conditions can be expected and your trip will be slowed.
- However if the wind blows with the tide, wave heights are smaller as shown in the figure opposite.

Cyclones

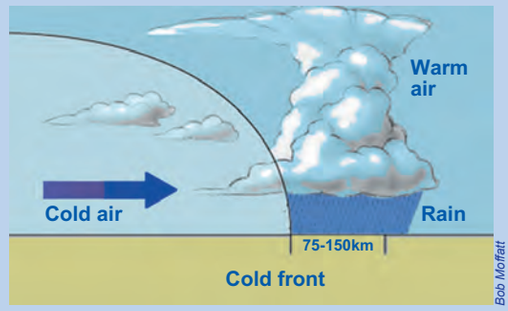
- Lows bring strong winds, rough sea and in summer can develop into cyclones.
- As storms and cyclones approach land, their winds whip up the sea and push a bank of water towards the coast called a *storm surge*. The BOM site has a good description of this.



It is not recommended you go boating with forecast winds greater than 20-25 knots.

A BOATING WEATHER FORECAST

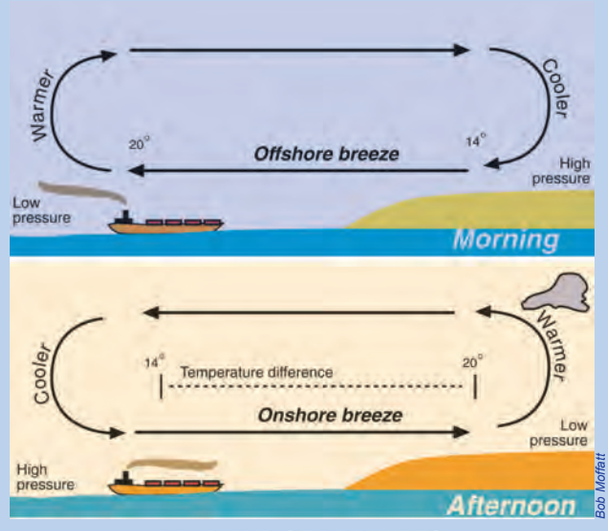
Australian Bureau of Meteorology



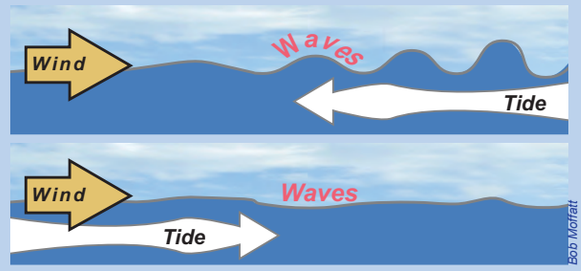
Signs of deteriorating weather include darkening lowering clouds, increasing wind strength, white caps and changing sea state

SAFETY

A COLD FRONT



LAND AND SEA BREEZES



WIND OVER TIDE

3.2 Tides

Sources of tidal information

The internet, newspapers, radio and television broadcasts will give tidal information. The most accurate information is from the internet - www.bom.gov.au. The Bureau of Meteorology web site can do tidal calculations for most coastal areas in Australia.

Basic causes of tides

Daily tides

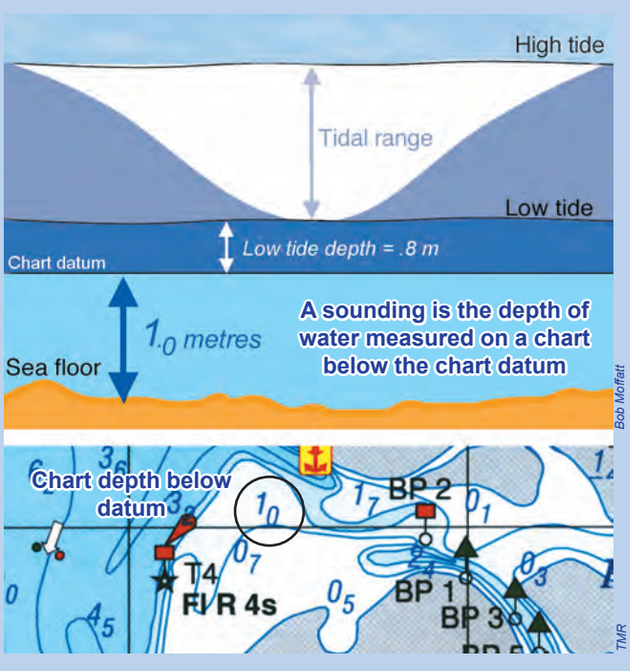
The gravitational attraction exerted by the Sun and the Moon helps produce tides. The figure below shows that each day the tide height will be 50 minutes later as a result of the movement of the moon. It also shows two high tides each day, with one higher than the other. This is caused by the slight difference in gravitational pull by the moon as well as the coastline's shape.

Spring and neap tides

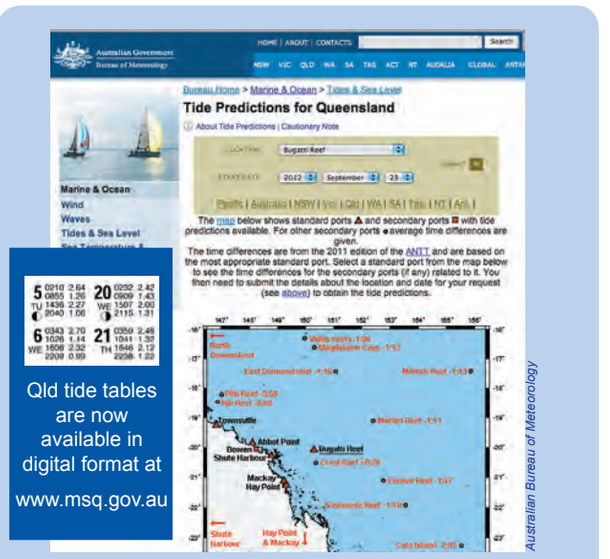
- Spring tides occur where the Earth, Moon and Sun are in a straight line. The gravitational pull of the Sun and the Moon are combined and the tides are at their highest. These tides occur when the Moon is in full or new.
- During a first-quarter Moon and again at the last quarter Moon phase, the Sun is at right angles to the Moon. Their separate gravitational pulls cancel each other out and produce a smaller high tide and a higher low tide. This is a neap tide. The tidal range between high tide and low tide is small during a neap tide.

Chart datum and high and low tides

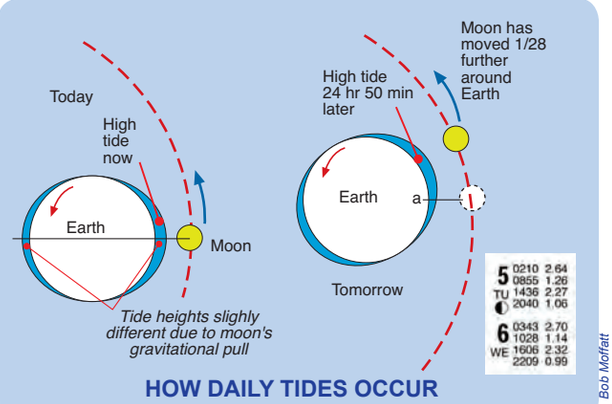
- Depths printed on charts are called *soundings* which have been reduced from a common level known as the chart datum point. The figure below shows a sounding of 1m and how it relates to the sea floor. This datum point is the lowest astronomical tide (LAT) or the lowest low water spring tide.
- These are therefore close to the minimum depth in the area and the height of the tides must be calculated to predict a real depth.
  - If low tide depth is 0.8 of a metre and the chart depth is 1 metre, then at low tide there is 1.8 metres between you and the sea floor.



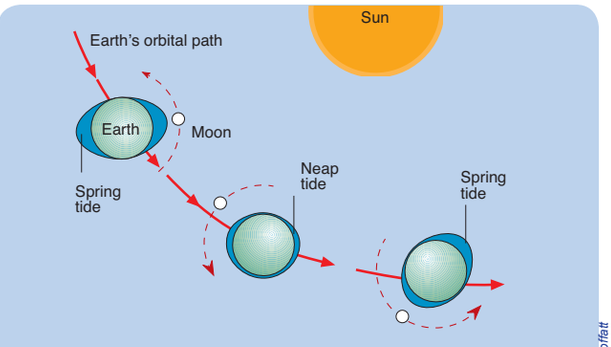
SOUNDINGS AND THE CHART DATUM



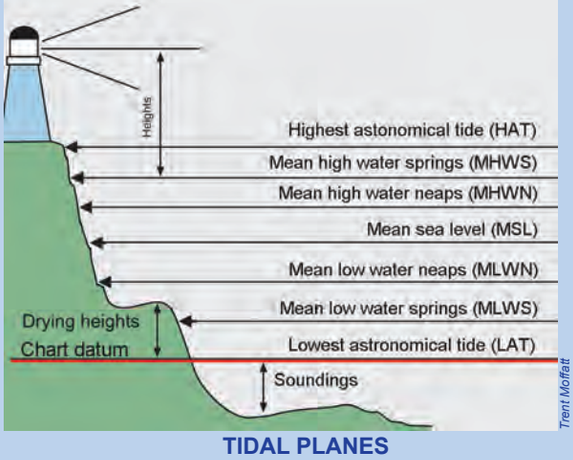
TIDAL PREDICTIONS FOR QUEENSLAND



HOW DAILY TIDES OCCUR



HOW MONTHLY TIDES OCCUR



TIDAL PLANES

Calculate depth of water under a boat

Step 1 Calculate the tidal range

- Tidal range is the difference between high and low tides for a given place on the Earth's surface.

Step 2 Use the rule of 1/12's

Use the Rule of Twelfths - see figure opposite.

- If the tidal range is 6 m and you want to find out how much the tide has fallen 3.5 hours after high water, an approximate answer is as follows:

In the first hour: The tide falls 1/12 x 6	=	0.5 m
In the second hour: The tide falls 2/12 x 6	=	1.0 m
In the third hour: The tide falls 3/12 x 6	=	1.5 m
The half hr tide falls 1/2 x 3/12 x 6	=	0.75 m
So the total fall in 3.5 hours	**=**	**3.75 m**

Step 3 Do the maths*

- Add the chart depth, the low tide water depth, the rise in tide due to the rule of twelfths AND the boat's draft.

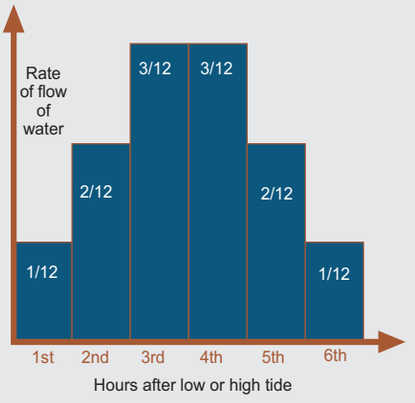
Worked example

- There is a low tide of 0.8 metre at 6 am, and high tide of 3.2 metres at 12 noon and your chart depth is 1 metre.
  - How much water is under your boat at 8 am?

The rule of twelfths is used as a guide to determine tidal height.

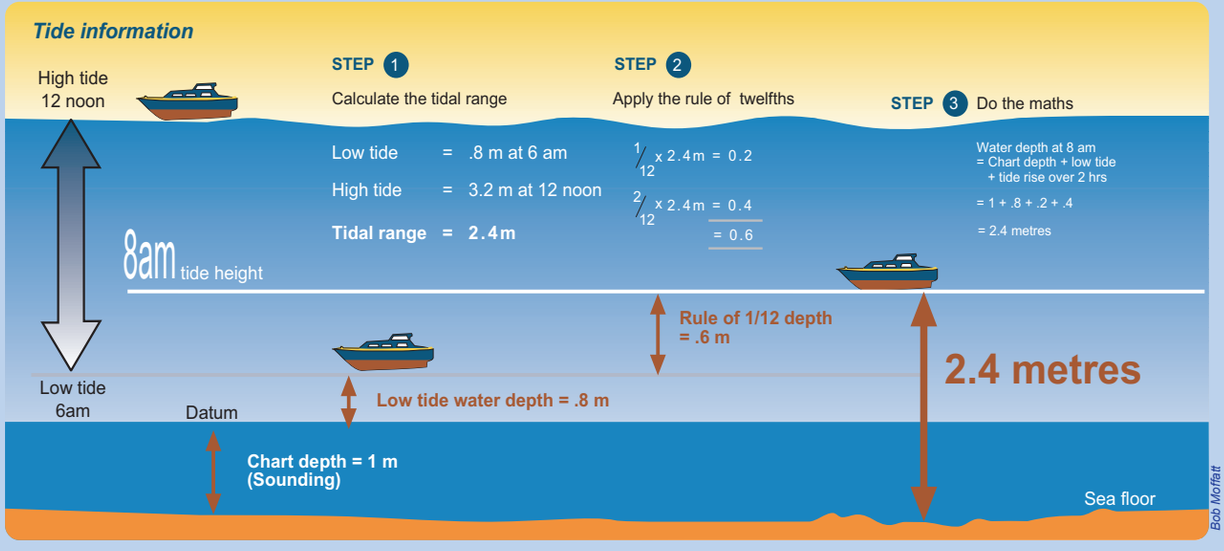
- The formula works on the rate at which the height of water changes between the tides - called the tidal range.
- The calculations are as follows:

- In the **first** and **sixth hour** the height will drop by 1/12 each hour
- For the **second** and **fifth hour** the height will drop 2/12 each hour
- During the **third and fourth** hours it will drop 3/12 each hour



Bob Moffatt

RULE OF TWELFTHS



WATER DEPTH UNDER YOUR BOAT

***If your boat's draft was 1.2 metres, you would add this to the above calculations**

THE DIFFERENCE BETWEEN TIDES AND TIDAL STREAMS

- **Tides** are heights and affect the depth of water at a place on an hourly, daily and monthly basis.
- **Tidal streams** are horizontal water flows that result from tides.
  - *They affect courses and the duration of a passage and are shown on a chart using tidal diamonds.*

    These indicate the speed and bearing of the tidal flow during each hour of the tidal cycle.
  - *To read more about tides*

  Go to: *www.icsm.gov.au/tides*

Tidal calculations and the internet

- For secondary places, or *non-standard ports*, the tide heights and times can be calculated.
  - The page over gives a traditional calculation based on secondary ports, tidal planes, columns and rows.
  - Information these days is also available on mobile phones and web sites.
- The BOM site has tidal predictions for all of Australia.

There are also any number of apps and web sites that will give you tidal information and do calculations.

Working out tides in secondary locations

For secondary places, or *non-standard ports*, the tide heights and times can be calculated.

Worked example - See Steps 1 - 7

Using the tide tables opposite and the table below, calculate the tide heights and times for Inskip Point, a non-standard port some distance from Outer Harbour for the 1st July.

Step 1 Copy the information for the standard port (Outer Harbour) into Column A. This shows the times for the low and high tides for the day.

Step 2 Write time difference for Inskip Point in Column B.

Step 3 Add Column A and B to get the tide times for Inskip Point.

Step 4 In Column D copy the tide heights for Outer Harbour for the 1st July.
To calculate the tide heights for Inskip Point we need to use the following from Table 2:
- the ratio from column 9 (which is 0.8)
- the adjustment from column 10 (which is 0.47)

Step 5 In column E, multiply the ratio from Table 2 by the Height of tide Outer Harbour from (Outer Harbour).

Step 6 In column F add the adjustment from Table 2 to the value you calculated in Column E.

Step 7 Column G then has the tide heights for the secondary port.

Looking up tides in a tide book

Tide heights and times are only given on tide tables for major places along the coast (also called *standard ports*). The figure below shows part of a tide chart for the standard port of Outer Harbour for June and July.

AUSTRALIA OUTER HARBOUR

LAT 25° 57' S LONG 153° 04' E

TIMES AND HEIGHTS OF HIGH AND LOW WATERS

JUNE				JULY			
Time	m	Time	m	Time	m	Time	m
1 0427	0.73	16 0518	1.07	1 0336	0.14	16 0530	1.03
1012	5.04	1104	4.41	1002	2.85	1116	4.36
SA 1628	0.27	SU 1706	0.84	MO 1621	0.13	TU 1717	0.86
2242	6.06	2322	5.50	2213	2.15	2331	5.39
2 0515	0.64	17 0551	1.15	2 0555	0.36	17 0559	1.07
1059	4.98	1135	4.30	1140	4.96	1144	4.32
SU 1712	0.28	MO 1734	0.97	TU 1750	0.15	WE 1745	0.94
2327	6.11	2353	5.37			2359	5.28
3 0603	0.64	18 0621	1.26	3 0002	6.23	18 0625	1.13
1148	4.86	1205	4.18	0643	0.36	1212	4.29
MO 1758	0.39	TU 1802	1.12	WE 1230	4.91	TH 1814	1.07
				1839	0.32		
4 0014	6.04	19 0022	5.21	4 0050	6.03	19 0027	5.14
0654	0.71	0650	1.37	0731	0.46	0653	1.20
TU 1240	4.69	WE 1235	4.07	TH 1322	4.79	FR 1243	4.22
1845	0.60	1831	1.30	1929	0.60	1845	1.25
5 0102	5.85	20 0052	5.02	5 0140	5.71	20 0056	4.94
0746	0.83	0722	1.48	0821	0.63	0723	1.30
WE 1335	4.52	TH 1309	3.96	FR 1417	4.65	SA 1317	4.13
1938	0.88	1904	1.51	2021	0.95	1919	1.48
6 0157	5.58	21 0127	4.81	6 0233	5.31	21 0130	4.70
0843	0.96	0759	1.59	0915	0.82	0800	1.40
TH 1437	4.39	FR 1351	3.85	SA 1518	4.54	SU 1400	4.04
2037	1.17	1945	1.75	2122	1.31	2001	1.73
7 0257	5.30	22 0209	4.58	7 0333	4.90	22 0212	4.44
0945	1.03	0845	1.68	1015	0.97	0845	1.50
FR 1545	4.36	SA 1445	3.78	SU 1628	4.51	MO 1457	3.99
2146	1.41	2038	1.98	2236	1.58	2100	1.95

MSQ modified for this exercise

Tidal Planes for Secondary Places
Height Above Local Low Water Datum

TABLE 2

PLACE	Average Time Difference High Water 1	Average Time Difference Low Water 2	MHWS 3	MHWN 4	MLWN 5	MLWS 6	AHD 7	ML 8	Ratio 9	Constant 10
	H.M	H.M.	m	m	m	m	m	m		
Outer Harbour										
Burnett Heads	Standard Port		2.5	1.9	0.8	0.2	1.35	1.34		
Boonlye Point	+1 09	+0 57	2.9	2.4	1.1	0.5		1.74	1.09	+0.27
Burrum River	−0 05	−0 05	2.6	2.0	0.6	0.0		1.28	1.18	−0.31
Elbow Point	+0 35	+0 05	1.9	1.5	0.7	0.3		1.10	0.69	+0.17
Inskip Point	+0 10	−0 35	2.4	2.0	1.1	0.7		1.55	0.80	+0.47
Maryborough	+1 57	+3 00	3.0	2.4	0.4	0.0	1.29	1.44		

OUTER HARBOUR JULY

	Time	m
1 MO	0336	0.14
	1002	2.85
	1621	0.13
	2213	2.15

Column A	Column B	Column C	Column D	Column E	Column F	Column G
Time Outer Harbour 1	Difference from Table 2 2	Time Inskip Point 3	Height of tide Outer Harbour 4	Calculations for height of tide Inskip Point: Ratio from Column 9 5	Adjustment from Column 10 6	Inskip Point Tide Heights 7
LOW 0336	-35 mins	LOW 0301	0.14 m	.8 X 0.14 m = -0.11 m	.47	.47 + 0.11 m = 0.58 m
HIGH 1002	+ 10 mins	HIGH 1012	2.85 m	.8 X 2.85 m = 2.28m	.47	.47 + 2.28 m = 2.75 m
LOW 1621	-35 mins	LOW 1546	0.13 m	.8 X 0.13 m = 0.10 m	.47	.47 + 0.10 m = 0.57 m
HIGH 2213	+ 10 mins	HIGH 2223	2.15 m	.8 X 2.15 m = 1.72 m	.47	.47 + 1.72 m = 2.19 m

Wet Paper

Worksheet 2

See page 78 for answers

Q1. What rules apply to speed limits in Queensland waters? (See pages 31 - 32)

.

Q2. Copy the information on pages 31-32 to summarise the first main point of the COLREG rules listed below.

Eg: Rule 2 - Responsibility - see page 31

ANS: It is the responsibility of the skipper to know the international rules and he or she cannot be excused for failing to know or adhere to them.

Rule 5 - Proper lookout - see page 31

Rule 6 - Safe speed rule - see page 31

Rule 7 - Risk of collision - see page 31

Rule 8 - Action to avoid a collision - see page 31

Rule 9 - Rivers and channels - see page 31

When power meets sail - see page 31

Rule 13 - Overtaking - see page 32

Rule 14 - Approaching bow of another boat - see page 32

Rule 15- Power driven boats crossing - see page 32

Rule 16- Action by give-way vessel - see page 32

Rule 17- Action by the stand-on vessel - see page 32

Rule 18 - Responsibilities between vessels - see page 32

Rule 19 - Restricted visibility - see page 32 and 38

Rule 30 - Boats at anchor less than 50 m - see page 38

Q2. List 6 important points to remember when visibility is poor especially at night - *see page 38*

Q3. What do these flags mean? - *see page 38*

Unit 4
Emergencies


Wet Paper

4.1 First aid

To deal with personal emergencies it is recommended that you do a first aid course and keep it up to date. There are plenty of private providers as well as recognised agencies such as St. Johns or the Queensland Ambulance Service.

4.2 Marine incidents

A marine incident must be reported to a shipping inspector as soon as possible but within 48 hours of the incident, unless there is a reasonable excuse.

Shipping inspectors are marine officers (located at Department of Transport and Main Roads Maritime Safety Queensland Regional Offices), and officers of Queensland Water Police and Queensland Boating and Fisheries Patrol. If you are unable to access one of these offices, contact a shipping inspector by phone. See page 80 for telephone numbers. They will advise you what to do next.

Under the Transport Operations (Marine Safety) Act 1994 in QLD, a marine incident is classified as an event causing or involving:

- the loss of a person from a ship
- the death of, or grievous bodily harm to, a person caused by a ship's operations
- the loss or presumed loss or abandonment of a ship
- a collision with a ship
- the stranding of a ship
- material damage to a ship
- material damage caused by a ship's operations
- danger to a person caused by a ship's operations
- danger of serious damage to a ship
- danger of serious damage to a structure caused by a ship's operations.

Wet Paper

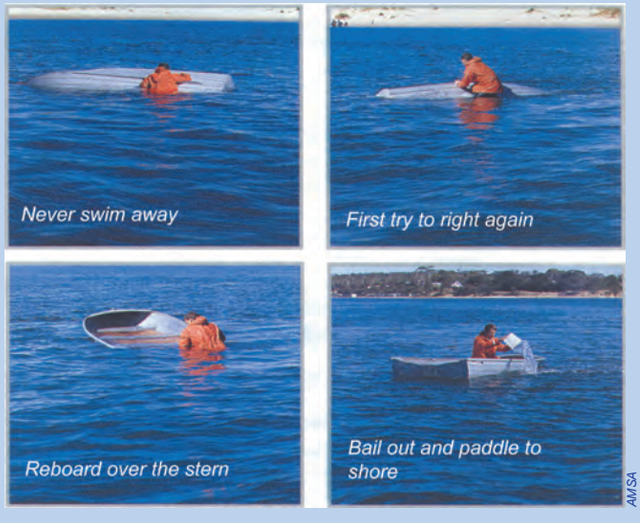
RUN OUT OF FUEL?

Bob Moffatt

WHERE ARE THE LIFE JACKETS?

MARINE INCIDENT FORMS

Marine incident forms can be downloaded from:
www.msq.qld.gov.au/Safety.aspx



AMSA

CAPSIZED! - NOT ENOUGH FREEBOARD?


Bob Moffatt

USING THE WRONG DATUM?

4.3 Fire on board

Fire extinguishers

Fires need three things to exist - oxygen, heat and fuel as shown in the fire triangle opposite. Remove one and you have a good chance of putting out the fire.

Most fire extinguishers remove the oxygen part of the triangle. A blanket can also be an effective way of starving a fire of oxygen. However when it comes to a burning engine, time is of the essence and a fire extinguisher is required.

To use this type of extinguisher remember the word - PASS:

- **P**ull the pin (and test the extinguisher).
- **A**im the extinguisher at the base of the fire.
- **S**queeze the handle.
- **S**weep the fire.

Not all fire extinguishers are alike however they all need to be serviced according to the manufacturer's specifications. The following web sites have useful information: *www.wormald.com.au* or *www.chubb.com.au*.

The Queensland fire service recommends that you take the biggest fire extinguisher on board that can be safely accommodated on your boat.

Probable causes of fire

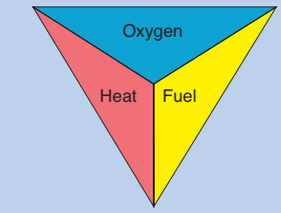
- Engine backfiring in air laden with combustible vapour.
- Hot exhaust pipe igniting adjacent to combustible materials.
- On inboard boats, fuel lines can leak or rupture and spray fuel over hot exhausts.
- Spontaneous combustion of oil rags in badly ventilated compartments.
- A spark caused by static electricity during refuelling.
- Fuel vapours collecting in the bilge due to spillage during refuelling.
- Short-circuiting and overloading the electrical system.

Reducing the risks

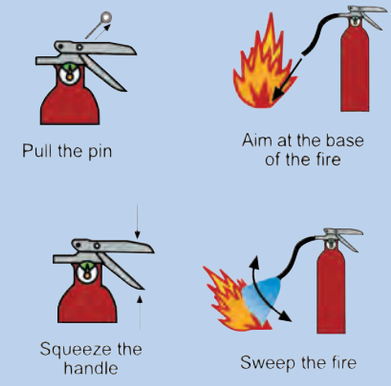
- Have the correct fire extinguisher on your boat - as a rule, dry powder prove most effective for the first time user.
- Keep the bilge and engine room clean and free of rags, newspapers and combustible materials.
- Check fuel systems at regular intervals for leaks and spillage.
- Any spare petrol should be carried in approved containers.
- Check the electrical system regularly for faults and keep all components as clean as possible.

When to use a fire extinguisher and when to abandon ship

If a fire occurs on a small boat - quickly anchor the boat and jump overboard and swim away from the boat. If you hear an audible alarm on a bigger boat, eg a V8 petrol inboard engine, and see smoke coming from under the engine hatch you should turn the engine and the fuel supply off as a first course of action and then assess the situation.



STOP ONE ELEMENT AND YOU MAY PREVENT THE FIRE SPREADING AND THE CONSEQUENCES



USING A FIRE EXTINGUISHER

Bob Moffatt

Class discussion

- Your boat is a 12 metre cruiser with a diesel inboard engine. While you are out off Airlie Beach you hear a fire alarm and see smoke coming from the engine.
- By looking at the fire triangle above you have three choices to try to control the fire.

  The first thing you could do is anchor the boat, but by the time you did that it may be too late.

  The last thing you would do is open the hatch and introduce more oxygen into the triangle.

  The most practical would be to shut off the fuel supply by turning off the engine. What does the class think?

4.4 Grounding

Be aware that as you travel through shallow waters you may need to tilt up the motor to avoid grounding.

- If grounded, don't try to dig your way out with your motor as this will clog the intake vents and ruin the impeller in the cooling system or may break the prop.
- Also check your hull to see if it has been damaged and your prop to see if it has been fouled before setting off again.
- It's best to try to get yourself off by using an oar or similar device.
  - If as a last resort you feel the need to get out and push, be aware of possible dangers including broken glass, rusted iron.
  - If operating a vessel in Northern Australia, skippers should check for crocodiles and stingers.

4.5 Marine radios

Small boat operators use VHF or 27mhz radio sets to obtain up-to-date weather forecasts, report arrival and departure times if going out to sea, listen to fishing details, communicate with shore stations and other vessels and listen to radio broadcasts advising of overdue vessels at sea.

VHF

- This is the preferred radio for short range communications due to their better performance over 27mHz.
- At time of publication, if your boat carries a VHF radio, you are required to attend a marine radio course or sit a written test to obtain a marine radio operators certificate of proficiency (VHF or open). ACMA/AMC are reviewing this law.

27 MHz

- 27 MHz sets are so called because all of their channels are in the 27 megahertz band. The range of these sets is between 6 to 30 nautical miles but this can be reduced if one station is behind an island or atmospheric conditions are bad.
- Since 27 MHz sets are extremely unreliable due to their low power, VHF sets are preferred. If using a 27mhz set the quality of the antenna is important.

  Poor performance of a radio can often be attributed to a poor quality or badly adjusted radio antenna and interference from the motor.

Frequencies

- Areas with large boating populations usually have marine rescue stations monitoring Channels 16 and 67 on a 24 hr basis. Weather information is regularly broadcast on Channel 67. Most areas have a local frequency or a common use re-broadcast frequency and Channel 73 is often used for this purpose.

Radio courses

- These can be done at most VMR's, Coast Guards, TAFE's or on line, for example: *www.vhfradioonline.com*

Controls

The following are the general controls that are found on most, but not all, radio transceivers.

- **Channel selector.** This control is used to select the channel or frequency that you wish to transmit or receive on.
- **On/off and volume control.** Turns the equipment on or off and controls the volume of signals coming from the loudspeaker.
- **Squelch or mute control.** Stops the constant and annoying background hiss or roar from the receiver.

Bob Moffatt

LOG ON/OFF WITH LOCAL AVCG OR VMR

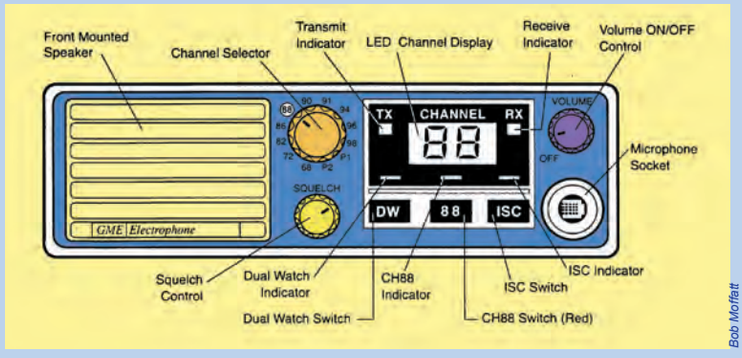
LETTER	PHONETIC	Spoken as	LETTER	PHONETIC	Spoken as
A	ALPHA	*Al fa*	B	BRAVO	*Brah vo*
C	CHARLIE	*Char lee*	D	DELTA	*Dell tah*
E	ECHO	*Eck oh*	F	FOXTROT	*Foks trot*
G	GOLF	*Golf*	H	HOTEL	*Hoh tell*
I	INDIA	*In dee ah*	J	JULIETT	*Jew lee ett*
K	KILO	*Key loh*	L	LIMA	*Lee mah*
M	MIKE	*Mike*	N	NOVEMBER	*Nov em ber*
O	OSCAR	*Oss cah*	P	PAPA	*Pah Pah*
Q	QUEBEC	*Keh bek*	R	ROMEO	*Roh me oh*
S	SIERRA	*See air rah*	T	TANGO	*Tang go*
U	UNIFORM	*You nee form*	V	VICTOR	*Vik tah*
W	WHISKEY	*Wiss key*	X	X-RAY	*Ecks ray*
Y	YANKEE	*Yank key*	Z	ZULU	*Zoo loo*

Bob Moffatt

PHONETIC ALPHABET

The correct setting is so that the hiss or roar just cannot be heard. Further rotation of this control will progressively desensitise the receiver.

- **ISC switch.** When activated it combines with a built in automatic noise limiter to eliminate electrical interference.
- **Dual watch**. Found on most VHF receivers. On operation it will permit a listening watch on two different VHF channels. A light emitting diode (LED) will come on in some receivers when this control is operational.



Bob Moffatt

RADIO MAINTENANCE AND CONTROLS

- Battery fully charged and in good condition.
- Battery terminals clean and leads intact.
- Radio leads securely fixed to the battery.
- Antennae and microphone plugged in properly.

Example of a radio check

Call on channels VHF 16 or 27.88. *Note in areas of poor reception say station identification three times.*

- *Redcliffe Coast Guard, Redcliffe Coast Guard, this is Reef Seeker, Reef Seeker (OVER)*
- *Reef Seeker this is Redcliffe Coast Guard please switch to Channel 73.*
- *Redcliffe Coast Guard, this is Reef Seeker Reef Seeker, am going out boating today and wanting a radio check (OVER)*
- *Reef Seeker this is Redcliffe Coast Guard your signal strength is FOWER to FIFE (OVER)*
- *Redcliffe Coast Guard, this is Reef Seeker Reef Seeker, thank you (OUT)*
- *Reef Seeker this is Redcliffe Coast Guard (OUT)*

Radio use rules

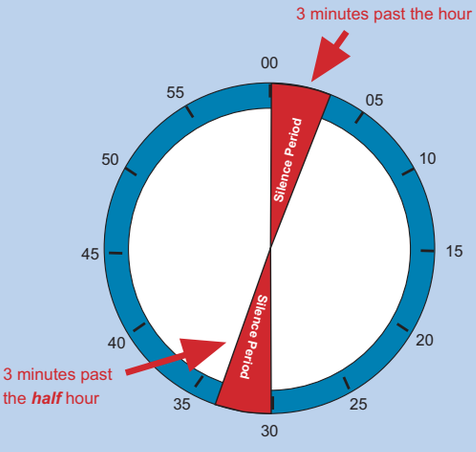
- Keep your radio tuned to Channel VHF 16 or 27.88mHz.
  - When you hear a call acknowledge and then ask the caller to change to a working channel for your local area. You can get this information from your local VMR or AVCG station.
  - You make a call on VHF 16 or 27.88mHz and then respond to the station change as requested.
- Observe radio silence periods - you do NOT call or respond during the three minute silence calls (see figure opposite).
- Listen before transmitting and follow the local area protocols.
- Do not transmit unnecessarily or allow children to play with the radio.
- Always use your call sign and the name of your boat for identification.
- Avoid interfering with other stations.
- For non distress messages, ask to switch to a "working channel" once you have contacted the other station.
- For distress messages, stay on channel VHF 16 or 27.88mHz or as directed by the local marine radio station.
- Keep your message brief and clear.
- Stop transmitting when requested to do so by a coast station.

Recognised distress signals

- Common recognised distress signals are illustrated in the diagram below.

Bob Moffatt

LOG ON/OFF



Bob Moffatt

RADIO SILENCE PERIODS

RECOGNISED DISTRESS SIGNALS

Bob Moffatt

4.6 Emergency radio calls

The three types are summarised in the boxes below.

Safety signals - SECURITE

When to use

Safety signals are used when a station wants to pass information concerning safety such as navigational warnings or weather warnings and are identified by the word.

SECURITE (spoken three times as

SAY-CURE-E-TAY)

What to say

Here is an example of a safety signal:
Note the following sequence:

- Securite (three times)
- Hello all stations (three times)
- This is (once)
- Name of vessel (three times)
- Indication of channel, safety message follows - change channels
- Safety message, then out.

Bob Moffatt

Urgency signals - PAN PAN

When to use

An urgency signal indicates that the station sending it has a very urgent message to transmit concerning the safety of a ship or aircraft, or the safety of a person.


Qui Nguyen

Urgency messages are sent on all distress frequencies and are identified by the words

PAN PAN - PAN PAN - PAN PAN

What to say

- Pan Pan (three times)
- Hello all stations (three times)
- This is (name of vessel three times)
- Urgency message details (once).

The urgency message and the message following should be sent on distress frequencies (except for long messages or medical messages which should be sent on working frequencies).

The message may be addressed to a particular station or to all stations.

If addressed to all stations, the station sending the message must cancel it with the same identification when action is no longer necessary.

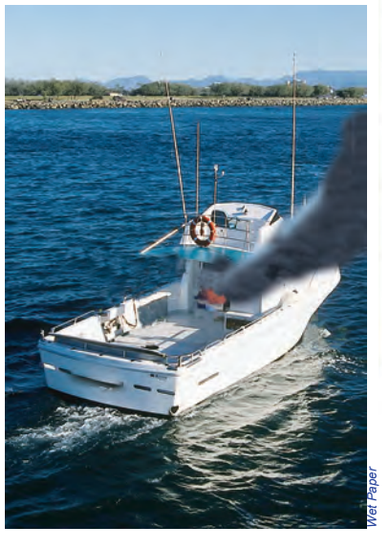
Distress signal - MAYDAY

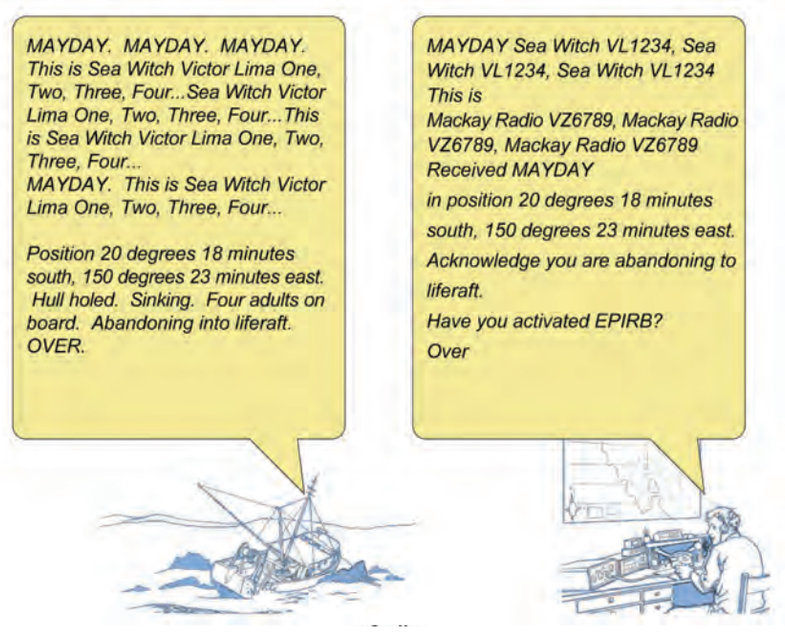
When to use

A Mayday call denotes an emergency involving grave and imminent danger to life or a vessel.

If a shore station fails to respond to the call, you should attempt to relay the message and render any assistance.

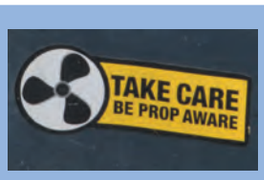
An example of what to say and what is likely to happen


Wet Paper



Kerry Kilzelman

Unit 5
Manoeuvring



Bob Moffatt

5.1 Departing the launching facility

Most likely your first lesson in real life will be at the boat ramp, so here are some important points to save what could turn in to either "ramp rage" or sheer comedy.

For example holding others up while you have six goes at backing the trailer, or swimming out to get your boat because you lost control of it can frustrate others and be very embarrassing.

On the boat ramp

- The best way to learn the skills shown in the photographs opposite is to go out with and experienced person first.

  That way you will have the opportunity to learn some practical skills such as using a chock under the rear wheels, keeping children waiting for you on the bank and away from cars and other boats in the carpark, tying a rope to the bow so the boat does not float away, and making sure the BUNGS are IN.
- Above all, practise backing in a car park so you don't hold everyone up while you stuff around trying to get the boat straight. LOCK your car and take your keys.

Conduct a safety briefing

- As part of your GSO, you MUST conduct a passenger briefing explaining where the safety equipment is stowed and how and when to put on a life jacket.
  - If necessary move around the vessel pointing out all safety equipment.
  - Ensure the information is understood because if you are stopped and your passengers are quizzed by the water police they must be able to locate the safety equipment - in a timely fashion.
- Point out the different types of safety equipment carried. For example if you are going offshore you will need to show the flares and EPIRB and how to use them.
  - Identify the location where equipment can be found and confirm that everyone has understood you and answer any questions they may have.
  - Identify where you will be going for the day, the type of conditions they can expect, how long till the next toilet stop or the need for footwear or protection from elements.

Starting the motor

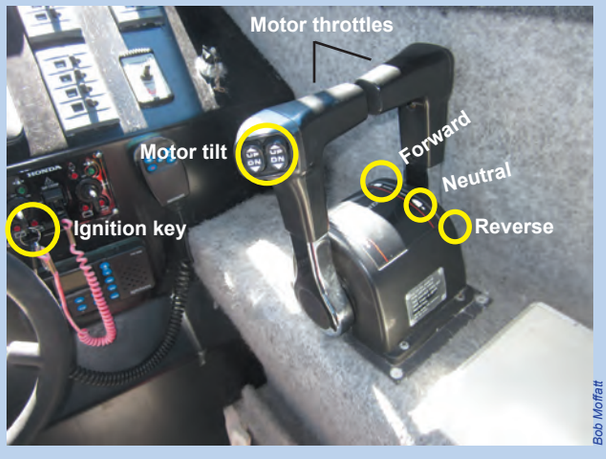
- Never start machinery if you don't know how to STOP IT, so identify how and where the motor is started and stopped. Forward controls usually have an ignition key system. Motors on the transom usually have a red stop button.

Fuel system

- Check fuel ventilation (any fumes). For inboards check the engine and gear box oil levels and bilge is free of fuel vapour.
- Check the fuel lines and cocks are open and connected.
- Check the fuel levels are adequate for the voyage plus a reserve.


Bob Moffatt

WORK AS A TEAM



Bob Moffatt

**FORWARD CONTROLS
TWIN SCREW**

Cooling system

- Check the coolant levels are correct (if fitted).
- Check the intakes are open and clear and raw water sea cocks (valves) are open.

Electrical system

- Check that the power is turned on.
- Check the kill switch (safety lanyard) is fitted.

Start-up

- Select neutral gear and check if safe to start ie no people in the water nearby.
- Turn the key to start the motor. Check the motor is running OK and the water pump is working.
- Ask someone to check that water is coming out of an outboard legged motor in what is called the 'tell tail'. Always check for trailing ropes that may be caught in the propeller.
- Monitor the motor for things like coolant temperature, oil pressure or unexpected changes in engine speed or sound.

Get the boat onto the plane

- You are now ready to go. Insist everyone on board is within the boat, not on the side decking and especially not on the bow or where the view is obstructed.
- Remind crew about stability and safety. Never stand or sit on the bow of a boat while the boat is departing or leaving.
  - Position all passengers so that weight is distributed evenly and equipment is stowed for maximum stability.
  - Keep the crew briefed during the voyage if conditions are changing eg, increasing waves, you are changing direction, looks like its about to rain heavily.
  - A few simple questions like - are you all OK, can everyone swim, if you fall overboard do you know how to call out for help?
- **Again warn the crew what you are going to do.**
  - Don't just wack it into gear and take off as you will throw your passengers all around the boat.
  - Then say something possibly politically incorrect like - "OK hang on we're off".

Accelerate

- Maintain a proper lookout and monitor engine performance.
- Engage forward gear by dropping the revs, waiting a few seconds and select forward gear.
  - Then sit or stand in a comfortable position with one hand firmly on the throttle and another on the gunwale (if you are in a tinny).
- When it is safe to do so and after warning crew, increase speed so the bow rises and then falls to make the boat plane as shown in the sequence of six photographs above.
- Remember that when you come off the plane, the boat continues and you have no brakes and you may have to do an emergency stop if needed.
  - The emergency stop is discussed next page.

Lags in the helm and throttle response

A vessel does not respond instantly to the wheel or throttle. The time between the two is called a lag and the duration will vary among different vessels. This lag needs to be anticipated.

A lag in helm response is known as an "advance". This is a segment of a turn in which the vessel travels forward after a helm instruction and before the vessel moves off its course line.

WHEN LOADING MAKE SURE THE BOAT IS STABLE

GETTING THE BOAT ONTO THE PLANE

SEAT PASSENGERS FOR MAXIMUM STABILITY

5.2 Make an emergency stop

Issues

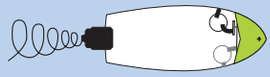
- Losing control and swamping or flooding vessel.
- Personal injury
- Person overboard
- Crew injury caused by things moving about.

Things to remember

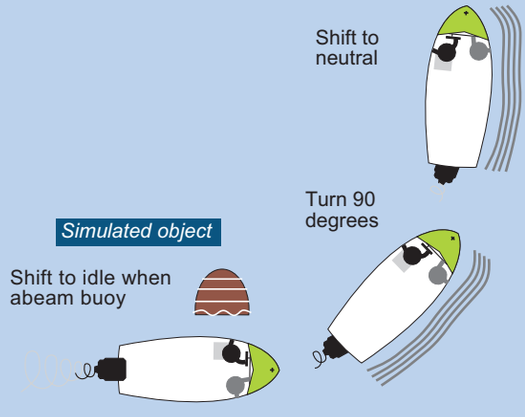
- Make sure everything is secure so nothing comes loose to injure your crew.
- Warn crew of your intentions and do not perform the skill until there is no chance of a collision with another boat.
- Keep one hand on the throttle and the other on the steering wheel at all times.

Always maintain a proper lookout

Approach on the plane



- Where the helm is mounted on the stern, keep one hand on the throttle and one on the gunwale.
- All occupants should be seated and have a secure grip on the boat.
- As a boat rolls in a tight turn, it always slides sideways. There is a risk in some boats of the boat's wake coming over the transom.



Bob Moffatt

5.3 Pick up a mooring buoy

If you are travelling to a mooring or intend docking at a jetty, it is necessary to assess the weather and tides before departure.

Weather - You will need this to determine how waves and wind speed and direction will determine your approach.

Tides - You will need to know the amount of water under the boat as well as the tidal flow and direction.

Mooring and docking

Mooring means coming up to an object in the water; docking is coming alongside a marine structure. Mooring may be necessary if no berth is available or you are in an environmentally sensitive situation, eg Marine Parks require that no anchors be used to avoid coral damage.

Docking requires a number of advanced skills that require lots of practice. In this situation, wind, tide and other boats play a very significant role.

Moorings typically have a large buoy that is attached to an anchor on the bottom with chain.

The driver should approach the mooring with it on his/her side of the boat to keep it in sight throughout the manoeuvre.

Approach at minimum control speed from a position downwind of the buoy, or down current if stronger.

- Approach a buoy in the forward gear slowly into the wind and waves or the current, whichever is the stronger.
- Engage reverse so that the boat stops when close to the buoy.
- Continue to use reverse to check the rate of movement of the boat.
- Instruct a crew member to pick up a buoy with a boat hook or similar device, or if you are by yourself, disengage gears and move to the bow and pick up the buoy yourself.

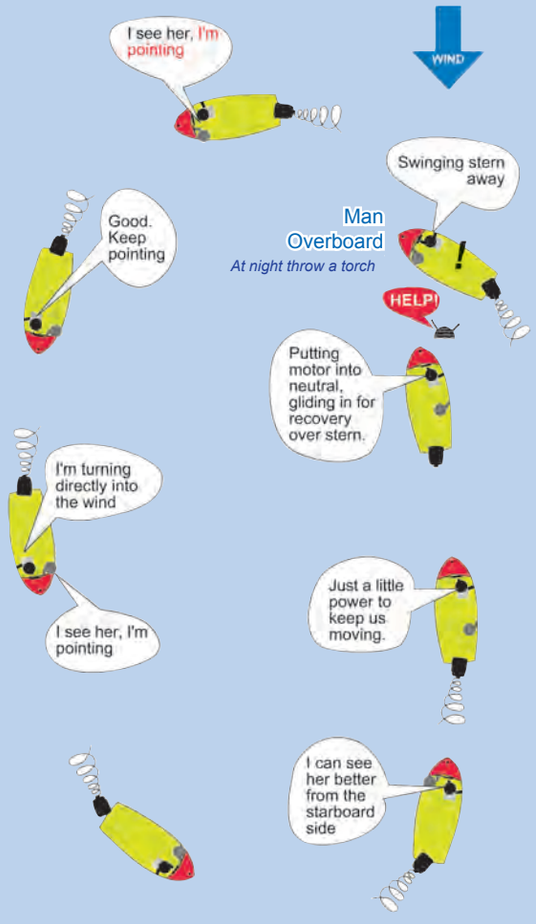
Bob Moffatt

Laurie Adams

Bob Moffatt

5.4 Man overboard

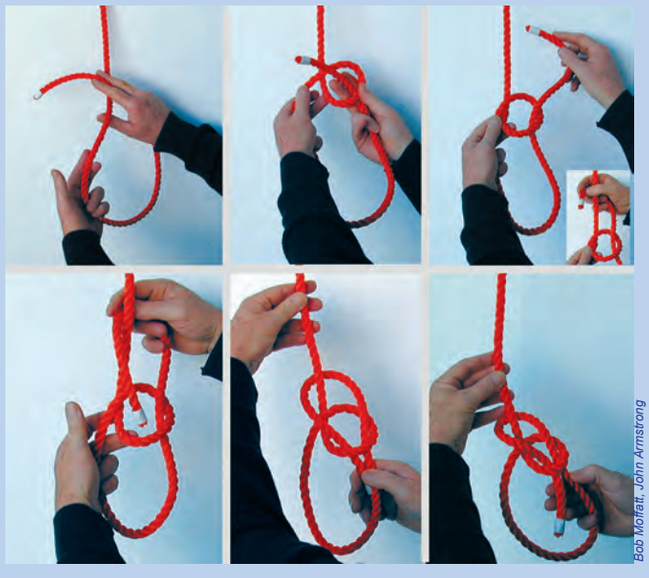
- If possible turn the tiller or wheel so as to swing the stern away from the person and throw something that floats into the water to mark the spot.
  - If this happens at night throw a waterproof torch overboard.
  - If a GPS is available, hit the "man overboard" button.
- Instruct the crew to watch and continue to point to "the person" all the time until rescue is complete.
- Turn the boat around safely and head back towards "the person" and nominate your approach side. Allow at least three boat lengths.
- When nearing "the person" bring the boat up into the wind (or into the current if it is stronger than the wind).
- Once you have contact with "the person" in the water cut the motor. If this could endanger the vessel then go into neutral and don't cut the motor (the type of situation that determines this action is a lee shore, bar crossing, very rough weather or if there is a problem in restarting the motor).
  - If the boat is a small dinghy, retrieve "the person" over the stern, so as to avoid capsizing the boat. If conditions permit - turn off the motor. If not care should be taken not to injure "the person" with the prop.
  - For other boats retrieve "the person" at the side of the boat. If there is difficulty getting "the person" on board rig a rope (the anchor line will do if nothing else is available) by tying it onto the boat at bow or stern and allowing the bight to fall into the water where it can be used as a step to assist recovery.



Bob Moffatt

5.5 Tie a bowline

- This knot can be used for making a loop for a mooring, attaching warps to boats, tying equipment in a boat, or just for making a loop at the end of a rope that will not slip.
- To tie this knot, take a loop in the rope end (sometimes called *a rabbit hole*). Now pass the free end up through the loop (sometimes called *up the rabbit hole*).
- Then pass the free end around the rope end (or *around the tree*) and finally back through the loop (*back through the rabbit hole*).
- If you are going to use the knot for throwing around a pylon, make the loop big enough to throw it around the pylon.
- Don't forget to secure the mooring line to a strong fitting on the gunnel ie a cleat or cross bollard, before throwing the mooring line.


Bob Moffatt, John Armstrong

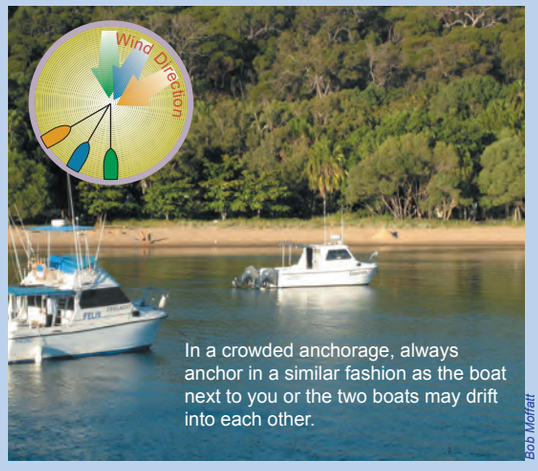

Bob Moffatt

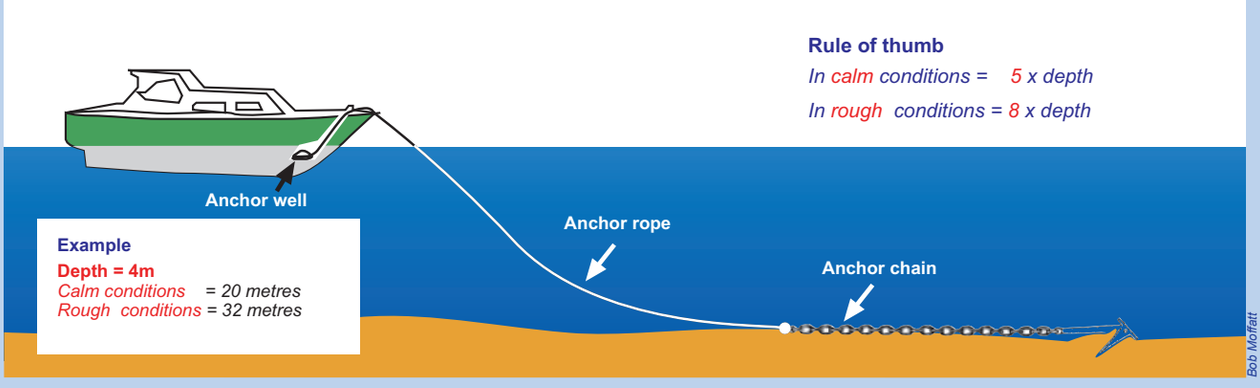
5.6 Anchor the vessel

- Identify a safe place in accordance with prevailing and forecast conditions and in accordance with relevant legislation, regulations and rules.
- Select the right anchor from those on page 21. For most tinnies and smaller vessels, you have a choice of a rock pick or a danforth.
- Lower, set and monitor the anchor according to prevailing conditions.
- Assess the conditions of wind, wave and current to determine the most favourable approach.
- Estimate the swing circle of the vessel with regard to prevailing and anticipated conditions and considering water depth, wind and current conditions.
- Identify marks on your anchor rope that denote length.
- Determine the depth and bottom conditions and calculate the amount of rope to lay out.
- Set an anchor by:
  - Motoring up into the wind or tide just ahead of your chosen spot, lower the anchor.
  - Laying out the required length until the anchor strikes bottom.
  - Setting out at least 5 times the distance to the bottom.
  - Securing your anchor line to a cleat.
  - Motoring gently in reverse so the anchor digs in.
- Checking to see if you are moving by lining up and keeping two points in transit; feeling the anchor rope.

Raising the anchor

- Raise the anchor by
  - Motoring up to it, feeding the rope into the anchor locker as you get closer.
  - Dislodging the anchor by giving it a strong pull or a small push forward with the motor.
- Always use the stem (or strongest part of the boat) when using engine power and never the stern (you will sink the boat).
- Use the anchor windlass system on a larger boat.





5.7 Complete a figure of eight

Perform this skill while you are planing the boat.

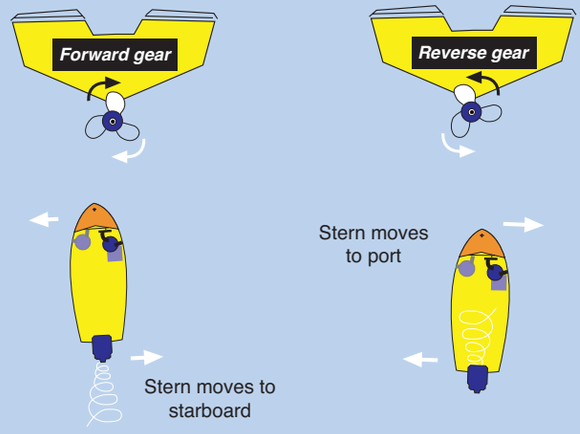
- Warn crew of what you are about to do.
- Look all around to see you have space to safely make the manoeuvre and make a wide arc.
- Keep the boat on the plane in a wide arc.
- Decelerate at the start of the turn so you can feel the chine of the boat gripping the water.
- Cross the wash and hang on tightly. Slow a little if necessary to ride over the waves to compensate for swell.
- Identify the two sets of wash in the water.
- Keep the boat on the plane.
- Look over your shoulder again and make a second turn to complete the Figure of 8.

5.8 Leave a jetty

- A vessel is turned by shifting the stern sideways under the influence of a rudder. In the case of an outboard, it is turned by axial thrust - a force from a propeller driving the boat forwards or backwards.

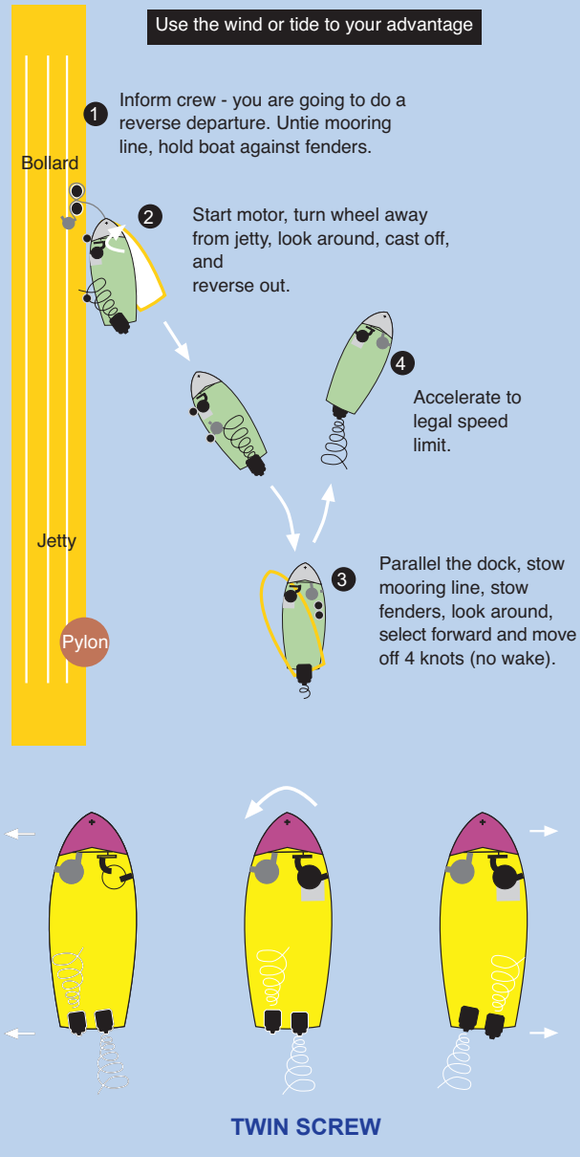
Pivot points

- When going ahead a boat has "rear wheel" steering. Because of this, the pivot point within the boat, and around which the boat turns, is located well forward of amidships (see page 9).
  - This means that the bow cannot be turned unless there is room for the stern to move in the opposite direction so you cannot steer a boat forwards away from the dock.
  - To move the bow sideways will require a much larger movement of the stern in the opposite direction.
  - When turning forwards, the stern of the boat will swing much more widely than the bow.
- In reverse, the pivot point is usually slightly aft of amidships. Because of this, the bow will follow the stern quite well in reverse and may often be easier to "reverse park" in tight situations.



Outboard leg single screw

- To successfully complete this task you will need to brief the crew and passengers on what is to happen, allocate lines or fenders and caution about hands being trapped between boat and berth.
- Before making your manoeuvre, ensure it will not interfere with other boats – look around.
  - Generally it is easier to reverse away from a berth. (It is difficult to get the bow off a berth while moving ahead because the stern swings when the rudder or engine movements are used for steering.)
- Tell the crew what you are going to do and if handling lines to watch the gap between them and the dock.
  - With the motor in neutral, turn the wheel fully away from the berth, this points the propeller in the direction the stern will go in reverse.
  - Put the motor in reverse and apply very little throttle. Unless wind or current is pushing the vessel onto the berth, the stern will move out and the bow will not scrape on the berth.
  - If the boat is being pushed on, you may need to straighten the wheel a little as the vessel moves astern, this will protect the bow from hitting the berth.
  - Once the bow of the vessel is clear of the jetty and while still in reverse, turn the wheel fully toward the berth, this will straighten the vessel by swinging the stern towards the berth and the bow away from the berth.
  - When the vessel is parallel to the berth turn the wheel in the direction you wish to go and engage forward propulsion.



Twin screw

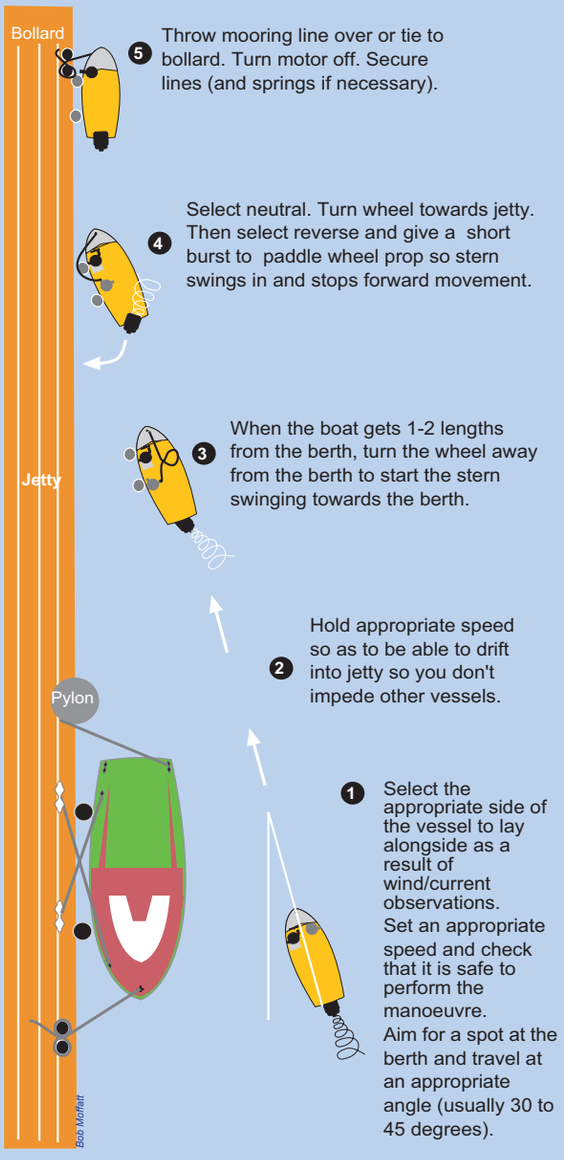
Departing a dock with a twin screw vessels is best done entirely with the engines and wheel amidships. Again, tell the crew what you are going to do and if handling lines to watch the gap between them and the dock.

- When swinging the stern out, go forward on the engine further from the berth, and astern on the engine closest to the berth.
- Once the stern has swung out far enough to clear any obstacles, go astern on both engines.
- Once the bow of the vessel is well clear of the jetty, go forwards on the engine closest to the berth. When the vessel is pointing in the direction you wish to go, engage forward on both engines.

Bob Moffatt

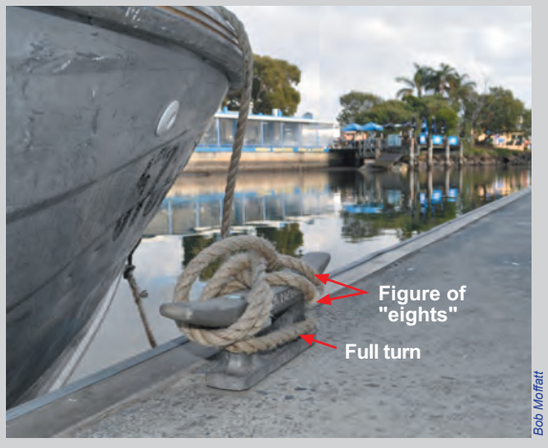
5.9 Return to a jetty

- Advise crew to keep fingers off the gunwale and impending wake from own boat at dock.
- Identify the correct place in a marina to moor a vessel obeying regulations.
- Approach a dock at an angle of about 30 - 45 degrees. If the wind is blowing you off the dock, approach at a shallower angle.
- At 2 boat lengths, slow to a minimum controllable speed by using intermittent power.
- Line up two items to tell if the boat is maintaining the desired track and adjust heading as necessary and at one-two lengths go to neutral.
- Position the motor towards the dock. At slow speed in neutral the helm has little effect, so as you turn the motor towards the dock the boat continues in a straight line.
- At 1/2 a boat length apply a brief burst of power astern to swing the stern towards the dock to bring the boat to a complete stop.
- Throw a mooring line over a bollard or tie up to the jetty and use a boat hook or paddle to fend off the jetty if necessary.



Safety issues

- Injured fingers and hands on dock
- Propeller fouled by lines/plastic in water
- Hull damage from collision with dock
- Crew injured by coming in too fast, colliding with dock
- Collision with another vessel at the dock
- Crew injured by boat rocking from own wake



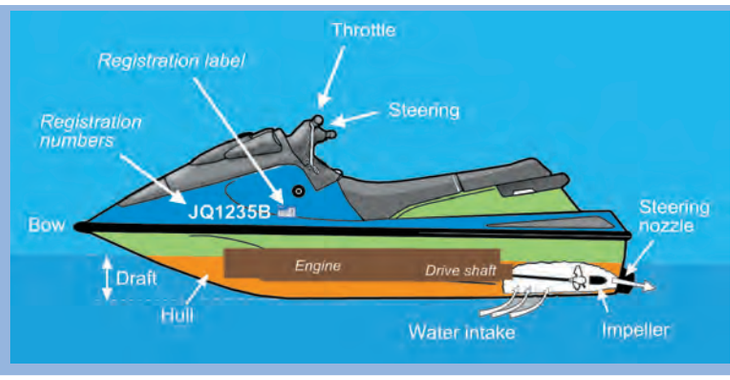
First make a full turn around the base of the cleat.
Follow with a couple of Figure 8's.
Finish with a full turn.

If you intend to stay on shore for a while - replace the full turn with one half hitch.

TYING TO A CLEAT

Unit 6 Personal water craft (PWC's)

Text supplied for this section is from the 5th Edition TMR BoatSafe workbook and has been reproduced with permission



Wet Paper

6.1 General safety obligation

Personal watercraft (PWC) are small, high-powered inboard jet-driven boats, capable of high speeds and radical manoeuvres.

The risk of a marine incident or injury to riders, passengers and other water users is dramatically increased due to these factors, particularly if the rider is unaware of the unique characteristics of PWC and are unskilled in their use.

- Just like the RMDL, PWC owners and operators have a general safety obligation (GSO) to make sure their personal watercraft is in good condition, used safely and has the correct equipment.
- You also have a safety responsibility towards those who use your personal watercraft.
- Whether you own or just borrow a personal watercraft, it is vital to understand the safety rules and regulations.
- Operators can achieve this obligation by ensuring their boat is
  - safe
  - properly equipped and crewed and
  - operated in a safe manner.

Registration

Personal water craft must be registered (see page 7) with registration symbols:

- Displayed on both sides
- At least 100 mm high
- Legible from 30 m
- Clearly visible in a contrasting colour to your craft
- Easily seen while your craft is under way.
- The registration label must be displayed on the port side of your craft, adjacent to the registration symbols as shown in the figure above.

Sea-Doo

Licensing

- It is compulsory for all PWC operators to hold a personal watercraft licence (PWCL) – a separate licence from the recreational marine driver licence (RMDL).
- To obtain a PWCL applicants must first hold an RMDL or commercial marine qualification as a master. There is no minimum time required to hold a RMDL before obtaining a PWCL.
- All PWCL applicants must undertake a competency-based training program (BoatSafe) for personal watercraft operations before being eligible for a licence.
- A supervised unlicensed driver is not allowed to carry passengers other than the supervising licence holder.
- The supervising licence holder must wear a kill switch safety lanyard while the unlicensed driver is driving the PWC.
- When towing a skier the operator must be licensed and have an observer on board.
- If you move from interstate, you are required to obtain a PWCL unless you hold an equivalent PWCL issued by another state. Short-term visitors can use their boat licence equivalent, if that is all that is required to operate a PWC in their home state.
- You can operate a PWC without a licence only if accompanied by a licensed operator who is able to take immediate control of the craft if required. Unlicenced drivers must not operate PWCs while towing someone else by a line attached to the ship eg, water skiing, riding a toboggan or tube.
- A PWC hired from a licensed PWC hirer can sometimes be ridden without a licence under their special restrictions which must be stated before the hirer operates the PWC.

6.2 Types and propulsion

Types of PWC

- Performance-orientated PWC (stand-up), featuring a hinged, adjustable steering column, the rider stands or kneels on a platform at the stern of the boat.

  These are often used for racing, and require skill and balance to operate. They can accommodate only one rider and are sometimes called a pole ski.

Bob Moffatt

- Cruising PWC (sit-astride): The most popular type, accommodating up to four people.

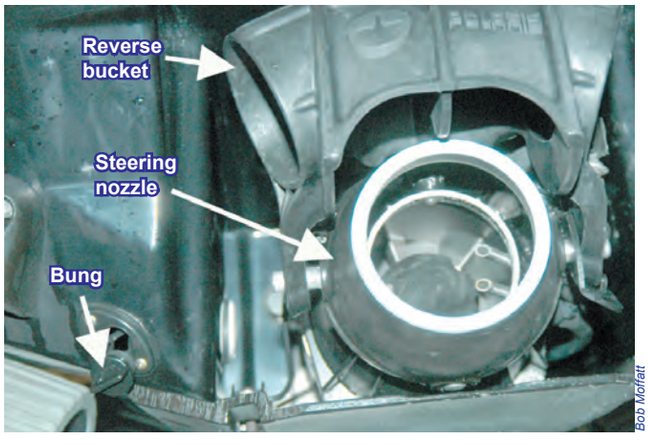
Propulsion

PWCs can use either a two-stroke (similar to many outboard motors) or a four-stroke engine (similar to a car engine).

The engine drives a powerful water pump which sucks up water from the bottom of the craft through an intake grate. The water passes through an impeller, a type of propeller fitted into a surrounding "tunnel", which pressurises the water and forces it out a jet nozzle (below) at the rear of the craft.

This jet of pressurised water propels and steers the craft when the throttle is engaged.

- Some newer PWC include 'off-throttle steering technology' which offers the craft limited manoeuvrability when the throttle is off.
- Technology is rapidly changing with a new reversing bucket which is claimed to actually act as a brake.



6.3 Pre-departure checks

Routine maintenance

- Like any other boat, before taking your PWC out on the water read and understand the owner's manual. Take the time to become familiar with all aspects of your craft.
- Check your operation manual carefully on how to flush your motor as models can vary.
- Leave storage compartment with seat up to allow ventilation.
- Use protective lubricants to prevent corrosion and don't forget the trailer and its regular maintenance, eg bearings, lights, winch and straps.
- In the event of breakdown, PWCs have no alternative propulsion such as oars or sail. It is therefore critical to inspect and maintain the craft to minimise the risk of engine or steering failure. See manufacturers handbook maintenance schedule.

Before launching

- Check inside and under the hull to make sure there are no cracks and excessive wear and tear on the craft, including water leaks.
- Secure bungs.
- Check steering and throttle for correct operation.
- Check battery fluid level and charge condition.
- Check if there is adequate fuel and oil for usage.
- Check spark plugs and electrical systems for evidence of wear and tear or potential for electrical sparks.
- Ensure that the intake grate is free of foreign objects.
- Ensure all compartments are secure.
- Check with the manufacturer's user manual to find out if they advise starting the engine before the PWC is launched into the water, and for how long the engine should run.

Fuel

- Where possible, fuel your PWC on land rather than on the water to minimise the risk of polluting the waterways and to ensure the PWC is stable.
  - Be responsible by regularly maintaining your fuel system, not overfilling your fuel tank watching the breathers and using absorbent material to collect fuel overflow.
  - Be sure to refuel in an open ventilated area where there are no naked flames. Do not over-tighten the fuel cap.

Post-operation checks

- Check with the manufacturer's user manual or dealer regarding recommended post-operation checks and maintenance.

  The success of your next trip and durability of your craft will depend on how you treat it after use.

6.4 Safety equipment

All personal watercraft (PWC) operating at night or in restricted visibility must show navigation lights as discussed on pages 23 and 69.

- This table outlines the minimum equipment requirement set by legislation and recommended equipment to satisfy the general safety obligation.
- Water limit maps on Pages 24 - 25 indicate the three designated water types along the Queensland coast. Consider your entire trip, including areas through which you are only traversing when equipping your PWC.
- Consider also the need to carry a torch as you may be delayed near sunset or in times of restricted visibility.
- PWC operators and passengers must wear a life jackets at all times. The type of life jacket and other safety equipment for a PWC is dependent on where you are travelling. See pages 18 - 19 for a description of life jackets.

  Carry the minimum safety equipment, but to enhance safety, confidence and enjoyment consider carrying safety equipment to cater for the unexpected. For example, consider the following equipment: tow rope, spare bungs, spare lanyard, helmet, gloves and booties.

Lanyard

- PWC's have either an ignition safety switch or a self-circling feature if the operator falls off.
- Most cruising PWC come equipped with an emergency ignition safety switch.

This is a safety device which is designed to shut the engine down if the operator is thrown from the proper operating position.

- The safety switch works by attaching a lanyard between the operator and the switch. It is attached either to the operator's life jacket or their wrist.

  If the lanyard is removed from the switch, then the engine will shut off.
- If the operator is thrown from the operating position of a PWC with a self-circling safety feature, the engine will begin running at idle speed while the PWC slowly circles.

  The operator can then reboard. Be sure that the idle speed is always set correctly, and don't swim after the circling PWC – it will come back to the fall-off position.
- Upon reboarding, be sure to re-attach the lanyard or the engine will not start. Always ensure that the lanyard is attached to the licensed operator who is in immediate control of the PWC.

  Test the lanyard is working before departing on your journey.

6.5 Navigation lights on personal watercraft

All personal watercraft (PWC) operating at night or in restricted visibility must show navigation lights as discussed on pages 35 and 36.

Types of lights

PWC operating in Queensland waters must be equipped with the appropriate lights as per the International Regulations for Preventing Collisions at Sea (COLREGS).

Installation

Navigation lights must be installed in accordance with the manufacturer's instructions. Navigation lights should be mounted so as to minimise damage by contact with other objects under normal operating conditions. For example lights mounted on the topside of smaller craft can be damaged when coming alongside a wharf or pontoon.

A mast for an all round white light on a PWC should be installed in such a way so it will not pose an impaling hazard. An option to reduce this risk would be a heavy duty spring mounted base. The addition of any after market products to a PWC must be in accordance with the manufacturer's instructions and must not compromise the watertight integrity of the hull.

Lights

An all round light shows over a nominal arc of horizon of 360°. The light fitting must be located at least one metre above the sidelights and should, as far as practicable, be on the centre line of the boat. As a general rule, an all round light should not be obscured by masts or other structures by more than 6° of arc.

PWC's need to have a port (red) and a starboard (green) side light, each showing an unbroken light over an arch of 112.5°.

If the design of the boat allows, a combination port and starboard light unit can be mounted on the centreline of the boat in place of two individual side lights.

Further information can be obtained from Queensland Transport Regional Marine Offices as listed on page 80 or on their web site.

http://www.msq.qld.gov.au/Safety/Navigation-lights

6.6 Manoeuvring

Trailer launching and retrieval

- As with other boats, PWCs are commonly transferred to the water, launched and retrieved via a trailer.
- It is possible to launch the PWC by either pushing it from the trailer manually, or if the stern is in sufficient water, applying the reverse lever to manoeuvre the PWC from the trailer under power.
- A bow line needs to be attached if the PWC is pushed off manually.

Launching

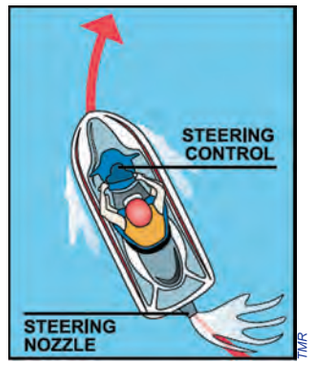
- When launching from a river bank or sand bar, make sure the craft is well clear of other water users such as swimmers, and no swimmers are in the path of the boat once it has started.

  Be aware that a PWC puts out a water jet stream up to three metres which can cause injury to persons bathing.
- Point the bow of the craft to the centre of the waterway or away from shore into knee deep water (where sand will not be sucked into the intake grate). Rock the craft from side-to-side to free the craft of sand and debris. Attach the lanyard and turn the ignition on.
- PWCs do not have a neutral gear. Once you start the motor, the craft will move forward. Maintain six knots or below until 60 m from the shore.

Landing

- Always allow plenty of room for stopping. From full speed, a PWC can travel up to 80 m after the throttle is released and engine stopped. Practise stopping in the middle of a waterway to find out the stopping characteristics of the PWC, and how much water you will require to land the craft without damage.

  Some PWC's are now fitted with a brake/decelerate/reverse feature.
- The reverse lever (see control at slow speed and reverse) can assist in landing. Those craft without a reverse lever can require a greater stopping distance.
- If landing on a beach or sandy shore, turning the engine off before entering shallow water prevents the engine sucking up sand through the intake grate and damaging the impeller.
- When beaching the PWC the speed should be less than six knots within 60 m of shore. A safe PWC operator would travel slower if the area has hazards such as rocks and concrete boat ramps.



TMR

Steerage

- PWCs are jet-driven and do not normally have a conventional rudder. Rather, they have a steering nozzle at the back of the craft which is controlled by the handlebar.

  This nozzle directs the stream of pressurised water from left to the right.

  When the steering control is turned right, the steering nozzle is turned right.

  The force of the water leaving the nozzle pushes the back of the boat to the left, which causes the PWC to turn right.
- Water conditions (rough, smooth, currents), the rider's body movement, and the number of passengers will all cause the PWC's steering to respond differently.
- Most importantly, a PWC must always be under power to maintain control. When the engine is idling or shut-off during operation, all steering control is lost.


TMR

  The PWC will continue in the direction it was headed no matter which way the steering control is turned (some PWC have a limited 'off-throttle' steering control).
- This connection between steerage and power is the most critical aspect to understand about operating a PWC and cannot be over-emphasised.

  Many accidents have occurred when a PWC operator has collided with objects or people after turning off the engine or reducing power.
- When confronted with an obstacle, many people's reflex action is to take their thumb off the throttle; however, to take evasive action it is important to retain power and turn to either side. Practise turning at high speed in an open area without other boating traffic.
- Safe PWC operators always keep a proper lookout, anticipate hazards and know their boat's capabilities.

Control at slow speed and reverse

Most cruising-style PWC are very stable when stationary or when travelling at slow speed in smooth water. Stand-up craft at slow speed require more coordination and balance on the part of the rider.

The three categories below will help understand how a PWC behaves at different speeds:

- Trolling is idle speed when little or no throttle is used. The bow of the PWC is down in the water and there is no wake.
- Sub-planing is medium speed. The bow of the PWC is out of the water, but the stern is forced deeper in the water which creates a larger wake.

TMR

- Planing is a faster speed where the bow and the stern of the PWC are level. The entire craft is skimming on top of the water, which creates a minimal wake.

TMR

- When trolling or sub-planing, tighter manoeuvring and cornering are possible by 'feathering' the throttle (applying the throttle with short, sharp actions) while steering.
- Most new model PWC have a reverse thrust to assist slow-speed manoeuvring. This is usually operated by a lever on the side of the cowling, which repositions a 'reverse bucket' over the jet nozzle, forcing the pressurised water jet to be redirected toward the front of the PWC.

  This makes the craft move backwards, with the steering assembly determining the direction.
- It is important to understand that the reverse lever does not redirect the jet nozzle itself, but repositions the reverse bucket, redirecting the pressurised water jet. Therefore, the reverse lever should only be applied when the engine is in a slow idle. Doing so at higher speed can damage your craft. Avoid using the reverse lever as a brake.

  Once the reverse lever is in place, more speed can then be applied but most PWCs travel at vastly slower speeds in reverse.
- The reverse lever (shown being applied opposite) is useful to assist in manoeuvring a PWC next to other stationary craft, structures such as jetties, when landing, or if picking a person out of the water.


Bob Moffatt

Control at speed

PWC are designed for speed. Turning a PWC at a higher speed is like turning a motorcycle. Reduce speed slightly, turn the handlebars and shift your weight towards the direction of the turn.

Apply sufficient throttle to complete the turn. The higher the thrust, the sharper the turn will be. Insufficient or no throttle may cause the PWC to turn slowly or not turn at all, while excessive throttle may cause the PWC to 'spin out', causing operator and/or passengers to be thrown from the PWC, or causing possible injury.

Rough water operations

Operating a PWC at high speed in rough conditions, such as in choppy conditions, affects the steering, power and balance of the craft. If after hitting a small wave, the craft becomes airborne, steering and power will momentarily stop. This will effectively reduce the straight line speed of the craft.

The amount of fuel on board (the average PWC holds around 60 litres) is also a contributing factor to the performance of the craft in such conditions. It is easy to fall off the PWC in choppy conditions and hard to reboard. Be sensible and reduce speed to match condition.

Extended high speed operation will affect muscle control in the arms and be exhausting. Rough water operation should only be conducted by experienced still water operators, and when possible, in the company of a second PWC.

Passenger's hold

The safest way a passenger can secure themselves while riding a PWC is to hold the life jacket of the operator or the person immediately in front of them. Many personal flotation devices made for PWC have specially designed straps on either side.

Holding onto the handle at the back of the seating can lead to injury of the passenger arms or back in the event of a capsize or a spin-out.

Before riding at high speed, an operator should familiarise themselves how the steering of the craft alters when extra passengers are on board. The operator should also brief passengers on the capabilities of the PWC. The operator is responsible for the well-being of the passengers and should ensure all passengers are wearing a suitable personal flotation device.

Freestyling

Freestyling is erratic and non-directional driving, where it is difficult for others to predict your course. High speed manoeuvres such as wake-jumping, donuts, figure 8's, 360's and so on are examples of freestyling. It can be unsafe, annoying and noisy for other water users and nearby residents. When you are freestyling be aware of other water users. Find a place away from populated areas like beaches and residential areas.

Distance-off laws apply to freestyling PWC operators (see 'Distance and speed' on page 72). PWC operators must obey speed limits. If there is more than one craft freestyling in an area, operators should discuss and agree on a direction of operation, for example, anti-clockwise.

Wave jumping and surf riding

Wave jumping and surf riding can be dangerous for inexperienced or careless riders. Before wave jumping and surf riding check how many other water users are in the vicinity; like swimmers, board riders and other PWC operators should also be aware of hazards in the area, such as rocks, jetties and sandbars.

Viewfinder

A PWC rider must stay at least 60 m from bathing reserves (for example, flagged areas) and people in the water. It is best to avoid wave jumping in an area where there are swimmers.

Avoid collisions and injuries by thinking carefully before jumping a wave. Note the location of other water users, think about the speed of the craft at take-off, the height of the wave, and approximately where the PWC will land.

When jumping in larger waves, it is often difficult to see board riders or other water users below the crest of the wave. Be aware of sandbars in shallow waters and underneath waves. Make sure there is sufficient water to manoeuvre after the wave has subsided.

Once airborne, it is easy for inexperienced riders of PWC to become separated from their craft. This can lead to serious injury if the rider lands on the PWC itself or a sandbar after a jump of several metres in the air.

Injuries from such accidents are common. For this reason, inexperienced riders should first practise jumping at a slower speed over smaller waves, and slowly progress as skill and confidence increase.

When going out to sea, ensure the PWC meets the wave head-on, limiting the chances of rolling or broaching. When returning to shore, ride behind the wave, allowing water beneath the PWC at all times.

Avoid riding the face of a wave with a PWC like a surfboard. If a PWC is caught by the lip of a wave, the craft can broach, leading to significant damage to the craft and rider. Use the throttle generously to avoid the crash zone, but also steer away from shallow water.

MSQ

Bob Moffatt

Class discussion - which is correct?

Falling off and reboarding

If you have fallen off in deep water and the engine has cut off, reboard over the back deck (climbing on the side can capsize the PWC). Most PWC have handles on the back of the seating assembly.

Practise reboarding with someone else around to make sure you can handle it alone. Avoid riding when tired or injured as reboarding will be difficult.

Capsizing and righting

Because of a low centre of gravity in their upright position, it is rare for a PWC to remain upturned after capsizing. Most manufacturers of PWC outline how to right the craft in the user's manual. If you roll it over the wrong way, you could cause serious damage to your PWC or to yourself.

The following is a typical way of righting your PWC:

- Ensure the engine is stopped by removing the engine stop switch or lanyard.
- Swim to the rear of the PWC and turn it over by gripping the ride plate with your left hand and pushing down on the gunwale rail with your right hand or right foot;
  - do not put your hand in the intake grille;
  - take care not to be hit by the PWC as it turns over and
  - if in rough water, observe the waves and avoid being near the PWC when waves approach.
- Reboard the craft, start the engine and head for shore as soon as practicable to inspect the PWC for water damage.

Picking up people from the water

Great care should be taken when manoeuvring a PWC near a person in the water, keeping in mind that a jet nozzle can propel water up to three metres behind the craft. Injury can also occur if hair or clothing is caught in the intake grate.

When the person in the water is close enough to swim toward the craft, turn off the engine. The person can then board from the back of the craft.

Distance off

- Consider the density of waterway traffic in the area to determine a safe speed. You must stay 60m away from, or reduce your speed to 6 knots if within 60m of:
  - people in the water
  - anchored or moored boats, structures, boat ramps, jetties or pontoons
  - the shore
  - the boundary of a bathing reserve.

6.7 On the water

All PWC users must know and abide by the IALA buoyage system, rules of the road, sound signals, navigation lights and local rules (See Unit 2 Navigation).

Distance and speed

For your safety and that of everyone else using the water, do not exceed set speed limits. Do not travel at speeds where your wash can cause damage to the shoreline, other boats or injury to others.

Consider the density of traffic in the area to determine a safe speed. The following distances must be adhered to or reduce speed to 6 knots (approximately 11km/h) within:

- 60 m from people in the water
- 60 m from anchored or moored boats, boat ramps, jetties or pontoons
- 60 m from shore
- 60 m from boundary of a bathing reserve.

Learn how to judge distance, for example 60 m is 10 m longer than an Olympic-sized swimming pool.

Exceptions apply to '6 knots within 60 m' from the shore under the following conditions;

- the waterway is less than 120 m wide, and the PWC operator;
  - drives the PWC as close as practicable to a straight line to transit the area;
  - stays as close as is practicable to the centre of the waterway or a marked channel.
- the PWC is being used in waterskiing/towing.

In coastal waters, freestyling or wave jumping is restricted to outside 200 m of the shore if dwellings are within 100 m of the shore line and visible to the operator, and are in the vicinity of the waters where the PWC is operating. Coastal waters do not include dams and inland waters.

Note: Restrictions on where PWC may operate can be found in the *Transport Operations (Maritime Safety) Regulation* on the Maritime Safety Queensland website and waterways management plans and marine zones.

Causes of PWC accidents

Of all boat types registered in Queensland, PWC are involved in the highest percentage of incidents. To reduce the chance of incidents consider the following:

- Do not ride too closely behind another PWC. A sharp turn by the leading PWC can lead to a collision. The rider of the leading PWC can be run over if they fall off.
- If you're travelling at more than 10 knots you must keep a distance of 30m from other moving vessels, unless you're involved in an approved aquatic event or where doing so would endanger you or another person.
- Always look over both shoulders before making turns – another boat may be too close behind.
- Do not zig-zag with another PWC at high speed.
- Be aware of traffic in your boating area – don't focus on the short distance ahead.
- Do not reduce power to avoid an object. Keep power applied and turn away.
- Do not ride or jump the wake of boats too closely. On-coming traffic can be obscured from view by the boat, or the boat can stop or change direction suddenly.
- Stop the engine when someone is boarding from the back of the craft.
- Reduce speed significantly in shallow water.

Don't go out alone

Always attempt to ride in pairs, particularly when wave jumping or travelling in open water. A mechanical breakdown can cause major trouble. A simple twisted wrist can reduce your ability to get yourself back to shore safely.

In cases of real emergencies the second PWC can act as a rescue craft or at least go to get help. Always tell someone who is staying on land where you are going and when you expect to return.

Communications

Most PWC are not capable of carrying a standard marine radio. If travelling long distances or in open waters consider taking either a hand held VHF radio or a mobile phone.

Waterskiing

As an observer is required, cruising PWC seating two or more can be used for waterskiing. The same rules apply to PWC as to other boats involved in waterskiing.

Cleaning jet intake and impeller

The most common cause of breakdown while operating PWC is a blocked impeller. If weeds or debris get caught in the intake or impeller during operation, cavitation can occur. Cavitation is indicated by engine speed rising and the same time forward thrust decreasing. If this condition is allowed to continue the engine will overheat and may seize.

If there is a significant loss of power, take your PWC to shore and check the intake and impeller. Always stop the engine before reaching land.

If at sea, turn your PWC off and sit for at least five seconds and then restart the engine. If the intake is still clogged, stop the engine, dismount and reach under the PWC to remove the obstruction from the intake grate.

Before attempting to remove weeds or debris from the jet intake or impeller areas, shut off the engine and remove the engine lanyard from the stop switch. If his is unsuccessful, return to shore immediately.

Refer to the manufacturer's manual of your own PWC for more detail on clearing the jet intake and impeller of debris.

Courtesy

Riding a PWC safely takes skill and a responsible attitude. Unfortunately some riders believe a PWC can be ridden anywhere and in any fashion without considering the consequences. To gain the most enjoyment from your PWC, ride where you can, have fun, but don't annoy others.

Don't operate the PWC in a manner that could cause nuisance, annoyance or danger to people in the area. For example, where possible avoid manoeuvres that cause the engine exhaust to lift out of the water because it increases noise levels.

Try to travel in areas where noise will not disturb other people or wildlife. In particular, try not to operate near houses, parks, populated beaches or boat ramps. Avoid shallow areas where wading birds congregate and roost. Remember your behaviour will reflect on all other PWC riders.

Tow in surfing

Tow in surfing is a very specialised skill which is used when waves usually exceed three metres. The skills required are extremely high and it is recommended you don't contemplate it unless you are a surfer with many years experience in surfing big waves.

There are also rules and zones for tow in surfing and these are available from Department of Transport and Main Roads Customer Regional Service Centres or their web site.

www.msq.qld.gov.au/Waterways/Tow-in-surfing-code-of-conduct

Marine zones

Noise and nuisance caused by these craft are the most common complaints about PWC. In areas where there are a large number of waterside residences, narrow stretches of navigable water and the waterway is used for other low impact activity (swimming, rowing and so on), excluding PWC from these areas through marine zones created under the *Transport Operations (Marine Safety) Regulations 2004*, may be the only feasible way of effectively managing the noise, amenity, safety and environmental impacts created by their use.

Marine zones may be introduced in certain areas throughout the state, limiting a certain type of boat, for example PWC, hovercraft, or a certain type of activity for example, freestyling, from an area.

Before going out to ride, check whether your intended destination is a marine zone. Information about marine zones is available on the Maritime Safety Queensland website.

www.msq.qld.gov.au/Waterways

Also refer to the Department of Environment and Resource Management website www.derm.qld.gov.au for information about marine park zones and any other restrictions that may apply in these areas.

In Queensland, PWCs have been prohibited in the waters of Tallebudgera Creek since 1997. Restrictions also apply for certain water-based activities on the Noosa River as part of the new Noosa Rive Marine Zone. The most significant changes apply to personal watercraft (PWC) activities, waterkiing, freestyling, hovercraft and airboats.

Enforcement officers

The Queensland Boating and Fishing Patrol and Water Police enforce marine safety regulations.

Answers

Worksheet 1 Answers

Q1. Safe, properly equipped and crewed and operated in a safe manner.

Q2. When it is powered by a motor greater than 4.5kW (over 6Hp).

Q3. Unlicensed drivers may drive a boat provided a licenced driver is on board supervising and is able to take immediate control of the boat. Unlicened drivers must not operate boats while towing someone else by a line attached to the boat, for example someone water-skiing or riding a toboggan or tube.

Q4. The blood alcohol limit of 0.05 applies at all times the boat is being operated, even at anchor. The limit does not change unless the boat is securely moored in a marina, to a jetty or wharf. In addition the skipper is also responsible for the safety of passengers and their alcohol consumption.

Q5. All vessels with an engine or auxiliary engine over 4 hp (3kw).

Q6. Symbols must be displayed on both sides of the vessel. They must be in contrasting colours to the vessel, clearly visible and legible from a minimum distance of 30 metres and at least 150 mm in height.

Q7. Registration labels will no longer be required on Queensland registered boats and personal watercraft from 1 October 2019.

Q8.

a. The physical condition of the boat itself.

b. The suitability of the boat and its propulsion for the type of activities and area of operation.

c. Proper loading with adequate freeboard.

d. Carrying required and other safety equipment.

e. Operating within the limits and capabilities of the skipper and crew.

f. Complying with all regulations, including displaying correct navigation lights at night.

Q9. Sewage, oil and garbage are classed as pollutants.

Q10. It's your obligation to obey the laws.

Q11. Trip plan, boat check, emergency plan, radio and navigation equipment, spare parts and tools.

Q12. Engine care - Manufacturers recommend a service once a year.

Water pump - Replace the impeller regularly, especially if you have been operating in the shallows and stirring up sand. Water pump impellers can deteriorate quickly.

Propellers - Keep shafts and props clean and in good working order and remove fishing line.

Gearbox oil - Check propeller shaft for caught line.

Fuel system - Carry spare fuel if required in the right container.

LPG - All LPG cylinders and appliances need to be fixed and in an upright position so they don't move.

Batteries - Keep terminals and cable clamps corrosion-free. Use a wire brush or hot water to remove corrosion. Coat terminals with non-flammable terminal protectant to prevent future corrosion.

Electrical system - Keep all electrical fittings dry.

Spark plugs - Carry new ones in your tool kit with a spanner to change them.

Pumps - Test bilge pumps for effective operation and service as required.

General check of boat and after every trip - Check all screws, bolts and other fittings to keep secure. Safety equipment - inspect for any deterioration or damage. Replenish water supplies. (See pages 12-13 for more)

Q13. Sharp knife, spark plugs, replacement fuses, fuel filters, starter cord, shear pins for propeller, spare nuts and bolts, propeller, spare fuel line, spare bung, spare oil and hydraulic fuel, duct tape, cable ties, spare rope, engine manual, pliers, de-watering spray, spark plug spanner that fits (injector spanner), oil/fuel funnel propeller spanner, gloves for handling hot materials in smooth waters.

Worksheet 2

Q1. A speed limit of 6 knots is required within 30 metres (m) of boats anchored, moored or made fast to the shore or aground, a jetty, wharf, pontoon or boat ramp, boat harbour, marina or anchorage area, people in the water. Within 60 m of people in the water and when operating a personal watercraft in boat harbours and marinas.

Unless otherwise gazetted or sign posted, the maximum speed you can travel in smooth waters, in Queensland, is 40 knots.

Q2.

Rule 5 - Proper lookout. This means that you should constantly look out and listen for any other vessel or obstruction.

Rule 6 - Safe speed rule At all times you must proceed at a safe speed so as to avoid collision and be able to stop in an appropriate distance.

Rule 7 - Risk of collision You must at all times use all available means to determine if there is a risk of collision. This can be done by estimating the range and bearing of the other boat.

Rule 8 - Action to avoid a collision Any action to avoid a collision shall be positive, in ample time and with due regard to the observance of good seamanship.

Rule 9 - Rivers and channels When navigating in narrow channels, all boats should travel on the starboard side or right hand side of the channel and pass oncoming boats on the port side.

When power meets sail The power boat must give way to sailing boats, row boats, ferries and craft under tow.

Rule 13 - Overtaking An overtaking vessel must keep clear of other vessels and pass on either side whichever is safe.

Rule 14 - Approaching bow of another boat When two power boats are approaching head on or nearly head on, each must alter course to starboard and pass port to port.

Rule 15 - Power driven boats crossing When a vessel is crossing your bow from *starboard to port* you should stop or reduce speed and pass under the stern.

Rule 16 - Action by give-way vessel The vessel giving way shall keep well clear.

Rule 17 - Action by the stand-on vessel The stand on vessel shall maintain course and speed until it is obvious that the other vessel is not giving way .

The stand-on vessel should then take whatever action as is necessary to avoid collision.

Rule 18 - Responsibilities between vessels Power driven vessels under way shall keep out of the way of a vessel sailing, engaged in fishing, constrained by her draft, restricted in her ability to manoeuvre, not under command or at anchor.

Rule 19 - Restricted visibility This rule applies to vessels not in sight of each other when visibility is poor. Reduce to a safe speed, have engines ready for manoeuvring, turn on navigation lights, sound signals if appropriate, post additional lookouts and navigate with extreme care. Have respect for the prevailing conditions.

Rule 30 - Boats less than 50 metres in length must display an all round white light where it can best be seen at anchor.

Anchor lights must be displayed from sunset to sunrise and if you are in a busy area use other lights eg cabin (except for navigation).

Q2. It is difficult to judge distance at night. Not all navigation hazards have lights eg oyster leases. Background lighting on shore can be confusing.

All boats in approved moored areas are required to show lights.

A safe speed is one at which sufficient action can be taken to avoid a collision.

Q3. The two flags R over Y mean to slow down and pass with no wash as there is a vessel engaged in activities where a wash could cause danger.

There is a diver down below. Keep well clear at least 30 metres. Slow down and pass at slow speed. Keep a good lookout.

Worksheet 3

Q1.

- the loss of a person from a ship
- the death of, or grievous bodily harm to, a person caused by a ship's operations
- the loss or presumed loss or abandonment of a ship
- a collision with a ship
- the stranding of a ship
- material damage to a ship
- material damage caused by a ship's operations
- danger to a person caused by a ship's operations
- danger of serious damage to a ship
- danger of serious damage to a structure caused by a ship's operations

Q2. A marine incident must be reported to a shipping inspector as soon as possible but within 48 hours of the incident, unless there is a reasonable excuse.

Q3.Fires need three things to exist - oxygen, heat and fuel . Remove one and you have a good chance of putting out the fire.

Q4. Don't try to dig your way out with your motor as this will clog the intake vents and ruin the impeller in the cooling system or may break the prop. It's best to try to get yourself off by using an oar or similar device.

Q5. By law if you have a VHF radio fitted you are required to attend a marine radio course or sit a written test to obtain a marine radio operators certificate of proficiency (VHF or open).

Q6. When going ahead, boats steer from the stern and the pivot point is about one third back from the bow. When you pull the wheel hard over to the left (port) and engage forward gear, roughly one third of the vessel moves to port and the remainder to starboard. When going astern, the pivot point moves aft and one third moves to port and the remainder to starboard. When turning in forwards, the stern will swing much more widely than the bow.

Q7. A Mayday call denotes an emergency involving grave and imminent danger to life or a vessel.

Worksheet 4

Q1. 60 m from people in the water; 60 m from anchored or moored boats, boat ramps, jetties or pontoons; 60 m from shore; 60 m from boundary of a bathing reserve.

Q2. Life jacket. Signalling device if operated at night. V sheet. Flares 2 red and 2 orange hand held. EPIRB, Anchor with 27 m cable, Drinking water. Chart, compass, hand held electronic navigation device (if not equipped a with a chart or compass).

Q3. A PWC must always be under power to maintain control. When the engine is idling or shut-off during operation, all steering control is lost.

Q4. High speed manoeuvres such as wake-jumping, donuts, figure 8s, 360s, wave jumping, surfing

Q5. Outside 200 m of the shore if dwellings are within 100 m of the shore line and visible to the operator, and are in the vicinity of the waters where the PWC is operating.

Q6. Hold the life jacket of the operator or the person immediately in front of them.

Q7. Reboard over the back deck (climbing on the side can capsize the boat).

Q8. Do not ride too closely behind another PWC. Always look over both shoulders before making turns. Do not zig-zag with another PWC at high speed. Be aware of traffic in your boating area – don't focus on the short distance ahead. Do not reduce power to avoid an object. Keep power applied and turn away. Do not ride or jump the wake of boats too closely. Stop the engine when someone is boarding from the back of the craft. Reduce speed significantly in shallow water.

Q9. Marine zones can be introduced in certain areas throughout the state, limiting a certain type of boat, for example PWC, hovercraft, or a certain type of activity for example, freestyling, from an area.

Worksheet 3

See page 74 for answers

Q1. What constitutes a marine incident under the Transport Operations (Marine Safety) Act 1994 *(Page 55)*

Q2. When must a marine incident be reported and to whom? *(Page 55)*

.

Q3. What are the three things a fire needs to exist and what happens if you remove one? *(Page 56)*

Q4. If grounded, what should you do? *(Page 56)*

Q5. What are the licensing requirements if you have a VHF set on board? *(Page 57)*

Q6. Compare how a boat pivots in forward and reverse gears *(Pages 9 and 65)*

Q7. What does a MAYDAY call denote? *(Page 59)*

Worksheet 4

See page 74 for answers

Personal water craft (PWC)

Q1. What distance must a PWC keep from people in the water when travelling at 6 knots? *(see page 72)*

Q2. What safety equipment must you have when using a PWC in open waters? *(see page 23)*

Q3. Why is important to remember that you must have power to maintain steering control of a PWC? *(see page 70)*

Q4. What types of riding are classified as freestyling? *(see page 71)*

Q5. What is the minimum distance from the shore line at which the operator of a PWC may engage in freestyling? *(page 72)*

Q6. What is the best way for a passenger to secure themselves while riding a PWC? *(see page 71)*

Q7. What is the best way to board a PWC after falling off? *(see page 72)*

Q8. What are 4 things you can do to help avoid an accident on a PWC? *(see page 73)*

Q9. What are marine zones? *(see page 73)*

Project

Use the information on pages 26 - 28 to make up your own predeparture checklist for the boat you intend to use.

Glossary of terms

Further terms can be found at www.marinewaypoints.com

Acronyms

AMSA – Australian Maritime Safety Authority

AVCG - Australian Volunteer Coast Guard

BTP – BoatSafe Training Provider

TMR – Department of Transport and Main Roads (previously MSQ)

COLREGS International Regulations for the Prevention of Collisions at Sea

GSO – General safety obligation.

PWC - Personal Water Craft

EPIRB – Emergency Position Indicating Radio Beacon

PFD – Personal Flotation Device (Old name for a life jacket)

RMDL - Recreational Marine Drivers Licence

PWCL - Personal Watercraft Licence

VMR - Volunteer marine rescue

A

Abaft - Behind or aft of. Towards the stern relative to some other object or position.

Abaft the beam - Any direction between the beam and the stern, more behind a vessel than in front of it.

Abeam - At right angles to the boat, or beside, the boat; on the beam.

Aboard - Passengers or crew safely accommodated on the boat.

Aft - Towards or at the stern. To move aft is to move to the back of the boat.

Ahead - In front of the vessel (opposite of astern). To drive in forward direction.

Anchor Warp - Consisting of chain and/or rope that connects the anchor to the boat.

Astern - Towards the stern (opposite of ahead). To drive a boat in reverse.

B

Beam - The transverse measurement of a boat at its widest point.

Bilge - The very lowest part of a boat's interior where water is likely to collect. This water is called bilge water.

Bollard - A large solid post on a wharf for securing mooring lines.

Bow - The front part of the boat.

Bung - A plug inserted in a hole at the base of the transom to let bilge water out.

Buoyancy - The capacity for floating.

C

Cavitation - Loss of effective propeller thrust (caused by the blades cutting across the water sucked along by the propeller, instead of working in it).

Chart Datum - The water level used to record data on a chart. Usually the lowest low tide water level. It is the level below which depths on a chart are measured.

Chine - The line of intersection between the topsides and the bottom of a boat. Hard-chined boats have this angle pronounced.

Cleat - A fitting around which ropes are made fast.

Cold Front - The line of intersection of warm and approaching cold air accompanied with strong winds and rain.

D

Dead Ahead - A position directly in front of the boat.

Dead Astern - A position directly aft or behind the boat.

Deck - A permanent covering over a compartment, hull or any part of a ship serving as a floor.

Draft - The depth of the boat below the waterline; the amount of vertical distance from a boat's water line to the bottom of its keel.

F

Fender - A protective cushion of durable material hung from the sides of a boat to protect it from rubbing or chafing against a jetty or another boat.

Forecast - A weather prediction.

Freeboard - The distance between the lowest point of the main deck and the waterline.

G

General safety obligation. This is imposed by the Qld Transport Operations (Marine Safety) Act 1994 on all vessel owners and operators, masters and crew to operate vessels safely at all times.

Give-Way Vessel - The vessel which must yield to the "Stand-on Vessel" in meeting, crossing, or overtaking situations.

Global Positioning System (GPS) - A navigation system using satellite signals to fix a position with great accuracy.

Gunwale - The upper edge of a boat's side; the part of a vessel where hull and deck meet. (Pronounced "gunnel").

H

Hatch - A hinged or sliding opening in the deck, providing people with access to the cabin or space below.

Helm - The place from which a vessel is steered.

Hull - The main structural body or shell of the boat.

I

International Regulations - Navigation rules governing all waters.

Isobars - Lines drawn on a weather map joining regions of equal pressure.

K

Knot - Speed of one nautical mile (6,076 feet or 1,852 metres) per hour.

L

Lanyard - A short line used to attach one thing to another.

Lee - The side of a ship, or a shore location, sheltered from the wind.

Lee Shore - A shore that wind blows onto; it is advisable to stay well off a lee shore in a storm.

Lookout - A person designated to watch for other vessels and hazards.

O

Occulting Lights - A navigational light which turns on and off in a regular pattern, but is on more than it is off, so the period of light is longer than the period of darkness.

P

Proper lookout - You should constantly look out and listen for any other vessel or obstruction. You must use all available means to look out.

Q

Quick Flashing Light - A navigational aid with a light that flashes about once per second.

S

Scope - The ratio of the length of an anchor line, from a vessel's bow to the anchor, to the depth of the water.

Sounding(s) - Depth measured on a chart below the chart datum.

Starboard - The right side of the boat when facing forward.

Stern - The back part of a boat.

T

Tidal Range - The difference in depth between high and low tide.

Tide - The periodic regular rise and fall of water in some areas due to the pull of the sun and the moon approximately every 6 hours.

Tiller - A handle for steering a boat's rudder or outboard motor.

Transom - The flat, vertical aft end of a boat.

U

Underway - Moving off. Not made fast to the shore or bottom.

Unseaworthy - Condition of boat when not in a properly maintained

W

Windward - Towards the wind.

Queensland Transport Regional Offices

Gold Coast region
07 5585 1810

Brisbane region
07 3632 7500

Mooloolaba
07 5373 2310

Bundaberg
07 4132 6600

Hervey Bay
07 4194 9600

Gladstone region
07 4971 5200

Mackay
07 4944 3700

Airlie Beach
07 4841 4500

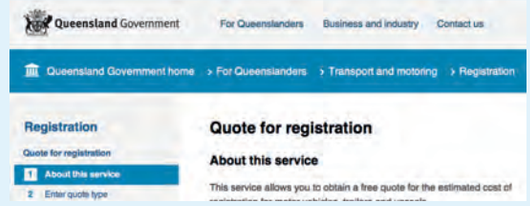
Townsville region
07 4421 8100

Cairns region
07 4052 7400

Weipa
07 4069 7165

Karumba
07 4745 9281

Thursday Island
07 4069 1351



ON LINE REGISTRATION IS NOW AVAILABLE

General changes for Queensland regulated ships 2017 and 2019

- In line with national changes, the Australian Maritime Safety Authority (AMSA) EPIRB registration label will no longer need to be attached to the EPIRB. The EPIRB will still need to be registered with AMSA.
- A Ride Smart sticker will no longer need to be displayed on a personal watercraft (PWC).
- A Capacity Label will no longer be required to be displayed on a PWC or a Ship.
- Personal flotation devices (PFDs) will now be referred to as 'Lifejackets' for national consistency.
- You can now check the registration status of a ship, the ship's purpose of use and other details such as the description of the ship online.
- Registration labels will no longer be required on Queensland registered boats and personal watercraft from 1 October 2019.

Digital ISBN
978-1-86283-180-3

6th Edition (Revised)
Published by Wet Paper
PO Box 540 Coolangatta 4225
www.wetpaper.com.au

Acknowledgements :
The publishers would like to thank Graham Rogers, Josh Belsham, Don Jones, Michael Paddison, Luan Baldwin, Luke Stratton, Ray Norton, Shane Riley, John Wilson, Darryl Greentree, Rusty Gilbert, Bob Macdonald, Archie Harding, Kerry Kitzelman, Derrick Baan, Tony Menezes, Steve Maccheroni, John Wilson and Jeff Guinea for their critique of previous editions as well as the following for their assistance with photography and permission to use their illustrations as indicated - AllState Boat Licencing and Training, Bayside Boat Licensing, Bureau of Meteorology, AMSA, Chubb, Queensland Transport and Main Roads, John Armstrong, CALM, Lisa Taylor, Neil Oliver, Neil King, Telwater Marine, Qld Fisheries, Viewfinder, WA Transport, Century Yuasa Batteries, Benowa and Clontarf Beach State High Schools.

Disclaimer
Although all care has been taken to provide information, safety instructions, offers of training and advice, Wet Paper or any of its advertisers, sponsors, employees, advisors or consultants accept no responsibility for any accident that may occur as a result of candidates performing any of these activities.

If students, teachers or instructors are unsure of any information or method, they are advised to contact their State Government Marine Safety Department. As this is a sixth edition and its getting much better, the publisher still welcomes all comments.

Printing
November 2019 Harding Colour, Brisbane.