

1.4 Seaworthiness of the vessel

Five key considerations of seaworthiness are:

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

Physical condition of the boat

For example, 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.

- Before operating any switches or engines, check for petrol and or liquid petroleum gas (LPG) odours. If such odours exist, fix the fault before you go out.
- Inspect the bilge. If there is 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 them in the garbage bin.
- Also check that you have the bilges in before you go out and keep bilges dry and the self draining hoses clear of rubbish, sand or grit from your last trip.

Other examples have been discussed in Section 1.3 on pre-departure checks.

Boat suitability and propulsion

Type of motor

- Hulls are designed for the type of propulsion required and the motor power and weight on as vessel should never exceed the manufacturers design.



CHECK THE HULL FOR DAMAGE

- The easiest way to check this is to look at the builders plate or consult with an authorised marine surveyor.

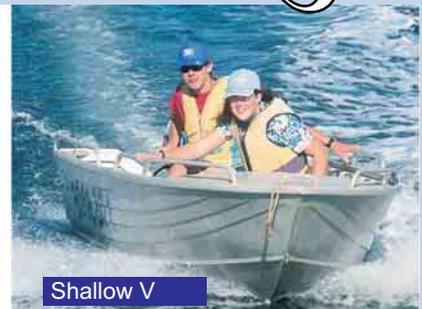
Area of operation

- 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 are the shallow and moderate V's suit estuaries. Your dealer can advise you on which one suits you.

Vessel stability and freeboard

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



CHECK THE SUITABILITY OF THE BOAT FOR ITS AREA OF OPERATION

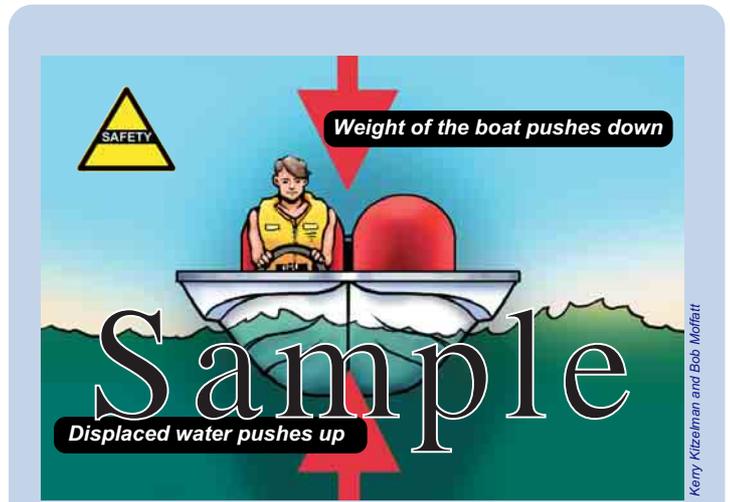
Note: This rigid inflatable, deep and moderate V vessels shown above require registration.

Centre of gravity and stability

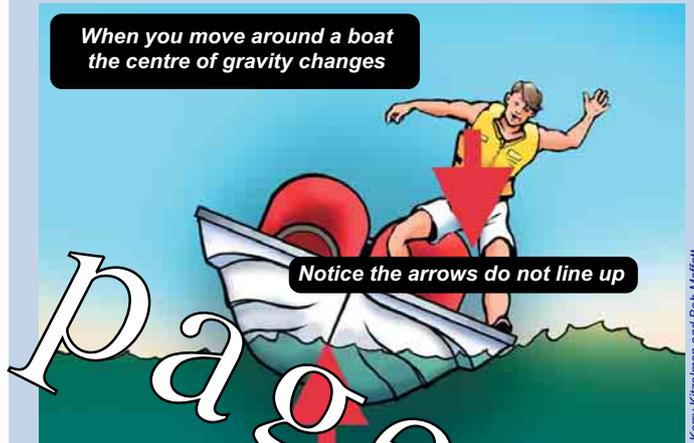
- A boat floats because the weight of water displaced pushing up is greater than the weight of the boat pushing down as shown in the figure opposite. However a boat can sink easily if its not stable.
- So a boat must have "positive stability" to be seaworthy.
- When you move around a boat, the centre 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.
 - Also when getting into a small boat, try to step into the center and keep one hand for yourself and one for the boat."

Proper loading and stability

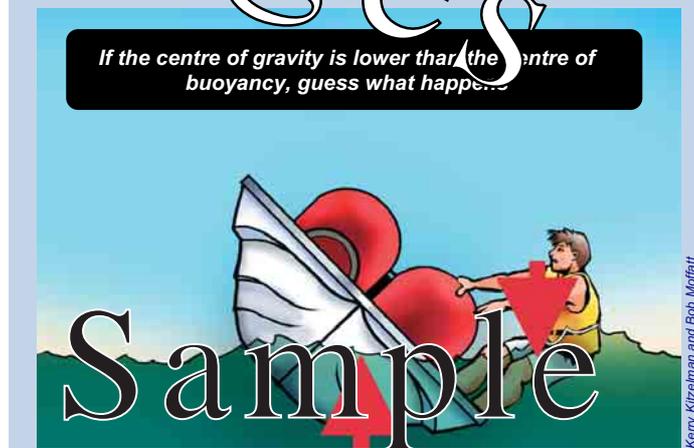
- When preparing for a trip, the skipper is responsible for assessing the load on board - both people and cargo, to maintain stability.
 - Heavy items should be stored in a low and central place where they cannot move around.
 - Weight, including passengers, should be distributed evenly through the boat. Passengers who are no heavier than normal (ie 80 kg) should be positioned to avoid loading over the transom.
 - The weight of extra fuel, water and provisions should be accounted for and if you experience rough conditions, secure the cargo.



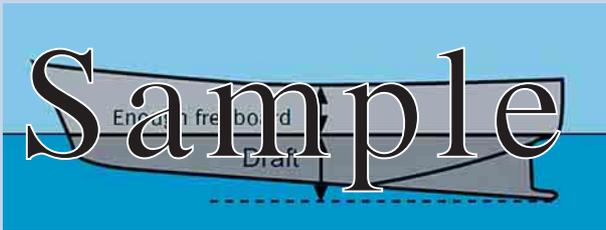
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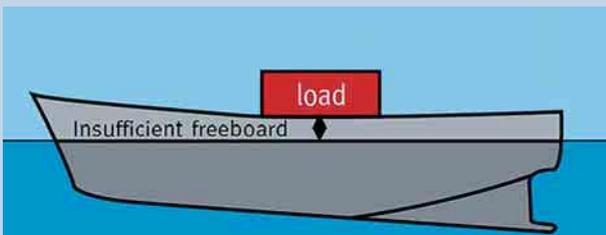
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STABILITY AND LOADING

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.

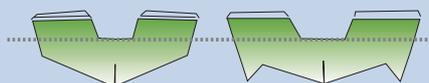
- The overloaded tinny shown opposite would have little time to recover and is at risk of flooding.
- To enhance the problem of instability, the freeboard in many "tinnies", is measured from the top of the cut out section of the transom decreasing the freeboard even further.

Free surface effect

- The 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.



Wet Paper



Lowest point of main deck on transom

Attachment of builders plates or capacity labels

Stowage of all heavy items, positioning of passengers on board and water in the bilges all affect stability and freeboard. But how does a skipper know how much cargo and many people he or she can put in the boat?

- A capacity label is designed to tell the skipper how many people and cargo the vessel can carry safely.
- The label is fixed next to the helm as shown in the photograph opposite.
 - 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.
 - Labels are available for boats under and over 6m as well as power boats with a flybridge.
 - Capacity labels are also required on a personal watercraft.



Bob Morfitt



CHECK THE BUILDERS PLATE
or check with an authorised marine surveyor

Builders plates

- All new recreational vessels manufactured or imported into Queensland since September 2009 are required to show an Australian Builders Plate (BP) built to Australian standard AS 17991 or other equivalent standard.
- If the builders plate is not visible to the skipper, the capacity label should be displayed near the boat's helm where it can be seen by the operator.

However alteration to the boat's hull or permanent fittings may invalidate the particulars on the plate and the recommended persons and maximum load should be reduced in bad weather or when the boat is operating offshore.

- If the vessel has an ABP where it can be clearly seen from the steering position, a capacity label is not required.

Buoyancy

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

- **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.

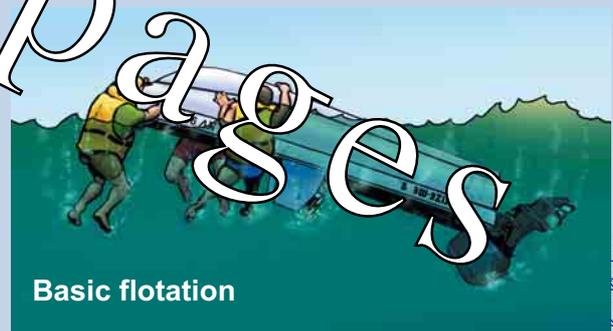
Inbuilt buoyancy

- 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 PFD's in smooth waters.

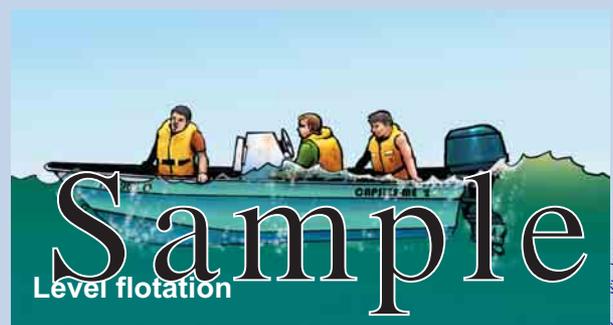
* Note on old builders plates

As the average size for passengers is now 80kg. Owners of old builder's plates should compensate for this in load calculations.

pages



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

Life jackets/personal flotation devices (PFDs)



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.
 - Do not use life jackets as a cushion.
 - Make sure you know how to put them on quickly.

Life jackets/PFDs 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'.
- To comply with Australian Standard 1512–1996 it must be marked 'PFD type 1'.
- Not to be used by personal watercraft (PWC) riders, skiers or people being towed.



Level 100, 150 or 275

Met Paper

**Example of 2008
AS 4758 label**

**Example of 1996
AS 1512 label**

Bob McFerrit

Under standard AS 4758	Under previous standards
Level 275	Coastal life jacket
Level 150	
Level 275	PFD type 1 (AS 1512-1996)
Level 150	
Level 100	
Level 150	PFD type 2 (AS 1499-1996)
Level 100 special purpose	PFD type 3 (AS 2260-1996)

Note: The level stands for Newtons of buoyancy (N) and is the amount of force or upward lift provided by a life jacket in water.

STANDARDS AND LOGOS

AMSA

Level

- ← PFD type, 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 PFD

Bob McFerrit

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.



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 VMR and VCO stations.
- As the weather bureau records changes in the weather, information is relayed to transmission towers, where it is beamed via VHF or 7 Mhz frequencies.
- Because of the dependence on 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 known 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 opposite 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

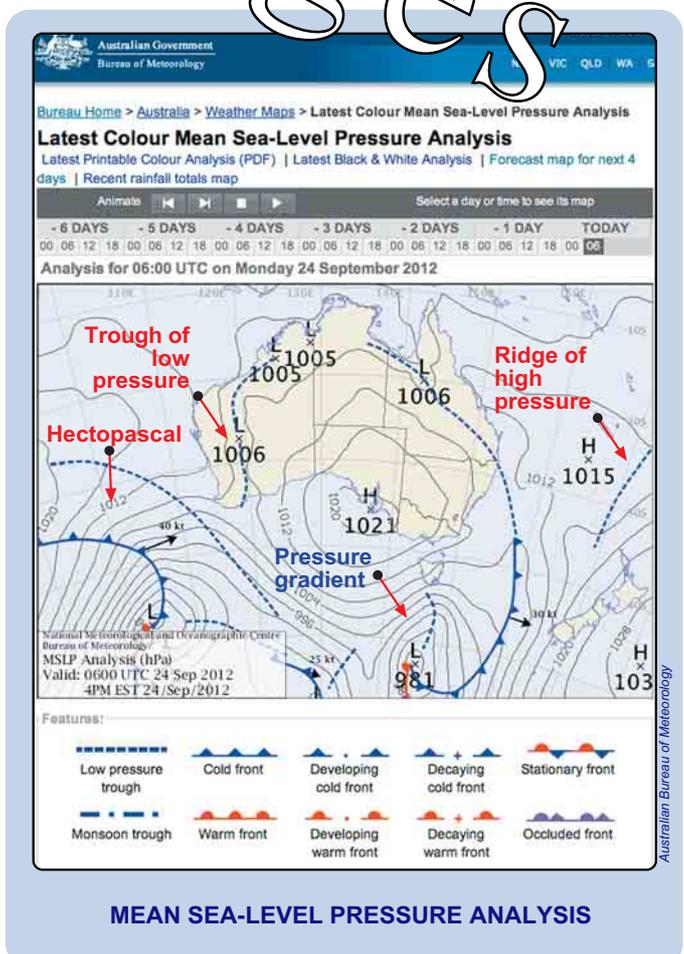
- Isobars are lines that join places of the same atmospheric pressure. When high and low pressure systems squeeze together, a pressure gradient forms.

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 passed over southern Queensland.
- A trough is an elongated area of low pressure, extending south from a low, also shown on the map to the right.





- 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 the storage compartment with the seat up to allow for 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, refuel 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.

Safety equipment

- PWC operators and passengers must wear a PFD at all times. The type of PFD and other safety equipment for PWC is dependent on where you are travelling. The table, on the next page, outlines the minimum equipment requirement set by legislation and recommended equipment to satisfy the general safety obligation.
 - Water limit maps starting on page 26 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.
- See pages 20 - 21 for a description of PFD types 2 and 3.
- A Ride Smart sticker must be affixed to the PWC and visible to the operator at all times.
- 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.

