

# Water Awareness and Charge Certificate Manual

## Module 19: Power & Keel Boat Emergency Procedures

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## **Outcomes**

After completing this module, the certificate holder will:

- Be able to recover a person lost overboard.
- Be able to diagnose and remedy basic mechanical problems
- Ensure crew safety in a capsize situation
- Be able to assist other vessels in trouble
- Manage a vessel after collisions and grounding

# 1 Man Overboard Procedures

The drill covered here is for a conscious, calm person. The general procedure is as follows:

- The person observing the MOB alerts the crew to the situation with the call “**MAN OVERBOARD**”. That person keeps their eyes on the MOB at all times.
- Throw something that will float to the person if they are likely to be able to reach it.
- The skipper takes charge of the vessel and the rescue effort. They may decide to take the helm, but not necessarily. The crew must listen for instructions
- Allocate one crew members to be ready to help the MOB aboard. If there is time they should put on PFDs. Advise them on which side of the boat you plan to have the MOB come alongside.

## 1.1 Motorised Vessels

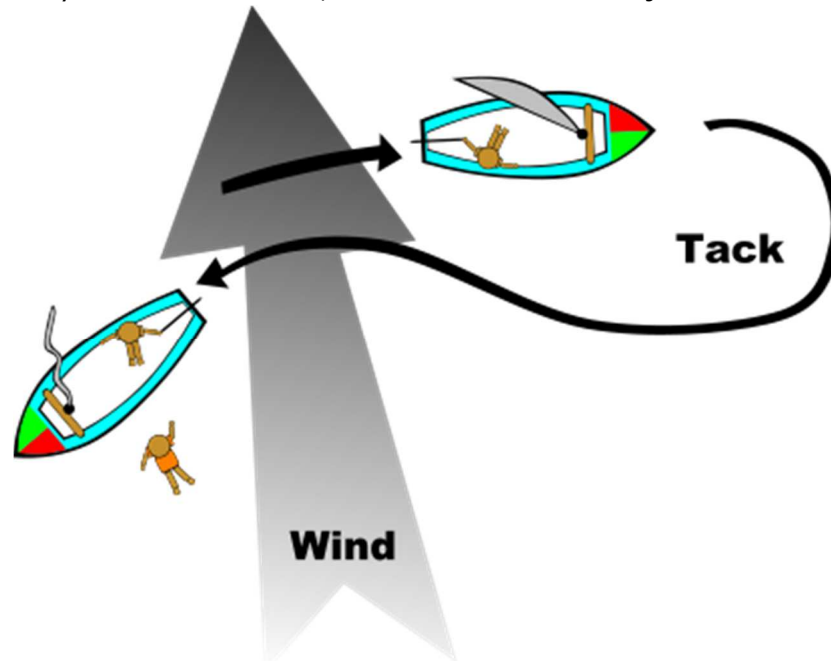
- Quickly turn back towards the MOB
- The crew member who is keeping sight of the MOB points at them at all times. If it is the helmsman of the vessel, he should get another crew member to spot the MOB and keep eyes on them at all times.
- Manoeuvre the vessel in a position downwind of the MOB and approach head to wind. The wind helps to slow the vessel down and make it easier to control. Never, ever approach anything from upwind (with the wind behind you). The wind will blow you onto the object and probably over it.
- Approach at slow speed, keeping the MOB to windward.
- Reverse engines to stop the vessel before coming alongside the MOB. As you drift alongside, stop the engines completely.
- Throw a line or grab hold of the MOB and help them to the stern of the vessel.
- Help the MOB into the boat over the stern. Objects and people are always brought aboard over the stern as it has the least freeboard and most cockpit space. This also does not affect the stability of the vessel.

The process is far more difficult at night and an illuminated marker should be dropped to provide a reference point.

## 1.2 Large Sailing Vessels

- If the helmsman falls overboard:
  - Go to the helm - take the helm and make sure the mainsail has a crew member ready to control it.
- If the vessel has an engine, crash tack into a “hove to” position.
- Start the engine and let the sails fly. Then proceed as described in 1.1 above:
- If the vessel does not have an engine
  - When it is safe to do so: release any secondary sail(s) (jib, spinnaker), making sure that these are very loose. If you have a Spinnaker up, you will need to take it down.
  - Bear slightly away from the wind to make sure you get downwind of the MOB. Keep watching for the position of the MOB.
  - When you are about five boat lengths down wind, tack back.
  - As you approach an imaginary line from the person downwind (you should be between 4-12 metres away), start to bear up (turn into the wind) and start slowing down. This will need constant small adjustments of the main sheet (to control mainly the speed of the boat) and the helm (to control the direction).

- The aim is to luff up the boat within easy reach of the MOB, with the boat stationary, and the designated crew should be able to pick up the MOB on your windward side, around the shrouds or jib sheet.



**Figure 1: Man overboard procedure**

## 2 Distress signals

There are many different signals that are internationally recognised as distress signals. All are listed below, but some of these are not possible on a small vessel, so they are not described in detail.

- A gun or other explosive signal fired at intervals of 1 minute
- Continuous sounding of fog horn
- Red star rockets, fired one at a time at short intervals
- An SOS ( ... --- ... ) in Morse code. This can be done using a radio, or visual / audio signalling (whistle, horn, mirror or flashlight)
- Radio signal of the spoken word "Mayday". See module 62 for more information.
- Flag signals N over C



- Any flames on a vessel
- Red hand held or parachute flare. See section 2.1
- Orange smoke markers. See section 2.2
- Slowly and repeatedly raising arms from an outstretched horizontal position.
- Signals from an Emergency Position-Indicating Radio Beacon (EPIRB)

## 2.1 Flares

Flares are by far the best piece of equipment you can have for attracting attention when you require assistance. Familiarise yourself with the flares on your vessel beforehand as you may not have time in an emergency. Flares can be classed in the major categories:

- Parachute flares are visible for up to 7<sub>mn</sub>. Always read the manual as not all flares operate the same way. To fire a parachute flare, hold the flare downwind and away from the body. Aim the flare vertically and firmly squeeze the trigger. The flare has a built in mechanism to fight back against the wind and deploy above you.
- Pencil flares are fired from a flare gun and are visible for 5-7 nm. Typically the gun comes with 6 cartridges. Fire a flare by screwing the flare into the launcher and pulling the trigger.
- Hand held flares offer a more cost effective solution and are visible for up to 5<sub>nm</sub> in good weather. Before using a hand held flare, wrap your hand with a wet cloth or other protective material. Hold the flare away from the body and over the water before firing. Make sure the hot ash falls into the water and not into the boat. Once lit, slowly wave the flares back and forth.

Flares do expire, so you need to check the date of expiry.

It is an offence to fire a flare if you are not in an emergency situation. You could be sentenced to 6 months in jail or a R10 000 fine and held responsible for any costs incurred in the rescue operation.

## 2.2 Smoke Markers

Familiarise yourself with the markers on your vessel beforehand as you may not have time in an emergency. After activating the marker, it must be thrown into the sea. The markers have a delayed action as the smoke is toxic

Orange smoke is very effective during air search operations during daylight hours. Smoke markers cannot be used during the night or in strong winds.

# 3 Capsize Recovery

In seamanship terms it is infinitely better to handle a boat that is the right way up. Preventing a capsize is preferable to righting a capsized boat.

A capsize is a sign of a serious error or a lack of skills and should never be taken as a joke. This is all the more relevant when inexperienced young crew are on board.

Adequate preparation and quick action in the event of capsizing can ensure that no permanent damage occurs to either the people on the vessel or to the vessel itself.

## 3.1 Motorised Vessels

- After capsizing, **never ever** leave the vessel as it will drift faster than you can swim. Any up-turned hull is an immediate sign of distress and it is far easier for rescuers to locate the vessel than a single person in the water.
- Implement the buddy system so the skipper is not required to check on everybody
- Retrieve the capsize bottle
- Display the ID sheet to signal for help immediately. Use flares sparingly.
- Fit the capsize rope to provide a secure fastening point for the crew.
- Try to right the vessel before you get close to shore. If successful, attempt to bail the water from the vessel before the crew re-boards. Try to avoid taking a capsized motor vessel near to shore as if sand enters the engine it will be almost impossible to repair.

- If righting the vessel is not successful, try to get the crew out of the water. The body rapidly surrenders heat to the water so try to climb on top of the up turned hull or any other wreckage and tie the crew to the vessel
- Attempt to keep the crew warm. Put on as many layers of clothing as possible and huddle together for warmth. Do not attempt to swim as the increased circulation will cause you to lose heat and become exhausted faster
- Count heads constantly and ensure all crew members are coping with the situation.
- Once ashore, wash down the engine and all equipment with fresh water.
- Find a large drum and remove the engine from the vessel. Place the engine upside down in the drum and fill with fresh water. This process of re-submersion will protect the engine from corrosion until you can get the engine to a repair centre.
- Remove all other electronic equipment from the vessel and wash in warm soapy water. Rinse and place in the sun to dry. This process may save your equipment, but there are no guarantees.

### 3.2 Sailing Vessels

Every sailor, irrespective of experience, will experience a capsize at some or other time during his/her sailing career. Capsize is a rare occurrence in large keel yachts, but it is therefore important to know what you are doing when such a capsize occurs and that there exists teamwork between the skipper and his/her crew.

A sailing vessel can capsize either towards the wind (windward capsize) or away from the wind (leeward capsize). The leeward capsize is the most common form of capsize that you will experience and is normally a gentle capsize where the vessel will heel over and fill up with water. The windward capsize is in contrast both a sudden and spectacular capsize, giving the helm and crew little time to think about what has happened.

Large and small multihull vessels are also prone to "pitch pole" capsizes when sailing at high speeds dead downwind. The leeward hull which has little inherent buoyancy in the bow sections digs into a wave and causes the stern to rise up, with the boom and sail in the air, still catching wind, which causes the boat to rotate nose first in the water

- In a capsize situation, **never ever** leave the vessel as it will drift faster than you can swim. Any up-turned hull is an immediate sign of distress and it is far easier for rescuers to locate the vessel than a single person in the water.
- Maintain a firm hold on the deck rails or side stay and pull yourself aboard as the vessel rights itself.
- If the righting moment of the keel does not start righting the yacht shortly after the capsize (commonly referred to as a knockdown if caused by wind, or rolled by a wave) it is likely that the vessel is damaged. Signal for assistance. Remember a catamaran is stable while upside down and large cats cannot be normally righted by the crew.
- After a knockdown and the yacht has righted itself, get head to wind and free all the sails. You may want to start the engine, to give you control since there will be strong winds and large waves
- Take stock.
  - Are all the crew accounted for, are there any injuries?
  - Has any equipment gone overboard? Can you see it and do you want to recover it?
  - Is the rigging, standing and running, all intact? can the yacht still be sailed?

- Free any tangled sheets and tidy up the halyards and other control lines.
- Check below for any damage or equipment that has flown around and re stow.
- Check your water supply is still intact or sufficient
- When you are ready, continue sailing, if you feel confident to do so. Reef the sails if necessary.
- If not or there is serious injury or damage, lower the sails and continue on the motor

## 4 Operating in Bad Weather

If bad weather strikes it is essential that the skipper maintains control over both boat and crew.

The behaviour of the crew will make the difference between a swim and reaching safety. Panic will cause untold problems and must be avoided at all costs. A pre-trip practice or lecture makes a world of difference to nervous members who must be told what is expected of them.

Crew should be briefed about any drill the skipper has in mind and each member should understand any task allocated to them.

If bad weather arises, every member must don their buoyancy aid which should fit over a weatherproof top to keep out the wind and keep the body as warm and dry as possible. Legs are less likely to cause cold and a weatherproof top can even be swum in.

Kit should be stowed as near to the centre of the boat as possible to keep the ends light and free to rise up and meet oncoming waves. This also leaves clear areas to work in to control the direction of the boat.

In high seas it is best to face the bow into the surf to shed the force of the waves. This is where a tarpaulin spread across the forward part will help keep water out. Weight should be positioned centrally or slightly aft to lighten the bows so that the boat can rise to meet oncoming waves.

If you do not have a proper sea-anchor then trail a long warp from an upwind position or make a warp into a loop. This will make a sea-anchor and keep the boat in line with the surf it will also slow the boat down and make it more manageable in the high seas.

Try and avoid landing on your lee or downwind shore. Most dams have bays behind sandbanks or inlets and it is safer to pull in there and find a sheltered shore to land on or to anchor out of the force of the wind and surf

### 4.1 Know your boat.

A skipper should "know his boat". All craft handle differently in different weather conditions and a "feel" for the boat is important. Never overload a boat as this makes a normally stable craft unmanageable, especially in heavy seas. Maintain a good balance of crew and equipment and keep the centre of gravity as low as possible.

Watch the weather and stay with a capsized boat and keep crew together.

### 4.2 Motorboats.

A power boat could find itself in a dire situation if the motor cuts out and they are adrift in big water. Boats with outboard motors are particularly vulnerable in this situation as the weight and drag of the motor tend to turn the boat stern to weather. Freeboard on the transom is generally low and waves breaking over the stern could quickly swamp the boat.

In such a situation urgent action is needed to keep the boat head to weather by streaming the sea anchor and balancing the weight in the boat.

### 4.3 Sailing craft.

Yachts have their own special requirements in heavy weather. Keelboats have an inherent stability, and if controlled properly can ride out quite severe storms.

The first obvious thing to do is to TIMEOUSLY get the crew to don PFDs and reduce sail in strengthening wind. Too much "canvas" can cause the boat to be knocked down and easily capsized. Excessive sail will cause too much speed for the conditions and in short choppy surf the boat will slam into the waves and can be damaged or swamped. If the nose digs in to solid water the boat can pitch-pole or somersault over itself.

The boat can be slowed by heaving to or lying a-hull. If necessary use sea-anchors or drogues to keep the boat head to weather as it is possible to still go too fast with bare masts, the force of the wind pushing the boat along without sails. It is even possible to steer a course if the boat is moving fast enough.

Reduce sail sooner rather than too late. Tie everything in. Count heads.

## 5 Towing

The nature of pulling and power vessels lends them to being rescue vessels. This means they may sometimes be required to tow other boats that are in difficulties.

Before towing any vessel, make sure that:

- It is safe to approach the vessel.
- It is safe to tow the vessel. – I.e. The vessel is not too large for your vessel and towline. Don't risk damaging your vessel trying to tow heavy vessels.
- It is a good idea to have a knife or an axe handy to cut the tow if you run into trouble.

The general procedure for towing is as follows:

- Approach the tow.
- Turn so you are head to wind, if possible, and the stern of your vessel is towards the tow.
- Reverse until you are within throwing distance of the tow. In the case where it is safe to go closer, do so.
- Pass a strong line to the tow.
- If the tow is abandoned, place one or two crew members wearing PFDs on board – ONLY IF SAFE TO DO SO.
- If the towed vessel has been abandoned have the line made fast to the bows of the tow.
- If the towed vessel has not been abandoned, the towing line must be made fast to it in such a way as to allow it to be cast off easily. If the crew is capable they should take one turn around a fore stay or bow cleat and one around the mast. They then hold the end of the towrope. Knots should not be used as they can tighten up under the load and take a long time to undo in an emergency.
- If the tow is aground, or needs to be towed backwards, make fast to the centre of the tow's stern.
- On the towing vessel use a yoke between the stern eyes or cleats to distribute the load. Keep the tow on the centreline of your vessel and keep the towline clear of your rudder or engine. If the towing vessel is powered by a single outboard motor, and a towing bridle or yoke is used, depending on its setup, it can seriously compromise the manoeuvrability



of the towing vessel, particularly in bad weather. If a small block is available to have the yoke or bridle rove through it, and the tow rope tied to the block eye. This will allow the towing force to intersect the fore and aft line ahead of the propulsion point in the towing boat. This will make steering the towing boat easier and safer. If no block is available, the towrope must be tied to the yoke or bridle with an eye so that it can slip side to side along the bridle as required.

- If the tow has a rudder, hold it or lash it into the straight ahead position so it can stabilise the tow can't pull it off course.
- Accelerate slowly to take up the slack.
- Once the tow has gathered way, you can increase speed.
- NOTE: Never tow fast. Fast tows are hard to control and will probably ram you. Such an impact could damage your vessel, leaving two vessels in need of assistance. Trying to tow fast is extremely heavy on fuel usage. If there is a long distance to cover you can very easily use up your 25% fuel reserve which you should have on board.

## 6 Engine Failure

Powerboats are always susceptible to engine failure and this is where their greatest vulnerability lies. Be it from lack of fuel or maintenance or from being swamped by a following wave they can suddenly become dead in the water and find themselves in distress.

When an engine cuts out, the drag of the propeller and drive shaft in the water and sheer weight of the engine at the rear causes the lighter and more bulky bows to be blown into facing in a downwind direction. The transom of a powerboat is usually much lower in freeboard than the bows and the weight of the motor prevents the stem from rising to meet oncoming waves and the boat is very easily swamped from the rear. It is therefore vital to take quick action to keep the bow into the weather

- Drop anchor and take bearings to ensure that the anchor is set
- If the anchor fails to hold, play out the sea anchor to keep the bow on the wind
- Radio shore with a Pan-Pan call, giving as much detail as possible
- If no reply is received, radio other vessels in the area
- Use flares sparingly. Use the ID sheet to attract attention during the day and handheld flares / torches at night.

Try to establish the fault while waiting for assistance. In small powerboats in heavy weather it may be inadvisable to have the weight of a crew member lying over the transom fiddling with a dead motor, unless the trim of the boat can be maintained by other crew moving forward to maintain safe transom freeboard.

### 6.1 The engine won't start

There are only 3 reasons why an internal combustion petrol engine won't start:

1. No Fuel
  - i. Check pipes for cracks or leaks
  - ii. Check pipes and filter for blockages
  - iii. Check that breather valves on the tanks are open
  - iv. Check for traces of water in the fuel
  - v. Sometimes too much fuel can be a problem. This is called flooding. Check for faulty choke mechanisms.

Do not attempt to open the carburettor unless you have experience in this area

2. No spark
  - i. Check kill switch
  - ii. Check the fuses
  - iii. Check the battery is properly connected and the terminals are tight.
  - iv. Check the leads are correctly connected to the plugs and the plugs are clean
  - v. As a last resort, attempt to rope start.
  - vi. Basic 2 stroke outboard motors generate spark from flywheel magnetos, and this is independent of the battery. 4 stroke motors rely on battery voltage to power its ignition circuitry.
  - vii. If the engine still will not start, the problem cannot be fixed while afloat. Call for assistance as soon as possible and take the engine to a dealer for repairs.
3. No compression

Without compression in the cylinder, the fuel-air mixture will not ignite. Typical causes would be piston rings, valves or head gasket. None of these can be fixed while afloat so call for assistance as soon as possible and take the engine to a dealer for repairs

## **6.2 Engine Running Rough at Low Speed**

- Faulty or loose plug(s)
- Shorts on leads due to moisture
- Water in fuel
- Incorrect timing
- Exhaust fumes in the engine cover
- Dirty or incorrectly set points.
- Incorrect mixture settings on carburettored engines

## **6.3 Engine Running Rough at High Speed**

- Faulty plug(s)
- Faulty fuel pump
- Restricted fuel flow: pinched pipe, loose connection, dirt in carburettor etc.

## **6.4 Engine Vibrating Badly**

- Broken or damaged prop
- Fouling on prop
- Loose or damaged flywheel
- Broken crankshaft
- Broken engine mountings

## **6.5 Engine Jumps out of Gear**

- Worn dog and gears
- Loose gear shift shaft or cables
- Worn prop shaft bearings

## **6.6 Engine Overheating**

- Faulty thermostat
- Worn or damaged impeller / water pump
- Intake, pipes or head passages blocked.

## **6.7 Engine Running at Speed and Suddenly Dies**

- Engine overheated and seized

- Fuel starvation
- Electrical fault
- Faulty kill switch or ignition key

## **6.8 The Engine Does Not Provide any Power**

- Incorrect or damaged propeller
- Fouling on propeller
- Vessel incorrectly trimmed
- Tilt pin incorrectly set
- Propeller cavitating
- Blocked carburettor jets

## **7 Collisions**

Regardless of the rules listed in Module 50: International Rules of the Road, always take whatever steps are necessary to avoid a collision, even if you feel you are in the right. However, if a collision does occur:

- Stop the engines
- All crew to don PFDs.
- Check all crew are onboard and assess injuries
- Do an initial assessment of the damage.
- Drop anchor and take bearings to ensure that the anchor is set
- If the anchor fails to hold, play out the sea anchor to keep the bow on the wind
- Radio shore with a Pan-Pan call, giving as much detail as possible
- If no reply is received, radio other vessels in the area
- If the vessel has been holed, begin pumping the bilges.
- If the vessel cannot be saved, take the capsized bottle and as much safety equipment as possible
- Make a final mayday call and abandon ship

## **8 Grounding**

Even the best of navigators can run aground. When this occurs

- Stop the engines and free all the sails
- All crew to don PFDs.
- Check all crew are onboard and assess injuries
- Do an initial assessment of the damage.
- Determine what the vessel is grounded on.
- If the vessel is on mud and undamaged, attempt to get her off by reversing the engines and / or lightening the vessel, especially at the grounded end. Move all crew to the other end.
- If the vessel has been holed, begin pumping the bilges.
- If the vessel cannot be saved, take the capsized bottle and as much safety equipment as possible
- Make a final mayday call and abandon ship
- Try to get the crew safely onto the obstruction