

EN

19.06



BOAT MASTER

STUDENT TEXTBOOK

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Course Content



The ISSA Boat Master Certificate is a course addressed to candidates that already have a good understanding of sailing/boat handling, nautical terminology and safety at sea and wish to commercially skipper power driven yachts up to 15m LOA. The aim of the course is to increase the candidates' nautical knowledge to competently take on the duties of a Boat Master on board a yacht, during the day and night hours and up to 20 NM from shelter in fair weather, and moderate sea conditions.

THEORY TOPICS

Safety at Sea: Safety equipment, crew briefing, handling hazardous situations.

Collision Regulations: Review of collision regulations, lights, sound and shapes, application of the regulations.

Taking over a vessel: Hull and rig checks, machinery and systems checks, instrument checks, safety equipment checks, vessel launching.

Meteorology: Sources of information, personal observation, weather patterns, sea and land breezes, cloud types and formations, precipitation and fog.

Pilotage and passage planning: Pilot books, almanacs and information sources, passage planning considerations, navigating a coastal passage, passage strategy, port regulations, pilotage plan.

Vessel handling: Anchoring mooring and MOB, berthing and leaving a berth, handling in confined areas with and against crosscurrents

Chartwork: Review of position fixing and running fixes, course to steer to counteract a current, effect of tide and plotting the effect of tides and currents

Upon completion, the students are eligible to undertake the ISSA Master Power Yacht 200GT Course

Tuition is provided by experienced and highly skilled ISSA Instructors using a combination of practical instruction and theoretical teaching. Student learning is enhanced using a variety of handouts and teaching aids with correct student/instructor ratios.

PRACTICAL TOPICS

Safety Equipment Use & Maintenance: VHF basics, practical usage of safety equipment, dates of expiry, mandatory servicing.

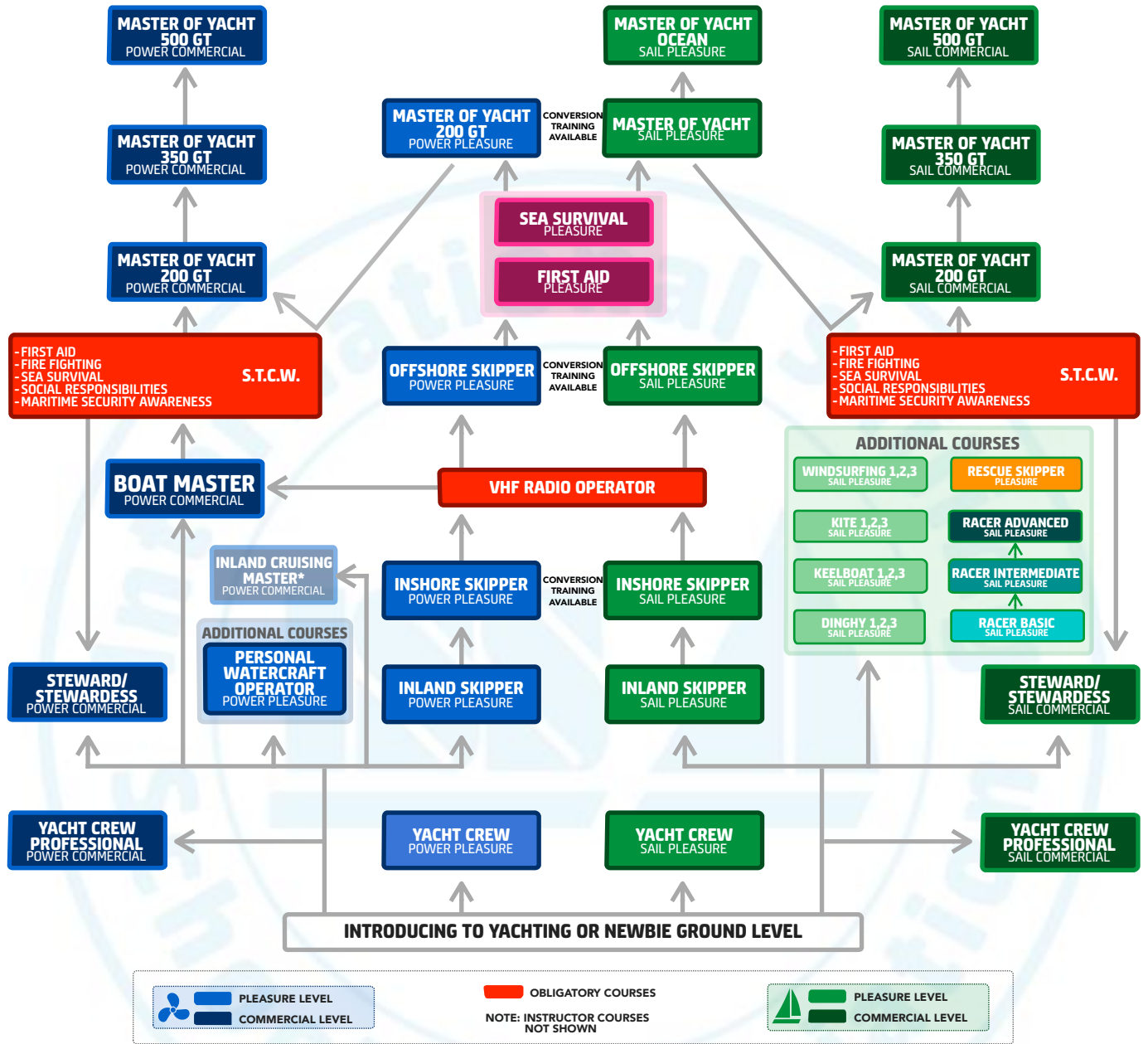
Vessel Check-out: Hull and rig checks, machinery and systems checks, instrument checks, safety equipment checks, fuel, and water capacity, vessel recovering.

Responsibilities of Captain/Skipper: Communication with the crew, delegation of responsibilities to the crew, seamanship general deck work, ropes, knots and splices, care and use of lines.

Vessel Handling: Anchoring, mooring and MOB, berthing and leaving a berth, handling in confined areas, handling with and against crosscurrents.



ISSA Competence Tree



ISSA LEVEL POWER PLEASURE	MAX LOA	TIME OF NAVIGATION	DISTANCE FROM SHELTER
YACHT CREW	N/A	N/A	N/A
PWC OPERATOR	N/A	DAYTIME	5 NM offshore
INLAND SKIPPER	15 m	DAYTIME	inland waters + 2 NM offshore
INSHORE SKIPPER	12 m	DAYTIME	20 NM offshore
OFFSHORE SKIPPER	24 m	DAY + NIGHT	60 NM offshore
MASTER OF YACHT	∞	DAY + NIGHT	150 NM offshore

ISSA LEVEL SAIL PLEASURE	MAX LOA	TIME OF NAVIGATION	DISTANCE FROM SHELTER
YACHT CREW	N/A	N/A	N/A
INLAND SKIPPER	15 m	DAYTIME	inland waters + 2 NM offshore
INSHORE SKIPPER	24 m	DAY + NIGHT	20 NM offshore
OFFSHORE SKIPPER	24 m	DAY + NIGHT	100 NM offshore
MASTER OF YACHT	24 m	DAY + NIGHT	∞
MASTER - OCEAN	∞	DAY + NIGHT	∞

ISSA LEVEL POWER COMMERCIAL	MAX LOA	TIME OF NAVIGATION	DISTANCE FROM SHELTER
YACHT CREW	N/A	N/A	N/A
STEWARD/DESS	N/A	N/A	N/A
INLAND CRUISING MASTER*	∞	DAY + NIGHT	inland waters + 2 NM offshore
BOAT MASTER	15 m	DAY + NIGHT	20 NM offshore
MASTER 200 GT	∞	DAY + NIGHT	150 NM offshore
MASTER 350 GT	∞	DAY + NIGHT	∞
MASTER 500 GT	∞	DAY + NIGHT	∞

ISSA LEVEL SAIL COMMERCIAL	MAX LOA	TIME OF NAVIGATION	DISTANCE FROM SHELTER
YACHT CREW	N/A	N/A	N/A
STEWARD/DESS	N/A	N/A	N/A
MASTER 200 GT	∞	DAY + NIGHT	160 NM offshore
MASTER 350 GT	∞	DAY + NIGHT	∞
MASTER 500 GT	∞	DAY + NIGHT	∞

* NOTE: INLAND CRUISING MASTER IS AVAILABLE ONLY TO CERTAIN REGIONS OF THE WORLD

Safety at Sea



BASIC GUIDELINES

Hazardous situations at sea happen rarely but frequently enough to make training for them meaningful. Here are some basic rules to follow:

- Always maintain and service your safety equipment on regular basis.
- Always make a safety briefing for the crew.
- Make sure the crew knows the location of the safety equipment.
- Make sure the crew knows how to use the safety equipment.

For more information go to chapter:
Operational Checklists

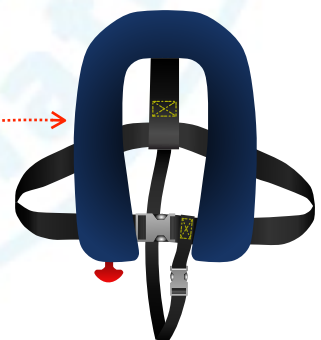
As a certified Boat Master, you are in command and you are responsible for the safety of every single person aboard, including yourself.

While being in charge of a vessel under way, the Boat Master, the helmsman or any other person performing any crew tasks MUST NOT be under the influence of alcohol nor any other drugs.

SAFETY EQUIPMENT

Life Jackets: You are obliged to always have a sufficient number of the SOLAS Life Jacket aboard. Life jacket keeps the head of an unconscious person above water.

There must be always at least **ONE LIFE JACKET PER PERSON** aboard. Life Jackets must be fitted with reflective tapes, whistle, and a flashlight. You can choose between solid/rigid ones and inflatable life jackets. However, keep in mind please that the inflatable ones must be serviced each year.



Personal Flotation Device (PFD): It is more convenient to wear, thus more popular and often used in water sports activities. However, **THIS IS NOT AN ALTERNATIVE TO THE LIFE JACKET.**

PFD provides only floatation features. It requires you to be conscious and able to swim as in some cases it might not support the whole weight of your body. PFD will not keep the unconscious person's head above water.

Distress signaling equipment is used to attract attention in case of an emergency at sea. There are three different types of pyrotechnics used as distress signals:

Red distress rockets - most effective during the night. They go up to 300m and should be fired pointing downwind.



ALWAYS FIRE DOWNWIND
DO NOT USE ROCKETS NEAR HELICOPTERS

Red hand flares - used mainly when other vessels are in the vicinity. They attract more attention if you wave them. They get extremely hot.



ALWAYS POINT DOWNWIND
DON'T LOOK DIRECTLY ONTO BURNING FLARE

Orange smoke - most effective during daytime and most visible to aircraft. It burns for 3 minutes and apart of attracting attention, it shows the direction of the wind.



White hand flares - are not distress signals. They are used to attract attention in order to avoid collision at night.



All the pyrotechnics have expiry dates. Make sure your equipment is always up to date.

Other safety equipment may vary across the vessels. On the following images you'll find items to be found on a well equipped yacht.



Ring buoy



Horseshoe buoy

GENERAL



First Aid Kit

GENERAL



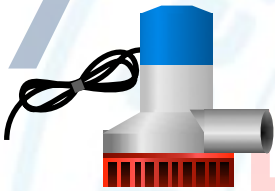
4 Fire extinguisher



5 Fire blanket



6 Toolbox



7 Electric bilge pump



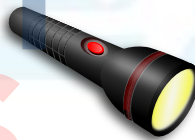
8 Manual bilge pump



9 Spare anchor



10 Handheld VHF Radio



11 Waterproof flashlight + extra batteries



12 Extra horn



13 Radar deflector



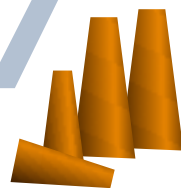
14 Magnetic compass



15 Extra rope
At least 2x boat's length long

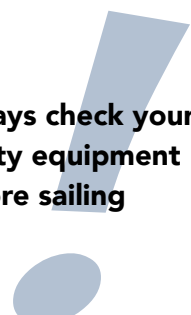


16 Boat hook



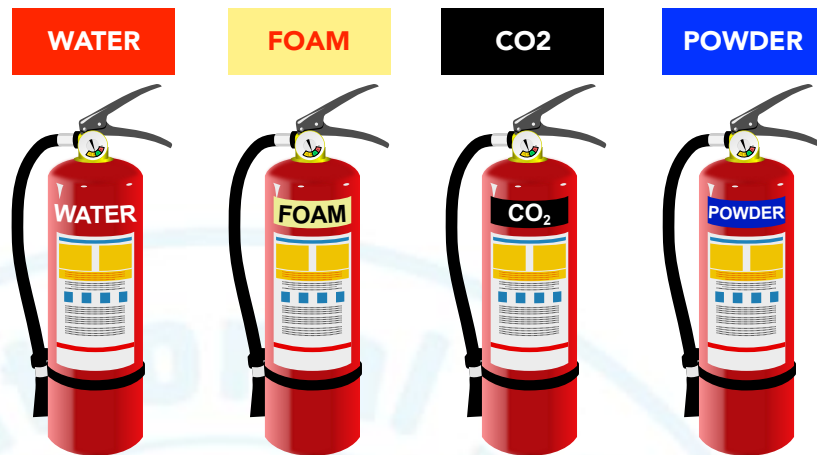
17 Wooden bunks

Always check your safety equipment before sailing



FIRE FIGHTING

There are different classes of fire (depending on the fuel that is burning) and different types of fire extinguishers. It is important to use the right extinguisher for the job.



A	Solids		WATER	FOAM	CO2	POWDER
B	Liquids			FOAM	CO2	POWDER
C	Gases					POWDER
	Electrical				CO2	POWDER

Fire triangle shows the necessary ingredients for most fires. It illustrates the three elements a fire needs to ignite:

Fuel + Heat + Air

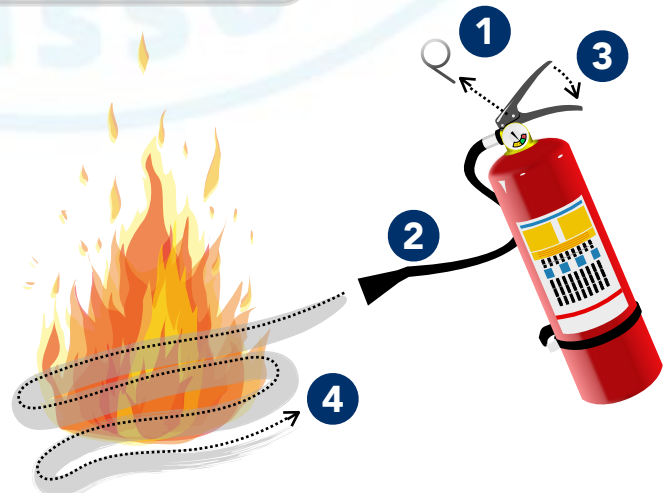


Powder extinguisher is the best one to use aboard small vessels.

OPERATING EXTINGUISHER

Every extinguisher is used in the same way. However always check the instructions written on the fire extinguisher.

- 1. Pull the safety pin.**
- 2. Aim the nozzle at the base of fire.**
- 3. Squeeze the handle.**
- 4. Sweep the nozzle side to side.**



VHF RADIO BASICS

The VHF Marine Radio is used to contact other vessels, marinas, and coast stations for **(1) distress, (2) urgency, (3) safety and (4) regular calling** purposes. In order to properly operate the radio, you need to undertake a **VHF Marine Radio Training**. In some areas of the world, a separate **VHF Short Range Certificate** is mandatory.

Keep watch on channel 16. This is the international distress channel.

DISTRESS CALL

In an emergency, any person can operate the VHF radio.

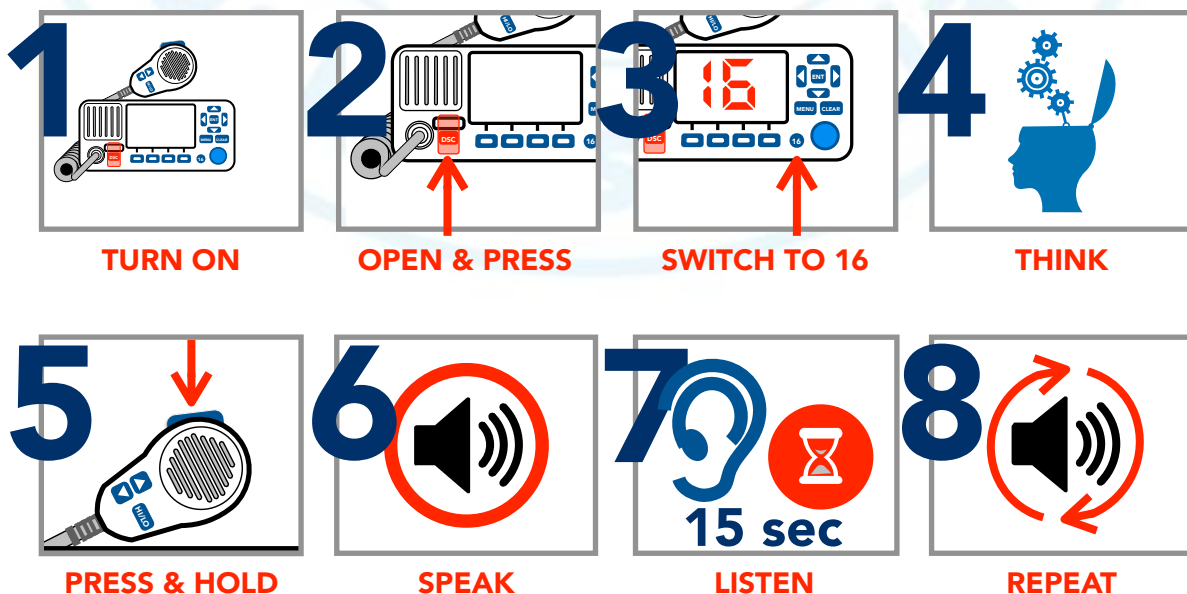
Upon making a distress call remember to **keep calm**, and always have a pencil and a piece of paper with you. **Think** of what you want to say and **write it down**. Speak slowly and remember to **press and hold** the Press To Transmit (PTT) button **when you speak** and release only when you've finished. Take your time. Poorly made distress call may not allow help to arrive.

Besides is a MAYDAY call template.

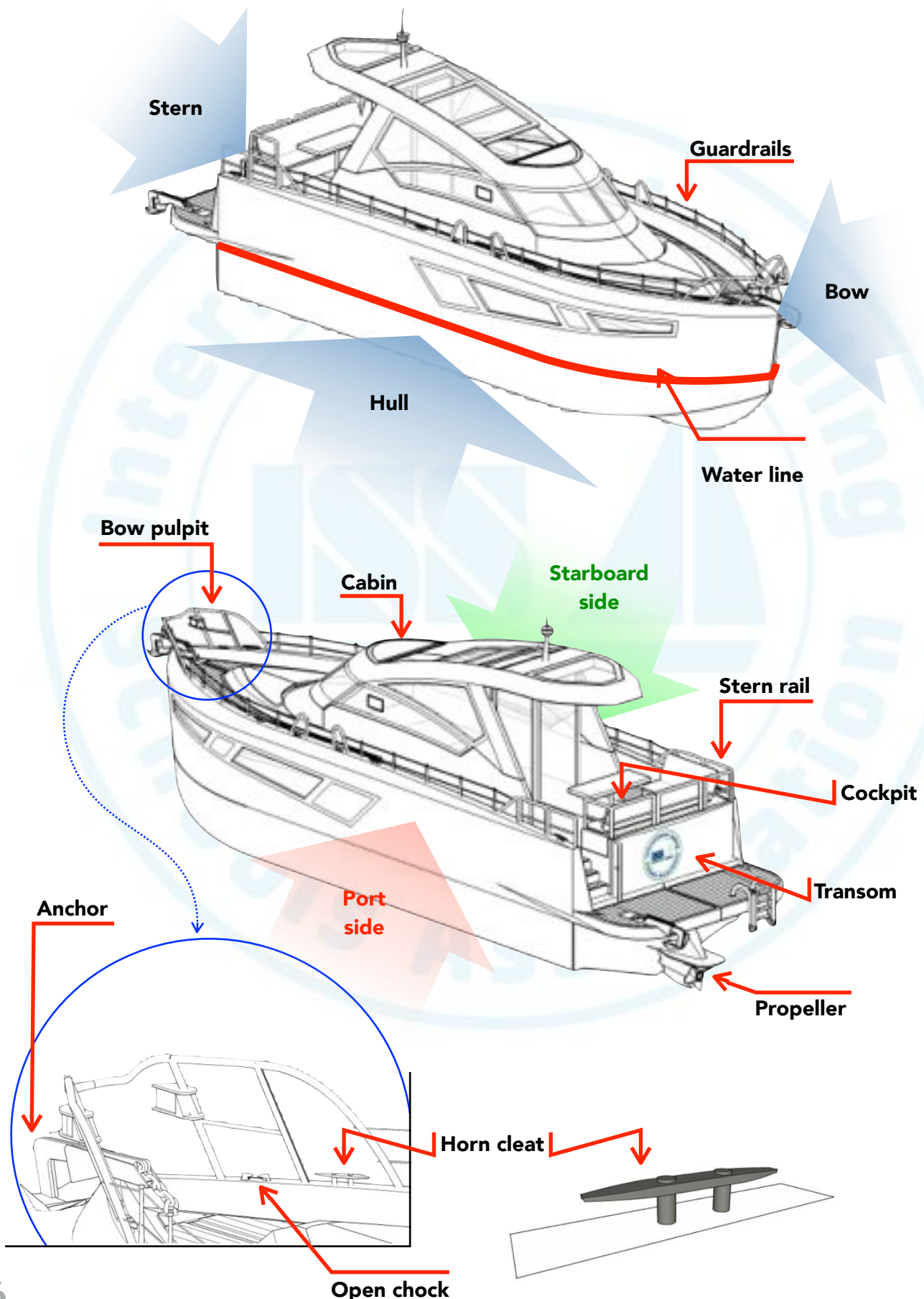
MAYDAY, MAYDAY, MAYDAY.
THIS IS YACHT... YACHT... YACHT...
MY MMSI IS ...
MAYDAY, YACHT... (CALL SIGN)
MY POSITION IS ...° ...' N/S & ...° ...' E/W
FOR EXAMPLE: 01 23,4' N 001 23,4' W
NATURE OF DISTRESS
IMMEDIATE ASSISTANCE REQUIRED
WE HAVE # OF PEOPLE ON BOARD
ANY OTHER USEFUL INFORMATION
OVER

DISTRESS CALL PROCEDURE

Distress = grave and imminent danger to life. Follow this procedure when making distress calls:

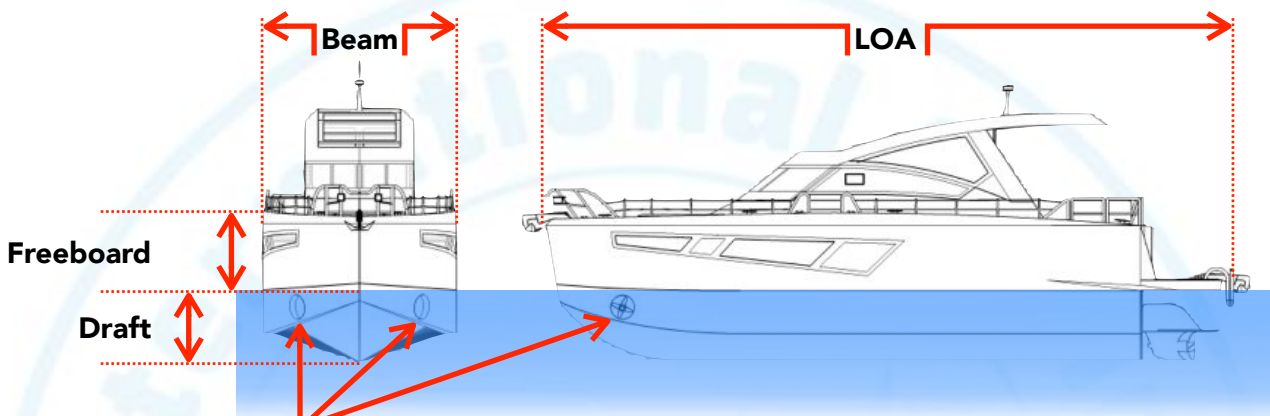


Parts of a Boat



Parts of a Boat

LOA (Length overall) is the length of a vessel's hull measured parallel to the waterline usually on the hull alone (so excluding railings or anchors or other fittings added to the hull). It is the most commonly used way of expressing the size of the vessel. LOA is used for calculating the cost of a marina berth.

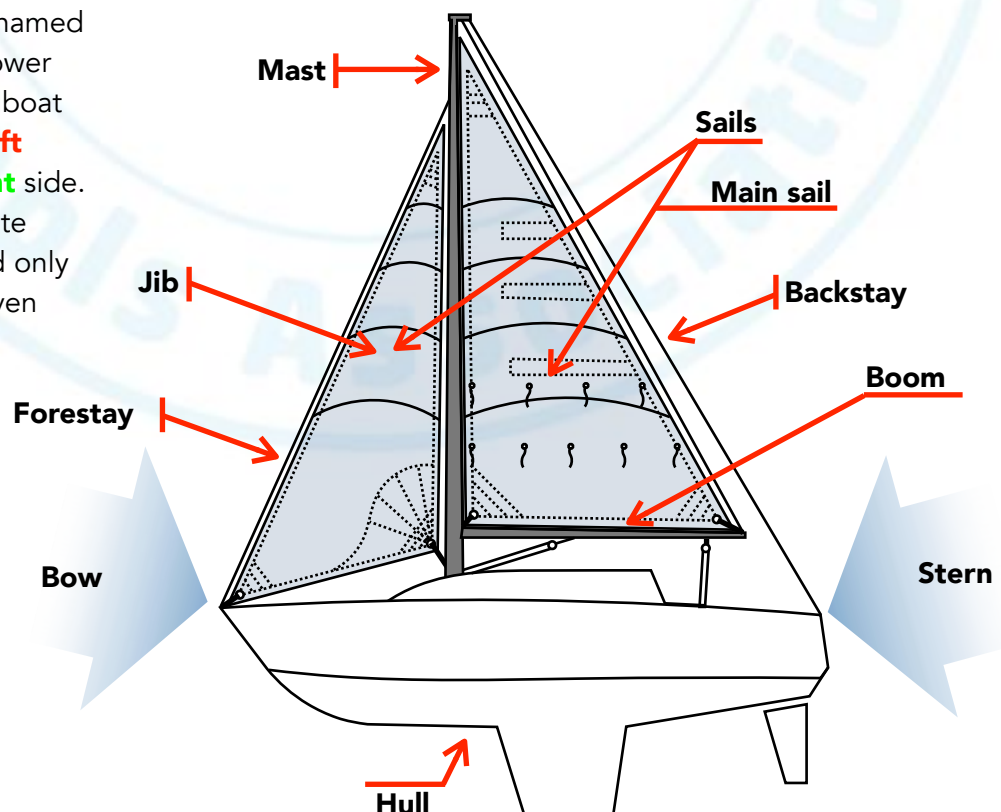


Bow thruster

A bow thruster is a propulsion device (usually electric) located at the bow. It provides lateral (port and starboard) thrust, making the vessel more maneuverable, thus making docking easier. They often come as a standard equipment. Be aware not to burn the device as it is not intended for constant, long lasting work but rather for short bursts.

PARTS OF A SAILBOAT

Most of the parts are named the same as on the power boat. Lights of the sailboat are also **red on the left** and **green on the right** side. However the 225° white masthead light is used only when the vessel is driven by its engine.



TYPES OF HULLS

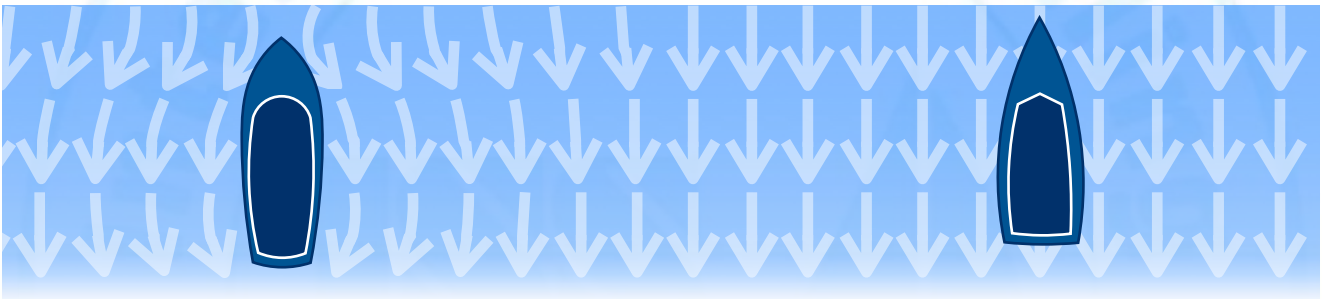
The hull is the body of the vessel, its shell. All hulls are designed to do one of only two things: displace water (**Displacement hulls**) or ride on top of it (**Planing hulls**). There are also the hulls capable of developing a moderate amount of dynamic lift while most of the vessel's weight is still supported by buoyancy (**Semi-displacement** or **Semi-planing**).

DISPLACEMENT HULL

This type of hull is supported exclusively by buoyancy. Sailing boats, slow-moving boats, and large ships have this kind of hulls. They move lower in the water, pushing or displacing it.

PLANING HULL

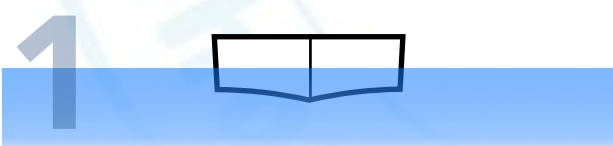
Boats with planing hulls are designed to slide on top of the water at higher speeds. Smaller, faster boats, like powerboats or personal watercraft, typically have these hulls.



COMMON HULL SHAPES

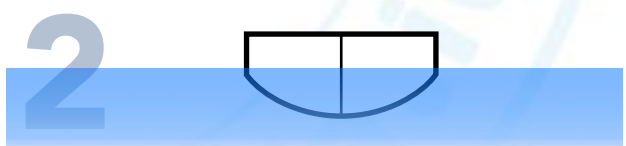
Sailing vessels come in a wide variety of shapes and sizes, however, there are only four most common hull shapes:

1 Flat-bottom



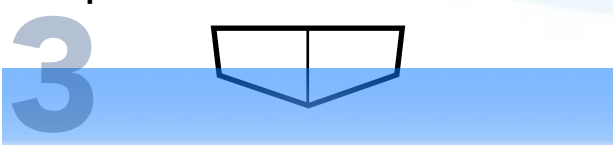
Boats with these hulls are very stable. They are great, great for fishing and other uses on calm waters.

2 Round bottom



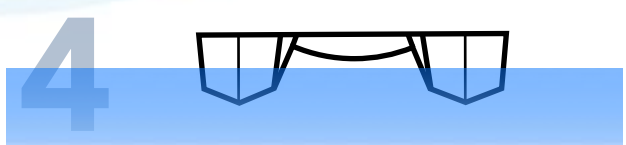
Typical displacement hulls. Designed to move smoothly through the water with little effort. Less stable - can capsize more easily.

3 V-Shaped



Typical planing hulls. Most common type of hull for powerboats. They can move at higher speeds and provide a smoother ride through rough water.

4 Multi hull



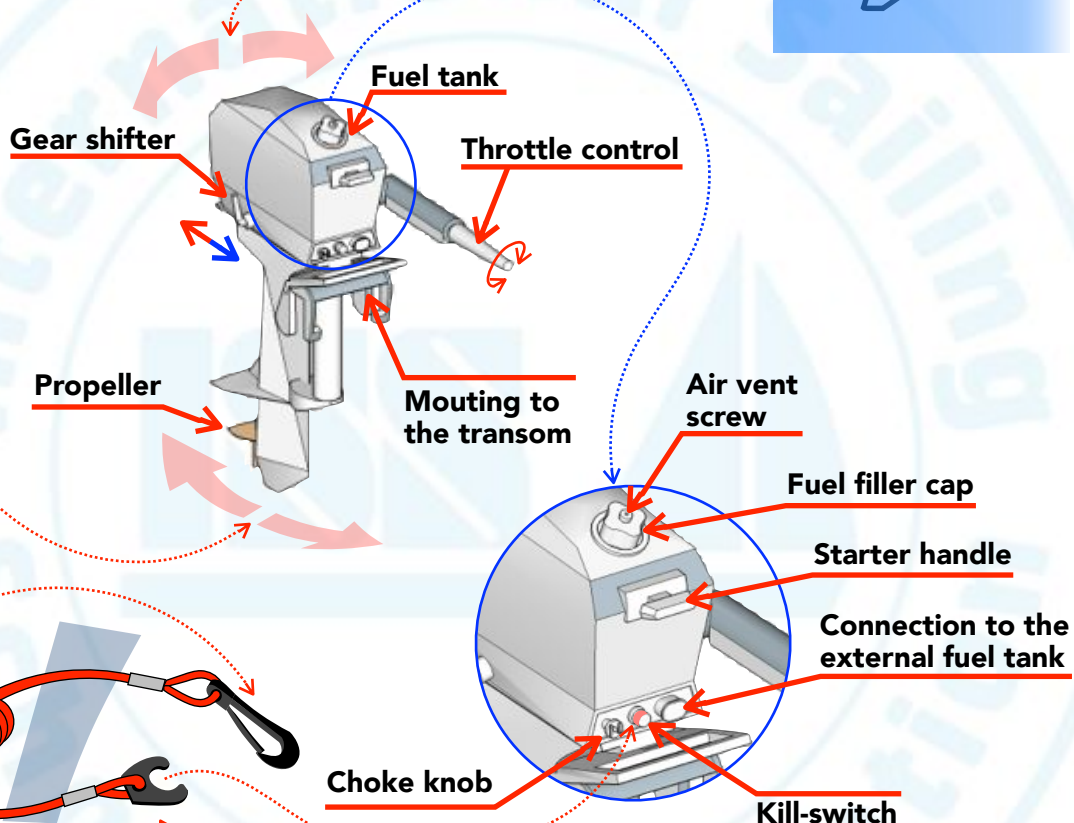
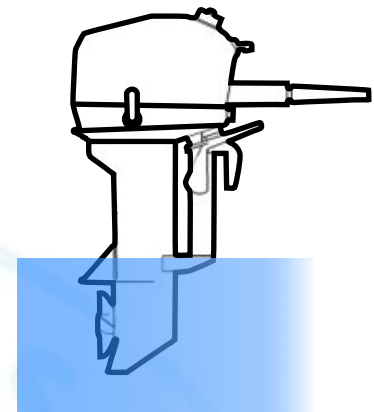
These can be either planing or displacement hulls (depending on the shape of the hulls). Some of the most stable on the water. There can be more than two hulls.

Operating the Engine

OUTBOARD ENGINE

An outboard engine is a self-contained unit that includes engine, gearbox, propeller and sometimes a fuel tank. It is designed to be mounted to the boat's transom.

Apart from propulsion, outboard engine provides also **steering** and **trim control**, as it allows to control the direction of thrust through pivoting over its mountings.

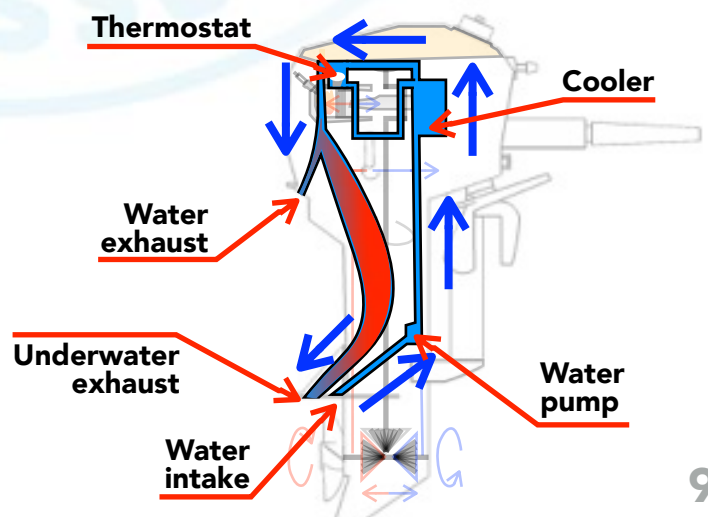


KILL CORD

It is also known as the safety lanyard and it cuts off electricity if detached from the kill-switch, thus shutting down the engine. Kill cord should be red and has a **clip** to attach to your clothing or to loop around your wrist and a **plastic fork** that must be attached to the kill-switch. If the fork is not attached, the engine won't start.

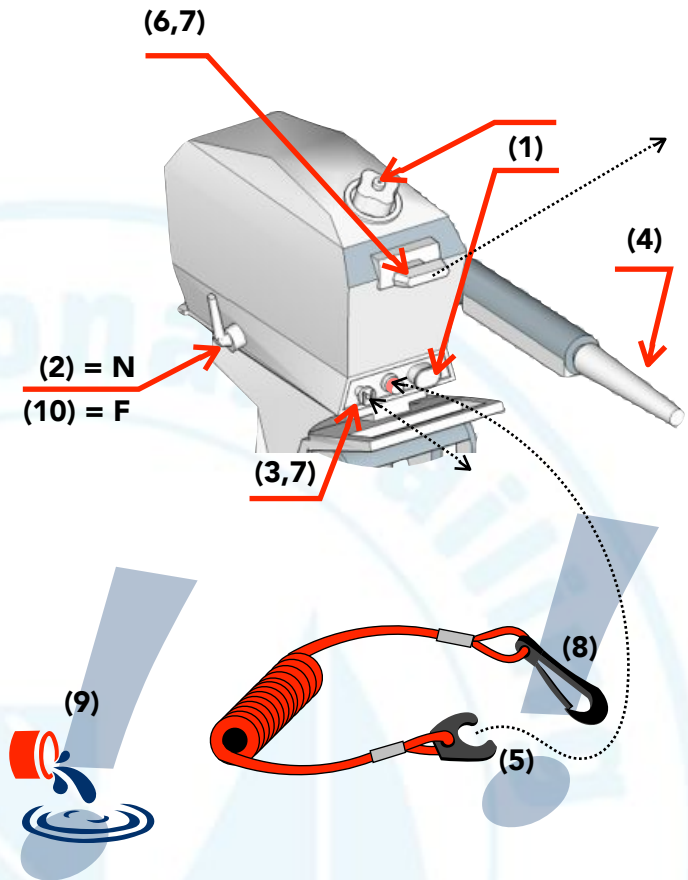
ALWAYS ATTACH THE KILL CORD TO THE DRIVER'S BODY. IF HE FALLS OVER BOARD, THE ENGINE WILL STOP.

COOLING SYSTEM



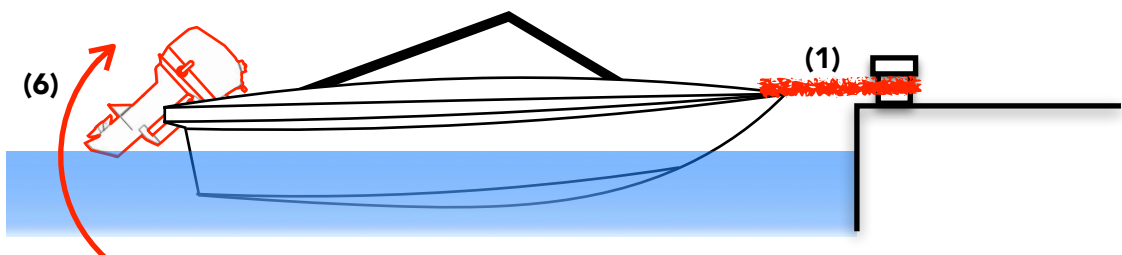
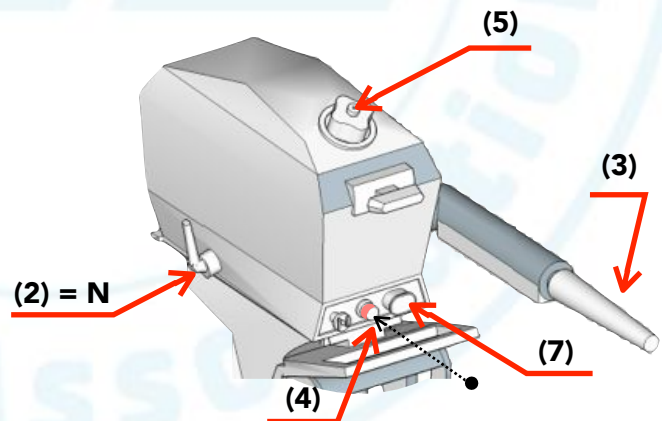
START PROCEDURE

1. Check the amount of fuel and if it is connected to the engine (or in case of using the engine tank, check the amount of fuel and open the air vent screw).
2. Put in neutral gear.
3. Open the choke (at the first start of the day).
4. Give a small amount of throttle.
5. Kill cord is attached to the kill switch but not yet on the wrist.
6. Check you are clear to pull the starter handle, use left hand to pull.
7. Pull starter cord once. Pull it again if the engine did not start at the first go. (if it was the first start of the day, **SWITCH OFF THE CHOKE**)
8. **Put the KILL CORD on the wrist.**
9. **Always make sure that the cooling water is coming out of the engine's cooling system.**
10. Put in gear and sail forward when ready.



STOP PROCEDURE

1. Make sure you are safely moored.
2. Check engine is in neutral.
3. Check the throttle is idling.
4. **Push the KILL-SWITCH** until engine stops or disconnect the kill cord.
5. In case you're using the built-in engine fuel tank, close the air vent screw.
6. Raise engine to avoid grounding of the propeller
7. In some cases, you might also need to disconnect the fuel.



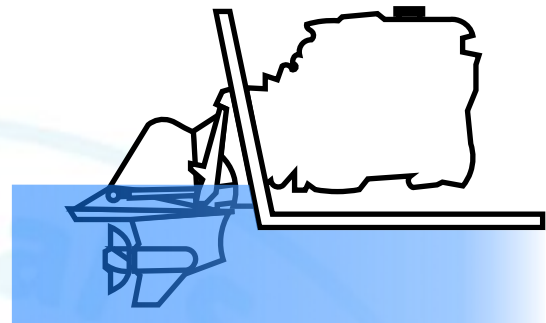
Operating the Engine

INBOARD ENGINE

Stern-Drive Inboard Engine


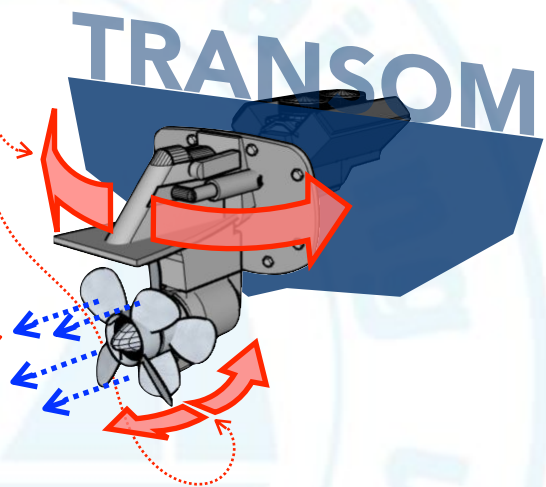
Apart from the fixed shaft and outboard engines, stern-drive inboard engines are quite common on larger power boats. They combine features of both the fixed shaft and outboard engines.

The engine is mounted inside the boat but a drive unit is attached through the transom. The drive unit operates as the lower part of the outboard engine providing **thrust, steering** and **trim control**.



Inboard engines also use seawater cooling systems. It is important to maintain the system to ensure the engine does not overheat.

Always make sure that the seawater is coming out of the exhaust after starting the engine.

Fixed Shaft Inboard Engine

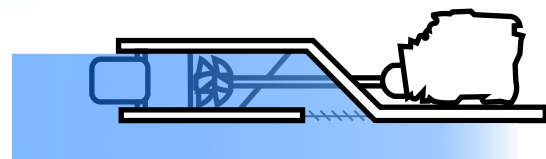
This is a conventional inboard gas or diesel engine. It is mounted inside the hull and the propeller is driven through a fixed shaft.



Boat with fixed shaft engines is steered solely by means of its rudder making it less maneuverable than in case of the outboard engine or the stern-drive one. That is unless there are two fixed shaft engines on the vessel. Maneuvering the boat with two fixed shaft engines enables you to put one engine into forwarding gear, the other into reverse and spin around your own axis.

JET DRIVE

Jet drives propel the boat by forcing a high pressured water stream out of the boat's aft. Directing this stream steers the vessel.

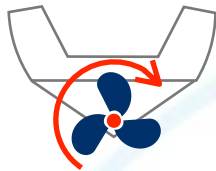


Jet drives can propel a small personal watercraft (jet ski) and much larger yachts. It is designed for shallow water conditions and can come in both the inboard or the outboard version.

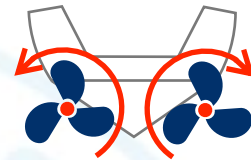
PROPELLERS ROTATION

Most single engine power boats have their propellers rotating clockwise

In case of two engines the propeller rotate opposite to each other.



Always **check the direction** your propeller revolves.



ENGINE TRIM

Outboards and stern-drives provide trim control. You trim your drive for grounding protection, better steering, visibility and wave-handling purposes and also to counterbalance weight in the bow. Good trim increases stability, fuel efficiency, and safety. Most boats perform best when running parallel with their waterline.

TRIM UP (IN) = BOW UP.

Trimming in too far can cause problems with hull pounding and visibility forward.

TRIM DOWN (OUT) = BOW DOWN.

Trimming down helps the boat accelerate to a plane by lifting the stern. Once you gain speed and plane you should trim up a bit to level the ride.



USING TRIM TABS

Some boat may be equipped with trim tabs - metallic plates with hydraulic jacks placed at the stern and used to stabilize the boat's movement over water. The concept behind the trim tabs is similar to the engine trim. Trim tabs put up or down the bow of the boat. Proper adjustment reduces the amount of necessary manual control, as well as provides greater efficiency.

Use one trim tab to level an unevenly loaded boat. Similarly **one trim tab** adjustment can help in the cross wind situations.

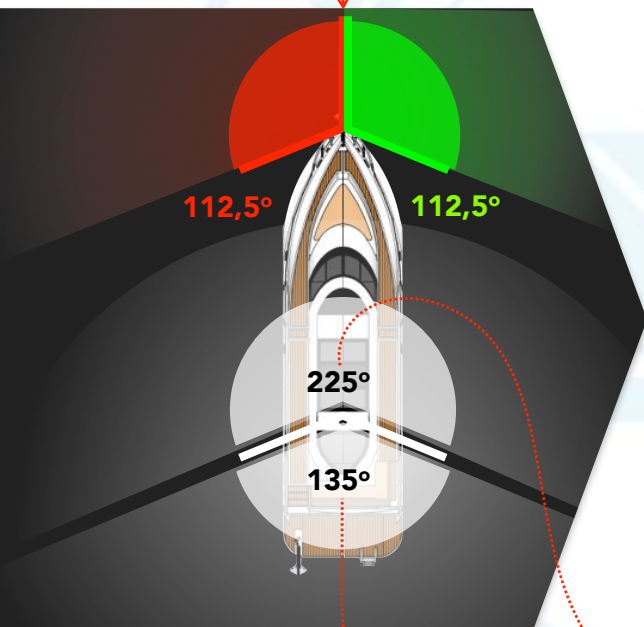
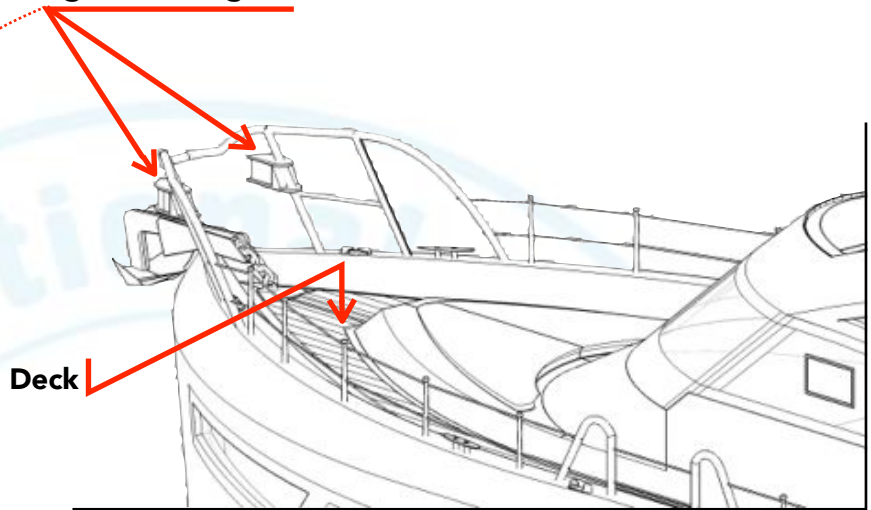


IRPCS

BOAT'S LIGHTS

A big vessel may not always see you, even if you have the right of way - be alert and ready to give way to avoid collision.

Navigation lights / sidelights



NAVIGATION LIGHTS EXPLAINED

In ancient times central rudder was too difficult to be mounted.



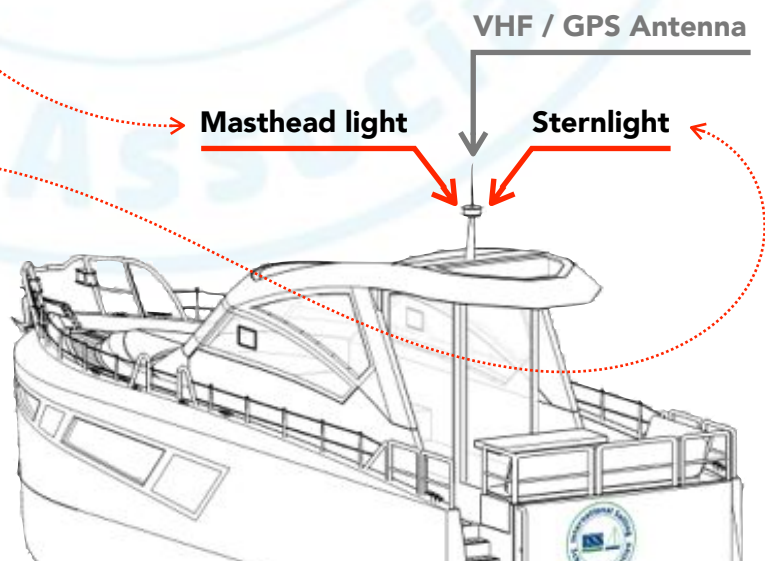
So it was mounted on the right side. Why on the right? Because most of us are right handed. Such boats would always moor with their left side to pier in order not to damage the rudder. So:

Left = STOP = Port = RED

Right - GO - Steer = GREEN

MASTHEAD LIGHT & STERNLIGHT

Both these lights are white and together they form a full, 360° circle. Nevertheless, those are still sector lights and on larger vessels the sternlight might be closer to stern on a separate mount.



The **International Regulations for Preventing Collisions at Sea 1972 (COLREGS)** are published by the International Maritime Organisation (the IMO) and set out, among other things, the "rules of the road" or navigation rules to be followed by ships and other vessels at sea to prevent collisions between two or more vessels.

FUNDAMENTAL RULES

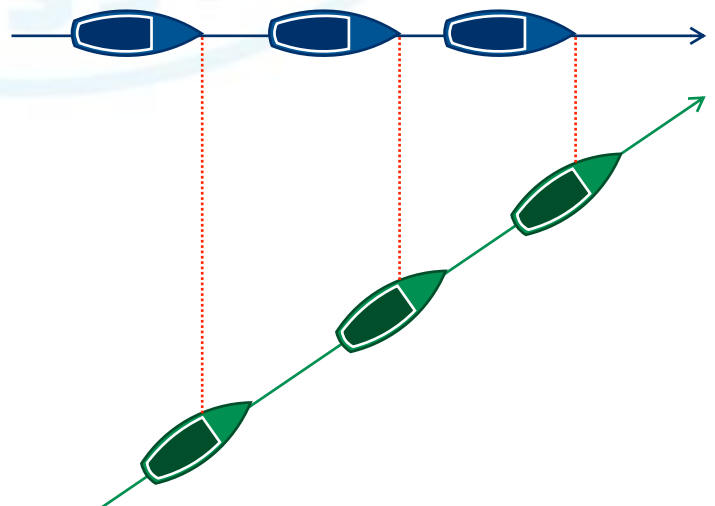
- 1 KEEP A WATCH** by all appropriate means (look, listen, radar, AIS)
- 2 NO ONE** has '**RIGHT OF WAY**'
- One vessel is the give way, the other is the stand on vessel.
3 BOTH remain **RESPONSIBLE** to avoid a collision
- Travel at a **SAFE SPEED** for the conditions
- In a narrow channel **KEEP TO STARBOARD** (right)
- GIVE WAY = EARLY & SUBSTANTIAL** action
- STAND ON = MAINTAIN COURSE AND SPEED** until it is clear the other vessel is not taking action and only then take avoiding action

RISK OF COLLISION

When there is deemed to be a risk of collision

- One vessel is the **GIVE WAY** vessel
- The other is the **STAND ON** vessel

If there is a **CONSTANT BEARING** between the two vessels which are approaching each other there is a risk of collision.



SAILING RULES

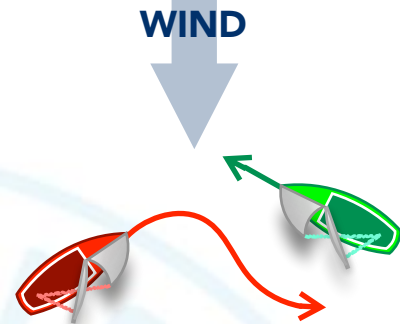
UNDER SAIL



Starboard Tack Rule

Wind on the Starboard side of the vessel

- **STARBOARD TACK** boat is the **STAND ON** vessel.
- **PORT TACK** boat is the **GIVE WAY** vessel.



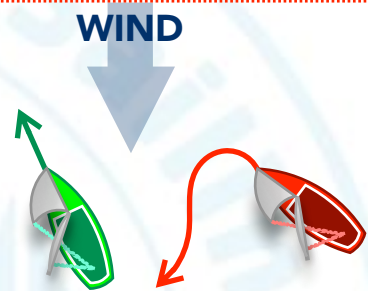
UNDER SAIL



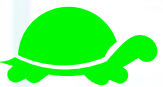
Windward Rule

The boat nearest the wind is the Windward boat. The boat furthest from the wind is the Leeward boat

- **LEEWARD** boat is the **STAND ON** vessel.
- **WINDWARD** boat is the **GIVE WAY** vessel.

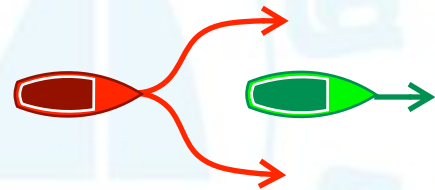


UNDER SAIL OR POWER



Overtaking Rule.

- The vessel **BEING OVERTAKEN** is the **STAND ON** vessel.
- The **OVERTAKING** vessel is the **GIVE WAY** vessel

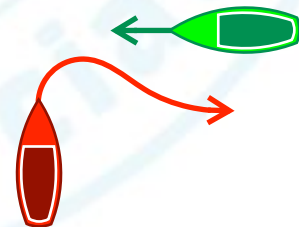


Overtaking is defined as coming from more than 22.5° abaft the beam (the angle a stern light becomes visible).

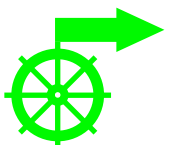
UNDER POWER



Vessels meeting at an angle but not when one is overtaking the other, give way to vessels on your **STARBOARD BOW**.



UNDER POWER



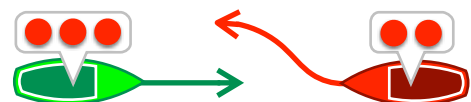
Vessels meeting head on – both turn significantly to **STARBOARD** and pass Port to Port.



GENERAL LIGHTS RULE



Vessel displaying more red lights is a **STAND ON** vessel.

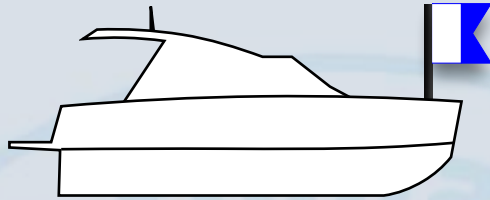


SHAPES AND SOUNDS

VISUAL DAY SIGNAL

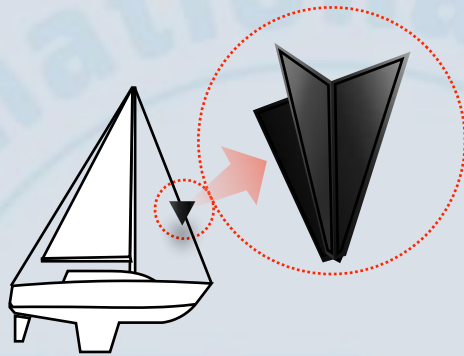
FOG SIGNAL

1
Vessel engaged in diving operation



Efficient sound signal at intervals not exceeding 2 mins

2
Vessel motor sailing



At intervals not exceeding 2 mins:

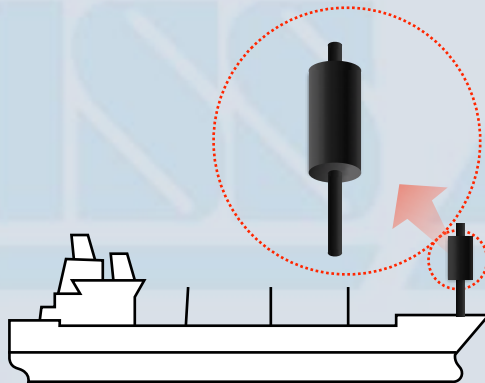
If making way



If not making way



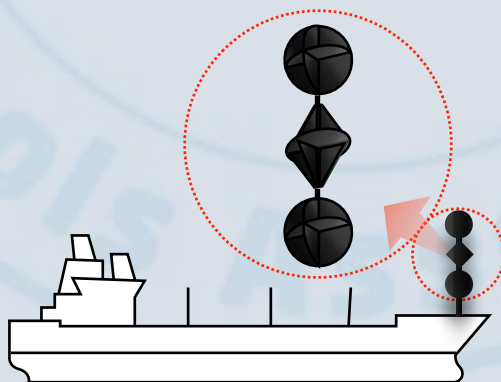
3
Power driven vessel constrained by draught



At intervals not exceeding 2 min



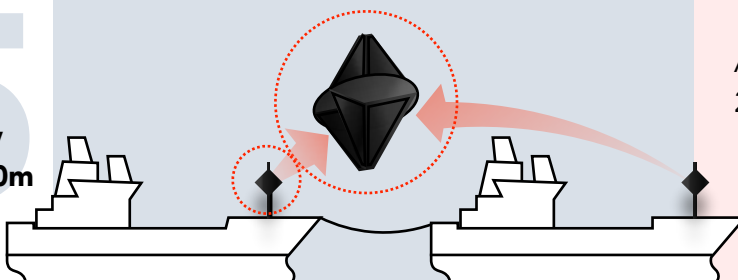
4
Power driven vessel with restricted ability to maneuver



At intervals not exceeding 2 min



5
Vessel towing and tow. Length of tow more than 200m



At intervals not exceeding 2 mins:

towing vessel



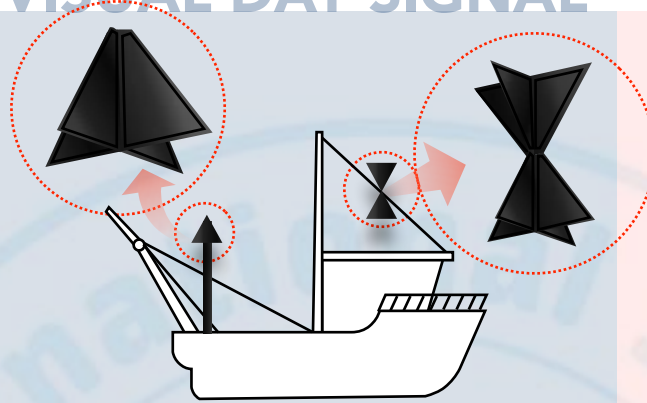
towed vessel



VISUAL DAY SIGNAL

FOG SIGNAL

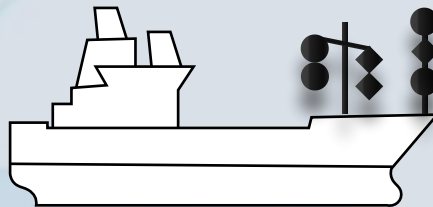
Fishing Vessel gear extending more than 150m horizontally



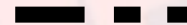
At intervals not exceeding 2 min



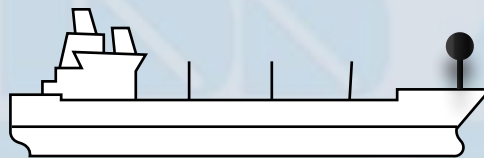
Carrying out underwater operations (Restricted ability to maneuver)



At intervals not exceeding 2 min



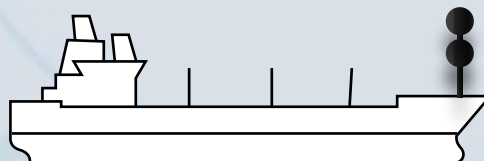
Vessel at Anchor



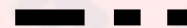
Rapid bell at intervals not exceeding 1 min. If over 100m followed by rapid gong. May also sound MORSE A on whistle



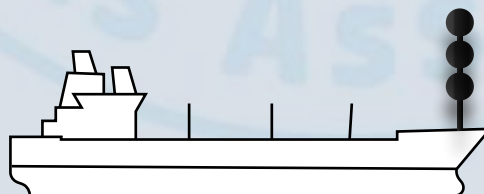
Vessel not under command



At intervals not exceeding 2 min



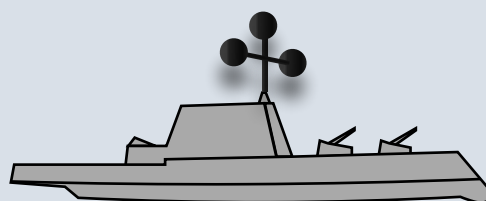
Vessel aground



3 bell strokes + rapid ringing + 3 bell strokes + (gong if 100m plus). At intervals not exceeding 1 min. May also sound Morse R on whistle



Vessel engaged in mine clearing operations



At intervals not exceeding 2 min



LIGHTS

AFT

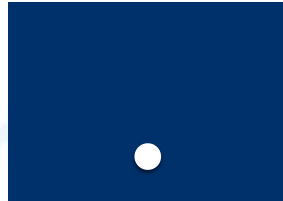
FORWARD

STARBOARD

Sailing vessels

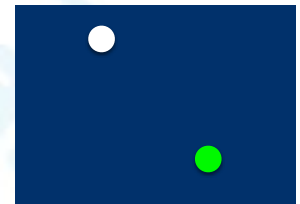
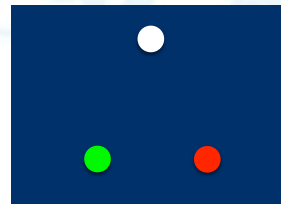
Under 20m a combined all-round mast light can be used

1



Power vessel < 50m

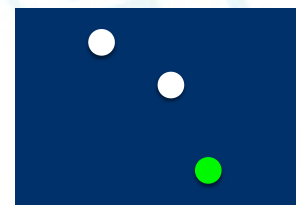
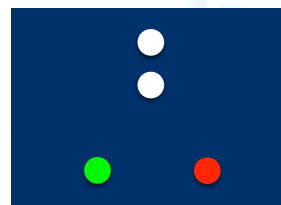
2



Power vessel > 50m

When seen from forward it is impossible to distinguish this from a towing vessel < 50m with tow < 200m

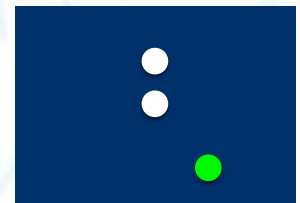
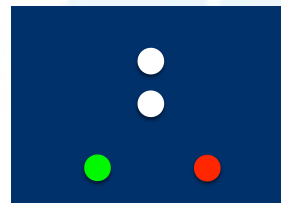
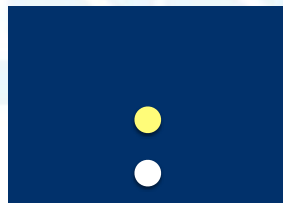
3



Towing Vessel < 50m (tow < 200m)

When seen from forward it is impossible to distinguish this from a power vessel > 50m or a power vessel < 50m showing the optional second masthead light

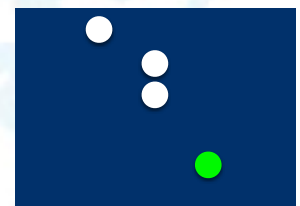
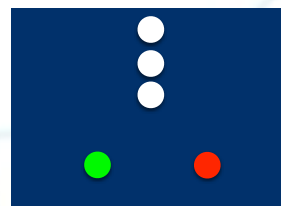
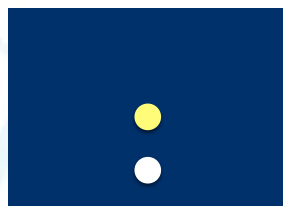
4



Towing Vessel > 50m (tow < 200m)

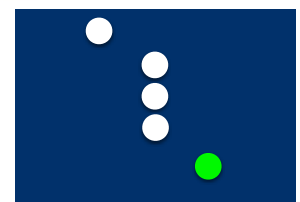
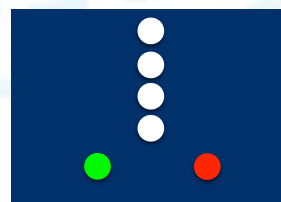
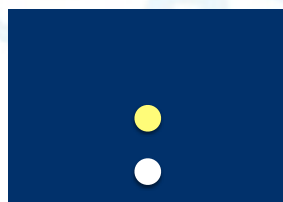
When seen from forward or aft it is impossible to distinguish this from a towing vessel < 50m with a tow > 200m

5



Towing Vessel < 50m (tow > 200m)

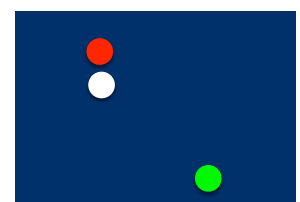
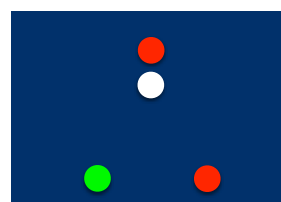
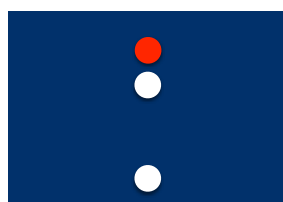
6



Fishing Vessel

Memory Aid:
Red Over White = Fishing At Night

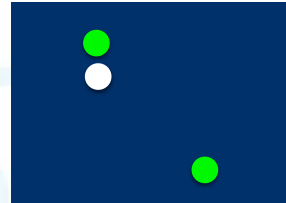
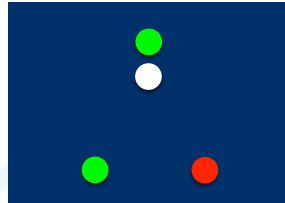
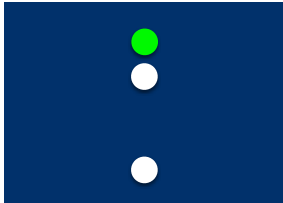
7



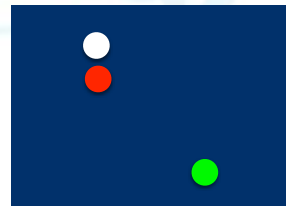
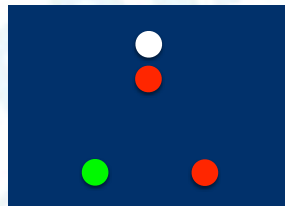
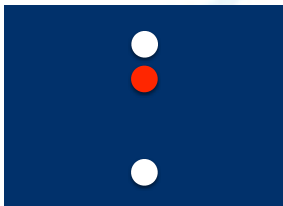
AFT

FORWARD

STARBOARD



Trawling Vessel



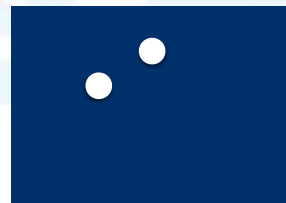
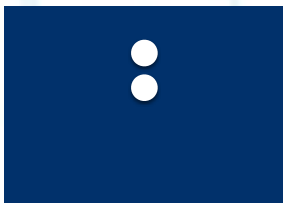
Vessel engaged in pilotage duties

Memory Aid:
White over Red = Pilot Ahead

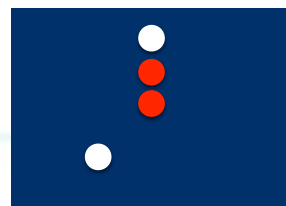
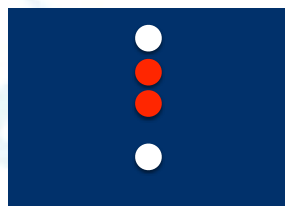
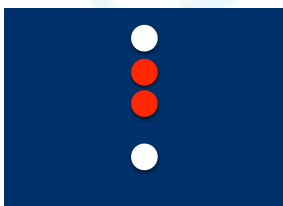


Vessel < 50m At Anchor

Remember, it is impossible to tell in many cases when only a single white light is seen - what this may mean (stern light? vessel at anchor? distant vessel where only the masthead light is visible over the horizon? etc...)

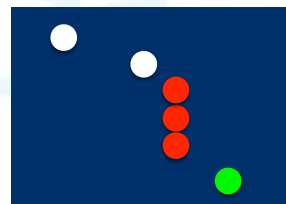
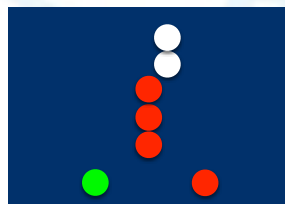
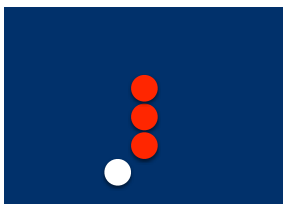


Vessel > 50m At Anchor

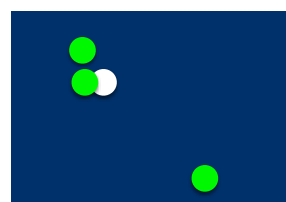
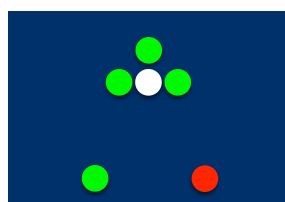
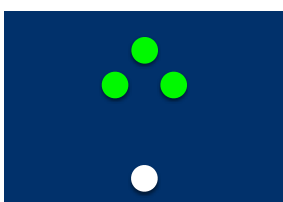


Vessels Not Under Way - Vessel Aground

Since the rule does not specify exactly where the two red lights should appear in relation to the anchor light they may appear either above or below the forward anchor light.



Vessel Constrained by her Draft



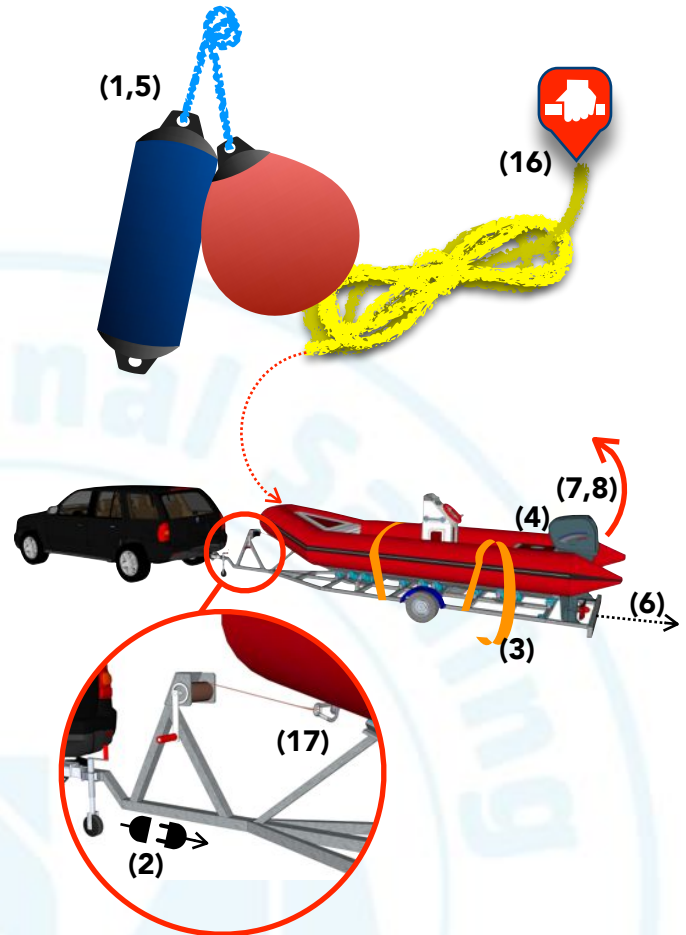
Vessel engaged in mine clearance operations

Launching & Recovering

BOAT LAUNCHING

Before the boat ramp

1. Put all the necessary equipment and supplies to the boat. **Remember about safety equipment.**
2. Disconnect trailer lights from the towing vehicle.
3. Remove all tie-down straps but leave the trailer winch cable securely attached to the vessel.
4. Put the drain plug in place.
5. Attach the mooring line and fenders to the boat.
6. Disassemble the trailer towing lights (if necessary, depending on the trailer)
7. Make sure your engine is up (for boats with outboard engines and stern drives)
8. Check the battery on the boat (you don't want to be stuck after launching)

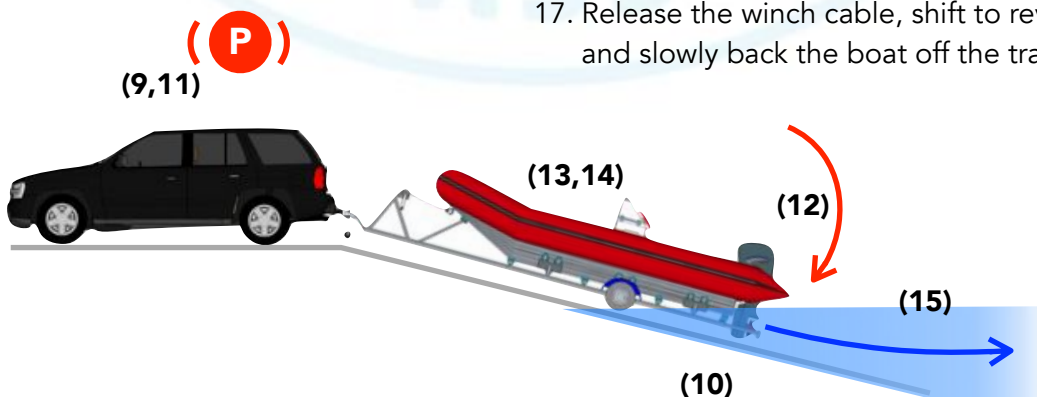


On the boat ramp

9. Make sure that you have a clear way. Especially make sure that no person is behind the boat and that no other boat in the water is in your path.
10. Go as far down the ramp to ensure that you can lower your engine into the water.
11. Set on the parking brake of the towing vehicle.

Actual launching.

12. Lower the engine or stern drive.
13. Turn on the bilge blower to remove any gasoline fumes that may have accumulated there.
14. Start the engine and wait for it to warm up.
15. Move the trailer further back into the water until the boat starts to float.
16. As a precaution secure the loose end (not attached to the boat) of the mooring line somewhere on the shore (ideally if a second person would hold onto it).
17. Release the winch cable, shift to reverse and slowly back the boat off the trailer.



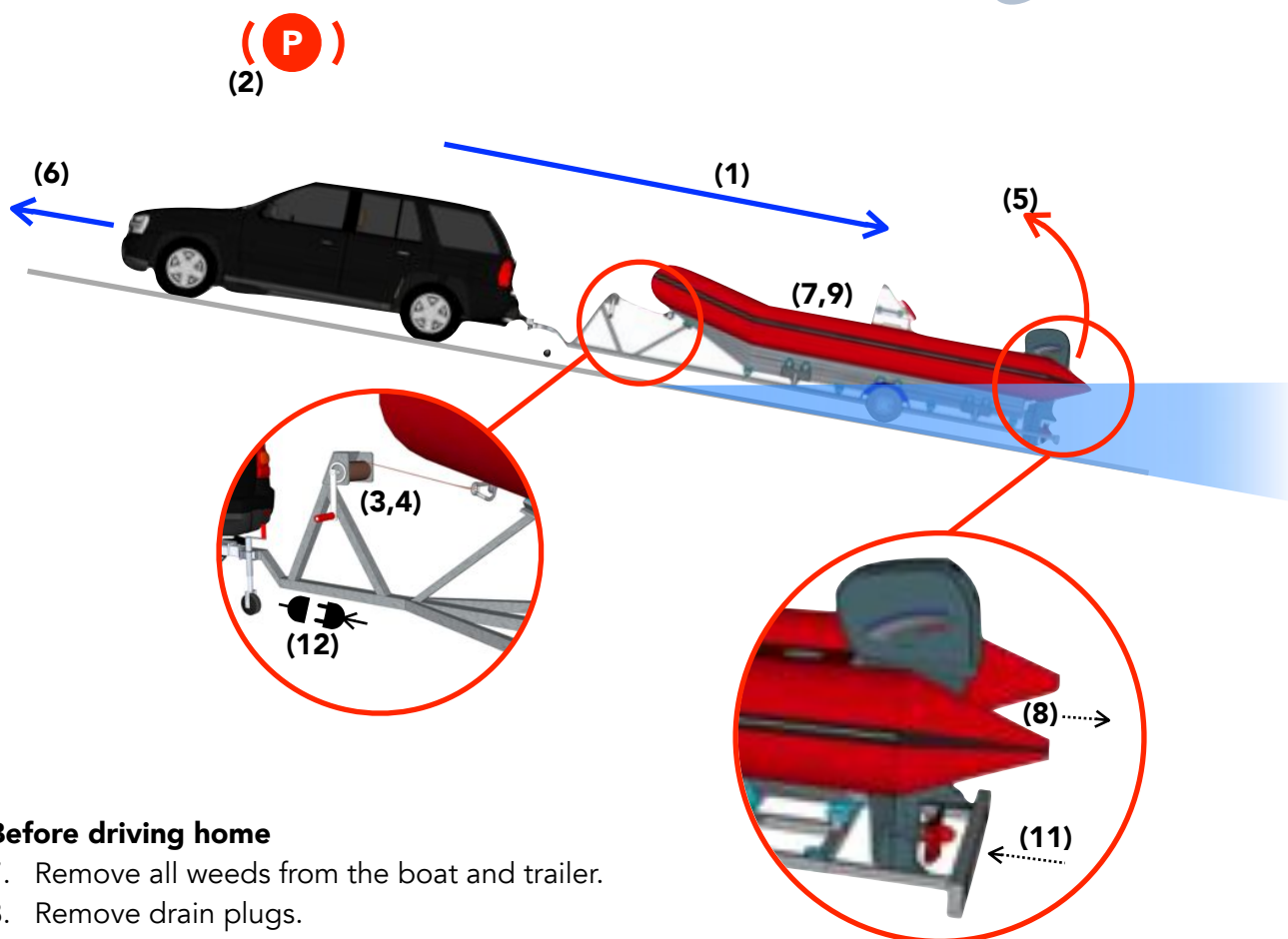
BOAT RECOVERING

On the boat ramp

1. Go as far down the ramp with your trailer to ensure that most of the rollers or bunks are submerged in the water.
2. Set on the parking brake of the towing vehicle.
3. Approach the trailer with the boat close enough to attach the winch cable.
4. Pull the boat onto the trailer with the winch. Make sure the boat properly comes on top of the rollers or bunks.
5. Shut off and raise the outboard engine or stern drive.
6. Drive off the ramp with the boat on the trailer.

Do not load a boat using its engine power

Stay out of the direct line of the winch cable. It might be dangerous if it snaps.



Before driving home

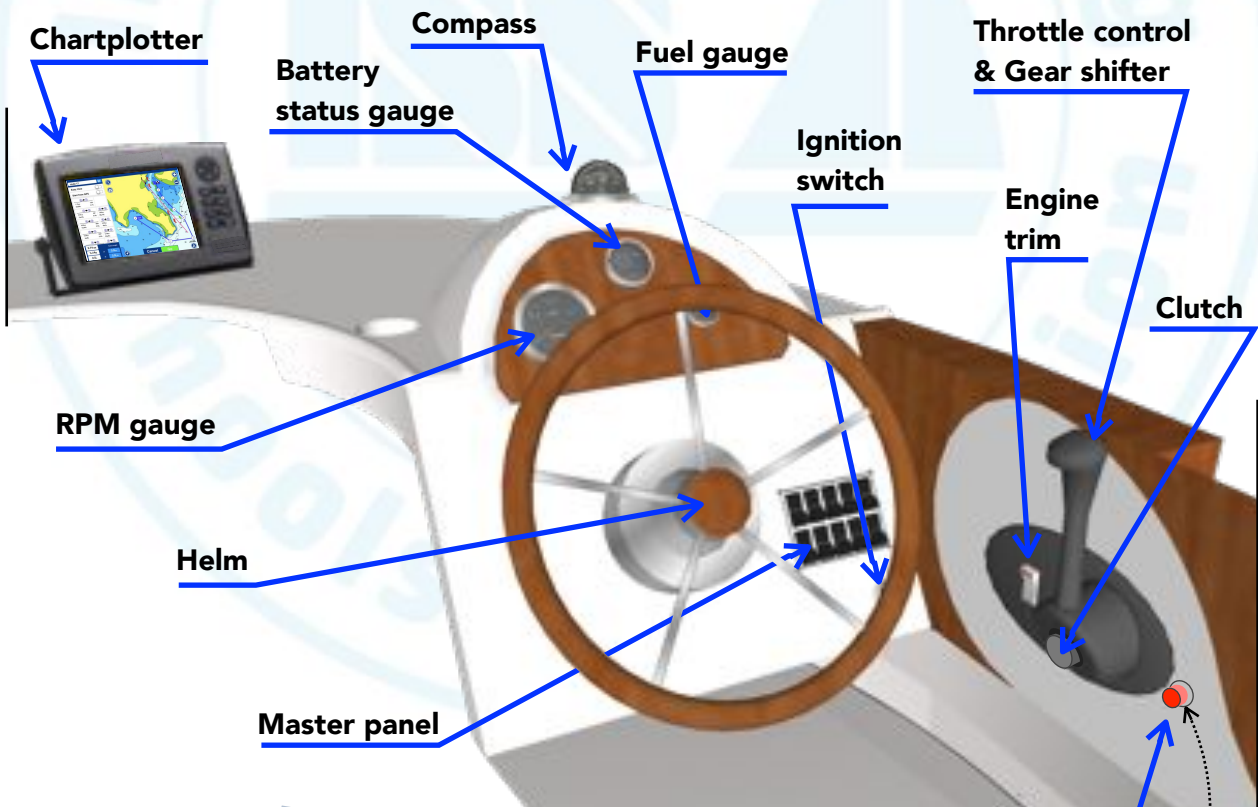
7. Remove all weeds from the boat and trailer.
8. Remove drain plugs.
9. Secure the equipment on the boat or remove it.
10. Strap the boat to the trailer.
11. Assemble the trailer towing lights (if necessary, depending on the trailer)
12. Connect trailer lights with the towing vehicle.

Handling Yacht Under Power

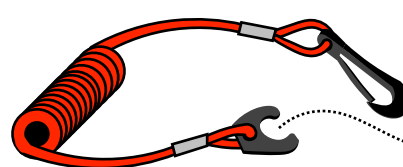
WHEELHOUSE

Construction of the modern power boat wheelhouse depends largely on the type and size of the boat itself. They go from very simple, consisting only the wheel, the throttle control perhaps some essential gauges like the RPMs or the fuel gauge, to very complex ones with plenty of electronics and even redundant systems and gauges. Here's what you can typically find in the wheelhouse:

- Helm
 - Throttle control
 - Gear Shifter
 - RPM gauge
 - Fuel Gauge
 - Battery status gauge
 - Speed gauge
 - Water gauge
 - Compass
 - Chartplotter
 - Ignition/kill-switch
 - Engine trim
 - Clutch
 - VHF radio
 - Windlass control
 - Lights control panel
 - Sound system (FM Radio)
 - Horn
- Master panel is usually customizable and can contain various switches.

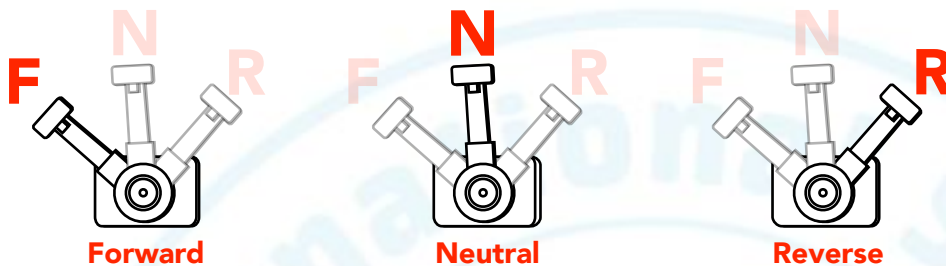


Kill cord does not mean strapping yourself solely to the outboard engine. On smaller vessels, somewhere in the wheelhouse, you can find a kill-switch requiring the kill cord plug-in.



GEARS

Most of the modern boats are equipped with a shifter like the one below. You always **start the engine on neutral** and then you can switch to forward or reverse. Moving the shifter further in each direction is like pushing the accelerator pedal in a car. **There is no break** however!



Always allow a **moment in neutral** when switching gears.

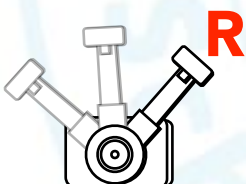
INERTIA

The behaviour of the boat on the water resembles ice skating a little. The boat will never stop at once. It also won't turn so precisely as a car.



Always bear in mind that the **boat is heavy** and has **a lot of inertia**.

PROP KICK

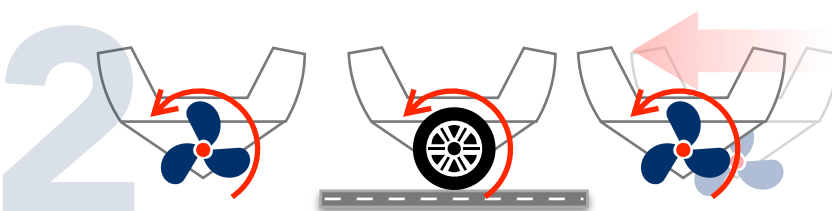


Appears only on the vessels with the **fixed-shaft engine** and only when you are **in reverse gear**.

Always **check the direction** your propeller revolves.



If propeller revolves clockwise, the stern will move to starboard before going into reverse.



If propeller revolves counterclockwise, the stern will move to port before going into reverse.

TURNING CAPABILITY - THE HEART RULE

Wind and stream play a strong factor in the boat turning capability .

WIND

When head-to-wind, the bow will easily come around

Pivot points are different for every boat, but when **going ahead** a yacht usually pivots around a point approximately **1/3 from the bow** (roughly at the mast). When **going backwards** the pivot point moves **1/3 from the stern**.



When going downwind, the wind will resist your efforts to make a turn

The bow is most vulnerable to the wind

When going **forward**, beware of colliding with obstructions **with your stern**

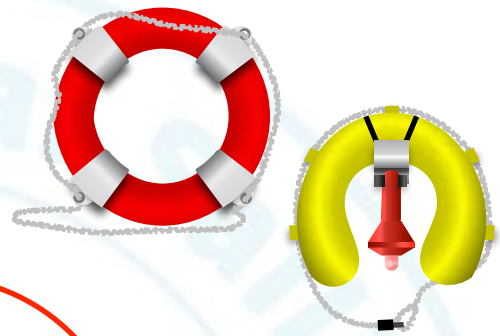
When going **backward**, beware of colliding with obstructions **with your bow**

Handling Yacht Under Power

MAN OVERBOARD PROCEDURE

In case of a man overboard (MOB) situation remember to **KEEP CALM**. It is essential not to lose sight of the person and recover him/her up as quickly as possible. Here's a simple procedure to follow:

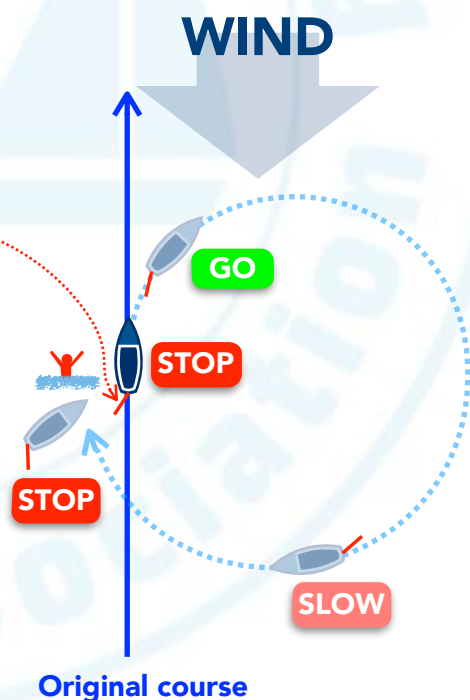
1. Alert the crew.
2. Stop the engines.
3. **DO NOT LOSE SIGHT** of the MOB. You can designate a crew member to watch the person.
4. Throw a ring or horseshoe buoy.
5. Turn the boat towards the MOB. Be careful and **DO NOT HIT THE PERSON**.
6. When close, maneuver to approach the person into the wind or into the current, whichever is stronger.
7. Bring the boat alongside to recover the person.
8. Provide first-aid if required and monitor the person.



TURN FOR MOB

1. Shift to neutral gear.
2. Turn the boat towards the person (e.g. if a person fell over the port side, make a rapid and strong turn towards the port side).
3. When clear of the person, go ahead to recover the person as quickly as possible. **KEEP CALM** however.
4. After making a 2/3 of a circle slow down.
5. Shift to neutral gear, when the person is ~15 degrees off the bow.
6. Ease the helm and put the engines into reverse, if needed. **DO NOT HIT THE PERSON**.

Always approach the person into the wind and/or current (whichever is stronger). Stop the boat with the person well forward from the propellers.



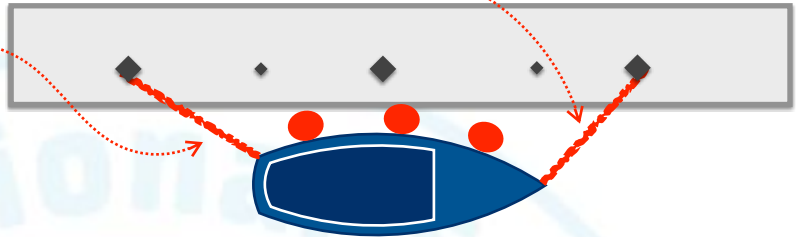
Case: MISSING PERSON

1. Alert the crew and search the boat well.
2. Slow the boat.
3. Turn on reciprocal course.
4. Make a distress radio call (**MAYDAY**)
5. Put the crew to muster stations.
6. Search.

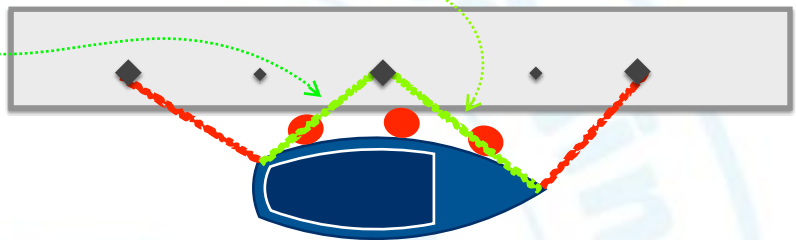
DOCK LINES

Each line used for docking a boat has a different function.

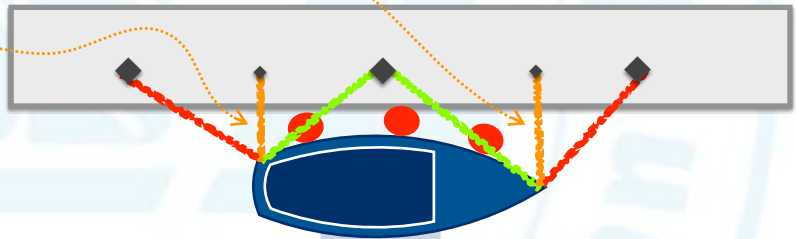
Bow line & stern line are the main docking lines. They keep the boat from running away from the dock but **DO NOT STOP the boat's FORWARD and BACKWARD** movement



Bow spring & stern spring are additional docking lines. They keep the boat from moving forward and backward. Always use them when leaving the boat longer at the dock

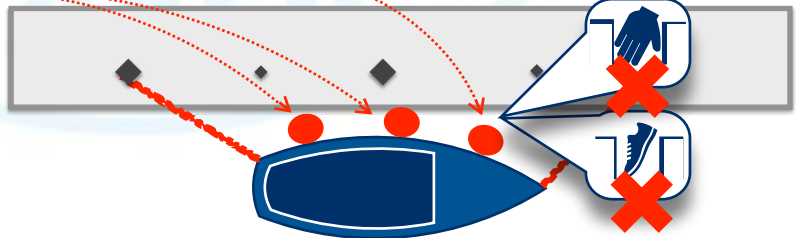
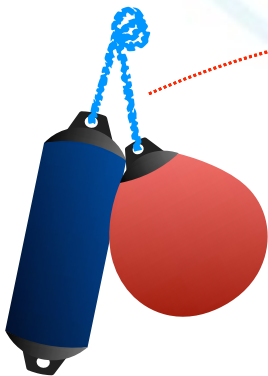


Bow breast & stern breast keep the bow and stern close alongside, particularly in case of a strong offshore wind. They are not essential when bow and stern lines and springs are also used.



FENDERS

Fenders are usually made of plastic and are hung from the guardrails or lifelines over the side of the boat to prevent it making contact with the bulkhead, dock or another boat along side. They are made in a variety of shapes to suit different situations. You should use at least three fenders when berthed alongside.

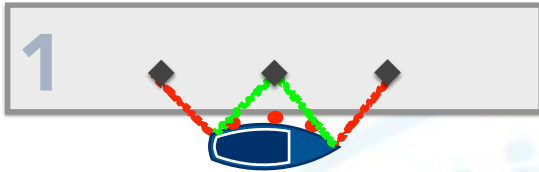


NEVER twist the fender rope around your hand when handling fenders.

NEVER Use your hands or feet to push away the boat from the bulkhead.

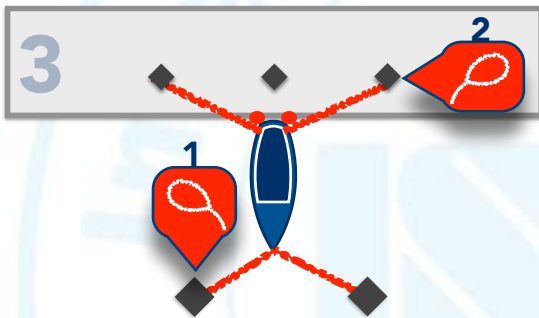
TYPES OF BERTHS

ALONGSIDE



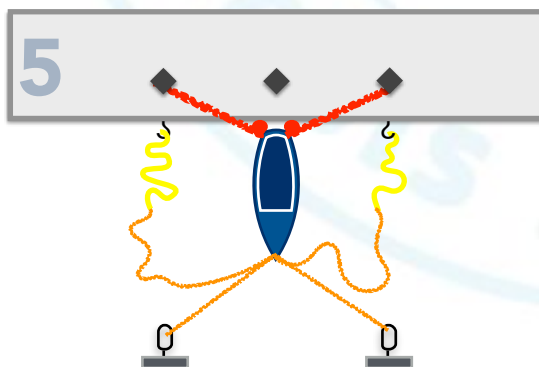
The most typical type of berth. Use at least bow and stern line. Adding just one spring line will better stabilize the boat.

DOLPHINES



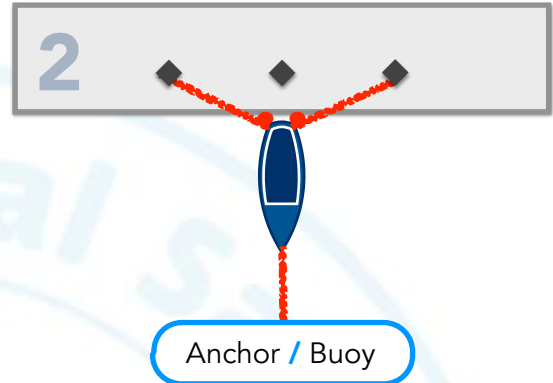
In some marinas you might encounter docking piles, called dolphins (large wooden or metal stakes driven into the seabed). When approaching the berth first fix the lines on the piles and then ashore.

MOORINGS



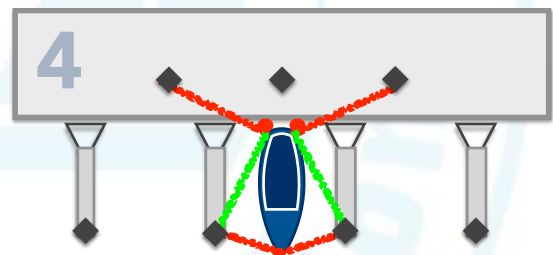
Usually there is a lazy-line secured to an underwater mooring. The lazy-line is **picked up from the shore side** on arrival and **led to bow (or stern, depending on how you want to dock)** and **fixed from the open water side**. Twin moorings secure the boat.

BOW/STERN

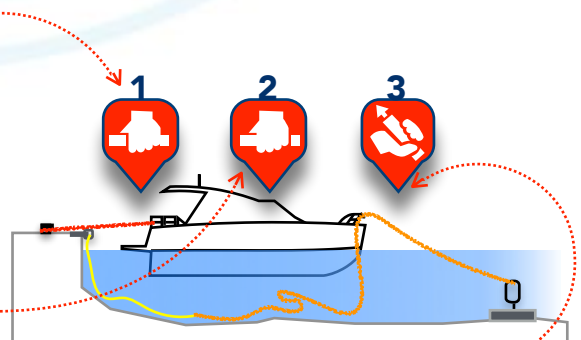


To berth with your bow or stern you will need to attach the boat to the docking buoy (if there is one) or to use your anchor to stabilize the boat.

FLOATING DOCK



Modern marinas offer platforms or ramp supported by pontoons that are called floating docks. They allow a convenient berth. ramps are usually shorter than the boats. Use spring in order to prevent the boat of hitting the bulkhead.



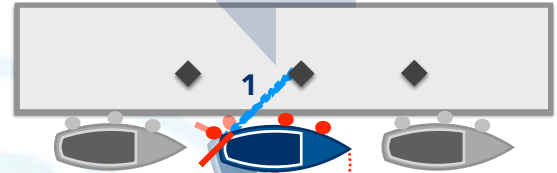
LEAVING THE DOCK

1
WIND



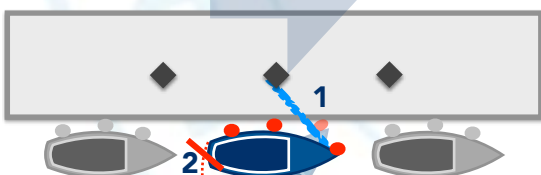
- (1) Remove all lines except the **stern line**.
- (2) The bow will be blown away.
- (3) When clear, **shift forward** and remove the stern line.

2
WIND



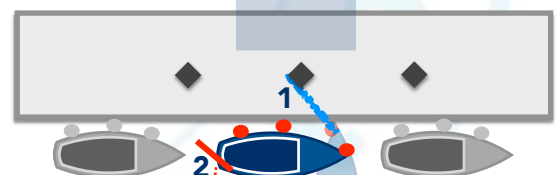
- (1) Move a **fender to stern** and remove all lines except the stern spring.
- (2) **Turn** as if You wanted **to leave** (steering wheel to starboard), **go into reverse** and wait for the stern to reach 45-60 degrees from the dock.
- (3) **Engage neutral**. Wait, adjust the steer for going reverse
- (4) **Engage reverse** and back off at possibly slow speed (depending on tide and wind).

3
WIND



- (1) Move a **fender to bow** and remove all lines except the **bow spring**.
- (2) **Turn** the boat as if You wanted **to hit the dock** (steering wheel to port), **shift forward** and wait for the stern to be put away.
- (3) **Engage neutral**. Prepare the steer for reverse gear.
- (4) **Remove the bow spring and go reverse**. Bear in mind the prop kick.

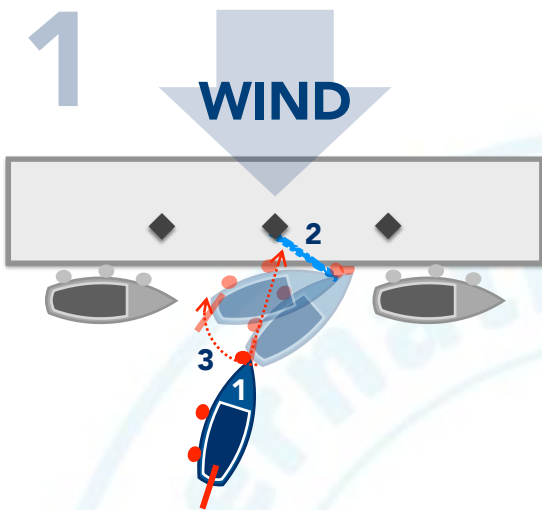
4
WIND



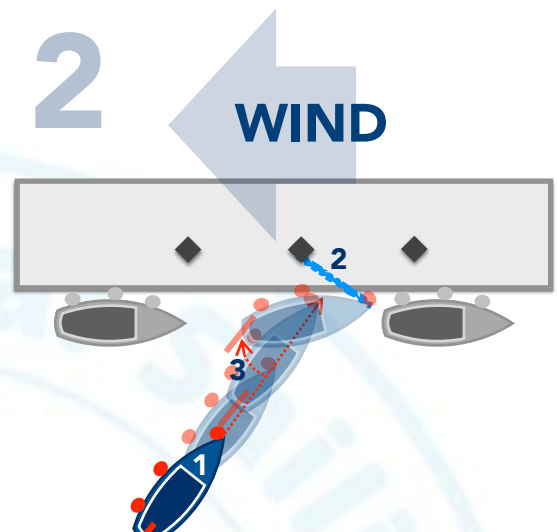
- (1) Move a **fender to bow** and remove all lines except the **bow spring**.
- (2) **Turn** the boat as if You wanted **to hit the dock** (steering wheel to port), **shift forward** and wait for the stern to be perpendicular to the dock.
- (3) Remove the bow spring and **go into reverse as far as possible**. **Bear in mind the prop kick**.

Handling Yacht Under Power

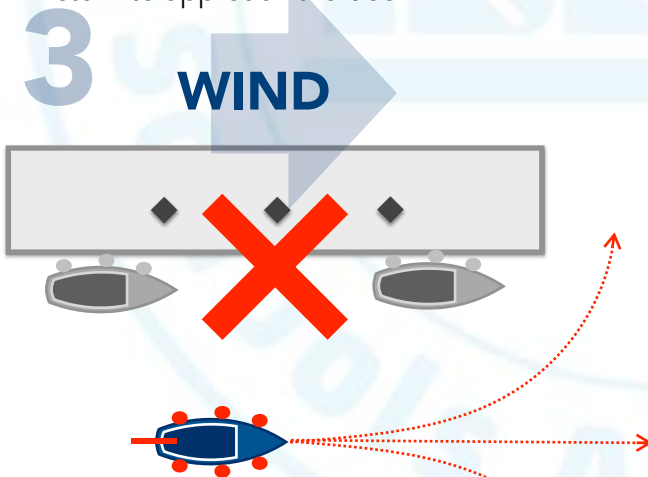
ARRIVAL AT THE DOCK



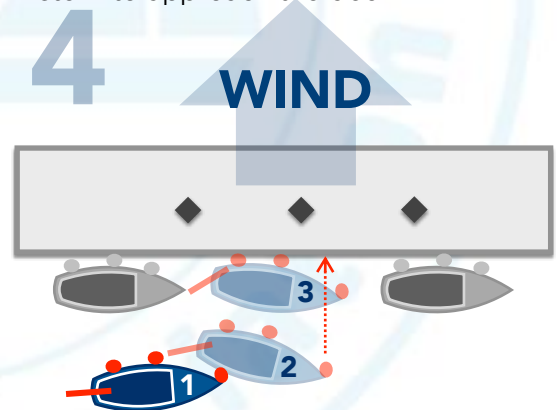
- (1) Come into the dock on a **wide angle**, targeting the **middle of the spot** to berth, watch your speed and move a **fender to the bow**.
- (2) **Fix the bow spring**.
- (3) **Turn** as much as possible **to starboard**. Keep the **forward** gear. Wait for the stern to approach the deck.



- (1) Come **into** the dock on a **gentle angle**, targeting **ahead** the spot to berth, watch your speed and move a **fender to the bow**.
- (2) **Fix the bow spring**.
- (3) **Turn** as much as possible **to starboard**. Keep the **forward** gear. Wait for the stern to approach the deck.



- **Avoid berthing with wind behind you** and carefully look for some other place in the marina.
- Or **alternatively** you can **turn the boat around** and approach the berth.
- When approaching the marina prepare your **fenders on both sides** of the boat.
- Move slowly and **make a reconnaissance**.
- You don't have to dock at once. It's not a race.



- (1) **Approach** the dock at a gentle angle, moving **almost parallel to the berth**.
- (2) **Stop** in the front of the place selected for berth **with the bow a bit to the wind**.
- (3) **Wait** until the **wind pushes the boat** into the berth.

Meteorology

Inshore Skippers should principally have meteorological information about their local sailing area (coastal sailing). This is mainly the daily forecast, but can also be extended to a week-long, regional or global forecast. In general, the skipper would want information on the following:

- Wind Strength
- Wind Direction
- Precipitation
- Sea State
- Air Pressure
- Temperature
- Cloud Cover
- Seasonal Changes

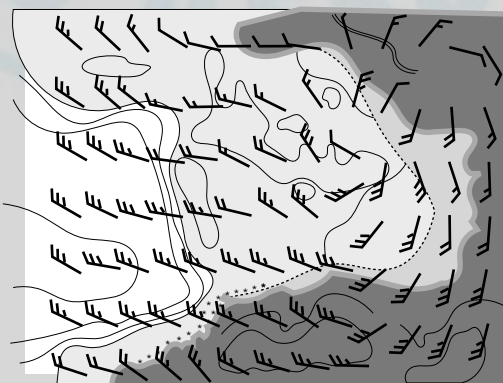
WEATHER FORECASTS

Weather forecasts are essential in planning a safe passage. They are available from a variety of sources.

- Internet
 - ▶ windguru.cz
 - ▶ weather4D.com
 - ▶ windy.com
 - ▶ GRIB Files
- Navionics™
- Local Radio
- National Radio (Shipping forecast)
- Marina Office
- Appropriate National Meteorological Offices
- INMARSAT
- NAVTEXT



GRIB FILES are the standard data format of the World Meteorological Organization. They are available to download and contain raw data based on the world's collected meteorological information.



The direction of the arrows corresponds to the direction of the wind.

- = 5kn
- = 10kn
- = 15kn
- = 20kn

FORMAT OF SHIPPING FORECAST

Shipping forecasts are issued daily by the UK MET Office at: www.metoffice.gov.uk/public/weather/marine and broadcast on BBC Radio 4 and other local, mainly national radio stations, usually few times a day. They use a specific format and terminology that skippers should know. The information is most commonly issued in the following order:

1. Gale Warning,
2. General Synopsis,
3. Sea Area Forecasts
4. Weather – Wind – Visibility
5. Coastal Station Reports
6. Wind
7. Significant Weather
8. Visibility in miles or meters
9. Pressure
10. Tendency

TERMS USED IN THE FORECAST

WIND

Veering Wind: Wind is changing its direction and is moving clockwise from 0°.

Backing Wind: Wind is changing its direction and is moving anti-clockwise from 359°.

Cyclonic: Considerable change in wind direction as a depression passes through an area.

TIME

Imminent: Within 6 hours from the time of issue.

Soon: Between 6-12 hours from the time of issue.

Later: More than 12 hours from the time of issue

VISIBILITY

Good: More than 5 miles.

Moderate: Between 2-5 miles.

Poor: Between ½ mile – 2 miles.

Fog: Less than 1000m.

SEA STATE

Smooth: Wave height is less than 0.5m.

Slight: Wave height is between 0.5m – 1.25m.

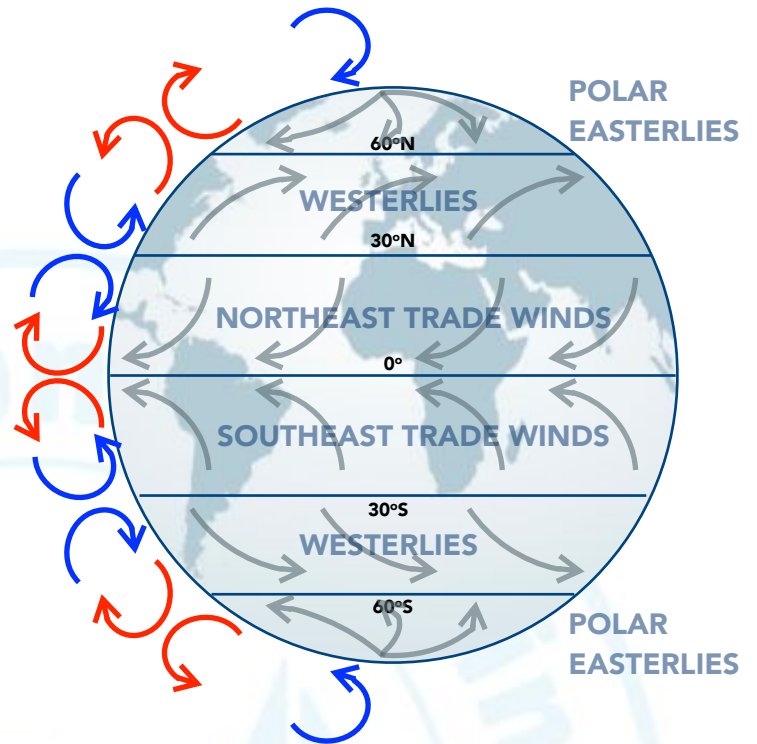
Moderate: Wave height is between 1.25 – 2.5m.

Rough: Wave height is between 2.5m – 4m.

Very Rough: Wave height is greater than 4m.

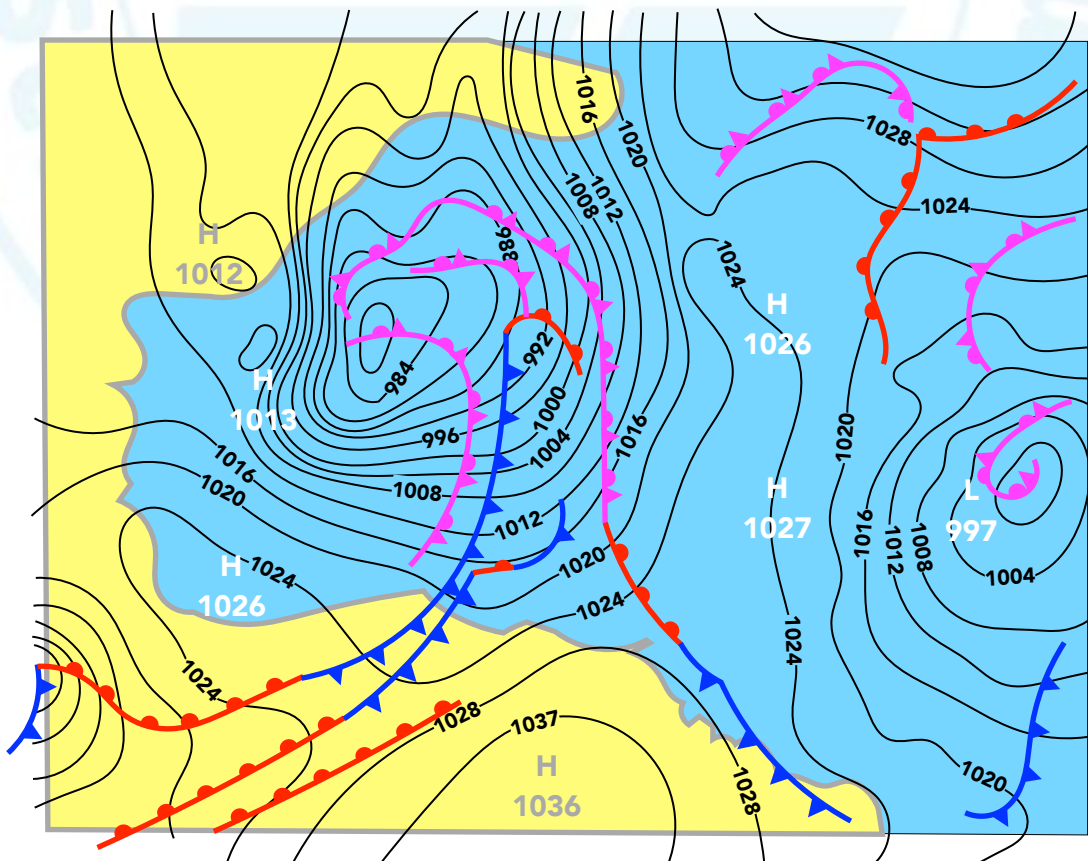
CORIOLIS EFFECT / GLOBAL WIND PATTERNS

The Earth is constantly rotating about its own axis, completing one revolution in 24 hours. This spinning causes anything which moves freely over the Earth's surface to be deflected to the right of its path in the northern hemisphere and to the left in the Southern hemisphere



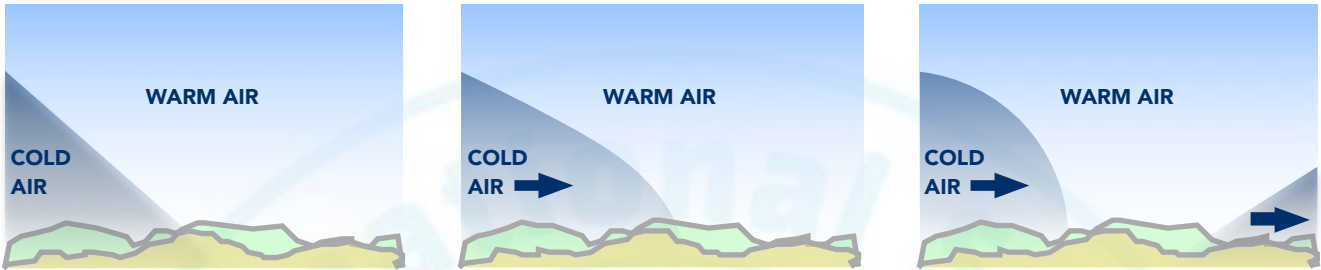
SYNOPTIC CHARTS

Synoptic charts are maps overlaid with meteorological information pertaining to air pressure and fronts. Lines of equal air pressure (isobars) indicate areas of high or low pressure, whilst red lines indicate warm fronts and blue lines indicate cold fronts.



FORMATION OF A DEPRESSION

Changes in weather are caused by the interaction of cold and hot air masses.

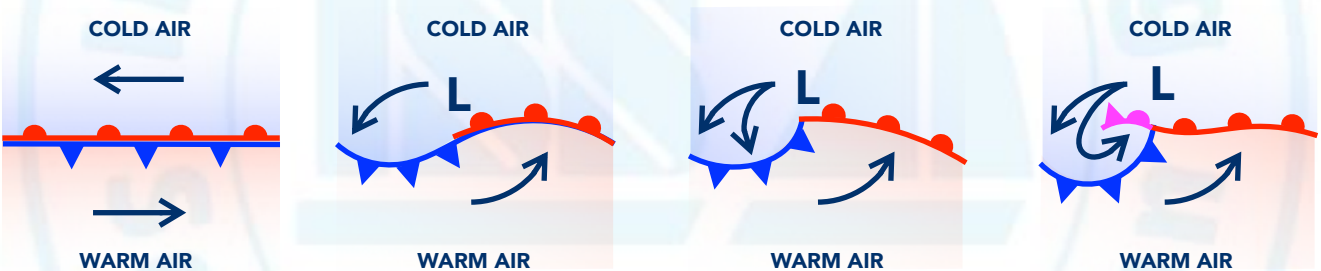


When they meet they do not mix. The cold air moves below the hot air as it is denser.

As the cold front advances it undercuts the hot air, moving it towards the centre of the depression.

The cold front moves quicker than the warm front and will soon develop into an occluded front.

Viewed from above, the development of a front looks like this:

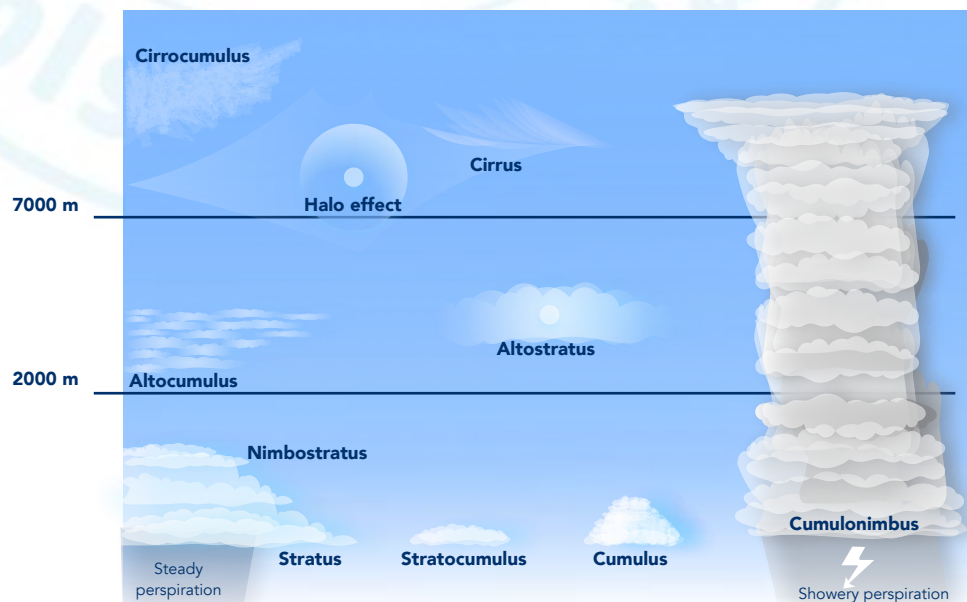


The rotation of the earth causes depressions to develop in a counter-clockwise fashion in the Northern Hemisphere

TYPES OF CLOUDS

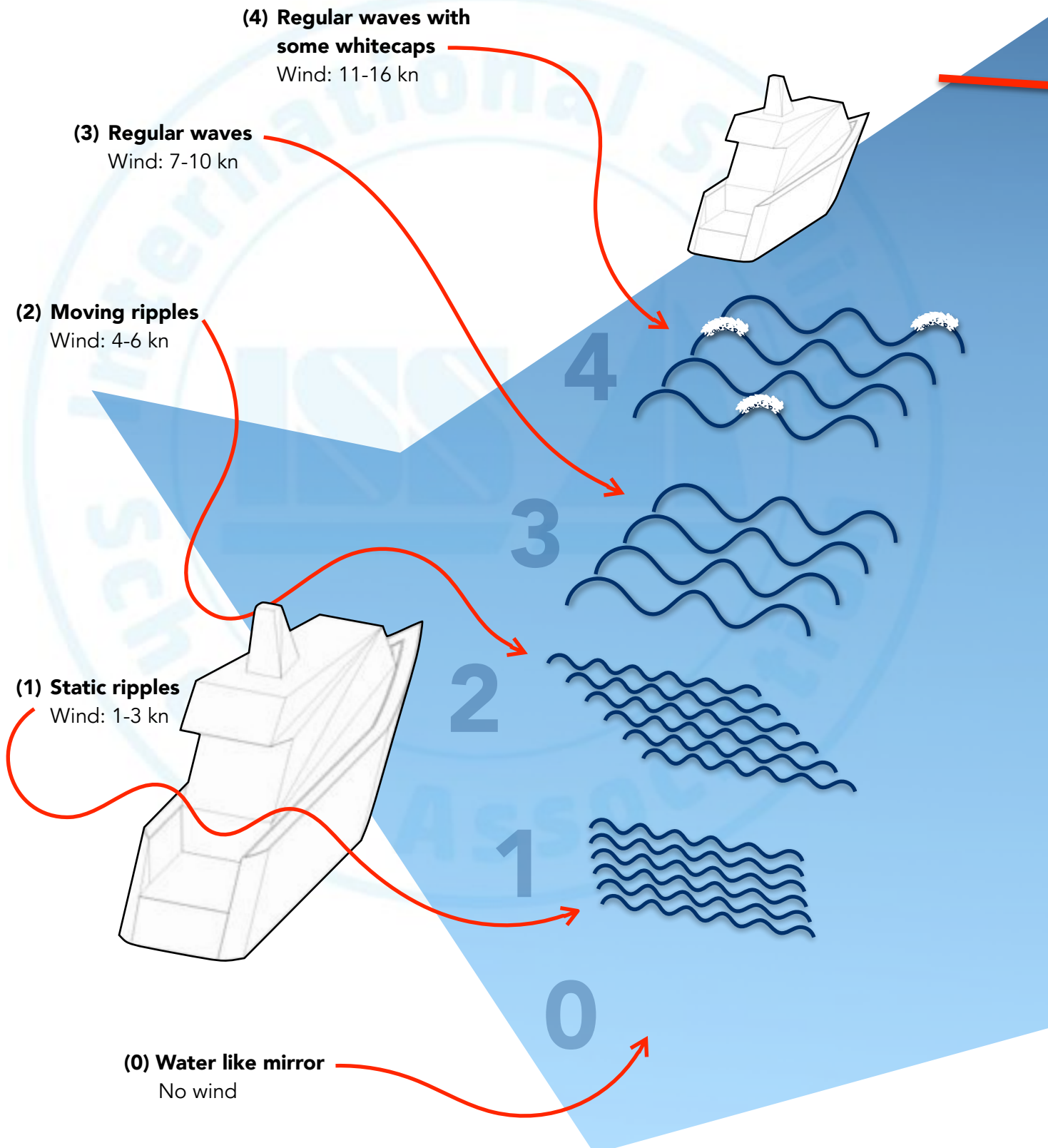
Clouds are formed by the condensation of water in the atmosphere.

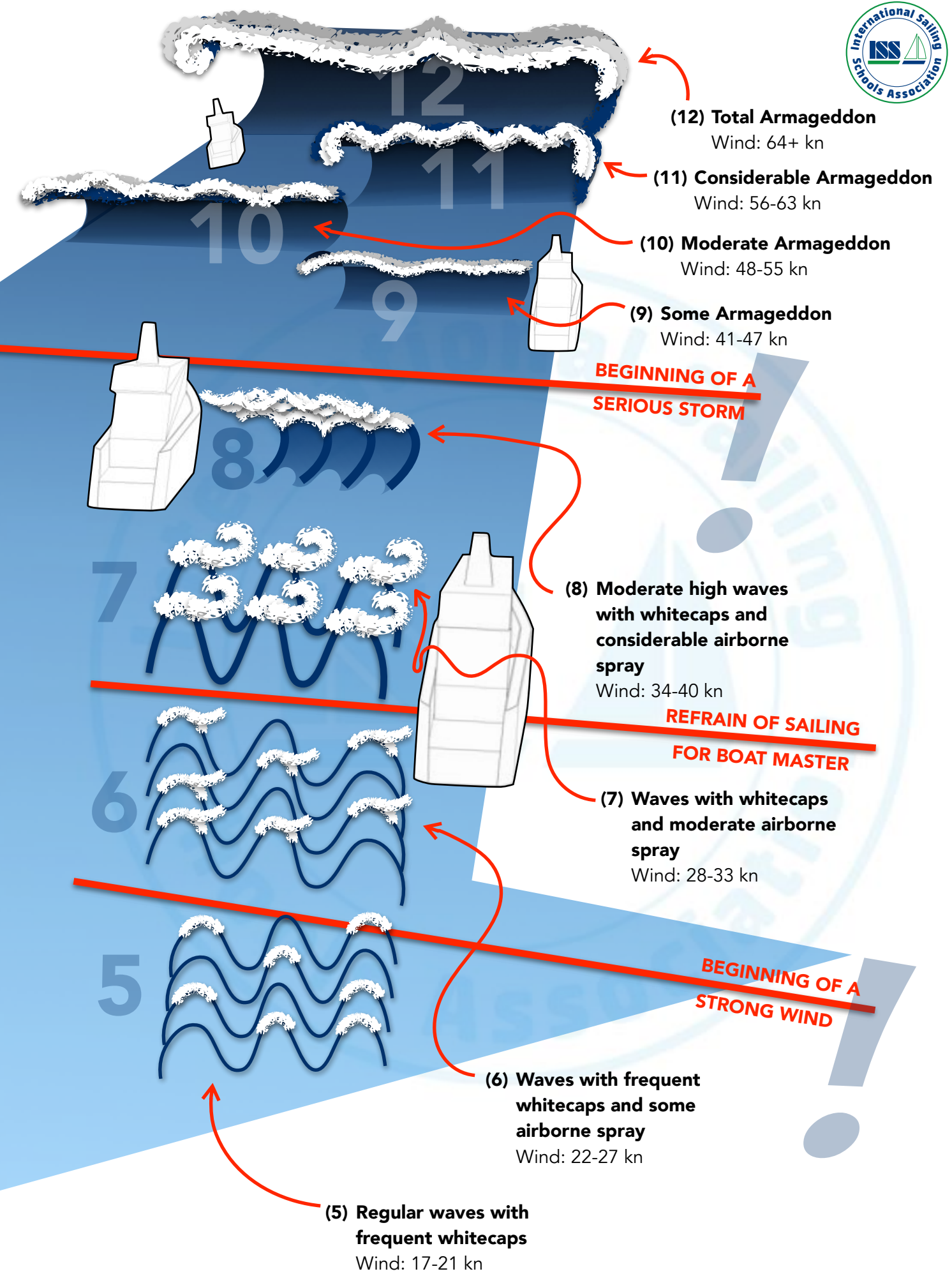
The height of cloud determines its shape and its risk of precipitation.



BEAUFORT SCALE

Beaufort scale is an empirical measure that relates wind speed to observed conditions at sea or on land.





TEST QUESTIONS

1 You see a **RED rocket** flashing in the sky. What does that mean?

- A It's a distress signal
- B There is a party
- C It does not mean anything



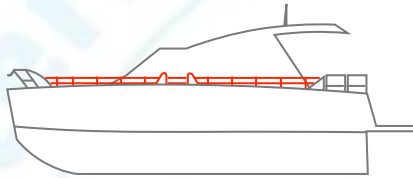
2 What is the difference between a Life Jacket and a **Personal Floatation Device (PFD)**?

- A None. Those are alternatives.
- B There is no such a thing as a PFD
- C PFD will not keep the unconscious person's head above water.



3 Name the **part** of the yacht marked in red

- A Bow pulpit
- B Guardrail
- C Water line



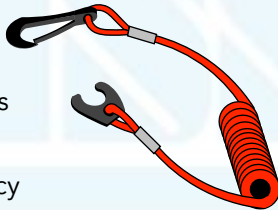
4 What **color** is the light indicated in the drawing with a question mark?

- A White
- B Red
- C Green



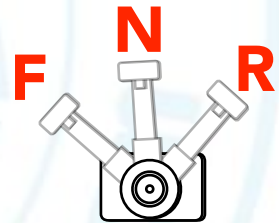
5 What is it?

- A Type of key ring - secure fastening for the yacht keys
- B Kill cord used to turn off the engine in an emergency
- C One of the electrical cables attached to the battery together with the terminal



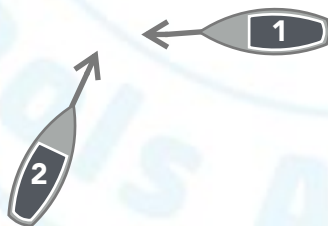
6 At **what gear** do you **start** the engine?

- A Forward
- B Neutral
- C Reverse



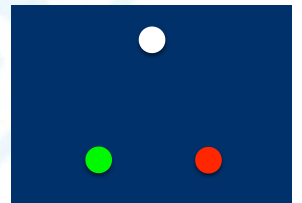
7 Which one is a **give way** vessel?

- A 1
- B 2
- C None of them



8 You see **those lights** while sailing at night. What do they mean?

- A Sailing vessel on anchor
- B Lighthouse
- C Power vessel approaching



9 What is the **most important piece of advice** for the skipper **in the MOB situation**?

- A Keep calm and go get him fast.
- B Don't worry. Close to shore waters are mostly shallow, warm and safe. He'll be fine.
- C Mind the wind direction.

10 What is the name of the following cloud?

- A Cirrus
- B Altocumulus
- C Nimbostratus
- D Cumulonimbus

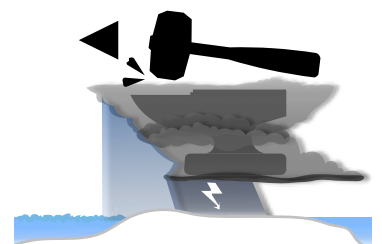


CHART SYMBOLS

All Charts contain symbols that are internationally standardised. Though you should be familiar with commonly used symbols and light signatures, the sheer number of symbols makes it impossible to remember them all.

The **5011 Chart Symbols and Abbreviations** is one of the most important documents a navigator has. It is used to decipher the various symbols found on a nautical chart. It is also available as an App for phone or tablet.

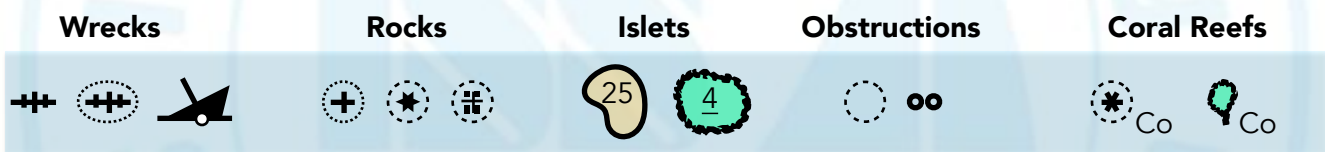
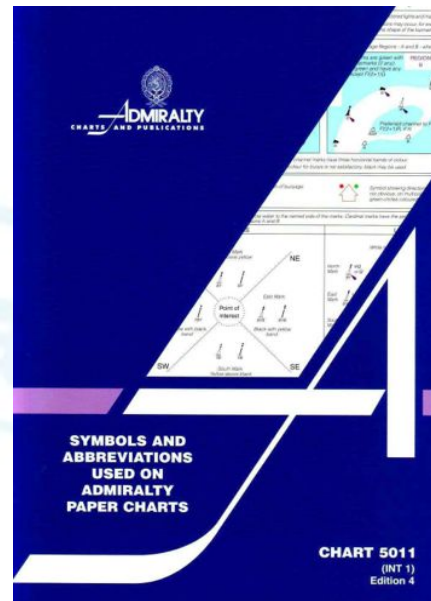
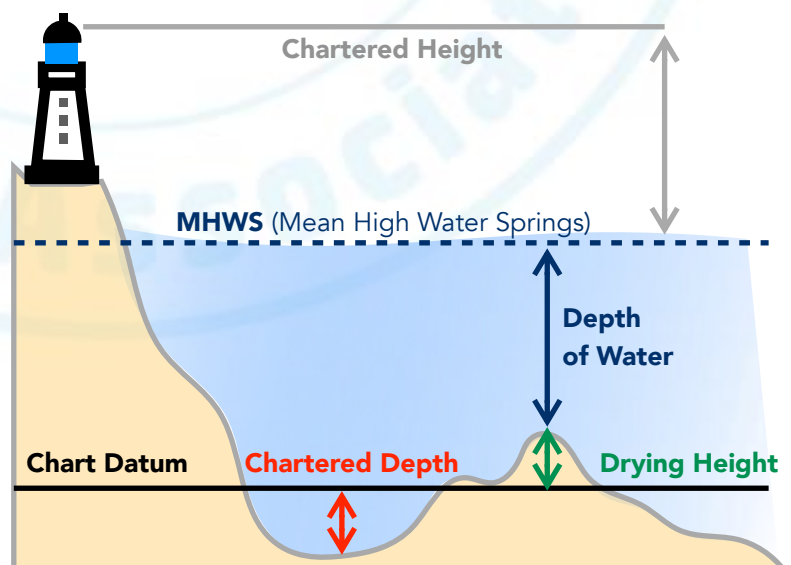


CHART DATUM

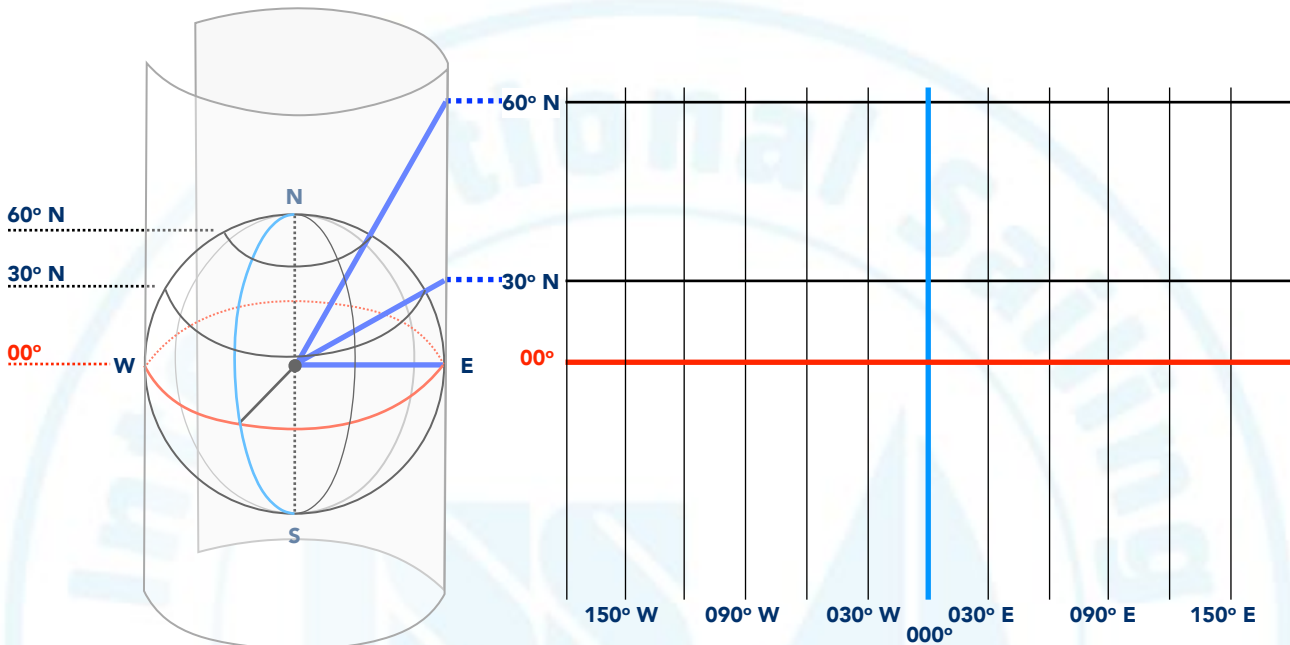
Chart Datum is the reference point for all depths on a chart. It can be the lowest astronomical tide on record – the theoretical minimum. On some charts however, it is the mean lowest low tide – the average of the lower of the two low tides in a day. As this is not the theoretical minimum, it is important to know what your chart datum is set to, to avoid running aground.

The zero contour line is the line between Drying Height and Chartered Depth.



MERCATOR PROJECTION

Projections are a means of representing a 3D object on a 2D surface.



- Project light from the center of a sphere onto a cone.
- Most commonly used with large scale maps.
- **Advantage** is a straight line will always be at the same heading.
- **Disadvantage** – A straight line may not be the shortest route over long distances and as you near the poles.
- Transverse for long coastlines North to South.

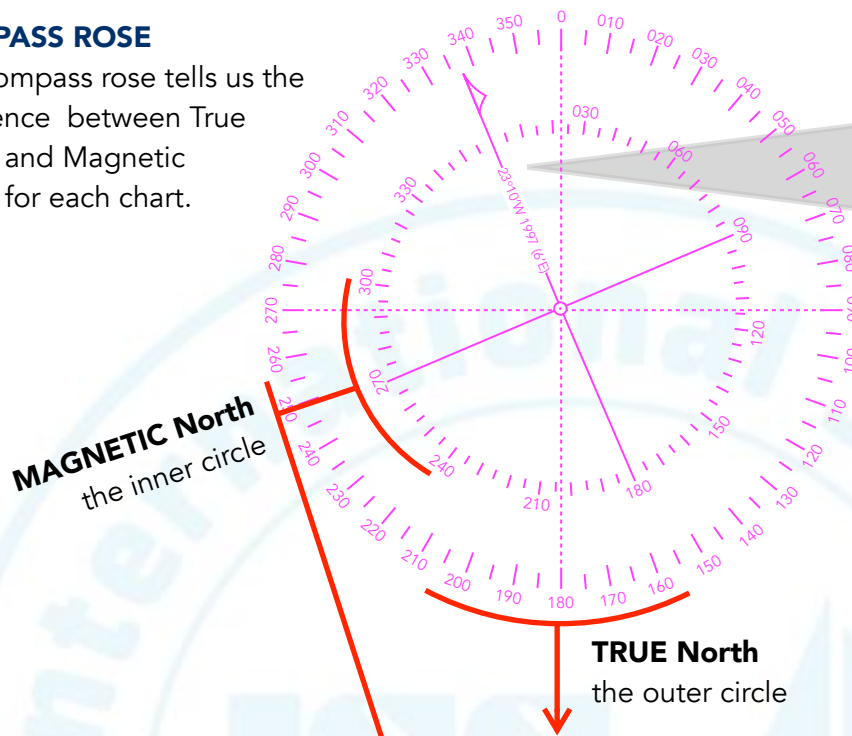
HORIZONTAL DATUMS

Over time cartographers have been busy producing their own charts. This has made any type of conformity very difficult and hundreds of datum points are in existence. The standard datum **WGS 84** was finally adopted and all UKHO and Imray charts now use this datum (or one that is compatible).

Check charts when taking over a vessel and if necessary make the appropriate adjustments on the GPS for the chart.

COMPASS ROSE

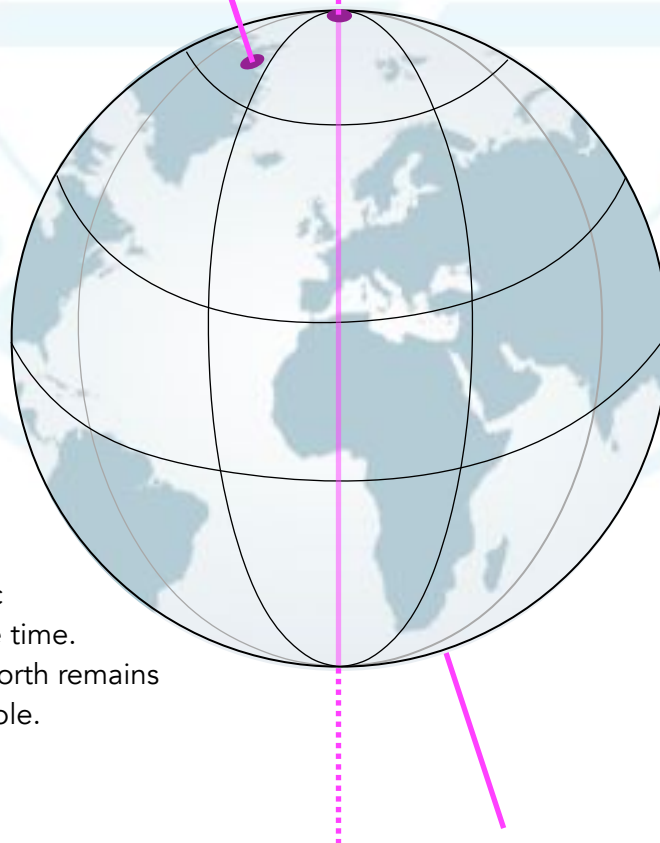
The compass rose tells us the difference between True North and Magnetic North for each chart.



In **1997** the difference was **23°10'W**.
Every year since then, the Magnetic North moves **6'E**.

MAGNETIC VARIATION

The difference between True North and Magnetic North is called **Variation**



The origin of Magnetic North is moving all the time. The location of True North remains the same: the North Pole.

You must factor this **VARIATION** into your navigational calculations in order to be accurate.

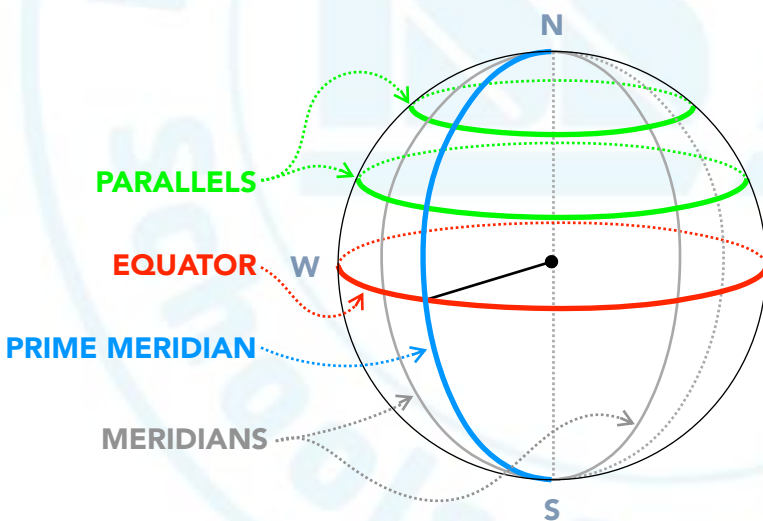
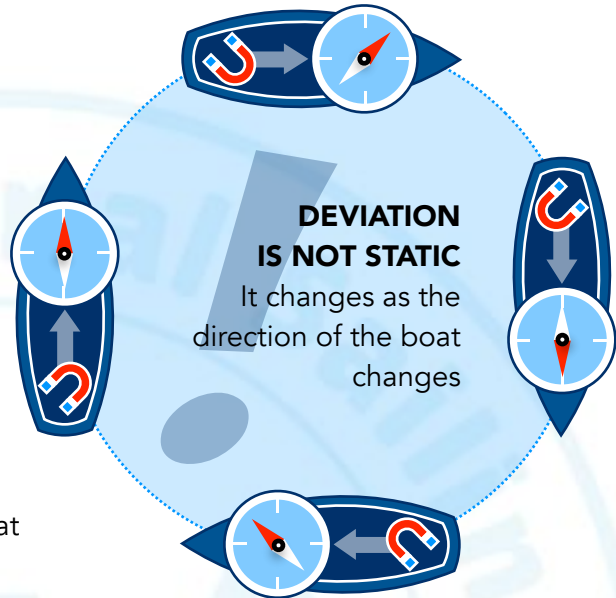
Navigation

DEVIATION

Deviation is caused by ferrous objects and materials on the yacht which affect the compass. It can be caused by the following objects:

- Engine
- Steel Emergency Tiller
- Binnacle Mounting
- Electric and Electronic Components and Wiring
- Radios
- Cockpit Speakers
- Binoculars

Deviation can be plotted onto a graph or chart that enables us to know the amount on each heading, and correct our route accordingly. This is known as a **Deviation Table**.



THE GLOBE

The globe is a ball, just under 13,000 km in diameter. The ball is actually slightly squashed but this distortion is so small that for many practical purposes we can simply ignore it.

Thus we can visualise the globe as a perfect sphere, whose surface is covered by an invisible grid of lines.

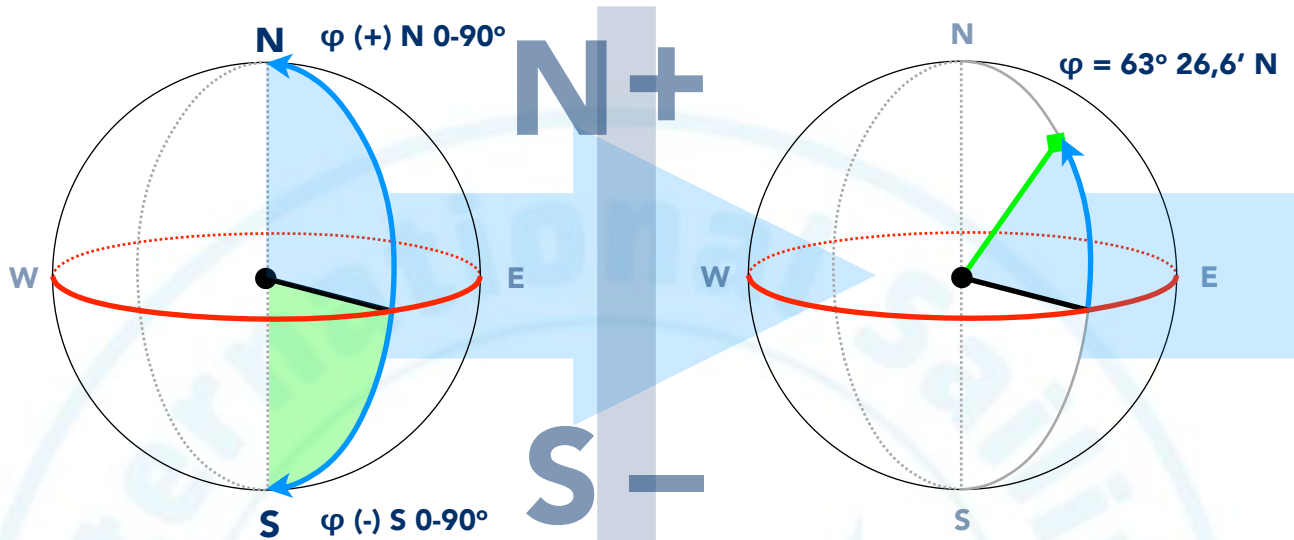
MEASUREMENTS

1° = 60' = 3600" → POSITION
 1 degree 60 minutes 3600 seconds

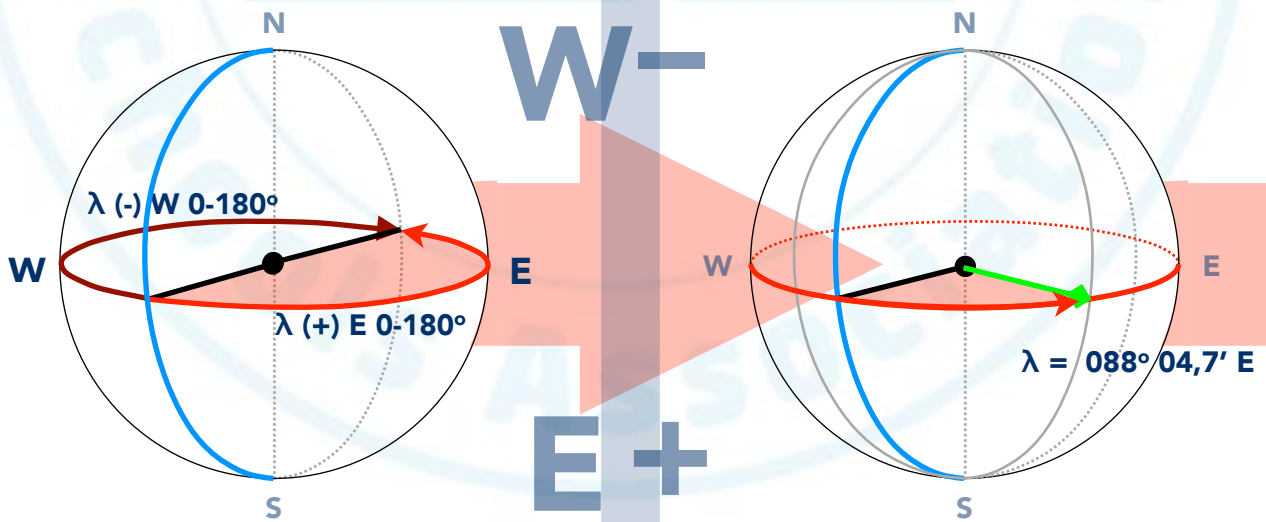
DISTANCE 1' = 1 NM = 1852 m →
 1 minute 1 nautical mile **ON EVERY MERIDIAN**

SPEED 1 kn = 1 nm/h →
 1 knot 1 nautical mile per hour

LATITUDE



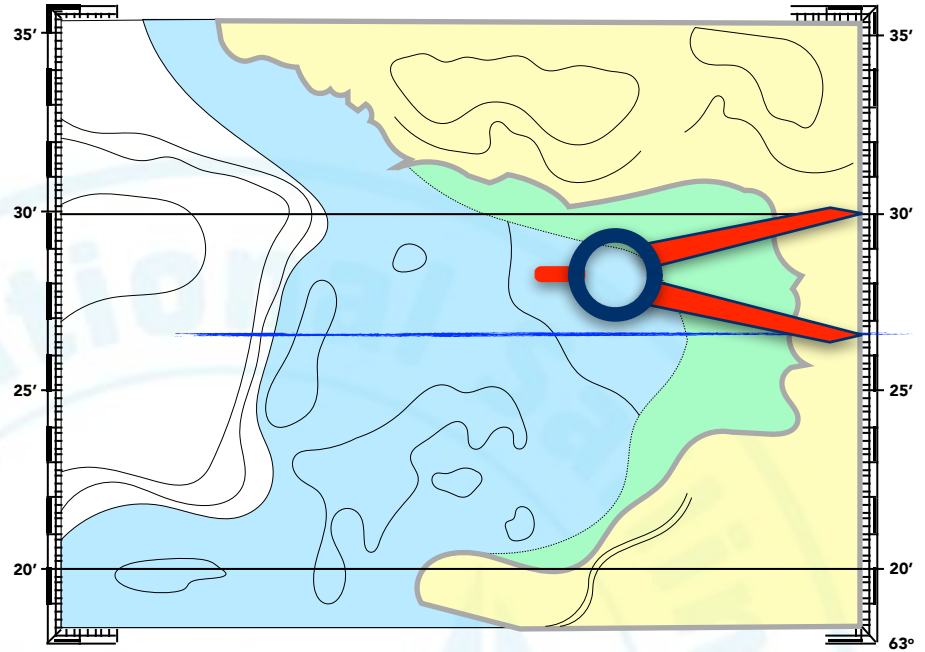
LONGITUDE



NEWS
+ + - -

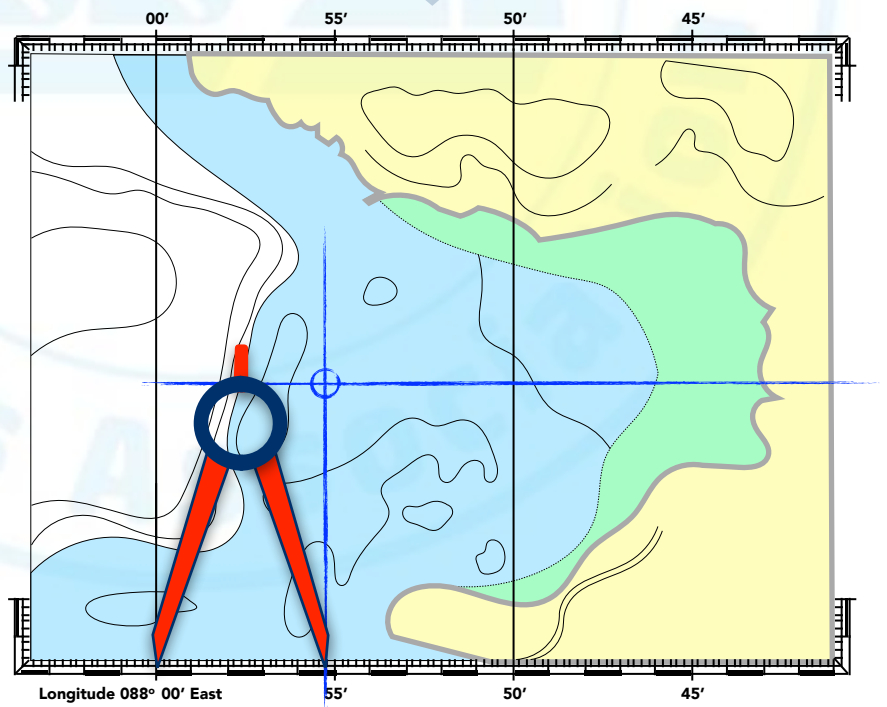
LATITUDE

Latitude scale
used for
measuring
distance and
position



LONGITUDE

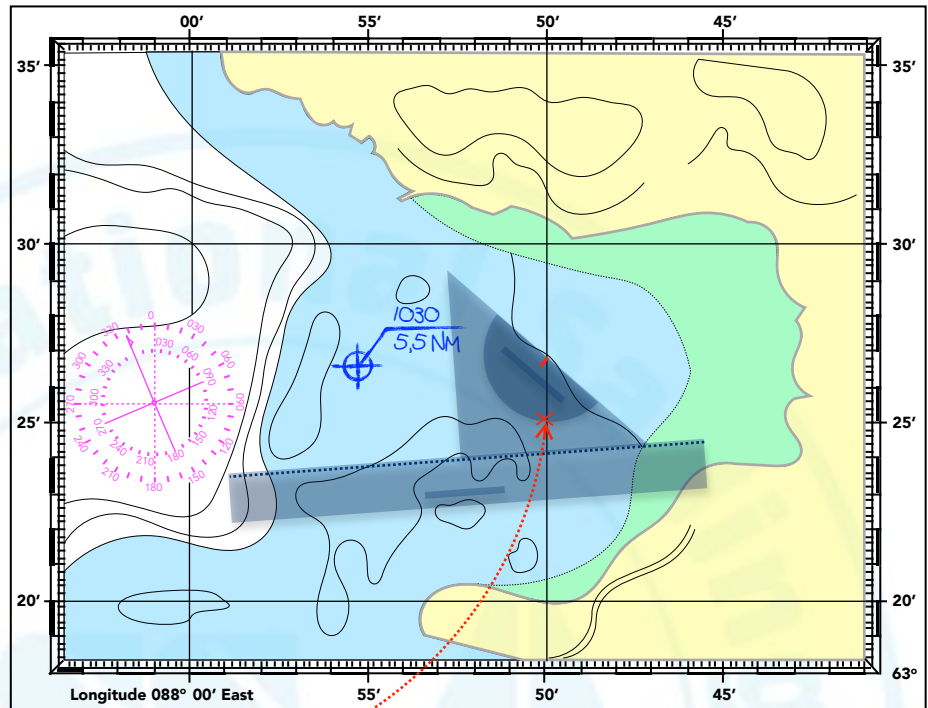
Longitude scale used for
position only,
do not use
to measure
distance.



PLOTTING THE COURSE

In maritime navigation direction (course) is plotted on the map as a straight line passing through the two points. That direction is determined by the angle between the direction of the north and the direction of the line. You plot your course using navigational triangle.

Always place the triangle with its right angle towards You as reading always faces this angle.

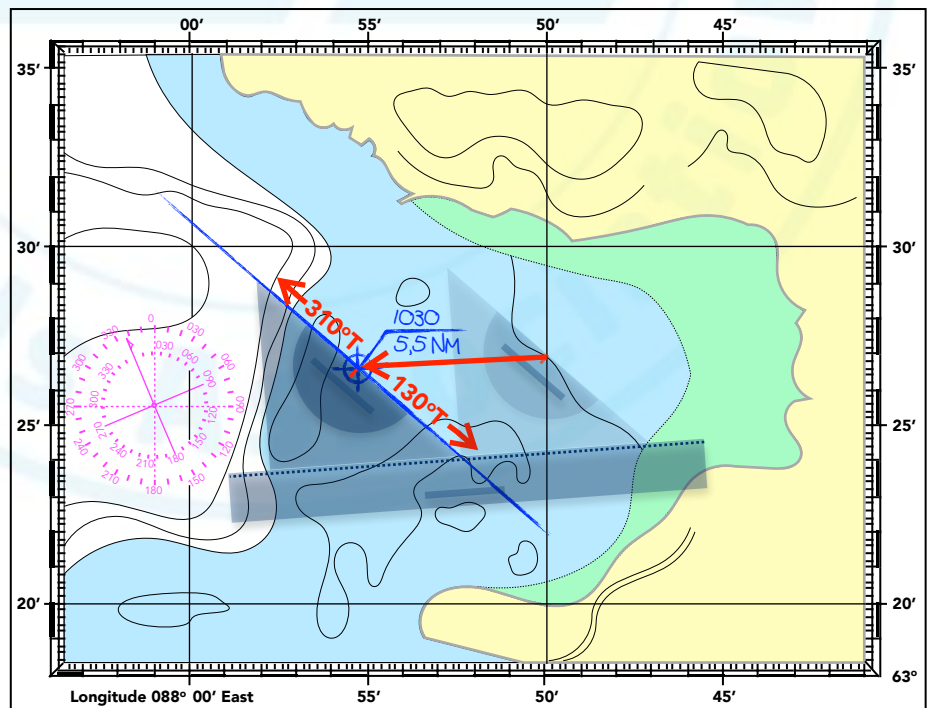


To the right of the meridian courses are from 0° to 180° (the triangle exterior scale), and to the left of the meridian are courses from 180° to 360° (the triangle internal scale).

Remember:

Draw the course line (T°) after taking into consideration:

- Variation
- Deviation
- Leeway



Position Fixing

QUICK REMINDER

Variation and deviation effect steering compasses. Handheld bearing compasses are only subject to variation



CONVERTING

Use these mnemonics to convert compass to true and vice versa.

CADET = From COMPASS TO TRUE we ADD EAST (or – West)

TAWC = From TRUE TO COMPASS we ADD WEST (or – East)

METHODS OF POSITION FIXING

- ▶ Line of Position
- ▶ Depth and Bearing
- ▶ 2 Point Fix
- ▶ 3 Point Fix
- ▶ Dead Reckoning
- ▶ Estimated Position
- ▶ Estimated Position with Leeway
- ▶ GPS Fix
- ▶ RADAR Fix
- ▶ Plotters and Overlay Radar
- ▶ Buoy (IALA)

The **accuracy** of your FIX **increases** as we move **down the list**. As Inshore Skippers you are expected to use a range of these methods to establish your location.

1

LINE OF POSITION

Line of Position involves taking one fix on a stationary object.



TRANSIT



Nearing the TRANSIT.
Turn to STARBOARD.



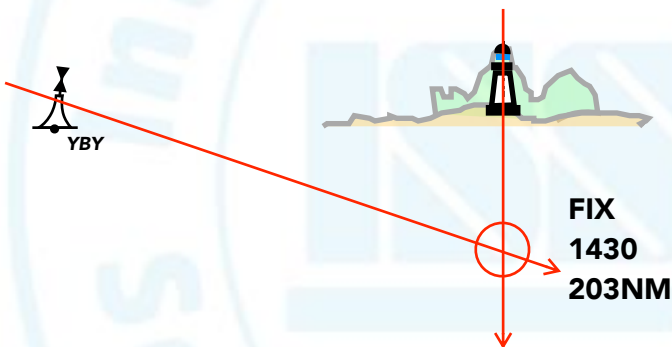
On the TRANSIT.
LINE OF POSITION
confirmed.



Passed the TRANSIT.
Turn to PORT.

TRANSIT & BEARING

You can combine a TRANSIT with a LINE OF POSITION to improve its accuracy.



Step 1:

Keep the mountain and lighthouse in transit.
Draw this line on the chart.

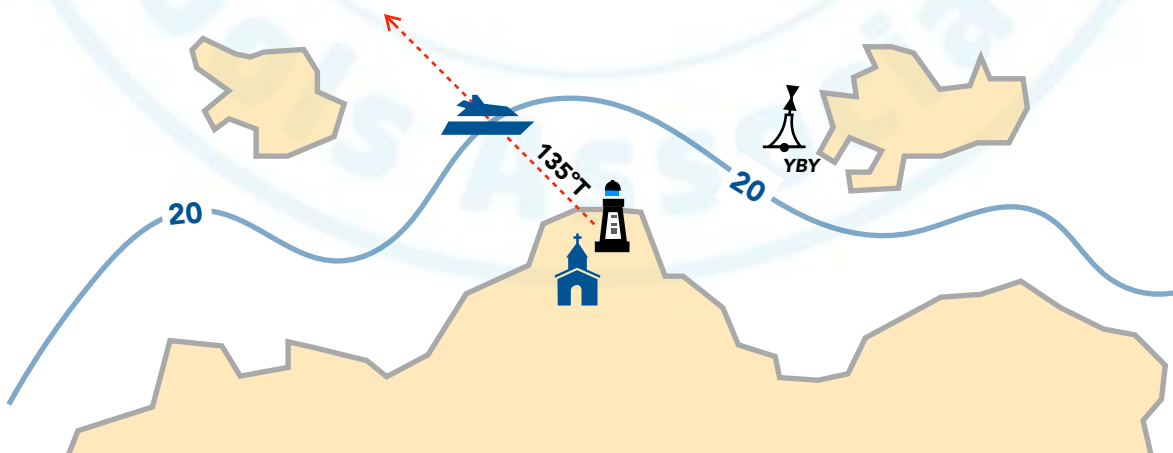
Step 2:

Add another bearing using the West Cardinal mark, giving you your location along the transit line.

2

FIX WITH DEPTH AND BEARING

Another way we can confirm our position with some degree of accuracy is by using our depth sounder.



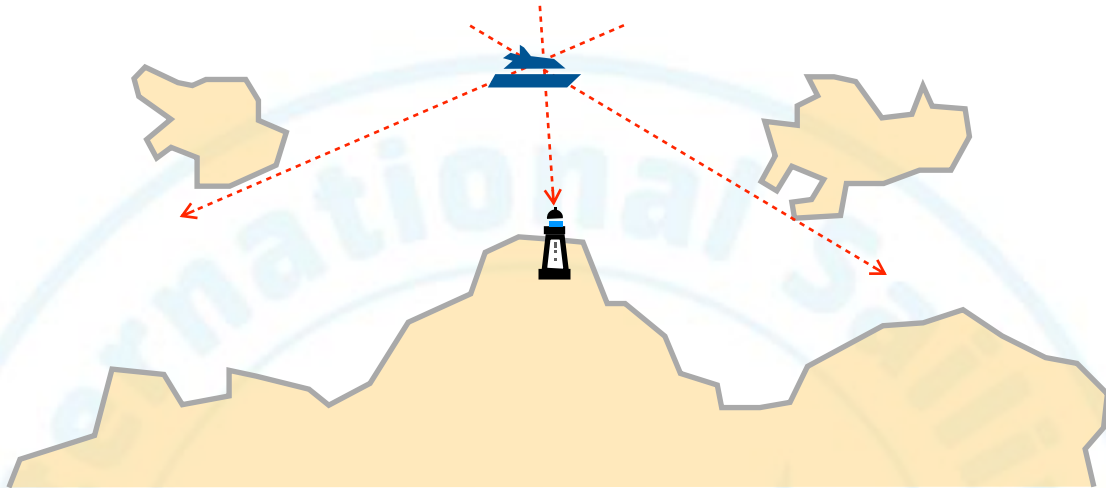
1415 Lighthouse at 135°T Depth 20m

Take a bearing on an object, and use the depth contours on the chart to confirm your location.

3

THREE POINT FIX

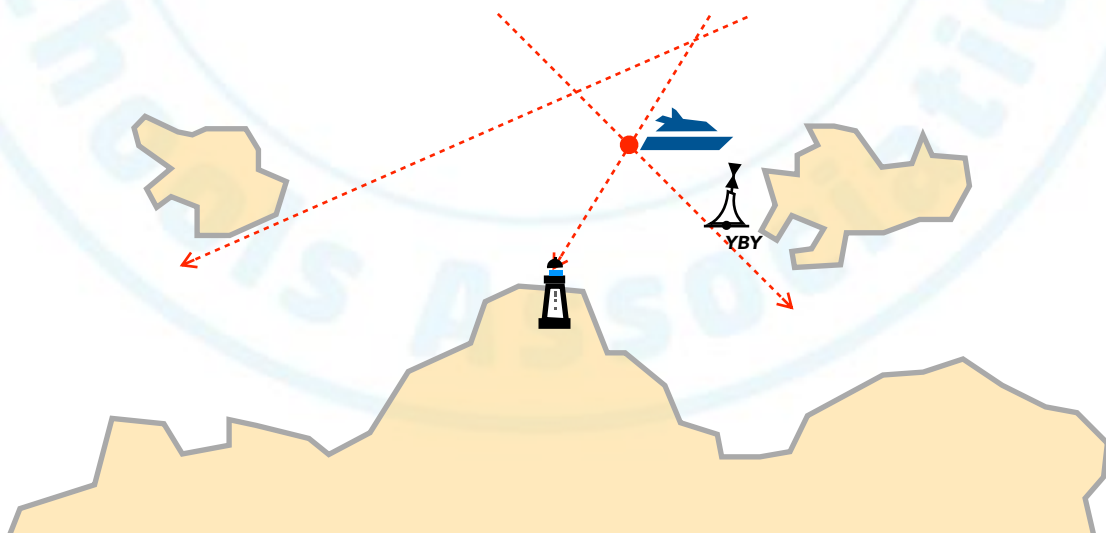
A Line of Position doesn't give your exact position, just a position on a line. So take three bearings to improve your accuracy.



This is called a Three Point Fix

Your Three Point Fix may not always be entirely accurate. This can be caused by inaccurate readings on the compass, or taking too long

to sight your bearings. If it isn't accurate you will end up with a triangle where our lines of sight meet. This is called a **cocked hat**.





Passage Planning

APPRAISAL

Creating a detailed mental and chart-based model of how the voyage will proceed. Gather and consider all relevant information: charts, weather, tides, almanacs etc.

PLANNING

Pre-departure Checks

Produce a detailed plan of your route on your chart, plotter or iPad, factoring in the weather, tides, buoyage, pilotage and Plan B. Communicate this to your team.

EXECUTION

Leaving Harbour A

Pilotage

Arrival at Harbour B

It is the skipper's responsibility to treat the plan as a "Living Document". Delegate roles to the crew and execute the intended plan accordingly.

MONITORING

DRs, EPs, Fixes

Regular checks and monitoring of the progress of the vessel along its planned route. DRs, EPs, Ship's Log, fixes, updating the chart. All crew must be able to confirm their location.



PLANNING YOUR PASSAGE

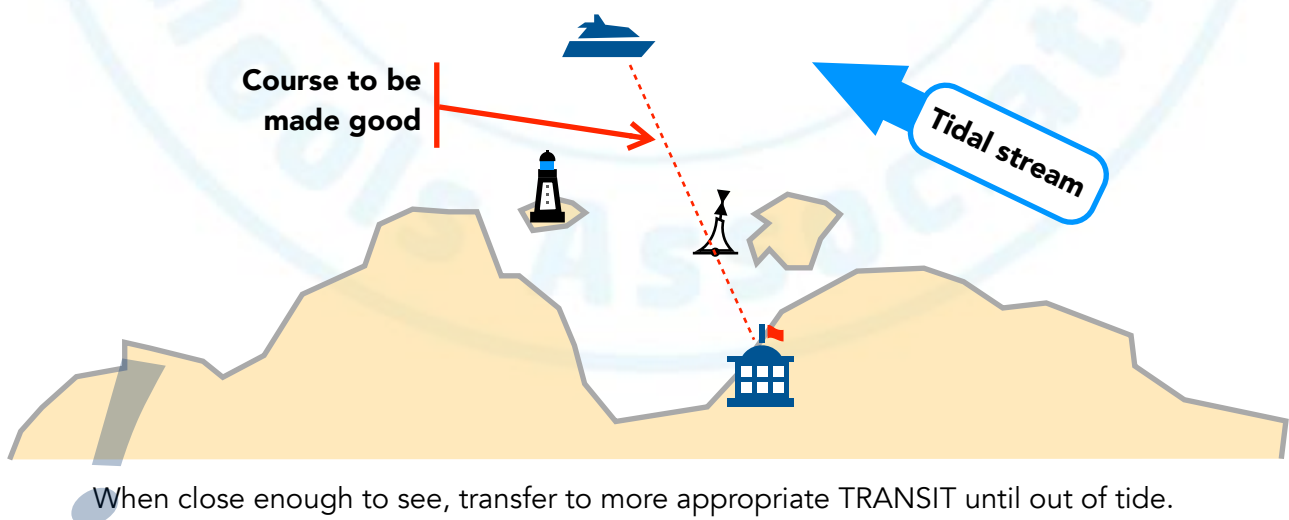
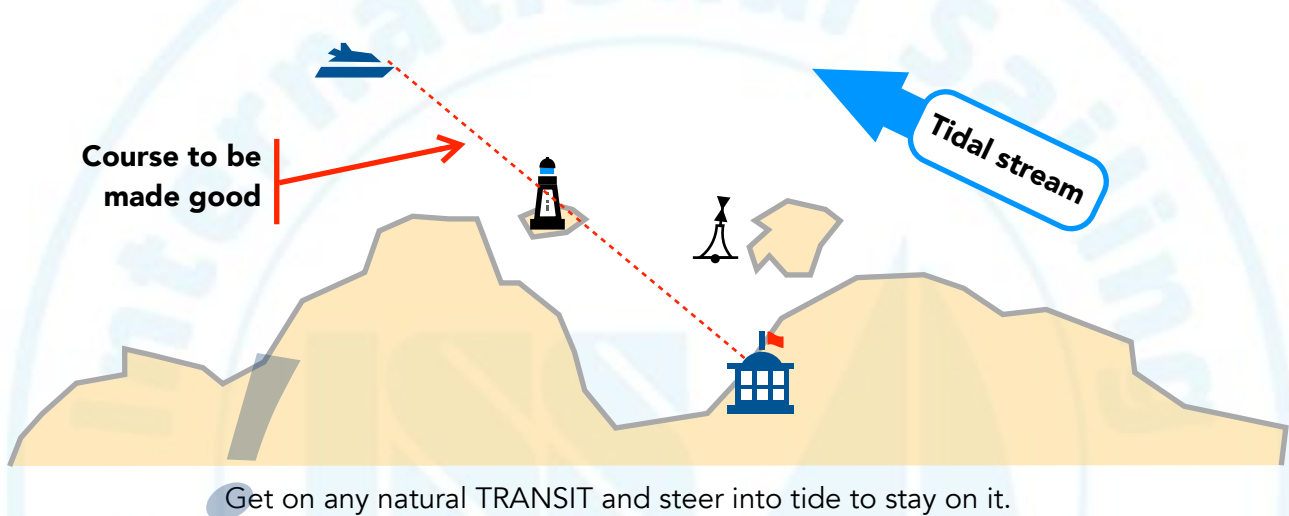
As Inshore Skippers it is your legal and moral obligation to plan your passage well in advance. A good skipper should:

- **Organize crew** – How many, how experienced, strengths and weakness?
- **Study the weather** – Seasonal changes, what is to be expected?
- **Navigation Equipment** – Charts, Navionics, pilot books, almanacs, tidal atlases.
- **Plan B** – A second option in the event of an emergency.
- **Victualing** – Organise sufficient food and provisions for the crew and the length of trip.
- **Boat Checks** – Ensure the boat is in good working order and that you carry spares.
- **Communications** – Internet, radio, EPIRB, SART, VHF, mobile phones, batteries.
- **Dangers** – Be aware of potential threats to the boat.

2 EXECUTION

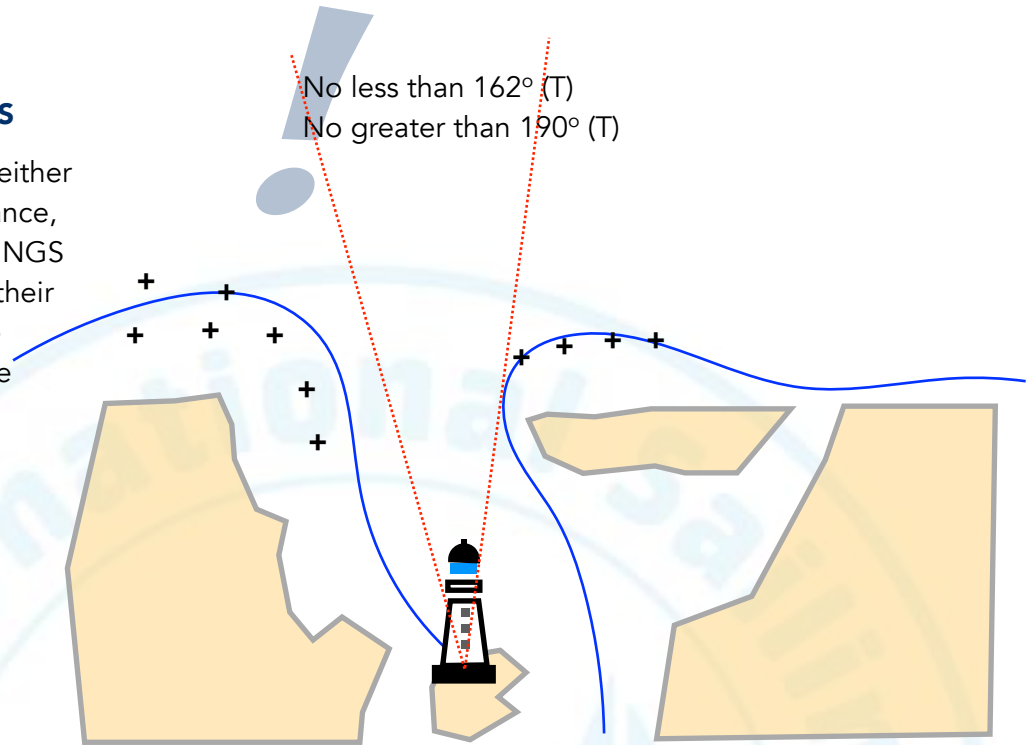
COURSE SHAPING

When entering or leaving a PORT or HARBOUR, the tide may alter your course. Use a **TRANSIT** to ensure you stay on course.



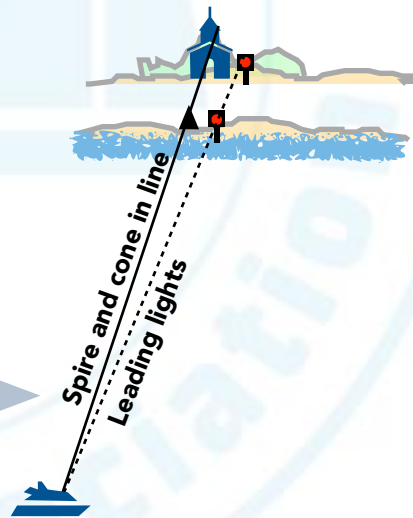
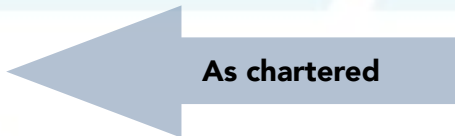
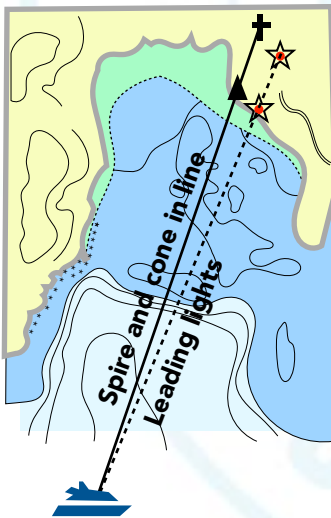
CLEARING BEARINGS

If there are HAZARDS either side of a channel entrance, take CLEARING BEARINGS to avoid crossing into their path. Stay within these constraints to avoid the dangers.



LEADING LINES & LIGHTS

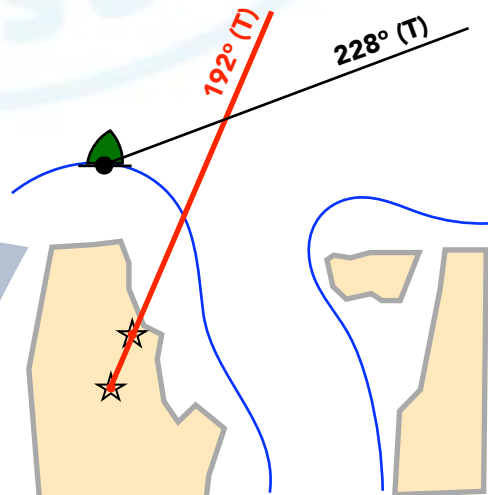
LEADING LINES & LIGHTS are a transit that will lead the vessel through hazards to safety.



POSITION LINES can be used in conjunction with LEADING LIGHTS to ensure a safer approach.



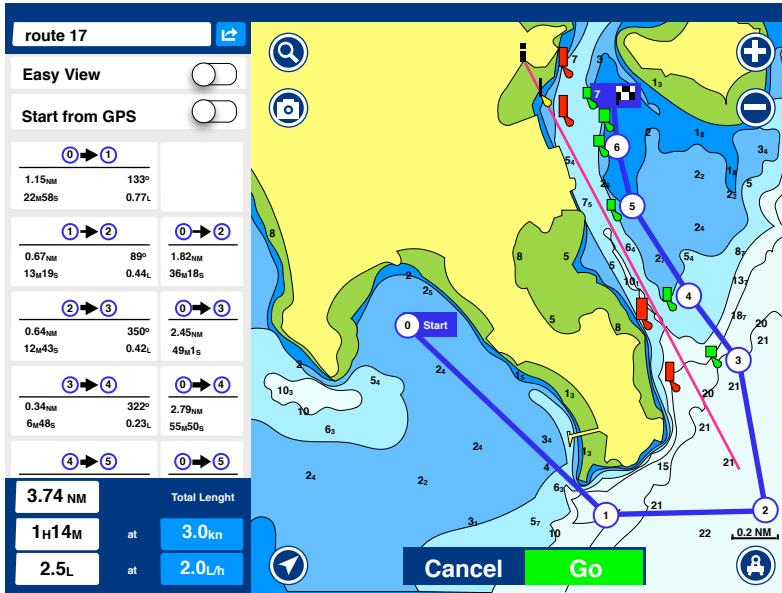
Keep the buoy on 228° until leading lights are in transit.



Passage Planning



NAVIONICS™



Electronic charts are very useful. There are many software providers, some using only one sort of chart and others able to use several. The ability to use multiple types of charts, including those used by dedicated chartplotters, is probably the ideal.

You can download the software onto your smartphone or iPad/tablet.

TEST QUESTIONS

1 Which scale would you use to measure distance?

- A Longitude scale
- B Latitude scale
- C None of them



2 What is the compass rose for?

- A For style. It is a traditional maritime ornament often used by yacht designers.
- B Piece of the compass that allows to get bearings.
- C To tell the difference between True North and Magnetic North on the chart.

3 Which of the following equations is the most accurate?

- A $1' = 1 \text{ NM} = 1852\text{m}$
- B $1' = 1 \text{ NM} = 1852\text{m}$ on every meridian
- C $1' = 1 \text{ kn} = 1 \text{ NM/h}$

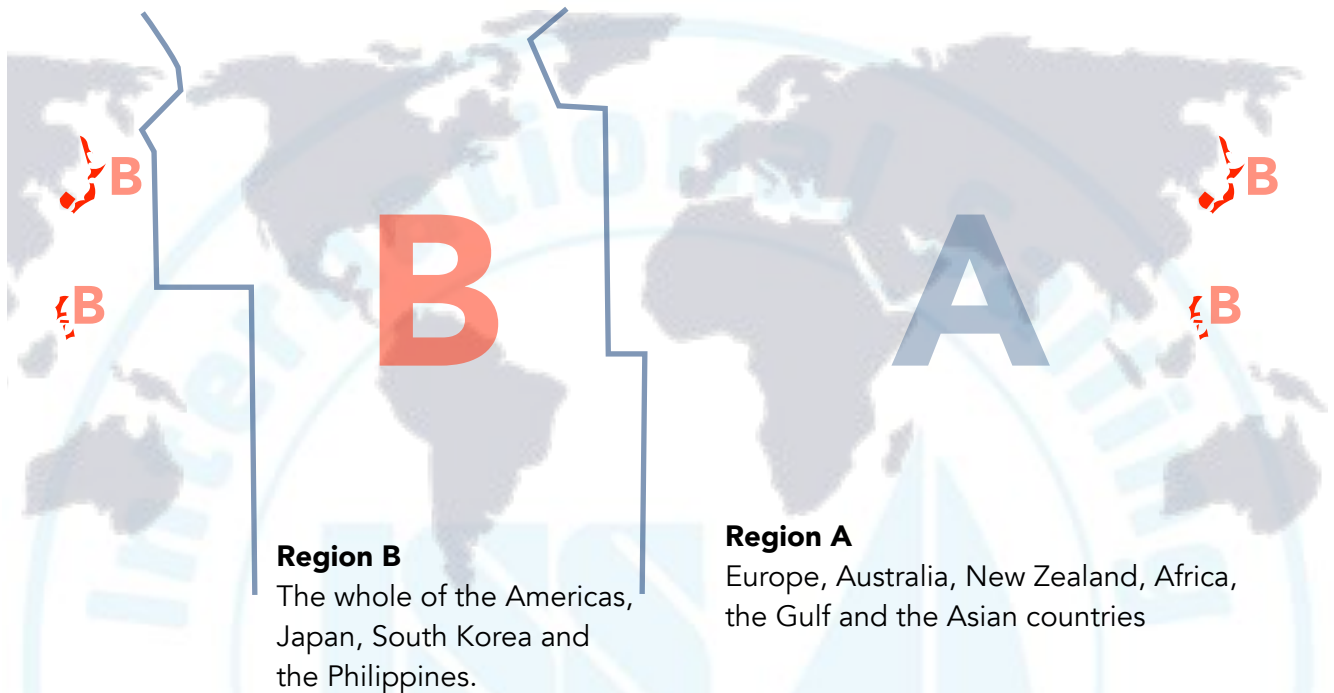
4 Which position fix is the most accurate?

- A 2 Point Fix
- B Dead Reckoning
- C Depth and Bearing
- D 3 Point Fix



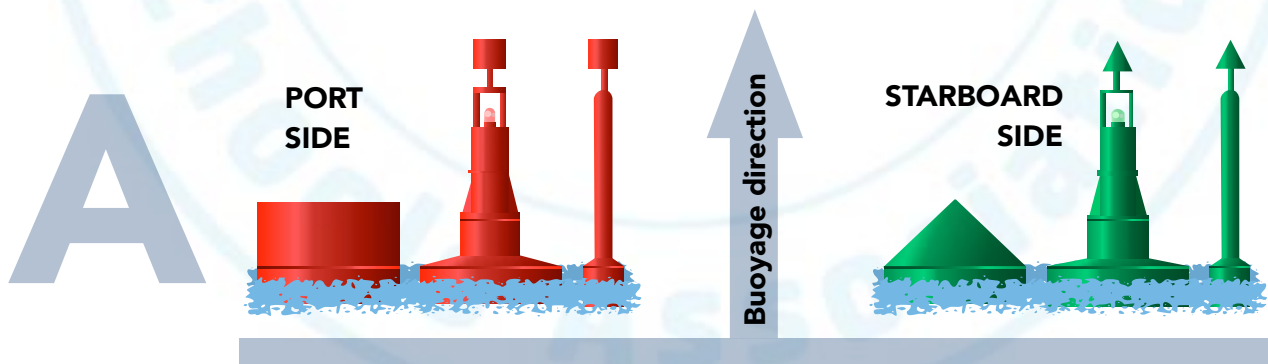
IALA Buoyage & Pilotage

Established in 1957, IALA (International Association of Marine Aids and Lighthouse Authorities) is a non-profit international technical association. IALA provides nautical expertise and advice. There are two IALA systems based on geographical location: Region **A** and Region **B**



LATERAL MARKS

When entering a port or harbour, the LATERAL MARKS ensure you stay in the required channel. We show here marks for the IALA Region A.

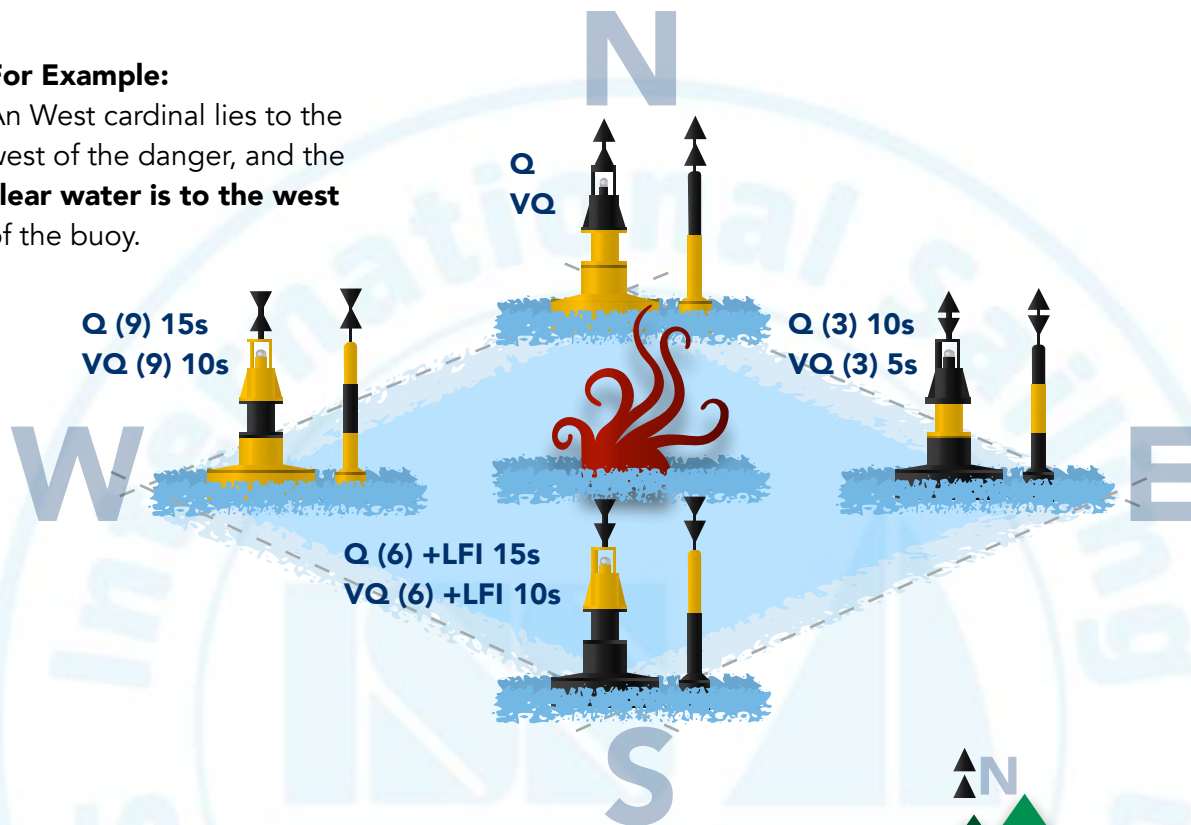


CARDINAL MARKS

Indicate the direction in which a particular danger lies, and the side on which it is safe to pass.

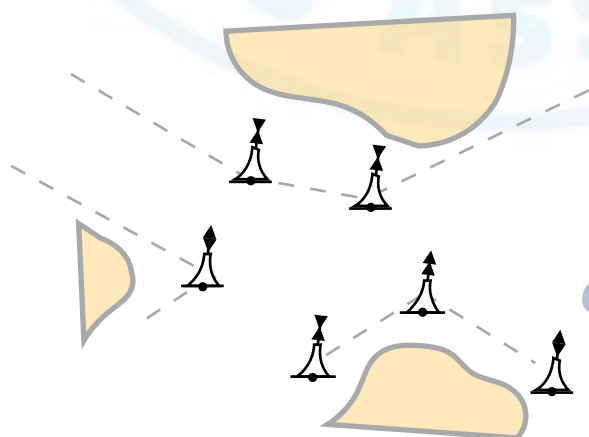
For Example:

An West cardinal lies to the west of the danger, and the **clear water is to the west** of the buoy.



You might use those icons to better memorise the cardinal marks. The icon refer to the arrangement of the cones.

Note that the tips of the cones always indicate the location of the black color on each marker.



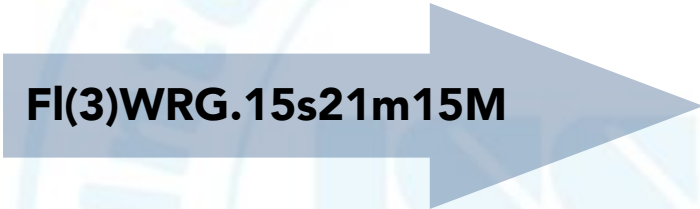
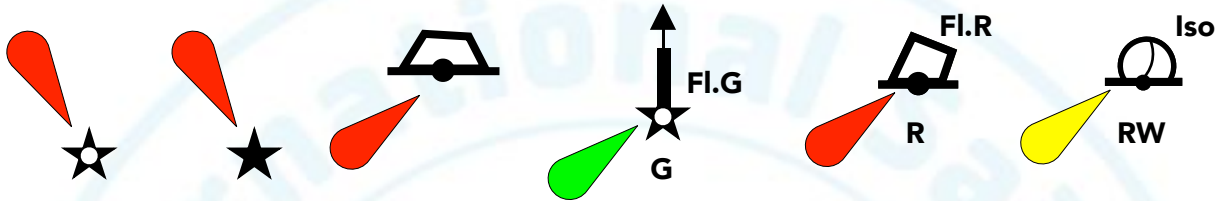
You will **NOT ALWAYS** encounter all **FOUR** marks around the danger zone

BUOYAGE ON CHARTS

IALA buoys and marks can be found on nautical charts.

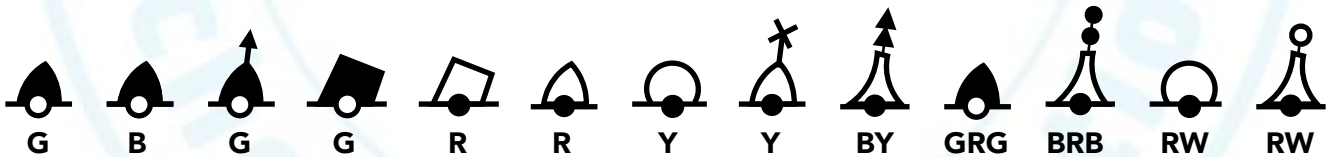
They will be labeled with either their light sequence, sound sequence, colour or shape.

LIGHTS



- Flashing groups of 3
- White / Red / Green sectored
- 15 second period
- 21 meters high
- 15 mile nominal visibility

COLOURS & SHAPES



Black | Green | Red | White | Yellow + combinations

SOUNDS

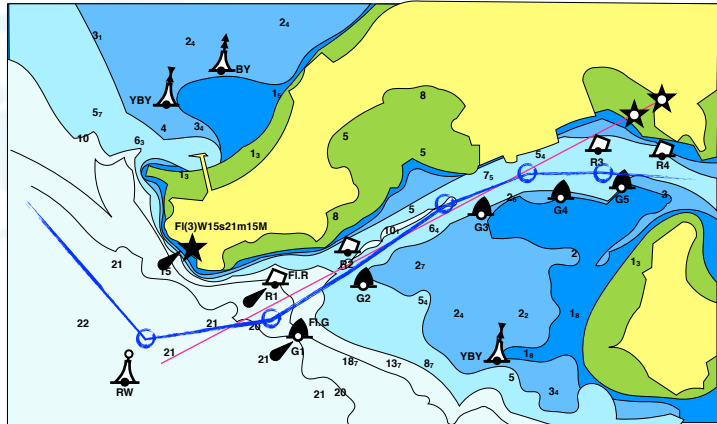


IALA Buoyage & Pilotage

You can use a Pilotage Plan to safely enter a harbour, day or night. Each leg can be jotted on a notepad for easy navigation on deck, including the distance and bearing for each leg.

Include in each leg of your plan:

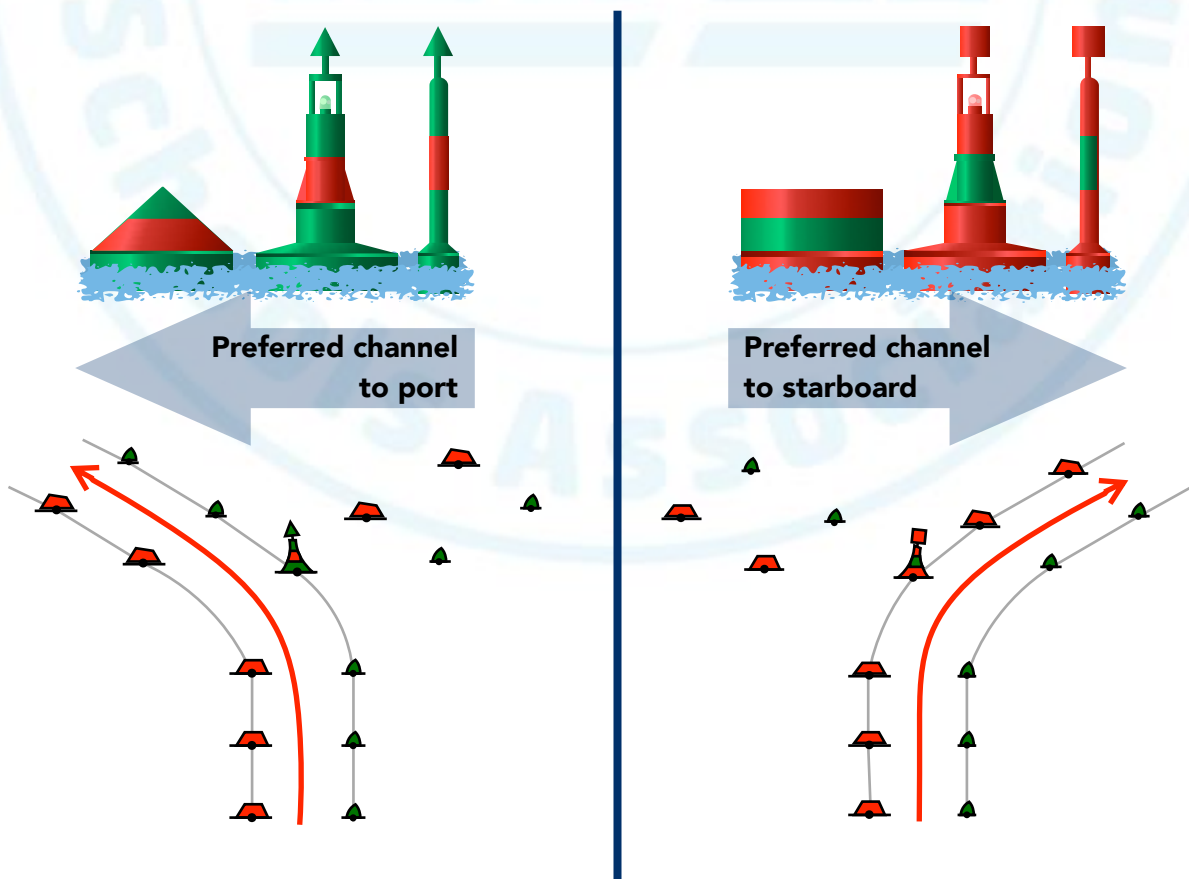
- **Bearing (Compass)**
- **Distance**
- **Dangers and Risks**
- **Buoys (Colour & Number)**



PREFERRED CHANNEL MARKS

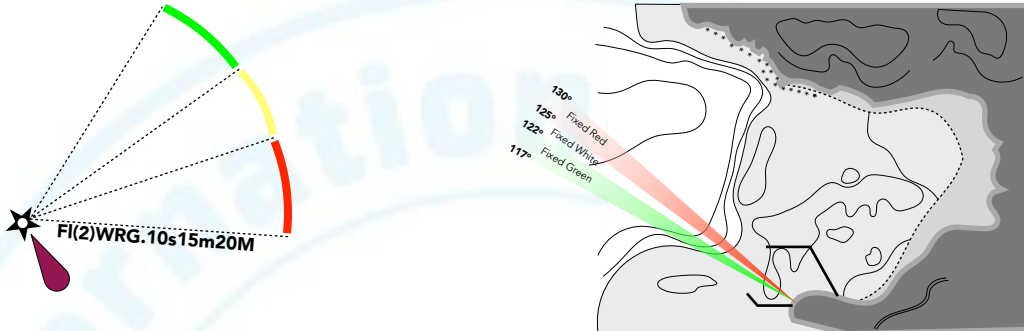
On entering an anchorage, port, harbour or bay there may be more than one route the skipper can take.

IALA have developed **Preferred Channel Markers** to indicate the preferred route into the anchorage.



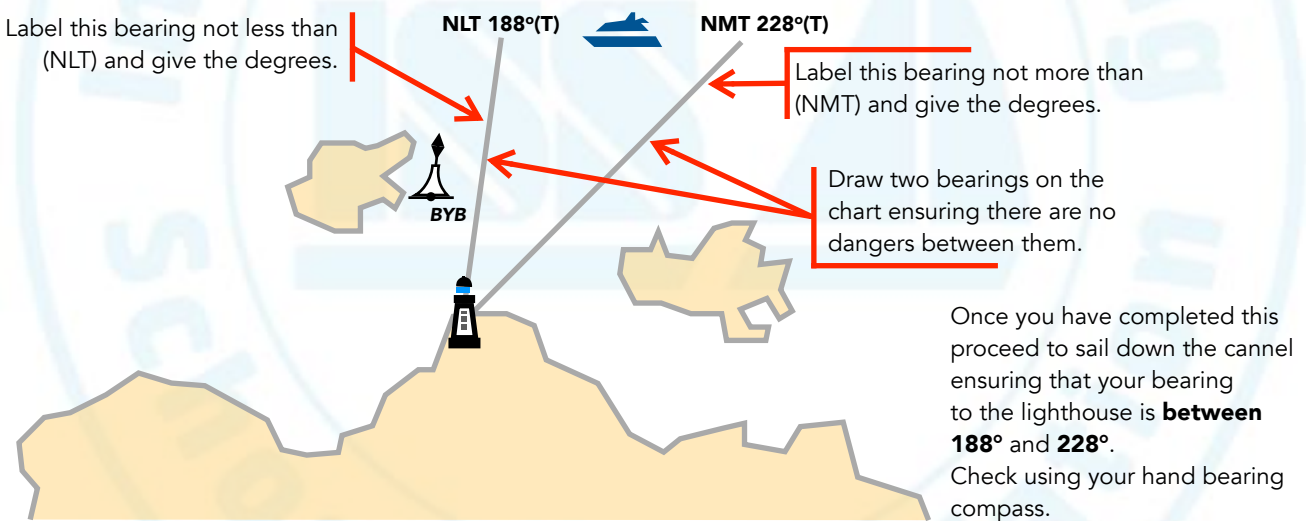
PILOTAGE - SECTORED LIGHTS

Sectored lights are used as a navigation aid to indicate fairway, a turning point, a junction with other channels, a hazard or something else of importance for the navigator. The light sequence will be shown on the chart, however sectored lights usually consist of a red section, a white section and a green section.



PILOTAGE - CLEARING BEARINGS

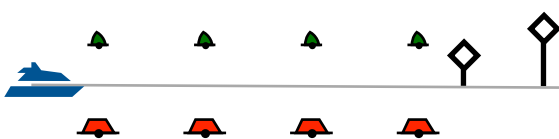
You can use clearing bearing to help you navigate through narrow channels between islands or hazards. To produce clearing bearings we need a prominent point to take two bearings from.



PILOTAGE - LEADING BEARINGS AND LEADING MARKS

Leading Bearings and Leading Marks are used to guide larger ships up the centre of a channel from the safe water buoy. Leading Bearings will be shown on most charts, and also in smaller pilotage charts in the Almanac.

During the day Leading Marks are large white posts usually with a shape on the top. At night these marks show yellow lights with the sequence shown on the chart.



If you see this alignment you are on the **Port side of the channel.**



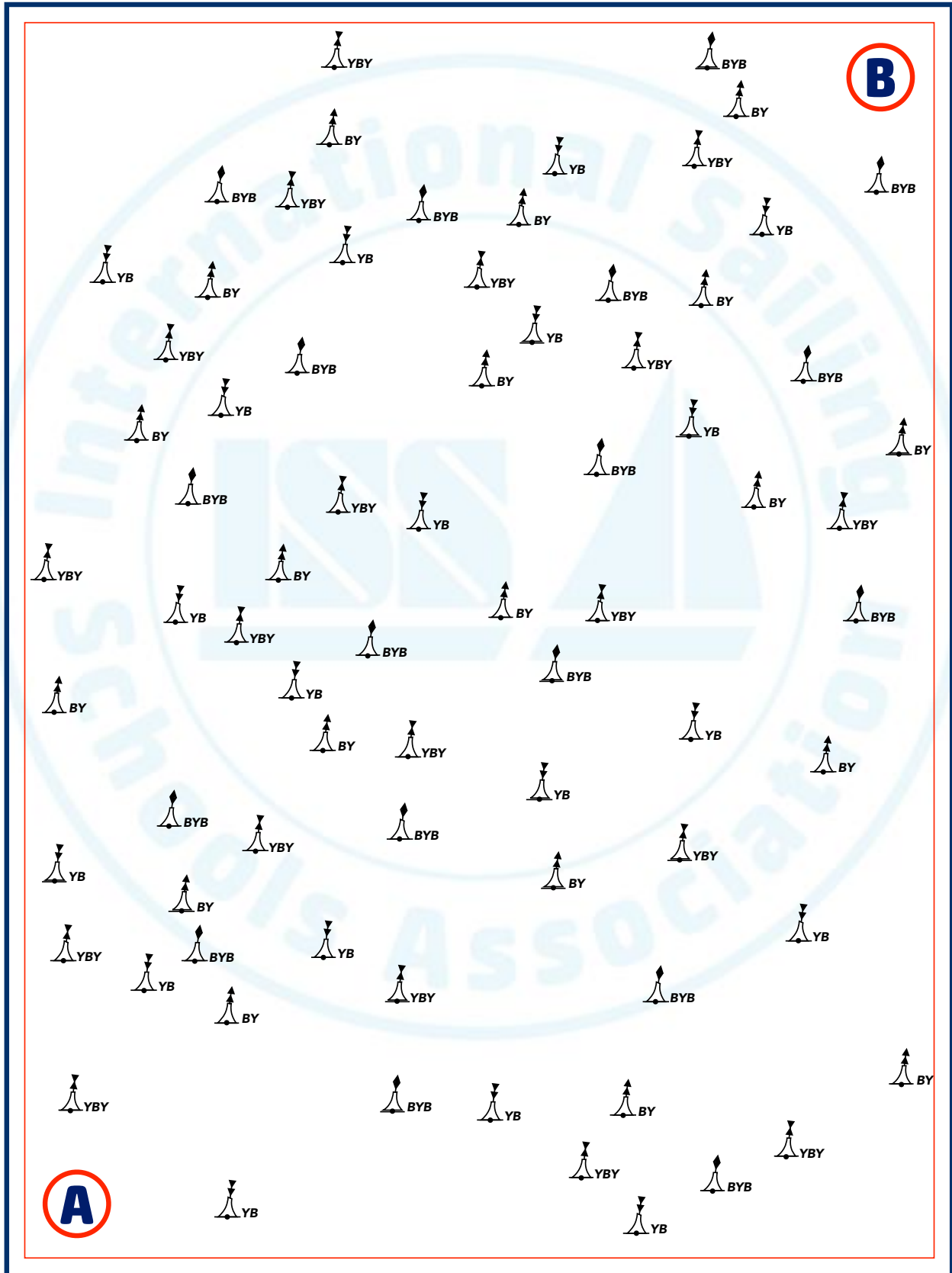
If you see this alignment you are in the **Centre of the channel.**



If you see this alignment you are on the **Starboard of the channel.**

EXERCISE 1

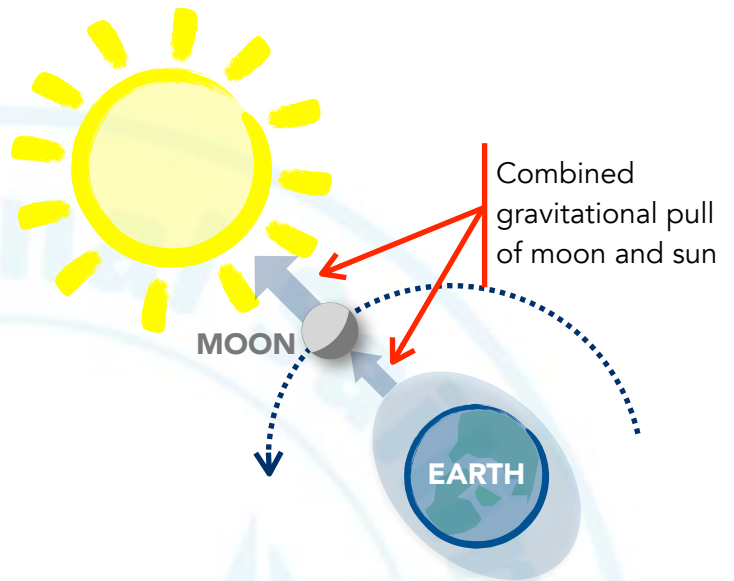
Sail safely from **A** to **B**, avoiding obstacles marked by the cardinal marks



Tidal Streams

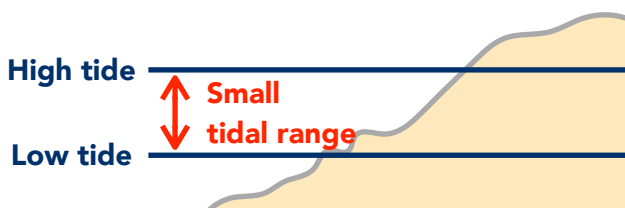
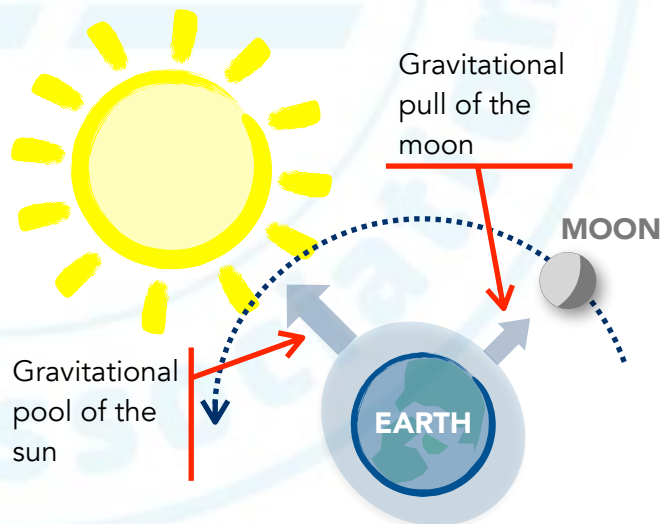
Tides are the movement of water around the coast caused by the gravitational effect of the Moon, and to a lesser extent the Sun.

Spring tides are especially strong tides (they do not have anything to do with the season Spring). They occur when the Earth, the Sun, and the Moon are in a line and therefore the gravitational forces of the Moon and the Sun both contribute to the tides.



Spring tides occur during the full moon and the new moon. They result in a very high tide and a very low tide and therefore have a large tidal range.

Neap tides are especially weak tides. They occur when the gravitational forces of the Moon and the Sun are perpendicular to one another (with respect to the Earth), and are working in different directions.

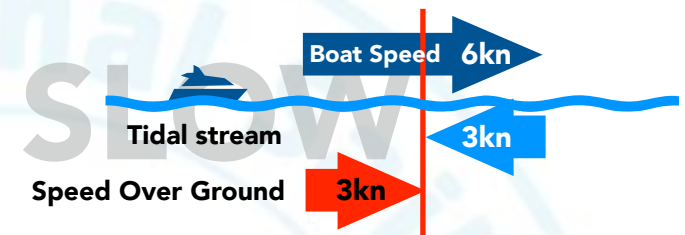
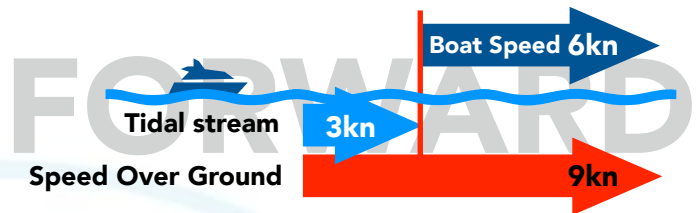


Neap tides occur during quarter moons. They result in low high tides and high low tides and therefore a small tidal range.

TIDAL STREAM

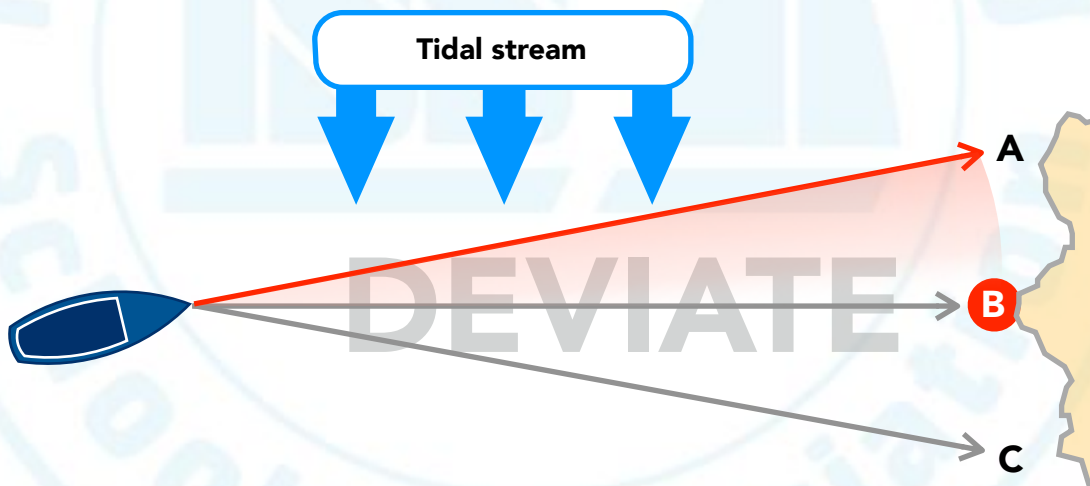
As the tide flows in (flood) or flows out (ebb), it can affect the position, direction and speed of a sailing boat. Understanding tide also means understanding this tidal stream.

The tidal stream can **help you FORWARD** or **SLOW you down** or cause you to **DEVIATE from your set course**. If you are fighting the tide you may appear to be sailing forward, but actually you may not be moving or may even be moving backwards!



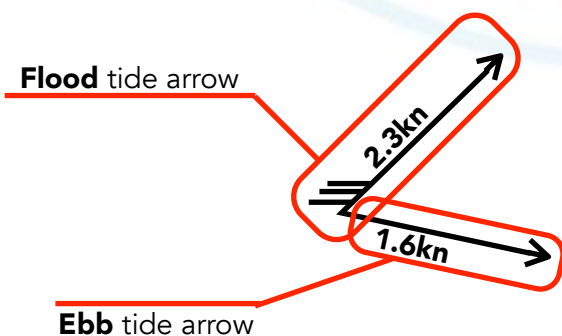
When sailing across the tide the helmsman needs to compensate for the effect it will have on the boat.

In the example below, if the boat wishes to arrive at Point **B**, it must sail for Point **A**. If it does not, it will end up at Point **C**.



TIDAL VECTORS

Nautical charts very often give the tidal information using Tidal Vectors. They tell us the direction (Set) and the speed (Rate) of the tide in a given area on the chart.



The Rates indicated on tidal vectors only refer to the third hour of a **Spring Tide**. If you want a different hour or a **Neap tide** you must adjust accordingly.

Anchoring

TYPES OF ANCHORS

There is a number of different types of anchors and each has its own advantages and disadvantages. Below the most common types you might encounter:



Bruce: Universal, but poorly keeps on clay and heavy mud.



Fisherman's: It holds well on the rocks, but it is difficult to store.



Delta: Holds well on most substrates. Weaker only on the rocks.



Danforth's: Holds well on the sand and in the mud. It occupies little space.

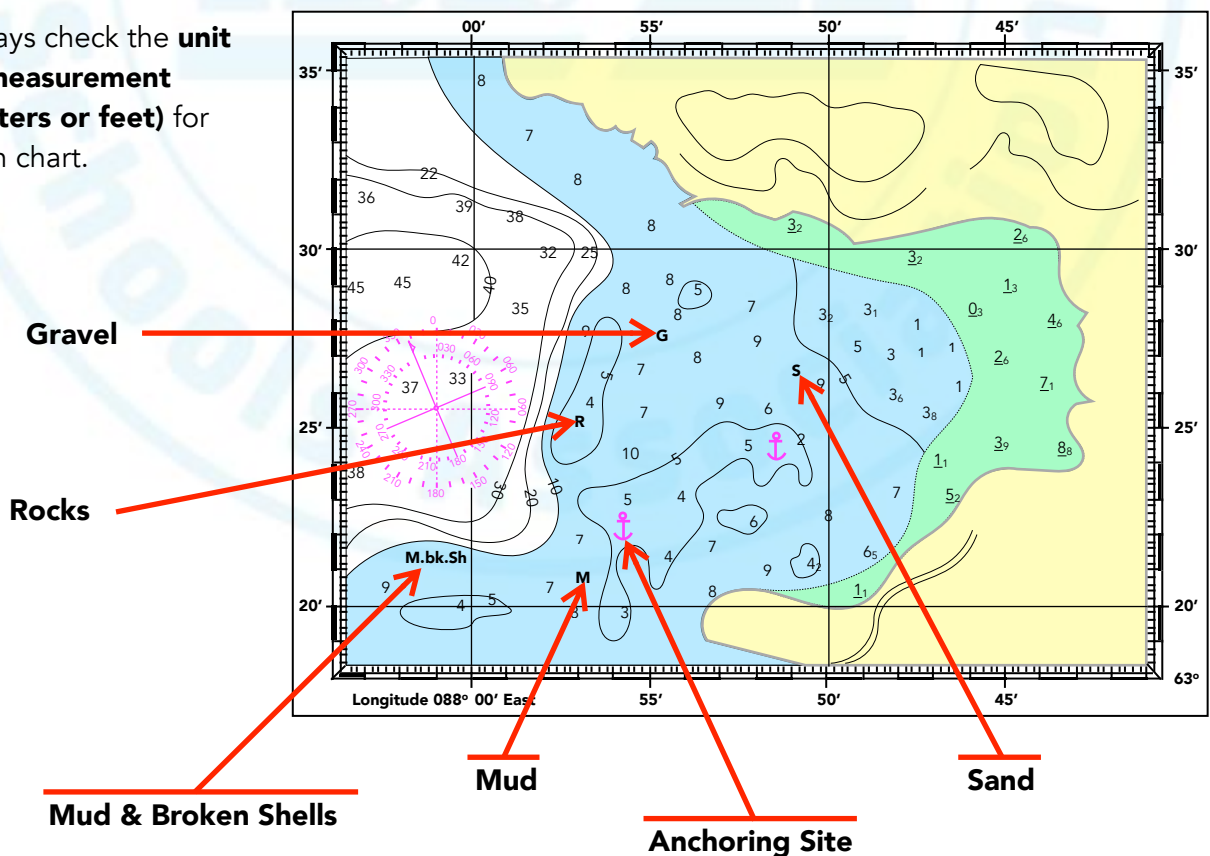


Mushroom: Good for long-term anchoring

CHOOSING THE RIGHT SPOT

Choosing the right spot for anchoring is crucial. Check your chart for proper depths, anchoring sites and type of substrate on the bottom.

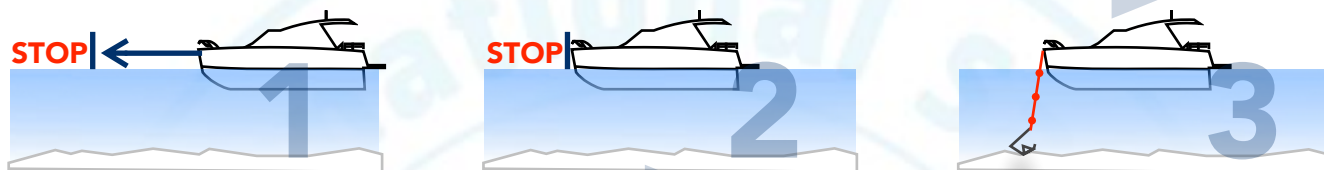
Always check the **unit of measurement (meters or feet)** for each chart.



DROPPING THE ANCHOR

Look at how other boats are oriented on the approach to the site. (1) Always go against the wind when dropping an anchor. (2) Ensure you have stopped. (3) Start easing the anchor. (4) Go slowly backwards, (5) until the chain/rope stretches.

WIND



WIND

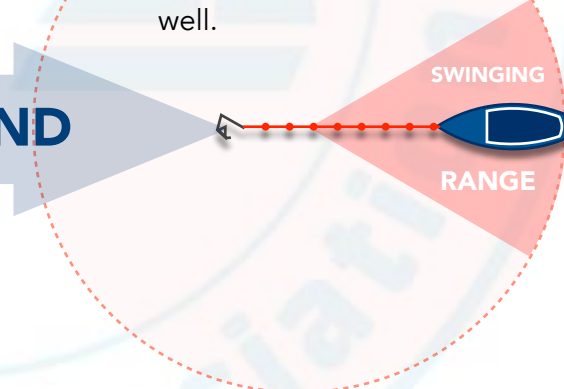


Anchor works best when the pull from the boat is closest to horizontal. When using **chain** apply it in the amount of **3-5 times the depth beneath the boat**. When using **rope** increase the ratio to **x7-10**. Once enough chain or rope is deployed engage reverse gear and with high revs for 2-3 seconds, check if the anchor holds well.

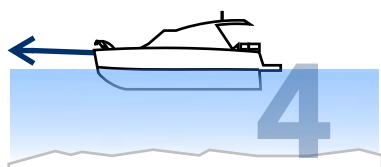
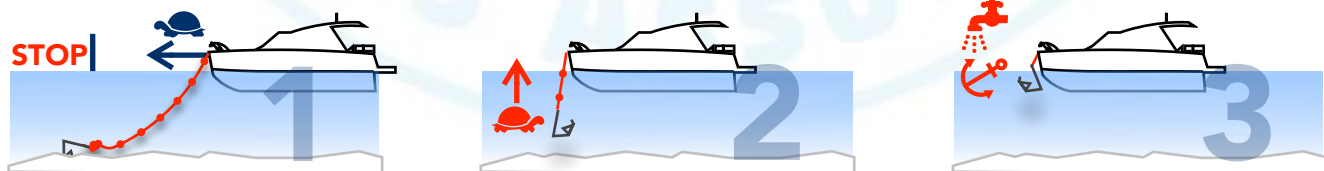
SWINGING CIRCLE

Bear in mind the swinging circle, which is around one third of the part of chain or rope that is laying on the seabed. Ensure your **swinging range** clears obstructions. In order to check if the anchor is holding observe your swing. **Keep in mind the possible change in wind direction.**

WIND



RAISING THE ANCHOR



(1) Slowly move towards the anchor. **Watch for the chain/rope not to get beneath the hull.** (2) When near vertically above, start pulling the anchor. (3) Rinse it and carefully get in aboard. (4) Secure the anchor aboard and you are free to go.

KNOW YOUR SYSTEM

The modern yacht is fitted with several sensors and instruments with display units. The major instruments on a yacht are:

- **GPS**
- **Depth Sounder**
- **Log**
- **Electronic Compass**
- **VHF Radio**
- **Satellite phone**
- **AIS**
- **Radar**
- **Chart Plotter**
- **Auto Pilot**

GPS - GLOBAL POSITIONING SYSTEM

Handheld or mounted GPS devices are a must for any sailing boat today.

They provide reliable position fixing using Lat./Long. co-ordinates provided by 27 satellites orbiting the earth.

Waypoints for a route can be entered and distance/bearing from the boat to the destination are calculated in real-time and displayed on the device.

DEPTH SOUNDER

Depth sounders are fitted under the hull or are handheld. They can display the depth in meters or feet of the sea beneath the hull.



If fitted under the hull, they need to be calibrated to either the keel or the bottom of the hull or the surface of the sea.

The sensor should be regularly cleaned of barnacles.

On a new boat, inquire about the calibration of the sounder to avoid confusion.

ELECTRONIC LOG

The modern yacht is fitted with low power instruments that record depth and speed.

The Speed/Log records the water track speed. It is wired to the main ship computer and then to the multi display in the cockpit.

The small wheel can get clogged and it should be carefully checked and be cleaned weekly.



ELECTRONIC COMPASS

The Electronic Compass display complements the standard magnetic compass but does not replace it.

It is mostly used in conjunction with the auto-pilot for keeping a bearing based on a compass course.

It can be calibrated to display True or Magnetic course.



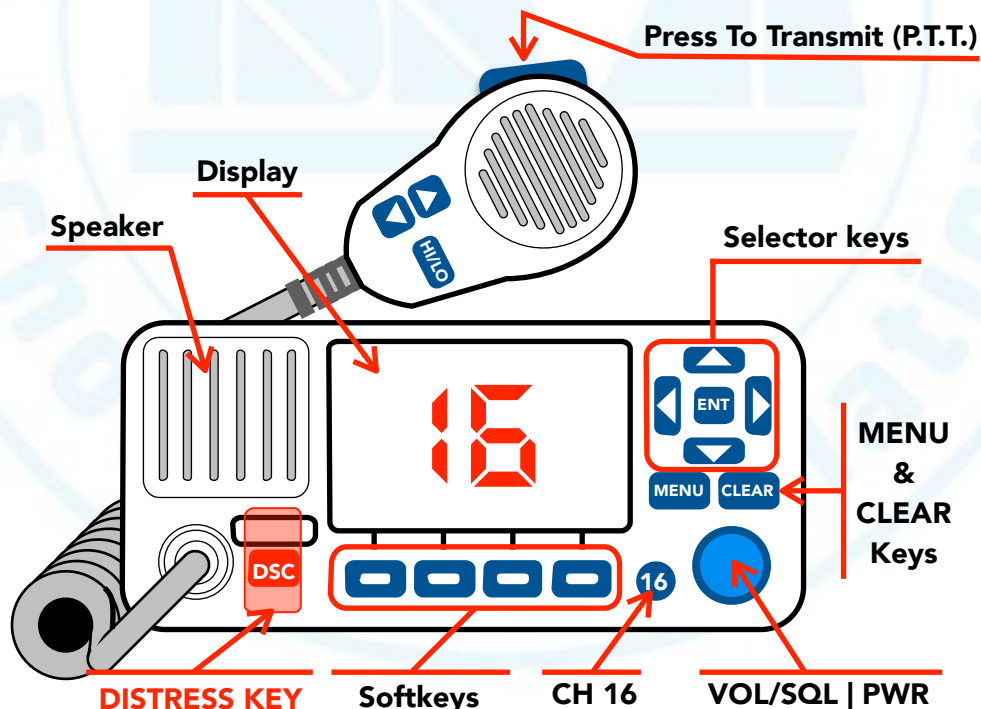
VHF RADIO

Marine radio transmitting and receiving on a radio frequency range between 156.0 and 162.025 MHz.

Use Channel 16 to monitor or send messages of high importance (Distress, Urgency and Safety).

Can be mounted with antenna or hand held.

Only operates with a radius of about 15-25 NM depending on the height of the antenna (range is 1.23 times the root of antenna height in feet).



SATELLITE PHONE

Satellite phones are becoming more prevalent on boats and are starting to replace Single Band radios.

Allow for two-way voice and data communication anywhere in the world.

Small form factor and low power consumption.

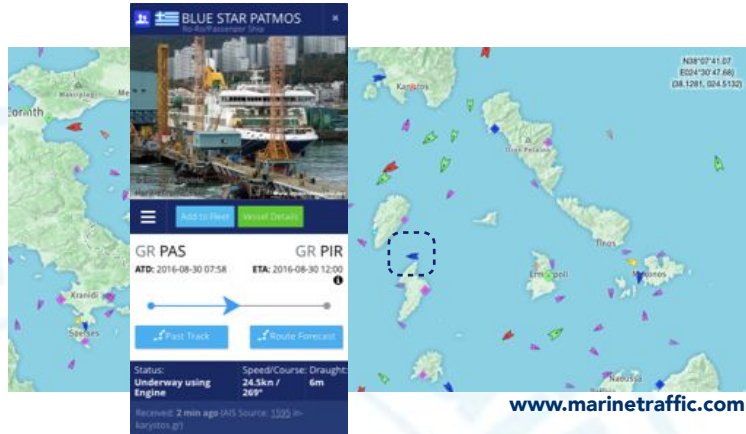
AIS - AUTOMATED IDENTIFICATION SYSTEM

AIS stands for Automatic Identification System, the international automated collision avoidance system.

Commercial ships are required to carry both an AIS transmitter and receiver.

Leisure boats should have an AIS receiver.

AIS receivers will display information about ships in the vicinity and their course/speed and possibly the risk of collision.



iPAD / TABLET

These devices can be used to access navigational, pilotage, weather information all over the world by accessing the internet or by installing software such as 'Navionics'.

RADAR

Radar allows visibility at night or when there is fog. It shows ships, land and other objects in the vicinity.

Radar can also detect squalls.

Radar allow for position fixes using bearing and distance to objects and land when there is no visibility.

Comes with an antenna mounted on the mast and a display unit.

CHARTPLOTTER

Chart plotters are multi function devices with built-in digital maps of specific sailing areas.

In conjunction with GPS, they allow the skipper to set waypoints, routes, keep track of the ships course.

Chart plotters allow for sailing regions to be zoomed to and display details not normally found on paper charts.

Small screen size can however hinder danger zones.

AUTOPILOT

The Autopilot is a great addition to a vessels instruments.

The autopilot can steer the boat automatically based on a waypoint, a compass course, a wind direction.

It comprises a hydraulic arm and an electronic control system.

Autopilot does not replace the helmsman.

Can be used in conjunction with a GPS and a radar when the helmsman needs to rest and no other crew can steer the boat.

First Aid at sea



Safety goes first on all ISSA courses

FIRST AID PREPARATION

A good skipper is always prepared.

He or another person on the crew should have some knowledge of first aid.

One-day courses are available at most good sailing schools.

Check all safety equipment is in date

- ▶ Heavy line with life buoy.
- ▶ Fire extinguishers.
- ▶ Signal flares and other signaling devices with current expiration dates.
- ▶ Life jacket suitable for each person on board, readily accessible, in good condition.
- ▶ MOB equipment and throwable flotation device easily accessible to helmsman.
- ▶ Flashlight and extra batteries.
- ▶ Horn or sound signaling device.
- ▶ Bell.
- ▶ Comprehensive first aid kit.
- ▶ Bailer or manual water pump.
- ▶ Sufficient foul weather gear, warm clothing & safety harnesses for all crew.

IN AN EMERGENCY

When there is a medical emergency onboard the captain or member of crew can put in a Pan Pan (non-life threatening) or Mayday (life threatening) call for help. Even if you require medical advice a Pan Pan Medico call can be made.

FIRST AID KIT

It is important to have a comprehensive first aid kit on board every boat. Your first aid kit should include the following as a minimum:

- 1  **Antibiotics**
- 2  **Eye drops**
- 3  **Allergies**
- 4  **Anti-pain**
- 5  **Diarrhea**
- 6  **Constipation**
- 7  **Stomach pain**
- 8  **Sedatives**
- 9  **Flu/cold/cough**
- 10  **Bandage & Scissors**
- 11  **Sterile compresses**
- 12  **Gloves (sterile & regular)**
- 13  **Wound stickers**
- 14  **Stretch mesh / net**
- 15  **Aseptic + Antiseptic + Burns**
- 16  **Syringe**
- 17  **Thermometer**
- 18  **Rescue Mask**

First Aid at sea

HYPOTHERMIA

Hypothermia is a condition in which exposure to cold air and/or water lowers body core temperature.

The symptoms include shivering, lethargy, stumbling, slurred speech, and loss of memory. The victim progressively develops a cold pale skin, slow breathing and a slow weak pulse, leading to collapse and unconsciousness.

1. Your first aim is to **prevent further heat loss**. Get the casualty out of the sea and out of the wind.
2. Get the casualty to the warmest spot on board and turn on all the heating. As soon as possible strip off all wet clothing, if necessary by cutting it off. **Do not rub the skin to dry it, but dab it dry with a towel.**
3. If the casualty is conscious get them into warm dry clothing, give them **lots of warm sweet drinks** and allow them to rest in a warm sheltered spot. If you have no other means of providing warmth get close enough to **transfer body heat**.
4. If the casualty is unconscious take off all their wet clothing and **put them in a sleeping bag**. Make sure they are in the recovery position and won't suffocate.
5. If the boat will take time to warm up, get into the sleeping bag with the casualty. **(Wear tight clothing to speed up transfer of heat.)**

HEAD INJURIES

Head injuries can be common on boats. It is important to be able to identify the symptoms of concussion.

- Headache or "pressure" in head.
- Nausea or vomiting.
- Balance problems or dizziness, or double or blurry vision.
- Bothered by light or noise.
- Feeling sluggish, hazy, foggy, or groggy.
- Confusion, or concentration or memory problems.
- Just not "feeling right," or "feeling down".

BLEEDING

Minor scrapes, cuts and bruising are easily treated.

1. **Wear gloves** and other barriers to protect yourself and patient from disease transmission.
2. If necessary **control bleeding** with direct pressure.
3. **Use disinfectant** (like Betadine) to remove dirt and parcels around the wound.
4. **Cover wound** with a non-adhesive dressing and bandage securely.
5. **Check wound** daily for signs of infection.



Serious bleeding requires specialty medical treatment as soon as possible. A Mayday call should be placed if the casualty is gushing blood. While waiting for medical treatment the following can be done to try and reduce blood loss.

1. **Wear gloves** and other barriers to protect yourself and patient from disease transmission.
2. **Place a clean cloth** or a sterile dressing **over the wound** and apply **direct pressure**. If a dressing or cloth is not available use a gloved hand.
3. While applying direct pressure on wound, **place a pressure bandage** over the sterile dressing.
4. If bandage becomes blood-soaked, **place another clean cloth** or dressing on top and bandage in place.
5. **Continue** to apply **direct pressure**.
6. **Do not remove blood-soaked bandages** as blood clots in the dressing help control bleeding. Add bandages as necessary.

MINOR BURNS

1. **Wear gloves** and other barriers to protect yourself and patient from disease transmission.
2. **Flush or soak burn in cool water** for at least 15 min. If possible, **remove jewelry**, watched belts or constricting items from the area before it begins to swell.
3. **Cover area with a sterile** (non-fluffy) dressing and bandage loosely.
4. **Check burn daily** for signs of infection.

MAJOR BURNS

A Mayday call should be placed as soon as possible for a Major burn. While waiting for emergency response the following can be done to help the casualty.

1. **Wear gloves** and other barriers to protect yourself and patient from disease transmission.
2. **Help the patient lie down** but ensure the burnt area does not come into contact with the ground.
3. **Douse the burnt area with cold liquid** for at least 10 minutes. Continue cooling the area until pain is relieved.
4. **Carefully remove clothing** from around the burnt area and **remove any constricting items** before swelling begins.
5. **Cover burns with a sterile dressing** or other non-fluffy material available. Cling film could also be used if applied lengthways.
6. **Continue to monitor the patient** until emergency response arrives.

Environmentally Responsible Sailing



Holders of the International Sailing Schools Association **certificates** are the **elite** that knows how to sail safely and should also **care about the environment**. Help us promote Environmentally Responsible Sailing and preserve the nature for future sailors generations **by applying these few simple rules**.

Segregate garbage for recycling purposes wherever possible



Recycling is an alternative to "conventional" waste disposal that can save material and help lower greenhouse gas emissions. Recycling prevents the waste of potentially useful materials and reduce the consumption of fresh raw materials, thereby reducing: energy usage, air pollution (from incineration), and water pollution. Search for segregated garbage bins in every marina.

Leave any beach or shore line you visit cleaner than when you arrived.

Leisure sailing can take you to many beautiful, paradise-like places. The community of sailors grows every year and it is constantly harder and harder to visit places untouched by a human hand. Some people do not regard that as a value and leave their trash behind them there. React and help to keep those places safe.



Strictly enforce no waste being thrown overboard.



This is not even a matter of ecology but personal culture. Oceans and seas are huge, but that does not mean that another piece of paper thrown into the water does not make a difference. It does. It is your attitude that matters.

Educate sailing guests on the ecology of the sea and shore.

You are the skipper. It is your responsibility to educate your crew on how to properly behave during your leisure yachting experience.





Operational Checklist

As a Skipper (in training) you should implement the operational process below to ensure safe use of the vessel. Familiarise yourself with the vessel and her equipment.

ISSA has provided you with the following checklist to ensure this is possible.

1. As Skipper you should:

- Prepare a Passage Plan (if appropriate)
- Obtain an up to date Weather Forecast
- Collect navigation equipment (Charts etc.)
- Check all safety equipment location
- Complete pre-departure legal procedure (Customs and Immigration)

ABOVE DECK

- ▶ Guardrails
- ▶ MOB life ring with light
- ▶ Anchor and anchor winch
- ▶ Engine throttle control lever
- ▶ Life-raft attached correctly

BELOW DECK

- ▶ Batteries (electrolyte level, terminals and voltage)
- ▶ Bilge (Ensure dry) Check Bilge pumps and float switches
- ▶ Safety equipment (lifejackets, harness lines, first aid, fire extinguishes, flares, VHF, Navigation equipment, spare anchor, spare lines, fenders, tools and spare parts, EPIRB, SART, torches, fog horn, bungs, bucket, day shapes.
- ▶ Ensure everything stowed safely ready for going to sea
- ▶ Hatches are closed and secure
- ▶ Engine and gearbox (See below for checks)
- ▶ Electronics (GPS- chartplotter, VHF, nav lights, radar AIS, bilge pumps, water pump, Instruments)
- ▶ Heads
- ▶ Galley equipment and cooker
- ▶ Sea cocks and hoses
- ▶ Fresh Water tanks and fuel tank levels

2. Pre-departure boat checks:

- **Above Deck**
- **Below Deck**
- **Engine Checks**
- **Generator Checks**
- VHF Radio Check
- Rig Checks
- Safety checks for the vessel

3. Crew Briefing:

- Personal Safety briefing
- Boat Safety Plan
- Action to be taken in an emergency
- How to stop and start the engine
- Location of the sea cocks
- Fire Brief
- Action to take in a MOB situation
- How to use the heads
- Where VHF is and how to use it

ENGINE CHECKS

- ▶ Batteries (electrolyte level, terminals, wiring and voltage)
- ▶ Engine Mounting is secure
- ▶ Engine bilge is dry from oil and water
- ▶ Belts are tight and free from damage
- ▶ All hoses in good condition and securely fastened
- ▶ All electrical connections are clean and secure
- ▶ Fresh water header tank is topped up with coolant.
- ▶ Engine oil and gearbox oil level is correct and oil is not black
- ▶ Raw water seacock is open and hoses secure
- ▶ Fuel tank filled and fuel valve open
- ▶ Primary fuel filter/Water strainer doesn't have water at bottom.
- ▶ Engine housing for damage

GENERATOR CHECKS

- ▶ Observe for obstructions around stern of vessel
- ▶ Throttle lever in Neutral
- ▶ Turn on ignition
- ▶ Start with key or button
- ▶ Ensure cooling water and exhaust gases are being expelled at stern
- ▶ Observe electronics panel for warning lights or alarms
- ▶ Check ahead and astern gears
- ▶ Leave engine to warm up
- ▶ Check for leaks on all cooling, fuel, oil and exhaust system

4. Provisioning check:

- Water and drinks
- Food and snacks. Enough for 100% of Passage + 20%
- Grab bag prepared
- Medical supplies
- Adequate clothing for any weather conditions

5. Before leaving port, remember:

- Weather forecast and tidal information
- Crew list and relevant documents
- Passage Plan
- Contact relevant authorities (Harbour master, Immigration, Customs)
- Leave information ashore

6. When returning to port, remember:

- Boat correctly moored and fendered
- Fuel and water tanks refilled
- Rinse boat with fresh water
- Safety equipment dried and stowed
- Tidy all lines
- All electrics turned off and batteries off (Cover instruments)
- Check no water in the bilge
- Check seacocks closed
- Check fuel system and turn off fuel valve
- Fridge left open to air
- Lock hatches and washboard



EXERCISE 2

Please make your own pre-departure check lists now.

Write down the 6 most important items, in your opinion, to be checked

ABOVE DECK CHECK LIST

- 1.....
- 2.....
- 3.....
- 4.....
- 5.....
- 6.....

BELOW DECK CHECK LIST

- 1.....
- 2.....
- 3.....
- 4.....
- 5.....
- 6.....



Topics Checklist

BOAT MASTER

THEORETICAL TOPICS

Safety at Sea	
Collision Regulations	
Taking over a vessel	
Meteorology	
Pilotage and passage planning	
Vessel handling	
Chartwork	

PRACTICAL TOPICS

Safety Equipment Use & Maintenance	
Vessel Check-out	
Responsibilities of Captain/Skipper	
Seamanship	
Vessel Handling	

NAME

This is to certify that the student,

has an understanding of the above topics and has achieved the level of BOAT MASTER.

NAME

Instructor

DD.MM.YYYY

Date

Instructor's signature



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Wherever You Sail