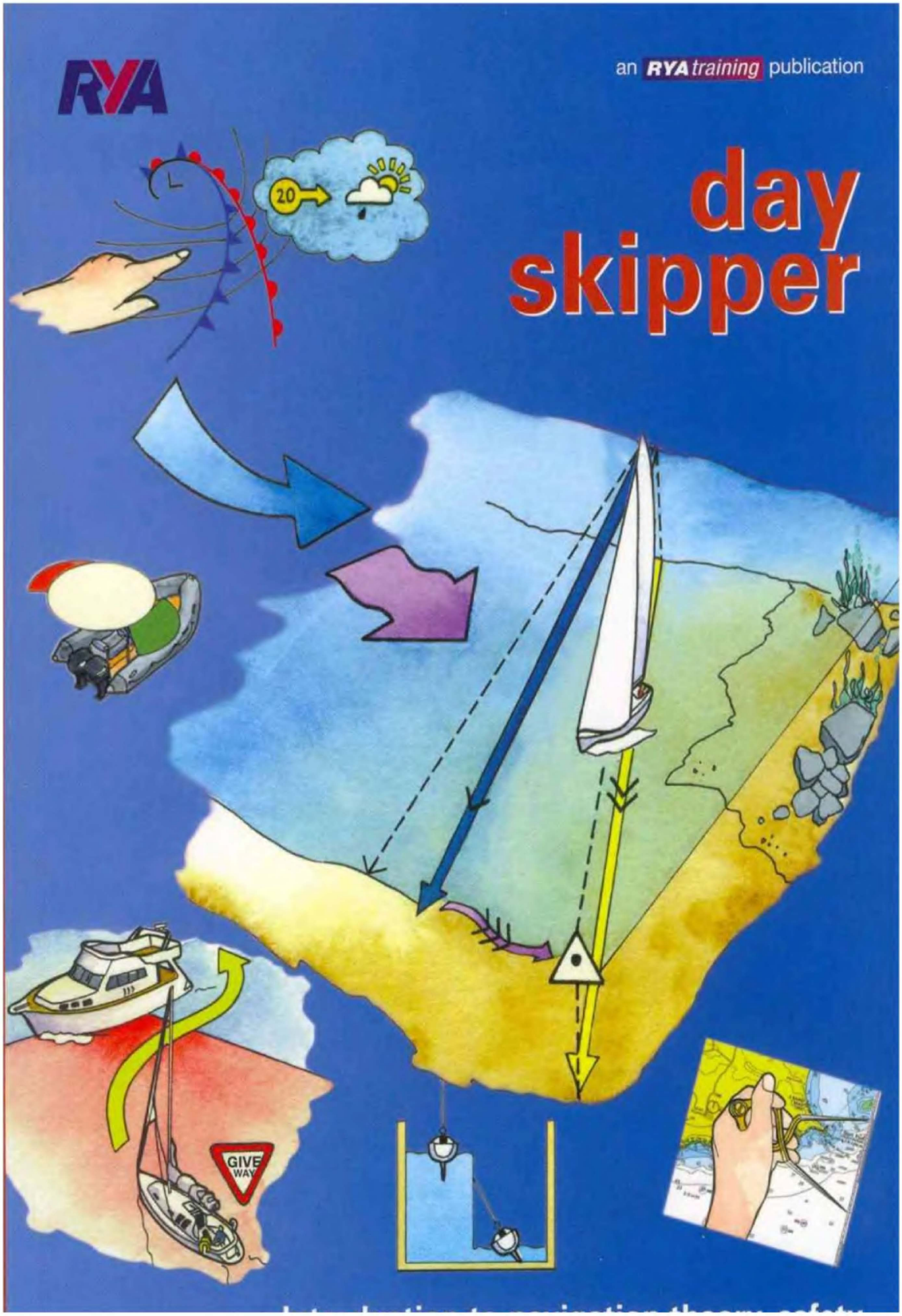
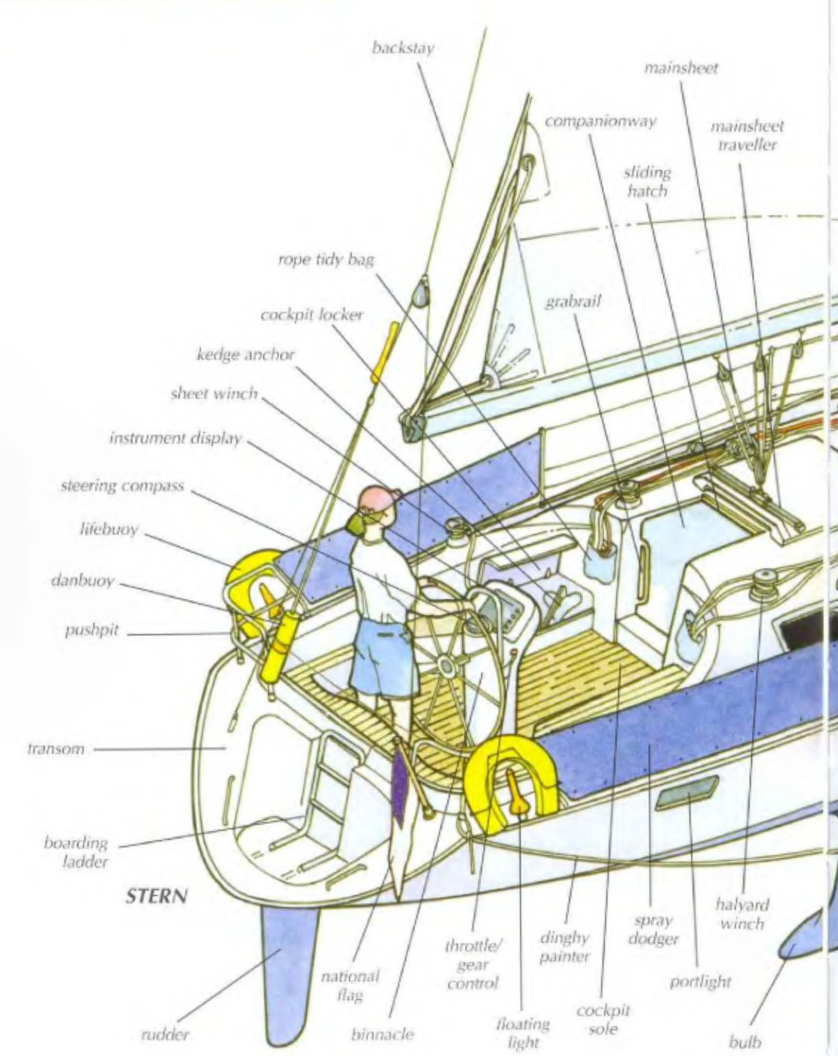
RYA

an RYA training publication

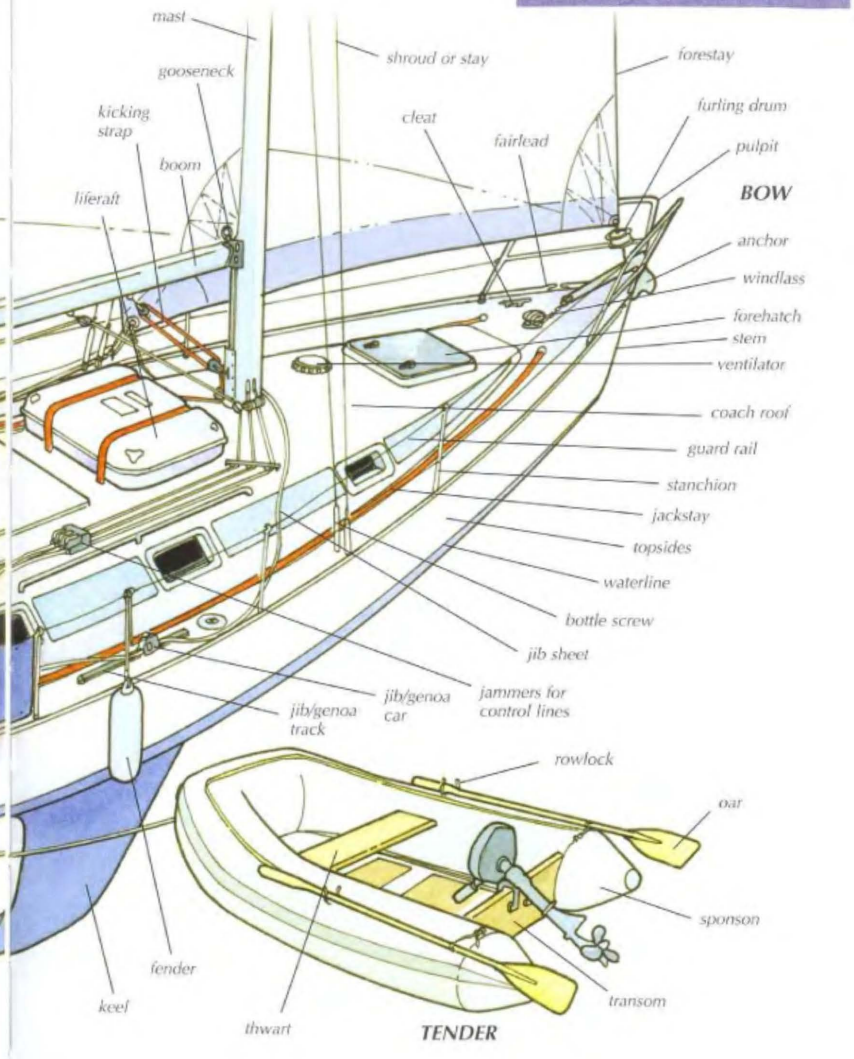
day skipper



TYPICAL SAILING YACHT

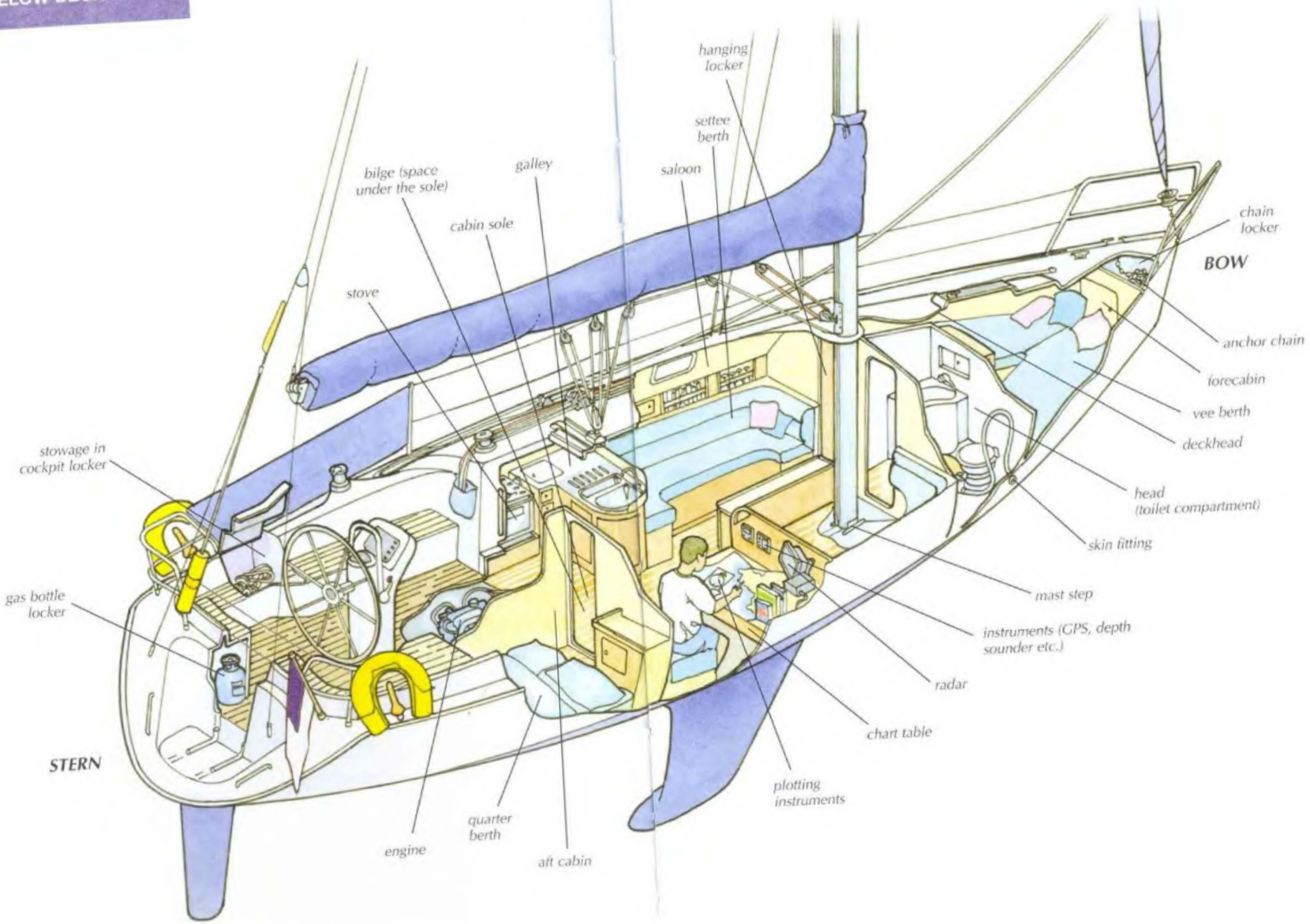


TYPICAL SAILING YACHT



BELOW DECK

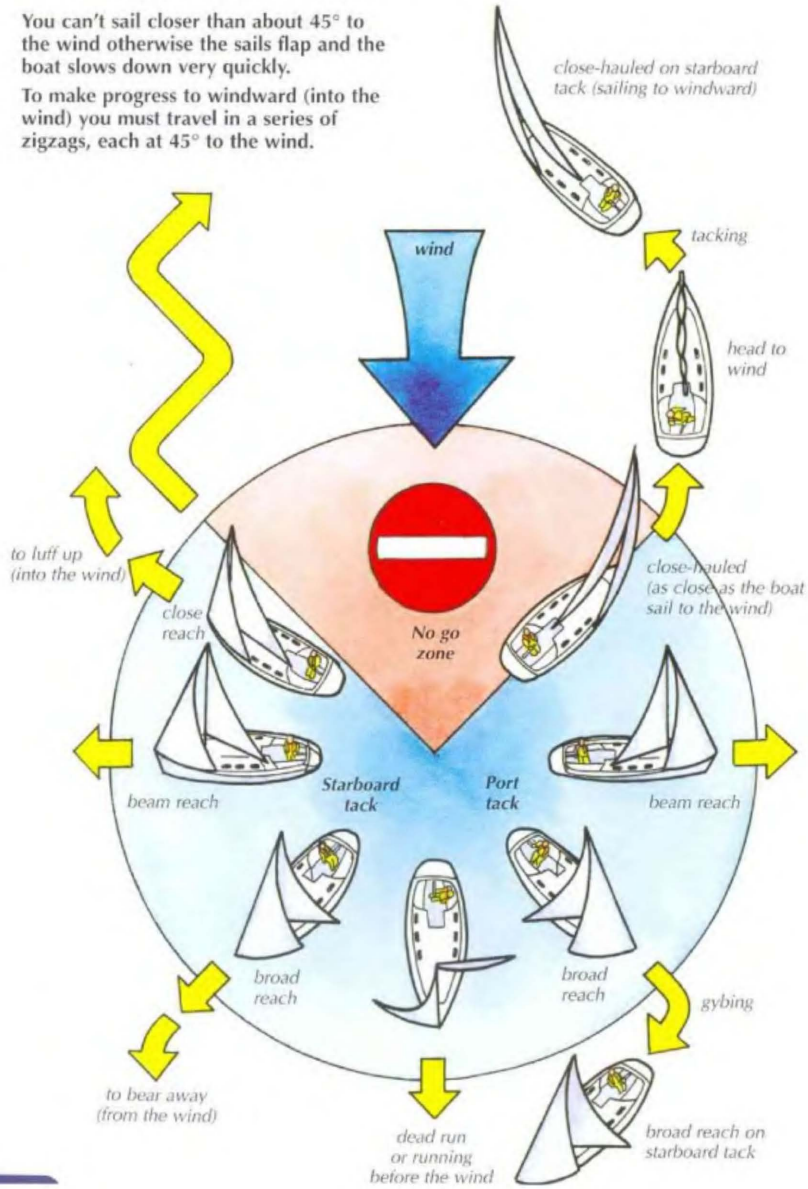
BELOW DECK



POINTS OF SAILING

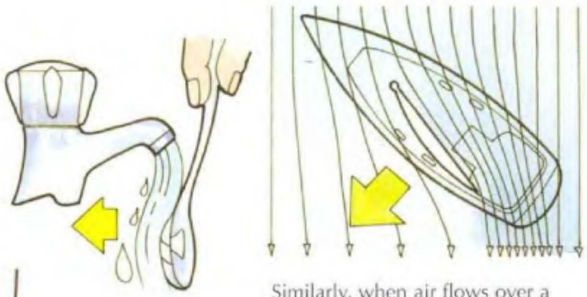
You can't sail closer than about 45° to the wind otherwise the sails flap and the boat slows down very quickly.

To make progress to windward (into the wind) you must travel in a series of zigzags, each at 45° to the wind.

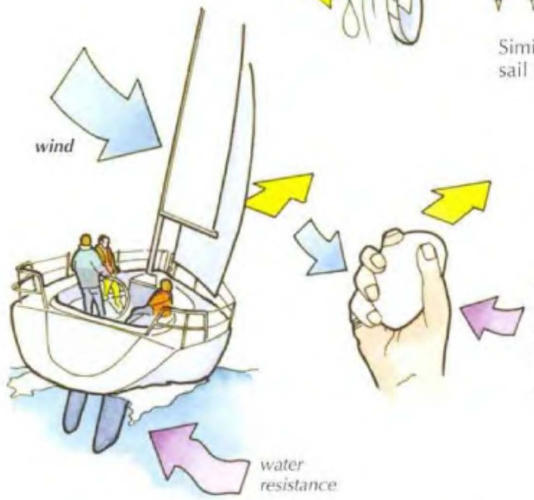


SIMPLE SAILING THEORY

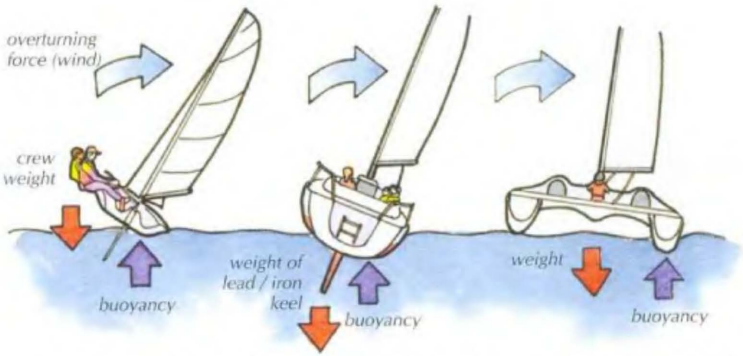
When you put a spoon into running water it is sucked into the flow.



Similarly, when air flows over a sail it creates a sideways force.

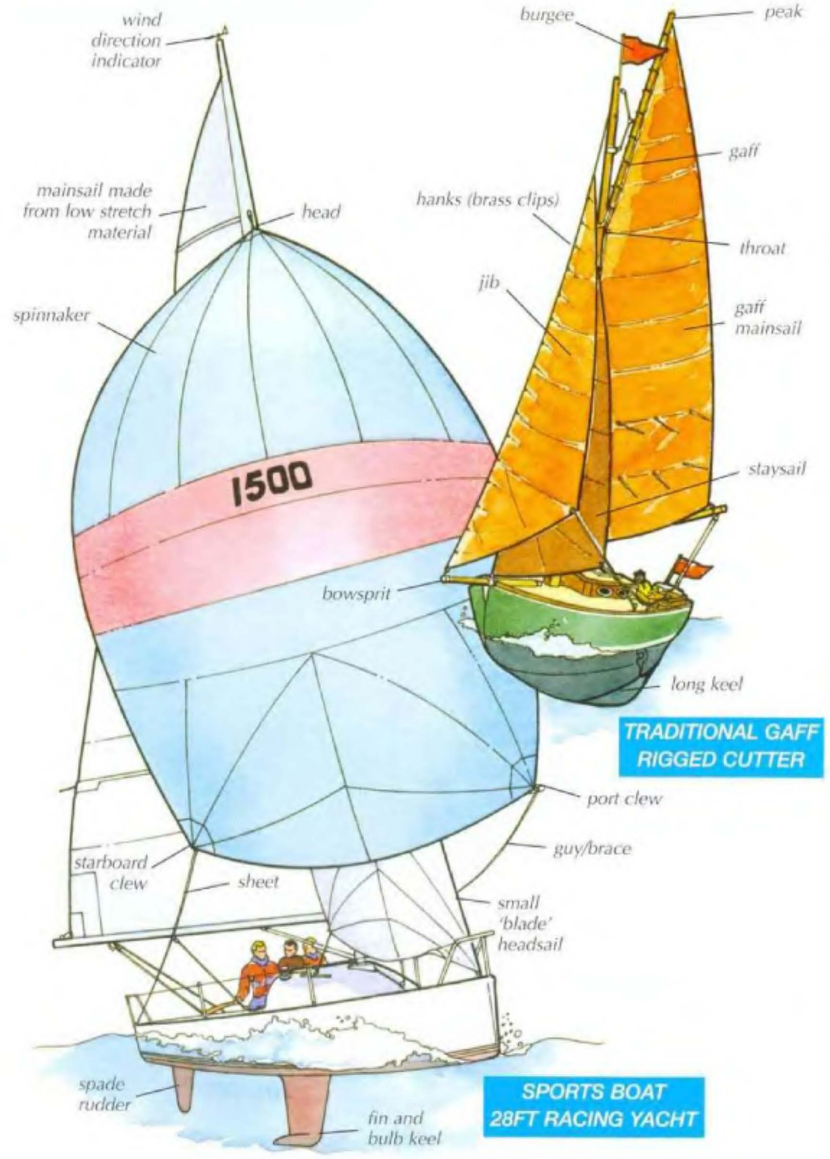


A combination of a sideways force from the sail and opposite resistance from the water pushes the boat forward like squeezing a bar of wet soap.

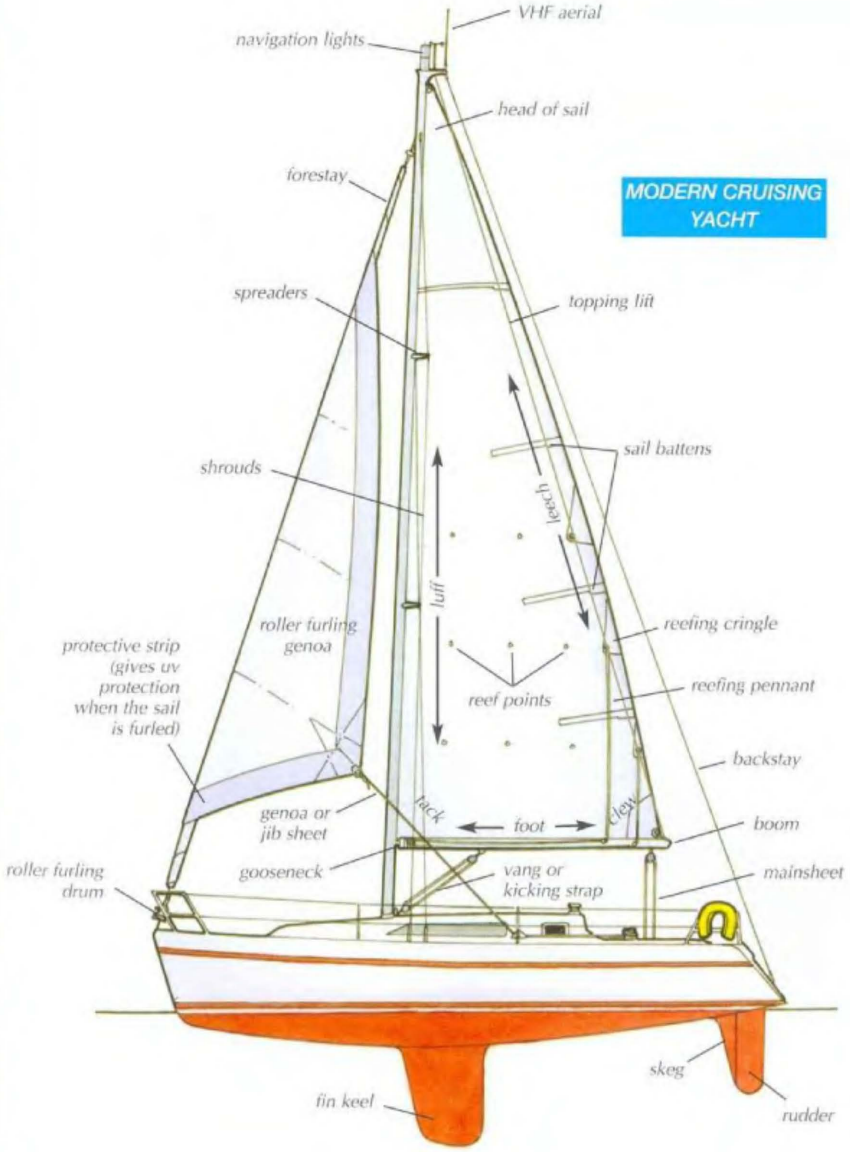


A sailing boat does not blow over as the force of the wind is counterbalanced by weight and buoyancy.

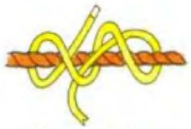
TYPES OF YACHT



TYPES OF YACHT



KNOTS



Rolling hitch

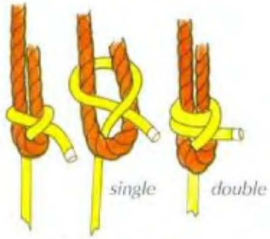
Used when you need a knot that won't slip when pulled at an angle. Ideal for taking the strain off another rope.

Round turn and two half hitches

Multipurpose knot. Can be untied under tension.

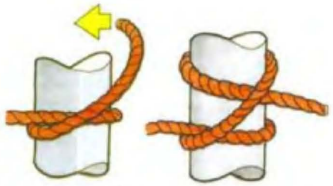
Reef knot

Mainly used for tying in reef points. Not very secure.



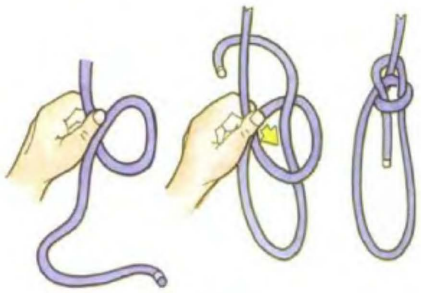
Sheet bend

Used for joining two ropes.



Clove hitch

Quick to tie and easy to adjust. Ideal for securing fenders.



Bowline

Makes a fixed eye in a rope which is very secure but can't be untied under tension. Many uses such as attaching jibsheets to sails and for loops in mooring lines.

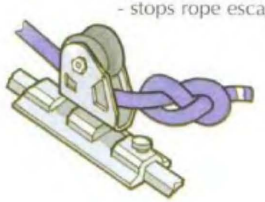
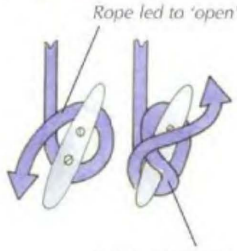


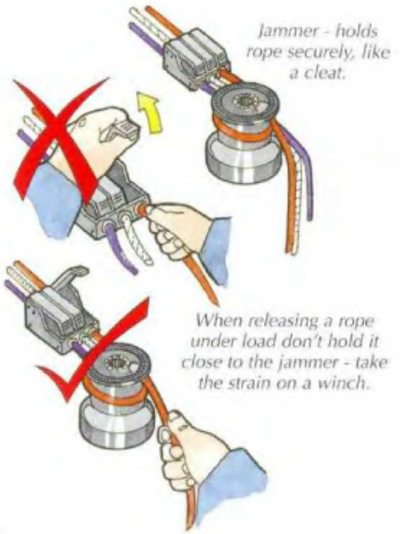
Figure of eight

Easy to tie stopper knot - stops rope escaping.

ROPEWORK

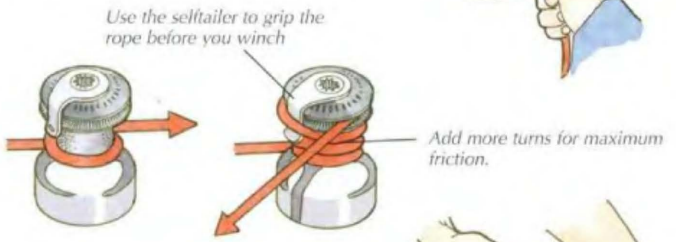
Making fast to a cleat

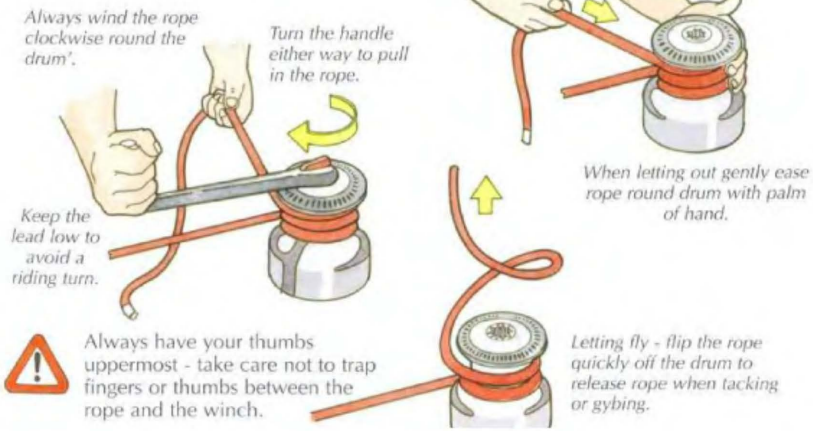




Winching techniques

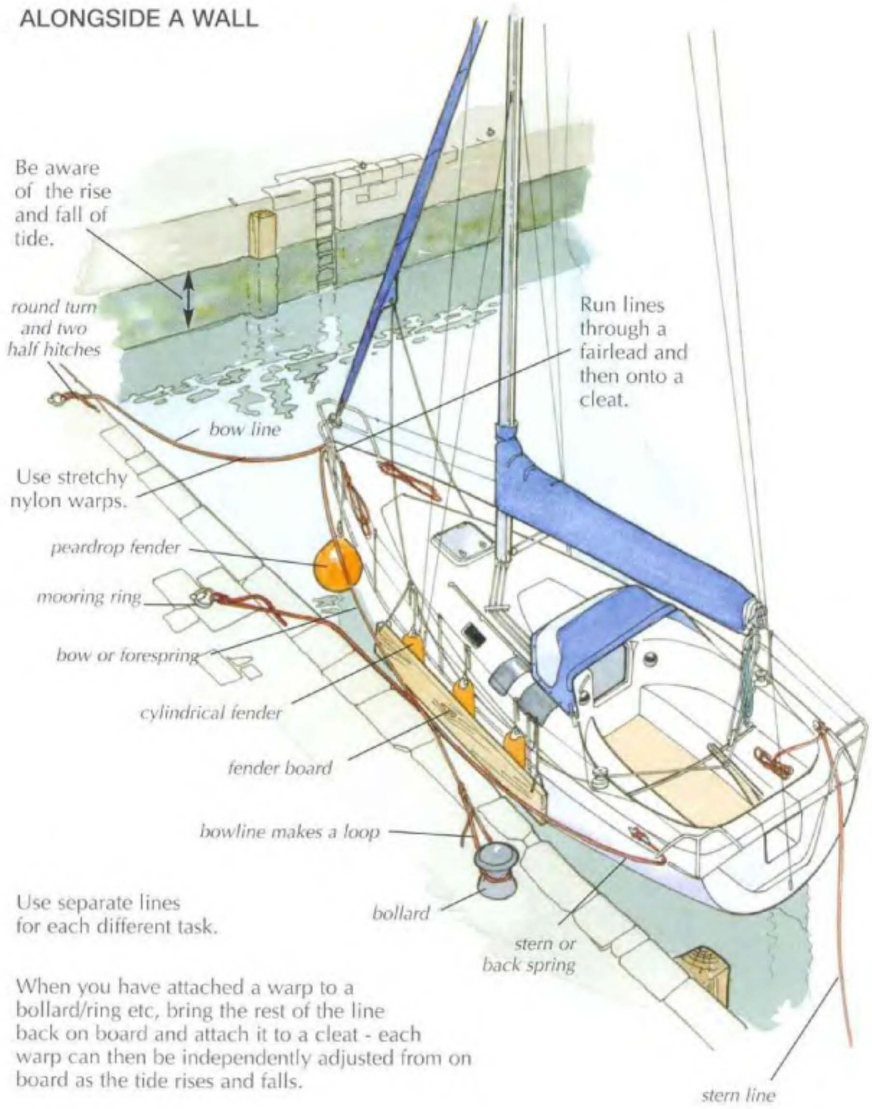
Using a winch gives more power for pulling in ropes.





Always have your thumbs uppermost - take care not to trap fingers or thumbs between the rope and the winch.

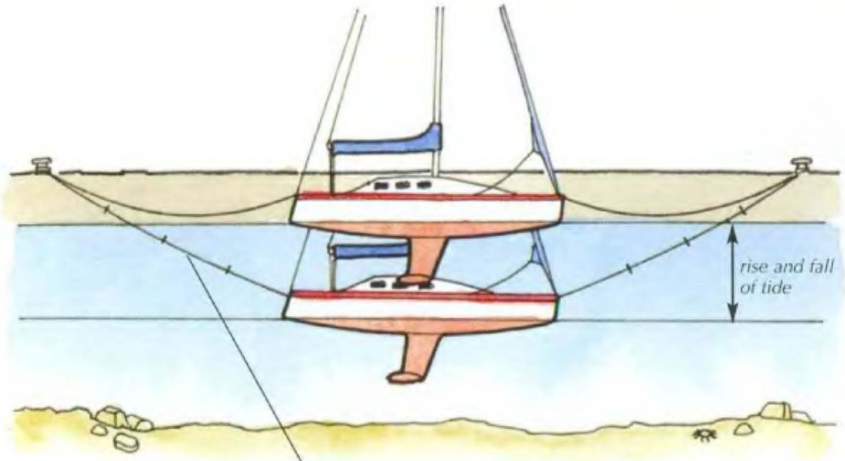
ALONGSIDE A WALL



Use separate lines for each different task.

When you have attached a warp to a bollard/ring etc, bring the rest of the line back on board and attach it to a cleat - each warp can then be independently adjusted from on board as the tide rises and falls.

MOORING ALONGSIDE

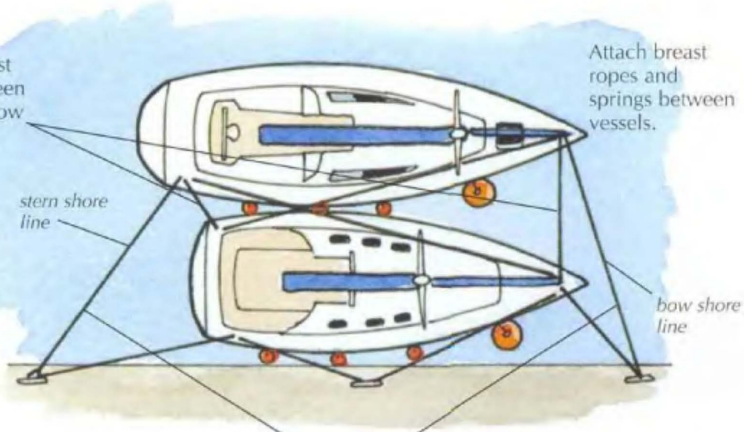


Length of warps should be at least 4 x the rise and fall of tide.

In a raft

Attach breast ropes between vessels at bow and stern.

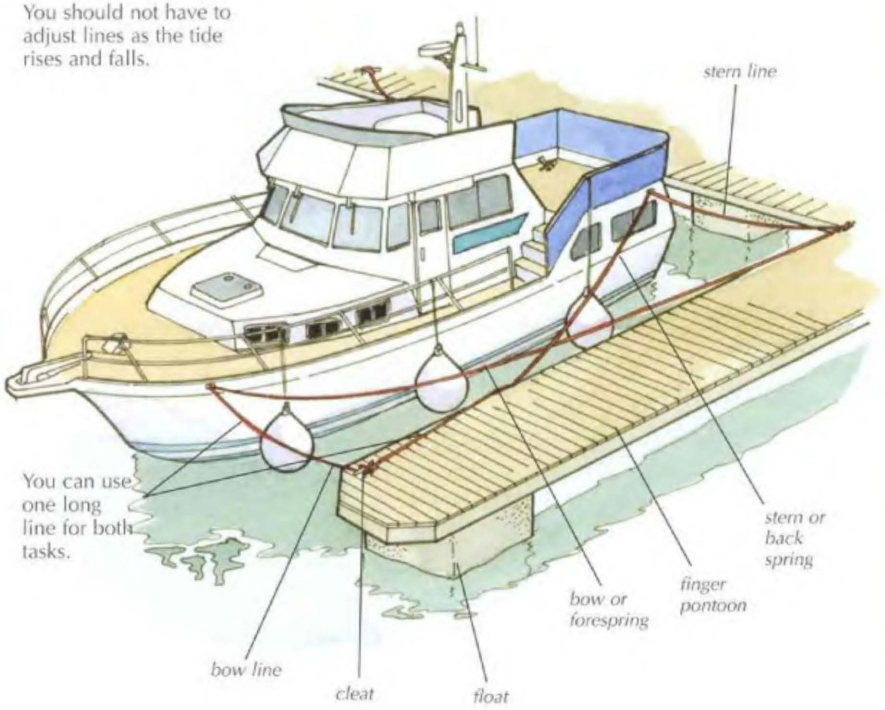
Attach breast ropes and springs between vessels.



Outside boat should take bow and stern lines ashore to minimise strain on the inside boat's shore lines.

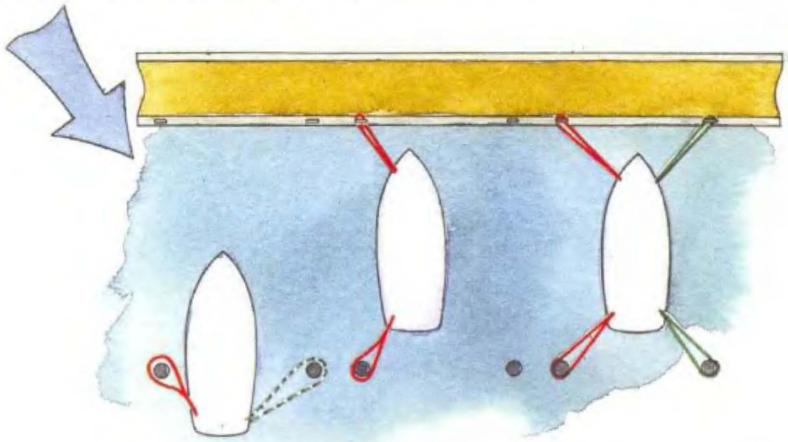
ON A FLOATING PONTOON

You should not have to adjust lines as the tide rises and falls.

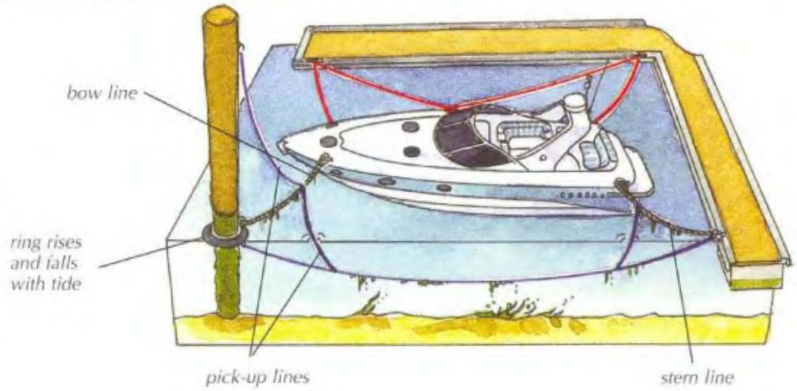


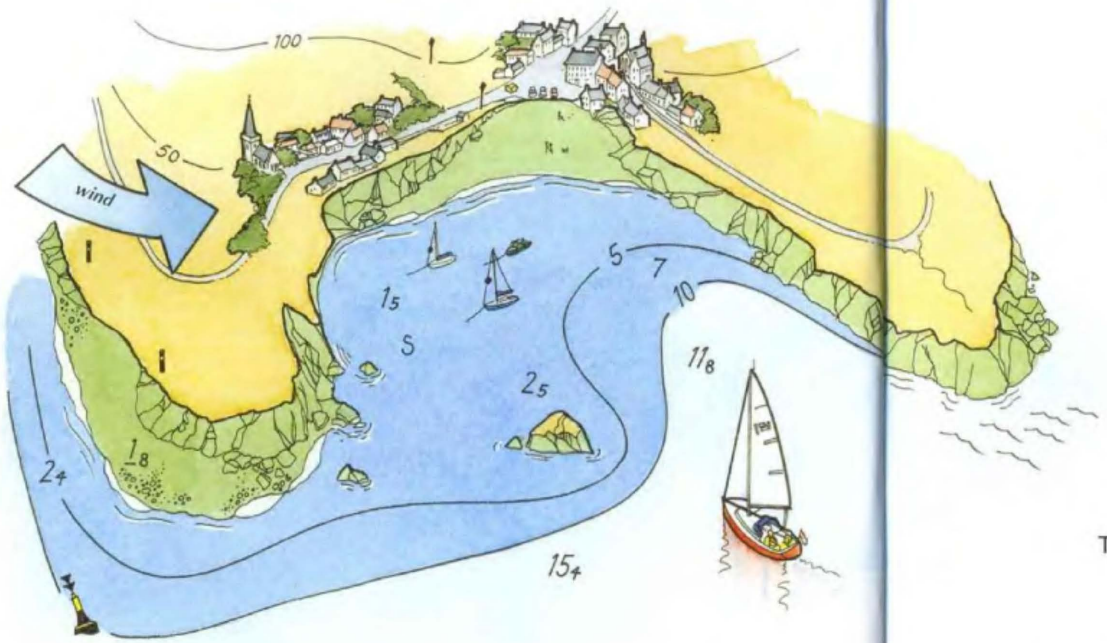
IN A PEN

Stern lines are attached to piles and the bow lines are attached to a wall or pontoon. Usually the windward lines are attached first.



In some countries one of the piles is replaced by a pontoon for ease of access to the shore. The lines are adjusted to allow access from the steps or amidships. Pick-up-lines are usually supplied on the piles to aid retrieval.





Selecting an anchorage

- Will you be sheltered? - look for maximum protection from wind, swell and tide.
- What is the sea bed like? - look at the chart symbols - mud and sand give better holding than rock or shingle.
- What will the tide do during your stay? - calculate the tide times and heights - make sure that you don't pick a spot where you will ground as the tide falls.
- Will you have enough swinging room? - allow for other boats, isolated rocks etc.
- Prepare the amount of anchor chain or warp that you need before dropping the anchor.

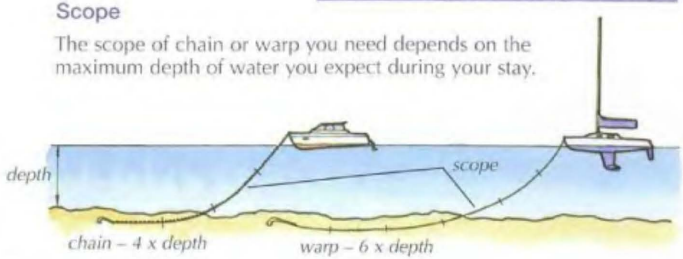
You don't necessarily need to anchor at the position of the anchor symbol. This is just a recommendation.

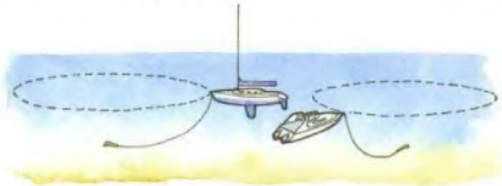
Avoid anchoring on or near the leading line - other boats may be coming in.

There will be much less tidal flow in the bay than outside.

Scope

The scope of chain or warp you need depends on the maximum depth of water you expect during your stay.





Always allow enough swinging room to account for wind and tide. Bear in mind that light/flat-bottomed boats will lie differently to deeper draft/low windage boats.

TYPES OF ANCHOR

Delta

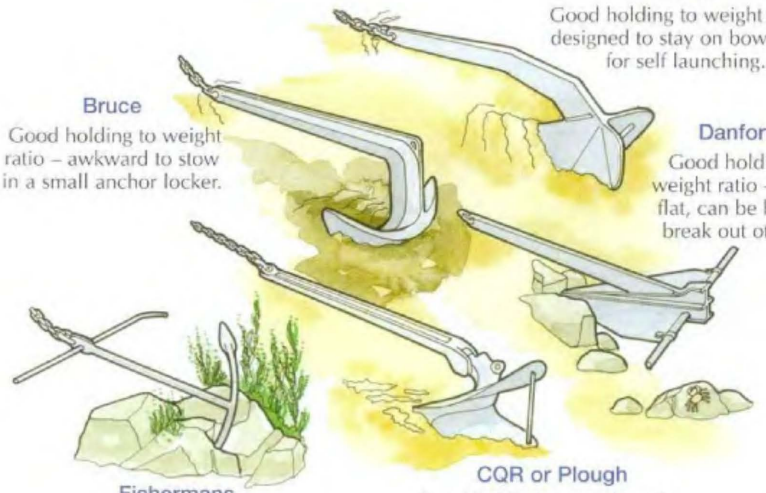
Good holding to weight ratio - designed to stay on bow roller for self launching.

Bruce

Good holding to weight ratio – awkward to stow in a small anchor locker.

Danforth

Good holding to weight ratio - stows flat, can be hard to break out of mud.



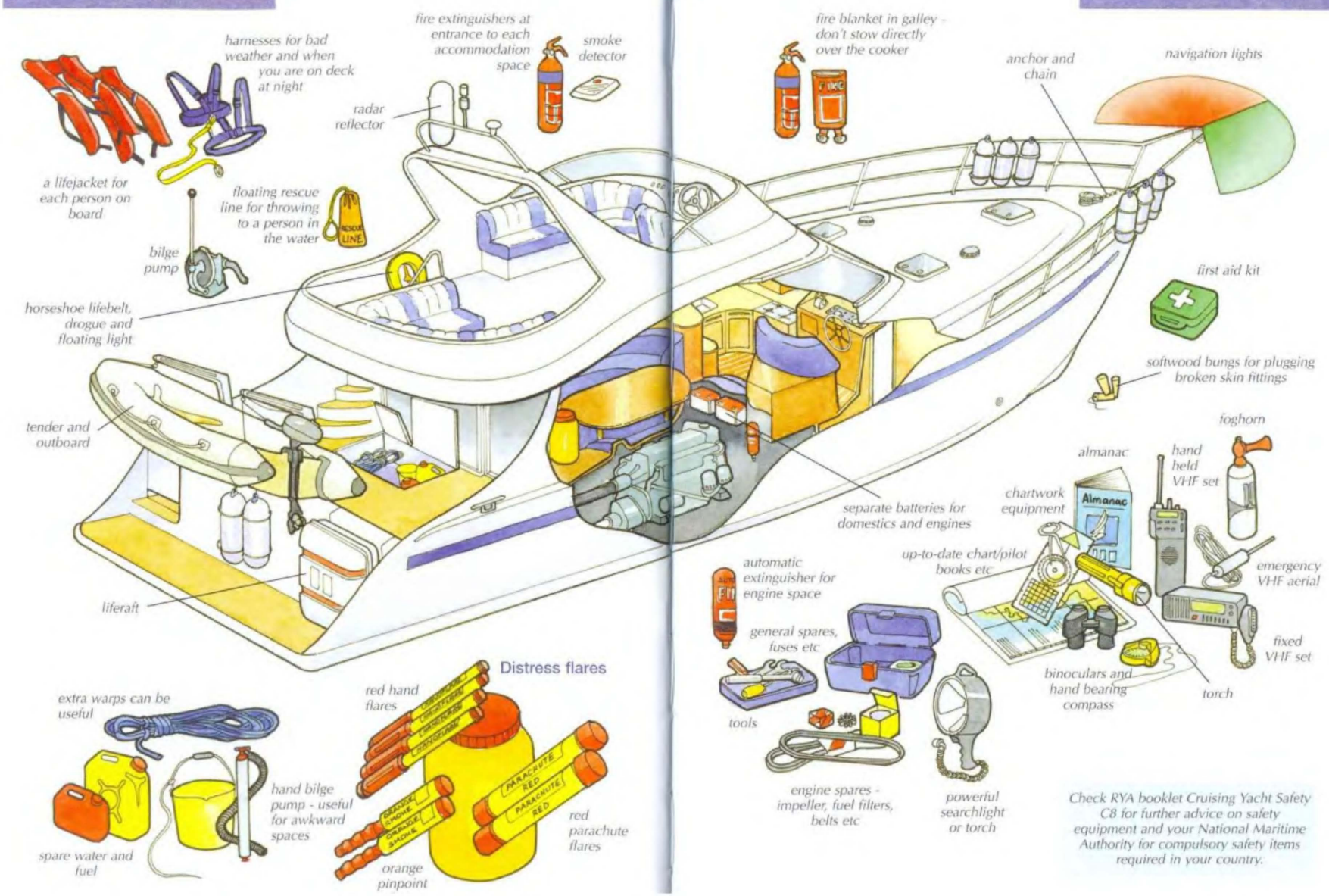
Fishermans

Traditional type, good for rocky & weedy bottoms – awkward to stow and poor holding power in sand and mud.

CQR or Plough

Good holding to weight ratio - hard to stow and moving parts can capsize.

SAFETY EQUIPMENT



Check RYA booklet Cruising Yacht Safety C8 for further advice on safety equipment and your National Maritime Authority for compulsory safety items required in your country.

Clothing

Man-made fibres layered to trap air for warmth.

PERSONAL SAFETY AND COMFORT

Ultra violet rays are harmful, may cause skin cancer and impair vision.

Reflection from the water increases the effect of the sun.

Wear a wide brimmed hat and/or one with neck protection. Use sun glasses with 100% UV protection.

FIRE SAFETY

Common causes of fire

Smoking below decks.

Solvents/paints stored below.

Gas build-up in the bilges.

Faulty wiring.

Cooking fats.

Extinguishers

Dry powder – don't use on flammable liquids
CO_2/Halocarbon – good for enclosed spaces
AFFF - foam, good for flammable liquids.

Splashing water from a bucket can be more effective than throwing its entire contents at a fire.

Blanket – good for smothering flames and if clothing is on fire.

Petrol/Gasoline vapour

Always vent engine space before starting an inboard petrol engine.

Keep outboards on deck to avoid the build-up of petrol vapour below.

'ous.

To clear gas - open hatches and turn downwind to vent fresh air through the boat.

Bilge pumps are designed to pump water - many won't clear gas very effectively.

Escaping gas is heavier than air and will sink into bilges.

Keep gas bottle in a sealed locker that drains overboard.

Shut-off valve inside

Don't attempt DIY repairs to your system -

FIRE FIGHTING

Location of extinguishers

Automatic for engine space.

Saloon

Forecabin

Extinguishers should be to hand near the exit to each accommodation space.

The engine space should have its own dedicated extinguisher which is automatic or can be activated remotely without having to open the engine compartment and let in oxygen.

Fighting the fire

Aim the extinguisher at the base of the flames.

Splashing water from a bucket can be more effective than throwing its entire contents at once.

Fire blankets can be used to smother a galley fire.

They are also essential for clothing fires.

REMEMBER

The boat will fill up with smoke very quickly.

- Get everyone on deck with a lifejacket.
- You may have to send a Mayday/fire distress flares etc.

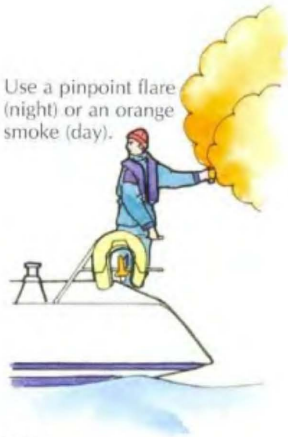
If you cannot fight the fire
BE PREPARED TO ABANDON SHIP.

EMERGENCY PROCEDURES

Boating is generally a safe pastime but, should the worst happen, make sure you and your crew know what to do.

Put on a lifejacket.

Alert the coastguard.



Use a pinpoint flare (night) or an orange smoke (day).

ABANDONING TO THE LIFERAFT

Make sure the painter is tied on.

Throw raft to leeward and tug painter to inflate.

Board raft from the yacht. Stay dry.

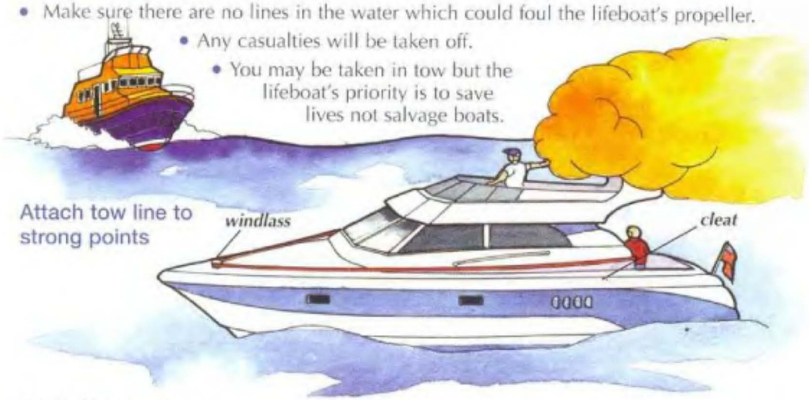
Put heaviest, strongest crew in first to stabilise the raft and assist others in boarding.

Once aboard:
- cut painter
- paddle away
- stream drogue
- close door
- take seasickness tablets
- keep as warm and dry as possible
- ventilate interior every hour.

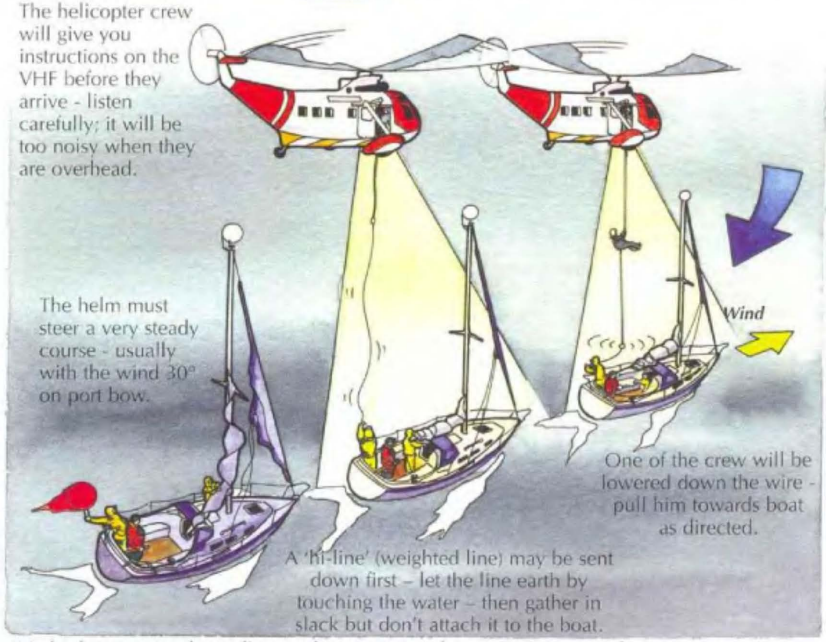
EMERGENCY SERVICES

RESCUE

- The lifeboat coxswain will need to talk to you to assess the situation.
- Make sure there are no lines in the water which could foul the lifeboat's propeller.
- Any casualties will be taken off.
- You may be taken in tow but the lifeboat's priority is to save lives not salvage boats.



The helicopter crew will give you instructions on the VHF before they arrive - listen carefully; it will be too noisy when they are overhead.



The helm must steer a very steady course - usually with the wind 30° on port bow.

One of the crew will be lowered down the wire - pull him towards boat as directed.

A 'hi-line' (weighted line) may be sent down first – let the line earth by touching the water – then gather in slack but don't attach it to the boat.

Methods may vary depending on the country and organisation, some lower rescue cages.

VHF VOICE CALL

Use VHF to alert the coastguard and other vessels in your area.

You must tell them:

- your boat's name
- your position
- how many people are on board
- what assistance you require.

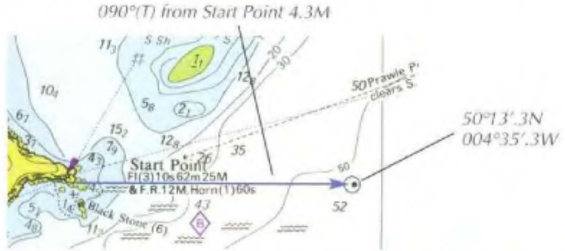
VHF is better than a mobile phone for distress calling - other vessels in your area will hear your call and the coastguard can use VHF transmissions to fix your position.

A mobile phone will only tell one person that you are in trouble; the network coverage is patchy away from land and you won't be able to talk direct to a helicopter or lifeboat.

DIGITAL VHF (DSC) CALL

You may not have time to send a voice call but some modern VHF sets can:

- send a distress alert or urgency call at the press of a button.
- be linked to a GPS to give your position.



MAYDAY

When life or vessel are in grave and imminent danger:

Mayday x 3
This is motor yacht *Puffin* x 3
Mayday yacht *Puffin*
(give MMSI if fitted with DSC)
My position is 50°13'.3N 04°35'.3W
We are holed and sinking and require immediate assistance
Six persons on board
Over

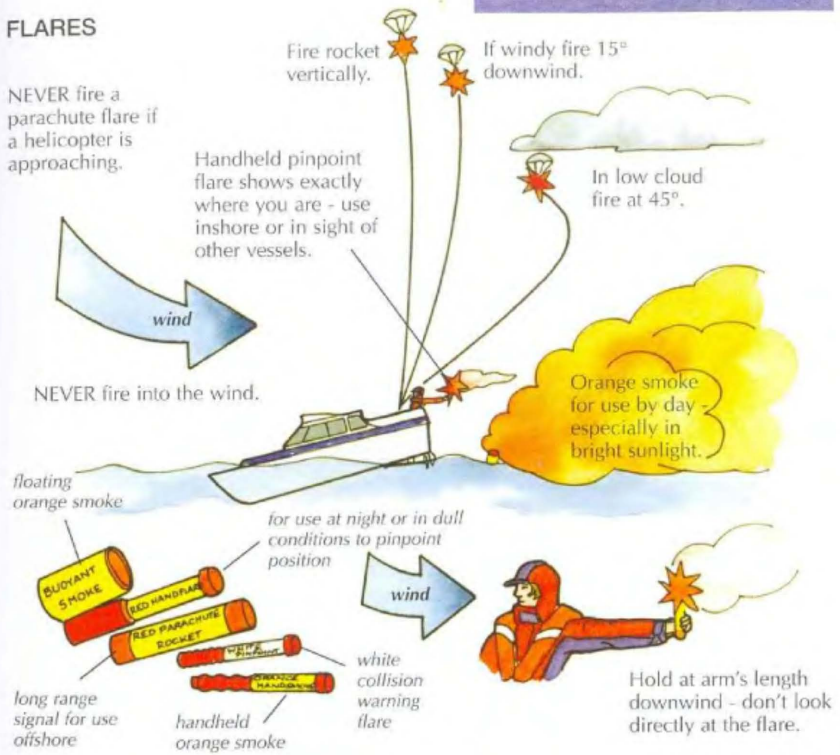
PAN PAN

Urgency message - if crew or vessel need assistance:

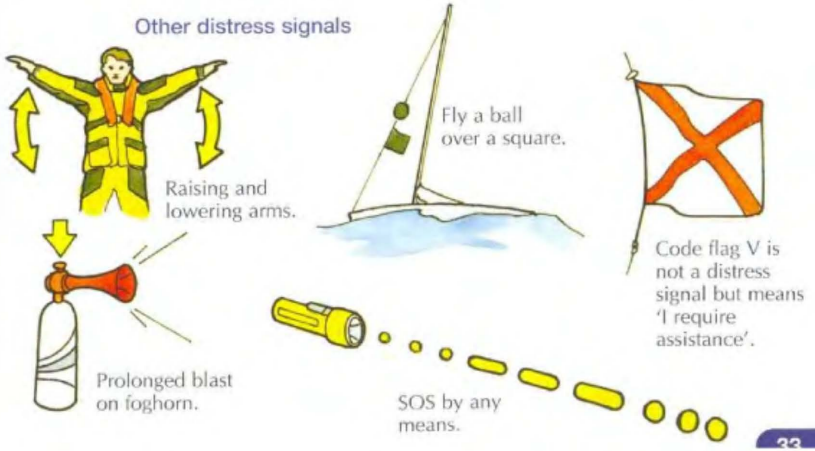
Pan Pan x 3
All ships x 3
This is yacht *Seaspray* x 3
(give MMSI if fitted with DSC)
My position is 090°(T) from Start Point 4.3 miles
I have a broken rudder and require a tow
Four persons on board
Over

You may use a VHF radio under the supervision of a qualified person or to make a distress call - otherwise you need an operator's certificate. Contact the RYA or your National Maritime Authority for details of courses.

FLARES

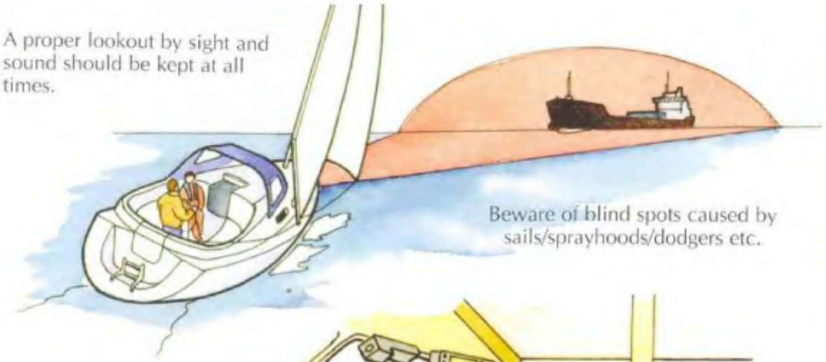


Other distress signals

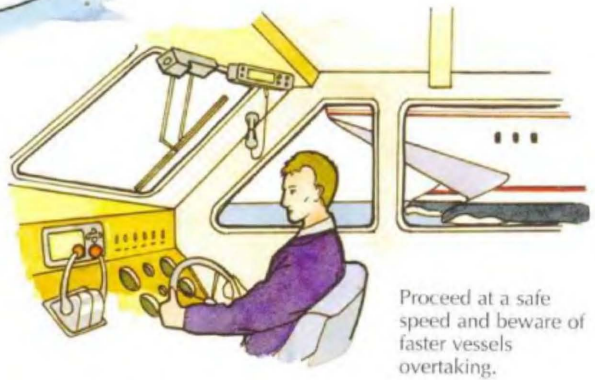


RULES OF THE ROAD

A proper lookout by sight and sound should be kept at all times.

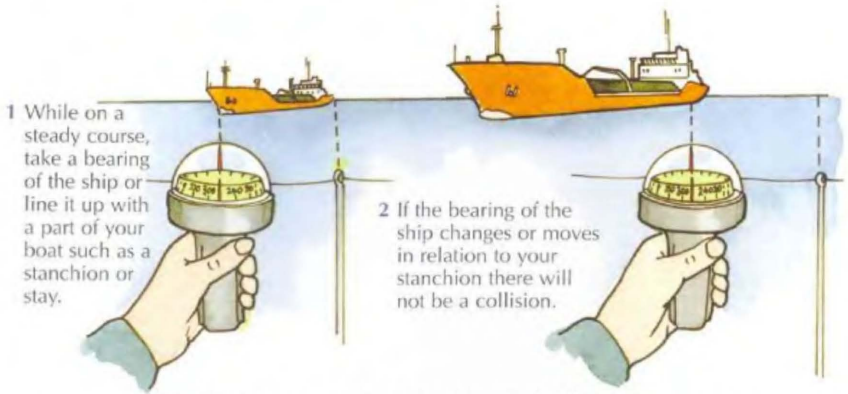


Beware of blind spots caused by sails/sprayhoods/dodgers etc.



Proceed at a safe speed and beware of faster vessels overtaking.

How can we tell if a risk of collision exists?



1 While on a steady course, take a bearing of the ship or line it up with a part of your boat such as a stanchion or stay.

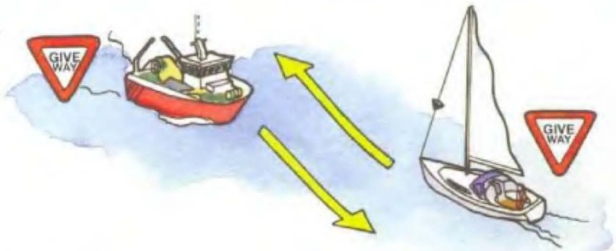
2 If the bearing of the ship changes or moves in relation to your stanchion there will not be a collision.

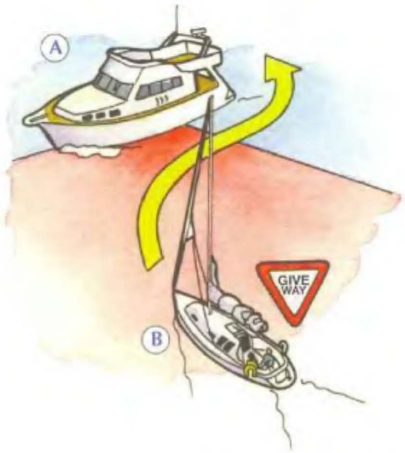
If the bearing stays steady or the ship remains lined up with your stanchion - a risk of collision exists.

WHO GIVES WAY?

Head-on situation -

Both vessels turn to starboard.





Crossing situation -

A is on the starboard side of B
B gives way to A.

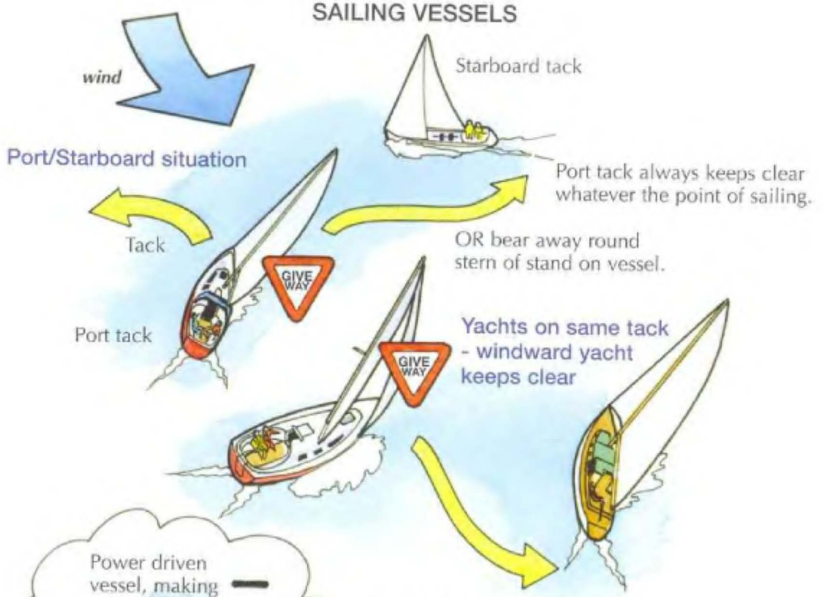
Overtaking situation

Stand-on vessels must keep a steady course and speed.

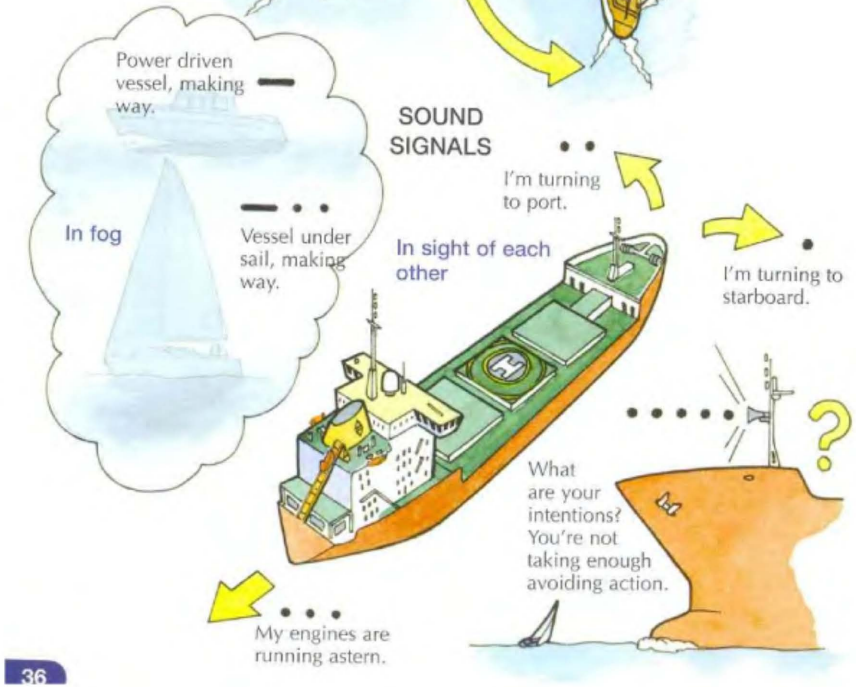
Any vessel in this sector - power or sail - must give way to the vessel being overtaken.

Give-way vessels must make their intentions clear, by making an early, bold alteration of course.

SAILING VESSELS



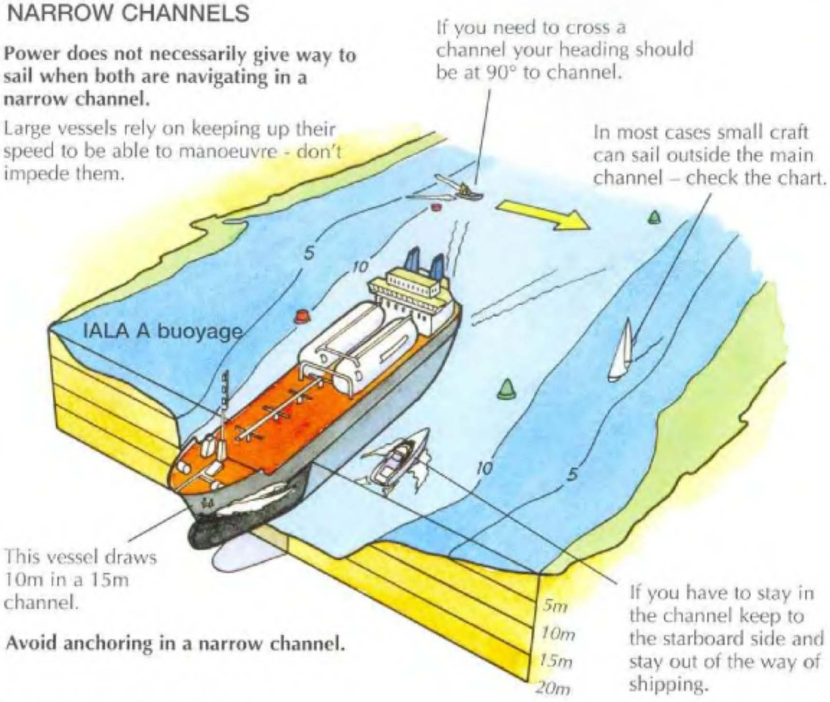
SOUND SIGNALS



NARROW CHANNELS

Power does not necessarily give way to sail when both are navigating in a narrow channel.

Large vessels rely on keeping up their speed to be able to manoeuvre - don't impede them.

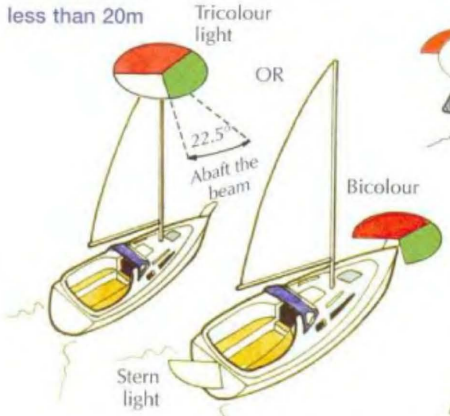


Avoid anchoring in a narrow channel.

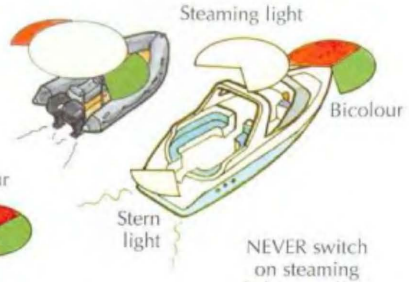
IN ORDER OF PRIORITY

UNDER SAIL

less than 20m



POWER-DRIVEN VESSELS

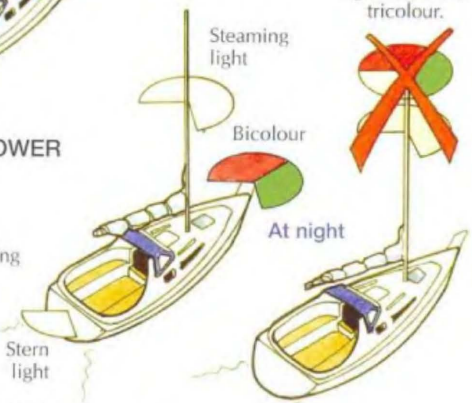


NEVER switch on steaming light as well as tricolour.

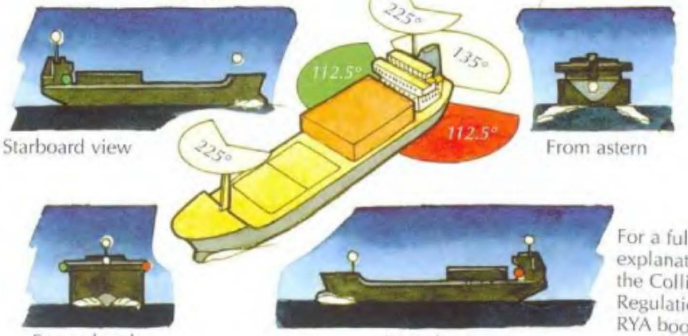
SAILING VESSEL UNDER POWER

By day

At night



Larger ships (over 50m) must have two steaming lights.



For a full explanation of the Collision Regulations see RYA book G2.

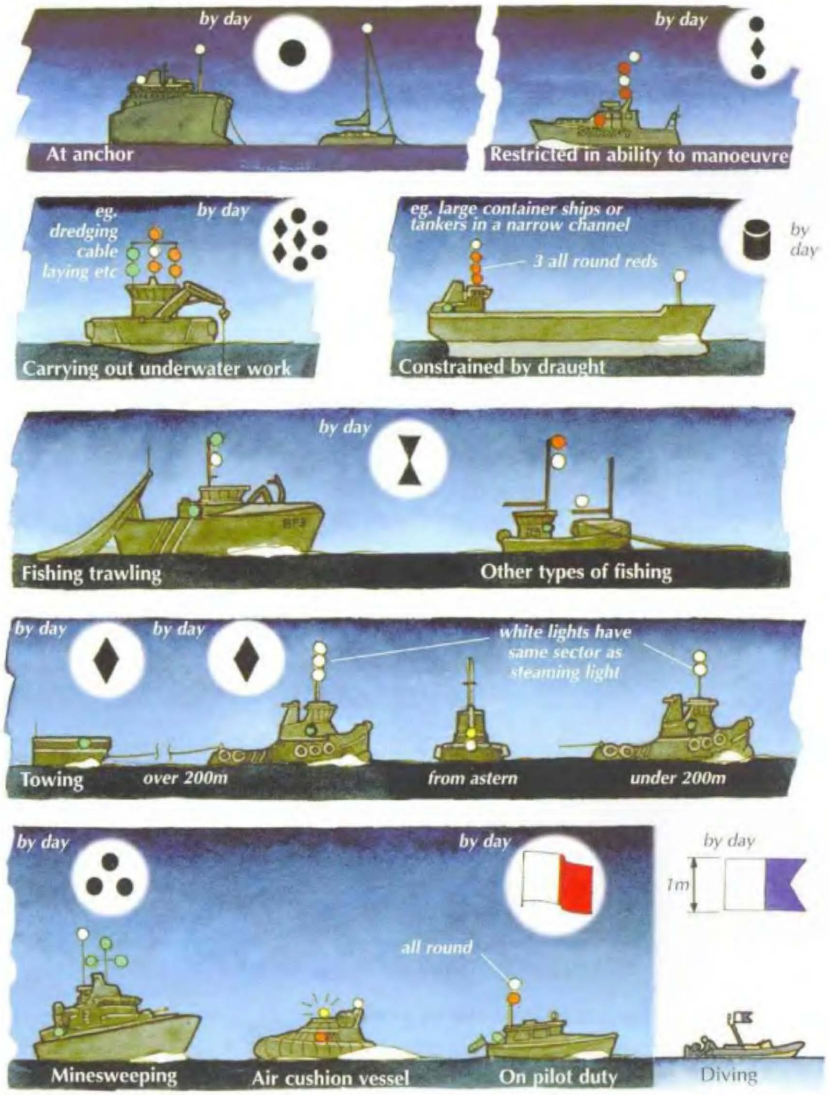
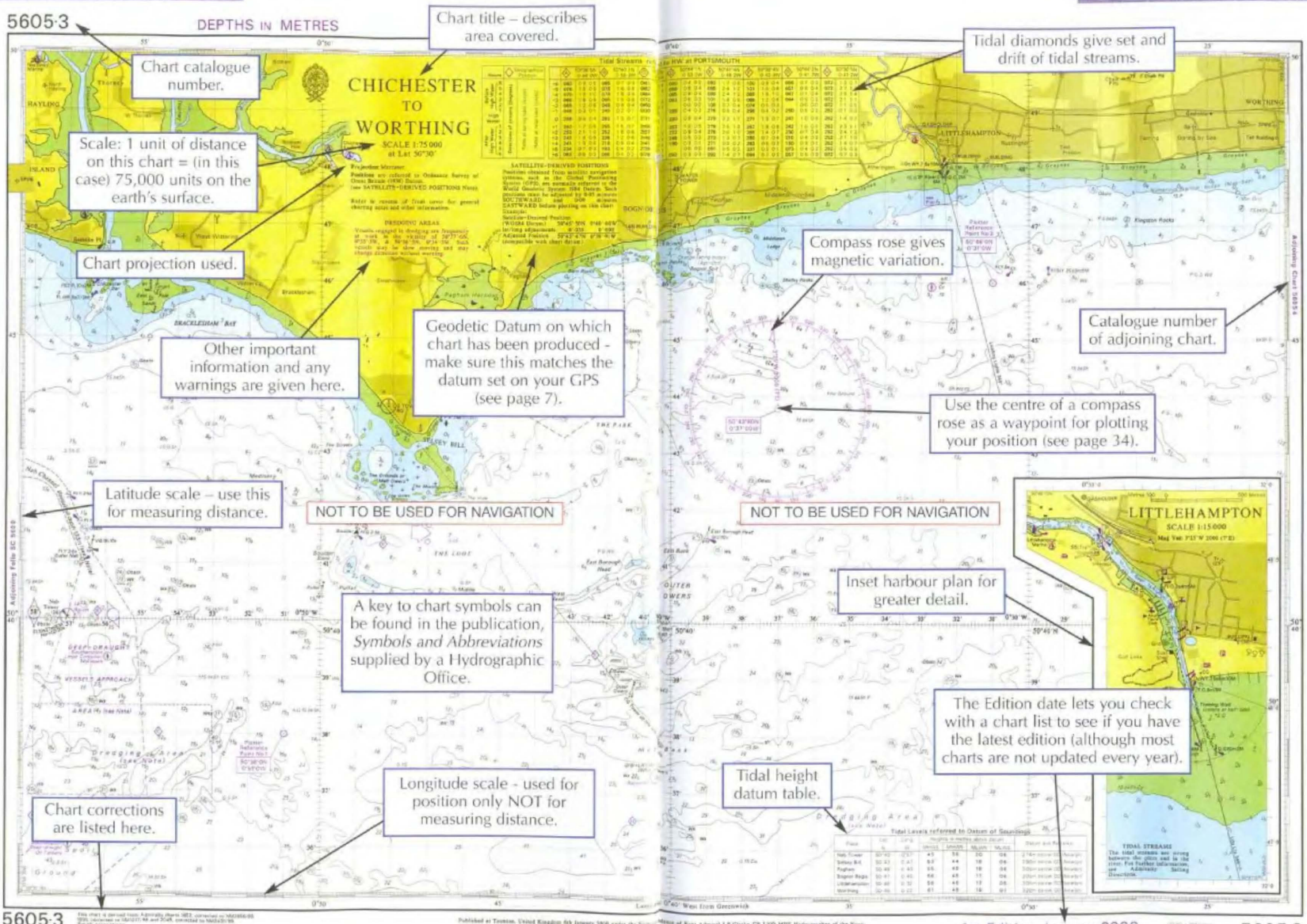
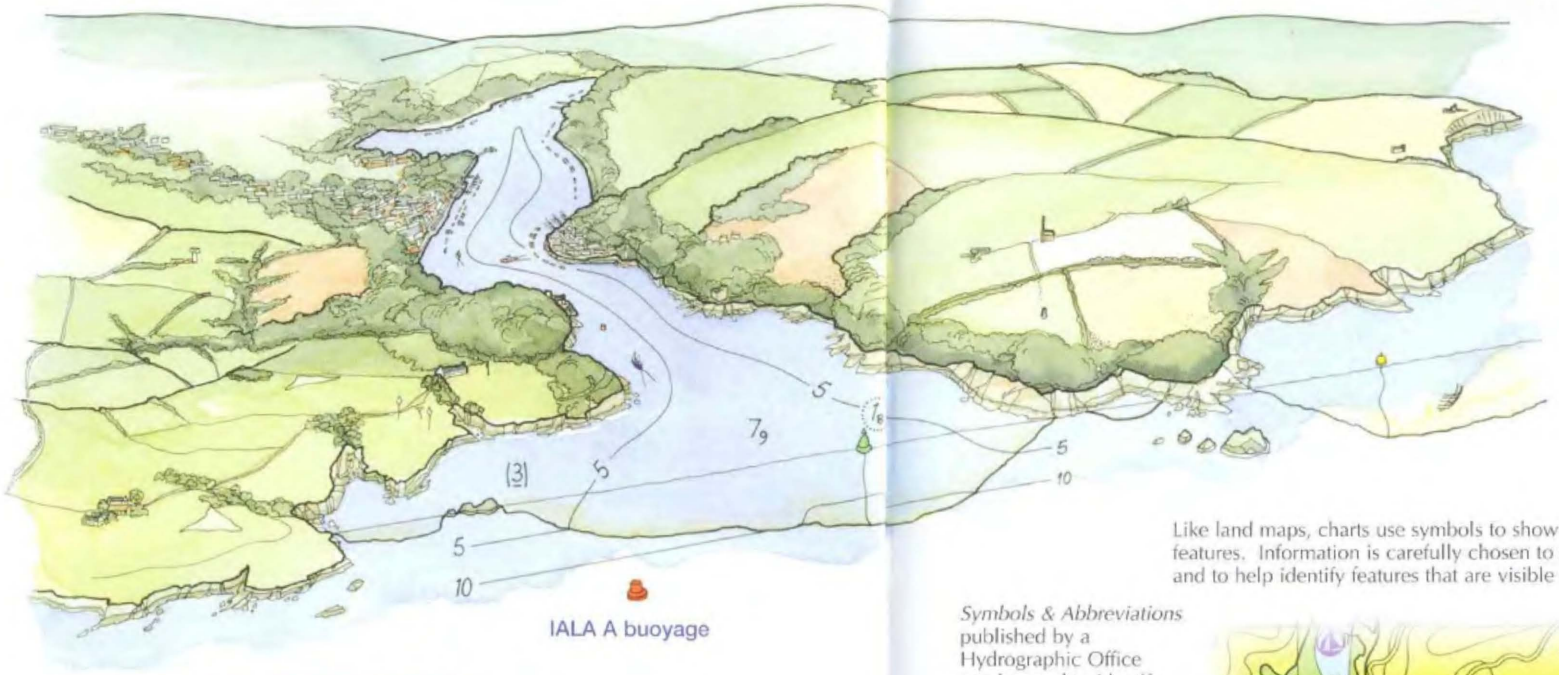
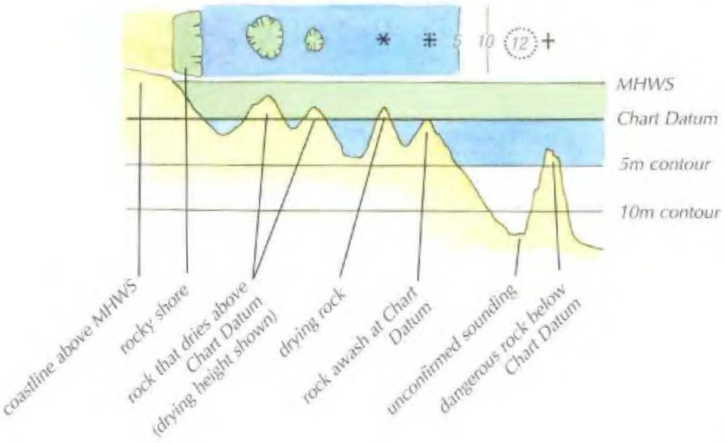


CHART FEATURES





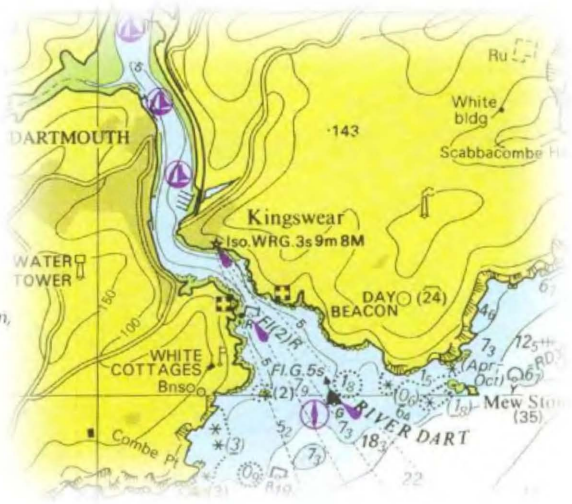
IALA A buoyage



Like land maps, charts use symbols to show useful and important features. Information is carefully chosen to show hazards clearly and to help identify features that are visible from a boat at sea.

Symbols & Abbreviations published by a Hydrographic Office can be used to identify features and symbols on the chart.

- *Beacon*
- *Yacht harbour/marina*
- *Can buoy, cylindrical buoy*
- *Wreck, depth unknown, not considered dangerous to surface navigation.*
- *Battery, small fort*
- *Chimney*
- *Steep coast, cliffs*
- *Building*



IALA A buoyage

BY LATITUDE AND LONGITUDE

Lines of longitude run from pole to pole dividing the earth into segments rather like an orange.

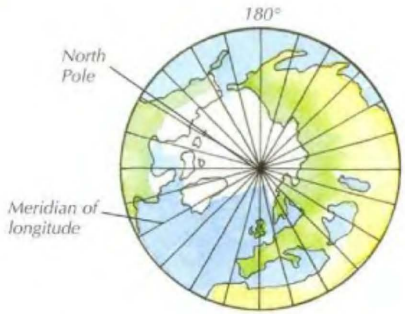
Lines of latitude are obtained by projecting angles made from the centre of the earth to points on its surface.

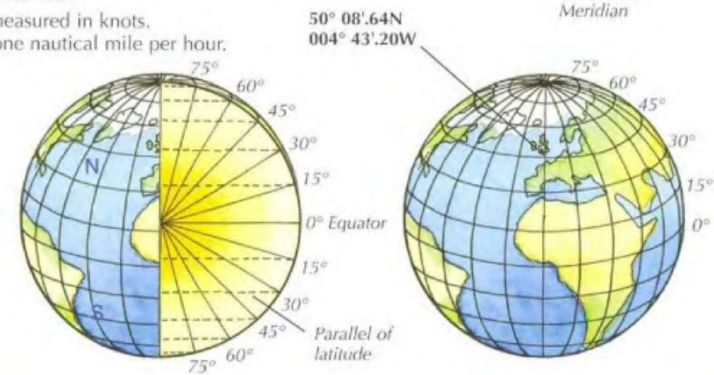
Distance and speed

For all practical purposes a mile at sea is 1852 metres.

1° = 60′ minutes of latitude
1′ = 1 nautical mile

Speed is measured in knots.
A knot is one nautical mile per hour.



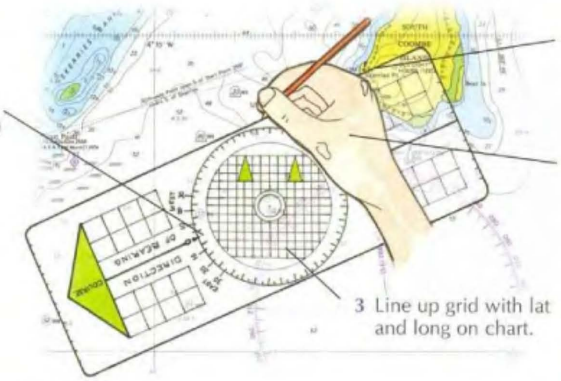


Plotting your position

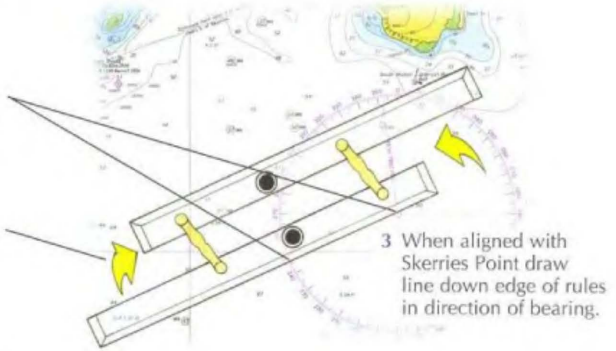
BY DISTANCE AND BEARING

eg. 246°(T) from Skerries Point 1.6M

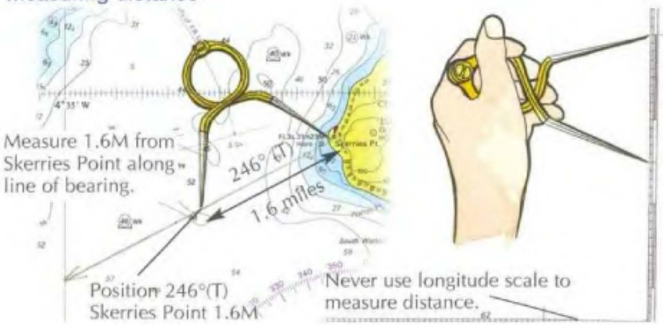
With a plotter



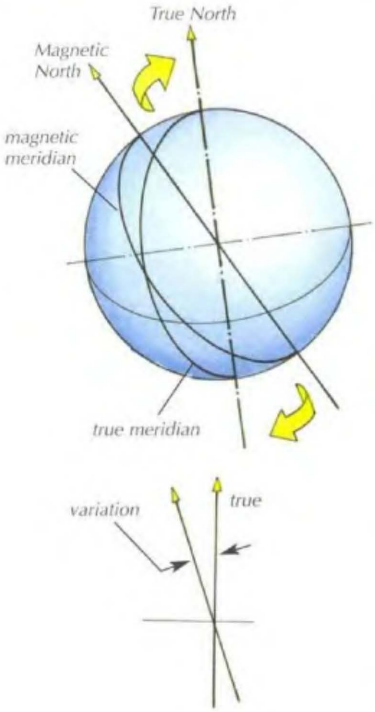
With parallel rules



Measuring distance



VARIATION



Charts show North as True (geographic) North. A compass can only point to Magnetic North, which changes with time and according to your position.

The difference between True and Magnetic North is called *variation.*

Variation for your position is found on the nearest compass rose

If variation is **West,** magnetic bearing is **greater** than true bearing.

If variation is **East,** magnetic bearing is **smaller.**

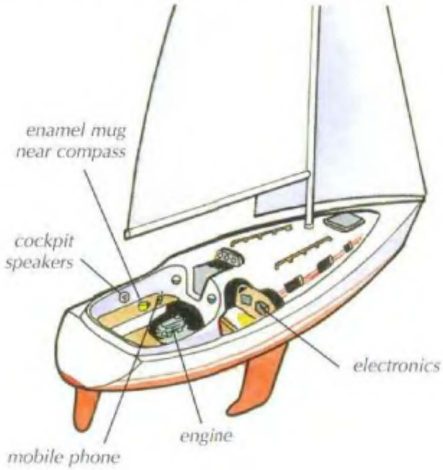
for example

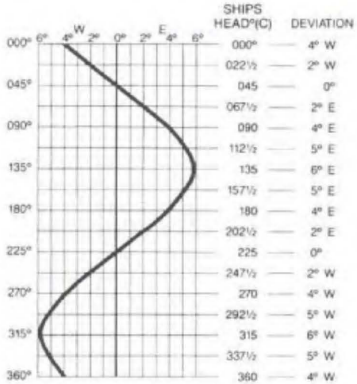
With 5°W variation
070°(T) = 075°(M)

With 5°E variation
070°(T) = 065°(M)

DEVIATION

Deviation is caused by ferrous metals and electro-magnetic fields on board which will affect the accuracy of the compass.



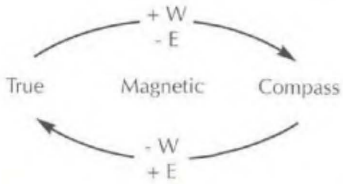


The ship's compass is swung to check the effect of magnetic influences on board, this will vary as the boat's heading changes.

A card can be produced for your steering compass showing the deviation for each heading.

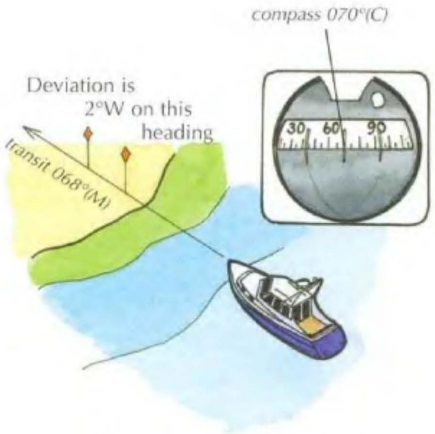
How to apply variation and deviation

Chartwork is in °True -
compass courses must be in °Compass



Finding a compass course

True bearing from chart	060°(T)
Variation	+ 7°W
Magnetic bearing	= 067°(M)
Apply deviation from card	– 2°E
Compass course	**= 065°(C)**

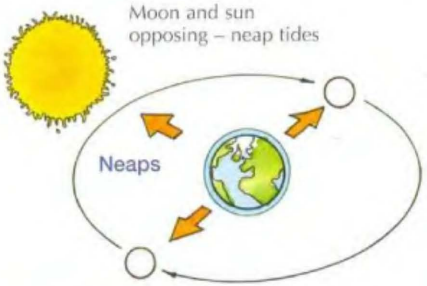


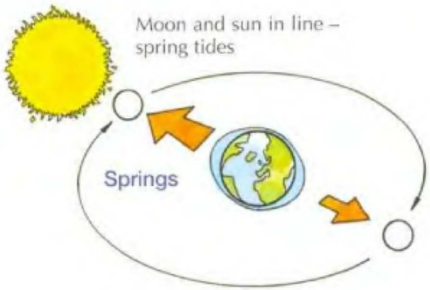
Checking for deviation

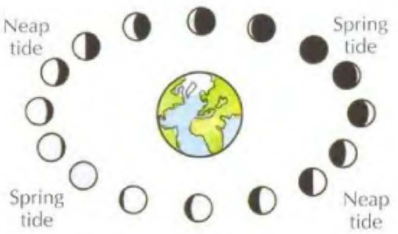
Point the boat straight at a transit and compare results.

TIDES

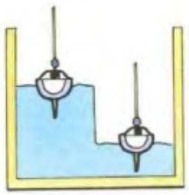
The gravitational pull of the moon and sun is the main cause of tides.



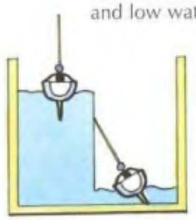




Moon orbits the Earth over a 28 day cycle creating Spring and Neap tides



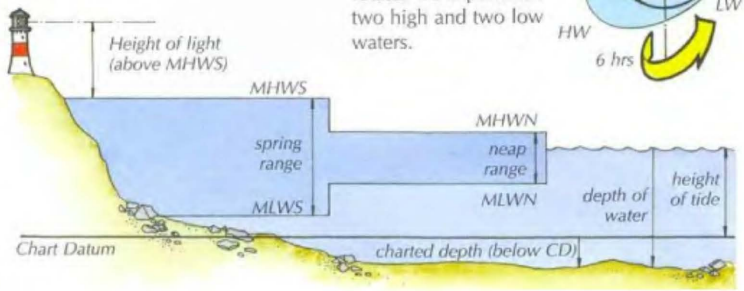
Difference between high and low water = tidal range.



Daily tides

Each day as the earth rotates we experience two high and two low waters.

Tidal terms

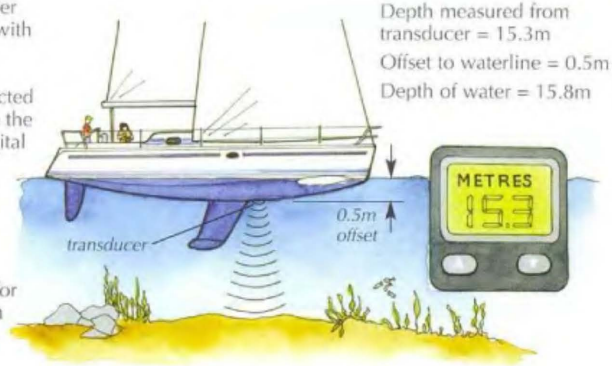


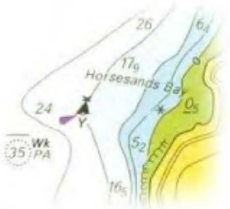
HOW MUCH WATER?

The depth of water under your boat is measured with an echo sounder – ultrasonic signals are transmitted to and reflected from the seabed to give the depth of water on a digital or analogue display.

The transducer is sited below the waterline - allow for this when reading the display.

You can also calibrate for the display to read from waterline or bottom of keel.





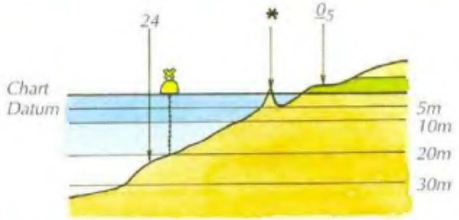


Chart shows depths you are likely to meet at the lowest predicted tide – Chart Datum (CD).

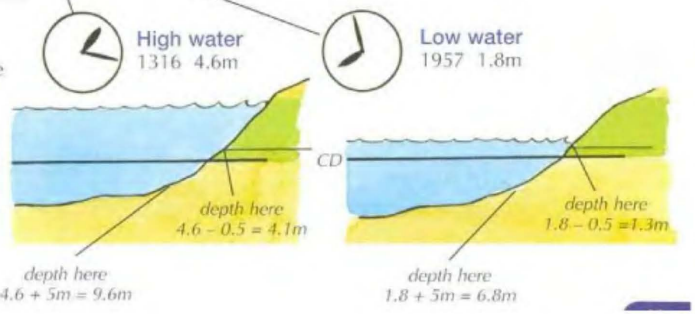
	Time	m
16	0043	4.5
	0715	2.0
TU	1316	4.6
	1957	1.8
17	0206	4.7
	0835	1.7
W	1440	4.8

Height of tide is measured above CD

Tide tables give the times and heights of high and low water for different ports.

ADD depths below CD to the height of tide.

SUBTRACT drying heights from the height of tide.

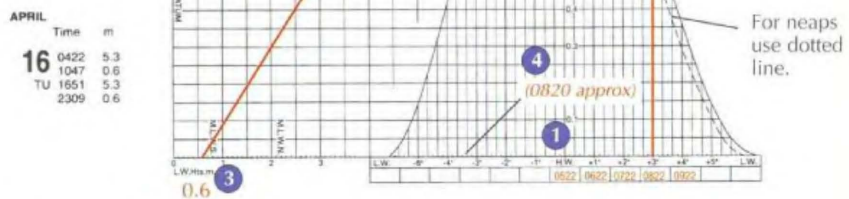


STANDARD PORTS

Standard ports – tide tables are produced for larger ports and give times and heights of high and low water for every day of the year. Tide times may need correcting for local changes, such as; differences in time zone from Universal Time (UT) and in countries operating Daylight Saving Time in summer time (BST in UK).

Tidal curves

Use these for finding out depth of water at any time between high and low water.



e.g. What will be the height of tide at 0820 on Tues 16th April?

1. enter HW ht (local time) and fill in the boxes for each hour after HW
2. & 3. mark in the heights of HW and LW and draw a line between them
4. find 0820 on bottom scale
5. draw line upwards to hit the curve, across to meet the HW/LW line then up to the HW scale
6. there will be **3.4m at 0820**

You can also find out when there will be a specific depth - ie at what time will there be 3.4m height of tide?

Go down to the HW/LW line from the HW scale, across to the curve and down to the time scale = 0820.

SECONDARY PORTS

Secondary ports – tide tables are not produced for minor ports. To find the height and times of HW and LW at these secondary ports you will need to apply corrections, usually found in an almanac, to the times and heights of the nearest standard port.

CARTERET Manche
Standard Port ST-MALO (→)

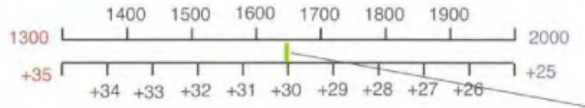
Times				Height (metres)			
High Water		Low Water		MHWS	MHWN	MLWN	MLWS
0100	0800	0300	0800	12.2	9.2	4.3	1.6
1300	2000	1500	2000				
Differences CARTERET							
+0035	+0025	+0020	+0035	-1.6	-1.1	-0.6	-0.3

Time difference – if HW St. Malo is at 0100 or 1300 HW Carteret is 35 minutes later but when HW St. Malo is at 0800 or 2000 HW Carteret is 25 minutes later.

Height difference – when HW at St Malo is 12.2m it is 1.6m less at Carteret. When HW is 9.2m, it is 1.1m less at Carteret.

However if HW and LW times fall between these set times you will need to interpolate between the 'differences' figures -

e.g. if HW St. Malo is at 1630 what time is HW Carteret?

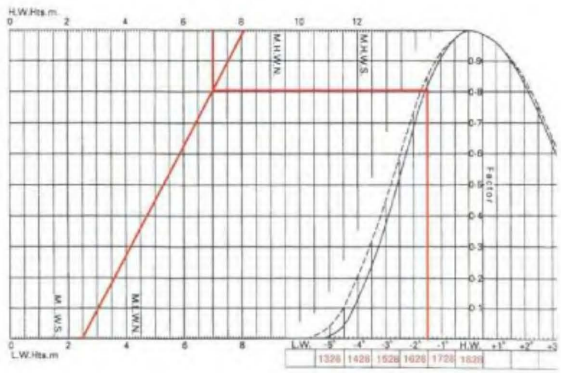


Use the same method to interpolate height differences.

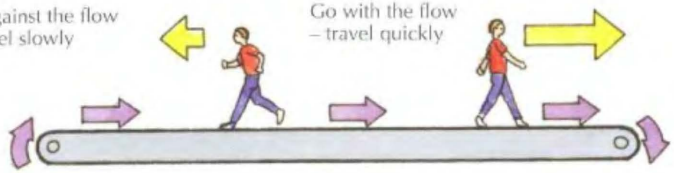
To find the height of tide between HW and LW at a secondary port use a tidal curve in the same way as for a standard port.

Use the related standard port.

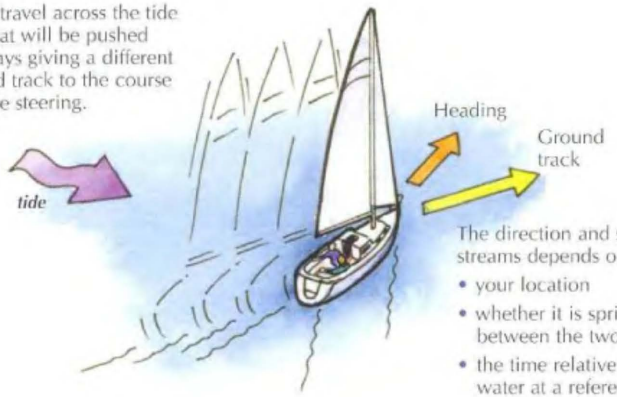
For example to find tidal information for Carteret you should use the curve for St. Malo.



Consider the tide as a travelator



If you travel across the tide the boat will be pushed sideways giving a different ground track to the course you are steering.

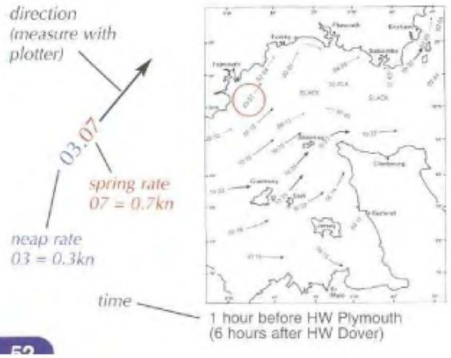


The direction and strength of tidal streams depends on:

- your location
- whether it is springs, neaps or between the two
- the time relative to high water at a reference port.

FINDING THE STRENGTH AND DIRECTION OF THE TIDE

Tidal stream atlas



1 hour before HW Plymouth
(6 hours after HW Dover)

Tidal diamond

Tidal Streams referred to HW at PLYMOUTH

	Hours	E	50°02'·65 N 5 50·10W
Before High Water	6	227	1·0 0·5
	5	232	1·4 0·7
	4	234	1·5 0·7
	3	241	0·8 0·4
	2	307	0·3 0·1
	1	034	0·7 0·3
High Water		048	1·1 0·6
After High Water	1	055	1·4 0·7
	2	061	1·4 0·7
	3	060	0·8 0·4
	4	074	0·3 0·2
	5	201	0·2 0·1
	6	222	0·8 0·4

spring rate (kn)
neap rate (kn)
direction (°T)
time

Example

What is the rate and direction of the tidal stream at a position near Plymouth at 0815 BST on Fri 23rd Aug?

1 Find the time of HW and the heights of HW & LW at Plymouth on Fri 23rd Aug

		Time	m
23		0505	1.9
		1135	4.5
	F	1758	2.0
24		0006	4.4
		0649	2.0
	SA	1258	4.5

1135 UT
1235 BST is the nearest HW to 0815

2 Is it springs, neaps or in between?

4.5
- 1.9
range 2.6m

= Neaps (more or less)

3 How many hours before or after HW is 0815?

		0705
-5	0735	
		0805
-4	0835	
		0905
-3	0935	
		1005
-2	1035	
		1105
-1	1135	
		1205
HW	1235	
		1305

0815 falls in this hour

HW is taken as being the midpoint of the hour i.e. the rate & direction given is an average for between 1205 - 1305

4 Find the nearest ◇ to your position = Ⓒ

Spring rate = 2.3kn
Neap rate = 1.1kn
Direction of tidal stream = 278°(T)

Ⓒ	50°12'·55 N 5 06·00W	
277	1·9	1·0
280	2·3	1·1
278	2·3	1·1
279	1·7	0·8
296	0·6	0·3
063	0·8	0·4
081	1·9	0·9
083	2·2	1·1
077	2·2	1·1
070	1·9	0·8
055	1·0	0·5
310	0·5	0·3
280	1·4	0·7

- 4hrs
HW

5 Or using a tidal stream atlas which is the nearest arrow?

4 hours before HW Plymouth
(3 hours after HW Dover)

Neap rate = 1.1kn
Measure direction of arrow = 278°(T)

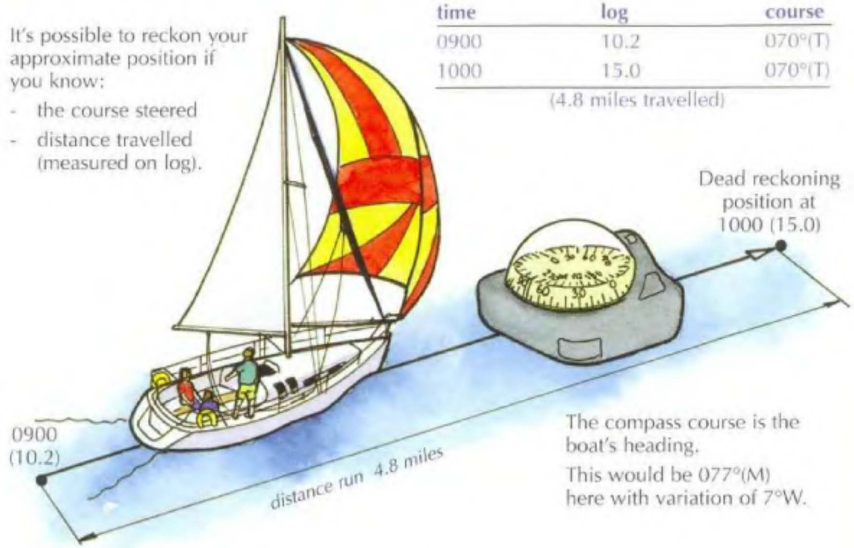
DEAD RECKONING POSITION

It's possible to reckon your approximate position if you know:

- the course steered
- distance travelled (measured on log).

time	log	course
0900	10.2	070°(T)
1000	15.0	070°(T)

(4.8 miles travelled)

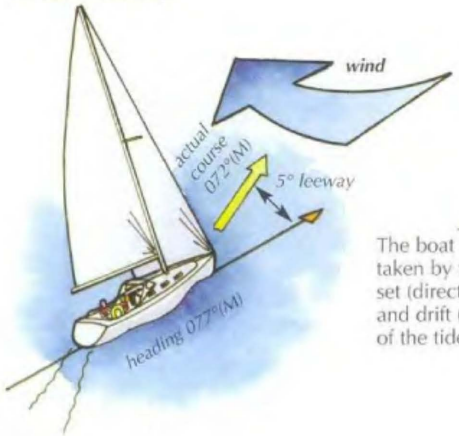


The compass course is the boat's heading.

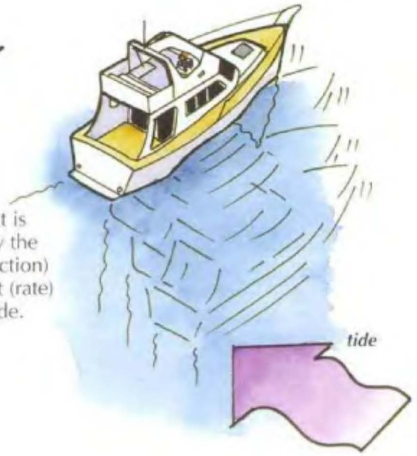
This would be 077°(M) here with variation of 7°W.

The effect of wind and tide means we don't always travel in the same direction as the compass course steered.

Effect of leeway



Effect of tide



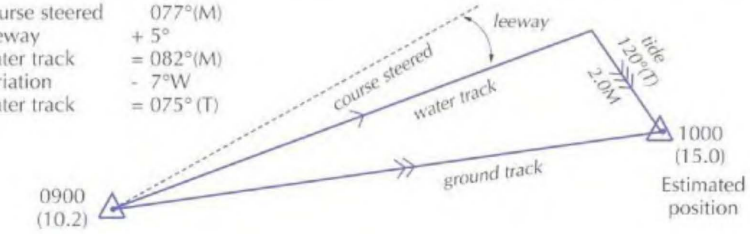
The boat is taken by the set (direction) and drift (rate) of the tide.

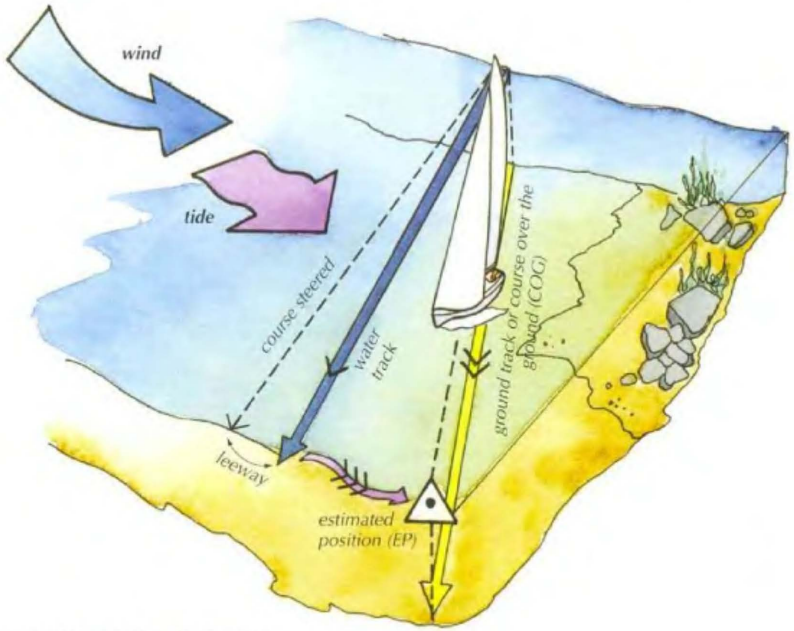
ESTIMATED POSITION

To plot an EP

time	log	course	leeway	wind	tide
0900	10.2	077°(M)	5°	N5	140°(T) 1.4kn
1000	15.0	077°(M)	5°	N5	120°(T) 2.0kn tide for 0900-1000

Course steered	077°(M)
Leeway	+ 5°
Water track	= 082°(M)
Variation	- 7°W
Water track	= 075° (T)

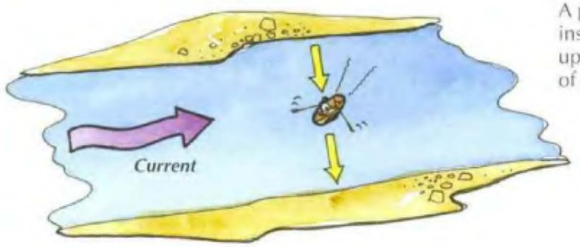




symbols used in chartwork

water track		EP	
ground track		fix	
tide set and drift		waypoint	
DR position			

COURSE TO STEER



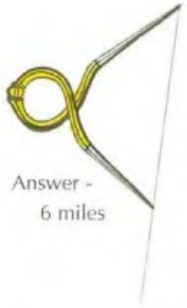
A person rowing across a river instinctively angles the boat upstream to counter the effect of the current.

At sea we often can't see our destination so we need to calculate how much to angle into the tide to make the most direct passage.

For example:

If I am at position A at 2100 Wed 17th April, what is the course to steer to waypoint B?

1 How far is it from A to B?



Answer - 6 miles

2 If I think my boat will be capable of 9kn on this passage how long will it take to travel 6 miles?

Answer – roughly an hour because it appears that the tide will push me back.

3 Leaving at 2105 how will the tide affect my passage for the next hour?

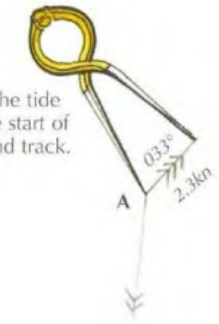
Use diamond (K) (RYA Training Chart 1)

Wed 17th April HW Plymouth

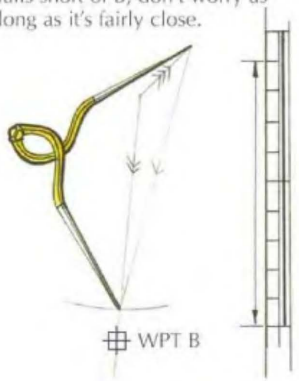
HW	1835	1905	= 1835 BST springs
+1	1935	2005	
+2	2035	2105	2100 - 2200 = HW +3
+3	2135	2205	

Answer 033°(T) 2.3kn

4 Plot the tide at the start of ground track.



5 Measure the expected boat speed for one hour (9kn) and arc dividers from end of tide to cross ground track, this usually goes beyond or falls short of B, don't worry as long as it's fairly close.

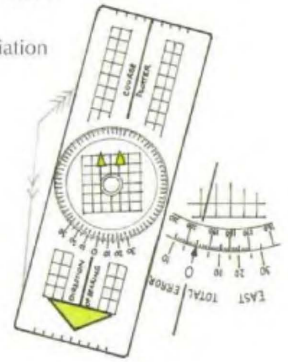


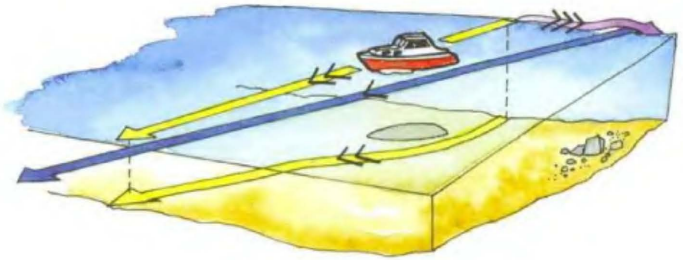
6 Measure bearing of water track - this will be your **course to steer.**

193°(T)

+ 7°W variation

200°(M)



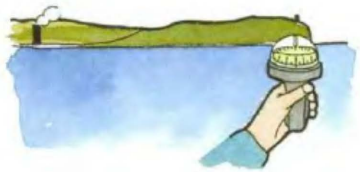


Although you are steering 200°(M) your ground track will be the shortest route from A to B.

A VISUAL FIX

Three point fix

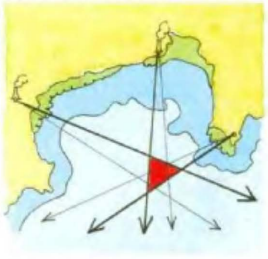
Take bearings on charted objects to fix your position.



Draw the bearings on the chart.

Your position will be where the lines intersect. Use closer objects for greater accuracy.

Bearings rarely line up as a perfect fix.



Error produces a cocked hat.

If bearings are too close together - error is greater.

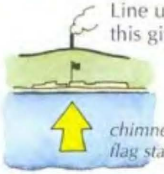
Don't use objects that will give a poor angle of cut.

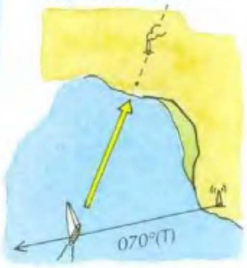
Bearing and contour

Fix your position by taking a bearing on a charted object as you cross a contour – don't forget to allow for the height of tide.

Transit and bearing

Line up two charted objects to make a transit - this gives you a very accurate position line. Obtain a fix by taking a bearing on another object, preferably at about 90° to the transit.



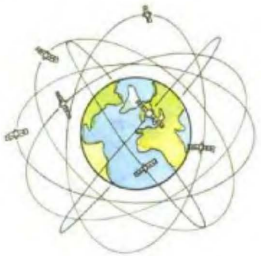


The simplest fix

Plot your position as you pass a charted object.

A GPS FIX

A GPS receiver obtains a fix from signals transmitted by orbiting satellites - this gives a position which is accurate to about 15 metres.



The simplest way to use GPS is to plot your position from the Latitude and Longitude given on the display.

It can also give:

- your current course and speed over the ground
- information about your position in relation to waypoints (see next page).

GPS is generally reliable and accurate but, as with all electronics, it can go wrong. The main things that can affect it are:

- power or aerial failure
- transmissions from mobile phones
- interruption or changes to the satellite system.

Always back up your GPS position with information from another source such as:

Bearing

IALA B buoyage

A charted object.

Depth allowing for tide.

Keep a record of your position at regular intervals on the chart and in the ship's log.

WAYPOINTS

Waypoints (WPTs) are tools to help you navigate. They are positions stored in the memory of a GPS and used as reference points.

For example you could use a WPT placed at the entrance of a harbour to help guide you safely into port.

You obtain WPTs from:

- the chart – double check you have the correct lat and long.
- publications such as almanacs, directories and magazines.

The GPS display can show the distance and bearing to a WPT and your current course and speed.

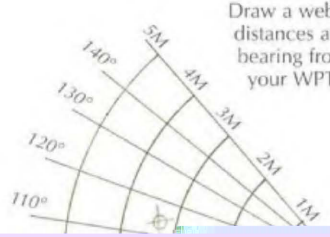
Be careful when you input a WPT into a GPS. It's as easy to put in the wrong position as it is to dial a wrong phone number.

When you input a WPT always check that the distance and bearing given by the GPS matches the distance and bearing that you have measured on the chart. Any difference

OTHER WAYS OF USING WAYPOINTS

You can plot your position quickly and simply by entering easily found positions as WPTs. The GPS will give you a distance and bearing to the WPT and you can plot these to give a fix. This is easier, quicker and less prone to error than plotting by lat and long but double check that you have entered the WPT correctly.

Draw a web of distances and bearing from your WPT.



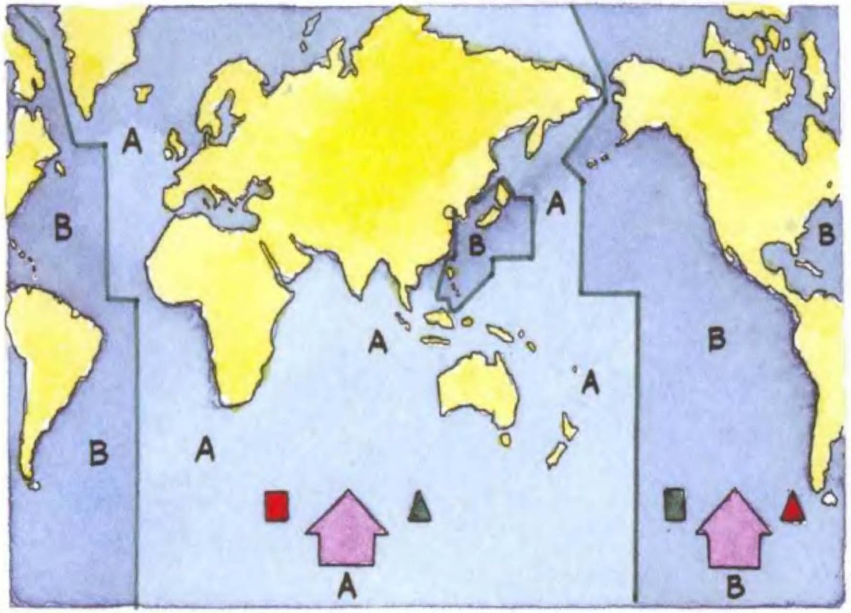
Plotting at speed

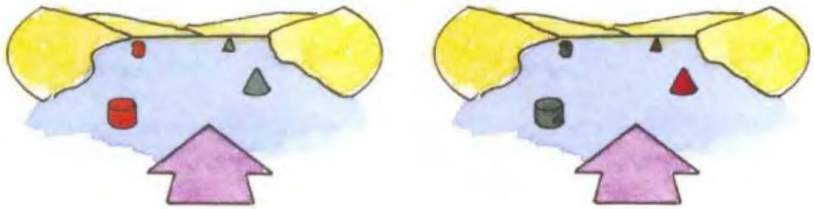
Conventional plotting can be difficult on a fast boat at speed.

Navigation must be

IALA - MARITIME BUOYAGE SYSTEM

Two buoyage systems exist in the world, IALA A and IALA B. The difference affects the colour and light characteristics of lateral marks.
IALA A is used in Europe, Africa, Russia, India, Australia and New Zealand.
IALA B, which is illustrated on page 62 ,is used in the USA, South America, the parts of the Caribbean, South East Asia and Canada.

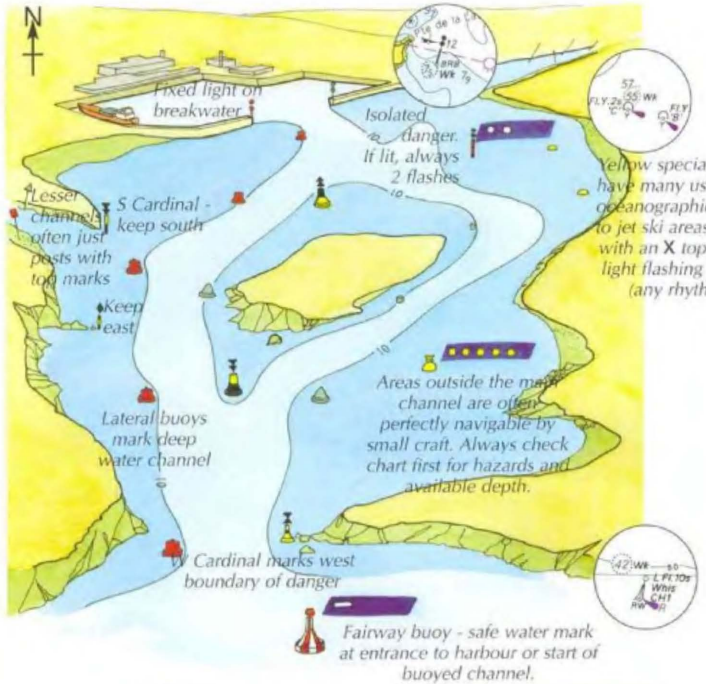


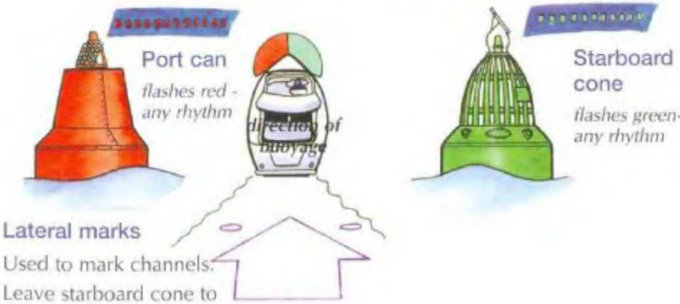


IALA A

IALA B

IALA - A BUOYAGE

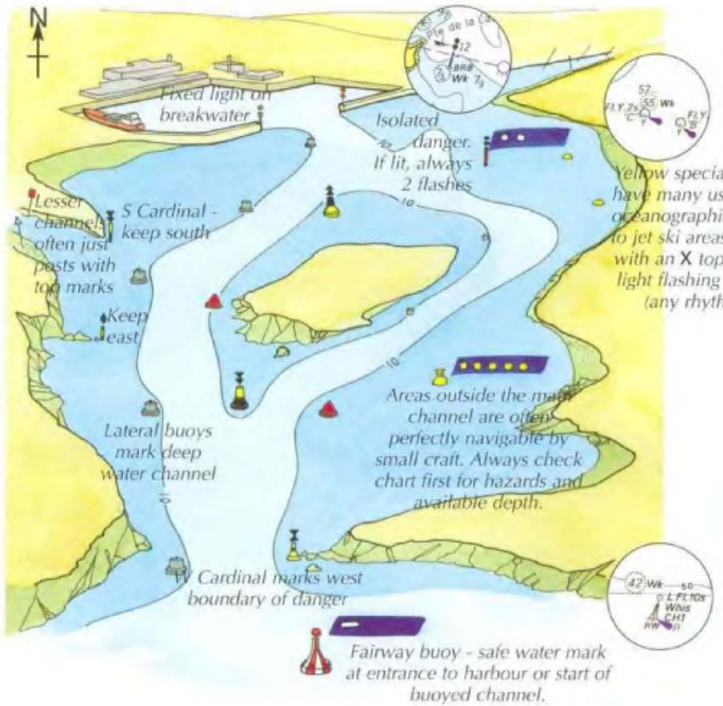




Lateral marks

Used to mark channels.
Leave starboard cone to your starboard side when going into harbour.

IALA - B BUOYAGE



Lateral marks

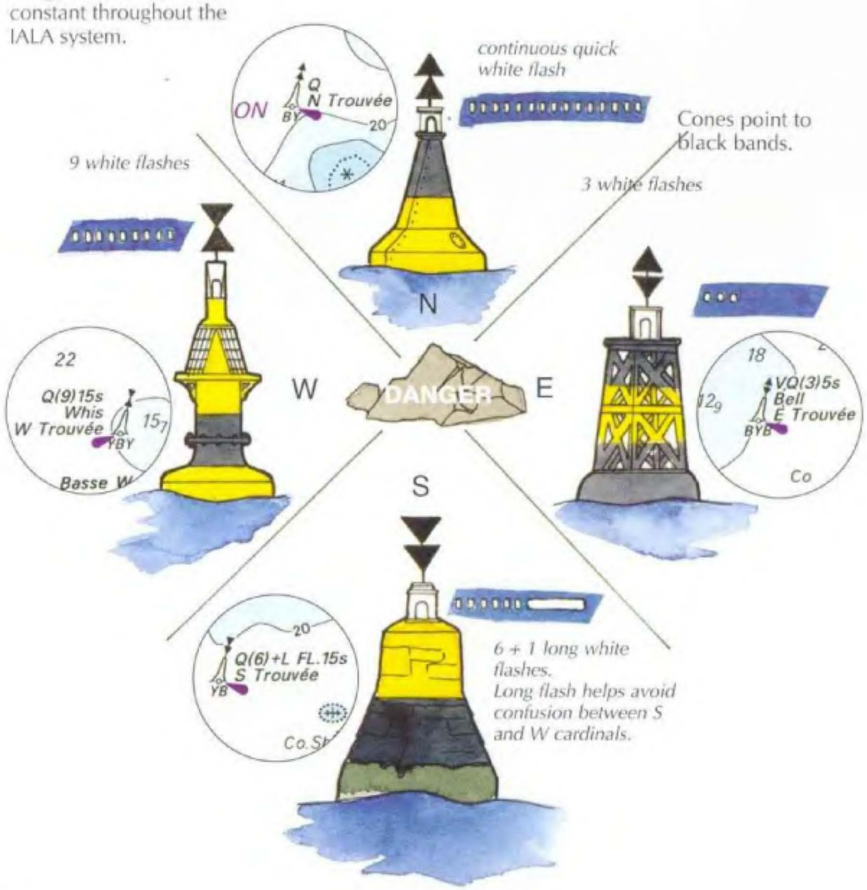
Used to mark channels.

Leave starboard cone to your starboard side when going into harbour.

CARDINAL MARKS COMMON TO IALA A AND B

Cardinals

Cardinal marks warn of danger. and remain constant throughout the IALA system.

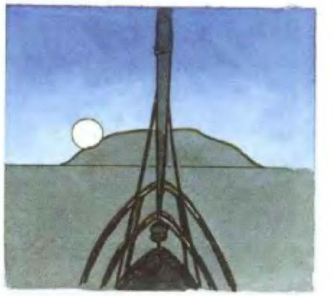


Buoys are found in many shapes and sizes.

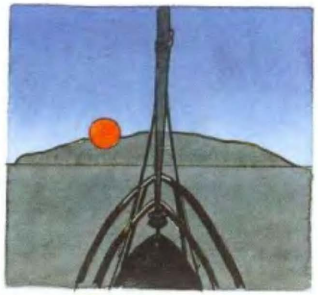
Solar panels and lights can make top marks difficult to distinguish.

Weed and guano can alter the appearance and colour.

SECTOR LIGHTS



A In white sector



B In red sector

4 secs

Iso. WR. 4s 20m 10 7M

- Iso. — equal light and dark
- WR. 4s — 20m above MHWS
- 20m — white - visible 10 miles in good conditions
- 10 — red - visible 7 miles in good conditions
- 7M

C LEADING LIGHTS guide you in and out of harbour

Too far to starboard — On course — Too far to port

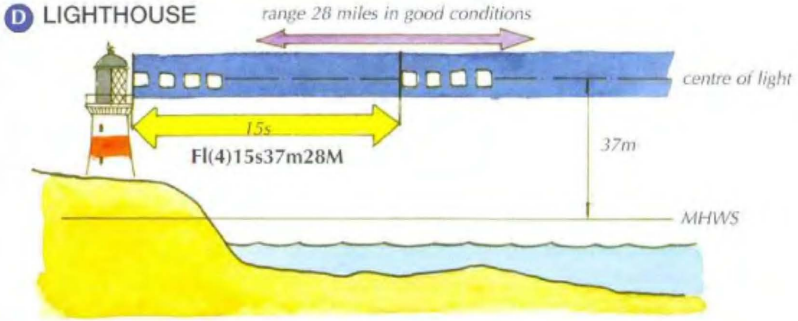
Upper light
Q 17M — visible 17 miles

quick white continuously flashing

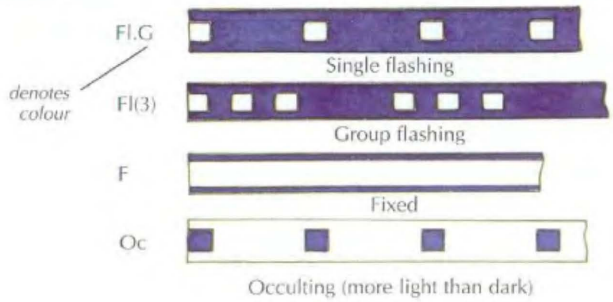
Lower light
Q 18M — visible 18 miles

in good conditions

D LIGHTHOUSE



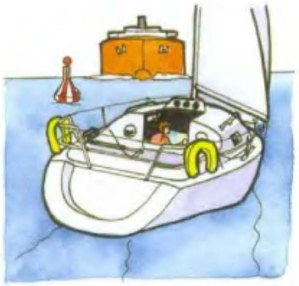
Other light characteristics



PILOTAGE

Pilotage is the art of inshore navigation when you have visual references to help you find your way along the coast and in and out of harbour.

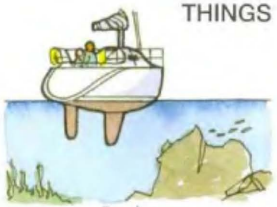
There may be lots of different hazards so good planning is essential.

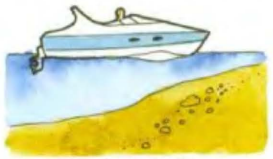


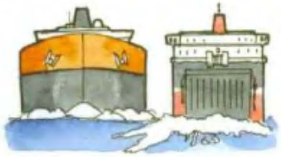
Don't spend too much time down below – you will soon lose track of where you are and put yourself in danger.

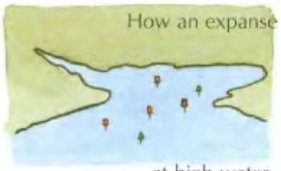
Making a good plan means you can navigate from on deck.

THINGS YOU MIGHT NEED TO PLAN FOR


Rocks

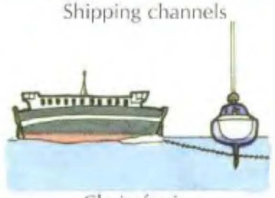

Shoals & shallows


Shipping channels



at high water

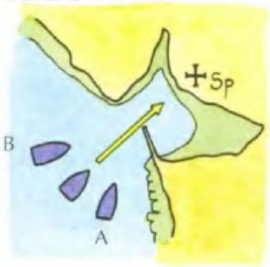

and low water

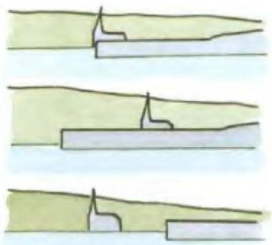

Chain ferries


Harbour byelaws

PILOTAGE TECHNIQUES

Transits





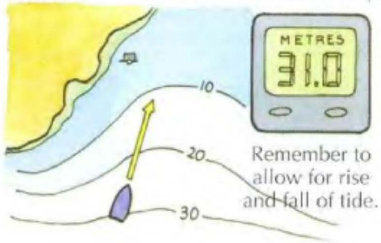
on course

A = To starboard

B = To port

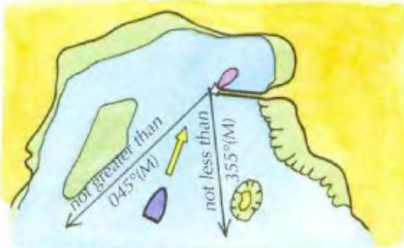
Contours

You can work out where you are when you cross a contour and they can be followed in poor visibility.



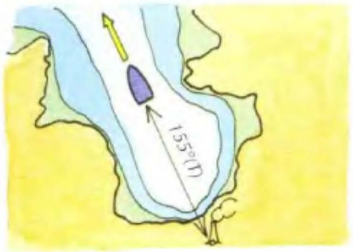
Remember to allow for rise and fall of tide.

Clearing bearing

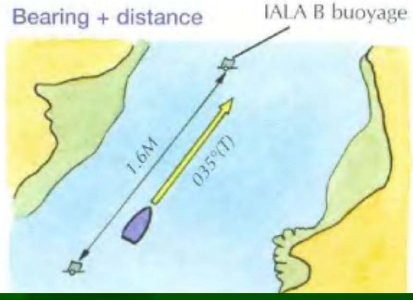


You can go anywhere between the two bearings.

Back bearing

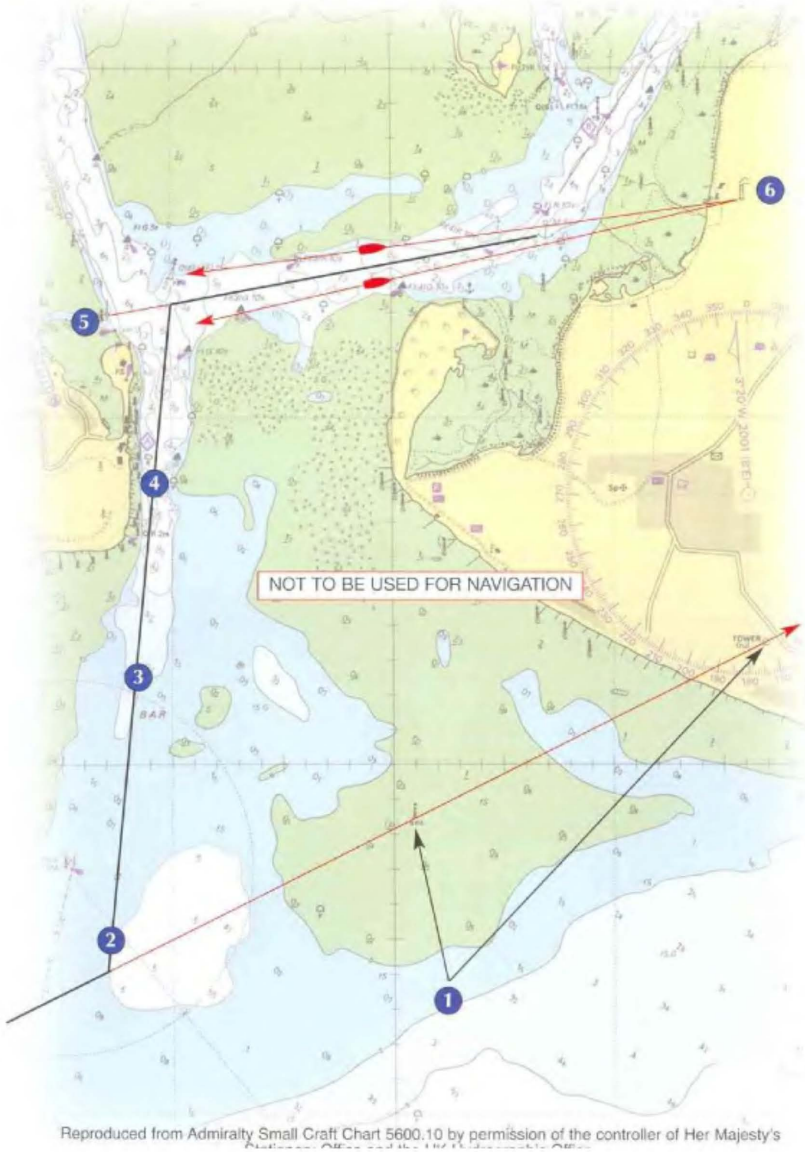


Bearing + distance



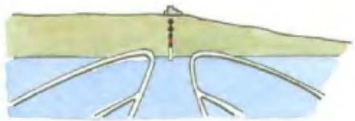
Turning points

MAKING A PILOTAGE PLAN

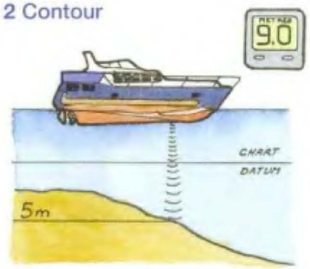


FOLLOWING YOUR PLAN

1 Transit



2 Contour



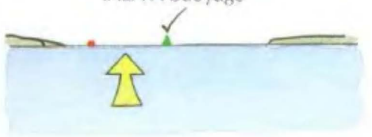
Height of tide = 4m

1. Follow transit 067°(M) isolated danger mark and ruined tower
2. At 5m contour (depth = 9m) turn onto 011°(C) for 2 miles
3. Min depth over bar = 4 - 0.3 = 3.7m
4. Leave green cone buoy to starboard
5. When pole bears 263°(M) turn onto 086°(C) keep pole on back bearing of 263°(M)
6. Keep between clearing bearings of 020°(M) and 090°(M) on chimney

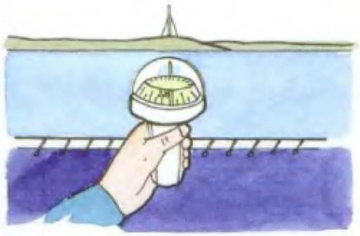
3 Clearance over bar

4 Positive identification of marks

IALA A buoyage



5 Back bearing

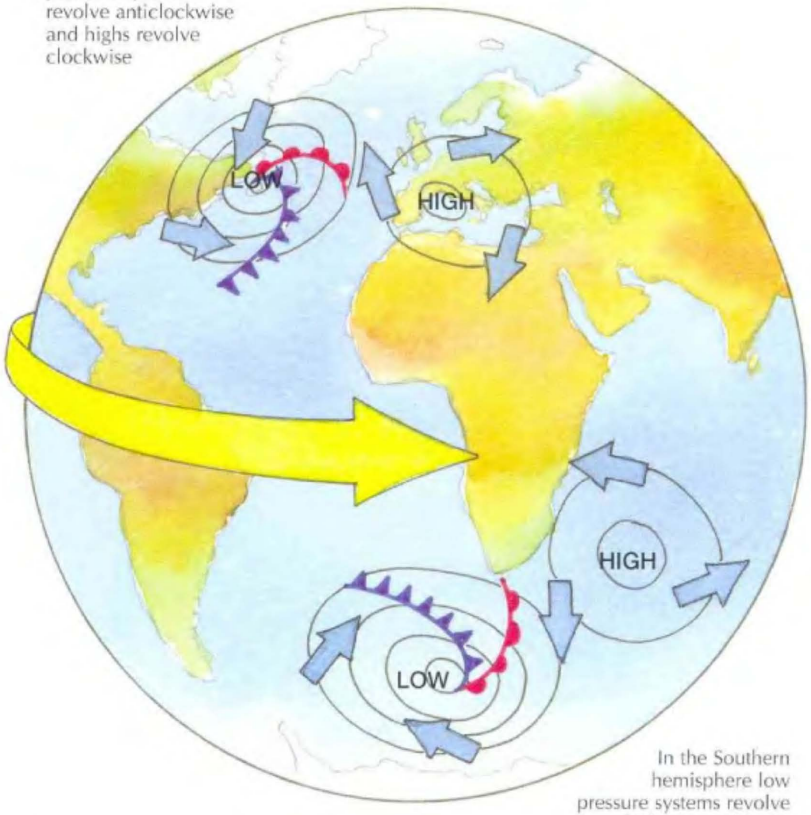


6 Clearing lines

General overview

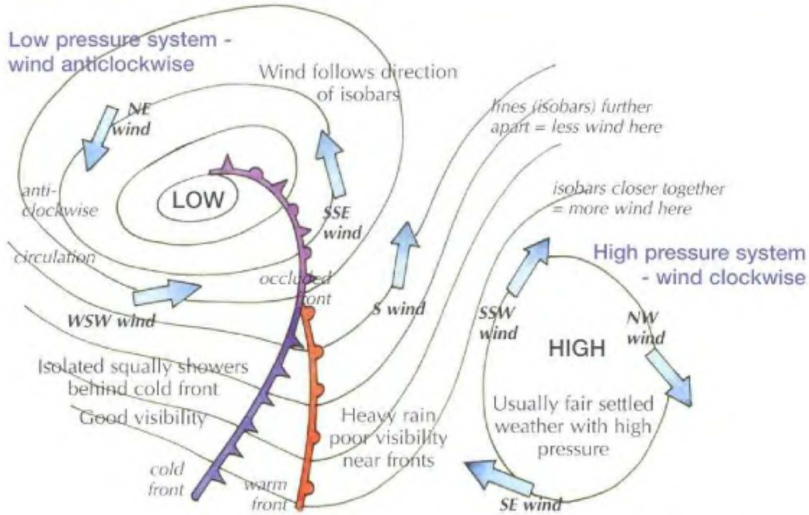
Low and high-pressure systems dictate our weather. They revolve in different directions, depending on which hemisphere they inhabit. Where you are cruising on the earth's surface will dictate whether lows, highs or a mixture of both dictate your weather. In the UK, low-pressure systems dictate our weather. In many places in the Southern hemisphere cold fronts dictate the weather scene.

In the Northern hemisphere low pressure systems revolve anticlockwise and highs revolve clockwise

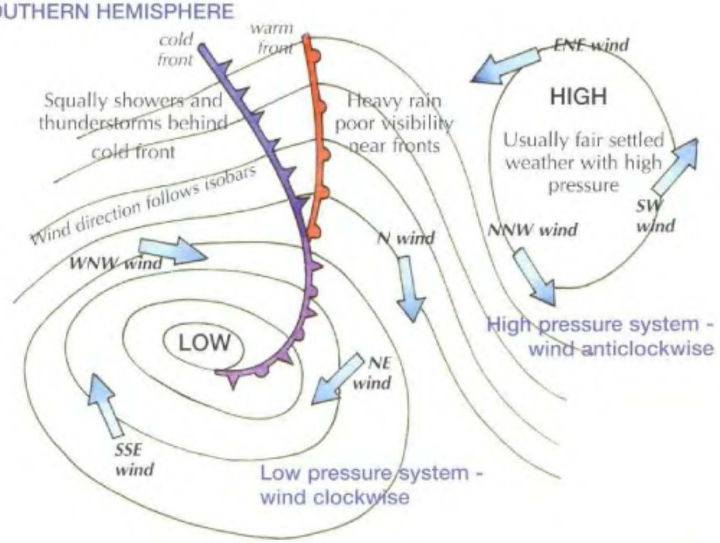


In the Southern hemisphere low pressure systems revolve clockwise and highs revolve anticlockwise

NORTHERN HEMISPHERE

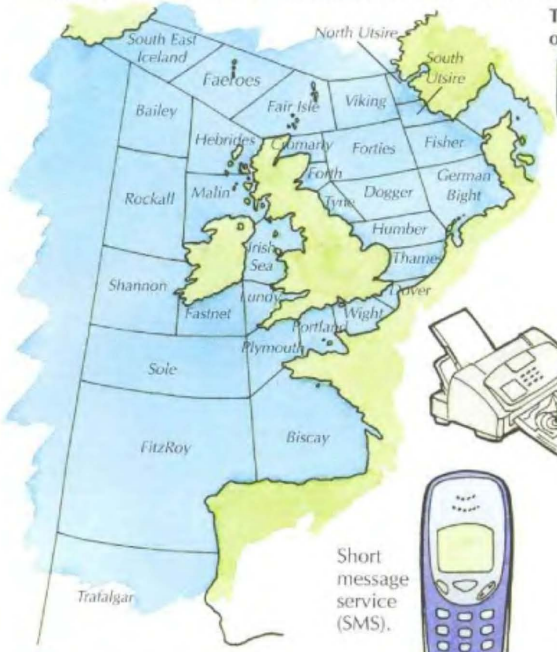


SOUTHERN HEMISPHERE



WEATHER FORECASTS

Shipping Forecast Areas Get to know your local Forecast Areas.

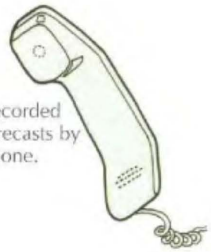


There are many different ways to obtain a forecast.

Marine safety information broadcasts on VHF by Coastguard.

Metfax.

Short message service (SMS).

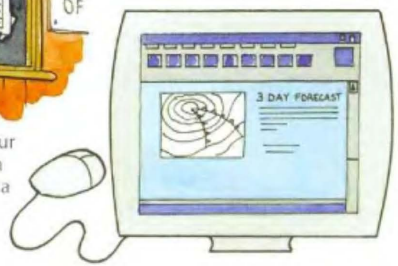


Recorded forecasts by phone.

For details of forecast times etc. look in an almanac or RYA book of Weather Forecasts (G5).

Many harbour and marina offices post a forecast.

Internet.



Teletext

Local radio stations.

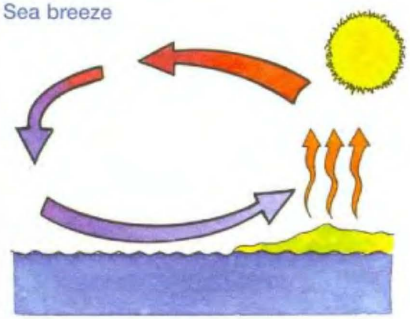
WEATHER FORECASTS

TERMS USED IN FORECASTS

Gale warnings	If average wind is expected to be F8 or more, or gusts 43-51kn.
Strong wind warnings	If average wind is expected to be F6 or F7. F6 is often called a 'yachtsman's gale'.
Imminent	Within 6 hrs of time of issue of warning.
Soon	Within 6-12 hrs of time of issue of warning.
Later	More than 12 hrs from time of issue of warning.
Visibility	*Good* - greater than 5 miles *Moderate* - between 2 - 5 miles. *Poor* - 1,000m to 2 miles. Fog less than 1,000m.
Fair	No significant precipitation.
Backing	Wind changing in an anticlockwise direction eg NW to SW.
Veering	Wind changing in a clockwise direction eg NE to SE.
General synopsis	How and where the weather systems are moving.
Sea states	*Smooth* - wave height 0.2 - 0.5m *Slight* - wave height 0.5 - 1.25m. *Moderate* - wave height 1.25 - 2.5m *Rough* - wave height 2.5 - 4m. *Very rough* - wave height 4 - 6m.

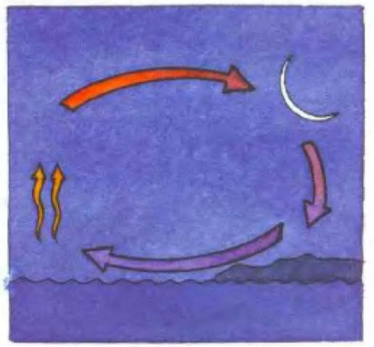
LAND AND SEA BREEZES

Sea breeze



In fair weather and light to moderate offshore wind, a sea breeze is likely to develop. Warm air rises over land, it then cools, descends and blows onshore. Wind up to force 4 in strength.

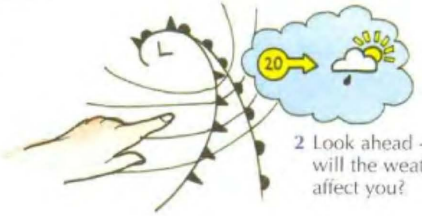
Land breeze



This occurs on a clear night when the air cools over land and flows downhill and out to sea, particularly from river estuaries. Wind usually no more than force 2- 3 except near mountains.

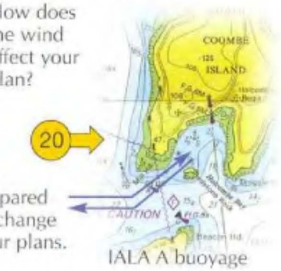
WEATHER AND PLANNING A PASSAGE

1 Obtain a forecast.



2 Look ahead - how will the weather affect you?

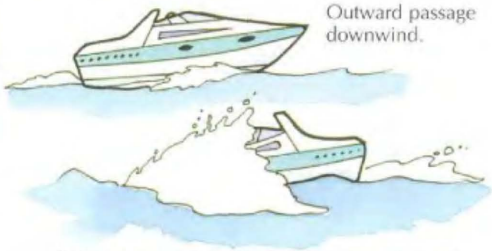
3 How does the wind affect your plan?



Be prepared to change your plans.

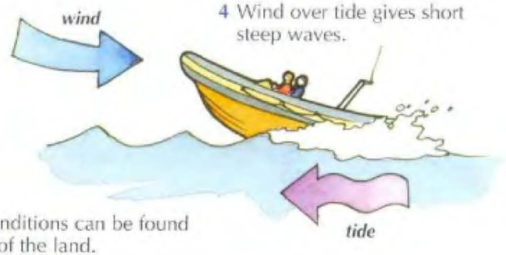
IALA A buoyage

Outward passage downwind.

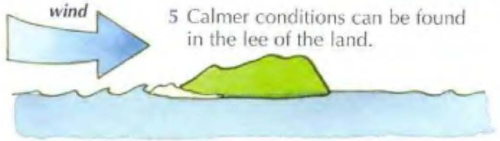


Return passage into wind - very uncomfortable.

Make sure you and your crew are prepared for what the weather will bring.

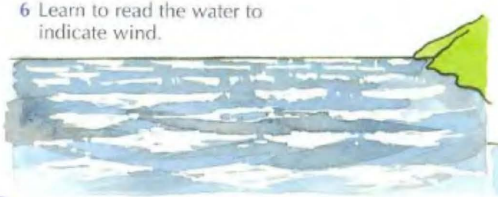


4 Wind over tide gives short steep waves.

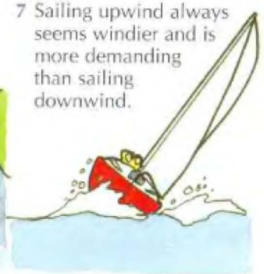


5 Calmer conditions can be found in the lee of the land.

6 Learn to read the water to indicate wind.



7 Sailing upwind always seems windier and is more demanding than sailing downwind.



BEAUFORT WIND SCALE

1 Light airs 1 - 3 knots
Ripples.
Sail - drifting conditions
Power - fast planing conditions

2 Light breeze 4 - 6 knots
Small wavelets.
Sail - full mainsail and large genoa
Power - fast planing conditions

3 Gentle breeze 7 - 10 knots
Occasional crests.
Sail - full sail
Power - fast planing conditions

4 Moderate 11 - 16 knots
Frequent white horses.
Sail - reduce headsail size
Power - may have to slow down if wind against tide

5 Fresh breeze 17 - 21 knots
Moderate waves, many white crests.
Sail - reef mainsail
Power - reduce speed to prevent slamming when going upwind

6 Strong breeze 22 - 27 knots
Large waves, white foam crests.
Sail - reef main and reduce headsail
Power - displacement speed

7 Near gale 28 - 33 knots
Sea heaps up, spray, breaking waves, foam blows in streaks.
Sail - deep reefed main, small jib
Power - displacement speed

8 Gale 34 - 40 knots
Moderately high waves, breaking crests.
Sail - deep reefed main, storm jib
Power - displacement speed, stem waves

9 Severe gale 41 - 47 knots
High waves, spray affects visibility.
Sail - trysail and storm jib
Power - displacement speed, stem waves

10 Storm 48 - 55 knots
Very high waves, long breaking crests.
Survival conditions