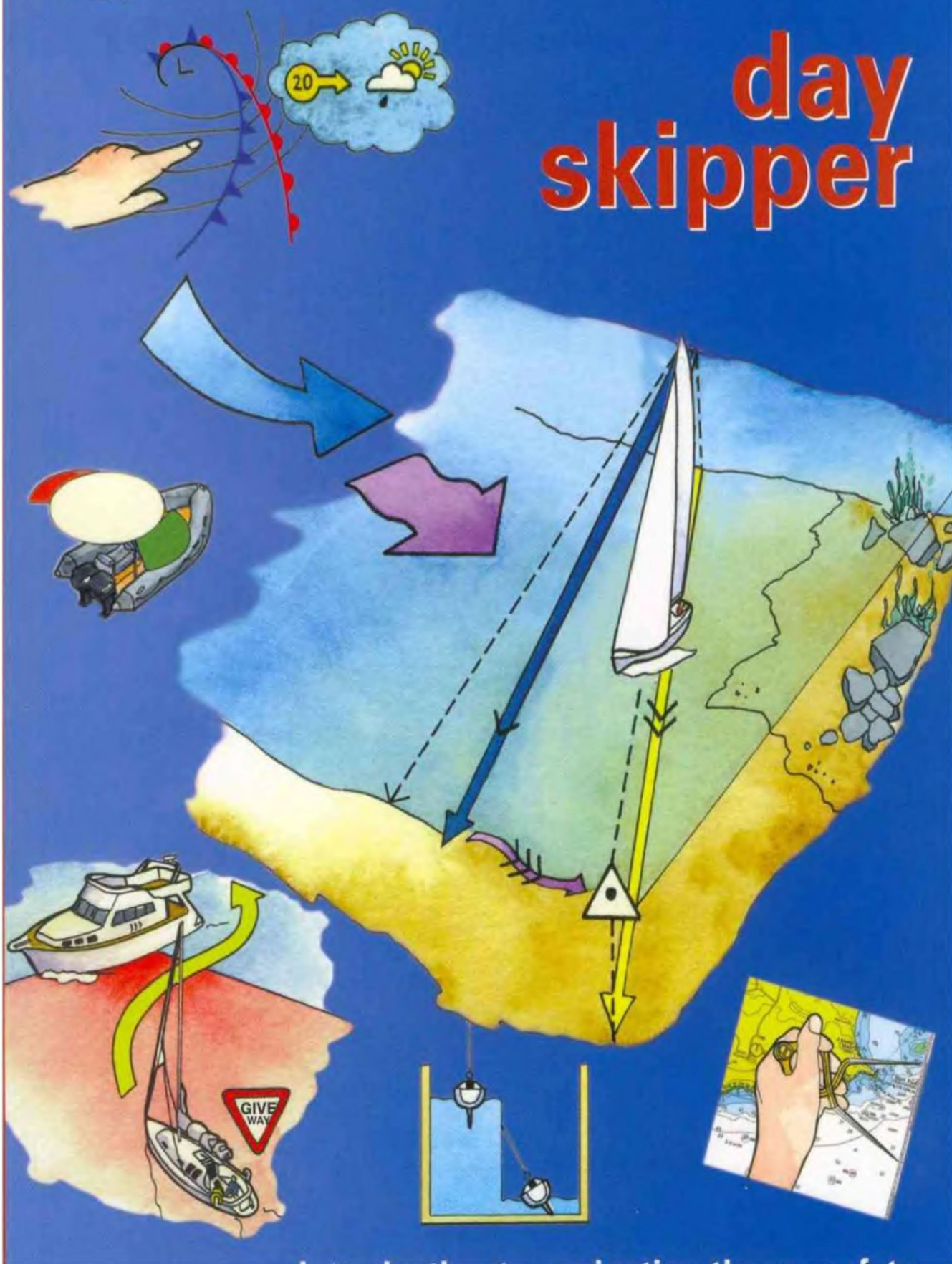


RYA

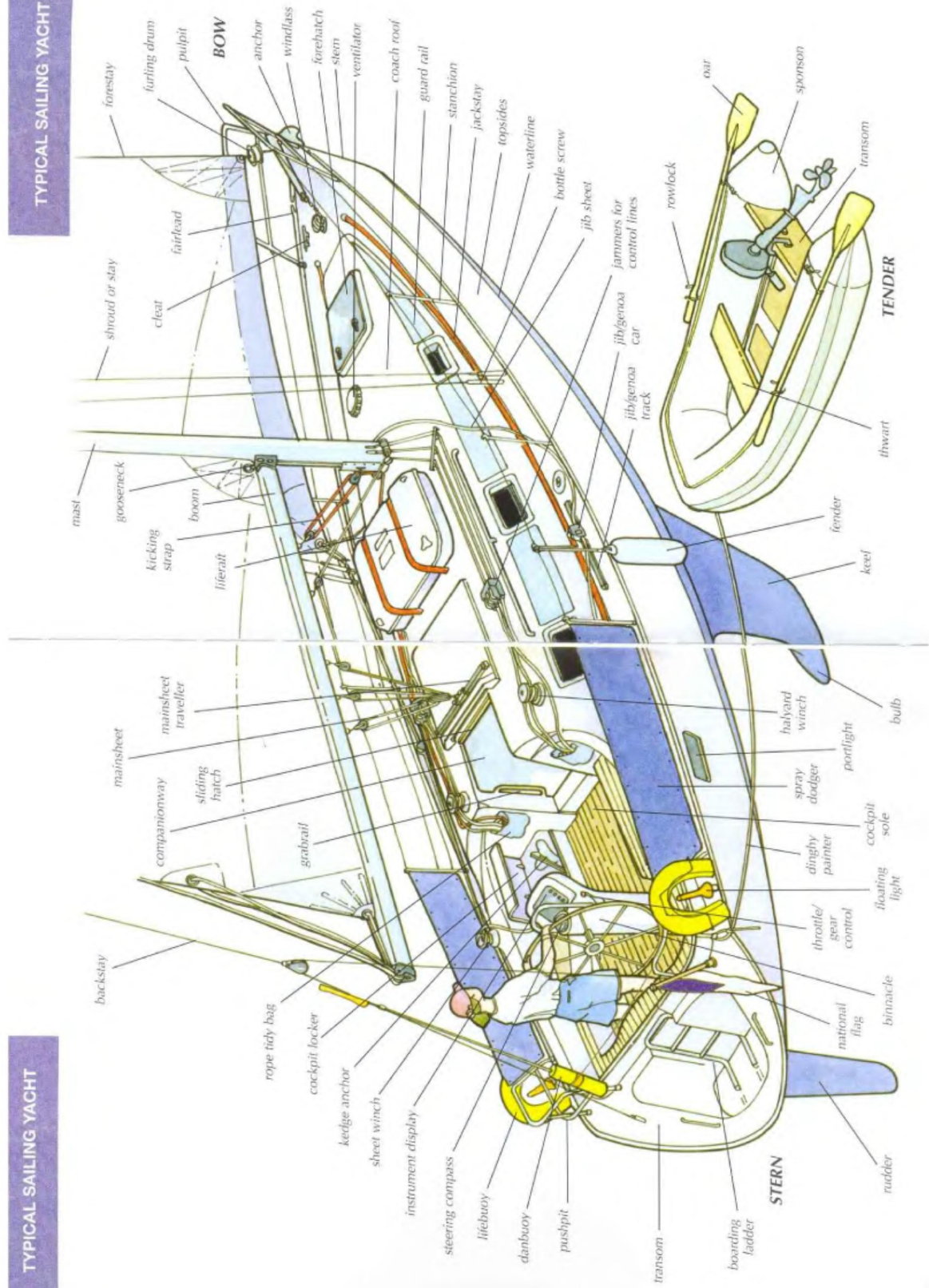
an **RYA training** publication

day skipper

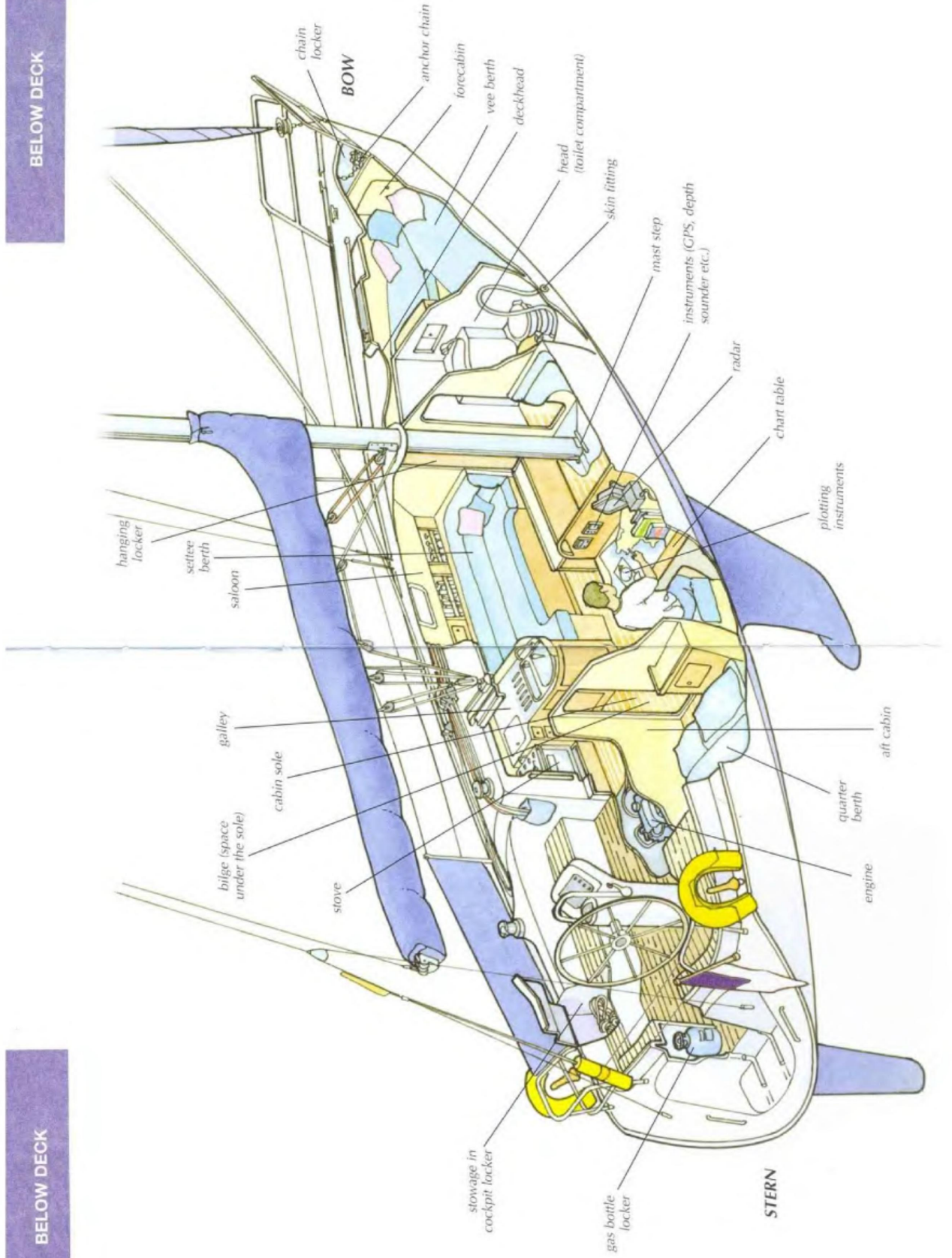


TYPICAL SAILING YACHT

TYPICAL SAILING YACHT

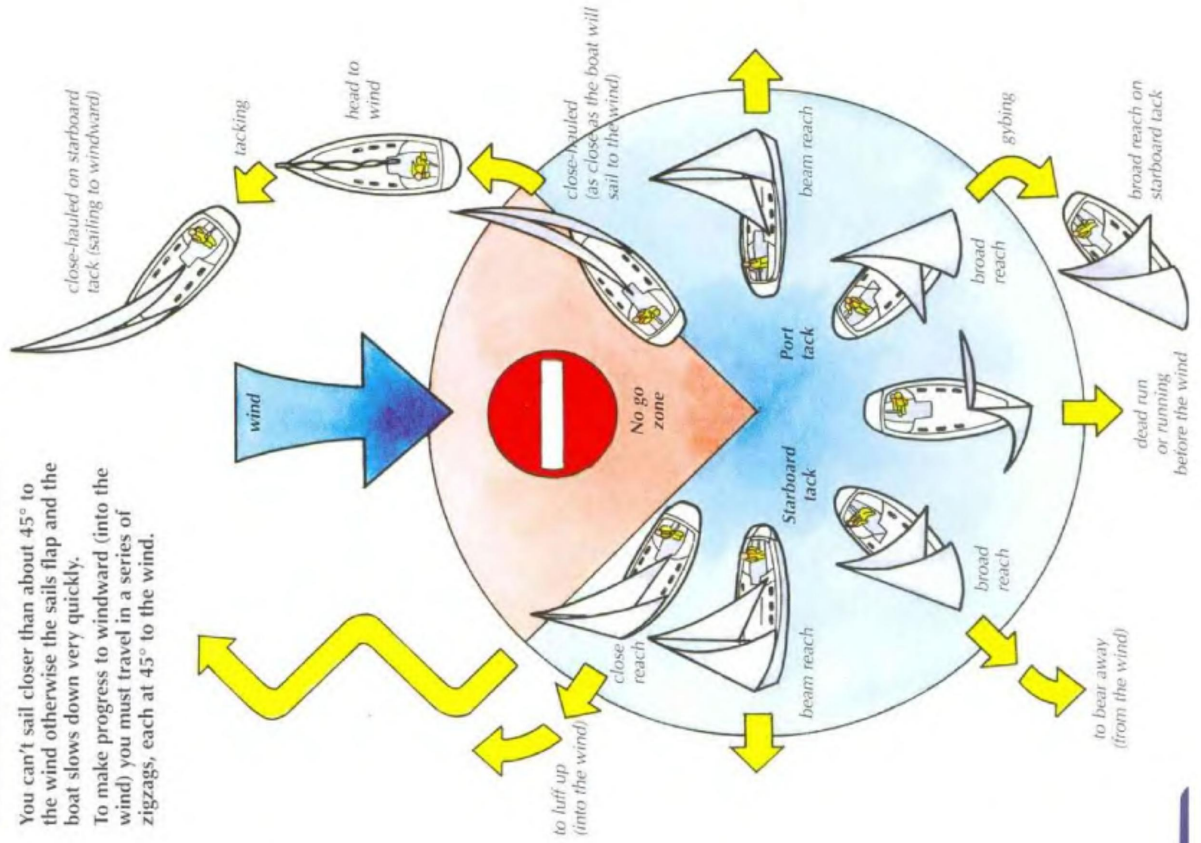


BELOW DECK

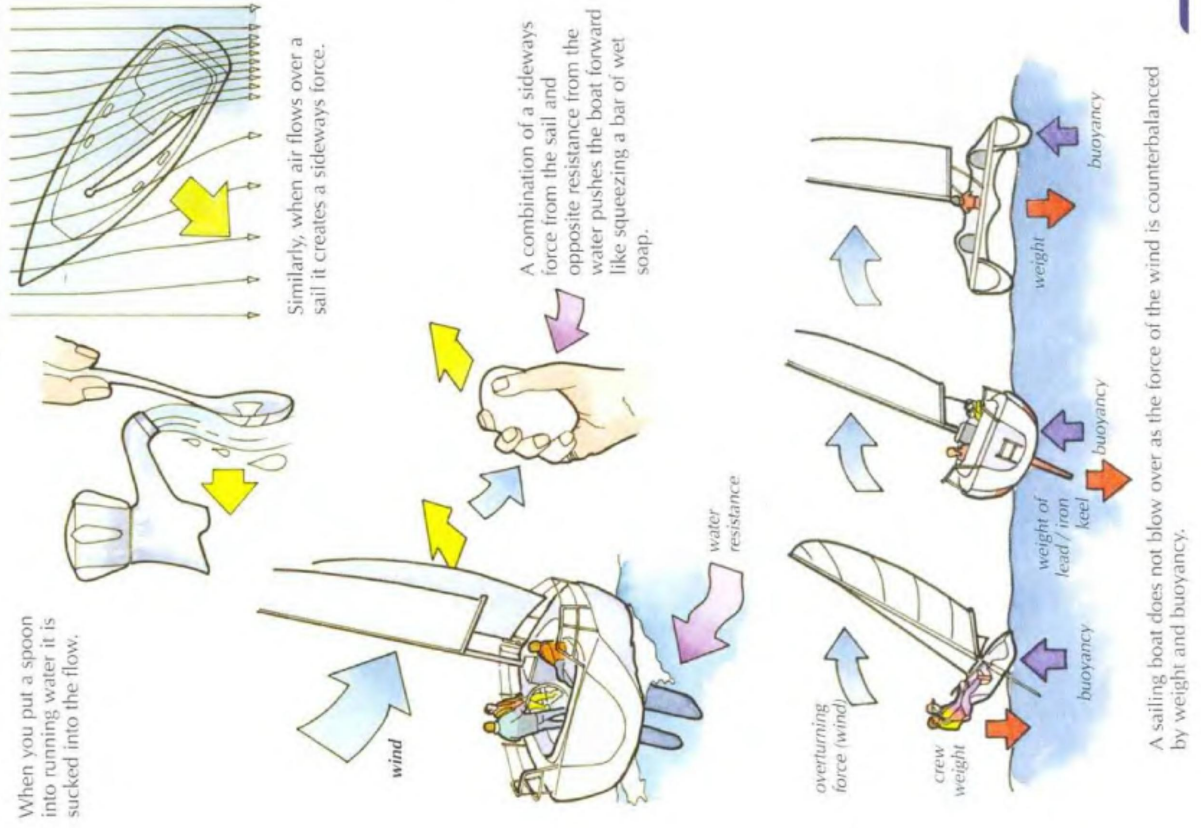


POINTS OF SAILING

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.

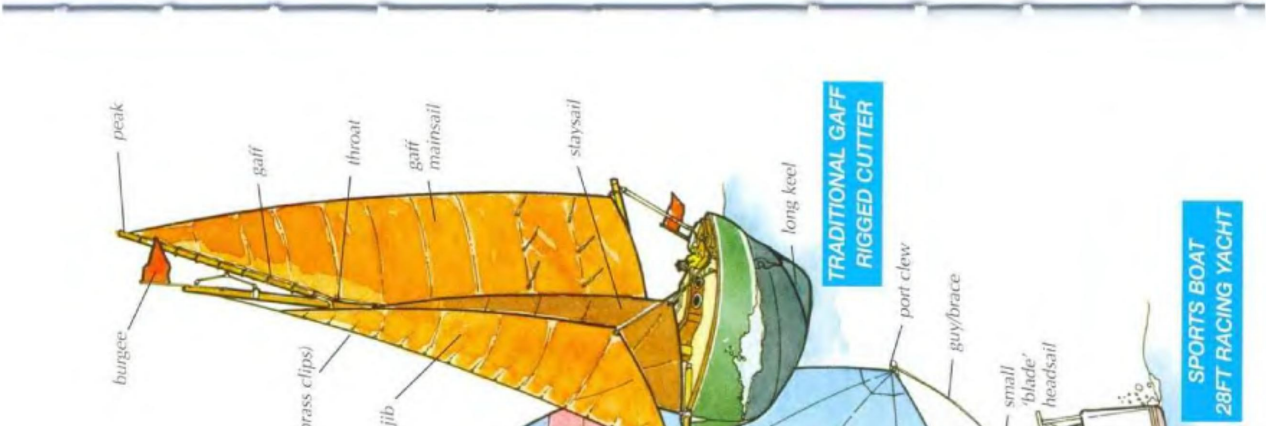


SIMPLE SAILING THEORY

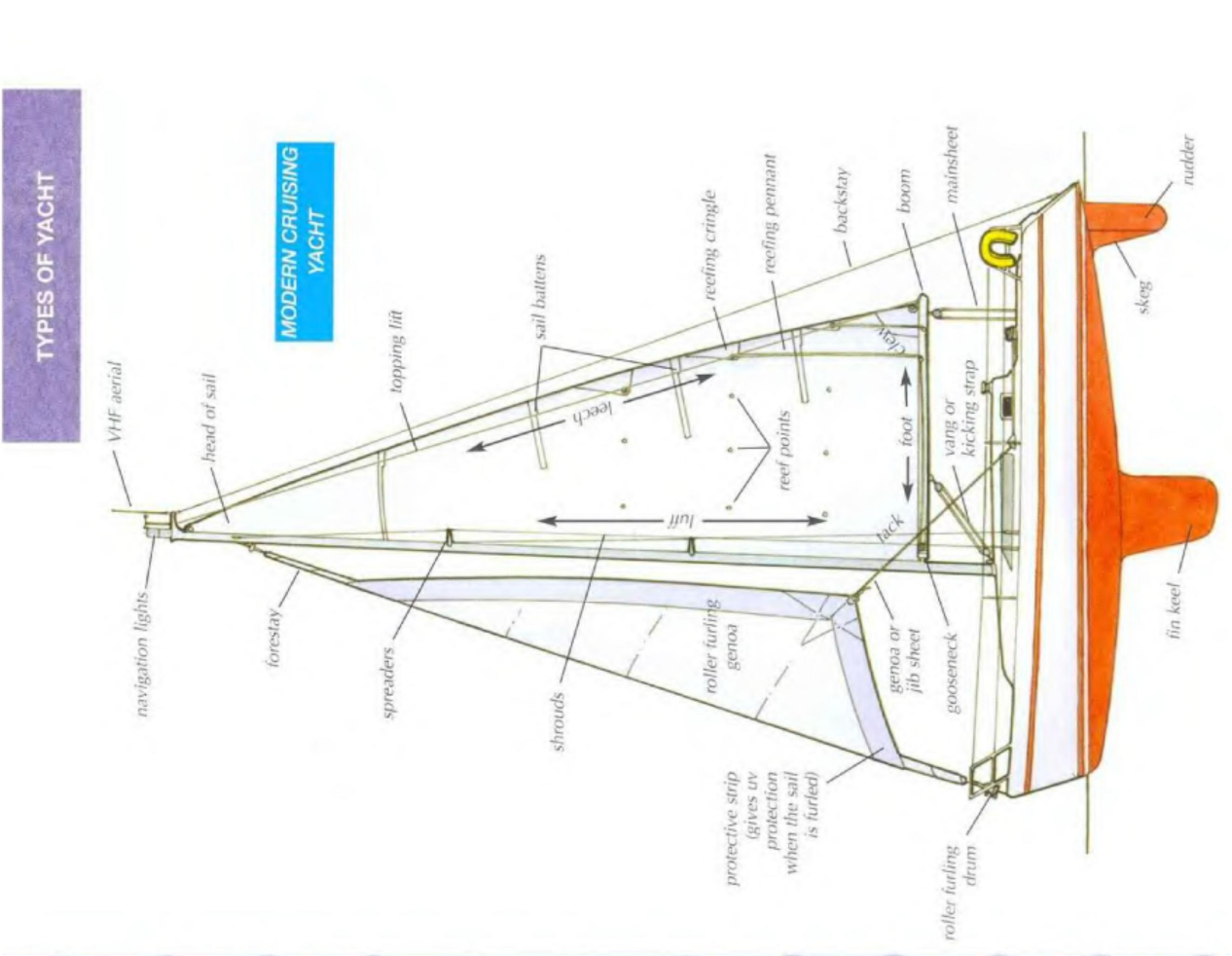


A sailing boat does not blow over as the force of the wind is counterbalanced by weight and buoyancy.

TYPES OF YACHT



TYPES OF YACHT



KNOTS



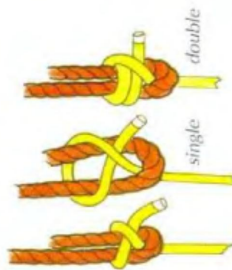
Round turn and two half hitches
Multipurpose knot. Can be untied under tension.



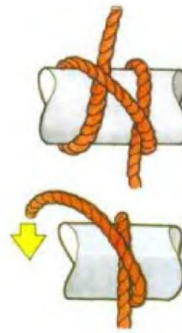
Rolling hitch
Used when you need a knot that won't slip when pulled at an angle. Ideal for taking the strain off another rope.



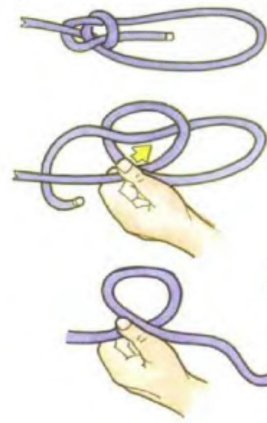
Reef knot
Mainly used for tying in reef points. Not very secure.



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.

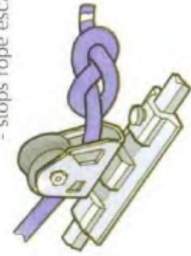
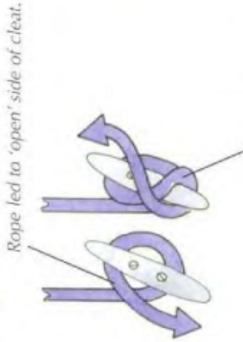


Figure of eight
Easy to tie stopper knot - stops rope escaping.

ROPEWORK

Making fast to a cleat



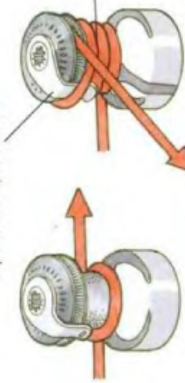
Jammer - holds rope securely, like a cleat.

Follow with several figure of eights and one more round turn to increase friction.

Winching techniques

Using a winch gives more power for pulling in ropes.

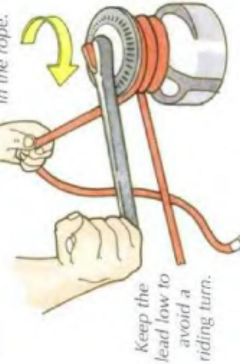
Use the self-tailer to grip the rope before you winch.



Add more turns for maximum friction.



Always wind the rope clockwise round the drum.



When letting out gently ease rope round drum with palm of hand.

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

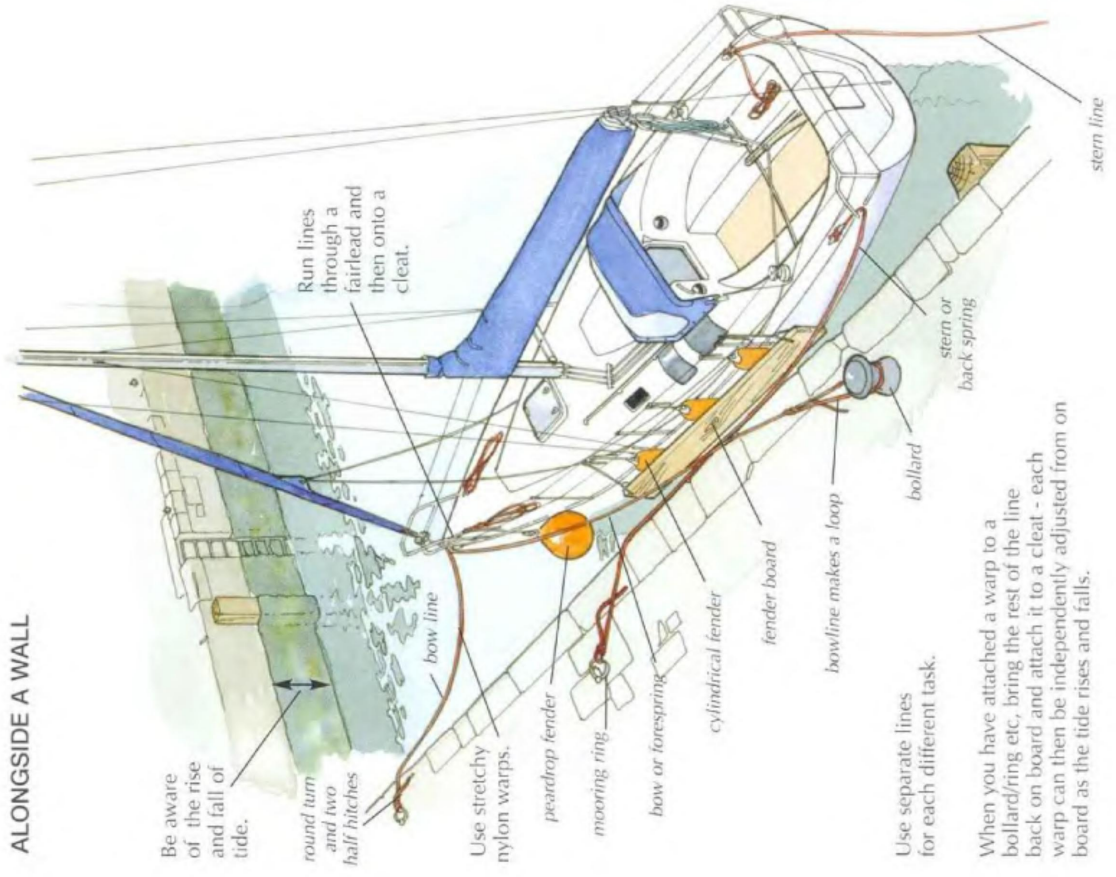


Letting fly - flip the rope quickly off the drum to release rope when tacking or gybing.



MOORING ALONGSIDE

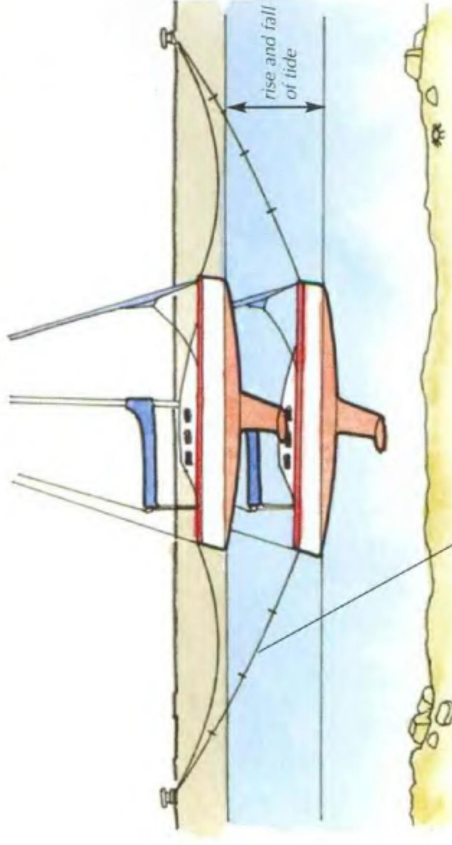
ALONGSIDE A WALL



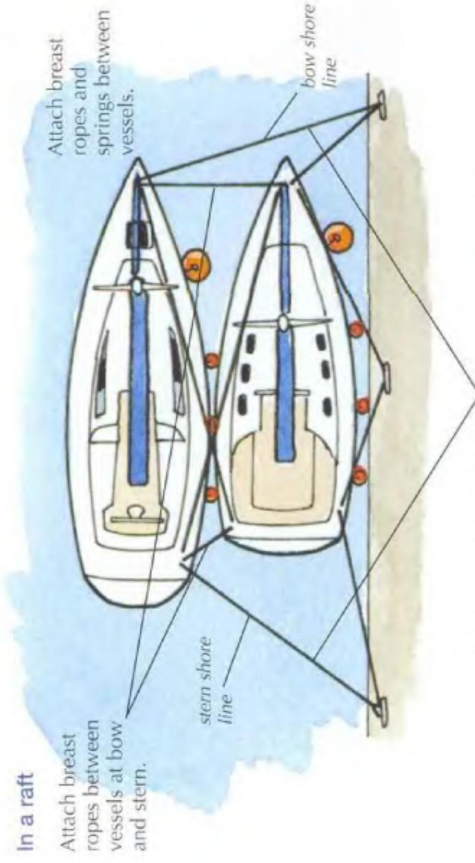
Use separate lines for each different task.

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

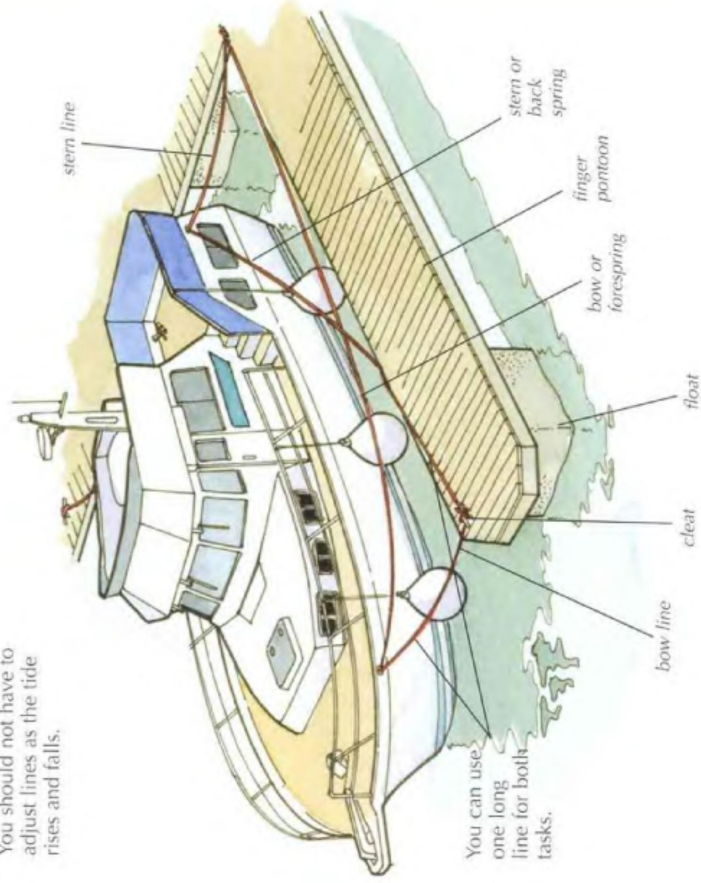
Attach breast ropes between vessels at bow and stern.

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

MOORING ALONGSIDE

ON A FLOATING PONTON

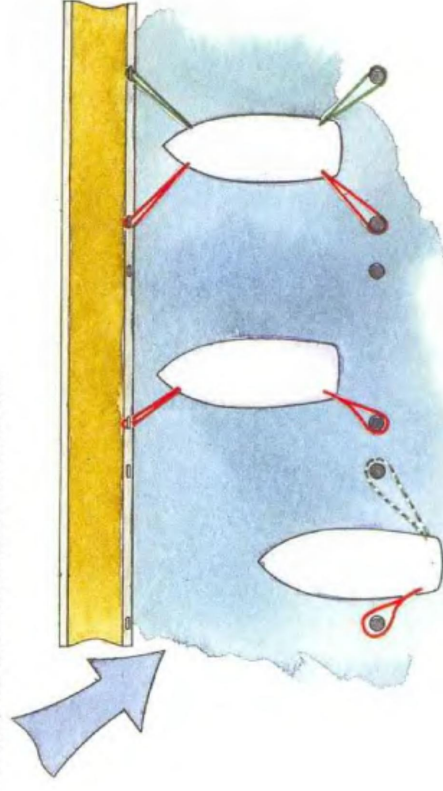
You should not have to adjust lines as the tide rises and falls.



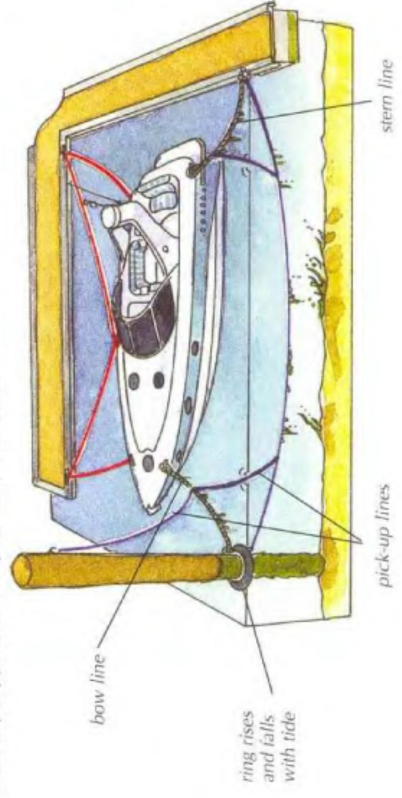
MOORING ALONGSIDE

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.

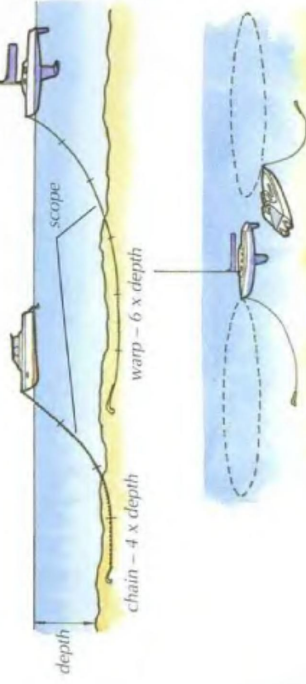


ANCHORING

ANCHORING

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

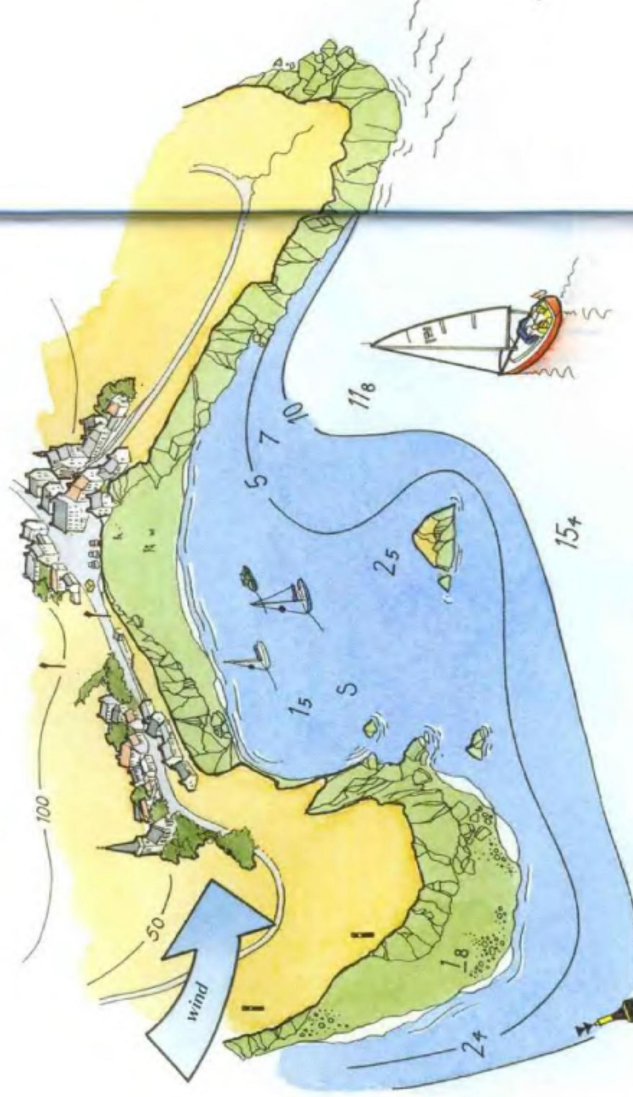
Good holding to weight ratio - stows flat, can be hard to break out of mud.

COR or Plough

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

Fishermans

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



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.



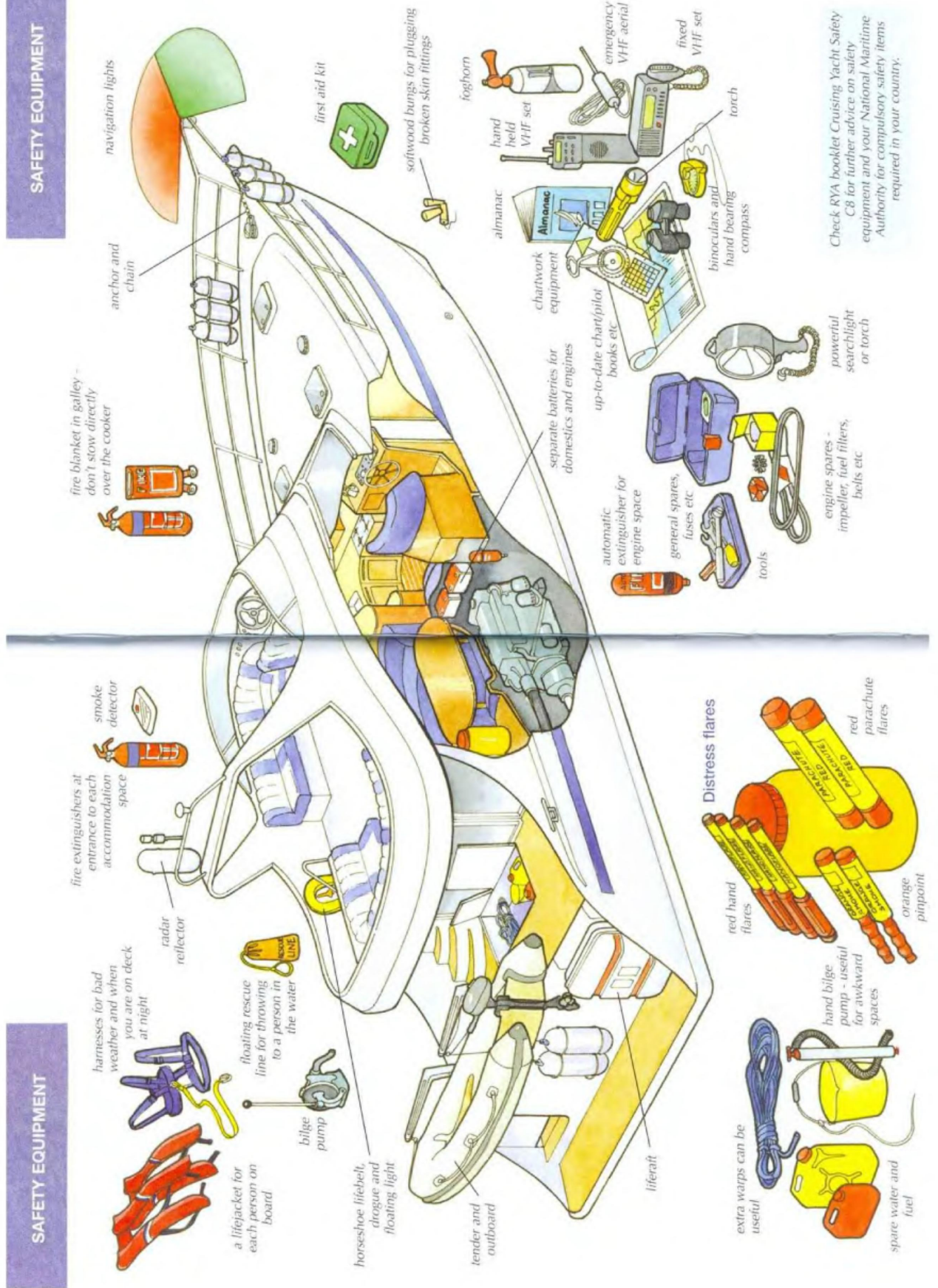
There will be much less tidal flow in the bay than outside.

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.

SAFETY EQUIPMENT

SAFETY EQUIPMENT

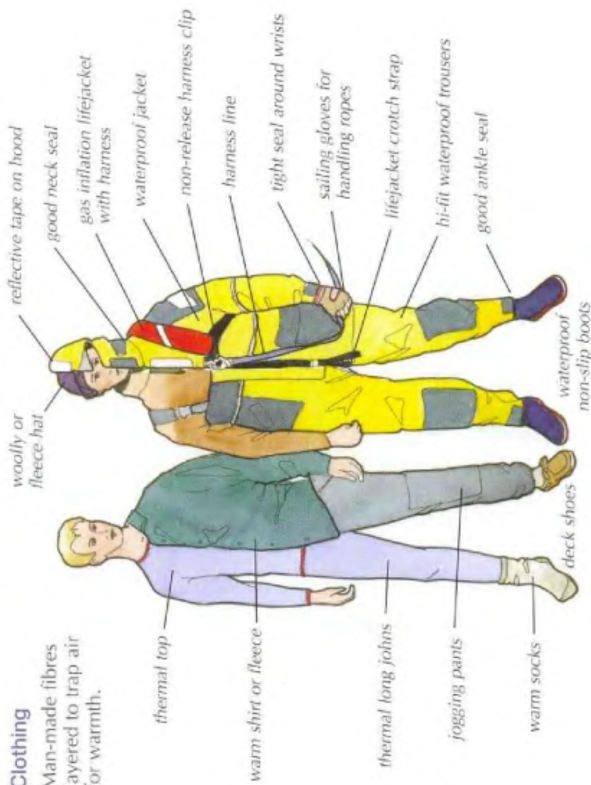


Check RYA booklet Cruising Yacht Safety C8 for further advice on safety equipment and your National Maritime Authority for compulsory safety items required in your country.

PERSONAL SAFETY AND COMFORT

Clothing

Man-made fibres layered to trap air for warmth.



Seasickness & hypothermia



Symptoms of seasickness

Lethargic/disinterested - pale colour.

Symptoms of hypothermia

Shivering, pale colour, irrational behaviour, disoriented.

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.

Regularly apply sun block of SPF 30 - 40.

Wear loose long sleeved shirts and trousers.

Try to avoid exposure between 11am - 3pm - take a long lunch and seek shade. Biminis and cockpit tents are ideal shelters.

Babies and toddlers are especially susceptible to UV damage - keep them out of the sun or well protected.

Dehydration is caused by vomiting, sweating and simply not drinking enough fluids. It can lead to shock and hyperthermia - heatstroke.

Wear shoes to protect feet from hot decks and stubbing toes.

Dehydration Symptoms

Mild - thirst, dry lips, dark urine colour. Remedy: Rehydrate using water and/or with an oral re-hydrating solution.

Moderate - partial heatstroke. Very dry mouth, sunken eyes, skin loses elasticity. Remedy: Rehydrate casualty under close supervision and seek medical guidance.

Severe - heatstroke. All of above plus rapid, weak pulse, rapid breathing, confused, lethargic. Remedy: Get medical help quickly and re-hydrate.

FIRE SAFETY

Common causes of fire



Extinguishers

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



Petrol/Gasoline vapour

Always vent engine space before starting an inboard petrol engine.

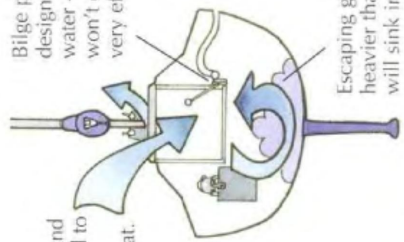


Keep outboards on deck to avoid the build-up of petrol vapour below.

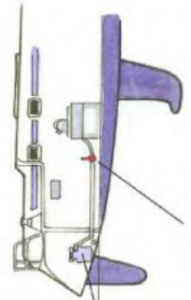
ous.

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.



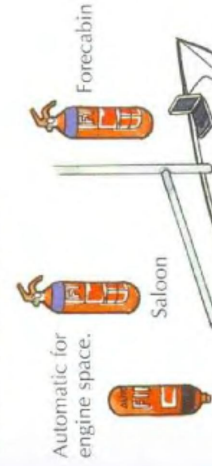
Keep gas bottle in a sealed locker that drains overboard.

Shut-off valve inside

Don't attempt DIY repairs to your system –

FIRE FIGHTING

Location of extinguishers



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.

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



Fighting the fire



Aim the extinguisher at the base of the flames.

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.

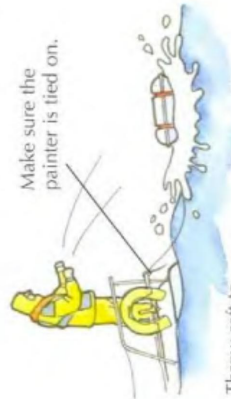


Alert the coastguard.

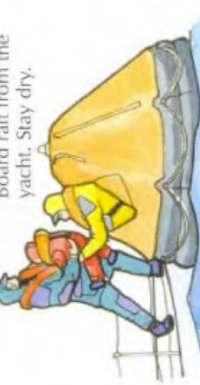


Use a pinpoint flare (night) or an orange smoke (day).

ABANDONING TO THE LIFERAFT



Throw raft to leeward and tug painter to inflate.



Board raft from the yacht. Stay dry.



Once aboard:

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

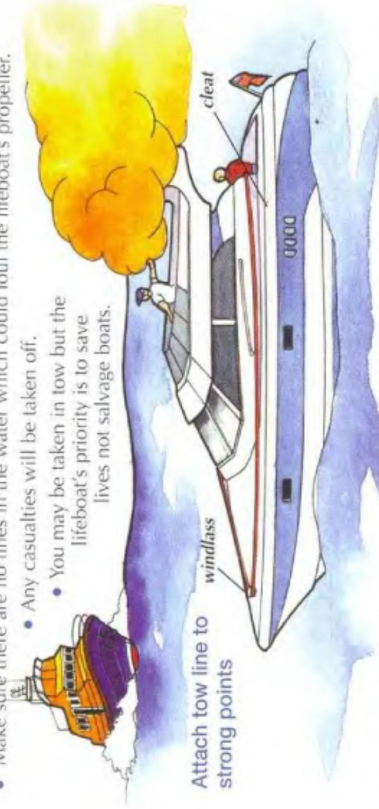
EMERGENCY SERVICES

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.

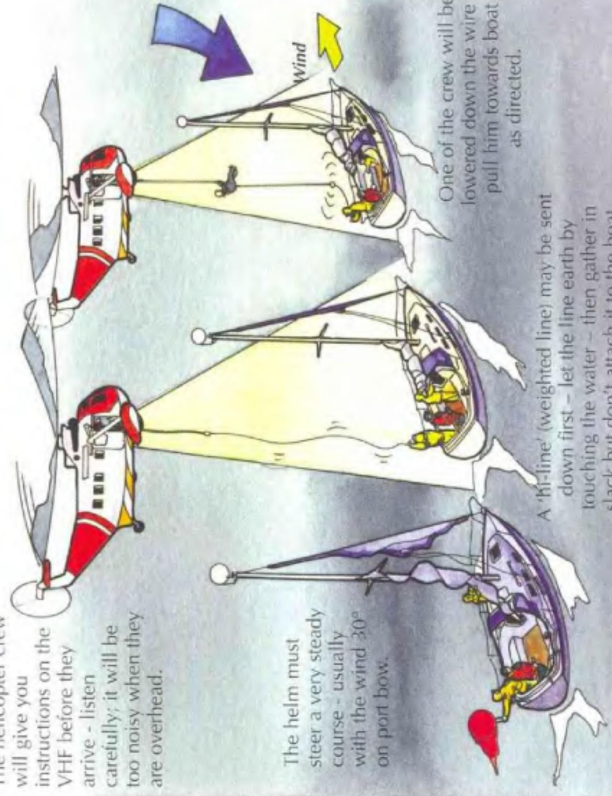
- Any casualties will be taken off.

- You may be taken in tow but the lifeboat's priority is to save lives not salvage boats.



Attach tow line to strong points

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.

RAISING THE ALARM

VHF VOICE CALL

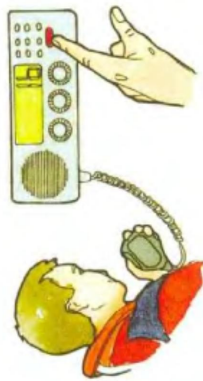
Use VHF to alert the coastguard and other vessels in your area.

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°13'31N 04°35'31W
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.

RAISING THE ALARM

FLARES

NEVER fire a parachute flare if a helicopter is approaching.

Fire rocket vertically.

If windy fire 15° downwind.

Handheld pinpoint flare shows exactly where you are - use inshore or in sight of other vessels.

In low cloud fire at 45°.

NEVER fire into the wind.

Orange smoke for use by day especially in bright sunlight.

floating orange smoke

for use at night or in dull conditions to pinpoint position

white collision warning flare

handheld orange smoke

long range signal for use offshore

Hold at arm's length downwind - don't look directly at the flare.

Other distress signals

Raising and lowering arms.

Fly a ball over a square.

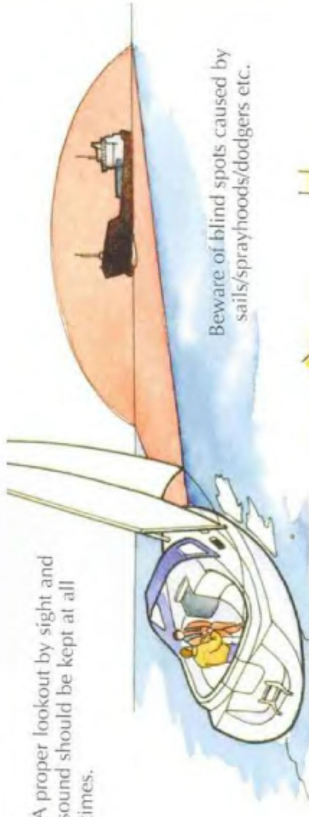
Code flag V is not a distress signal but means 'I require assistance'.

Prolonged blast on foghorn.

SOS by any means.

RULES OF THE ROAD

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

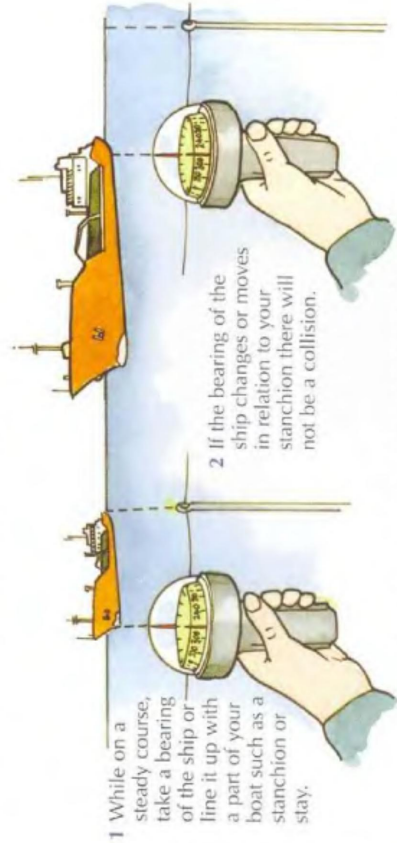


Beware of blind spots caused by sails/sprayhoods/dodgers etc.



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

How can we tell if a risk of collision exists?



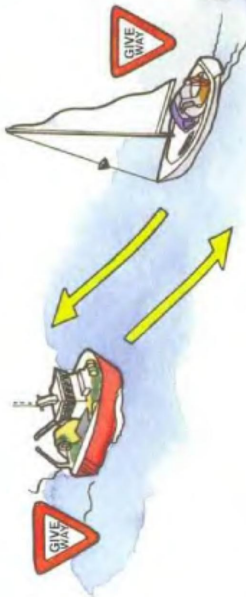
1 While on a steady course, take a bearing of the ship or line it up with a part of your boat such as a stanchion or stay.

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.

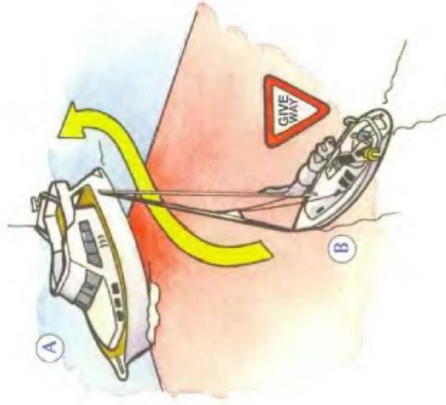
WHO GIVES WAY?

Head-on situation -
Both vessels turn to starboard.



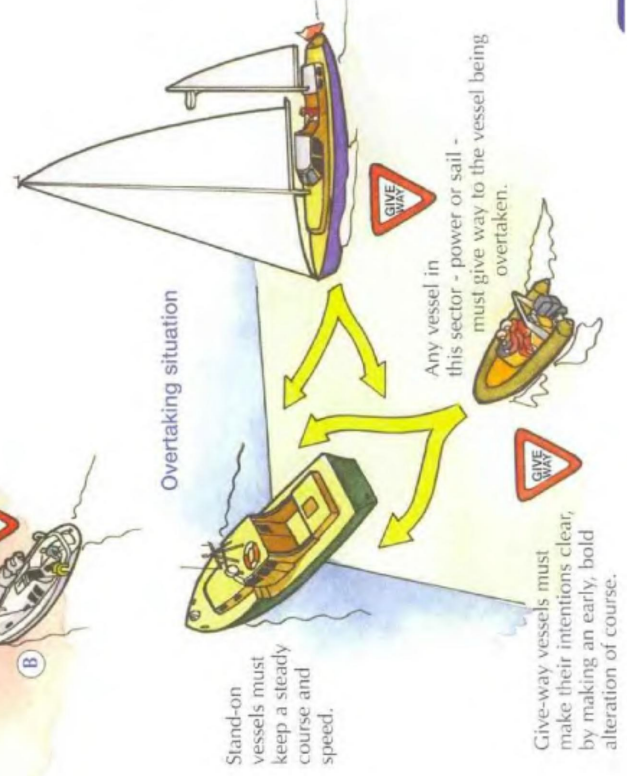
Crossing situation -

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.

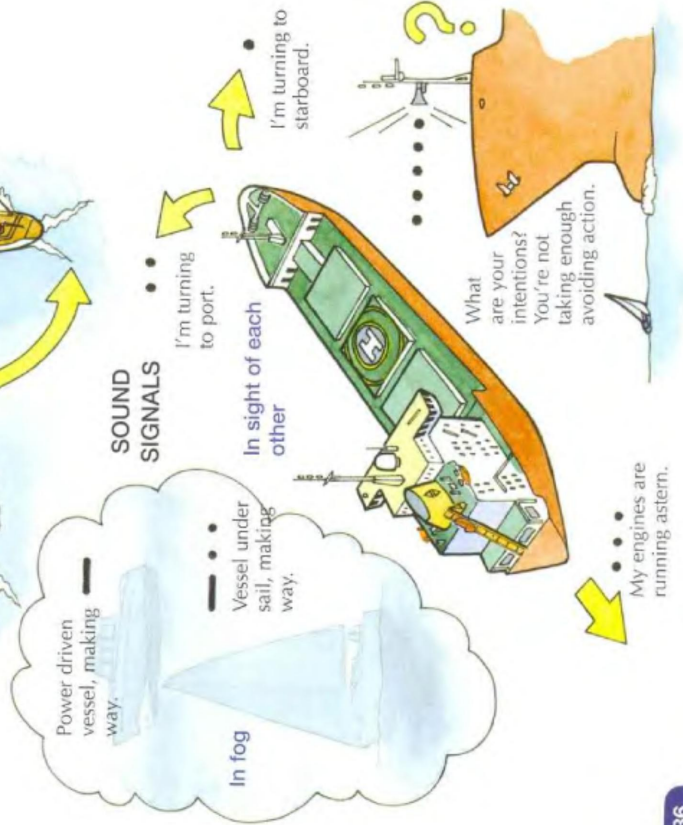
Give-way vessels must make their intentions clear, by making an early, bold alteration of course.

WHO GIVES WAY?

SAILING VESSELS

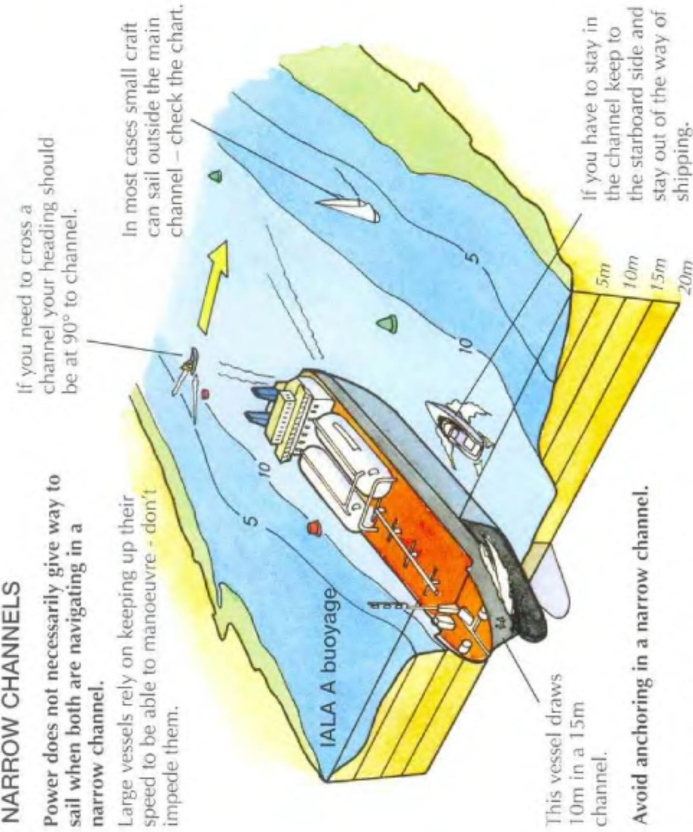


SOUND SIGNALS



WHO GIVES WAY?

NARROW CHANNELS



IN ORDER OF PRIORITY

Vessel restricted in ability to manoeuvre (laying marks, dredging etc.)

Vessel constrained by draught

Vessel engaged in fishing

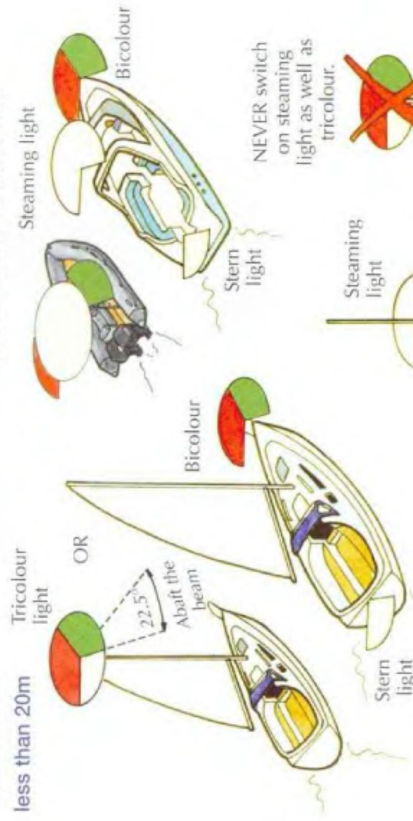
Vessel under sail

Power-driven vessel

LIGHTS AND SHAPES

UNDER SAIL

less than 20m

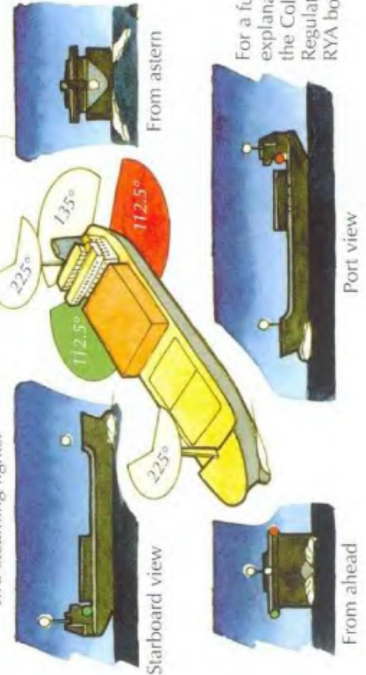


SAILING VESSEL UNDER POWER

By day



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



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

LIGHTS AND SHAPES

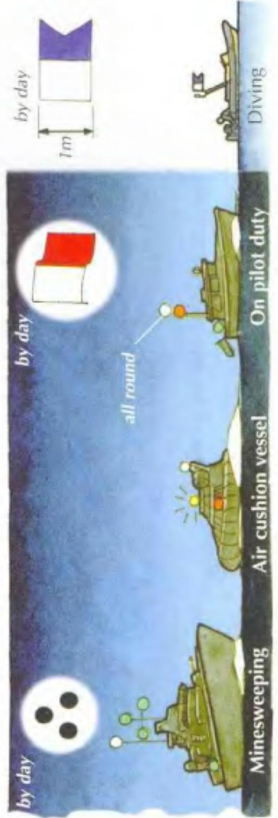


CHART FEATURES

56053 DEPTHS IN METRES

Chart title – describes area covered.

Chart catalogue number.

Scale: 1 unit of distance on this chart = (in this case) 75,000 units on the earth's surface.

Chart projection used.

Other important information and any warnings are given here.

Geodetic Datum on which chart has been produced – make sure this matches the datum set on your GPS (see page 7).

Latitude scale – use this for measuring distance.

NOT TO BE USED FOR NAVIGATION

A key to chart symbols can be found in the publication, *Symbols and Abbreviations* supplied by a Hydrographic Office.

Longitude scale – used for position only NOT for measuring distance.

Chart corrections are listed here.

CHART FEATURES

Tidal diamonds give set and drift of tidal streams.

Compass rose gives magnetic variation.

Catalogue number of adjoining chart.

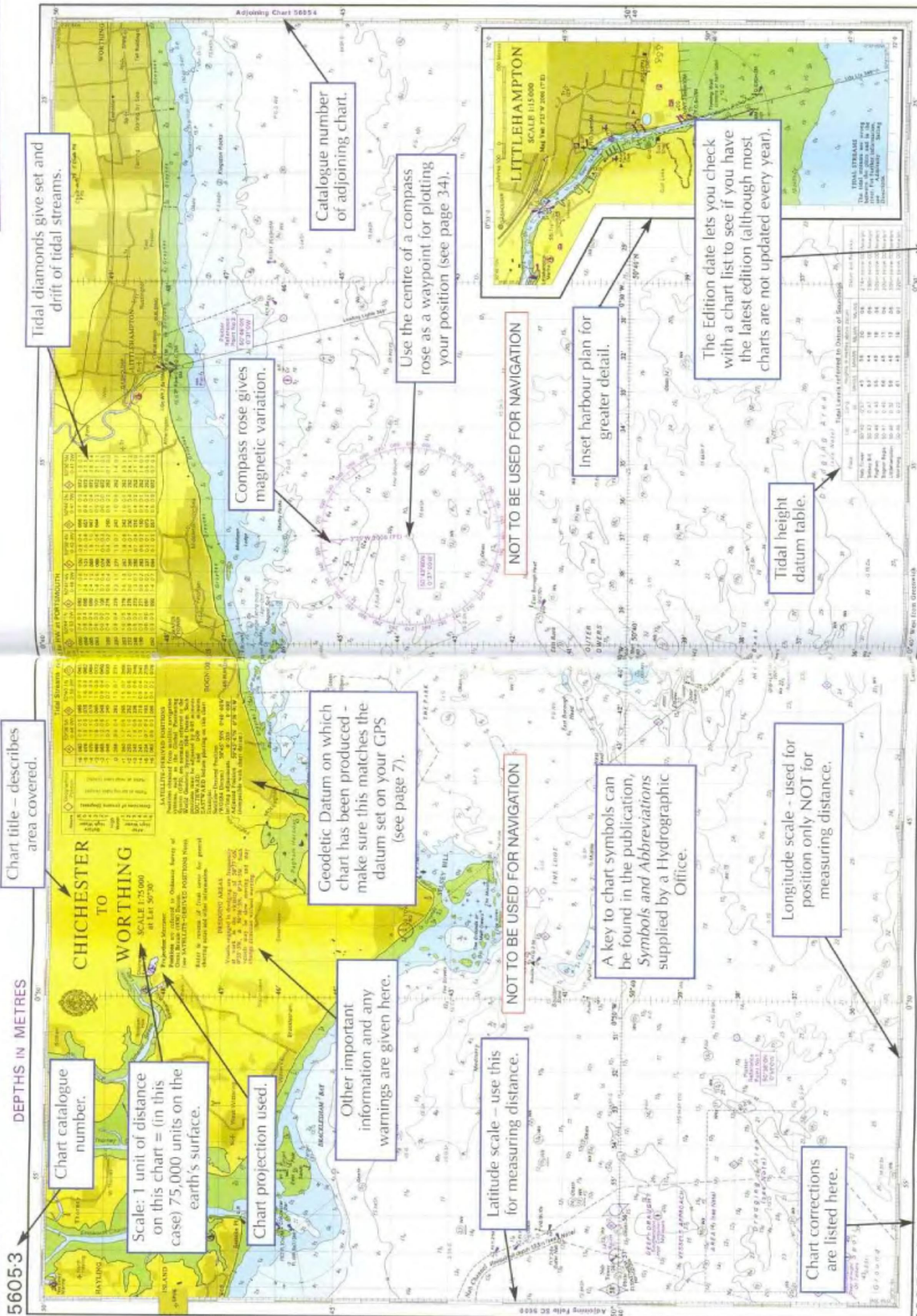
Use the centre of a compass rose as a waypoint for plotting your position (see page 34).

NOT TO BE USED FOR NAVIGATION

Inset harbour plan for greater detail.

The Edition date lets you check with a chart list to see if you have the latest edition (although most charts are not updated every year).

Tidal height datum table.



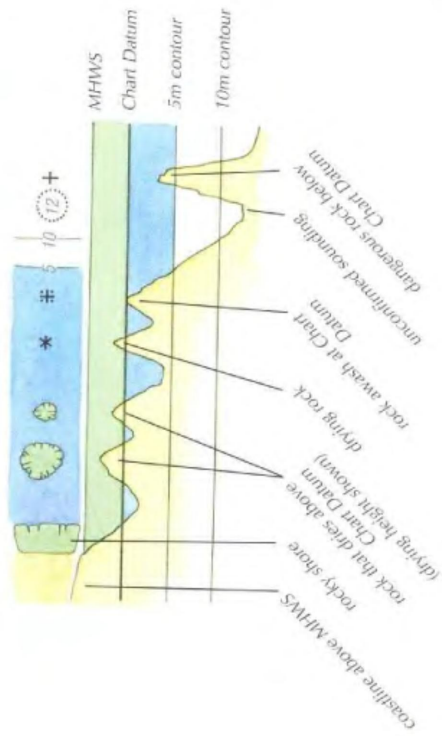
56053

1st Edition January 2000

56053



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

PLOTTING YOUR POSITION

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

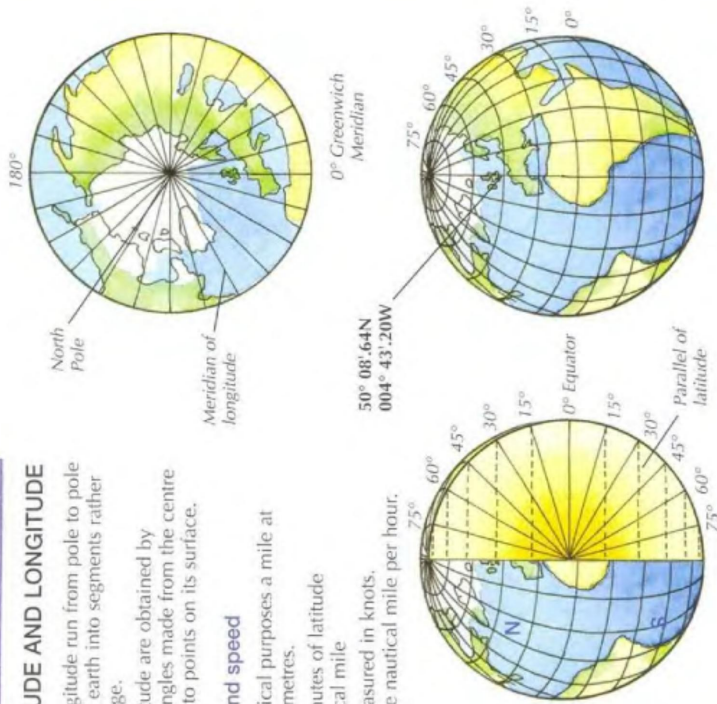
For all practical purposes a mile at sea is 1852 metres.

$1^\circ = 60'$ minutes of latitude

$1' = 1$ nautical mile

Speed is measured in knots.

A knot is one nautical mile per hour.



Plotting your position



PLOTTING YOUR POSITION

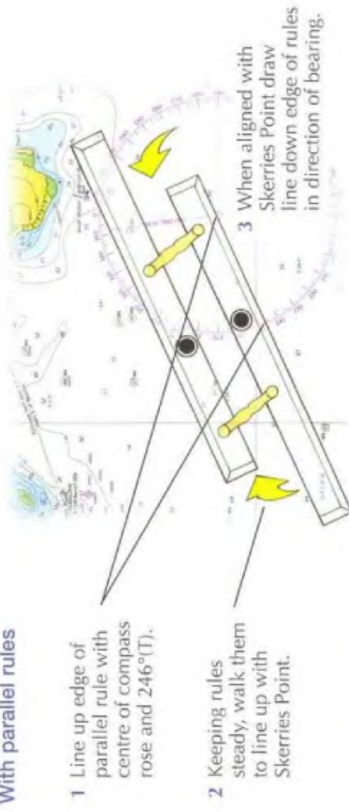
BY DISTANCE AND BEARING

eg. $246^\circ(\text{T})$ from Skerries Point 1.6M

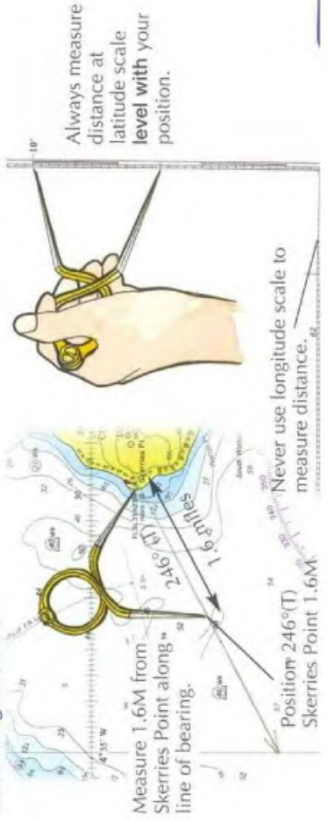
With a plotter



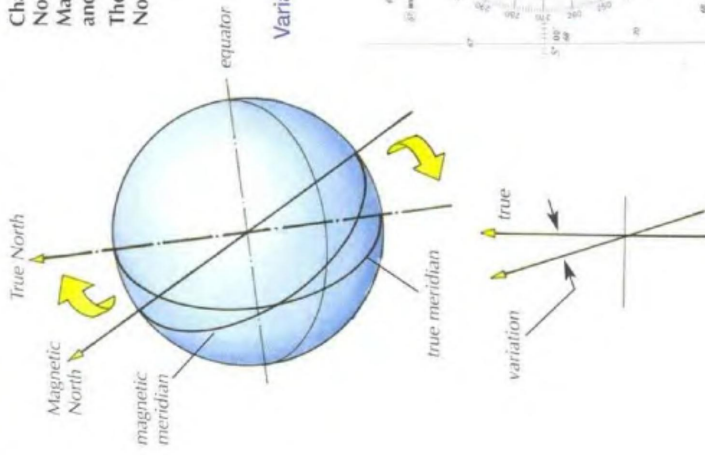
With parallel rules



Measuring distance



VARIATION



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
 $070^{\circ}(T) = 075^{\circ}(M)$

With 5°E variation
 $070^{\circ}(T) = 065^{\circ}(M)$

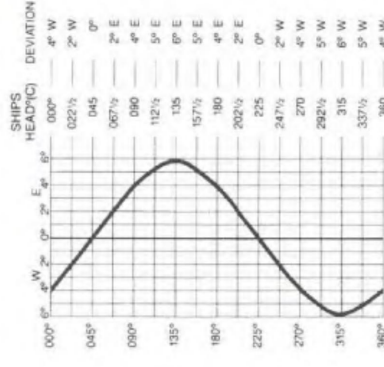
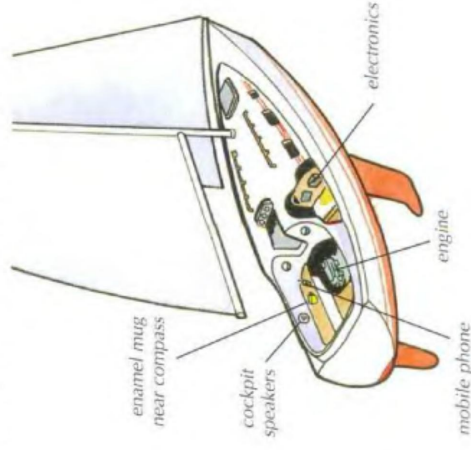
Charts show North as True (geographic) North. A compass can only point to Magnetic North, which changes with time and according to your position.
The difference between True and Magnetic North is called **variation**.

Variation for your position is found on the nearest compass rose



DEVIATION

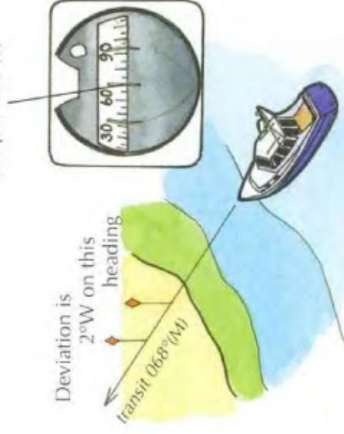
Deviation is caused by ferrous metals and electro-magnetic fields on board which will affect the accuracy of the compass.



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.

compass 070°(C)



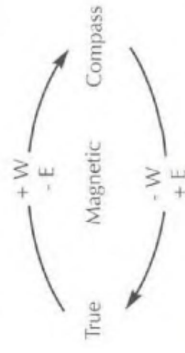
Deviation is 2°W on this heading

Checking for deviation
Point the boat straight at a transit and compare results.

How to apply variation and deviation

Chartwork is in °True -

compass courses must be in °Compass



Finding a compass course

True bearing from chart $060^{\circ}(T)$

Variation $+ 7^{\circ}W$

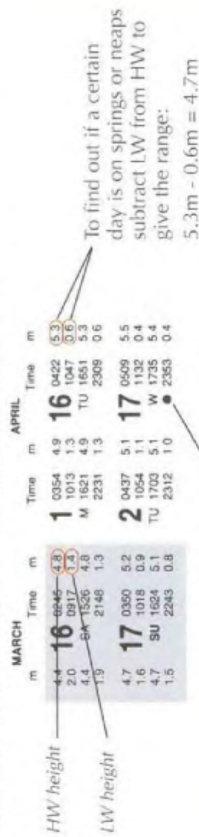
Magnetic bearing $= 067^{\circ}(M)$

Apply deviation from card $- 2^{\circ}E$

Compass course $= 065^{\circ}(C)$

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).

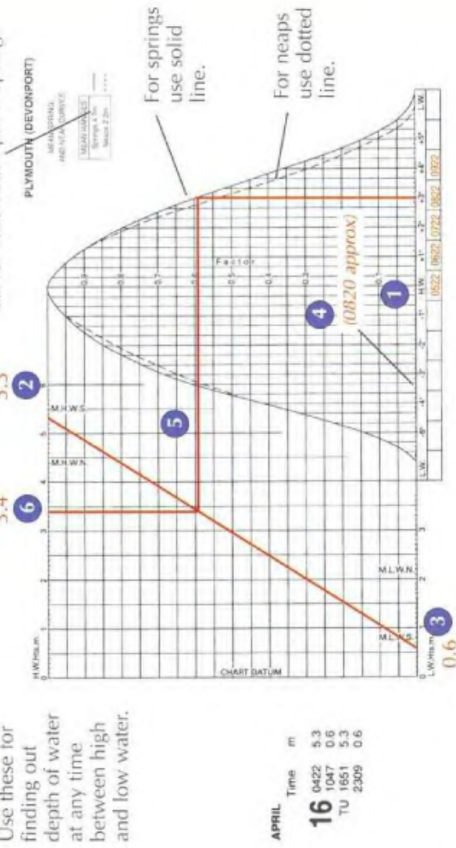


Moon symbol tells you that you are on or near springs

Tidal curves

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

Compare with mean range on curve. Tues 16th April = springs



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 (→)

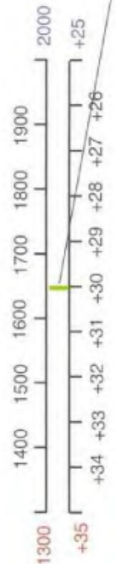
Times	High Water	Low Water	MHW	MWN	MLWN	MLWS
0100	0800	0300	0800	12.2	9.2	4.3
1300	2000	1500	2000	-1.6	-1.1	-0.6
+0035	+0025	+0020	+0035			

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?



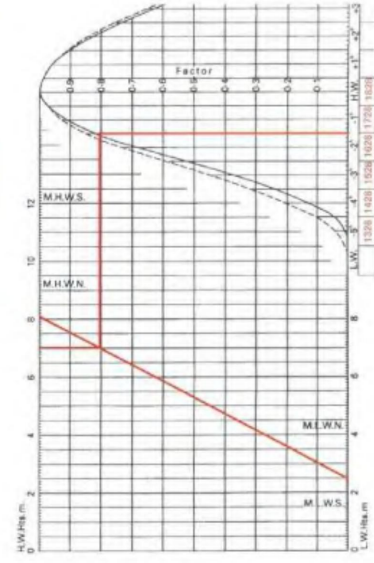
HW Carteret (30 mins later than HW St. Malo) = 1700.

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.

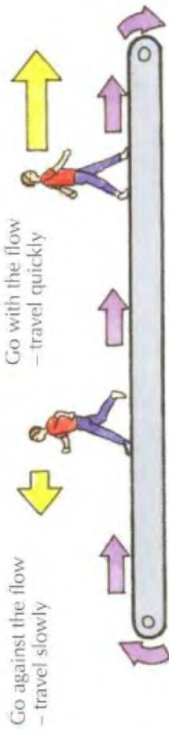
Use the related standard port.

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

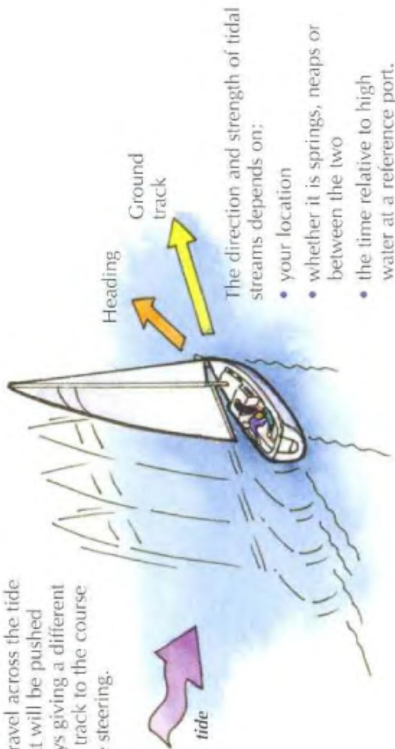


TIDAL STREAMS

Consider the tide as a travelator

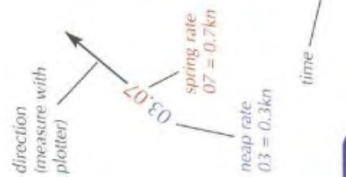


If you travel across the tide the boat will be pushed sideways giving a different ground track to the course you are steering.



FINDING THE STRENGTH AND DIRECTION OF THE TIDE

Tidal stream atlas



Tidal diamond

Tidal Streams referred to HW at PLYMOUTH

Hours	50°12'55N	5°50'10W	spring rate (kn)	neap rate (kn)	direction (°T)	time
6	227	10	0.5			
5	232	14	0.7			
4	234	15	0.8			
3	241	08	0.4			
2	307	03	0.1			
1	033	07	0.3			
High Water	048	11	0.6			
0	053	14	0.7			
1	060	18	0.7			
2	060	08	0.3			
3	074	03	0.2			
4	071	02	0.1			
5	201	02	0.1			
6	222	08	0.4			

TIDAL STREAMS

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	1135 UT
23 0505	1.9	
1135	4.5	1235 BST is the nearest HW to 0815
F 1758	2.0	
24 0006	4.4	
0649	2.0	
SA 1258	4.5	

- 2 Is it springs, neaps or in between?

$$\frac{4.5}{-1.9} = \text{Neaps (more or less)}$$

range 2.6m

- 3 How many hours before or after HW is 0815?

-5	0735	0705
-4	0835	0805
-3	0935	0905
-2	1035	1005
-1	1135	1105
HW	1235	1205
		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 $\diamond$ to your position = $\diamond$

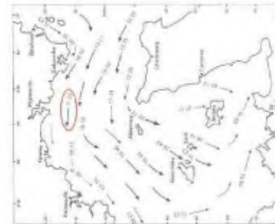
$$\begin{aligned} \text{Spring rate} &= 2.3\text{kn} \\ \text{Neap rate} &= 1.1\text{kn} \\ \text{Direction of tidal stream} &= 278^\circ(\text{T}) \end{aligned}$$

50°12'55N	5°05'00W
277	19 10
280	23 11
278	23 11
279	17 08
296	08 03
063	08 04
081	19 09
083	22 11
077	22 11
070	19 08
055	10 05
310	05 03
280	14 07

-4hrs

HW

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



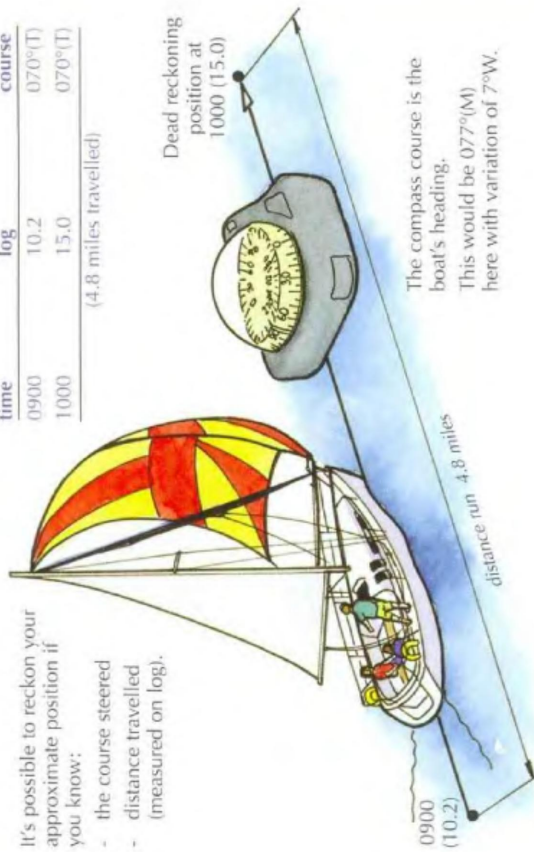
4 hours before HW Plymouth
(3 hours after HW Dover)

$$\begin{aligned} \text{Neap rate} &= 1.1\text{kn} \\ \text{Measure direction of arrow} &= 278^\circ(\text{T}) \end{aligned}$$

DEAD RECKONING POSITION

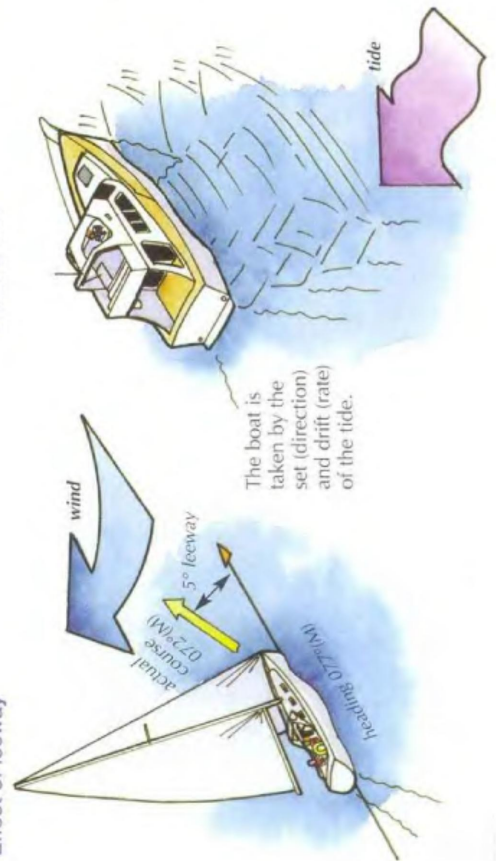
It's possible to reckon your approximate position if you know:

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



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

Effect of leeway



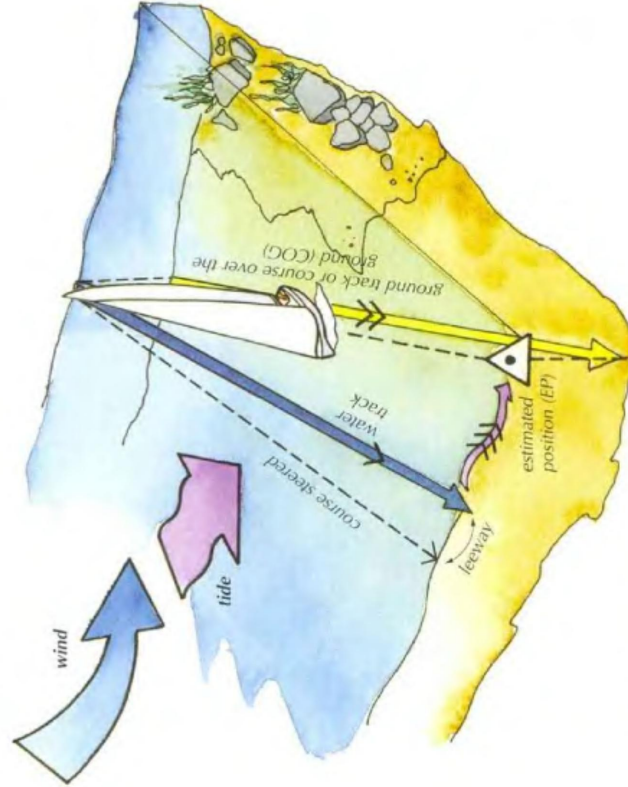
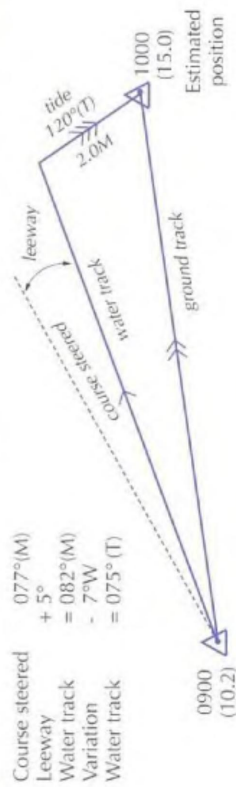
Effect of tide



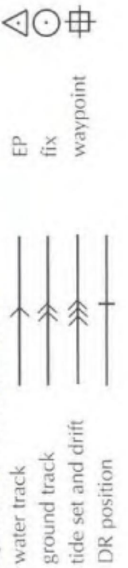
ESTIMATED POSITION

To plot an EP

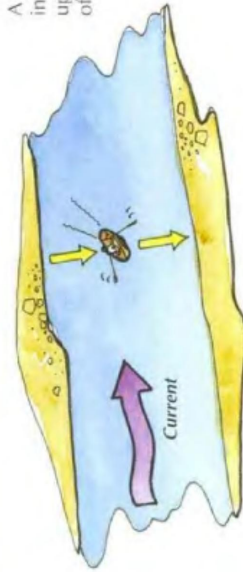
time	log	course	leeway	wind	tide
0900	10.2	077°(M)	5°	N5	140°(T) 1.4kn
1000	15.0	077°(M)	5°	N5	120°(T) 2.0kn tide for 0900-1000



symbols used in chartwork



COURSE TO STEER



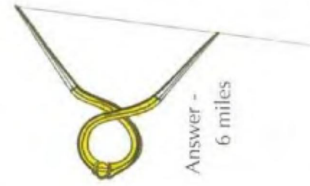
A person rowing across a river instinctively angles the boat upstream to counter the effect of the current.

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?



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.

COURSE TO STEER

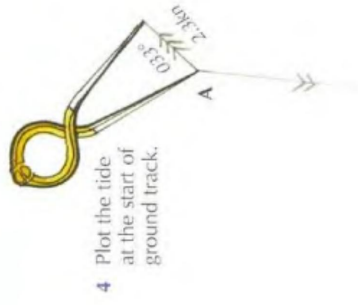
3 Leaving at 2105 how will the tide affect my passage for the next hour?
Use diamond $\diamond$ (RYA Training Chart 1)

Wed 17th April HW Plymouth = 1835 BST springs

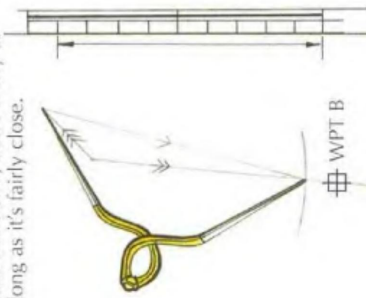
HW	1835	1905
+1	1935	2005
+2	2035	2105
+3	2135	2205

2100 - 2200 = HW +3

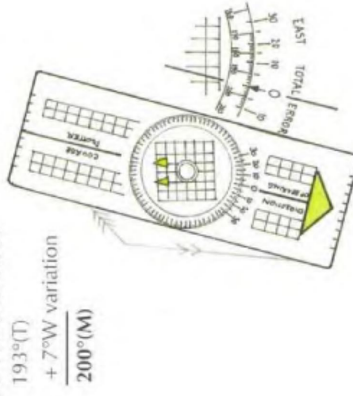
Answer 033°(T) 2.3kn



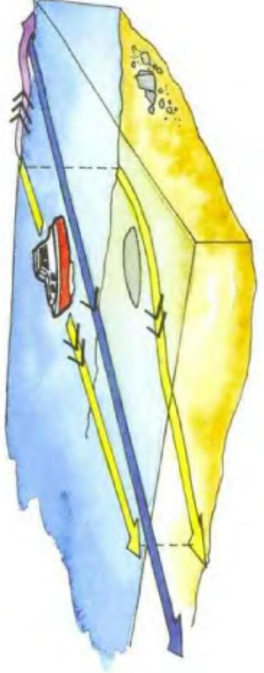
5 Measure the expected boat speed for one hour (9kn) and arc dividers from end of tide to cross ground track, this usually goes beyond or falls short of B, don't worry as long as it's fairly close.



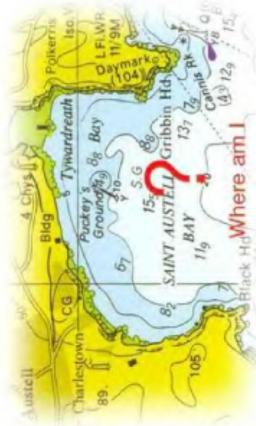
6 Measure bearing of water track - this will be your **course to steer**.



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



A VISUAL FIX



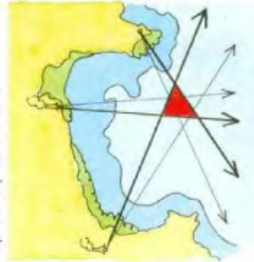
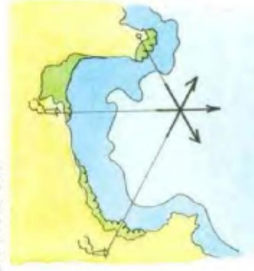
Three point fix

Take bearings on charted objects to fix your position.

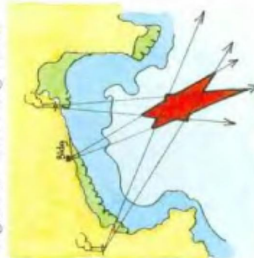


Draw the bearings on the chart.

Bearings rarely line up as a perfect fix.



If bearings are too close together - error is greater.



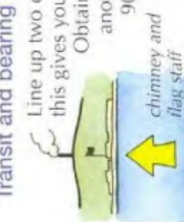
Your position will be where the lines intersect. Use closer objects for greater accuracy.

Error produces a cocked hat.

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

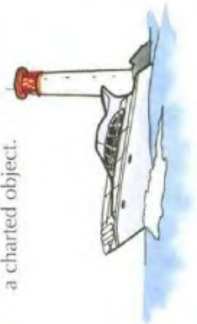
Transit and bearing

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.



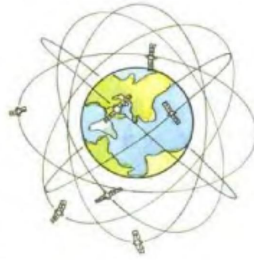
Bearing and contour

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.



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.

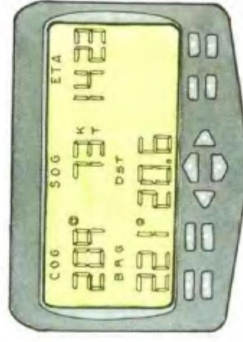


It can also give:

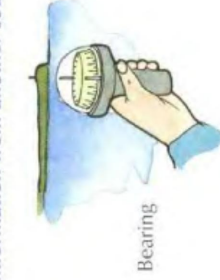
- your current course and speed over the ground
- information about your position in relation to waypoints (see next page).

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:



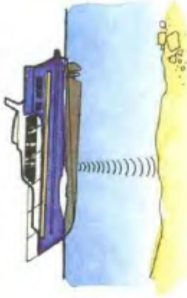
IALA B buoyage



A charted object.



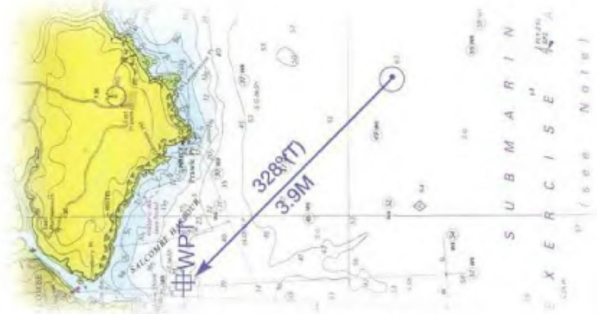
Depth allowing for tide.



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.

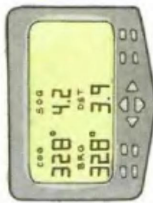
You obtain WPTs from:

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

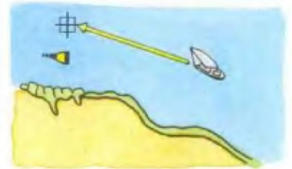
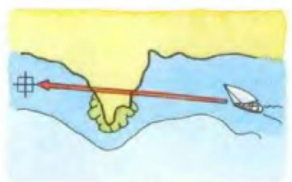
The GPS display can show the distance and bearing to a WPT and your current course and speed.

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.

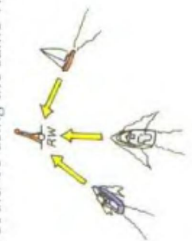
When you input a WPT always check that the distance and bearing given by the GPS matches the you have measured on the chart. Any difference means you have probably input the WPT lat and long incorrectly.



Never input a WPT straight from a book or magazine. Always plot it on a chart to check your route.

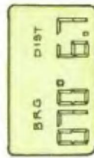


In busy areas bear in mind that lots of boats could be using the same WPT.



OTHER WAYS OF USING WAYPOINTS

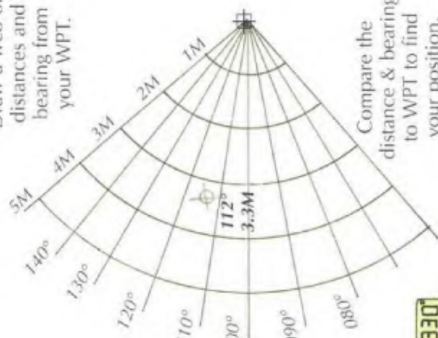
You can plot your position quickly and simply by entering easily found positions as WPTs. The GPS will give you a distance and bearing to the WPT and you can plot these to give a fix. This is easier, quicker and less prone to error than plotting by lat and long but double check that you have entered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



You can also use the WPT that you are travelling to.



Draw a web of distances and bearing from your WPT.



Plotting at speed

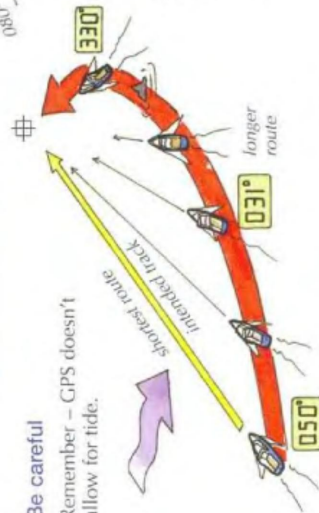
Conventional plotting can be difficult on a fast boat at speed.

Navigation must be pre-planned.



Be careful

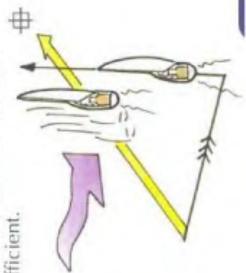
Remember – GPS doesn't allow for tide.



It seems easy to just steer the bearing that the GPS gives you to a WPT but if there is significant cross tide you:

- will sail a longer route
- could put the boat in danger.

Always pre-plan a course to steer to allow for tide – it's more efficient.

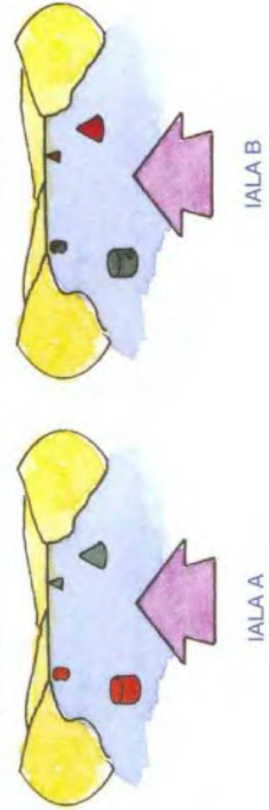
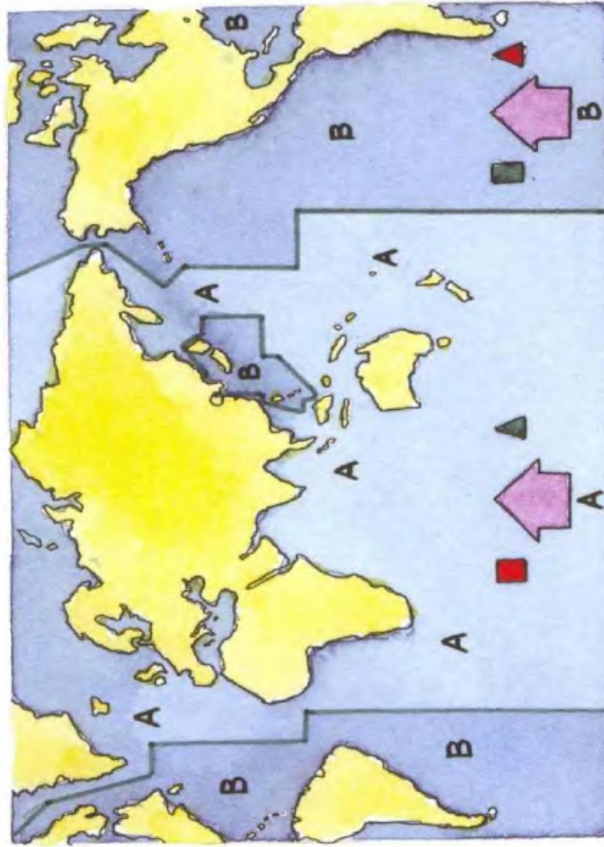


IALA - MARITIME BUOYAGE SYSTEM

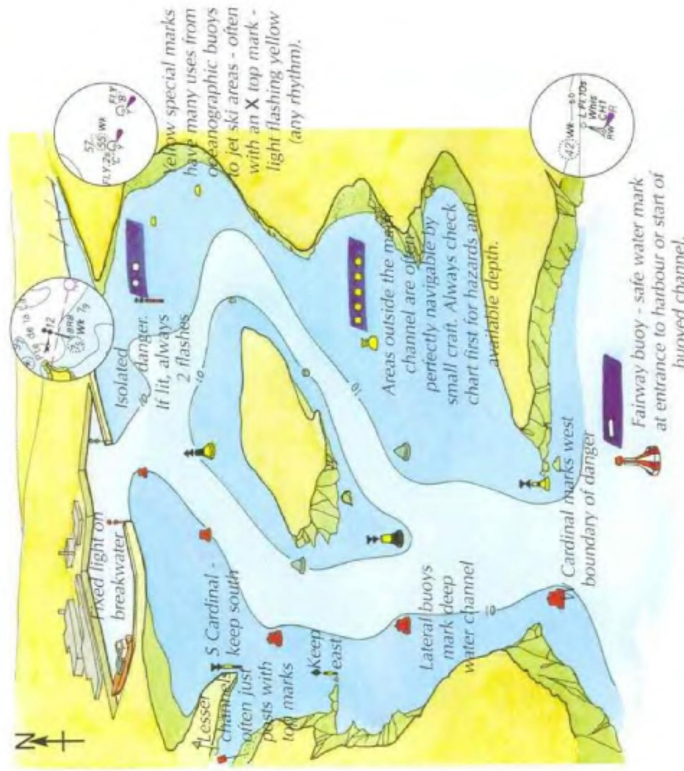
Two buoyage systems exist in the world, IALA A and IALA B. The difference affects the colour and light characteristics of lateral marks.

IALA A is used in Europe, Africa, Russia, India, Australia and New Zealand.

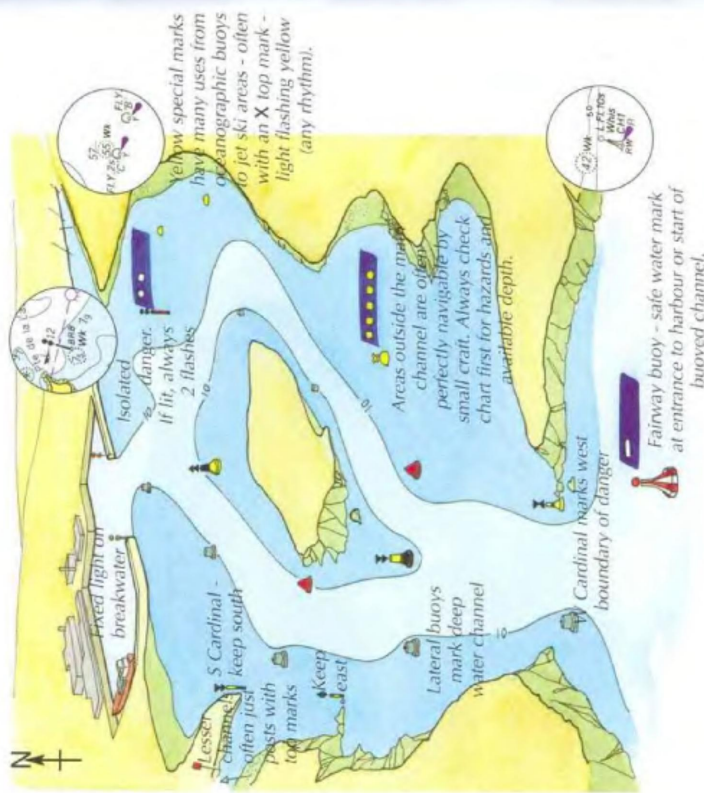
IALA B, which is illustrated on page 62, is used in the USA, South America, the parts of the Caribbean, South East Asia and Canada.



IALA - A BUOYAGE



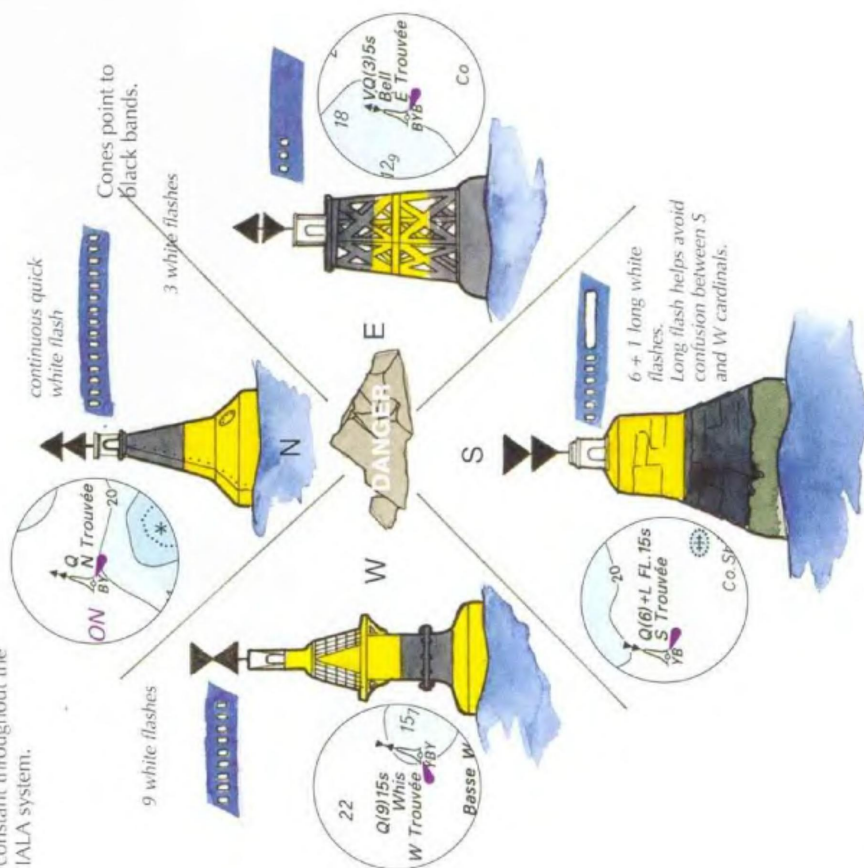
IALA - B BUOYAGE



CARDINAL MARKS COMMON TO IALA A AND B

Cardinals

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

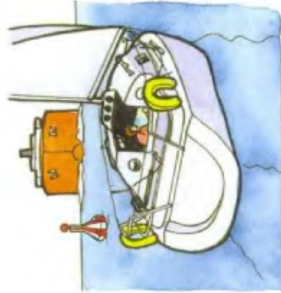


Buoys are found in many shapes and sizes. Solar panels and lights can make top marks difficult to distinguish. Weed and guano can alter the appearance and colour.

PILOTAGE

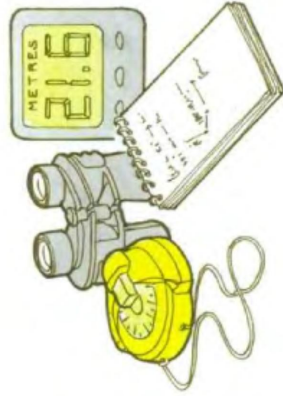
Pilotage is the art of inshore navigation when you have visual references to help you find your way along the coast and in and out of harbour.

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.

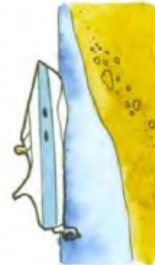
Making a good plan means you can navigate from on deck.



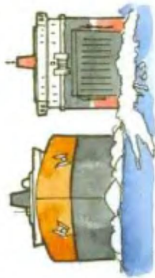
THINGS YOU MIGHT NEED TO PLAN FOR



Rocks



Shoals & shallows



Shipping channels



Harbour byelaws



at high water and low water



e.g. Small craft channels



Speed restriction in channel



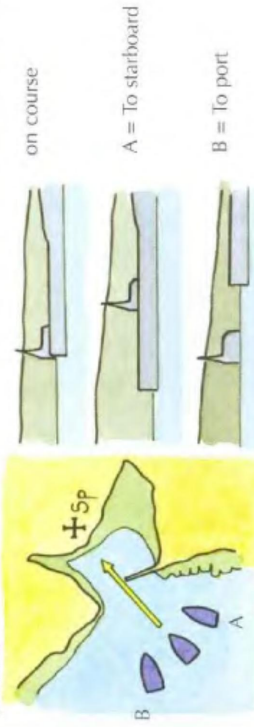
Chain ferries

Effect of tide

A different port may have a change of buoyage system – here it is IALA A buoyage.

PILOTAGE TECHNIQUES

Transits



Contours

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



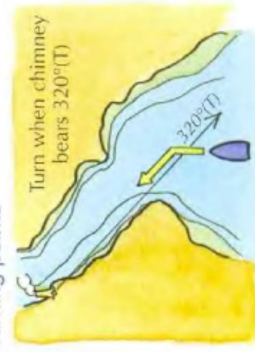
Clearing bearing



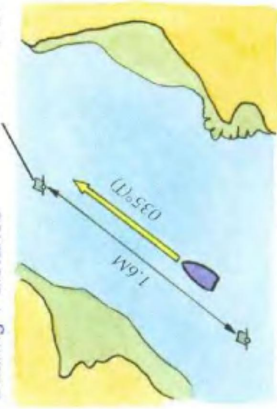
Back bearing



Turning points

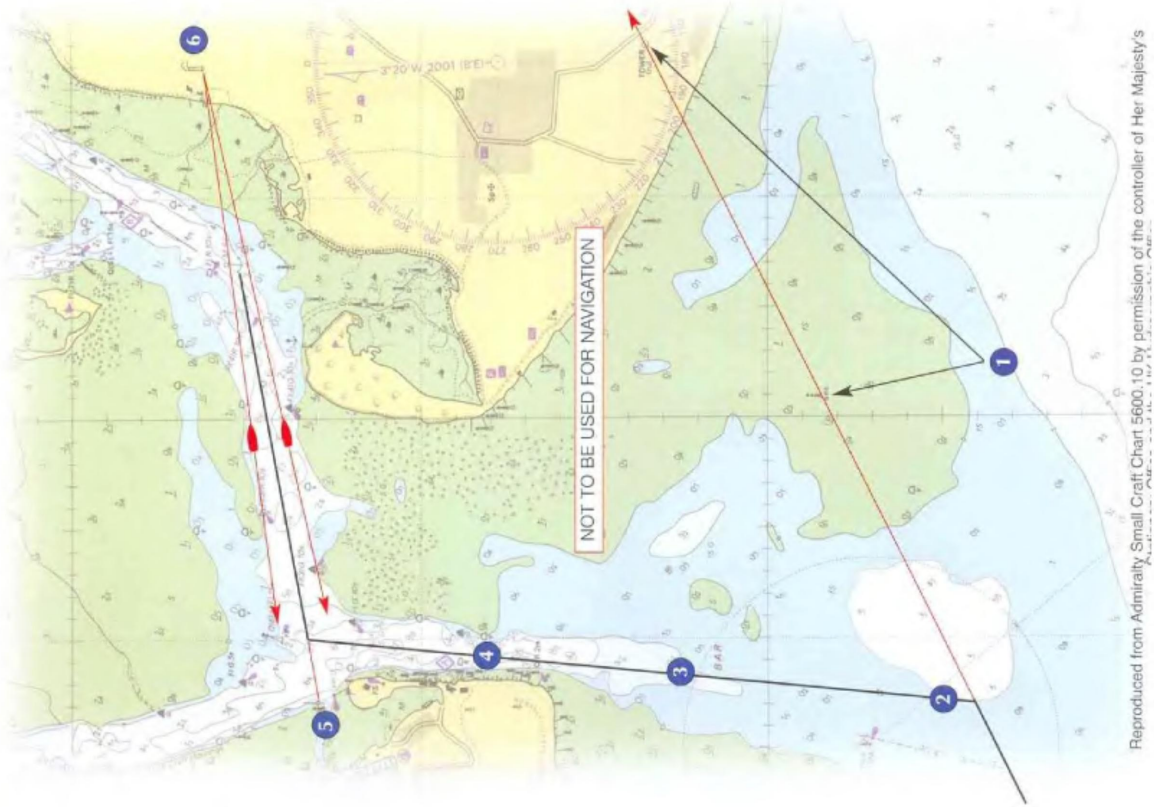


Bearing + distance



Work this out in advance so you know when and where to expect the next buoy.

MAKING A PILOTAGE PLAN



Reproduced from Admiralty Small Craft Chart 5600.10 by permission of the controller of Her Majesty's

FOLLOWING YOUR PLAN

1 Transit

2 Contour

3 Clearance over bar

4 Positive identification of marks

IALA A buoyage

5 Back bearing

6 Clearing lines

Height of tide = 4m

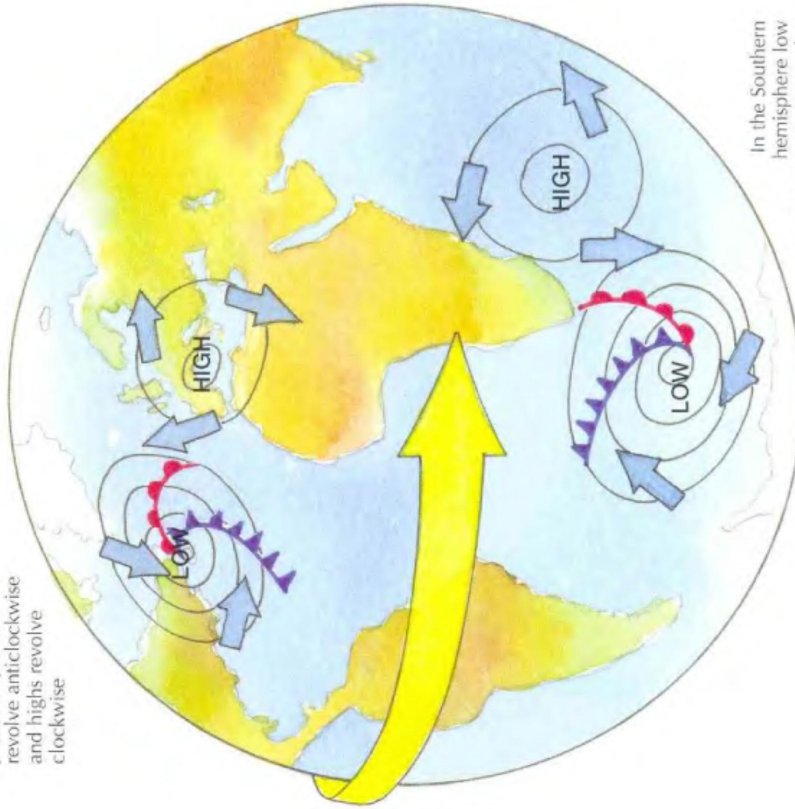
1. Follow Transit 087°(M) isolated danger mark and mined towers
2. At 5m contours (depth = 9m) turn onto 011°(C) for 2 miles
3. Min depth over bar = 3.7m
4. Leave green cone buoy = 4-0.3
5. When pale buoy 263°(M) turn onto 086°(C) keep pale on back bearing of 263°(M)
6. Keep between clearing bearings of 080°(M) and 090°(M) on chimney

WEATHER SYSTEMS

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.

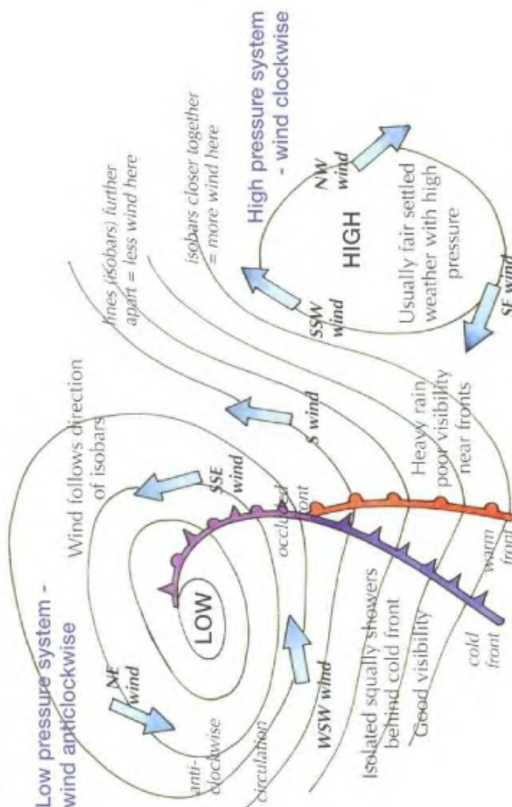
In the Northern hemisphere low pressure systems revolve anticlockwise and highs revolve clockwise



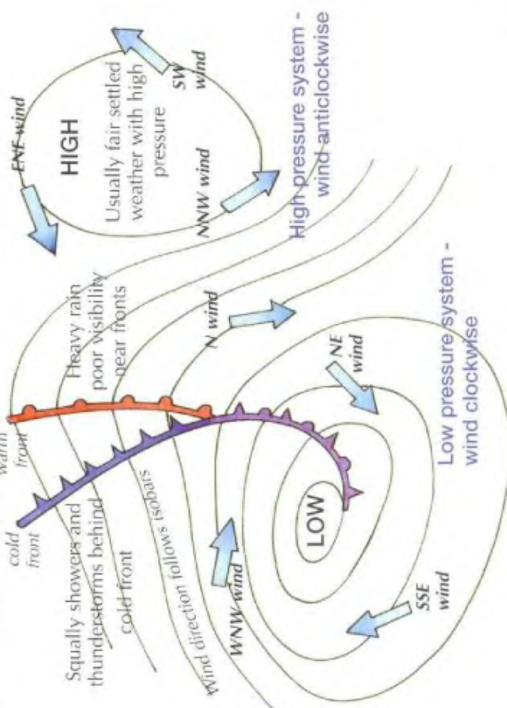
In the Southern hemisphere low pressure systems revolve clockwise and highs revolve anticlockwise

WEATHER SYSTEMS

NORTHERN HEMISPHERE



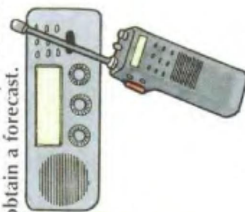
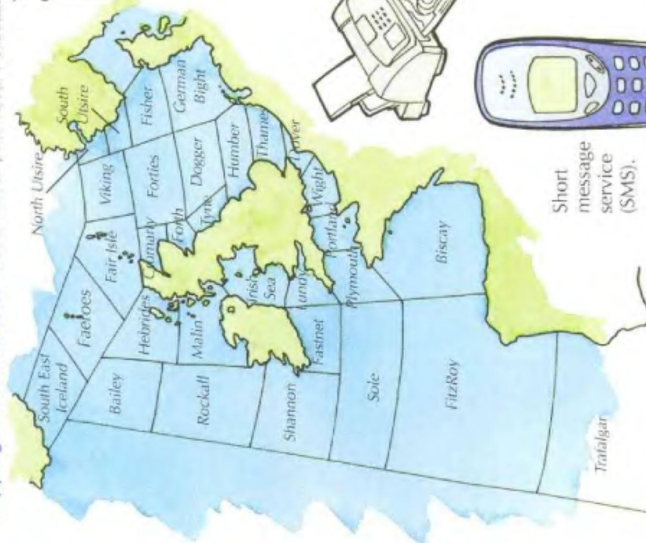
SOUTHERN HEMISPHERE



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.

Melfax.



Short message service (SMS).



Recorded forecasts by phone.



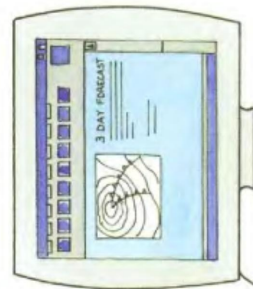
Many harbour and marina offices post a forecast.

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

Teletext



Internet.



Local radio stations.

WEATHER FORECASTS

TERMS USED IN FORECASTS

If average wind is expected to be F8 or more, or gusts 43-51 kn.

If average wind is expected to be F6 or F7, F6 is often called a 'yachtsman's gale'.

Within 6 hrs of time of issue of warning.

Within 6-12 hrs of time of issue of warning.

More than 12 hrs from time of issue of warning.

Good - greater than 5 miles **Moderate** - between 2 - 5 miles.

Poor - 1,000m to 2 miles. Fog less than 1,000m.

No significant precipitation.

Wind changing in an anticlockwise direction eg NW to SW.

Wind changing in a clockwise direction eg NE to SE.

How and where the weather systems are moving.

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.

Gale warnings

Strong wind warnings

Imminent

Soon

Later

Visibility

Fair

Backing

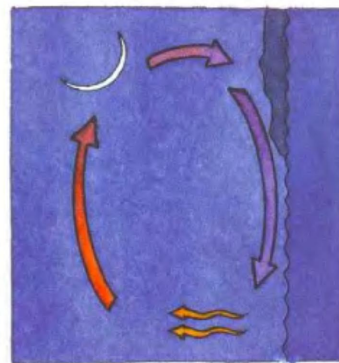
Veering

General synopsis

Sea states

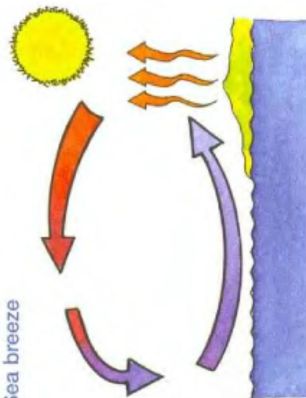
LAND AND SEA BREEZES

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.

Sea breeze

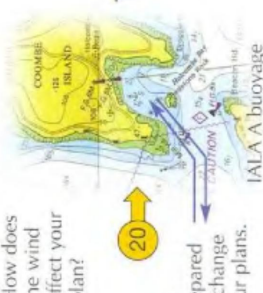


In fair weather and light to moderate offshore wind, a sea breeze is likely to develop. Warm air rises over land, it then cools, descends and blows onshore. Wind up to force 4 in strength.

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?

- 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.


Return passage into wind - very uncomfortable.

Outward passage downwind.

Be prepared to change your plans.

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

ALA A buoyage

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

