SOUTH AFRICAN SAILING

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# COASTAL SKIPPER SYLLABUS

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The Coastal Skipper Syllabus requires mastery of the Day Skipper and Local Waters Syllabuses plus the additional sections listed below:

## SECTION 1: CHARTS AND NAUTICAL PUBLICATIONS

Candidates must have a sound understanding of nautical charts including:

- An understanding of the horizontal chart datum and the need to correct satellite derived positions if this datum is not WGS 84.
- An understanding of the importance of the vertical chart datum used for charted depths. Candidates should know that South African charts used the IMO preferred datum that is LAT, but that many countries have not standardised on LAT.
- Candidates must know that local magnetic variation is shown either on an inner compass rose or by lines of constant magnetic variation (isogonic lines). Candidates must be aware that magnetic variation changes with time and must know how to use the information presented on the chart to extrapolate magnetic variation to the current year.
- Candidates must recognise common chart symbols – particularly rocks, wrecks, obstructions, buoys, lights, leading lights, lighthouses and sector lights. Candidates must be familiar with SAN HO-6 Chart Symbols and abbreviations.
- Candidates must understand the importance of updating charts from Notices to Mariners.
- Candidates must understand the basic concept of a Mercator projection and a rhumb line.

Candidates must be familiar with the basic South African Navy Hydrographic Office publications, namely SAN HO-1 (South African List of Lights and Radio Signals), SAN HO-6 (Chart Symbols and Abbreviations) and SAN HO-15 (International Regulations for the Prevention of Collisions at sea). Candidates must be aware of South African sailing directions (SAN HO-21 – 23) AND SAN HO-2 (South African Tide Tables).

Candidates must be aware that most coastal nations have hydrographic offices that publish similar information for their coastlines. The Admiralty (the UK Hydrographic office) publishes worldwide information that is comprehensive but expensive. NOAA (the National Oceanographic and Atmospheric Administration – the USA's Hydrographic office) publish some worldwide information much of which can be downloaded free of charge.

Both the Admiralty and NOAA publish seasonal weather charts – one for each month – showing wind roses, ocean currents and other weather statistics. The Admiralty charts are called Routing Charts while NOAA's charts are called Pilot Charts and can be downloaded for free. Candidates must be familiar with these charts and know how to read their wind roses.

Both the Admiralty and NOAA publish worldwide sailing directions. NOAA's directions can be downloaded for free. However candidates should be aware that commercial pilot guidebooks aimed at the leisure yachtsman are often far more useful than official sailing directions that have commercial shipping in mind.

## SECTION 2: NAVIGATION

Candidates must be able to competently use both a parallel rule and a Portland plotter.

They must understand the importance of using the correct chart work symbols and terminology for ground tracks, water tracks, current, position lines, transferred position lines, dead reckoning, estimated position, fixes and waypoints. Plus they must understand why a DR, an EP and a fix must always have a time next to them.

They must also be able to swing the compass and develop a compass deviation card.

Candidates must understand that fixes, other than GPS fixes, are obtained from the intersection of position lines. They must also understand the factors that to be considered when selecting

navigational landmarks to get a two bearing or three bearing fix. Plus they must understand the relevance of a cocked hat and the probability of being inside the cocked hat.

Candidates must be able to plot their EP or shape their course in the presence of leeway and current. Candidates must also be able to determine the current from the difference between speed and heading as determined from log and compass and the SOG and COG as determined by GPS.

Candidates must be able to fix their position using a running fix with leeway and current, as well as with a double angle on the bow. They must also understand the danger of fixing position using a running fix or a double angle of the bow with an unknown current or leeway of faulty log.

Candidates must be able to fix their position by dipping the light. Plus they must be able to use the geographic range formula used in dipping the light to estimate the range of VHF communication or the maximum range of radar or AIS.

Finally, Candidates must be able to shape a course to intercept another vessel using the principle that a constant bearing ensures a collision. Candidates must understand the connection between this construction and the use of constant bearing in Colregs to indicate potential collisions.

## SECTION 3: NAVIGATIONAL DISCIPLINES ON A COASTAL PASSAGE

Candidates should be able to describe an appropriate navigational discipline for a coastal passage. While it is not appropriate to define a single set of disciplines for all passages, the following provides a guideline:

1. The sailboat's log should be filled in at appropriate intervals. Hourly intervals might be appropriate. The entries should include course, speed and distance logged, a GPS fix, barometric pressure and general comments. (Some skippers prefer to keep a separate navigator's logbook for navigational detail.)
2. A GPS fix should be plotted each hour and the track projected forward with a suitable DR or EP to ensure that the track is well clear of charted hazards.
3. The watch captain should be aware of the implications of any difference between the course and speed as indicated by the yacht's instruments and as indicated by the GPS.
4. Navigational landmarks en-route should be noted and their GPS bearings compared with a hand held compass as a means of confirming their identity and GPS navigation. This process also helps to develop local knowledge that becomes essential in the event of a GPS failure.
5. Where appropriate, suitable depth alarms should be set to warn of any navigational or watch keeping failure.
6. The times of weather forecasts should be noted in advance, and the salient details entered into the log. The barometric pressure and wind conditions should also be recorded in the log. Any ominous developments in the forecast of the recorded weather should be reported immediately to the skipper.
7. All watch captains should be capable of maintaining these disciplines. The skipper should check on a regular basis that the watch keeping and navigational disciplines are being followed diligently.

## SECTION 4: PILOTAGE

Candidates must be able to understand the importance of developing a pilotage plan for any complex entry, particularly if there is a risk that the entry may have to be conducted at night or in restricted visibility.
Candidates must also demonstrate the ability to develop a pilotage plan for a complex entry, and be able to use traditional pilotage techniques such as clearing bearings, back bearings, transits, sector lights, depth and log. He or she should also be able to use the GPS techniques of pilotage and understand and manage the risks of GPS pilotage.

## SECTION 5: GPS

Because of its accuracy and reliability, GPS has made an enormous contribution to the safety of navigation at sea and has become the primary means of navigation and fixing position. So candidates are expected to understand and make full use of the GPS techniques that add so much to safety at sea. Plus they are fully expected to understand and manage the risks of GPS navigation and pilotage and be able to use the techniques of traditional navigation for confirmation and back-up.

### PRINCIPALS OF OPERATION

Candidates must understand the following fundamentals of the GPS system:

1. A GPS works by measuring the time it takes for a radio signal to travel from a GPS Satellite to the GPS receiver.
2. The GPS satellites are under the control of the Pentagon. There are typically 30 or more operational satellites in orbit (2007).
3. These satellites transmit radio signals in the 1 to 2 GHz bands that is essentially line of sight.
4. There are civil signals that are freely available and military signals that are encrypted.
5. Before May 2000 the civil signal included an International error limiting the accuracy to 100m. This policy was called Selective Availability because the full accuracy of GPS was only available to selected parties who were given access to the military signals. When Select Availability was discontinued in May 2000 the accuracy of civil GPS receivers improved to better than 15m for 95% of the time.
6. The Pentagon has the ability to switch off the civil signal in any region of the world. This policy, which replaced Selective Availability, is called Regional Selective Denial, and has important implications for the yachtsman.
7. A GPS gives a fix in four dimensions: latitude, longitude, altitude and time. To do this it needs to lock on to four satellites.

### RISKS OF GPS NAVIGATION:

Candidates must understand the risks inherent in GPS navigation:

1. Like all electronics a GPS or chart plotter can fail, or the boat's power supply can fail switching off all installed instruments. The only responsible course is to have at least one spare hand held GPS with ample spare batteries.
2. The GPS system itself can fail. There are several possible failure modes:
   a. The Pentagon can switch off the civil signal in any region.
   b. A solar radio storm can swamp the GPS signal.
   c. In the event of war, several countries have missiles capable of destroying satellites.
3. Because the GPS system can fail it is essential to maintain traditional navigational disciplines. On a coastal or ocean passage a deck log and a running plot on paper charts or ocean plotting sheets is essential back up. This way DR navigation can be established quickly in the event of GPS failure.
4. The GPS system operates in the WGS 84 horizontal chart datum. Although many countries are converting their charts to WGS 84, many still remain in other datums.
5. Even when allowance is made for chart datums, the GPS co-ordinates on many older charts are not near the accuracy of the modern GPS systems. The navigator should in particular be aware of this risk with remote islands where, prior to GPS surveying, precise co-ordinates could not be obtained by triangulation with the mainland.
6. Entering waypoints and routes manually is error prone and a rigorous validation process is essential. It is safer if waypoints and routes are developed on a computer with electronic charts.

Candidates must understand the following additional risks associated with GPS Linked chart plotters:

1. The dangers of under zooming and over zooming.
2. The fact that it is not possible to update many commercial electronic charts on a routine basis so that new hazards announced via Notices to Mariners will not be shown.

**GPS LITERACY**

Candidates must be able to use a GPS to demonstrate the following:

1. Plotting a fix on a chart. (This is better done by plotting a range and bearing from an appropriate waypoint as this reduces the risk of error.)
2. Urgent and immediate use of the MOB function.
3. Helming to achieve a prescribed COG.
4. Enter a waypoint.
5. Set a proximity alarm.
6. Set an anchor alarm.
7. Use GPS clearing bearings.
8. Give the distance and bearing to any waypoint.
9. Follow a safe fog route back into port.
10. Calibrate the log.
11. Check the deviation on the boat's compass and develop a deviation card.
12. Use a GPS to estimate current and leeway.

Candidates must be able to describe alternative ways of using a GPS anchor alarm, in possible combinations with wind speed alarms and depth alarms, when at anchor.

**GPS PILOTAGE**

Candidates must be able to describe the GPS techniques that can be used for a complex pilotage entrance under sail with a failed engine where visibility might be poor and it might be necessary to beat on any leg. The description should include the following essential techniques:

1. GPS clearing bearings
2. GPS cross track error
3. GPS route defining the port and starboard clearing lines

Candidates must understand the importance of comparing GPS COG and SOG with the yacht's log and compass heading in order to maintain a feel for the effects of leeway and current.

Candidates must understand and manage the risks of GPS pilotage, namely:

1. The chart accuracy may not match GPS accuracy, or sand banks might have moved.
2. The GPS signal could be lost in the middle of the pilotage exercise.

For this reason, a GPS pilotage plan should be backed up by a traditional plan. But, by the same token, any traditional pilotage plan should be backed up by a GPS plan to minimise the risk of getting lost or making errors, particularly at night or in fog.

## SECTION 6: RADAR, AIS AND COLLISION AVOIDANCE

Candidates must be able to explain:

- the principles of radar, including the effect that pulse length and beam width have on resolution
- the importance and methodology of adjusting a radar set correctly using gain and sea clutter control and rain clutter control
- the use of range, the electronic bearing line (EBL) and the variable range marker (VRM)

- the use of EBL in collision avoidance
- the principle of MARPA on modern radars and the relevance of CPA and TCPA
- the principles of AIS and its use in collision avoidance

Candidates must also understand the low radar profile of GRP yachts even with radar reflectors, and the advantages of an RTE to enhance a yacht's radar image.

They must also be able to compare the advantages and disadvantages of radar, AIS and RTEs in collision avoidance.

## SECTION 7: OTHER NAVIGATIONAL INSTRUMENTS

### DEPTH

Candidates should be:

- aware of the benefits of a lead line for confirming depth or making soundings from a tender, or as a back up to electronic instruments.
- familiar with the use of an electronic depth sounder and know how to set deep and shallow water alarms.

### SPEED & DISTANCE

Candidates should be:

- familiar with the operations of the log. They should know how to calibrate it against their GPS and how to zero the trip log. They should understand the difference between speed and distance as measured by their log and GPS.
- able to remove a paddle wheel log transducer and clean it.

### FLUXGATE COMPASS

Candidates should be aware of:

- fluxgate compasses that determine North by comparing the magnetic field detected by coils facing in different directions.
- its use in autopilots and to provide the "north up" orientation in radars with this functionality.

### AUTOPILOTS AND SELF-STEERING DEVICES

Candidates must understand the operation principles of these devices and explain their merits and demerits.

## SECTION 8: TIDES AND TIDAL STREAMS

Tide tables reflect astronomical tides that can be forecast years in advance. Superimposed on these are metrological tides caused by wind and variations in barometric pressure. Some areas are also prone to seiches.

Candidates must be able to use the rule of twelfths to determine the tidal movement between the tides for tidal intervals that are different from six hours by using a tidal hour equal to one sixth of the tidal interval. They must also be able to do this using a simple geometric construction.

Candidates must understand the difference between diurnal tides, semi-diurnal tides and mixed tides. They should be familiar with the terms HW, LW, HAT, LAT, MHWS, MLWS, MHWN and MLWN as well as be aware of terms such as MLLWS used in areas with mixed tides.

Candidates must also understand that while the IMO has stated that LAT is the preferred tidal datum, MLLW or MLW or other datums are used in some areas of the world. This can result in

negative tidal heights and depths below charted depths, particularly around the equinoxes when spring tides are more extreme.

Candidates must be able to use tidal diamonds and tidal atlases to determine the set and the rate of tidal streams.

They also need to be aware that in some regions the shape of the tidal curve is abnormal and the rule of twelfths cannot be used. Around the UK and channel ports in particular there is a significant tidal range with strong tidal stems and abnormal tidal curves. The Admiralty have developed a system of standard ports with individual tidal curves, secondary ports and tidal atlases to deal with this complexity. While this is dealt with in the SAS Yachtmaster Syllabus, any Coastal Skipper wishing to sail in these waters should be aware of the need to make a thorough study of this material.

Candidates must be aware that where the tidal curves are abnormal, they must resort to one of the following methods not included in this syllabus to calculate inter tidal depths:

1. The Admiralty publishes individual tidal curves for standard ports in the UK and channel ports.
2. There are commercially available tidal programmes that calculate tidal heights from harmonic tidal coefficients.
3. There is a rather complex manual calculation that can be done using tidal coefficients published in Admiralty tide tables and elsewhere.

## SECTION 9: RADIO AND GMDSS

Candidates must have a basic understanding of VHF and SSB radios with and without DSC. They must also be able to use the geographic range formula to estimate the geographic range limitation on VHF radio, and have an appreciation of the expected range of MF communication.

Candidates must be able to use the phonetic alphabet with confidence – both sending and receiving. They must know the Mayday protocol by heart, have an appreciation of the Pan-Pan and Pan-Pan medico protocols and be able to reference the correct protocols if required.

Also, candidates must have a basic understanding of the GMDSS system and the GMDSS safety features – namely DSC radio, EPIRB, Inmarsat communication, NAVTEX, SafetyNET and SART.

## SECTION 10: THE INTERNATIONAL REGULATIONS FOR THE PREVENTION OF COLLISIONS AT SEA

Candidates must:

1. have a sound appreciation of the regulations
2. understand that a constant bearing implies a collision course
3. be able to indentify the stand on and give way vessels under all circumstances and must understand their obligations
4. know the sound signals to be made by vessels
   a. in sight of one another
   b. under restricted visibility
5. know in detail the lights and shapes to be carried by power vessels
6. know the alternative lights and shapes on all other categories of vessels
7. be able to recognise the lights and shapes on all other categories of vessels

Candidates must also be able to recognise the distress signals listed in annex IV of Colregs.

## SECTION 11: IALA BUOYAGE AND LIGHTS

Candidates must:

1. be able to demonstrate a thorough knowledge of the IALA system of buoyage in Regions A and B
2. understand the abbreviations used on charts and in the List of Lights for lighthouses and lights in general
3. know the abbreviations for common flashing sequences and how to look up the abbreviations for the less common flashing sequences
4. understand leading lights and sector lights and the representation of these lights on charts.

## SECTION 12: NIGHT SAILING, FOG AND COLLISION AVOIDANCE

Candidates must be aware of that the first line of defence when sailing at night is good vision. Photochromatic glasses (glasses which darken in sunlight) should not be worn because even at night they block 20% of the light. Using red lights can preserve night vision. Red LED headband lights are essential because they allow the helmsman to see the compass if the power fails.

At night or in fog, flares should be available in the cockpit to alert larger vessels to imminent collisions. And candidates must understand fully the benefit of modern technology – radar, AIS, RTEs – when sailing at night or in restricted visibility. Candidates must be able to describe the precautions to be taken when caught out in fog.

## SECTION 13: HANDLING A YACHT UNDER POWER

Candidates must have a sound understanding of the underlying theory, specifically:

1. When steering, the boat pivots around the keel kicking out the stern.
2. Going forward you get steerage the moment you engage the prop. Going astern you only get steerage as you develop way.
3. Boats with the prop close to the hull often exhibit significant prop walk. Modern boats with deep keels and sail drive my exhibit no prop walk.
4. Going astern from a standing start, prop walk will have the overriding effect until the boat pick up speed.

Candidates should be able to:

1. Demonstrate coming alongside, turning 360º in a constrained space, motoring astern taking any prop walk into account, and springing off the bow or the stern.
2. Confidently motor astern and understand when this is the preferred method of manoeuvring.
3. Demonstrate picking up a buoy at the bow or the stern.
4. Handle an engine failure in a marina.

## SECTION 14: SAIL TRIM AND THE THEORY OF SAILING

Candidates must understand that there is a centre of lateral effort created by the aerodynamic forces on the sails and a centre of lateral resistance created by the hydrodynamic forces acting on the underwater profile of the boat. When these centres of effort are not aligned the resulting turning moment will cause weather helm or lee helm. Candidates must understand how to adjust sails to balance the boat and how to use sails to get some level of steerage if the rudder fails.

Candidates must understand that sails act as a wing when sailing to windward and must know how to use tell tails to get the best performance out of the sails.

They must appreciate how the boat's movement through the water creates an apparent wind that is forward of the true wind.

Candidates must also be able to read the tell tails and use them to set the sails correctly. The need this in order to adjust the position of the jib or genoa car to get the correct twist in the headsail, as well as how to use the position of the mainsheet traveller and the kicker to get the correct twist in the mainsail.

Candidates must know the benefits of flattening the sail as the wind strengthens, how each of the controls affect sail shape and how to use them in order to sail more efficiently in different conditions of wind and sea.

Candidates must demonstrate a high degree of competence in managing the crew to hoist or drop sails, to reef in or shake out a reef and how to change sails with or without power. They must demonstrate the ability to coach crew in working efficiently and safely when winching, tacking, gibing, heaving to or working sails. They must know how and when to rig a gybe preventer.

Where practical, they must demonstrate the ability to sail onto their moorings or onto any available emergency moorings or buoy as a means of handling a potential engine failure.

Candidates must be able to demonstrate the ability to achieve some level of steerage in the event of a rudder failure by adjusting the sails.

## SECTION 15: MAN OVERBOARD (MOB)

Candidates must demonstrate the ability to recover a man overboard effectively under motor and under sail, by day or by night. They must adopt a sound method appropriate to the boat, and the crew must be well drilled in the procedures adopted. Candidates must also be able to describe alternative methods that could be used to get the MOB aboard.

They must be aware of the dangers of sailing too close to the MOB particularly in heavy seas and must rather stop a few meters from the MOB and throw him or her a line.

## SECTION 16: WEATHER

Candidates must:

- be able to explain basic meteorological terms including barometric pressure, isobar, air masses, cyclones (lows), anti-cyclones (highs), cold fronts, warm fronts, inter tropical convergence zone (ITCZ or doldrums), trade winds, temperature inversions, stable air and unstable air.
- be able to read a synoptic chart and identify key features including isobars, highs, lows, cold fronts, warm fronts, wind arrows, and tropical rotating storms.
- be able to explain how the Coriolis effect leads to Buys Ballot's law and the direction of rotation of wind around a high and a low pressure systems in the Southern hemisphere.
- have an understanding of the mid latitude low pressure systems, their typical movement, early warning signs and the sequence of events as warm and cold fronts pass. They must be aware that warm fronts seldom, if ever, affect South Africa because they pass to the South.
- must know about the typical movement of a coastal low along the South African coastline and the associated weather patterns including berg winds, fog and South West busters. They must also be aware that cold fronts often follow coastal lows.
- understand the formation of clouds and be able to recognise basic cloud types and what they say about the weather. Important cloud types include cirrus, cirrostratus, cirrocumulus, altostratus, altocumulus, nimbostratus, cumulus and cumulonimbus. In particular candidates must be able to recognise cumulonimbus clouds – especially if they exhibit anvils – and understand the dangers of thunderstorms and the associated microbursts that can bring

gusts exceeding 100 knots. The cumulonimbus and the associated thunderstorms typically form at cold fronts, above land on warm afternoons or in the doldrums.

- have an understanding of sea and land breezes and how they behave.
- have an understanding of the impact of the Agulhas current, the Benguela current and upwelling on the sea temperatures along the coast of South African, and how they contribute to the prevalence of advection fog particularly along the West Coast of southern Africa.
- be aware of the dangers of wind against current. In particular they must be aware of the dangerous situation that develops along the East coast of South African when a South Westerly gale blows against the Agulhas current. They must understand the actions to take if caught out under these circumstances.
- have an appreciation of the wind and barometric pressure patterns around the world.
- know how to access official maritime weather forecasts along the coast of southern Africa. They must also know how to access the additional information available from commercial and Internet sources that extract more detailed weather information from computer forecast models such as GFS.
- be aware that weather systems in the Northern Hemisphere are a mirror image of those in the Southern Hemisphere and that these differences should be understood before chartering a boat in the Northern Hemisphere. Similarly, chartering a boat in any foreign region requires an understanding of local weather patterns and hazards.

## SECTION 17: ANCHORING

Candidates must be able to describe the important criteria to be used when selecting an anchorage, especially:

1. Shelter from current and expected weather
2. Good holding ground

Candidates must:

- know the five common traditional anchors (Fisherman's, Dandorth, Bruce, CQR and Delta) and their merits and demerits. Recent tests strongly suggest that some of the new generation anchors provide greatly superior setting and holding performance.
- be able to describe or demonstrate the procedure they would use to ensure that the anchor has set well.
- be able to describe or demonstrate the technique that could be used to sail off an anchorage in a strong wind (assuming or simulating engine and windlass failure)
- be able to explain why chain and nylon are the preferred anchor cables, and why a combination is preferred, and becomes essential, for riding out a storm.
- be able to describe the various techniques that could be used to attempt to release a fouled anchor.
- know that the safest procedure for lying at anchor is to set an anchor watch.
- be able to describe or demonstrate how to use GPS along with depth and wind speed instruments to generate anchor or anchor drag alarm.
- know how to estimate the length of scope required when anchoring and be able to describe the methods of measuring the scope let out, including marking of the chain or cable.

## SECTION 18: SAFETY AND EMERGENGIES AT SEA

Candidates must be able to give comprehensive safety briefings to the crew. These should include the location and use of safety equipment, handling of emergencies, abandoning to a life raft and their general safety policy.

Candidates must have a thorough knowledge of their boat – electrics, instrumentation, safety equipment etc to allow them to respond to any emergency.

Candidates must also be able to explain the safety precautions they would take to prevent the following emergencies at sea:

1. Flooding (through hull fittings, shaft seals, hull penetration being pooped and knocked down)
2. Burns from cooking
3. Fire and gas explosions
4. Ropes around the prop
5. Electrical power failure

Candidates must also be able to describe how they would handle the following emergencies at sea:

1. Steering failure (this should include options available for rigging a jury rudder)
2. Fire
3. Flooding
4. Dismasting
5. Power failure
6. Firing flares (in the dark if necessary)
7. Helicopter rescue
8. Abandoning to a life raft

Candidates must recognise that many accidents are associated with the use of the tender and must know the appropriate safety precautions.

They must know flags Alpha, Bravo, Quebec and the flags required in the CoF.

Candidates must appreciate that it is the skipper's responsibility to ensure that the boat is in good condition and adequately prepared for the voyage. It is also the skipper's responsibility to set the safety standards and demand safe working at all times.

## SECTION 19: HEAVY WEATHER SAILING

Candidates must understand the importance of:

1. obtaining regular weather forecasts at sea
2. taking action to avoid the worst of the storm
3. preparing for a storm

Candidates must be able to describe the actions they would take in preparation for a storm. Candidates must be able to discuss the merits and demerits of various heavy weather tactics including:

1. sailing under storm sails
2. heaving to
3. lying ahull
4. running before the storm trailing ropes or storm drogues
5. lying bows into the storm off a storm anchor

Candidates must also be able to describe methods of clawing off a lee shore under storm conditions.

## SECTION 20: DIESEL ENGINES

Candidates must understand the basic operation of a diesel engine and the associated systems – power supply, diesel supply, cooling water system, exhaust system and the control cables from the cockpit.

The following basic engine checks must be done:

1. Diesel level and diesel water trap

2. Water intake filter and secondary cooling water level
3. Engine and fuel oil levels
4. Water flow and battery charging after starting the engine

Candidates must know how to conduct the following maintenance and troubleshooting:

1. Cleaning the sea water filter and clearing the intake line
2. Changing the water pump impeller
3. Changing the oil and the oil filter
4. Changing the primary and secondary diesel filters
5. Bleeding the diesel supply line
6. If the engine has decompression levers, candidates must know how to use these to start the engine with low battery power
7. If the engine has a crank handle arrangement Candidates must know how to crank start the engine

Candidates must be capable of identifying the reasons for an engine that will not start. They must also describe the techniques that could be used to start an engine in an emergency. It is important to understand the danger of bacterial fungal growth in diesel tanks, and to know the risk can be minimised by:

1. Buying diesel from a high turnover outlet where the water content is likely to be low
2. Keeping the diesel tank full to minimise condensation
3. Using an appropriate biocide

Candidates must know what spares and tools are required for basic trouble shooting and maintenance at sea.

## SECTION 21: COASTAL PASSAGE PLANNING

Candidates must be able to list the sources of information that should be consulted in order to develop an appropriate passage plan including:

1. Sailing directions and commercial pilot books
2. Admiralty routing charts or NOAA pilot charts describing seasonal wind and weather statistics
3. Navigational charts and other navigational publication such as Lists of Lights, etc.
4. Weather forecasts.

Candidates must be able to develop a passage plan that includes where appropriate:

1. Waypoints and routes
2. Boltholes and alternative destinations, each with a pilotage plan suitable for use in adverse conditions
3. Adequate provision for tides and tidal streams if these are significant
4. Plans for accessing weather forecast en route
5. A victualling plan with adequate provision for emergencies
6. Adequate supplies of water and diesel
7. A watch organisation
8. Appropriate navigation discipline for the passage
9. Appropriate safety policy
10. Appropriate documentation

The plan must include appropriate boat preparation and checking. Detailed checking of rigging, sails, fittings and safety equipment is essential. The SAS CoF requirements provide another useful checklist.

## SECTION 22: FIRST AID

As a minimum requirement candidates should be able to do the following without reference to any first aid manual:

1. treat hypothermia
2. recognise the need for CPR or AR and apply as needed
3. treat burns
4. staunch severe or arterial bleeding

Candidates should have on board an appropriate first aid manual that they have studied, and know how to reference in any emergency.

## SECTION 23: LOCAL KNOWLEDGE

Candidates should have sound local knowledge including:

a) any port or marina regulations
b) buoys, leading light and lighthouses
c) useful transits and charted landmarks that can be used for fixing position
d) unmarked navigational hazards
e) local charts
f) local weather and weather indicators
g) night entry into home port

Candidates must be aware of the need to obtain the essential local information before arrival at an unfamiliar port.