2026



IYT DAY SKIPPER / CREW SAIL 2026

This course provides candidates with skills and confidence to skipper a vessel up to 10 meters in inland or coastal waters <5 miles offshore during daylight hours in moderate wind and sea conditions.

International Yacht Training

WORLDWIDE

List of IYT Courses

Recreational Courses

Dinghy Sailing - Bronze Level – Start Sailing
Dinghy Sailing – Silver Level – Safe Sailing
Dinghy Sailing – Gold Level - Independent Sailing
Dinghy Sailing – Platinum Level – Perfected Sailing
International Yacht Racing
IYT Day Skipper / Crew
Introductory Sailing Skills
Try Sailing
Introduction to Yachting
International Crew Power or Sail
International Flotilla Skipper Power or Sail
International Bareboat Skipper Power or Sail
International Bareboat Skipper Sail Catamaran
VHF Radio Operator
Personal Watercraft Operator (PWC)
Small Powerboat & RIB Master (MCA Approved)
Powerboat Skipper
Navigation Master
Weather Master
International Certificate of Competency <10m Power Coastal
International Certificate of Competency <10m Power Coastal & Inland
International Certificate of Competency <24m Power Coastal
International Certificate of Competency <24m Power Coastal & Inland
International Certificate of Competency <24m Sail & <10m Power Coastal
International Certificate of Competency <24m Sail & <10m Power Coastal & Inland
International Certificate of Competency PWC Coastal
International Certificate of Competency PWC Coastal & Inland
Yachtmaster Coastal Power or Sail
Yachtmaster Coastal Sail Catamaran
Yachtmaster Offshore Power or Sail
Yachtmaster Offshore Sail Catamaran
Yachtmaster Ocean
IYT Commercial Tender License

Professional Courses

VHF Radio Operator
Small Powerboat & RIB Master (MCA Approved)
Superyacht Deck Crew
Professional Superyacht Hospitality
Superyacht Chef
Master of Yachts Coastal/Mate 200 Tons
Master of Yachts Limited
Master of Yachts Unlimited

Master of Yachts Inshore < 80gt.
IYT Boat Engineer Grade 1

PREFACE

This course is designed for skippers of sailing vessels up to 10 meters in inland or coastal waters < 5 miles offshore during daylight hours in moderate wind and sea conditions.

Candidates who successfully complete the IYT Day Skipper/Crew Sail are also eligible to obtain the MCA (Maritime & Coastguard Agency of Great Britain) Recognised IYT International Certificate of Competency (ICC) which is required to legally operate in European waters.

Introduction

The IYT Day Skipper course is designed to develop the **knowledge, practical skills and confidence required to safely take command of a recreational vessel in familiar coastal waters**.

The course combines theoretical knowledge with practical training and introduces the essential skills required of a skipper, including **boat handling, navigation, COLREGS, weather, tides and currents, safety, seamanship, passage planning and the responsibilities of command**.

Candidates who successfully complete the IYT Day Skipper/Crew Sail course will be well equipped to progress to the IYT International Flotilla and/or IYT International Bareboat Skipper course and certification which allows for chartering yachts in the Mediterranean and Caribbean.

Training should always be supplemented by current charts, publications, weather and tidal information, and by knowledge of the regulations and conditions applicable to the local area of operation.

The IYT Worldwide Training Programme

IYT Worldwide has developed a comprehensive recreational training programme that allows candidates to progressively develop the knowledge and practical skills required to safely operate sailing and power vessels.

The programme is designed as a **progressive and modular training pathway**, allowing a complete beginner to advance through increasingly higher levels of knowledge, practical competence and responsibility, from introductory boating courses through to **Yachtmaster Ocean**.

Flexible and Modular Training

IYT courses are structured to provide flexibility in the way training is completed. Depending on the course and the requirements of the training programme, theory and practical components may be delivered separately or combined into a complete course.

This allows training to be scheduled in a variety of formats, including:

- eLearning theory training
- Individual training modules

- Day or weekend training
- Intensive training periods
- Combined theory and practical courses

Regardless of the format, candidates must successfully complete all required elements of the applicable course before certification can be issued.

Continuity of Training

Where the theory and practical components of a course are completed separately, candidates are encouraged to complete the entire course within a reasonable period so that previously acquired knowledge and skills remain current.

Where IYT specifies a maximum completion period for a particular certification, the applicable course requirements must be followed.

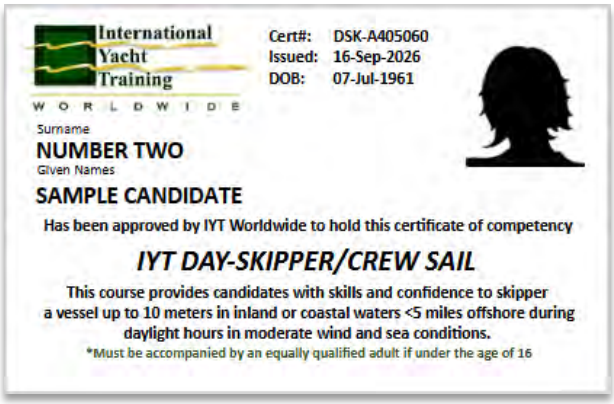
Professional Training

For candidates wishing to pursue a professional career, IYT provides **MCA (Maritime & Coastguard Agency of Great Britain) recognised professional yacht training courses.** These programmes include the **Master of Yachts (MOY)** certification pathway, with progressively higher levels of professional training and certification. Professional certification requirements vary according to the vessel, area of operation, flag state and applicable maritime authority.

Candidates intending to operate vessels commercially should ensure that the certification they obtain is appropriate for their intended employment and is accepted by the relevant maritime authority.

Certification

Candidates completing this course will be awarded the **"IYT Day Skipper/Crew Sail"** Certificate of Competency.



Course Objectives & Scope

The objective of this 4-day course is to provide students with the knowledge, practical skills and experience required to competently and safely command a vessel up to 10 metres in length.

Students should complete this course with a full understanding of and practical ability to skipper sailing vessels up to 10 metres in inland or coastal waters < 5 miles offshore during daylight hours in moderate wind and sea conditions.

The course includes approximately 16-20 hours on the water.

As with all IYT courses, the **depth of knowledge, level of responsibility and practical competency increase progressively** as students advance through higher levels of training.

A substantial part of the course is based on the **practical application of theoretical knowledge.** Students are expected to demonstrate their understanding through hands-on training and practical exercises aboard the vessel.

Important Notice

Every effort has been made to ensure the accuracy of the information contained in this manual. However, it is intended to be used in conjunction with **current local information and appropriate training materials** relevant to the area of operation.

This may include:

- Local navigational information and regulations
- Current nautical charts and publications
- Sources of marine weather information and forecasts
- Local tides and tidal currents
- Local weather and sea conditions
- Notices to Mariners and other relevant navigational information

Conditions, regulations and navigational information may change. Skippers are responsible for ensuring that they use **current and appropriate information** when planning and conducting a voyage.

Comments and Suggestions

Comments, corrections or suggestions regarding this manual are welcomed and should be directed to **International Yacht Training Worldwide (IYT)**.

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Amendments

Amendments and updates to the Publication will be published as and when necessary. Edition number and date will be noted on the footer of each stage.

Any comments or suggestions for this document should be directed to International Yacht Training. Please e-mail: support@IYTworld.com or telephone Canada +1 778-477-5668.

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Module 1 PARTS OF THE SAILBOAT

1.1 Key Objectives

THE OBJECTIVE OF THIS MODULE IS TO GIVE THE STUDENT AN UNDERSTANDING OF THE BASIC ANATOMY AND TERMINOLOGY USED BY SAILORS.

Before you can confidently handle a sailboat, it is important to understand its basic anatomy and the terminology used by sailors. Knowing the correct names for the different parts of a vessel allows you to communicate clearly with your crew, understand instructions, interpret charts and manuals, and describe a problem accurately when something goes wrong.

This chapter begins with the hull, keel and rudder—the principal components below and around the waterline that provide buoyancy, stability and directional control. It then moves above deck to the rig, sails and their fittings, which work together to harness the wind and propel the boat.

1.2 The Hull

The hull is the main structural body of the boat. It is the watertight shell that provides buoyancy, supports the vessel's internal structure and allows the boat to move through the water.

The hull is designed to withstand the forces generated by the sea, wind, crew, machinery and rigging. The shape of the hull also has a major influence on the vessel's speed, stability, comfort and handling characteristics.

Everything else on the boat is either attached to, supported by, or incorporated into the hull, including the keel, rudder, deck, bulkheads, engine beds and rig.

Sailboat hulls are primarily **categorized by the number of hulls** (monohull, catamaran, or trimaran) and how they interact with water (displacement vs. planing).

Number of Hulls

- **Monohull:** A traditional sailboat with a single hull. They rely on a heavy keel underneath for ballast and stability, making them comfortable and self-righting in heavy ocean conditions.
- **Catamaran:** A multihull boat with two parallel hulls connected by a deck. They offer a wide, stable platform, shallow draft, and high speed, but do not right themselves if flipped.
- **Trimaran:** A multihull boat featuring three hulls, a larger central hull, and two smaller side outriggers (*amas*) for extreme lateral stability and speed.

Hull Sections and Vessel Structure

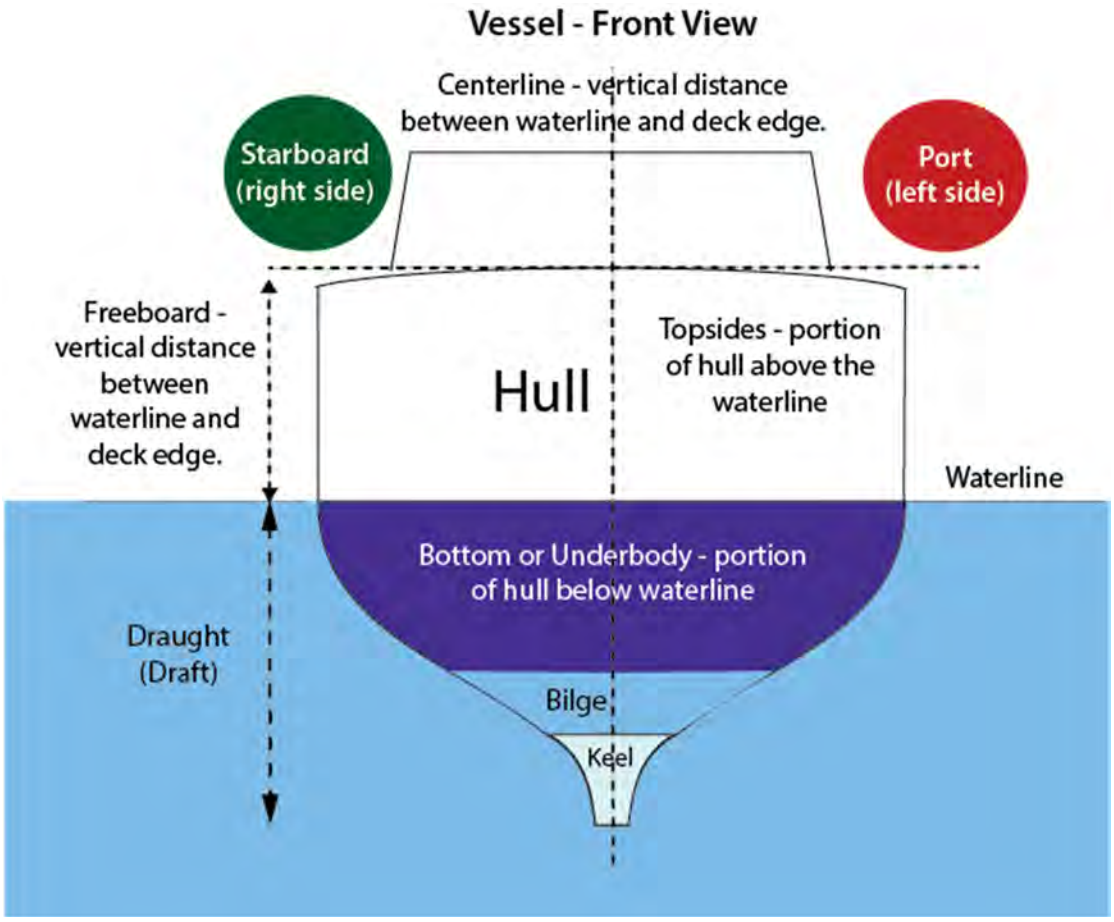


FIGURE 1 - HULL SECTIONS AND VESSEL STRUCTURE

Port and Starboard — The terms used to identify the left and right sides of a vessel when facing forward. Port is the left side, and starboard is the right side when looking toward the bow. These terms are used instead of "left" and "right" because they remain unambiguous regardless of which direction a person is facing.

Centerline — An imaginary line running longitudinally from the bow to the stern, dividing the vessel into port and starboard halves. The centerline is an important reference when discussing the position of equipment, crew and loads aboard the vessel.

Topsides — The portion of the hull above the waterline when the vessel is afloat. The topsides are normally visible from alongside the boat and may be finished in a different colour or coating from the underwater hull.

Freeboard — The vertical distance between the waterline and the deck edge or gunwale. Freeboard provides reserve buoyancy and helps keep the sea from coming aboard. A vessel with greater

freeboard will generally have a drier deck, although it may also present more surface area to the wind and therefore experience greater windage.

Bottom or Underbody — The portion of the hull below the waterline. Its shape is designed to provide the required balance between stability, resistance and efficiency as the vessel moves through the water. The underwater hull is normally protected by an antifouling coating to reduce marine growth.

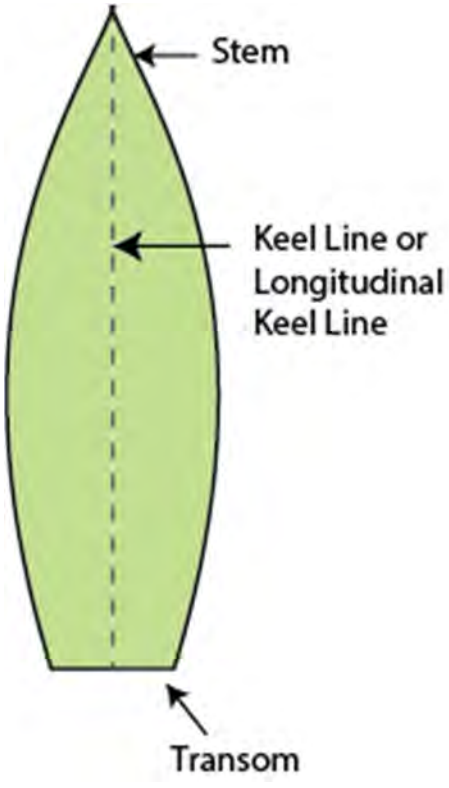
Bilge — The lowest internal part of the hull where water and other liquids naturally collect. Any water entering the boat will generally find its way toward the bilge, where it can be removed by a **bilge pump**, manual pump or other drainage system. Sailors should regularly check the bilges, as an unexpected increase in bilge water can be an early indication of a leak or plumbing problem.

Bulkheads — Vertical partitions that divide the interior of the hull into separate compartments. Most bulkheads run athwartships, meaning from one side of the vessel to the other. In addition to dividing the accommodation, bulkheads provide important structural strength by helping resist twisting, bending and racking forces. Where bulkheads are designed to be watertight, they can also limit the spread of flooding if the hull is damaged.

Stringers — Longitudinal structural members that run fore-and-aft inside the hull. Stringers reinforce the hull skin and help prevent excessive flexing or bending. They work together with bulkheads, frames and other structural members to create a strong and rigid hull structure.

Frames or Ribs — Transverse structural members that help establish and maintain the shape of the hull while providing additional strength. They are particularly prominent in traditional wooden boat construction, although modern composite and steel vessels may incorporate equivalent structural elements using different construction techniques.

Keel Line or Longitudinal Keel Line — The fore-and-aft reference line running along the centreline of the hull from the bow toward the stern. It forms an important reference point in hull design, construction and measurement. On many sailing vessels, the keel itself is also positioned along or incorporates this centreline.



Stem — The forward-most structural part of the hull at the bow, where the port and starboard sides of the hull meet. The shape and angle of the stem have an important influence on how the vessel enters the water and behaves in waves.

Transom — The structure forming the stern of the vessel. It may be flat, curved, or shaped to suit the design of the boat. On many modern sailing yachts, the transom incorporates steps, boarding platforms, swim ladders and sometimes a dinghy or tender storage arrangement.

Understanding the hull and its terminology is fundamental to safe boat handling. As a Day Skipper, you should be able to identify the major structural features of your vessel and understand how they contribute to buoyancy, stability, strength and maneuverability.

Key Dimensions and Abbreviations

A good understanding of a vessel's principal dimensions is essential for any Day Skipper. These measurements appear regularly in boat documentation, registration papers, specifications, charts of particulars, navigation exercises and sailing manuals.

They are also important when planning a passage. For example, knowing the vessel's draught is essential when assessing whether there is sufficient depth of water, while beam and LOA may be important when entering a marina, negotiating a berth or passing through a lock. The following terms and abbreviations should become familiar to every skipper.

Term / Abbreviation	Meaning and Description
LOA	**Length Overall** — The maximum length of the vessel measured from the foremost point to the aftermost point. Depending on how the measurement is defined, this may include permanent structures such as pulpits, bowsprits or other fittings extending beyond the main hull. Always check the manufacturer's or registration authority's definition when using LOA for official purposes.
LWL	**Length at Waterline** — The length of the vessel measured along the waterline when afloat. The LWL may change slightly depending on the vessel's loading, trim and displacement. On many modern yachts, the LWL is shorter than the LOA because the bow and stern extend beyond the waterline.
Beam	**The Beam** is the maximum width of the vessel measured from one side of the hull to the other. The beam has a significant effect on stability, interior space and maneuverability. It can also be important when selecting a berth or determining whether a vessel can safely pass through a restricted area.
Draft / Draught	The vertical distance from the waterline to the lowest point of the vessel **below the water**, normally the bottom of the keel on a sailing yacht. Draft is one of the most important dimensions for navigation because it determines the minimum water depth required to keep the vessel clear of the seabed.
Displacement	The weight of water displaced by the submerged portion of the hull. According to the principle of Archimedes, the weight of the displaced water is equal to the total weight of the floating vessel. Displacement therefore provides an indication of how heavy or light a vessel is and has a significant influence on its performance and handling characteristics.

Freeboard	The vertical distance from the waterline to the deck edge or gunwale. **Freeboard** provides reserve buoyancy and helps prevent waves from readily coming aboard. The vessel's freeboard can vary with loading, as a heavily loaded vessel will sit lower in the water.

Core Hull Dimensions and Abbreviations

Abbreviation / Term	Definition	Why It Matters to the Skipper
LOA	Length Overall	Important when entering marinas, selecting berths and assessing maneuvering space.
LWL	Length at Waterline	Influences hull speed, handling and the vessel's underwater characteristics.
Beam	Maximum width	Affects stability, accommodation and the space required for maneuvering and berthing.
Draft / Draught	Depth below the waterline	Critical when assessing available water depth and the risk of grounding.
Displacement	Weight of water displaced	Gives an indication of the vessel's overall weight and influences sailing performance.
Freeboard	Waterline to deck edge	Provides reserve buoyancy and helps keep the deck clear of waves and spray.

Day Skipper Tip:
Always know your vessel's LOA, beam and draft before leaving the berth. These three dimensions are particularly important when entering unfamiliar harbors, navigating shallow water, selecting a berth or operating in confined spaces.

Understanding the Dimensions

These measurements should not be considered in isolation. They describe different characteristics of the same hull and together provide a useful picture of the vessel.

For example, a yacht with a large beam and relatively shallow draft may have good initial stability and access to shallow anchorages, while a narrower yacht with a deeper keel may have different stability and sailing characteristics and may be capable of pointing higher into the wind.

The skipper should also remember that published dimensions are not always the dimensions that apply in every situation. Loading fuel, water, stores, passengers and equipment can alter the vessel's displacement, trim and effective draft. Equipment such as a dinghy, outboard, anchor or davit system may also affect the vessel's overall dimensions.

For practical navigation, always use the actual vessel's documented dimensions and allow an appropriate safety margin, particularly when dealing with shallow water or restricted maneuvering areas.

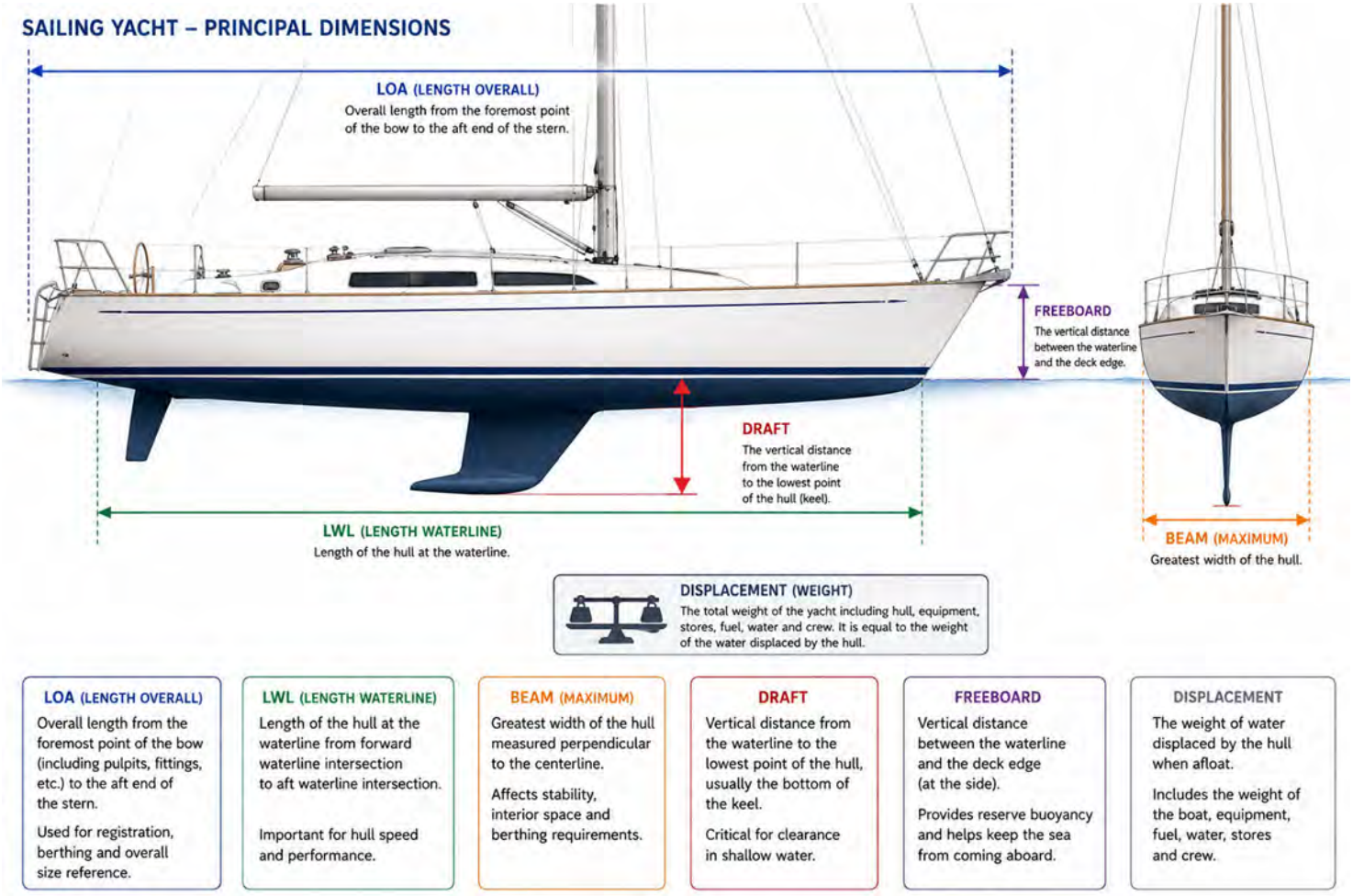


FIGURE 2 - SAILING YACHT DIMENSIONS

The Keel

The keel is one of the most important underwater components of a sailing vessel. It is a fin or similar structure that projects downward from the hull, normally along or close to the vessel's centerline.

The keel performs several important functions.

- It helps prevent the boat from being pushed sideways by the wind,
- provides stability by carrying ballast low in the vessel, and,
- when correctly shaped, acts as an underwater foil that generates hydrodynamic lift.

Together with the sails and rudder, the keel enables a sailing yacht to make effective progress to windward rather than simply being blown sideways.

Functions of the Keel

Lateral Resistance — When a sailing vessel is moving through the water with the wind coming from the side, the force generated by the sails tends to push the boat sideways. This sideways movement is known as leeway. The keel resists this movement by presenting an underwater surface to the flow of water, allowing the vessel to maintain a more effective course through the water.

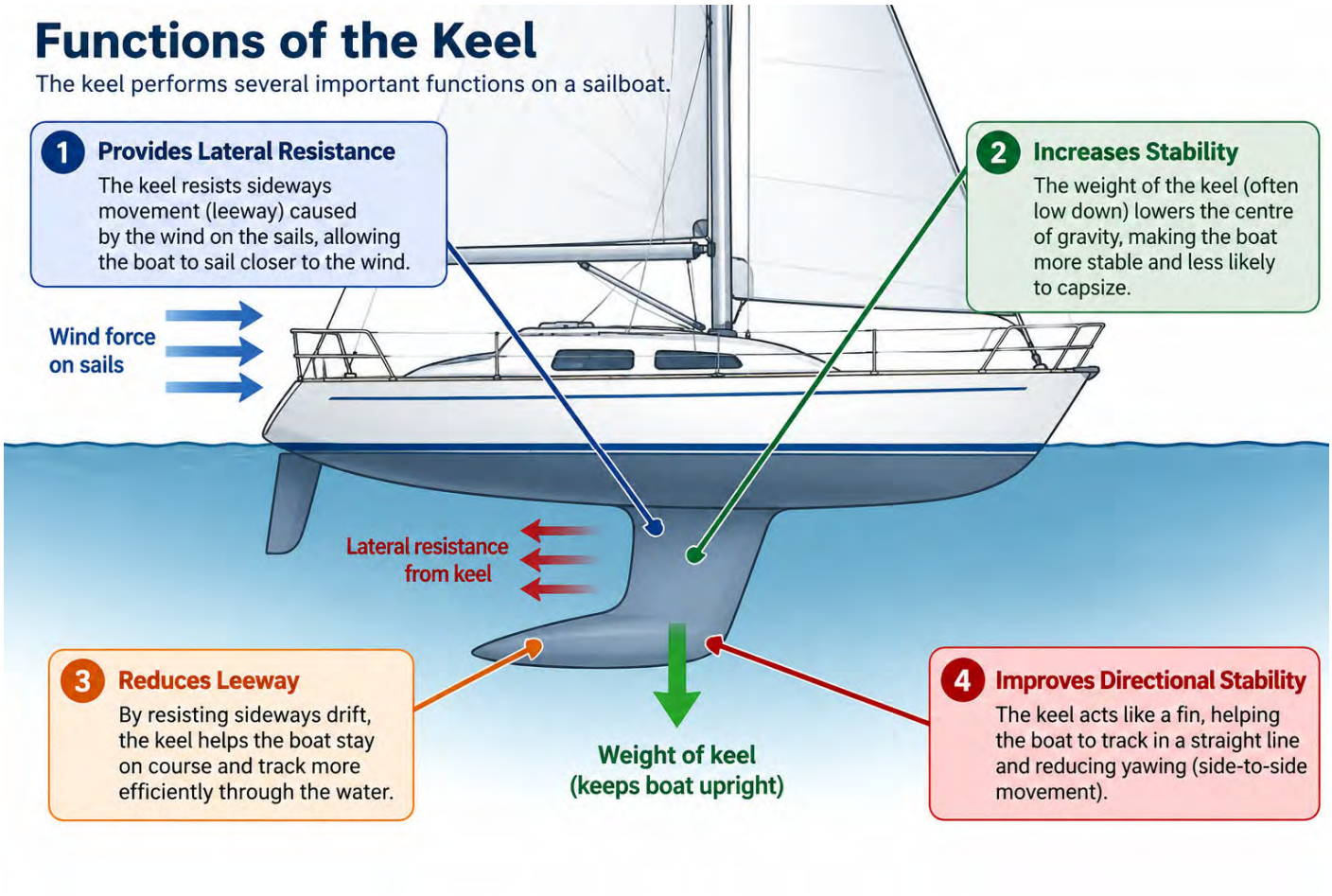


FIGURE 3 - FUNCTIONS OF THE KEEL

Stability and Righting Moment — Many sailing yachts carry ballast within or attached to the keel, commonly made from lead, iron or other dense materials. Positioning this weight low in the vessel lowers the center of gravity and increases the vessel's resistance to heeling. As the yacht heels under the force of the wind, the relationship between the center of gravity and centre of buoyancy produces a righting moment that tends to bring the vessel back toward an upright position.

It is important to distinguish between the keel itself and its ballast. Not every keel is heavily ballasted, and some vessels derive much of their stability from hull form, crew weight or other design features.

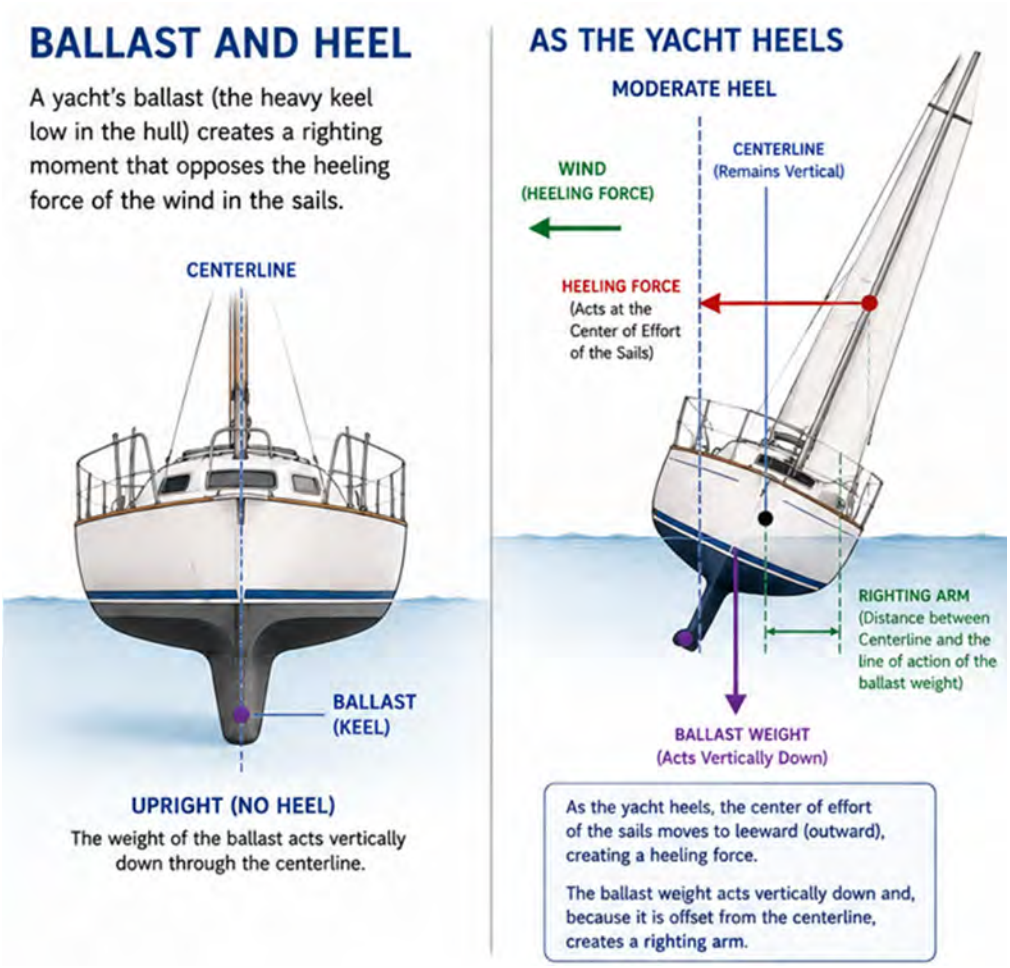


FIGURE 4 - BALLAST AND HEEL

Lift to Windward — A modern keel is not simply a flat plate resisting sideways movement. Its underwater shape acts much like an aero-foil or aircraft wing. As water flows around the keel, it can generate hydrodynamic lift that opposes the sideways force produced by the sails. This allows the yacht to make progress closer to the wind and improves its ability to sail efficiently to windward.

Common Keel Types

Long Keel — A long keel extends over a substantial portion of the hull's length and forms a deep, continuous underwater structure. The rudder is often mounted at or near the aft end of the keel, providing good protection from grounding and excellent directional stability. Long-keel yachts generally track well and can have predictable handling characteristics, particularly in heavy weather. The disadvantages can include increased wetted surface, greater resistance and reduced maneuverability, particularly at low speeds and in confined spaces.



FIGURE 5 - LONG KEEL

Fin Keel — A fin keel is a relatively short, deep keel projecting from the underside of the hull. It is usually positioned toward the center of the vessel and is designed to provide efficient lateral resistance with relatively low drag. Fin keels are extremely common on modern cruising and racing yachts. Their efficiency generally provides good windward performance, although a deep fin keel can increase the vessel's draft and may make the keel more vulnerable to grounding damage.



FIGURE 5- FIN KEEL

Bilge Keels or Twin Keels — A vessel fitted with bilge keels has two separate keels positioned on either side of the centerline. These keels provide lateral resistance and can also provide stability when the vessel is resting on the seabed. Twin-keel yachts are particularly useful in areas with significant tidal ranges, where vessels may deliberately dry out on a suitable bottom. Their relatively shallow draft can also provide access to anchorages and waterways that deeper-keeled yachts cannot reach.



FIGURE 6 - TWIN KEELS

Wing Keel — A wing keel is generally based on a fin-keel design but incorporates a horizontal foil, wing or bulb near its lower end. The additional ballast can provide a lower center of gravity without requiring the same increase in draft as a conventional deep keel. Wing keels can therefore offer a useful compromise between stability, performance and draft.



FIGURE 7 - WING KEEL

Centerboard — A centerboard is a retractable underwater foil that can be raised or lowered through a case within the hull. When lowered, it provides lateral resistance and helps the boat sail effectively to windward. When raised, the vessel's draft is significantly reduced, allowing access to shallow water.



FIGURE 8 - CENTERBOARD

Daggerboard — A daggerboard performs a similar function to a centerboard but normally slides vertically through the hull rather than pivoting. It is commonly found on dinghies, performance sailing craft and some shallow-draft cruising vessels. Unlike a fixed ballast keel, a daggerboard generally provides little or no ballast, so the vessel's stability must come from other means.



FIGURE 9 – DAGGERBOARD

Keel and Sailing Performance

The design of the keel has a direct influence on how a sailing vessel behaves. A deep, efficient fin keel may provide excellent windward performance and strong stability, while a long keel may favor directional stability and predictable handling.

The skipper should also be aware of the keel's draft when navigating. A deep keel may provide excellent sailing characteristics but restrict access to shallow anchorages, harbors and rivers. Before entering unfamiliar waters, the skipper should always know the vessel's draft and compare it with the available charted depth, allowing for tide, vessel loading, sea state and an appropriate safety margin.

Day Skipper Tip:
The keel is more than a weight hanging beneath the boat. It is a critical part of the vessel's stability, lateral resistance and sailing performance. Understanding its purpose will help you better understand why a yacht heels, why it makes leeway, and how it is able to sail effectively toward the wind.

The Rudder

The rudder is the underwater steering surface of a sailing vessel. It is normally positioned at or near the stern and is used to control the vessel's direction by altering the flow of water passing around the rudder blade.

When the rudder is turned, the water flowing past it is deflected. This creates a hydrodynamic force that causes the vessel to turn about its vertical axis, changing the direction of the bow.

The rudder works most effectively when there is sufficient water flow across its surface. This flow may be produced by the vessel's forward motion through the water, by propeller wash when under power, or by a combination of both.

The rudder is controlled from the cockpit or helm position by either a tiller or steering wheel. A tiller provides a direct mechanical connection to the rudder stock, while wheel steering may operate the rudder through cables, chains, rods, linkages or hydraulic steering systems.

Main Parts and Rudder Types

Rudder Stock — The shaft or structural member to which the rudder blade is attached. The stock transmits the steering movement from the tiller or steering mechanism to the rudder blade. It normally passes through or is supported by the hull and is connected to the vessel's steering system.

Rudder Blade — The underwater surface that interacts with the water flow to produce the force required to steer the vessel. Modern rudders are often shaped as streamlined foils to improve steering efficiency and reduce drag.

Transom-Hung Rudder — A rudder mounted externally on the transom of the vessel. It is normally supported by fittings known as pintles and gudgeons, which act as hinges and allow the rudder to rotate.

This arrangement is relatively simple, easy to inspect and straightforward to maintain. It is commonly found on smaller sailing boats, dinghies and some traditional yacht designs. Because the rudder is mounted externally, however, it can be more exposed to damage from floating objects or grounding.

Skeg-Hung Rudder — A rudder supported along part or most of its leading edge by a fixed skeg extending downward from the hull. The skeg provides additional support and helps protect the rudder from underwater impacts.

The skeg also carries some of the loads generated by the rudder, making this a strong and robust arrangement. Skeg-hung rudders are commonly associated with traditional offshore cruising yachts and are often valued for their durability and protection in heavy weather and offshore conditions.

Spade Rudder — A spade rudder is attached primarily or entirely to the rudder stock, with the blade projecting freely beneath the hull without a supporting skeg.

The relatively deep and balanced foil provides excellent steering response and efficiency. Spade rudders are therefore widely used on modern fin-keel cruising and racing yachts. Their disadvantage is that the rudder is more exposed to damage from grounding, floating debris or **underwater objects**, and the loads are concentrated at the rudder stock and its bearings.

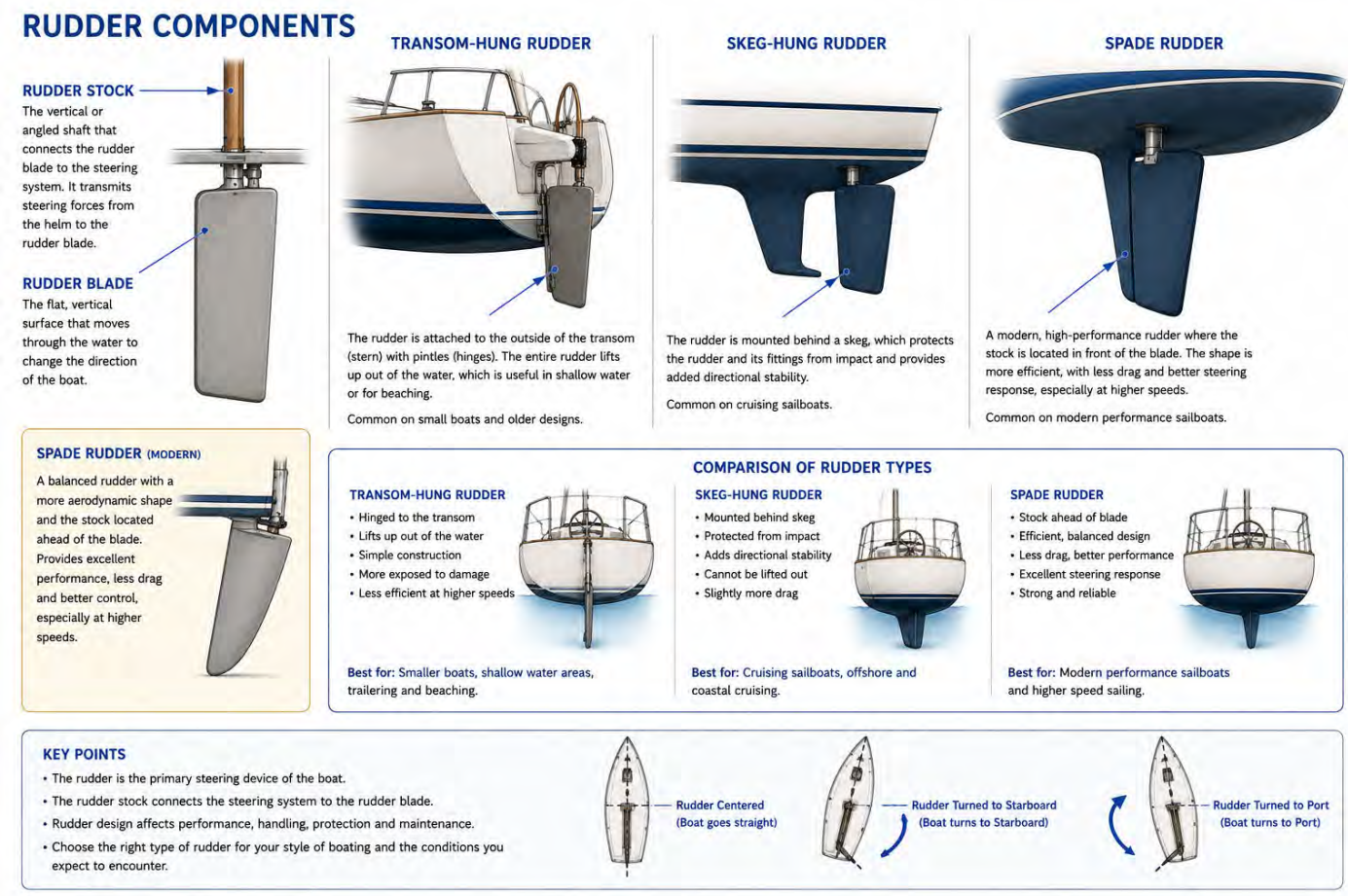


FIGURE 10 - RUDDERS

Rudder and Steering

The effectiveness of the rudder depends on several factors, including boat speed, water flow, rudder angle and vessel design. Excessive rudder angle increases drag and can reduce sailing efficiency. In normal sailing conditions, a well-trimmed yacht should generally require only moderate rudder movement to maintain its course.

The rudder should not be regarded as the primary means of controlling a poorly balanced sail plan. Excessive weather helm, for example, can require large rudder angles and create unnecessary drag.

Correct sail trim, boat balance and course selection should be used wherever possible to reduce the steering load.

When maneuvering under power, the rudder can also interact with propeller wash. This is particularly important at low speeds, where the propeller can provide strong water flow over the rudder even when the vessel itself has very little forward motion.

Day Skipper Tip:
Remember that the rudder needs water flow to be effective. At very low speed, steering response may be limited unless there is sufficient propeller wash over the rudder. Always allow for this when maneuvering in confined waters, particularly when approaching or leaving a berth.

Rudder Inspection

As part of your pre-departure checks, the steering system should be inspected for obvious defects. Look for excessive movement or play in the rudder, signs of damage, loose fittings, leaks around the rudder stock and any unusual stiffness in the steering system.

The skipper should also know whether the vessel has an emergency steering arrangement and where it is located. A steering failure can occur without warning, and knowing how to establish alternative steering before an emergency occurs is an important part of good seamanship

Module 2 SAILS

2.1 Key Objectives

THE OBJECTIVE OF THIS MODULE IS TO RELAY BASIC INFORMATION REGARDING HOW SAILS WORK, POINTS OF SAIL, TYPES OF SAILS AND BASIC SAILING VESSEL HANDLING SKILLS.

Sails are the primary means by which a sailing vessel harnesses the power of the wind and converts it into a driving force. Understanding how sails work, the different types of sails commonly found on yachts, and the terminology used to describe their parts is essential for any Day Skipper.

A skipper should be able to identify the principal sails, understand their relationship to the wind, and recognize the basic equipment used to hoist, lower, trim and reef them.

2.2 How Sails Work

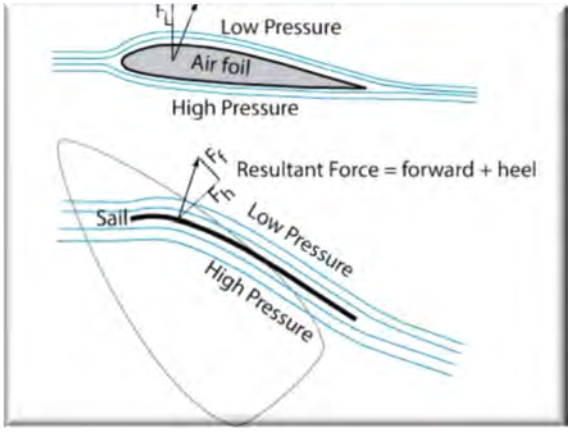
A sail can be thought of as an aero-foil, similar in principle to an aircraft wing, but positioned vertically and designed to work with the wind flowing across it.

When a sail is correctly trimmed, its curved shape causes the airflow to change direction as it passes around the sail. This produces a difference in air pressure between the two sides of the sail and creates an aerodynamic force.

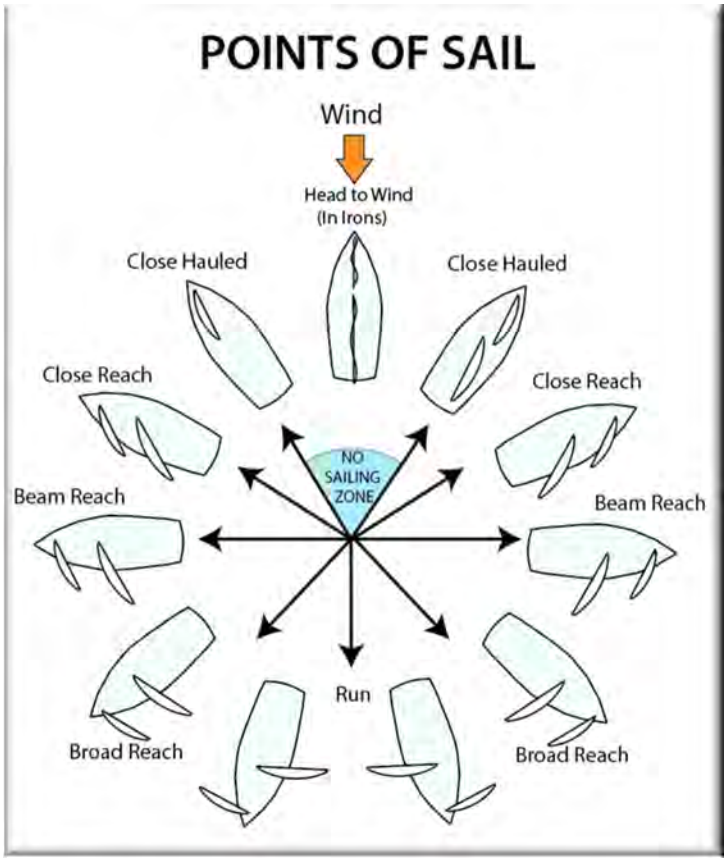
Part of this force acts in the direction the boat is travelling and becomes driving force. Another component acts sideways and tends to push the vessel away from its intended track. The keel and underwater profile resist much of this sideways force, allowing the boat to convert the wind's energy into forward progress.

The amount and direction of force generated by a sail depend on factors such as:

- The angle of the sail to the wind.
- The shape or camber of the sail.
- The angle of attack.
- The strength and direction of the wind.
- The speed of the vessel.
- The trim of the sail and its relationship with other sails.



Points of Sail



The way a sail behaves changes significantly depending on the direction from which the wind is coming.

Close-Hauled — Beating
The vessel is sailing as close to the wind as its design and sail plan allow. The sails are trimmed in relatively tightly and are shaped primarily to generate aerodynamic lift. A yacht normally cannot sail directly into the wind; instead, it sails at an angle to the wind and may tack from one side to the other to make progress toward the wind.

Close Reach
The wind is forward of the beam but not as far forward as when close-hauled. The sails can be eased slightly, and the boat will generally have good speed and pointing ability.

Beam Reach
The wind is coming approximately from the side of the vessel, at about 90° to the centerline. The sails are eased further, and the vessel can often achieve a high and efficient speed.

Broad Reach
The wind is coming from behind the beam. The sails are eased substantially as the wind moves farther aft. A broad reach is often a comfortable and relatively fast point of sail.

Running
The wind is coming from directly or almost directly astern. The sails are eased well out, sometimes nearly at right angles to the centerline. In this situation the sails may operate more like a parachute, with the wind pushing against the sail rather than the sail relying primarily on aerodynamic lift.

Day Skipper Tip:
As the wind moves progressively from ahead toward astern, the sails generally need to be eased progressively. As the wind moves forward, the sails generally need to be trimmed in.

The Mainsail and Foresail Working Together

On a typical cruising yacht, the mainsail is used together with a foresail such as a jib or genoa.

When correctly trimmed, the airflow around the foresail and mainsail interacts. Air passing through the narrow space between the two sails, commonly called the slot, can influence the airflow over the mainsail and contribute to an efficient overall sail plan.

The two sails therefore should not always be considered independently. Adjusting one sail can affect the trim and performance of the other.



FIGURE 11 - MAIN AND FORESAIL

Apparent Wind

An important concept for the Day Skipper is apparent wind.

The wind experienced on board a moving vessel is a combination of the true wind and the wind created by the vessel's own movement through the water. The resulting wind is known as the apparent wind.

As the boat accelerates, the apparent wind changes in both speed and direction. This is why the wind felt by the crew while sailing may be different from the wind reported by a weather forecast.

Sail trim should therefore be judged primarily against the apparent wind experienced by the vessel. Wind indicators, masthead wind instruments and sail telltales provide useful information to help the skipper determine whether the sails are correctly trimmed.

2.3 Parts of Sails

The terminology used to describe the corners and edges of a sail is generally consistent across mainsails, jibs, genoas and other triangular sails.

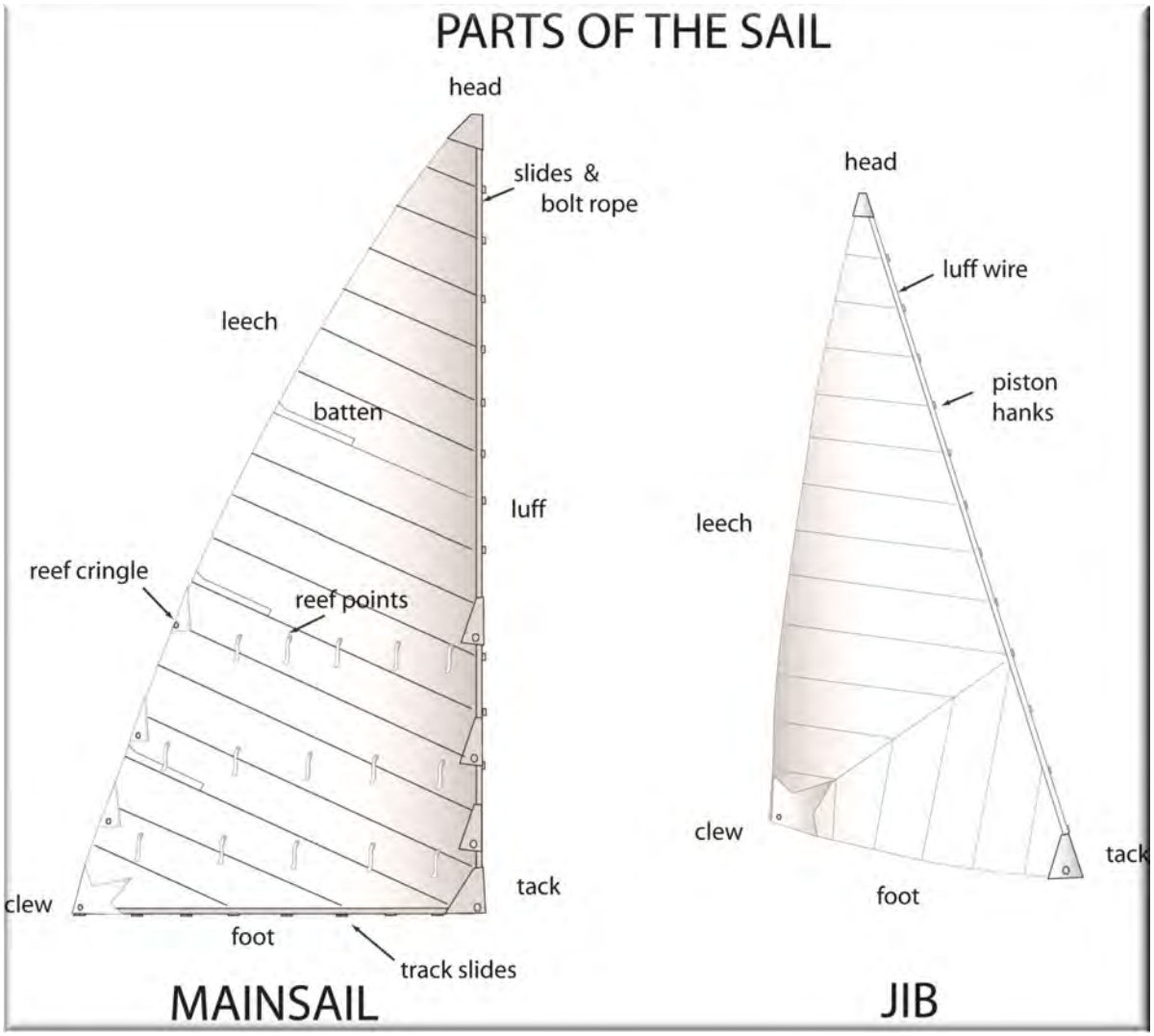
Part	Description
Head	The uppermost corner of the sail. On a mainsail, it is normally hoisted toward the top of the mast.
Tack	The forward lower corner of the sail. On a mainsail, it is located near the gooseneck at the forward end of the boom. On a foresail, the tack is normally secured near the bow or stem=head fitting.
Clew	The aftermost lower corner of the sail. The sheet is normally attached at or near the clew to control the sail's angle to the wind.
Luff	The forward edge of the sail. On a mainsail, the luff runs along the mast; on a jib or genoa, it normally runs along the forestay.
Leech	The after edge of the sail, extending from the head to the clew.
Foot	The lower edge of the sail, extending from the tack to the clew.
Roach	The additional curved area of sail extending beyond a straight line between the head and clew along the leech. Roach increases the effective sail area and is commonly supported by battens in a mainsail.

Standard Sail Parts

These terms form the basic vocabulary used when discussing sail handling and trim. They apply to most triangular sails, although their exact arrangement and method of attachment may vary depending on the sail type and rig.

For example, a crew member may be instructed to "ease the mainsheet," "trim the jib," "check the leech," or "secure the tack." A Day Skipper should understand these instructions immediately and be able to identify the relevant part of the sail or control.

Understanding the names of the sail's parts is therefore not simply a matter of terminology. It provides the foundation for learning sail trim.



There are many different sail configurations, but the most common arrangement on a modern cruising yacht consists of a mainsail and one or more foresails.

2.4 Types of Sails

The Mainsail

The mainsail is normally set aft of the mainmast. Its forward edge, or luff, runs alongside the mast, while its lower edge, or foot, is normally attached to or supported by the boom.

The mainsail is controlled primarily by the **mainsheet**, together with equipment such as the vang, outhaul, halyard and reefing system. These controls allow the skipper to alter the shape of the sail and its angle to the apparent wind.

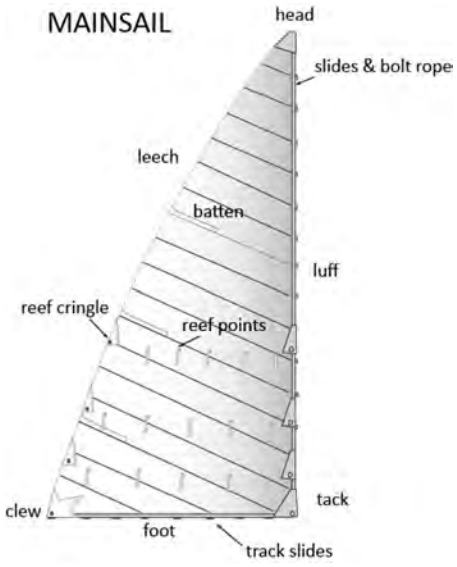


FIGURE 12 - MAINSAIL

Mizzen

The mizzen is a smaller sail set on a second, shorter mast known as the mizzenmast, positioned aft of the mainmast. It is found primarily on ketch- and yawl-rigged sailing vessels.

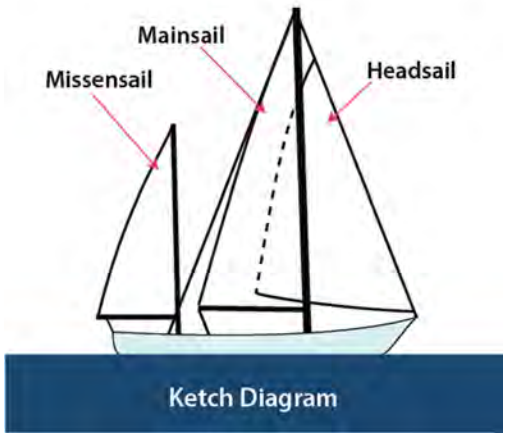
Although smaller than the mainsail, the mizzen can make an important contribution to the vessel's overall sail plan. Its primary purpose is not simply to provide additional sail area, but to help balance the rig and influence the vessel's handling characteristics.

A mizzen can be useful for:

- **Balancing the sail plan** — The mizzen can help balance the forces generated by the mainsail and headsails, reducing excessive weather helm and making the vessel easier to steer.
- **Providing additional drive** — When sailing on a reach or with the wind aft, the mizzen can provide useful additional propulsion.
- **Improving handling** — Correctly trimmed, the mizzen can help control the vessel's balance and reduce the workload on the helm.
- **Steadying the vessel** — In suitable conditions, a mizzen can help steady the boat when lying to or while at anchor, particularly by reducing the vessel's tendency to swing excessively with changes in wind direction.



FIGURE 13 - KETCH (MIZZEN)



The exact role of the mizzen depends on whether the vessel is ketch-rigged or yawl-rigged. On a ketch, the mizzenmast is positioned forward of the rudder post, while on a yawl the mizzenmast is positioned aft of the rudder post.

Day Skipper Tip:
The mizzen is more than an extra sail. It can be used as a sail-trimming and boat-balancing tool. A well-trimmed mizzen can make a noticeable difference to the vessel's helm balance and handling, particularly on a reach or when maneuvering under sail.

Foresails (Headsails)

Foresails, commonly referred to as headsails, are sails set forward of the mast. They are normally attached along the forestay or an inner stay and are used to provide additional driving force and to balance the mainsail.

The size and type of headsail carried will depend on the vessel's rig, design and intended use. Many cruising yachts carry a combination of headsails so that the sail area can be adjusted to suit changing wind conditions.

Jib

The jib is a triangular foresail set forward of the mast, normally with its luff attached to the forestay.

A conventional jib does not overlap the mast. Its clew remains forward of the mast when the sail is correctly set. Jibs are available in various sizes and configurations and are commonly used on cruising yachts because they are relatively easy to handle and provide good all-round performance.

The jib is controlled by jib sheets, which lead from the clew aft to the cockpit or winches. By adjusting the sheets, the skipper controls the angle and shape of the sail in relation to the apparent wind.

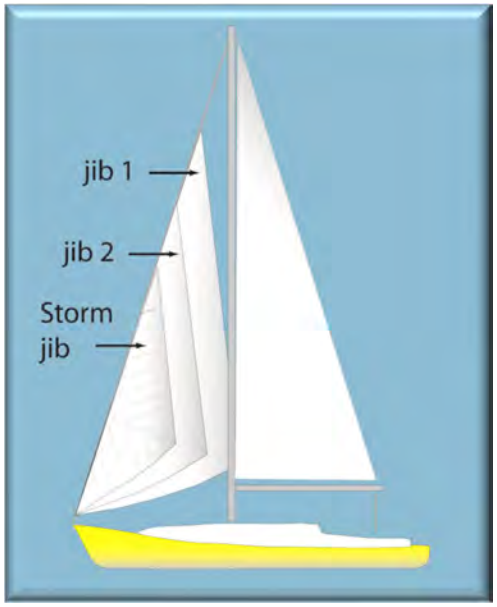


FIGURE 14 – JIB SAILS

Genoa

A genoa is a larger headsail that overlaps the mast, with its clew extending aft of the mast when the sail is set.

Because a genoa has greater sail area than a conventional jib, it can generate additional power, particularly when sailing close-hauled or on a reach. Genoas are therefore commonly used in lighter to moderate wind conditions where the additional sail area can improve performance.

Genoas are often identified by numbers according to their relative size, such as No. 1, No. 2 or No. 3, although numbering conventions can vary between sailmakers and vessels. The larger sails are generally selected for lighter winds, while smaller headsails are used as the wind increases.

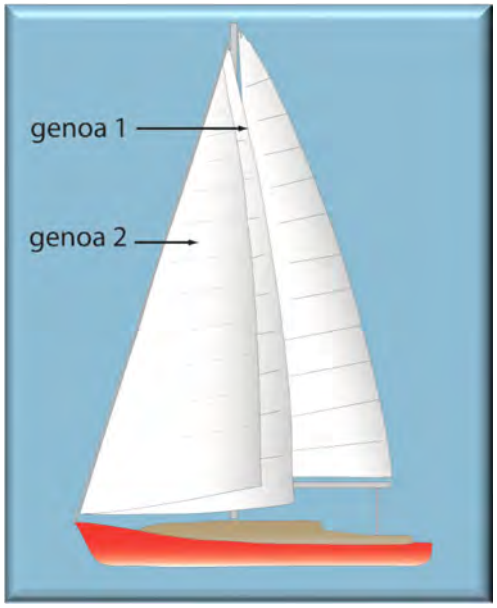


FIGURE 15 - GENOA SAILS

As the wind strengthens, the skipper may need to reef, partially furl or change down the genoa to reduce sail area and maintain a balanced and manageable vessel.

Staysail

A staysail is a smaller foresail set on an inner forestay, positioned aft of the main forestay.

Staysails are particularly associated with cutter rigs, although they can also be found on other sailing vessels. On a cutter-rigged yacht, the staysail is normally positioned between the mast and the forward forestay carrying the main headsail.

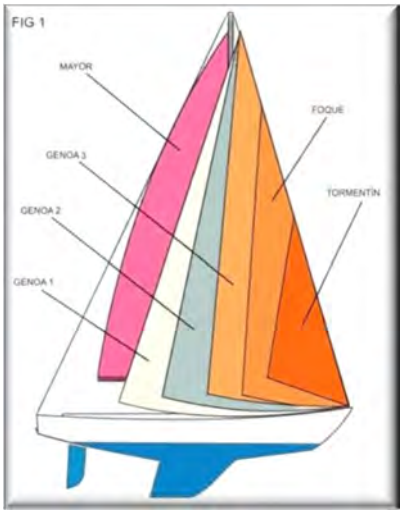
A staysail provides useful additional sail area and can contribute to maintaining a balanced sail plan. In stronger winds, a staysail may be particularly useful when the larger genoa has been reduced or removed.

Because it is smaller and set closer to the center of the vessel, a staysail can remain manageable in conditions where a large genoa would create excessive heeling force.

Selecting the Appropriate Headsail

The choice of headsail should be based primarily on the strength and direction of the apparent wind, rather than simply selecting the largest sail available.

As wind strength increases, reducing sail area helps control heel, weather helm and excessive loads on the rig and sails. Reducing sail early is an important part of good seamanship and generally makes the boat easier and safer to handle.



Day Skipper Tip:
Do not wait until the boat is difficult to control before reducing sail. Reefing or changing to a smaller headsail early is usually easier and safer than trying to reduce sail after the wind has increased significantly**.**

Spinnakers

Spinnakers are large, lightweight sails used for sailing downwind or on broad reaches, where the working sails become inefficient.



Symmetrical spinnaker — cut symmetrically about its centerline; flown from a spinnaker pole rigged out from the mast on the windward side, with a guy (to the pole) and a sheet (to leeward) controlling it. Best suited to dead-downwind running.

Asymmetrical spinnaker (cruising chute / gennaker) — shaped like a large genoa, with a defined tack, clew and longer luff; the tack is fixed forward (to the bow or a bowsprit) rather than to a pole, and it is trimmed with a sheet like a headsail. Simpler to handle than a symmetrical kite and popular on cruising boats, though best suited to reaching angles rather than dead downwind.

2.5 Sail Controls and Hardware

Knowing the names and functions of the equipment attached to a sail is just as important as knowing the names of the sail itself. These fittings allow the crew to hoist, lower, shape, trim and control the sails.

Correct use of sail controls allows the skipper to extract the best performance from the sail plan while also controlling the forces generated by the wind. Understanding this equipment is therefore an important foundation for learning sail trim, reefing and sail handling.

Battens



FIGURE 16 - BATTENS

Battens are relatively rigid strips inserted into pockets in the mainsail. They are commonly made from fiberglass, wood or composite materials.

Battens support the sail's roach, allowing additional sail area to extend beyond a straight line between the head and clew. They also help the sail maintain its designed aerodynamic shape and prevent excessive flutter of the leech.

Battens may be:

- **Partial length** — extending only partway across the sail from the leech.
- **Full length** — extending substantially across the entire width of the sail from the leech toward the mast.

A mainsail fitted with full-length battens is commonly referred to as a full-batten mainsail. Full-length battens can provide good sail shape and reduce flogging, although they may require specialized cars or fittings to allow the sail to move freely up and down the mast track.

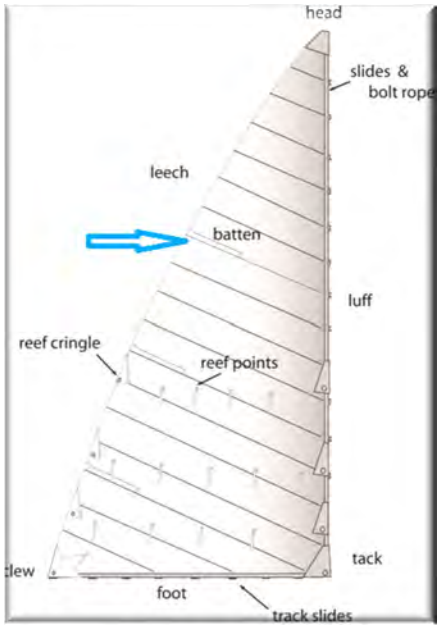


FIGURE 17 – BATTEN POCKET

Batten Pockets

Batten pockets are the sewn sleeves or channels incorporated into the mainsail into which the battens are inserted.

Sail Slides or Slugs

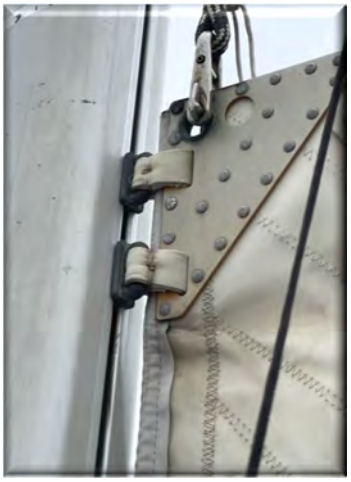


FIGURE 18 - SAIL SLIDES

Sail slides, also known as slugs, are small fittings attached along the luff of a mainsail. They engage with a track or groove on the mast, allowing the mainsail to be raised and lowered while remaining attached to the mast.

On some sailing vessels, similar fittings are also used along the foot of the mainsail where it is carried in a boom track.

Sail slides allow the sail to move smoothly as it is hoisted or lowered and help keep the luff under control when reefing or handling the sail.

Cars



FIGURE 19 - CARS

Cars are sliding fittings that travel along a track and allow the position of blocks, sheets or other control points to be adjusted.

For example, a genoa track car carries the block through which the genoa sheet runs. Moving the car forward or aft changes the angle at which the sheet pulls on the sail and therefore influences the sail's shape.

A mainsheet traveler car runs across a track, usually positioned athwartships in the cockpit or ahead of the companionway. Moving the traveler allows the skipper to alter the position of the mainsail's clew and control the sail's angle without relying entirely on changes in mainsheet tension.

Understanding the difference between sheet tension and traveler position is an important part of learning to trim the mainsail correctly.

Telltales



FIGURE 20 - TELLTALES ON THE SAIL

Telltales are short lengths of wool, yarn, ribbon or lightweight material attached to the sail. They are used to observe the airflow across the sail and provide the skipper with a simple visual indication of whether the sail is correctly trimmed.

Telltales are commonly positioned on both sides of a headsail, and mainsails may also have telltales positioned at strategic points.

When the sail is correctly trimmed, the telltales on opposite sides of the sail will generally stream smoothly aft. If one or more telltale's lift, flutter or become disturbed, this can indicate that the sail is over-trimmed, under-trimmed or at an unsuitable angle to the apparent wind.

Day Skipper Tip:
Telltales provide a simple way of "reading" the airflow. Rather than relying only on how tight the sheet feels, watch the telltales and adjust the sail until the airflow remains attached and smooth.

Bringing It Together

The hull, keel and rudder provide the vessel with its fundamental structure, stability and directional control, while the sails and their associated hardware provide the means of harnessing the wind and producing propulsion.

Understanding these components gives the Day Skipper a foundation for the remainder of the syllabus. The next sections build on this knowledge by introducing the spars and rigging that support the sails, deck equipment used to handle and secure the vessel, navigation and electronic equipment, and the layout and systems found below decks.

Module 3 SPARS

3.1 Key Objectives

THE OBJECTIVE OF THIS MODULE IS TO UNDERSTAND SPARS, THE MAST, THE BOOM, SPINNAKER POLE, AND BOWSPRIT

Spars are the rigid structural members used to support, position and control a sailing vessel's sails. They form an essential part of the rig and are designed to withstand the considerable loads generated by the sails and rigging.

The **principal spars** found on a modern sailing yacht **are the mast and boom**. Depending on the vessel's rig and sail plan, additional spars such as a spinnaker pole or bowsprit may be fitted to position certain sails away from the mast and hull.

3.2 Mast

The mast is the principal vertical spar of the sailing vessel. It supports the mainsail and, depending on the rig, may also support or form the attachment point for various headsails and associated rigging.

The mast carries the luff of the mainsail, either directly through a mast groove or by means of sail slides or cars running in a mast-track.

The mast also supports much of the standing rigging, including the shrouds and stays, which hold the mast in position and transfer the forces generated by the sails into the hull.



FIGURE 21 - MAST ON MODERN SAILBOAT
Credit - By Tropenmann - Own work, Public Domain

Modern masts are commonly manufactured from aluminum alloy, although carbon fiber and other composite materials are increasingly used, particularly on performance yachts.

The mast may also carry equipment such as:

- Spreaders.
- Navigation and steaming lights.
- Wind instruments.

- VHF or communication antennas.
- Radar equipment.
- Rigging attachments and halyard sheaves.

3.3 Boom

The boom is the horizontal spar attached to the mast by the gooseneck fitting. It supports the foot of the mainsail and allows the lower part of the sail to be controlled.

The boom is normally controlled by the mainsheet, which determines the overall angle of the mainsail to the wind. Other controls, including the kicking strap or vang and outhaul, are used to control the shape and position of the mainsail.



FIGURE 22 - BOOM

The boom is a particularly important consideration for crew safety. During a tack or gybe, the boom can move rapidly across the cockpit and can cause serious injury if crew members are standing in its path.

Day Skipper Tip:
Always be aware of the boom's position. A gybe can cause the boom to move suddenly and with considerable force. Crew should be briefed before maneuvers and kept clear of the boom's arc.

3.4 Spinnaker Pole

The spinnaker pole is a horizontal spar used primarily with a symmetrical spinnaker. One end is attached to a fitting on the mast, while the other end is connected to the sail.

The pole holds the appropriate corner of the spinnaker out to the side of the vessel, allowing the sail to be presented more effectively to the wind. It is particularly useful when sailing on a broad reach or run.



FIGURE 23 - SPINNAKER POLE

With a conventional symmetrical spinnaker, the pole is normally used to hold the windward clew of the sail out from the mast. This helps maintain the shape of the spinnaker and allows it to operate efficiently when the wind is coming from well aft.

The pole must be handled carefully because it can be under significant compression or tension when the spinnaker is flying.

3.5 Bowsprit



FIGURE 24 - BOWSPRIT

A bowsprit is a spar that projects forward from the bow of the vessel. It may be a permanent structural member or a removable or retractable fitting, depending on the design.

Its primary purpose on modern cruising yachts is to move the tack of an asymmetric spinnaker or cruising chute forward of the bow. This increases the separation between the sail and the mainsail and allows the sail to develop its designed shape.

A bowsprit can also provide additional space for rigging and sail-handling equipment and may incorporate fittings for the tack line or other control lines.

Skipper's Tip

Before getting underway, take a quick look over the mast, boom, spinnaker pole and bowsprit. Check for anything unusual such as cracks, bends, loose fittings, damaged lines or obvious corrosion.

Remember that the spars carry significant loads, particularly when sailing in strong winds. If something looks damaged or out of place, stop and investigate before putting the rig under load.

3.6 Maintenance

Regularly inspect the spars and their fittings for:

- Cracks, bends or other signs of damage.
- Loose or missing fasteners.
- Corrosion, particularly around fittings and connections.
- Wear at goosenecks, mast tracks and pole fittings.
- Damage or excessive wear to blocks, sheaves and attachment points.
- Chafing or damage to lines running through or around the spars.

Keep tracks, fittings and moving parts clean and properly lubricated where recommended by the manufacturer.

A simple inspection before and after sailing can identify small problems before they develop into a rig failure or serious safety issue.

Skipper's Tip:
Look up, look over and check the rig before you sail. A few minutes of inspection can prevent a much bigger problem at sea.

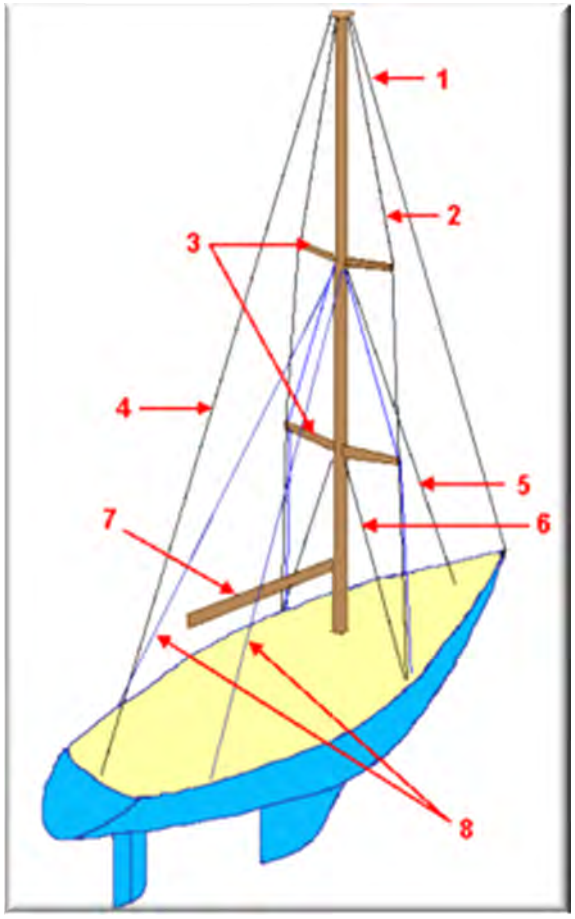
Module 4 STANDING RIGGING

4.1 Key Objectives

THE OBJECTIVE OF THIS MODULE IS TO EXPLAIN STANDING RIGGING AND THE SUPPORT SYSTEM THAT HOLDS THE MAST IN POSITION.

Standing rigging is the fixed wire, rod or synthetic support system that holds the mast in position. Unlike running rigging, it is normally left in place and under tension while the boat is in service.

The standing rigging supports the mast in all directions and allows it to safely carry the loads created by the sails. Correct rig tension and adjustment are important for both safety and sailing performance.



Key:

1. Forestay
2. Shroud
3. Spreaders
4. Backstay
5. Inner forestay
6. Sidestay
7. Boom
8. Running backstays

FIGURE 25 - STANDING RIGGING

4.2 Forestay

The forestay runs from the bow or foredeck area to the mast. On a masthead rig, it normally attaches near the top of the mast. On a fractional rig, it attaches at a lower point.

The forestay supports the mast from forward and normally carries the luff of the headsail or supports the headsail furling system.

4.3 Backstay

The backstay runs from the stern or aft deck area to the mast, usually near the masthead.

It supports the mast from aft and counteracts the forward pull of the forestay. On some boats, the backstay can also be adjusted to alter mast bend and forestay tension, which can be used to influence sail shape.

4.4 Cap Shrouds

The cap shrouds provide sideways support for the upper part of the mast. They run from chainplates on the deck, up to the spreader tips and then to the masthead or upper section of the mast.

Because they support the mast at its upper end, cap shrouds carry significant loads and are an important part of the vessel's overall rig structure.

4.5 Lower Shrouds

The lower shrouds support the lower section of the mast. They run from deck-level chainplates to attachment points lower down on the mast, generally around or below the spreader area.

Depending on the rig design, separate forward and aft lower shrouds may be fitted to provide support in different directions and help control the mast's bend and alignment.

4.6 Spreaders

Spreaders are horizontal or slightly angled struts extending from the mast. They push the shrouds outward, increasing the angle of the shrouds and making them more effective at supporting the mast.

Most cruising yachts have one or more sets of spreaders, depending on the height and design of the mast.

Spreaders must be securely attached and correctly aligned. Damage to a spreader or its fittings can seriously affect the strength and stability of the rig.

4.7 How the Rigging Works Together

The standing rigging works as a triangulated support system around the mast.

- The **forestay** supports the mast from forward.
- The backstay supports the mast from aft.
- The cap shrouds and lower shrouds provide sideways and additional fore-and-aft support.
- The spreaders increase the effectiveness of the shrouds.

Together, these components keep the mast straight, secure and correctly positioned while the sails are generating load.

Skipper's Tip

Before sailing, make a quick visual inspection of the standing rigging. Look for broken or damaged wires, corrosion, loose terminals, damaged chainplates, cracked fittings or anything that appears out of alignment.

Do not ignore a single broken strand of wire. It may be an early indication of a developing rigging failure.

Skipper's Tip:
If the standing rigging looks wrong, don't put the rig under load. Stop and investigate the problem before sailing.

4.8 Maintenance

Standing rigging should be inspected regularly, paying particular attention to:

- Wire or rod for corrosion, kinks or broken strands.
- Terminals and swaged fittings for cracking or corrosion.
- Chainplates and their fastenings.
- Spreader roots and spreader tips.
- Clevis pins, split pins and retaining devices.
- Areas where rigging passes through, or contacts other fittings.
- Evidence of unusual movement, slackness or changes in rig tension.

Standing rigging has a finite service life and should be professionally inspected at appropriate intervals. Follow the manufacturer's recommendations and the vessel's maintenance schedule, particularly for vessels used regularly or in demanding conditions.

A well-maintained rig is essential to safe sailing. The standing rigging carries substantial loads, and a failure of one component can place additional loads on the remaining rig and potentially lead to mast failure.

Module 5 RUNNING RIGGING

5.1 Key Objectives

THE OBJECTIVE OF THIS MODULE IS TO EXPLAIN RUNNING RIGGING AND HOW THE LINES ARE CONTROLLED AND ADJUSTED THROUGHOUT THE DAY.

Running rigging is the term used for the lines that move and are used to hoist, lower, trim and control the sails. Unlike standing rigging, running rigging is regularly handled by the crew and may be adjusted throughout the day.

Most running rigging passes through blocks, clutches, fairleads and winches, allowing the crew to control significant loads with relatively little effort.



FIGURE 26 - RUNNING RIGGING

Halyard

A halyard is a line used to hoist and lower a sail. Common examples include the main halyard for the mainsail and the jib, or genoa halyard, for a headsail. The halyard is normally attached to the head of the sail, passes through a block or sheave near the top of the mast, and returns to the deck where it can be secured on a clutch, cleat or winch.



FIGURE 27 - SHEAVE AT TOP OF MAST

Mainsheet

The mainsheet controls the angle of the mainsail to the wind by controlling the position of the boom. Pulling in the mainsheet brings the boom toward the centreline, while easing the sheet allows the boom to move outboard. The mainsheet is normally led through a series of blocks between the boom and the mainsheet traveller or cockpit, providing mechanical advantage.

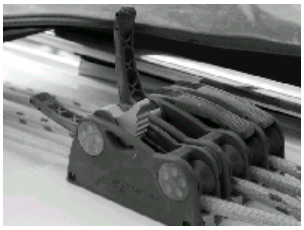


FIGURE 28 - CLUTCH

Jib Sheet / Genoa Sheet

The jib sheet, or genoa sheet, controls the angle of the headsail to the wind. The sheet is attached to the sail's clew and led aft to a winch or other control point on each side of the cockpit. When sailing, the sheet on the leeward side is normally the working sheet and carries the load.

When the boat tacks, the headsail moves to the opposite side and the working sheet changes accordingly.



FIGURE 29 - WINCH



FIGURE 30 - MAINSHEET TRAVELLER

Topping Lift (Boom Topping Lift)

The topping lift supports the boom when the mainsail is not fully hoisted or when it has been lowered. It normally runs from the mast or masthead area to the aft end of the boom. It prevents the boom from dropping into the cockpit when the mainsail is lowered.

Some boats use a rigid vang or other mechanical system instead of a conventional topping lift.



FIGURE 31 - BOOM TOPPING LIFT

Boom Vang / Kicking Strap



FIGURE 32 - BOOM VANG

The kicking strap, also called a boom vang, runs between the base of the mast and the underside of the boom. Its main purpose is to control the upward movement of the boom and therefore the tension in the mainsail's leech.

It becomes particularly important when sailing on a reach or run, when the mainsheet may not provide enough downward control. Adjusting the vang allows the skipper to control mainsail shape and prevent the leech from becoming excessively open.

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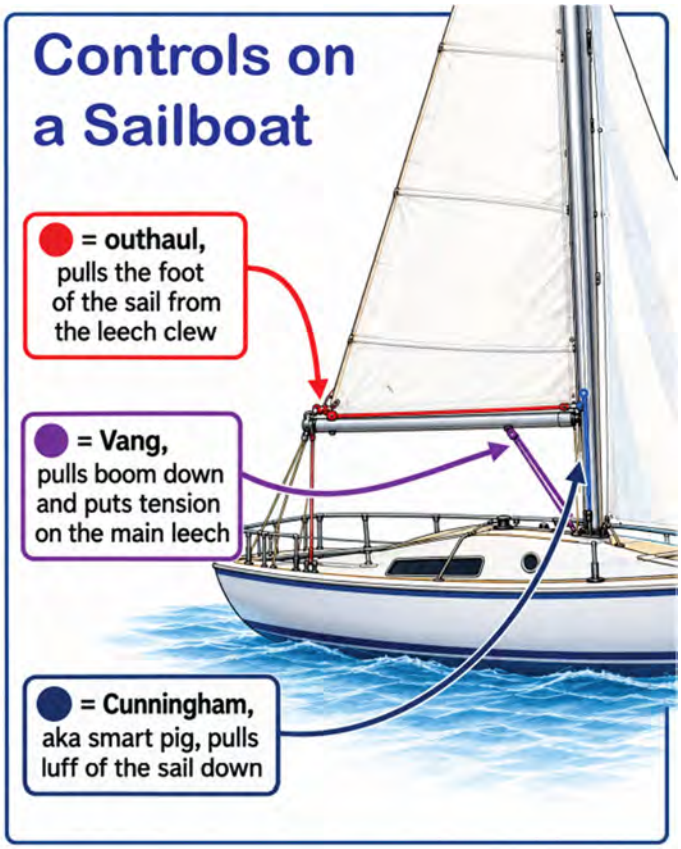


FIGURE 33 – CONTROLS ON A SAILBOAT

The outhaul controls the tension along the foot of the mainsail. Pulling the outhaul tightens the foot and generally flattens the lower part of the mainsail. Easing it allows more fullness or "belly" to develop in the lower part of the sail.

As a general rule, a flatter sail is useful in stronger winds, while a fuller sail can provide additional power in lighter conditions.

Cunningham

The Cunningham is a control line attached near the tack of the mainsail. It is used to increase tension along the forward part of the sail without having to adjust the halyard.

Increasing Cunningham tension moves the sail's draft forward and helps flatten the lower and forward sections of the mainsail. It is particularly useful as wind strength increases.

Skipper's Tip — Sail Controls
Learn what each control does before you need it. Halyard = height, sheet = angle, outhaul = foot tension, Cunningham = luff tension, vang = leech control. Correct use of these controls allows the skipper to change sail shape as the wind conditions change.

Module 6 SPINNAKER CONTROL LINES

6.1 Key Objectives

THE OBJECTIVE OF THIS MODULE IS TO EXPLAIN SPINNAKER RIGGING AND HOW THE LINES ARE CONTROLLED AND ADJUSTED.

A symmetrical spinnaker requires additional control lines because the sail is supported and positioned differently from a conventional headsail.

Spinnaker Halyard

The spinnaker halyard is used to hoist and lower the head of the spinnaker. It normally runs from the head of the sail to a block near the masthead and back to the cockpit or mast.

Guy

The **guy** is attached to the tack or windward corner of a symmetrical spinnaker and is led aft to the cockpit.

The guy controls the position of the spinnaker pole and helps hold the windward corner of the sail in the correct position. It is particularly important when setting or gybing a symmetrical spinnaker.

Sheet

The spinnaker sheet is attached to the clew and led aft on the leeward side of the vessel.

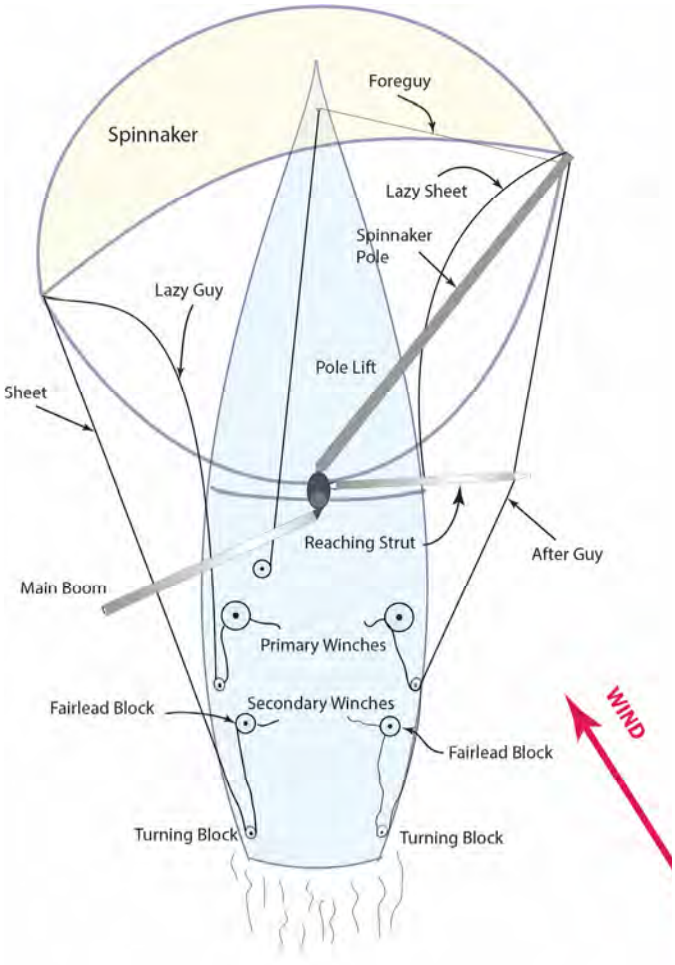


FIGURE 34 - SPINNAKER CONTROLS

The sheet is adjusted continuously to keep the spinnaker correctly filled and to maintain the sail's shape. As with a jib, the working sheet is normally the one on the side away from the wind.

Pole Topping Lift / Uphaul

The topping lift, or uphaul, supports the outboard end of the spinnaker pole.

It controls the vertical position of the pole and prevents the pole from dropping when it is not fully supported by the sail.

Fore-guy / Downhaul

The fore-guy, also called a downhaul, runs from the outboard end of the spinnaker pole forward and down toward the foredeck.

Its purpose is to prevent the pole from lifting when the spinnaker is under load. The topping lift and fore-guy work together to control the height and movement of the pole.

Skipper's Tip — Spinnaker Handling
Spinnaker equipment can become heavily loaded very quickly. Before hoisting, make sure the halyard, sheets, guy, topping lift and fore-guy are correctly rigged and free from twists or snags.

Asymmetric Spinnaker / Cruising Chute

An asymmetric spinnaker, often called a cruising chute, is normally set from a bowsprit rather than using a conventional spinnaker pole.

This simplifies the arrangement because there is no pole to control. The sail normally requires:

- A halyard to hoist the head.
- A tack line securing the tack to the bowsprit.
- A sheet on each side of the vessel.

Only the sheet on the working side is normally under load. The sail is trimmed in much the same way as a large, lightweight genoa.

Module 7 INTERIOR LAYOUT

7.1 Key Objectives

THE OBJECTIVE OF THIS MODULE IS TO EXPLAIN THE LAYOUT OF A TYPICAL DAY SAILBOAT'S INTERIOR AND THE NAMES FOR ALL THE INTERIOR CABIN AREAS.

The interior of a cruising yacht is designed to make the best use of the limited space available while providing accommodation, cooking facilities, navigation equipment and storage.

Although layouts vary considerably between vessels, many cruising yachts follow a broadly similar arrangement from bow to stern. As a Day Skipper, it is useful to become familiar with these areas and their correct names.

Refer to

Figure 35 - Sailboat Interior Layout Illustration on following page/s.

V-Berth / Fore-cabin

The fore-cabin is the accommodation area at the forward end of the yacht.

It is commonly fitted with a V-shaped berth, so it is often referred to as a V-berth. The berth follows the narrowing shape of the bow and may provide the main sleeping accommodation on smaller cruising yachts.

The fore-cabin may also contain storage lockers, shelves and drawers for personal equipment.

Heads

The heads is the vessel's toilet compartment. Depending on the size and design of the yacht, it may also incorporate a shower, washbasin and storage.

The heads is often positioned just aft of the fore-cabin, although its location varies between different yacht designs.

On a sailing vessel, the heads may use a marine toilet and holding tank system, and the skipper should understand its basic operation and any restrictions on discharge.

Saloon

The saloon is the main living and social area below decks.

It normally contains seating or settees arranged around a table. On many yachts, the settees can be converted into additional sea berths when required.

The saloon is used for eating, relaxing, passage planning and general living. It may also contain storage lockers, bookshelves and access to various vessel systems.

Galley

The galley is the yacht's kitchen.

A typical galley may include:

- Stove or cooker.
- Oven.
- Sink.
- Fresh-water supply.
- Refrigeration.
- Food and equipment storage.

Many sailing yachts have a gimballed stove, allowing the cooker to remain relatively level as the vessel heels while sailing.

Crew should be particularly careful when using the galley at sea. Hot liquids, cooking equipment and sharp utensils can become dangerous when the vessel is moving or heeling.

Galley Safety Tip:
Make sure the cooker, fuel supply and surrounding equipment are secure before cooking underway. Use the pot restraints and safety features provided and never leave cooking unattended.

Chart Table / Navigation Station

The chart table, often called the navigation station or nav station, is the area dedicated to navigation and vessel management.

It is normally positioned where the skipper or navigator can work with charts and access the vessel's navigation equipment.

Depending on the vessel, the navigation station may contain:

- Paper charts.
- Chart-plotter or navigation display.
- GPS equipment.
- VHF radio.
- Compass or repeater.
- Depth and speed instruments.
- Radar display.
- AIS information.
- Electrical distribution panel.
- Navigation books and sailing directions.

The nav station should be kept organized and readily accessible, particularly when preparing for a passage or dealing with an emergency.

Aft Cabin

The aft cabin is a sleeping cabin located toward the stern of the vessel, commonly beneath or adjacent to the cockpit.

Many cruising yachts have one or more aft cabins, providing additional private sleeping accommodation separate from the fore cabin.

The space available in an aft cabin varies considerably between yacht designs and may be affected by the shape of the hull, engine installation and cockpit structure.

Companionway

The companionway is the opening and steps connecting the cockpit or deck area with the accommodation below.

It is normally the principal route between the cockpit and the interior of the vessel.

The companionway is an important part of the vessel's safety and should be kept clear of loose equipment and obstructions. The companionway hatch and washboards should be capable of being secured, particularly when sailing in rough conditions.

Storage and Access

Storage is an important part of any cruising yacht. Lockers, cupboards, drawers and under-berth compartments are used to store food, clothing, tools, spare parts and safety equipment.

Heavy items should be stored low and securely, particularly when preparing for a passage. Poorly secured equipment can move when the vessel heels or encounters heavy seas and can become a hazard to the crew.

Skipper's Tip — Know Your Boat
Before taking charge of a vessel, walk through the entire boat and identify the main accommodation areas, engine access, electrical panel, fuel and water systems, seacocks, bilge pumps, emergency equipment and escape routes.

The Complete Picture

The boat is made up of many interconnected systems and areas. The hull, keel and rudder provide the basic structure and control; the sails, spars and rigging provide propulsion; the deck equipment allows the vessel to be handled and secured; the electronics and compass assist with navigation and communication; and the interior layout provides accommodation and access to many of the vessel's essential systems.

A Day Skipper should become familiar with the complete vessel, not just the helm. Knowing where equipment is located and how it operates is an essential part of safe and confident boat handling.

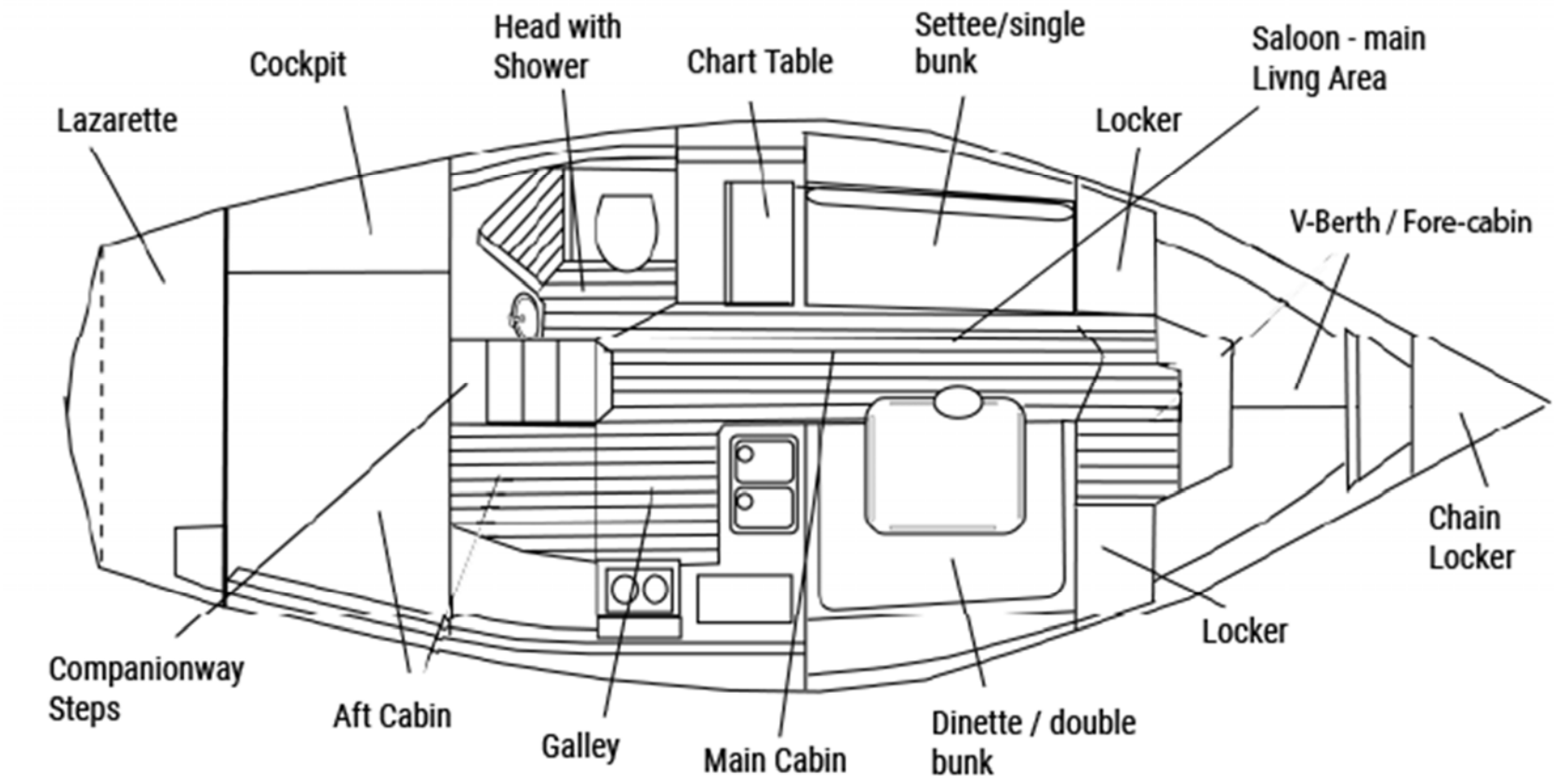


FIGURE 35 - SAILBOAT INTERIOR LAYOUT

Module 8 DECK EQUIPMENT

8.1 Key Objectives

THE OBJECTIVE OF THIS MODULE IS TO COVER ESSENTIAL DECK EQUIPMENT AND HOW TO USE THE EQUIPMENT SAFELY.

In addition to the rigging and sail controls, a sailing vessel has a range of deck equipment and fittings used for mooring, anchoring, crew safety and general boat handling.

A Day Skipper should be able to identify the main deck fittings and understand their purpose before leaving the berth.

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Winches and how to use them Safely

For a sailing training manual, I would cover winches as both equipment and a safety system. The important distinction is between the primary winches, normally used for heavily loaded sheets such as the genoa, and secondary winches, used for lighter-duty sheets, furling lines, control lines, or other deck work.

Winches and Safe Use on Sailboats

A winch is a mechanical device used to multiply the force available to the crew when handling loaded lines. On a modern cruising or sailing yacht, most sheet winches are self-tailing winches, allowing the line to be held and hauled without requiring a second crew member to maintain tension on the tail.

Primary Winches

The **primary winches** are generally the larger winches located near the cockpit helm or aft end of the cockpit. Their principal purpose is to handle the **genoa or jib sheets**, which can carry considerable loads, particularly when sailing close-hauled or in strong winds.

Primary winches are normally larger than secondary winches because they must handle higher loads. They may be **two-speed or three-speed** winches, providing different mechanical advantages depending on the direction in which the winch handle is turned.

The normal procedure is:

1. Lead the sheet correctly to the winch.
2. Take several turns around the drum, normally **2–4 turns**, depending on the load and manufacturer's guidance.
3. Keep the turns neat and in the same direction.
4. Place the sheet into the self-tailing mechanism.
5. Haul the line by hand while there is relatively little load.
6. Once the line becomes heavily loaded, use the winch handle to bring the sail in to the desired position.
7. When easing the sheet, control the line carefully and allow it to run under controlled tension.

Secondary Winches

Secondary winches are generally smaller and may be positioned further forward or elsewhere around the cockpit. They can be used for:

- Mainsail sheets
- Spinnaker or gennaker sheets
- Furling lines
- Traveller control lines
- Halyards
- Reefing lines
- Other control lines

The exact function depends on the yacht's deck layout.

Because secondary winches are generally smaller, they should not automatically be assumed to be capable of handling the same loads as the primary winches.







Self-Tailing Winches

A self-tailing winch has a jaws or stripper arrangement at the top of the winch that grips the loaded line after it has been wrapped around the drum. This allows the crew to operate the winch without continuously holding the tail.



FIGURE 36 - SELF TAILING WINCH

The line should be loaded into the self-tailer correctly. The tail should still be kept under control, particularly when easing a heavily loaded sheet.

Never place fingers or hands between the turns of a loaded line. A sheet under high tension can cause serious crushing or amputation injuries if it suddenly moves.

Winch Handles

Winch handles are available in different lengths and with different locking arrangements. A longer handle generally provides greater leverage, while a shorter handle can be quicker and easier to operate when the load is moderate.



FIGURE 37 - WINCH HANDLE

Many winches are two-speed. The winch changes gear depending on the direction in which the handle is turned:

- Low-speed/high-power: used when the line is heavily loaded and substantial force is required.
- Higher-speed/lower-power: used when there is less load and the line needs to be brought in quickly.

A two-speed winch handle does not itself create the two speeds; the winch's internal gearing provides the different ratios. The handle simply drives the winch.

Some modern winches use a locking winch handle, which must be properly engaged before significant load is applied.

Safe Winch Technique

The most important principle is:

- Use the winch to increase mechanical advantage—not to force equipment beyond its limits.
- Before grinding a loaded sheet, check that the line is running freely and that the sail, blocks, travelers and fittings are not fouled.

When grinding:

- Keep your hands clear of the loaded turns.
- Keep fingers away from the self-tailing jaws.
- Do not wrap the line around your hand or wrist.
- Keep loose clothing, jewellery and hair away from the winch.
- Maintain control of the tail.
- Do not use excessive force on the winch handle.
- If the handle becomes unusually difficult to turn, **stop and investigate**.
- Do not use a winch to pull a line that is jammed or fouled.
- Remove the winch handle when it is no longer required.

The "Power Zone"

Crew should understand that a winch can generate very high loads with relatively little physical effort. This makes it possible to damage sails, blocks, deck fittings or the winch itself without immediately realizing how much force is being applied.

If a sheet becomes excessively loaded, it is often safer to reduce the load on the sail first rather than simply applying more force to the winch.

For example, if a genoa sheet is heavily loaded while beating into strong wind, easing the mainsheet or bearing away slightly may reduce the load sufficiently to allow the genoa sheet to be adjusted safely.

Easing a Loaded Sheet

Particular care is required when releasing a heavily loaded sheet.

The turns around the winch should be released gradually and under control. The crew should maintain a firm grip on the tail and allow the sheet to run through the winch rather than simply letting it go.

A sudden release can cause:

- The sheet to run violently.
- Burns to hands.
- The sail to flog.
- The boom or other equipment to move unexpectedly.
- Loss of control of the vessel.

Never attempt to stop a rapidly running sheet by grabbing it with bare hands.

Winch Maintenance

Winches should be regularly inspected, cleaned and lubricated in accordance with the manufacturer's instructions. Particular attention should be given to:

- Drum condition
- Self-tailing jaws
- Pawls and springs
- Gears
- Bearings
- Winch handle socket
- Locking mechanism
- Corrosion

A winch that is difficult to turn, slips, fails to hold the line properly, or makes unusual noises should be removed from service until it has been inspected.

Good winch handling is a combination of correct line lead, proper use of the available gearing, controlled handling of the tail, and keeping hands and body parts away from loaded lines.

Sailor's Tip — Let the Winch Do the Work
A winch is designed to multiply your strength, but that does not mean you should use all of that power. If you find yourself standing on the winch handle, something is probably wrong. Stop, check the line lead, look for a fouled sheet, and consider reducing the sail load before applying more force.
When trimming a heavily loaded sheet, use the low speed/high-power gear to bring the sail in under control. Once the load has reduced, change to the higher-speed gear to take in the remaining slack quickly.

Remember the simple rule:
"If the winch won't turn, don't force it—find out why."

And always keep your fingers, hands and loose clothing away from the loaded turns. A winch can generate far more force than a person can safely resist.



Pulpit

The pulpit is the protective guardrail structure fitted around the bow.

It provides crew with a secure handhold when working forward and helps prevent crew from going over the

bow. The pulpit may also incorporate or support equipment such as the anchor roller, navigation light or other fittings.

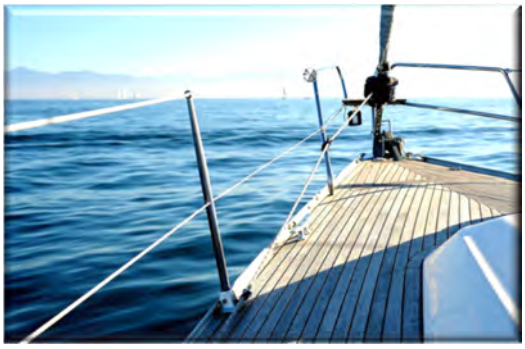
Pushpit



The push-pit is the guardrail structure fitted around the stern.

It provides protection and handholds for crew in the cockpit and aft deck area. Depending on the vessel, it may also carry equipment such as a stern navigation light, horseshoe lifebuoy, radar reflector, antennas or other safety equipment.

Stanchions and Guardrails



Stanchions are vertical posts fitted around the deck edge. They support the horizontal wires or webbing known as lifelines or guardrails.

Together, the stanchions and lifelines form a protective barrier around the side decks and help prevent crew from accidentally going overboard.

They should never be treated as a substitute for maintaining a secure position on deck. In rough conditions, crew should use appropriate handholds and safety equipment.

Cleats

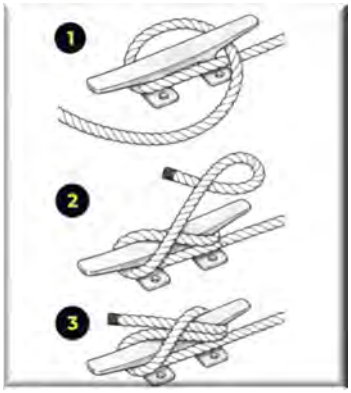


Cleats are strong deck fittings used for securing lines.

They are commonly used for:

- Mooring lines
- Spring lines
- Halyards and control lines
- Temporary securing of equipment

A typical cruising yacht may have bow, midship and stern cleats on each side, although the exact arrangement varies between vessels.



When securing a mooring line, the skipper should ensure the line is correctly led, free from unnecessary chafe and secured so that it can be released safely when required.

Fenders

Fenders are protective cushions placed between the vessel and a pontoon, quay, dock or another vessel.

They protect the hull and topsides from damage caused by contact while maneuvering or lying alongside.



Fenders should be positioned at the correct height for the berth and secured so that they cannot easily slip or become trapped beneath the dock.

The number and size of fenders required will depend on the vessel, berth and conditions. In exposed berths or strong winds, additional fenders may be required.

Skipper's Tip — Before Leaving the Berth
Make a quick check of the deck equipment: fenders secure, mooring lines clear, lifelines in place, cleats clear and all loose equipment secured. A few minutes spent preparing the deck can make leaving and returning to the berth much safer.

Maintenance

Deck equipment is exposed continuously to salt water, sunlight, weather and mechanical loads. Regular inspection is therefore important.

Check:

- Cleats and their mounting points for looseness or damage.
- Stanchions for movement or corrosion.
- Lifelines for broken strands, wear or loose terminals.
- Pulpits and pushpits for secure attachment.
- Fenders for splits, cracks or excessive wear.
- Mooring lines for chafe and deterioration.
- Deck fittings for corrosion and damaged fasteners.

Any fitting that is loose, cracked or significantly corroded should be investigated and repaired before it is relied upon.

Maintenance Tip
Don't just inspect the fitting—check what it is attached to. A strong cleat is only useful if the deck and backing structure beneath it are also sound.

Module 9 THE COMPASS

9.1 Key Objectives

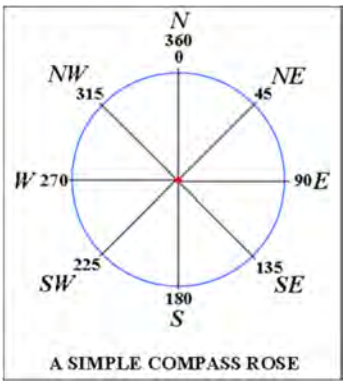
THE OBJECTIVE OF THIS MODULE IS TO GIVE STUDENTS THE BASIC UNDERSTANDING OF THE COMPASS, VARIATION AND DEVIATION.

9.2 True North, Magnetic North and Compass North



Understanding the difference between True North, Magnetic North and Compass North is fundamental to Day Skipper navigation. A course taken from a nautical chart is normally referenced to True North, while a vessel's magnetic compass indicates Compass North, which can differ from True North because of variation and deviation.

True North



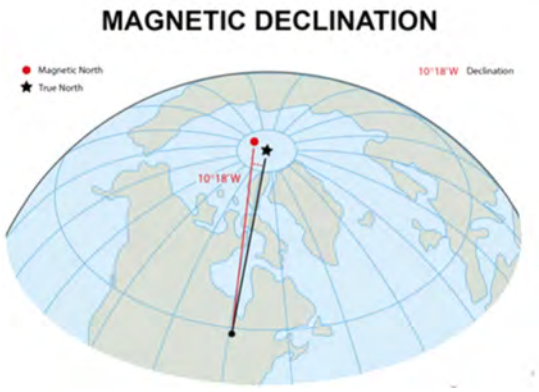
A SIMPLE COMPASS ROSE

True North is the direction from your position toward the geographical North Pole.

This is the **north** used as the **primary reference on nautical charts.** When a course or bearing is described as a True bearing, it is measured clockwise from True North.

The four basic directions are:

- 000° True — North
- 090° True — East
- 180° True — South
- 270° True — West



Magnetic North

Magnetic North is the direction indicated by the Earth's magnetic field. A magnetic compass aligns itself with this field rather than pointing directly toward the geographical North Pole. **Magnetic North** therefore **does not normally coincide with True North.**

The **difference between True North and Magnetic North** is called **magnetic variation**, or **magnetic declination.**

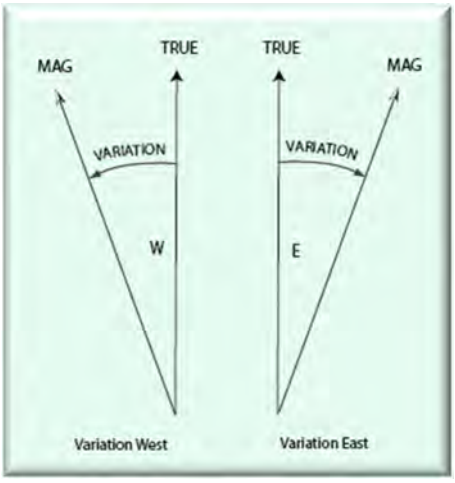


FIGURE 38 - VARIATION (WEST & EAST)

Magnetic Variation

Variation is the angular difference between True North and Magnetic North.

Variation is:

- Different from one geographical area to another.
- Expressed in degrees East or West.
- Shown on nautical charts, normally within the chart's compass rose.
- Slowly changing over time as the Earth's magnetic field changes.

For example, if a chart shows 10°W variation, Magnetic North lies 10° west of True North at that location.

Day Skipper Tip:
Variation belongs to the Earth and the location you are sailing in. It does not change because you move from one boat to another.



FIGURE 39 - CHART SHOWING VARIATION AND THE ANNUAL INCREASE

Compass North

Compass North is the direction actually indicated by the **vessel's magnetic compass**.

Ideally, the compass would point exactly toward Magnetic North. However, the compass is affected by **metal, electrical equipment, wiring, engines** and other magnetic influences aboard the vessel. These local effects cause an error known as **deviation**.

Compass Deviation

Deviation is the difference between Magnetic North and Compass North caused by the vessel itself.

Unlike variation, deviation can change depending on the heading of the vessel, because different parts of the vessel's structure and electrical equipment affect the compass differently on different headings.

A deviation card may be provided for the vessel, showing the known deviation for various compass headings.

Day Skipper Tip:
Variation is caused by the Earth; deviation is caused by the boat.

Putting the Three Together

A simple way to remember the relationship is:

TRUE → VARIATION → MAGNETIC → DEVIATION → COMPASS

Or:

True North
↓ *Variation*
Magnetic North
↓ *Deviation*
Compass North

When working with a chart, you will normally start with a True course. You then apply the appropriate variation to obtain the Magnetic course, and finally account for deviation to determine the Compass course to steer. The exact calculation depends on whether the errors are East or West.

A Simple Example

Suppose the **chart** gives you a course of:
090° True

The chart shows:
6° West variation

The magnetic course will be:
096° Magnetic

If the vessel's deviation on that heading is 2° East, the compass course would then be adjusted accordingly.

The important point for the Day Skipper is not simply memorising the numbers, but understanding that the chart, the Earth's magnetic field and the vessel's compass may all use slightly different references.

Why This Matters

A small compass error may not seem important over a short distance, but even a few degrees can result in a significant position error over a longer passage.

For this reason, a Day Skipper should always know:

- Whether a course is True, Magnetic or Compass.
- The current variation for the area.
- The vessel's deviation, where applicable.
- How to convert between the three.

Skipper's Tip — Remember the Difference

- True North = geographical North
- Magnetic North = Earth's magnetic reference
- Compass North = what your boat's compass actually shows

Variation = True to Magnetic
Deviation = Magnetic to Compass

A crude but useful mnemonic that some sailing instructors teach to help students remember this relationship is “True Virgins Make Dull Company”.

True → apply Variation → Magnetic Course → apply Deviation → Compass Heading

When you’re going from a Compass Heading to a True Course, remember **“East is least, West is best”.** This means that you would add any deviation and variation that is Westerly and subtract one that is Easterly.

A magnetic compass remains an important piece of safety equipment even on a modern yacht equipped with GPS and electronic chart plotters. If the electrical system or navigation electronics fail, the compass can still provide the skipper with a reliable indication of the vessel's heading.

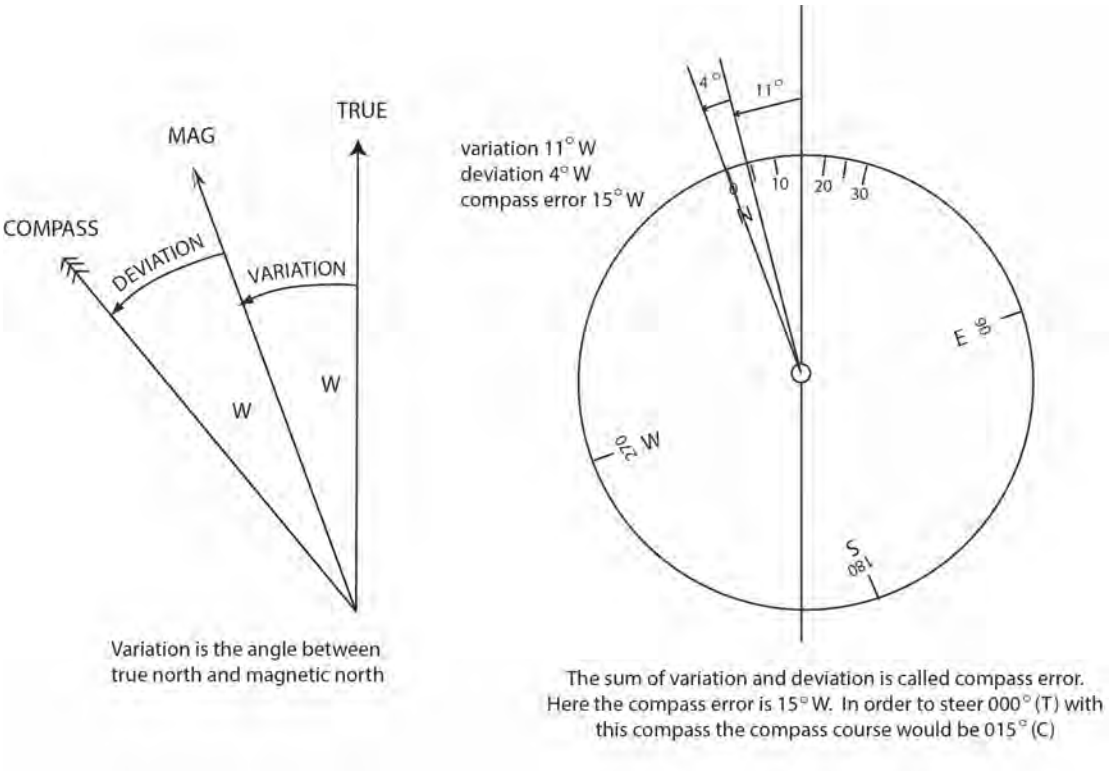


FIGURE 40 – ILLUSTRATION TO DESCRIBE TRUE - VARIATION - MAGNETIC - DEVIATION - COMPASS

Module 10 KEY ELECTRONICS ONBOARD

10.1 Key Objectives

THE OBJECTIVE OF THIS MODULE IS TO FAMILIARIZE STUDENTS WITH THE BASIC ELECTRONICS ONBOARD THE VESSEL.

Modern sailing vessels use a range of electronic equipment to assist with communication, navigation and safety. These systems are normally located around the navigation station or chart table, with additional displays or repeaters often installed in the cockpit.

Electronics are valuable aids to the skipper, but they should not replace good seamanship, visual lookout, paper or electronic charts, and proper passage planning.

10.2 VHF Radio

The VHF radio is the primary means of short-range ship-to-ship and ship-to-shore communication.

It is used for routine communications, marina and harbour calls, safety information and emergency communications.

Channel 16 is the international VHF distress, safety and calling channel. It should be monitored as required and used for initial distress, urgency and safety calls before moving to an appropriate working channel.

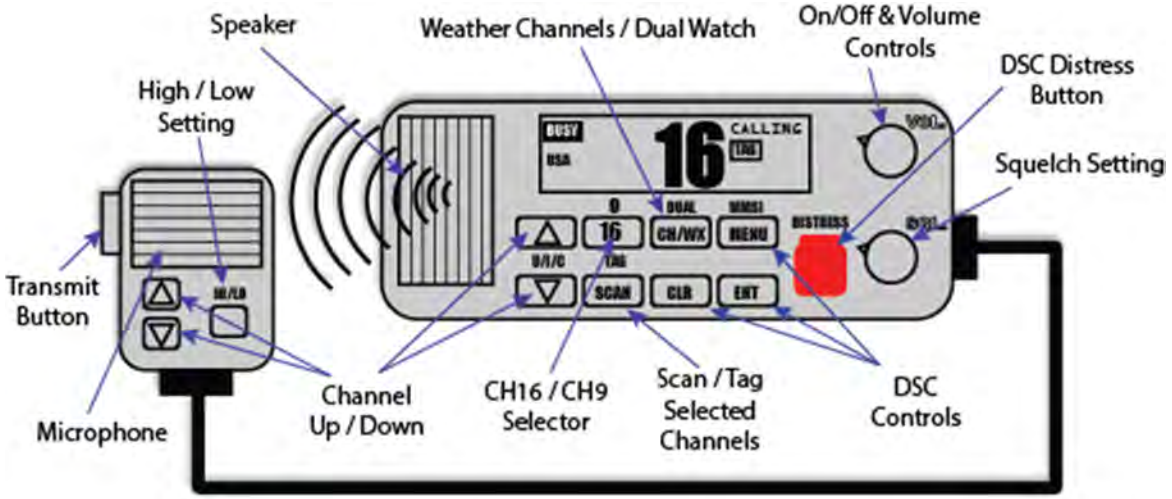


FIGURE 41 - VHF RADIO ILLUSTRATION SHOWING CONTROLS

Many modern VHF radios are fitted with DSC — Digital Selective Calling. When correctly connected to the vessel's GPS and properly configured, DSC can transmit a digital distress alert containing the vessel's identity and position.

Day Skipper's Tip:
Know how to make a Mayday, Pan-Pan and Sécurité call before you need one. Make sure the VHF is switched on, the correct antenna is connected, and the GPS position is available to the DSC system.

10.3 GPS / Chart plotter

A GPS provides the vessel's position using signals received from navigation satellites.

A chart-plotter combines position information with electronic charts and can display useful navigation information such as:

- Vessel position.
- Course over the ground (COG).
- Speed over the ground (SOG).
- Waypoints.
- Routes.
- Depth information connected to a suitable sounder.
- Other navigational information depending on the system.



FIGURE 42 - CHART PLOTTER

A chart plotter is a powerful navigation aid, but the skipper should understand its limitations. Electronic charts can contain errors, equipment can fail, and incorrect settings or user input can result in an unsafe navigation decision.

10.4 SART — Search and Rescue Transponder

A SART is a search-and-rescue locating device designed to help rescuers find a survival craft or person in an emergency.

A radar SART responds when it is detected by a searching vessel's radar. The response produces a distinctive pattern on the radar display, helping rescuers distinguish the survival craft from normal radar returns.

A SART may be carried in a liferaft, grab bag or other readily accessible emergency location, depending on the vessel's safety equipment arrangement.



FIGURE 43 - SART

The SART should be activated according to the manufacturer's instructions when rescue assistance is required.

10.5 EPIRB — Emergency Position-Indicating Radio Beacon

An **EPIRB** is an emergency satellite distress beacon used to alert search-and-rescue authorities that a vessel or crew is in distress.

When activated, an EPIRB transmits a distress signal containing information that can be used by the search-and-rescue system to identify and locate the casualty. Modern EPIRBs can provide a highly accurate position when fitted with an appropriate internal or connected positioning system.

The EPIRB should be readily accessible and its operation understood by the skipper and crew.



FIGURE 44 - EPIRB

A related device is a PLB — Personal Locator Beacon, which is designed to be carried by an individual rather than being permanently associated with the vessel.

Safety Tip — Emergency Electronics
Electronic equipment is only useful if it works when you need it. Before departure, check the VHF, GPS/chart-plotter and emergency beacons as appropriate. Know where the SART and EPIRB are stored and make sure the crew know how to access and use the emergency equipment.

10.6 Electronics Are an Aid — Not a Substitute

A Day Skipper should never become completely dependent on electronic navigation equipment.

The vessel should still be navigated using sound pilotage, visual observations, compass information, depth information and appropriate charts. Where practical, the skipper should also have a backup method of determining the vessel's position if the primary electronic navigation system fails.

A loss of electrical power, damaged antenna, GPS failure, software problem or simple operator error can make an otherwise reliable electronic system unavailable.

Good seamanship means knowing where you are without relying on a single piece of equipment.

10.7 Maintenance of Electronics

Regularly check electronic equipment for:

- Secure electrical connections.
- Corrosion around plugs and terminals.
- Damaged cables or antennas.
- Correct GPS position and time.
- Adequate battery power.
- Correct VHF configuration and radio operation.
- EPIRB and SART service dates and battery expiry dates.
- Physical damage to equipment and mounting brackets.

Emergency equipment should be serviced and maintained in accordance with the manufacturer's instructions and applicable safety regulations.

Day Skipper's Tip:
Know your position, know how to communicate, and know how to raise the alarm. Electronics make this easier—but the skipper must still be prepared to navigate and respond if the electronics fail.

Module 11 WIND

11.1 Key Objectives

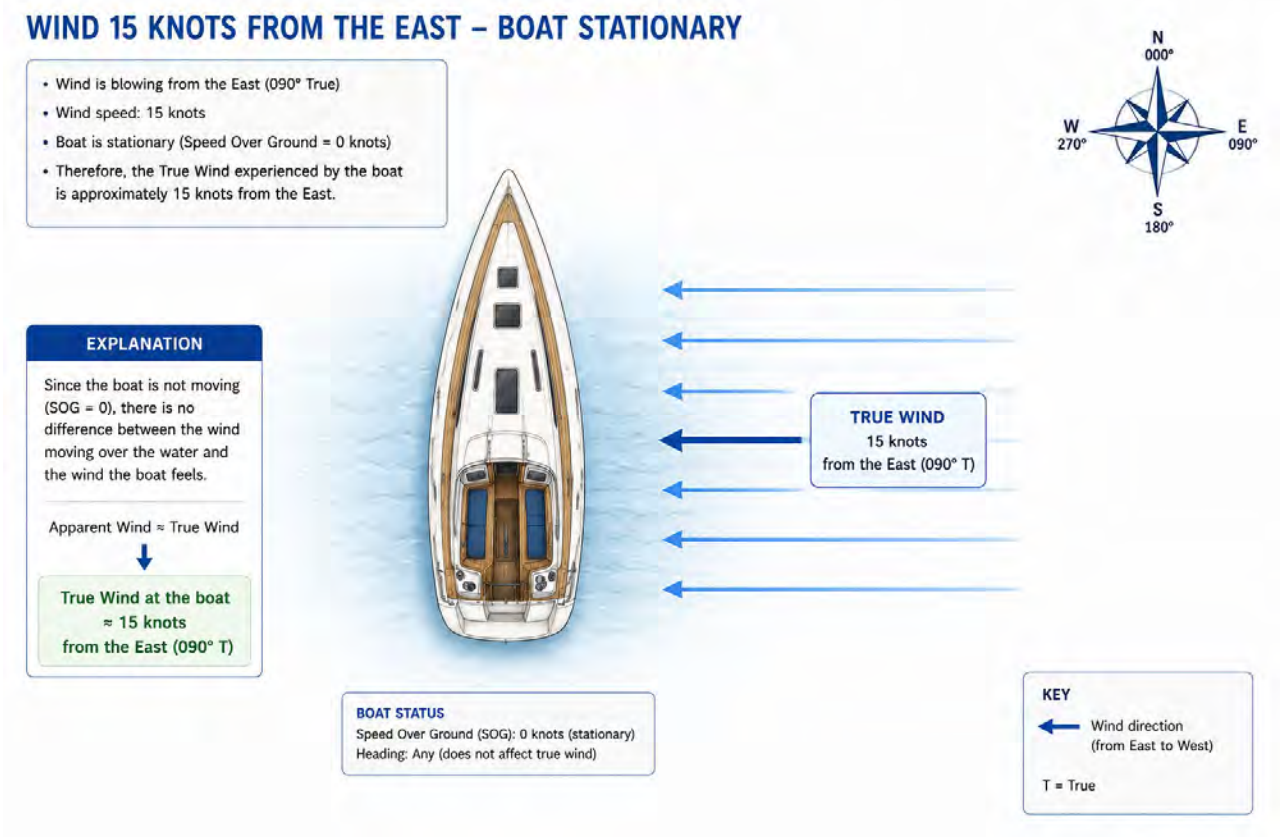
THE OBJECTIVE OF THIS MODULE IS TO UNDERSTAND WIND, TRUE WIND & APPARENT WIND, HOW WIND AFFECTS SAILING AND WHY IT MATTERS.

Wind is the engine of a sailing boat, but it is also the least constant thing on the water. This chapter covers what the wind actually is from the boat's point of view (true vs apparent), how the shape of the land, buildings and clouds change it, how to read shifts as headers and lifts, and the language and maneuvers, tacks, jibes, and the points of sail in between that you use to work with it.

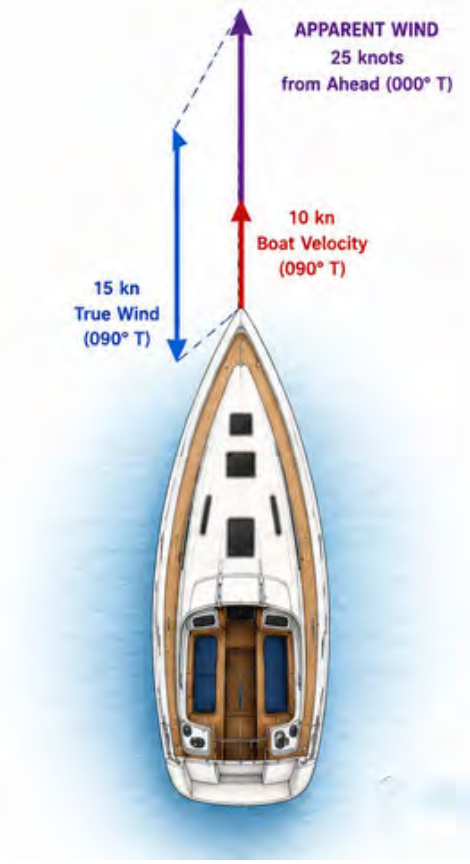
11.2 True Wind and Apparent Wind

True Wind

True wind is the actual movement of the air relative to the surface of the water. For example, if the wind is blowing at 15 knots from the east while the boat is stationary, the true wind experienced by the boat is approximately 15 knots from the east.



Apparent Wind



Once the boat begins to move, its own movement creates an additional airflow over the boat. This combines with the true wind to produce the apparent wind.

A simple way to understand this is to imagine riding a bicycle on a calm day. There may be no actual wind, but as you ride forward you feel air moving toward your face. This is created by your own movement through the air.

The same principle applies to a sailing boat.

The apparent wind is therefore determined by:

True Wind + Boat's Motion = Apparent Wind

The boat's movement always produces an airflow from directly ahead of the boat. How this combines with the true wind depends on the boat's course and speed.

Apparent Wind When Sailing Upwind

When sailing close-hauled or on a reach, the boat is moving partly toward the direction from which the true wind is coming.

The boat's forward movement therefore adds to the wind experienced on board. The apparent wind becomes:

- Stronger than the true wind.
- Further forward than the true wind direction.

This is why a boat sailing upwind can feel as though it is experiencing considerably more wind than the wind speed reported in a forecast.

For example, if the true wind is 15 knots and the boat is sailing at 6 knots toward the wind, the apparent wind may be significantly stronger than 15 knots.

Apparent Wind When Sailing Downwind

When sailing on a broad reach or run, the boat is moving in roughly the same direction as the wind.

The boat's motion therefore reduces the wind experienced on board. The apparent wind becomes:

- Weaker than the true wind.
- Further aft than the true wind direction.

This explains why sailing downwind can sometimes feel surprisingly calm even when the true wind is quite strong.

A yacht travelling quickly downwind can effectively "run away" from some of the wind.

Why Apparent Wind Matters

Sails are trimmed according to the apparent wind, not simply the wind shown in a weather forecast.

As the boat changes speed or changes course, the apparent wind changes. This means that the sails may need to be adjusted even though the true wind has remained unchanged.

For example:

- **Boat accelerates upwind:** apparent wind generally becomes stronger and moves forward.
- **Boat slows down:** apparent wind generally becomes weaker and moves aft toward the true wind.
- **Boat bears away:** apparent wind generally moves aft.
- **Boat heads up:** apparent wind generally moves forward.

This is one reason why good sail trim requires the skipper to continuously observe the wind indicator, telltales, sail shape and boat performance.

Day Skipper's Tip:
The wind forecast tells you about the true wind; your sails respond to the apparent wind. Always trim the sails according to what the boat is actually experiencing.

A Simple Rule to Remember

Think of apparent wind as the combination of the wind that is already blowing and the wind created by the boat moving through the air.

When sailing toward the wind, the two effects combine and the apparent wind becomes stronger.

When sailing away from the wind, the boat's movement reduces the wind you feel.

Understanding apparent wind is fundamental to learning points of sail, sail trim, tacking, gybing and boat speed.

Apparent Wind = True Wind + Wind of the Boat's Own Motion



11.3 Wind as a Variable

A weather forecast provides an indication of the general wind speed and direction, but the wind experienced by a boat can be very different from the forecast.

As wind moves across the surface of the sea and over land, buildings, cliffs, islands and other obstructions, its speed and direction can change significantly.

A Day Skipper should therefore learn to anticipate areas where the wind may become stronger, weaker or more turbulent.

Geography

Headlands and Points

As wind approaches and passes around a headland or point of land, the available space for the airflow can become restricted. This can accelerate the wind and cause it to change direction as it passes around the land.

A skipper should therefore expect stronger gusts, and wind shifts when sailing close to a headland.

High Ground and Cliffs

High ground and cliffs can create areas of reduced wind, commonly known as wind shadows, on the sheltered or leeward side.

The wind may be light or almost absent close under the land, while stronger and more turbulent air can spill over or around the higher ground.

This can produce sudden gusts, lulls and changes in wind direction, particularly near steep cliffs or mountainous terrain.

Valleys, Gaps and River Mouths

Valleys, gaps between hills and river mouths can act as natural wind funnels.

When air is forced through a restricted opening, the wind can increase in speed and may also be directed along the valley or opening rather than following the general offshore wind direction.

This effect can be particularly noticeable when approaching the coast from offshore.

Islands

An island can create a wind shadow on its leeward side. Depending on the island's size, height and the strength of the wind, this area of reduced wind can extend a considerable distance downwind.

As the boat moves out of the wind shadow, the skipper may experience a sudden increase in wind strength.

Day Skipper's Tip — Watch the Land
Before passing close to a headland, cliff or island, consider what the land will do to the wind. The wind you experience may be very different from the wind reported offshore.

Buildings and Harbours

Wind is affected not only by natural features but also by structures built along the shoreline.

Harbour Walls and Buildings

Harbour walls, waterfront buildings and other structures can interrupt and redirect the airflow.

Close to a marina or harbor entrance, the skipper may encounter:

- Sudden wind shifts.
- Stronger gusts.
- Areas of very light wind.
- Turbulent or disturbed airflow.
- Wind coming from a different direction from that experienced offshore.

Moored vessels and other boats can also contribute to local wind disturbance.

Gaps and Breakwaters

Gaps between buildings, harbor walls or breakwaters can act like natural valleys.

As the wind is forced through the restricted opening, it can accelerate and become more concentrated. This can result in a stronger wind inside the harbor than might be expected from the general offshore conditions.

This is particularly important when entering or leaving a marina, where the skipper may suddenly encounter a gust or change of direction while maneuvering at low speed.

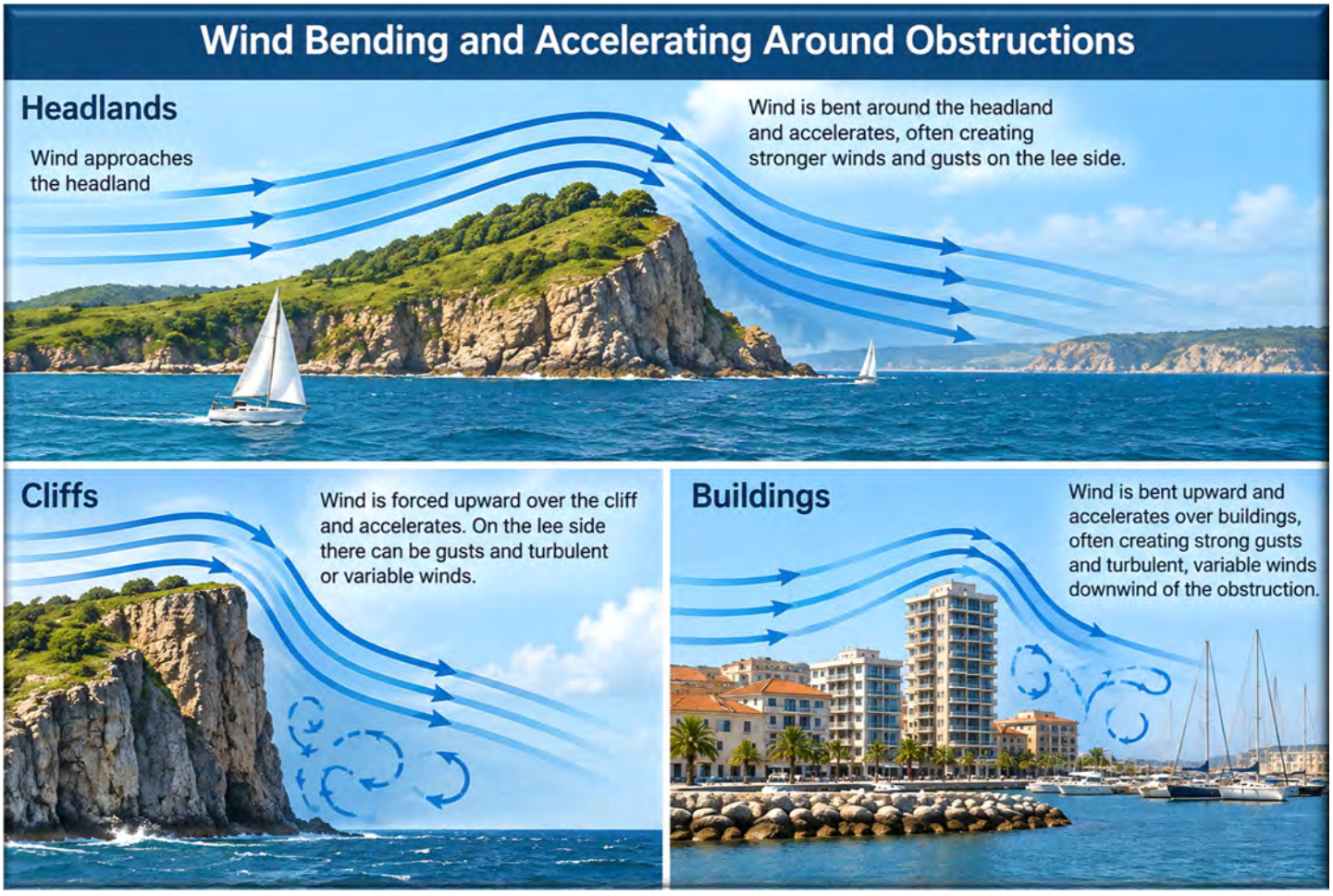


FIGURE 45 - WIND BENDS AND ACCELERATES AROUND HEADLANDS, CLIFFS AND BUILDINGS; EXPECT SHIFTS AND GUSTS NEAR ANY OBSTRUCTION.

Skipper's Tip — Approaching Harbour

Expect the wind to change as you enter a harbor. Keep your speed under control, allow room for a sudden gust, and avoid making your final approach based solely on the wind conditions experienced outside the harbor.

Cloud Formations

- Building cumulus cloud (growing, cauliflower-topped cloud) is often associated with increasing wind and gusts as the day heats up.
- A gust or shift frequently arrives just ahead of, or beneath, a cumulus cloud passing overhead, as air is drawn up into the cloud and cooler air spills back down.
- Dark, tall cloud with an anvil top (cumulonimbus) signals a squall — be ready for a sudden, significant increase in wind speed together with a marked shift, often followed by rain and just as sudden a drop afterwards.
- Watching the sky, not just the instruments, gives useful early warning of a change on the way.

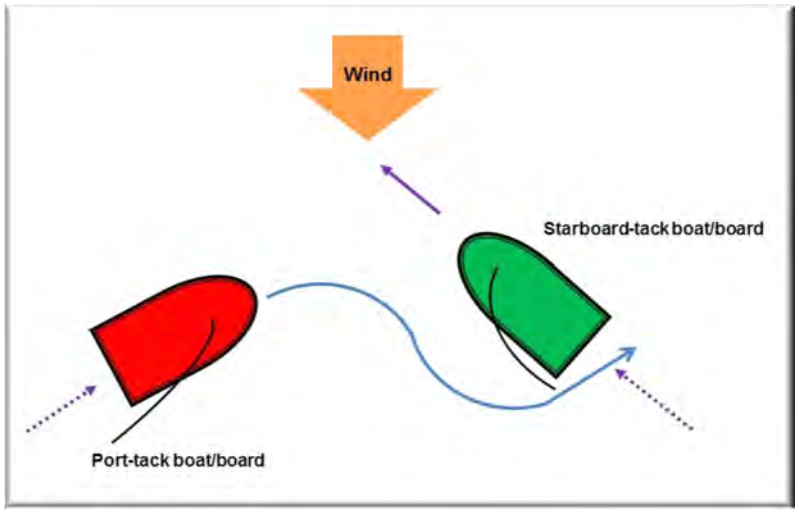
11.4 Port and Starboard Tack

Which 'tack' a boat is on is decided by which side the wind is blowing onto, not by the boat's heading or compass course.

Starboard tack — the wind is blowing over the starboard (right-hand) side of the boat first; the boom is normally out to port. A boat on starboard tack holds right of way over a boat on port tack.

Port tack — the wind is blowing over the port (left-hand) side of the boat first; the boom is normally out too starboard. A boat on port tack must keep clear of a boat on starboard tack.

The quickest way to check which tack you are on is to look at which side the wind is striking and which side the boom is out — if in doubt, look up at the burgee or masthead indicator, or feel the wind on your face.



11.5 Points of Sail

The 'points of sail' describe the boat's heading relative to the true wind, moving from directly into it to directly away from it. Each point of sail calls for a different sail trim.

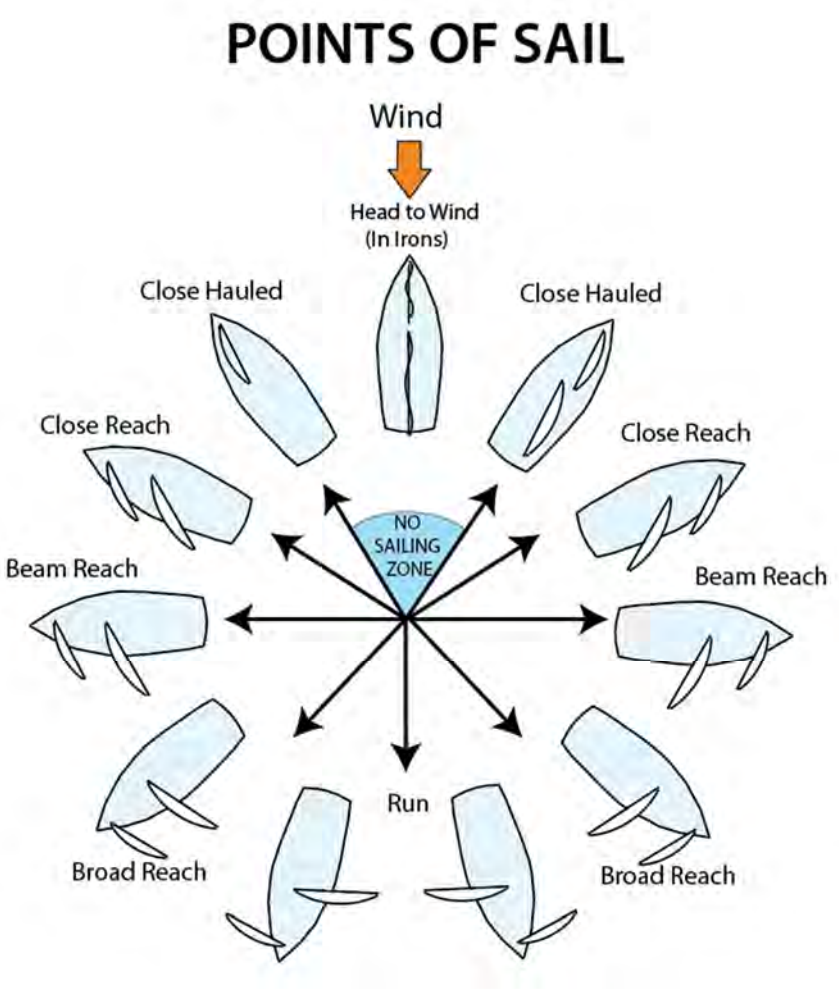


FIGURE 46 - THE POINTS OF SAIL, SHOWN FOR BOTH STARBOARD AND PORT TACK

Head To Wind/No-Go Zone (In Irons) — roughly the 45° either side of dead into the wind. No sail can generate drive here — the sails simply luff. A boat caught head to wind with no way on is 'in irons.'

Close-Hauled (Beating) — sailing as close to the wind as the boat can point, typically 40–50° off the true wind. Sails are trimmed in hard, close to the center=line, and kept just on the point of luffing for maximum pointing ability.

Close Reach — wind forward of the beam, sails eased somewhat from close-hauled. Faster and slightly more forgiving to steer than close-hauled.

Beam Reach — wind directly over the side (roughly 90° to the boat), sails eased to around the mid-point of their travel. Often the fastest and easiest point of sail to trim well.

Broad Reach — wind aft of the beam, sails eased well out. A comfortable, fast point of sail; an asymmetric spinnaker comes into its own here.

Run (Dead Downwind) — wind directly astern, sails eased right out, boom close to perpendicular with the boat. Steering is more sensitive to inattention here, and there is a real risk of an accidental jibe if the wind gets round behind the mainsail.

11.6 Tacking

Tacking turns the bow of the boat through the wind, so that the wind changes from one side of the boat to the other while sailing upwind (close-hauled or close reaching).

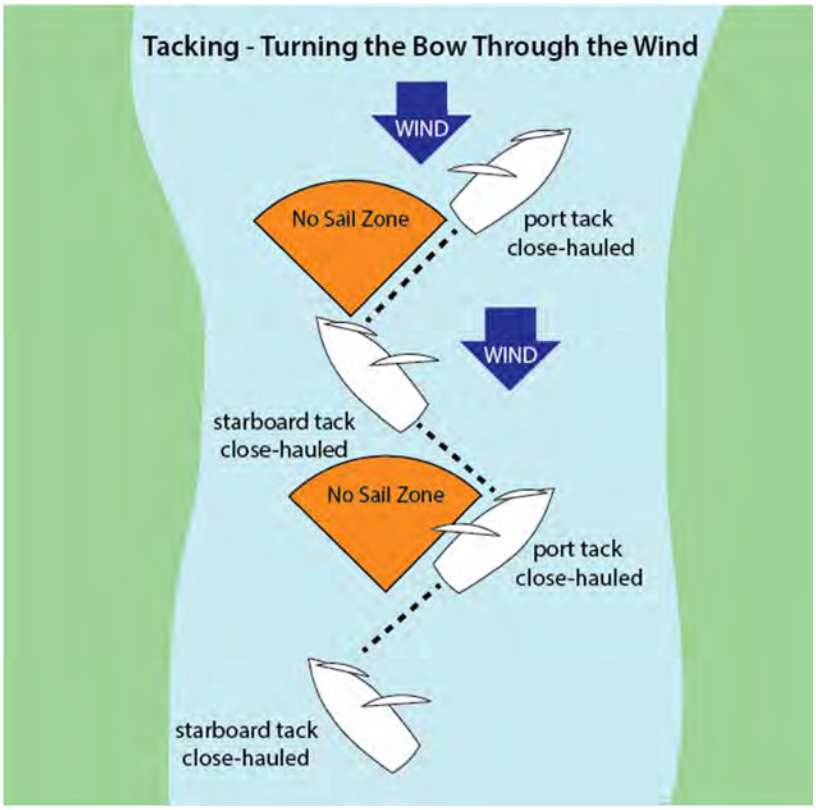


FIGURE 47 - TACKING: THE BOW SWINGS THROUGH HEAD-TO-WIND FROM ONE CLOSE-HAULED COURSE TO THE OTHER.

Tacking Commands

- **Helm: "Ready to tack?"**— asking the crew to confirm they are ready at the sheets and winches.
- **Crew: "Ready"** — confirming sheets are clear to run and the new working sheet is ready to be taken in.
- **Helm: "Tacking now"** — said as the helm pushes the tiller to leeward (or turns the wheel to windward), starting the turn through the wind.

Tacking Sequence

- The helm turns the boat smoothly through the wind, keeping enough speed to carry the bow through the no-go zone.
- As the headsail begins to back, the old sheet is released, and the new sheet is hauled in on the opposite side as the clew crosses the foredeck.
- The mainsail crosses over on its own (or is helped across) as the boat passes through head-to-wind; on a boat with a self-tacking jib, the headsail looks after itself and only the mainsail needs attention.
- The boat settles on the new close-hauled course, and sails are given a final trim.

11.7 Jibing (Gybing)

Jibing turns the stern of the boat through the wind, changing the wind from one side to the other while sailing downwind (a run or a broad reach). Because the mainsail and boom can swing across quickly and with real force, a jibe is always done under control.

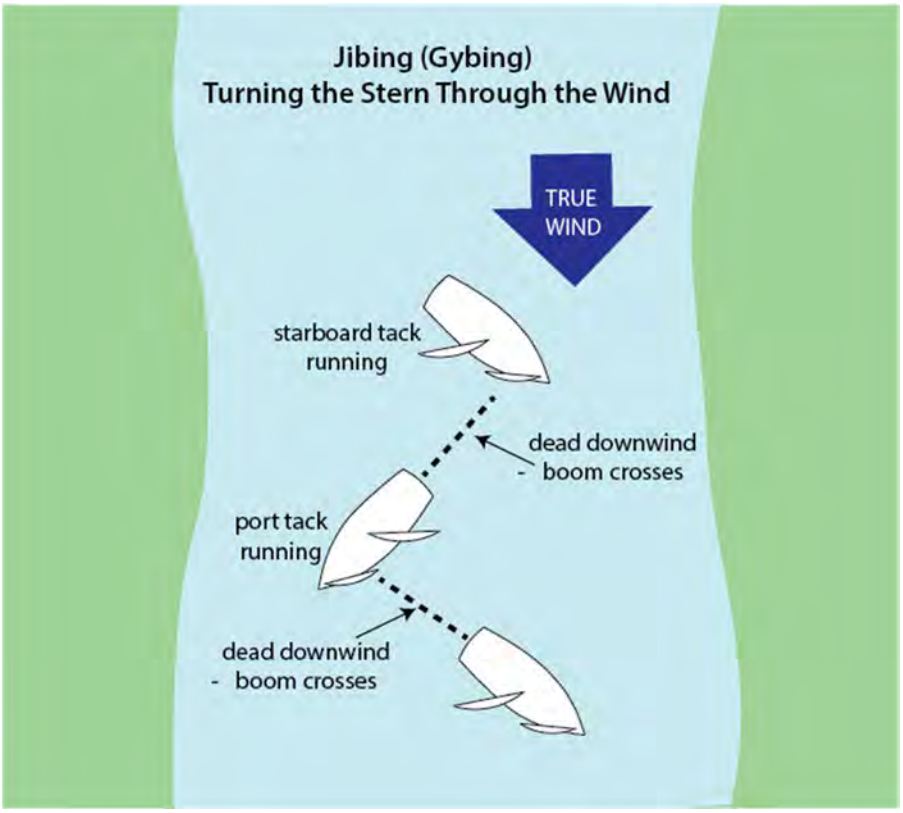


FIGURE 48 - JIBING: THE STERN SWINGS THROUGH DEAD DOWNWIND AS THE BOOM CROSSES FROM ONE SIDE TO THE OTHER.

The Commands

- Helm: "Ready to jibe?" (or "Stand by to jibe") — checking the crew are ready and clear of the boom's path.
- Crew: "Ready" — confirming the mainsheet is ready to be hauled in and the new course is clear.
- Helm: "Jibing now" (or "Jibe-oh") — said as the boom is hauled amidships and the stern is turned through the wind.

The Sequence

- Before the stern passes through dead downwind, the mainsheet is hauled in hard to bring the boom close to the center=line, controlling its swing.
- The helm turns the stern through the wind; as the boom crosses, it is eased back out on the new leeward side in a controlled manner, not let go to run free.
- Headsail sheets are swapped to the new leeward side, in the same way as when tacking.
- In stronger winds, an uncontrolled jibe — where the boom slams across unchecked — can damage the rig or injure crew, so easing the mainsheet in and back out under control (a 'controlled jibe') is the safe method at all times.

Module 12 SAFETY EQUIPENT

12.1 Key Objectives

THE OBJECTIVE OF THIS MODULE IS FOR ALL STUDENTS TO HAVE A THOROUGH UNDERSTANDING OF NECESSARY SAFETY EQUIPMENT AND THEIR IMPORTANCE.

Carrying the right safety equipment — and knowing how to use it — is what turns an emergency into an inconvenience. This chapter covers personal flotation, pyrotechnics, firefighting, life rafts, distress signaling, pumping out floodwater, and the drag devices used to ride out heavy weather, plus a few items often overlooked that round out a well-found boat's safety kit.

12.2 Lifejackets, Buoyancy Aids, and Classification Standards

The terms are often used loosely, but a lifejacket and a buoyancy aid are different pieces of equipment, built to different standards, for different purposes.

Lifejacket (PFD — Personal Flotation Device) — designed to **turn an unconscious wearer face-up** in the water and keep their airway clear, unsupported. Bulkier, with a rear collar and (on inflatable types) 150N or 275N of buoyancy.

Buoyancy aid — designed to **help a conscious, competent swimmer float and swim** more easily — low profile, less bulk, no collar, but will not reliably turn an unconscious person face-up. Suited to dinghy sailing, watersports and other activities close to help.



FIGURE 49 - VARIOUS TYPES OF BUOYANCY AIDS

Classification Standards

Several overlapping standards are in everyday use, and it helps to know which one you're looking at on a label:

ISO 12402 (EN standard) — the standard used across the UK and EU for recreational lifejackets and buoyancy aids, rated by buoyancy in newtons (N) — 50N, 100N, 150N and 275N. This is the number you'll see printed on a UK-bought lifejacket.

SOLAS (Safety of Life at Sea) — an International Maritime Organization convention setting equipment standards for commercial and passenger vessels, not recreational boats. A 'SOLAS lifejacket' is built to its own separate MED (Marine Equipment Directive) specification — very high buoyancy, standardised bright colour, whistle and light — and is what you'll find aboard ferries, liferafts, and commercial ships rather than on a typical cruising yacht.

USCG (United States Coast Guard) — the approval system used in the United States, classifying devices into Types I–V by intended use rather than by a single buoyancy number.

USCG Classification (United States)

Type I	**Offshore Life Jacket**	Highest buoyancy; turns most wearers face-up; for rough, remote water, slow rescue.
Type II	**Nearshore Vest**	Turns some wearers face-up; for calm inland water, quick rescue expected.
Type III	**Flotation Aid**	Most common; good for conscious wearer, activities; will not turn an unconscious wearer.
Type IV	**Throwable Device**	Cushion or ring, thrown to a person in the water — not worn.
Type V	**Special-Use Device**	Kayaking, waterskiing, or workvest — must be used per its label to count as approved.

The practical takeaway: SOLAS-grade equipment is a commercial/passenger-vessel requirement built to its own standard, ISO 12402 is what recreational sailors in the UK and EU will actually be buying and wearing, and USCG Types I–V is the equivalent framework used in the United States — none of the three scales map onto each other exactly, so check which standard applies in your waters.

12.3 First Aid Kit



A first aid kit should be appropriate for the size of the vessel, number of crew, type of operation and distance from medical assistance. A coastal day boat will generally require a less extensive kit than a vessel making longer offshore passages.

The kit should be kept in a clearly marked, dry and readily accessible location.

Typical contents may include:

- Adhesive plasters and wound dressings.
- Sterile gauze and absorbent dressings.
- Adhesive and medical tape.
- Antiseptic wipes or wound-cleaning solution.
- Triangular bandages.
- Roller and elastic bandages.
- Disposable gloves.
- Scissors and tweezers.
- Instant cold pack.
- Burn dressings or burn gel.
- Eye-wash solution.
- CPR face shield or breathing barrier.
- Foil emergency blanket.
- Pain-relief medication appropriate for the crew.
- Seasickness medication where appropriate.
- Thermometer.
- Safety pins.
- Waterproof notepad and pencil for recording treatment.

For coastal operations, where professional medical assistance can normally be reached relatively quickly, the emphasis is on treating common minor injuries and stabilizing a casualty until help is available.

For offshore operations, medical assistance may be many hours or even days away. The first aid equipment should therefore be more comprehensive, with additional wound-care materials, burns treatment, trauma supplies and other equipment appropriate to the voyage. Crew should also have a greater understanding of first aid and emergency medical procedures. The exact contents should be based on the vessel's operating area, voyage duration, crew and applicable regulations.

Day Skipper's Tip:
A first aid kit is only useful if you can find it and use it. Check the contents before each voyage, replace anything used or expired, and make sure at least one person aboard knows basic first aid and CPR.

12.4 Flares

Pyrotechnic flares remain a key backup to electronic distress alerting — visible without any receiving equipment and internationally recognized.

Handheld red flare — the standard close-range distress signal, day or night, burning for about a minute; used once a rescuer is likely to be within a few miles and able to see it.

Orange smoke signal — a daytime-only distress signal, producing dense orange smoke for about three minutes — most effective in light wind and to guide in a rescue helicopter or nearby vessel that has already been alerted.

Parachute rocket flare — fired up to around 300m altitude, burning as it descends on a small parachute — visible for many miles and the flare of choice for raising the alarm at longer range.

White handheld flare — not a distress signal — used to indicate your position to another vessel, for example to warn off a ship on a collision course at night.

Area	Suggested minimum flare pack
Inshore / coastal (day sailing, close to harbour)	4 red handheld, 4 orange smoke
Coastal (up to ~ 7 miles offshore)	6 red handheld, 2 orange smoke, 6 parachute rocket
Offshore / passage-making (beyond ~ 7 miles)	6 red handheld, 2 orange smoke, 6 parachute rocket



12.5 Fire Extinguishers

Different extinguishing agents suit different classes of fire, and using the wrong type can make things worse — water or foam on an electrical or fat fire, for instance, is dangerous.

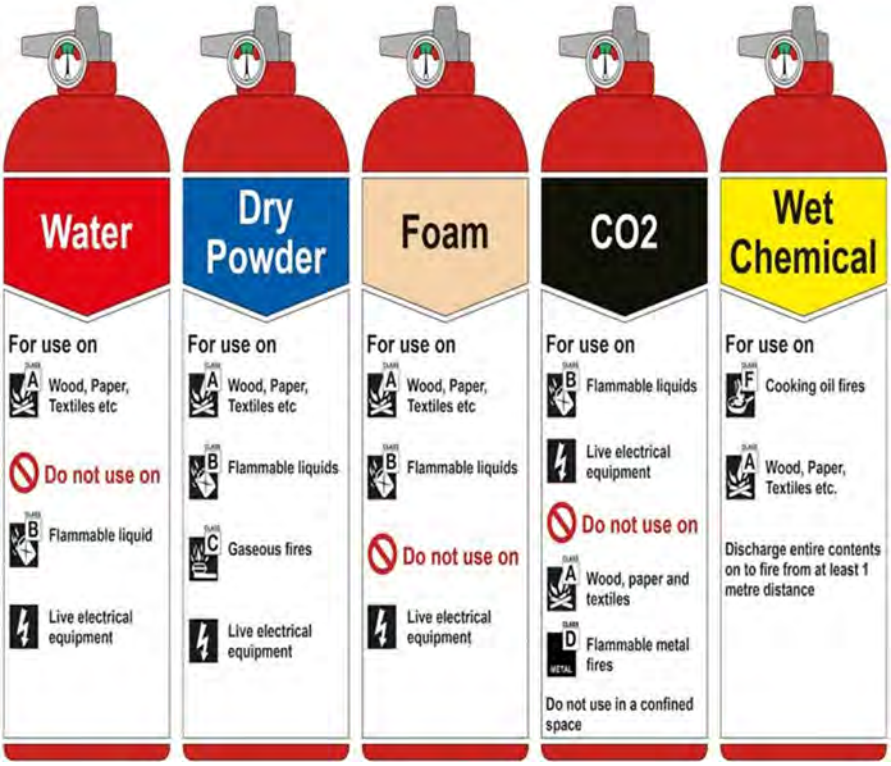


FIGURE 50 - COMMON EXTINGUISHER TYPES AND THE FIRE CLASSES EACH IS RATED FOR

Water (A) — good general-purpose extinguisher for Class A (solid combustibles). not for use on flammable liquid and live electrical equipment.

Dry powder (ABC) — versatile across Class A, B and gas (C) fires; knocks a fire down fast but the powder is messy, reduces visibility, and doesn't cool well, so re-ignition is possible.

Foam (AFFF) — good general-purpose extinguisher for Class A (solid combustibles) and Class B (flammable liquids) fires; not for use on live electrical equipment.

CO2 — displaces oxygen rather than cooling or coating, leaves no residue, and is safe to use on live electrical equipment — the right choice for an engine bay or nav station fire.

Wet chemical — specifically for Class F (cooking fat and oil) fires in the galley — other agents can cause a fat fire to flare up violently.

A well-found boat carries extinguishers sized and sited for the engine space, galley, and living accommodation, checked and serviced or replaced according to their service life.

12.6 Liferafts and Hydrostatic Release Units (HRU)

A liferaft is the last resort after abandoning ship — stepping up into a liferaft, not down, is the standard guidance, meaning it's only used once the yacht itself is no longer viable.



Valise liferaft
packed in a soft bag, stowed in a locker — lighter and cheaper, but must be manhandled to launch



Canister liferaft
packed in a rigid, weatherproof canister mounted on deck or in a dedicated cradle — ready to launch quickly and suited to mounting with a Hydrostatic Release Unit (HRU)



Hydrostatic Release Unit (HRU)

a pressure-sensitive fitting that automatically releases and inflates a canister liferaft if the boat sinks to roughly 4 meters depth without anyone having launched it manually — a critical backup if the crew cannot reach the raft.

Liferaft contents are set by their servicing pack (coastal vs offshore packs differ), but typically include:

- Sea anchor (drogue) already attached and deployed automatically on inflation, to reduce drift and stop the raft capsizing
- Hand or foot-operated bailer and sponge

- Paddles, a repair kit and a topping-up pump for the buoyancy tubes
- Flares, and often a torch
- First aid kit and anti-seasickness tablets
- Drinking water (and sometimes a solar still or hand-operated water-maker on offshore packs)
- A canopy providing shelter from sun, wind and spray, usually with a rainwater collection channel

12.7 Grab Bags

A grab bag is a single, ready-to-go bag of essentials kept near the companionway, taken along when abandoning ship into the liferaft or dinghy — everything in it should already be there, not searched for in an emergency.

Many of these items overlap with the liferaft's own equipment; the grab bag's job is to add communication and navigation capability (VHF, EPIRB, papers) that the raft itself doesn't carry, plus a backup of key survival items in case the raft's pack is short on something.



12.8 Distress Signals

- Flares are only one category of recognized distress signal. The COLREGs (International Regulations for Preventing Collisions at Sea) list a full set of signals, to be used only when in genuine distress. A 'Mayday' call on VHF Channel 16 (or via DSC distress alert) — the primary modern distress signal for any vessel with radio fitted
- Flag signal 'N' over 'C' (International Code of Signals)
- A square flag with a ball, or anything resembling a ball, above or below it
- Continuous sounding of any fog-signaling apparatus
- Slowly and repeatedly raising and lowering outstretched arms
- An ensign flown upside down (not an official COLREGs signal, but widely recognised)

Alongside these, orange smoke, red flares (any type), and rocket parachute flares are all listed distress signals in their own right — the full COLREGs Annex IV list is longer, but these are the signals a Day Skipper is most likely to use or encounter.



FIGURE 51 - THE FULL 16 DISTRESS SIGNALS.

12.9 Bilge Pumps and Wooden Bungs

Dealing with unwanted water inside the boat — whether from a leak, a following sea, or a failed fitting — depends on pumping it out faster than it comes in, and on being able to plug the source

Manual (diaphragm) bilge pump — hand-operated, so it works even with the batteries flat or the electrics dead — every boat should have one that's accessible and usable from a safe position, ideally without lifting floorboards in a seaway.

Electric submersible bilge pump — mounted in the bilge with an automatic float switch, offering much higher pumping capacity for less effort — but only while the battery holds out, so it's a supplement to, not a replacement for, a manual pump.

Wooden bung (softwood tapered plug) — kept on a line near every seacock and through-hull fitting, so it can be driven in immediately if the fitting or its hose fails — a simple, low-tech fix that has saved many boats.



FIGURE 52 - ELECTRIC BILGE PUMP AND FLOAT SWITCH AND WOODEN BUNGS

12.10 Life-Ring / MOB Recovery Ring

A Life-ring, or MOB recovery ring, is a floating recovery device attached to a long floating line. It is designed to assist in recovering a person who has fallen overboard, particularly when the casualty is unable to climb back aboard without assistance.

The ring is normally deployed from the vessel and allowed to trail behind. The person in the water can be guided or assisted into the ring, which is then used to support and secure the casualty alongside the vessel while preparations are made to bring them aboard.



FIGURE 53 - SOLAS LIFE RING

The ring should be highly visible and fitted with a light, allowing it to be located more easily in darkness, poor visibility or rough conditions. The light should be checked regularly and maintained in accordance with the manufacturer's recommendations.

It can be particularly valuable on a short-handed vessel, where there may not be enough crew to easily lift or support an exhausted or injured casualty.

12.11 Additional Safety Equipment

A few further items round out a well-equipped boat's safety kit, and are worth knowing even though they weren't in the original list:



Safety harness and tether, with jackstays — worn and clipped to fixed jackstay webbing running along the deck, keeping crew attached to the boat when moving forward or working on deck in rough conditions — the primary defense against a man overboard in the first place.



Danbuoy — a tall, high-visibility pole and flag with a weighted base and often a light, thrown immediately when someone goes overboard to mark the spot and give the person in the water something to swim to.



Horseshoe buoy — a buoyant horseshoe-shaped ring, usually stowed at the stern with a light and a small drogue attached, thrown to a person in the water to give them immediate flotation.



Lifesling / MOB recovery sling — a floating sling on a long floating line, towed to the casualty and used to help hoist them back aboard — particularly valuable for a short-handed crew recovering a person who cannot help themselves.

Toolkit



A basic toolkit should be carried aboard every vessel and should contain the essential tools needed to deal with **minor repairs, adjustments and breakdowns** while underway.

The exact contents will depend on the vessel, but a useful marine toolkit should normally include:

- **Adjustable spanners and combination spanners** — for nuts, bolts and fittings.
- **Socket set and ratchet** — useful for engine and mechanical repairs.
- **Screwdrivers** — flat and Phillips/Pozi-drive types.
- **Pliers** — including long-nose and locking pliers.
- **Side cutters** — for cutting wire, cable ties and damaged lines.
- **Allen keys** — for equipment and mechanical fittings.
- **Hammer or mallet** — for general maintenance and freeing stuck fittings.
- **Utility knife** — for cutting rope, hose and packaging.
- **Electrical test meter** — for checking batteries, wiring and electrical faults.
- **Electrical tape and heat-shrink tubing** — for temporary electrical repairs.
- **Spare fuses** — matching the ratings used on the vessel.
- **Cable ties and spare wire** — useful for securing and making temporary repairs.
- **Hose clamps** — useful for securing hoses and dealing with minor hose problems.
- **Duct tape** — useful for temporary repairs and securing damaged items.
- **Spare nuts, bolts, washers and screws** — common sizes used on the vessel.
- **Work gloves and protective equipment** — to protect the hands during repairs.

Why a Toolkit Is Important

A minor failure at sea can quickly become a serious problem if the skipper cannot make a simple repair. A loose fitting, electrical connection, hose clamp or mechanical component may be repairable with basic tools.

Day Skipper's Tip:
Carry the tools needed for the boat you are actually operating. Before departure, check the engine, electrical system and deck equipment and make sure you have the basic tools required to deal with

the most likely minor failures. A good skipper should know where the toolkit is kept, and which tools are available before leaving the dock.

12.12 Drogues and Sea Anchors

Both drogues and sea anchors are drag devices deployed from a vessel on a warp or rode in heavy weather. Although they may look similar, they perform different jobs and are normally deployed from different parts of the vessel.

Drogue

A drogue is normally streamed from the stern of the vessel. Its purpose is to create drag and slow the vessel down, helping to reduce the risk of surfing uncontrollably down the face of waves and reducing the likelihood of a broach. A drogue can also help keep the stern facing generally toward the approaching seas, depending on the vessel and conditions.

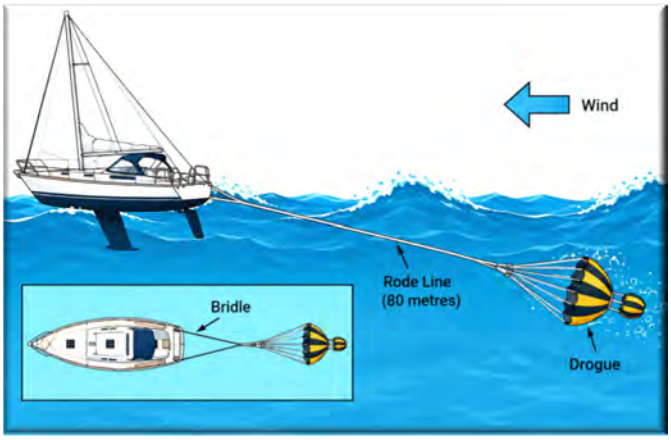


FIGURE 54 - DROGUE

Sea Anchor

A sea anchor is normally deployed from the bow. Rather than simply slowing the vessel, its purpose is to create sufficient drag to hold the bow toward the wind and seas and reduce the vessel's drift. A sea anchor is particularly useful when the skipper needs to reduce the vessel's movement and maintain a more controlled attitude in severe weather.

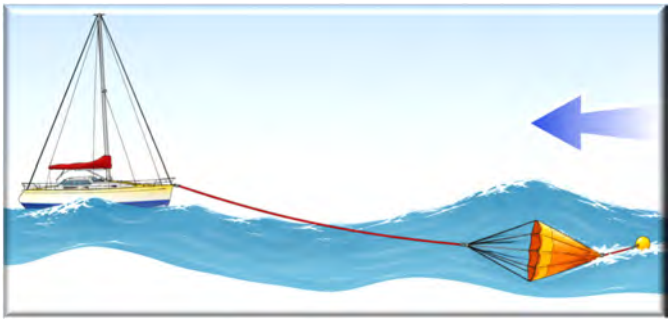


FIGURE 55 - SEA ANCHOR

The Simple Difference

Device	Normally Deployed From	Main Purpose
Drogue	Stern	Slow the vessel and control its speed
Sea anchor	Bow	Hold the bow toward the seas and reduce drift

Day Skipper's Tip:

Drogue = slowdown from the stern. Sea anchor = hold the bow into the weather.

The correct choice depends on the vessel, sea conditions and the situation.

Both devices should be rigged and deployed only in accordance with the manufacturer's instructions and a properly prepared heavy-weather plan.

Module 13 MAN-OVERBOARD PROCEDURES

13.1 Key Objectives

THE KEY OBJECTIVES OF THIS MODULE ARE TO UNDERSTAND THE PROCEDURES TO BE UNDERTAKEN TO RETRIEVE A MAN-OVERBOARD. THIS MODULE IS DESIGNED TO BE A "PRACTICAL" MODULE REQUIRING THE ACTUAL PRACTICE OF THE PROCEDURES OUTLINED IN THIS THEORY MODULE.

13.2 Man Overboard (person overboard) Emergency

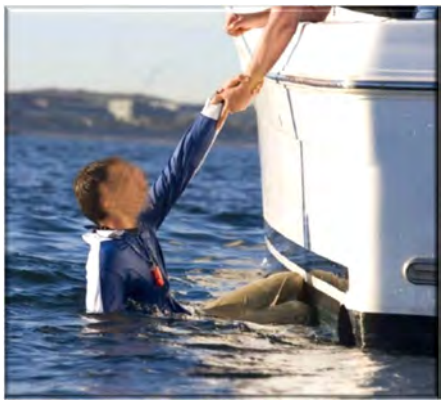
Over 40% of all boating fatalities are the result of people falling overboard. Getting struck by the boom is the number one cause of man overboard accidents on sailboats.

All boats should be prepared with the knowledge and equipment to rescue someone who has fallen overboard.

- Ensure that the emergency equipment is properly maintained and readily accessible.
- Practice overboard rescue techniques with your passengers (using a bucket) and make them aware of their responsibilities in this event.
- Practice maneuvering your pleasure craft to properly position your boat so that you're ready to perform an overboard rescue.
- Be aware of the water surface and weather conditions as well as condition of the person being rescued.

13.3 Rescuing a Person Overboard - General

- Shout "man overboard" reduce speed and prepare to turn around
- Assign another person onboard to keep a lookout for the person overboard and continuously point to their location in the water.
- Immediately throw a bright colored buoyant item overboard (such as a cockpit cushion or lifejacket) to increase their visibility in the water and mark their approximate position.
- In limited visibility, look at the compass for the course you were steering when the person fell overboard



13.4 Man Overboard - Sailboats

Despite what other nautical training associations may tell you, there is no one “correct” procedure for rescuing a man overboard while under sail or power.

The following need to be taken into consideration when deciding which procedure is best for you and your crew:

1) Is the person in the water wearing a life jacket?
2) Is the boat flying a spinnaker?
3) What are the weather conditions?
4) Is it daytime or nighttime?
5) How big are the seas?
6) What is the visibility like?
7) What is the water temperature?
8) How many crew are on deck?
9) How experienced are they?
10) Does the sailboat have an auxiliary motor?
11) Has the person been knocked unconscious?
12) Are they wearing survival clothing?
13) How heavy is the victim?

The reasons for this are as follows:

1) If the person is wearing a lifejacket, then they will be visible from a distance and less likely to panic, if they are not, reaction time will need to be a lot faster.

2) If the boat is flying a spinnaker, it is imperative that this sail is taken down before anything else happens. This is a very powerful sail and can cause a lot of damage if gybed and it will be very difficult to get back to the person in the water in a timely fashion without removing this sail first.

3) If the weather conditions are reasonably calm it will be much easier to turn the boat around and retrieve the victim, not so in rough conditions.

4) If it is daytime, visibility will be much better than nighttime and easier to spot the victim in the water, if nighttime, reaction time will need to be much faster.

5) If there are big seas with high waves, it is far easier to lose sight of the victim.

6) If visibility is restricted due to fog or heavy rain, it will be much harder to keep the victim in sight.

7) If the water temperature is high (such as Caribbean or Mediterranean), the victim can survive afloat for days. If the water is cold, you will have far less time to react.

8) If you are alone on deck, you will need to get the crew topside immediately to help you.

9) If the crew are experienced and have practiced man overboard procedures, they will be far more likely to respond positively and without delay.

10) If the sailboat has an auxiliary engine, it should be started immediately so the boat can be maneuvered without the need for sails.

11) If the person has been knocked unconscious, it may be necessary for another crew member to grab a life ring and jump overboard to assist the unconscious person. This will of course depend on water temperature, sea state, visibility, whether they are wearing a lifejacket etc.

12) If the victim is wearing survival clothing, they are less likely to panic and can survive longer in the water.

13) If the victim is an adult and there are only children on board, hauling a wet person back on board can be a very difficult task. If close to shore, it is possible to get the victim to hold on to the side of the boat while you motor into shallow water where the person can stand or get back on board under their own strength.

Getting the victim back onto the deck is another issue, some modern sailboats have a boarding ladder on the “sugar scoop” at the stern, which is easy in light weather, however in a heavy swell this could be dangerous as the boat may rise and fall a substantial distance. Winches can be used to recover a man overboard on either a sailboat



MAN OVERBOARD SAIL – APPOINT LOOKOUT
PHOTO BY JOHN ROUSMANIERE & PHIL COWLEY



MAN OVERBOARD SAIL – APPROACHING VICTIM
PHOTO BY JOHN ROUSMANIERE & PHIL COWLEY



MAN OVERBOARD SAIL - TOSS LIFE SAVING FLOAT OBJECT
PHOTO BY JOHN ROUSMANIERE & PHIL COWLEY



MAN OVERBOARD SAIL - RETRIEVE VICTIM USING LIFESLING
PHOTO BY JOHN ROUSMANIERE & PHIL COWLEY

Module 14 ROPE (LINE) AND KNOTS

14.1 Key Objectives

THE OBJECTIVE OF THIS MODULE IS TO ENSURE THAT STUDENTS CAN DEMONSTRATE THE ABILITY TO TIE BASIC KNOTS AND KNOW THE CORRECT PROCEDURE FOR SECURING A BOAT TO A DOCK BY TYING LINES TO CLEATS.

Every line aboard — halyard, sheet, mooring warp, anchor rode — is a rope (generally referred to as "Line") chosen for the job, and every job on deck relies on a small set of knots tied correctly and quickly. This chapter covers the modern rope materials in everyday use and what each suits, followed by the core sailing knots every Day Skipper needs: the stopper knot, reef knot, clove hitch, round turn and two half hitches, bowline, sheet bend, and cleat hitch — plus why coiling a line properly matters as much as tying it.

14.2 Rope Materials

Modern rope is made from synthetic fibers, each with a different balance of stretch, strength, weight and durability. Choosing the right material for the job matters as much as choosing the right knot.



Nylon (Polyamide) — high stretch (20-30% at high loads) and very high strength, making it the standard choice for anchor warps and mooring lines, where that elasticity absorbs shock loads from waves and snubbing rather than transmitting them straight to the cleat or bow fitting. It absorbs some water and loses a little strength wet.

Polyester (Dacron) — low stretch, high strength, and excellent resistance to UV and chafe — the all-round workhorse for halyards, sheets, and any running rigging where you want the load held firmly without the sail shape changing as the line stretches. 'Dacron' is simply a trade name for polyester rope.

Polypropylene — the only common rope fiber that floats, making it useful for waterski or dinghy tow lines and general utility use, but it has poor UV resistance (degrading and going brittle in sunlight over time), stretches more than polyester, and is not strong enough for critical loads like halyards or anchor warps.

Dyneema / Spectra (UHMWPE) — an ultra-high-molecular-weight polyethylene fibre with extremely low stretch (1-3%), and a strength-to-weight ratio that beats steel — a much thinner Dyneema line can replace a much thicker, heavier conventional line at the same working load. Increasingly used for halyards, control lines and even standing rigging on performance and modern cruising boats, though it's more expensive and, being very slippery, needs specific knots or splices to hold reliably.

Kevlar / Aramid — another very high-strength, low-stretch fibre, historically used for racing halyards and backstays before Dyneema became widely available. It holds up less well to repeated flexing and UV exposure, becoming brittle over time, which has seen it largely superseded by Dyneema for most rope applications — though it remains common in other marine uses like sailcloth reinforcement.

Beyond material, construction matters too: three-strand (laid) rope is cheap, easy to splice, and stretchy — traditional for anchor and mooring warps — while braided or plaited rope (a woven core and cover, or a hollow plait) is smoother to handle, doesn't kink, and is standard for halyards and sheets.

14.3 The Stopper Knot: Figure-8

The simplest and most-used knot on any boat is a stopper knot, tied in the end of a line to stop it running out through a block, fairlead, or your hand — every sheet should have one in its working end.

Figure-8 (stopper) knot — tied by forming a loop, passing the working end around the standing part, and back through the loop to make the shape of the numeral 8. It is bulkier than a simple overhand knot, which makes it easier to untie after loading, and just as importantly, hard to pull through a block by mistake — the main reason it's preferred over an overhand knot at sea.

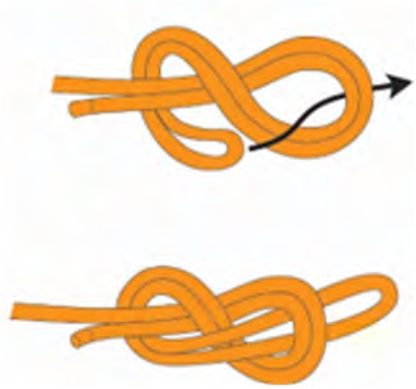


FIGURE 56 - STOPPER KNOT: FIGURE 8

14.4 Reef Knot (Square Knot)



FIGURE 57 - REEF KNOT (SQUARE KNOT)

A flat, symmetric knot for joining two ends of similar-sized rope for a temporary, non-critical purpose — classically for tying in a reef (hence the name) or securing a sail cover or bundle of line. Tied as 'left over right and under, then right over left and under' (or vice versa, so long as both tucks go the same way) — get this wrong and you tie a granny knot instead, which slips and binds unpredictably.

Important limitation: a reef knot is not reliable for joining two ropes under real load and can capsize and slip if the two ropes are of different sizes or materials — for that, a sheet bend is the right choice (see below).

14.5 Clove Hitch

A quick hitch for securing a line to a rail, post, or fender line to a stanchion — fast Tied by taking a turn around the post, crossing over the standing part, and taking a second turn, tucking the working end under itself. It grips well under a steady load pulling in one direction but can work loose if the load comes and goes or pulls from changing angles — for that reason it's often backed up with a half hitch, or avoided in favor of a round turn and two half hitches for anything left unattended.

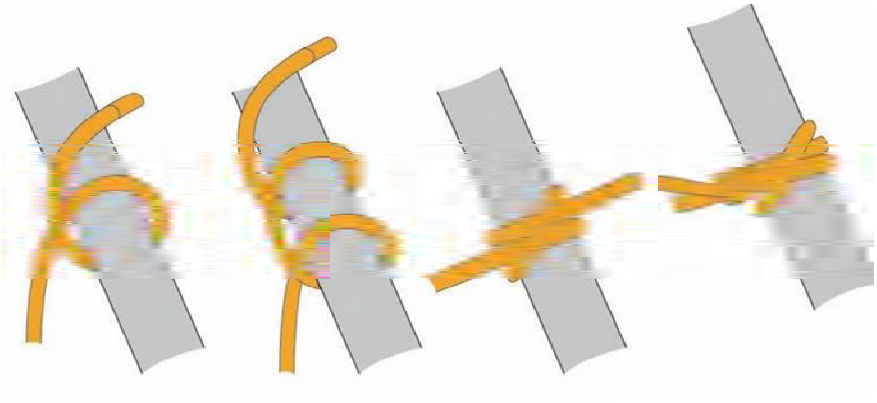


FIGURE 58 - CLOVE HITCH

14.6 Round Turn and Two Half Hitches

A secure, easy-to-untie hitch for making a line fast to a post, ring, or rail — one of the most useful and trustworthy hitches aboard, and the standard choice for a mooring line to a ring or a fender line to a rail. The round turn — a full turn (or two) around the post or ring — takes the strain and lets you control a loaded line by hand before it's made off, since the friction of



FIGURE 59 - ROUND TURN & TWO HALF HITCHES

the turn does most of the holding. The two half hitches that follow then lock the working end against the standing part, stopping it from slipping. Because the round turn carries the load, this hitch stays easy to untie even after being under heavy load, unlike a knot that's been crushed tight.

14.7 Bowline

The most useful single knot at sea is a fixed loop in the end of a line that will not slip or capsize under load yet unties easily by hand once the load comes off. Bowline is used for mooring lines round a post, attaching a sheet to a sail's clew, or a rescue loop under a person's arms.

A way to remember it:

- the standing part is the tree,
- a small loop in it is the hole, and the working end is the rabbit
- the rabbit comes up through the hole,
- round the tree,
- and back down the hole.

Practised a few times, it becomes a knot you can tie without looking, including one-handed or behind your back — both genuinely useful party tricks and genuinely useful skills in the dark on a moving foredeck.

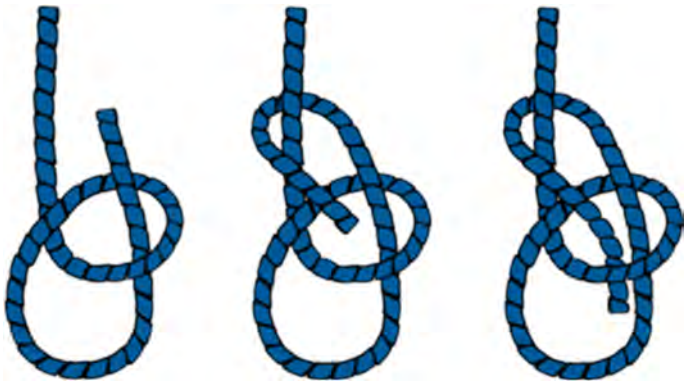


FIGURE 60 - THE BOWLINE, REMEMBERED AS 'THE RABBIT COMES UP THROUGH THE HOLE, ROUND THE TREE, AND BACK DOWN THE HOLE.'

14.8 Sheet Bend

The sheet bend is the standard knot for joining two ropes together, particularly when the ropes are of different diameters or materials. Unlike a reef knot, which can slip or capsize when used with unequal ropes, a properly tied sheet bend provides a more secure connection.

To tie a sheet bend, form a bight in the thicker rope. Pass the end of the thinner rope up through the bight, around behind both parts of the bight, and then tuck the end under its own standing part. Pull the knot firmly tight and dress it neatly.

For heavier loads, or where the knot will remain tied for an extended period, a double sheet bend provides additional security. The thinner rope is passed around the bight twice before being tucked under its own standing part.

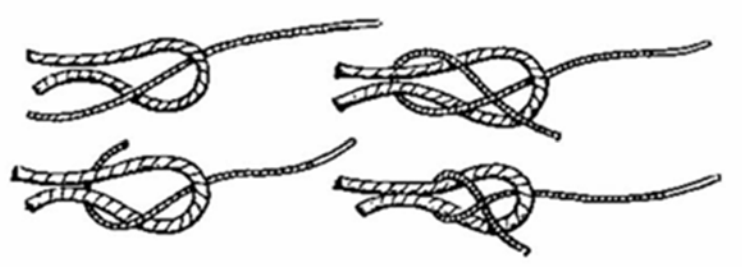
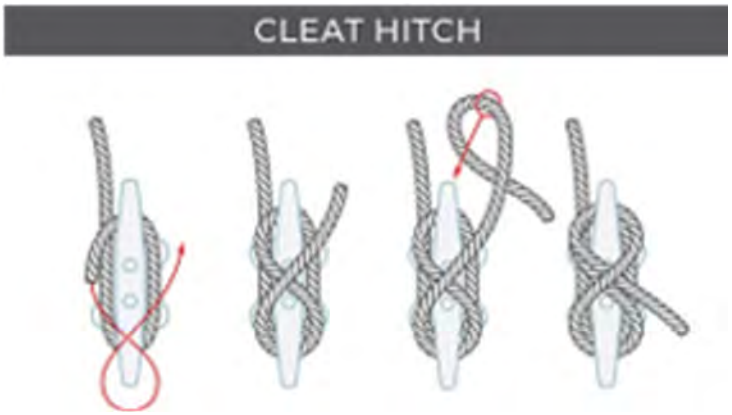


FIGURE 61 - A SHEET BEND: THE SECOND ROPE THREADS THROUGH AND AROUND A BIGHT IN THE FIRST

14.9 Cleat Hitch

Not one of the traditional named knots, but the everyday method of making a line fast to a deck cleat, and worth knowing properly — a badly cleated line can slip, jam, or be maddeningly slow to release under load. Tied by taking a full turn around the base of the cleat first (this takes the initial load), then a figure-8 pattern over the two horns, finished with a locking hitch — a final turn tucked under itself so it can't shake loose, but still releases in one pull when needed. Too many turns make a cleat slow to cast off in an emergency; too few and it can slip — the pattern above is the standard balance.



14.10 The Importance of Coiling Line

A line left in a heap may look harmless until it is needed quickly. A snagged, kinked or tangled line can become a serious problem during an important maneuver such as dropping an anchor, throwing a mooring line, easing a sheet or recovering a person from the water. Properly coiling and stowing lines is therefore an important part of good seamanship.

Why Proper Coiling Matters

- **Allows the line to run freely** — A properly coiled line can pay out quickly and smoothly when required. A tangled line can jam or come out in a snarl at exactly the wrong moment.
- **Prevents twists and kinks** — Coiling the rope correctly and following its natural **lay** helps prevent unnecessary twists, kinks from developing.
- **Keeps the deck safe** — Properly stowed lines keep the deck clear and reduce the risk of crew tripping or getting a line caught around their feet, winches or other moving equipment.
- **Protects the rope** — A line that is regularly twisted, kinked or poorly stored can suffer premature wear and damage.
- **Keeps the line ready for use** — A properly coiled and secured line will remain organized and ready when it is needed.

Coiling and Stowing



As a general habit, coil a line as soon as you have finished using it.

For example:

- Coil a halyard after hoisting or lowering a sail.
- Coil a mooring warp after securing the vessel.
- Coil a sheet after trimming or changing tack.
- Coil spare lines and secure them where they cannot fall underfoot.

When coiling, follow the natural direction of the rope's lay rather than forcing the line into tight or twisted coils.

Once coiled, the line should be hung, secured or stowed so that it cannot unravel and create a hazard.

Day Skipper's Tip:
A line should be ready to run before you need it. Good crew develop the habit of coiling and stowing

every line immediately after use. It keeps the boat safer, the equipment in better condition and the crew ready for the next maneuver.

Good Seamanship Knowing how to select the correct rope, tie the appropriate knot and properly coil and stow the line gives the Day Skipper the basic skills needed to handle lines safely and confidently. These simple habits form the foundation for many everyday boat-handling tasks, including mooring, anchoring, sail handling, reefing and recovering a person from the water.

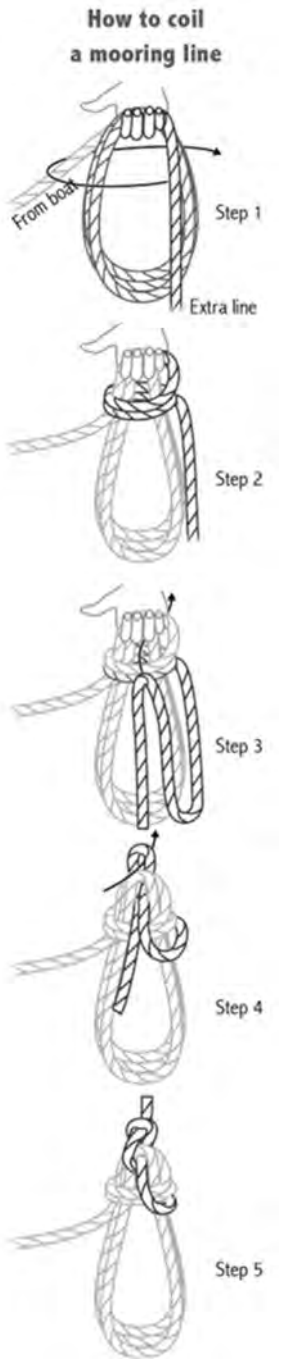


FIGURE 62 - A PROPERLY COILED LINE: EVEN LOOPS, NO TWISTS, SECURED SO IT CAN'T SPILL.

Module 15 VESSEL CHECKOUT - DOCUMENTATION, CHARTS, NAUTICAL PUBLICATIONS AND FLAGS

15.1 Key Objectives

THE OBJECTIVE OF THIS MODULE IS TO COVER THE NECESSARY PAPERWORK AND DOCUMENTATION REQUIRED TO OPERATE A VESSEL, NAUTICAL PUBLICATIONS TO BE CARRIED and THE USE OF FLAGS.

15.2 Registration / Ships Papers

Every vessel should carry registration and ownership documents identifying its owner and port of registry. These may be requested by Port State Control, marine police, Customs or Immigration.

Keep important vessel documents together in a waterproof, easily accessible bag in case the vessel must be abandoned.



VESSEL REGISTRATION

15.3 Insurance Papers

Vessels should carry current insurance documents, as these may be required following an accident or incident. Personal liability insurance is also recommended to provide protection against claims arising from injury or damage to others.



15.4 Proof of Competency

Many countries require the skipper of a recreational vessel to hold an appropriate certificate of competency. Requirements vary according to the country, vessel size, type and area of operation.

In many **European countries, the International Certificate of Competency (ICC)** is commonly required or accepted. In Canada, operators of recreational powered vessels may be required to hold a Pleasure Craft Operator Card (PCOC).

The skipper must be suitably qualified and experienced for the vessel being operated. **Always check local regulations and certification requirements before operating in unfamiliar waters.**





15.5 VHF Radio Operators License & Radio Equipment License

Most countries will require proof that you can safely operate a VHF radio, and some countries require that the radio set itself is actually licensed. Check with your local administration.



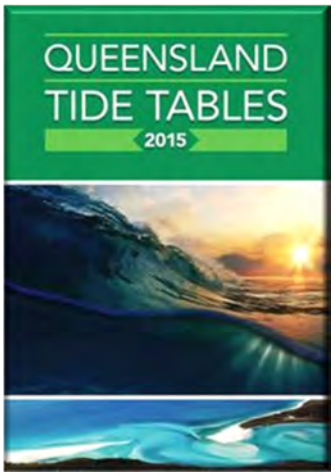


15.6 Crew List / Logbook

Keep a crew list aboard containing each crew member's name, contact details, emergency contact or next of kin, and any relevant medical information. This information may also be recorded in the vessel's logbook and should be readily accessible in an emergency.



15.7 Tide Tables



Tide tables provide daily times and heights of high water and low water for a given area. The table are published in various forms such as paper-based tables or on the internet.

15.8 Flags and Flag Etiquette

Boating etiquette is based on **courtesy, respect and consideration for others**. Accepted maritime customs, including **yacht-club ceremonies and onboard routines**, have developed over time to promote good conduct, tradition and positive relations among those who share the waterways.

Recreational boaters should understand a few basic flag conventions.



COURTESY FLAG ON STARBOARD

National Ensign — Identifies the vessel's country of registration and is normally flown at the stern. When following traditional flag etiquette, it is raised in the morning and lowered at sunset while in harbour or at anchor. Flags should be kept in good condition and replaced if torn or badly worn.

Courtesy Flag — When visiting foreign waters, the national flag of the country being visited is normally flown from the **starboard side**, commonly from the starboard spreader, as a sign of courtesy and respect.



DIVER DOWN FLAG

Diver Flags — Indicate diving activity and warn other vessels to keep well clear and proceed with caution. Two flags are commonly encountered:

- **International Code Flag "A"** — means *"I have a diver down; keep well clear at slow speed."*
- **Red flag with a white diagonal stripe** — widely used as a recreational diver-down flag, particularly in North America. Its legal meaning and requirements vary by jurisdiction.

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DIVER DOWN "A" FLAG

Module 16 CAPSIZING, SWAMPING AND SINKING

16.1 Key Objectives

THE OBJECTIVES OF THIS MODULE IS TO UNDERSTAND THE SERIOUSNESS OF CAPSIZING, SWAMPING OR SINKING AND THE ACTIONS TO BE TAKEN IN THE EVENT OF SUCH AN OCCURANCE.

16.2 Definitions

Assistance to Vessels in Distress

Under international maritime law, a master is generally required to render assistance to persons in distress at sea, provided this can be done without serious danger to their own vessel, crew or passengers.



CAPSIZED VESSEL

Capsizing

Capsizing occurs when a vessel rolls onto its side or overturns.
If it becomes completely inverted, it is commonly described as turning turtle.

Capsizing may result from heavy weather, breaking waves, excessive loading, poor weight distribution or loss of stability. If capsized:

- Ensure everyone is accounted for and wearing a lifejacket.
- Stay with the vessel whenever it is safe to do so; it is generally easier to see than a person in the water.
- Get out of cold water and onto the hull if possible.
- Use available distress signals to attract assistance.

Swamping

Swamping occurs when a vessel fills with water but remains substantially upright. It may be caused by waves coming aboard, overloading, hull damage or failure of a through-hull fitting or other plumbing.



SWAMPING

If swamped or flooding:

- Ensure everyone is wearing a lifejacket.
- Identify and control the source of flooding if possible.
- Bail or pump water from the vessel.

- Send a distress or urgency call when appropriate.
- Prepare signaling and survival equipment.
- Head for a safe location if the vessel can still be operated.

Sinking

Sinking occurs when flooding causes a vessel to lose sufficient buoyancy to become submerged.



SINKING

If the vessel is in danger of sinking, send a distress call and prepare to abandon the vessel. Launch the liferaft, if carried, and keep the crew together.

Do not abandon a vessel prematurely. A vessel, even when badly damaged or partially submerged, is usually easier for rescuers to locate than people or a liferaft in the water.

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Grounding

Grounding occurs when a vessel makes contact with the seabed, shore or an underwater obstruction.

After grounding:

- Check immediately for hull damage and flooding.
- Ensure the vessel is stable and everyone is safe.
- Check the tide before attempting to refloat.
- Avoid using excessive engine power if this could cause further damage.
- Reduce weight or reposition it when appropriate.
- Seek assistance if the vessel cannot be safely refloated.



GROUNDING

A grounding on a falling tide may leave the vessel stranded until the tide rises again, while grounding near high water may require outside assistance.

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Prevention and Preparedness

Many emergencies can be prevented through good seamanship. Before departure, check the **weather forecast, tides, charts, vessel condition and safety equipment**. Continue monitoring conditions while underway and alter plans when necessary.

Lifejackets, communications equipment, distress signals and other emergency equipment should be **readily accessible and ready for immediate use**.
If in doubt, do not venture out.

Module 17 BOAT HANDLING UNDER POWER

17.1 Key Objectives

THE OBJECTIVE OF THIS MODULE IS TO EXPLAIN HOW TO HANDLE A BOAT UNDER AUXILLIARY POWER TAKING INTO ACCOUNT THE EFFECTS OF WIND, TIDE AND CURRENTS. DEPARTURE FROM A DOCK & ARRIVING AT A DOCK.

A sailing yacht operating under its auxiliary engine behaves much like a single-engine power vessel. However, its **keel, rudder, hull shape and rig** affect how quickly it turns, stops and responds to wind and current.

17.2 Propeller and Rudder Effects



Many yachts are fitted with a **right-handed propeller**, which rotates clockwise when viewed from astern while driving the vessel ahead.

When operating **astern**, a right-handed propeller will generally tend to move the **stern to port and the bow to starboard**. This sideways movement is known as **prop walk** or **transverse thrust**.

Prop walk is normally much more noticeable in astern because the rudder receives less effective propeller wash and the vessel has limited steerage until sufficient sternway develops.

The amount of prop walk varies considerably depending on the **propeller, hull, keel, rudder and propulsion arrangement**. A skipper should determine how their own vessel responds.

17.3 The Effects of Wind, Tide and Current

When maneuvering under power, particularly at slow speed, the skipper must consider the effects of **wind, tide and current**.

Wind acts on the hull, mast, rigging and superstructure, creating **windage**. Even with the sails furled, a sailing yacht may be blown sideways or have its bow or stern pushed off course. This effect becomes particularly important at low speed when the rudder is less effective.

Tide and Current — Moving water carries the vessel with it, affecting its **course and speed over the ground**. The skipper must allow for the direction and strength of the current when approaching docks, moorings or navigating confined waters.

Momentum — A vessel has no brakes and will continue moving after power is reduced. To stop more quickly, the engine may be used in the opposite direction. Always allow sufficient **stopping distance**, particularly with heavier vessels.

When maneuvering in confined waters, consider **wind, current, momentum, rudder effectiveness and prop walk** before beginning the maneuver. Whenever possible, use these forces to assist rather than oppose the vessel's movement.

17.4 Alongside

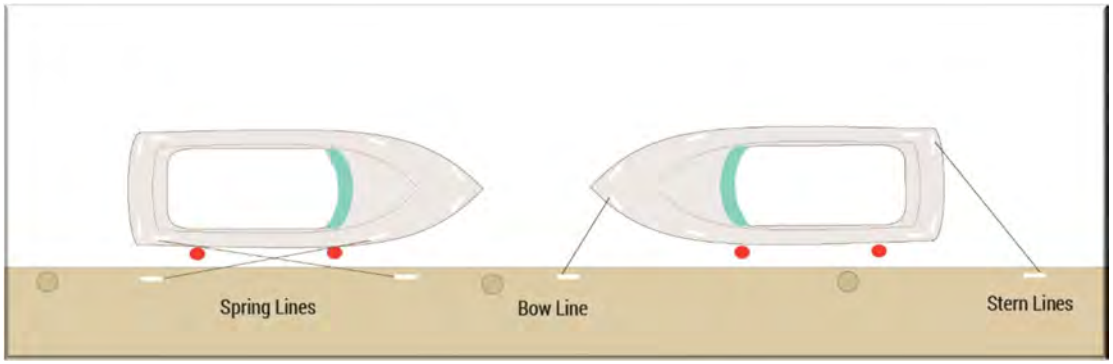


FAIRLEAD & CLEATS

Deck Equipment & Fittings

Docking Lines (revision) - required to secure a vessel properly are:

- Bow line. A line that is lead forward from the bow of the boat.
- Stern line. A line that is lead aft from the stern of the boat.
- Spring lines. One line leads from the bow of the vessel aft of midships to the dock and one from the stern of the vessel lead forward of midships to the dock. These stop the boat moving fore and aft and should be taut.



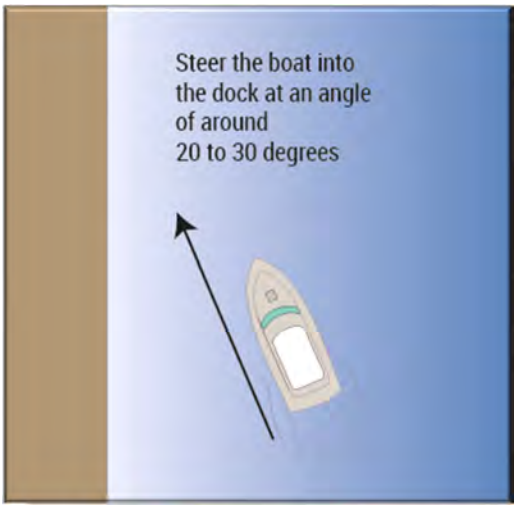
DOCKING DIAGRAM / CLEATS ON DOCK AND BOAT

17.5 Coming Alongside (wharf or dock)

1. Steer the boat into the dock at an angle of around 20 to 30 degrees with just sufficient way on the vessel to have good control.

2. One should approach upwind if possible. Coming in to a moored or anchored boat should be relatively easy as the vessel will probably be lying "head to wind".

3. When the bow is close to the wharf put the engine in neutral and then reverse, as this is done, it will have the twofold effect of stopping the boat and the reverse thrust will tuck the stern in neatly alongside.



COMING ALONGSIDE A DOCK

4. Have your mooring line prepared in advance and crewmember designated to step ashore and tie up the vessel.

5. Where there are mooring lines attached to the dock it may be easier to have the crewmembers who step on to the dock pass those lines to people on deck.

Small boats are quite susceptible to the effect of wind and current and will generally make a fair amount of leeway, careful course and speed corrections may have to be made by the coxswain to counter leeway effects.

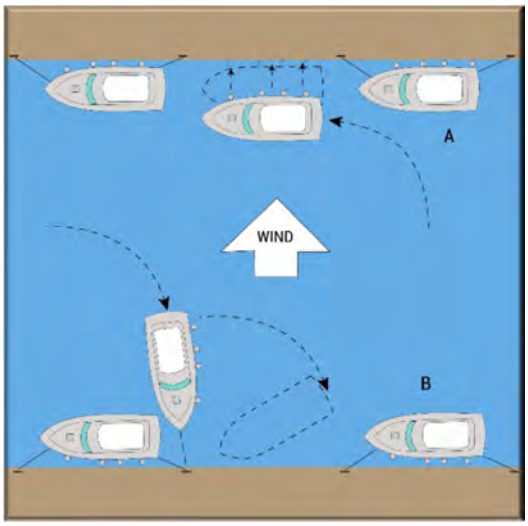
Small boats are quite susceptible to the effect of wind and current and will generally make a fair amount of leeway, careful course and speed corrections may have to be made by the coxswain to counter leeway effects.

Arrival at a Dock

Always have lines and fenders prepared.

In situation **A**, the vessel is positioned in the gap by nosing into the space and allowing the wind to push the vessel alongside.

In situation **B**, with the vessel being blown off the dock, approach the dock bow first, attach a bowline and with the rudder/engine to port, gently go astern which will gradually pull the stern into the dock.

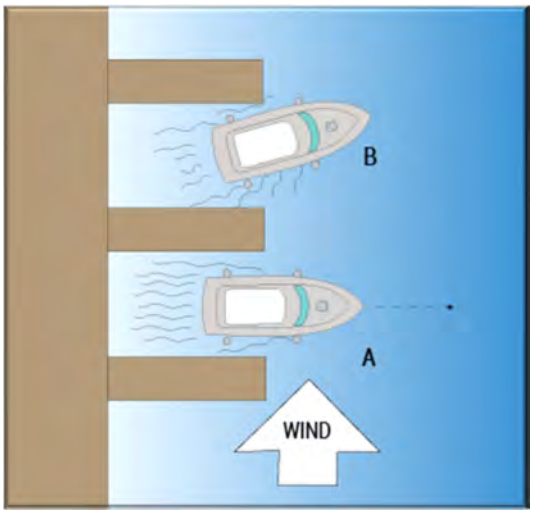


ARRIVAL AT DOCK

17.6 Handling Skills

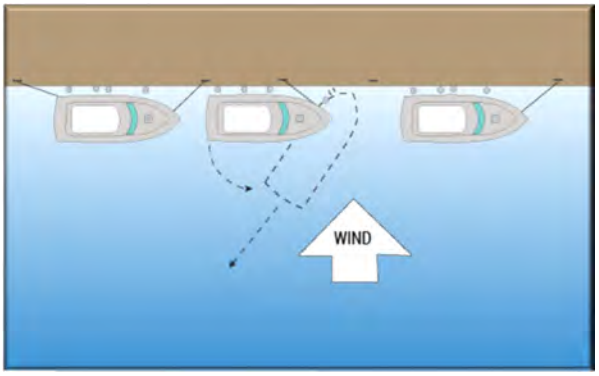
Departure from Dock

Before departing a dock make sure the engine is running smoothly. In this instance with a cross wind, the vessel must be given enough power to exit the dock quickly. (Boat A), or else the wind will blow the boat on to the dock (Boat B). Remove the spring lines, slip bow and stern lines together.



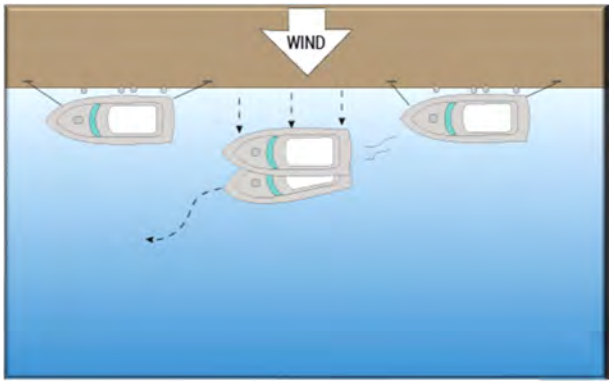
DEPARTURE FROM DOCK WITH CROSSWIND

With a wind blowing the vessel onto the dock, slip all lines except the forward spring, power gently ahead to kick the stern out. Slip the spring and motor astern into the channel.



DEPARTURE FROM DOCK WITH WIND BLOWING ONTO DOCK

With the wind blowing the vessel off the dock, slip all lines except the stern line. The bow will be blown out into the channel. When clear, the stern line can be slipped.



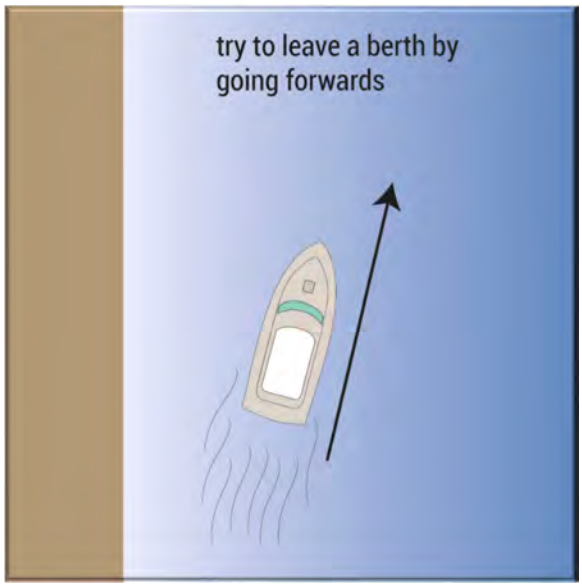
DEPARTURE FROM DOCK WITH WIND BLOWING OFF DOCK

17.7 Clearing (wharf or dock)

- Whenever possible you should try to leave a berth by going forwards though this will always be dependent on the wind and current at the time.

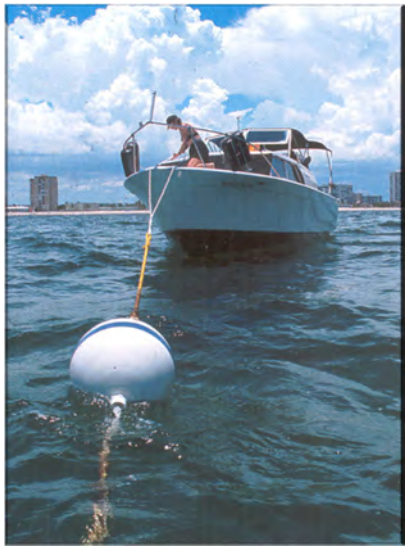
- The order in which you untie your mooring lines is dependent on the wind and current. If the wind is coming from ahead or off the dock, hold the yacht on the after spring line to stop her drifting back onto any vessel astern; the wind will take the bow out and once clear you can leave the dock.

- Conversely if the wind or current is astern you will swing out on the bow spring until the stern is clear and then you can go astern to clear the berth.



CLEARING A DOCK

17.8 Picking up mooring buoy



Mooring is tying up to an object in the water, such as a mooring buoy.

Approach mooring buoy slowly and if possible, into the wind, waves or current, whichever is strongest, when close, select reverse gently to stall forward momentum. Select neutral, pick-up mooring painter and secure to the deck. When leaving, use reverse to back off the buoy to keep propeller away from the line. REMEMBER that a boat has no brakes. Many authorities strongly discourage the use of anchors for environmental reasons and will provide 'mooring fields' for use by small craft.

17.9 Maintenance

It is important that boats fitted with an auxiliary engine have the engine regularly serviced to avoid engine failure.

17.10 Practical Skills to Demonstrate

Candidates should demonstrate the following during the course:

- Complete engine pre-start checks.
- Prepare the vessel for departure.
- Depart a berth safely.
- Approach a dock with the wind blowing onto it.
- Approach a dock with the wind blowing away from it.
- Use bow, stern and spring lines correctly.
- Pick up and secure to a mooring buoy.

Module 18 BASIC METEOROLOGY

18.1 Key Objectives

THE OBJECTIVE OF THIS MODULE IS TO UNDERSTAND BASIC WEATHER PATTERNS, SEA AND LAND BREEZES, KATABATIC AND ANABATIC WINDS, THE BEAUFORT SCALE, CLOUD TYPES, TROPICAL REVOLVING STORMS, LIGHTENING, THUNDERSTORMS AND WHAT TO DO IN THE EVENT OF ADVERSE WEATHER.



Meteorology is the study of the atmosphere and the processes that produce weather. For the Day Skipper, the objective is not to become a meteorologist, but to understand **basic weather systems, interpret forecasts and recognize changing conditions** that may affect a vessel and crew.

Weather has a major influence on the safety and comfort of any passage. Before departure, the skipper should obtain a **current marine weather forecast** covering the planned area and duration of the trip and continue monitoring conditions while underway.

Important factors include:

- **Wind direction and speed**
- **Visibility, fog and precipitation**
- **Cloud and approaching weather systems**
- **Atmospheric pressure and its changes**
- **Temperature**
- **Sea state and wave height**
- **Warnings for strong winds, storms or other hazardous conditions**

A good skipper compares the forecast with the **conditions observed** and is prepared to alter or abandon the passage if conditions deteriorate.

18.2 Sources of Weather Information

Weather forecasts are produced using information from **satellites, weather stations, buoys, ships, aircraft, radar and other monitoring systems**.

For the Day Skipper, **wind speed and direction** are particularly important, but forecasts should also be checked for visibility, precipitation, sea state, temperature and any weather warnings.

Use reliable marine weather sources, such as:

- National meteorological services
- Coastguard or marine radio broadcasts
- Port and harbour authorities
- Marine weather websites and applications
- VHF weather broadcasts where available

Obtain a **current marine forecast before departure** and consider whether the expected conditions are suitable for the vessel, crew and planned passage. **If in doubt, postpone the trip.**

Continue to monitor forecasts while underway, particularly on longer passages or when conditions are expected to change.

Observe the Weather

A forecast should always be supported by **your own observations**. Monitor the wind, clouds, visibility, sea state and changes in atmospheric pressure. Conditions experienced at your location may differ from the general forecast.

Never rely solely on a forecast—watch what the weather is actually doing around you.

18.3 Weather Patterns

Air Movement and Pressure

Most weather occurs in the **troposphere**, the lowest layer of the atmosphere. The Sun heats the Earth unevenly, causing differences in temperature and atmospheric pressure. Warm air tends to rise and cooler, denser air moves in to replace it, creating wind.

The rotation of the Earth also influences the movement of air through the **Coriolis Effect**.
In the **Northern Hemisphere**:

- Low-pressure systems rotate **counterclockwise**.
- High-pressure systems rotate **clockwise**.

In the **Southern Hemisphere**, directions are reversed.

For the Day Skipper, the important point is that changes in **pressure, wind direction, wind speed and cloud** can indicate approaching changes in the weather.

18.4 Monitoring the Weather

Weather should be monitored **before and throughout a passage**. A deteriorating forecast may require the skipper to alter the passage plan, seek shelter or return to harbour.

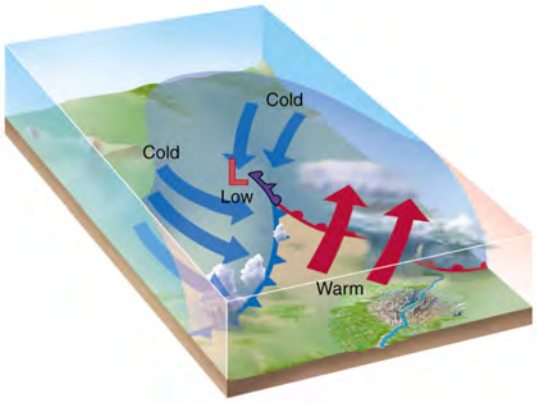
Watch for:

- Changes in wind direction or strength
- Falling or rising atmospheric pressure
- Changes in cloud type or amount
- Reduced visibility
- Increasing sea state
- Sudden changes in temperature
- Marine weather warnings

Do not rely solely on a forecast. **Compare the forecast with the conditions you actually observe.**

18.5 Fronts

A **front** is the boundary between two air masses with different temperatures and characteristics. The passage of a front is commonly accompanied by changes in **cloud, wind, pressure, temperature, visibility and precipitation**.

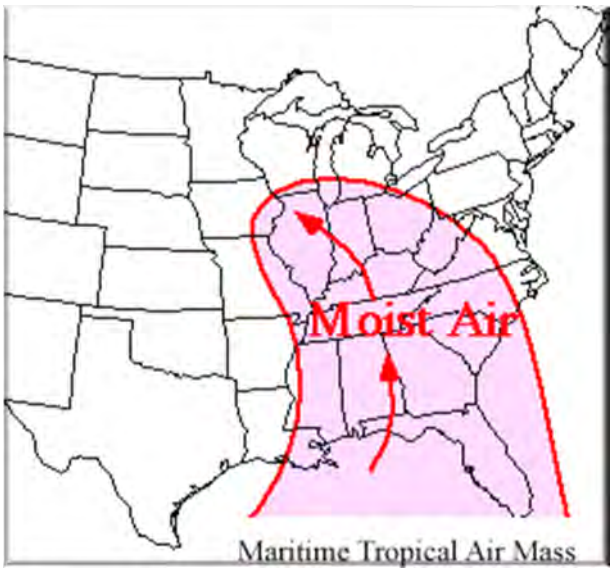


Warm Front

A **warm front** occurs when warm air advances over colder, denser air. As the warm air rises and cools, cloud forms and may produce prolonged rain or drizzle.

Typical signs include:

- High cloud gradually thickening and lowering
- Falling atmospheric pressure
- Increasing rain or drizzle
- Reduced visibility
- Changes in wind direction



Cold Front

A **cold front** occurs when advancing cold air pushes beneath warmer air, forcing the warm air rapidly upward.



Cold fronts may produce:

- Rapidly developing cloud
- Heavy showers or rain
- Squalls and strong gusts
- Sudden wind shifts
- Thunderstorms
- Rapidly changing sea conditions

Conditions may improve relatively quickly after the front passes, although strong winds and rough seas may remain.

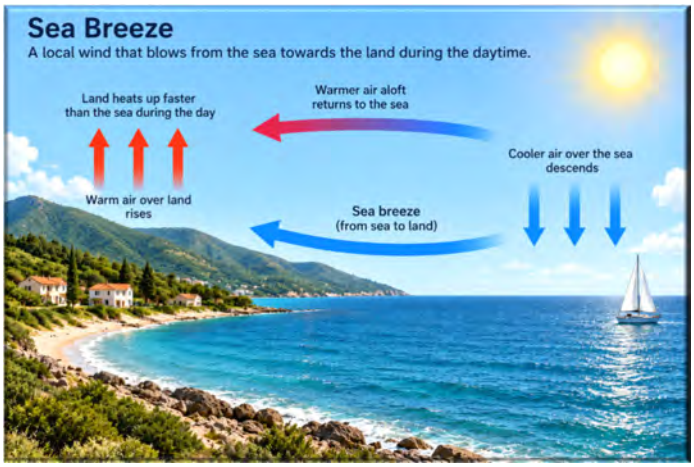
18.6 Sea Breeze

A **sea breeze** is a local daytime wind that blows **from the sea toward the land**.

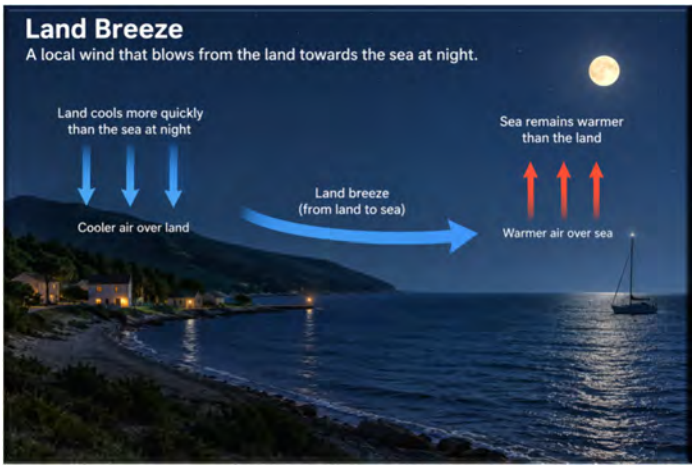
During a sunny day, the land heats more quickly than the sea. Air over the land warms and rises, allowing cooler air from over the water to move inland and replace it.

Sea breezes are generally strongest during the afternoon and are most noticeable near the coast.

The sea breeze combines with the existing wind and may **increase, decrease or alter the overall wind direction and strength**.



SEA BREEZE



LAND BREEZE

18.7 Land Breeze

At night, the land cools and the air in contact with it is cooled and flows down and out to sea. Contact with the sea, which is relatively warm, heats the air which rises up and flows back towards the land where it is cooled and a circulation

continues. A land breeze starts at the land and works its way out to sea. Land breezes are not as strong as sea breezes, and they are not felt as far out to sea as a sea breeze might be.

18.8 Katabatic and Anabatic Winds

Katabatic Wind

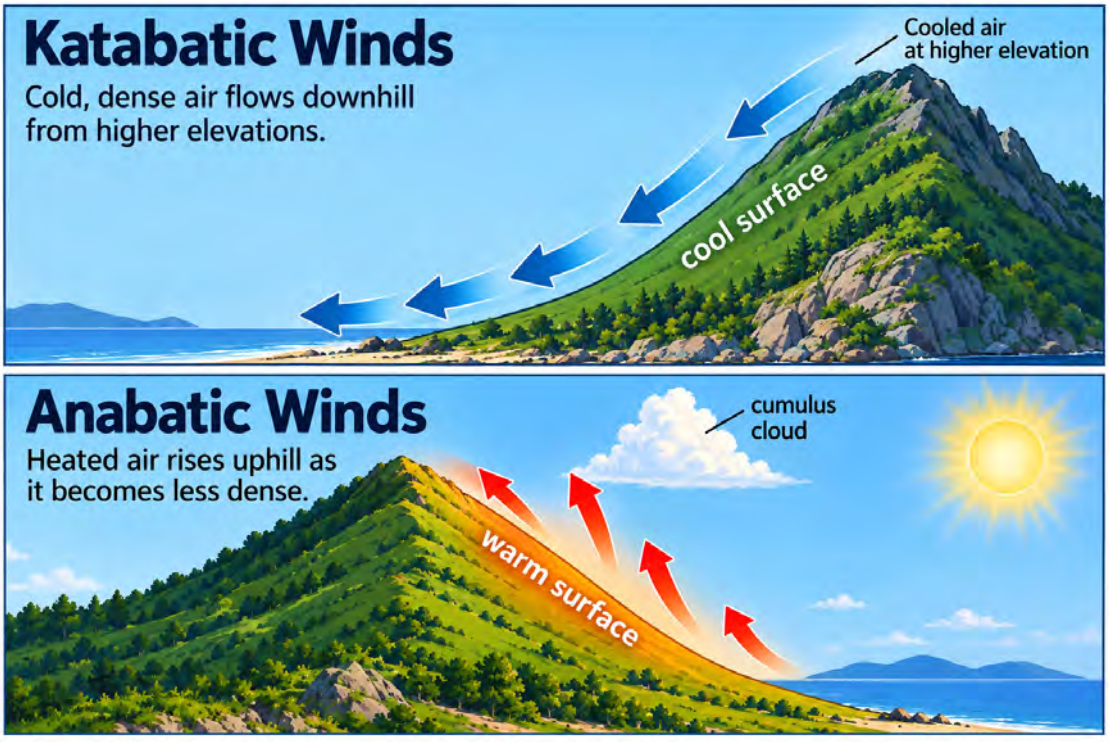
A **katabatic wind** occurs when cool, dense air flows downhill from higher ground toward lower elevations or the coast.

These winds may be strengthened considerably by valleys and mountain passes and can produce unexpectedly strong gusts in otherwise sheltered anchorages.

Anabatic Wind

An **anabatic wind** develops when the Sun heats a mountain or hillside, warming the air above it and causing the air to flow **upslope**.

Both effects are examples of how **local terrain can significantly alter the wind experienced by a vessel**.



KATABATIC & ANABATIC WINDS

18.9 The Beaufort Wind Scale

The Beaufort Scale describes wind strength by relating wind speed to its observable effects on the sea and surroundings.

A Day Skipper should be familiar with the scale and, importantly, be able to estimate wind strength by observing the water.

Beaufort	Description	Wind Speed	Typical Sea Appearance
0	Calm	<1 knot	Sea like a mirror
1	Light Air	1–3 knots	Ripples
2	Light Breeze	4–6 knots	Small wavelets
3	Gentle Breeze	7–10 knots	Small waves; occasional whitecaps
4	Moderate Breeze	11–16 knots	Frequent whitecaps
5	Fresh Breeze	17–21 knots	Moderate waves; many whitecaps
6	Strong Breeze	22–27 knots	Larger waves and spray
7	Near Gale	28–33 knots	Sea heaps up; foam streaks
8	Gale	34–40 knots	Moderately high waves; considerable spray
9	Strong Gale	41–47 knots	High waves and heavy spray
10–12	Storm to Hurricane Force	48+ knots	Very high to exceptional seas

The skipper should always consider whether the forecast wind and sea conditions are appropriate for the **vessel, crew and intended passage**.



BEAUFORT FORCE 0 & 1 PHOTO



Force 2 — Wind speed 4–6 kn; mean, 5 kn
(Small wavelets, still short but more pronounced — crests have a glassy appearance and do not break)
(Photograph - G J Simpson, Courtesy of the Meteorological Office)

Force 3 — Wind speed 7–10 kn; mean, 9 kn
(Large wavelets. Crest begin to break. Foam of glassy appearance. Perhaps scattered horses)
(Photograph - I G MacNeil, Courtesy of the Meteorological Office)

BEAUFORT FORCE 2 & 3 PHOTOS



Force 4 — Wind speed 11–16 kn; mean, 13 kn
(Small waves, becoming longer; fairly frequent white horses)
(Photograph - I G MacNeil, Courtesy of the Meteorological Office)

Force 5 — Wind speed 17–21 kn; mean, 19 kn
(Moderate waves, taking a more pronounced long form; many white horses are formed (Chance of some spray))
(Photograph - I G MacNeil, Courtesy of the Meteorological Office)

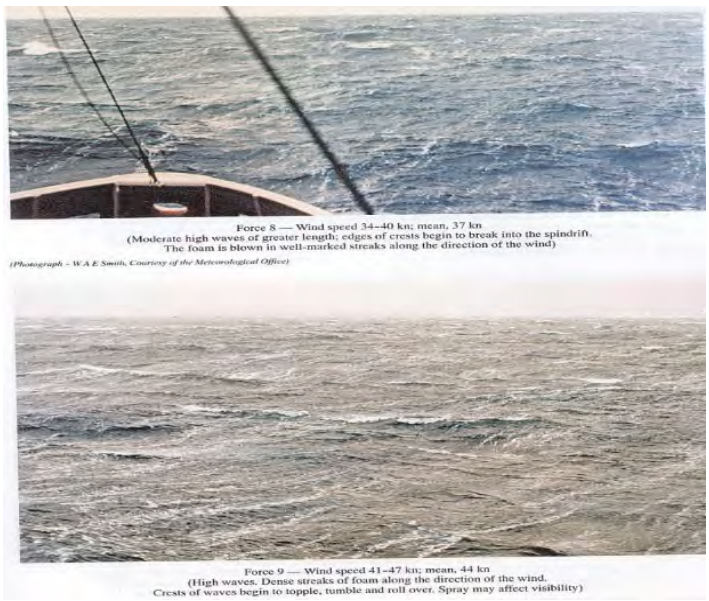
BEAUFORT FORCE 4 & 5 PHOTOS



Force 6 — Wind speed 22–27 kn; mean, 24 kn
(Large waves begin to form; the white foam crests are more extensive everywhere (Probably some spray))
(Photograph - I G MacNeil, Courtesy of the Meteorological Office)

Force 7 — Wind speed 28–33 kn; mean, 30 kn
(Sea heaps up and white foam from breaking waves begins to be blown in streaks along the direction of the wind)
(Photograph - G J Simpson, Courtesy of the Meteorological Office)

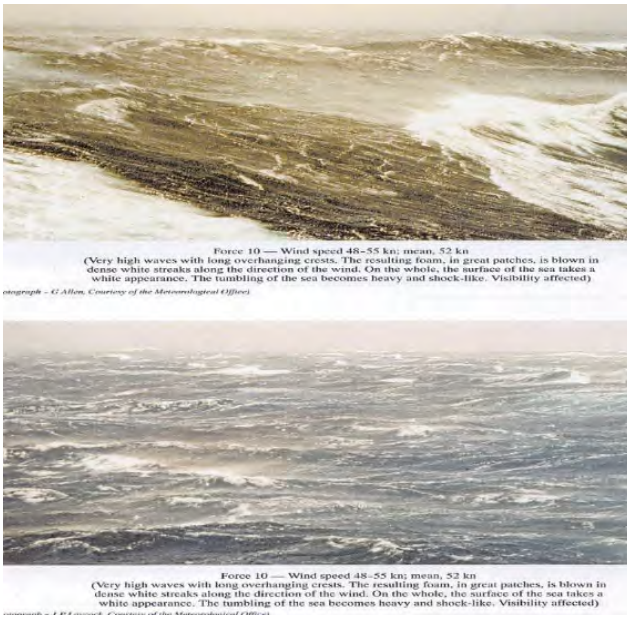
BEAUFORT FORCE 6 & 7 PHOTO



Force 8 — Wind speed 34–40 kn; mean, 37 kn
(Moderate high waves of greater length; edges of crests begin to break into the spindrift.
The foam is blown in well-marked streaks along the direction of the wind)
(Photograph - W A E Smith, Courtesy of the Meteorological Office)

Force 9 — Wind speed 41–47 kn; mean, 44 kn
(High waves. Dense streaks of foam along the direction of the wind.
Crests of waves begin to topple, tumble and roll over. Spray may affect visibility)

BEAUFORT FORCE 8 & 9 PHOTO



BEAUFORT FORCE 10 PHOTOS



BEAUFORT FORCE 11 PHOTOS



BEAUFORT FORCE 12 PHOTO

18.10 Clouds

Clouds form when moist air rises, cools and reaches a temperature at which its water vapour condenses into tiny water droplets or ice crystals.

Clouds provide valuable clues about approaching weather. A Day Skipper does not need to identify every cloud variation but should recognize the principal types and the weather commonly associated with them.

Important Cloud Types

There are three basic cloud types--cirrus, cumulus, and stratus.

Cirrus — High, thin, wispy clouds composed mainly of ice crystals. Increasing cirrus may be an early indication of an approaching weather system.



CIRRUS

Cirrostratus — A thin, high sheet of cloud that may cover much of the sky and sometimes produces a halo around the Sun or Moon. It can indicate an approaching warm front.



CIRROSTRATUS

Cumulus — White, heaped clouds with relatively flat bases. Small cumulus clouds are commonly associated with fair weather, but increasing vertical development may indicate instability.



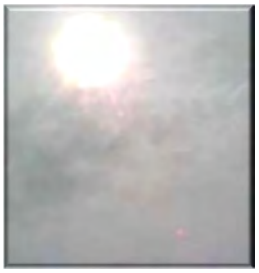
CUMULUS

Stratus — Low, grey, uniform cloud that may produce mist or drizzle and poor visibility.



STRATUS

Altostratus — A widespread grey or blue-grey middle-level cloud often associated with an approaching frontal system and prolonged precipitation.



ALTOSTRATUS

Nimbostratus — Thick, dark cloud associated with prolonged and widespread rain or snow.



NIMBOSTRATUS

Cumulonimbus — Large, vertically developed thunderstorm clouds, often with an anvil-shaped top. They may produce **heavy rain, lightning, hail, strong gusts and sudden wind shifts**.



CUMULONIMBUS

For the Day Skipper, recognizing a **rapidly developing cumulonimbus cloud** is particularly important.

18.11 Precipitation

Precipitation occurs when water droplets or ice particles in clouds become large enough to fall to the surface as **rain, snow, sleet or hail**.

Precipitation may:

- Reduce visibility
- Make decks slippery
- Increase wind gusts
- Obscure navigational marks and other vessels
- Accompany rapidly changing weather

Heavy precipitation should therefore be considered when planning and conducting a passage.

18.12 Fog and Restricted Visibility



FOG - SAN FRANCISCO BAY

Fog is a cloud at or near the Earth's surface that significantly reduces visibility. At sea, one of the most common types is **advection or sea fog**, which forms when warm, moist air passes over colder water.

Other types include:

Radiation Fog — Normally forms over land on clear, calm nights as the ground cools the air above it. It may subsequently drift over nearby water.

Frontal Fog — May develop in association with fronts and precipitation.

Sea Smoke — Forms when very cold air passes over comparatively warmer water.
Fog may clear when the air warms, the wind increases or changes direction, or a different air mass arrives.

Navigating in Fog

Restricted visibility considerably increases the risk of collision. If fog is encountered:

- Maintain a **proper lookout**.
- Proceed at a **safe speed**.
- Display the required navigation lights.
- Make the appropriate **COLREGS sound signals**.
- Use radar and AIS if fitted, but do not rely on them alone.
- Monitor your position carefully.
- Keep a listening watch on VHF.
- Be prepared to alter the passage plan if necessary.

If dense fog is forecast, the safest decision may be to **delay departure**.

18.13 Thunderstorms and Squalls



Thunderstorms develop from rapidly rising warm, moist air and are associated with **cumulonimbus clouds**.

They can produce:

- Strong and sudden wind gusts
- Rapid wind shifts
- Heavy rain
- Hail
- Lightning

- Reduced visibility
- Rapidly increasing waves

Conditions may change very quickly, particularly when a **squall or gust front** approaches.

If thunderstorms are forecast, consider delaying the passage. If caught underway, prepare the vessel and crew early. Reduce sail if applicable, secure loose equipment, ensure life jackets are worn and seek safe shelter when practical.

18.14 Lightning

Lightning is an electrical discharge that occurs within or between clouds or between a cloud and the Earth's surface.

Sailing vessels may be particularly exposed because the mast is often the highest point in the immediate area.

A lightning strike can cause **serious injury, fire and extensive damage to electrical and electronic equipment**.

If thunderstorms threaten:

- Avoid unnecessary contact with metal fittings.
- Keep crew away from the mast and rigging where practical.
- Disconnect or protect portable electronic equipment where appropriate.
- Keep essential portable communications equipment readily available.
- Seek safe shelter if this can be done without creating additional risk.

The best protection is to **avoid being caught in a thunderstorm whenever possible**.

18.15 After Severe Weather

Hazards may remain after a storm has passed.

Heavy rainfall can cause:

- Increased river and stream currents
- Flooding
- Floating logs, branches and other debris
- Reduced water clarity
- Changes in local depths and conditions
- Strong currents near river and harbour entrances

Do not assume that conditions are safe simply because the wind and rain have stopped. Continue to navigate cautiously and monitor **weather, water levels, currents and local warnings**.

Make sure to steer clear of any rapids as the rate of water flow in currents will increase significantly. As with other adverse weather conditions, head to shore and seek a safe anchorage or marina as soon as possible.

Module 19 NAUTICAL CHARTS

19.1 Key Objectives

THE OBJECTIVES OF THIS MODULE ARE TO FAMILIARISE THE STUDENT WITH CHARTS AND WHERE TO FIND THEM.

A **nautical chart** is one of the navigator's most important tools. It provides the information required to plan a safe passage, monitor the vessel's progress and identify hazards.

The prudent navigator regularly determines the vessel's position and checks it against the chart. Although GPS and electronic chartplotters have made position fixing much easier, the skipper should **never rely entirely on a single source of navigation information**.

Positions should be checked more frequently when navigating:

- Near the coast or navigational hazards
- In confined or unfamiliar waters
- In poor visibility
- Near traffic, shoals or other dangers
- Whenever there is doubt about the vessel's position
-



NAUTICAL CHART

19.2 Information Shown on Charts

Nautical charts are specially designed for marine navigation and contain considerably more information than ordinary maps.

Depending on the chart, information may include:

- Coastlines and prominent land features
- **Water depths and depth contours**
- Rocks, wrecks, shoals and other underwater hazards
- Buoys, beacons and other aids to navigation
- Lights and their characteristics
- Channels and recommended routes
- Harbours, marinas and anchorages
- Bridges, cables and overhead obstructions
- Tidal information
- Currents and tidal streams
- Magnetic variation
- Restricted or regulated areas
- Other information important to safe navigation

The navigator must understand the **symbols, abbreviations and notes** used on the chart.

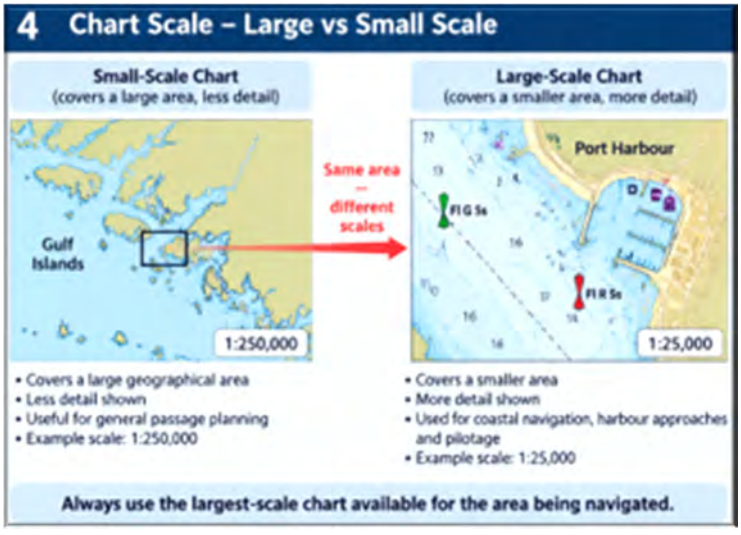
19.3 Chart Scale

Charts are produced at different **scales** depending on the area and level of detail required.

A **small-scale chart** covers a large geographical area but shows less detail and is useful for general passage planning.

A **large-scale chart** covers a smaller area in greater detail and should be used for coastal navigation, harbour approaches and pilotage.

Always use the largest-scale chart available for the area being navigated.



19.4 Official Charts

Official nautical charts are produced by national hydrographic authorities.

Examples include:

United Kingdom Hydrographic Office (UKHO) — Produces Admiralty nautical charts and publications covering waters throughout the world.

Canadian Hydrographic Service (CHS) — Produces official charts and nautical publications covering Canadian coastal and inland navigable waters.

National Oceanic and Atmospheric Administration (NOAA) — Provides official electronic navigational charts for United States waters.

Other countries have their own national hydrographic authorities responsible for charting their waters.

19.5 Paper and Electronic Charts

Nautical charts may be provided in **paper or electronic form**.

Paper Charts

Paper charts remain useful for:

- Passage planning
- Plotting positions and courses
- Measuring distances and bearings
- Viewing a large geographical area
- Providing an independent means of navigation if electronic equipment fails

Electronic Charts

Electronic charts are commonly displayed on **chartplotters, multifunction displays, tablets and other navigation systems**.

They provide convenient access to position, course, speed and other navigational information, but must be used carefully.

The skipper should:

- Understand how to operate the equipment
- Use appropriate chart scale or zoom
- Ensure chart data is current



FIGURE 63 - CHART PLOTTER

- Check the vessel's position against other available information
- Be aware that electronic equipment, GPS signals or electrical power can fail

Electronic navigation should assist good seamanship, not replace it.

19.6 Small Craft Charts and Chart Books

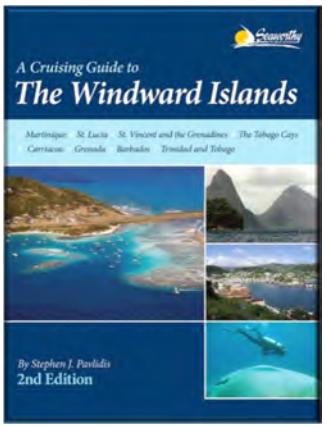


FIGURE 64 - CRUISING GUIDE

Commercial publishers may produce charts, chart books or cruising guides specifically for recreational vessels. These may be waterproof, foldable or include useful enlarged **chartlets** of harbours, anchorages and approaches.

They can be valuable aids but should not automatically be assumed to contain all the information available on an official nautical chart.

19.7 Keeping Charts Current

Charts and electronic chart data must be kept **up to date**. Buoys may be moved, lights changed, new hazards discovered and channels or regulations altered.

Before and during a passage, check appropriate official sources for:

- Chart corrections and updates
- Notices to Mariners
- Navigational warnings
- Local Notices to Mariners
- Temporary changes to aids to navigation
- Harbour and port information

19.8 Using the Chart

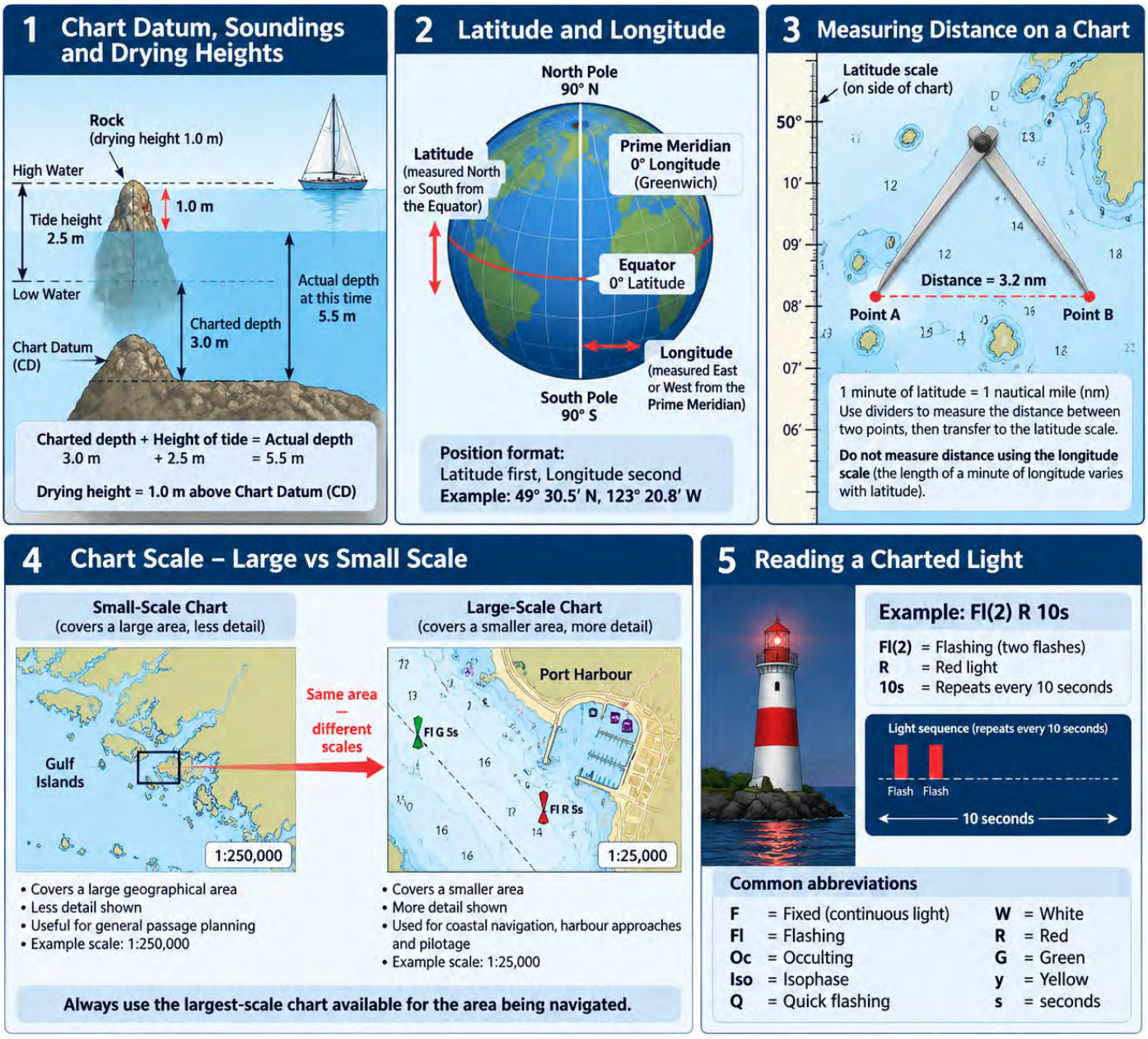
Before departure, examine the chart carefully and identify:

- The intended route
- Safe depths of water
- Shoals, rocks and other hazards
- Aids to navigation
- Harbour entrances and approaches
- Tidal or current considerations
- Suitable anchorages or alternative destinations
- Areas that require particular caution

A chart should never simply be followed from waypoint to waypoint. **Continually compare the vessel's actual surroundings, depth and position with the information shown on the chart.**

Remember: The safest navigator uses all available information and never relies solely on GPS or a chartplotter.

The following diagrams should be referred to while describing content of the following topics.



19.9 Chart Datum

Water depths shown on a nautical chart are measured from a reference level called **Chart Datum (CD)**.

Chart Datum is normally selected at or near a level below which the tide seldom falls. The exact definition varies between regions, so the chart and local tidal information should always be checked.

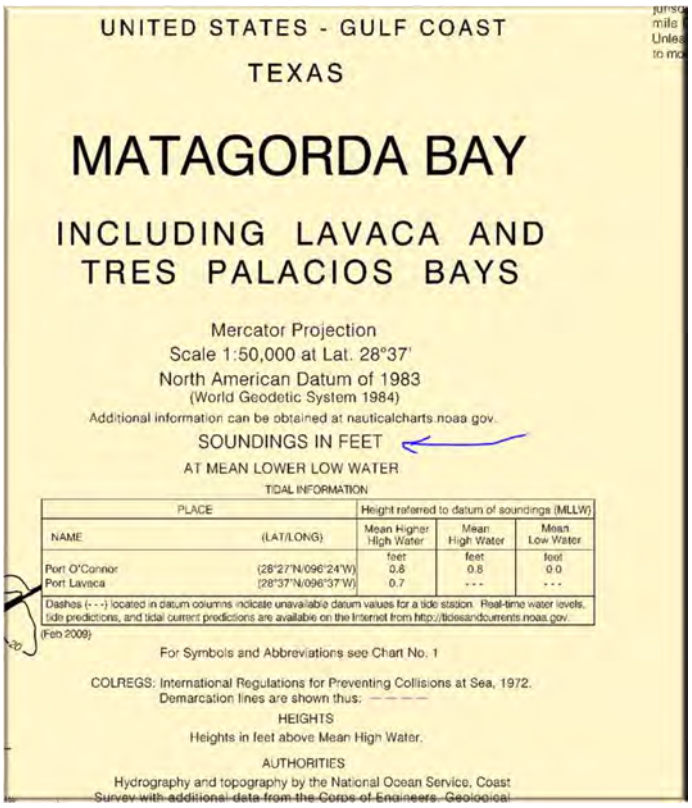
The depths printed on a chart are called **soundings** and represent the depth of water above Chart Datum.

To determine the approximate **actual depth of water**, add the **height of tide** to the charted depth:

Charted Depth + Height of Tide = Depth of Water

Example:
Charted depth = 2.5 m
Height of tide = 1.8 m
Approximate depth of water = **4.3 m**

Remember that actual depth may also be affected by weather, atmospheric pressure, waves and other local conditions.



UNITED STATES - GULF COAST

TEXAS

MATAGORDA BAY

INCLUDING LAVACA AND TRES PALACIOS BAYS

Mercator Projection
Scale 1:50,000 at Lat. 28°37'
North American Datum of 1983
(World Geodetic System 1984)
Additional information can be obtained at nauticalcharts.noaa.gov.

SOUNDINGS IN FEET

AT MEAN LOWER LOW WATER

TIDAL INFORMATION

PLACE		Height referred to datum of soundings (MLLW)		
NAME	(LAT/LONG)	Mean Higher High Water	Mean High Water	Mean Low Water
		feet	feet	feet
Port O'Connor	(28°27'N/096°24'W)	0.8	0.8	0.0
Port Lavaca	(28°37'N/096°37'W)	0.7	---	---

Dashes (- - -) located in datum columns indicate unavailable datum values for a tide station. Real-time water levels, tide predictions, and tidal current predictions are available on the Internet from http://tidesandcurrents.noaa.gov

(Feb 2009)

For Symbols and Abbreviations see Chart No. 1

COLREGS: International Regulations for Preventing Collisions at Sea, 1972.
Demarcation lines are shown thus: ———

HEIGHTS
Heights in feet above Mean High Water.

AUTHORITIES
Hydrography and topography by the National Ocean Service, Coast Survey with additional data from the Corps of Engineers, Geological

FIGURE 65 - EXAMPLE OF CHART SHOWING SOUNDINGS IN FEET AND TIDAL INFORMATION

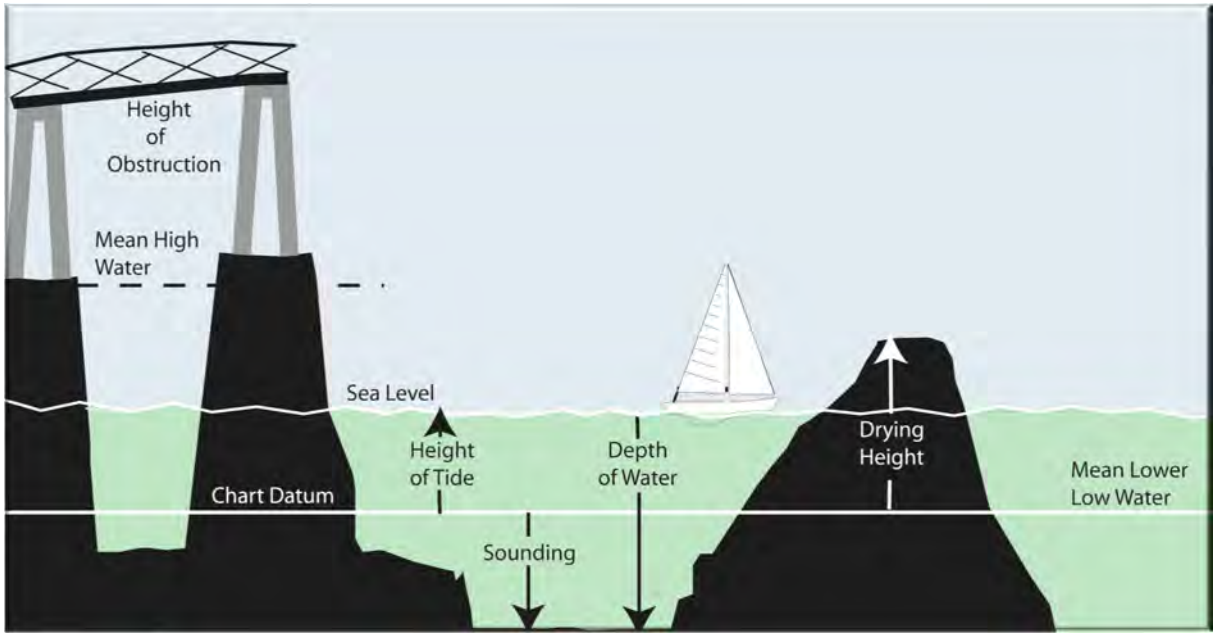


FIGURE 66 - TIDAL HEIGHT DEFINITIONS

19.10 Soundings and Depth Contours

Soundings are the numbers shown on a chart indicating charted water depth. The units used—normally **metres, feet or fathoms**—are stated on the chart.

Lines joining areas of equal depth are called **depth contours**. These help the navigator identify:

- Shallow water
- Deep-water channels
- Shoals
- Banks
- Changes in seabed profile

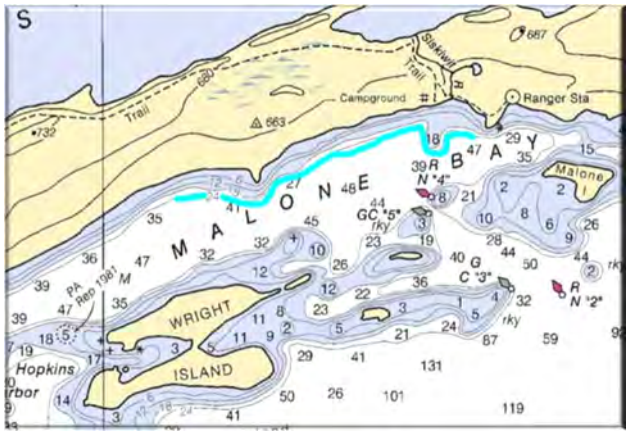


FIGURE 67 - DEPTH CONTOURS SHOWN ON CHARTS

Colours may also be used to distinguish different depth areas.

When planning a passage, the skipper must ensure there will be sufficient water for the vessel's **draft**, allowing an appropriate safety margin or **under-keel clearance**.

Drying Heights
Some features are above Chart Datum at low water but covered as the tide rises. These are known as **drying areas**.

A **drying height** indicates how far the feature lies above Chart Datum.

For example, if a rock has a drying height of 1.0 m and the height of tide is 2.5 m:

2.5 m – 1.0 m = 1.5 m of water over the rock

Never confuse a **drying height** with a sounding.

19.11 Heights and Vertical Clearances

Not all charted heights use the same reference level.

Heights of objects such as **lighthouses, cliffs and landmarks** are measured from a stated vertical datum.

Clearances beneath **bridges, overhead cables and other obstructions** may use another specified reference level.

The appropriate chart notes and symbols must therefore be checked before relying on a charted height.

When passing beneath an obstruction, allow for:

- Height of tide
- Vessel's maximum height above the water
- Waves and vessel movement
- Appropriate safety clearance

Never assume that a charted bridge or cable height represents the clearance available at the time you pass beneath it.

19.12 Latitude and Longitude

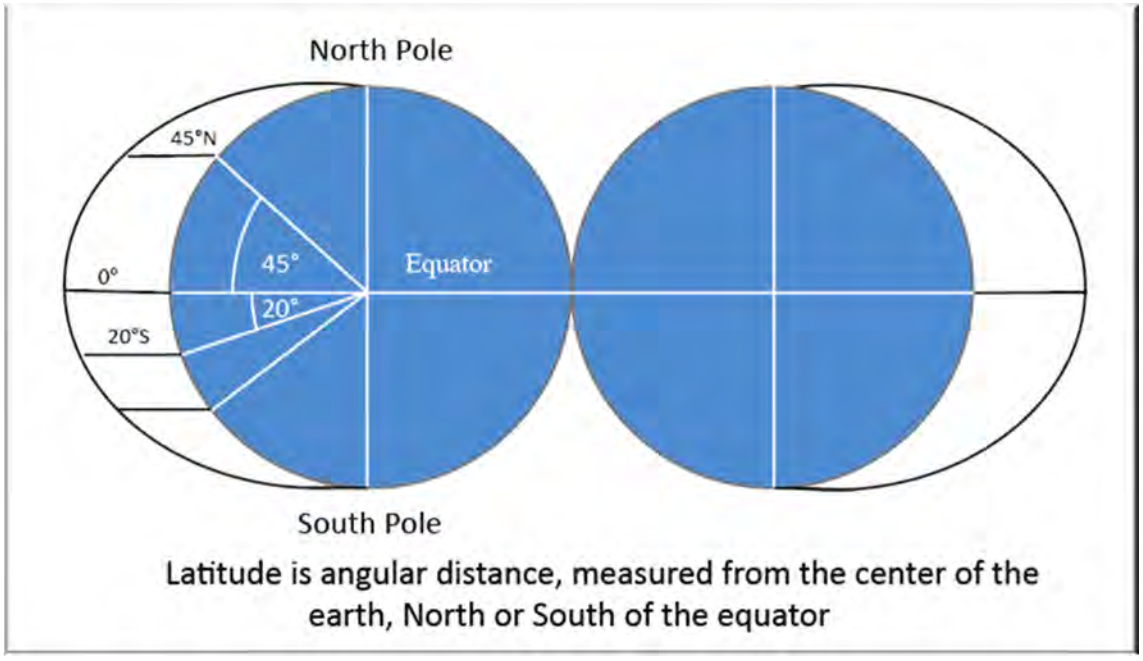
A vessel's position on the Earth can be described using **latitude and longitude**.

Latitude

Latitude measures distance **north or south of the Equator**.

The Equator is **0° latitude**, increasing to 90° North at the North Pole and 90° South at the South Pole.

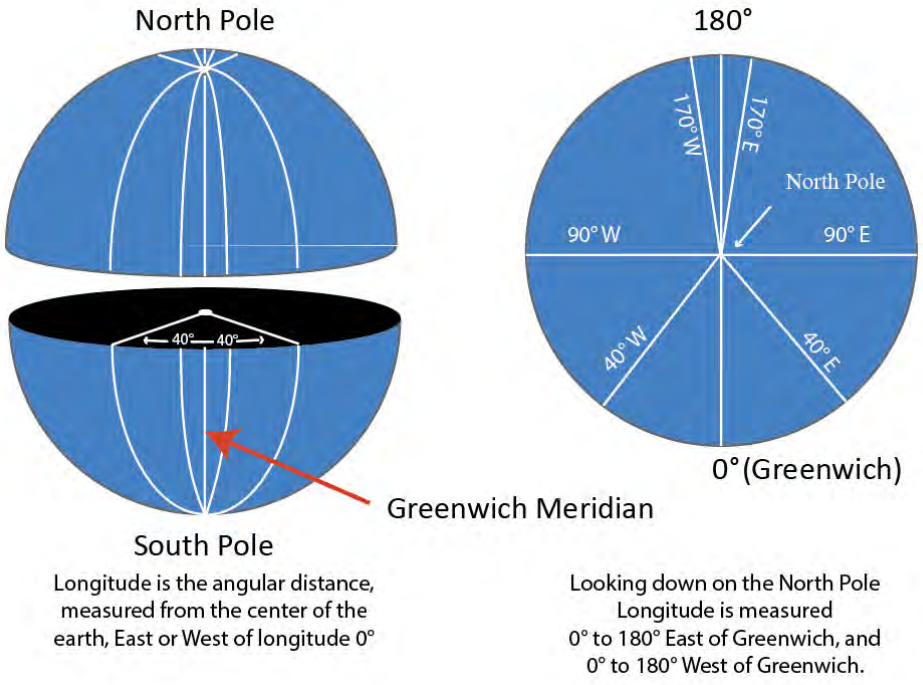
Lines of latitude run east-west around the Earth.



Longitude

Longitude measures distance **east or west of the Prime Meridian, which passes through Greenwich, England.**

The Prime Meridian is **0° longitude**, with longitude measured up to 180° East or West. Lines of longitude run from pole to pole.



A position is normally written:

Latitude first, Longitude second.

For example:

49° 30.5’ N, 123° 20.8’ W

Degrees and Minutes

Each degree (°) is divided into **60 minutes (’)**.

For navigation:

1 minute of latitude = 1 nautical mile

This relationship is extremely important because it allows distance to be measured directly from the **latitude scale at the side of a nautical chart**.

19.13 Measuring Distance on a Chart

Distances on a nautical chart are measured using the **latitude scale**, normally at the left or right side of the chart.

Because:

1 minute of latitude = 1 nautical mile

A pair of dividers can be used to measure the distance between two points and then transferred to the latitude scale.

Important - Do not normally measure distance using the longitude scale at the top or bottom of the chart.

The physical length of a minute of longitude changes with latitude, whereas a minute of latitude represents approximately one nautical mile.

19.14 Chart Scale

The **scale** of a chart describes the relationship between the distance on the chart and the actual distance on the Earth.

For example:

1:50,000

means that one unit measured on the chart represents 50,000 of the same units in the real world.

Large-Scale Charts

A **large-scale chart** covers a relatively small area in greater detail.

Examples include:

- Harbours
- Marina approaches
- Narrow channels
- Pilotage waters

Small-Scale Charts

A **small-scale chart** covers a much larger geographical area but provides less detail.

These are useful for:

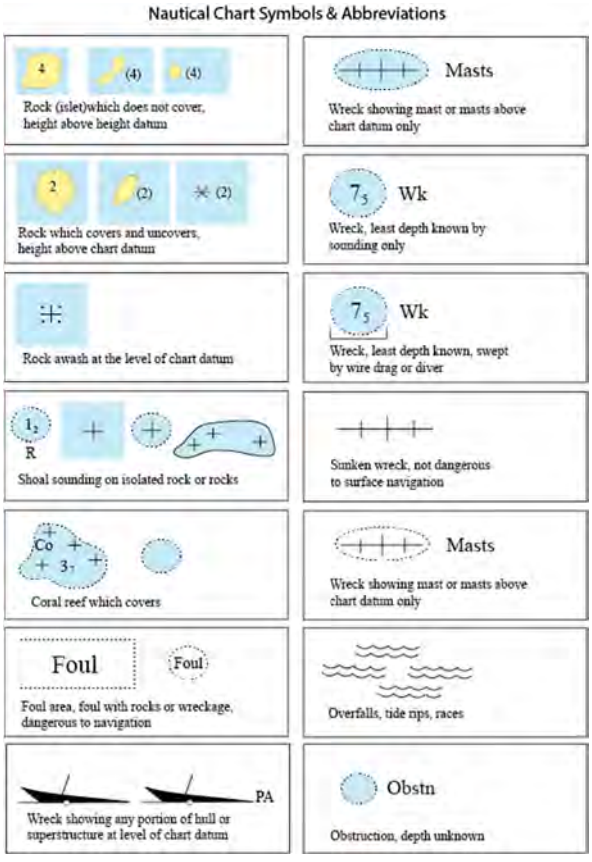
- General passage planning
- Offshore navigation
- Viewing a larger geographical area

Use the largest-scale chart available for the area being navigated.

This is particularly important with electronic charts. Zooming in on an electronic display does **not necessarily mean that additional charted detail exists**.

19.15 Chart Symbols and Abbreviations

Nautical charts use standardized **symbols, colours and abbreviations** to present a large amount of information clearly.



These may identify:

- Rocks and wrecks
- Buoys and beacons
- Lighthouses and light characteristics
- Anchorages
- Marinas
- Submarine cables and pipelines
- Bridges and overhead cables
- Restricted areas
- Traffic separation schemes
- Seabed characteristics
- Tidal information
- Pilot boarding areas

The navigator should never guess the meaning of an unfamiliar symbol.

Official chart publishers provide a reference explaining the symbols and abbreviations used on their charts. Examples include **Admiralty Chart 5011** for Admiralty charts and **Chart No. 1** publications used by other hydrographic authorities.

19.16 Lights on Nautical Charts

Navigation lights are shown on charts using abbreviations describing their **colour, character and period**.

Common abbreviations include:

- **F** — Fixed

- **Fl** — Flashing
- **Oc** — Occulting
- **Iso** — Isophase
- **Q** — Quick flashing
- **W** — White
- **R** — Red
- **G** — Green

For example:

Fl(2) R 10s

indicates a **red light showing two flashes every 10 seconds**.

Light characteristics allow the navigator to distinguish one aid to navigation from another, particularly at night.

19.17 Compass Rose and Magnetic Deviation

Nautical charts normally include one or more **compass roses**.

The outer circle indicates **True North**, while an inner compass rose may provide information about **magnetic variation** for the area.

Magnetic variation changes gradually over time. The chart will normally state:

- The variation at a specified year
- Whether it is East or West
- Its approximate annual change

The navigator must use current variation when converting between **true and magnetic directions**.

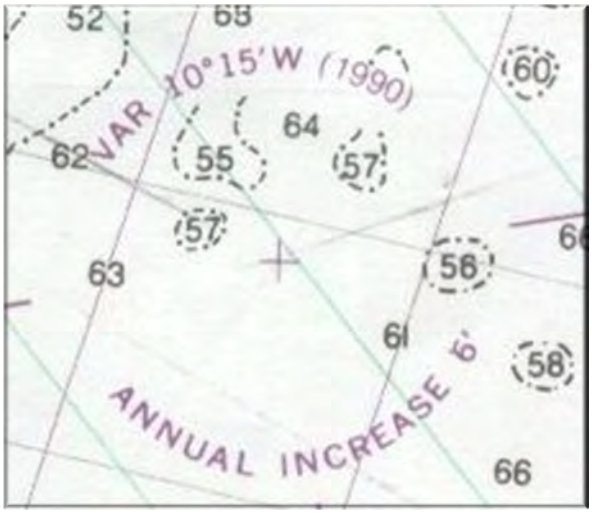


FIGURE 68 - COMPASS ROSE ON CHART

19.18 Notes, Warnings and Cautions

Important information is often printed directly on the chart in the form of **notes, warnings and cautions**.

These may relate to:

- Strong currents
- Dangerous shoals
- Restricted navigation

- Military exercise areas
- Traffic regulations
- Submarine cables
- Unreliable surveys
- Changing depths
- Local regulations

Always read the notes and warnings on a chart before using it for passage planning.

19.19 Source Data and Reliability

Not every part of a nautical chart is based on surveys of the same age or accuracy.

Some areas may have been surveyed recently using modern equipment, while others may rely on much older information.

The skipper should therefore exercise additional caution in:

- Poorly surveyed areas
- Remote waters
- Areas where depths frequently change
- Sandbanks and river entrances
- Areas specifically identified as having uncertain data

Electronic positioning can tell you very accurately **where the vessel is**, but it cannot make inaccurate or outdated chart information more accurate.

19.20 Using Charts Safely

A chart is an aid to navigation and should always be used together with other available information.

During a passage, compare the charted position with:

- Visual observations
- Depth soundings
- Buoys and navigational marks
- Compass bearings
- GPS position
- Radar, where fitted
- Other available navigational information

When navigating electronically, avoid becoming focused solely on the screen. **Look outside the vessel and continually compare what you see with what the chart indicates should be there.**

Key Points

A Day Skipper should be able to:

- Understand **Chart Datum**
- Read charted **depths and drying heights**
- Determine available depth using the **height of tide**
- Understand charted heights and clearances
- Plot and read **latitude and longitude**
- Measure distance using the **latitude scale**
- Select an appropriate **chart scale**
- Recognize common chart symbols and abbreviations
- Interpret basic **light characteristics**
- Locate magnetic variation
- Read chart notes and warnings
- Recognize the limitations of charted information
- Use paper and electronic charts safely

Never rely on a single source of navigational information.

Module 20 TIDES & CURRENTS

20.1 Key Objectives

THE OBJECTIVE OF THIS MODULE IS TO GIVE THE STUDENT AN UNDERSTANDING OF TIDES AND CURRENTS AND THE CAUSES.

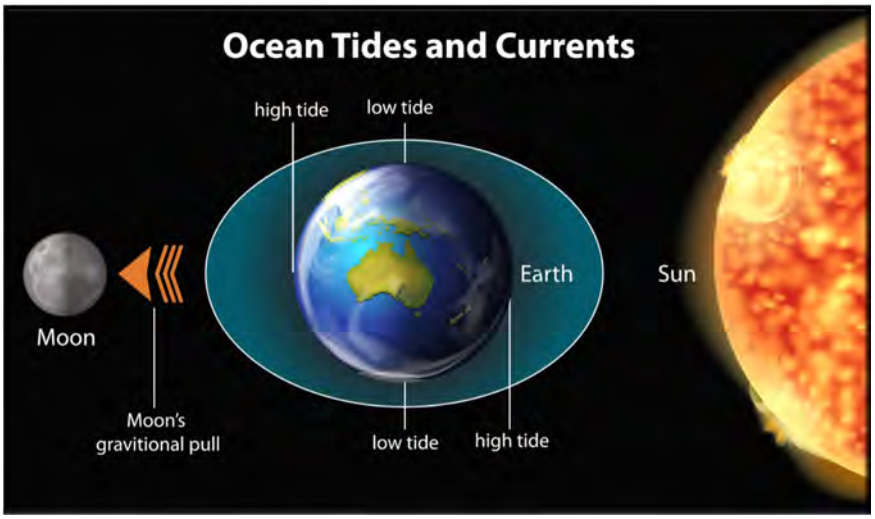
Note: This section does not apply to lakes and reservoirs as they are non-tidal.

20.2 Tides

An understanding of tides is essential for safe coastal navigation. Tides affect two important factors:

- Depth of water — the vertical rise and fall of sea level.
- Tidal current or stream — the horizontal movement of water caused by the tide.

The skipper must consider both when planning a passage, entering or leaving harbour, anchoring, calculating under-keel clearance and determining the vessel's course and speed over the ground.



Tidal Cycles

In many parts of the world there are approximately **two high waters and two low waters each lunar day**. This is known as a **semidiurnal tide**.

Other tidal patterns include:

- **Diurnal tide** — approximately one high water and one low water each lunar day.
- **Mixed tide** — two high and two low waters of noticeably different heights.

Local geography can significantly alter the timing, height and character of the tide.

What Causes Tides?

Tides are caused primarily by the **gravitational attraction of the Moon**, together with the gravitational effect of the Sun and the motion of the Earth-Moon system.

The Moon's influence produces two principal tidal bulges on opposite sides of the Earth. As the Earth rotates through these bulges, coastal areas generally experience alternating periods of high and low water.

Although the Sun is much larger than the Moon, the Moon is considerably closer to Earth and therefore has a greater influence on the tides.

The Lunar Day

A **lunar day** is approximately **24 hours 50 minutes**. In an area with a regular semidiurnal tide, successive high waters occur approximately **12 hours 25 minutes apart**.

As a general guide, corresponding high and low waters occur about **50 minutes later each day**, although actual times vary considerably with location.

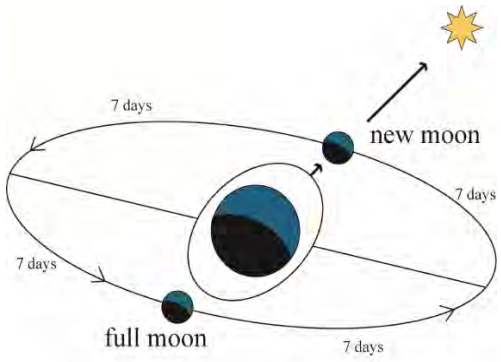
Spring Tides

Spring tides occur around **new moon and full moon**, when the Sun, Moon and Earth are approximately aligned.

Their gravitational effects combine to produce a **greater tidal range**:

- Higher high waters
- Lower low waters
- Generally stronger tidal currents

The term *spring* refers to the tide "springing" to a greater range and is **not related to the season**.



Spring Tides

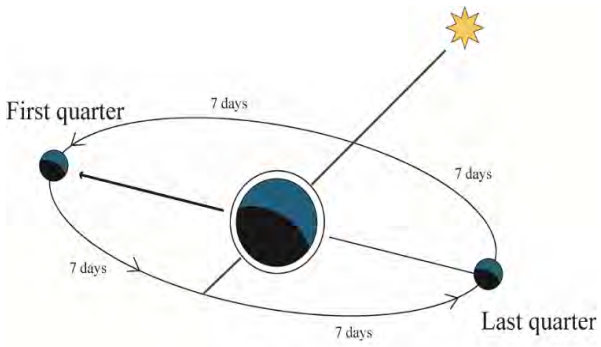
Neap Tides

Neap tides occur around the **first and third quarter moons**, when the Sun and Moon are approximately at right angles relative to the Earth.

Their gravitational effects partially oppose each other, producing a **smaller tidal range**:

- Lower high waters
- Higher low waters
- Generally weaker tidal currents

Spring and neap tides alternate approximately every **seven days**.



Neap Tides

Tidal Currents

As the tide rises and falls, large quantities of water move into and out of coastal areas, harbours, bays, channels and rivers. This horizontal movement is called a **tidal current** or **tidal stream**.

Tidal currents are generally stronger during **spring tides** and weaker during **neap tides**, although their actual strength and direction are greatly influenced by local geography and water depth.

For the Day Skipper, knowing the **time and height of the tide** and the **direction and strength of the tidal current** is an important part of passage planning.

20.3 Tidal Definitions and Tidal Heights

Understanding the following terms is essential when using **charts and tide tables** to determine the depth of water available. Much of this section was covered in the Nautical Charts section but included here as it is relevant to understanding tides.

Chart Datum (CD)

Chart Datum - Chart Datum is the reference level from which charted depths, drying heights and tidal heights are measured.

The datum used varies by charting authority. For example:

- Many charts use **Lowest Astronomical Tide (LAT)**.
- U.S. charts commonly use **Mean Lower Low Water (MLLW)**.

Always check the chart to determine which datum is being used.

Charted Depth or Sounding

A **charted depth**, or **sounding**, is the depth of water shown on the chart measured below Chart Datum. The approximate actual depth of water is:

Charted Depth + Height of Tide = Depth of Water

Drying Height

A **drying height** is the height of a feature **above Chart Datum**. Rocks, sandbanks and other features with drying heights may be exposed at low water and covered as the tide rises.

To determine the water over a drying feature:

Height of Tide – Drying Height = Depth of Water over the Feature

Height of Tide

The **height of tide** is the vertical distance between Chart Datum and the water level at a particular time.

It is obtained from tide tables or other approved tidal predictions.

High Water (HW)

High Water is the time when the tide reaches its maximum height during a tidal cycle.

Low Water (LW)

Low Water is the time when the tide reaches its minimum height during a tidal cycle.
Published times and heights are predictions and may be affected by **wind, atmospheric pressure and other weather conditions**.

Duration

The **duration** of a rising or falling tide is the time between successive high and low waters.

Range of Tide

The **range** is the difference in height between successive high and low water.

Range = Height of HW – Height of LW

Example:
HW = 4.8 m
LW = 1.2 m

Range = **3.6 m**

Lowest Astronomical Tide (LAT)

LAT is the lowest tidal level predicted to occur under average meteorological conditions and under any combination of astronomical conditions.
It is commonly used as Chart Datum in many parts of the world.

Mean Lower Low Water (MLLW)

MLLW is the average height of the lower of the two daily low waters calculated over a long period. It is commonly used as Chart Datum on U.S. nautical charts.

Spring Tides

Spring tides occur around the new and full moons and have a **greater tidal range**:

- Higher high waters
- Lower low waters
- Generally stronger tidal currents

Neap Tides

Neap tides occur around the first and third quarter moons and have a **smaller tidal range**:

- Lower high waters
- Higher low waters
- Generally weaker tidal currents

Spring and neap tides alternate approximately every seven days.

Standard and Secondary Ports

A **Standard Port** has tidal predictions published directly for that location.

A **Secondary Port** uses tidal information derived from a nearby Standard Port by applying published corrections to the times and heights of high and low water.

The Rule of Twelfths

The **Rule of Twelfths** provides a simple estimate of the rise or fall of a regular semidiurnal tide between high and low water.

It assumes approximately six hours between high and low water and divides the tidal range into twelfths:

Hour	Rise or Fall	Cumulative
1st	1/12	1/12
2nd	2/12	3/12
3rd	3/12	6/12
4th	3/12	9/12
5th	2/12	11/12
6th	1/12	12/12

The tide therefore changes relatively slowly near **high and low water** and most rapidly around **mid-tide**.

Important: The Rule of Twelfths is only an approximation. It should be used where the tidal curve is reasonably regular. Where official tidal curves, tables or electronic predictions are available, these should be used.

Tidal Height Calculations

Day Skipper tidal calculations generally require you to determine either:

1. **The height of tide at a particular time**, or
2. **The time at which a required height of tide will occur.**

These calculations are particularly important when determining whether there will be sufficient water to pass safely over a shallow area or drying feature.

Required Depth of Water

Before crossing shallow water, allow for:

- Vessel's **draft**
- Required **under-keel clearance**
- Any **drying height**

Example — Crossing a Drying Feature

A yacht has:

- Draft = **4 ft**
- Required safety clearance = **1 ft**
- Drying height = **1 ft**

The required height of tide is:

Drying Height + Draft + Safety Clearance

1 ft + 4 ft + 1 ft = 6 ft

The yacht therefore requires a **height of tide of at least 6 ft** before it can safely pass over the feature.

The tide tables can then be used to determine **when the tide will reach 6 ft**.

Remember

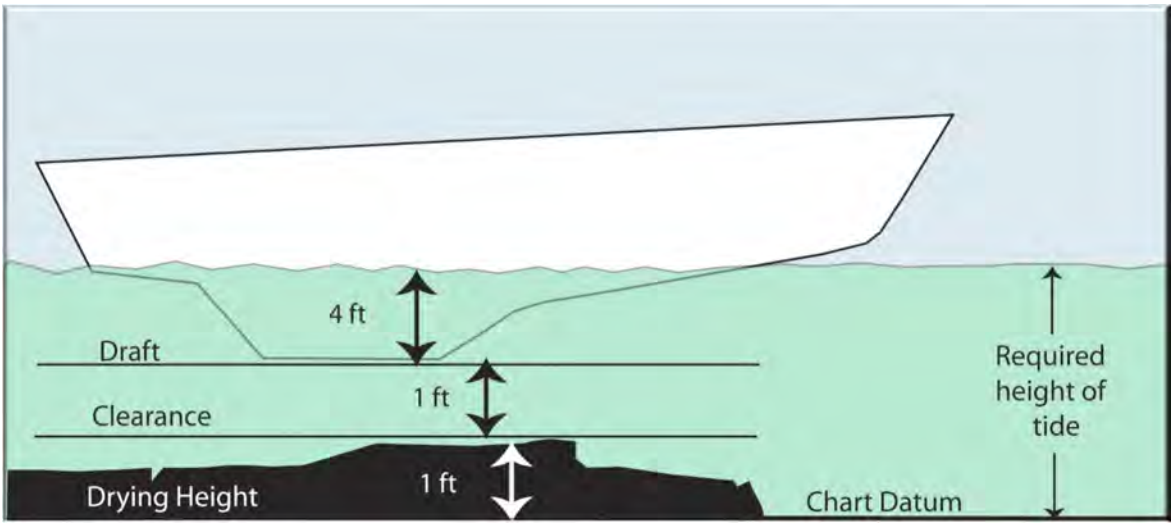
For a charted depth:

Available Depth = Charted Depth + Height of Tide

For a drying height:

Water over Feature = Height of Tide − Drying Height

Always include an appropriate **under-keel clearance** when determining whether sufficient water is available.



TIDAL HEIGHT

20.4 Currents and Tidal Streams

A **current** is the horizontal movement of water. Currents may be caused by tides, wind, river flow, ocean circulation or a combination of these factors.

A **tidal stream** is a current caused specifically by the rise and fall of the tide.

Currents affect both the **direction** and **speed over the ground** of a vessel.

For example, a boat travelling at 5 knots through still water will normally make approximately 5 knots over the ground. If it enters a 2-knot current, its speed and direction over the ground will change depending on the direction of the current.

The skipper must therefore allow for current when planning and navigating a passage.

Flood Stream

The **flood stream** is the tidal current generally associated with the rising or incoming tide.
In many coastal areas it flows towards the shore, into a harbour, bay or estuary. Local geography can, however, cause the direction of the stream to differ from what might be expected.

Ebb Stream

The **ebb stream** is the tidal current generally associated with the falling or outgoing tide.
It commonly flows away from the shore or out of harbours, bays and estuaries.

Slack Water

Slack water is the period when the tidal stream becomes weak as it changes between flood and ebb, or vice versa.

The water may become nearly stationary before beginning to flow in the opposite direction.

> **Important:** Slack water does not necessarily occur at the same time as high or low water. The timing varies with location and should be obtained from the appropriate tidal information.

Direction — Set

The direction in which a current is flowing is called its **set**.

Set is normally expressed in **degrees True (°T)** and refers to the direction **towards which the water is flowing**.

For example:

Set 090°T means the current is flowing towards the east.

Rate — Drift

The speed of the current is called its **rate** or **drift** and is expressed in **knots**.

For example:

Set 090°T, Drift 2 knots
means that the water is moving towards 090° True at a speed of 2 knots.

Spring and Neap Rates

Tidal streams are generally stronger during **spring tides** because of the greater tidal range and weaker during **neap tides**.

Tidal information may therefore provide separate rates for springs and neaps.

The actual rate may also be affected by local geography, river flow, wind and weather conditions.

Effect of Current on a Vessel

A vessel moves **through the water**, while the current moves the water itself over the seabed.

The combination determines the vessel's actual **course and speed over the ground**.

A following current increases speed over the ground, while an opposing current reduces it. A current flowing across the vessel's course will carry the vessel sideways.

For example, a boat travelling at **5 knots through the water** with a **2-knot current directly against it** will make approximately:

5 − 2 = 3 knots over the ground

With the same current directly behind it:
5 + 2 = 7 knots over the ground

When the current acts from the side, the skipper must alter the vessel's heading to compensate for the sideways movement.

CHESAPEAKE BAY ENTRAN

CURRENT TABLE 2004 36°58.80'N 75°59.88'W

Eastern Time (75°W) Corrected for Daylight Saving Time

MAY JU

	Slack time	Max time	Fld knots	Ebb knots
1 Sa	0330	0016	0.7	1.1
	0855	0601		
	1558	1237	0.9	1.3
	2154	1838		
2 Su	0420	0108	0.8	1.2
	0937	0642		
	1631	1319	1.2	1.5
	2243	1915		
3 M	0509	0159	0.9	1.4
	1019	0726		
	1707	1403	1.4	1.6
	2329	1956		
4 Tu ○	0557	0250	0.9	1.6
	1103	0815		
	1748	1449	1.5	1.7
		2042		
5	0016	0338	0.9	1.7
	0648	0906		
16	0502	0153	0.6	1.2
Su	0959	0709		
	1648	1345	1.0	1.2
	2314	1936		
17 M	0547	0241	0.6	1.3
	1032	0750		
	1721	1421	1.0	1.2
	2351	2011		
18 Tu	0631	0322	0.5	1.3
	1104	0833		
	1754	1454	1.1	1.2
		2049		
19 W ●	0028	0358	0.5	1.2
	0714	0915		
	1137	1525	1.0	1.2
	1830	2126		
20	0104	0432	0.5	1.2
	0757	0956		
1 Tu	0448	0136	0.8	1.4
	0937	0657		
	1636	1330	1.5	1.6
	2308	1926		
2 W ○	0538	0230	0.8	1.6
	1030	0748		
	1723	1423	1.6	1.7
	2358	2016		
3 Th	0629	0321	0.9	1.7
	1124	0843		
	1813	1516	1.6	1.7
		2108		
4 F	0049	0411	0.9	1.7
	0723	0938		
	1220	1607	1.6	1.7
	1907	2201		
5	0142	0502	0.9	1.7
	0819	1031		

CURRENT TABLE EXAMPLE

Sources of Current Information

Information on tidal currents and streams is available from official hydrographic authorities and nautical publications. Depending on the cruising area, these may include:

- Tide and tidal current tables
- Nautical charts
- Tidal Stream Atlases
- Current diagrams
- Nautical almanacs
- Electronic charting and navigation systems

The skipper should use **current and appropriate information for the area being navigated**.

Tidal Stream Atlases

Where tidal streams vary considerably across an area, the information may be presented in a **Tidal Stream Atlas**.

An atlas consists of a series of chartlets showing the predicted tidal stream at different stages of the tidal cycle.

Arrows show the **direction of flow**, while accompanying figures indicate the predicted **rate** of the stream.

The chartlets are commonly related to a reference high water, for example:

HW −3, HW −2, HW −1, HW, HW +1, HW +2

This allows the navigator to see how the direction and strength of the tidal stream change throughout the tidal cycle.

Tidal stream information is particularly important when navigating:

- Narrow channels and harbour entrances
- Headlands
- Straits and sounds
- Areas of strong tidal flow
- Areas where wind against tide may produce rough or dangerous seas

Remember

A current can significantly alter both the vessel's **course over the ground** and **speed over the ground**.

Before a coastal passage, determine:

- **Direction (set)** of the current
- **Rate (drift)** of the current
- How these will change during the passage
- Whether the current will assist or oppose the vessel

Whenever practical, a passage should be planned to **use favourable currents rather than fight them**.

Module 21 BUOYAGE

21.1 Key Objectives

THE OBJECTIVE OF THIS MODULE IS TO UNDERSTAND THE IMPORTANCE OF THE INTERNATIONAL BUOYAGE SYSTEM WITH PARTICULAR REFERENCE TO IALA REGIONS A & B AND WHAT THIS MEANS FOR THE NAVIGATOR, & THE USE AND IDENTIFICATION OF CARDINAL MARKS.

21.2 The IALA Maritime Buoyage System

Buoys, beacons and other navigation marks are used to identify **channels, safe water, navigational hazards and special areas**.

The international system was established by the **International Organization for Marine Aids to Navigation (IALA)** and is known as the **IALA Maritime Buoyage System**.

Navigators must be able to recognize the different types of marks by their:

- **Colour**
- **Shape**
- **Topmark**
- **Light colour and characteristic**, when fitted

IALA Regions A and B

The world is divided into two buoyage regions:



FIGURE 69 - IALA A AND B

IALA Region A - Used throughout Europe and most of the rest of the world.

IALA Region B - Used throughout North, Central and South America, the Caribbean, Japan, Korea and the Philippines.

The most important difference between Regions A and B concerns **lateral marks**, where the red and green colours are reversed. When entering a harbour or proceeding in the conventional direction of buoyage:

	Region A	Region B
Port-hand mark	Red	Green
Starboard-hand mark	Green	Red

A useful reminder for Region B is:
"Red, Right, Returning."

This means that when returning from seaward, the **red lateral marks are kept to starboard**.

Important: Always determine which IALA region applies before navigating unfamiliar waters. The other principal types of IALA marks follow the same basic system in both regions.

Types of IALA Marks

The IALA Maritime Buoyage System includes six principal types of marks.

Lateral Marks

Lateral marks identify the port and starboard sides of a navigable channel.

Their colours differ between Regions A and B.

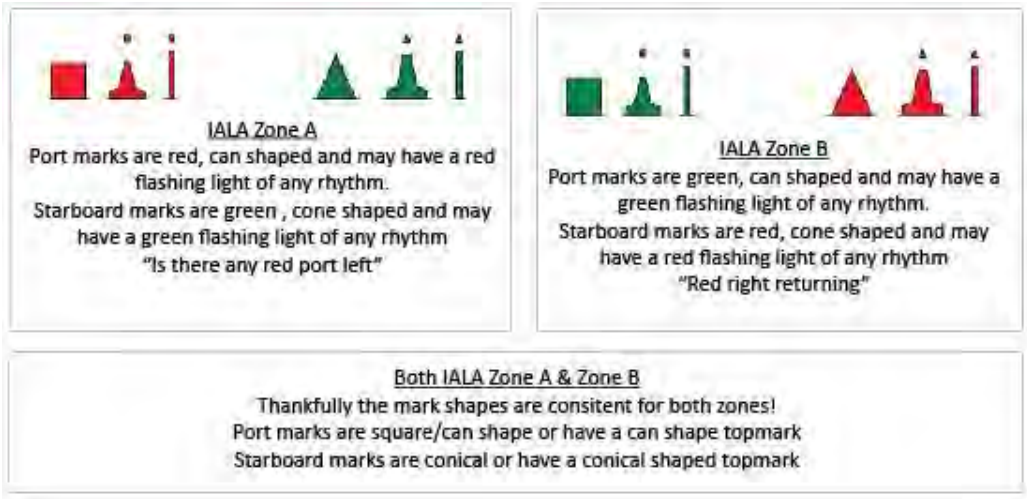
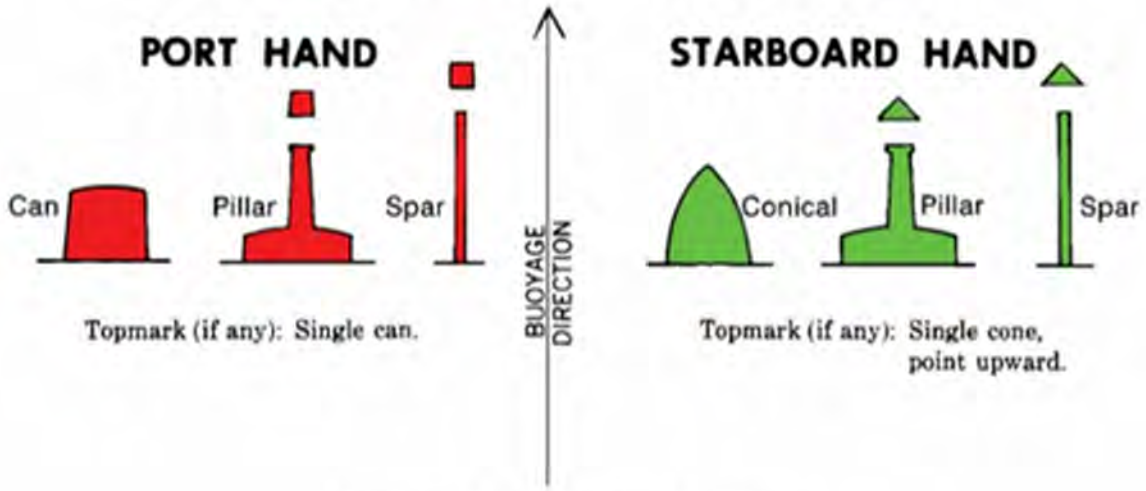


FIGURE 70 - LATERAL MARKS

IALA MARITIME BUOYAGE SYSTEM
LATERAL MARKS REGION A



Topmark (if any): Single can.

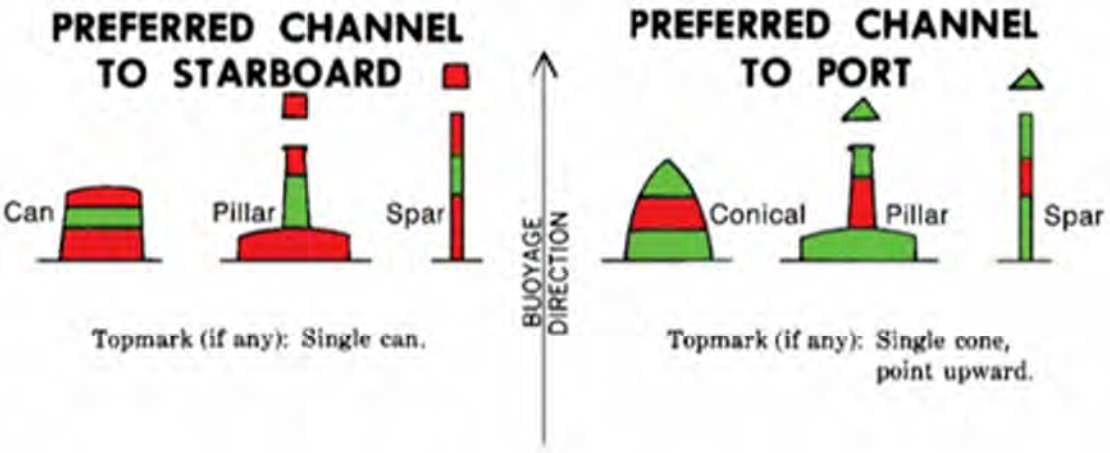
Topmark (if any): Single cone, point upward.

Lights, when fitted, may have any phase characteristic other than that used for preferred channels.

Examples



Quick Flashing
Flashing
Long Flashing
Group Flashing



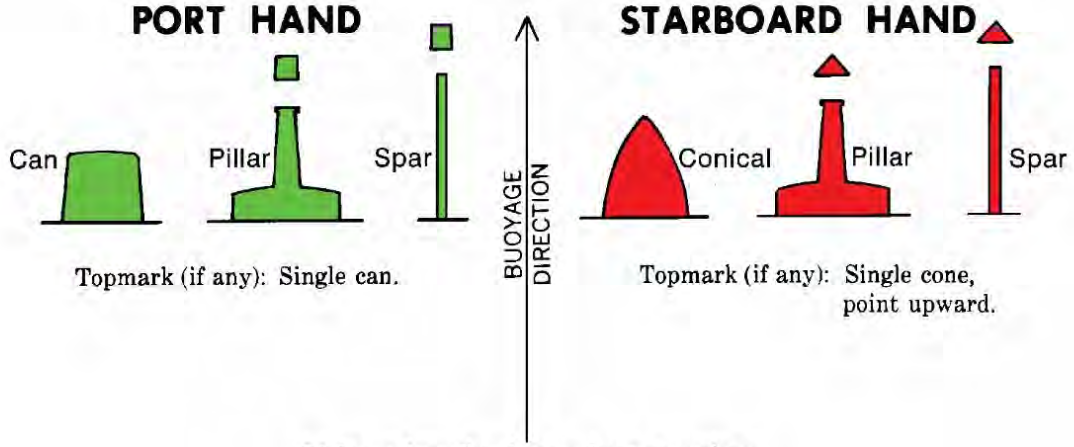
Topmark (if any): Single can.

Topmark (if any): Single cone, point upward.

Lights, when fitted, are composite group flashing Fl (2 + 1).



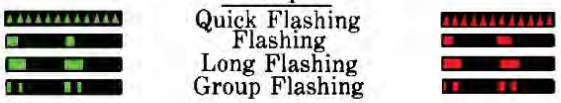
IALA MARITIME BUOYAGE SYSTEM
LATERAL MARKS REGION B

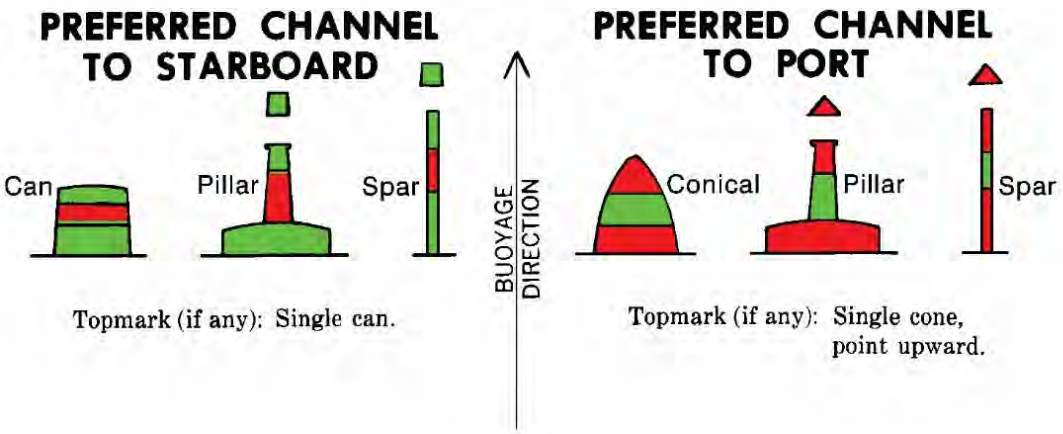


Topmark (if any): Single can.

Topmark (if any): Single cone, point upward.

Lights, when fitted, may have any phase characteristic other than that used for preferred channels.





Topmark (if any): Single can.

Topmark (if any): Single cone, point upward.

Lights, when fitted, are composite group flashing Fl (2+1).



Cardinal Marks

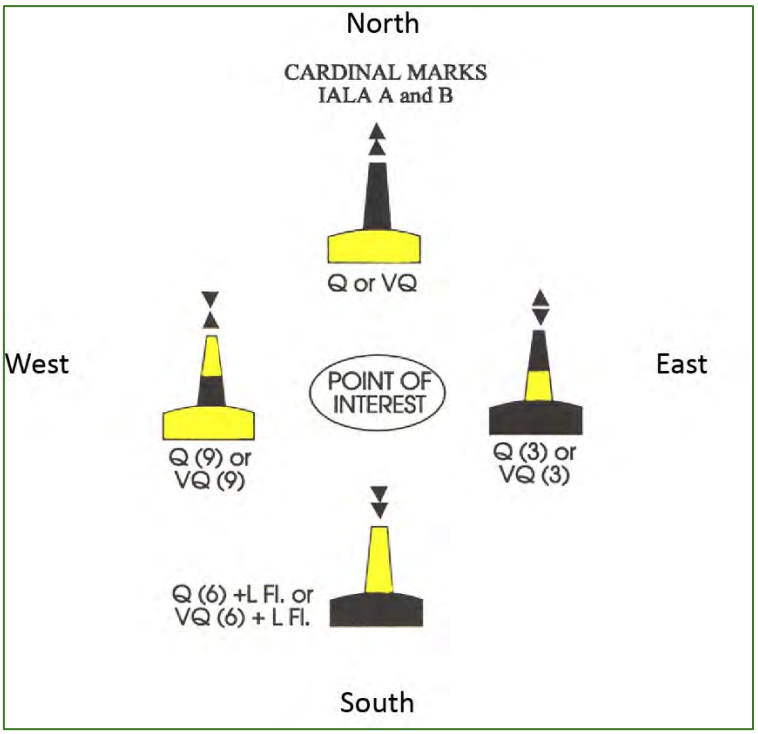
Cardinal marks indicate where the safest water lies in relation to danger.

They are named according to the safe side on which to pass:

- North Cardinal — safe water to the north
- East Cardinal — safe water to the east
- South Cardinal — safe water to the south
- West Cardinal — safe water to the west

Cardinal marks are identified by distinctive black and yellow bands, black cone-shaped topmarks and white light characteristics.

MARK	MARK COLOUR	DIRECTION OF TRIANGLE	LIGHT AND FLASH
North Cardinal	Black over Yellow	Triangle point up	Continuous flash
East Cardinal	Black/Yellow/Black	Triangle point away	Flash in a group of 3
South Cardinal	Yellow over Black	Triangles point down	Flash in a Group of 6, followed by 1 long flash
West Cardinal	Yellow/Black/Yellow	Triangle points in	Flash in a Group of 9



CARDINAL MARKS IALA A & B

- **Q (9)** indicates quick flashing light 9 times
- **VQ (9)** indicates very quick flashing light 9 times
- **Q (6) + L Fl.** indicates quick flashing light 6 times and a long flash

Isolated Danger Marks

An **Isolated Danger Mark** is placed on or near a small, isolated hazard with navigable water around it.

Typical examples include an isolated rock, shoal or wreck.



ISOLATED DANGER MARK

Safe Water Marks

A **Safe Water Mark** indicates that navigable water exists around the mark.

It may be used to indicate the center of a channel, a landfall position or the entrance to a channel.



SAFE WATER MARK

Special Marks

Special Marks identify a special area or feature shown on the chart.

They may be used to mark:



SPECIAL MARK

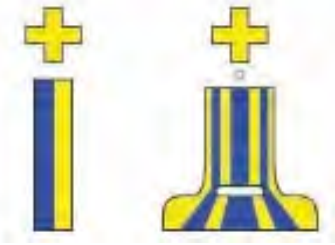
- Recreation areas
- Cable or pipeline areas
- Dredging areas
- Spoil grounds
- Aquaculture areas
- Traffic separation features
- Other special-purpose areas

Special marks are **yellow** and may carry a yellow **X-shaped topmark**. They consist of one quick flash with intervals of 5 seconds.

Emergency Wreck Marking Buoys

An **Emergency Wreck Marking Buoy** may be used to temporarily mark a new wreck or other newly discovered danger until a more permanent form of marking is established.

It is distinguished by **vertical blue and yellow stripes** and, when lit, an alternating **blue and yellow flashing light**.



WRECK BUOY

Using Buoyage Safely

Buoys and beacons are important aids to navigation, but they should not be relied upon as the vessel's only means of determining position.

Marks can be:

- Moved from their charted position
- Damaged
- Unlit
- Missing
- Difficult to identify in poor visibility

The skipper should confirm navigation marks using the **nautical chart, vessel position, depth, compass bearings and other available navigational information.**

Module 22 COLLISION REGULATIONS

22.1 Key Objectives

THE OBJECTIVE OF THIS MODULE IS TO GET THE STUDENT TO UNDERSTAND THE IMPORTANCE OF THE INTERNATIONAL COLLISION REGULATIONS, LIGHTS, SOUNDS AND SHAPES AND SAFE OPERATION IN RESTRICTED VISIBILITY.

The International Regulations for preventing collisions at sea were agreed upon by a conference of the International Maritime Organization (IMO) and are usually referred to as the "COLREGS". It is not necessary to know all of the Rules off by heart but a thorough knowledge of the COLREGS is essential.

22.2 Definitions

Here are some important definitions contained in the Colregs. The type of vessel defined will dictate what action should be taken.

The word **"vessel"** includes every description of watercraft, including seaplanes, capable of being used as a means of transportation on water.

The term **"power-driven vessel"** means any vessel propelled by machinery.

The term **"sailing vessel"** means any vessel under sail provided that propelling machinery is not being used.



POWER DRIVEN VESSEL



SAILING VESSEL

The term **"vessel engaged in fishing"** means any vessel fishing with nets, lines, trawls or other fishing apparatus which restrict maneuverability, but does not include a vessel fishing with trolling lines or other fishing apparatus which do not restrict maneuverability.



VESSEL ENGAGED IN FISHING

The term **"vessel not under command"** means a vessel which through some exceptional circumstance is unable to maneuver as required by these Rules and is therefore unable to keep out of the way of another vessel.

The term **"vessel restricted in her ability to maneuver"** means a vessel which from the nature of her work is restricted in her ability to maneuver as required by these Rules and is therefore unable to keep out of the way of another vessel. (E.g. dredging, surveying, pipe or cable laying, towing, etc.).



VESSEL RESTRICTED IN HER ABILITY TO MANEUVER

The term **"vessel constrained by her draught"** means a power-driven vessel, which, because of her draught in relation to the available depth and width of navigable water, is severely restricted in her ability to deviate from the course she is following.

The word **"underway"** means that a vessel is not at anchor, or made fast to the shore, or aground.

The term **"restricted visibility"** means any condition, in which visibility is restricted by fog, mist, falling snow, heavy rainstorms, sandstorms or any other similar causes.



VESSEL CONSTRAINED BY HER DRAUGHT

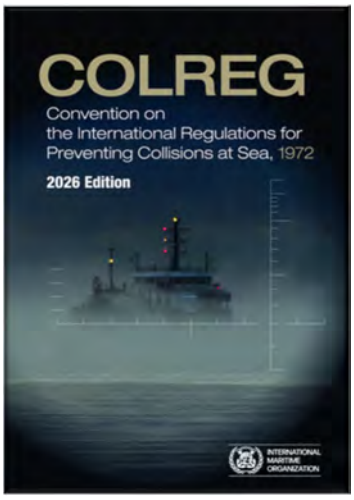


VESSEL UNDERWAY



VESSEL / RESTRICTED VISIBILITY

22.3 COLREGS & What You Need to Know



A thorough working knowledge of the COLREGS is essential for every skipper. Although it is not necessary to memorize every Rule, mariners must be able to recognize common situations and know the correct action to take without having to stop and consult a reference. Uncertainty or delay can lead to collision and endanger your vessel and others. A current copy of the COLREGS should always be readily available for reference.

One of the more challenging areas to learn is the navigation lights and shapes displayed by vessels in different circumstances. These must be recognized quickly, as they provide important information about a vessel's type, activity and ability to manoeuvre. Flash cards, training aids and practice exercises are useful ways to develop this recognition.

The COLREGS are effectively the rules of the road at sea. Just as drivers must understand road signs, traffic signals and right-of-way rules, skippers must understand and apply the COLREGS consistently to navigate safely and avoid collisions.

The 72 COLREGS

The COLREGS consist of 38 rules which are set out in 5 parts, as follows:

Part A: General
Part B: Steering and Sailing Rules
Part C: Lights and Shapes
Part D: Sound and Light Signals
Part E: Exemptions

22.4 Part A, General

Part A defines that the Rules apply to all vessels (regardless of size) on the high seas and to all waters connected to the high seas that are navigable by seagoing vessels.

- The Rules, however, allow appropriate authorities to operate special rules in harbours, rivers, lakes and inland waterways but state that any such special rules should conform as closely as possible to the COLREGS.

- In Europe there is a complete set of regulations for inland waterways, rivers, lakes and canals (CEVNI: Code Europeen Des Voies De Navigation Interieure), while the U.S. has the Inland Navigation Rules which apply on the inland waters of the United States. The point at which the rules change from International to Inland is marked on U.S. charts by the words 'COLREGS DEMARCATION LINE."

- The Inland Rules apply on U.S. navigable waters inside the demarcation lines and on the U.S. side of the Great Lakes. These waters are called "inland waters" and are formally defined in Rule 3. The Inland Rules also apply to U.S. vessels operating on the Canadian side of the Great

Lakes except for those provisions that conflict with Canadian navigation rules for the Great Lakes. The U.S. and Canadian navigation rule drafters worked together to minimize the differences between the two countries' rules and to help ensure that the Great Lakes mariner would have little difficulty transiting from one side to the other.

- Many of the Inland Rules wherever you sail are in fact identical to the International Rules.

22.5 Part B, Steering and Sailing Rules

Section I – Conduct of Vessels in any condition of visibility

Application "Rule 4"
Rules in this section apply to any condition of visibility.

Lookout "Rule 5" **(one of the most important of all the rules)**
Every vessel shall at all times be responsible for maintaining a proper look-out by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision."

Safe Speed "Rule 6"
Vessels shall at all times proceed at a safe speed taking into consideration visibility, traffic density, manoeuvrability of the vessel, background lights at night, state of the wind, sea, current, and proximity of navigational hazards.

Risk of Collision "Rule 7"
Vessels shall use all available means to determine if risk of collision exists. Risk of collision shall be deemed to exist if the compass bearing of an approaching vessel does not appreciably change; risk of collision may sometimes exist with a large vessel, a tow or a vessel at close range even if the bearing does change appreciably.

If there is any doubt, risk of collision shall be deemed to exist.

Assumptions shall not be made on the basis of scanty information, especially scanty radar information.

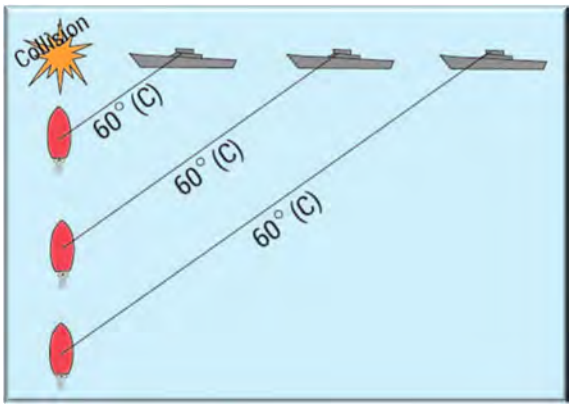


FIGURE 71 - RISK OF COLLISION

Action to Avoid Collision "Rule 8"
Any action taken to avoid collision shall be positive, made in ample time and with due regard to good seamanship. A change of direction and/or speed shall be large enough to be obvious to the other vessel - avoid small successive changes in speed and/or direction.

The most important rule for avoiding collision is to **maintain a proper lookout at all times** by watching, listening and all other means possible such as radar or binoculars. It is imperative that when you first

encounter another vessel, the question needs to be asked "is there any risk of a collision?". Every vessel is required to travel at a safe speed which means that proper and effective action can be taken to stop the boat within a safe distance or to manoeuvre while maintaining control of the vessel.

Narrow Channels "Rule 9"

Vessels should keep as close as practical to the starboard side of a channel or fairway. A vessel less than 20 meters, a sailing vessel or a fishing vessel shall not impede the passage of a vessel that can only safely navigate within a narrow channel or fairway.

"Rule 10" - Traffic Separation Schemes (TSS)

Traffic separation schemes have been set up in area where there is a heavy concentration of shipping. They are designed to act in similar fashion to a divided highway by separating the opposing flows.

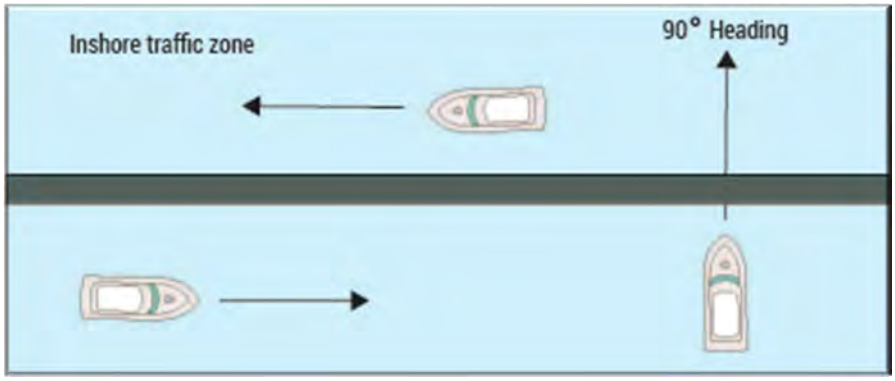


FIGURE 72 - TRAFFIC SEPARATION ZONE

Use the TSS and always use correct lane, join at shallow angle, cross at 90° heading.

Do not use inshore zone without local knowledge.

Vessels should:

- proceed in the appropriate traffic lane in the general direction of traffic flow for that lane.
- keep clear of a traffic separation line or separation zone.
- normally join or leave a traffic lane at the termination of the lane, but when joining or leaving from either side shall do so at as small an angle to the general direction of traffic flow as practicable.
- avoid crossing traffic lanes but if obliged to do so shall cross on a heading as nearly as practicable at right angles to the general direction of traffic flow.
- vessels of less than 20 meters in length, sailing vessels and vessels engaged in fishing may use the inshore traffic zone.
- A vessel may use an inshore traffic zone when en route to or from a port, offshore installation or structure, pilot station or any other place situated within the inshore traffic zone, or to avoid immediate danger.
- A vessel shall avoid anchoring in a traffic separation scheme or in areas near its terminations.
- A vessel engaged in fishing shall not impede the passage of any vessel following a traffic lane.

Section II – Conduct of vessels in sight of one another

"Rule 11" - Application – Stand on / Give way
Rules in this section apply to vessels in sight of one another. (Which vessel shall "stand-on" and which should "give-way"

'Give Way', 'Stand On'
If risk of collision exists between two vessels correct application of the Rules will require one vessel to give way and confer right of way to the other vessel. The vessel required to give way is called the Give Way vessel and the vessel with right of way is called the Stand On vessel; both vessels have specific responsibilities under the Rules.

Action by Give Way vessel
The Give Way vessel shall take early and substantial action to keep clear.

Action by the Stand On vessel
The stand on vessel must maintain her course and speed. The stand on vessel may, however, take action to avoid collision by her maneuver alone, as soon as it becomes apparent to her that the vessel required to keep out of the way is not taking appropriate action in compliance with these Rules.

When, from any cause, the vessel required to keep her course and speed finds herself so close that collision cannot be avoided by the action of the give-way vessel alone, she shall take such action as will best aid to avoid collision.

"Rule 12" - Sailing vessels in sight of one another
When two sailing vessels are approaching one another, so as to involve risk of collision, one of them shall keep out of the way of the other as follows:

When each has the wind on a different side, the vessel, which has the wind on the portside shall keep out of the way of the other, a boat on port tack gives way to a boat on starboard tack.

When both have the wind on the same side, the vessel, which is to windward, shall keep out of the way of the vessel, which is to leeward.

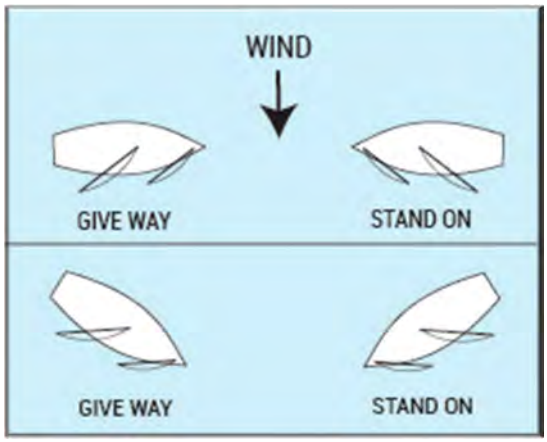


FIGURE 73 - SAILING VESSELS IN SIGHT OF EACH OTHER

For the purposes of this Rule the windward side shall be deemed to be the side opposite to that on which the mainsail is carried.

If a vessel with the wind on the port side sees a vessel to windward and cannot determine with certainty whether the other vessel has the wind on the port or on the starboard side, she shall keep out of the way of the other.

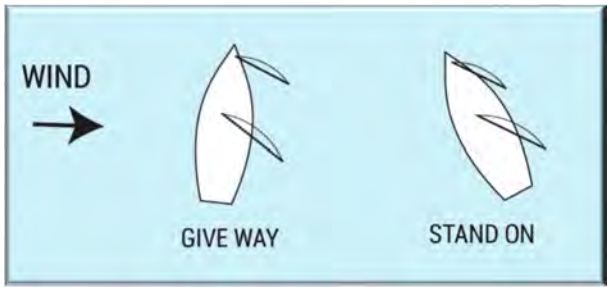


FIGURE 74 - WIND FROM SAME SIDE - RULE 12

In this diagram the yacht B, on port tack, cannot see which side the mainsail of the other boat, A, is being carried on as it is obscured by the large headsail.

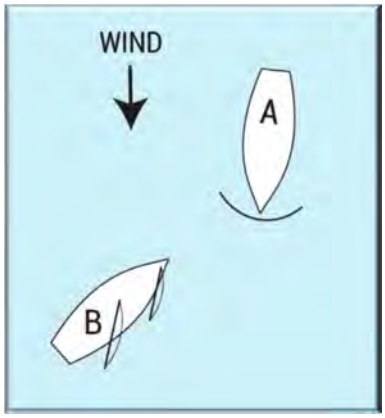


FIGURE 75 - EXAMPLE DIAGRAM FOR RULE 12

"Rule 13" - Overtaking

Any vessel overtaking any other shall keep out of the way of the vessel being overtaken. A vessel shall be deemed to be overtaking when coming up with another vessel from a direction more than 22.5 degrees abaft her beam, that is, in such a position with reference to the vessel she is overtaking, that at night she would be able to see only the stern-light of that vessel but neither of her sidelights. When a vessel is in any doubt as to whether she is overtaking another, she shall assume that this is the case and act accordingly.

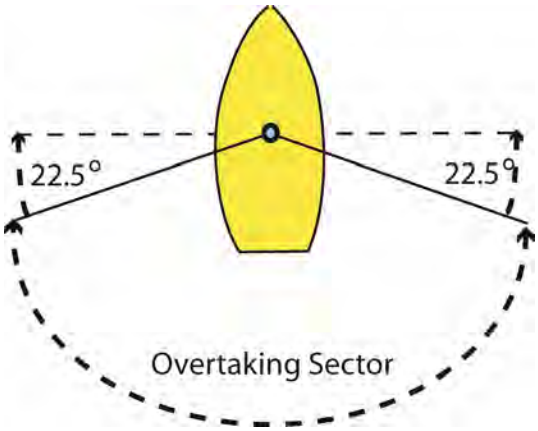


FIGURE 76 - OVERTAKING SECTOR - RULE 13

Assume overtaking vessel if more than two points abaft the beam, or any doubt. Always keeps clear, until past & clear.

"Rule 14" Power driven vessels meeting head on

When two power driven vessels are meeting head on both alter course to starboard.

Both turn to starboard.

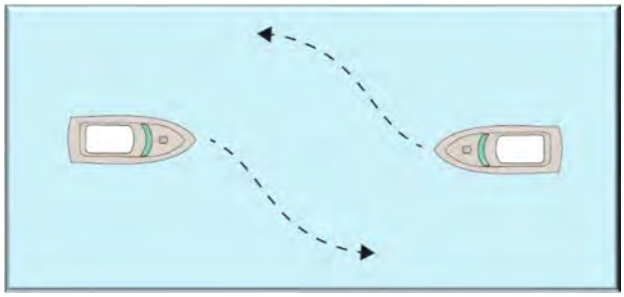


FIGURE 77 - POWER VESSELS MEET HEAD ON - RULE 14

"Rule 15" Power driven vessels crossing

When two power driven vessels are crossing, or converging, and risk of collision exists, the vessel which has the other on her own starboard side must give way.

The give way vessel should avoid crossing ahead of the other vessel if possible.

Give way to vessel on your starboard side, Stand on for vessel on your port side.

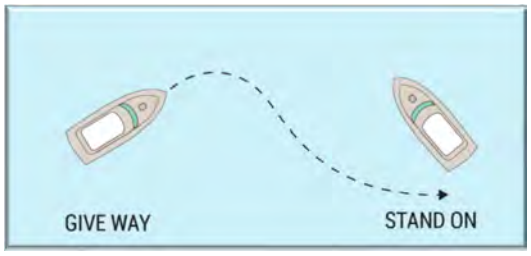


FIGURE 78 - POWER VESSELS CROSSING – RULE 15

"Rule 16" - Action by give-way vessel

The give - way vessel, is required, if possible, take early and substantial action to keep well clear.

"Rule 17" – Action by stand-on vessel

The stand on vessel should maintain course and speed.
The stand on vessel may however take action to avoid collision by her manoeuvre alone, as soon as it becomes apparent to her that the vessel required to keep out of the way is not taking appropriate action in compliance with these Rules. If the vessel required to keep her course and speed finds herself so close that collision cannot be avoided by the action of the give-way vessel alone, she shall take such action as will best aid to avoid collision.

1. FIRST STEP STAND-ON,
2. MAY ALTER (Not to port for a vessel to port), WHEN DOUBT OF OTHER VESSEL KEEPING CLEAR
3. MUST KEEP CLEAR, WHEN ACTION OF GIVE WAY VESSEL'S ACTION ALONE CANNOT AVOID COLLISION.

"Rule 18" - Responsibilities between Vessels

A power-driven vessel underway shall keep out of the way of:

- a vessel not under command;
- a vessel restricted in her ability to manoeuvre;
- a vessel engaged in fishing;
- a sailing vessel.

A sailing vessel underway shall keep out of the way of:

- a vessel not under command;
- a vessel restricted in her ability to manoeuvre;
- a vessel engaged in fishing.

A vessel engaged in fishing when underway shall, so far as possible, keep out of the way of:

- a vessel not under command;
- a vessel restricted in her ability to manoeuvre.

Any vessel other than a vessel not under command or a vessel restricted in her ability to manoeuvre shall, if the circumstances of the case admit, avoid impeding the safe passage of a vessel constrained by her draft.

"Rule 19" - Conduct of vessels in restricted visibility

This Rule applies to vessels not in sight of one another when navigating in or near an area of restricted visibility.

- Every vessel shall proceed at a safe speed adapted to the prevailing circumstances and conditions of restricted visibility.
- A power-driven vessel shall have her engines ready for immediate maneuver.
- Every vessel shall have due regard to the prevailing circumstances and conditions of restricted visibility.

A vessel, which detects by radar alone the presence of another vessel shall determine if a close-quarters situation is developing and/or risk of collision exists. If so, she shall take avoiding action in ample time, provided that when such action consists of an alteration of course, so far as possible the following shall be avoided:



- an alteration of course to port for a vessel forward of the beam, other than for a vessel being overtaken;
- an alteration of course towards a vessel abeam or abaft the beam.

Every vessel which hears the fog signal of another vessel forward of her beam (unless it has been determined that risk of collision does not exist) shall:

- reduce speed to minimum
- if necessary, take all way off
- navigate with extreme caution until danger of collision is over.

ALWAYS GO AT A SAFE SPEED, ALL VESSELS KEEP CLEAR – THERE IS NO STAND-ON VESSEL IN RESTRICTED VISIBILITY

AVOID ALTERING TOWARDS VESSEL ABEAM OR ABAFT BEAM,

AVOID ALTERING TO PORT FOR VESSEL FORWARD OF BEAM

22.6 Rule 33 (Equipment for Sound Signals)

A vessel of 12 m or more in length shall be provided with a whistle, a vessel of 20 m or more in length shall be provided with a bell in addition to a whistle, and a vessel of 100 m or more in length shall, in addition, be provided with a gong, the tone and sound of which cannot be confused with that of the

bell. The whistle, bell and gong shall comply with the specifications in Annex III to these Regulations. The bell or gong or both may be replaced by other equipment having the same respective sound characteristics, provided that manual sounding of the prescribed signals shall always be possible.

A vessel of less than 12 m in length shall not be obliged to carry the sound signalling appliances prescribed in paragraph (a) of this Rule but if she does not, she shall be provided with some other means of making an efficient sound signal.

22.7 Local Regulations

local navigation rules, signs, speed restrictions and operating requirements may differ from those in coastal waters. Skippers should be aware of, and have knowledge of, the regulations for inland waters.

Module 23 ANCHORS AND ANCHORING

23.1 Key Objectives

THE OBJECTIVE OF THIS MODULE IS TO GAIN AN UNDERSTANDING OF THE MOST COMMON TYPES OF ANCHORS AND ANCHORING PROCEDURES.

23.2 Purpose of Anchoring

Anchoring allows a vessel to remain in position without being secured to a dock or mooring. A vessel may anchor:

- For an overnight or temporary stop
- While swimming, fishing or resting
- While waiting for favourable tide or weather
- Following an engine or equipment failure
- In an emergency to prevent the vessel from drifting into danger

Safe anchoring requires the correct **anchor, suitable seabed, sufficient rode and adequate swinging room**.

23.3 Choosing an Anchor

Different anchors perform differently depending on the seabed.

Anchors generally hold well in:

- Sand
- Mud
- Clay
- Firm gravel or shingle, depending on anchor type

Holding may be poor in:

- Weed or kelp
- Smooth rock
- Very hard seabeds

The skipper should know the type of anchor carried, the seabeds for which it is suitable and how to deploy it correctly.

Where practical, carrying a **second anchor of a different type** provides additional options for different seabeds and emergency situations.

23.4 Anchor Rode

The equipment connecting the anchor to the vessel is called the **anchor rode**.



ANCHOR WITH RODE AND CHAIN

It may consist of:

- All chain
- Rope and chain
- In some installations, other suitable combinations

Larger cruising vessels commonly use all-chain rode. Smaller vessels often use a length of chain attached to a nylon anchor warp.

The inboard end of the rode is known as the **bitter end** and must be securely attached to the vessel.

Why Chain is Important
For an anchor to hold effectively, the pull on it should be nearly horizontal as practical.

Chain:

- Adds weight to the rode
- Helps keep the pull on the anchor more horizontal
- Resists abrasion on the seabed
- Helps absorb movement as the vessel rides to wind and waves

Ultimately, however, the anchor must **dig into and hold in the seabed**.

23.5 Scope

Scope is the ratio between the length of rode deployed and the vertical distance from the vessel's anchor lead or bow roller to the seabed.

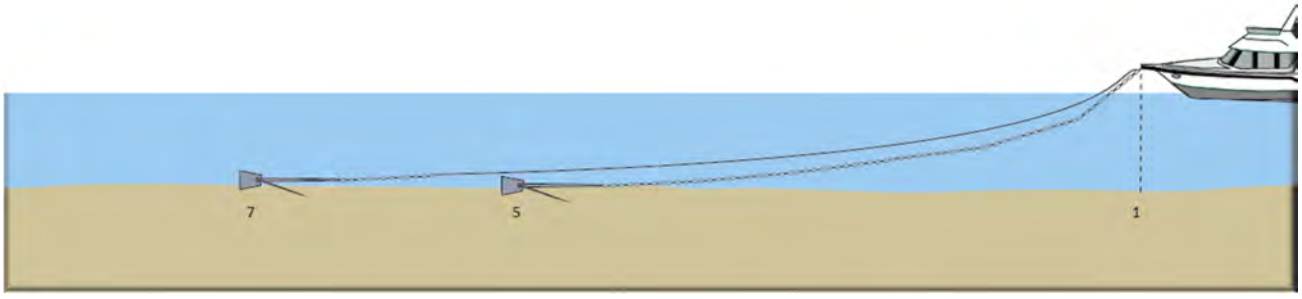


FIGURE 79 - SCOPE

For example, a scope of **5:1** means that five metres of rode are deployed for every one meter of vertical distance.

As a general guide:

- **All chain:** at least **5:1**
- **Rope and chain:** at least **7:1**

More scope may be required in strong winds, rough seas or poor holding ground.

Example
If the vertical distance from the bow to the seabed is **4 m**:

All chain:
4 × 5 = **20 m**

Rope and chain:
4 × 7 = **28 m**

Important: Allow for the **maximum expected depth of water**, including the rise of tide, when determining the required scope. Insufficient scope increases the upward pull on the anchor and may cause it to break free and drag.

23.6 Choosing an Anchorage

Before anchoring, consider:

- **Depth of water**, including the tidal range
- **Type of seabed** and expected holding
- **Shelter** from wind and waves
- **Direction and strength of tidal current**
- **Weather forecast**
- **Swinging room**
- Other anchored or moored vessels
- Shallow water and other hazards
- Channels and harbour entrances
- Submarine cables, pipelines and prohibited anchoring areas
- Safe access to and from the anchorage

The vessel may swing through a large arc as the wind or current changes, so sufficient room must be available around the vessel.

Sailing yachts and powerboats may lie differently to the same wind and current. In a crowded anchorage, this should be considered when selecting a position.

23.7 Anchoring Procedure

Before lowering the anchor, determine the required depth and scope and prepare the anchor and rode.

Setting the Anchor

1. Approach the selected position slowly, normally **into the stronger of the wind or current**.
2. Stop the vessel or begin moving slowly astern.
3. **Lower the anchor under control** until it reaches the seabed. Do not throw the anchor.
4. As the vessel moves slowly astern, progressively pay out the rode.
5. When the required amount of rode has been deployed, secure it correctly.
6. Allow the rode to straighten and gradually load the anchor.
7. Use gentle astern power, where appropriate, to confirm that the anchor has set.
8. Check that the vessel has stopped moving astern and that the anchor is holding.

Avoid excessive engine power while initially setting the anchor, as this may pull it out before it has properly buried.

23.8 Checking That the Anchor is Holding

Once the anchor is set, confirm that the vessel is not dragging.

Useful methods include:

- Taking compass bearings of fixed shore objects
- Using transits or ranges
- Monitoring the vessel's position on GPS or chartplotter
- Using an electronic anchor alarm
- Checking the vessel's position relative to nearby fixed objects

Remember that a vessel will normally move around its anchor as the wind and current change. Movement within the expected **swinging circle** does not necessarily mean the anchor is dragging.

The skipper should continue to monitor the vessel throughout the period at anchor.

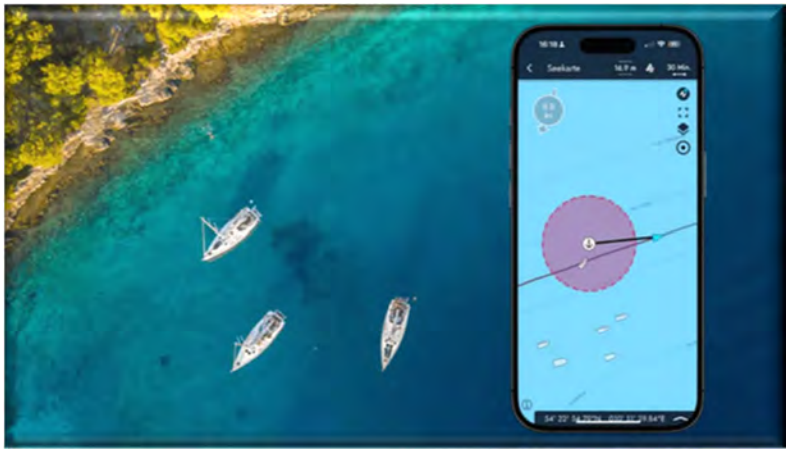


FIGURE 80 - ANCHOR ALARM

23.9 Swinging Circle

A vessel anchored from the bow will normally swing around its anchor as the wind or current changes.

When selecting an anchoring position, allow for:

- The length of rode deployed
- The length of the vessel
- Changes in wind direction
- Reversal of tidal current
- Nearby vessels and their different swinging characteristics
- Shallow water, rocks and other hazards

Do not assume that all vessels will swing in the same way.

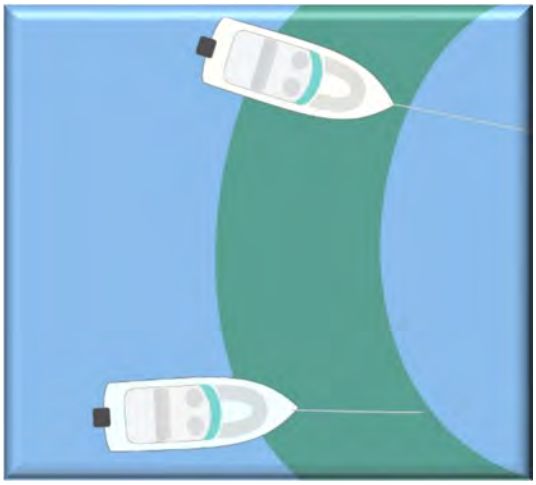


FIGURE 81 - ANCHOR SWING

23.10 Anchoring from the Bow

For normal anchoring, the anchor should be deployed from a **suitable strong point at or near the bow**.

Anchoring a small vessel from the stern can expose the stern to waves and place inappropriate loads on the vessel. In rough conditions this may increase the risk of water entering or swamping the boat.

23.11 Retrieving the Anchor

When weighing anchor:

1. Start the engine and prepare the vessel for manoeuvring.
2. Motor slowly towards the anchor while taking in the rode.
3. Avoid using the windlass to pull the vessel forward against heavy loads.
4. When the rode is approximately vertical, retrieve the anchor.
5. If necessary, move gently ahead to help break the anchor free.
6. Bring the anchor aboard carefully.
7. Secure the anchor and rode before proceeding.

Once recovered, check that the anchor is properly stowed and cannot deploy accidentally.

23.12 Fouled Anchor

An anchor may become caught on rocks, wreckage, cables or other seabed obstructions.
If an anchor is difficult to recover:

- Bring the vessel carefully over the anchor to change the direction of pull.
- Avoid excessive force that could damage the windlass, fittings or vessel.
- If necessary, attempt to free the anchor by pulling from a different direction.



FIGURE 82 - TRIP LINE

A **trip line** may be attached to the crown of some anchors to assist recovery from a fouled seabed.

A trip line may be led to a small buoy or back aboard the vessel.

Care must be taken with buoyed trip lines in busy anchorages because they can create a hazard for other vessels.

23.13 Using Two Anchors

A second anchor may occasionally be used to:

- Reduce the vessel's swinging area
- Improve holding in strong conditions
- Control the vessel in a confined anchorage
- Deal with reversing tidal streams

Two anchors may be laid from the bow in different directions. The arrangement selected will depend on the expected wind, current and available swinging room.



FIGURE 83 - LAYING SECOND ANCHOR

Using two anchors also introduces additional risks, including **crossed or tangled rodes**, and should only be used when there is a clear advantage.

Fore and Aft Anchoring

Anchoring with one anchor from the bow and another from the stern can severely restrict the vessel's ability to align naturally with changes in wind and current.

For this reason, **fore-and-aft anchoring is generally unsuitable for normal anchoring of small craft**, although it may occasionally be used in confined situations by experienced skippers.

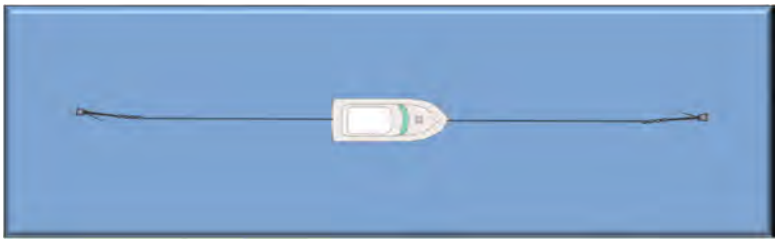


FIGURE 84 - LAYING SECOND ANCHOR FORE AND AFT

23.14 Kedging



FIGURE 85 - KEDGE ANCHOR

Kedging uses an anchor to help move a vessel.

A smaller anchor, sometimes called a **kedge anchor**, can be carried away from the vessel by dinghy or other suitable means and deployed in deeper water. The vessel can then be moved towards the anchor by taking in the rode.

Kedging may be useful when attempting to refloat a lightly grounded vessel, provided it can be done safely and without causing further damage.

23.15 If the Anchor Drags

An anchor is **dragging** when it fails to hold and the vessel moves away from its expected position.

If the anchor begins to drag:

- Start the engine if available.
- Check that the vessel remains clear of hazards and other vessels.
- Let out additional rode if there is sufficient swinging room.
- If the anchor does not reset, retrieve it and anchor again.
- Consider moving to a more sheltered location or better holding ground.

Dragging can become an emergency if the vessel is being carried towards **shallow water, rocks, another vessel or the shore**.

23.16 Key Points

Before anchoring:

- Select suitable holding ground.
- Determine the depth and expected tidal change.
- Calculate sufficient scope.
- Allow adequate swinging room.
- Check the weather and tidal current.
- Approach under control and lower the anchor—never throw it.
- Set the anchor and confirm that it is holding.
- Monitor the vessel while at anchor.
- Be prepared to act immediately if the anchor begins to drag.

A properly selected and correctly set anchor is an important part of both **routine seamanship and emergency preparedness**.

Module 24 BASIC FIRST AID

24.1 Key Objectives

THIS MODULE OUTLINES THE BASIC KNOWLEDGE REQUIRED TO RECOGNISE HYPOTHERMIA AND OTHER POTENTIAL MEDICAL ISSUES AND BASIC FIRST AID PROCEDURES.

24.2 First Aid at Sea



First aid is the immediate care given to an injured or ill person until professional medical assistance is available.

On a boat, medical assistance may take longer to reach the casualty than it would ashore. Every skipper should therefore have a basic knowledge of first aid and CPR, and at least one person aboard should ideally have current training from a recognized first-aid provider.

In any medical emergency:

1. **Ensure the scene is safe** for yourself, the casualty and the crew.
2. **Check responsiveness and breathing.**
3. **Call for medical assistance early.**
4. Treat immediately life-threatening conditions such as severe bleeding or cardiac arrest.
5. Protect the casualty from further injury, cold, heat and exposure.
6. Continue to monitor the casualty until help arrives.

Use protective gloves or another suitable barrier whenever possible when dealing with blood or other body fluids.

24.3 Calling for Medical Assistance

Do not delay requesting assistance when a casualty is seriously ill or injured.

Depending on the situation and location, assistance may be requested by:

- VHF radio
- Mobile or satellite telephone
- Coastguard or rescue services
- Nearby vessels

A **MAYDAY** is appropriate when there is grave and imminent danger requiring immediate assistance.

A **PAN-PAN** may be appropriate for an urgent medical situation where there is serious concern for the safety of a person, but the situation does not presently justify a distress call.

When requesting medical assistance, be prepared to provide:

- Vessel name and position
- Nature of illness or injury
- Casualty's condition
- Age and sex of casualty, if relevant
- Treatment already given
- Assistance required
- Your intended course of action

Follow the instructions provided by medical or rescue authorities.





24.4 Cold Water Shock

Sudden immersion in cold water can cause an immediate and potentially dangerous reaction known as **cold water shock**.

The casualty may experience:

- An involuntary gasp
- Rapid breathing or difficulty controlling breathing
- Increased heart rate and blood pressure
- Panic and disorientation
- Reduced ability to swim

The immediate priority is to **keep the airway clear and control breathing**.

A properly fitted life jacket greatly improves the chance of keeping the casualty's head above water during this initial response.

If you unexpectedly enter cold water:

- Concentrate on keeping your airway clear.
- Try to control your breathing.
- Do not immediately attempt a long or strenuous swim.
- Hold onto the vessel or another floating object if possible.
- Signal for assistance.

24.5 Hypothermia

Hypothermia occurs when the body loses heat faster than it can produce and the core body temperature falls below approximately **35°C (95°F)**.

It may result from:

- Immersion in cold water
- Wet clothing combined with cold air and wind
- Prolonged exposure to cold conditions

Signs of Hypothermia

Signs may include:

- Shivering
- Cold, pale skin
- Poor coordination
- Slurred speech
- Confusion or unusual behaviour
- Increasing tiredness
- Reduced level of consciousness

Severe hypothermia is a medical emergency.

Treatment

Once the casualty has been recovered:

- Handle them gently.
- Move them to a sheltered location.
- Remove wet clothing if this can be done without unnecessary exposure.
- Dry and insulate the casualty.
- Cover the head and neck.
- Use dry blankets, clothing or other insulation.



FIGURE 86 - INSULATING BLANKET

- Call for medical assistance if hypothermia is significant or suspected to be severe.
- Monitor breathing and responsiveness.

If the casualty is fully alert and able to swallow safely, a **warm, non-alcoholic drink** may be appropriate.

Do not give alcohol and do not vigorously rub or massage cold limbs.

24.6 Surviving in Cold Water

The first objective is to remain afloat and conserve heat and energy.

Whenever possible:

- Wear or secure your lifejacket.
- Stay with the vessel or a large floating object.
- Get as much of your body out of the water as possible.
- Minimize unnecessary movement.
- Signal for assistance.

Do not attempt a long swim unless reaching safety is realistically achievable. Swimming increases heat loss and uses valuable energy.

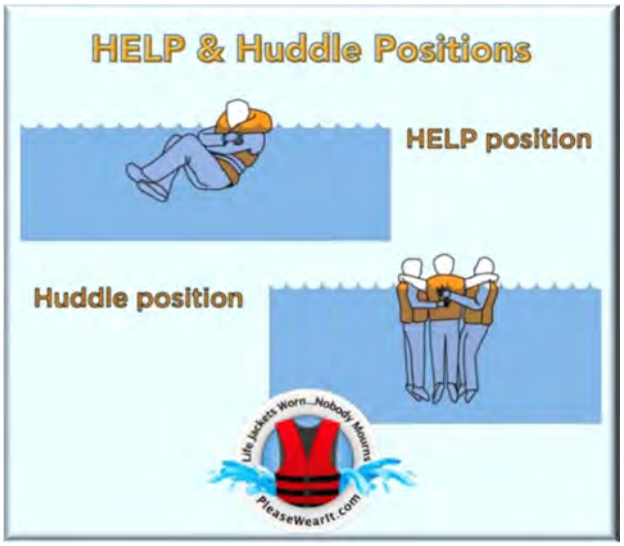


FIGURE 87 - H.E.L.P. POSITION

H.E.L.P.

A person wearing a suitable lifejacket may use the **Heat Escape Lessening Position (H.E.L.P.)**:

- Keep the head out of the water.
- Hold the arms close to the chest.
- Bring the knees towards the body.
- Minimize movement.

This helps reduce heat loss from vulnerable areas of the body.

Huddle Position

When several people are together in the water, they may **huddle closely together** to conserve heat and assist one another.

Keep children and more vulnerable casualties towards the centre of the group.

24.7 Common Injuries

Cuts and Bleeding



Minor cuts should be cleaned and protected with appropriate sterile dressing.

For significant external bleeding:

1. Apply **firm direct pressure** to the wound with a sterile dressing or clean material.
2. Maintain pressure until the bleeding is controlled.
3. Apply a secure dressing.
4. Seek medical assistance for severe or uncontrolled bleeding.

If blood soaks through the dressing, maintain pressure and add additional dressing material as appropriate rather than repeatedly disturbing the wound.

Severe bleeding can rapidly become life-threatening.

Internal Bleeding

Internal bleeding may not be immediately visible.

Possible signs include:

- Pain or swelling
- Pale, cool or clammy skin
- Weakness or dizziness
- Rapid breathing
- Increasing confusion
- Reduced level of consciousness

Suspected serious internal bleeding requires urgent medical assistance and evacuation.

24.8 Burns

For a burn:

- Remove the casualty from the source of the burn.
- Cool the burn promptly with **cool running water** where practical.
- Remove jewelry or clothing near the burn before swelling develops, provided it is not stuck to the skin.
- Do not remove material stuck to the burn.
- Do not break blisters.
- Do not apply butter, grease or other unsuitable substances.
- After cooling, protect the burn with a clean, non-stick dressing or suitable covering.

Large, deep or serious burns require urgent medical advice.

24.9 Bites and Stings

Bites and stings can range from minor irritation to severe allergic reactions.

For a minor reaction:

- Move away from the source.
- Remove the sting if appropriate.
- Clean the area.
- Apply a cold pack wrapped in cloth to reduce pain and swelling.

Watch for signs of a severe allergic reaction, including:

- Difficulty breathing
- Swelling of the tongue or throat
- Widespread rash or hives
- Dizziness or collapse

A severe allergic reaction (**anaphylaxis**) is a medical emergency. Call for immediate assistance and help the casualty use their prescribed epinephrine/adrenaline auto-injector if they carry one and you are trained or directed to assist.

24.10 Medical Emergencies

Shock

Medical shock is a life-threatening condition in which the body's organs are not receiving adequate blood flow and oxygen.
It may result from severe bleeding, burns, major injury or serious illness.

Signs can include:

- Pale, cool or clammy skin
- Rapid breathing
- Weakness or dizziness
- Rapid pulse
- Confusion or anxiety
- Increasing drowsiness or unconsciousness

Treatment

- Call for medical assistance.
- Treat the cause where possible, particularly severe bleeding.
- Keep the casualty lying in a safe and comfortable position.
- Keep them warm without overheating.
- Reassure them.

- Do not give food or drink if serious injury, reduced consciousness or urgent medical treatment may be required.
- Continually monitor breathing and responsiveness.

Heart Attack and Cardiac Arrest

Heart Attack

A heart attack occurs when the blood supply to part of the heart muscle is reduced or blocked.

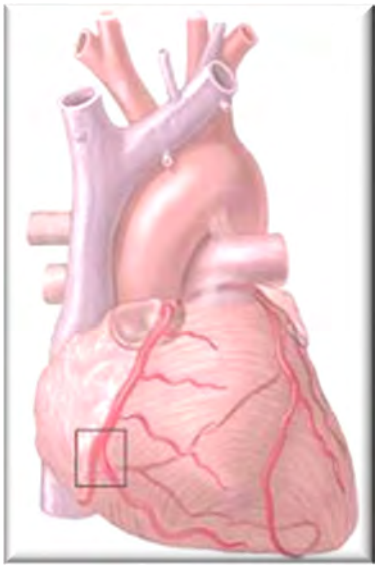
Possible signs include:

- Chest pressure, tightness, squeezing or pain
- Pain spreading to the arm, shoulder, jaw, back or upper abdomen
- Shortness of breath
- Sweating
- Nausea
- Dizziness or weakness

Symptoms can vary considerably between individuals.

If a heart attack is suspected:

- Stop the casualty from exerting themselves.
- Keep them comfortable.
- Call for urgent medical assistance.
- Monitor their breathing and responsiveness.
- Be prepared to begin CPR and use an AED if they become unresponsive and are not breathing normally.



HEART (BOX REFERS TO FIGURE BELOW WHERE BLOCKAGE HAS OCCURRED)



BLOCKAGE IN RIGHT CORONARY ARTERY

Cardiac Arrest

If a casualty is **unresponsive and not breathing normally**, treat the situation as cardiac arrest.

- Call for emergency assistance.
- Begin **CPR immediately**.
- Use an **Automated External Defibrillator (AED)** as soon as one is available.
- Follow the AED prompts and continue CPR until the casualty recovers or professional help takes over.

Practical CPR and AED techniques should be learned through an approved first-aid course.

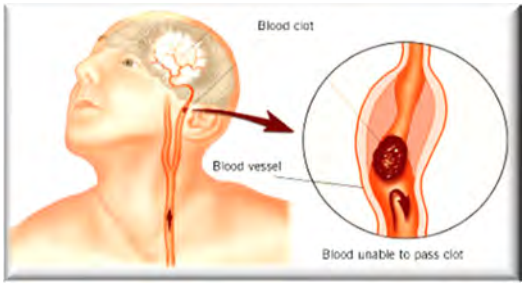
Stroke

A stroke occurs when the blood supply to part of the brain is interrupted.
Remember **FAST**:

F — Face: Is one side of the face drooping?
A — Arms: Can the casualty raise both arms?
S — Speech: Is speech slurred, confused or unusual?
T — Time: Seek emergency medical assistance immediately.

Other symptoms may include sudden loss of balance, vision problems, severe headaches or confusion.

Record the **time the symptoms began**, or the last time the casualty was known to be well and arrange urgent medical assistance.



STROKE

Choking

A casualty with a **partial airway obstruction** may still be able to speak, breathe or cough. Encourage effective coughing and monitor closely.

A casualty with a **severe airway obstruction** may:

- Be unable to speak
- Be unable to breathe effectively
- Have a weak or silent cough
- Clutch their throat
- Become unconscious

Call for emergency assistance and follow the current first-aid procedure for choking taught by a recognized first-aid organization.

If the casualty becomes unresponsive, begin the appropriate CPR procedure.

Drowning

When rescuing a person from the water, avoid becoming a second casualty.

Whenever possible:

- Throw the casualty a flotation device.
- Reach them from the vessel.
- Manoeuvre the vessel or tender to recover them safely.
- Enter the water only when necessary and when it can be done safely.

After recovery:

- Check responsiveness and breathing.
- If the casualty is not breathing normally, begin CPR.
- Use an AED when available.
- Protect the casualty from cold.
- Arrange medical assessment.

A person who has experienced significant drowning or inhalation of water should receive medical evaluation even if they initially appear to recover.

Heat and Seasickness

Heat Exhaustion and Heat Stroke

Heat Exhaustion

Heat exhaustion results from excessive heat exposure and loss of fluids and salts.

Signs may include:
- Heavy sweating
- Weakness
- Headache
- Dizziness
- Nausea
- Thirst
- Muscle cramps

Move the casualty to a cooler location, loosen unnecessary clothing and begin cooling. If fully alert and able to swallow, encourage appropriate fluids.

Heat Stroke

Heat stroke is a medical emergency.

The casualty may have:
- Very high body temperature
- Altered behaviour or confusion
- Poor coordination
- Seizures
- Reduced consciousness

Sweating may be present or absent.

Call for emergency medical assistance and **begin rapid cooling** while awaiting help.

Seasickness

Seasickness is a form of motion sickness and is common aboard small vessels.

Symptoms may include:
- Pale or clammy skin
- Sweating
- Dizziness

- Fatigue
- Nausea
- Vomiting

Severe or prolonged vomiting can lead to **dehydration and exhaustion**.

To help reduce seasickness:

- Stay in fresh air where practical.
- Look at the horizon.
- Remain near the part of the vessel with the least motion.
- Rest.
- Take small amounts of water regularly.
- Avoid alcohol and heavy meals.



Appropriate motion-sickness medication may be useful when taken according to its instructions and individual medical advice.

24.11 First Aid Equipment

First Aid Kit

Every vessel should carry a first-aid kit appropriate for:

- Number of people aboard
- Length of voyage
- Distance from medical assistance
- Operating area
- Activities undertaken



A basic marine first-aid kit may include:

- Disposable medical gloves
- Sterile gauze and wound dressings
- Adhesive bandages
- Roller and triangular bandages
- Medical tape
- Antiseptic supplies
- Burn dressings
- Scissors
- Tweezers
- Eye-wash solution
- Cold pack
- Emergency thermal blanket
- CPR barrier device
- Thermometer

Any medications carried should be appropriate for the vessel's operating area and the people aboard and should be checked regularly for expiry.

The first-aid kit should be **clearly marked, readily accessible and protected from water**.

24.12 Key Points

A Day Skipper should be able to:

- Protect themselves before assisting a casualty.
- Assess responsiveness and breathing.
- Recognize when urgent medical assistance is required.
- Control serious external bleeding.
- Recognize cold water shock and hypothermia.
- Recognize heart attack, cardiac arrest and stroke.
- Recognize serious choking.
- Provide basic care for burns, bites and stings.
- Recognize heat-related illness and dehydration.
- Understand the risks associated with drowning.
- Know where the vessel's first-aid equipment is stored.
- Know how to request medical assistance.

First-aid knowledge in a manual does not replace practical training. Skippers and regular crew are strongly encouraged to maintain current first-aid, CPR and AED certification.

Module 25 RESPONSIBILITIES OF THE SKIPPER/CAPTAIN

25.1 Key Objectives

THE OBJECTIVES OF THIS MODULE IS TO UNDERSTAND THE RESPONSIBILITIES THAT COME WITH BEING THE SKIPPER OF A VESSEL.

The terms **skipper** and **captain** are often used interchangeably, and their precise meaning varies between countries and types of vessels.

For the purposes of this course, the **skipper** is the person who has overall command and responsibility for the vessel.

The skipper may be the vessel's owner or another suitably experienced person appointed to take command. On commercial vessels, the person in command may formally be referred to as the **Master or Captain** and may be required to hold specific professional qualifications.

Throughout this manual, the term **skipper** refers to the person in command of the recreational vessel.

25.2 Responsibilities of the Skipper

The skipper has overall responsibility for the **safe operation of the vessel and the safety of those aboard**.

Before and during every voyage, the skipper should ensure that:

- The vessel is suitable and seaworthy for the intended voyage.
- Required safety and navigation equipment is aboard and operational.
- The voyage is appropriate for the vessel and the experience of the crew.
- Weather, tides, currents and navigational hazards have been considered.
- Sufficient fuel, water and supplies are carried.
- The vessel complies with applicable local regulations.
- Crew and passengers receive an appropriate safety briefing.
- A proper lookout is maintained.
- The vessel is navigated safely and in accordance with the COLREGS.
- Changing conditions are continually assessed.
- The voyage plan is altered when conditions make this necessary.

Being skipper is not simply a matter of steering the boat. It requires **planning, judgement, communication and leadership**.

25.3 Competence

The skipper should have the knowledge and practical ability necessary to operate the **type and size of vessel** and undertake the intended voyage.

Where a certificate of competency or operator qualification is required by local law, the skipper must hold the appropriate certification.

A prudent skipper also recognizes their own limitations and those of the vessel and crew.

25.4 Duty of Care

The skipper has a **duty of care** towards crew, passengers and others who may be affected by the operation of the vessel.

This includes taking reasonable steps to provide:

- A safe and properly equipped vessel
- Appropriate safety equipment
- Safe working practices
- Clear instructions
- Adequate supervision
- Safe access around the vessel
- Appropriate precautions for weather and sea conditions
- Protection from foreseeable hazards

The skipper should never place the vessel or crew at unnecessary risk simply to maintain a schedule or complete a planned passage.

25.5 Crew Responsibilities and Delegation

The skipper remains in overall command but may delegate duties to suitably capable crew members.

Instructions should be **clear, understood and appropriate to the crew members' experience**.

Crew members should carry out the skipper's instructions promptly and advise the skipper immediately if they are uncertain about an instruction or observe a potential danger.

Watchkeeping

On longer passages, the skipper may establish a watch system so that competent crew are available while allowing everyone, including the skipper, adequate rest.

The skipper should ensure that anyone left in charge understands:

- The planned course
- Navigational hazards
- Traffic conditions

- Weather and expected changes
- When to call the skipper
- What to do in an emergency

The skipper should be called whenever there is **doubt or uncertainty**.

25.6 Keeping a Proper Lookout

A proper lookout must be maintained by **sight, hearing and all available means appropriate to the circumstances**, as required by the COLREGS.

The skipper should ensure that the person keeping lookout is not distracted by:

- Mobile phones
- Navigation screens
- Conversation
- Food preparation
- Other duties that interfere with keeping watch

Extra vigilance is required:

- At night
- In restricted visibility
- Near harbours and channels
- In heavy traffic
- Near swimmers and small craft
- Around fishing vessels, ferries and commercial shipping

25.7 Passage Planning and Monitoring

The skipper should plan the voyage before departure and continue to monitor progress throughout the passage.

The plan should consider:

- Intended route
- Weather forecast
- Tides and currents
- Depth of water
- Navigational hazards
- Ports or places of refuge
- Fuel requirements
- Daylight and visibility
- Crew capability
- Expected traffic
- Provisioning and Housekeeping

The vessel's position and progress should be checked regularly using appropriate navigational methods.

A passage plan should never prevent the skipper from changing course, destination or schedule when circumstances change.

25.8 Provisioning and Housekeeping

Before departure, the skipper should ensure that sufficient **food, drinking water and other essential supplies** are aboard for the planned voyage.

Provisioning should consider:

- Number of people aboard
- Length of the voyage
- Availability of supplies at the destination and ports en route
- Expected weather and conditions
- Possible delays or changes to the passage plan
- Dietary requirements and food allergies
- Storage and refrigeration available aboard

Food and Water

Carry sufficient food for the planned voyage, including meals and snacks, together with an appropriate **reserve supply** in case the voyage takes longer than expected.

Adequate drinking water is particularly important. Before departure, determine whether potable water will be available at planned stops and at the destination.

Where appropriate, carry an emergency reserve of drinking water separate from the vessel's normal supply.

Medical Requirements

Ensure that:

- An appropriate first-aid kit is aboard and readily accessible.
- Crew members have sufficient quantities of any personal medications they require.
- Important medical conditions or allergies are known where appropriate.
- Essential medications are stored correctly and protected from water.

Cooking Fuel

If propane/LPG or another fuel is used for cooking, ensure that there is sufficient fuel for the voyage.

Spare cylinders, where carried, must be **properly secured and stored in an appropriate ventilated location** in accordance with the vessel's installation and applicable regulations.

Never store spare LPG cylinders in accommodation spaces or other areas where leaking gas could accumulate.

Food Storage and Housekeeping

Food should be stored securely so that it cannot move or fall as the vessel heels or encounters rough conditions.

The skipper and crew should also:

- Keep food preparation areas clean.
- Refrigerate perishable foods where required.
- Secure bottles, containers and cooking equipment.
- Dispose of garbage responsibly.
- Keep companionways, passages and emergency equipment clear.
- Clean spills promptly to prevent slipping hazards.
- Maintain good ventilation where appropriate.

Good housekeeping is an important part of **safety at sea**. A vessel that is clean, organized and properly stowed is safer and easier to manage, particularly in rough weather or an emergency.

25.9 Safety Briefing Before Departure

Before leaving the dock, the skipper should ensure that everyone aboard receives a safety briefing appropriate to the vessel and voyage.

The briefing should include:

Lifejackets

Passengers and crew should know:

- Where lifejackets are stored
- How to put them on correctly
- When they are expected to be worn

Emergency Equipment

Everyone should be shown the location of relevant equipment, including:

- Fire extinguishers
- First-aid kit
- Distress equipment
- Lifebuoy or other recovery equipment
- VHF radio
- Emergency engine shut-off, where fitted

Moving Around the Vessel

Passengers should be advised to:

- Maintain secure handholds.
- Move carefully.
- Keep weight appropriately positioned.
- Keep hands, arms and legs clear when docking.
- Avoid standing or sitting where they may be injured by lines, booms or other equipment.

Emergency Procedures

Crew should understand their basic responsibilities in emergencies such as:

- Person overboard
- Fire
- Flooding
- Grounding
- Collision
- Abandoning the vessel

For a short recreational trip, the briefing can be brief. For a longer or more demanding passage, it should be more comprehensive.

25.10 Assistance to Persons in Distress

A skipper who becomes aware of persons in distress at sea should be prepared to render assistance **where required and when it can be done without creating serious danger to their own vessel or persons aboard**.

Depending on the circumstances, assistance may include:

- Alerting rescue authorities
- Maintaining communications
- Providing flotation equipment
- Recovering persons from the water
- Providing shelter or first aid
- Standing by until appropriate assistance arrives

The skipper must consider the safety of their own vessel and crew before attempting a rescue.

25.11 Large Vessels and Commercial Traffic

Small craft should be particularly cautious around large commercial vessels.

Large vessels may:

- Have limited maneuverability
- Require considerable distance to stop
- Be constrained by their draft
- Have significant blind areas
- Be unable to safely leave a channel

The skipper should:

- Avoid unnecessarily impeding large vessels.
- Keep clear of vessels restricted in their ability to manoeuvre.
- Exercise particular caution around ferries.
- Keep well clear of tugs and their tows.
- **Never pass between a tug and its tow.**
- Cross shipping channels only when it is safe to do so.

The COLREGS remain applicable and should be used to determine the responsibilities between vessels.

25.12 Changing Conditions

Conditions on the water can change quickly.
The skipper should continually monitor:

- Wind
- Weather
- Visibility
- Sea state
- Tide and current
- Vessel condition
- Crew condition
- Fuel and other resources

Good seamanship means acting **before conditions become dangerous**.

Possible actions include reducing speed, changing course, seeking shelter, returning to harbour or abandoning the planned voyage.

25.13 Environmental Responsibility

The skipper should operate the vessel in a manner that minimizes harm to the marine environment.

This includes:

- Preventing fuel and oil spills
- Disposing of garbage ashore
- Complying with sewage discharge regulations
- Avoiding damage to sensitive seabeds and habitats
- Respecting wildlife
- Avoiding unnecessary wake and shoreline erosion
- Preventing the spread of invasive species where applicable
- Following local environmental restrictions

Waste, fuel, sewage and other pollutants must be handled in accordance with applicable regulations.

25.14 Courtesy and Responsible Operation

Good seamanship includes consideration for other people using the water.

The skipper should:

- Control the vessel's wake.
- Reduce speed where appropriate.
- Observe posted speed and no-wake restrictions.
- Keep clear of swimmers and divers.
- Give paddle craft and other vulnerable water users adequate room.
- Minimize unnecessary noise in marinas and anchorages.
- Respect other vessels' space when anchoring or docking.
- Be considerate of shoreline residents and wildlife.

The skipper is responsible for understanding and complying with **local regulations and restrictions** in the area of operation.

25.15 Fitness of the Skipper and Crew

Safe operation requires the skipper and crew to remain capable of performing their duties.

Performance and judgement can be affected by:

- Fatigue
- Alcohol or drugs
- Seasickness
- Dehydration
- Heat or cold
- Stress
- Illness
- Lack of sleep

The skipper should monitor both their own condition and that of the crew and adjust duties or the passage plan when necessary.

25.16 Key Responsibilities of the Day Skipper

The skipper should:

- **Plan** the voyage.
- **Prepare** the vessel.
- **Brief** the crew and passengers.
- **Delegate** duties appropriately.
- **Navigate** and operate the vessel safely.
- **Maintain** a proper lookout.
- **Monitor** weather, tide, traffic and vessel condition.
- **Communicate** clearly with the crew.
- **Protect** people, property and the environment.

- **Respond** effectively to emergencies.
- **Change the plan** when conditions require it.

The skipper has overall responsibility for the conduct of the voyage. Good skippering is demonstrated not only by boat-handling ability, but by **sound judgement, preparation and the ability to keep the vessel and everyone aboard safe**.

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