

# SAILING & RACING THE WIND TODAY



**S**ailboat design has changed only slightly from ancient times to the 1800s. If a sailor from the 19th century could travel back in time to an ancient Roman ship, for example, he would recognize enough of the rigging and gear to pitch in and pass as part of the crew.

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the number of people sailing for pleasure burgeoning, boat designers changed their focus from building on tradition to developing better designs, methods, and materials. Even so, the early pleasure boats remained heavy because the primary construction material still was teak and other wood.

Only in the last 50 years have modern materials produced lighter boats that require less maintenance. That means more time spent sailing, which has increased the sport's appeal to both leisure sailors and racers.

Today, sailboats are fast and sleek, built primarily of fiberglass, polyethylene, aluminum alloy, polyurethane, and other durable, yet lightweight materials. Contradictory though it seems, a few sailboats are made of concrete. Most recreational sailboats are sloops or cutters. Although some experts use the terms interchangeably, a sloop technically has one mast and one headsail, whereas a cutter has one mast but two or more headsails.



Even a single-sailed sloop might use other sails according to wind conditions. For example, in strong winds, the headsail might be replaced with a smaller jib sail (its three corners connect to the mast, the bow, and a sheet secured by the crew). On an offwind course, a large, lightweight spinnaker will be raised to balloon opposite the headsail and catch any puff of breeze.

## BOAT BASICS

Modern boats are available in a wide range of sizes. The smallest are only around six feet and the largest are 45 feet or longer. The tiny flat-bottomed racers have cabins barely large enough for sitting, while at the other end of the scale are those equipped with ample sleeping accommodations and room for various forms of leisure recreation, fully-equipped kitchens, and heads (bathrooms).

Despite this diversity in design and sails, sailboats have many common components.

## THE HULL

The hull provides the basic shell, or frame, for the boat. Today's hulls are made from many natural and synthetic materials, singly or in combination: fiberglass, resin, composites, wood, polyurethane, acrylics, and others.

Most of the hull's surface is smooth to minimize water resistance. The deck (top) surface and other areas where the crew sit, stand, or walk are molded with small ridges or non-slip patterns that increase traction.



Most hulls are molded to provide room for airtight tanks, blocks of polyurethane foam, or other buoyant materials. Should the boat capsized so the cabin fills with water, the craft itself will still remain afloat. A skilled crew should be able to right the lightweight boat and resume sailing.

The front of any boat is the bow, and its rear is the stern. Between the bow and stern is the cabin. Its size and amenities depend on the size of the boat.

The smallest boats have no under-deck room, making them more suitable for shorter or daytime sailing jaunts. Slightly larger boats might have what's called a cutty cabin, below-deck space that is too short for standing, but handy for sleeping, storage, and protection from the weather.

Large boats have a full-size under-deck cabin, with standing-height room for one or more sleeping areas, a fully equipped kitchen, a head, and more. The outdoor seating area outside an indoor cabin is the cockpit.



From the cabin (small boat) or cockpit (large boat), the captain and crew do most of the work of sailing, manipulating the centerboard, the tiller, and the boom with the sail.

## THE CENTERBOARD OR KEEL

Depending on the boat design and size, either a centerboard or keel hangs below the hull to make the boat more stable and to prevent the boat from drifting sideways.



On a small, flat-bottomed sailboat, the crew pushes a removable centerboard through a slot in the boat's floor. By moving the centerboard up and down, the crew can influence direction, speed, and other sailing operations. Removing the centerboard leaves the hull bottom unobstructed so that the crew can deliberately sail the boat onto the shore.

However, larger boats have a keel, not a centerboard. The keel is a permanent part of the boat that extends below the boat like a fin. The depth of the keel determines how deep the water must be for the sailboat to not run aground. Sometimes a keel will be hinged so the crew can shorten it temporarily to take the boat into shallower waters. Large boats have a fixed, inoperable keel.



## STEERING MECHANISMS

The tiller is the long handle connected to the rudder, which is a large, flat piece of wood or metal. Hinged vertically, the rudder hangs in the water from the transom (or back edge) of the boat. Moving the tiller moves the rudder from left to right on its hinge, creating resistance to the water. The direction of the rudder determines the direction of the boat.

Larger boats sometimes have a steering wheel, too, giving the captain another way of controlling the rudder. Turning the wheel has the same effect as moving the tiller back and forth.



## THE MAST AND SAILS

At the front of the cabin stands a tall mast of either wood or aluminum alloy. So the mast can withstand the incredible forces of sails buffeted in strong winds, special metal fixtures secure it to the deck. Additional support comes from three wires that form a "T", what's called standing rigging, that connect the mast to the deck: a forestay wire to the bow, and two shrouds to the sides.

To further distribute the load from the pulling sails and to position the shrouds for good alignment, the mast has one or more spreaders. These horizontal bars are bolted along

the mast's height. A single spreader will be in the middle of the mast. Special rigging between the mast and spreaders takes pressure off the mast itself.



The larger the sailboat, the taller the mast it can support. However, some sailboats will have more than one mast to split up the sail area. For example, handling two sails on an 80-foot boat is easier than managing one enormous sail.

A free-moving boom, also of aluminum alloy or wood,

extends perpendicularly from the bottom of the mast. Lines (ropes) attach the bottom (and two corners) of the usually triangular sail to the boom so that the hoisted sail keeps its correct shape. Secured lines keep the boom from swinging wildly and give the crew the control needed to adjust the angle of the boom, which determines the angle of the sail.

The sails themselves used to be made of canvas, flax, cotton,

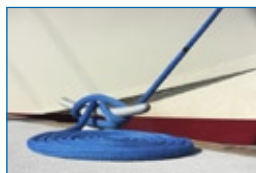


or silk. In 1937, the America's Cup defender, Ranger, was the first boat to use sails with an artificial material. Since the 1950s, a succession of artificial materials such as polyester and ripstop nylon have replaced the traditional natural materials.

Ropes, or lines, have special names and uses. For example, pulling a line called the halyard hoists the third corner of the



sail up the mast, unfurling the sail from the boom. Pulling other lines, called sheets, adjusts (or trims) the sails. Releasing the halyard drops the sail, which the crew wraps around the boom and secures with other lines. Because lines can easily become tangled and dysfunctional, the crew routinely coils or bundles any length of line that collects in the cabin as a result of pulling in lines.



## SAILING BASICS

So how does a sailboat work? The principle is easy: hoist the sail, and the sail catches the wind. The wind can't blow through the sail, and that resistance is what propels the boat. The captain uses the tiller to determine the direction of the boat.

Many sailboats have a pennant-like burgee or other wind indicator, at the top of the mast. Otherwise, you can determine wind direction by looking for ripples on the water or smoke from an on-shore chimney. The side of the boat closest to the wind is "windward," and the other side is "leeward."



Ideally, the wind drives the boat forward. In strong winds with full sails, however, the wind could drag the boat sideways (the keel minimizes this) or possibly tip the boat. To maximize the forward drive and minimize the sideways drag, the crew adjusts the angle of the sail, the rudder, and—particularly in small boats—sometimes their own bodies (which shifts their weight) each time the boat changes direction.

Sailing directly into the wind is impossible. At best, a boat can sail at an angle about 45 degrees either side of the wind direction. With respect to the wind, the crew makes the sailboat move ahead by any of three tactics: running, reaching, or beating.



### These are called the points of sailing:

- Running means sailing before the wind—that is, away from the wind. With the wind directly behind the sailboat, or astern, the sails catch all the wind, and boat moves straight ahead. If the wind is a little to either side of the stern, the sailboat runs in an almost straight line.
- Reaching involves sailing across the wind, which can be faster than running. On a broad reach, the boat sails obliquely away from the wind. On a beam reach, the boat sails directly across the wind, which is blowing at a right angle to the direction the boat is sailing. On a close reach, the boat sails obliquely towards the wind (the opposite of a broad reach). A close reach can give the crew both the most control over the boat and the most speed (theoretically even faster than wind speed!).
- Beating happens when keeping the course means going in such a direction that the sails, even trimmed flat so they are almost parallel with the length of the boat, can't stay full



of wind. To keep moving ahead, the crew must tack, sailing in a zigzag path rather than a straight line to the destination.

So what initially sounds simple, hoisting a sail to catch the wind, quickly becomes a complex set of operations for getting the sailboat from point A to point B. Even if you're sailing a steady course, you have to adjust the sails constantly to keep them wrinkle-free and to keep the luff, or leading

edge, of each sail just taut enough that it doesn't shake or flap.

Although many books describe how to sail, the best way to learn is by doing. An experienced sailor who has a boat and patience can be an excellent teacher. The park systems of many cities that have public lakes not only rent small sailboats, but also offer short courses in their use. Other inexpensive options include adult education classes at community colleges and classes offered through boat dealers. Anyone willing to spend more money for the thrill of sailing on a larger boat can ask a travel agent to locate an adventure outfitter who will provide the boat and either individual or group training while cruising the outfitter's home waters.

### CONTINUING TRADITION

Yacht racing began in the Netherlands during the 16th century, and Charles II brought the sport back to England when he successfully bet his Katherine would beat the Duke of York's



Anne. A few years later, Sir William Perry won the first recorded open-sea race, reaching Dublin from Holyoke in 15 hours.

By the 1720s, the early yacht clubs began arranging races for its members. These and other early races were boat-to-boat competitions, based on wagers between the owners. Even the first recorded yacht race in the United States in 1835 was a boat-to-boat race. However, racing enthusiasts wanted more, so they began developing ways to match groups of boats for racing.

In 1854, racing enthusiasts adopted the Thames Tonnage rule, the first of a succession of rating systems to minimize inequality in racing. The Thames measurement calculated tonnage based on the beam length, and boats with similar tonnage raced each other. By the 1870s, the competitions had developed into regattas between fleets of boats sailing for prizes.

Sailing enthusiasts realized that the Thames Tonnage rule penalized beam and favored narrow boats. Boat designers quickly narrowed their craft, giving their boats a competitive advantage. Many designs, however, became so narrow that they were unstable. To discourage poor boat design, the racing community switched rating systems in 1886, adopting a method developed by Dixon Kemp based on length and sail



area. Unfortunately, that system eventually led to wide, shallow boat designs.

To keep racing sailboats from becoming unseaworthy, the newly formed International Yacht Racing Union introduced an international rating system in 1906 that classified boats by meters. This international standard encouraged the design of full-bodied sailing yachts. The next standard was the International Offshore rule adopted in 1969. In turn, this yielded in the mid-1990s to the more complex International Measurement System, which encourages faster but still seaworthy boats.

## THE RULES OF THE SEA

A casual sailor can manage a small sailboat and have fun without perfecting the techniques of sailing, but leisure sailors who want to enjoy the thrill of competing will want to hone their skills and get familiar with rules, conventions, and strategy of racing. Although a local race might have its own subset of rules, all sailing races follow basic rules as set by the International Yacht Racing Union and applied on the open seas.

Anyone serious about racing needs to locate a sailing club, class



association, or other group that sponsors sailing races. Then they need to get familiar with both the international rules and the rules of the individual race. Most races are limited to a particular design or class of boat. In a handicap race, competition is open to a mix of boats from different classes, and the finishing time of each boat is adjusted according to yardstick numbers determined for each class of boats.

All sailing races start from a line either set up between two moored buoys or marked by signs on the shore. Usually the course is triangular with several laps. However, the courses vary because sailing clubs set their own courses according to the local waters and wind conditions. Buoys or permanent navigation markers identify the course, which is posted before the race. The goal is to test the competitors' sailing skills, requiring some markers to be rounded to port and others to starboard. Any boat that fails to follow the course is automatically disqualified. Any boat that hits a marker has to go around



the marker again, although some races may require the boat to retire from the competition.

Sailing races don't have referees to enforce the rules. Instead, the competitors

enforce the rules themselves. If a boat commits a foul, such as a collision, the guilty party should volunteer to take the applicable penalty. Similarly, if one boat thinks another is at fault or has committed an infraction, the boat can raise a flag signaling a protest that will be resolved after the race by an independent committee. To encourage self-policing actions, a boat that withdraws from the race always scores higher than one that is disqualified, although still lower

than the last boat that actually finished the race.

## THE GREAT RACES

Today, racing clubs, sailing magazines, and other sponsors organize and conduct hundreds of sailboat races throughout the world. Some are local, others national, and a few attract racers from around the world. Several of the international races have gained professional stature, requiring the best skills and equipment to win.



The oldest of these is the America's Cup, which evolved from a letter written in 1850 from Britain to George Schuyler, one of the founders of the New York Yacht Club. That letter invited an American schooner between 80 and 100 feet to participate in a race celebrating the first "world fair" to be held in London in 1851. Schuyler and his cronies commissioned a new boat, America, to take on the challenge.

America participated in the fair, but the actual race that became the America's Cup took place almost a month later around the Isle of Wight. More than 10 hours later, the America won, usurping Britain's racing supremacy on the seas. Today, the competition continues in what has become the most prestigious and most expensive racing event in the world.

In 1906, T. Fleming Day organized a sailing race from New York to Bermuda (635 miles). As editor of Rudder magazine, Day promoted the seaworthiness of small sailboats, and this race proved his point. The race repeated annually until 1910, then stopped until 1923 when the newly formed Cruising Club



of America (CCA) began sponsoring the race.

Since 1964, the race has been the last in a series of other springtime ocean races called the Onion Patch, which is named after Bermuda where the last race ends. The unpredictable weather and the strength of the Gulf Stream make the Onion Patch races a challenge where winning depends on sailing skill as much as boat speed.

The Southern Ocean Racing Conference (SORC) began in 1930 with a race between St. Petersburg, Florida, and Havana, Cuba. Today, the SORC features a series of races in southern Florida and the Bahamas. Like the Onion Patch races, the SORC series is influenced by the Gulf Stream, which can reach speeds of six knots.

In the southern hemisphere, the Southern Cross Series has dominated the ocean racing scene since it was launched by the Royal Yacht Club of Tasmania in 1945. The series consists of three short in-shore races marked by buoys, an intermediate 200-mile race, and a long race from Sydney, Australia, to Hobart, Tasmania. The unpredictability and variability of the weather conditions, coupled with grueling winds, force many boats to retire during this rigorous series.

Held every odd-numbered year since 1957, the fiercely competitive international Admiral's Cup Series takes place in British waters, open to three boats from every country. The six-race series features four inshore races, a 230-mile race in the English Channel, and a 605-mile off-shore race between from Cowes,



England, to Fastnet Rock (off the coast of Ireland) and then back to Plymouth, England.

### OTHER WELL-KNOWN RACES INCLUDE:

- OSTAR (the Observer Single-handed Transatlantic Race) was started in 1960 by a sailing enthusiast who sailed alone to avoid the problems of finding crew. Sponsored by a British newspaper, The Observer, and held every four years, the race gives hundreds of solo sailors a chance to follow routes between Plymouth, England, and Newport, Rhode Island.
- The Round Britain and Ireland Race, open to any boat with a two-person crew, began in 1966 under the sponsorship of The Observer and the Royal Western Yacht Club. Boats race almost 2,000 miles with four mandatory two-day stops while circling all of Great Britain, subject to variable winds, fickle weather, strong tides, and a rugged coastline.
- The Round the World Race, started in 1973 by the Whitbread brewing company, challenges fully-crewed boats with a 32,000-mile route circumnavigating the globe. Solo sailors who want to compete in a round-the-world race enter the Vendee Globe Challenge, launched in 1990.



# GET READY TO SAIL

