

by Gregor Tarjan

Multihull Seamanship – Part I

What is sailing and sail trim like on a cruising cat or tri? To a large extent that depends on your level of sailing expertise, on the boat you sail, and your perspective. Since the basic sailing concepts apply to all types of sailing craft including multihulls, you'll find the experience similar to monohull sailing with subtle but important differences. Those new to sailing have few preconceptions about how a multihull should perform. They find multihulls relatively easy, forgiving boats to learn on, as they aren't trying to subdue years of monohull sailing instincts. Becoming proficient at sailing and sailing a multihull become one and the same. While experienced monohull sailors have a firm grounding in the basics of sailing, they need to get over the mindset of always comparing multihull sailing to sailing one-hulled ballasted boats. Once they can do that the process is easy.

The boat you learn on tends to become your benchmark for what multihull sailing is all about, though performance and handling varies remarkably between various designs. Despite the huge strides in market acceptance over the past few years, there is still a tendency to lump all multihulls together. Trimarans are as different from catamarans as are proas to foilers. Even the differences between daggerboard equipped cats and the ones with low aspect ratio keels are noteworthy. If one actually compares different types of multihulls to each other, one would discover larger differences between them than compared to monohulls. Handling and safety aspects are influenced by the design and underwater appendages of multihulls as much as their construction. Some sailors learn on a true cruising multihull, quite a different experience from sailing a high-performance model. Generally speaking the crew's level of alertness and anticipation must be greater on a faster boat than on a slower one. Forces and loads on hull and rig are directly proportional to the speed. The bottom line is that the crew of the vessel must be able to have full control of the vessel at all times.

Your perspective on what sailing is all about also influences your approach to multihulls. Some sailors feel you really aren't sailing unless you are cold, wet and tired. If you can relate to those sentiments, you'll probably be disappointed with sailing a multihull. I personally couldn't agree more, having always taken great pleasure in the comfortable, protected sailing conditions and quick passages a multihull affords.

Sailing fast and on the level

One of the first things you notice is the lack of heeling on a cruising multihull. There's no need for constantly bracing yourself and your gear at unnatural angles. When sailing with novices or inexperienced sailors, the large horizontal surfaces of catamarans allow for a safe and stress free sailing environment even in rougher conditions. Trampolines on the foredeck are converted for socializing and are the main attraction for kids, sunbathers and porpoise

watchers. Sailing is more comfortable and less tiring, which should translate into more enjoyment and safer operating conditions.

Searching for a downside to level sailing, I'd say there's a lack of feedback that heeling provides the helmsman. With no appreciable heel and a reduced tendency for weather or lee helm on a multihull, it is more difficult to tell when it is time to reduce sail. You have to rely on boat speed and boat motion relative to the seas. For this lack of feedback at the helms, which is further exaggerated with boats with hydraulic steering systems, some catamarans are equipped with either cable steering via pulleys and quadrants. This in turn, if not installed properly can add to friction and failure. The very best steering system, especially in combination with lightweight materials seems to be the direct rod steering, which has the most helm feedback of all installations.

Multihulls have no real ability to spill a gust of wind by heeling; they typically translate excess wind energy into acceleration, something that takes a little getting used to. Rapid acceleration is most noticeable on light displacement multihulls with high-performance rigs. I thought I knew what boat acceleration was until I sailed a 31 foot trimaran sport cruiser. She went from 6-7 knots to 12-13 knots in the blink of an eye, quite normal, I later discovered, for high-performance multihulls.

Cruising multihulls not only accelerate quickly, they maintain higher average speeds than monohulls. This also adds to the active safety (the passive safety being: that most properly designed multihulls do not sink). The high average speeds of some larger performance cruisers will allow 250 nautical mile days or more, which permits boat and crew to stay in front or even dodge a weather system. Because of these easily reached, strain-free speeds, travel time of ocean passages can be reduced by as much as 40 percent or more, consequently also reducing the exposure time of inclement weather.

Generally, cruising multihulls, usually equipped with keels, sail about as fast as fast monohulls, only with higher top speeds, so sailing and sail trim is comparable. Some lightweight daggerboard multihulls, however, can easily attain surfing speeds of 20 knots or more without heel or any strain on crew and boat, even under autopilot. Sailing at those speeds is quite different, partly because everything happens much faster. Apparent wind is brought far forward, to the point where a broad reach on a monohull becomes a close reach on a fast multihull, and a beam reach becomes close-hauled sailing. This is why sails for fast multihulls must be very strong and cut much flatter than those of monohulls. Most cruising multihulls on the market fall somewhere in between, so as a rule you can expect to maintain smaller sheeting angles and flatter sails for a given true wind speed.

The multihull motion

While multihulls sail faster, the sensation of speed can be less than on a monohull due to the wide decks and lack of heeling. Multihulls don't plunge and rise through the waves like a heavy displacement boat. They stay on the surface of the water, so their motion is lighter, quicker and less sustained in one direction. The leading, high tech catamaran builders go to great length of reducing the pitching- speed robbing motion by carefully centering the weights of the boat around its center of gravity, designing voluminous hull extremities and

also by reducing all possible weight in the rigging. Still, some long-time monohull sailors miss the steadiness and responsiveness of a keelboat, but most have an easier time with the multihull motion. Others find it just as easy to be seasick on a multihull.

Light displacement sailing

Multihulls have no use for heavy ballast, since their comfort and safety depends on their ability to remain perched on top of the waves. Good performance is linked to the designer's recommended payload, which is usually relatively light compared to the boat's displacement. This is one reason many live-aboard multihulls lack sparkling performance, because they've been loaded in excess of the designer's recommendations. This is one of the big dangers of the cavernous insides and abundant locker space of multihulls. They lure inexperienced owners into filling every corner of the boat with their life's belongings, turning a narrow hulled and fast thoroughbred into a sluggish platform with sometimes even dangerous sailing characteristics. Therefore, when purchasing a multihull it is very important to respect the limitations of a certain design and also understanding the parameters of different boats and ones payload requirements.

You'll need to get used to the handling of a light displacement boat. The wind will have a much greater influence on boat handling then on a monohull. Therefore the careful design of aerodynamics of a boats super structure, will be as important as its hydrodynamics of the underwater body. This is especially important at high speeds, where windage becomes the main limiting factor of speed. High windage hulls and bulky bridge deck structures are not only a deterrent to the eye but also make harbor handling in high winds challenging. Multihulls can accelerate rapidly and similarly they lose their way quickly upon heading into the wind, much to the chagrin of neophyte sailors as they attempt to anchor, shoot moorings, close with docks, and come about. In general you'll need to head up closer to your desired stopping point than you would in a ballasted boat (a little unnerving in the beginning), and maintain boat momentum to make good gains to windward and to bring the boat smoothly through a tack.

Shallow draft

Most cruising catamarans have either low profile fixed keels (draft typically ranges between 2'4" to 4'6") or daggerboards where the draft can vary from less than 2'0" with boards up to over 8'0" with boards down (trimarans typically have one centerboard or daggerboard in the main hull). It's a major adjustment for monohull sailors to cruise on a shallow draft multihull. Numerous monohull sailors find themselves hyper-ventilating the first time they sail fast in five to six foot deep, crystal-clear Bahamian water.

Properly designed daggerboards can improve performance. They are extremely simple to operate and are superior to low aspect ratio keels in their ability to help the boat sail as close to the wind. They reduce leeway by more than half and because of this ability are much safer when on a lee shore. Not only do they produce much greater lift at even speeds below 7 knots but in heavy weather, by retracting the dagger boards, allow the boat to safely slide down steep waves. Most cruising multihulls have drafts of less than 4 feet,

permitting them access to snug anchorages. They allow easy beaching and even running the boat onto a suitable shore in emergencies.

Room with a view

Multihulls have lots of room topsides for sail handling and crew maneuvering. Catamarans usually have full-width travelers for the mainsail, and those designs with bridge deck cabins have the added advantage of a saloon area, which is on the same level with the cockpit, providing good visibility of the surrounding water. This allows crew members to stay in touch with those in the cockpit. Most catamarans even have huge sliding doors and windows turning saloon and cockpit into one giant interconnected living space. Forward looking nav stations and push-button autopilots allow steering the boat from below in inclement weather. It's not unusual for one crew member to help navigate while tending to some domestic chore "below" in the main cabin.

You may find it difficult initially to steer a straight course over the wide foredeck of a catamaran. The secret is to sight over some point up forward that keeps your line of sight parallel with the boat's centerline. The optimum arrangement, however, is the use of an autopilot to steer the boat. They do not get tired, complain or make errors, although being an electronic device they may fail when you need them most. The multihull with its better tracking ability than monohulls makes the autopilot's job easier, permitting its use in rough conditions where monohulls would have to be hand steered.

Upwind sailing

Years ago multihulls were considered to have poor windward ability, but modern cruising multihull designs exhibit very respectable upwind performance. Those boats with sleek topside profiles, efficient hull shapes, and daggerboards or centerboards point the best. One trick is to not pinch a multihull as you would a heavy-displacement monohull. By falling off just a bit and keeping your sails full, you'll maintain momentum and higher average speeds, and avoid making excessive leeway. This also increases lift over the daggerboards or keels, since lift increases with velocity.

Maintaining speed is especially important when getting ready to come about, since good momentum helps take you through a tack smoothly. All tris and most performance cruising cats with dagger boards tack with little effort, if you do not forget to leave them down. The balance of the cruising cats with keels now on the market come about less quickly and are more sluggish sailors in general (especially if they have excessive windage), but usually tack without problem. Vintage cruising cats tend to come about in a rather stately fashion. Light winds with choppy seas is always a bit of a challenge, since it's hard to gather the momentum needed to overcome the seas in those conditions. You might occasionally have to backwind the jib to avoid being caught in irons, but the technique should only be employed if necessary since it tends to slow your progress.

When you're ready to come about on a multihull, do it decisively, and make sure you are close to the wind but still maintaining good speed. Trim the main hard before tacking. This allows the main to act like the aft section of a wind vane, helping swing the boat into the

wind. Find a lull in the waves and bring the helm over smoothly, and keep it there until you approach 45 degrees off the wind on the new tack. At that point slowly reverse the helm to bring the boat onto your new heading. As you pass through the wind, ease the main a bit to reduce the wind vane effect, which is no longer needed, and to allow the main to fill and provide power on the new tack. If you lose momentum during the tack and need to backwind the jib, delay the release of the headsail sheet until the back side of the jib has filled and is pushing the boat off the wind. As soon as you're well through the wind, but no farther than necessary, release the windward sheet and haul the leeward sheet in quickly to get the boat moving forward again. Always trim the jib first and then the main. Allow the boat to pick up speed before moving close to the wind again.

When close-hauled in a monohull in windy conditions, standard practice is to head up when hit with a gust. This prevents excessive heeling that can result in a knockdown. When sailing close hauled on a high-performance cruising multihull, luffing up is still the best course of action when you're temporarily overpowered; falling off can make the boat accelerate rapidly. This will also depend on your heading, sea state and sea room. Generally speaking if one is on an upwind course with the wind forward of the beam it is recommended to luff up if overpowered. Consequently on a reach or run you would fall off. This will reduce the effect of the centrifugal force and help keep the boat under control. Another way to cope with gusts is to use a square-top mainsail; the square top blows off in a gust, serving as an automatic first reef.

You'll have to allow for additional leeway when going to windward in any shallow draft boat. Besides their safety aspects of heavy weather sailing, daggerboards greatly help reduce leeway by reaching down into deeper water. Recommendations from the builder or designer and your own experience under sail will tell you how much to allow in various sea conditions. On catamarans with a daggerboard in each hull, use both boards down in light winds to give you the most lift. In moderate winds, use the leeward board since it will be in slightly deeper water. As you gain speed or fall off the wind, the daggerboard can be gradually raised; experience on your boat will tell you how much you can comfortably raise the board under various sea and wind conditions. Also, just before taking, lower the leeward board. High speeds can make it difficult to raise the board; you may find you have to reduce speed temporarily to ease the pressure on the board trunk.

Downwind sailing

Sailing downwind in a multihull is a breeze, with reaching typically a perfect point of sail. When sailing from a close reach to a beam reach or from a beam reach to a broad reach in a multihull, trim the sails as you would for a monohull—ease the sheets until the leeward telltales flow aft evenly. The main difference from monohull sailing is that fast multihulls bring the apparent wind farther forward, so that for a lot of downwind sailing the sails are set as though for a beam reach. Most multihulls have a 7/8 rig and their masts are held up by shrouds, which are attached to chainplates aft of the mast. This setup, although an excellent means of keeping the rig in place, has a disadvantage of creating chafe on the mainsail rubbing against the shrouds, if the mainsail is allowed to be let out fully. Because of the speed of the multihull, the wind is further forward of the beam than on a monohull, therefore this problem is only apparent in very light air and running deep. A neat trick is to

be able to raise the dagger boards and by heading upwind one can increase the apparent wind and consequently the speed of the boat, letting the vessel crab slightly sideways towards its destination. Course made good downwind will be thus increased and you will be sooner at your anchorage. Fast cruising multihulls are often seen flying asymmetrical spinnakers with the headsail up, an advantage for racing. Slower cruising multihulls differ less from monohulls when sailing downwind, although flatter sheeting angles are typically needed to maintain proper sail trim.

When the destination is dead downwind, fast cruising multihulls usually “tack” on a broad reach course and jibe 90 degrees through the wind. This technique produces the fastest speeds and best distance made good. Slower multihulls usually sail closer to dead downwind, but with little heel. This typical rolling motion of a monohull is all but eliminated and the tendency to broach is greatly reduced.

Cruising multihull sailors favor asymmetrical spinnakers for downwind sailing in light winds. With a spinnaker sock all the hassles of deployment and bagging are history. They can be used even single-handed. The tack of an asymmetrical spinnaker is supported by a line from each of the outward bows and one from the main bow of a tri or forward beam of a cat. Asymmetrical spinnakers can be set without a pole due to the wide beam of a multihull, although a short pole permanently mounted on the main bow of a tri or the forward beam of a cat allows the tack to be tightened using only one line. When flying a spinnaker on a multihull you need to be aware of when it’s time to reduce sail. Higher boat speeds mean lighter apparent winds, and it’s easy to get caught in true winds too strong for spinnakers. Get recommendations from your boat designer or sail maker on maximum wind speeds for your boat and sailplan. On a fast multihull, heading downwind temporarily de-powers the sails just as luffing up does when going to windward.

When sailing downwind in light winds, trim the spinnaker first by sheeting it in until the sail begins to stall, then ease the sheet until the leeward telltales flow aft evenly. If the headsail can be carried, trim that next in the same manner, then set the main traveler and trim the main.

If your boat has dagger boards, keep the board(s) down partially for a beam reach to minimize leeway, then raise the board(s) gradually as you sail farther off the wind. Experience will tell you exactly where to place the board(s) in various conditions; it’s best to keep a foot or so of board down when running to improve steerage.

Jibing on a monohull must be done under controlled conditions to avoid rigging damage to gear or personal injury. Boat speed is higher than on monohulls, which means that the apparent wind is lower downwind, so the boom and mainsail can swing across with less force and more controlled than on a monohull. Jibing on a multihull is much easier because one has a wide mainsheet track to control the mainsail. Some multihulls don’t even have a track but employ a double mainsheet systems securing the boom from two sides. Just as a mainsheet traveler this setup allows for an infinite number of sheeting angles and mainsail shaping possibilities, but also acts as an automatic preventer for the boom when jibing or running. When jibing a fast cruising multihull from a broad reach, don’t steer down near the wind before the jibe. This reduces boat speed and makes the conditions more similar to a

monohull. It's better to bring the helm over steadily and "tack" through about 90 degrees until you are sailing on the opposite broad reach course. On slower multihulls you'll need to jibe in a more controlled fashion. Take the slack out of the main as you steer downwind by trimming the mainsheet and by pulling the traveler amidships. Bear away to jibe the mainsail. As the headsail becomes blanketed by the main, jibe the headsail. Ease the traveler and ease the mainsail for your new heading.

Jibing with an asymmetrical spinnaker complicates the process slightly. As the boat passes through the jibe, release the working sheet and allow the sail to be blown outboard, making sure that the sheet is long enough to now act as the lazy sheet. When the wind is on the opposite quarter quickly haul in the new sheet to prevent the spinnaker from wrapping around the forestay. On the new heading make sure the sheets as well as the lines bracing the tack are free and clear.

Downwind surfing

Multihulls occasionally surf down the backside of large ocean waves under normal sailing conditions. They can sometimes surf at speeds approaching true wind speed, which brings the apparent wind to zero and causes the headsail or spinnaker to temporarily collapse. A spinnaker in this situation may wrap itself around the head stay. If it wraps tightly, you may need to jibe the mainsail to allow it to release itself. When released, jibe back to your original course. You can help prevent spinnaker wrap by temporarily over sheeting until the apparent wind picks up again. Repeated surfing might indicate that you have too much sail up for the wind and sea conditions.

Maneuvering under sail

Maneuvering a multihull under sail in tight anchorages or around docks requires some practice, particularly with cruising cats that lack good crisp helm response. Give yourself some additional time and distance to turn, and be aware of how quickly a multihull can accelerate in a gust or come to a stop once headed into the wind. Play your main and jib just as you would with a monohull.

Multihull Seamanship – Part II

Heavy weather and survival conditions

First, let us make the distinction between heavy weather sailing and survival sailing. Heavy weather sailing is done in full control of your circumstances and ability to manage your vessel. Survival is when you pass that point and must take action to preserve life and property, a topic discussed later in this article under the heading of Drag Devices.

Historically, many situations that would have been survival situations in other craft were just heavy weather sailing for cruising catamarans. A classic story by Robin Knox-Johnston was published in *Cruising World*. It is his account of sailing his catamaran through Force 12

winds. There are other similar experiences that support the notion that keeping the vessel underway is a good survival tactic.

Little has been written specifically for survival situations in multihulls. The basic reason for this lack of literature is the astonishing safety record compiled by ordinary sailors in “off-the-shelf” catamarans. At the time of the famous Fastnet disaster, of which volumes have been written, there were two cruising catamarans in the vicinity. They were shadowing the fleet as unofficial entries when the racing fleet sailed into a serious storm. The carnage caused by the storm was so great that a “Committee On Safety From Capsizing” was formed. Their purpose was to design a minimum stability formula for ocean racing monohull yachts. The weather that was a disaster to the Fastnet fleet was considered merely “beastly weather for sailing” by the two adjacent catamarans.

During the tragic “Queen’s Birthday” typhoon off New Zealand, the two catamarans showed that even with an aging and somewhat handicapped short crew they could provide predictable and adequate safety. There are numerous stories of catamaran crews simply furling all sails, lashing the helm amidships and going below to wait out the storm while their cat bobbed around looking after herself.

Basic tactics

Knowing when to reef is the most important skill to develop for heavy weather sailing; next comes sail shape and sheeting angle. There are a few generalities that will help you get started learning about heavy weather sailing tactics:

- As the wind increases, move the sheeting point to leeward. This is one of the best features of multihull sailing. Multihulls have a wide sheeting base which allows a greater angular choice for sail trim than narrow boats. Ease off the traveler to move the main to leeward and use an outside rail attachment point, stanchion base, toe track and car to move the jib to leeward. To further flatten the mainsail tighten the main halyard, outhaul, downhaul and running backstay as necessary.
- Allow more twist in the sails as the wind strengthens and reduce camber (flatten) the sails. This is achieved in the main by slacking the main-sheet and in the jib by moving the sheeting point aft.
- Reduce sail. Most multihulls are just as happy with reduced sail and you will be surprised how little speed you really lose. By reducing speed you will also greatly decrease the loads on rig and structure, diminishing any chance of fitting failures or torn sails.
- Learn to use a barber-hauler (see glossary) to control your jib. A barber-hauler does not need to be a fancy multi-part tackle, but can be made from most anything, including just a length of line lead from the clew of your jib via an appropriate turning point to a winch.
- Slow down to a more moderate speed. Think of it as similar to slowing down your car when you come to a rough road.
- Choose a sail combination according to direction. Downwind, reduce the main area first, then the jib. Upwind, reduce jib area first, then the main. This is just a rule-of-thumb. It must be tailored to the individual vessel. If pressure on the helm is

excessive and the boat wants to constantly break away, raising or lowering the dagger boards will allow you to fine tune the boat to near perfect balance.

- Expect to hand-steer downwind in big waves. Your auto pilot will not be able to react fast enough, nor can it anticipate waves. The trick is never to allow yourself to be perpendicular to the waves, but always to be at an angle to them, especially if you are sailing a keel catamaran. By taking the waves from the rear quarter you are always sailing downhill and you reduce the chance of pooping or pitch poling (pooping is unheard of in cruising catamarans and pitch poling comes from excessive speed perpendicular to the waves). If caught in a situation where an errant wave plunges the boat head-on into a very steep sea, the importance of full volume, properly designed bows will play a great role in safely stabilizing the boat and preventing disaster.

Getting to windward

If you seriously feel the need to maximize your heavy-weather windward ability under sail, then you must be prepared to change headsails for the purpose. Roller-reefing sails are good to a certain point. It must be remembered that a sail is sewn to pull against the head, the tack and the clew with the luff supported by a stay. When a sail is partially rolled, it is no longer pulling against the designed strong points, it is pulling against the luff and the foot where they roll around the stay. While it is possible to do reasonably well with a partially rolled jib, it is without doubt much better to have a sail specifically cut for that purpose, such as a good storm jib.

On the other hand, if you do what most cruisers do and simply run your engine about one third your normal cruising speed you will go to windward just fine. This motor-sailing concept is almost the universal choice of cruisers for going to windward in heavy weather. In a catamaran with twin engines, it is usually necessary to run only one of the engines, preferably the leeward engine, to gain the desired effect.

Knowing when to reef

This is the most often asked question concerning multihull safety. The answer is deceptively simple: "It is time to reef when you first think about it." This is not meant to belittle the importance of knowing that "time". As you acquire more experience with your particular boat, the more feel you will get for the process.

Let us compare learning how to "feel" your boat with how you learned to "feel" your car. When you first learned to drive, how did you know when to start slowing for a stop? If you started slowing too soon, you created a traffic hazard. If you started too late, you wound up with a panic stop or a rear-end collision. How did you learn this subjective judgmental skill? How did this judgmental process become habitual? The "feel" just developed with experience.

Subjective sailing. From the subjective point of view, when you begin to feel uneasy, apprehensive or concerned, it is time to reef. The correct time to reef will also depend on your state of mind, nature of the boat, the sea room and sea state. When the boat no longer

has its feather light touch at the helm, it is time to reef. When the boat's motion changes from its normal light, resilient feeling to one of petulant obedience, it is time to reef. When the lee bow seems to want to plunge and bury, it is time to reef.

Objective sailing. From the objective point of view, when the apparent wind speed goes over 18 knots, it is time to reef on most boats. When you are heeled 2 degrees more than normal, it is time to reef. When you are no longer strong enough to crank in the sails, it's time to reef.

Reefing, as referred to in this section, includes both headsail and mainsail. As a rule for masthead boats going upwind, reef the jib first; downwind, reef the main first. It is hard to generalize about fractional rigs. Sailing under main alone is typically far more controllable and the main can be reefed as necessary. The fully battened mainsail has the most sail controls, is held on two sides by spars, and can be given optimum size and shape. Modern mainsail reefing systems have gotten more dependable, but the sailor's choice is still the dependable slab reefing system, which, with all lines lead to the cockpit can be done in 30 seconds or less. It is still the most dependable, quickest and safest reefing system around. With the help of the full battened main and lazy jacks (which can also be used as a topping lift) the excess sail is gathered neatly on the boom. Roller furling booms or masts in my mind, have no place on a highly loaded multihull. They will work most of the time in the first year, but will eventually fail when you need them most.

Experience counts

There is no substitute for experience, so take your boat out in a controlled environment in strong winds with some capable crew. If you have a cruising catamaran, sail it as hard as you can and try to lift a hull. You probably won't be able to do it, but you will learn a lot about how your cat feels when you begin to reach the realistic usable limits. Then never sail your boat that hard again if you can help it!

Trimarans

A trimaran is far easier to judge when overpressed than a catamaran. The extreme initial stability of the cat muddles both sensory and visual clues. A trimaran initially heels almost like a monohull, and you can visually see the lee float being depressed. Since there is more heel, there is more familiarity for those used to monohulls. As with any multihull, however, the wide beam of a trimaran allows you trimming angles not available to monohulls, thus you can have far more control and can keep your power up longer. A good multihull also requires less power to move at speed because it is lighter and does not have the hull speed limitation factor of a monohull.

Drag devices

—contributed by Victor Shane, Para-Anchors International

The multihull configuration has proved itself to be more seaworthy than even the most ardent of its proponents anticipated. The proverbial fly in the ointment has to do with what many people perceive as the multihull's Achilles' heel: capsize. The argument goes that

ballasted monohulls are more likely to capsize, and they sink while multihulls don't. On the other hand, a monohull's ballast will right the boat if she is capsized (even though she may be dismasted or have sustained other damage), while in the unlikely event a multihull is capsized she will need outside assistance to right herself (a ship with a crane, for instance). If that outside assistance is not forthcoming, the multihull will remain upside down indefinitely and may have to be written off altogether.

The dynamics that lead to capsize are complicated. Entire books have been written on the subject. Although simply lying ahull (broadside to the waves) is a technique that has been employed successfully on many cruising catamarans, as a general rule boats are far less likely to capsize when they are properly aligned with the seaway (parallel to the direction in which the wind and the seas are running). Many experts feel that the ability to survive a severe storm, whether on a monohull or multihull, is closely related to alignment, and therefore boats should be forcefully brought into alignment by some sort of a drag device. There are two classes of drag devices: 1) Parachute Sea Anchors used off the bow, and 2) Drogues towed off the stern.

A sea anchor forcefully holds your boat's bow(s) into the seaway. A drogue keeps your boat aligned with the seaway if you choose to run downwind with the storm. According to experts, a sea anchor and drogue are two items that enable a multihull to be respected as a fully seaworthy, sail-anywhere yacht.

Parachute sea anchors. All boats are designed to penetrate the waves with their bows. This is especially true of multihulls which, as a rule, have knife-like bows. A parachute sea anchor is used to keep those knife edges pointed into the waves offshore, where the water is too deep to use a regular anchor. It aligns the boat by "anchoring" it bow-on to the surface of the ocean. More importantly, it provides sufficient drag to pull those knife-like bows through large breaking waves without allowing the capsize or pitch pole cycle to begin.

Small cone-type sea anchors have proven to be ineffective and unstable; what are needed are parachute-type devices. As a general rule, the diameter of the parachute sea anchor should be large enough (A) to maintain stable inflation without being tumbled by surface action, (B) to overcome the lateral resistance of any keels involved, (C) to hold the bow(s) into the seas and keep side-to-side yaw to a minimum, and (D) to reduce drift so as to protect the rudder and its fitting. As a general guideline the diameter of the parachute sea anchor should be at least 35% of the LOA for both monohull and multihull yachts. When in doubt select a bigger chute.

Modern parachute sea anchors must be used in conjunction with a long nylon rode to allow the boat to yield to the seas and not stand up against them. The long nylon rode is integral to the parachute anchoring system to prevent excessive dynamic loads. For both monohulls and multihulls it is suggested that this rode be equal to at least ten times LOA of the boat when in survival conditions (for example, a 40 ft. multihull will need a nylon tether that is at least 400 feet long).

Rode diameters should be the same as ground tackle rode. A bridle is essential for multihulls. It is recommended that the arms of this bridle be equal to 2.5 times the beam of

the multihull (for example, a multihull with a 20 foot beam will have a bridle whose arms are about 50 feet each. A swivel is required at the parachute terminal and it is recommended that all other unions be in the form of spliced thimbles (no knots) utilizing shackles of equal strength which are wired shut.

Centerboards and dagger boards should be lowered (or partially lowered) when using a parachute sea anchor off the bow. This has the effect of keeping the CLR (center of lateral resistance) well forward which, in turn, minimizes the extent of side-to-side yaw.

Bow rollers used for conventional anchors can be used for the para-anchor; however these must have retaining pins to keep the rode in place (otherwise the rode will jump off the roller when the bow of the vessel dips down into a trough). Heavy-duty chafing gear must be used where the anchor line meets the boat. Never underestimate what chafe can do to your equipment, to your boat and to the lives of those on board. Chafe is the bane of any storm anchoring system. Never take it for granted that the protective rubber or leather sleeve is going to stay put; it's going to migrate, and sooner than you think. Post anchor watch and keep a sharp eye on the gear.

The safest method of deploying a parachute sea anchor in heavy weather is known as the standing set. This method allows the boat's drift to pay out the rode. The procedure is as follows:

1. Head up into the wind, allow sails to luff and the boat to stall.
2. Lower/furl all sail.
3. Secure the rudder amidships, lower all boards.
4. Heave the float.
5. Slam-dunk the para-anchor ON THE WINDWARD SIDE (and never on the lee side, where the boat may drift over and foul with it).
6. As the boat drifts away from the sea anchor, snub the line to help the canopy open under water (only half a turn is required on the cleat; do not fully cleat until adequate "scope" has been payed out.)
7. Secure the rode; put on chafe gear.

An alternative method, commonly used by commercial fishermen and requiring a great deal of practice, is known as the flying set. In this case the vessel is placed on a downwind course and the para-anchor is jettisoned off the stern while quartering the seas on storm jib or bare poles (mainsail has to be furled). With all but the last coils of the line slipped, the helm is put down hard. As the slack goes out of the system the rode will pull the bow around into the wind. A WORD OF CAUTION: Because of the dynamic and/or shock loads involved in attempting to stop a heavy boat that is moving downwind at some speed, the author does not recommend the flying set in heavy weather situations.

Parachute sea anchors can be retrieved by means of a full or partial trip-line. I favor attaching the trip-line to the crown of the parachute, since it enables the crew to invert the canopy and retrieve it with relative ease. A partial trip-line doesn't come all the way back to the boat (unlike the full trip-line) and hence reduces chance of nasty foul-ups. The procedure is fairly straightforward; simply winch (or power) the boat up to the second float

and retrieve it with a boat-hook. Haul in the trip-line and bring the chute on deck. Even so, it is best to wait for calmer weather before retrieving a large parachute sea anchor.

Drogues. Drogues generate much less drag than parachute sea anchors and require considerable sea room for use. They are towed off the stern in order to limit the speed of the vessel when running before strong following seas. Speed-limiting drogues are, for all intents and purposes, steering assist devices, requiring a man at the helm. They may simply consist of a warp (length of line), or warps, with bights of chain attached. They may consist of any number of on-board items towed off the stern, or they may be purpose-made devices.

Drogues must track straight as they are being towed through the sea. If the drogue configuration is unstable it may “squid”, “kite” and “zig-zag” in a seaway, allowing the towline to go slack and boat to possibly broach and capsize. Stable tracking is critical in association with the drogue concept. Whereas large diameter parachute sea anchors are designed to block the flow of water outright, small drogues must be designed to allow for very stable flow configurations. They may be solid plastic devices shaped like torpedoes, as is the case with the two-stage Australian Sea Brake, or they may be parabolic baskets fabricated from strong nylon webbing, as is the case with the American Galerider. Other devices may work, including those associated with defense and aerospace recovery systems (ballute, guide-surface, hemisflow, ringslot and ribbon chutes used mainly for aircraft deceleration).

Speed-limiting drogues are used in conjunction with several hundred feet of nylon or Dacron towline (consult the manufacturer’s instructions). In general, it is necessary to use some chain next to the drogue. This helps to keep the drogue submerged. Any speed-limiting device may lose its bite if it is allowed to surface, cavitate and/or be pulled out of a wave face. In this connection it is important to position the drogue behind its wave when the boat is beginning to surge down the face of another wave. This pulls the drogue through the meaty part of the wave (and not into thin air).

Drogues used with bridles will take more control of the whole situation. Even so, they are not designed to take total control of the situation, as sea anchors are. If the boat needs to be steered, on the other hand, no bridle should be used. By bringing a single towline to a winch well forward of the rudder the helmsman may be able to steer the boat freely, even with the drogue in tow. Raising and lowering the boards will give additional control, either to the drogue or to the helmsman.

Drogue or sea anchor? Speed-limiting drogues are designed for low drag. The associated “Catch 22” is as follows: the same low drag that allows the boat to be steered may allow the boat to be pitchpoled in the ultimate storm. The forces that pitch pole a boat are so great that they will yank the drogue through the sea while throwing the boat end over end. You need the higher drag of a sea anchor to be physically pulled through the breaking sea (and not be thrown by it). It goes without saying, therefore, that the prudent sailor will have both items on board, and know when to use which. If he is towing a speed-limiting drogue off the stern, for instance, the prudent sailor will keep an eye on the barometer in anticipation of making the transition from drogue to sea anchor. And if that transition becomes imminent

the prudent sailor will go to the sea anchor early on in the game, long before he is irrevocably committed to the dread toboggan ride to oblivion.

Conclusion

You will be able to remain under sail in many heavy weather situations on a cruising multihull—as long as you reef when you should. You will probably find when the wind is up you can go just as fast reefed down. Besides, most times you will want to slow down a bit to remain comfortable—yes, a bit like slowing your car down when you come to a rough stretch of road. There is one other basic rule of thumb associated with reefing: on a monohull you typically reef to the strength of the gusts, while on a multihull you reef to the strength of the lulls.

by Gregor Tarjan