

## Cruising Sails: In Praise of the Versatile Staysail

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I wasn't too many miles into a voyage from Costa Rica to the Galapagos on board a Jim Brown Searunner trimaran before I'd fallen in love with our staysail. It was the handiest and most versatile of all the sails in our inventory, a breeze to tack or jibe, and quite easy to set or strike even though (and in part because) it wasn't a self-tending or roller furling sail. It was there to augment the mainsail and jib or genoa's sail area. It brought extra speed when we needed it, and we could quickly douse it when we were feeling overpowered. It was our first line of defense in heavy weather, providing just the right amount of sail area and maintaining the same center of effort or "leverage point" under a double reefed main as we had with the full rig. It was a trouble free sail to back-wind when we were heaving-to in moderate winds or needed a push coming about or help getting on the right tack when sailing off the anchor.

Staysails, of course, do have limitations, optimal wind ranges, and most favorable points of sail, and many frustrated sailors have asked for advice about when and how to use them to their best advantage. Some sailmakers have a somewhat tongue-in-cheek response to questions about staysails: "Put it up and you'll gain half a knot; take it down and you'll gain half a knot." The gain or loss in speed, maneuverability, comfort, or safety a staysail yields depends on many factors. The staysail's size relative to your boat's working sail area, the position of the staysail stay, and the location of the staysail sheet leads all play roles in the sail's effectiveness. Other key elements in its ease of handling are various rigging details and options: running backstays, staysail booms, roller furling systems, and mechanisms to release the staysail stay.

There are many different kinds of staysails. Ketches and yawls may carry mizzen staysails—free-flying reaching sails set between the main mast and the mizzen mast. On a staysail schooner, the main staysail is rigged from the main masthead to the base of the foremast, and it's generally secured to a boom. The staysail most common to cruisers, however, is that small, jib-like sail flown between the mainsail and the jib—or genoa on a cutter. It's also found on a double-headsail sloop, ketch, or yawl. This working staysail—as opposed to staysails used specifically for light air or storm force winds—has some ideal parameters and construction standards if it's to be as versatile, effective, and as durable as possible. The primary role of the working staysail is that of a moderately heavy-weather sail able to handle winds from 25-40 knots in conjunction with a deeply reefed mainsail on all points of sail.

## The Right Size

A cruising staysail's tack should be cut to just clear the bow pulpit and lifelines when its sheet is eased. An 18—30 inch tack pendant of appropriately sized UV and chafe protected Spectra webbing will raise the tack to minimize sail chafe and provide a clear view from the cockpit. Webbing pendants must be watched diligently for chafe and UV deterioration. An integral snap shackle attached to the bottom of the tack pendant makes it easier to quickly bend-on or remove the staysail.

The cruising staysail's foot should be high enough to see under on all points of sail and to allow room for opening a foredeck hatch or working ground tackle if necessary while under sail. The staysail's foot should also clear the dinghy if you carry one on the foredeck, the dodger if one is mounted over the forward hatch, and mast pulpits if you have them. Often a clew position that's just below the main gooseneck (roughly four feet above the deck on a 35-45 foot boat) ensures a practical height for the foot. While a deck-sweeping staysail may offer an advantage when working to weather, a higher clewed staysail will give room for green water to wash under the sail and will be a better reaching sail. To minimize wear and tear, the staysail's clew should be forward of the mast and the forward lower shroud. In addition, this allows the staysail sheets to be led inside the upper and after lower shrouds.

It's essential that the staysail clew height allows for proper trim. Unfortunately, staysail tracks are often positioned so far abaft the mast that the staysail clew must be six or seven feet above the deck to allow the sheeting point to optimally tension both leech and foot. This sheet track position and clew height is often fine for a storm staysail, but it usually won't allow for a big enough working staysail. In most cases, a staysail sheeting track will work well if it's at least two feet long (three or four feet is even better) and starts very near the forward face to the mast when viewing the boat in profile. The port and starboard tracks should be sufficiently reinforced and lie along lines that are eight to ten degrees off the centerline drawn from the staysail stay to the mast. This often places the staysail sheeting track on the cabin top, and it allows the staysail sheets a fair lead aft to cabin top winches.

A working staysail isn't always full hoist, particularly on boats with high aspect fore-triangles (tall masts and shorter fore decks). Its head angle, where luff and leech meet, shouldn't be narrower than 20 degrees or the heeling force at the top of the sail may outweigh its forward drive. Once you and the sailmaker settle on the clew position, the leech may be drawn with its angle 20 degrees or greater from the headstay.

After you decide the positions of a staysail's three corners, you can determine its square footage. If the area of the staysail doesn't represent at least 20 percent of a vessel's working sail area (100 percent of the fore-triangle plus mainsail area—not including roach—plus staysail's square footage), a single headsail may be more efficient. An inner stay may still be useful for setting a storm staysail (roughly 25 percent of the fore-

triangle), but a working staysail is worth adding to the sail inventory only if it's at least 30 percent larger than the storm staysail in area. For example, a 40-foot cutter may have a 180 square foot working staysail and a 100 square foot storm staysail. A traditional cutter's working staysail can be as much as twice the size of its storm staysail and can be flown in up to 40 knots of wind with a double or triple reefed main. I remember three weeks in late October beating to Maui from Victoria, British Columbia under staysail and double reefed main on an Orca 38. The wind never fell below 35 knots nor did our boat speed drop below eight knots. The boat was perfectly balanced. (We, on the other hand, were perfectly miserable for having missed our weather window by six weeks).

### **Staysails at Work**

Because of its relatively small size and necessarily robust cloth weight, a working staysail usually doesn't start adding significantly to boat speed until the wind is blowing ten knots or more. Also, on a boat with a narrow beam and an inboard genoa/jib track, it may be difficult to have both headsails and the main well trimmed when going to weather. From a close reach to a broad reach, however, you'll feel the staysail's horsepower.

If a staysail is too full, or the slot between the leech and mainsail is too tight because of poor sail trim or shape, it will disturb the airflow and efficiency of both the jib and the mainsail, particularly when sailing close hauled. You'll also experience this problem if you have any of the following: too much sag at the staysail stay, not enough luff tension, sheet leads that are too far forward or outboard, or tired sail cloth that allows the sail's fullness to migrate aft.

A common frustration is how difficult the staysail's stay can make tacking a large genoa. One often must leave the cockpit (so unpopular these days) and guide the genoa through the stays. Coming about with the genoa is easier if the staysail is set because the staysail—particularly if left back-winded—will act as a funnel, letting the genoa slip right over it. Because the staysail may impair light-air performance, a great solution to this problem is a retractable staysail stay. When equipped with a release lever or easily tensioned wheel or turnbuckle, you can secure the stay aft near the shrouds when you're tacking in light wind. This option is complicated and may be precluded, however, if the staysail stay is rigged with a roller furling system or a boom.

A clubfooted staysail has its foot secured to a boom. Its foot may be attached to the boom (or club) with slides or lacing, but more commonly it's loose-footed (attached to the club only at its tack and clew) to facilitate trimming. While a club-footed staysail's self-tending ability is very useful when short tacking in winds over 15 knots, it has many disadvantages. For coastwise or bluewater cruising, I share yacht designer Bill Crealock's sentiments about boomed staysails: "The first splash you'll hear when you're offshore is that of the club being thrown overboard."

One of the main reasons I don't like clubs on staysails is that they can become a crippling or lethal weapon during an accidental jibe or if a sheet parts or is let go when crew are working the foredeck. Clubs dominate the area forward of the mast, interfering with anchoring, making sail changes, keeping bow watch, storing a dinghy, or simply lounging.

When the staysail sheet is eased for a reach or a run, the boom lifts, opening the leech and allowing the forces in the head of the sail to round the boat up and induce rolling. A vang, preferably led to the cockpit, will prevent this, but it isn't commonly rigged. As the wind increases, the staysail club also needs a preventer, although it's difficult to find the necessary leverage point forward of the staysail stay to lead a preventer that will keep the sail from jibing. You should run both port and starboard leads for the preventer to the cockpit in case the staysail is caught aback or its boom is dipping into seas when the boat is rolling. Back-winding the staysail when coming about in order to speed up or ensure a new tack or when heaving to also becomes a problem with a self-tending, club-footed staysail. You'll have to go forward and secure the boom to windward or use a preventer led aft to hold the staysail aback. Exposed to deck wash and high winds, the staysail boom could also be a liability when you're forced to work to weather with a storm staysail in extreme conditions.

A staysail designed for a boom may be freed from its club and sheeted instead to staysail sheeting tracks retro-fitted to the cabin top or deck, as I've already described. This track is generally necessary for sheeting a storm staysail anyway. Unless a vessel is over 60 feet and single masted, it's really quite easy to tack a staysail that isn't self-tending. In fact, it can aid in staying on the new tack when coming about if you keep it back-winded while you sheet the jib or genoa home.

## Reefing and Furling

Whether they're free footed or on a club, staysails may have a row of reef points much like those in a traditional mainsail. A reefing staysail should have its reef row installed at an angle that elevates the reef clew above the reef tack in order to maintain the same sheet lead whether the sail is reefed or set full size. Reefing the sail must reduce sail area by approximately 30 percent to have a noticeable effect. Much deeper reefs leave a sailor with a lot of extra cloth to tidy up, which is vulnerable in heavy weather. A reefing staysail may eliminate the need for a storm staysail if its reefed size is small enough (without making the reef row too deep) and its construction is robust enough for Force 10 or greater winds.

Many accomplished sailors swear by reefing staysails, and just as many swear at them. While potentially eliminating the need to change, stow, and buy an additional sail, a reefing staysail still requires a fair amount of foredeck work to reef. And once you've

reefed the sails, the possibility of the reef coming undone while coming about—or pounding—is a vexing concern, not to mention the potential of collecting green water in the bunt of the sail. (“Dead babies,” was the less than charming name tall-ship sailors used for this often sail damaging nuisance.) While a little more work than reefing, bending on a dedicated storm staysail that hasn’t seen routine wear and tear can be reassuring when a blow sets in.

Alternatively, roller furling systems offer an easy way to deploy, furl, and stow a staysail as well as to reduce sail area by partially furling. If construction standards and sailcloth are robust enough for heavy weather and the sail is adequately protected from sun exposure when it’s furled, a furling staysail may be a viable option. The potential concerns still remain—the staysail unceremoniously unfurling at some inopportune moment and converting itself into so many teltales, slipping out of the extrusion, or even carrying away the staysail stay. I definitely wouldn’t want to change a roller furling working staysail for a roller furling storm staysail in the conditions that would warrant such an undertaking. If you choose a roller furling staysail, you’ll probably need to retrofit an additional sheeting point well forward of the staysail track in order to provide a proper sheeting base for the staysail when it’s partially furled. And with roller furling, a retractable staysail stay becomes a more complicated option.

## **Construction Details**

Since the staysail often doubles as the heavy weather sail, robustness all around is imperative. The most failsafe staysail arrangement is a hanked-on, free-footed sail that’s stoutly constructed and that’s sized and shaped conservatively. It should be made of durable Dacron—even if it’s a roller furling sail and even if the other working sails aboard are made of laminated cloth. Its fabric weight should be equal to or greater than the weight of the mainsail cloth, and it should be triple stitched with heavy, UV protected, polyester thread. Its corners should be heavily reinforced with six or seven layers of the same sailcloth that the sail is made of, extending along twelve to fifteen percent of the length of the luff, leech, or foot that they’re supporting.

The corner hardware should be non-corroding bronze or stainless steel, built and installed to take the load of a 70 knot gust. Hydraulically pressed rings of dissimilar metals (aluminum and stainless steel is one notorious combination) that invite galvanic corrosion don’t belong on any cruising sail. Webbing “strainers” may be added to enhance the strength and flexibility of the corner rings. These are 1—1.5 inch wide webbing straps that are folded in half, led through the corner ring, and sewn port and starboard a foot or so into the body of the sail. Corners protected with leather from sunlight and chafe will last longer and require fewer repairs than those that aren’t.

The type of jib hanks and the way they’re secured to the luff of a hanked-on staysail make a huge difference in the reliability and ease of repairing the sail. Bang-on hanked

attached through a grommet will quickly wear through the chafe guard that protects the luff—especially if that chafe guard is plastic rather than leather. Once the chafe guard has been worn through, the hank will begin chafing through the structural luff rope, and you'll need to remove the hank in order to renew the chafe guard. When you remove a bang-on hank from the sail, you can't re-use it. These hanks are easier to install than sew-on hanks, but they're more difficult to remove, particularly on a rolling deck. Jib hanks are made of bronze so that they'll wear away (albeit slowly) instead of wearing out the stainless steel stay to which they're attached. Longer lasting sew-on hanks have substantially more bronze on the part that rides up and down the stay than do bang-on hanks. Hanks sometimes wear unevenly, so you should be able to easily exchange worn ones at the top for ones in the middle of the luff which often see less wear. Jib hanks should be the same size along the entire luff, and their piston pulls should all be on the same side of the sail for convenience when bending on or removing the sail.

The grommets to which the hanks are attached won't corrode or pull out if they're hand worked. A hand worked eyelet grommet is composed of a brass ring that's stitched in place along the sail's luff with thick waxed, Dacron thread and into which a brass liner is set. These are over twice the strength of the more common stamped-in brass or nickel spur grommets. Alternatively, the brass spur grommets along the luff may be upgraded to hydraulically pressed rings. While these lack the flexible bearing surface and ease of removal of the hand-sewn ring, they're very strong.

The venerable and versatile staysail adds much to a cruiser's options under sail if it's built for the task and the rig it's flown on is designed to maximize its performance. This little sail that consistently provides yeoman service proves once again that good things do indeed come in small packages.