

MAXIMUM SAIL POWER

CHAPTER 7

THE DEVIL IS IN THE DETAILS - Part 4

Chapter 7 is close-up look at the individual parts of a sail. We will examine all the bits and pieces that go into making a good sail from whether you should add a foam luff and sunshield to a headsail or have full length battens in your mainsail. Understanding the make-up of your sails is key to getting the most use and performance out of them. In Part 4 we look at what goes into making an excellent cruising headsail.



HEADSAILS FOR THE CRUISING SAILOR

Fortunately, headsails are a far less complicated part of a sail inventory, although no less important. Without them the boat would just not sail as efficiently. While roller-furling units have become as common as anchors on sail-boats, it was not

always that way, and many cruisers, for good reason, will not switch from hanks to roller-furling. There is some merit to this argument.

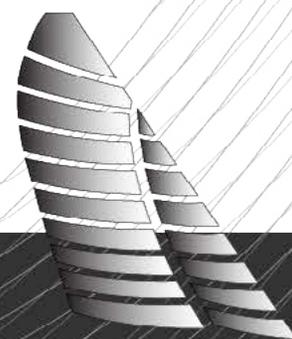
Hanks for Headsails

Hanks may be old fashioned, but they are reliable, and if you change sails to suit the conditions, as opposed to just rolling up a piece of a genoa, you will always have a sail up that is designed specifically for the conditions, rather than a compromise. For example, a working jib designed for sailing upwind in 30 knots of wind will have a flat chord depth and a forgiving luff, perfect for sailing in that kind of weather. On the other hand, no matter what you do, a roller-furling genoa designed to sail in 12 knots of wind that is reefed will not have the correct shape, nor will it be engineered for heavy air. The initial chord depth, for example, will be much deeper than the working jib, the fabric lighter, and once you start to roll fabric away there is no way of keeping the location of the draft where it needs to be. Of course, the advantage to roller-furling is that it's convenient. With the flick of a switch or a crank on the winch you can reduce sail area quickly and efficiently. Again it's a balance between priorities. If you are an elderly couple sailing a 40-foot boat, for example, it will be better seamanship to have a furling unit rather than attempt to change headsails on a heaving foredeck.

Note that while hanks are reliable, they work best only if the sail has been engineered for them. Once the headsail is hoisted all the way the load is spread evenly between the hanks and the luff rope, but while the headsail is being hoisted it's a different story. Specifically, there is a lot of point loading at each hank and the sail needs to be reinforced accordingly. You might also consider hank-covers, small Dacron covers that wrap around the hank and fasten back on themselves, since hanks are a never-ending source of potential snag points for head-sail halyards, spinnakers, and the like. Covering the hank stops an errant line from getting stuck behind the piston and causing problems.

Sail Engineering for Roller-Furling Headsails

As is the case with hanks, if the sail is going to be reefed on a

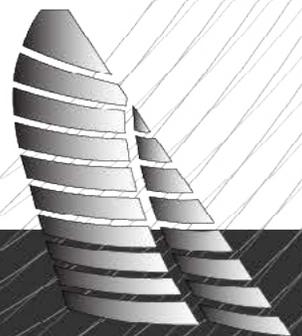


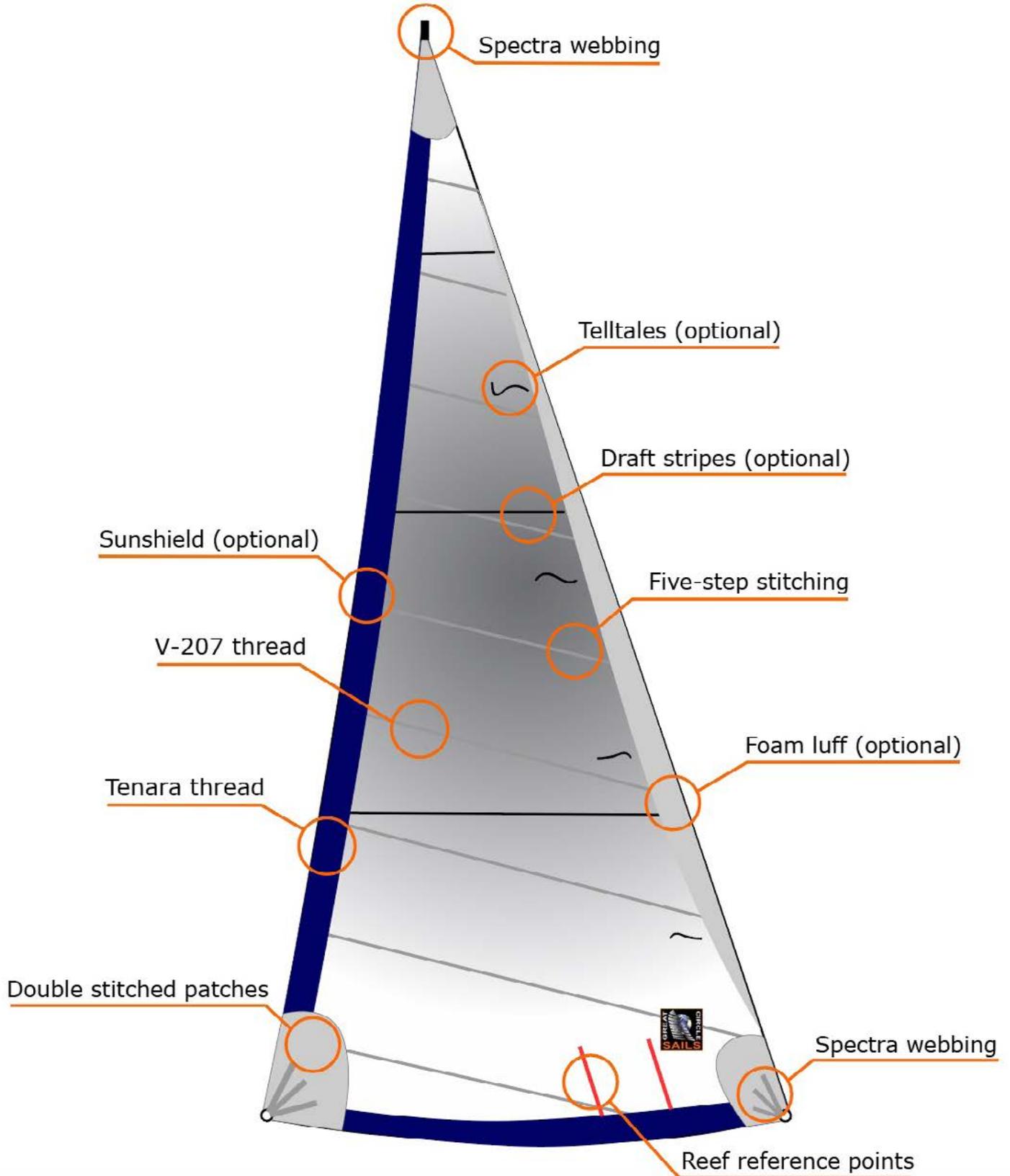
furling unit, special attention needs to be paid to the engineering of the sail. One of the most difficult aspects of a reefing headsail is to engineer a sail that is light enough to fly when fully unfurled, yet strong enough to handle the loads when the wind is up and the sail reefed. Radial sails work better than cross-cut sails because the sailmaker is able to place strength exactly where it is needed. Cross-cut sails on the other hand, can have a second ply along the leech. But while this goes some way toward helping with strength, it's not absolutely critical. Be sure to discuss wind ranges with your sailmaker. Just because a sail is reduced in area to the size of a storm jib doesn't necessarily mean that it will be strong enough. Again, don't let anyone daysailing maybe, but for offshore passagemaking, definitely not.

Foam Luff Pad

Soon after roller-furling units were introduced, sailmakers found themselves faced with the problem of a reefed sail having a deep belly at a time when a flat sail was desirable. Basically, as soon as the first roll was taken, the edges of the sail got tight and the body bagged out, a situation that became worse with each turn. To compensate, sailmakers added a foam luff pad that runs the length of the luff of the sail. This pad, made of closed-cell foam, tapers toward the head and tack and is widest in the middle of the sail where there is the most shape. The actual fore-and-aft width of the pad is determined by the size and shape of the sail, and the end result is that as soon as the first roll is taken on the furling unit, the pad bulks up on the foil creating a fatter roll in the middle of the sail. With each successive roll this extra girth removes some of the depth of the sail, effectively flattening the sail where it is most needed.

Low-aspect sails need a foam luff pad more than high-aspect sails because they have more shape over a larger area to remove. While there may be less need for a foam luff pad on a high aspect sail, all sails will benefit from having one. Even though it can remove shape, the luff pad does nothing to help keep the shape where it is needed most — approximately 33 to 38-percent aft. This is one reason why sails reefed on a furling unit are not nearly as effective as those designed specifically for the conditions, especially when sailing to windward.





UV Sunshield

For cruising sails, especially those used in sunny climates, a sunshield is a must. This acrylic- or UV-treated polyester fabric is laid along the leech and foot of the sail to protect it when it is rolled up on the headstay. The fabric does not add to the strength of the sail, but it does add to its life by protecting it. If aesthetics are important, your sailmaker can make a sacrificial sunshield from the same fabric as your sail and replace it when the fabric starts to rot. This is a slightly more costly option, but the sails do look nicer.

Overhead Leechline

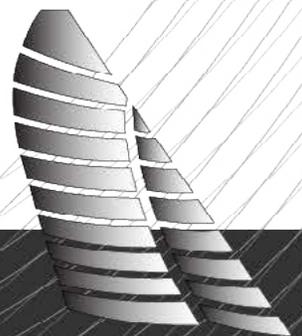
If your sails are high-clew, or if your boat is so big that you can't reach the clew to adjust the leechline, you might consider an overhead leechline running over a small block at the head of the sail and down the luff. This leechline will be adjustable at both the tack and clew. Note, however, that you will not be able to adjust the leechline at the tack if the sail is rolled up or reefed on a furling unit.

Extended Head and Clew Patches

The first portion of the sail to roll up includes both the head and tack patches, so they should be extended so that the corner structure is preserved when the sail is partially reefed. Otherwise, once the patches are rolled away completely you end up with two important parts of the sail effectively having no reinforcement. This is obviously not desirable at a time when you need more strength, not less.

Reef Reference Points

Your sailmaker should mark the foot of the sail with reference points so you will know by how much you are reducing sail area when reefing. This is important for the overall balance of the sailplan. It's also important so you can know where the sheet lead should be positioned when the sail is reefed. More about this in the chapter on sail trim.





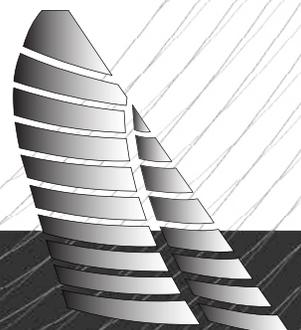
Reef reference points

Hank Reinforcement

If your sail is hanked on, be sure that your sailmaker adds reinforcement patches behind each hank. As soon as the load comes off the halyard there is point loading at each hank. This point loading can be fairly significant and could rip the luff of the sail if it is not properly reinforced.

Trim Stripe

To make it easier for you to trim your sails, your sailmaker should add a trim stripe at the clew of the sail. The trim stripe is a line that roughly splits in half the angle made by the leech and foot. This stripe is a good average reference point for you to use when you are trimming your sails. Sight down the stripe to your sheet and if the sheet is in line with the stripe, you can be sure that your sail is trimmed correctly.



Telltales

Headsail trim is important to both the cruising sailor and the racing sailor, so have your sailmaker add telltales to the luff of each headsail. You can then fine tune your headsail shape by adjusting your lead position so that all the telltales along the luff lift at the same time. If the top telltale lifts first, move the lead forward; conversely if the lower telltale lifts first, move the lead aft.

Gaining Performance From Your Furling Headsail

The moment you reef a headsail you lose some of its design attributes, and if you view sail efficiency as part of overall seamanship — which you should — then finding ways to improve the performance of your headsail is important. An average headsail has the maximum draft located at a point about 33 to 38 percent aft from the luff. Therefore, as soon as you roll the sail up, even a little, you roll away the ideal shape and end up with a compromise. Furthermore, as the clew rises the center of effort gets higher as well, precisely at a time when you would prefer to have it lowered to reduce heeling moment. You cannot do much about this, but you can modify your deck layout to ensure that your genoa is trimmed properly and performing effectively.

Start with a sail that has the correct clew height and then modify your deck layout so that you can move the sheet lead position to accommodate clew location as the sail is reefed. Each sailmaker has his own idea of where to place the clew. Those with a racing bent like it low, whereas classic cruisers, for example, those with traditional-looking schooners or cutters, like it high. In the end it really depends on your sailing plans and the kind of boat you are sailing. For most cruisers the clew height should fall somewhere between the two extremes, since there are benefits to be gained from each. A low clew, for example, provides the best upwind performance since the shape is more consistent throughout the sail, the center of effort is lower and you have a short, sure sheeting point. On the down side, the moment you reef the sail, your sheeting position changes and unless you have a way of adjusting the sheet lead, you quickly lose all performance.

With a high-clew sail, on the other hand, you can reef the sail and even without

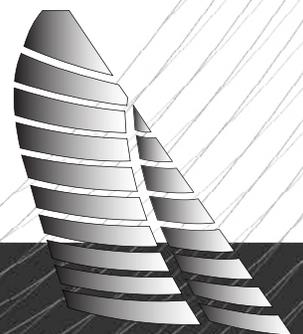
much adjustment to the lead position you will end up with a decent sheeting point. The problem is that high-clew sails are fairly inefficient for windward work, although they are fine for reaching and work well with a staysail. Again, it is a matter of preference. My ideal sail is one that has the clew high enough so that there is good visibility under the sail but low enough that the sail retains some of its performance ability. You also need to allow room for waves crashing over your bow to pass easily under the foot of the sail, and you need the clew low enough so that you can adjust the leech line without hanging over the lifelines.

If your deck layout does not already allow you to adjust the sheet lead position while under sail, modifying with modern deck hardware is a simple matter. Replace your car and track with one that can be adjusted under load, and add a line that runs from the front of the car forward to a turning block, and then aft to a winch. This allows you to drag the lead forward, or ease it aft. As soon as you reef your genoa, the clew travels forward. Sails with lower clews need a sheeting position adjusted sooner and more often. The same applies when you ease the sail out when sailing on a reach. If you do not move the lead forward the clew rides up and spills wind from the leech, depowering it and losing most of its efficiency. Having the ability to adjust the car position is crucial to overall performance.

A New Generation of Furling Headsails

We've discussed how new equipment developed for the racing market often trickles down to the cruising market, and a good example of this is the latest generation of furlers and furling headsails that were first developed for single-handed sailors. These are line-drive furling units used with an anti-torque line in the luff of the headsail. Line-drive was originally developed by Facnor, a French company, and is now available from other manufacturers like Profurl, Selden and Harken. A line-drive furler is essentially a large spool furling drum with a single endless line, in other words a loop. The large radius of the spool gives greater leverage to roll up big sails just as a larger sprocket on the rear wheel of a bike allows you to go uphill. They are simple to use, but fairly expensive.

The key to the success of this system is the furling line that

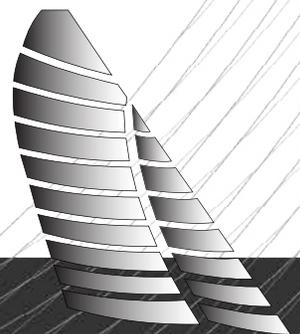


runs up the luff of the sail. Anti-torque lines have been developed specifically for this type of application and over the last few years have become increasingly less expensive. The drawback of these systems is that these are furling units, not reefing units, and each sail is either completely rolled up or completely unfurled. Therefore, you need a number of different headsails each on its own line-drive furler in order to adapt your sailplan to the changing conditions. The foretriangle is a bit more cluttered, but for racing sailors who need to change gears often and quickly it's a good solution.



Line Drive furler

There is much to think about when it comes to buying new sails and getting them to work properly on your boat. Like many things



in life, you often have to make small compromises, but the key is an understanding of what all the components do and how they affect your sailplan. Ask yourself good questions and think carefully about your sailing ability and sailing plans before buying new sails. Getting exactly what you want is very satisfying and part of the overall fun of sailing.

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