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MAXIMUM SAIL POWER

CHAPTER 8

ALL ABOUT SPINNAKERS - Part 1

Chapter 8 is a close-up look at spinnakers. A bit about the history of the spinnaker, different panel layouts, symmetrical versus asymmetrical and a whole lot more. In Part 1 we look back at how the spinnaker was developed and how we got from cross cut spinnakers to radial spinnakers.

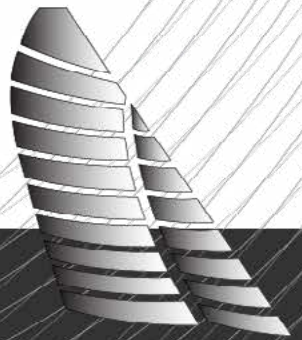
DOWNWIND SAILS EXPLAINED

There is nothing quite like a day in the trades with a warm wind at your back and the horizon ahead stretched in a wide arc like open arms just waiting for you. You are romping downwind with every inch of sail set, your boat rollicking and reveling in the conditions. Unfortunately for many sailors this is not a reality. They are wobbling downwind wing-and-wing, or worse, with the engine on and the spinnaker neatly stowed in the sail locker. Sailing with a spinnaker should not be a scary thing. With a little practice it is not only easy to set, but capable of making sailing that much more fun.

Up to now these blogs have concentrated on the front-and-back sails: the mainsail and headsails. Now it's time to ease the sheets, feel the speed increase, and set the chute. Before we drag the sail out of its bag, however, we are going to look at the sail's history, construction, engineering, and design. The spinnakers of today are a far cry from the spinnakers of a few decades ago. They are more versatile, easier to set and douse, and much more fun to use. In this chapter we will learn all there is to know about these colorful sails, and by the time you have read the chapter on sail handling you should be an expert. If not an expert, then at the very least you will have a greater understanding and appreciation of the sail, and most important of all, you will no longer be afraid to set one, even in brisk winds.

A Brief History

Spinnakers have been around for almost 150 years. In fact, the early spinnakers were first used on the Solent, that storied strip of water between mainland England, and the Isle of Wight off the country's south coast. In the mid-1800s, dozens of yachts could be seen racing on the Solent, and the competition was as keen then as it's ever been. Any edge that could be gained might mean the difference between winning and losing, and sailors tried everything they knew to be competitive. While living in Cowes on the Isle of Wight in the late 1970s, I heard a theory that the first spinnaker was designed and built by a local sailmaker by the name of William Gordon. The sail was used on his yacht Niobe, and with it Gordon had many



successes. The sail was made from cotton and was more like a fat-bellied genoa than the round spinnaker of today. In fact, the first spinnakers were asymmetrical. The story goes that when the sail was first set one of the crewmen commented that it was sure to make the boat "spin," or go fast in the language of the day. The sail was soon dubbed the spin-maker which later became spinnaker.

A second theory, however, credits the origin of the name to Mr Gordon's arch rival, a man by the name of Herbert Maudslay who owned a yacht called Sphinx. For a while these new sails were named after the boat names, with the one on Gordon's boat being called a "niobe," and the one on Maudslay's boat being called a "sphinx." Word has it that the crew bastardized the word sphinx to spinker, and eventually to spinnaker. I can't comment on the authenticity of either of these theories, but they are interesting stories none the less.

Different Panel Configurations

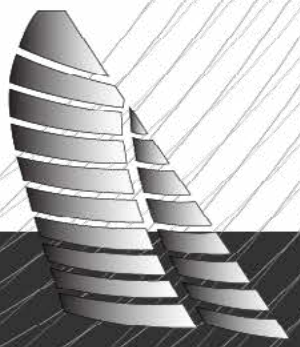
Although spinnakers remained a part the sailor's inventory through the late nineteenth and early twentieth centuries, it was only when nylon replaced cotton as the fabric of choice that spinnakers really came into their own. This is because nylon has a good strength-to-weight ratio, meaning it's not only light but strong, perfect for a sail that needs to float out and away from the rest of the sailplan. What it trades for this strength and lightness it gives up in stretch resistance, but for spinnakers that's not a bad thing. As noted in Chapter 2, nylon was first developed by

the Du Pont company in late 1930s, and it was shortly thereafter that the most notable sailmaker of the day, Ratsey & Lapthorn, used the fabric to build the first symmetrical spinnaker. The panel layout on this new type of sail consisted of a series of vertical panels working in from the leeches toward the center of the sail in diminishing sizes. While the sail worked well, it was only when Ted Hood turned the panel layout on its side and started to build cross-cut spinnakers that sail development began in earnest.

Because of the way the panels ran from the clews to the head of the sail, the Ratsey & Lapthorn sail was triangular in shape, like an "A." But Ted Hood believed that a sail that had more projected area, especially up high, would perform better, and so he built his sail with cross-cut panels, which meant there was no practical limit to how wide the sail could be across the head. With this new flexibility, Hood began experimenting with different size sails, until he eventually found a balance between too little projected area and a sail that would fly without its edges being so large and heavy that they collapsed in on the center. Having the panels run across the sail also allowed him to introduce sail shape more consistently and, drawing from his experience building cross-cut headsails and mainsails, more precisely.

Unfortunately, although cross-cut panels worked quite well through the middle sections of the sail, in the top third there were serious problems. Most significantly, where the edges curved in toward the head of the sail, the fabric was cut on a huge bias causing it to stretch and distort to the point where it was no longer able to support the shoulders of the spinnaker. Hood Sails was the first sailmaker to put a radial head on a cross-cut body to address the problems caused by the cross-cut panels. And afterward, North Sails, seeing this improvement in the head, reasoned that the clews could also benefit from being radial. This resulted in what became a true benchmark sail: the tri-radial spinnaker.

Despite the obvious advantages of a tri-radial spinnaker, sailmakers eventually became keen to create a sail that had a more uniform transition of fabric strength along load lines, which meant getting



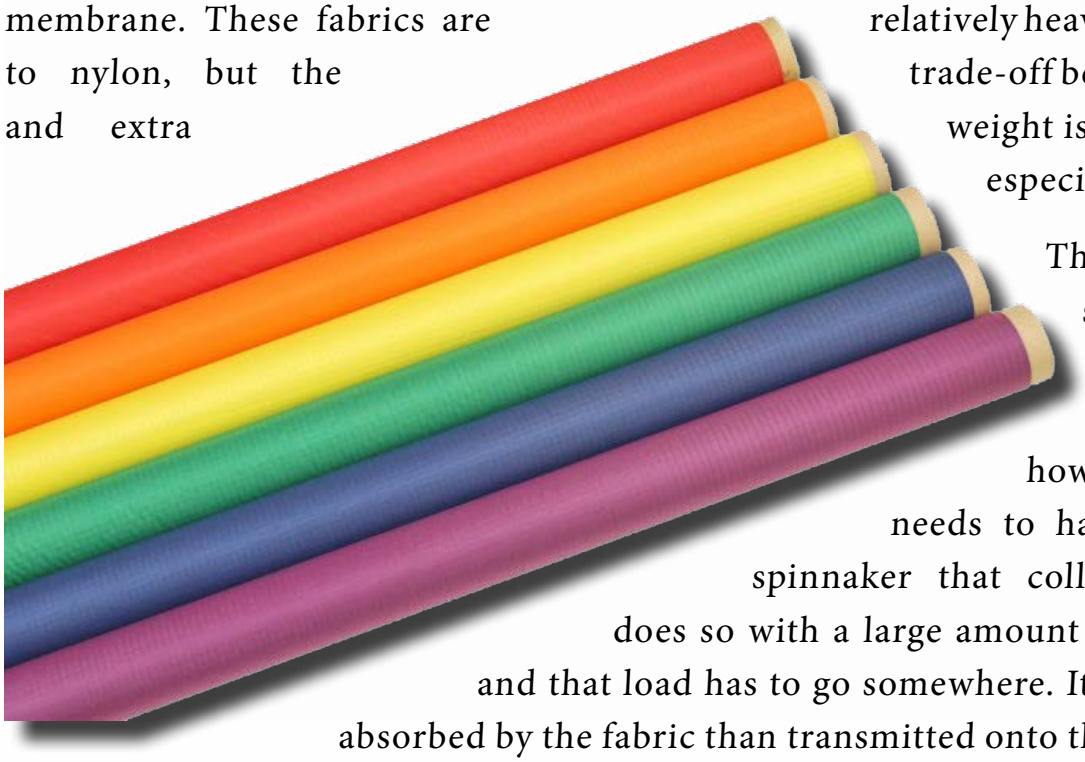
rid of the cross-cut panels in the center. Just as you would not expect to see horizontal panels on a radial headsail, sailmakers reasoned that there should not be horizontal panels on radial spinnakers and set about designing and engineering a new generation of spinnakers with panels oriented along expected load paths and the fabric making a turn at each horizontal seam. Spinnaker nylon is generally warp-oriented, meaning its strength runs the length of the fabric, so to use the fabric effectively the sailmaker needs to cut small panels and piece them together so that the warp yarns run along the load paths. The smaller the panels, the more accurate the orientation, although there is always the trade-off between the expense of making a sail with an infinite number of panels and one that has a reasonable amount of panels.

One for the "how not to fly a spinnaker" department

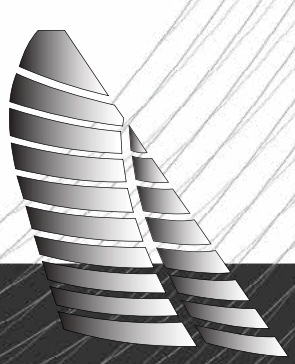
Spinnaker Fabrics

While the advances in spinnaker fabrics have not been as dramatic as we have seen in the fabric for working sails, there have in fact been some subtle improvements, mostly in terms of finish. Nylons are not set with as much heat so there is quite a bit of bias stretch, but ever since fabric makers started to weave warp-oriented nylons specifically for tri-radial sails, this bias stretch has not been as much of a problem. Spinnaker nylon comes in a number of weights including 0.5 ounce, 0.75 ounce, 1.5 ounces, and 2.2 ounces. The actual finished cloth weighs about a quarter ounce more than these designations.

For spinnakers that are used for reaching where there is still quite a bit of attached flow, low stretch and an aerodynamic shape areimportant and sailmakers have been using laminate scrims and light Cuben Fiber or more recently a light membrane. These fabrics are relatively heavy when compared to nylon, but the trade-off between low stretch and extra weight is a reasonable one, especially on a reach.



This is fine for light spinnakers. Once you get into heavy-air sails, however, the fabric needs to have some give. A spinnaker that collapses and refills does so with a large amount of shock loading, and that load has to go somewhere. It's better that it be absorbed by the fabric than transmitted onto the sheets, halyard, and mast where it could possibly do some real damage. Light-air reaching sails are less likely to collapse and refill, so stretch resistance is key to good shape retention and speed. As soon as you bear away onto a reach or run, the apparent wind drops,



and loads on sails are dramatically reduced. The loads on the body of a spinnaker with the wind from behind are fairly minimal, and therefore stretch resistance can be traded for give in the fabric that will absorb shock loads.

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