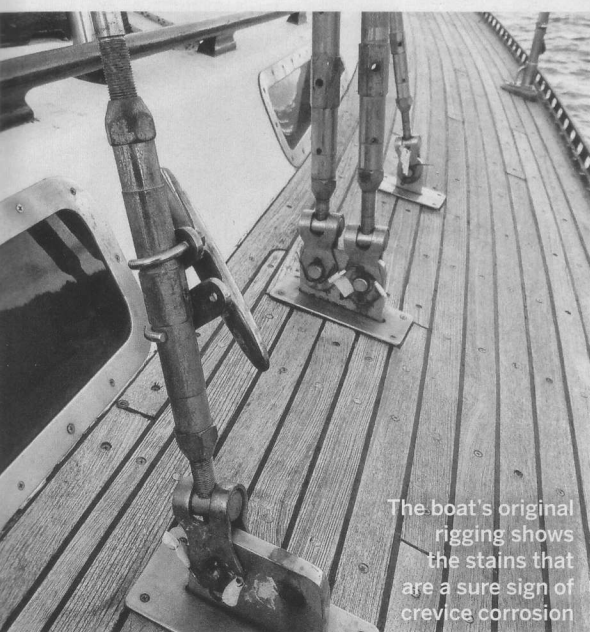


# Rigging Reimagined

Phil Gutowski goes synthetic with his new standing rigging

Removing the mast in anticipation of the re-rig: it's a job more easily done on the hard



The boat's original rigging shows the stains that are a sure sign of crevice corrosion

It was blowing 25 knots when the inner forestay let go. *Eclipse*, my 1984 Tayana 42, was screaming along on a broad reach just south of Saint Thomas. I had gone to raise the staysail, and upon putting a slight strain on the hanks, the stainless wire separated from its swagged fitting at the deck. I leapt forward to get the sail and wire under control, using a spare line to lash it back to the chainplate. In shock, I stared up at the rig, expecting the rest of the stays and shrouds to start letting go. Fortunately, *Eclipse* is rigged as a cutter, so the broken inner forestay wasn't required to hold the mast up. Still, I was lucky the mast had held and I was so close to land. I'd recently sailed from New England to the Caribbean by way of Bermuda, and an issue like a snapped inner forestay could have resulted in a much more catastrophic outcome.

Truth be told, while I had done what I could to get the boat ready for the long trip south, a re-rig wasn't in the budget. They say you should replace your standing rigging every 10 years or so, but this was most likely the original wire from 1984! Stainless steel can be visually deceptive, and it's prone to catastrophic failure without warning. In order for it to retain its anti-corrosive properties, its surface must be allowed to interact with oxygen to form a protective oxide layer; however, the parts of a wire stay trapped inside a swagged fitting are deprived of oxygen, which can allow microscopic fissures to develop, a condition known as crevice corrosion. If any moisture gets in there, the wire can literally corrode from the inside out.

Before sailing the 1,500 offshore miles to the Caribbean, I had inspected the rigging hoping to get at least one more season out of it. However, in the wake of this forestay failure, new rigging was at the top of my to-do list. As a result, after returning north and with *Eclipse* back on her home mooring in Boston, I called up a local rigger to take the mast down. It was tricky,

**Colligo Marine**

Comments and Exceptions  
 SEE EMAIL FOR DIMENSIONS  
 TURNBUCKLE LENGTHS  
 WE ARE CHANGING SOME DIA  
 SIZES ON CHAINPLATES.  
 BOSUN'S CHAIR REQUIRES NEW SHROULD  
 RODS.  
 NEEDS 3/8" TEE FITTING FOR SHROULD  
 RODS.  
 NEED 3/8" TEE FITTING FOR SHROULD  
 RODS.

Part to Part Length (Specify length for connections)	Size diameter or number parts	Type (11-19, Dyneema, stainless steel, etc)	Material connections (size etc)	Material Connection (Type, brand, size, color, etc) (11-19, Dyneema, stainless steel, etc)	Chainplate type (and hole size, length, diameter, etc)	Position (if known)
Lower	3/4"	11-19	1/2"	11-19	11-19	
Intermediate	3/4"	11-19	1/2"	11-19	11-19	
Upper	3/4"	11-19	1/2"	11-19	11-19	
V1	3/4"	11-19	1/2"	11-19	11-19	
V2	3/4"	11-19	1/2"	11-19	11-19	
D1	3/4"	11-19	1/2"	11-19	11-19	
D2	3/4"	11-19	1/2"	11-19	11-19	
D3	3/4"	11-19	1/2"	11-19	11-19	
D4	3/4"	11-19	1/2"	11-19	11-19	
	3/4"	11-19	1/2"	11-19	11-19	
	3/4"	11-19	1/2"	11-19	11-19	

22/19  
Version 1.2

**Measure twice, cut once: the list of specifications/dimensions the author sent to Colligo**

daunting. Skeptics of synthetic rigging often cite the danger of UV damage from the sun and vulnerability to chafe. Through years of experience and testing, though, Franta has found that the initial UV damage to the line is only on the outside and easily identified when the fibers take on a fuzzy texture. Some gradual loss of strength is considered acceptable, given that Dyneema is so many times stronger than it needs to be to actually do the job. Chafe should always be monitored, but like UV degradation is easy to detect. In other words, a simple inspection of the rigging is all it takes to prevent any surprise failures like the one I had just experienced with Eclipse's forestay. Next thing I knew, I was feeling even more comfortable with the idea of Dyneema rigging than I was with stainless steel.

Of course, it's also true that a boat's standing rigging is only as strong as its weakest link. In order to be entirely confident in the new setup, I would therefore need to completely replace every single part, including the chainplates and turnbuckles. Colligo assisted with new chainplates made of titanium. The new turnbuckles came from CS Johnson Marine Stainless.

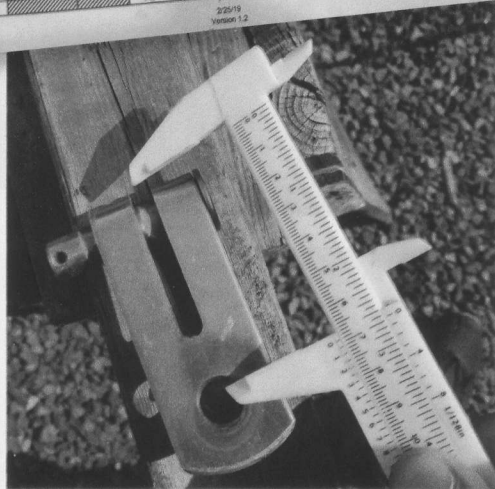
With my mast laid on wood horses in the boat yard, I started out by labeling and disassembling all of the stays and fittings. Each was laid on the ground and a careful measurement was taken with a long tape. I transferred these figures, along with the exact dimensions of fittings I'd be replacing, to a worksheet provided by Colligo. John also took into consideration the turnbuckles I had ordered so they could splice my new Dyneema stays at the correct length. One of the great advantages of Dyneema single braid line is that it's easy to splice, which makes it possible to DIY your own rigging from start to finish. However, because it can be challenging to get the length precise enough to mate with your turnbuckles, I had Colligo splice my stays and

shrouds in its shop. Colligo Dux is pre-stretched with heat. After they splice the ends the stay is stretched again with about a 2,000lb load to set the splice. This is critical, because it's the resultant length, after stretching, that matters.

In terms of the type of rope I used, I replaced my 3/8in, 1x19 stainless wire shrouds and stays with 13mm Dyneema Dux Dyneema. The breaking strength for 13mm Dyneema is 49,000lb, compared to 17,500lb for the standing rigging it was replacing. Each stay is fitted with a custom Colligo line terminator fitting. These are designed to adapt the Dyneema to the type of fitting you have on your boat. In my case I had to integrate a set of stemball fittings at the top end and turnbuckle pins at the deck. Colligo also has a very cool pin, or lashing terminator, which was very helpful.

Despite our best efforts, one of the stays came out a bit short, and with an important departure deadline fast approaching, it was too soon to get a new one sent in the mail. John therefore instructed me to use a length of small Dyneema line to lash the line terminator directly to the turnbuckle pin. This old-school approach—which at first seemed like a bit of a hack—proved to be an elegant and completely reliable solution. It also highlighted yet another one of the benefits of Dyneema, i.e., that it can be cut, shortened and re-spliced at sea.

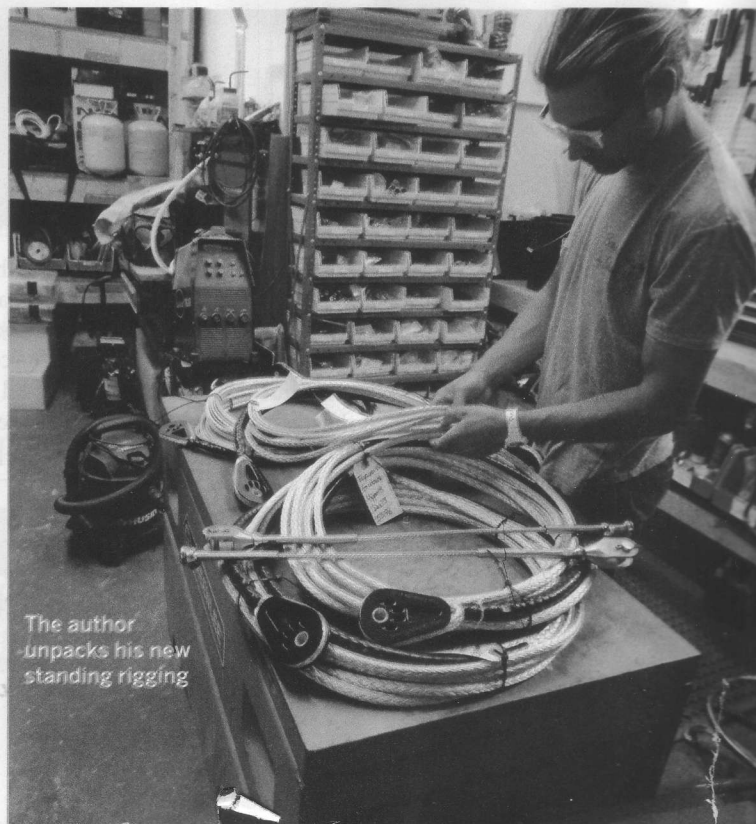
I also had another stay that measured out slightly long. However, without any prior splicing experience (and the aid of a YouTube



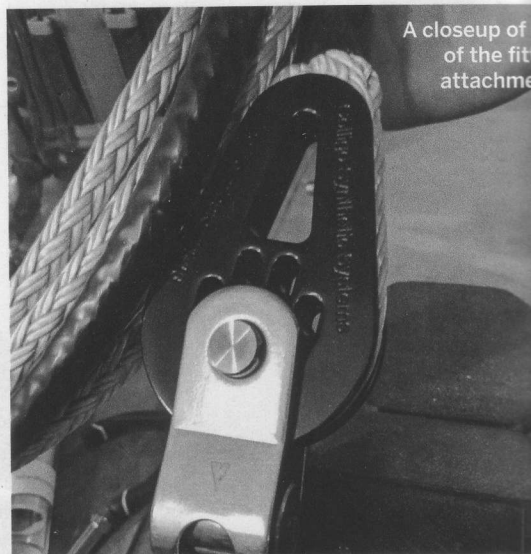
but we managed to unstep the mast with the boat still in the water and tied up alongside an old pier. It's possible to replace your standing rigging without unstepping the mast. But it's time consuming and requires a lot dangling in a bosun's chair. I wanted plenty of time to ponder a number of extra changes and upgrades, and so I opted to do everything at once with the rig on the ground.

I had already received a number of quotes for replacement stainless cable and fittings when I decided to call up Colligo Marine, makers of Dux synthetic rigging. The owner, John Franta, was incredibly helpful. He's an industry veteran and someone who has dedicated his life to promoting the use of Dyneema on sailboats. After having just observed an unexpected failure of stainless steel wire, I was intrigued to try out these advanced fibers. Colligo's Dux is an uncovered Dyneema braided line that, when sized correctly, will be at least two to five times stronger than the steel wire or rod it replaces. Since Dyneema fibers are a type of plastic, there is zero risk of failure due to corrosion.

New products are often viewed with skepticism. Synthetic rigging is unfamiliar to most sailors, and I'll admit the prospect of using plastic rope to hold up my mast felt initially



The author unpacks his new standing rigging

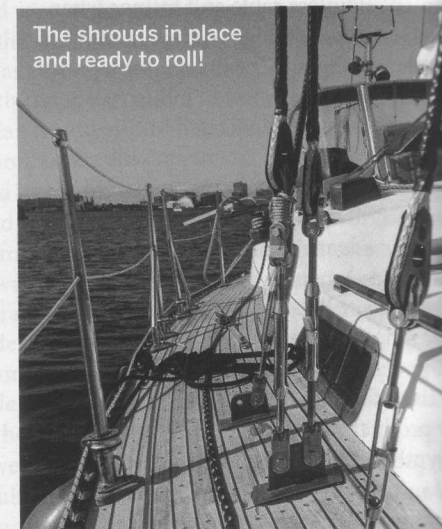


A closeup of the fitting attachment



One of the nice things about Dyneema is it's easy to splice

The author attaches the fittings to the shrouds



The shrouds in place and ready to roll!

video) I managed to shorten it with a new brummel splice. Using the lashing technique, I was then able to install the stay and apply tension to the splice until it elongated enough to attach directly to the turnbuckle pin. The new setup performed flawlessly on the passage south from Boston to Miami that fall. In all, I'd estimate installing the new set of shrouds after everything arrived from Coligo took about 18 hours.

I've now put thousands of offshore miles on my new standing rigging, and I absolutely love it. There is no better piece of mind at sea. I enjoyed the DIY aspect of the project, too, although I was

appreciative of the support of experts, like John. I also couldn't have done it without the help of a rigger with a boom truck to drop the mast. A side note, the cost of the project also included storage fees paid to my local boatyard, which allowed me to keep it there for three weeks while I completed the project. **S**

In addition to being a longtime liveboard sailor, **Phil Gutowski**, who grew up sailing on the Great Lakes, is also the owner of BoatRx ([boatrx.com](http://boatrx.com)), which specializes in installing and designing marine refrigeration and air-conditioning systems throughout New England and the USVI