Mast Tang Reinforcement Project

Project Performed by Michael Clements and Colin Gilbert, Fleet One
on the Mast of Too Wicked, 304
November 26, 2023

Most 242 masts encounter the same problem: a relatively thin cross pin that connects the upper forestay swivel to the mast tang, which in turn wears its way over time through the aluminum and elongates the hole.

If not addressed in time, this issue could theoretically distend the aluminum enough that it would eventually break, thus losing the mast in the process.

There are a few remedies, one of which is to take the mast to a shop (or have a welder visit the boat), have them fill the hole with molten aluminum, and redrill the hole, with or without a large stainless bushing inserted (usually about 1/4” diameter). A bushing that’s larger than the cross-pin helps spread the load of the cross-pin.

The other solution is outlined below, and it was originally developed by Yury Levskovskiy of Kitsilano Yacht Club, who sails Swift, #233. Photos of it can be seen in Michael Clements’ Boat Maintenance document on the Fleet 1 website.

As you can see from the photos below of Too Wicked’s 1 year old mast, it is already suffering from slight hole elongation, coupled with excess wear on the flat surfaces below the hole, presumably from the pin tilting slightly when under load.

Step 1: Procure your parts.

The Barton tangs can be procured at Steveston Marine for about $4 and cut in half as shown. You also need a few stainless bushings. Jim Hyslop was kind enough to donate his to our project, with some left over (which we will use on Matt Collingwood's mast in the Spring), so he can advise where best to obtain these. Perhaps one of the Metal Supermarkets stocks them.

Not shown is a 1" to 1.5" bolt, 2 small washers, and a lock-nut for the upper bolt assembly.

A Dremel or a file for grinding down the raised aluminum burrs around the original cross-pin hole in the tang.

Dry fit the lower pin assembly to make sure the two metal tangs fit within the jaws of your shackle or whatever else might be used.

Note that the two stainless tangs are not aligned with the upper face of the mast tang: in fact they are angled down slightly at the lower end because that’s the angle the forestay usually takes.

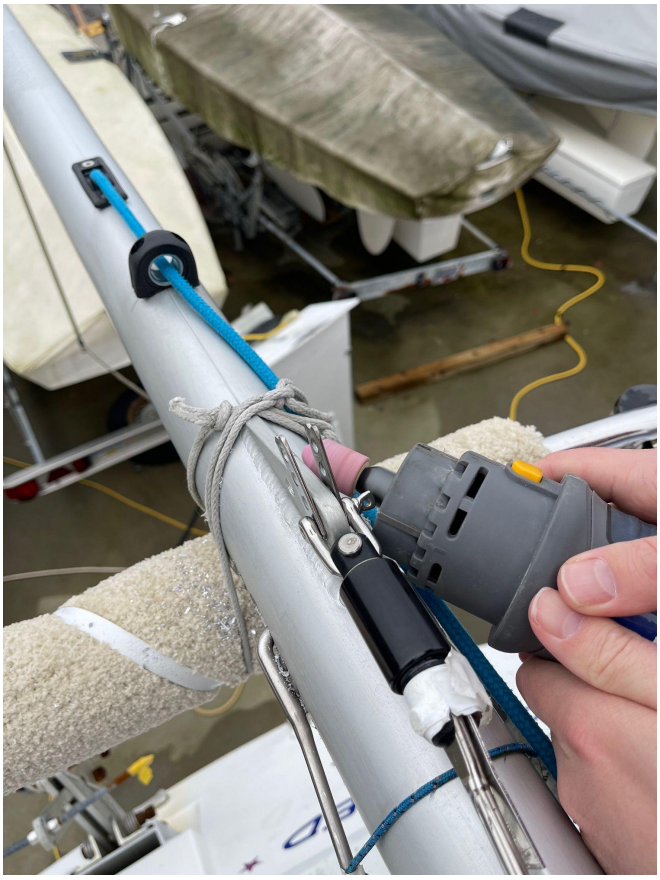
Use a handheld drill to enlarge the lower hole to accommodate the new stainless bushing, and then do a dry fit of that bushing, per the 2nd photo.

Then do a dry test fit of the entire lower assembly.

Then fully-assemble the lower section and drill a smaller pilot hole higher up. Once it is drilled then you can use a larger bit to enlarge the Upper Assembly hole so it will accommodate the upper bushing.

Note: we cut the bushing so it was long enough to also fit inside the tang holes and thus provide more support to the cross bolt and reduce the wiggle room potential.

We then used the Dremel to grind down the aluminum burrs caused by the drilling.



Then do a dry fit of the upper stainless bushing, per the next photo.

Then we used the larger drill bit on the tangs so they could also accommodate the larger bushing. This took quite a while. Then we used the Dremel to burn off the metal burrs on the tangs.

Then we did a dry fit of the upper bushing.

A top-down view

A top-down view with the cross-bolt inserted, plus washers.What you don’t see is the end of the bolt: we broke it off with pliers in line with the top of the lock-nut via wiggling the bolt up and down a few times.

Port view:

Starboard view: