

2. Of Cotter Pins and Rigging Tape

September 23, 2016 [Marc Hughston](#)

This is an older article from Cruising World, but it is just as valid today. When the various boat checklists you may come across ask you to check the rigging, this is what you are looking for. What was enlightening to me, when I first read it, is that covering stainless steel with rigging tape, as you often see done on shroud turnbuckles and lifeline connections, is actually not a good idea. Read the article and see why.

Scroll down to read the article

STANDING RIGGING BY BILL SEIFERT

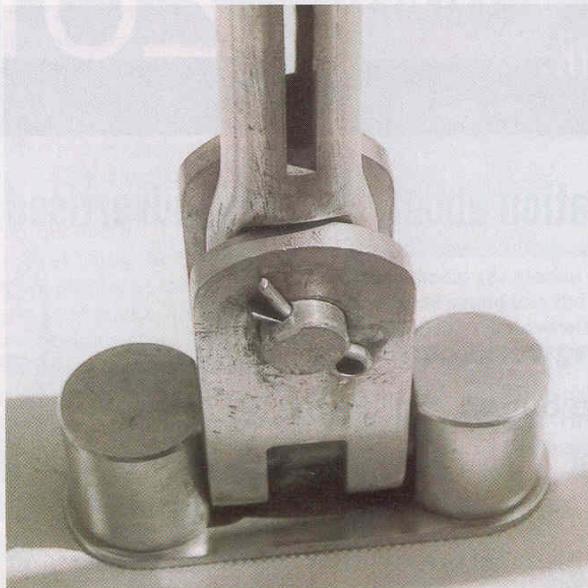
Of Cotter Pins and Rigging Tape

A refit expert takes aim at common practices that often lead to rig failure

SAILBOAT RIGGING PRESENTS clear examples of the maintenance challenges cruising sailors face: Neglecting a tiny detail can have catastrophic results. The best-engineered rig on the planet could come crashing down for want of a 10-cent cotter pin. Here are some tips that will help you to avoid dismasting and to cope with it should it occur.

To keep turnbuckles from unscrewing, I replace the usual bent cotter pins with round-head machine screws tapped into the cotter-pin hole. That way, I don't have to wrap the machine screws with rigging tape to prevent the cotter pins from ripping sails or people. As I'll explain below, rigging tape is generally not a good idea on stainless-steel rigging components. I use a larger-than-normal pilot drill for the tap and a machine-screw length equal to the diameter of the turnbuckle screw.

Machine screws are quick and easy to remove for standing-rigging adjustment. In a dismasting, fully unscrewing the turnbuckle is the neatest way to disconnect rigging, provided that the turnbuckle hasn't been bent. Always generously lubricate the turnbuckle threads. You can clean excess lubricant off exposed threads, but by keeping the engaged threads fully lubricated, you should have no trouble adjusting them, even years later. Note that WD-40



Bending cotter pins in curlicues is unnecessary and can interfere with removal in an emergency. At shrouds, the angle of the legs should be no more than 10 degrees each (top). At headstays and backstays, or other places where there's sideways load on the clevis pin, a 20-degree spread is acceptable.



Round-head screws tapped and threaded into turnbuckle studs (above, left) don't require tape (which is bad for stainless steel) and are faster to remove in the event of a dismasting. Routine inspection revealed the dramatic fracture in the body of this turnbuckle (above, right). If we hadn't removed the tape for a closer look, the whole rig might have been lost.



is a solvent, not a lubricant. In fact, it removes lubricants. Super Lube grease or anhydrous lanolin is a good choice if you don't have molybdenum disulfide grease handy.

Never tension a turnbuckle that's under load. If it's not convenient to take the boat for a sail to adjust shrouds on the leeward side, heel the vessel at the dock by running a spinnaker halyard to a fixed object, then tensioning it so the hull is heeled at an angle of at least 5 degrees. To adjust tension on a starboard shroud, take the spinnaker halyard to a fixed object on the starboard side, tension it to heel the boat to starboard, and then tension the starboard shroud as needed. Release the halyard and sight up the mast to check the effect. Repeat the process as needed on each side. By sighting up the mast with the vessel inclined, then with the vessel upright, you can come very close to a proper tuning of, first, the upper (cap) shrouds, then the lowers.

Tape on Turnbuckles

Stainless steel's resistance to corrosion relies on exposure to oxygen in the air or water. When you tape a stainless-steel turnbuckle or rigging terminal, you deprive it of oxygen, and the metal is more prone to crevice corrosion, to which stainless steel—even when it's fully exposed to oxygen—is already very susceptible. Therefore, avoid taping stainless-steel turnbuckles and other hardware.

Over time, the consequences of oxygen deprivation can be disastrous. Just as prop shafts generally break right at the stuffing box, wire often breaks where it enters a terminal. Turnbuckles and

rigging parts, in particular, experience accelerated corrosion when the surface of the metal is no longer exposed to the air. Twice I've seen turnbuckles part because of corrosion under tape.

As a race inspector, I sometimes ask skippers to remove tape on turnbuckles to allow for a close examination, and I recommend that the owners not reinstall it. Vinyl covers on shrouds and lifelines, as well as spreader-tip boots, are also potential troublemakers.

Cotter Pins

The "yachty" look of cotter-pin legs bent around a clevis pin in curlicues makes removal very difficult. Most cotter pins are too long. Yacht designer Rod Stephens always admonished me to trim cotter pins to one-and-a-half times the diameter of the clevis pin. Each leg should be spread only

10 degrees. A small dab of silicone over the short, spread cotter-pin legs prevents them from ripping sails and gashing toes. I like to round cotter-pin leg ends with a file, which facilitates installation and helps prevent ripping sails.

Orient clevis pins to have clearance around the cotter-pinned ends so that if the need arises, you can drive the clevis pins out with the aid of a drift punch

On turnbuckles that don't exert a lot of side force on the cotter pins (such as shrouds), you can replace the normal stainless-steel cotter pins with brass, which makes them easier to drive out in an emer-

gency, such as a dismasting.

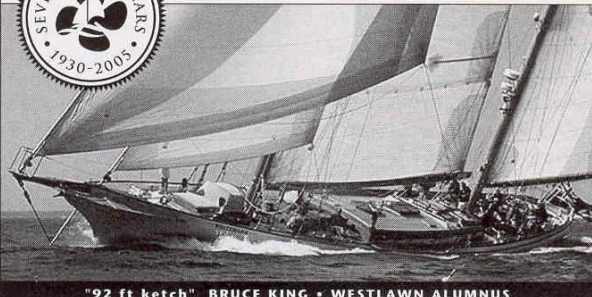
You should orient the head of a clevis pin toward the side of the chainplate that has the least clearance to a fixed object. For example, on a boat with a cabin house and close inboard shrouds, the head should be on the same side of the chainplate as the cabin house. The object is to allow enough room to fit a drift punch and lump hammer (a small, 4-pound sledgehammer) on the opposite side of the chainplate, where the tip of the clevis pin emerges. In a dismasting, you can then use the lump hammer and punch to drive out the clevis pins. If you use brass cotter pins, these will probably shear, saving time. Try this on your boat—the price of one cotter pin is worth it. Both the sledge and drift punch should have wrist lanyards, as you're likely to use them when waves are washing

over the deck. Headstay and backstay attachments are likely to be side-loaded, so you should use stainless-steel cotter pins that are cut, rounded, and spread 20 degrees.

Contrary to what one might think, a sailboat without a mast rolls much faster and has a much more uncomfortable motion without the damping effect from the inertia of the rig. Soon after a dismasting, suggest to your crew that they take medication for motion sickness, because once the adrenaline rush wears off, seasickness is likely to set in.

Bill Seifert is a marine engineer with four decades of experience building, designing, and refitting sailboats. This article is an excerpt from his book *Offshore Sailing: 200 Essential Passagemaking Tips* (\$20; 2001; International Marine, www.internationalmarine.com).

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