

## Unstep and Step Your Mast

By Jack and Alex Wilken

We have written a lot in the past about rigging, so this month it is how to unstep and step your mast. There are many reasons you may eventually have to do this, from rigging replacement to electronic installments to maintenance.

The processes to unstep or step your mast will differ depending on whether the mast is deck stepped or keel stepped, and how much the mast weighs. Masts that weigh 100 pounds or less can usually be put in place by a skipper and one or two crew. Heavier deck stepped masts can be raised and lowered without a crane by using a tabernacle. Boatyards are, of course, set up to pull masts and step them, and they normally will also have a place for you to work on your mast.

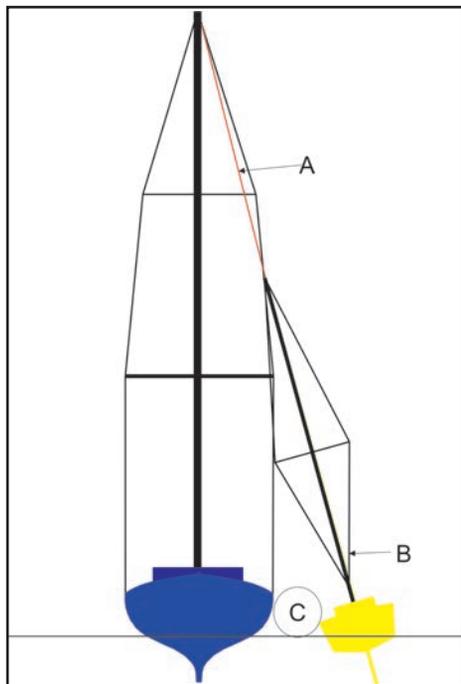


Figure 1: Shown here is a keel stepped mast on one boat being pulled using the halyard from a larger boat. "A" is the spinnaker halyard for a 50' plus tall mast being used to pull a 30' plus tall mast. The rigging is secured to the mast "B". A large fender "C" allows you to heel the smaller boat to align with the mast head of the larger boat.

The manufacturer of your mast can give you the weight of the mast extrusion per foot, so by multiplying that by the height in feet, you will have the weight of the bare mast. Rigging, fittings, and spreaders all add weight that will need to be taken into consideration when lifting your mast. Generally, boats over 25' will be advised to use a crane and someone who knows what they are doing to unstep or step a mast.

The mast on a small boat can often be man-handled into place. However, there are things to consider and ways to make it easier, both of which are essential if you're going to do it without professional assistance. If the mast is fairly lightweight, is keel stepped, and has some deck or support above the step to capture the mast in an upright position without other support, it can be set into place by one or two people. A halyard from a taller mast can be used to hoist a keel stepped mast that is too heavy or long to manhandle - for example, a 26' Thunderbird with a 38' mast (Figure 1). In this case, the fact that it is keel stepped means that it can go up without any standing rigging attached. But it also means that levering the mast into place does not work because, even if the rigging would allow it, when you got the mast upright it would fall from the deck to the keel.

Deck stepped masts on smaller,

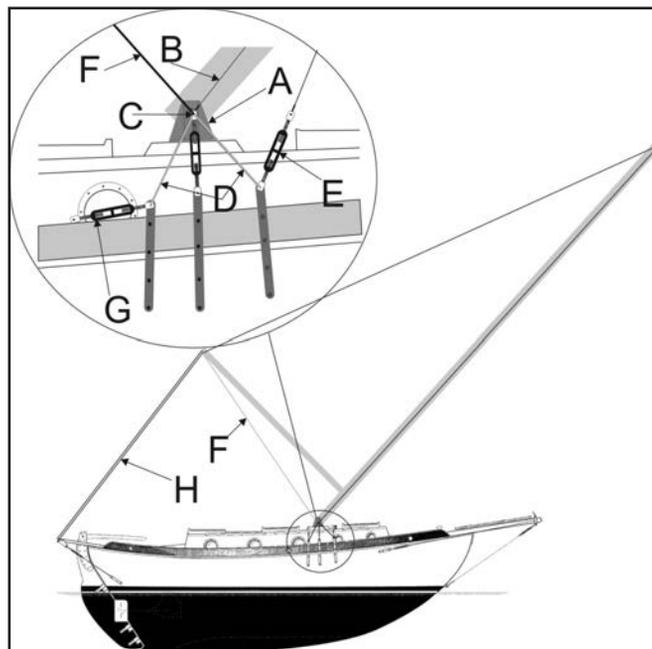


Figure 2: Larger boats with tabernacles can be rigged to raise and lower the mast using the boom as a gin pole. "A" is the tabernacle. "B" is the upper shroud that stays in line with the centerline of the mast as it goes up and down. "C" is the pivot point on the tabernacle. "D" are the restraining lines to keep the shroud pivot point close to that of the tabernacle, and "E" is the forward lower gone slack. "F" are the guys to keep the boom on center; they attach from the boom end to the upper shroud pivot, and "G" is the aft lower shroud turnbuckle not connected. While "H" is a 4-to-1 tackle used to control the mast up and down.

and sometimes even larger, boats can be levered into an upright position. An example of a larger, heavier mast that can be levered is the one on the Westsail 32. It is close to 45' long and is a couple of hundred pounds with rigging and fittings. It was built to be raised and lowered using the boom as a gin pole (Figure 2). The tabernacle used in this case was quite stout and the upper shrouds were tied to maintain the pivot point as the mast transits from up to down or visa versa.

Lighter masts, especially those with hinges or tabernacles, can be rigged while laying on deck or in a crutch with the uppers, aft lowers, and

backstay attached when lifting from aft to forward or the opposite if lifting the other way around. If you can lift the mast part of the way just by pushing on it, you can then raise it the rest of the way with a single line or a two or three-part tackle (Figure 3). You will want an angle of 10 to 15 degrees between the mast and the line to give you an easy pull up instead of trying to just compress the mast.

Larger boats that need to use a crane still have plenty to do. The crane is usually a flat rate, but there is an expectation that you will be ready to go so that when the crane gets hooked up, the mast is only a few clevis pins from being free to lift. Start by removing your sail covers and sails and then look for anything that connects to the deck and the mast. Flag halyards can be easily missed. The boom needs to be removed and stored out of the way. If the spinnaker pole is attached to the front of the mast, it must be detached and stowed elsewhere. All running rigging, halyards and such, should be fastened or tied off to the mast. Do not wrap lines around the mast above the winches or goose neck as the lifting harness may need to slide up the mast unencumbered.

Most boats will have electrical and signal wires running up the mast; these

must all be disconnected. If they run inside the mast through the cabin top, it is best to push them up into the mast so they will not get caught on anything. On keel stepped masts, disconnect and tape them temporarily to the mast. You will need to pay attention to these as the mast comes out so that they do not get trapped between the mast and the deck or collar.

The turnbuckles will need to be loosened enough to allow the removal of the clevis pins. Mark the turnbuckles by placing tape - this is a good use of "electrical" or vinyl tape - around the screw where it enters the barrel. When you loosen the turnbuckles, the tape will stay in place to be used as a guide for tightening later. Often, turnbuckles are obstinate after years of not moving. In that case, last month's *48° North* article on "Replacing Your Rigging" will give you some pointers.

Remove all the cotter pins or rings so that the clevis pins are ready to come out. If your mast is keel stepped, remove

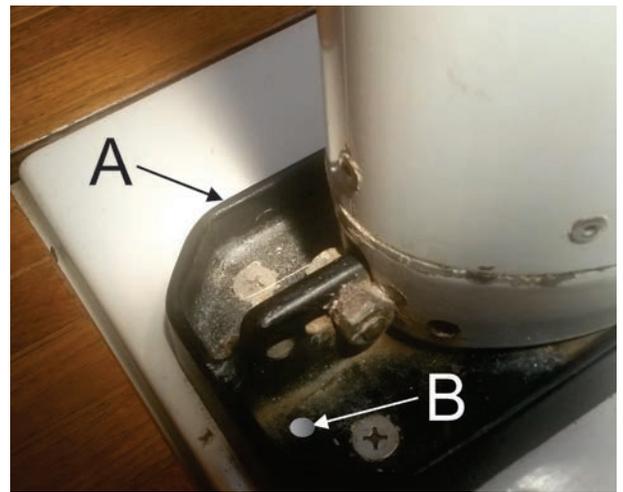


Figure 4: This is the step on a keel stepped mast that has been designed with a lip, "A", to capture rain water coming down the mast. The hole, "B", drains into the bilge so the mast is high and dry.

the mast boot, or, if it has a tabernacle, make sure the pin is ready to come out. Keel stepped masts will have wooden wedges or rubber between the mast and the deck/collar where the mast comes through the deck. These have to be removed and kept in a safe place for later.

Before the crane is hooked up to pull the mast, remove all the clevis pins that are not necessary to keep the mast aloft in the at-rest position. This usually means leaving in position the headstay, backstay, and upper shrouds, but it could be anything that gives support fore, aft, and athwartship. This does not need to come from the top of the mast and could be the forward and aft lowers, for example, to name only one of many possibilities. The crane will swing close into the front or aft side of the mast so clear the space so the yard personnel, or whoever is rigging the lifting harness, will not be stepping on screw drivers, etc. Get your own tools ready and organized: we always have a ¼" tip alignment punch, that is close to 10" long, and at least a 16 oz. brass hammer for knocking out stubborn clevis pins.

The big moment is when the crane starts to take up on the harness that has been rigged on the mast. Now will be the moment to pull the remaining clevis pins. This harness is normally rigged so that the mast is a little heavy at the foot so it will not come out of the

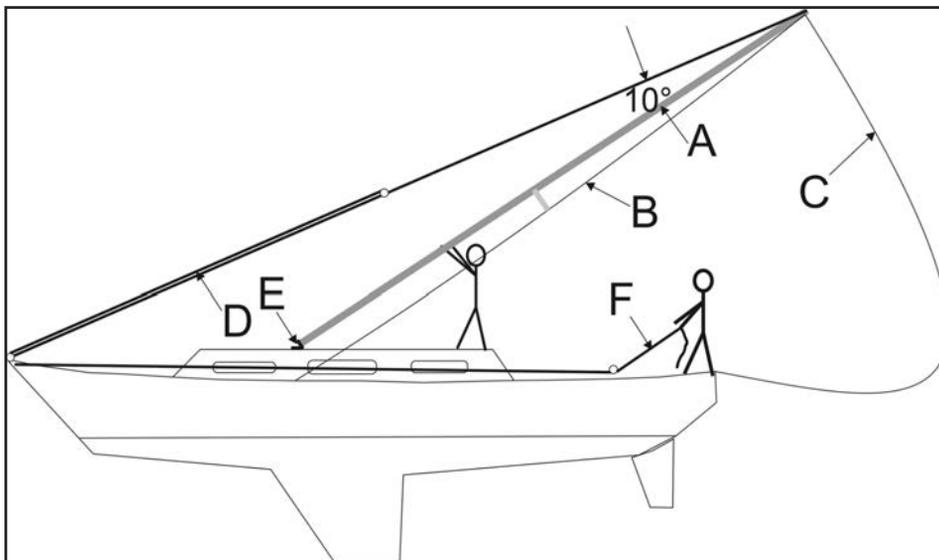


Figure 3: Lighter masts can be rigged and levered up by pushing them to an angle of 10 degrees or more, "A". With the upper shrouds in place, "B", the mast will be held on the center line, especially as it gets higher up. "C" is the backstay already in place to limit the mast from moving too far forward. "D" is the tackle to make this not only easier but to give you more control. "E" is the hinge. If there is no hinge, you should have an extra crew person to keep the mast in line with the mast step. "F" is the tail from the tackle after it runs through a block, preferably with a cam cleat.

step or deck and turn upside down. This means that when the mast is being lowered onto cradles or saw horses, it will come down foot first and may need to be lifted a little. This is usually taken care of by the boatyard personnel. Jib furling gear will take some special care, and, if you have someone to deal with that only, it will be helpful. With the mast on the dock, check that it is well supported. This will usually mean two supports 6' to 10' in from each end. If the mast has a splice where two sections of aluminum profile are fitted together with a sleeve somewhere in the middle of the mast, you will want to support it there as well. Remove or otherwise protect masthead instruments, lights, and antennas.

Putting up the rig is pretty much the reverse of the above. Getting the spreader angles right is helpful, but not critical. If you do not want to go up the mast after it is up, you will need to get tension on the uppers so that you can carefully measure and fix the spreader tips in place. Do not forget the mast boots.

Many prospective skippers ask, "Which is better: deck stepped or keel

stepped?" As with so many things in sailing, it is not so much about better as it is about different. Each has its pros and cons. In the end, if designed well, they will both give you many nautical miles under your keel. We have owned and sailed both and have never lost a mast over the side. However, on one occasion we lost all the starboard chain plates. The boat was keel stepped, and when all the starboard side support went, if the mast had been deck stepped it would have gone overboard. The boat was well built and the cabin was never in danger, nor did the mast jump out of its well-designed step. Having said that, when it rains, water does wind up in the bilge, and the mast boot needs to be kept in good condition (Figure 4, page 33).

As to the question of how much heat is lost up the mast on a cold day with the heater going, the answer is some, but not so much that you cannot heat the boat. If weight aloft is important to you, the deck stepped mast needs to have a 25% stronger mast section to equal the keel stepped mast in strength, so it's the heavier choice of the two. Again, design matters most,

and for a deck stepped mast, part of the design must be supporting the step so that the boat doesn't distort.

Before you step your mast, traditional-minded mariners may consider whether or not to place a coin under the mast, as is customary. There seems to be a number of reasons for, or versions of, this tradition, but whether it is to pay the ferryman who takes you across the river after one's inevitable demise or something else, most coins will react with aluminum. Thus, it is wise to seal them in something to isolate them.

We pull a lot of masts and so it seems like not a big deal, but if you have never done so, or you are understandably apprehensive, talk to the boatyard beforehand or get a rigger's professional help. Whether it is climbing, stepping, or tuning a mast, we hope you will enjoy this all-important part of your boat.

*Jack and Alex Wilken are experienced boat builders and have cruised extensively. They each hold a 100-ton USCG Captain's License and are the owners of Seattle Boat Works LLC in Seattle.*

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