



Essential Rig Tuning Guide

The Ins and Outs of tuning your mast.

Tuning Your Rig

The main goal in tuning your mast is to achieve a spar that's straight. By doing this it will help you gain control of sail shape and also achieve proper helm in a variety of conditions. The basic adjustments are actually quite easy and not as much of a headache that some might believe.

For starters let's define the difference between fore and aft tune and lateral tune. Fore and aft tune describes the amount of rake and mast bend in the spar. Lateral tune refers to setting the mast up straight side to side or in column.

Fore and aft tune

The first thing to look at is mast rake; rake is determined by the length of the headstay. Rake affects your helm by moving the center of effort of the sails relative to the center of lateral resistance. A longer headstay gives more rake in the mast and in turn increases weather helm.

Calculating rake is quite simple, as a starting point a typical 40' boat would have about 15-18" of rake. To calculate the rake in your mast, hang a plumb bob from your main halyard and measure from the aft side of your mast along the cabin top to the tip of the plumb bob. If you have an adjustable backstay it should be set at about 50-60% of the maximum tension that you sail with. Your actual rake may vary depending on where you are sailing and the wind conditions at your lake.

Once we have determined mast rake it's time to look at mast bend. A certain amount of mast bend is desirable. Mast bend is determined by a few factors, the position of the mast head (which we have already set with the mast rake), deck partners and mast step. Since we have already determined our mast head is set we move on to adjusting the partners and mast step. By either moving the mast step fore or aft we can induce bend in the mast. It is never good to have

a perfectly straight section or even worse an inverted mast leaning forward. Masts are designed to be in compression leaning aft and in tension on the front face.

Other items that control your mast bend can be double lower shrouds, babystays and inner forestays. A babystay is typically found on a boat with single in line lowers and is used to pull the mast forward (down lower) much like a forward lower on a boat with double lowers. Inner forestays add a large amount of bending moment in the mast and usually have to be countered with running backstays or aft intermediates.

Achieving proper mast bend is very important to do, because it makes your mast stable and less likely to pump in heavy conditions. Most sails even cruising sails are cut for a few inches of pre bend and require a certain amount of mast bend to fly correctly as the wind increases. The combination of more backstay tension and more bend will flatten out your mainsail and keep the boat on its feet and moving forward through the water.

Lateral Tune

Lateral tuning is one of the most important things to do when tuning your mast. Keeping the mast straight in a variety of wind strengths is key to keeping the mast from not falling off to one side, increasing heel and making for a difficult helm.

The first thing to look at when getting your mast in column is getting the mast straight in the boat. At this point your uppers and backstay should be slack or hand tight. Pull a steel tape up on your main halyard and cleat it off. Measure down to the chain plates on the port and starboard side of the boat, snug up your uppers until you have the same measurement on both sides of the boat.

Now that you are in column with the spar, if you have a keel stepped mast make sure you are firmly secured at the partners with either hard rubber or wood wedges. I also recommend the Spartite kit as well.

At this point your mast should be secured in its step and locked in side to side and fore and aft. It's now time to begin tensioning your rigging; if you have a loose gage (tension gage) now is a good time to use it to make sure you have the proper amount of tension on the cable for the cable size.

After your uppers are secure, start with your D1 also known as the lower stay. If you have a single spreader mast, sight up the back side of it until it appears straight at the lower spreader. If your boat has double lowers the forward set typically has more tension than the aft lower. The forward lower takes more strain than the aft lower when we are looking at lateral loading.

Next is the D2 or intermediate stay. This stay has a large affect on transverse bend in the top end of the mast. The stay should be gradually tightened to eliminate sag at the second spreader. If this stay is over tightened, it will pull the mast at the second spreader hard and make the top of the mast fall off to leeward. Most people want to fix this by cranking on the upper more when you should be easing the D2 to fix this problem.

As always each boat is a little bit different and everyone's sailing is not the same but this is a good basic start to getting your boat dialed in to where your mast should be. Either racing or cruising it is key to have your boat rigging properly tensioned for not only speed and handling but also for safety. You can contact your boat builder for proper rig tension or call Great Lakes Rigging and we will be happy to work with you on achieving the proper rig tune for your boat.

Rigging Inspection Check List

- 1) Mast tune make sure you have proper bend and rake
- 2) If keel stepped make sure proper blocking at the partners
- 3) Check your chainplates look for loose bolts and any indications of dry rot in the bulk heads
- 4) Closely look over your turnbuckles for galled threads, broken strands, bent studs, cracks or any sign of wear
- 5) Look at your rod rigging if you have it, for any dings, bends or cracks
- 6) Inspect your furling hardware for proper operation and make sure it is clean and all screws are tight.
- 7) Inspect your boom and all its fittings for the vang and gooseneck where it attaches at the mast.
- 8) Make sure all your halyards are in proper working order, shackles are working properly and wire to rope halyards have no broken strands.
- 9) All your liferail should be properly pinned and taped, make sure there are no broken fittings or cracks in any of the hardware
- 10) Inspect your winches for proper use; winches should be rebuilt every 1-2 years.
- 11) Call Great Lakes Rigging if you have any questions and we can give you a full rigging inspection.

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