TUNING THE MAST

It is very dangerous (not to mention expensive) to have your mast collapse. The mast is relatively heavy, hard and can do considerable damage to anything it hits while falling. For this reason, it is important to inspect the standing rigging at least annually. Make sure that the shrouds and stays don't have any little broken wires or rust. Insure that all clevis pins are secured with either cotter pins or split rings. Never use kinked wires or bent turnbuckles. Replace immediately any shrouds or stays that show bent, broken, or cracked swaged fittings. How long does rigging last? That depends on how often the boat is used; if the boat is raced, cruised or only day-sailed; how often the boat is trailered; if the boat is stored outside during freezing weather; and many other factors. Sometimes standing rigging will last many years. Other times, a turnbuckle bolt will become bent the first time the mast is raised and will need to be replaced immediately for safety sake. At the very least though, the standing rigging needs to be completely inspected annually and any part of the rig that is not 100% needs to be immediately replaced before going out again. Relative Tensions Like everything that has to do with sailboats, compromise and judgment are important factors when you are tuning your rig. Some sailors don't want to "over-tension" the rig; others want to make sure that the rig is very tight; and there are lots of folks who fall somewhere in between these extremes. However, the relative tension between the shrouds and stays are as follows: Forestay and Backstay have the greatest tension Upper Shrouds have nearly as much tension as the forestay and backstay

Forward Lower Shrouds have less tension than uppers, but more tension than Aft Lower Shrouds OK, let's get started with the mast raised and all of the shrouds and stays loosely adjusted - Start At the Dock: Step One

Forestay/Backstay Rake or Not Rake Is The First Question–

Raking the mast (tipping it forward or aft from the vertical) will directly influence the feel of the helm. Generally, raking the mast aft increases weather helm while raking the mast forward reduces weather helm and can lead to lee helm. Most sailors like a little bit of weather helm for the "feel" this give while steering. Too much weather helm though makes steering the boat difficult and can quickly tire out the helmsman. Adjust the Forestay and Backstay– Start by using your main halyard's headboard shackle to make a plumb bob. Shackle the headboard shackle to a large wrench or crescent wrench. Set the halyard so that the headboard shackle/plumb-bob is at the level that the boom gooseneck will be while sailing. If you want the mast straight up and down, adjust the turnbuckles on the forestay and backstay until the plumb-bob is just touching the back of the mast. If you want the mast raked aft a couple inches, loosen the turnbuckle on the forestay and tighten the turnbuckle on the backstay until the plumb bob is the desired distance aft of the mast. Once the desired amount of mast rake has been set, tighten the turnbuckles on both forestay and backstay one turn at a time until the amount of tension you want is "dialed in". Remember that these two wires need to have the greatest tension; so, make sure that these two wires have considerable tension. I know that this is vague, but each rigger/skipper will have a different "feel" for this tension. Check other boats where you sail by pulling on their forestays. Racers will often have much more tension than daysailers.

Loos Gauge–

There are shroud/stay tension adjustment gauges available that will give you a numerical method to adjust the wires. You can check with others to see if your tensions are greater on less than the wires you are comparing to.

Step Two– Upper Shrouds The Kerf is the slot in the back of the mast. Your mainsail's bolt rope or slugs fit into the kerf so that the mainsail's luff is fully supported by the mast. By looking up the kerf you can see if the mast is bending–either bowing or bending in an "S" - curve. Adjust the Upper Shrouds to insure that the mast is straight up with respect to tipping either to port or starboard (left or right). The easy way to do this is to tape a steel tape measure to your main halyard's headboard shackle. Hoist the halyard and extend the tape measure aloft. You can now measure the distance from the masthead to the toe-rail outside the upper shroud chainplate with the tape measure. Adjust the turnbuckles so that you get the same measurement to both sides of the boat. Now tension both turnbuckles so that you end up with the mast straight up and nearly as much tension on the upper shrouds as you have on the forestay/backstay. Turn the turnbuckle barrels either one or ½ turn at a time until you get the tension you want.

Step Three– Forward Lowers Two Considerations that you have now are Is The Kerf Bent and Do You Want To Pre-Bend The Mast. Look up the Kerf to determine if the mast is bent, bowed or in an "S"-curve. Usually, there will be a bow, if anything. If you see one, increase the tension on one of the forward lower shrouds until the bow has been straightened out. Tension the opposite side now to balance the previously tensioned forward lower shroud. At this point, the mast should be raked the amount that you want and exactly straight up and down with relation to a starboard/port lean. The reason that you might want to have "pre-bend" in the mast has to do with the amount of draft your mainsail has. Another way to look at this is–

If your sails are old and "full" as opposed to newer and relatively "flat", you might want to pre-bend the mast forward in the middle so that some of the fullness is pulled out for better upwind pointing. If you decide to Pre-Bend the mast all you have to do is increase the tension on both forward lower shroud turnbuckles until two or three inches of bend is pulled into the middle of the mast. When you are done with this, your mast will be bowed forward in the middle and when you hoist your mainsail, it will be flatter than before and you'll notice that you can sail higher on the wind than before. Make sure that you sight up the mast as you pre-bend it to make sure that you aren't getting an "S" or a bow left-right.

Step Four– Aft Lowers The Aft Lowers balance the forward lowers, fine-tune the rig, and give additional support to the mast. All you need to do with the aft lowers is tighten the turnbuckles about one turn past "finger-tight". Sight up the kerf to make sure that the mast is still straight. With these steps complete at the dock, it's time to set sail and make your final adjustments.

Go Sailing - Step Five–Fine Tuning Fine tuning the Rig is fairly easy. On a day with moderate breezes in the 8 to 12 knot range sail the boat on a series of upwind tacks. What your are looking for is a couple of things:

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