

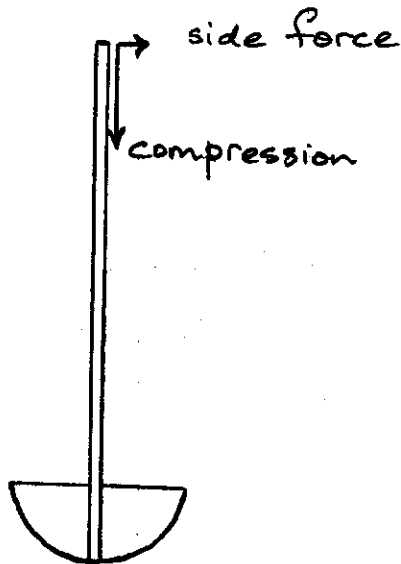
TIPS ON MAST TUNING

Correct mast tuning is a vital part of any sailing boat. Your speed and your safety can depend on having a mast that stands correctly in the boat.

The problems of side control and fore-and-aft control can be treated separately.

Side Control

The problem here is to get your mast to stand straight and support a force from the headsail. (See figure 1.)



This figure shows the dominant forces that affect the sideways bend of the mast.

Figure 1.

Problems encountered

1. Mast falling off at top. Smooth Bend

The most common. Slacken off lowers and intermediates or tension ippers. Sometimes you should go right back to Step 1. at the dock.

2. Mast falling off at top. 'S' Bend

Upper intermediates too tight. Mast head, partners and step not perfectly in line.

3. Mast 'buckling' to one side between spreaders and hounds

Either incorrect intermediate tensions, or perhaps no intermediates where there should be some. Try going back to Step 1, re-tune.

If you find it impossible to improve, ask a mast-maker. You may have too light or too tall, a section. You may need to add upper intermediates, if yours is a single spreader rig, or even to go to a full double spreader rig.

4. Mast 'buckling' between deck and spreaders

Maybe the mast is being pushed out of column at the partners. It could also be that the mast is not sitting straight on the step.

5. Mast tune changing dramatically with wind strength

This could mean a too-light section, or too light rigging or both. Again see a professional.

Other problem areas can be: incorrect or too short spreaders, unbalanced shroud sizes, flaws in the mast section. Basically, if your mast and rigging are well designed for the loads, you should find it an easy matter to achieve a straight-standing section under a wide range of wind and sea conditions.

Step 1

At the dock, ease off shrouds, disconnect forestay and backstay; support the mast with the jib halliard, and with mainsheet and topping lift.

Rock the mast fore and aft until you find the point where the butt sits flat on the step. It is very important that you know at what rake the mast sits flat, as the step forces have a considerable influence on bend.

Step 2

Lean the mast aft slightly, (about $\frac{1}{2}$ to 1" at the top) and insert deck wedges.

Step 3

Now lean the mast aft another 12 inches, and take up the forestay and backstay.

Step 4

At this stage you can set up the shrouds as in Step 1 of the instructions for side control.

Step 5

Now go sailing. With gentle tensioning of the lowers the mast should come up so that it has a bend of about 3-4" fore and aft, and is straight sideways. This is in say 10 knots of wind, sailing upwind with max. backstay load.

c). Pumping. This is quite common on sections which are insufficiently supported. Often the static position of the mast will be one of unstable equilibrium, so that the mast can move fore and aft without much restraint. This can occur more easily on masts which are set up fairly straight. Talk with your mast maker, or a local expert. If you have single lowers, then installing an extra set, or a jackstay, will often help. Setting up with prebend and using runners or after lowers to help restrain may produce a bend which is in stable equilibrium, and solve the pumping problem.

Note that the main provides a fair amount of columnar support to a bent mast; taking the main down in heavy airs to reduce heel can endanger the rig.

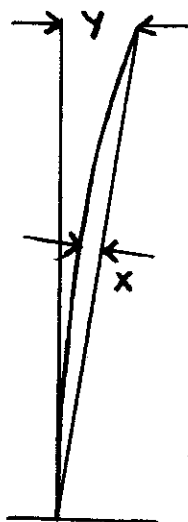
What if your boat has a deck-stepped mast?

Generally this goes hand in hand with stiffer mast sections, smaller boats. If you have a double set of lowers, then you should still be able to induce and maintain a moderate bend.

Use the following rule for even bend:

If 2" of bend is wanted, then the mast should stand square on the step 8" ahead of the desired rake.

(This factor of 4:1 is theoretical, and stems from the geometry of a simple arc



$Y=4X$ (for small amounts of bend)

The proof is a bit messy - the best way to check it is by doing a simple drawing with ruler and compass.