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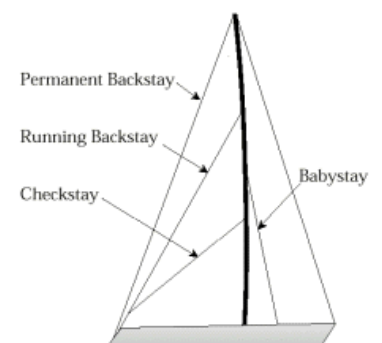
## 8.1 - Tuning Your Rig

The first objective in tuning a rig is to get the mast centered in the boat and standing straight. Once this is achieved, refinement of the tuning will improve the boat's performance by changing the balance of the helm and, more importantly, by controlling sail shape.

Tuning your rig is a two step process. The first part is done at the dock and the second part is done while sailing. To start, pick a calm day, or find a sheltered spot to tie up. If the rig is already set up, loosen everything so that you can start from scratch. It is a good idea at this point to lubricate all the turnbuckles.

The first job is to set the rake of the mast. If you are putting the mast in the boat for the first time, set the mast so that it leans back a few inches. More rake adds weather helm. Rake is achieved by moving the butt of the mast forward in the

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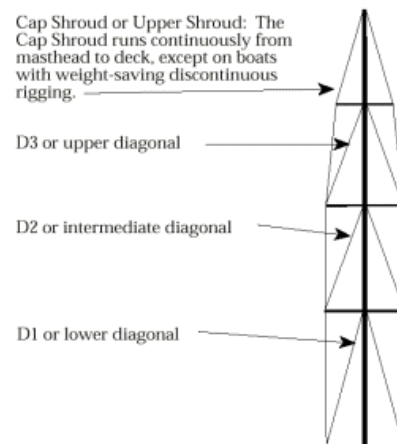
7.2 - Cruising Spinnaker

step or the mast aft at the partners. If you've been sailing the boat and the helm feels right, leave the rake alone. Be sure the mast is firmly set in the step and solidly chocked at the partners. Use either very hard rubber or hardwood chocks. One of the best ways to secure the mast at the partners and to seal out water is to use a product called SPARTITE™. This product gets poured into the space between the mast and partners and hardens to form a reusable hard rubber chock around the mast.

Now, using a halyard or a steel tape measure suspended from the masthead, check to see that it is centered by measuring to the same spot on either side of the boat. (Be sure that the halyard or tape measure is led clear.) Next, tension the upper shrouds. They should be as tight as you can make them with a pair of wrenches.

**Never use an extended piece of pipe on the handle of a wrench because you will over tighten the rigging and do damage to the turnbuckle.**

Work down the mast (upper intermediates, lowers, etc.), sighting up the mast for straightness. Relatively speaking, the cap shrouds should be tighter than the intermediates because they are longer and will stretch more under load.



Now you can tackle fore-and-aft tune. Tighten the backstay to the maximum tension you will use while racing. At this point you should have the maximum amount of mast bend for your boat. If you don't have enough bend you can ease the headstay or move the mast either forward at the partners or aft at the step. (To check fore-and-aft bend, attach the main halyard to the gooseneck and pull it tight. Mast bend is the maximum distance between the halyard and the mast. See diagram).

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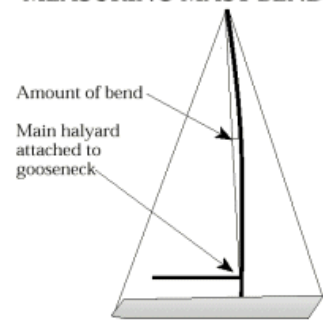
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Now it's time to go sailing. Put the boat hard on the wind in at least 10 knots of wind. It's a good idea to have enough crew to handle the boat easily. Use a non-overlapping genoa so that tacking is quick and easy, you'll be tacking a lot while tuning.

MEASURING MAST BEND



Before you start tightening the shrouds, take a look at your mainsail. If you feel the main is not flat enough, you might need more mast bend. Even though you made the shrouds tight during your dock tuning, they may be loose on the leeward side when sailing. Your goal is to get the mast straight and to have the leeward shrouds straight, not dangling, when the boat is hard on the wind in 15 knots of breeze. If the leeward shrouds are loose when the boat heels, tighten them to remove about half the slack. Keep track of the number of turns you make. Next, tack and make the same number of turns on the other side. Do this back and forth tuning until you are happy with the tension and the leeward side does not move around when the boat heels.

When you are done, sight up the mast to make sure it's still straight. If not, decide what adjustments are needed; tack the boat and make them. Sight up the mast on the new tack and once again, decide what adjustments are necessary. Tack again; make the adjustments and check how well your previous changes worked. Keep repeating this process until the mast is straight on both tacks. If you have a problem, contact a professional rigger.

**BEFORE UNSTEPPING YOUR MAST, MAKE SURE TO PUT TAPE MARKS ON YOUR TURNBUCKLES SO THAT YOU CAN RETURN TO YOUR CURRENT RIG SETTINGS WITHOUT HAVING TO GO THROUGH ALL THE TACKING AND TUNING, TACKING AND TUNING AGAIN.**

## TUNING FOR PERFORMANCE

Your boat's performance can be improved with careful tuning

your boat's performance can be improved with careful tuning. First, think critically about your helm balance. If you are carrying more helm than you'd like, try sailing with less rake. Conversely, if you'd like more "bite" in the helm (weather helm) rake the mast back another six inches to a foot. For the best feel when steering upwind, the boat must want to head up toward the wind. Set the mast so that the rudder must be turned three to five degrees to keep the boat going straight.

If you want to get optimum performance out of your sails, good tuning is a must. If you have the controls available for tuning underway, you can adjust to changing conditions. If you don't, then set up for average conditions. Jib draft can be controlled with headstay sag; more sag, more draft; less sag, less draft.

Mainsail draft can be controlled with mast bend; more bend, less draft; less bend, more draft.

On a masthead boat, the permanent backstay directly controls headstay sag and also affects the amount of mast bend.

On fractional-rigged boats, the permanent backstay controls mast bend only. Unless the fractional-rigged boat is equipped with running backstays, headstay control is difficult to achieve. Runners on masthead boats, check stays on fractionally-rigged boats, and babystays all control mast bend. Mast bend can also be induced (as mentioned earlier) by moving the step aft and/or moving the mast partners forward.

## TUNING NOTES

- If your leeward rigging hangs too loose, it can mean that your starting upper shroud tension was too low.
- Set up your rigging so that you can get a firm headstay when the breeze is on, it will make your boat go faster.
- Check your mast in rough sea conditions. If it is "pumping," meaning the middle of the mast is moving fore-and-aft, tighten your running backstay or babystay.
- Use brass cotter pins. They are much easier to bend so that

you can get them in and out in an emergency.

- Don't forget to tape over your cotter pins and any other rough spots.
- Bend cotter pins over completely. A half-bent pin can poke through tape and murder a sail.
- Check your tuning frequently — all rigging has some stretch, which can throw tuning off.



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