

Tuning the B&R Rig

The B&R Rig

To understand a bit about tuning the B & R rig, you need to comprehend the various parts of a conventional rig, something that most sailors know a bit about.

The basic, one spreader rig is comprised of actually six basic parts which are all interconnected. The parts are: mast, spreaders, upper shrouds, lower shrouds, backstay and forestay.

When the rig is correctly tuned, the mast will be straight athwartships when under sail. While it may be raked or bent longitudinally to suit the individual skipper's preference as to boat handling, the mast won't bend sideways.

The upper shrouds, also called uppers, keep the top part of the mast, that which is above the spreaders, from moving from side to side. When an upper is tightened it does two things. It will pull the mast in the direction of the shroud, and it will put a bend in the mast at the spreader in the opposite direction from the shroud.

Example: when the starboard upper is tightened it will pull the top of the mast to starboard and push the middle of the mast at the spreader to port.

The lower shrouds keep the middle of the mast from bending sideways. If the boat is fitted with fore and aft lowers the mast will also be kept from moving fore and aft.

The forestay and backstay position the top of the mast, in a fore and aft direction. It is possible to rake the mast forward or aft to the desired amount by the correct adjustment of the forestay and backstay.

An attractive way to reduce the mast diameter, and thereby improve the aerodynamics of the rig, is to increase the number of spreaders on the mast. The double spreader rig is only slightly more complicated in that it has an intermediate shroud between the upper and lower shrouds. The intermediate shroud's function is to keep the mast from bending to either side at the upper spreader. Also, to keep the mast from bending fore and aft with a two spreader rig of appropriate size, one needs to add an inner forestay and running backstays. This complicates sail handling.

The inner forestay is generally in the way when tacking. Sails often get hung up on it, slowing the tack down and sometimes requiring the crew to go forward to clear the fouled sail. When gybing, at one point, both forestay and running backstays

will be loose. The mast will have very poor longitudinal support, and if anything extraordinary happens, it can result in a mast failure. In heavy weather, if a running backstay, or inner forestay, comes loose for some reason or is not set properly after a gybe or tack, there is a distinct possibility of a mast failure.

The B & R rig is designed to eliminate inner forestay and running backstays, yet allowing the use of a small mast section which will have good aerodynamics. On the B & R rig, no rigging has to be loosened at any point of sail, thereby achieving a safe rig at all times.

The performance-minded skipper will benefit from the inherent aerodynamic efficiency and quick tacking ability of the B & R rig due to the smaller mast section and swept back spreader arrangement. The cruising sailor, who often sails with minimum crew, will enjoy the feeling of safety and comfort of not having to worry about constantly moving about the boat and undoing various parts of the rigging.

B & R rigging systems are on boats the world over. World cruisers and racers, OSTAR boats, 2 ton, 1 ton, 1/2 ton, 1/4 ton boats and multihulls. Wherever one finds sailors who want performance and reliability.

The basic difference between a B & R rig and a conventional rig lies in the B & R's use of swept back spreaders and diagonals. The swept back spreaders eliminate the running backstays. The diagonals perform the same function as inner forestays.

A good way to tune the B & R rig is as follows:

The easiest is to perform step one before the mast is stepped, lying with the aft side down, supported in both ends, with all rigging slack.

If the mast is stepped, loosen all the rigging until it is slack, and go to step one.

1. Start with all rigging slack. Then induce the desired mastbend by tightening the diagonals. Measure the bend by tensioning a thin string, or the main halyard, along the back edge of the mast. The amount of bend desired, depends on the way the sails are cut. As a general rule, 1% of the height of the mast over the boom can be used as normal mastbend. This means that a boat with a mast 45' high over the boom should have approx. 0.45', or 5-6", away from the mast, when measured half way up. Upper and lower diagonals should be about equally tight, so that you have a nice and even

bend in the mast.

It is very important that you get the mast straight athwartships at this stage, so that all the bend is in the longitudinal plane.

When this goal is achieved, all 4 diagonals should be about equally tight.

2. Step the mast, with all shrouds attached loosely (if the mast was not already stepped).
3. Adjust the backstay and forestay to the desired mast rake. Hang a weight from the main halyard and use this as a plum bob. Normal is to have the mast stepped vertical or raked back slightly. More mast rake will increase the weather helm on the boat.

Tighten the forestay up to approx. 25% of the final tension you will want on it. This means that the turnbuckle on the forestay will be adjusted approx. another 0.1% of the forestay length to reach its final tension.

4. Up until now all shrouds shall have been slack, and the mast shall be straight athwartships. Start by adjusting the uppers, equal amount of turns on the turnbuckles on both sides, until they are tight. Now the mastbend has increased some, which will be corrected later.
5. The next step is to check if the mast is standing straight up athwartships on the boat. Use the jib halyard for this. Pull it out so that it reaches below the sheerline by the mast. Thereafter pull it down past the sheerline on one side, and mark the halyard at the sheerline. Bring the halyard over to the other side, and do the same thing. If you find a difference, adjust the turnbuckles equal amount of turns on both sides in opposite directions until the mast is standing straight on the boat.
6. Tighten the intermediate shrouds, equal amounts on both sides, until they are almost as tight as the uppers. Sight along the mast, and see if it is straight athwartships. If it is not, adjust the intermediates, equal amount of turns on both sides in opposite directions, until it is.
7. Tighten the lower shrouds, until they are equally tight with the upper shrouds. Again sight along the mast, and see that it is straight athwartships. If it is not, again adjust, but this time the lowers, until it is. You must now have about the same amount of longitudinal bend, as you originally set up, and no bend athwartships.
8. Finally, set the desired load on the forestay as mentioned above. If the

forestay is 40' long, it should be tightened approx. 1/2" more.

9. The final test on how well your rig is adjusted comes when you are sailing. Sail upwind in 10-15 knots of wind.

First adjust the tightness of the shrouds. If the leeward shrouds are very loose, take about 1/2 the amount of slack out by tightening the turnbuckles, carefully marking down the number of turns for each one. tack over, and adjust the shrouds on the other side (again the leeward side), by the same number of turns.

Keep on sailing upwind. Sight along the back of the mast. The mast should now look almost straight athwartships. If, for example, the mast looks straight up to the top spreaders and thereafter falls off to leeward, tighten the uppers on both sides, until it is straight.

In this final tuning, always adjust both sides in the same way, or else it is very hard to get the mast straight on both tacks. Try to make all adjustments on the leeward side, and then tack over and make the adjustments on the new leeward side. By doing this you decrease the loads on the threads in the turnbuckles.

Once your B & R rig is adjusted, you will not have to redo it. If the mast is to be taken down for winter storage, only loosen the forestay until the pins in the shrouds can be taken out. Leave the spreaders on the mast, and do not adjust the backstay, shrouds, or the diagonals.

A good way to store the mast, is on top of the boat, with the spreaders pointing down. It can then be used to support the winter cover, and will efficiently keep snow and water off the boat.

Good luck with your B & R mast.