

# A Guide to Basic Tuning and sail setting on an International One Metre Yacht (IOM)

This article by MYA Vice Chairman Peter Sutton is written for the newcomer to racing, but there is much here for the more experienced skipper.

I began radio sailing at about eight years ago as a complete novice to sailing of any kind - bar a couple of trips out in an old clinker built, lug sailed dinghy and playing around with various toy yachts as a school boy, together with a few books on sailing that I read around about the same time. One of the problems that I encountered was the lack of any simple but fairly complete, single source reference for beginners on how to set the sails and tune the boat in order to get it to sail in a reasonably competitive manner.

It wasn't that fellow radio sailors were unwilling to help, it was just that I lacked any written reference that I could go back to time and again when things didn't seem quite right. Of course I could never have compiled this list of what I hope is helpful information were it not for all the help, advice and encouragement I received, either through written publications or face to face contact, from many experienced and expert radio sailors. Among those who have been kind enough to encourage me with my radio sailing and share their knowledge are; Graham Bantock, Brad Gibson, Lester Gilbert, Peter Stollery, Martin Roberts and Geoff Byerley and what follows is a sort of montage of all the bits of information that I picked up from them together with a few things that I discovered for myself.

## Tuning for competitive racing

By following my suggestions you should be able to rig your boat, tune it and set the sails so that it performs well enough for competitive racing at club level. Use the information as a starting point but experiment and try different things for yourself; read and research more and talk about boat set up, sail trimming and tuning

with other sailors, especially those that always seem to beat you. It is of course important to practise racing as much as possible and experience serious competition in order to improve and progress because the best set up boat in the world won't win much if the man at the controls keeps making the wrong decisions during the race. Above all, remember that racing is enjoyable and beats painting and decorating, gardening, shopping, watching TV or cleaning the car hands down. Have fun!

Whilst what follows is primarily about the IOM class but the general principles will apply to other classes of sail boat.

## Attaching the rig

First - you need to attach the rig to the boat:

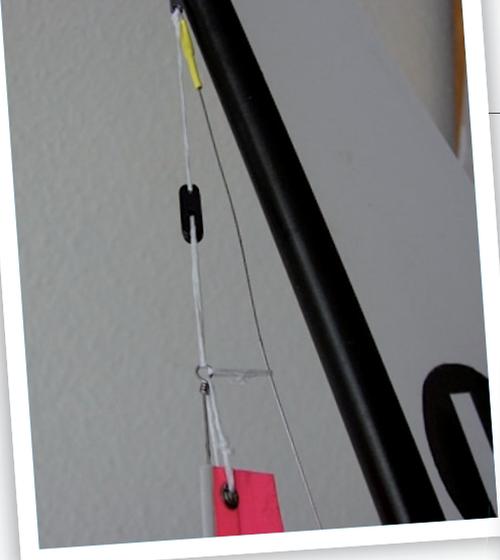
1. I suggest keeping the jib sail attached to the mast whilst the sails are stored off the boat, (preferably in a sail box) then provided you don't move the forestay bowsie, the degree of mast rake will be preserved and the back stay will need only minor adjustment next time you sail.
2. Fit the fin, complete with ballast, to the boat and place the boat in a stand

(be careful it doesn't blow over in the breeze) or lay it on the ground.

3. If you are right handed and rig your boat from its left hand side; take the rig from its box or bag, holding the bottom of the mast and main boom/kicker in your right hand, and the jib boom in your left so that you keep control of both sails and they don't flap in the breeze. Allowing the sails to flap uncontrollably could damage and crease them badly.
4. Place the mast heel in the mast tube making sure it is properly located.
5. Locate the mast in the mast gate and/or let it rest against the ram.
6. Check that the headsail leech line and forestay are not twisted and then attach the head sail boom to the appropriate deck eye.
7. Attach the backstay to the hook or eye at the stern of the boat and if necessary adjust the

*The IOM on its purpose built stand. The set of the sails can be checked as the boat is held well canted over.*





*These head stay and leech lines should never be twisted*

tension in it until the mast bend matches, approximately, the mainsail luff curve. If the top seam of the main sail begins to flatten or if creases run from the clew diagonally upwards, the mast is over bent and the tension in the backstay should be reduced until the sail sets correctly. It may be necessary to revisit back stay tension later in the tuning cycle.



*Side stay attachments. The bottom half permanently attached to the deck eye*

putting just enough tension in the side stays, so that when the boat is laid on its side, the side stay nearer the ground doesn't become slack.

Later you may need to change this slightly in order to obtain the desired rig tension, mast shape and boat performance. When you are satisfied that the side stay tension is about right, lay the boat on the ground, propped up by a sail box or tool box, or put it in the sort of stand that holds the boat at a shallow angle, and sight down the mast to ensure that it is vertical and not pulled off to the left or right.

At the same time check that the head fitting and backstay crane are correctly aligned. If the mast is, for example, pulled off to the right, relax the tension on the right hand side stay and increase the tension on the left hand stay until the mast is vertical. Check that the side stays are still at the correct tension and if necessary go through the procedure again until the mast is vertical and the tension in the side stays is correct.



*Align the head stay and backstay fittings*

The side stays should be tight enough to avoid the slackening as described above but not so tight that they twang like guitar strings. If you want temporarily to reduce the tension in the side stays, for light airs or for some other reason, simply insert one or two washers between the bottle screw and lock nut before assembly. It is worth experimenting with side stay tension, especially when the deck mounting points are aft of the mast, because of the effect it has on rig tension, mast bend and the way the main sail sets. Tightening the side stays will pull the centre of the mast back and increase the tension in the forestay. Slackening the side stays will have the opposite effect. If doubtful about just how tight to have them, I suggest that it is probably better to have them a little bit loose rather than too tight.

Once the correct setting is achieved the rig can be detached from the boat after sailing, leaving the nylon lined locking nuts undisturbed, so the same settings can be used again next time. It is essential that the side stays are evenly tensioned and the mast vertical (left and right) if the mainsail is to have the same amount of twist on both tacks. Side stays - especially new ones - will stretch and become loose and/or unevenly tensioned with use, so it is important to check them from time to time.



*Back stay hook and eye adjustment*

8. Attach the side stays to the appropriate deck eyes. I think it is best if the bottom part of the bottle screw is permanently attached to the deck eye. The threaded, upper part of the bottle screw should be fitted with a self locking, nylon lined nut and permanently attached to the side stay. As a rough guide, begin by

9. Attach the sheets to the main and jib booms.
10. If your mainsail has a luff wire don't over tension it because this may cause strange wrinkles to appear in the sail and it will interfere with the movement and set of the main sail when changing from tack to tack.
11. Tighten the downhails on the jib sail and main sail just enough to remove any wrinkles or bubbles in the luff of each sail. For very light airs try leaving the downhails and the luff wire in the main sail, slightly slack.

12. Start with the mast ram just supporting the mast. You may need to come back to the ram later when doing the fine tune.

13. When dismantling your boat at the end of the day simply reverse the above procedure and be sure to take all of the tension out of the rig by slackening off both down hauls, the luff wire tensioner in the main sail if your boat has one, and most importantly the kicker. Failure to do this will have the sails stored under tension with the strong likelihood that they will become permanently distorted and pulled out of shape. If after use the sails are wet, the sail box should be opened on your return home and the sails allowed to hang free so that they can dry out. If a bag is used the sails must be removed from it and allowed to dry.

## Setting the sail camber

Now that you've got the rig safely on the boat you need to set the amount of camber in the foot of each sail, the distance each boom is out from the centre of the boat in the close hauled position and the degree of twist in each sail.

1. The main boom should be about 15mm (+ or - 5mm) from the centre of the sheeting post in the close hauled position.



*The neatly arranged jib foot and adjustable counterweight*

2. The end of the jib boom should be about 65mm away from the centre of the mast in the close hauled position (+ or - 5mm).
3. The gap measured between the mid point of the boom and the foot of the sail should be about 20mm for both the jib sail and main sail (+ or - 5mm).
4. To set the twist in the sails: Let the sails fully out and hold the boat in the wind so the sails fill as if the boat were on a run. Adjust the kicker so that the middle seam on the mainsail is at approximately 90 degrees to the mast. This is the correct setting for running before the wind and it is important to get this right. Keep in mind that the wind strength may not be the same on shore as it will be out on the water and that you are holding the boat stationary, this means that a little more twist may need to be set than seems correct. The final check must be done on the water with the boat sailing.

Lay the boat down and check that the mast head fitting is straight fore and aft and not twisted off to one side. This will ensure an equal amount of twist in the mainsail on both tacks. With the boat still lying on its side, sheet in to the close hauled position and hold the main boom on the centre line of the boat without loading the kicker. Measure the distance between the middle seam of the mainsail and the backstay. I suggest that it should be somewhere between 40mm and 60mm. Twist can be increased by tightening the backstay slightly (be



*Setting the main seam at 90° to the mast*



*Looking down the mast to check the camber and twist.*

careful not to over bend the mast) and/or reducing the amount of ram pressure on the mast. Twist can be reduced by slackening the backstay slightly and/or increasing the ram pressure. It isn't good practice to alter twist in the close hauled position by adjusting the kicker because this will probably result in the amount of twist being wrong for running before the wind.

For this method of setting and controlling twist to work well it may be necessary to introduce some packing between the bottom end of the gooseneck body and the mast at the time the rig is built (a couple of layers of tape or deck patch material about 5mm wide will usually do the job). As a general rule, in flat water and steady winds less twist can be used.

As the wind becomes more gusty and/or the water rougher it is usually beneficial to increase the amount of twist. Similarly when sailing in very light or flukey air more twist is usually better. Try setting the gap between the centre seam and the backstay at 50mm for a start and see how the boat sails. If in any

doubt or if the boat seems sluggish, set more rather than less twist.

5. With the boat still lying on the ground, adjust the jib leech line until the gap between the mid point of the jib sail leech and the leech line is 20mm to 40mm, less in flat water and steady breeze, more in choppy water or strong winds. When viewed from the front or back of the boat, both sails should show a similar degree of twist. Once again if there is any doubt or the boat seems sluggish, set more twist. There does seem to be a correlation between the distance the booms are from the centre line of the boat at close hauled and the amount of twist required; if the booms are tight in then it seems that more twist is needed to get the boat to perform well, on the other hand if the booms are set a little freer (further out from the centre line at close hauled) then less twist is needed. It seems to be a bit of a balancing act - experiment and make notes.

## Keep a careful record

6. After a good days sailing when your boat has performed well, record in a little note book the weather and water conditions and the basic settings: - wind strength, choppy or smooth water, the gap at the foot of the main sail and jib sail, the distance between the centre of the sheeting post and the main boom, between the centre of the mast and the end of the jib boom and the amount of twist in each sail. After a time you will build up a picture of how to set your boat up for the various conditions you will encounter and this will help you to quickly achieve a good setting each time you are on the water.

*Peter Sutton*

Note: Peter continues his tuning article in the December edition of Acquaint. All photographs are by Peter Sutton unless otherwise captioned. An article describing recent technical developments in IOM hull design starts on page 14.