



Sail Trimming

By Roger Stollery

Whatever boat you sail, the pleasure of seeing it sail and handle well will depend on how you set the sails before you go on water and what you do with your transmitter once your boat is afloat (**Photo 1**). Hopefully, the tips in this article may help to achieve that pleasure and they apply to all boats that are powered by a jib and a mainsail, irrespective of their size or class. It does not matter whether they are conventionally rigged, rigging less or swing rigged, as the wind cannot distinguish such things as it flows round the sails (**Photo 2**).

Before going afloat

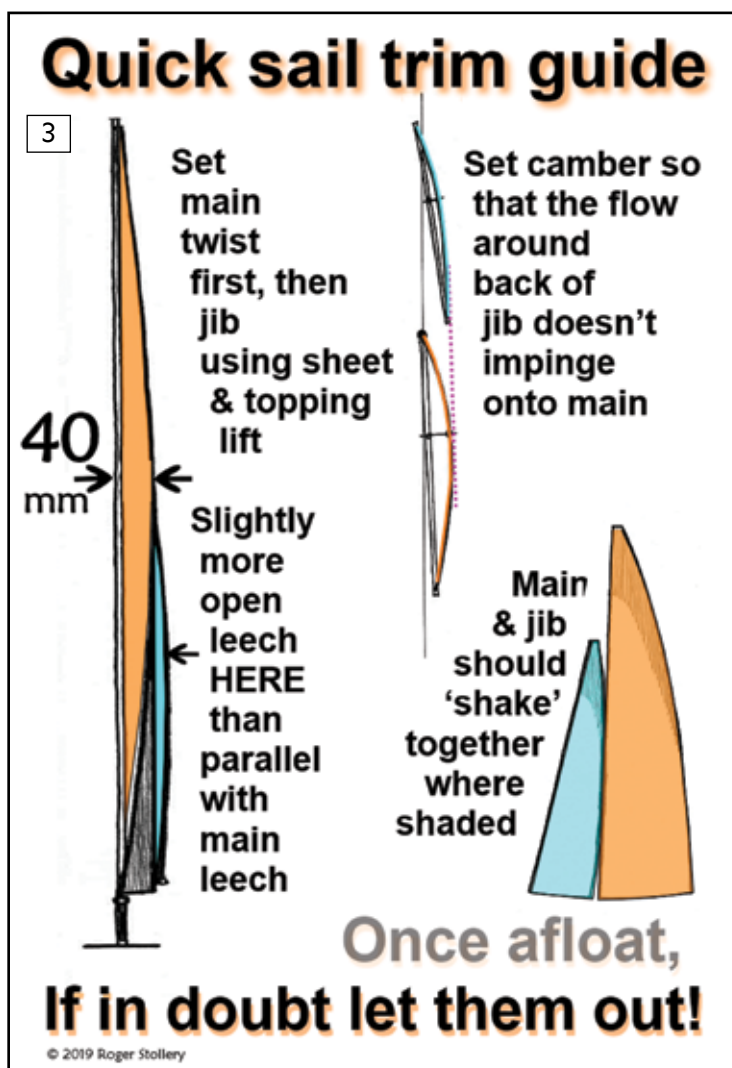
Always check your sail trim before going afloat. Assuming that your mast is set up as the designer intended with the mast more or less vertical, the following things need to be adjusted; sail camber, boom angles, sail twist. Before making any adjustments, switch on and pull the sails in to your beating trim. Refer to the quick sail trim guide illustrated (**Photo 3**).

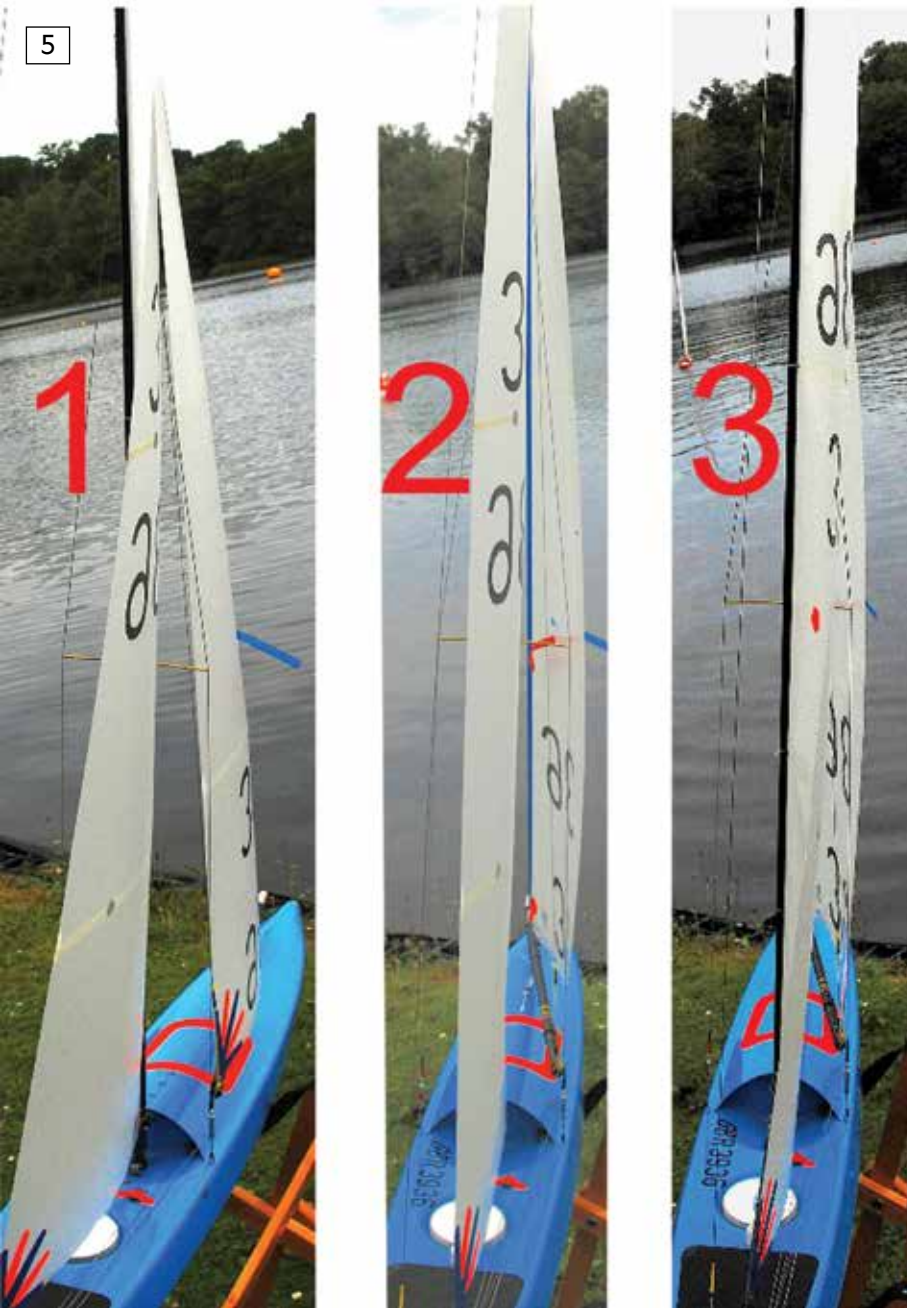
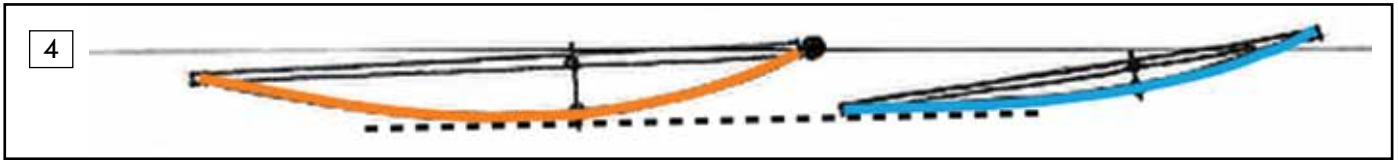
Sail camber

The camber in the mainsail should vary approximately between 1-in-6 and 1-in-12, with less camber as the wind increases. The camber in the jib should be slightly less than that in the mainsail. As sails often have different amounts of fullness cut into them, depending on the manufacturer's design, assess the camber setting in the area of maximum fullness, not just at the boom. A full cut mainsail may well need very little camber at the boom.

Boom angles

Your beating trim should bring the end of the main boom close to the centre line, but the jib boom should be at a greater angle as shown in the diagram (**Photo 4**). Adjust the jib





camber so that the angle of the back of the jib doesn't impinge onto the mainsail, as this will encourage back winding of that sail, which is not a good idea. The wind needs to funnel through the gap or slot between the two sails without undue restriction.

Sail twist

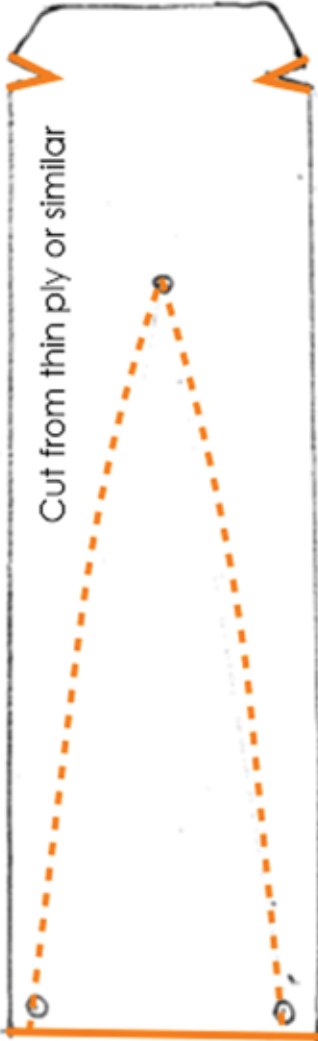
Whilst it is OK to set the boom angles at the bottom of the sails to encourage this airflow, it is most important that there is plenty of this gap or slot along the whole length of the back edge of the jib. This is to encourage the flow around the back of the mainsail, to increase its power.

Set the twist in the mainsail first. The amount of twist needs to vary with the wind strength with more twist in light winds and in very strong winds, but a good guide for light to moderate winds is approximately 1-in-40 (40mm in a 1600mm leech length). This should be assessed against the straight line of the backstay as shown in **3**. No twist, as in **2**, makes a boat a bit slow with a tendency to point higher and to feel 'niggly'. Too much twist **1** also slows a boat down by the drag from a flapping leech, but is less serious than too little twist (**Photo 5**).

Then set the jib leech tension to match the shape of the mainsail leech. Assuming that the forestay is tensioned and that the

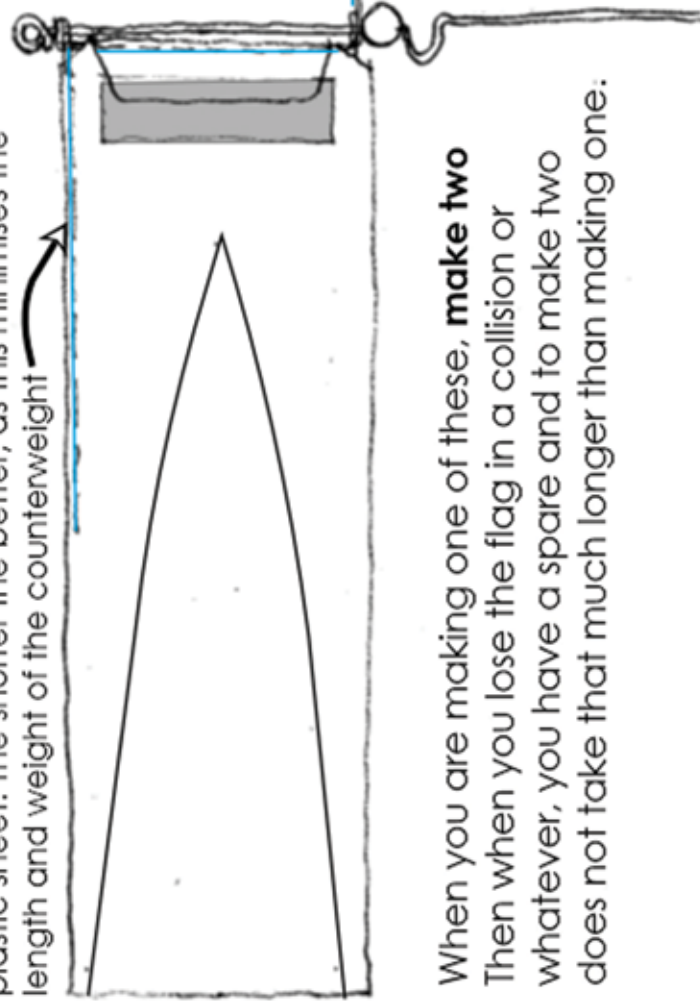
pivot point of the jib boom is approximately 20% of the length of the boom back from the tack, the jib leech line needs to be adjusted to achieve a jib leech shape that is more or less parallel to the mainsail leech shape, except a bit more open halfway up the jib, as shown in **3**. In **1** there is no twist in the jib leech and the slot is closed down preventing a clean airflow getting to the mainsail. If in doubt err on having the slot more open, either by increasing the boom angle or increasing the leech line tension. Getting a good trim is getting a good balance between the various tensions so that the sails work well together and this can be done by testing how the sails perform in the wind (**Photo 6**).

Lightweight WIND INDICATOR - the 1 gram flag



Pattern for 'cutting' lightweight, colourful polythene or other plastic sheet. Fold sheet and use fold as the top edge and cut other edges with a hot soldering iron, except where indicated in orange. These should be cut with scissors or a sharp knife. Through the holes shown, mark dots and then cut out the vee shape on one side of the flag, as shown dotted.

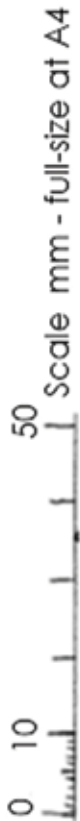
This **length of 0.5mm wire** needs to be just more than half the length of the flag, depending on the stiffness of the plastic sheet. The shorter the better, as this minimises the length and weight of the counterweight



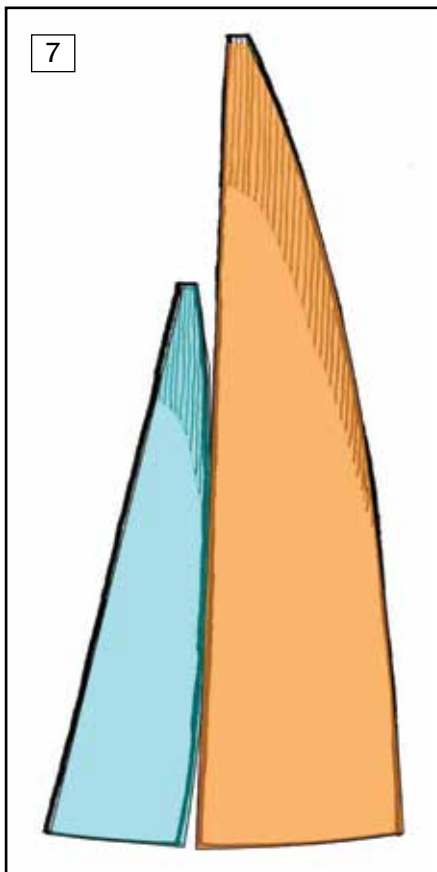
Assembly of parts - flag cut as above, PVC tape shown in grey, to stick the fold over part, 0.5 mm stainless steel wire highlighted in blue to support flag and provide counterweight, 5 mm fishing ball as bearing and 0.8 stainless steel wire bent to form vertical support.

When you are making one of these, **make two**. Then when you lose the flag in a collision or whatever, you have a spare and to make two does not take that much longer than making one.

Counterweight formed by bending 3 turns of the wire with round nose pliers at about 4 mm diameter size.



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Trim testing

Test your windward trim by holding your boat into the wind, as if it were sailing as close as possible to windward with the sails fully drawing. Rotate the boat closer to the wind and observe which sail luffs first. With an ideal trim both should flap together as shown in the shaded area.

If the front of the sail luffs first, then reduce the fullness in the sails, until both sails luff together. If just the main luffs first, open the slot with the jib boom angle or leech line adjustment or flatten the mainsail. Adjust and test several times until the ideal is approached. Always check your trim before launching and adjust to suit the wind conditions, which are always changing.

Wind indicators

These are two items of equipment which will help you to see the wind and how to trim your sails to its constantly changing direction and strength; a flag and tell tales. Without these you are to some extent blind as to what the wind is doing out there in the distance (**Photo 7**). **Photo 8**

Setting up the rig

All the illustrations show what a good trim looks like and this next section describes how to achieve those shapes in more detail. Balanced swing rigs, where the yard rotates about the mast, and rather than the mast rotating, are the easiest to set up, because the forces in the jib 'magically' balance the forces in the mainsail. Once the camber in the sails and the jib sheet sets the slot at the booms, there is really only one adjustment to be made and this is adjusted by the bowsie at the head of the jib on the forestay. This automatically controls the amount of twist in both sails, so whatever the tension in this 'kicking strap' the shape of the slot retains the correct



relationship. This is the case for the BOTTLE boat as shown in the heading photograph and most rigs in the Footy class (**Photo 9**).

Despite the sails of these boats being cut without any fullness, being double sided with the light polythene just folded round the mast, the fullness can be adjusted on the head stick in the same way as you would adjust the camber at the bottom of the sail at the boom as shown here (**Photo 10**). Incidentally, the rules for the next America's Cup demand this form of double sided mainsail.

On a Marblehead with this balanced rig, as well as adjusting the forestay this tension is balanced by the jib leech line to give the precise slot. The balance between the two sails also allows for the leech tensions to be very simply adjusted by the TX trim on the sheet whilst you are sailing (**Photo 11**).

Most commonly used swing rigs used on Marbleheads and other classes have the 'forward and aft booms' rigidly fixed to the mast which rotates and whilst each sail has to be set



up separately without any magical balance, at least the settings can remain the same each time you take the rig out of the sail bag.

Much more complex is the setting up of a conventional rig, as there are so many adjustments to be made in setting the rig up before you even start to adjust the trim. Illustrated



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is an IOM rig set up in accordance with the designer's rigging guide with all the points of adjustment marked with a green star (**Photo 12**).

Once the mast is in place, the shrouds need to be set up and it is very important that they are set up with even tension either side. This can be checked with finger and thumb on the shrouds either side of the mast and the shroud closest to the mast tightened so that these distances are the same (**Photo 13**).

Once this is adjusted it is important to repeat the tensions and this can be done by the bottom of the bottlescrew connecting to the deck fitting with an L-shaped hook as shown on the deck of this fabulous wooden scale ENDEAVOUR J class. The bottlescrew can then be locked to repeat the tensions (**Photo 14**).

In the fore and aft direction the mast needs to be set up using the forestay and the backstay. The aim is to produce a very gentle S bend in the mast aiming backwards a touch at the bottom, bending forward to the forestay and then being bent back by the backstay. The forestay needs to be tight, but to create this backstay tension is needed. How much backstay tension will depend on the bend in the mast matching the shape of the luff of the mainsail. Too much tension will cause creases and the loss of mainsail leech tension. Too little tension and the mainsail may look too full with a hard leech as shown in the leech comparison 2. This is assuming that there is no ram.

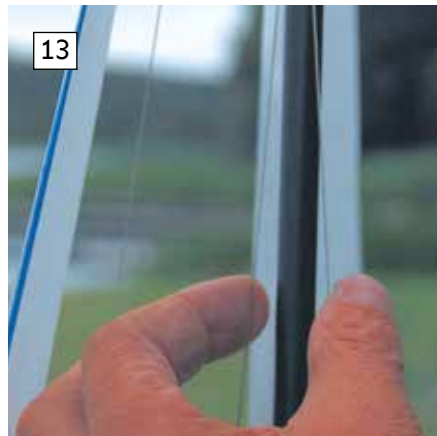
If you do have a ram this can be used to create the desired mast shape. The ram can be set up so that when the mainsail is out on the run the kicker either tightens or slackens slightly. More ram will allow the kicker to slacken as the main boom goes out and less ram will allow the kicker and therefore the mainsail leech tension to tighten.

The kicking strap is a key adjustment and the amount of tension will depend on the wind conditions. In light of fluky airs, which we often encounter on our small enclosed lakes, less tension is always better than too much. The kicking strap will tighten the leech and by doing so will reduce the relative tension in the luff, so this needs to be adjusted to suit.

Finally, one more thing to check is that the jib is balanced and that the counterweight to the jib boom should be sufficient to keep it balanced so that it has no bias, which will help you to gybe the jib easily (**Photo 15**).



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Once afloat

Now is the time to go afloat and test your sail trim, because a perfect trim set up on the shore is only part of achieving a good performance. This effort will be wasted if the sail trim is not adjusted to relate to the constantly changing winds experienced on our enclosed lakes. Always come back and fiddle if

you are not happy. Many expert skippers bring their boats back and adjust their tensions a short time after launching to make sure it is adjusted perfectly for the conditions, which of course are always changing!

Sailing to windward is not just about pulling the sheets in hard and steering. In all wind strengths, easing the sheets helps restore speed immediately after a tack, for example. In very light winds your flag and tell tales may indicate that the wind has more off the side and requires the sheets to be eased to gain speed. Steering the whole boat closer to the wind may be too slow to take advantage of such a shift. Speed is everything in these conditions, so avoid using the braking effect of the rudder.

When reaching it is very important to let your sails out as much as possible to prevent the sails stalling and losing drive. If the flag at the masthead is making a big angle to the top of the sail, let your sails out. Lower down if the leeward tell-tale is not streaming, the airflow over the jib is stalled and the sails are pulled in too hard. This is the most common fault made by sailors of all sizes boats, not just models. It is so easy for radio sailors to pull that stick down hard in the excitement of racing in an attempt to go faster, but it stalls the sails and the boat goes slower.

So if in doubt, let them out!

When running downwind the tell-tales may not help, but keep an eye on the flag to make sure that you are on the most favourable gybe. Try and keep your wind clear of those behind, who are likely to take your wind and slow you down.

Watch and talk to the experts

The importance of good sail trim cannot be emphasised enough. It is all-important in vane racing, which is all about sail setting and getting the balance between the sails and the vane steering gear. This has made vane sailors masters of this art and you will rarely see vane sailor's radio racing with a poor sail trim. Watch how top sailors set their sails and don't be afraid to copy them. Many will be only too pleased to pass on their knowledge, so don't be afraid to ask questions. ●

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