

SeaWind Tuning

By Doug Lanterman

Now that you have decided to race your SeaWind with the AMYA class rules, how do you win races? Two elements are involved. One is boat speed and the other is tactics. Tactics have the most influence in winning races but without boat speed you start in the hole. In this article I will concentrate on the element of boat speed although with the SeaWind there are only a few adjustments available that affect boat speed. The information presented comes from many sources including my own experience with the SeaWind. One of the best sources is the Internet. www.seawindrc.com and www.amya.org are great places to start.

Building in Speed

There are some things that affect boat speed that should be done during your building process. They have to do with rudderpost installation, bulb attachment, gooseneck-vang assembly, sheets and bottom finish.

In step 5 of the Kyosho Instruction Manual I recommend that instead of using the 6 mm o-ring (part 8) between the rudder post tube and the hull that you use one of the washers from the batten set in step 9 (part 50). This minimizes the drag from the o-ring hanging below the waterline.

In step 19 the keel fin is assembled and the bulb attached. I recommend that rather than using the vinyl boot provided in the kit for the bulb, that you attach the bulb with the lock nut and fill the hole with a good filler, sand smooth and paint the bulb with an epoxy paint. The area where the top of the bulb meets the fin and where the top of the fin meets the hull should be faired and smooth as well. The vinyl boot protects the lead from scratches but it also adds wetted surface and thus some drag. It is optional within the rules.

In step 26 the gooseneck-vang is assembled. The rotating parts next to the mast are made up of ball ends and balls. These balls do not move freely in the plastic ball ends. This makes for a stiff main boom that will not move in light air. My solution to this is to place a piece of 1/16" rod in the bottom of the threaded holes for the screws that hold the balls so that the screws do not restrict the balls rotation. This allows the metal balls to easily rotate on the metal screws and thus the boom moves easily in light air.

The cord supplied with the kit is a bit stiff to be used for sheets. In a light breeze they do not move easily. A soft Dacron trolling line or Stren fishing line 20 to 30 lb test works well.

It is a matter of personal choice whether the boat is painted or not. I feel that it is good to paint the hull your favorite color to distinguish it from the other boats on the water. Whether you paint it or not the bottom and all items below the water line should be smooth and fair. Sanding with a 600-grit wet/dry sand paper I believe provides the fastest surface through the water. A glossy finish provides a basis for surface tension to provide drag.

Initial Set-up

Before you take your boat to the water for the first time, you need to get set-up out of the wind so that when you get to the sailing site it will be ready to go.

Mast Alignment

The mast should be straight and vertical from side to side with respect to the boat. Laying the boat on its side on a flat surface and measuring the distance from the tip of the mast to the surface, turning the boat over and measuring again, then making adjustments in the shroud lengths can achieve this. The distances to the tip of the mast from the flat surface should be equal for both sides. This insures that performance is equal on both tacks. When the boat is on its side, sight down the mast to insure it is straight from side-to-side. Unequal tension on the upper and lower shrouds will cause the mast to bend. Tension all shrouds so that the mast remains straight from top-to-bottom and side-to-side.

The fore and aft rake of the mast affects the amount of weather helm. It is one of the adjustments that can be made to tune for sailing conditions. From a consensus of many SeaWind skippers a good mid-range starting position is for the backstay to be 1530 mm from the mast crane eye to the deck attachment point eye and the forestay to be 1310 mm from the eye on the mast to the tip of the bow. This provides a slight weather helm for sailing in air under 8 knots. For heavier air the mast should be raked more forward.

Sheets

When the sheets are pulled in all the way, the main boom should point to the corner of the transom and the jib club should point at the shrouds. This is about 5degrees from the centerline for the main and about 15 degrees for the jib.

Rudder Alignment

When the rudder stick and trim lever on your transmitter are in the center with no finger pressure the rudder should line-up with the keel and the centerline of the boat. Make adjustments to the rudder linkages until this is the case.

Fingers/Radio

Your fingers need to be tuned up with your radio for good sailing. This means that when you move the sticks you know what is happening on the boat. To get a feel for this, lay the boat on its side on a table with the deck near an edge so that when the sails are let out all the way the booms will drop down and the sails will be all the way out. With the sheets all the way out the main boom will be out about 70 degrees and the jib club out about 80 degrees. Place yourself at the rear of the boat with the radio on and move the sticks.

Watch the position of the sails caused by each position of the left stick. Move the sails to various intermediate points between beating and running. Next, practice letting them out slightly from full in and next letting them out slightly from intermediate points. This will be needed for compensating for puffs and lulls in the wind while maintaining speed.

Watch the position of the rudder caused by each position of the right stick. Practice **slowly** moving the rudder from center to left and center to right then practice holding the rudder slightly off center. Quick and large movements of the rudder are a drag on boat speed. You will want to avoid these movements.

Mainsail Shape

The sails power the boat and their shape determines the power. The SeaWind class rules require the use of the manufacturer supplied single panel sails and the attachment points for the outhaul and shrouds are fixed. The vang is not easily adjusted and basically sets the angle of the boom. The 95 mm length of the vang rod between the plastic ball-ends from step 26 in the instructions works well.

Setting the sail 1cm up from the boom at the tack with the fixed downhaul from instruction step 29 is good. The halyard at the top of the sail is adjustable to allow tensioning the luff in the mast slot. The rules now allow an adjustable downhaul as well. I accomplish this with a small screw eye in the plastic of the ball-end of the boom directly under the grommet in the tack of the main. The downhaul is run from the tack through the screw eye to a cleat on the top of the boom. This permits moving the sail up and down the slot in the mast to adjust the twist as discussed below.

Rather than running the halyard from the head of the sail through the middle hole in the mast crane as shown in the instructions, I would run it through the hole next to the mast. This will allow a better twist to the sail on a reach or run.

If the luff is pulled too tight a wrinkle will appear in the luff from the top to the bottom of the sail. This is not good. Loosen the halyard or adjustable downhaul so that this wrinkle disappears.

There is one hole in the end of the boom for attaching the outhaul. The position sets a fairly flat sail, but in medium air (3 to 7 knots) a little more camber or curvature in the base of the sail is desirable. Adjust the camber at the base of the sail to be about 30mm. This may be achieved within the class rules at least two ways. One is to install an outhaul slide which is a sliding bowsie installed on the boom which allows the movement of the clew in toward the mast from where it would be if only attached through the hole in the end of the boom. Another is to install a second adjustable attachment point about 5mm from boom hole. This also allows moving the clew in from the existing hole in the boom.

The single panel sail has a slight curve in the luff. Because it is fixed in the mast slot bending the mast to match this curve makes the sail relatively flat. This is the shape used for very high winds (10 knots and above) and very light winds (under 2 knots). With a straight mast the luff curve in

the sail provides a top to bottom cambered shape to the sail. For medium air the cambered shape with a straight mast is best and a good starting point.

The greatest affect on mast bend is achieved from tightening the backstay. In addition the SeaWind shrouds are connected to the deck behind the mast so that tight shrouds have some affect on mast bend.

The affect of a tightened backstay or shrouds may be seen by using your index finger and thumb on the shrouds or backstay. Place one finger above the other and twist your hand. This can be used to apply more tension or to feel the tension already there. This “fingerometer” is an effective tension gage.

The twist of the main is determined by the tightness of the leach. This is accomplished by adjusting the vang.

There are alternate indirect methods to cause the same affect as adjusting the vang if that is found to be too difficult. If using the outhaul slide, the easiest method of increasing the twist/leach tightness is to raise the sail in the mast slot using the halyard and downhaul. This means making the downhaul adjustable by using a bowsie or cleat. The main halyard is already adjustable. If using a second attachment point, both the downhaul and inhaul may be tightened.

A good starting point for main twist with the boat on its side is to have the middle batten parallel with the center line of the boat, the bottom batten slightly pointing in and the top batten parallel with the boom.

Jib Shape

Setting the jib 10 mm up from the jib club at the tack with the fixed downhaul from instruction step 32 is good. The halyard at the top of the sail is adjustable to allow tensioning the luff on the forestay. As with the main sail, if the luff is pulled too tight a wrinkle will appear in the luff from the top to the bottom of the sail. This is not good. Loosen the halyard so that this wrinkle disappears.

The jib club has one hole for attaching the outhaul just like the main boom. The position sets a fairly flat jib, but in medium air (3 to 7 knots) a little more camber or curvature in the base of the jib is desirable. Adjust the camber in the base of the sail to be about 25 mm. This may be achieved within the class rules on the jib club the same way as on the main boom.

The jib is also a single panel sail and has a slight curve in the luff. The tightness of the forestay affects the camber in the jib. A tight forestay provides the needed camber in the jib. A tight forestay also provides a tight leach because of the lever effect of the offset jib pivot point. This tightness is provided by the backstay and shrouds which means that both the main and jib shape is affected at the same time by the backstay and shroud tension.

The Slot

The jib club is off the centerline of the boat by about 15 degrees when fully sheeted in. When looking at the boat on its side from directly behind you will see a space between the jib leach and the curve of the main. This is called “the slot”. Ideally the curve of the jib leach would be parallel to the curve of the mainsail, but without a “topping lift” which is not class legal the slot will be more closed at the top of the jib. When the wind is on the sails the slot becomes more parallel depending on wind speed and backstay/shroud tension.

As a starting point set the backstay tension to just before the mast starts to bend and wrinkles start to occur in both the main and jib.

Telltails

Telltails are used to see how the wind is passing over the sails. This is important for getting the proper shape and set of the jib and main together. Once the shape and set are fixed telltails are used for steering and sheeting. Telltails may be made out of many lightweight materials. Lightweight yarn works well but is hard to see at a distance. Lightweight Mylar, silk or plastic material 5 to 10mm wide of a contrasting color to the sails works well. They should be about 10cm long and may be applied with a piece of pressure sensitive clear plastic tape. I have found that VHS cassette tape works well. It is a dark color and can be seen through the opaque sails.

On the mainsail, place one on each side up about 40 cm and 80 cm from the bottom. Place the top one back about 50 mm from the mast and the bottom one back about 80 mm. The starboard telltale can be about 5 mm higher to distinguish it from the port. Also, place two white ones on the leach at about the same heights. White is used for visibility against a dark background.

On the jib, place one on each side up about 33 cm and 66 cm from the bottom back about 25 mm from the forestay. Like on the main the starboard telltale can be about 5mm higher to distinguish it from the port.

I also like to add a masthead fly. This is used to get a quick fix on wind direction and speed and to help sail down wind when the telltails on the sail don't tell you much. There are many versions of the masthead fly. One version is to drill a 1/16” hole straight down the plastic masthead crane into the hollow mast. Using the same material as the telltails, fasten a white telltale to the end of a 100 mm piece of 1/16” brass rod so that it will rotate easily. The rod is then inserted into the hole at the top of the mast.

On the Water

Trim for Sailing to Windward

With this initial set-up you are now ready to try it out on the water with the wind. Before you remove the mast, use a marker on the shrouds and stays or other means to allow you the quickly repeat the settings when you get to the water.

Once the boat is on the water, you have control only of the rudder and sheets. You would like to have all the fixed settings optimized for sailing to windward since this is when the settings are most critical.

Optimum Conditions

The set-up you have created should be best for medium winds of 3 to 7 knots. It is most helpful during tuning for the wind speed to be steady. This allows you to sail for some distances to observe the boat's performance and to determine any adjustments.

The Tuning Cycle

On the water tuning is a cycle. Start by assessing the helm, then jib twist, the slot, main twist and finally back to the helm.

Helm

Start with a close-hauled beat to windward. The boat should sail several boat lengths with the rudder centered before coming up into the wind with the windward telltales just starting to lift. It will require you to steer slightly to the lee periodically as the windward telltales just start to lift. It gives you the feel for the boat to steer to a point as high as possible and take advantage of lifts as they occur. If this is the case, great, you have the desired "slight weather helm".

With too ***much weather helm***, you will continually be steering to the lee. This is a drag and is slow. The boat may tend to snap to windward in a puff. ***Rake the mast forward*** to correct this. Loosen the backstay and shorten the forestay about 10mm. Reset the backstay and try again.

If the boat sails without moving the rudder from center or requires you to steer slightly to windward periodically it may feel easy to sail but it will not be pointing as high as possible. You have ***lee helm***. In light air you will be particularly slow. It may even fall off in a puff instead of taking advantage by coming to weather. ***Rake the mast back*** to correct this. Loosen the backstay and add about 10 mm to the forestay. Reset the backstay and try again.

Repeat until you have the "slight weather helm". Next we check the flow over the sails to get it as close to ideal as possible. This means that there is an even flow of air over the windward and leeward sides of the sails and that the sails are acting in consort for the most power. We adjust the jib twist, slot, and main twist in that order to achieve the even flow.

Jib Twist

Sailing close-hauled, watch both the upper and lower jib telltales. Bear off slowly until the leeward telltales just start to lift. If the top leeward telltale lifts first, more twist is needed in the jib. This is accomplished with less forestay tension; this comes from less backstay and shroud

tension. First loosen the backstay slightly and try again. If this is not enough, slightly loosen all shrouds equally. If the bottom leeward telltale lifts first, you have too much twist and the backstay and shrouds should be tightened. This may be the case in high winds with a loose backstay. Repeat until the telltales lift together.

Slot

Now that the jib twist is set, it is time to assess the slot. Sailing close-hauled, with the sheets all the way in, slowly head up into the wind. As the jib just starts to luff, the main should not be backwinded and should luff very shortly thereafter. If this is not the case, tighten the jib sheet until it just starts to backwind the main and let it out slightly. The main should not luff before the jib in any case.

Main Twist

With the slot set, it is time to check the main. Sailing close hauled, bear off slowly until the leeward telltales just start to lift. Ideally, both the upper and lower leeward telltales on the main should start to lift at the same time. If the top leeward telltale lifts first, more twist is needed. This is accomplished by loosening the vang. If the top lifts first, tighten the vang.

Next watch the windward telltales. Sailing close-hauled, with the sheets all the way in, slowly head up into the wind. At some point a windward telltale will start to lift. If one lifts before any of the jib telltales, the main has too much camber at that point on the sail. Try flattening the sail in that area. This can be done at the bottom of the sail by tightening the outhaul and at the top by more backstay tension.

The objective is to get all telltales laying flat on both the jib and the main and the leech telltales flying straight out the rear of the main while close hauled. As you start to pinch too high, the top windward telltales will just start to lift and the leech telltales will start to become agitated as well. Bear off slightly to have just one windward telltale just start to lift or one leech telltale just start to agitate. You should now be sailing your optimum course to windward.

Repeat the Cycle

If changes were required to get the jib twist, slot and main twist correct, the helm may have been affected. Do you still have the “slight weather helm”? If not, begin the cycle once again. Keep in mind that backstay tension does three things: (1) it will tighten the forestay to reduce the sag in the jib luff for a flatter jib, (2) it will reduce the twist in the jib, and (3) it will provide mast bend for a flatter main. A compromise in backstay tension may be required in less than optimum conditions.

Test Against Another

You cannot be sure that you really have a fast boat until you sail against another sailor who is consistently fast. Sail on parallel courses. Watch which boat points best and can get to weather fastest. If the other boat is still faster, observe what is different on the other boat. Make adjustments to get your boat at least as fast. Don't be afraid to ask advice of a faster skipper. We all want the best competition and being asked for advice is always taken as a compliment.

Once you are pleased with the settings for a wind condition, mark the position of the shrouds, stays and sheets. Record any measurements that can be made. Hold the boat heeled into the wind by its keel and watch the sails. Also observe the boat on its side out of the wind. You want to be able to repeat these settings for use another time with the same conditions.

Less Than Optimum Conditions

It is nice to sail the SeaWind in 3 to 7 knots of steady wind but we don't always have those conditions. We often have puffs, shifts in direction and velocity, as well as very heavy and very light wind.

Light Wind

If the wind is going to be predominately 0 to 2 knots you will not be heeling much and it will be hard to get the telltales streaming. Follow the tuning cycle again. A little more mast rake might be in order to maintain the "slight weather helm". Now is the time to flatten the sails and provide more twist. This means loosening the backstay for the jib twist and the vang for the main twist. A bit more of a slot will help. You definitely do not want to back wind the main with the jib. When sailing don't try to pinch into the wind. Sheet out slightly and keep the boat moving.

If the wind is 0 to 2 knots *and* the water is rough, the boat will just be bouncing around and not catching the wind when it comes. The best option here is to loosen the backstay and vang even more. This will give a lot of twist to both sails. It seems to let the sails flap enough to get forward motion even in these awful conditions.

Heavy Wind and Puffs

The boat is going to be overpowered with the wind predominately 8 knots or above. Heel will be in excess of 35 degrees. It is time for another tuning cycle.

You will probably need less aft mast rake even to the extent of some slight forward rake in order to reduce the tendency to snap to windward in heavy puffs and to maintain a "*slight* weather helm" the rest of the time.

You want a flat jib especially if the water is still flat. This will mean more backstay tension and a tight outhaul. More backstay tension does two positive things: (1) it will tighten the forestay to reduce the sag in the jib luff for a flatter jib, and (2) it will provide mast bend for a flatter main at

the top. It may be hard to get both jib telltales to break at the same time since the tight backstay also reduces jib twist, but a flat jib is more important than jib twist in heavy wind.

Set the slot so that during a puff the main gets a bit of backwind from the jib with the sheets in all the way. This has a needed de-powering affect. If you have waves to cut through, leave the camber in the base of the jib.

Set the main outhaul for a flat sail at its foot. Loosen the vang for more main sail twist to the extent that it may luff slightly in the puffs. These steps should help to keep the boat under control in these conditions.

When overpowered, trying to steer with the rudder without also sheeting out will be slow and maybe impossible. The rudder becomes a brake in these conditions. This is where coordinating your thumbs is important. You want to sheet out enough to reduce helm pressure but not enough to luff or loose way. This takes practice.

If the boat is heeling at 45 degrees or more, it is not a time to tack. The rudder will force the stern down rather than turning the boat. Release the sheets to reduce the heel and then try to bring it around. If the wind is too heavy, you may just end up in irons. This may be the time to jibe away to get on the other tack.

In puffs 12 knots and above the boat may be knocked over in excess of 50 degrees. Letting the sails out will have the boom held in by the water. It will then come to weather to give you a chance to recover. Keep it moving if at all possible and get back on course.

Sailing off the Wind

The adjustments that can only be done off the water are most critical in sailing to weather. Once these adjustments are fixed, the sheets and rudder are all that you control. The telltales, masthead fly and amount of heel let you know how the boat is performing.

The Reach

When not going to weather or running down wind, you are reaching, and you want the sails to be providing their maximum power. This is where the boat goes its fastest. Watch those telltales. Those near the luff of the sails should all be streaming against the sails. The leech telltales on the main should be streaming straight back. If the leeward telltales and the leech telltale start to lift, the sail is stalling. If the windward telltales start to lift you need to sheet in to maintain power.

The Run

In light to moderate wind, heading straight down wind, a quick shift of the rudder as if starting a jibe and returning to the run will get the boat wing-on-wing with the jib on one tack and the main on the other. This configuration exposes the most sail area to the wind and is the fastest straight

down wind. The masthead fly indicates the direction of the relative wind to let you know when a jibe is in order.

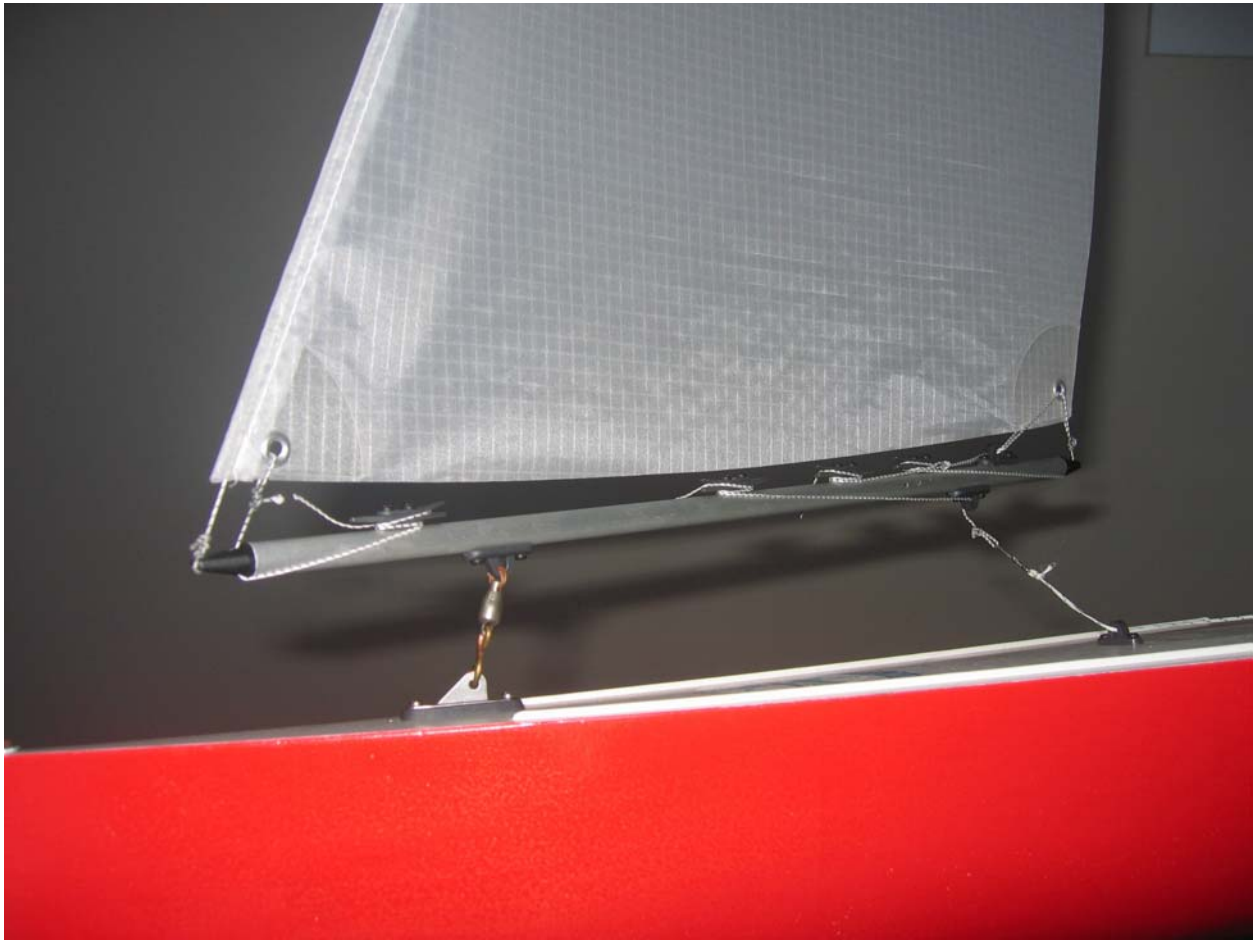
In heavy wind the bow may be buried to the extent that the rudder is lifted out of the water. Having the deck just awash is fine and is not unusual in heavy wind with the boat's low freeboard. If the rudder is lifted the next thing likely is a broach as the boat tries to come to weather and the boom catches in the water as the boat heels and the bow goes under. This is slow and dangerous in close quarters. When the wind is 15 knots and above it is hard to avoid. Do not go wing-on-wing in these conditions; rather stay on a broad reach with the jib behind the main. Jibe between puffs using the sheets to help bring the sails to the opposite side. Watch the water behind you to anticipate or avoid the big puffs.

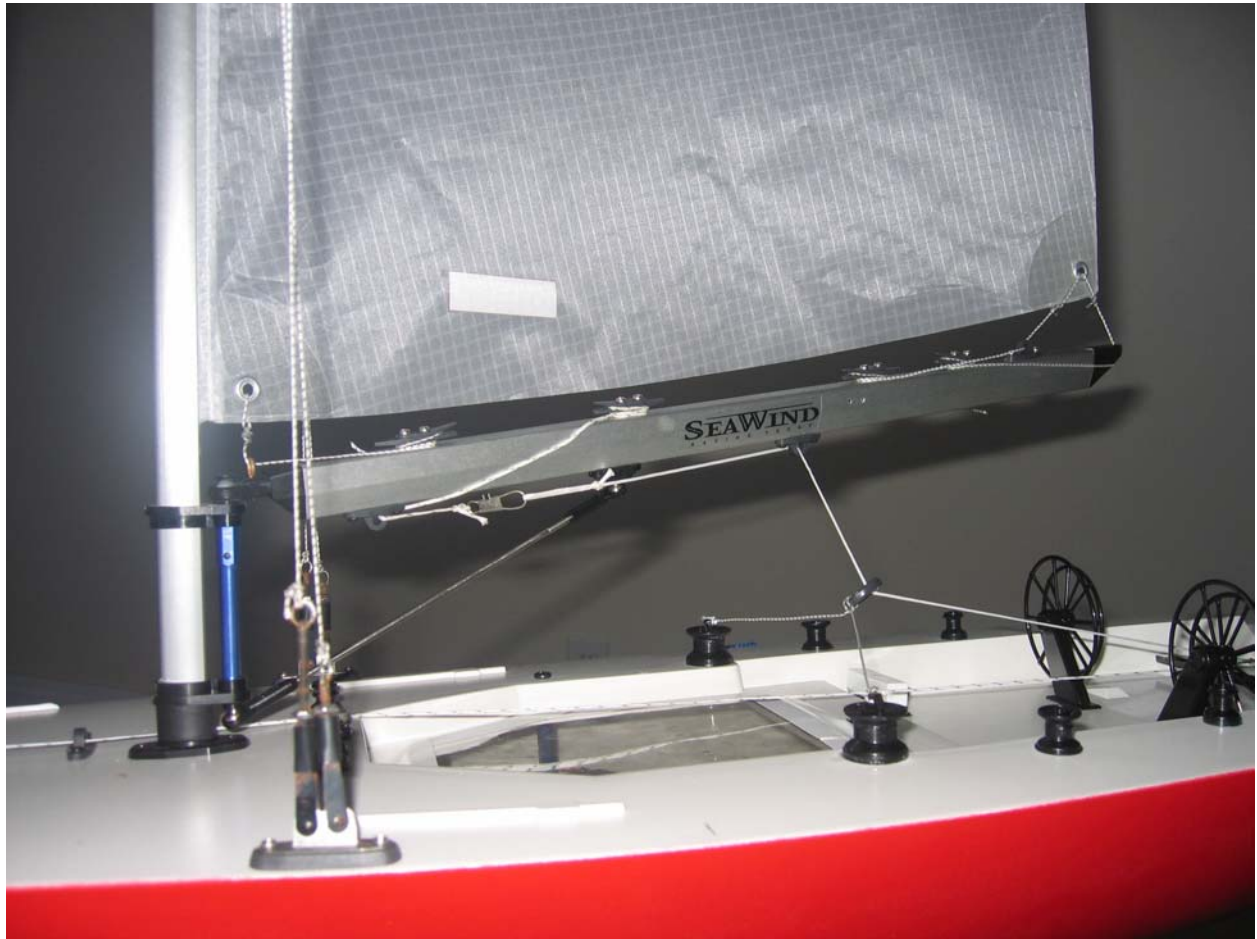
Conclusion

More often than not, the wind is not steady. Your settings will be a compromise. If there are lulls, it is best to be set for the light wind condition and compensate with the sheets and rudder in the puffs. Concentration is a key. Watch the water and other clues for wind speed and direction. Keep the telltales streaming. Practice as often as you can in all types of conditions and with other SeaWinds. Find the optimum settings for each condition and record them for future use. You cannot be sure of conditions for race day.

Remember that boat speed will help you stay in the pack, but good tactics is the biggest reason for winning races. The building tips and the initial set-up described here will be good for normal conditions. Fine-tuning only makes small changes in speed for the SeaWind since everyone is using the same boat and sails.

For more on tuning see Bob Sterne's article "How to sail fast – Rig tuning" available on the AMYA Hints page.





The above photos show the second attachment point method for setting camber at the base of the sail. A second line is run from the clew through a second attachment added to the top of the boom and run to an added cleat. Note that all cleats are on top of the boom to avoid catching on the shrouds of other boats.



The “Fingerometer” is used to adjust or measure the backstay tension by placing the stay between the thumb and index finger and twisting.



Practice using the transmitter with the boat on its side before going to the water. Know the positions of the sails and rudder that correspond to the position of the transmitter sticks. Be able to hold the rudder slightly off center.



The objective is to get all the telltales on the luff of the sails streaming against the sails and the leach telltales streaming aft. The slot between the jib and the main should be evenly spaced from the top to bottom of the jib.