Hampton Tuning 101

This guide is divided into three sections. The first, Basic Setup is meant to provide a good starting point for setting up your standing rigging. The numbers are based on Eddie Williams' four decades of racing, building, and rigging Hamptons and generally follow the template he uses to set up new boats. Where possible, they have been translated into universal measurements that can be used on wooden boats as well. While these numbers may or may not add up to a magic formula for speed, they can certainly establish a base-line reference for tuning your boat. The Sail Trim section is an abbreviated checklist for on the water adjustments, which probably play a bigger role in your boat speed than anything you might do with your rig in the parking lot. The last section, Tuning is an attempt at synthesizing the information found in the firsts two sections. It tries to address the big picture by describing the overall affect one is trying to achieve through "proper" setup and sail trim.

THE BASIC SETUP

1. The Mast

Before you step the mast, sight down the sail track to see if it's bent. If it is, this may not be the end of the world, but it may help

explain why your mast looks the way it does under sail. Make sure the step is central athwartship and that the deck partner is central - directly over the step. You can check this by running a string down the centerline from bow to stern and hanging a plumb weight from the string through the partner - use a level to make sure the boat/trailer is level first.

This would also be a good time to check the position of the shroud/deck connection: they should be equidistant from the centerline and the same distance from a fixed point on the bow (see reference numbers below).

If you know all these things early, you may be able to tune around certain asymmetries, or at the very least you will know why other measurements don't add up. This could also keep you from misdiagnosing things you see on the water and help provide answers to questions that come up later in the process.

Spreaders

Length (Poke)

The length of the spreaders determine the amount of athwartship bend you get in the middle of the mast. Spreader poke is the significant variable that is effected by spreader length. "Poke" describes the athwartship deflection of shroud by the spreader. The longer the spreader, the more the more the shroud is poked out of a straight line from deck to hound when viewed from astern. The more poke the stiffer the spar gets athwartship around the spreader bracket area. Eddie Williams of Hampton Boat Works delivers new Hamptons with spreaders that measure 19.25 inches from the shroud wire to mast wall (shortest distance). Eddie Williams is shooting for neutral spreader poke with this length. Neutral spreader poke means that the length of the spreader is such that it does not shift the shroud out of a straight line from the hound to deck. You can check this visually by holding the trapeze hook at the shroud/deck intersection and then looking up at the spreader tip. The trapeze wire will give you a visual reference point to see how much the spreader length is deflecting the shroud from a straight line. Others who have optimized for light air have used longer spreaders, in the 21 inch range. You also may want to use this length if you have the higher Superspar hounds location discussed below.

Angle- (Sweep)

The fore/aft angle the spreader makes at the bracket determines the stiffness of the mast fore/aft. Eddie Williams likes to start with neutral spreader sweep. "Neutral spreader sweep" means that the fore/aft angle the spreader makes coming out of the bracket does not deflect the shroud fore or aft of a straight line. On a glass boat, you can get in the ballpark by measuring the distance between spreader tips. This should be 36" with 19.25" spreaders. Visually, the sweep should appear neutral when sighting up the shroud when rigged. Once again you can check this with the trapeze wire. The trapeze wire gives you a reference point for checking the spreader sweep. If the tip and trap wire are adjacent, then you have neutral sweep. If the tip is forward of the trap wire, you have negative sweep, and mast will bend less fore and aft in the middle. If the tip is behind the trap wire, you have positive sweep and will be inducing a some bend/softening the middle of the mast. Light air specialists sometimes start out with some positive sweep to help induced pre-bend.

Other Spar Measurements (for the hard core do-it-yourselfer)

- Headstay/jib halyard shive above deck 18' 6"
- Shroud hounds above deck 18' 6"
- Trapeze hounds above deck 19' 3.5"
- Spreader Bracket above deck 7' 8"
- Headstay length 20'2" on glass boats

(try 20' 3 1/2 on wood boats, I have found that the stem fitting on glass boats provides a higher attachment point than most wood boats)

The Superspar masts from the Sindle era had significantly higher hounds (19'2") with the same headstay/jib halyard attachment. If you have this rig, it can work (it's won several National Championships). By stiffening the top athwartships and helping to induce more even prebend, it can be fast in light air. The longer 21" spreaders mentioned above work well with this mast's higher hounds location because they create roughly the same amount of poke as you get with the shorter spreader/lower hound combination. Although this rig can work, I would stick with Eddie's numbers if you are starting from scratch with a new mast.

2. Mast Heel Position

The short answer for B.O.W. and Hampton Boat Works boats is "aft pin in third hole from the back." For wooden boats this same position works out to the following measurements: 7 11/16" from CB pin to aft edge of mast or 10'10" from transom corner to the vertical extension of the pin. This measurement was as hard to take as it is to describe, so take it with a grain of salt.

3. Shroud Position at Deck

9'2" aft from front of stem head.

Roughly 2'8" from centerline out to shroud.

Roughly 2 N " in from outside edge of a fiberglass boat.

4. Athwarships Mast Position

Once stepped, make sure the mast is even athwartship. You can do this by measuring the distance of the mast tip from each rubrail. Hook up the shrouds and headstay with moderate tension. Hoist a tape measure on the mainhalyard, and then check the measurement on each rubrail, at the same point on each side (you can use the back of the shroud track or any two spots on the rubrail that are equal distance from the bow). The measurements should be the same. If they are not, it may indicate that the tip is closer to one side than the other. This could indicate any one of four problems: 1) the shrouds are not the same length; 2) the mast step is not centered; 3) the mast partner is not directly over the step (yes, this can happen on wood or glass boats); 4) the mast is bent (but you already knew this). Next, sight up the sail track with your eye next to the spar and make sure the mast is straight in column. If it is not, this could indicate several combinations of the four problems listed above, or more likely, one of the following additional problems: 1) the spreaders aren't the same length/sweep; 2) the shroud tension is not the same. Don't get frustrated, lots of rigs will flunk parts of these tests. Even if you don't iron out all of these things at once, knowing what is going on with each variable can help you tune around the imperfection.

To ice the cake, make sure the mast does not twist in the step, this will throw off your spreader settings and hence mid bend control. Finally, make sure you don't have too much play in the partner. A sloppy partner will let the mast tip fall off to leeward, depowering the rig, hurting pointing, especially in a wooden boat where the step is deeper in the boat.

5. Rake

Rake can be measured by hoisting a tape measure on the main halyard to the black band and then seeing where the corner of the transom intersects the tape. Measure rake with the mast straight fore and aft. In other words, make sure the ram is not prebending the mast, this moves the tip aft and will throw off the measurement. A standard measurement here is 25'1" measured at the transom corner. If you want a ball park rake measurement that is independent of mast heel position, hang a plumb weight on the main halyard. This pure rake angle measurement should be about 19" from the weight to the gooseneck. This measurement allows you to measure rake even if you decide you

want your heel in a different position. Remember, if the heel position is different, comparing the distance from mast tip to transom corner will not be helpful. If you are trying to copy the standard set-up, make sure your heel is in the standard "third hole" from back position, then just measure rake at the transom.

6. Rig Tension

Eddie Williams starts out with 140-175 lbs of parkinglot rig tension. (measured with a Loos II tension gauge on 2.5mm dyform wire). I don't know how helpful these numbers are, but for the curious, I have about 100lbs in the parking-lot when setup for light air. There are so many variables that this light air number doesn't mean much. For heavy air I have found numbers that I think may be too high, over flattening the jib. This is the only time I have found rig tension a helpful tuning variable in the Hampton.

7. The Centerboard

The centerboard pin should be 10’ 2M from the outside edge of the deck at the transom, measured horizontally to the vertical extension of the centerboard pin.

If you have a plastic boat, you have nothing to worry about, the pins are all in the same place. Most wooden boats are in the ball park, but if you are tuning a woody, you should check this and keep any variance in mind as you look at the other related measurements (mast rake and step measurements are only significant to the extent that they reflect are certain relationship between the sail plan and the foils).

8. Jib Leads

The standard jib track makes a 9 degree angle from the centerline of the boat. For us non-math majors, a nine degree line can be found by holding a line attached to the bow 9 1/2" out from the centerline, measured at a point on that line 5 feet aft of the stem. This measurement shows where the standard jib track lies. A good starting place for the leads is around 84"-86" from the stem.

SAIL TRIM

1. Mainsheet

This is the Hampton's throttle and should be adjusted regularly for max speed. In light air you need to keep the leech twisted open, so be careful not to over trim.

When the breeze fills in a bit, the idea is to keep the top batten parallel to the boom. Under 7 or 8 knots, you can use the top leech telltale. It should be flying 70% of the time. If it flies all the time, you need more leech tension so try more sheet. If it stalls more than 70% the leech is too tight, ease the sheet and make sure the vang is loose.

Above 8-10 knots the top telltale will fly all the time even when over trimmed, so here you just try to keep the top batten parallel to the boom. This wind range is where you will transition to using the vang rather than the mainsheet to control leech tension. In breeze I use the vang to control leech tension and the sheet to move the boom in and out - without changing your sail shape. In boats with the midship traveler, the mainsheet remains an important control for the leech tension. It also helps control the headstay tension. With this type of mainsheet system, set your mainsheet/vang for proper leech tension (noting the effect on the headstay) then use the traveler to play the boom in and out in the puffs.

2. Boom Vang and Ram

In light air, prebend with the ram (up) and make sure the vang is completely slack.

In medium conditions, fix the ram in the neutral position and trim the vang until the top batten is parallel to the boom. If you don't like to sail with your head pressed next to the boom, you can use your leech telltales. Vang on until they are stalling about 70% of the time, less for more speed, more to squeeze someone off, or sail next to Charlie McCoy. In particularly smooth water you can trim it hard enough to hook it about 5 degrees to windward for more point without loosing speed. Obviously the vang and ram work together to control the leech tension. As a general rule if you have speed with no pointing, try more vang (and/or more down ram) both of these adjustments will tighten the leech. If you have pointing with not enough speed try easing the vang (and/or ease the down ram) these adjustments will both ease the leech.

3. Main Cunningham

This should be slack up to about ten knots. Above 10 kts tighten enough to remove wrinkles along the luff. When it's blowing the dogs off the porch, you can crank on it to move draft forward and depower leech.

4. Outhaul

In light air, tight to get main draft aft and open the slot.

In medium conditions: Theoretically this is when you could loosen it, but I have never had Hampton sails that let me do that.

5. Jib Luff Tension

Tighten just enough to remove wrinkles for the given conditions.

6. Rig Tension/Jib Halyard Tension

Rig tension or jib halyard tension can be used on any Hampton, whether you have fancy adjustable shrouds, or just several different swage balls on your jib halyard. The difference here between the simple and complex rigs is just ease of adjustment underway. Either way you are rigged you can accomplish the same thing. In light air you want some jib luff sag. This is not sail cloth tension along the luff, but rather how far the whole luff of the jib sags to leeward of a straight line. This gives the jib a slightly fuller entry and twists the leech off, providing more power and, in the really light stuff, keeps the flow attached and the slot open. Also, by dropping the luff to leeward and keeping the leech in the same place you effectively rotate the jib away from the apparent wind, reducing the sail's angle of attack. This allows you to point the boat higher, even though you have a rounder jib entry. As the wind builds from 1-3 knots to 5-7 in flat water the round entry and open leech will hurt your pointing and you will need to start to add some tension to reduce the jib luff sag. This will move the draft aft, flatten the entry and close the jib leech a bit to optimize your pointing. If there is lots of chop, leave it looser longer than you would normally. As the breeze builds just continue to add tension to maintain the same jib luff sag that was optimal at 7 knots, (1.5-2.0").

7. Jib Sheet Tension

Yes, this is a tuning variable. Mark your sheet it so you can tell what your crew is doing with it. Ease for speed, tighter for height.

TUNING - the big picture

OK, we are on page seven of the "tuning" guide and we haven't even gotten to tuning. There is really not much to add here, other than to try and put the first two sections into perspective. "Tuning" to me is just the process of optimizing the combination of the variables presented in the first two sections, Setup and Sailtrim. The optimal combination is one that achieves the "right boat balance". Correct balance is really the bottom line, this balance is most of what you are trying to achieve through proper rig setup and sailtrim.

This is why different setups and sailtrims can both be really fast. Different combinations of the setup and trim variables can be combined to create good over all tune. In other words, like most things in life, there is more than one way to do it "right". I personally don't feel that any of the dimensions in the first section, by themselves, are critical. In fact, my own experience is that they are not. I have had my ass kicked by all different kinds of setups. What is important to good tune is good overall boat balance. The numbers here are simply some that have yielded well balanced boats for some very good helmsmen.

So what is the "right balance". Unfortunately, this is where things get complicated, and the physics of each discrete element become metaphysics as you try to understand how all these variables work together. In other words I don't really know what I am talking about here, but I do have a theory!

My personal theory is that in a Hampton, the correct balance is one that yields the "right" amount of helm and the "right" amount of heel at the same time. Too little helm, your are not getting enough lift off your rudder, too much and you are getting too much drag. Of course this is true of tuning most boats, where the Hampton differs a bit from others is in the importance of the "right" amount of heel. Heel is one of the most important variables in the Hampton, right up there with mainsheet tension and sunscreen. As with the rudder, there is a lift/drag trade off as you increase heel. As the lee chine digs in, and the rudder loads up, you get more lift from both than you are loosing from the tilted centerboard - and suddenly you are in the groove. Changing all of the set-up variables just changes how much heel you carry for a given amount of helm. Having the rig balanced means you get the optimum helm at the same moment you have the optimum amount of heel. The tricky part is that the two variables are related, you can't adjust one without effecting the other. The more you sail your Hampton the quicker and more instinctively you will know when it is "right". My rule of thumb is to shoot for dead neutral helm when the boat is flat. Then, as helm and heel increase together, they should reach optimum at the same time. I could tell you more, but then I would have to shoot you.

The best way to get faster is to sail more regattas and ask more questions - in that order. At the very least, this guide represents a good list of the variables in the speed equation, and can help you to ask smarter questions. Thinking about these things can also make the process of getting faster more interesting. So while reading this guide won't win you the High Point Trophy, understanding it will make trying a more fascinating and rewarding experience.