Seminar 1 Rigging and Tuning

Section 2 Tip O'Neil

Jan 14 2015

DISCLAIMER

These notes have been written by Bill Key (me) from a sketchy memory of the event and are a combination of both the presenter's and my views on the various topics, but hopefully represent something close to what the presenter said in Seminar One. I anticipate future modifications, as everyone has their opinions on how something should be done. All that said, please don't be surprised if there are modifications, or further discussions about the material presented in this document, as there are many ways to make a Townie go fast. Please don't be shy about calling for help.

1. Boom

There are two kinds of goosenecks: fixed and rotating. The fixed goosenecks, typically found on older boats, are cast bronze and are very nice, but limited in function and permit the boom to swing port/starboard and up/down, but not rotate.

The more modern stainless steel gooseneck provides the functions of the bronze gooseneck, but also lets one rotate the boom which proves to be quite handy for furling the main on the boom. Tip simply rolls the boom while feeding the main onto the boom and very quickly has a nicely furled main without wrinkles or cracks.

I have a stainless steel gooseneck and I am not aware that it rotates, so this might be a new type fitting. If you have a question about the kind of gooseneck you have on your boat, try turning the gooseneck on your boom. If it doesn't turn, call Tip to find out how to get the rolling gooseneck as this feature makes life easy at the end of the day.

2. Boom Outhaul

Tip brought in his boom and showed how he has two Highfield (sometimes Hifield) levers, one on each side of the boom for setting and slacking the outhaul tension. "The Highfield Lever was invented by the late Mr. J. S. Highfield, an electrical engineer and rear-commodore with the Royal Thames Yacht Club, in about 1930." (Wikipedia) Figure 2-1 shows a Highfield Lever

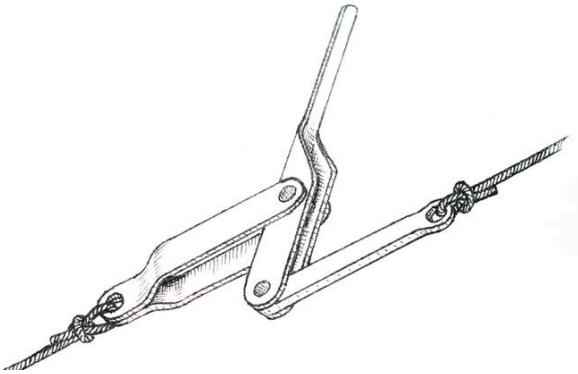

Figure 2-1 Highfield Lever (Wikipedia)

The concept is that a Highfield Lever, when open, provides several inches of slack in the mainsail outhaul and when closed, automatically goes back to the original adjustment. The outhaul is set for the optimal tension for sailing upwind and when the boat arrives at the windward mark, all the crew has to do is open the Highfield Lever and it slacks the outhaul for better sail shape and speed off the wind. The nice part is that when the leeward mark is rounded, all the crew has to do is close the Highfield Lever and the foot of the main is automatically back to the original adjustment for sailing upwind. Tip has two Highfield Levers, one on each side of the boom so that the crew has easy access to the lever. The use of a Highfield lever is not anew concept as can be seen in Figure 2-2 from 1968 and one can really get fancy as seen in

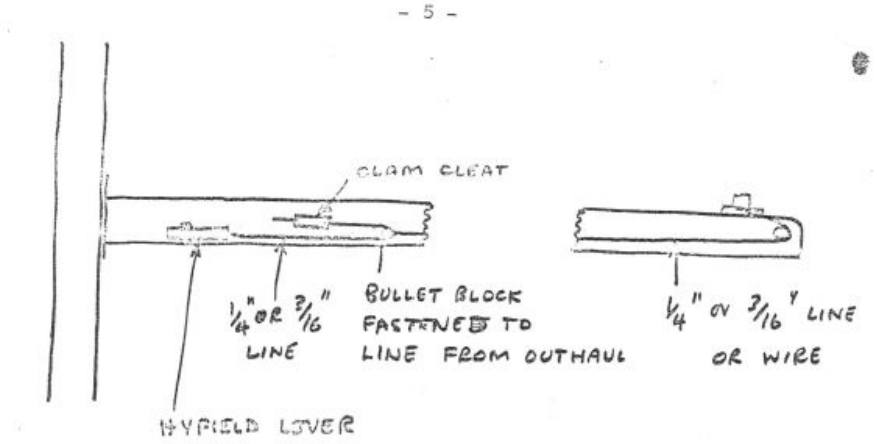

Figure 2-2 Highfield Lever Outhaul Arrangement (Campbell et al 1968)

Needless to say, this is high level gadgetry and the average sailor can manually adjust both his outhaul and Cunningham by having a cleat on one side or both sides of the boom for the crew to manually slack and tension both the outhaul and the Cunningham. The advantage of the Highfield Lever is that it takes the guess out of the tension when tensions are running high at the mark.

3. Outhaul Tension

The outhaul is utilized to shape the mainsail by tensioning the foot of the sail with high tension stretching the sail cloth and pulling the sail shape flatter. Conversely, slacking the outhaul slacks the foot of the main, creating a fuller shape to the main.

In light air, the outhaul should not be tensioned too tightly as a taut mainsail foot will flatten the shape of the sail at a time when you need a very full sail to drive through the sloppy chop of Marblehead. In heavy air, tightly tensioning the outhaul will flatten the main and make it easier to sail the boat without luffing the main.

Finding this optimum outhaul tension is difficult and comes with practice. Don't get discouraged. A good place to start is to tension the outhaul so that the wrinkles in the foot are just pulled out. Sailing in light are means slacking the outhaul to the point where the foot actually "bat-wings" between slides. Conversely, sailing in high winds, stretch the stink out of the foot and keep sailing. Table 3-1 provides a general guide for tensioning the outhaul to obtain optimum sail shape.

Wind Condition	Outhaul Tension	Sail Shape Required
Light 1-5 knots	Slack with bat wings between slides on the foot	Very Full
Medium 6-12 knots	Tensioned to pull the wrinkles out on the foot	Full
High 13-18 knots	Highly tensioned…stretch the stink out of the foot	Flat

Table 3-1 Outhaul Tension Guidelines

Section 4 Boomvang

The first thing that everyone asks is what is a Boomvang ? It is a tensioning device, typically a 4:1 tackle, running from the lowest part of the mast to about 1/3 the way out on the boom and designed to:

1. Decapitate the crew

2. Keep the boom from rising up as the sail pulls the boom upward.

Forget reason #1 since we all know that the crew needs a good whack in the head every once in a while to keep their attention.

Figure 4-1 Typical Townie Boomvang Rig (Key photo 2014)

Reason #2 is more the reason for use of a Boomvang since every time the boom rises up in the air, the leech dumps and the sail loses power. It is very obvious that a Boomvang should be used off the wind to keep the boom from rising on a reach or run as one needs every bit of power in the sail to drive a Townie through the Marblehead slop. Depending on the breeze, the vang can be slacked a little for downwind sailing to help put more shape in the main. All of these adjustments will come with experience, so use the vang for all sailing conditions and fiddle with it to get the best sail shape. Remember, the Boomvang controls the leech.

What is not obvious and technically a big advantage is using the Boomvang when sailing upwind. In a medium breeze, the main can be sheeted in tight and the mainsheet holds the boom down, but in a high breeze, the mainsheet has to be let out to luff the main and as soon as the boom leaves the end of the traveler, it begins to rise upward, dumping the leech. However, a Boomvang keeps a constant downward tension on the boom regardless of the location of the boom relative to the centerline of the boat, permitting the mainsheet to be slacked, the main sail to luff, but the sail to keep sailing on the leech, even though the sail is luffing potentially ½ way back from the mast. We will talk about traveler control of the boom in the next section.

Think of the Boomvang as an additional sail shape control device for use in Moderate to High breezes.

Section 5 Traveler

Town Class travelers one typically sees are a U Shaped bent metal bar with a sliding block that slides over the length of the traveler without restraint. A more sophisticated legal versions of the traveler are made from a piece of line instead of the metal bar which permits the block to slide out to the edge of the hull, providing more downward force on the end of the boom. If you recall from the Boomvang section, holding the end of the boom down controls the leech and control of the leech means sailing fast. Figure 5-1 and 5-2 provide a visual explanation of the soft traveler and these are from 1968 so trust me, there is nothing new under the sun.

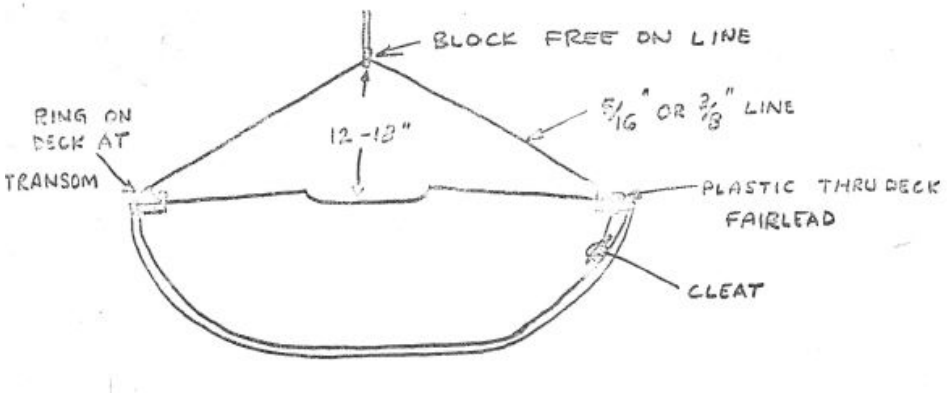

Figure 5-1 Simple Soft Traveler made from Line (Campbell et al 1968)

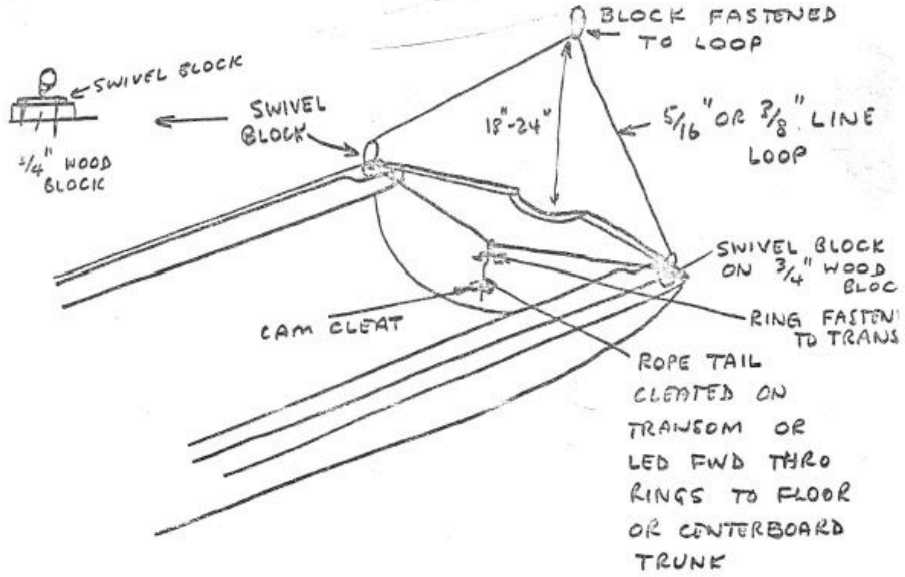

Figure 5-2 Loop Line Traveler (Campbell et al 1968)

The simple line traveler seen in figure 5-1 has a sliding mainsheet block which allows the mainsheet block to position itself over the leeward gunwale in which provides some downward force on the end of the boom as a pseudo-Boomvang. It is more effective than the standard metal rod traveler and requires no attention from the skipper or crew for adjustment. However, the only way to get the boom over the centerline of the boat in light air is to tension the mainsheet, something counter to what one would normally want to do in light air. The Loop Line Traveler seen in Figure 5-2 has the mainsheet block fastened to the traveler and provides additional control by pulling on the rope tail seen in the drawing which centers the block amidships. Pulling on the tail causes the mainsheet block to center amidships without increasing the tension on the mainsheet….a big advantage in light air.

The next step in traveler control and complexity replaces the tail with a control line for each side of the traveler so that the mainsheet block can be positioned anywhere between port and starboard gunwales. For example, in light air, the mainsheet block can be pulled to windward so that a light tension on the mainsheet will pull the boom to amidships for optimum sail trim without pulling the shape out of the sail.

The ability to control the position of the mainsheet block is great, but after the skipper and the crew have been tangled up a couple of times in the control lines, everyone may have second thoughts. For the majority of the Class, the metal traveler will work fine and should provide hassle free sailing….stick with it.

Section 6 Mainsail Rigging

When hoisting the mainsail, think of it in the following sequence:

UP DOWN OUT (**U**pside **D**own **O**verboard)

- UP: Pull the sail UP with the main halyard;
- DOWN: Pull the sail DOWN with the Downhaul and/or Cunningham;
- OUT: Pull the sail OUT with the Outhaul.

Tension on all will be determined by the current wind conditions. If using a standard horn cleat to fasten the main halyard DO NOT run the line through the middle of the halyard as it is a recipe for problems, as it will bind up when you need to drop the main in a hurry e.g. at the mooring.

Section 7 Main Halyard

There are two types of halyards that can be used on Town Class boats: wire or line. The wire is nice because it doesn't stretch and can be secured at the top or the foot of the mast using a halyard lock, a piece of sheet metal with a split into which a ball swaged onto the halyard can be slipped….no cleating required. Sounds great, but sometimes the ball gets stuck and it is always at the most embarrassing or urgent time. Wire also "eats" up the mast head sheave and eventually will split it in half with unhappy results. It is possible to avoid a split sheave by using a metal sheave, but the wire eventually will still eat up a metal sheave. Wire will also begin to fray often at the sharpest turning point and if not attended to will break suddenly.

The other alternative is to use flexible, synthetic line for the halyard which is easy on the hands and easy to manage for both hoisting and lowering of the main. The standard argument against synthetic line is that it stretches after being hoisted to the proper tension. However, with the availability of low stretch, axial filament synthetic line, the "stretch" argument goes away. This line is like wire, but with improved handling characteristics and is recommended

When you are cleating the mainsheet halyard….using synthetic line of course….one must be careful not to use a double jam cleat which looks like a standard cleat, but once the halyard is "jammed" in the jam cleat, getting the mainsail down in a hurry could be problematic. Don't use a double jam cleat; use a single jam cleat or a standard cleat so that you can cast off the main halyard in an emergency.

Whatever you do, don't run the halyard through the center of the cleat as it is just an invitation for fouling, especially when trying to dump the main in an emergency.

Our recommendation is to use a synthetic line for a halyard and in the beginning, stick with standard low stretch line available at West or similar. More sophisticated synthetic lines are available, but Townies don't need that level of sophistication.

Section 8 Mast Bands

Class rules require that bands be put on the mast to delineate the maximum length of the luff of the main sail as noted in Figure 9-1.

> "A pair of bands shall be painted around the mast. They shall be 1" wide and their color shall contrast with that of the mast, preferably black on light colored spars and white on dark colored ones. The outer edges of a pair of bands shall be located 19' 8" apart. If desired, additional pairs of bands may be used. The sail must be located within one pair of bands while racing."

Figure 9-1 Town Class Specifications Mast Bands

Mast bands are used to clearly show other competitors that the sail is within specifications for luff length. The reason for this is that some unscrupulous sailors could stretch the main beyond the allowable luff length to increase the sail area of the sail and the bands let everyone see that the main is within limits. The Town Class is not strict on about having bands on the spar, but be advised that it is required in the Class Specifications and you should have mast bands on your spar. Related sections include Section 9 Downhaul and Section 10 Cunningham.

Section 9 Downhaul

The downhaul is used to pull the boom gooseneck down on the mast track to stretch the luff of the sail out to the limits of the two bands on the mast, re Section 8. These bands are required by the Class rules to clearly delineate the allowable luff dimension. Downhauls can be as simple as a single piece of line hanging from the gooseneck and muscled down to the lower band, then cleated on a standard cleat, or as fancy as a multi-part tackle which provides leverage and eliminates the need for muscle.

In some Classes, the downhaul is utilized as a luff tension device and is used to shape the sail. However, in the Town Class, the rules clearly specify the distance between the bands on the mast, so the usefulness of the downhaul as a sail shaping device is limited. When the sail is fully stretched between

the mast bands, a Cunningham is utilized for stretching the main to shape the sail as described in Section 10.

Section 10 Cunningham

The Cunningham was named for Briggs Cunningham who was a great sailor and always pushing the edge of the rules envelope. Most Class rules require bands on the mast so that skippers can't use an oversized main or stretch the main to be oversized, so that if the sail comes to the limit of the bands, the downhaul can't be used to stretch the luff and shape the sail. Therefore, if the main comes to the allowable limits and more luff tension is required to shape the sail, a grommet is put about 12 inches above the tack grommet and the sail luff is tensioned from that grommet using a multi-part tackle, but since the grommet is above the tack, the sail can be tensioned without exceeding the band limits. Pulling down on the Cunningham usually puts a wrinkle in the luff below the Cunningham grommet, but the sail luff is still within the Mast Bands so is legal. Figure 9-1 provides a illustration of a simple Cunningham which consists of a piece of line secured on one side of the sail on the mast or boom, then passed through the Cunningham grommet down to the opposite side of the sail where the end of the line is secured to a fitting on the mast, deck or boom. The principal advantage of the Cunningham is that the tension on the luff of the main can be adjusted quickly and easily for control of the sail shape, without exceeding the black band limit on the mast.

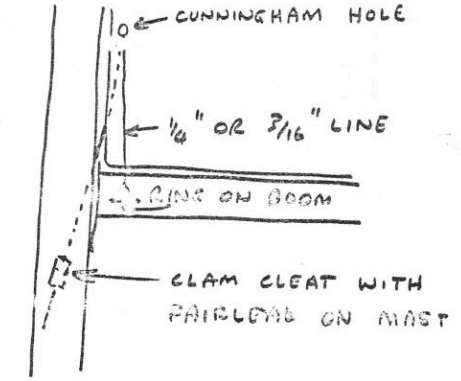

Figure 9-1 Simple Cunningham Rig (Campbell et al 1968)

Section 11 Adjustments

Skippers can literally and figuratively get wrapped around the tiller with adjustments and lose sight of the race. The olde salty dogs have been sailing so long that the adjustment comes naturally and they don't lose focus on the race. For the average sailor, Table 10-1 will provide guidelines for sail adjustment.

Wind Condition	**Sail Shape Required**	**Outhaul**	**Boomvang**	**Downhaul**	**Cunningham**
Light 1-5 knots	Very Full	Slack with bat wings between slides on the foot	Attached, but slack going to windward	Loosely tension to leave slight batwings in luff	Not attached
Medium 6-12 knots	Full	Tensioned to pull the wrinkles out on the foot	Tensioned with no slack going to windward	Pull to black lines	Attached but not used unless boat is overpowered
High 13-18 knots	Flat	Highly tensioned…stretch the stink out of the foot	Really tensioned going to windward	Pull to black lines	Attached and tensioned to shape sail upwind, slack downwind

Table 10-1 Sail Adjustment Guidelines (O'Neil, Key et al 2015)