Seminar 1 Rigging and Tuning

Section 3 Peter Maitland

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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. Contact information is provided in the Class List.

1. Racing Tips

Centerboard (CB) Position for Conditions

The optimum position of the CB varies with wind velocity, boat weather helm and the sailing direction (upwind, reaching or running). Table 1-1 provides a guideline for CB position. A tip is to mark the CB hoisting tackle with tape at key points so that the crew can easily and accurately position the CB without a lot of hassle..

CB Upwind

When sailing upwind, the CB should be vertical to provide the most CB area exposed to the water for minimum leeway (side slip). Most Townie sailors will find that if the boat is balanced properly (reference Bart's discussion on Center of Sail Effort (CS) and Center of Underwater Effort (CU), a vertical board is most desirable when sailing to windward in normal wind. When the wind begins to blow, what typically happens is the boat heels over and weather helm develops. In these higher breezes, raising the CB about 1/4 of the way helps both heel and weather helm, but increases leeway as there is no free lunch.

CB Reaching

As soon as the boat rounds the windward mark, the CB needs to come up to a 1/2 position to reduce drag while minimizing leeway, but also reducing weather helm. Remember weather

helm is BAD, so pulling the board up on a reach will minimize weather helm and keep boat speed up.

CB Running

Once the boat is running, pull the board completely up to minimize drag, but be sensitive to the boat "crabbing" (sailing sideways) through the water as a result of no board and the main being all the way out on one side. Look over your shoulder at the wake to see if the boat is crabbing and if yes, lower the CB until the crabbing minimizes. A tip here is to heel the boat to windward (boom up in the air) and the shape of the curved windward side of the hull on a Townie will act like a rudder, countering the sail force with resultant minimal crabbing and weather helm without lowering the CB.

Sailing Mode	Centerboard Position	Comment
Upwind	Vertical, Full Down	Theoretically best position for sailing upwind, but could create weather helm, depending on wind conditions
Upwind	3/4 Down	Pulling the board up slightly will ease the weather helm, but increase leeway (side slip). Adjust for best speed upwind
Reaching	Half Up	Half board is about right, but adjust for best boat speed
Running	All the way up	All the way up reduces drag on a run, but could introduce "crabbing", so look at your wake and if crabbing, put the board down a little

Table 1-1 Centerboard Position Guide

Boat Heel

Townies are sailed to windward best with no heel and the CB vertical in the water. This requires hiking from skipper and crew, but will result in best boat speed to windward. There is some disagreement with this theory and some think that a slight heel so that the leeward chine catches the water better provides for best boat speed. In light air, boat speed is minimal so hydrodynamic effects can be ignored and the boat should be heeled slightly to leeward to keep the sails stay full.

Weight Distribution

In light to medium breezes, Townies sail better with the skipper and crew weight positioned so that the balance point between the two is slightly forward of the rear of the CB box. This is to keep the boat from digging the bow in or dragging the transom. However in higher breezes, it pays to move the balance point forward as much as possible going to windward to get the bow to dig in and balance point aft off the wind to keep the bow from digging in. Off the wind, the sails try to force the bow down, so move aft to keep the bow from digging too deeply

2. Cockpit Layout

Seat Modifications

The rules permit the removal of the outboard most seat plank to permit hooking your foot under the remaining seat planks for hiking without a hiking strap. If you rig hiking straps, then removal of the outboard plank shouldn't be necessary. Peter has rigged a net bag where the planks were to hold misc stuff, a neat addition since usually the "stuff" ends up in the bilge.

Hiking Straps

Hiking straps in moderate to high breezes make for good boat speed, as it permits the crew to shift weight to the gunwales without falling overboard. Remember the racing rules require the boat to start and finish with the same number of crew members. Figure 1-1 shows a simple hiking strap for the crew, while Figure 1-2 shows how to rig a hiking strap for the skipper. Both of these designs are effective and simple to rig.

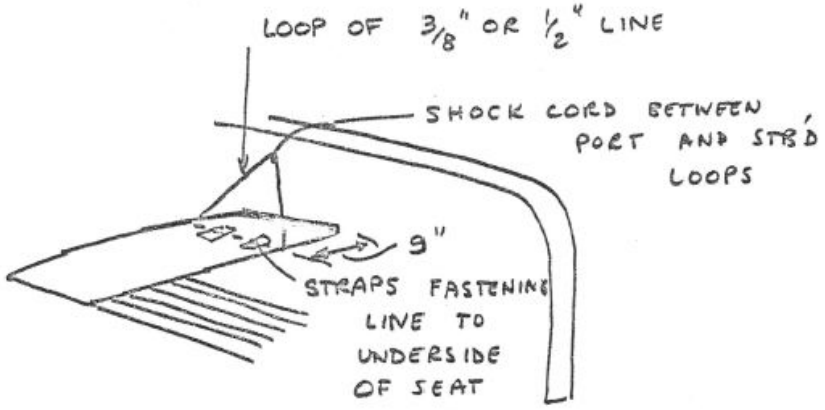

Figure 1-1 Crew Hiking Strap (Campbell et al 1968)

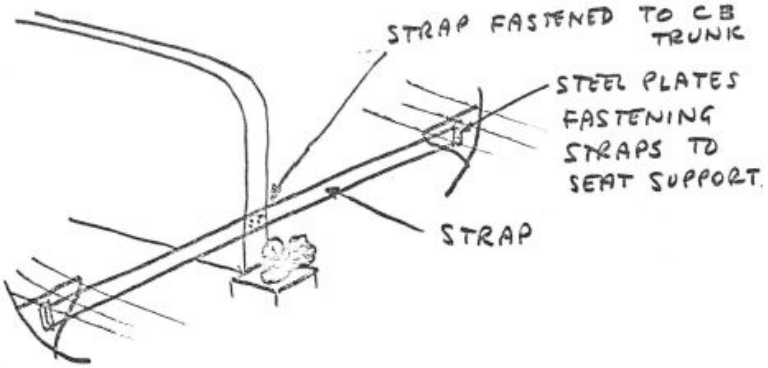

Figure 1-2 Skipper Hiking Strap (Campbell et al 1968)

Required Equipment

There is equipment, while not specifically required in the Class Specifications, is required by the MRA and/or the USSCG and the prudent sailor will maintain the equipment noted below:

- One life jacket for each member of the crew
  A Type 3 sports life jacket is the best since the crew can wear it in hazardous conditions without being too hampered in movement
- Two Paddles
  A Townie goes twice as fast with two paddles with minimal mutiny from the crew.
- Anchor with anchor line
  A 2 ½ lb Danforth type with 4 ft of 1/4" chain and 100 ft of anchor rode should be sufficient for Marblehead waters.

- Towline, readily available and not tangled in knots
  The Towline should be 100 ft in length and 3/8" in diameter. A braid is more expensive than a 3 strand line, but tangles less, so spend the money. (Paddling gets really a nuisance if you miss the tow because the tow line is tangled)
- Bailer
  A windshield washer fluid bottle sliced to make a scoop works great, but tie it in the boat with a long piece of twine.

Gear Stowage

Gear stowage in a Townie usually means dumping the gear in the bilge and letting it slosh around. Peter has a net gear bag in place of the outboard plank on the seat and others have gotten plastic boxes to put forward of the thwart, port and starboard, for the anchor, towline, and misc stuff. Lifejackets can be secured under the deck forward using bungee cord so that they are up out of the way, but readily available in an emergency. The whisker pole can either be thrown up under the bow, hung under the deck with hooks or put in a tube alongside the boom, as is done on fast racers. The boom stowage technique may not be appreciated by the crew after he whacks his head a couple of times, so you won't see many rigs like that.

3. Rigging

Whisker Pole

Class rules note that the whisker pole must not be longer than 7 feet and must not be held by the crew. Other than that, beauty is in the eye of the beholder. Peter has a very nice wooden pole with spring loaded clips on each end for connecting to the mast fitting and the jib sheet. . What is normally seen in the Town Class is a wooden pole with a straight fitting on the jib end for sticking in the jib clew and a hook on the other end to fit into the mast fitting. As long as the pole is no longer than 7 feet and fits onto the mast, anything goes. Everyone please note that Peter whisker pole is only 6'6" in length

4. Hull Exterior

Topside Paint

Topside (between the waterline and the deck edge) paint can be whatever you want to use, but experience has shown that a single part poly paint such as Petit Unipoxy or the equivalent International Brightsides works well. Peter painted his plastic hull approximately 10 years ago and with a good wax job every year, the paint has lasted well. A touch up in spots might be necessary, but that is about all. Be sure to wet sand the sides, both wood and plastic with

440 grit prior to painting. Applying the paint with a roller, then tipping (smoothing) it out with a foam brush will work well.

Bottom Paint

Any good quality ablative paint will work well on the bottom as ablative paints are soft and wash away over the summer, but they only slough off if the boat is sailed, so stay with it. A quick wipe with a sponge along the sides and as far as you can reach under the boat should work for every week racing. For a big regatta, washing the entire bottom and center board by beaching the boat on a sandy bottom and rolling her over by pulling on the main halyard gives a complete wash job for a smooth bottom. Figure 3-1 shows how it's done in the Spring by experts.

Figure 3-1 the making a Go-Fast Bottom with lots of love

Deck Paint

Decks tend to take a beating from the sun, drips of whatever and holes drilled in various places for various purposes. Ralph Johnson says that he uses a "wash" to recolor the deck. What you don't want to do is use a thick paint on the deck as the paint will build up and look horrible. The "wash" that Ralph uses is a heavily thinned paint (>50% thinned) which provides the color and hides the mess, but creates minimal buildup.

Bottom Shape

Townies were designed to have a flat bottom athwartship (across the boat) like a dory and the theory is that the faster boats have a completely flat bottom . The wood Townies have cleats

athwartship across the bottom to keep the planks together and to keep the bottom flat, so typically wood Townies don't have any issues with the bottom not being flat. Plastic Townies suffer from a concave bottom resulting from thin plastic bottoms with no athwartship reinforcing, plus sitting poorly supported on trailers for most of their life. Bart has had good success with filling the bottom with polyester putty and flat boarding (sanding with a long, flat board with sand paper glued on). Bill Key put in athwartship hat sections to reinforce the bottom. There are different opinions on the significance of making the bottom flat for racing speed, so take your choice as to what to do.

Rudder

The rudder on a Town Class sail boat is a low aspect (short and squat) rudder and when dragged sideways in the water to counter a weather helm, acts as a water brake. To sail fast, do not use a lot of rudder as weather helm causes rudder drag and significantly slower speeds.

Some boats will develop a vibration in the tiller when the boat is sailing fast. This vibration is caused by the leading edge of the rudder being not sufficiently faired into a sharp leading edge. The rudder should be faired up to the first pintal (hinge since Townies don't have a true pintal) then back to the rear edge of the rudder. It is important on the leading edge to have a well faired, tapered shape while the trailing edge of the rudder can have a less tapered edge.

Tiller

There are two types of tillers used on Townies: a short tiller and a long tiller. The long tiller will permit the skipper to sit forward at the optimum weight location, but tends to get in the way. A short tiller requires a hiking stick (hinged extension of the tiller which permits the skipper to sit forward or hike or both) for the skipper to sit forward which is easy to use, but sometimes confusing in the heat of battle.

The most important thing about the tiller to remember is to have a retaining pin to keep the tiller from coming out of the rudder head. Most boats have a ¼" metal pin with a hole on each end of the pin for a cotter pin or circular pin. Use a retaining pin….it is awkward to have the tiller come out in a tight situation.

5. Centerboard (CB)

CB Material

A Town Class Center Board (CB) is made of iron, or stainless steel (SS), each with their own advantages: Stainless steel doesn't rust, is usually provided with faired edges but

unfortunately is expensive. An Iron board will rust if not protected, typically does not have fared edges like the SS boards and is cheaper than SS.

Iron boards can be made very serviceable, even the older, pitted boards, by grinding the rust off to bright metal and smoothing the surface with epoxy and micro-balloons. A zinc anode placed near the CB board bolt in combination with the epoxy will stop the rust completely. A grinder can be used to fair the edges for lowered drag, if desired.

A stainless steel board is the most desirable on the basis of maintenance. Put in stainless steel and forget maintenance, except for the centerboard bolt discussed in the following paragraphs.

CB Lifting Pennant

As seen in Peter's model, there are two types of rigging: Vertical where the pennant comes up through the top of the CB box; and Horizontal where the pennant comes through the front of the CB box. The Vertical rig creates problems when the board is down because the pennant wire creates significant drag in the water, while the Horizontal pennant never is exposed to the water flow.

The disadvantage of the Horizontal pennant is that it required more pull on the pennant to hoist the board because the mechanical leverage of the horizontal rig is lower than the vertical rig.

The plastic hulls were made with a hole in the top front of the CB box for a Horizontal pennant, but were rigged with a Vertical Pennant. Changing over is relatively easy using the turning block on top of the CB box. The rig on the wood hulls is anyone's guess, but again, it would be relatively easy to rig a Horizontal pennant.

CB Hoisting Tackle

A Horizontal pennant which as discussed, requires more force to hoist the CB and should have a tackle with a minimum of a 3:1 purchase, as seen in the photograph…..more is better, but you will end up with a lot of line in the cockpit when the board is up.

A 3:1 purchase for the centerboard tackle, seen in Figure 1-2, is adequate for both vertical and horizontal pennant arrangements. Greater than 3:1 purchase would be more desirable for the horizontal pennant as it makes hoisting easier. A cam cleat mounted on the side of the CB box is used to secure the rope pennant.

To help in determining where the CB is in the centerboard box, mark the rope pennant with white tape at the vertical down and half down positions, so that the crew can position the board properly every time.

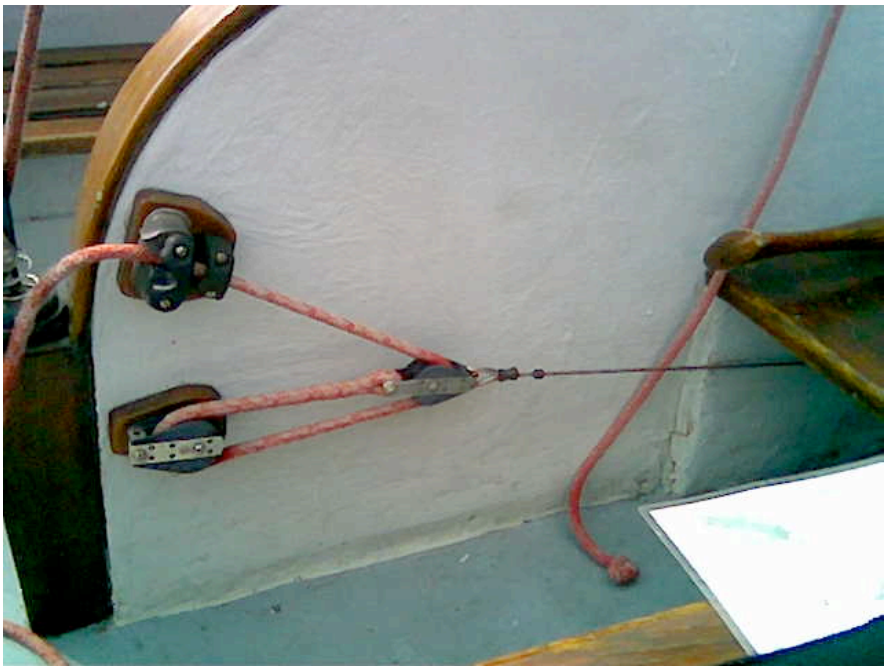

Figure 1-2 3:1 Centerboard Hoisting Tackle with Cam Cleat

CB Bolt

There are three kinds of CB bolts: the right grade of Stainless Steel (SS), the wrong grade of Stainless Steel and Galvanized Iron. The wrong grade of SS has a propensity to experience inter-granular corrosion when matched up with a different grade SS board. The inter-granular corrosion is caused by galvanic action and looks similar to the sample shown at the seminar. This corrosion causes sudden, unanticipated failure of the bolt. A Townie sailor lost his SS CB during the 2012 Nationals as a result of a SS bolt failure. Galvanized iron will wear, but never catastrophically fail like SS. For best longevity in service, match the washer material to the bolt material. The SS boards are Type 316 stainless steel and the bolt must be the Type 316 SS. Be careful as most bolts easily obtainable are Type 18-8 and will corrode as the one Peter showed.

In either case, a periodic inspection will provide a cheap solution to losing your CB. A good rule of thumb would be to pull and inspect the bolt every two years. Those with SS bolts should carefully inspect the bolt for surface corrosion and/or very small cracks. If you suspect any problems, replace it. A CB is expensive.

Pulling the CB bolt for inspection can create issues if the CB is not held in place. If the boat is upside down, the CB can be held with two vice grip pliers while the bolt is extracted. If the boat

is right side up, the CB can be held in place with two belly bands under the boat under which are inserted small wood blocks to hold the CB in place.

CB Spacer Washers (on the inside of the CB box)

The CB trunk opening is significantly wider than the CD thickness so many sailors use several 1/2" washers on either side of the CD to limit the side play of the CB. Getting the CB bolt back in place while holding several internal washers in place is difficult…..to say the least. Peter Maitland has welded the proper thickness washer on either side of his SS CB to hold the washer in place, making insertion of the bolt easier. An alternative to welding would be to epoxy the washers in place, something easier for us average folks. Again be sure to use washers of the same material as the centerboard and the bolt.

CB Bolt Gasket and Washers (on the outside of the CB box)

Leather washers like the Vikings used will work well to seal the CB bolt, but leather is hard to source. Peter Maitland has the correct tools for making the gaskets and has a few spare leather washers for needy sailors. An alternative is a flat rubber gasket approximately 3/8" thick which works as well, but is hard to source. A metal cabinet rubber grommet sized for a ½" center hole works well, lasts a long time and can be sourced at Ace Hardware as well (in the same aisle as the bolt/washers).

CB Flatness

The CB needs to be flat for best sailing performance. All flat, thin pieces of metal tend to warp, either from fabrication, service damage or from stresses in the metal….which is probably why Pert made the CB slot 1" wide….

Recovery of flatness is relatively easy, but don't be shy about it. Two 2x4s place in the right place on either side of the warped area are effective for supporting the board during straightening. A grown man's weight, either stepping or jumping on the board between the 2x4s is effective in straightening a slight bend. A hydraulic jack sometimes is required for those stubborn bends. Don't be shy about using force….you can't hurt it. If you bend it too far one way, turn it over and bend it back.

I (Bill Key) have the original iron board that came with the boat which I have flattened and smoothed with epoxy and micro-balloons…..works fine.