

Rigging Guide Viola 14 Square Head rigs



Rigging the Viola 14 Square Head rig is a very simple affair. As you see in the picture below, just 2 mast sections, 1 fully rigged boom, the sail (which has the full length battens permanently in place and is rolled due to the type of fabric used – Mylar) and a small bag containing the various sail controls.



Preparing the mast

Start by wrapping tape around both bearings on the mast top section until you will have a tight fit when two top and bottom section are slotted together.



Next slide the top mast section in the bottom mast section. Wrap some electrical tape around the joint to make the mast watertight and to avoid the joint being able to pinch the fabric of the luff mast sleeve



Tip: To make the top section water tight, you can either use commercially available plastic caps or inserts, if you can find them in the right size, or simply make some yourself using plywood offcuts. Since you are wrapping electrical tape around the joint, you could omit having a plug in the bottom of the top mast section. I do like to build in some additional security however and have fitted them on both ends.

If making the plugs yourself, cut two rounds the size of the inner diameter of the tube and two other rounds slight oversized in comparison to the outer diameters of the top of the top mast section/bearing at the bottom end of the top mast section. Glue one smaller and one larger round together making sure that they are nicely centred and do the same with the remaining smaller and larger round. Next glue the plugs that you just created in place in the top mast section. Apply varnish (epoxy optional) to protect the plywood. (Below photos are of the top mast of the lug rig that show the end result)



Sleeving the sail on the mast

Next you will need to insert the mast in the luff sleeve of the sail. The fairlead at the top of the mast needs to be fairly small to fit well through the mast sleeve. If you want to use a halyard, you will need to tie the halyard to the fairlead at the top of the mast before sleeving the sail on since the halyard runs in the luff sleeve. An easier alternative is to simply tie on the sail to the fairlead in the top of the mast directly (this also saves you from installing a horn cleat to the bottom mast section).



An easy method that ensures that the sail is always positioned correctly in relation to the boom is to use a loop of Dyneema rope and a large rope stopper as you see in the photos.

Using a cow hitch, tie the loop to the fairlead. Next pull both strands of the Dyneema loop in a loop through the head cringle and pull the rope stopper through this loop. Pull on the bottom of the sail to tighten the loop. All is now nicely secured at the top end of the sail.



The length of the loop replacing the halyard should be so that the foot of the sail is positioned appr. 100mm above the top of the boom before applying any downhaul tension.



Tip: The Viola 14 square head sails come with one reef. If you are going to reef the square head sail, you will most likely not be doing this on the water, so a halyard is not really needed like for the lug rig. Simply make another longer rope loop with a rope stopper for the reef.

Stepping the mast and hanging the boom in place

The next step in rigging your Viola 14 canoe is to step the mast.



Attach the vang/kicker to the mast by clipping the bottom end of it with a carabiner or a quick release shackle to the stainless steel ring on the mast.



Tip: The webbing is wrapped tightly in a figure of 8 around the mast section with the ends sewn together. The webbing nicely distributes the forces over the front and back end of the mast and avoids large forces being applied to the rivets directly on the stainless steel eye strap. One could also substitute the webbing by Dyneema rope.

Next you will need to get the boom in place. Attach the topblock of the vang/kicker to the boom with the carabiner and insert the pin of the gooseneck in the front end of the boom. Tighten the vang/kicker some to avoid having the boom sliding out of the gooseneck pin when the clew is attached to the boom.



Hang the clew hook at the back of the boom in the eye in the clew.



The saddle for the webbing for the kicker/vang attachment point is located just above the mast partner when the mast is put in place in the mast step. The center of the boom pin of the gooseneck is located exactly 750mm from the bottom of the mast.

A pre-rigged boom is nice since it is so quick and easy to rig and derig the boat. A couple of pages down you will find a complete description on how the outhaul is rigged as shown in the photos.





Saddles are mounted on the top of the boom. For the mainsheet and kicker/vang, there are rope loops going around the boom which are kept in place by the saddles. The carabiners for the main sheet and the vang/kicker are clipped to these rope loops using small carabiners. The rope loops distribute the forces over a larger area on the boom and avoids putting much strain on any rivets/bolts/screws.

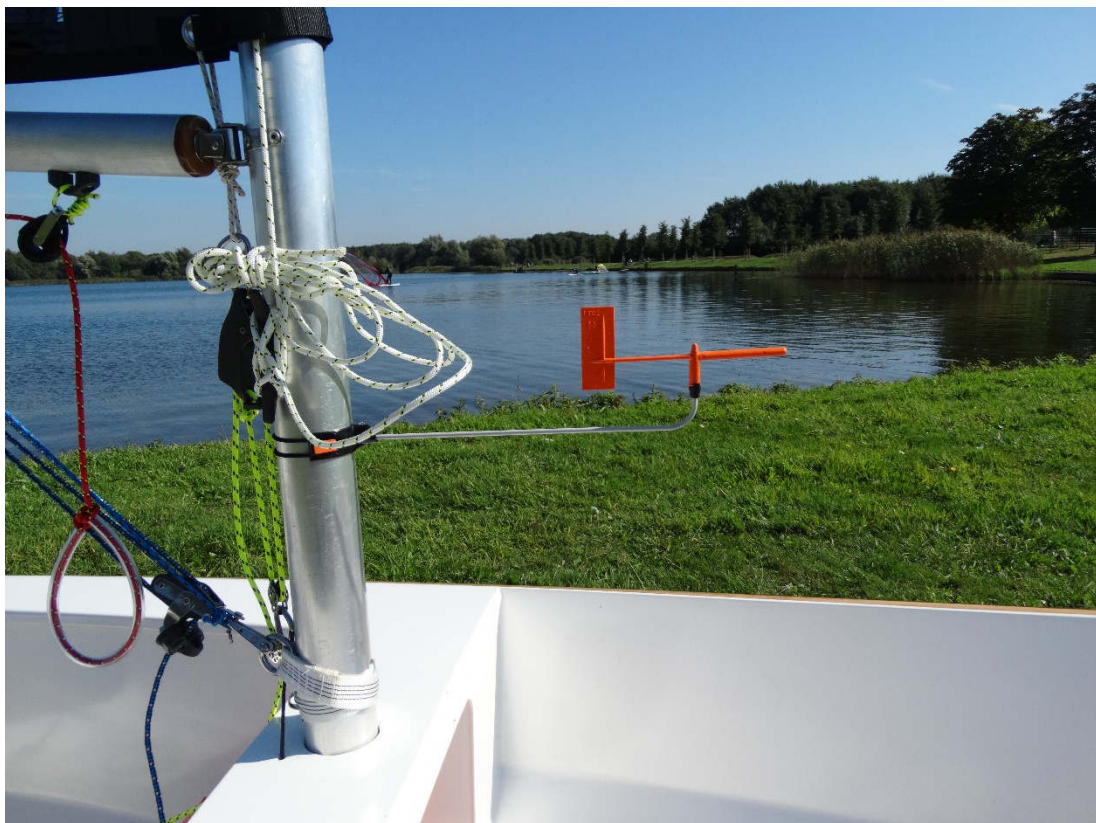
There are 4 saddles in total on the top of the boom as follows:

1. One saddle is located as much back as possible on the boom to attach the pre-lead line of the outhaul to.
2. The center of the saddle for the mainsheet is 820mm from the front of the boom.
3. The center of the saddle for the kicker/vang is 500 mm from the front of the boom.
4. The saddle for the outhaul turning block attached at the front of the boom is where the wooden plug ends (appr. 100mm from the front of the boom). More detailed photos of the boom and outhaul further below!

On the bottom of the boom a clam cleat with becket (Racing Junior Mk1 with Becket CL704AN) is fitted for the outhaul control line.



Tip: the gooseneck can either be a type that allows the boom to swivel to either side of the mast (typically 90 degrees) OR a type where the pin only goes up and down but not starboard-port forcing the mast to turn in the mast step / mast partner when the boom goes in or out.



If using the first type, it may be beneficial to ensure that the mast cannot turn in the mast step since otherwise there will be a lot of strain on the fitting (the mast has the tendency to turn in the mast step due to the forces on the sail that are transferred by the boom to the gooseneck forcing the mast to turn – when sailing on the other tack the boom will then put large forces on the gooseneck rivets since the pin is not in the middle of the boat any longer). Tie in a figure of eight in the mainsheet to avoid the boom from going out more than 90 degrees if using the first type.

With the second type, the boom can go out further than 90 degrees allowing sailing by the lee. Always tie the end of the sheet to the boat however. Also it may be beneficial to use a plastic of some sort, like the Teflon mast discs sold for the Laser 1, in the mast step to avoid wear and tear.

The gooseneck used with the aluminium boom visible in the photos is of the first type. The gooseneck with the carbon boom visible in the photos is of the second type (replica Laser gooseneck).

Attaching the mainsheet and downhaul

All that remains to be done now is attaching the main sheet and the downhaul (cunningham). Shackle on the bottom block of the mainsheet to the rope bridle at back end of the dagger board case (more detailed photos further down).



Next attach the top block of the mainsheet with a carabiner to the rope loop going around the boom for that purpose and tie the aft end of the main sheet to the boat (or put a figure of eight in).

The downhaul is easily fitted in place by having a carabiner on each end. One end clips in a rope loop fitted just aft of the mast. The other end clips in a rope loop in the tack of the sail. The downhaul prevents the mast from popping out of the mast step (for example during a capsize) so some tension is always needed. Do not go big on the downhaul however; first use the vang/kicker in stronger winds and only apply more downhaul tension if the wind is really piping up.

Outhaul

The outhaul fitted allows quick and precise adjustments to the depth in the bottom part of the sail. The maximum depth is pre-set by having a roper stopper in the control line (red line in the photos).



The outlook consists of a 3mm Dyneema pre-lead line and a 4mm Dyneema control line. The pre-lead line runs from a saddle fitted on the end of the boom to a single block fitted in the clew of the sail to a cheek block on the end of the boom ending in a single block. The control line consequently runs from a becket in the clam cleat to the single block attached to the end of the pre-lead line mentioned above, through the clam cleat to a single block mounted at the front of the boom.

This means a 1:2 cascade running into a 1:2 cascade so a total purchase of 1:4. Elastic is fitted on the top of the boom between the clew (hook) and the saddle to which the the kicker/vang is attached, pulling the clew forward when the outhaul is released and thus helping to get depth in the sail immediately.

All sail controls are within easy reach of the helmsman. One could lead the controls back to the sides of the boat, but this would require more fittings taking away some of the minimalist approach, it would take more time to rig/derig the boat and you will have some hard fittings on the decks which may get in the way if the boat is used for paddling or when sailing with a passenger.

One final thing to be fitted is the wind indicator. The one you see in the photos is kept in place on the mast by an elastic band.

Final tips

Some final tips:

The controls can be simplified some to diminish costs:

- 1. Omit the halyard and simple use a rope loop with stopper to attach the head of the sail to the top of the mast.*
- 2. A traditional (old type) 1:3 style Laser vang/kicker would work quite well and is much cheaper.*
- 3. The downhaul is as simple as it gets and not much money to save there.*
- 4. The outhaul can be simplified by leaving the second cascade in the system out, so no primary line in the system followed by the control line but just the control line that runs from the saddle on the aft end of the boom to the clew to a cheek block on the aft end of the boom through the cleat mounted on the bottom of the boom just in front of the mainsheet attachment to a block tied to the front end of the boom.
More than enough purchase really; the advantage of having a second cascade in the system is that it is easier to precisely set it.
Even simpler would be to have the control line run from the saddle on the aft end of the boom to the clew to a block tied to the saddle on the aft end of the boom through a cleat mounted on the top of the boom appr. a foot or so forward from where the clew is positioned.*
- 5. Rather than using the clew hook, one could also have the dyneema rope loop with stopper go directly through the eye in the clew. You would lose some however when looking for ease of rigging and derigging the boat. (So in the below photo you would omit the clew hook)*



- 6. The bottom fiddle mainsheet block has a ratchet bottom sheave and ball bearing top sheave. You can easily build one of these from 2 separate blocks to save some money: the bottom part of the block would consist of a ratchet block with becket, the top part would consist of a smaller sized single block that is tied/shackled to the becket on the ratchet block. Use some wounds of electrical tape to make for a stiff assembly.*

7. The blocks in the photos are ball bearing blocks. One could also use simpler cheaper non-ball bearing blocks of a larger diameter than required for the diameter of the rope to still get some decent action (i.e. low friction), so for example blocks suitable for 6mm rope using 4mm rope only.

Booms are easily made from a simple aluminium section as for the mast. Another option is to (re)use the bottom part of a carbon windsurfer mast. This will save considerable weight. Attaching the various attachment points will require more attention though since you cannot simply rivet Monel rivets in the carbon section. A carbon plate is cut from an off cut of the carbon section to which the saddle are bolted using stainless steel bolts, rings and locking nuts on the inside of the carbon plate. Cut off any part of the bolts sticking out of the nuts. Next some oversize holes are drilled in the carbon tube in which the nuts just fit. Lastly the plate with the saddle bolted in place is glued on the boom with epoxy glue. The same method is used for attaching the clam cleat to the boom.



Obviously you can also make a wooden boom (either a T-shaped one or a boom with 4mm plywood sidewalls and timber top and bottom). The sail is loose footed which means that the boom will need to be reasonably stiff, also because it is sheeted centrally.

If having both the larger and the smaller square head sails, it makes sense to have just one boom that fits the larger sail and to use a rope loop attached to the clew hook (or the clew of the sail if not using a clew hook) of the smaller sail and the block for the outhaul to make up for the difference in foot lengths. This will save having to fit out two booms and obviously costs. (The light grey rope in the photo below between the clew hook and the shackle on the small single block is this rope loop)

For the reef you can use the same trick to ensure you have the same foot length and you can still use the adjustable outhaul when reefed.



The individual controls:

1. Halyard (if used). The halyard is attached the same way to the top of the sail as the short rope loop with stopper shown further above (obviously only 1 strand to create the attachment in the head cringle rather than 2 if using the rope loop):



2. Downhaul - this system is 1:3 and used the clam cleat trapeze/vang block, 2 single blocks, 2 carabiners and 1 x 4mm control line. The handle is made from a piece of plastic tubing:



3. Outhaul: Please see the detailed pictures above under pre-rigged boom.

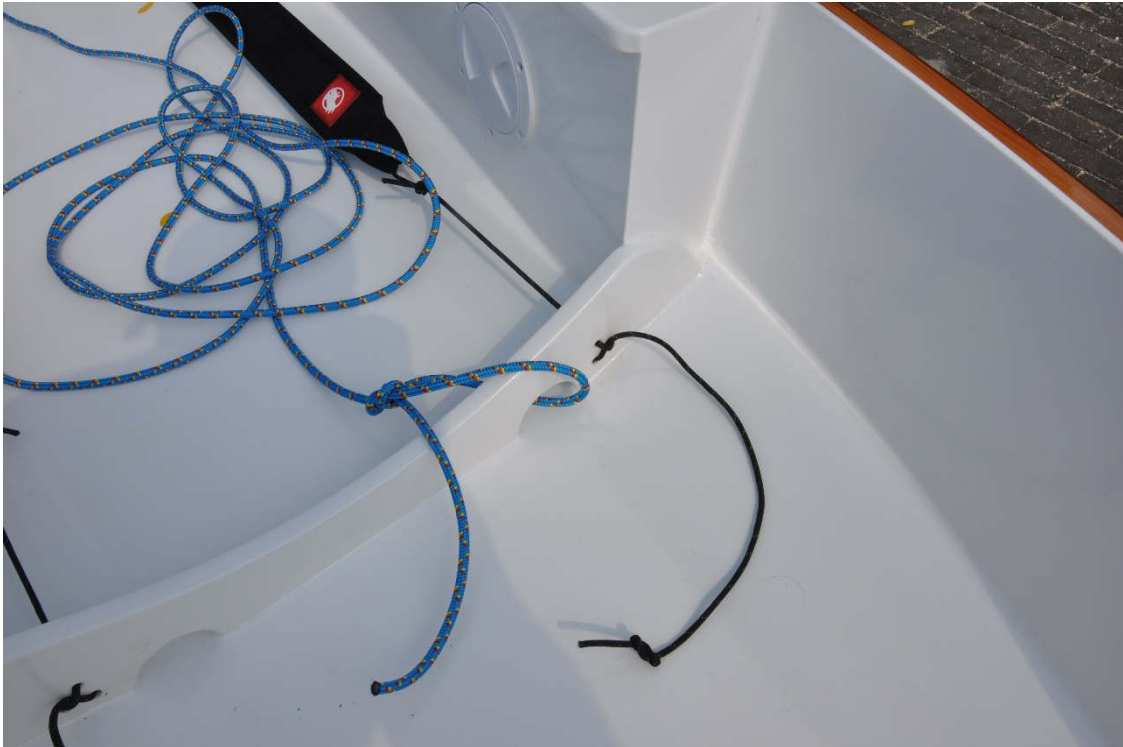
4. Kicker/vang – this system is 1:6 (1:2 cascade running into a 1:3 cascade) and uses a fiddle block with cleat, 2 carabiners/shackles, 2 single blocks, 1 x 3mm pre-lead line and 1 x 4mm control line:



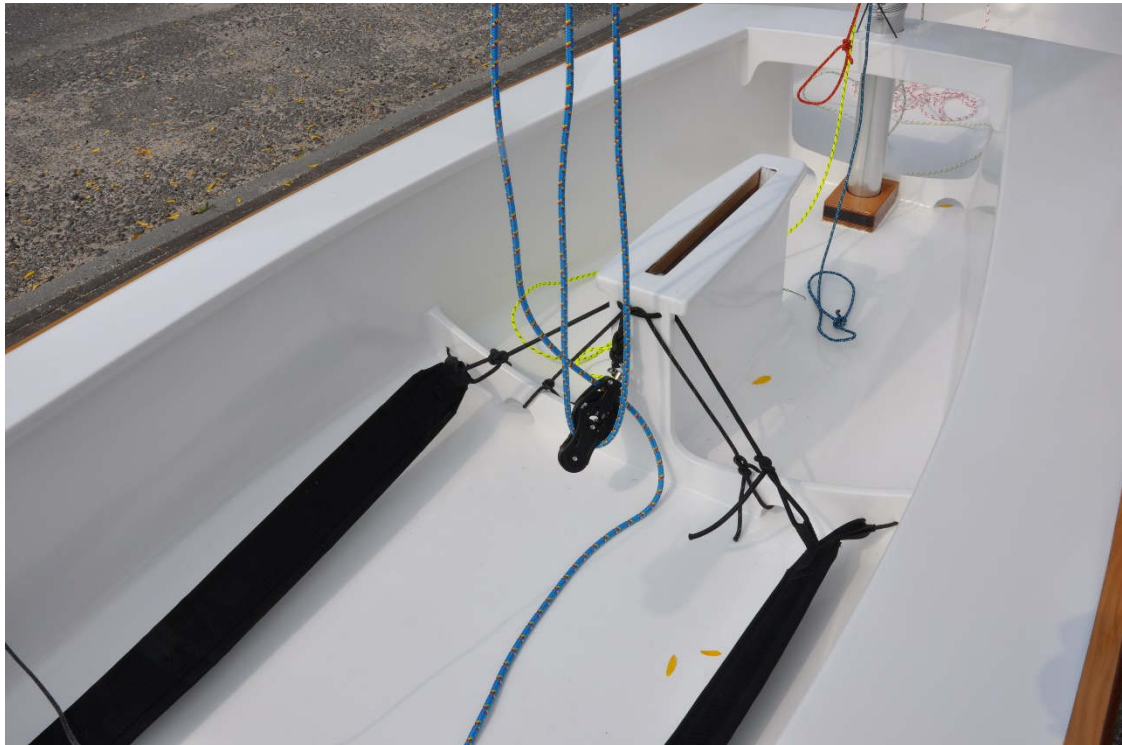
5. Mainsheet – this system is 1:3 and uses 1 fiddle block (lower block is a ratchet block) with shackle, 1 single block with becket, 1 carabiner and a 7mm mainsheet:



6. Leaning straps adjustment. 3 holes are drilled in the aft link frame through which the tails attached to the leaning straps is fed as visible in the below photo. This allows easy adjustment of the leaning straps (much easier, faster and precise in comparison to using saddles and knots bolted to the aft frame, very lightweight and strong and soft):



7. The front end of the hiking straps are attached to a rope lope fed through 2 holes drilled in the mid frame. Further down there is another more detailed photo.



The front end of the hiking straps are lifted off the sole by 6mm elastic that is fed through 2 holes in the mid frame next to the dagger board case. The elastic also keeps in place the top end of the rope bridle that is knotted to the limber holes in the mid frame. All soft attachment points, cheap and easy.

Rudder, rudder downhaul and uphaul

The rudder downhaul is necessary to keep the foil down. The uphaul is optional; not really necessary when just using the boat for sailing since the foil will float up nicely (after all it is all timber with some glass!), but necessary for when using the boat for cruising and having to paddle (when paddling hard the rudder will start to steer the boat which is annoying).

Insert the rudder blade in the rudder stock so that the holes in the rudder stock and the hole in the foil taking the bolt line up. Insert the bolt and put the nuts on. Use big washers on the outside of the bolt to distribute the forces over a larger surface.



Do not overtighten the nuts on the bolt, just tighten them up by hand. If using 2 nuts on each end, one can tighten these against each other using spanners and this will avoid them coming loose. Use cap nuts on the outside to avoid having any sharp bits.



The downhaul ends up in a clam cleat. One could use a auto release clam cleat if afraid for hitting something with the rudder unexpectedly (SD-002570 Auto-Release Cleat). The rudder is not very deep though, but make your choice in accordance with your specific needs.



In the photos the downhaul consists of a 3mm rope with Dyneema core pre-lead line and a regular polyester 4mm control line that stretches. Due to the stretch in the downhaul control line it is easier to tension the downhaul and to get it out of the cleat again.

To obtain the correct position for the hole in the rudder for the downhaul attachment, rotate the board in the cassette until the leading edge of the rudder passes the aft bottom corner of the rudder cassette. Mark this place and drill the hole just below this mark to ensure that the downhaul attachment point will clear the rudder cassette when the rudder rotates in its case. Obviously you will need to drill the hole 20mm or so from the leading edge.

It would be wise making an epoxy bushing for the downhaul attachment hole which is very simple to make as follows: (i) drill the hole oversize first, (ii) fill the hole with epoxy glue using packaging tape on the other side and (iii) only then (when the glue has hardened) drill the final 4mm hole necessary for the 3mm pre-lead line. This avoids any potential water ingress.



The rudder uphaul is a very simple affair on the Viola 14 canoe. A hole is drilled in the rudder head aft of the centreline of the foil and a rope is attached to this hole by a simple knot on the opposite side of the where the clam cleat for the uphaul is located (please refer to the first photo on the rudder and its controls above for the exact location of the hole in the rudder head). Obviously the same comments apply in respect of making an epoxy bushing for the uphaul attachment hole.



The rudder uphaul runs directly to the clam cleat. Very simple and it works great.



A 900mm long tiller extension is suggested mounted right at the front of the tiller.

Daggerboard

The dagger board can tilt back in the dagger board case some to accommodate different rigs having different centers of efforts. To take up the play between the foil and the case, use Jap tape, carpet, felt strips etc. inside the dagger board case at the top and bottom. If the fit is just tight enough, the friction will keep the board in the desired position whilst being able to slide the foil up and down.

Alternatively, some elastic can be used to keep the dagger board in the correct position.



The above photo shows an elastic loop going around the front of the dagger board case, then in between the elastic at the back of the dagger board case which is lifting the leaning straps of the cockpit sole and keeping the mainsheet attachment point at the back of the case (please refer to the next photo), and finally going around the leading edge of the foil to keep the dagger board vertical against the back of the case.

A piece of plastic tube reduces friction when pulling the foil up or pushing it down.



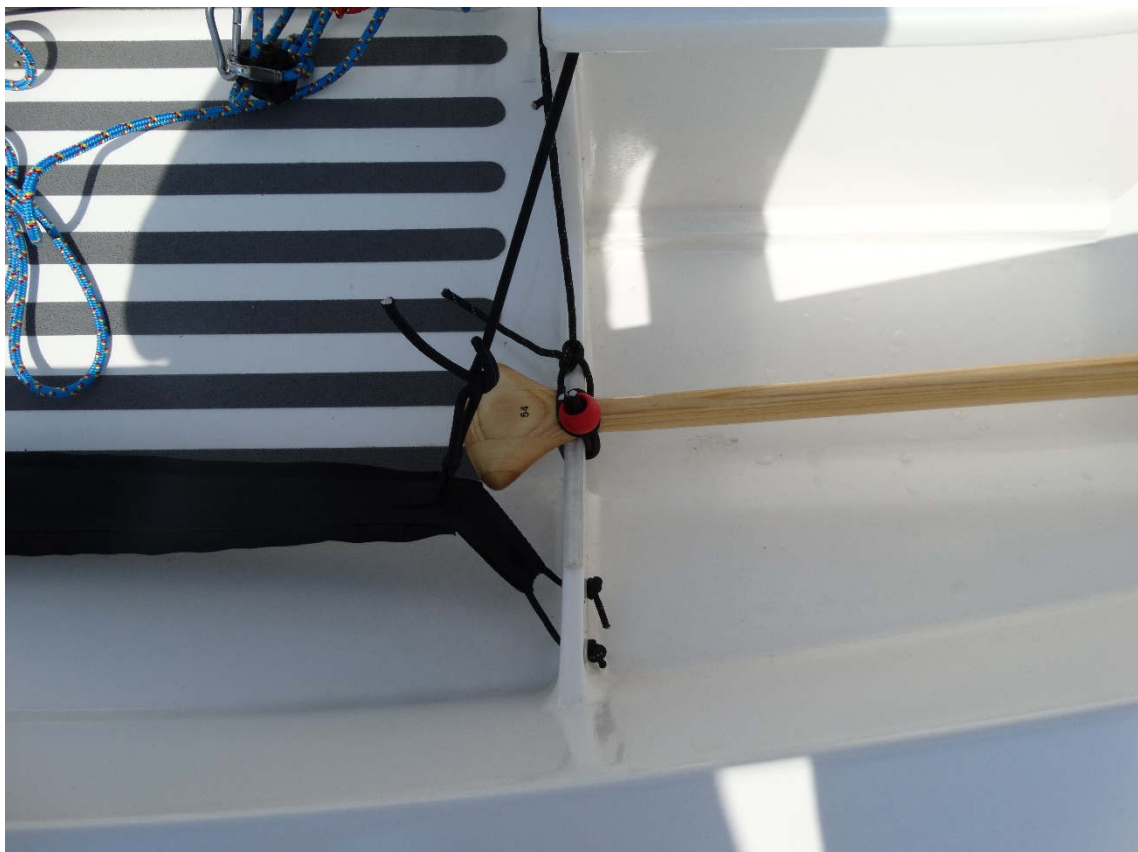
If the dagger board is to be tilted back (like on the large fathead sail), an elastic between the handle on the daggerboard and the attachment ring on the mast for the downhaul/vang will keep the foil in position.





The plastic hook allows for quick (de)rigging.

Paddle



A paddle is easily secured to the boat using 2 elastic loops and the limber holes in the front frame and the mid frame of the boat. Again rope stoppers are used on the elastic loops that thus quickly fasten around the limber holes and the paddle. To avoid losing them when not fastened up, the elastic loops can be kept in place on the limber holes using some Velcro.

Carried like this, the paddle is stored out of the way of the helmsman and within easy reach.

Useful links

www.storerboatplans.com – here you can find links where to purchase the Viola 14 canoe plans as well as much other useful information about building, maintaining, sailing, transporting and storing the canoe.

[www.facebook.com](https://www.facebook.com/storerboatplans) – you will find the storerboatplans group on Facebook with lots of information regarding the boat (including many photos of the build the boat underway).