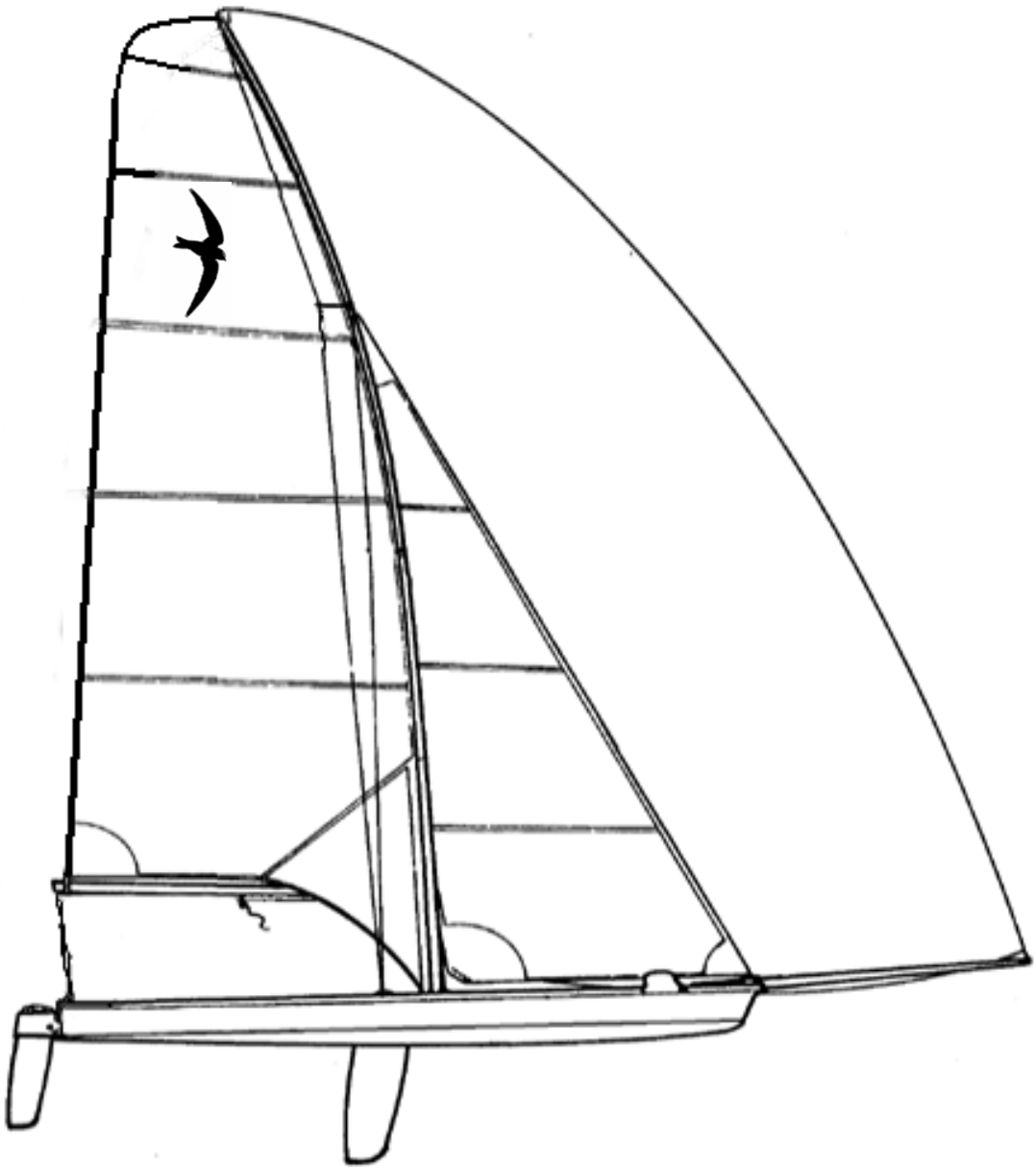
Rigging guide for the Swift Solo Volume 1 (mostly boat rigging)



Thanks to Greg Ryan for the drawing

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Preface and Safety

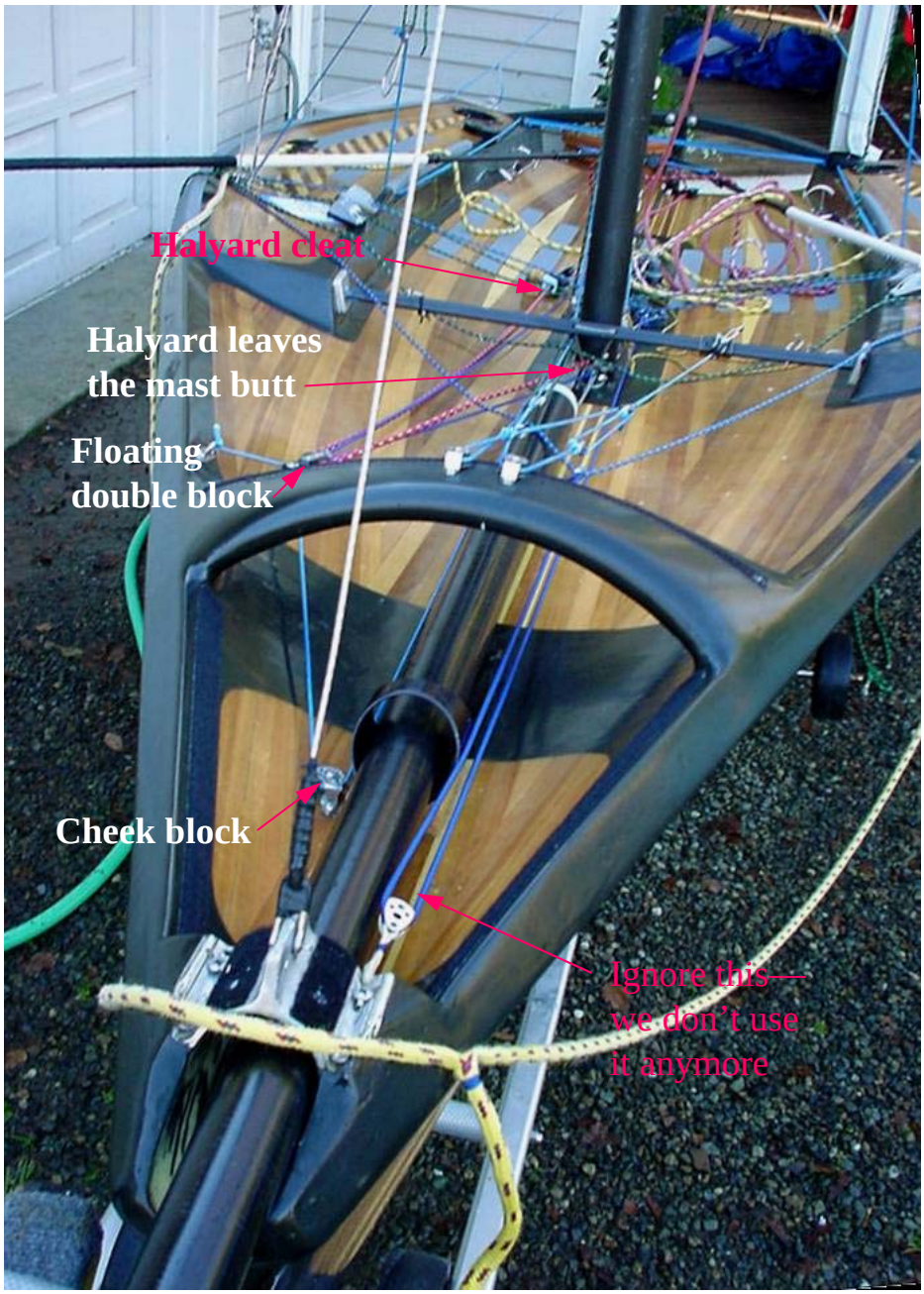
- This manual is intended to help you get your Swift Solo systems running smoothly and to save you some money if you want to rig your own mast and boom.
- **The parts and methods shown are only recommendations and not class requirements. Expect the highly innovative minds of our class to improve both the parts and the procedures for making them over the next several years.**
- You are getting close to the day when building will end and sailing will begin—at least until next winter. This is a good time to talk about safety.
- Several "Do's" and "Don'ts"
- Do:
  - Always wear a wetsuit (or drysuit) and a life jacket. The wetsuit will provide some body protection as well as protection from hypothermia.
  - Sail only when someone else is in the vicinity that can help you if you become disabled.
  - Maintain the water integrity of your air chamber.
  - Keep your main and jib halyards where they are easily accessed in the event that you need to lower the sails.
  - Have a plan in your mind for using the spinnaker sheets as a tow line.
  - Be prepared to accept this boat as a challenge. It will take several days on the water to cross the threshold from fear to fun. If you stick with it, you will cross that line quickly.
  - Read the "how to" instructions on the website (to be published by March of 2004)
- Don't
  - Go sailing is heavy winds until you've worked your way up the wind scale by sailing regularly in lighter air. If you are determined to push your personal limit, have a rescue boat go out with you and wear a helmet.
  - Go sailing without checking all fittings and shackles to determine that they have remained tight.
  - **Sail this boat if you have a serious heart condition. You will be pushed over your anaerobic threshold many times during the learning process as you work up the wind range.**

Quick line measurements you'll need

("raw" means cut the piece that long to start with—splices will ultimately make it shorter)

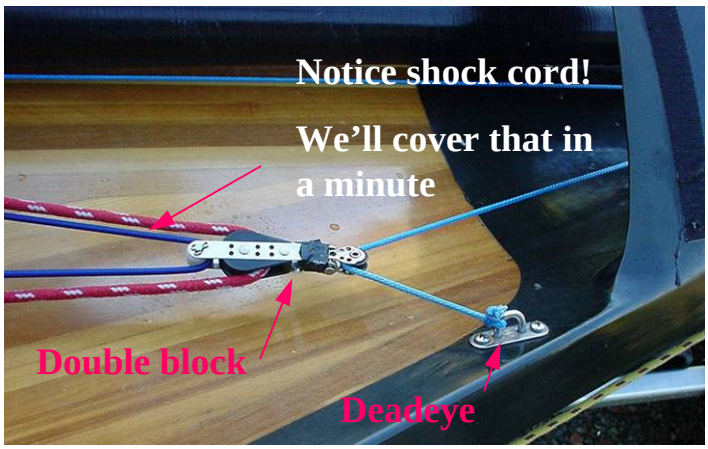
- Spinnaker sheets 38 feet
- Mainsheet (Maffioli) 14 feet, lightning rope raw = 31 feet (mark and fork at 23 feet and 8 feet)
- Main halyard raw 21' 2" long eye and splice takes 9"
- Main halyard tail raw 20'
- Jib halyard raw 15' 6"
- Jib halyard tail raw 13'
- Trapeze "wires" raw 14'
- Spinnaker halyard raw 65' with 40' of cover
- Cap shrouds raw 265"
- Primaries raw 176"
- Lowers raw 60"
- Transom bridle raw
-

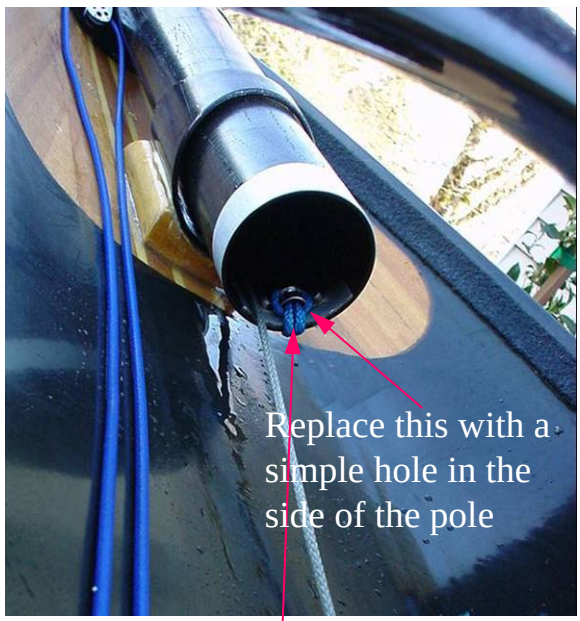
Spinnaker pole launcher and halyard system



The spinnaker pole on the Swift is launched automatically when the halyard is pulled to hoist the spinnaker. The pole is retrieved by the tack tag line which pulls the pole inward with the tack of the kite as it is pulled back into the spinnaker sock

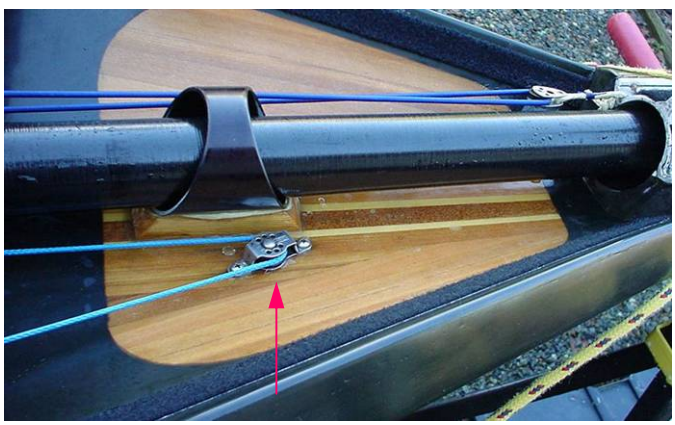
Pole launching portion of the Spin halyard





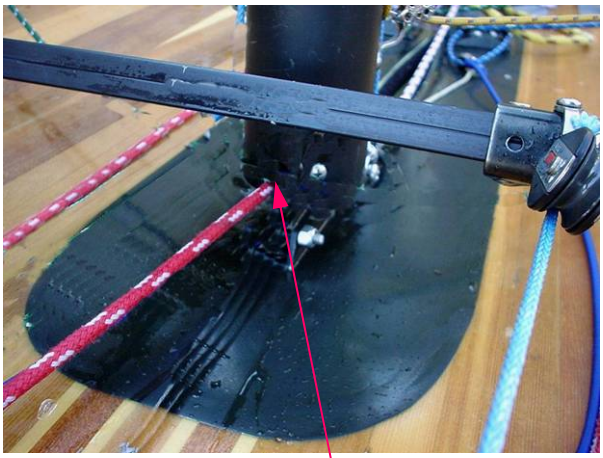
Starting at the dead eye just aft of the launcher on the starboard side the line goes through the special floating double block and then turns forward to the cheek block shown in the picture below. It then goes to the inboard end of the pole as shown in the picture on the right.

As an alternate method, you can simply drill a small hole about a half inch from the end and run the line thru and tie off with an figure eight knot (to keep it from pulling through)



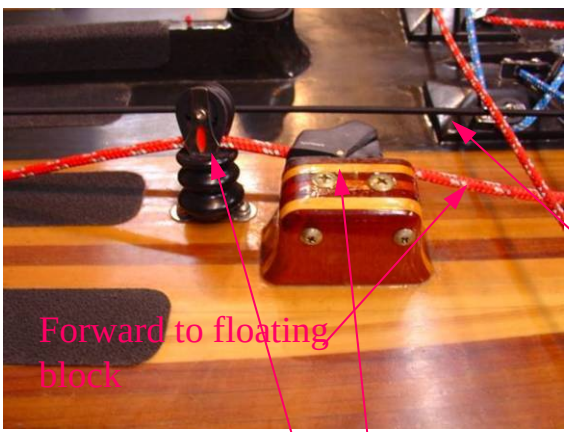
Here you see the cheek block where the lines turns aft to the aft end of the pole (above right)

Spin halyard



The spinnaker halyard leaves the front of the mast and goes forward to the floating double block (picture to the right)

The halyard then goes aft to the cleat and the hoisting block (below left)



After the halyard leaves the hoisting block it goes to the transom floating block (picture on the next page). The relative location of this cleat and the hoisting block must be precise

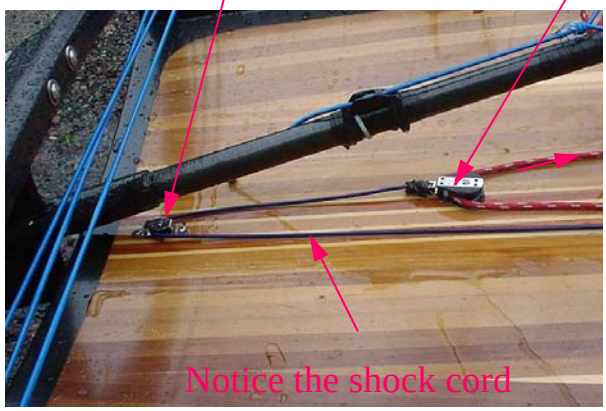
The relative position of the halyard cleat and the sheave is critical. This system cleats and un-cleats automatically when you hoist and douse the kite.

Notice the shock cord headed aft to the transom cheek block and then to the transom floating block

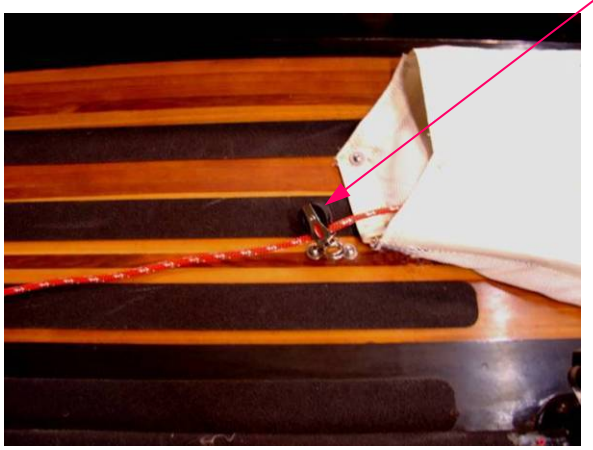
Spin halyard

Transom cheek block

Transom floating block

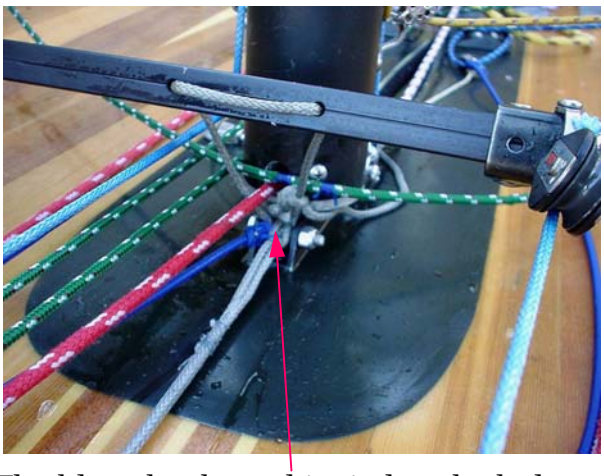


From the floating block the halyard goes forward to the retrieving block (below).

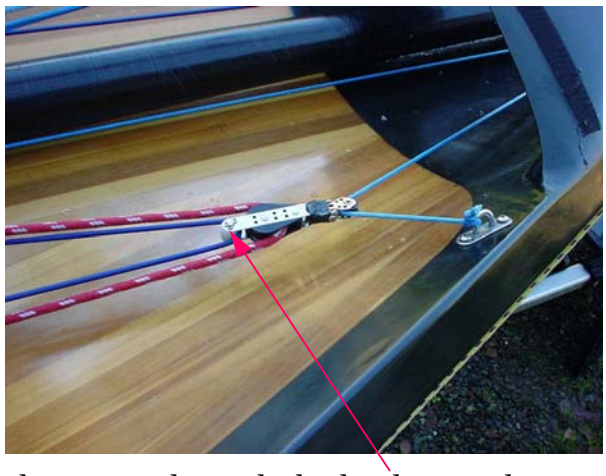


Here you see the retrieving block and the halyard entering the spinnaker sock. The halyard goes through the spinnaker sock and attaches to the spinnaker retrieval patches.

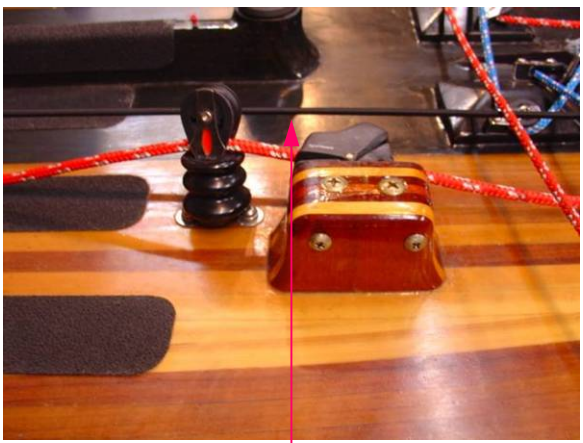
Spin halyard shock cord



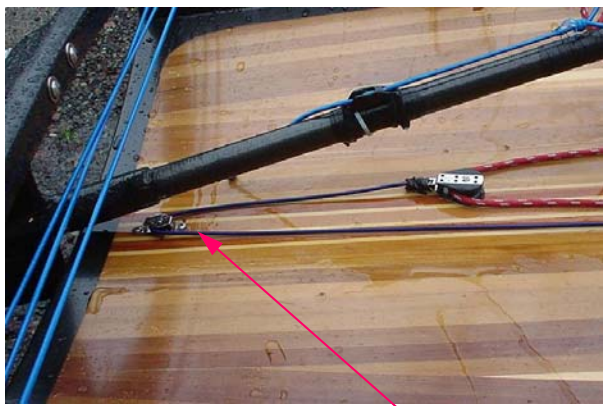
The blue shock cord is tied to the bolt in the mast step (forward of the mast).



It then goes through the becket on the big double floating block and goes aft.



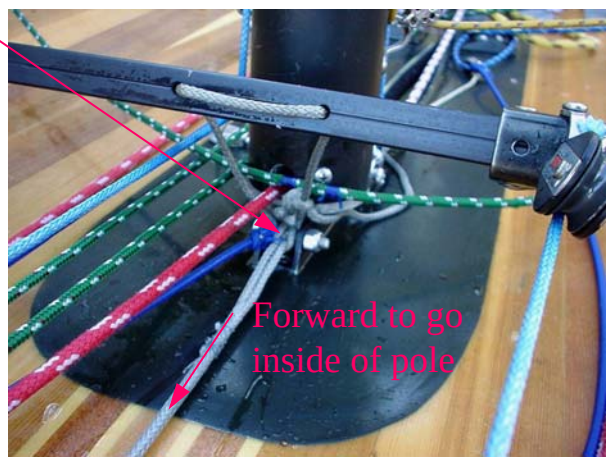
Here you see the shock cord passing the halyard cleat and continuing aft.



Here you see the transom fixed cheek block where the shock cord turns forward and ties to the floating block.

Spinnaker pole tag line

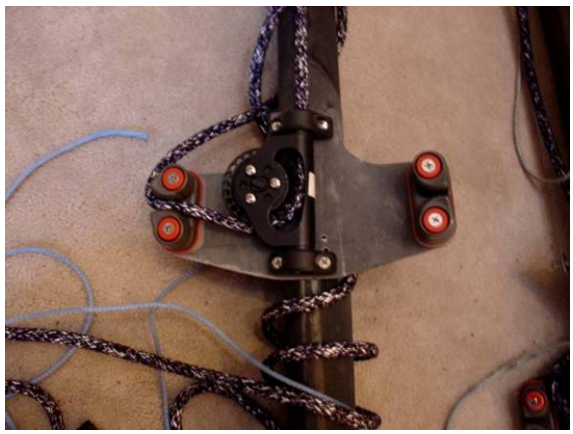
This line ties to the tack of the spinnaker and goes through the center of the pole aft to the bolt at the mast base. That's all there is to it



Main/jib sheeting system

You have one of these cleats on each side of the boom as shown below.

This is where it starts. The main/jib sheet (we'll call it the main sheet) is hanging from the cam cleat on the other side. You can see the mainsheet going forward where it will enter the boom below

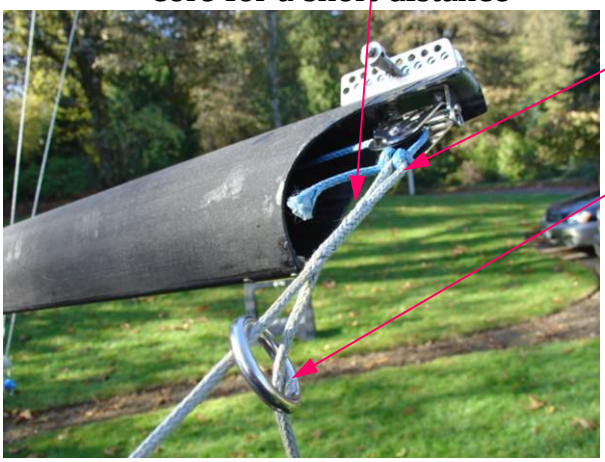


This is what this cleat and block look like from below. You will find construction instructions later in this manual

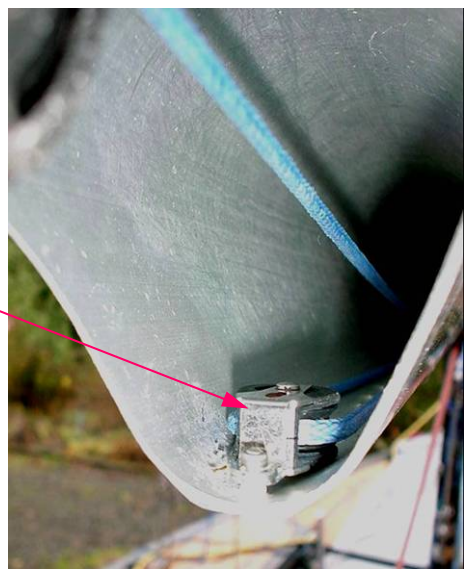
Here you see the mainsheet entering the boom through the thru deck block. After entering the boom the sheet splits in two. One of the 1/8th inch sheets goes to the end of the boom, through a swivel base block and to the mainsheet bridle where it is tied off.

Sheeting

This eye spice is made by inserting each end inside the core for a short distance



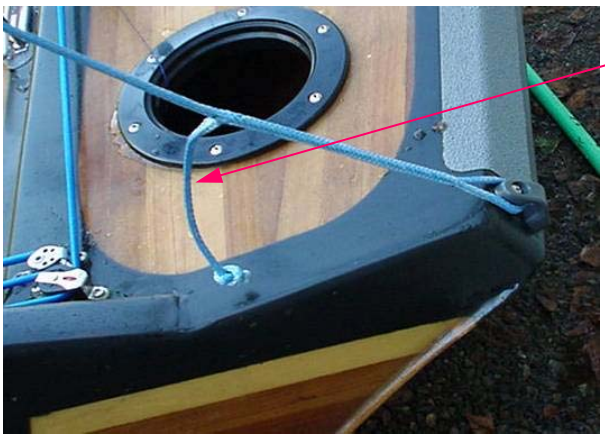
The mainsheet where it exits the swivel base block and ties to the bridle. Notice the stainless ring that acts to keep the slack side of the bridle out of the water



Here you see the cheek block on the outer end of the boom for the jib sheet. The jib sheet turns back forward to the front of the boom

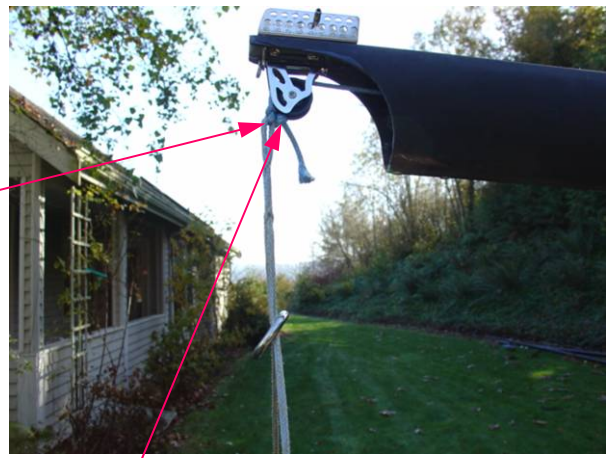
After leaving this swivel base block the jib sheet goes to another swivel base block on the deck at the foot of the mast (this is an old style aluminum boom)

Mainsheet bridle



When you splice the bridle terminal keep the tail long and leave it outside. You now have an adjustable bridle that is easy to deal with. This is a good thing on most of you eye terminals

A very simple and effective knot that you should use in place of a bowline most of the time is the “skiff knot”. Simply tie an overhand knot if the end of the line, then tie another overhand knot cinched up to the first knot. This is an easy knot to untie and uses a minimum of distance.



Here you see the first overhand knot. See next page for instructions.

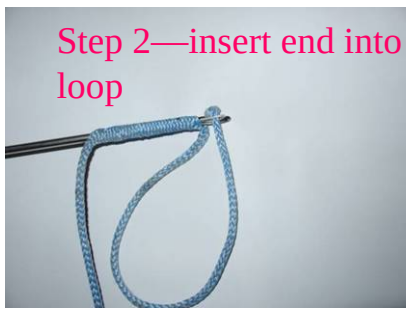
Tying the skiff knot

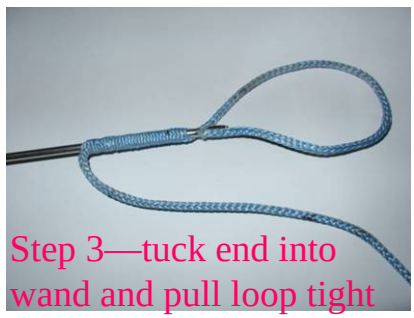
This is a knot that you'll learn to trust and use most of the time in place of a bowline. It is also the best way to terminate shock cord

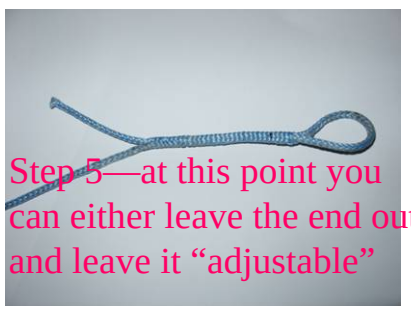
Splicing the single and double tailed eye splice

No skiff sailor should be without this splicing wand (you can get it from Fisheries Supply. It is for 3/16" to 3/8" rope but it works great for 1/8" Lightening rope or PBO

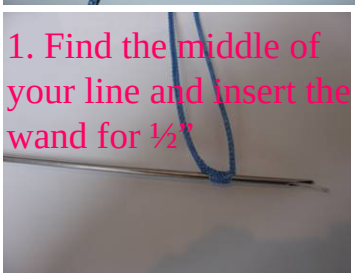
Single tailed eye splice (typical)

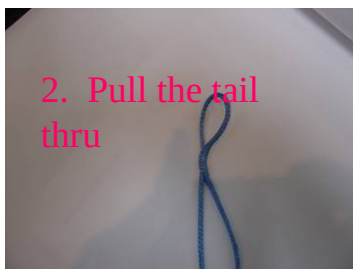


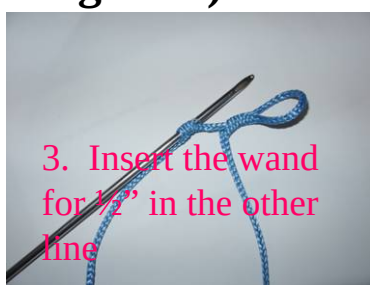


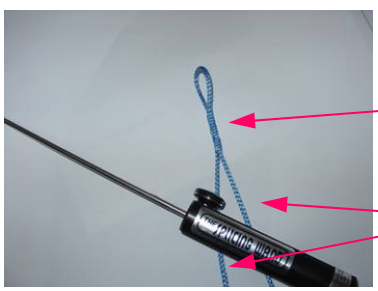


Double tailed eye splice (used on the transom bridle and righting lines)









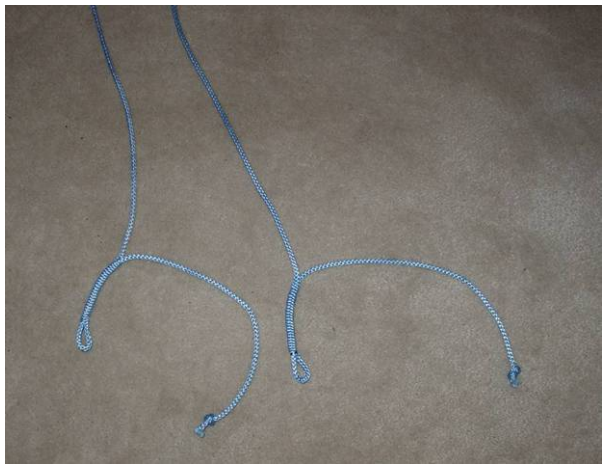
4. Pull the other tail through and the two splices tight

You can now pull on either tail without the splice slipping

Mainsheet transom bridle

Cut a piece of lightning rope 11 feet long and put a double tailed eye splice in the middle. From the top of the eye splice measure down each leg 40, and 46 inches and make marks. Insert the wand in the highest mark and exit at the 46 inch mark. Pull the tail through and put knots in the end to keep the from pulling through.

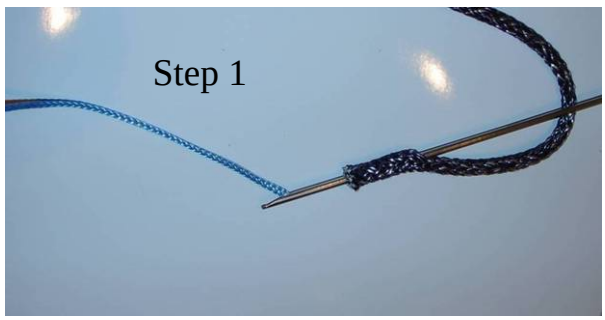
Double tailed eye splice

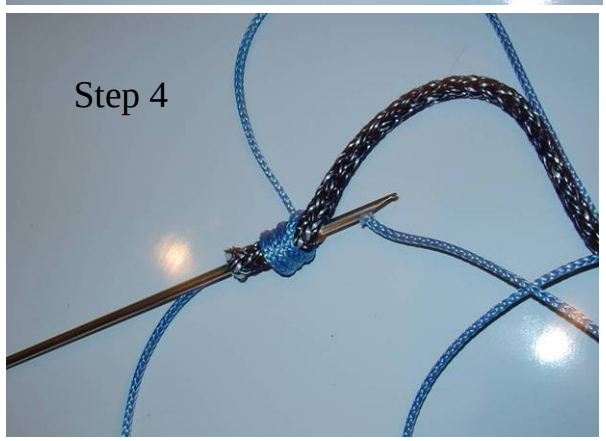


Single adjustable eye splices allow you to adjust the bridle length. When sailing the lower leg should never be tight except in very light air (or when pinching someone off your weather quarter after the start).

Making up the mainsheet

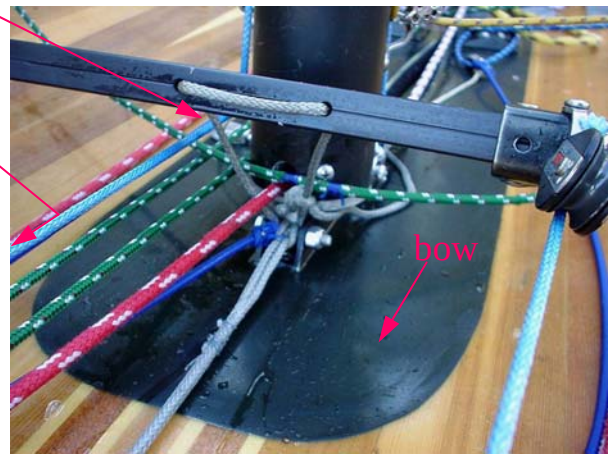
Start by burning the end of the Mafioli to keep it from fraying. Insert the wand about 2” and pull 8 feet of the 31 feet of lightning rope through. Make 4 loose wraps and pull the end back through from the opposite side of the Mafioli. Work the loops up tight while pulling both ends. Use heat shrink tubing to cover the splice. A 14inch strap with a loop in one end is used to attach the mainsheet and vang to your harness. The Velco closure allows it to come free with any significant amount of pull.





Jib sheet

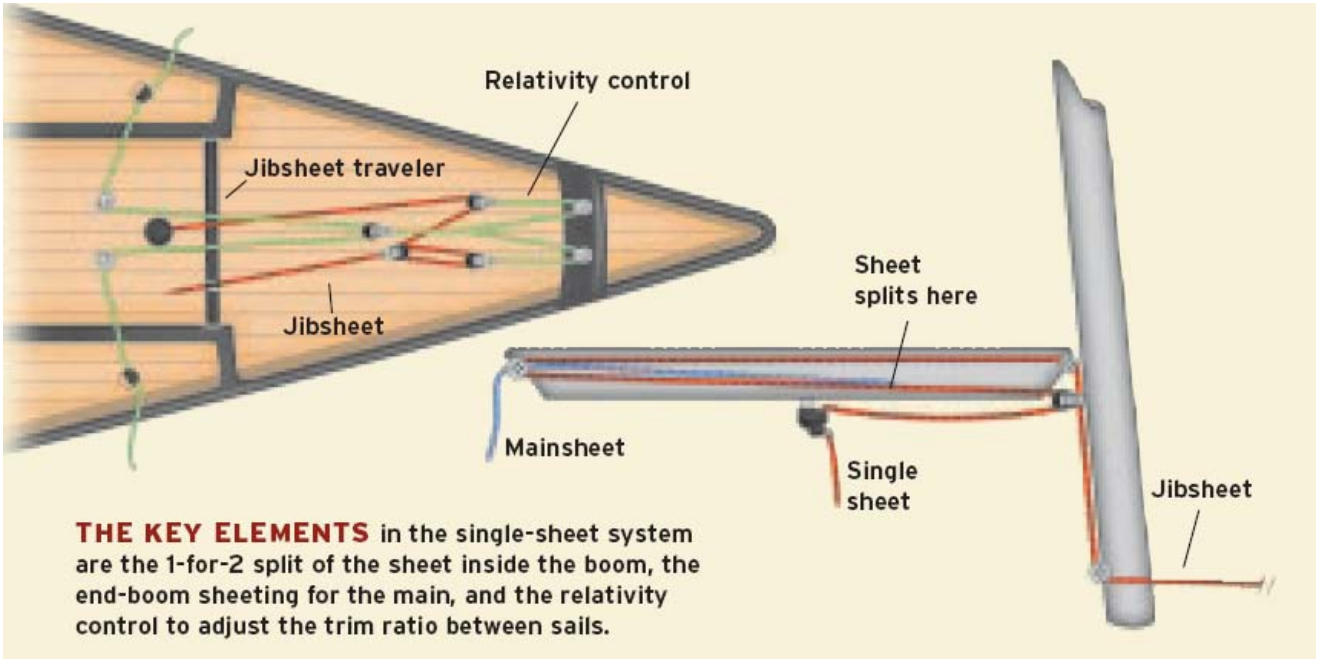
Hiding behind the jib track is the jib swivel base block that is attached to the deck. Here the sheet (blue) heads for the floating blocks just off of the launcher throat. On the right hand side you can see the final block of the system—just before it attaches to the jib clewboard.



Are you still with me?.
Throw the ball—you idiot!!

5/28/2004

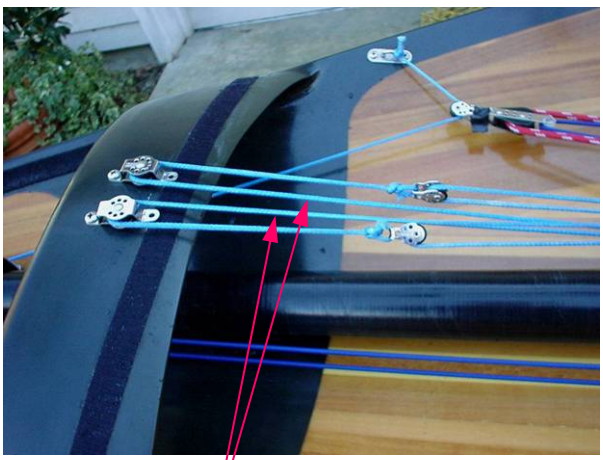
Jib sheet layout

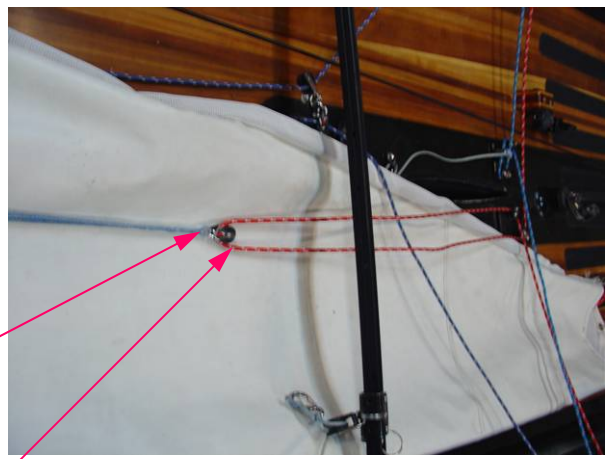


THE KEY ELEMENTS in the single-sheet system are the 1-for-2 split of the sheet inside the boom, the end-boom sheeting for the main, and the relativity control to adjust the trim ratio between sails.

Jib relativity control

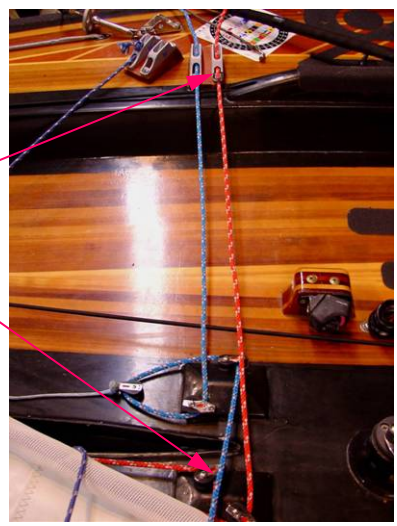
Here you see the four primary blocks of the relativity control. The two forward block have the aft screws missing because they will be screwed into the spinnaker sock to help lock it in place.



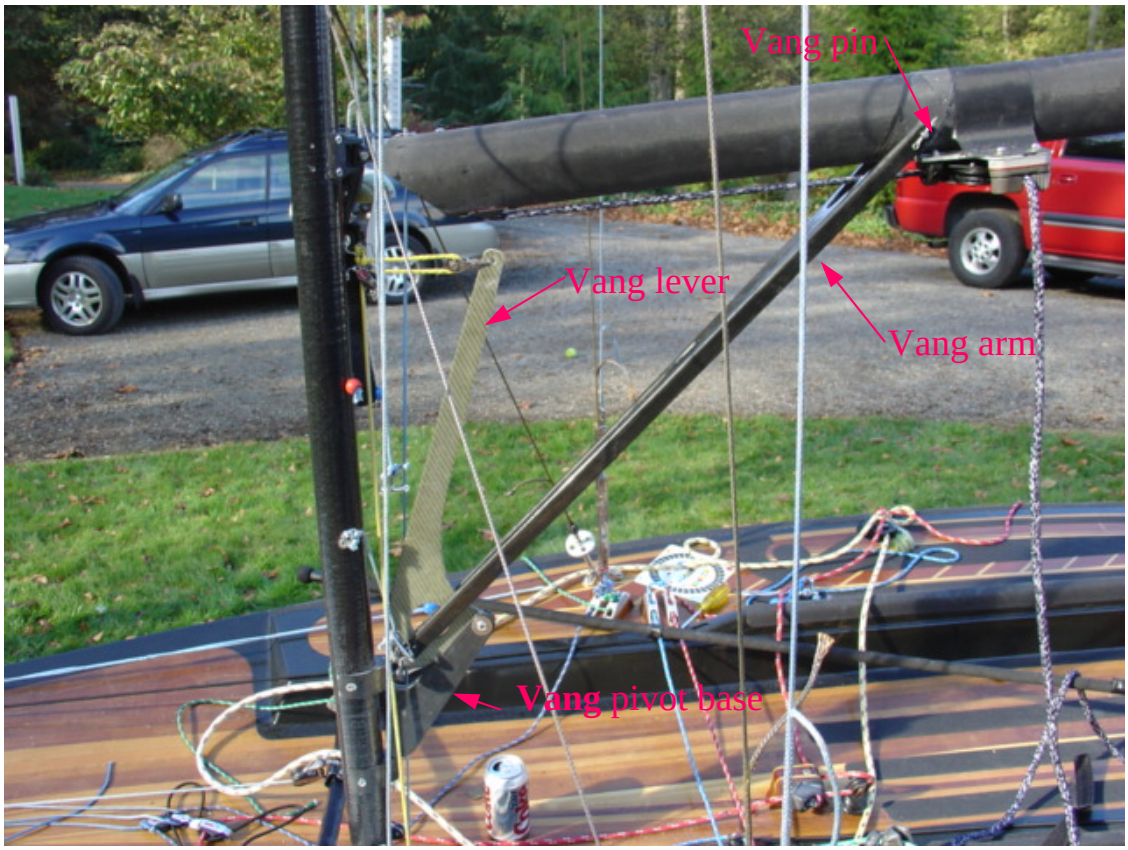


These two lines are spliced together just aft of the edge of the picture. They continue aft to the double tailed eye splice and block shown in the picture on the right.

The red relativity control lines leave this block and go to bevel base on the side of the CB trunk where they turn (more blocks) and head to the clam cleats on each side.

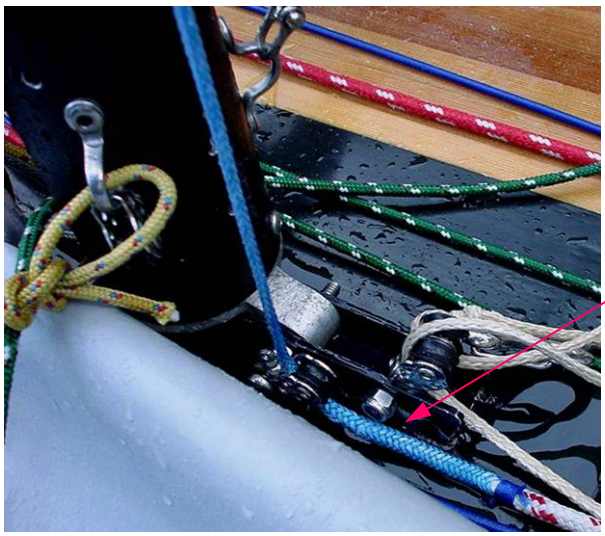


Vang control



The yellow line at the top of the vang lever is tied to the eye strap on the mast that holds the turning block. After going through the block at the end of the lever, it goes back through the turning block and to a block on the mast step pin at the base of the mast.

Vang control



In this case the line is blue (you can see where it's cover starts just aft). This block is shackled to the mast base pin. This line simply goes aft to the vang pedestal swivel base and cleat and out to the velcro strap that attaches the mainsheet and the vang to your harness.

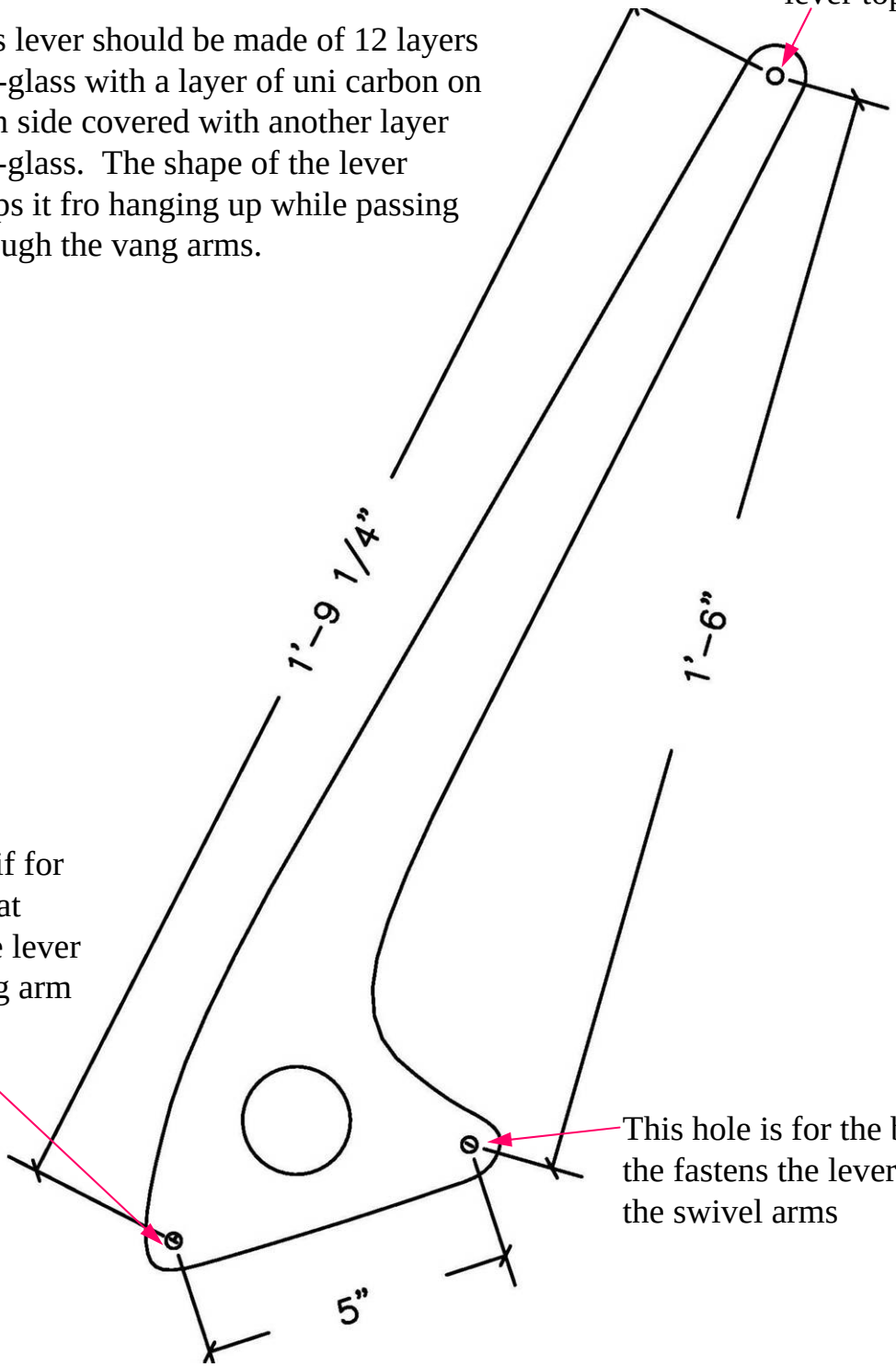
The cleat on this swivel base was extended away (doubling the distance) from the eye with a piece of carbon fiber/s-glass plate. This works much better than the standard unit.

Making the vang

Above is the high tech, lightweight vang arm and lever that you can make. We use the solid vang system because we must keep the boom from rotating in order for our sheeting system to work (the cleats in the same place). Below is the vang pivot base that the other bolt in the vang arm fastens to on the mast.

Vang lever

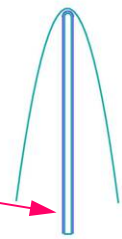
This lever should be made of 12 layers of s-glass with a layer of uni carbon on each side covered with another layer of s-glass. The shape of the lever keeps it fro hanging up while passing through the vang arms.



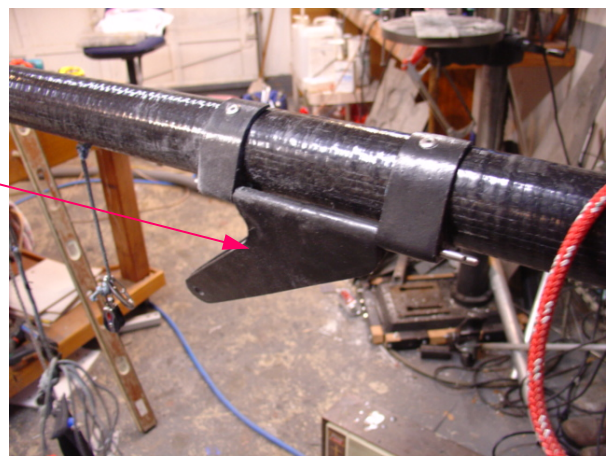
Vang pivot base

Use a piece of 1/4” plywood about 10 inches wide to form the swivel base over. After sanding a nice radius on the top edge, cover it with a 20” wide piece of mylar and staple along the bottom edge. Drape eight 16 inch wide pieces of s-glass followed by a layer of carbon and another layer of s-glass. Cover it with peel ply and mylar and clamp a piece of plywood on each side while being careful to keep the material tight on the top radius

Plywood covered with mylar

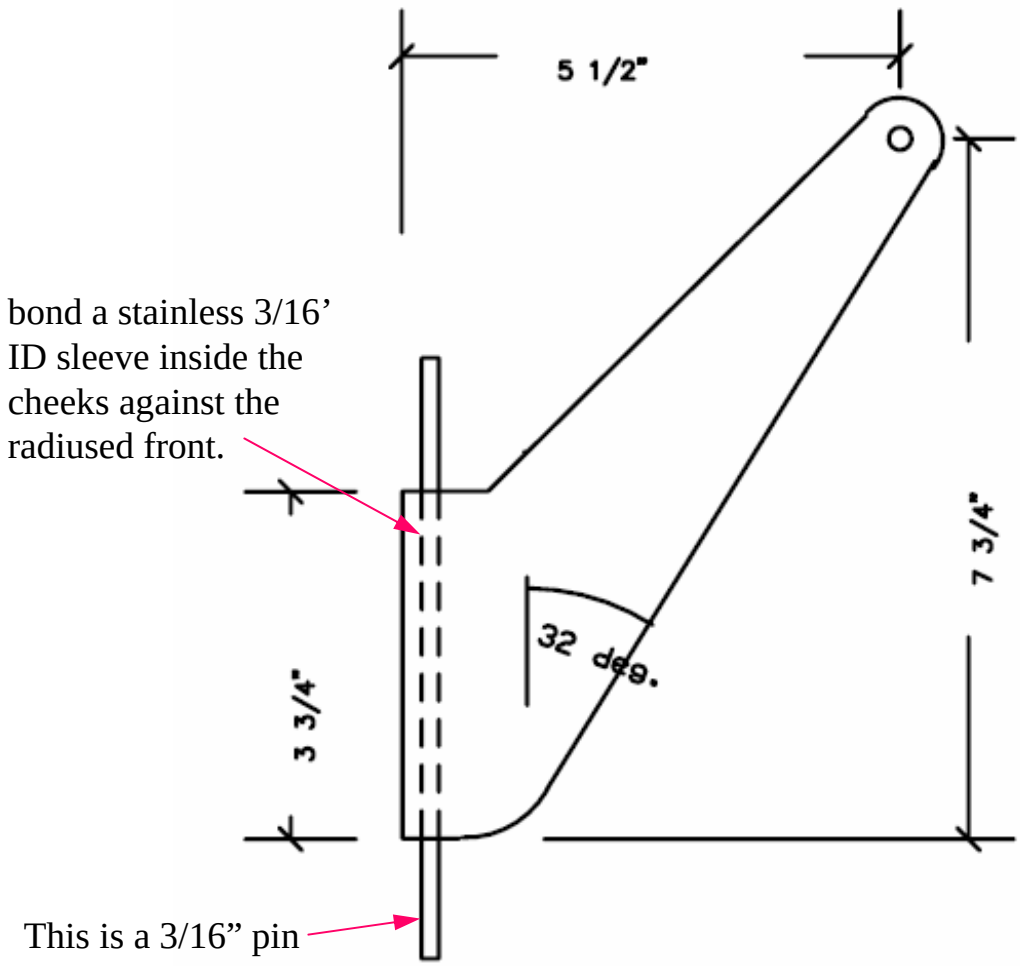


This is the vang pivot base.



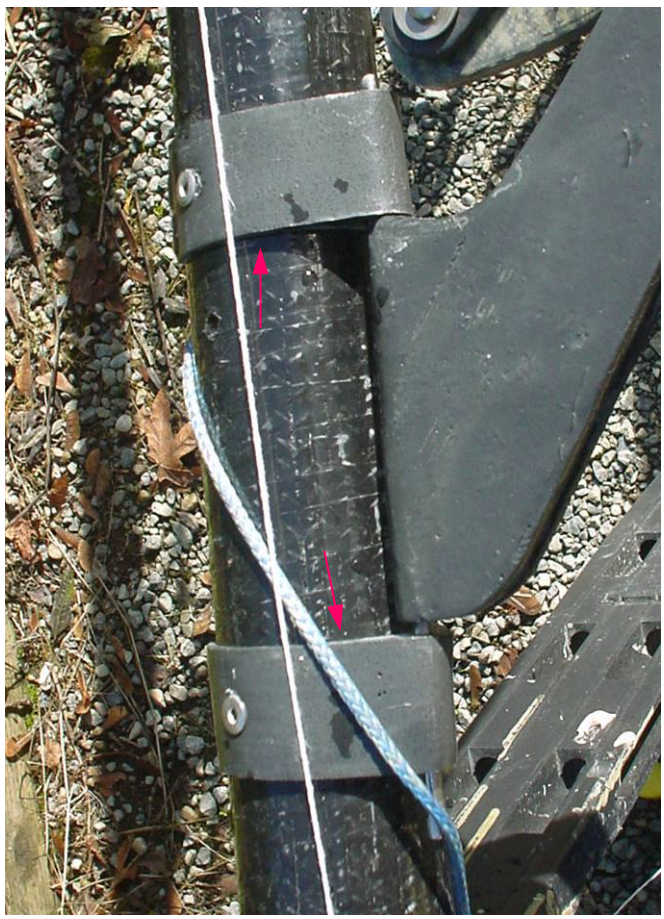
Vang pivot base

After the layup has cured, remove it from the plywood and cut it to the shape shown below. Bond the pivot sleeve inside of the front radius. Later, you will need to drill this sleeve to oversize it a bit for a 3/16” pin



The vang swivel sleeves

These sleeves are made by using a piece of 2 1/4” aluminum as a mandrel. Wrap it with a 60” long piece of s-glass about 4” wide and after three wraps inset a 5” piece of 3/16” stainless tube parallel to the mandrel . Use some silica filler on both side of the tube and continue wrapping. Prior to the last couple of wraps, insert 2 2” wide pieces of carbon uni about 12” long and finish wrapping the s-glass with at least one layer over the carbon. Remove the piece and cut 1 1/5” out of the back (adjacent and parallel to the tube). Cut into two finished pieces 1 ¼” wide. Plexus and rivets work well for bonding to the mast

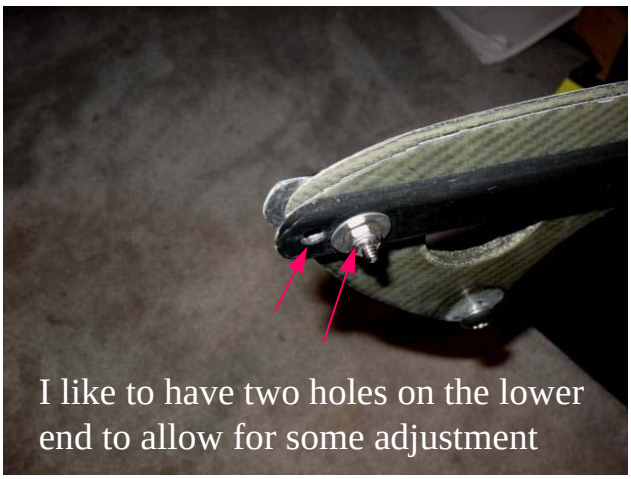


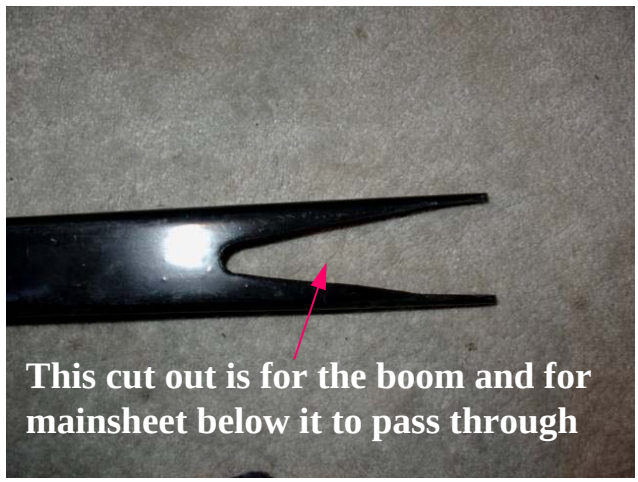
Vang Arm

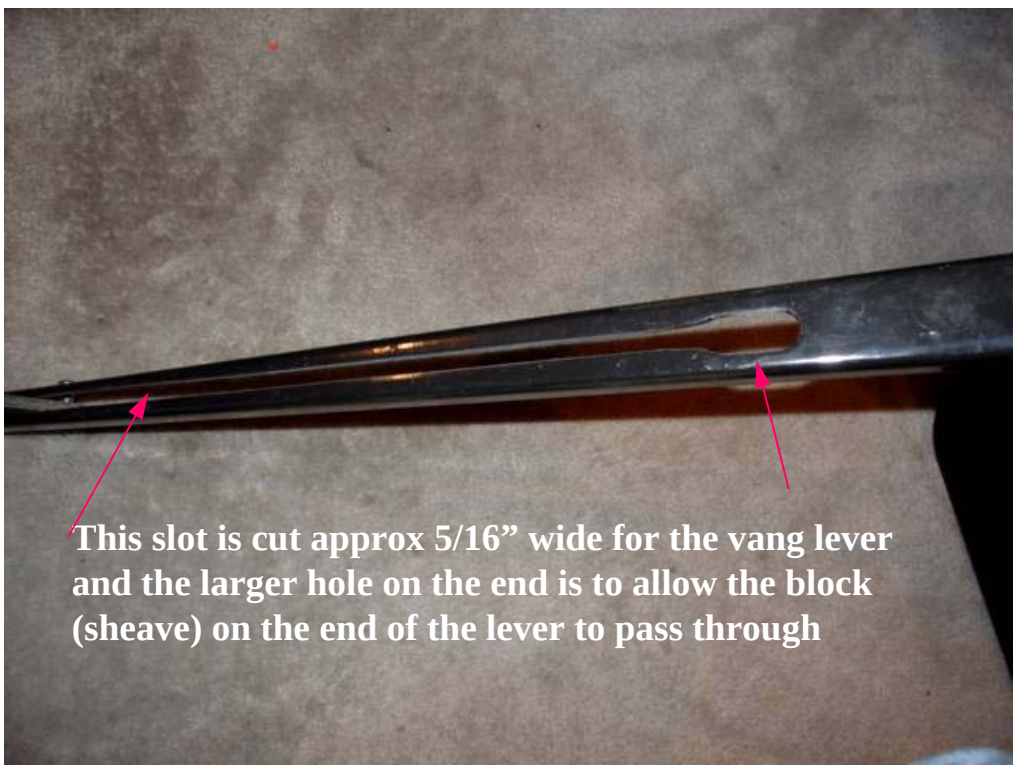
On the bottom is the mandrel for making the vang arm (top). Made of 1” thick wood it is coated with epoxy and epoxy with graphite powder and wet sanded smooth. It is 39 inches long and tapers from 2 ¼” to 3/8”. It has a ¼” radius on the top corners.

On top is the actual part. It is 36” long with hole centers at 34 3/8”. It is made by cutting pieces of cloth that are 39 inches long, 5” wide on one end and 3” on the other. Lay a piece of clear plastic on you flat clean table and begin the lay-up with a layer of s-glass followed by a layer of hybrid with the carbon the long way followed by six layers of s-glass, followed by another layer of hybrid (run the same way) followed by another layer of s-glass. Place another piece of clear plastic over the 10 wet layers, center the mandrel on the layup, brace the mandrel with pressure off of the ceiling with some properly cut 1x4’s. Next, pull the plastic up on the sides of the mandrel and place some 1” thick pieces of wood on each side to hold the plastic and wet layup against the sides of the mandrel. While holding the plastic tight, clamp the two pieces of wood across the mandrel and leave until the parts has cured.

More on the vang arm



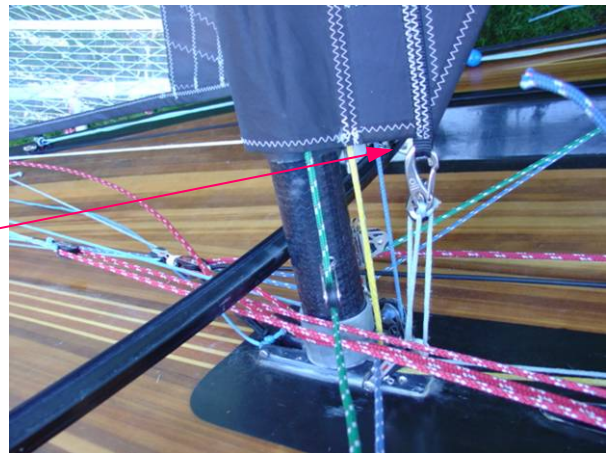


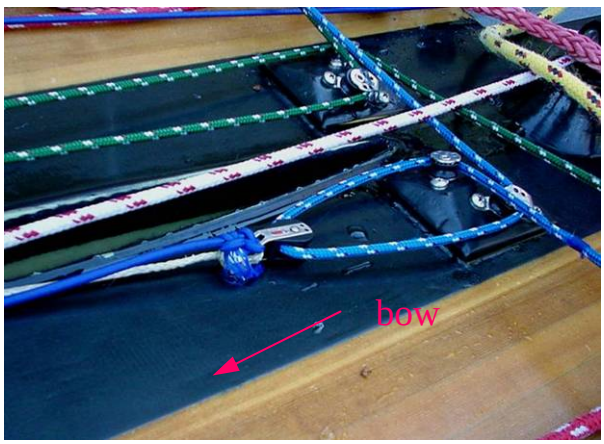


See *vang control* page for more details

Cunningham

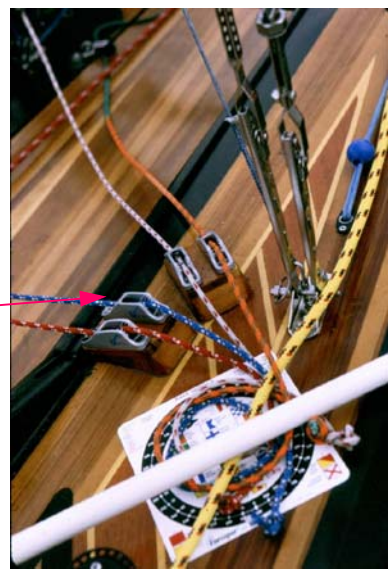
These cheeks are an integral part of the cunningham system on the Swift since they distribute the load from the over a broad area. You can see the lines attached on the bottom that pull down on the cheeks. This entire system is designed to bend the mast without adding much leech tension (for de-powering)



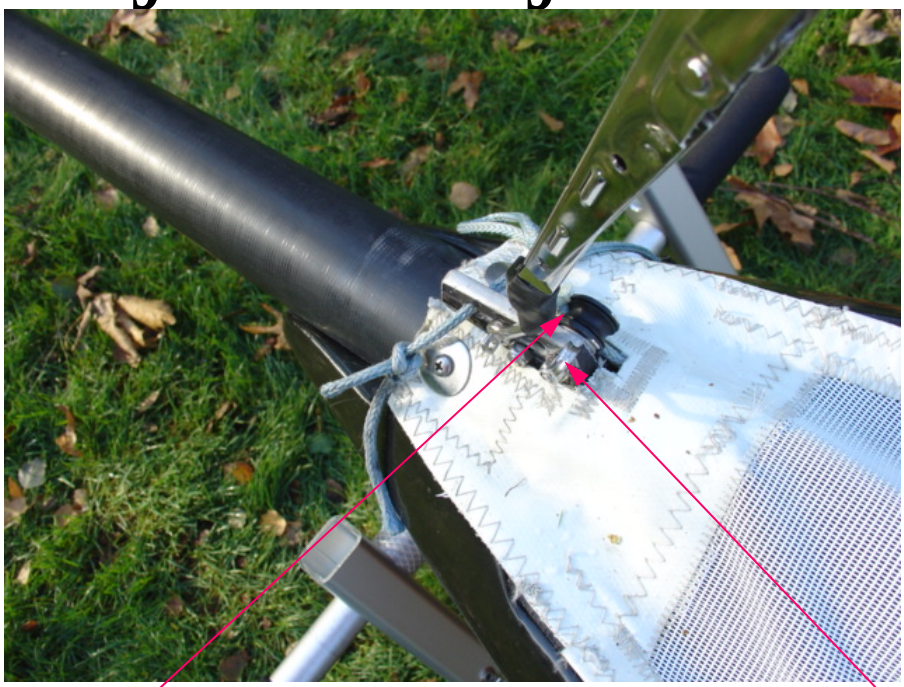


The cunningham control lines go aft from the base of the sail to a floating bullet block and then through the bevel base cheek blocks out to both sides

You can see the cunningham in this picture. It is led to both sides



Adjustable jib tack



This cheek block is bolted through the forestay fitting to an eye strap on the other side. The tack line comes up through this block, through the eye on the bottom of the jib, and back down to the eye strap where it ties off. The other end goes aft (under the sock) where it ties to a floating bullet block, splits and goes through blocks at the base of the mast before heading outward to the clam cleats

This jib tack line, when used in conjunction with the halyard, allows you to change both the luff and the leech tension of the jib