

Restoration of a Minisail Monaco Mark 2

Greetings and welcome to all! Please allow myself to introduce myself; I'm Andy, and if you're anything like me you were idly bimbbling along one day and happened across the unloved and abandoned, yet sturdy looking hull of a sailing boat and got all excited about the possibilities of sailing the high seas with the wind in your hair and a grin on your face. Fret not; with just a bit of time, effort, love and money, you could be doing just that.

All that time and effort and whatnot makes the job sound daunting so it's time for a background check on the author (me). I'm a 37 year old fellow who lives in the heavily built up suburbs of Manchester, I did some topper sailing when I was at school at the tender age of 14 and have since only ever wistfully gazed upon sailing boats from the shores of lakes while on pleasant walks and cycle rides in the countryside. What I'm trying to get at is that no matter what your sailing history or expertise, you can get a boat on the water through what can only be called a labour of love and stubbornness.

So, what follows is the trial and error account of the trial and error refurbishment of a Minisail Monaco Mark 2 Boat. I'm unsure how much of this would apply to any other Minisail vessel as I've never even seen any other ones, but you're welcome to peruse and use whatever info applies to you, if you're unsure if your boat is a Monaco Mark 2 then behold the picture below, a Monaco Mark 2 hull looks like this:



As I've said, I'm a far stretch from being an expert on boat refurbishment so the actual experts out there reading this will probably be disgusted at my shoddy workmanship and disregard for thought of ultra-performance, but hey, I'm not good enough or knowledgeable enough to try and build a prize winning vessel, I just want it to float for as long as I want it to and roughly go in the direction I point it.

I should also take this moment to say that every single nugget of advice and piece of information I give here in this document are things that the folks of the Minisail community have told me, this is just a compilation of all the information that I've gleaned over a long time from folk like Rupert, Ronny DG, David Argles and Peter Matthews, thanks to them all for allowing me to stand on their shoulders.

The Approach

So, you've found your hull, you're all excited about possibilities, take a moment to inspect the hull top and bottom, if you see any major holes or deformations then we're already out of my depth, the worst I have to deal with is little bits like this where the outer plastic has chipped away:



Your hull seems sound? Excellent! Now you roughly know that you'll need some bits to get the boat working but have no idea where to start. Again, if you're anything like me you'll stand there excitedly scratching your head going, "Oh, I'll need a dagger board and a rudder, a mast and a sail and some other rigging bits... erm... to the internet!"

Unfortunately they don't make any parts for these boats anymore so you're going to have to fashion most of it yourself and adapt the rest from parts of other similar boats such as the Topper or Laser, unless you are lucky enough to hunt second hand parts down. At this point it's important to take one step at a time and focus on each part and getting that done before tackling the next part, or you'll end up with lots of little bits of stuff but not actually finishing anything for ages, for the record, that's exactly what I did and I quickly got bogged down and overwhelmed with all the things to do and stuff to get.

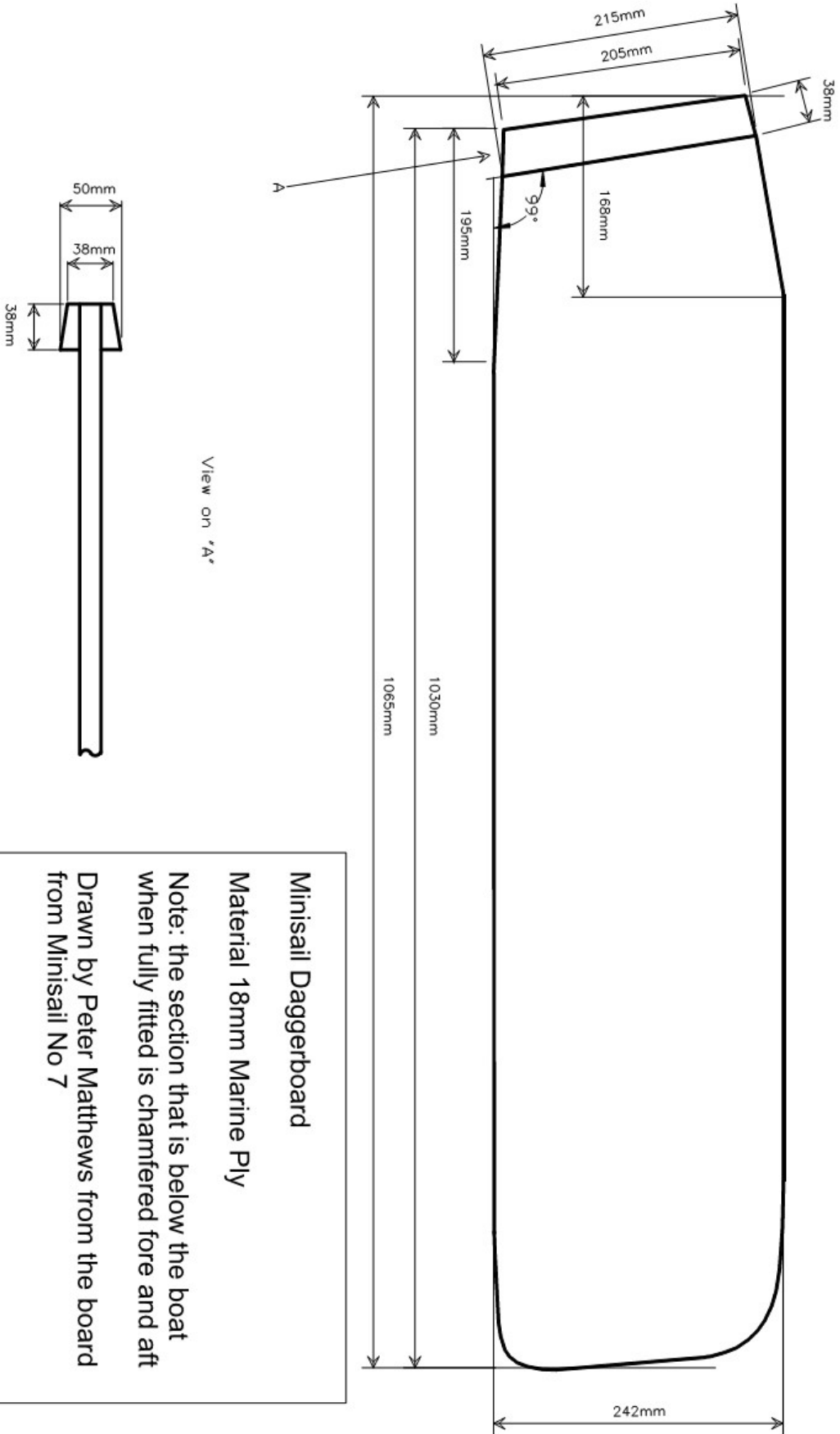
There are 6 main parts you'll need to tackle; the dagger board, the rudder, the mast, the sail and rigging, and the hull itself. It's not important where you start off, but for the sake of a quick sense of accomplishment I started off with the dagger board.

The Dagger Board

This bit requires the least thought but some ability with a saw and a belt sander, use 18mm thick marine ply board and go at it. Some folks in the Minisail community mentioned rake angles for upwind speed and so on but I'm not experienced enough to attempt anything fancy, so when Peter Matthews kindly sent me the following schematic, I stuck to it as much as I could.

The dagger board will need to have bevelled edges fore and aft so that it cuts through the water nicely, I started off trying to use a plane to whittle it down but quickly found that the cross grain of the ply board was chipping away and damaging the finish, so I settled for a belt sander to shape it, not the best tool for the job but it seemed to work okay. I had no real idea how thin the board will need to be at the edges so I just went with my gut, it needed to withstand the odd knock or two yet cut through the water nicely, I think I did mine a little on the thin side but that was an accident of poor workmanship more than anything.

It's also worth drilling a hold at one end of the handle section so you can tie the board to the boat when out on the water, the last thing you want when you capsize is the dagger board to slide out and float away.



Minisail Daggerboard

Material 18mm Marine Ply

Note: the section that is below the boat when fully fitted is chamfered fore and aft

Drawn by Peter Matthews from the board from Minisail No 7

Mine turned out like this:



Victory! We're a bit of the way there, now onto the rudder!

The Rudder

Funny story; since I've started this project, after I'd made my rudder, a new section appeared on the Minisail class association website (written by one Peter Matthews) about how you can fit a Topper rudder to the back of your Monaco 2 Minisail. I wouldn't have done it anyway as it requires welding (I don't have access to a welder), and I also rather enjoy the challenge of making things from scratch. I would add a link to the article but since I started writing this manual, the article has gone beyond my reach.

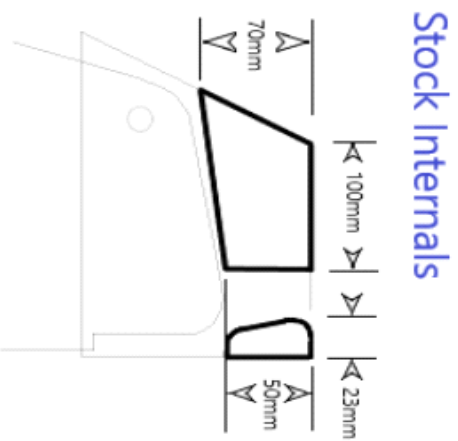
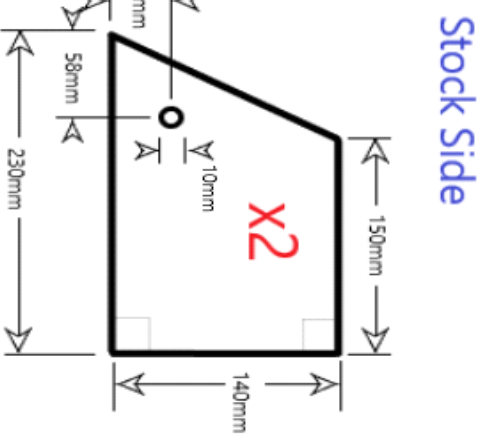
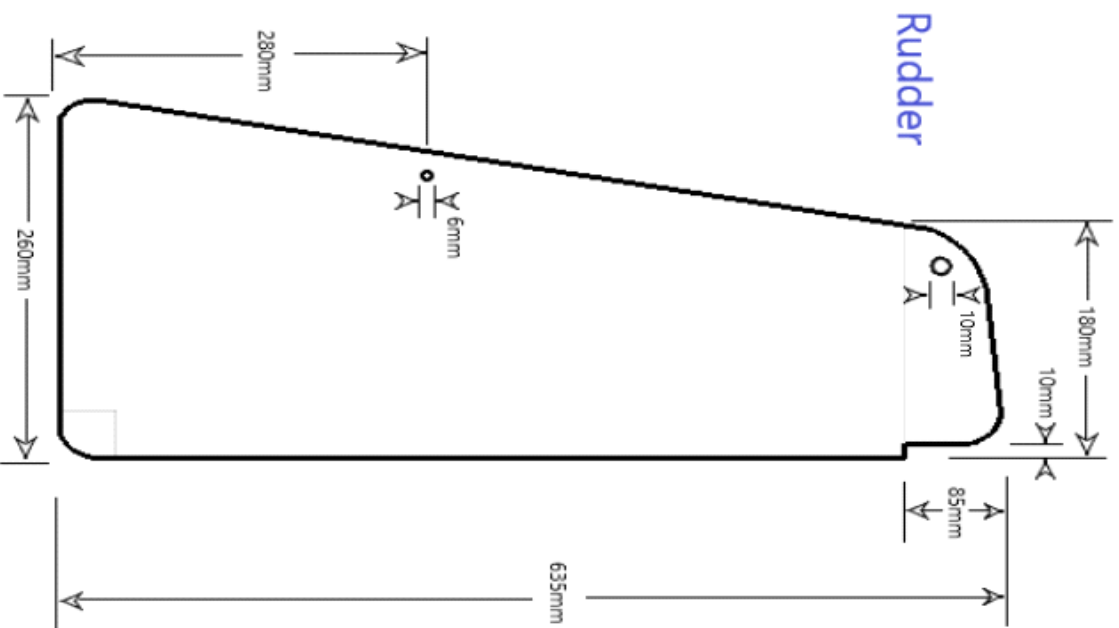
Now, I must admit, the rudder had me foxed for quite a while because I wasn't sure how the raising and lowering mechanism worked. I remembered from my old Topper days that I used to pull on the tiller to raise the rudder blade and push the tiller back to lower it into the water, Minisail ones however, work slightly differently. They have a rudder stock where it connects to the boat and a piece of rope that seems to do something... I had no idea what the stock assembly has inside it or how the little bit of rope acts in terms of raising and lowering the blade.

During my initial investigations of how to fashion a Minisail rudder a fellow by the name of Tom Moore kindly sent me some hand drawn schematics that worked as a good starting point for fashioning the rudder blade and the fixing to the boat but still left me puzzled as to the mechanics.

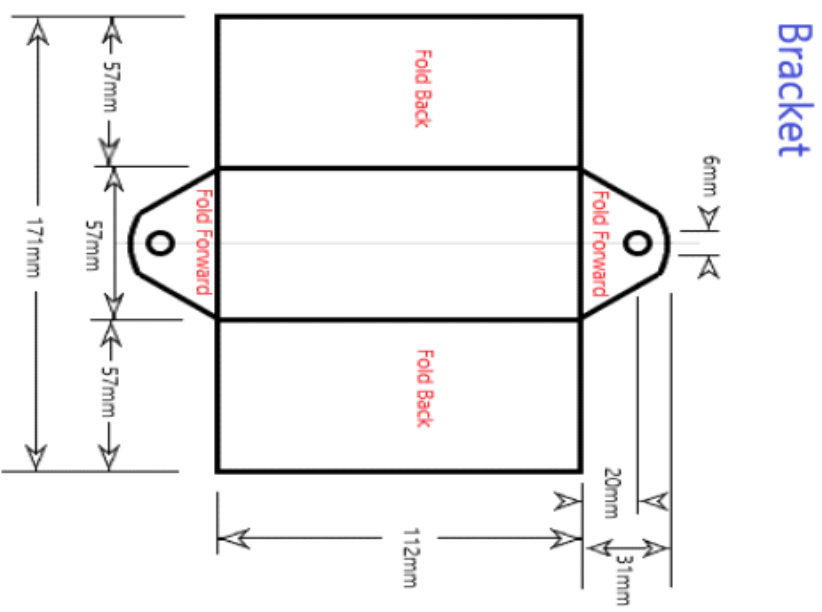
I used those schematics to make myself a rudder blade, and then set out to find out the hidden secrets of the rudder stock. After a bit of delving around on the internet and reading through Ronny's blog (which details his scratch build Minisail boat) I found the answers I was looking for. The stock houses a simple hinging mechanism for the rudder and a little channel for the piece rope to thread through which, when pulled taught, simply locks the rudder into its lowered position. When the rope is released, another line tied to the rear of the rudder blade can be used to pull the rudder up. It's as simple as that.

A brief word on the construction: You may need to thin the rudder with a good bit of sanding where the rudder enters the stock, or once you have applied your protective treatment to the wood and bolt it into position, the rudder will stick and not move freely. The rudder is hinged in the stock by a smooth sided M10 bolt.

What follows are some schematics for the parts you need to be making from 18mm marine ply and a sheet of 2mm aluminium or stainless steel. The tiller will need to be made from a length of wood at least 55mm wide, 790mm long and 20mm thick.

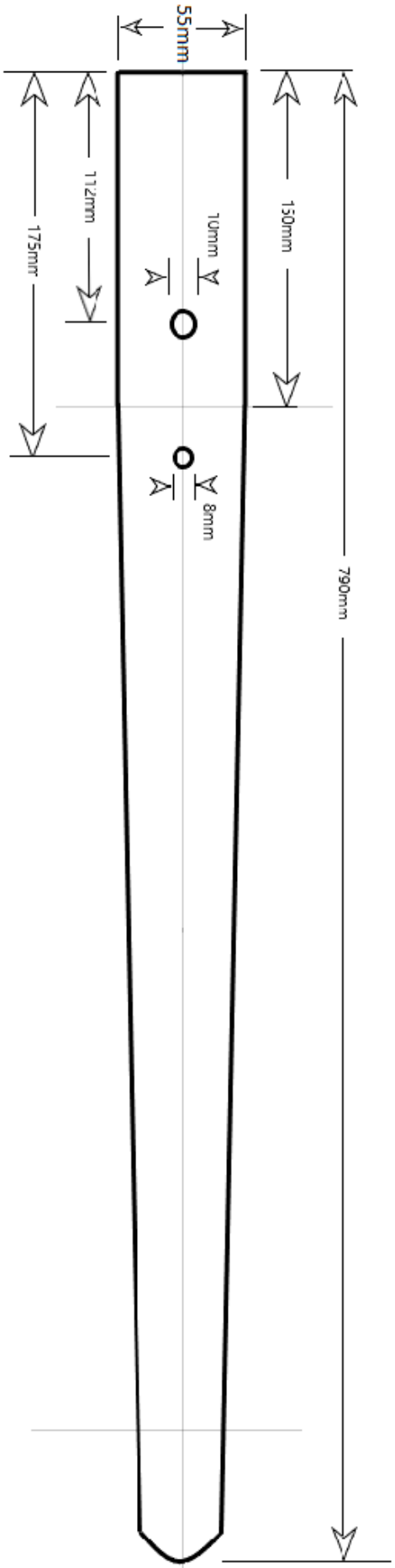


Rudder and Stock to be made from 18mm Marine Ply



Bracket to be made from 2mm sheet Aluminium.

Tiller



As for the method of attaching the rudder to the boat, I simply took a length of 5mm diameter stainless steel rod, minimum length 180mm, put a thread at either end with a tap and die set, then screwed an eye on one end and a simple retaining bolt at the other. This rod passes through the forward hole on the tiller, the two holes on the bracket and the two holes at the back end of your boat. Poking up on top of the tiller will be the eye, see pictures for clarification.

The tiller extension I use is made from an old microphone stand boom arm, though you could easily track down a length of aluminium tube that matches the diameter of the tiller extension universal joint, (Which you can easily find on the internet).

I have since found and bought an original rudder and stock assembly from a well-known internet auction site and found that its construction is somewhat different than mine. On mine, the tiller simply screws into the top of my stock assembly, whereas the original had the stock internals sitting proud of the stock sides along the centre, and the tiller has a 'U' shape cut into the back end which straddles the internals. I can see the benefit of such a construction, such as increased strength on a turning motion. If I ever need to make one again I shall do it that way, until then, here are some pictures of the original assembly and the one I made.





And here's the original:



The Hull

The hull was the most daunting part as I know it would take a lot time, space and money to get it looking the way I wanted. There were many places where the gelcoat had simply broken away and many more that suffered from severe stress cracks. Beyond that, the gelcoat had heavily faded and was very mucky, there was also a piece of the internal buoyancy material bouncing around inside the foredeck.

The first stage was to remove all of the screwed in hardware and give the whole thing a good clean, I just used a good stiff brush, some washing up liquid, and some elbow grease, followed by a rinse with plain water and a damp cloth. She immediately looked healthier.

Now I set to work on the holes in the gelcoat and stress cracks. These were repaired with some Blue Gee epoxy gelcoat repair stuff which I got off the internet, you can get pigment to try to colour match your repair, but I knew I wanted to paint my hull so opted for the clear version. The repairing process goes as follows:

- 1) Clean the area you want to repair with an evaporating cleaning solvent, such as Acetone or Rubbing Alcohol, really get in there with a toothbrush or similar, make sure it's good an clean.
- 2) Widen the hole and cracks. For the larger holes with jagged edges I used an orbital sander to smooth out the sides of the holes and make sure that the edges I was sanding to were still properly secured to the fiberglass layer underneath. For the stress cracks I brought out the hand held Dremmel and used a drill bit like a milling tool to widen the cracks to something that can be filled with epoxy and repaired properly.
- 3) Clean properly with Acetone or Rubbing Alcohol again.
- 4) Pop on some gloves and a mask then mix your gelcoat repair to the directions as given by the manufacture, then generously yet carefully stuff all your holes full of gelcoat repair... On the boat that is. As the curing process starts at the time you mix the parts together, you will have 15 minutes to do the job before the goo becomes unusable, so be realistic about how much you think you can use in that time. I had to repair lots of holes over many sessions spanning a total of about 2 weeks, only once or twice had I mixed slightly more than I could use in the time, though better to have mixed slightly too much than not enough.
- 5) Give the epoxy 24hrs to cure properly then pop on some gloves and a mask and sand down the excess epoxy to make it level with the

surrounding. I can't stress this enough; Wear a mask, that sanded epoxy powder is horrible. When sanding down start off with some 80 grit or so sandpaper to bring it down quickly, then use gradually higher grit papers as you get closer to where you want to be, when you get to the proper level you should be at 1200 grit or similar for polishing. DO NOT use an electrical sander to do this job, use a sanding block and some elbow grease, you will have much more control over how deep you go and where you are sanding.

6) Wash horrible dust from yourself and have a well-earned cup of tea.

Here's some pictures of the process:







Deep Inside the Hull

As I could hear a piece of internal buoyancy material bouncing around and I figured that the interior would be water logged, I decided to cut in an access hole and install a circular inspection hatch. Having bought a suitable sized circular inspection hatch from a popular internet sales and auction site, I simply cut a circular hole using a reticulating saw and installed said hatch. In the process finding the interior to be bone dry and securing the buoyancy material with some strong double sided sticky tape.

If you are happy with the colour of your gelcoat and do not wish to go through the soul destroying process of painting your hull, then skip this bit and go straight to the section on deck hardware. On the other hand, if you want a rad custom design to impress your friends and cruise along in style, then read on and prepare yourself for torment.

Painting the Hull

Now, I made the mistake of painting the underside of mine as well as the topside... Why? You ask... Well, a good few stress cracks had appeared on the hull, which I had to repair with that Blue Gee stuff, and it was scratched to all hell, really deep scratches, and I'm an idiot. You could simply repair the underside and then clean and sand down to the depth of the deepest scratches and still have a good firm hull. Anyway...

The first thing you will have to do is give the whole thing a damn good clean, again. Then hand sand the whole thing with 80 grit sandpaper to give your primer something to key into. Then apply 2 layers of high build epoxy primer, I used Jotun Penguard High Build Epoxy Primer, though there are others on the market, giving a cursory sanding between layers to give each layer something to key into.

Finally I applied 3 layers of GRP paint. Specifically, SupplyShed Marine Paint for Fibre Glass, naturally giving a quick sand with 100 grit paper between layers.

This process is quick to explain but long to perform, in order to ensure good adhesion between layers you must sand each layer then clean it at least twice (per layer) to ensure that you have removed as much of the sanding dust as possible, furthermore you can only apply 1 layer per day, so you'll need to set aside a few hours per day over a period of 6+ days to ensure you've done a good job. Having said all that, the end result was worth it:





Deck Fittings and Hardware

Fortunately most of the deck fittings were still attached to the boat so all I had to do was remove them, give them a bit of a spruce up, replace any that were broken and job's a good 'un. There were some fiddly bits however so let me be more specific.

At the head of the cockpit is a cam cleat in which the 2 moving parts had completely seized, I removed this, disassembled it and gave it all a good low grade oil bath, I then reassembled it and gave the small spinning parts a good little work out and hey presto, one fully functional cam cleat. The part itself is a very simple assembly with a small round spring inside each of the toothed rope catchers.

Further to this the toe straps were looking very sorry for themselves and the plastic stays were also looking rather tired, as such I simply did an internet search for 5 metres of red car seatbelt material and some Topper toe strap plates. Fixed.

There is a self-bailer in the bottom of the cockpit, a simple device that opens a hole to allow water to flow out, I took this off, gave it a good clean and got the spiders out, then when the hull was painted I put it back in, sealing around the edges with Milliput epoxy putty.

I have 2 side notes to add to this section, first of all; It is very easy to tighten your screws too much and cause the thread to be ripped from the fibreglass, an easy fix for this is to get some small offcuts of your marine plywood and use that inspection hatch to get to the back of where the screw goes in, then you can screw into the plywood through the fibreglass.

The other point is sealing the fittings, you can use either Mastic sealant or marine grade Silicone, but that doesn't mean you need an airtight hull, you should make sure you have a little 3mm diameter breath hole somewhere that it won't encounter lots of water, like at the head of the cockpit near where the Minisail nameplate is. This breath hole is important because when you take your nice warm hull with its warm air inside it, then throw it onto the cold water, the warm air will contract and most likely suck some water into the hull, this breath hole just ensures you maintain equal air pressure inside and outside the hull.

Mast, Boom and Sail

The mast is constructed of 2 pieces of aluminium tube, and the boom is 3rd section of aluminium tube. There are a few suppliers of tubing in the UK and some will use imperial and some will use the metric measurement system so if you're not savvy with the SWG and other such measurements, fret not, the people you are asking will most likely help you along. Looking for the exact pieces of tubing you need can be a pain, but you'll get there in the end. The measurements for the 3 sections are as follows:

Lower mast:	60mm OD x 3mm WT x 2440mm L
Upper mast:	50mm OD x 2mm WT x 3960mm L
Boom:	50mm OD x 2mm WT x 3200mm L

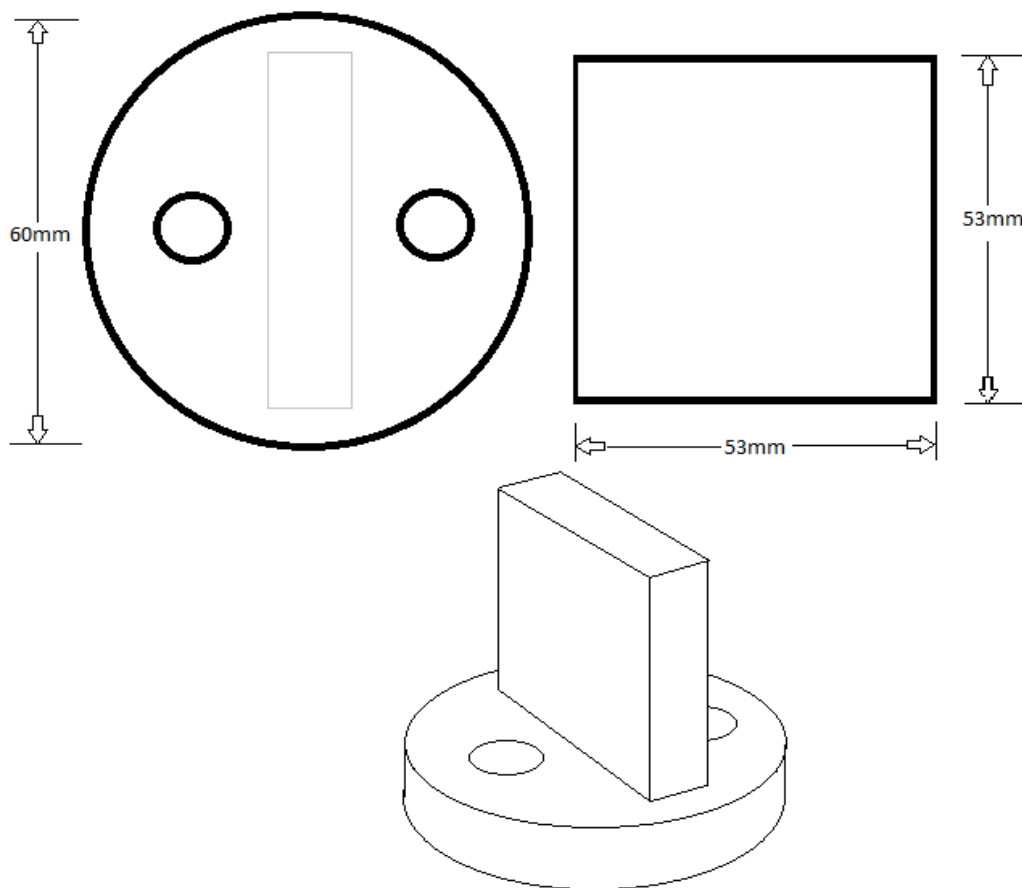
OD = Outside Diameter

WT = Wall Thickness

L = Length

When you get your Aluminium tubes, drill 2 holes in the lower mast section 400mm from the top, bevel the edges of the holes and put 2 screws in, you can now slide the top mast section into the bottom section with an overlap of 400mm. The fit will be slightly loose so make a few wraps of duct tape around the upper section to make a more snug fit.

Your work with the mast is not yet done! If you were to use the mast in its current state, the Aluminium tube will eat a hole through the bottom of your boat, as such you should make a good strong stopper for the bottom. To do this take an offcut of your 18mm Marine ply, cut a circle of 60mm diameter (The same OD as your lower mast section) then a square of 53mm, stick them together in a T shape, drill a couple of holes in the circle to allow water to flow out and hey presto, one stopper.



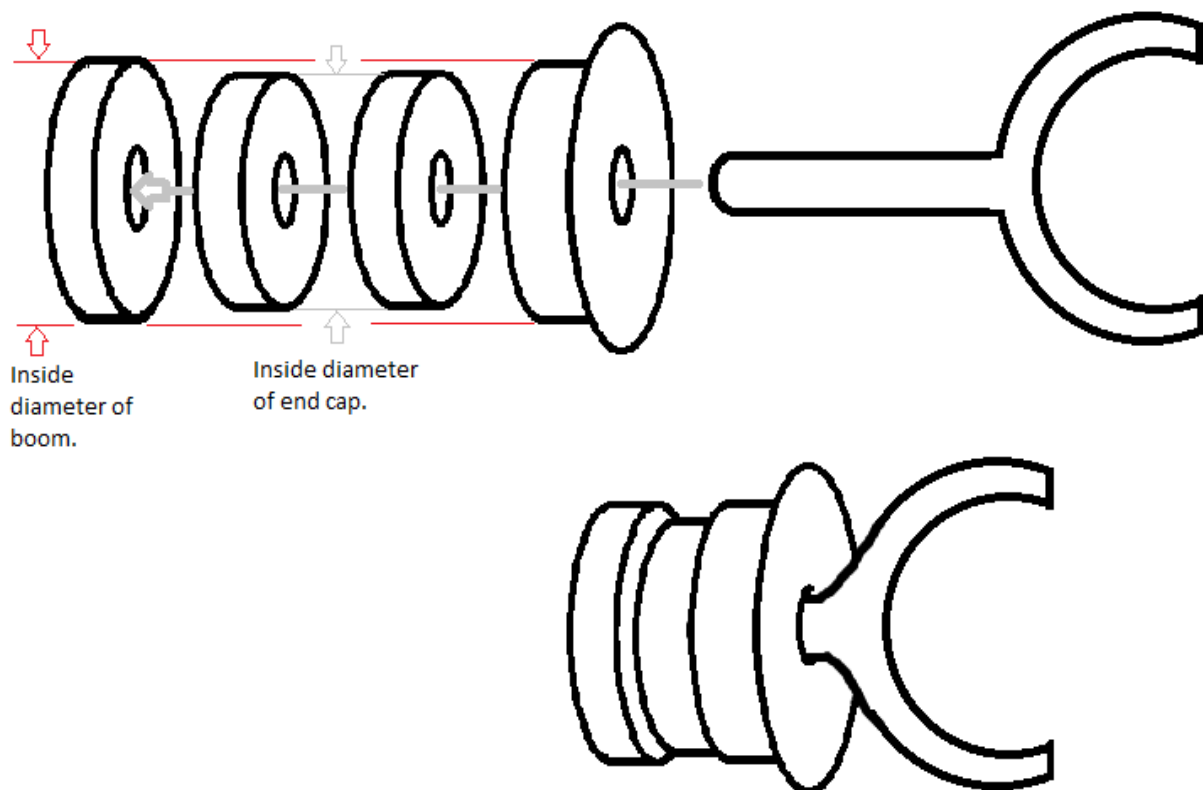
The square part of this stopper slots into the bottom of the mast and you drill a hole in each side of the mast to screw into the upright, remember to bevel the edges of the hole you drill and use countersunk screws so that the screw head does not protrude and eat through the walls of the mast tube.

It is also a good idea to get a couple of standard plastic stoppers for each end of the mast top section too, make it water tight and eliminate the sharp edges at either end.

Finally, a few wraps of duct tape around the bottom of the mast to make a snug fit into the mast hole in your deck and the mast is complete, now onto the boom.

The boom is a bit more complicated as it has lots of bits and pieces attached to it for the outhaul, sail control, and for where the boom clips to the main mast. Let us start with the mast clip and work back.

The mast clip is a simple rowlock, or oarlock, fitted into an end cap and some pieces of marine ply. More specifically; I cut 2 round pieces of 18mm marine ply to match the diameter of the inside of a plastic end cap. Then cut one piece of the same ply to match the inside diameter of your boom, stick these together with some good wood glue, screw the wood assembly into the back of the end cap, drill a hole through the centre to put your rowlock in and that is it done.

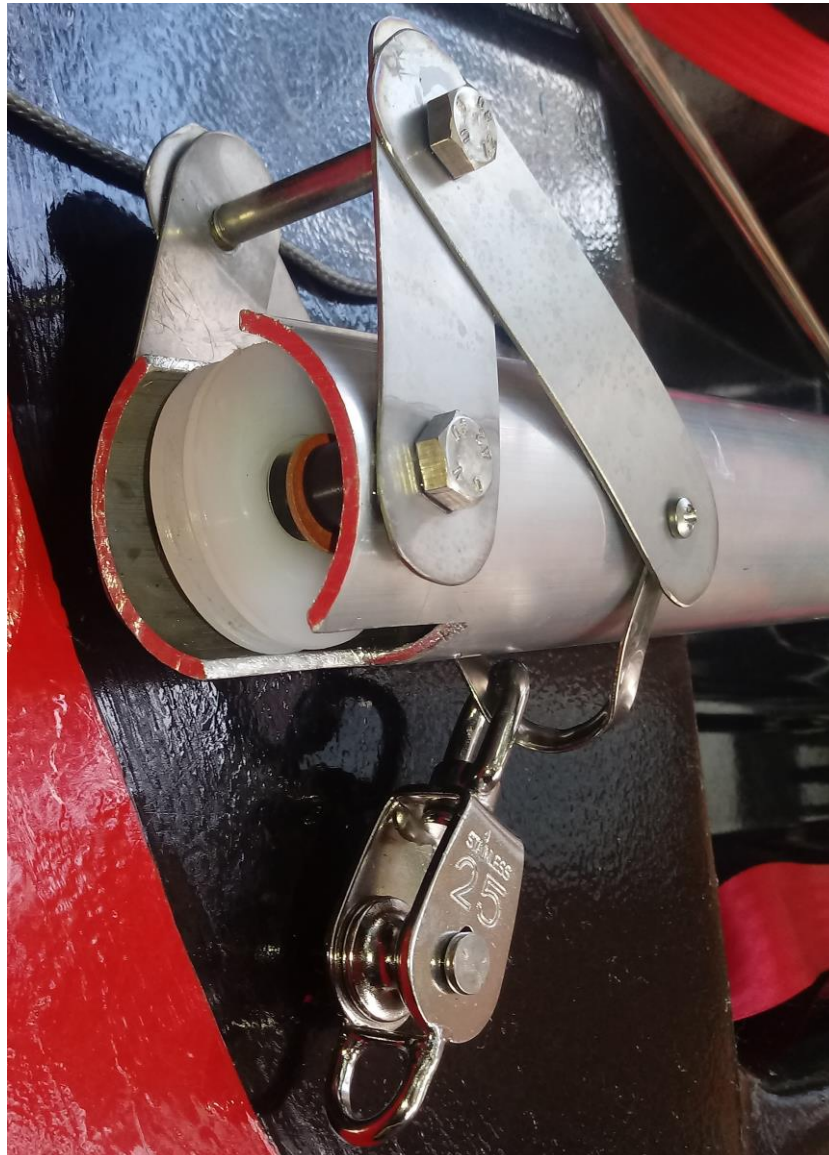


A bit further back you'll need a U bracket with a pulley on it for your kicking strap dangling from the bottom. A bit further back from there, also on the underside, screw on a clamcleat which you use to lock off the outhaul. At 2

metres from the mast end put another U bracket with a pulley on the underside, this is for your mainsheet.

The bit that caused me the most noggin scratching was how to set up the outhaul and mainsheet attachment at the back end. I settled on cutting out a U shape in the Aluminium tube, into which I bolted a large pulley wheel, then out of the top of the boom a small stay onto which the outhaul will be terminated, and again, a U bracket with a pulley for mainsheet control.

Here are some pictures to better explain what I mean:

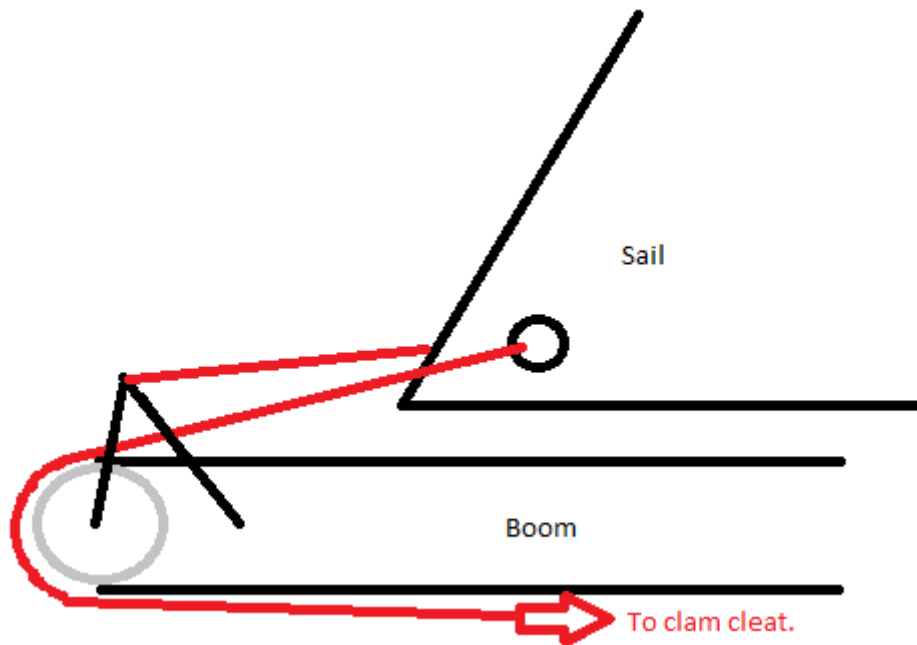




Rigging

Rigging is best described in pictures. In the following sets of diagrams, the red lines indicate ropes.

Outhaul:



Mainsheet:

