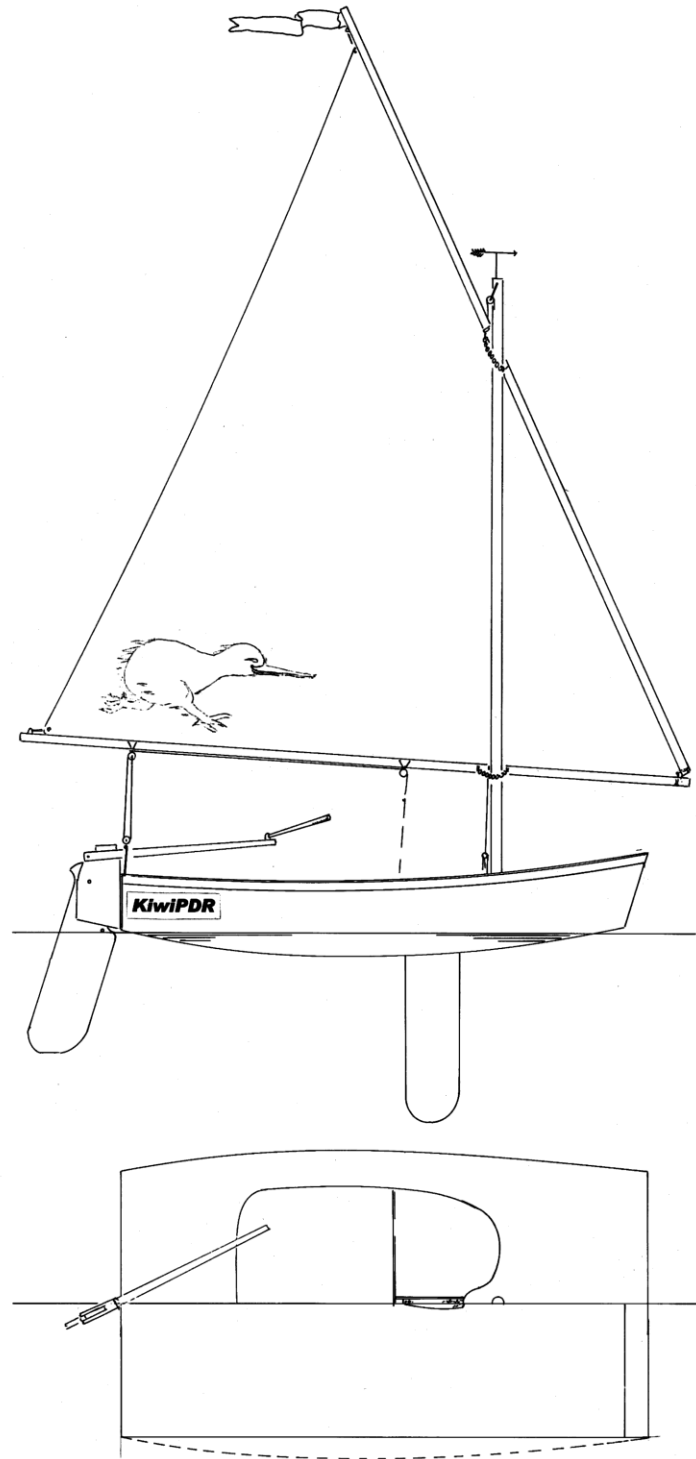




KIWI PDR

Instructions & Drawings

By John Welsford

Kiwi PD Racer plans and building guide.

V 2 3rd /Jan/ 10

First of all, if you are not already a member and have internet access, there are two Yahoo discussion groups that will be of interest to you as the builder of a Puddle Duck Racer.

You can join them from “here” <http://groups.yahoo.com/>

And the groups are <http://groups.yahoo.com/group/jwbuilders/>

And <http://groups.yahoo.com/group/pdracer/?yguid=125329655>

The first being my own John Welsford boat builders support group, and the second being the PD Racer forum. Ask a question on either and you’ll get an answer.

“Mother Ducker” Jackie Monies is building her own Kiwi Puddle Duck Racer, and will be documenting the build at her own website plus articles in www.duckworksmagazine.com. She has as yet not got her own site up, but as soon as it is, there will be a link from my own site at www.jwboatdesigns.co.nz

Materials. Plywood, it pays to buy reasonably good quality exterior bonded plywood. Although the boat has few curves, the bottom is very curved and good plywood bends much more evenly than the cheap stuff.

Note that for boats like these marine plywood is not really necessary, exterior bonded plywood has a dark red or black glueline. Look at the plywood and choose sheets without gaps in the edges or knotholes in the faces. Note that Fir or Pine plywood will check (mini splits in the surface) no matter how well you paint it, and Meranti or some of the better grades of Luan do rather better.

Use marine plywood if you really want to, but bear in mind that these boats are intended to be low cost and fun rather than an exercise in excellent boatbuilding or cabinetwork.

Glues, I suggest that you use epoxy resin glue, as with almost all of the items needed for this project you can get epoxy resin, hardener, the glue and filler powders can be obtained from www.duckworksmagazine.com.

Materials.

Plywood. 3 sheets 6mm (1/4in) plywood, try and get imperial sized sheets (4 ft x 8ft that’s 1220 x 2440mm) but if not available you can scarf or otherwise join a small piece onto the forward corners of the side panels and “wings”.

Wood, unless otherwise specified the solid wood required is to be medium density clear straight grained softwood such as pine, douglas fir, kauri or similar. It is not necessary to use top grade boatbuilding lumber, that’s too rich for a little craft like this and if kept well painted, dry and ventilated between uses even cheap lumberyard material will last for a very long time.

Where hardwood is specified it is because there is a need for extra strength, choose a hardwood that glues well, has straight grain and works easily as well as having that extra strength. If in doubt go to on or other of the forums and ask, remember that I the designer live in a county 7000 miles from where most of these boats will be built and I am not 100% familiar with what will be available in your local lumber merchants stock.

Solid wood.

20 x 30mm.	4 Pieces 2.5m long.	(Side stringers)
	6 pieces 1.3m long	
	8m assorted.	
	22 pieces 1m long	(rudder and centerboard)
20 x 40	4 pieces 1.3 long.	

20 x 30 hardwood.

	2 pieces 1m long	(Rudder and Centerboard leading edges)
30 x 200 hardwood.	1 piece 400mm	(rudder stock internal spacer)
20 x 200 hardwood	2 x 350mm	(Rudder stock side cheeks)
35 x 30 hardwood	1m	(centercase end posts and mast step)
25x100 hardwood.	1000mm	(Tiller)

Note that with care you can cut all of the above from a few pieces of larger stock, and it may be much easier to buy it that way. If you do not have access to a table saw or bandsaw for ripping down the sections, see if you can get a hand held circular saw with a fence and use that. But, BE CAREFUL. It takes a LONG time to get used to working with less fingers than you were born with. That applies to other tools as well, machinery designed to cut wood cuts flesh and bone even better.

Plywood.

3 sheets of 6mm plywood. Note that this is very tight and if you are unsure and live some distance from your source of supply, get a fourth sheet. Whats left over will help get you started on your next boat (go and have a look at www.jwboatdesigns.co.nz for some ideas in that direction)

Epoxy resin glue and filler.

Note that useage varies hugely , experienced builders tend to use much less than beginners. The quantities below are the designers best guess.

Resin 1 US gallon

Hardener to suit.

Glue powder ¼ lb.

Filler powder, use glue powder and mix a little thicker. But 5 oz of low density filler will enable the builder to fill corners and smooth off surfaces.

If the Epoxy supplier has a measuring system it pays to buy a set.

Fastenings. Should be all silicon bronze, stainless steel or monel metal. Quantities are approximate only. DO NOT USE BRASS SCREWS.

A note on stainless steel, for this type of boat screws need not be marine grade stainless steel.

12mm (1/2 in) countersunk head wood screws.	20
20mm (3/4in) countersunk head wood screws.	350
30mm (1 ¼ in) cs head w/s	50
45mm (1 ¾ in) cs head w/s	30
Pan head screws 25mm (1in)	30
6mm (1/4in) Stainless steel bolts with nuts.	2 @ 100mm (4in) plus large washers
6mm Stainless steel bolts with nuts.	8 @ 50mm (2in) plus washers
6mm countersunk head ss machine screws	4 @ 30mm (1 ¼ in) plus washers
6mm round head ss machine screws	8 @30mm (1 ¼ in) plus washers.
3.5mm (3/16in) round head ss machine screws.	20 @ 40mm (1 1/2in) plus washers and nuts.
20mm (3/4in) ringbarbed boatnails.	500

Alloy Pipe for spars.

Sizes and dimensions as stated on the plans.

Drawn seam Aluminium Tube (Aluminum if you speak American rather than English)

Grade 6061 – T6

In the USA I suggest “On Line Metals” as a possible supplier who will cut to length and ship mail order. Similar tube may be obtained from other suppliers but do check the grade and if you are not able to get the exact section check the weight, the tube you choose should be at least the same weight per foot, and preferably larger and a fraction heavier rather than smaller and lighter. The Kiwi PDR is much more powerful than, for example, an Optimist sailing dinghy, and has more sail area so places a considerable load upon its rig.

Links below.

From <http://www.onlinemetals.com/index.cfm>

Mast section.

http://www.onlinemetals.com/merchant.cfm?pid=4368&step=4&showunits=inches&id=71&top_cat=60

Yard and Boom

http://www.onlinemetals.com/merchant.cfm?pid=4360&step=4&showunits=inches&id=71&top_cat=0

Fittings. Fittings for the rudder and rig as well as other essentials such as fiberglass cloth and epoxy resin with glue and filler additives may be obtained from www.duckworksmagazine.com boatbuilders supply section.

Check the list below which details the particular product required.

Fittings. All fittings numbers below are as per the Racelite product in Duckworksmagazines product list at the above, and the good people there can supply you with a complete kit. Contact them for a price.

Eye Straps.	RL-413		14
Rudder pintles.	RL-490 2 ¾ in		2
Rudder gudgeons	RL-490		2
Hold down	RL-336		1
Halyard.	RL-325 H	hounds fitting	1
	RL-205 block	mast head pulley	
Also turning block at deck level for halyard.			2
Boom downhaul. 3 part purchase.			
Top block.	RL-702A		1
Lower block	RL-378A		1
Cleats for halyard and downhaul.			
	RL-260 S		2
Mainsheet.			
Traveller (horse)	RL-307A		1
Boom End	RL-304A		1
Boom	RL- 305A		1
Mounted on centercase.	RL-621B		1
Cleat for traveler adjustment.	SD 002310		2
Cleats for rudder up and downhaul			
	RL -260 s		2
Inspection hatches . (Deck plates)			
	SD 337160		2

Towing and tie up cleat.	SD 043050	1
Plastic parrell beads	Short oval	20
Shackles. Stainless steel.	SD- 107104	6
Tiller extension.		

Rope. Use below or equivalent.

Note, these are all over length so can be shortened to “freshen the nip” .

Halyard	6mm low stretch yacht braid or 4.5mm Vectra.	7.5m
Downhaul.	As above.	2m
Mast secure lashing.	3.2mm polyester solbraid.	1.5m
Rudder up and down haul.	As above	1m
Sail lashings and outhauls.	1.5mm polyester solbraid.	12m
Mainsheet horse.	6mm yachtbraid.	1.5m
Mainsheet.	8mm spun polypropylene.	9m
Centerboard hold down.	6mm shockcord.	0.5m
Rudder holddown	6mm shockcord	0.5m
Towrope.	8mm UV stabilized polyprop 3 strand laid rope.	5m

Building the KIWI PD RACER.

Note, at every stage, where glue or epoxy resin is used, very carefully clean up while its still wet. It's a nightmare to clean up later, rather like trying to sandpaper steel. The other thing that saves much time and effort later is to carefully round off exposed edges and sandpaper all the components as you build them.

Build each of the bulkheads and the two transoms. Note , working from forward aft.

This boat being a PD Racer all bulkheads and both transoms are simple rectangular shapes.

The bow transom has the edge reinforcing pieces on the after side of the plywood and the piece across the bottom should be fastened on with the bottom edge piece 10mm proud of the lower edge of the plywood to allow the piece to be beveled to fit the curve of the bottom.

B#1 has the edge reinforcing pieces on the forward side of the plywood to allow the centercase and mast step assembly to be fastened to it and the top edging piece should be 5mm high on the plywood to allow it to be beveled to suit the slope of the deck.

If you are going to fit an inspection port or hatch to the bulkhead rather than the foredeck now is the time to cut it and fit the doubler on what will be the inside of the buoyancy tank. The reason this one is in the bulkhead face and not the foredeck is that the foredeck is curved so requiring a doubler to be fitted outside then planed flat.

Note, before fitting the port, make sure that the cut edge of the plywood hole has been sealed with epoxy or paint.

B#2 has the plywood braces on the forward side of the solid wood pieces, again, to allow it to be fastened to the centercase assembly.

B#3 is a temporary frame, can be made from any cheap panel such as chipboard, plywood or even built up from solid wood as long as the shape and size is correct.

B#4 has the solid wood edging on the after side of the plywood.

The stern transom should have the edging pieces on the forward side of the plywood and the lower edging piece lower than the plywood to allow the bevel as shown on the drawing.

When making the bulkheads up, leave the centerlines prominent to help you line things up later in the build.

Cut out the sides, to mark out make a straight line from one end of a sheet of plywood to the other 170mm from one edge. Mark out the 200mm grid as shown on the plan. Draw a line at right angles across the lengthwise line at each of the 200mm marks and measure up and down from the lengthwise line as shown.

Your next job is to reproduce the shape of the side panel at full scale using the dimensions shown on the plan.

Note, it may be that the sheet of plywood you are working with is a metric one, 2400 long instead of the 2440 required. If you are confident enough to make a scarf joint do so (not a big deal, give it a go) or otherwise use a backing block to add a little piece on to get the extra length at the bow end.

Put a fine nail into or a weight on the marks, and lay a thin, flexible batten of wood or plastic (the thin mouldings used between waterproof sheeting in bathrooms are cheap and work well for this) to form a “fair curve” around through those points. Trace around with a pencil being careful not to move the batten as you do so.

Cut out one side panel, carefully plane it to its finished size and use it to trace out the other side. When cut out clamp the two sides together and trim the second side to the same shape and size as the first one.

Mark out the bulkhead positions. Note, B#1 and B#2 go on the forward side of the mark, B#3 and B#4 on the after side.

Make up the centercase and mast step assembly. Note the bolts used in the corners of the centercase, there is a lot of stress on these areas if the boat is run aground with the daggerboard down so make it strong. It pays to coat the inside of the case, end posts and the mast step with three coats of epoxy resin before assembly. When the resin has cured lightly sandpaper the areas that will be glued and dry assemble with bolts and screws as shown.

The lower curve is not described upon the plans, to get that curve mark the ends of the assembly at the height from the baseline shown, place the side panel on it at those marks ensuring that the side panel is at the correct position fore and aft, and trace with a pencil to mark the lower edge curve on the centercase and mast step side. Cut out to suit.

The centercase logs and top side pieces must be glued and screwed to the sides before assembly as its not possible to put those screws in later, remember to fill the screw heads and sand off before assembly.

Remember that the forward end post is longer, and goes right up to the underside of the foredeck king plank that makes the top step for the mast. Round the corners where they are exposed.

Remember not to glue the mast step pieces, these are intended to be replaceable with ones that give a different mast rake should you wish to change the “balance” of the boat so are simply through bolted where shown. Use large washers on the 8mm (3/8in) bolts and nuts and do up firmly but not dead tight.

When the assembly is all glued up, glue and screw to B#1 and B#2, taking care to get the assembly square and straight. Use the centerlines on the plywood bulkheads as a guide, dry assemble, check with a set square and sight the sides and bottom of the frames to check for twist or offset before taking the screws out and assembling with glue.

Screw the sides to those two bulkheads, again, dry fit using screws, and check for accuracy measuring the distance between the two frames at each side panel, the measurements should be identical and when you sit the assembly upright, the side panels at bow and stern should be at the same height. Check by putting a level across.

When happy with this, take the screws out, and reassemble with glue.

Fit B#3, B#4 and the two transoms in the same way.

As you go, mark the side panels with the centerline of the edge pieces of the bulkheads, when the bottom panel is being fitted you will use these as a guide to rule a line across to indicate where the screws are to be put in.

What you have now is an odd shaped box with no bottom, cross dividers and a centercase. It will be diagonally quite unstable and the next job is to fit the bottom panel which stiffens the assembly.

But it **MUST** be square.

Check that the bulkhead bottom edges are planed off to match the sides so when the bottom panel goes on it will sit properly on the bulkheads bottom edge piece.

Before fitting the bottom, fit the two 20 x 30 crosspieces that strengthen the boats bottom in way of the cockpit, dropping them into the notches cut into the side panel lower stringers and securing with screws and glue.

One can assume that the end of a sheet of plywood is square to the sides, but it pays to check. Do so, and if necessary plane it square. (Remember your geometry, 3 units on one side, 4 four on the other and five diagonally is 90 deg. So, 900mm on one side (being 3 units of 300), 1200 along the other and that should be 1500 across the diagonal)

Measure across the bottom and trim your plywood (if necessary) to the width of the bottom.

Scribe a line exactly down the middle inside and out. When you have it dry fitted, lift the boat up and check that its centered on the centercase as you'll use this line as a guide to fasten the case to the bottom and to cut the dagger board hole.

With the "box" upside down dry screw the end of the panel to the stern transom leaving perhaps 2mm overhanging, and working forward gradually bend the plywood to the bottom shape until its in place on the boats bottom. This will markedly stiffen the hull. When you are satisfied with the fit and squareness of the assembly, mark the centerline of all of the bulkhead positions, the centercase and stringers, and drill for the permanent screw holes.

Undo the bow end back a little beyond halfway and apply glue, then re fasten in place back about 1/3 the boats length, and then do the same at the after end working with the fastenings back from

where you left off . DON'T work in from each end with the screws, you can end up with a bump that you cant pull down.

Screw at 120mm intervals, with two ringbarb nails in between each screw. Don't forget to countersink the screws in so the heads are about 1.5mm below the surface, You can punch the nails down later.

Now you've got a boat. A bit rough yet but it will float.

While upside down and the glue cured, round off all the corners as shown, and very carefully use the template to mark and cut the foil shaped hole in the bottom. Needless to say it has to be centered exactly on the centercase and be exactly lined up with the centerline. Take care.

You will need to adjust this foil shaped slot with sandpaper after making your centerboard. Optimum is about 3mm total clearance, that's total, not each side. The centerboard must move through this slot freely with not the slightest jamming or friction.

Now its time to work on the inside and the decks.

Fit the rudder fittings, painting the area with primer and sealing the inside of the bolt holes with paint or epoxy resin. Take them off again, this might sound like a waste of time but once the decks are on its not easy to drill those holes and seal them, and you need to get the boat painted before final fitting . Note, I buy some thick section neoprene "O" rings from an engineering seals and bearing place, I choose ones that are a fairly tight fit on the bolts and put one on each bolt under each fitting on the outside. I coat them very lightly with marine grease and find that is very effective at keeping water out of the end grain in the bolt holes (I know I said to seal them but its not easy to get them perfect and rudder fittings get a hammering). It's a good idea on deck fittings in bigger boats as well.

Take some 20 x 40 pieces long enough to go from the stern to B#4, place each piece against the side panel and trace the curve so you can cut the top edge to match. Cut the bottom edge parallel so you have a 25mm deep curved stringer. Round the lower edges except where in the frames, sand off and fit.

Do the same at the forward end of the boat to make the two stringers.

Make up a jig picking up the shape in exactly the same way, two pieces of 45mm x 95 (two by four) wood with the top edges cut to match the curve from the bow transom back to the forward end of the centercase slot in the same way you cut the deck beams and glued together makes a 90mm wide laminating press so you can put three strips of 6mm plywood 100mm wide along it, glue between them and clamp until set. Plane the edges smooth, round the lower corners and sand off. You now have a curved king plank tough enough to hold your foredeck, the mast, and take a towing cleat ahead of the mast. Round off the "show " edges and sand , then paint all but the areas that will be glued.

Fit the stringers and king plank into place, making sure that the king plank is very well fastened into the solid wood at the ends with three x 45mm (1 3/4in) c/s head screws each end plus glue. You'll

need to be careful with the size of pilot holes for these as they are going into relatively small sections of wood and if not careful you'll split them.

Paint, epoxy or otherwise seal the wood inside the "tanks" formed by the enclosed areas at the ends of the boat. Take care, be thorough, three coats minimum, with luck you'll never see the inside of these again.

Make up the foredeck in two pieces, note that it will overhang the boats sides to form the "wings". Note too the shape around the mast step, and the side decks, the deck plan shows where the joins to the side decks will be. Coat the underside of the deck pieces, three coats again. If you dry fit one side at a time you can reach in under from the other side to pencil mark the areas which will be glue surfaces (under stringers and king plank, bulkheads etc so you can leave them uncoated if using paint, or lightly sand if using epoxy resin.

Fit the towing cleat, it bolts onto the foredeck about 100mm in front of the mast, so you can get at it from inside the boat without having to reach, and if you are a novice sailor I'd suggest that you splice a 200mm long loop in both ends of the towrope specified above and tuck one end through "between the cleats legs) and pull the loop back over the horns of the cleat then thread the rope over that loop to make it secure. Coil the rope up and put it on the cockpit floor alongside the centercase. With luck you will only ever use it to tie the boat up.

Do the same with the afterdeck, cutting out for and fitting the inspection port in the deck. Note, that's required to be in that position so you can access the rudder fittings area and fit them when the paint job is all done.

When the decks are all fitted, fit the doublers under the edges on the inside. Make sure you round all the underside edges and sand them, as with the areas inside the "tanks" you won't be able to access these later. These doublers can be pieced up from scrap but ensure that the joins are long angled ones and well away from the joins in the top surface of the decks.

It's important that you round the doubled inside edges as shown, a plain radius is not comfortable and the slight difference as drawn is much easier on the underside of the thigh.

Fit the underneath layer to the "wings" as shown. Fit the 45% 20x20 bracing piece as shown, be generous with the glue on this as you can use the glue squeezed out to produce a nice radiused fillet which will help strengthen the area. Fasten with the screws into the sides before nailing from the top. Note that the "wings " are natural places to pick the boat up by so need to be strong both in lift and downwards from sitting on them.

Fill all nail and screw heads, any gaps or holes, and ensure that there is no place where water can get in between two pieces of plywood or wood, sand everything off smooth, then paint.

Paint, I prefer to use good quality oil based exterior house paint, that's the stuff for which you use mineral turpentine to thin and clean brushes. Use the entire system from the same manufacturer. That may be undercoat primer followed by top coat, or primer, undercoat and then topcoat.

A hint, when brush painting, put three or four coats of the primer and undercoat on, then carefully wet sand all the brush marks out with 300 grit wet and dry paper on a cork block. If you go through it, patch and resand.

Then thin the topcoat very slightly and keeping a wet edge brush three coats on. With practice you can achieve a finish better than most spray paint jobs.

You still have a centerboard and rudder to build, note that the blanks for the centerboard and rudder are the same width and section, and are laminated together in the same way. I've shown a hardwood leading edge for both, and a little lead in the tips of each to ensure that there is no tendency to float up.

Note, where the section changes from the foil shape that will give you lift to the square section that holds the centerboard or rudder square in its case or stock, make sure the change is radiused as shown.

The rudder has a piece of shock cord that runs from the eye straps screwed to the side of the rudder stock, back through the hole in the trailing edge of the rudder blade and back. Make sure it has some tension on it so it pulls the rudder down when down, goes through over center as the blade is pulled up, and holds the blade up when up.

Before assembling the rudder stock, dry assemble it and offer up the rudder pintles, mark the holes and you will see that the after most holes do not line up with the center packing piece. Drill those holes to suit your bolts, take the cheek pieces off the packer and countersink those holes on the inside. When you assemble the rudder stock you will use countersunk head machine screws through from the inside to secure the after end of the pintle mounting straps, the forward ends have a bolt right through the whole assembly.

The downhaul line runs from the hole in the leading edge, through the eye strap and groove in the forward corner of the rudder stock and up through a groove behind the rudder pintles to a cleat on the forward face of the rudder stock above the deck level. That line then continues back to the hole in the trailing edge of the blade so you can pull it up.

The centerboard has also a shock cord control loop. It runs from the eye strap on the forward side of the centercase up and over the notch in the "handle" on top of the centerboard, and back down the other side. It holds the 'board down when right down, and by pulling it back over the end of the handle and allowing it to bear on the back edge of the centerboard it will hold the 'board partly up .

Make sure that the centerboard has about 3mm clearance each side within the centercase, and about 1.5mm each side where it fits through the bottom panel. It is very important that this is very easy to lift and put down, no friction or jamming.

The rudder must be very easy to move within the rudder stock, no friction, but no slop. You can adjust this a little with the pivot bolt, but don't rely on this as you can only close it perhaps half a millimeter.

Note that the rudder and stock are very strongly built for a small boat, but its not only there to steer, this is a part of the boats lateral plane and as such takes more load than a conventionally laid out boat. It also doubles as a means of sculling the boat along so takes more wear and tear.

Tiller. Make the tiller as shown, use close grained strong hardwood and make sure that the slot is a close but free fit on the rudder stock head. The tiller is mounted by holding the tiller near vertical, engaging the bolt across the after end of the slot with the notch in the back of the rudder stock head, then laying the tiller down forward over the rudder stock head. It fits in under the sail sheet horse so it can't come up enough to disengage, but just in case it pays to put a securing line on it so if it comes loose it cannot be separated from the rudder stock.

Note the screw just above the slot that takes the tiller pivot bolt, It is there to stop the wood splitting away.

Do put the tiller extension on as shown, with the "wings" forming seats the tiller is too far away to be easily reached from your seating position, and the extension will allow you to sit comfortably upright and to move your weight back and forth to trim the boat.

Rigging.

Having glued the wooden plugs into the ends of the yard and boom, file or sand the ends of the alloy tube so it is slightly rounded and sufficiently smooth to prevent it scratching or cutting.

Fit the "eye straps" where shown, a pop riveter with 4.5mm (3/16in) monel or stainless steel rivets may be used to secure the items secured by screws as shown on the ends of the spars, or similar sized self tapping stainless steel screws will do the job.

Make up a small loop as shown and thread it through the eye straps, shackle the blocks to it.

Fit up and tie the Parrells to the spars leaving the forward end free. That will be taken forward around the mast and tied with a rolling hitch when you set the spars and sail up on the mast. From there you may either undo each time you unrig, or slide the mast out leaving the tied end in place.

You do need a little slack in the parrell.

Tie the two forward ends together as shown, leave a little slack as these must be able to move slightly relative to one another.

Lay out on the ground and set the sail up inside the vee made by the spars, lace the forward corner (tack) into place, leaving about 30mm (1 ¼ in) between the sail and the fittings, this may vary but you have to start somewhere and you may find that you'll change it later to improve the sail set.

Lace the outer ends the top one is the "head" the lower the "clew") to the fittings on the end of the spars. These two lashings are meant to be adjustable, you need to pull them up until there is a definite crease along the sail parallel with the boom and yard. That tension will probably need adjustment, but if ever you see creases radiating away from the lacings when , you need more outhaul tension. Ideally the crease should show when there is no wind in the sail and should pull out when sailing .

Lace the sail to the boom and the yard, ideally the sail should sit about 6 to 8mm (¼ in) to (3/8 in) away from the spars when set and drawing and that gap should be the same from one end to the other.

Having set the sail up on the spars, its time to address the mast.

I'd expect that the wooden plugs and the square on the lower end will be in place at this point, note the hole through the square step and that its oriented from side to side to match the hole in the mast step. This takes an 8mm bolt so the mast cannot lift out until you are ready to unrig. Note that if it were to come out while sailing or during a capsize the leverage of the sail may smash the top step. Don't forget that bolt.

Offer up the mast hounds fitting, and mark the holes, drill and fit the fitting. Shackle the halyard pulley on and thread the halyard through.

Done!

Some will want to fit an eye strap on the forward side of the mast just above the deck, this is for a lacing to an eye strap on the deck, does the same job as the bolt through the step.

Fasten the two eye straps that take the downhaul and halyard turning blocks. Note that the downhaul one should be directly under the boom with the boom straight down the middle of the boat. It , like the halyard block should be about even with the aftermost edge of the mast.

Fit the same item for the halyard on the other side, but this one needs to be about 30mm out from the mast side.

Shackle the blocks into place.

In line with the eye straps but near the after end of the king plank and deck extension that runs back to the centercase forward post, put the two cleats specified, thread the halyard and downhaul tails through and put a figure of eight knot (stopper knot) in each.

Put the sail and spars alongside the mast on the port side, secure the halyard and downhaul as shown, and haul the sail up. Cleat the halyard when the sail is about at the height indicated on the drawing, (about 450mm that's just under 20in) above the deck.

A vertical crease between the halyard point on the yard and the downhaul position on the boom indicates too much tension, too little gives you a baggy sail. Use the downhaul to tune this, you can adjust this under way but will need to learn what it is you are trying to achieve before you mess with it too much.

The mainsheet is on a rope "horse" at the after end. This "horse" allows the mainsheet block to be clear of the tiller, and gives adjustment as explained below.

First, put an eye strap on each side of the boat out on the "wings " about 120mm forward of the stern transom. Thread the rope for the "horse" through the mainsheet block lower (smaller) end and then through the eye straps and take each end across to the other side of the boat at deck level

at the forward end of the stern deck. Put a cleat in there about 300mm in from the side of the boat, run the rope ends through the cleats, take the ends and tie them together.

When sailing to windward in heavy weather let the “horse” out until the mainsheet block is out far enough so the boom sheets to about the stern quarter (corner). In light weather pull the horse tighter so the boom sheets about 200mm outside the rudder on the downwind side. This allows you to alter the sheeting angle as well as the amount of downforce on the leech (after edge) of the sail which can have an effect on the sail shape. (more to learn but don’t worry about it too much. The learning that is, it will happen!). ;-)

A keen sailor will fit toe straps in the cockpit so she or he can put their feet under it and lean out to counteract the wind in the sail. I’d use webbing such as old car seat belt material or similar, screw each end in by wrapping over an SD-090125 folding loop at each end, stitching and fitting in a position where the feet will be in a comfortable position when “stacked out”. Leave some slack in the toe strap and put a piece of shock cord pulling upward at the forward end so the strap sits up high enough to tuck the toes under without having to look down.

Sailing, sail her “free” . That is not too close to the wind, that gives less leeway, more speed and better control, and makes better progress . Sit forward a little when sailing upwind in light weather, and a little aft when sailing downwind. In heavy weather sit right back on the after deck close to the middle of the boat when sailing downwind, and don’t sail directly downwind, sail perhaps 15 or 20 degrees off to one side and gybe (change the sail over and swap sides) occasionally.

Learn to use the tiller extension, it will make life so much easier for you.

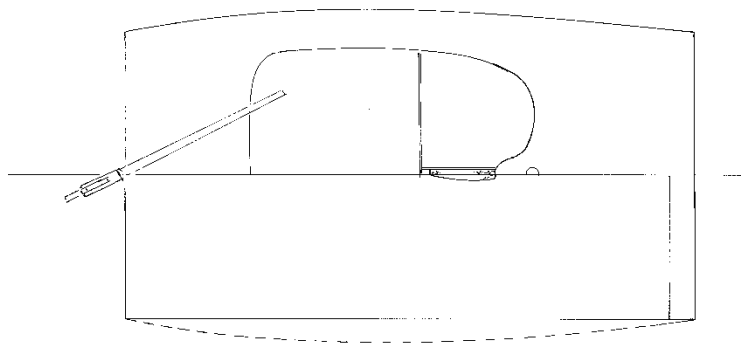
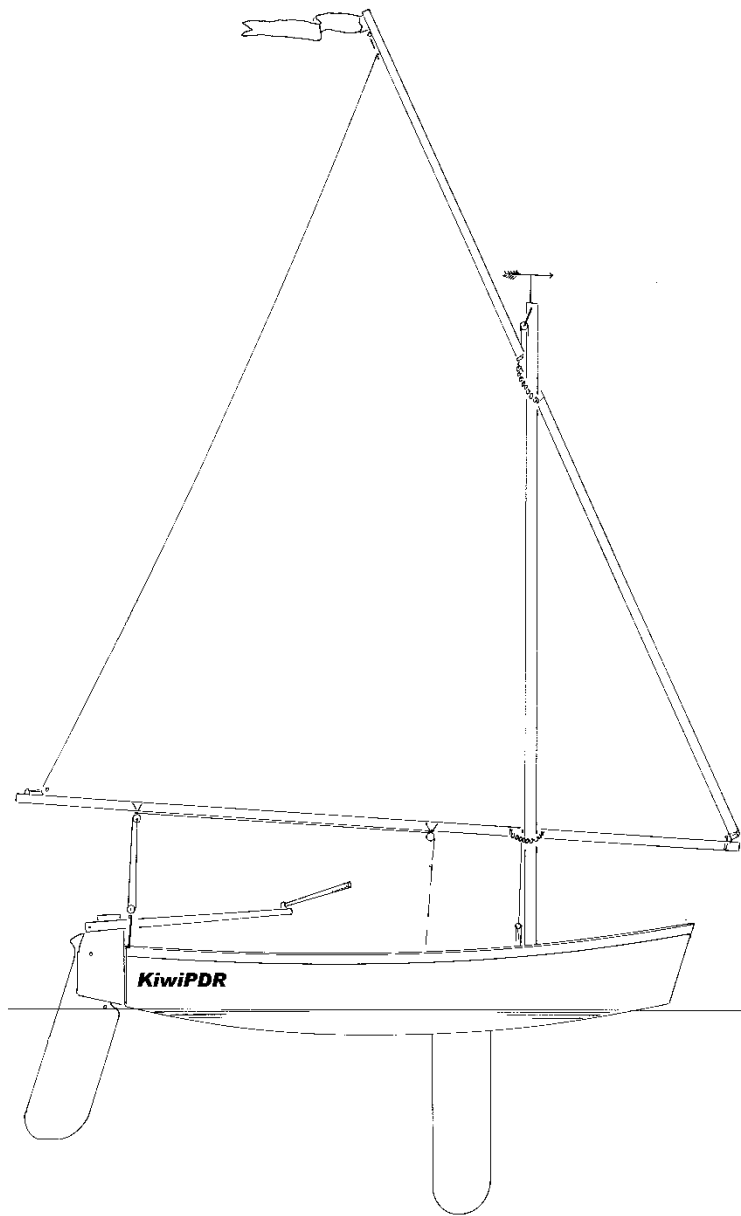
Wear your PFD!

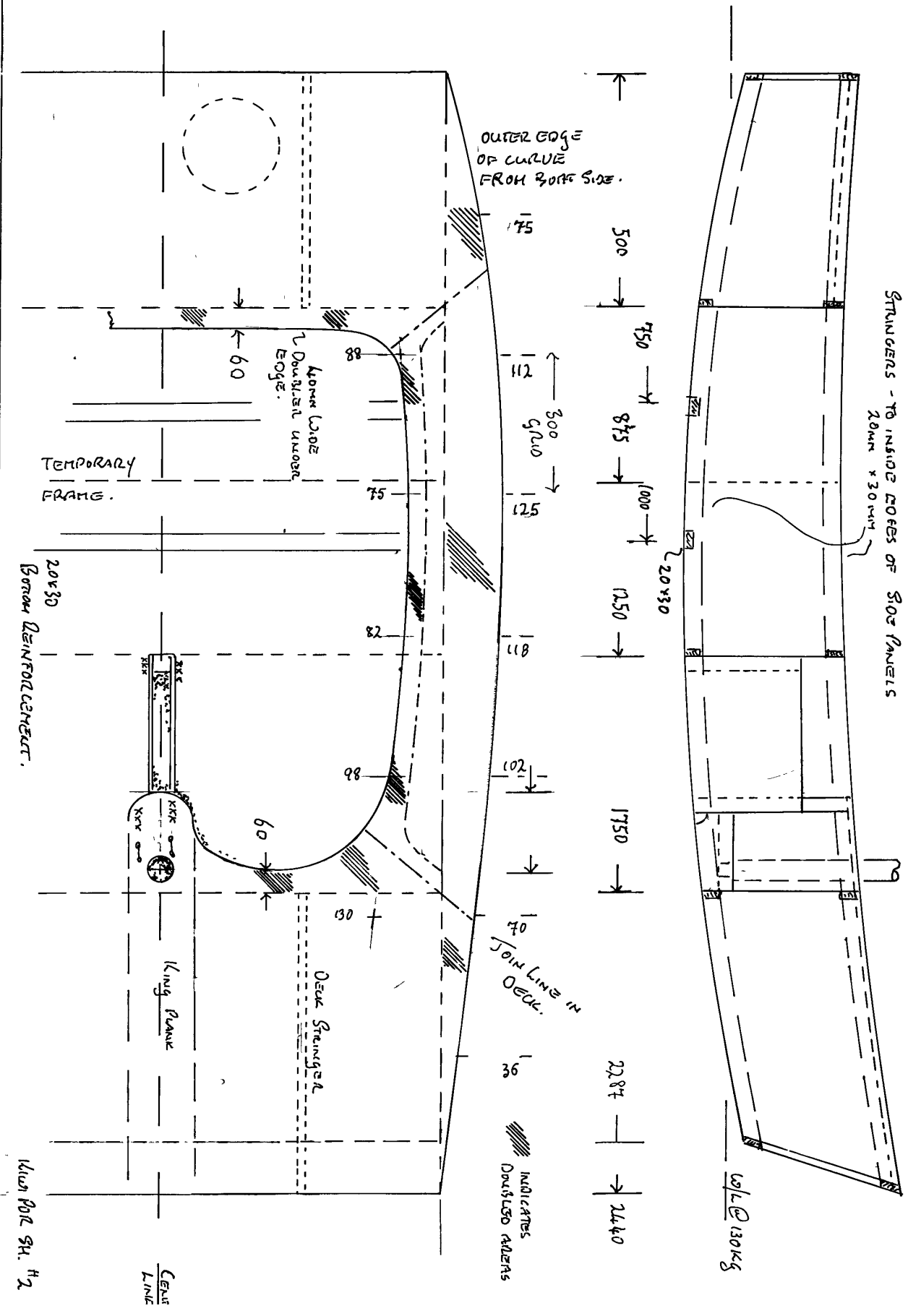
Absolutely the most important instruction is the one below.

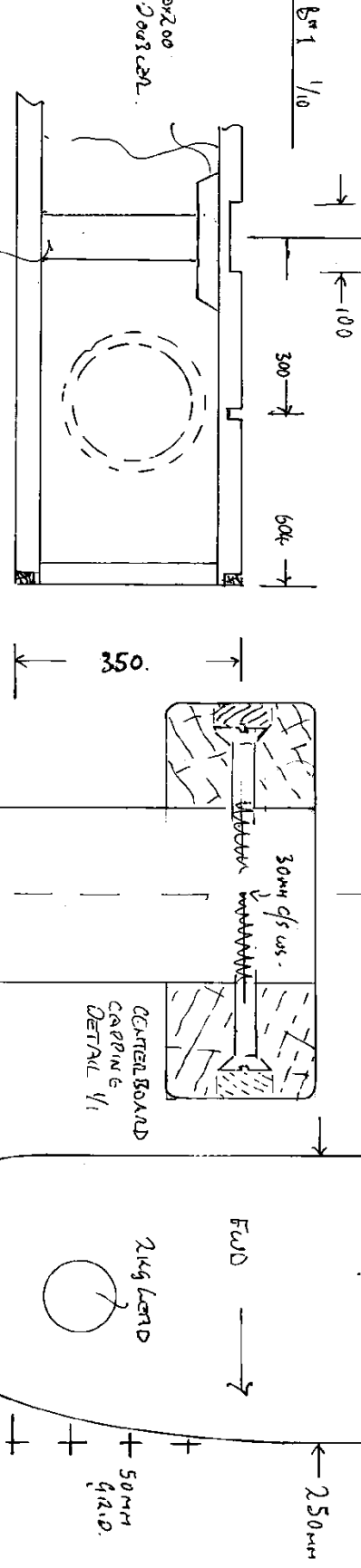
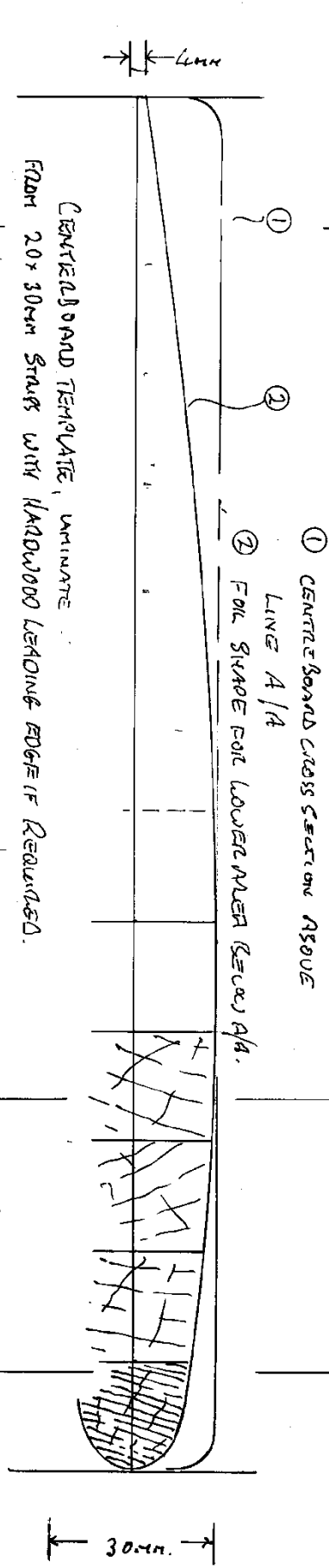
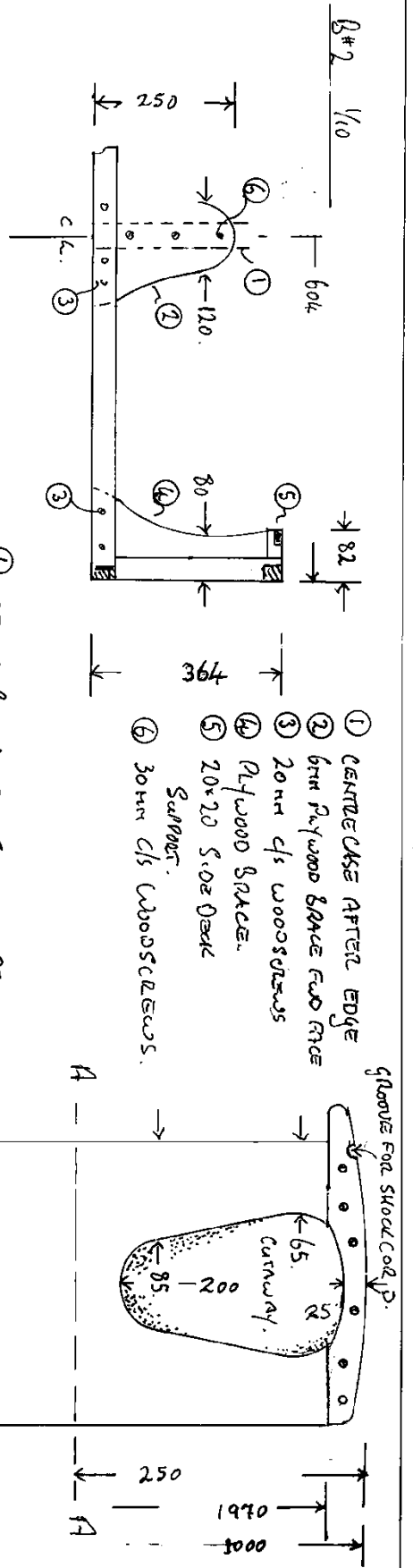
HAVE FUN.

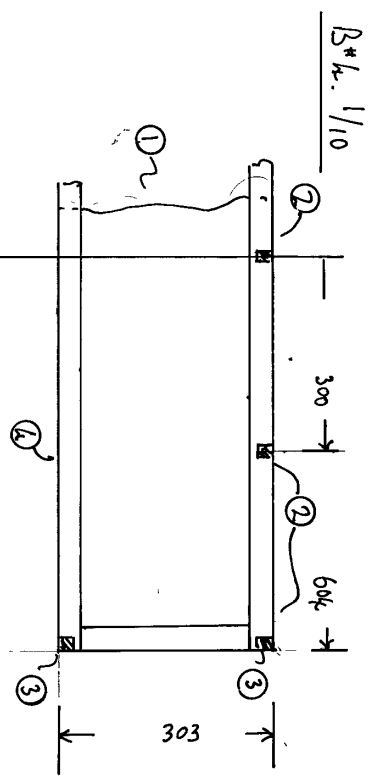
John Welsford

Marine designer.

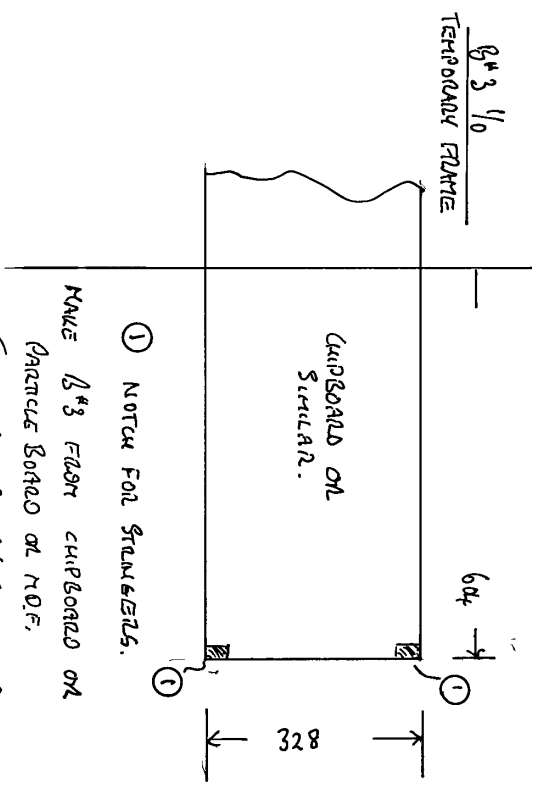




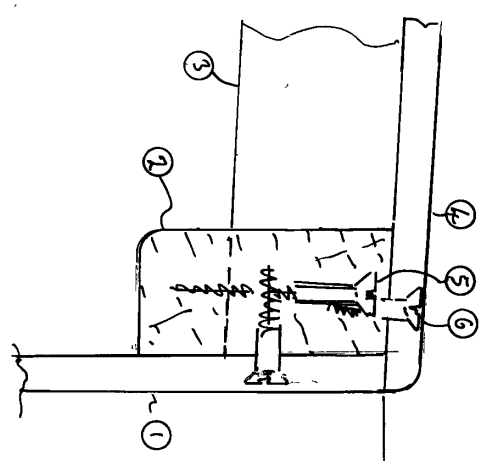




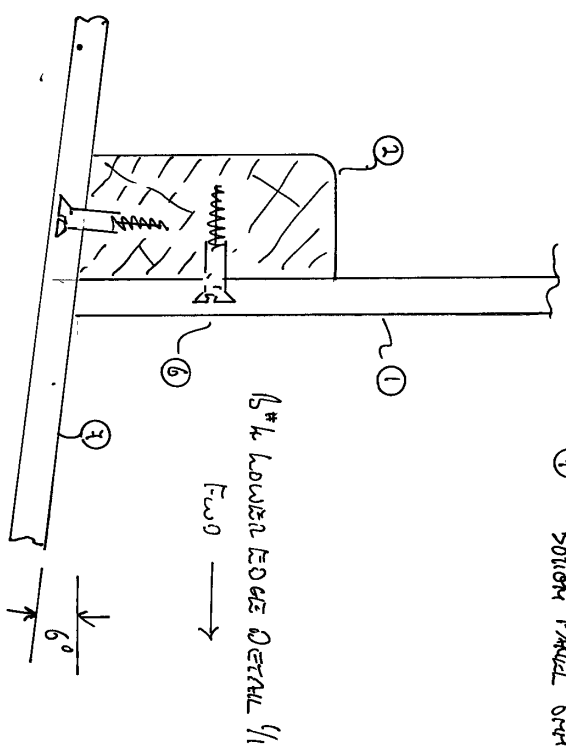
- ① B*4 6mm Plywood with 30x40 Edge Pieces
- ② AFTER DECK STRINGERS, 20x25
- ③ STRINGER 20x30
- ④ 20x40 TO LOWER EDGE OF ALL FENCES.



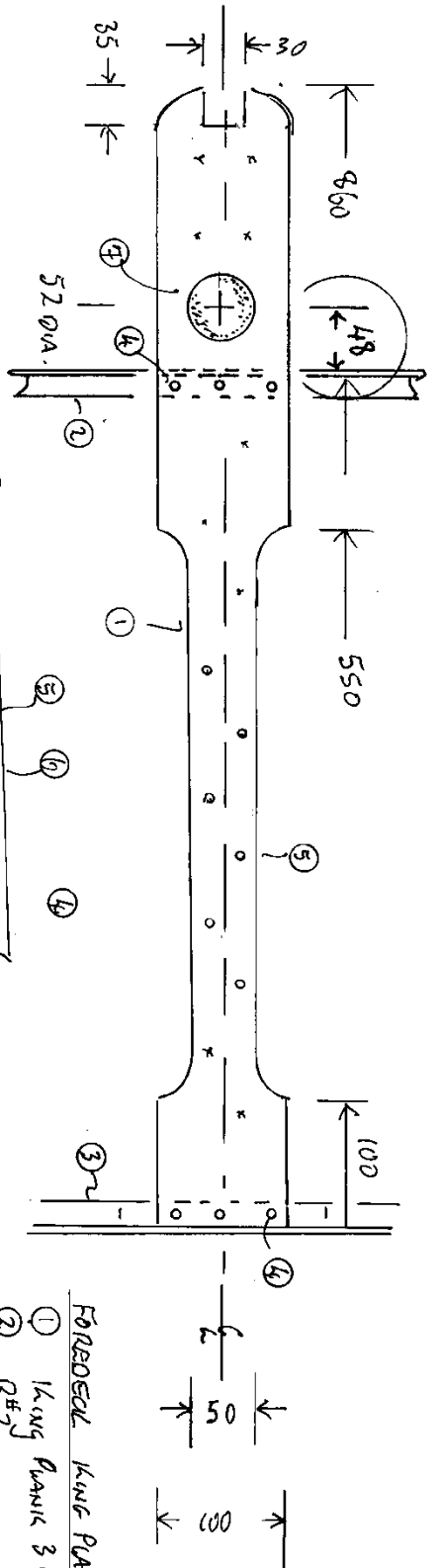
- ① NOTICE FOR STAINLESS.
- MAKE B*3 FASTER CURVED ON PARALLEL BOARD ON R.O.F.
- THIS IS A TEMPORARY/FENCE TO BE REMOVED AFTER THE BOTTOM PANEL HAS BEEN FITTED.



- ① B*4. 6mm Plywood
- ② 20x40 Edge Piece
- ③ 20x25 DECK STRINGER
- ④ AFTER DECK 6mm Ply
- ⑤ STRINGER TO B*4 30mm
- ⑥ 20x40 TO LOWER EDGE OF ALL FENCES.
- ⑦ 20x30
- ⑧ 20x40 TO LOWER EDGE OF ALL FENCES.



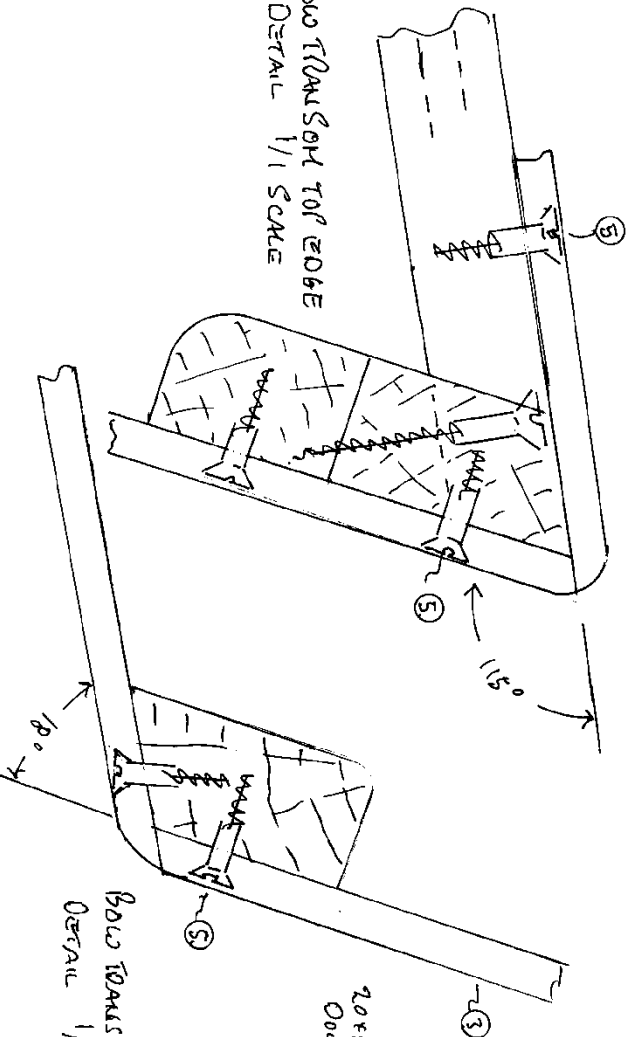
22/01/10
16/01/10



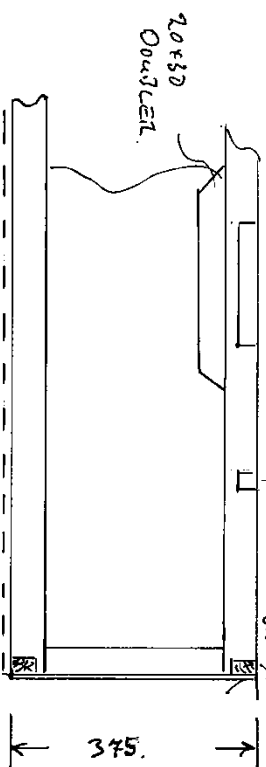
FORWARD LINE PLATE

- ① 1/2" PLATE 3 LAMINATIONS 6mm PLY
- ② 3/4" 2
- ③ 800 TRANSOM
- ④ 45mm c/s 18000300000
- ⑤ 20 mm c/s 18000300000
- ⑥ 100 mm ϕ
- ⑦ 20x30 Double 200 long.
- ⑧ 20x30 Double 200 long.

800 TRANSOM TOP EDGE
DETAIL 1/1 SCALE



800 TRANSOM LWR EDGE
DETAIL 1/1

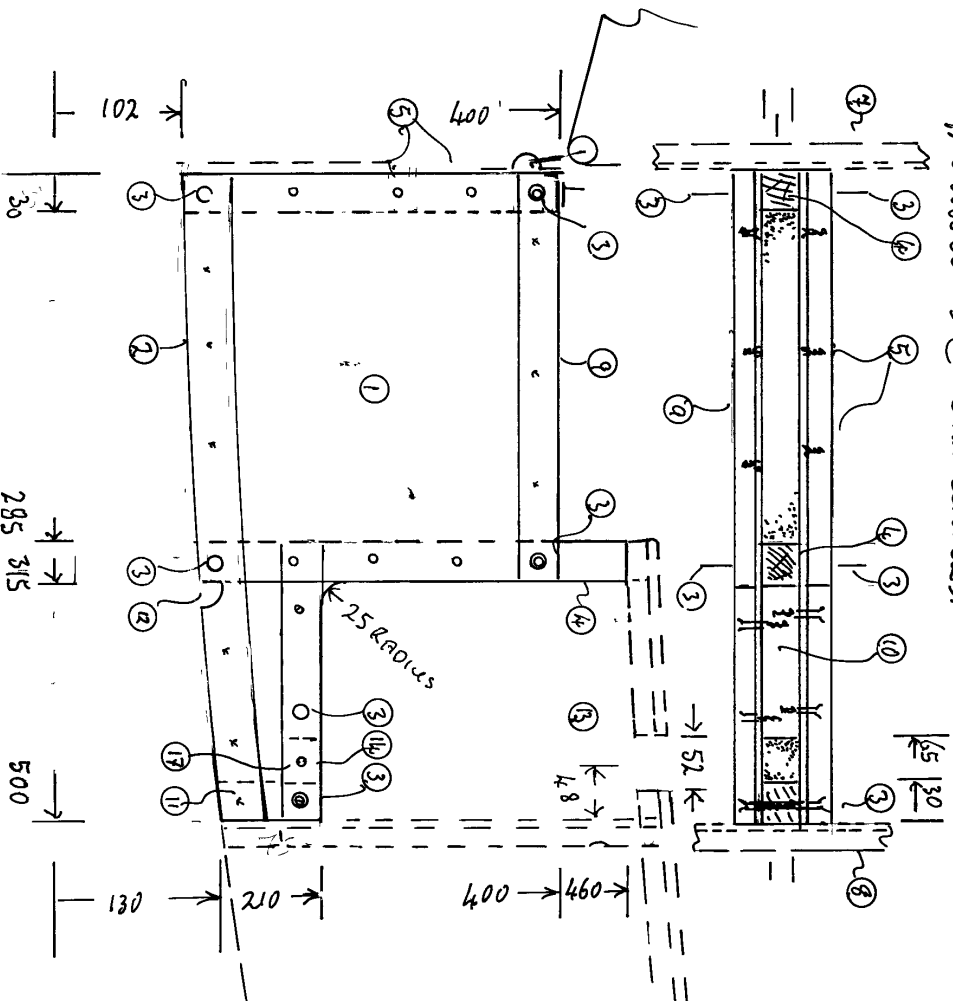


800 TRANSOM 1/10

FROM 6mm PLYWOOD WITH
20x30 SIDE AND EDGE PIECES
20x40 BOTTOM & TOP PIECES

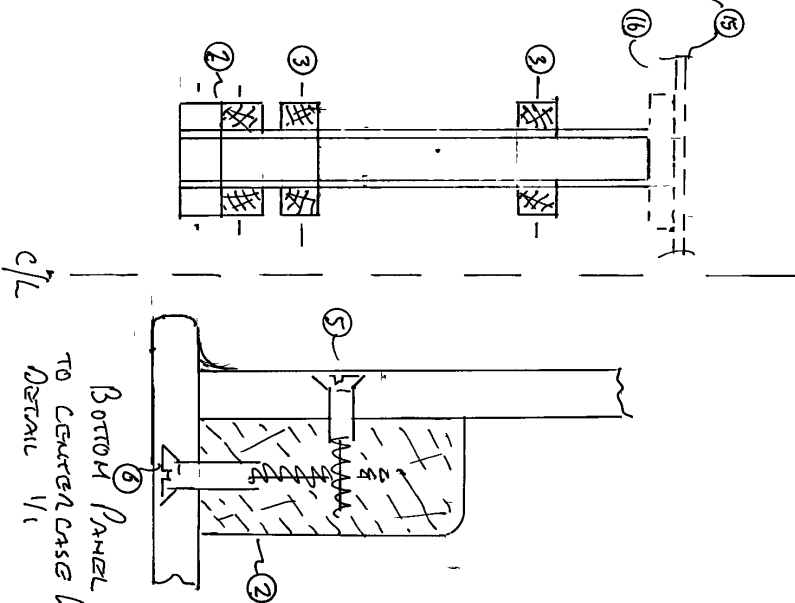
QUARTER CAGE AND MAST STEP DETAIL 1/5.

- ① CENTENCE CLOZ 6mm PLUMOOD
- ② CENTENCE LOG 20x100
- ③ 6mm THROUGH BOLTS.
- ④ 30 (WIDE) x 35 (LONG) CLASZ END POSTS.
- ⑤ 20mm c/s WOOD SCREWS.
- ⑥ 40mm c/s WOOD SCREWS. @ 75mm CENTRES.



- ④
 ⑧
 ⑨
 ⑩
 ⑪
 ⑫
- B# 2.
 B^2
 30 * 30 central case logs,
 30 * 35 first step
 30 * 35 first step
 drain

- (13) MAX STEP-TO-POSSIBLE
- (14) MAX STEP-LOWER PARTNER.
- (15) FOREWARD from Paywood
- (16) KING PAUK LAMINATED FROM
- (17) 3 layers of gum Paywood

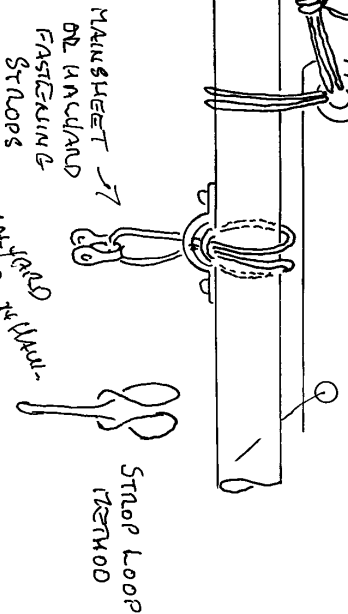


Kluon Par Sky

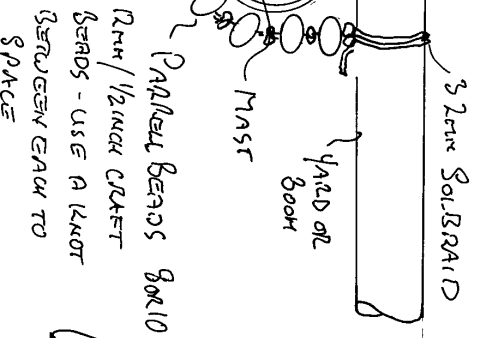
Not to Scale

Rigging Details.

Clew and Peak
Lashing / Occluding
Detail.
Side View



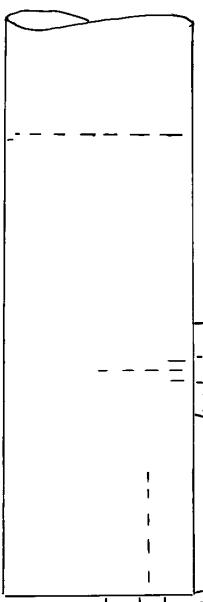
PARREL DETAIL AT
MAST AND BOOM WHILE
THEY CLOSE THE MAST



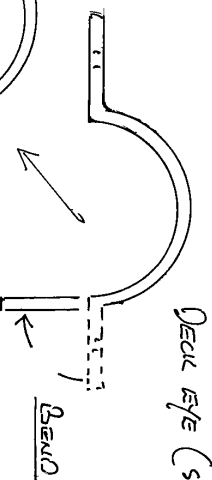
HARDWOOD PLATE TO
TURN FROM END

To

SPAR END FITTINGS



Deck Eye (Saddle)

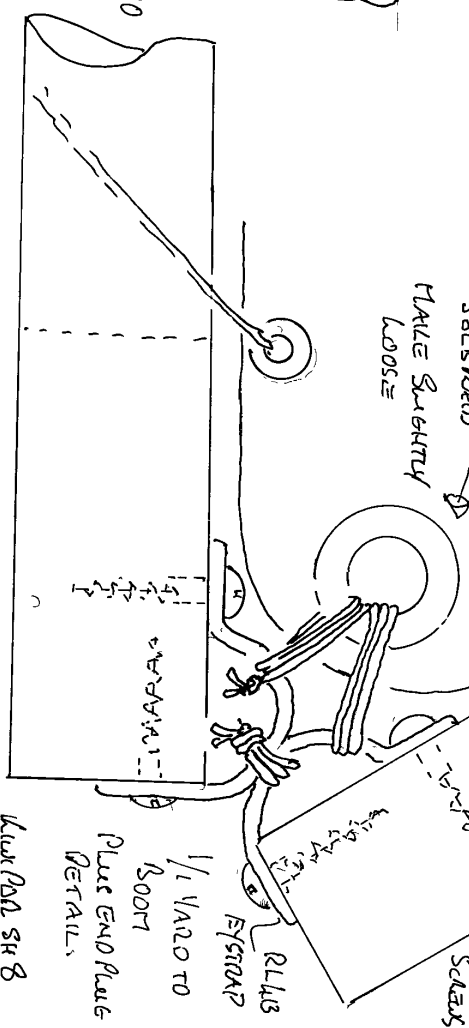


25mm Round or Plus Head
Screws

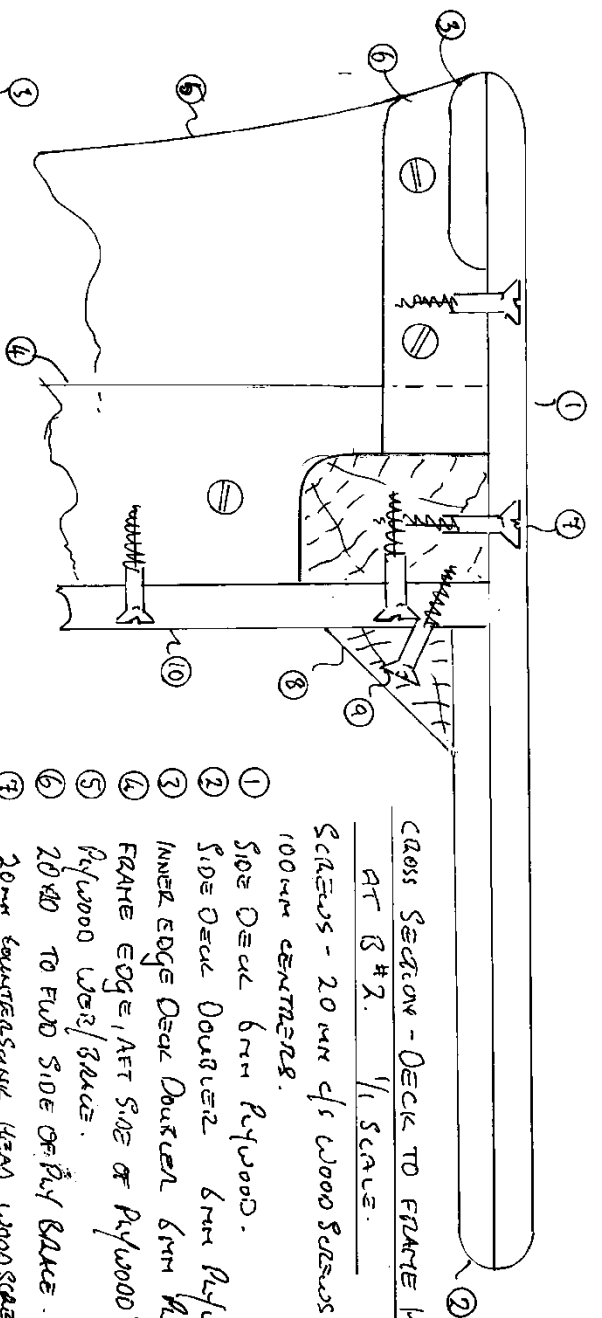
HARDWOOD
PLATE TO TURN
(TURN FROM
END)

LASHINGS FROM 3/2 IN
SOLID RAIL
MADE SURETY
LOOSE

25mm
Round Head
Screws

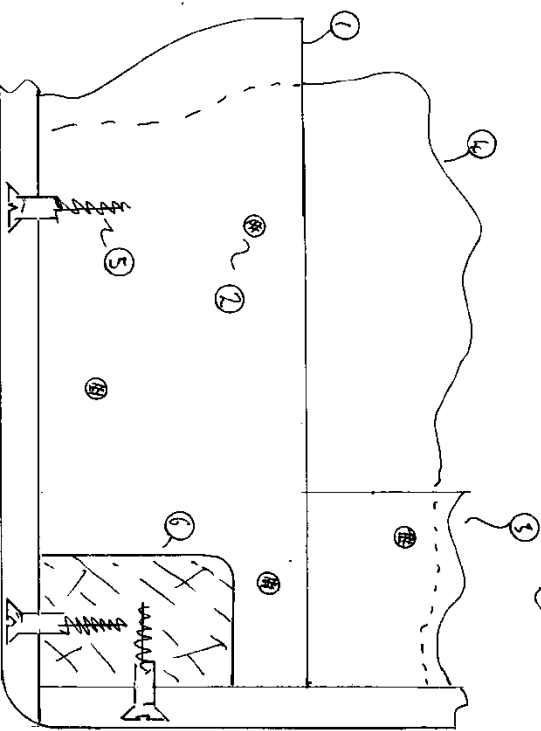


1/2 IN
BOOM
PLUS END PLATE
DETAIL.
BLACK PALL SK 8



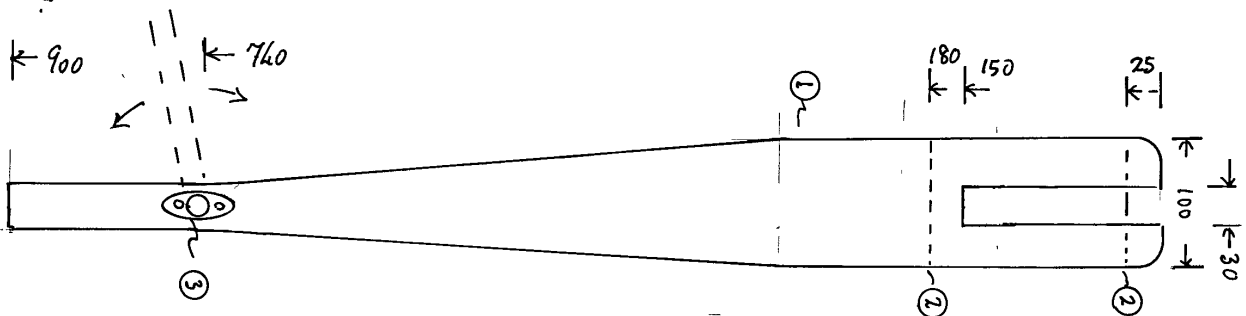
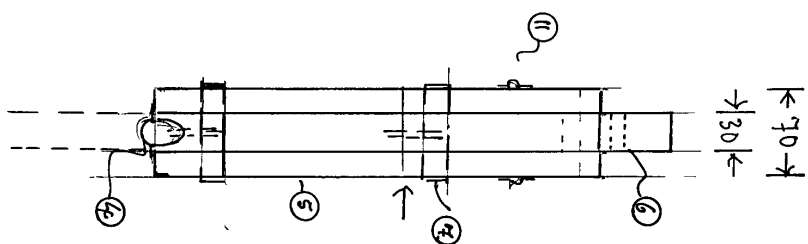
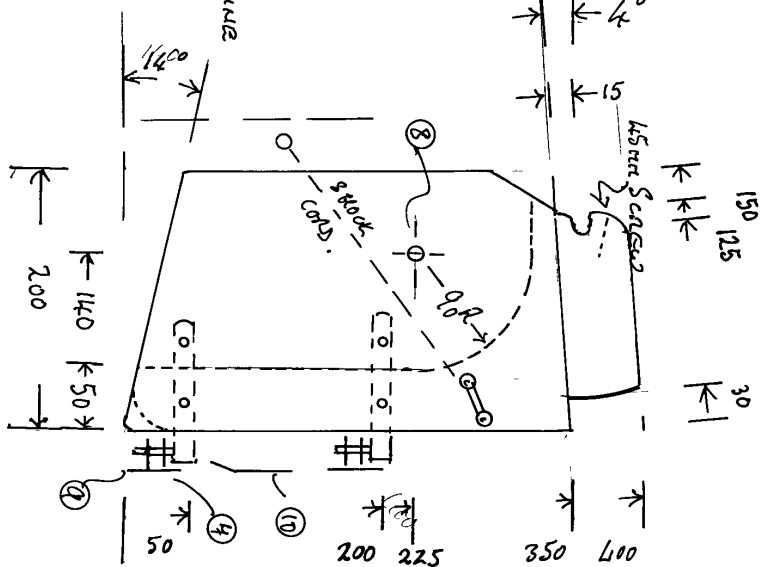
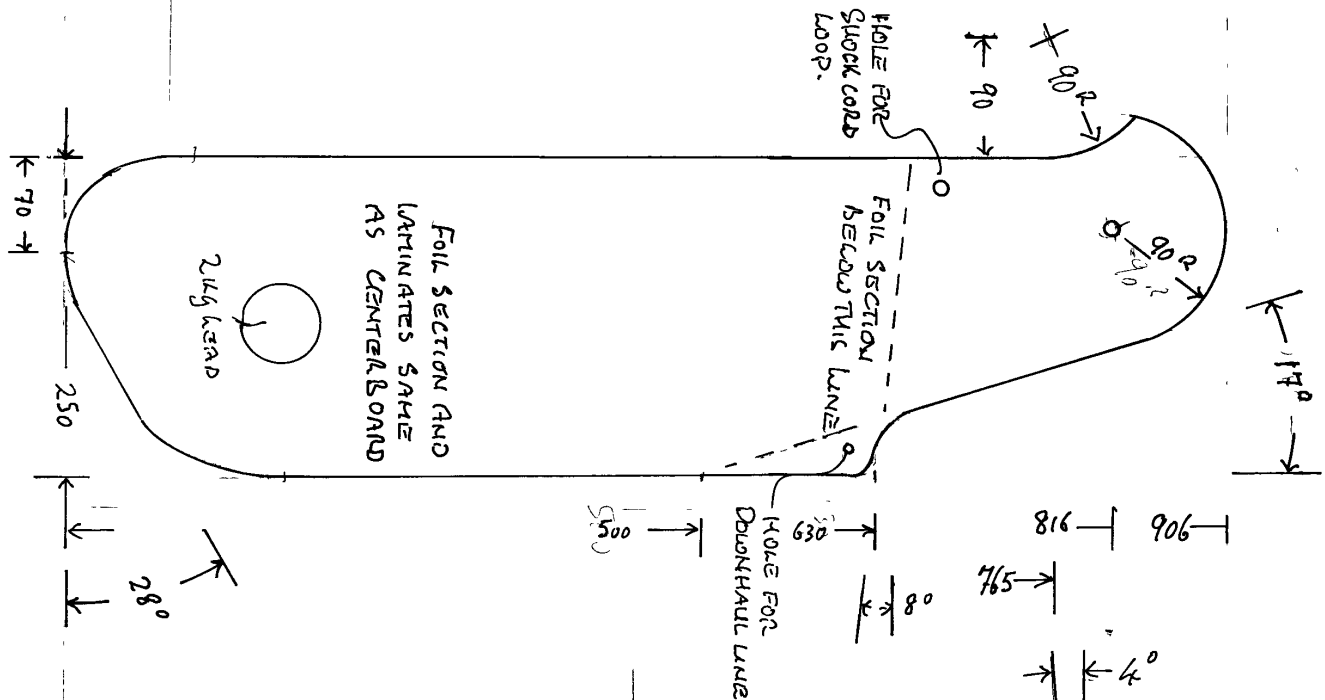
CROSS SECTION - DECK TO FRAME HEAD
AT BULKHEAD 1/1 SCALE.

- 1 SCREWS - 20mm c/s WOOD SCREWS @ 100mm CENTRES.
- 2 SIDE DECK 6mm PLYWOOD.
- 3 SIDE DECK DOUBLE 6mm PLYWOOD
- 4 INNER EDGE DECK DOUBLE 6mm PLYWOOD.
- 5 FRAME EDGE, AFT SIDE OF PLYWOOD DECK.
- 6 PLYWOOD DECK/GRADE.
- 7 20mm TO FWD SIDE OF BULKHEAD.
- 8 20mm TRANSVERSE HEAD WOOD SCREWS.
- 9 20x20 x 45° CORNER PLATE FROM BOW TO STEER.
- 10 20mm c/s WOODSCREWS @ 125mm c/s.
- 11 6mm PLYWOOD BOW SIDE.



TYPICAL SIDE TO BOTTOM DETAIL 1/1 SCALE.

- 1 20mm Lamin Filtrite Rite. Bottom edge sealed to match bottom panel.
- 2 3/4" (20mm) hanging board nicks @ 50mm centres
- 3 20x30 side frame edge
- 4 1mm ply wood scullered.
- 5 20mm c/s head wood screws @ 100mm centres.
- 6 20x30 stringer.

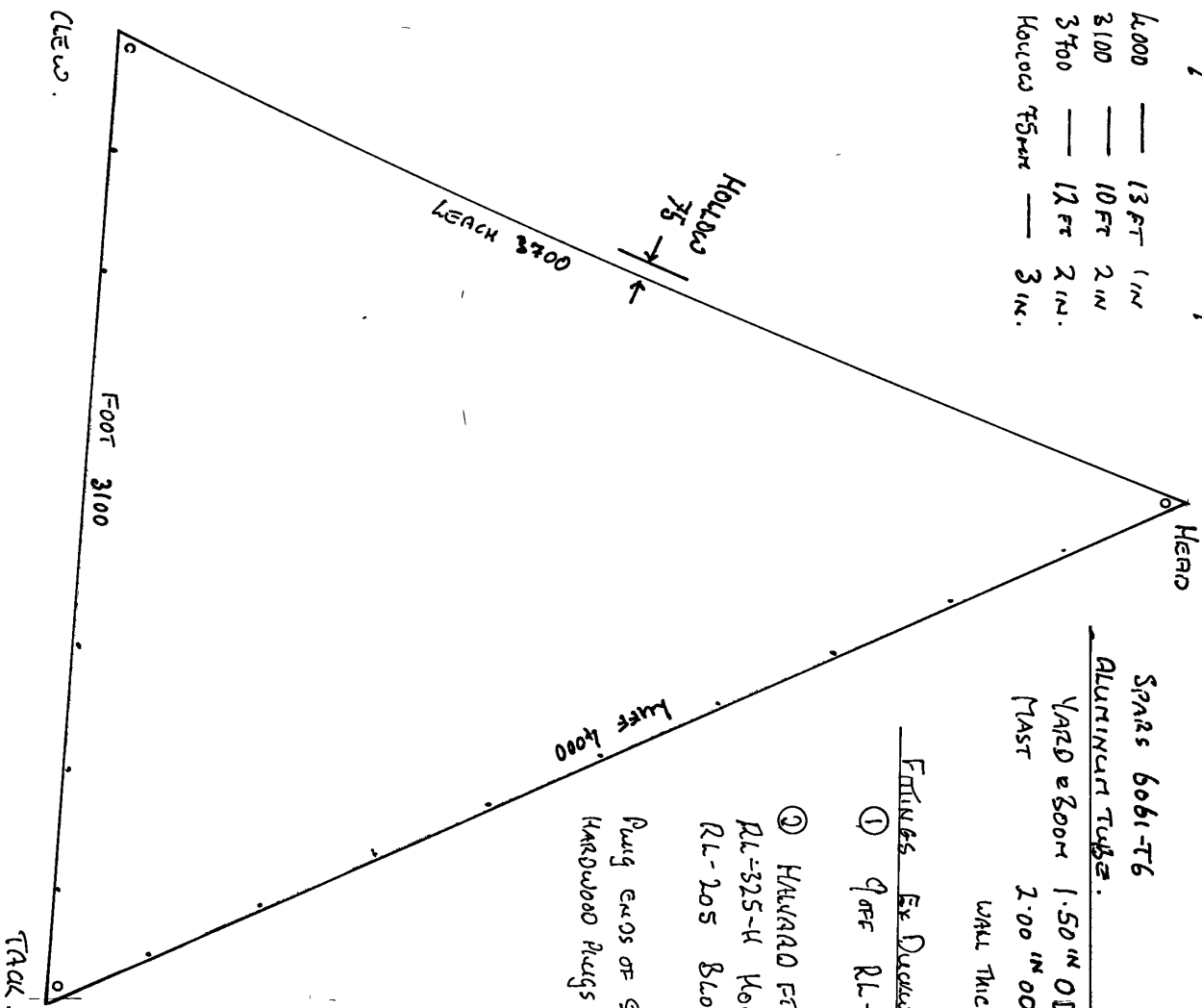


- ① TILLEN, FIBER 25x100 HANDWOOD
- ② 6mm bolts or equivalent also
- ③ SWIREL TILLEN EXTENSION 600mm long
- ④ RE-413 EYEPART/DECK LOOP with groove for DOWNHAUL. REMARK REE BUILDING GUIDES.
- ⑤ 20mm HANDWOOD SIDE SHEETS.
- ⑥ 30mm HANDWOOD RAUZZER AND TILLEN POINT.
- ⑦ RE-490 2 3/4" PINTLES - REEPA BUILDING GUIDES.
- ⑧ 12mm 1/2" PIVOT BOLT - WARE WASHERS ON OUTSIDE.
- ⑨ RE-490 GUIDES.
- ⑩ RE-336 HOLE DOWN
- ⑪ RE-413 EYE STRAPS (EACH SIDE).

LINE DOWN SIDE

SAIL - 50 2 FT FRONT 2 3/4 OZ US WEIGHT SAILCLOTH.
 LARINE GABLETS @ 200 ϕ .

LUFF 4000 — 13 FT 1 IN
 FOOT 3100 — 10 FT 2 IN
 LEACH 3700 — 12 FT 2 IN.
 LEACH HOULED 75mm — 3 IN.



Spar 6061-T6
 ALUMINUM TUBE.

VAID e 300mm 1.50 IN OD x 0.065 IN
 MAST 2.00 IN OD x 0.065 IN
 WALL THICKNESS.

FITTINGS EX DUCEDORAS MFG.

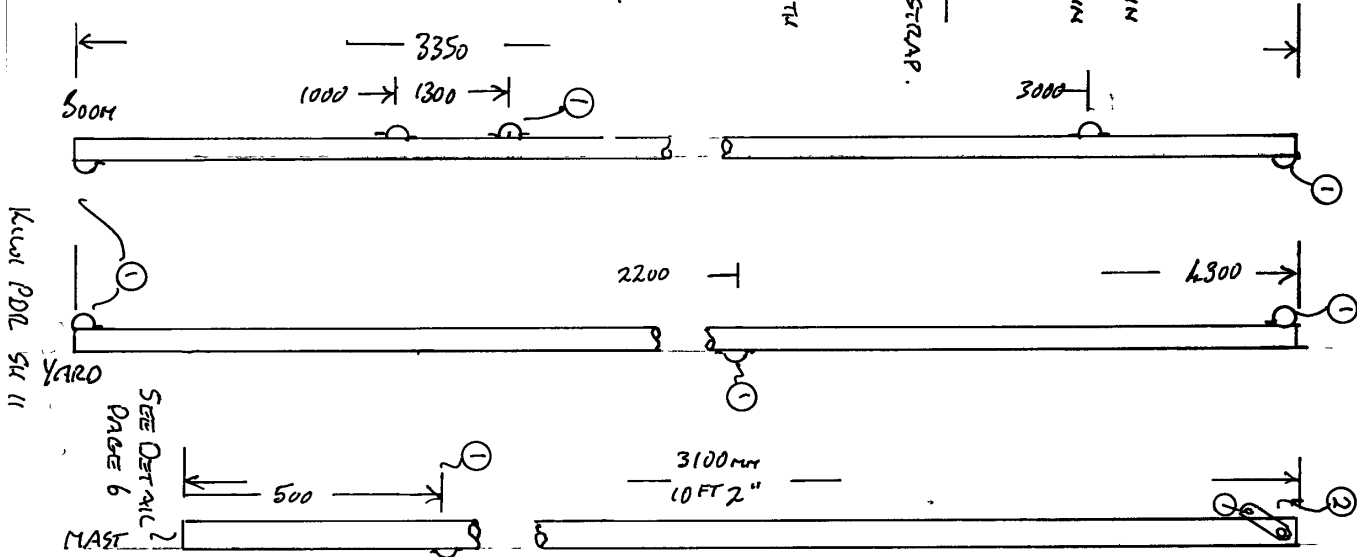
① 9 OFF RL-413 EYE STRAP.

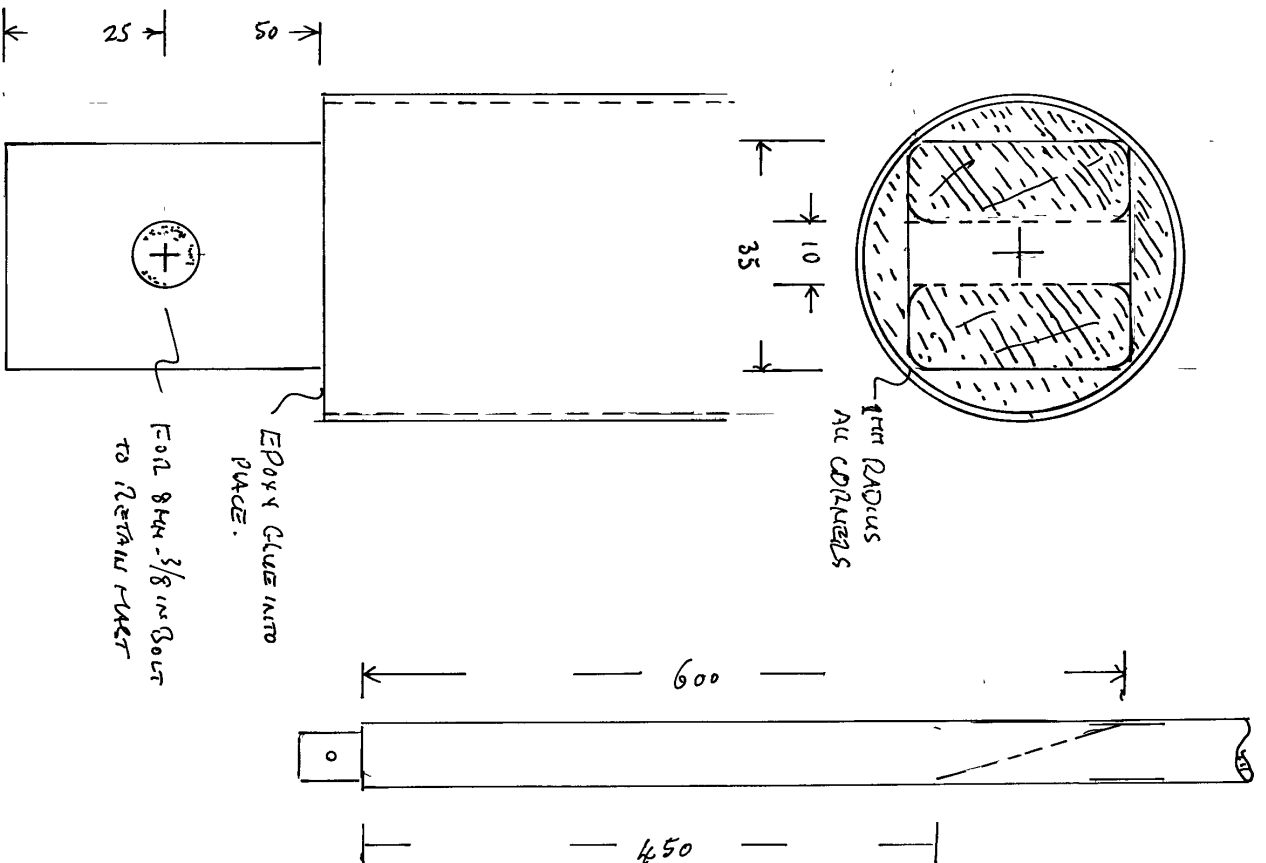
② HAWAIIAN FITTING.

RL-325-K HOULES WITH

RL-205 BLOCK

PLUG ENDS OF SPARS WITH
 HARDWOOD PLUGS 70mm LONG.





NOTES ON MAST LOWER SECTION

FOR MAST BASE AND REINFORCEMENT FROM 2" (50mm) THICK STOCK CUT A 50x50 650 LONG. USING A HAND PLANE 8 SIDE IT - THEN 16 SIDE - THEN ROUND IT TO GET A GENTLE RUSH AT INSIDE THE MAST. CUT THE SQUARE AS SHOWN AND DRILL FOR THE MAST RETAINING PIN - I'D USE AN 8mm BOLT FOR THAT.

NOTE THAT THIS DOES NOT HAVE TO BE A PERFECT FIT - YOU JUST NEED A LITTLE FRICTION AS IT IS PUSHED IN.

CUT THE ANGLE AT THE TOP - ENSURE IT FACES FORWARD ASH THE "PUSH" IN ABOUT 145 DEGREE AND COAT THE RETAINED WITH EPOXY GLUE THEN PUSH IT IN THE REST OF THE WAY.

USE A PIECE OF CLEAR GLAZED STAINLESS MEDIUM DENSITY SOFTWOOD FOR THIS - AN OFFCUT FROM THE BLUNDER OR CERTAINLY STOCK MIGHT SURVIVE.

Notes: