

finishing and rigging your **firebug**



Issue No 31 covered building the Firebug hull and included instruction on marking out and making all the 'parts', constructing the building jig and assembling the components to complete the hull. Also covered was the use of epoxy glue and sealer, sanding, filling and painting, and the success for Firebug building and sailing programs in schools.

by PETER TAIT

In issue # 30 of *Australian Amateur Boatbuilder* the 2.4 metre DIY Firebug was described as a family fun yacht and trainer, ideal for knocking about in at the beach, club sailing or taking camping. Performance-wise it is a notch above the basic trainer, appealing to teenagers as well as youngsters. Adults can take out a child for tuition or enjoy a sail themselves. Sailing clubs in New Zealand where Firebugs race report more mums and dads taking part than kids.



ABOVE & BELOW:
Putting it all together on the back lawn



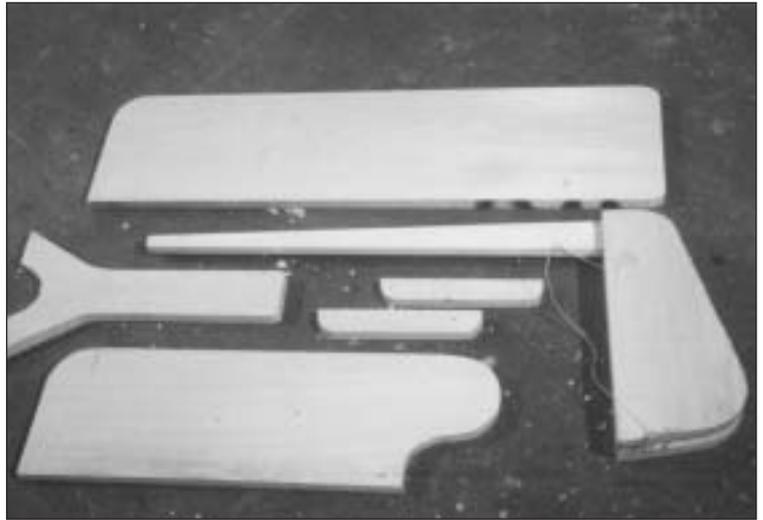
*The series continues - 'Finishing Your Firebug.
And in the next issue - Lets Go sailing!*

So, lets get on with the job.

A. FINISHING YOUR FIREBUG

After completing the hull woodwork, painting and graphics on the new boat there is still work to be done. That's if you're still having fun. If time is running out or you are not keen on metal work then it is possible to purchase completed spars, deck fittings, rudders and centreboards from FBHQ. But you can make some of these yourself without too much difficulty. If your budget is tight this is where big savings can be made. For example, fittings can be made by hand and if necessary used sails from other classes can be recut to give years of service. The drawings contain all the required details, most full size.

The Firebug philosophy 'getting people afloat (especially children) at low cost' got off to a flying start. Firebug number 1 actually called 'Firebug' was built at Russell in New Zealand's Bay of Islands for about \$300 using bits from boxes of stuff and second hand sail etc. This is the boat reviewed by the designer John Spencer after its first sail. The review is quoted in full in *AABB* Issue # 30.



Cut out the bits

1. RUDDER TILLER AND CENTREBOARD

There is still some woodwork to be done. Mark out the rudder and centreboard bits from the plans or use the full size pattens. Cut them out then assemble the rudder stock and tiller as shown on the drawings. No fastenings are required, just glue them up with epoxy. For shaping the foils a hand plane and spoke shave work best but the blades must be kept very sharp! A power planer is not much help here as it is too fast and furious and awkward as the cuts don't go full length.



Using a spokeshave on the rudder blade

The original Firebug No 1

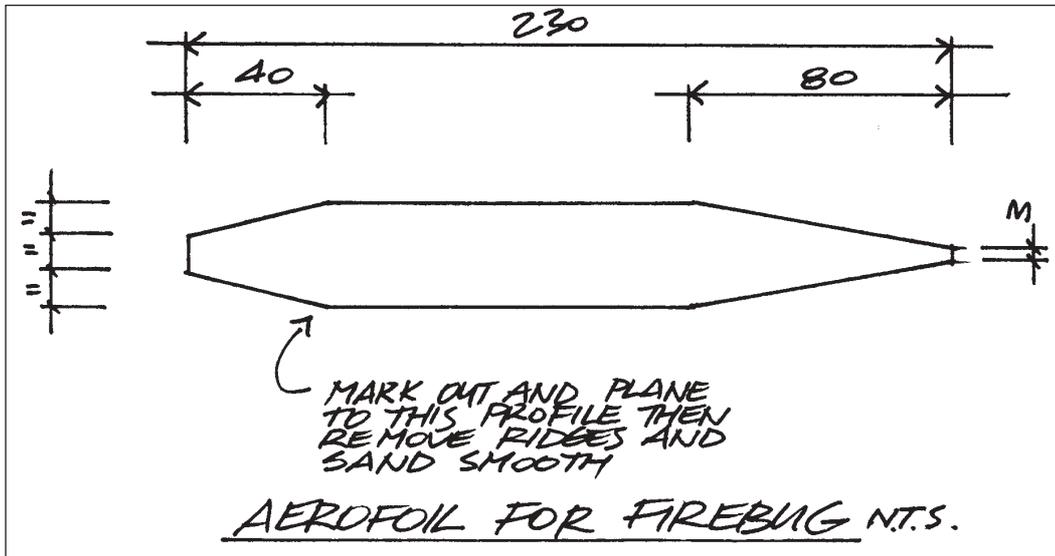


To shape the blades you start by marking out the centreboard and rudder as shown in the sketch. Shape it in stages. Create flats first then take off the ridges to form smooth surfaces. The important thing is to not lose track of where you are at. Keep to the set out and the resulting symmetry will be accurate.

3. COAMINGS

If you are going to be sailing in all conditions, ie not just a fair weather sailor your boat will need a set of coamings to deflect water on the foredeck away from the cockpit. The boat will still sail, even with the cockpit full of water but it goes better without it. Even small amounts of cockpit water sloshing around tends to make the boat nosedive off the wind.

The two coamings are shaped from a length of 20 x 50, painted and screwed in place. To keep it simple there is no mitre, ie there is a gap between the two halves.



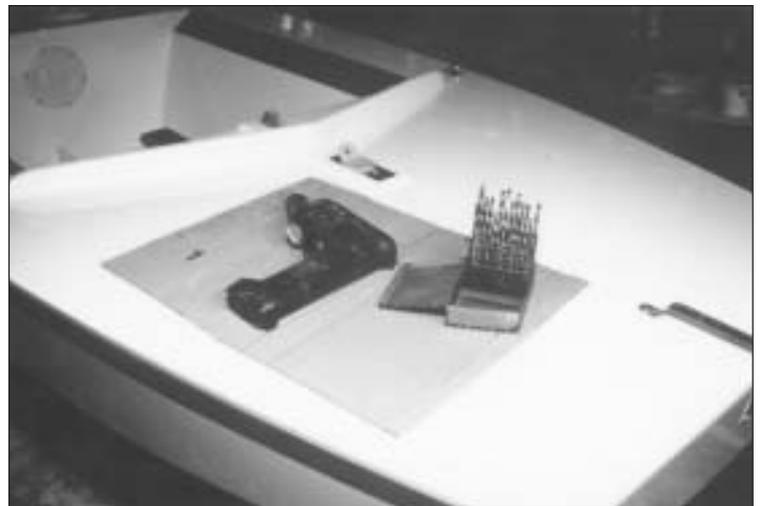
Making the aerofoil cross-section

2. CENTRECASE TOP

The centrecase top is a nice finishing detail and also helps to support the centrecase. If you are clear finishing the centreboard and rudder then do this too. Then get someone little to screw it on from the inside to avoid ugly fastenings.



Only small wrists can do this!



Coamings in place

4. SOME MORE PAINTING

The rudder, centreboard, centrecase top and coamings will also benefit from a few coats of epoxy sealer. This not only works as a primer for further paint or clear finish but also does an excellent job in keeping moisture out and if you live in a borer ridden antique house like I do it keeps the woodworms at bay as well!

5. MAKE YOUR OWN STAINLESS STEEL FITTINGS

Stainless steel is not an easy material to work with but it is still possible to make all the fittings for a Firebug in a home workshop. If you have a vice, a hacksaw with a good quality blade (don't skimp here), a file and a slow revving drill, it shouldn't be a problem. There is only a small amount of welding to be done, \$10 worth where I go. Any sheetmetal shop can help. The same sheetmetal shop will also be able to help with materials supply. The

quantities are just scrap to them. A buff on a drill and abrasive polish brings stainless steel up to a permanent shine.

As an example, the side chainplates are basically very simple. Cut a rectangle from a piece of stainless sheet, radius the corners, drill four holes for the fastening screws then two more to take the ends of the loop. Fit the loop into these holes and it is ready for the 'plug' welds on the underside, out of sight. The loop can either be bent up from a piece of rod or made from a ring cut in two.

Mast step plate, rudder gudgeons and pintles are all formed in a similar fashion. A builder here in Auckland did a 'total' build on his boat, even making his own blocks.

6. MAST

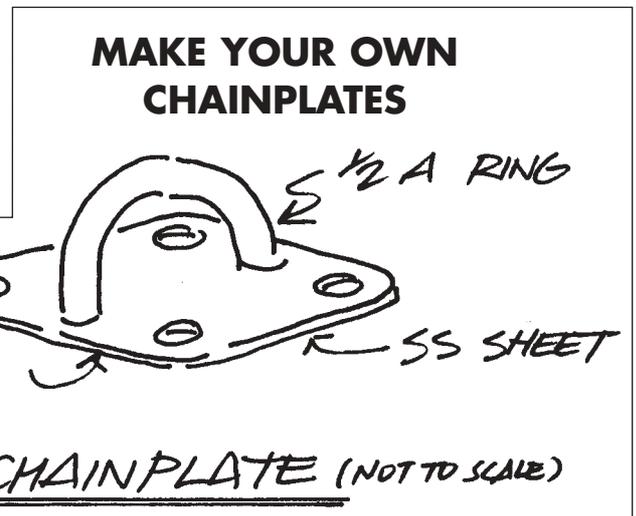
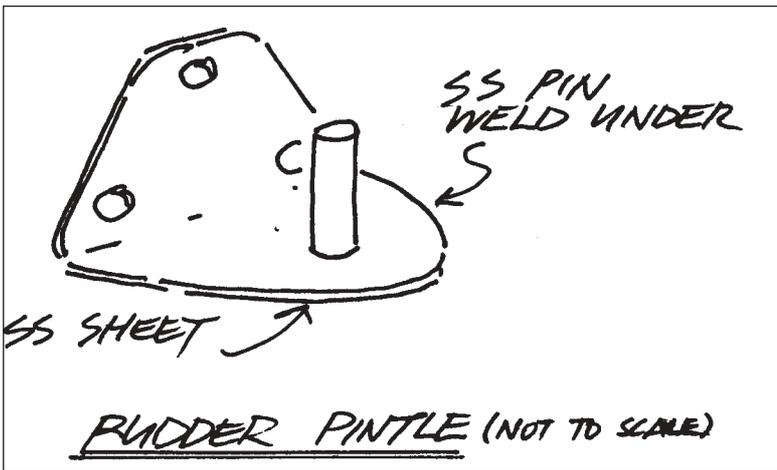
It is possible to purchase a ready made mast from FBHQ but it is not too complicated to put it together yourself.

The sail track on the mast extrusion needs to be cut back to a point above the gooseneck. Take care however that if you can't obtain the Fosters F4 section, that there still will be enough strength left with the track cut away. This is where they break!

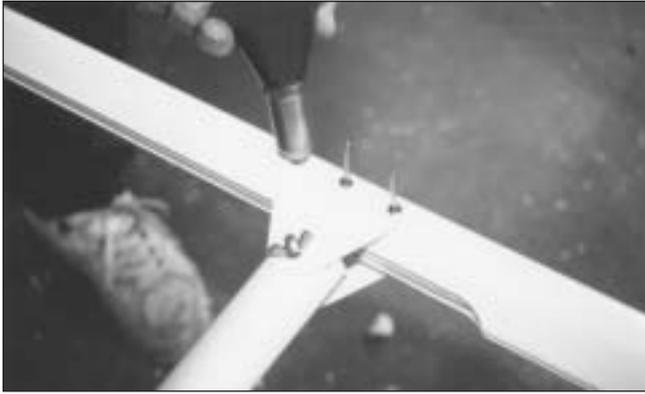
The base plug and pin, cleat etc are fitted as detailed on the drawings.



A set of homemade Firebug deck fittings



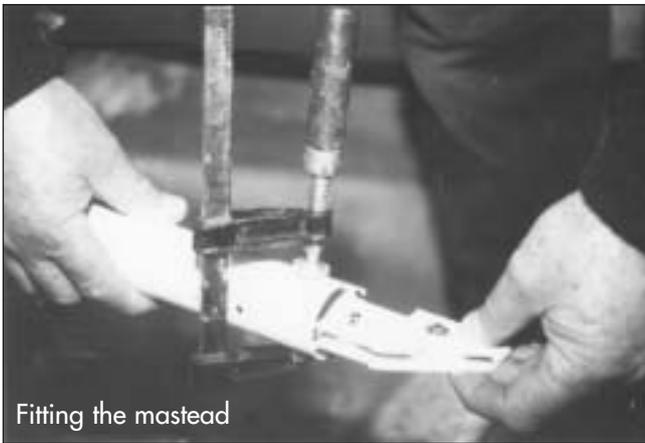
FIREBUG FITTINGS.



Gooseneck going on

The gooseneck is cut from two pieces of stainless steel sheet and pop riveted to the aluminium mast section. You will need a heavy duty pop rivet gun. A bedding sealant makes sure that there are no gaps where corrosion might get started.

The masthead fitting is cut from 2mm aluminium to the full sized pattern. Stainless steel pins hold two sheaves in place to take the internal halyard. To attach the masthead fitting - squeeze the mast oval with a clamp, push in the fitting, let go the



Fitting the masthead



The 'hounds' fitting attaches stays to mast

clamp go and the spring in the section will hold it in place. Clever!

See a rigger for the stays or find a chandler where you can make up your own. Allow for a 60mm cord lashing to attach the stays on to the chain plates.

7. BOOM

The boom is a simple drawn aluminium tube, ie it has no sail track, drilled at one end to take the gooseneck bolt. Blocks are attached to saddles riveted on to the underside to take the mainsheet. The cleats and saddles for sail attachment are riveted to the top surface.

8. SPAR TREATMENT

Aluminium spars are often left untreated on small boats but for smart looks and corrosive resistance, anodising does the best job. Marine grade is best, providing an extremely resistant coating. (My 30 footer mast built in 1972 and marine grade anodised still cleans up like new.) Powdercoating looks great but is easily scratched. All rivet holes etc should be drilled prior to any treatment. And all fittings should be on sealant to control corrosion.



Powder coated spars look great

9. ATTACHING FITTINGS TO THE HULL

You almost have a boat! This is the most satisfying part of boatbuilding - finally putting it all together. It is downhill to the finish from here. If you happen to be doing it in a classroom - watch the faces. Eyes will pop and jaws will hit the floor as all those unfamiliar bits go together to make a sailboat.

The basic Do's and Don'ts for attaching the fittings to the hull are:

Always drill holes for screws.

Always seal screw and bolt holes to prevent water entering and soaking in. Boltholes should be sealed with epoxy. I dip screws in something like linseed oil before screwing them. This both lubes the screw and seals at the same time. Don't glue them in. You need to be able to easily take fittings off when a repaint is required.

Think about what's under the ply and where any hidden screws are likely to be, before you drill.

Don't over tighten screws and bolts as this will split the paint seal around the fitting.

Always bed fittings on a bedding compound.

Wooden boats that have been well sealed with epoxy should last forever.



Dip screws in linseed oil or similar but not glue



Rudder on in the workshop

10. RUDDER FITTINGS

The rudder pintles are bolted through the stern but the gudgeons are simply screwed on to the rudder stock. The pintles can be fitted before the deck goes on but it is still possible later by reaching into the inspection port.

11. CHAINPLATES

Chainplates screwed into the deck like this raise a few eyebrows as to their adequacy but 'self tapping' screws are incredibly strong. A series of 'pull out tests' gave excellent results. A chunk will bust from the boat before the screws give up. The forward chainplate incorporates a carrying handle.



Side chainplates going on



Hey
what's
this hole
for

Cleats, clips stack straps are simply screwed on. At each position where a fitting attaches a doubler or block of timber will already be in place to take the fastening screw.

12. INSPECTION PORTS

The plastic inspection ports allow access to the two buoyancy compartments. Allow to miss the centre case top for the forw'd one. If you are using FBHQ fittings cut the holes 140mm diameter.

13. STACKSTRAPS

The stackstraps are attached to each end of the cockpit in such a way as to be not in the way when not being used but to always be easy to slide a foot under when needed. Small plastic or stainless steel plates reinforce the strap ends.

B. RIGGING YOUR FIREBUG

With all fittings attached, take a deep breath, send someone off to pick up granny, she will love this sort of thing, and carry it all outside to rig up! The sketch from the building instructions on the following page explains how.

1. PUTTING THE MAST UP

The pin protruding from the mast passes through the mast washer into the mast step. Stand the mast up, in the middle hole, rake (slope) it back a bit, then attach the stays to the chainplates with cord lashings. Shackles may be used here but it is a handy skill to be able to tie a sound lashing. It is surprising who can't! Slip in the bolt to attach the boom to the gooseneck.

2. HOIST THE SAIL

If there is any wind blowing place the boat head to wind to prevent the sail filling and being difficult. Tie the halyard cord to the head of the sail, two tight half hitches will do, start the sail in the mast track and haul away, right to the top.

3. SAIL ADJUSTMENT CORDS, KICKER AND BRIDLE

Attach the sail outhaul and downhaul cords, bridle, kicker etc as shown in the sketch.

The tack and clew adjustment cords cleat off on the boom. An additional short cord ties around the boom at the clew to take the verticle load off the outhaul.

The mainsheet rope starts on the boom then passes through four blocks as shown on the sketch. In light air it's okay to leave out a purchase and start at the bridle block.



"Hey Dad is this a bowline?"

4. RUDDER AND CENTREBOARD

The rudder clicks on over the safety clip, the centreboard lies in the cockpit until needed. Always keep the rudder and especially the centreboard out of the sun. Heat of the sun on one side but not the other will create warps which are sometimes impossible to get rid of. And the boat won't sail either.

5. TOW ROPE

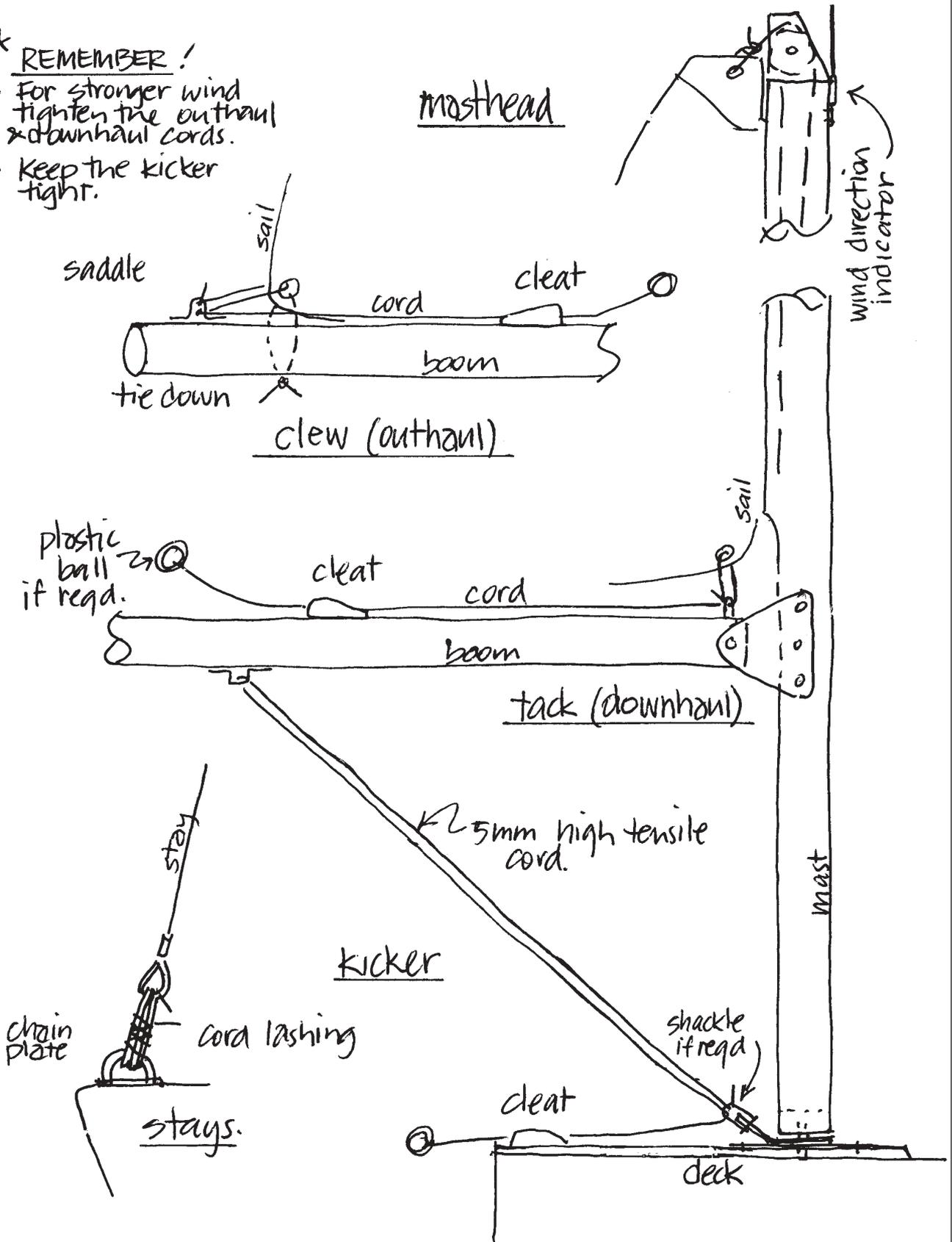
Splice the tow rope on to the forward chainplate just in case you need a tow home some time.

6. A CRADLE OR TRAILER

Getting boats around is sometimes a problem. Unfortunately not all of us, even in New Zealand, live actually at the beach. A proper boat trailer is nice but can be expensive. But don't despair! A timber cradle for carrying the boat is easily made up. This can be made to fit a domestic trailer or if the family car is not too flash, scribed to fit the roof of the car, or both.

* REMEMBER!

- For stronger wind tighten the outhaul & downhaul cords.
- Keep the kicker tight.



When you get to the beach the cradle becomes a rigging and carrying cradle. A similar cradle can be used to stack boats on top of one another, say at a club or school. Enquire about a drawing from FBHQ.



'Beeline' to the beach



The 3-up FBHQ trailer. What's that Optimist doing there!

This is it! Check the weather and head for the beach. Rig it up and you're ready for that first sail..

IN THE NEXT ISSUE:

The next issue will cover: Sailing your Firebug; choosing the right beach and suitable weather for a launching, very basic sailing for beginners, ie getting away from the beach and then how to get back, hopefully! Basic tuning, capsizing, tuning for racing. Safety rules. Sailing in windstrengths to 30 knots. Taking the boat(s) camping. Trailers for school fleets. How and where schools are using their fleets of up to 10 boats.

PLANS AVAILABLE NOW:

For those who are keen to get started, planpacks with full instructions are available now. FBHQ is

funded from sales of planpacks. Only A\$50 (a normal cheque works okay) to:

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PROUD MOMENTS ON LAUNCHING DAY

