The Agecroft Rowing Club Boat Trestle

I was asked to make some new trestles for Agecroft RC and spent some time looking for a suitable design, both on the web and elsewhere. Finding none I experimented with various designs, and took advice from my friends in the rec.sport.rowing newsgroup, and came up with a design which has proved satisfactory.

This short paper describes the design and offers some advice on constructing trestles using it. I hope it will be of some use to those who come along behind.

If you use the design, I'd like an email to agecroft@lawshouse.org.

Henry Law, October 2003

Dimensions

As will be seen from the drawing at the end of this paper, the final version of the trestle in use in our club is 700mm high and accommodates boats of a maximum width of 650mm. The trestle itself is 500mm wide. None of these dimensions is critical. The prototype was 865mm high; since I am well over average height that struck me as an admirable size, offering freedom from back pain when working on the seats and so on. However it was pointed out to me that the more vertically challenged members of the club found it a bit high, so I made the rest of them to the dimensions in this paper. You can easily make them whatever height you want by changing the length of the side frame, and possibly the length of the webbing.

Note on units of measurement: all the dimensions in this paper are in millimetres; I apologise to my American cousins, who will have to translate them into inches. None of the dimensions are critical and you won't have any trouble.

Materials

The prototype trestle is made from plain softwood: the pale straw-coloured stuff that is the staple of D-I-Y stores and local timber merchants. You could make it out of better timber if you have a ready supply.

50mm wide polypropylene webbing is used to support the boat. I obtained this on-line from Point North at http://www.pointnorth.co.uk . You could use old car safety belts.

All my bolts are galvanised steel coach bolts, which I obtained from my local timber merchants. Any bolts of the right size and length could be used, but bear in mind that they will get wet frequently so some form of rust protection will be necessary.

You will also need waterproof wood glue and screws for jointing the pieces of timber.

Tools

The only critical tools are: a saw; a drill capable of taking the 11mm bit for the hinge bolts; some means of clamping the pieces together; a sharp knife; spanners for tightening the two sizes of nut; and a screwdriver. However use of a smoothing plane will make it easier to achieve a good finish on the timber and a square will be helpful for marking joints

It is possible to make holes in the webbing using the drill, and to leave the ends of the straps untreated; but it is much easier to melt the holes, for which a skewer and a flame of some kind could be used. I had an old soldering iron which turned out to be ideal both for melting the bolt holes and for sealing up the ends of the freshly-cut webbing.

Every rower knows that trestles go missing at regattas. We have chosen to incise the club's initials into the timber of the trestles, using a routing bit designed for use with the Dremel tool, but actually used in a normal electric drill. We also stencil the club's name on the side.

Consumables

You will need a supply of glasspaper for smoothing the timber, and paint or varnish to protect the trestle in use.

A hint on using woodscrews

Woodworking books tell you that to screw two pieces of timber together you need holes in both pieces, and that the holes should be of different sizes. Using countersunk screws, as shown in the specification, would additionally require use of a countersink bit. But when using soft timber like this to make a robust item like a boat trestle there really is no need to go through all that palaver. Drill a hole of the right size in one piece of timber, insert the screw, offer up the joint accurately, and hit the screw a firm blow with a hammer. Then screw it in firmly; as the head comes down to the surface it will draw itself in without the need for a countersink bit.

Construction

Cut all four uprights at one time; if they are twisted (my timber was very fresh and was all sorts of funny shapes) then arrange them so that the worst of the twists are "front-to-back", rather than side-to-side, in the direction of the other frame. This will reduce the tendency for the two frames to bind.

At this stage leave the uprights cut square at the ends; it is easier to make the angled cuts later on.

The outside frame

Cut the cross-members for the outside frame. Mark and drill the screw holes, and make the joints (see the hint on using screws above), using the square if you have one to make sure things are lined up properly. Do not glue the joints at this stage.

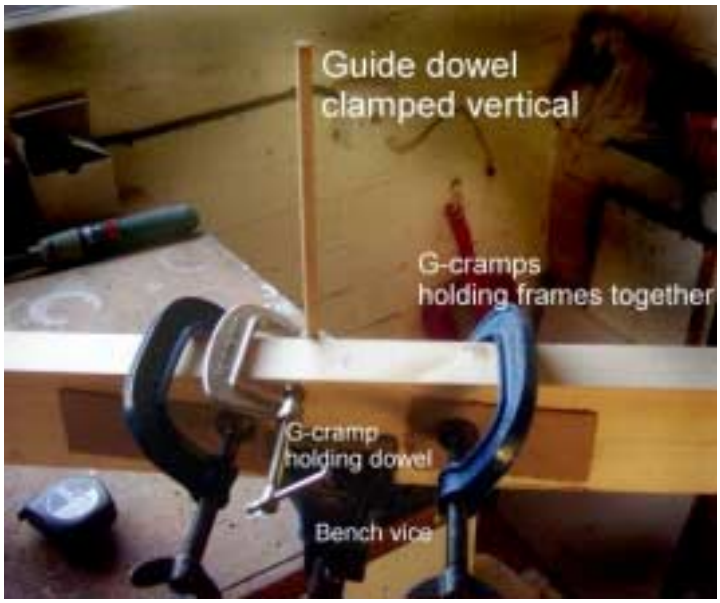
The inner frame

Place the outside frame flat on the bench and set the uprights for the inner frame in their positions; here is where you find out if your timber is twisted! Adjust the inner uprights for best fit inside the outer frame and measure the distance between their outer edges; less a small amount for clearance that gives you the length of the cross-members for the inner frame ("Dimension A" in the drawing).

Cut the cross members, mark and drill the screw holes, and assemble the inner frame, once again using only screws at this stage.

Drilling the pivot holes

Care is needed to get the pivot hole drilled true. Offer up the two frames to one another, making sure that the tops and bottoms of the legs are lined up, then clamp the two frames together.



Measure the mid-point of the frame and mark the position of the pivot hole there.

In order to help keep the drill vertical it is helpful to clamp a dowel (a pencil would do) close to the site of the hole and use the square to set it vertical in both directions. Then as you drill the 11mm hole you can check that you are drilling vertically.

The picture shows the sides of the two frames held in a vice and clamped for drilling.

When the two holes are drilled, assemble the frame loosely using the M10 bolts with one nut, finger-tight.

Cutting the clamping pieces and drilling the webbing bolt holes.

Measure the distance between the uprights of the inner frame at the top and cut the clamping piece for the inner frame; make it 2mm narrower so that it can be easily inserted and removed.

Use G-cramps to hold the clamping piece in the proper position at the top of the inner frame; mark the positions of the holes to suit the width of your webbing (see drawing) and drill the holes for the bolts. For M6 bolts a ¼" drill produces a perfect clearance hole! Secure the clamping piece with the two

bolts.

Close up the trestle and mark the size of the clamping piece for the outer trestle, leaving room for the inner trestle to close alongside it. See from the drawing and from the picture above how the clamping piece for the wider frame is the same size as that for the narrow one (actually slightly less).

Again use G-cramps to hold the outer clamping piece in place; mark the position of the bolts so that they match those on the inner clamping piece and drill the clearance holes.

Cutting the webbing to size and burning the holes

Cut the webbing to the right length, using a sharp knife. If you are able to it is much better to seal the ends of the webbing by melting it a little; a soldering iron (one which isn't needed for electrical work!) is ideal for this but you could use a naked flame or something metal heated in a gas ring.

Burn, or perhaps drill, the holes. You will need to experiment with an offcut to find how far apart they should be. See the drawing for how to wrap the webbing round.

Levelling up

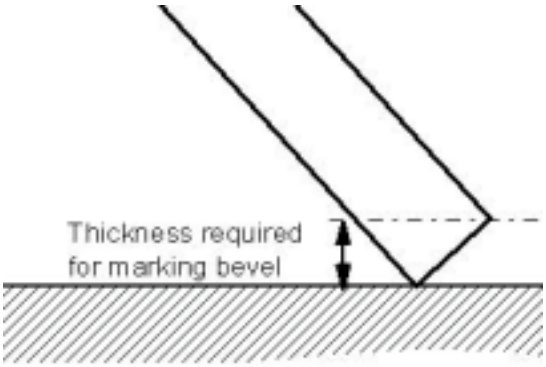
Install the two webbing straps and tighten up the nuts. Open the trestle and check its dimensions.

Before you cut the ends of the legs to the right angle you need first to correct any tendency for the trestle to rock. Place it on a level floor and check; if it rocks (as it almost certainly will) then you need to trim a little off one, or perhaps two of the legs.

Choose one of the two rocked-over positions – the one that is more level – and measure the distance gap between the "up" leg and the floor. Start by taking half that amount off each of the two legs that are not diagonally opposite to the "up" leg. You may need to cut and try – in fact a file or plane is easier than a saw at this stage.

Marking the bevels on the legs

Once the trestle stands level find something to use as a "marking gauge" – a piece of wood, for example, or a ruler – which is the right thickness, as shown in the diagram on the right. As shown in the photograph overleaf, place the marking gauge against each leg in turn and mark the cutting line; this will ensure that it's at the right height and at the right angle, and is a much more accurate way of doing it than marking the bevel "on the bench".



Marking the chamfers at the top of the legs

The tops of the legs need to be chamfered as shown in the drawing; this provides a flat surface to the top of the trestle in use, and removes some sharp corners.

To mark these chamfers it is easiest to use a straight edge or a straight piece of timber. Lay it across the top of the open trestle and mark the cutting lines with a pencil.

Once the two sets of bevels have been marked, dismantle the trestle completely, taking care to mark both faces of each joint so that you know how they fit together.. Carefully re-mark the bevel lines with a ruler and extend them down the sides of the pieces using the square. Then make the appropriate cuts, using a finer saw if you have one.

It's a great deal easier to make these cuts accurately if the frames are dismantled; this is the reason for leaving the joints unglued up to this point. This is also the time to do any other work, such as putting on permanent identifying marks. I used a Dremel grinding tool to cut the club's initials into one of the legs.

Frame re-assembly

Re-assemble the frames, using waterproof wood glue and tightening the screws securely. Wipe off any excess glue which may squeeze out of the joints. (Choose a glue which wipes off with a damp cloth when wet!) When the glue is dry, reassemble the trestle and check that you've done the bevels correctly and that it doesn't rock. If it does you'll have to shave bits off the bottom of the legs with a file or a plane. But perfect flatness is not required for a utilitarian project such as this.

Finishing

You must sand off any rough bits on the wood but apart from that you could leave it as it is: wood is durable stuff. However a coat of paint or of varnish will make it look better (which might just mean that people take care of it more), and increase its work life considerably. Paint takes four coats (primer, undercoat and two finish coats) while with varnish you can get away with two. Lightly sand between coats if you're using varnish.

I spray the club name on the side once the varnish is dry and before assembly. Since I'm making lots of trestles I photocopied letters of the required size onto an overhead transparency and cut them out to form a stencil. Painstaking work, to be sure, but once it's done it is the matter of five minutes to tape the stencil to the side of the outside frame, mask up the remainder with newspaper, and use car spray paint to add the name.

Final assembly

Put a fairly generous layer of grease on the shanks of the pivot bolts before joining the frames; it will protect them where they are hidden inside the holes. It would be worth while spraying the webbing bolts and all the nuts and washers with silicone spray (WD-40, for example). Best let it dry before final assembly.

If you can obtain M10 lock nuts (the kind with nylon inserts) for the pivot bolts then use those; otherwise use two nuts tightened against one another. Make sure the frames can move smoothly before finally tightening the nuts.

Tighten the webbing nuts securely but not too tightly; beyond a certain point further tightening just compresses the timber without adding materially to the security of the webbing attachment.

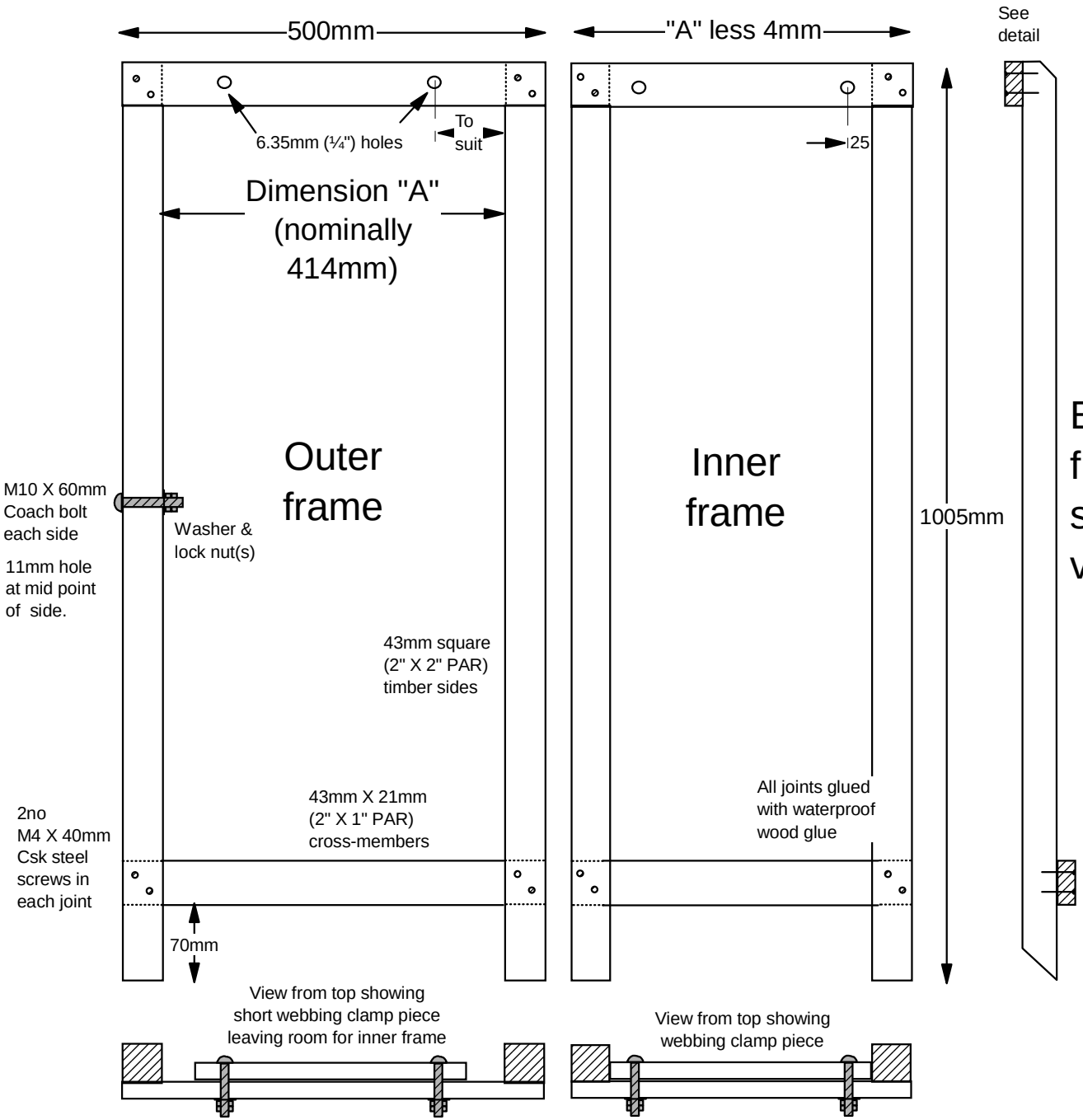
Now all you need to do is to prepare yourself for the way that your club-mates will take the new trestles for granted, knock them about, leave them out in the rain, …

The drawing

The full drawing – not to scale – is on the next page.

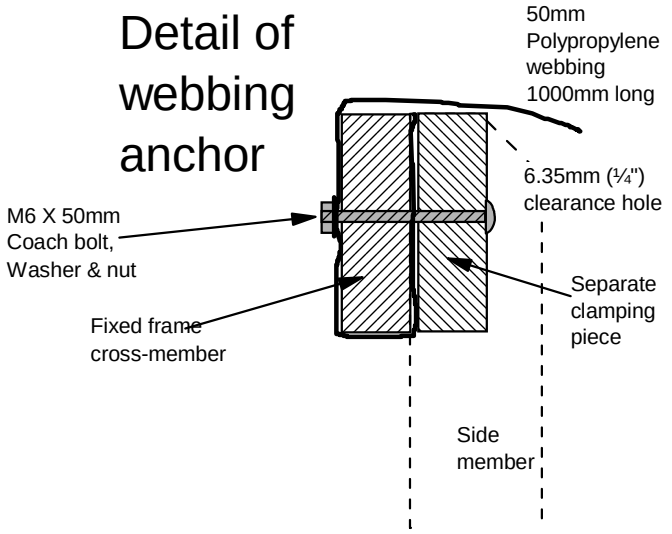
Revisions

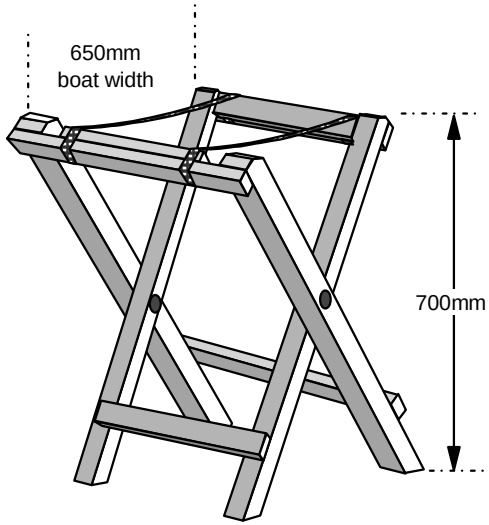
October 19th 2003 Changed main dimension to 1003mm. Added eMail address.



Both frames side view

Detail of webbing anchor





Agecroft Rowing Club Boat trestle

Henry Law
October 2003