SECTION 8 - TIMBERING

8.1 Setting up

8.1.1 The dinghy should be removed from the jig, preferably with the temporary moulds left in place. If you drove some temporary fastenings into the moulds (¶7.4.12) then these can be left in for the moment and they will secure the moulds in place. If you did not need to do this, it is best to drive a few temporary fastenings now (say two per mould per side) - see ¶7.4.12.

8.1.2 Turn the dinghy over and set it up on stools or blocks under the keel, so that the underside is about 400mm from the floor. Position the stools or blocks at –480 and –1920. Make a pair of shaped chocks to approximately fit the hull up to the turn of the bilge at –480 and –1920 and secure these to stools or blocks so that they hold the hull firmly. Note that the chocks are positioned in way of the moulds as they will hold the dinghy more firmly and without distorting the hull. The edges of the chocks against the hull can be covered with carpet or similar, so as not to damage the planking.

8.1.3 It is preferable to set the dinghy up level fore-&-aft and athwartships. This makes it easier to get the daggerboard case, thwarts etc. in level and square. Provided that they haven't moved, you can check for level on the moulds.

8.1.4 Mark off the centreline of the timbers on the inside of the planking. At the top, middle and bottom also tick off the half width (or say 1mm more than the half width) of the timbers each side of the centreline - these ticks will still show when the timber is bent into place so that you will know that you have it on the centreline. But see also ¶8.2.8

8.2 Preparing the timbers

8.2.1 The timbers are cut from fresh sawn oak. By this we mean that the oak should not be seasoned (neither air dried nor kiln dried). If you can't buy fresh oak, then at least buy air dried - and at as high a moisture content as possible. Do not buy kiln dried. Keep the boards wet in storage.

8.2.2 The timbers are sawn to thickness and width as near in time as possible to steaming and fitting them (no more than a day or two before if possible). If you are not going to steam and fit the timbers in one go, or at least over a few days, then only prepare enough timbers for immediate use. Measure around the inside of the hull with a steel tape (or a thin batten) to get the length of the longest timber. Make the timbers about 100mm over-length. You can cut all the timbers the same length, or you can make some of them shorter (for the timbers further fwd) - really depending on the length of your boards.

8.2.3 The boards for the timbers should be cut clear of the heart of the tree but not from too

near the outside of the log. The best boards for timbers come from just immediately clear of the heart. This will give boards with the grain vertical (looking on the end of the board, with the board laid horizontal). The boards should be of a suitable thickness to give the siding (width) of the timbers. This will mean that the grain will lie fore-&-aft in the finished timbers.

8.2.4 Your timbers are 15mm sided. This means that you boards will need to finish at 15mm thickness after planing. You will therefore need 20mm sawn (you will loose about 5mm in planing up). Many saw mills saw to 25mm as the thinnest material in which case you will either have to waste rather a lot of material or buy thicker so that you can re-cut (which is often just as wasteful).

8.2.5 Having planed the boards to 15mm thickness, straighten one edge and side off the timbers through the circular saw (as many as you are going to need at one time) at a suitable thickness for putting through the planer to arrive at 10mm thick finished - probably about 13mm off the saw will be right. Push the timbers through the planer (in batches of four or five wide if your planer will grip them OK - singly if it won't). Plane both sides of the timbers to finish at 10mm thickness.

8.2.6 Plane a chamfer (about 2mm across) along the two corners of the timbers which will be uppermost (i.e. not against the planking).

8.2.7 At the centreline of the boat, the timbers are shown (on Plan 038/11/003) crossing the hog - so each timber is in one length. An alternative, which can make steaming and fitting easier, is to fit each timber in two sections - one on each side of the boat. In this case, the timber sections will lay alongside each other on the hog. The port side section will finish on the stbd side of the hog, and the stbd side section will finish on the port side of the hog. If you opt for this system, then your timber centrelines (¶8.1.4) will in fact be the the lines of the edges of the timber sections - one section (say the port side) will lay aft of the centreline while the other will lay fwd of it. Be consistent throughout the boat.

8.2.8 The timbers in way of the stem knee, the stern knee and the daggerboard case, will in any case be in two sections each side of the knees or daggercase. If you are going to fit all the timbers in two sections, then we would fit these timbers aft and fwd of their centreline to match. If you are going to fit the other timbers in one piece, then fit these timbers on their centrelines.

8.3 Steaming the timbers

8.3.1 You will need an arrangement whereby the timbers can be kept in hot wet steam for about half an hour. Preferably the timbers should not be immersed in the boiling water that produces the steam as this will tend to turn the oak black (OK for painted boats, but not for clear finished). The steamer can be a wooden box the length of the timbers, with a removable

top, or a length of piping (about 100mm Ø), with the timbers being inserted through the end. In either case you will need a means of generating steam and getting it into the steam box. You can hire steam generators of various sorts, from the simple affairs for stripping wallpaper through to the high-pressure commercial machines used for cleaning and de-greasing. You do not need high pressure steam - just good quantities of hot wet steam.

8.3.2 Probably the simplest steamer is made from a length of iron pipe (about 100mm Ø x 600mm long) connected reasonably rigidly to a wooden box or a length of plastic pipe. The whole set-up is set on stools or blocks so that it is at an angle of about 45°. The iron pipe is filled with water and heated (usually with a fire - but a couple of good gas torches would do as well). The end of the pipe can be sealed with a wooden plug (provided it is kept reasonably clear of the fire), or it can have a plate welded on. Top the steamer up with boiling water if necessary.

8.3.3 The prepared timbers are placed in the upper part of the steamer and a sack is hung over the end to keep the steam in. You can drive a small nail right near the end of each timber to hook over the end of the steamer to stop the timber sliding down into the boiling water - or you can be a bit more sophisticated and have a perforated barrier between the two parts of the steamer. Timbers usually need to steam for about 1 hour for every 25mm of thickness - so yours will require getting on for half an hour. They can steam longer - but don't leave them steaming all day.

8.3.4 To start with it is best to steam about five timbers which is probably all you will deal with in one go.

8.3.5 You will need a good pair of fabric gloves to handle the timbers when they come out of the steamer as they will be hot enough to blister your hands.

8.3.6 Set the steamer up fairly near the boat so that you can take a timber from it to the boat quickly and bend in into place before it loses its flexibility.

8.3.7 You can always return a timber to the steamer if it not flexible enough, or gets cold before you can deal with it.

8.4 Timbering

8.4.1 The timbers in way of the stem and stern knees can either go up on to the hog and finish against the knee - in which case the knees should be fitted before timbering, or they can butt against the sides of the hog.

8.4.2 The timbers in way of the daggercase butt against the sides of the hog.

8.4.3 As the timbers are bent into place, they are partially fastened into place, so you will

need drills, copper nails, doll, punch etc. ready to hand.

8.4.4 It doesn't really matter where you start timbering - we would start with the timber immediately astern of –1440 and work fwd and aft from this.

8.4.5 If the timbers are in two sections - one each side (see ¶8.2.8), then you will need to start them on the far edge of the hog. If they are in one length, you will need to push them down in the middle on to the hog. We are assuming that you have the timbers in two sections for the moment.

8.4.6 You will probably find it helpful to have a small piece of ply (say 75 long x 50 wide x 10 thick) or similar wood to wedge or shore in place vertically against the far edge of the hog in way of the timber to be bent into place

8.4.7 Get the first timber out of the steamer. Lay it in the boat in as near as possible the right place and push the lower end against the piece of wood at the far edge of the hog (¶8.4.6). Then gently push the timber down in to the hull, working from the bottom to the top. You are going to almost smooth the timber into place - sharp jerky pushes will probably break it (some breakages are to be expected).

8.4.8 Once the timber is down on to the hull planking, cramp it at the top to hold it in place.

8.4.9 Make sure the bottom is in the right position fore-&-aft and resting flat on the hog. If it isn't resting flat on the hog, loosen the cramp at the top and push the timber firmly down on to the hog - re-tighten the cramp.

8.4.10 Drill for two fastenings through the timber into the hog - the far nail should be about 20mm in from the edge of the hog and the near one about 15mm in from the edge. The drill should be the correct size so that the nails get a good hold. The maximum drill Ø is the dimension across the flats of a square boat nail or $^{4}/_{5}$ths the Ø of a round bronze gripfast nail. The gripfast type of nail (12g) is probably the best for this job. Drive the two nails home.

8.4.11 Loosen the cramp at the top and press the timber very firmly down on to the hull planking. Drill from inside through the timber and the planking in the middle of the lap between the garboard and the the second planks. Drive a copper boat nail from the outside, holding on the inside with the doll. Just driving the nail home with the doll held on the timber will probably draw the timber down on to the planking - if it doesn't, you may need to set the rove on the nail - but don't clench up at this stage. Drill for and drive a nail on every other plank lap. This should pull the timber well down to the planks. The remainder of the nails can be drilled for and driven later on when the timber is cold; setting the roves and clenching up can also be done later on. Do not drive the topmost two fastenings yet (see §8.5). Make sure the timber stays straight on its centreline mark on the hull.

8.4.12 Fit the other side section of the timber next. The nails in the end will be 20mm in from the edge of the hog on the (new) far side and 15mm on the near side. This will mean that the nails in the two adjacent timber sections are staggered a little.

8.4.13 Now move to the two timber sections immediately ahead of –1440. These butt up to the sides of the hog. So you can push the bottom end of the timber up against the hog to start the timber off, and then bend it down into place as described in ¶8.4.7 and ¶8.4.8 Don't drive a fastening right at the end of the timber, but drive the first fastening through the lap of the garboard and second planks. We shall want to drive an end fastening right through the centrecase outer runner and the timber. Otherwise, fasten the timber as ¶8.4.11. Fit the timber the other side. The next two timbers forward are also butted to the hog, although the one at –960 cannot be fitted yet because the mould is still in place.

8.4.14 Continue timbering, working forward and aft, until all the timbers (except those in way of the moulds) are in place.

8.4.15 The timbers in way of the transom knees will just have one nail fastening into the hog if they butt up to the sides of the knees. If you keep them down on the planking, butting against the sides of the hog, the ends will be clench fastened through the planking .

8.4.16 The final timbers forward blade off on to the transom. It is best to shore these into place (positioned a bit aft of where they are finally going to be so that you have some extra curved length at the bottom) until they are cold and dry (say overnight). Then remove the timbers and fit the bottom ends and then fix in place.

8.4.17 Now go through the boat driving the remainder of the fastenings and clenching up on to roves. Do not drive the topmost two fastenings yet (see §8.5).

8.4.18 The moulds can now be removed and the timbers in way of them can be steamed into place and fixed.

8.5 Finishing off

8.5.1 The tops of the timbers can either be cut off flush with the top of the sheer strake, in which case the gunwhale is fitted on top of the timbers (so that the timbers are sandwiched between the sheer strake and the gunwhale); or the timbers can be cut to finish immediately beneath the gunwhale - in which case the gunwhale is fitted hard against the sheerstrake.

8.5.2 We prefer the first way, with the timbers continuing right to the top and sandwiched between the sheer strake and the gunwhale. The second way with the timbers cut off under the gunwhale is probably the more usual and is what we have drawn on the original structure plans.

8.5.3 If you choose the first method, then you will have to fit blocking between the gunwhale and the sheer strake in way of the various knees, and the rowlock chocks.

8.5.4 If you decide on the second method, you will need to gently prise the timbers away from the hull, in order to cut them off to the correct length (which is 25mm down from the sheer edge. The final two fastenings at the top of each timber can then be driven and clenched.

8.5.5 For the first method, the timbers are cut off flush with the top of the sheer strake - but square to the timber (rather than level horizontally) across the boat and on the line of the sheer fore-&-aft. This doesn't make much difference amidships where the timbers are near enough vertical, but forward and aft there is quite a bit of flare so the timber tops will need to be cut off at an angle. You can alternatively leave them long until the gunwhale is fitted - but you will have to be careful to get the gunwhale at the correct height - which can be found by a try-square off the hull (see §10). Whichever way you do it, the very top fastening will be right through the sheerstrake, the timber and the gunwhale - so for the moment, just drive and clench the second fastening down.

END

SEE BOOK 3 FOR:

KNEES
GUNWHALE
THWARTS & RISERS
DAGGERCASE & RUNNERS
MAST STEP
ROWLOCK CHOCKS
TRANSOM TOPS

SEE BOOK 4 FOR:

DAGGERBOARD
RUDDER & FITTINGS
SPARS & FITTINGS