SECTION 1- INTRODUCTION

1.1 Terminology

1.1.1 We shall use boatbuilding terminology throughout as the words usually have precise meanings.

1.1.2 Most of the names of the structural items are fairly clear from the drawings themselves. Rather than give a long list of terms, the names of the various structural elements will be introduced as they occur naturally during the build of the boat.

1.1.3 One name that often causes confusion however is “floor”. In boatbuilding terms a floor is a transverse structural member that lays across the centreline structure and helps to link the centreline structure to the hull skin and other parts of the transverse structures. The “floor” that you walk on in a boat is known as the “sole”, though in an open boat they are usually called the “floor boards”.

1.2 Principals of structure

1.2.1 The hull skin is supported by a sub-structure consisting of longitudinal and transverse elements. In this way individual panel areas of hull skin are kept reasonably small and regularly supported.

1.2.2 The main transverse structures are the eight frames (plus the transom). thwarts etc. also add to the transverse structure.

1.2.2 The transverse structures are bonded to the skin both directly and using fillet joints. Fillet joints increase the bond area and they smooth the transition from the relatively very strong transverse to the weaker skin structure.

1.2.3 The principal longitudinal structure is the backbone/stem/keel lamination. The thickness of the laminations of this change around the forefoot of the boat because the curve becomes sharper, so thinner laminates are required to be able to bend around it without breaking.

1.2.4 Other hull longitudinal structures are the shelves and the various carlings etc. in the deck and superstructure.

1.2.5 The whole of the structure of the boat is put together and coated using WEST™ system materials. Fastenings are used largely for convenience in holding parts together while the epoxy cures. Some of these may be temporary, to be removed later, but most will remain in permanently.

1.3 The Drawings

1.3.1 The drawings and information to build the boat are divided into groups as follows:

074/001	Proposal drawings
074/002	Build instructions
074/003	Longitudinal structures
074/004	Transverse structures
074/008	Rudder, tiller & fittings
074/009	Centreboard & case
074/010	Interior furniture
074/011	Spars, sails & rig

1.3.2 Drawings carry an “issue number”.

This is to allow modifications to be made to the drawings - perhaps because of a mistake on them or because of a change in requirements. It is best if old issues are thrown away upon the issue of a new version - otherwise the wrong drawing can very easily get inadvertently into use.

1.3.3 All dimensions on the drawings, specifications and instructions will be millimetres unless otherwise noted. The most common non-metric item is wood screws which are still measured in inches for the length and gauge for the thickness.

SECTION 2 - THE "LINES"

2.1 What are they?

2.1.1 The boat is designed on a computer and resides in the computer as a sets of data representing 3-dimensional surfaces. However, to build the boat, we have to start with some 2-dimensional shapes and build these up into the 3-dimensional object that is the boat as a whole. The 2-dimensional shapes that we look at for this purpose are known collectively as the "lines".

2.1.2 When boats were designed manually, the design itself was built up from drawing and measuring the 2-dimensional shapes - so the 3-dimensional design was also derived from the lines. Although this is no longer the case, we still tend to draw out from the computer-generated 3-dimensional surfaces the same 2-dimensional views as were previously used to design the boat.

2.1.3 A major difference however is that manually drawn lines were drawn at a reduced scale (so they could fit on a piece of paper) and they needed to be drawn out full size so that they could be checked for accuracy and "fairness". This process is known as "laying off" or "lofting". Computer generated surfaces are inherently fair and entirely accurate dimensions of them can be obtained directly from the computer - so lofting is no longer required.

2.1.4 Another major difference is that, with manually drawn lines, the designer only knew the shape of the hull on the lines. With computer generated surfaces we know the shape of the hull everywhere. This means that we have the facility to extract the accurate position of any point on the surface of the hull. It is this facility that allows us to provide accurate dimensions, bevels etc. of the majority of the elements of the boat.

2.2 Datum points

2.2.1 We have to set datum points from which other points on the boat can be measured. The datum points on your boat are as follows:

2.2.2 The Datum Waterline (dwl). This is a horizontal line drawn at the approximate flotation position of the boat. It should not be confused with the Load Waterline (LWL) which is the calculated flotation line under specified load conditions.

2.2.3 The Zero Point. This is the forward extremity of the boat at the top of deck. In fact, the stem carries on above the deck so ends up a little forward of the Zero

Point.

2.2.4 The Centreline. This is the fore-&-aft centreline of the boat.

2.3 Point measurements

2.3.1 Position. This is measured forward and aft of the Zero Point. Positions aft of the Zero Point are negative. So Position -400 is a point 400mm aft of the Zero Point.

2.3.2 Offset. This is measured out from the centreline. So a point at Offset 870 is 870 mm out from the centreline. If necessary an offset is designated port or starboard. Port is the left-hand side of the boat (when you are facing forward); starboard is the right hand side.

2.3.3 Height. This is measured above or below the dwl. Heights below the dwl are negative. So Height -50 is a point 50mm below the dwl.

2.3.5 Thus any point in the boat can be identified by three co-ordinates - Position, Offset and Height. These co-ordinates are often brought together in tabular form - somewhat confusingly known as a "Table of Offsets". You will see Tables of Offsets on the drawings - either complete ones, or ones giving just the necessary information (perhaps just Positions and Heights).

2.3.6 Now we will just identify the various lines we use to find the shape of the boat.

2.4 Sections

2.4.1 A section is a vertical athwartships (across the boat) slice through the boat (like a slice of bread off a loaf).

2.4.2 Sections are designated "s" followed by their position. Thus s -400 is a section through the boat 400mm aft of the Zero Point.

2.4.3 Sections are used to obtain the shape of frames, bulkheads and any athwartships element.

2.5 Waterlines

2.5.1 A waterline is a horizontal fore-&-aft slice through the boat.

2.5.2 Waterlines are designated "wl" followed by their height. Thus wl -50 is a waterline 50mm below the dwl; wl 200 is a waterline 200mm above the dwl.

2.5.3 Waterlines are used to obtain the shapes of horizontal elements of the boat.

2.6 Buttocks

2.6.1 A buttock is a vertical fore-&-aft slice through the boat.

2.6.2 Buttocks are designated "b" followed by their offset. Thus b 200 is a buttock 200mm out from the centreline.

2.6.3 Buttocks are used to obtain the shape of any fore-&-aft items.

2.7 Diagonals

2.7.1 Diagonals are fore-&-aft slices through the boat taken at an angle (i.e. neither horizontal nor vertical - but some angle in between).

2.7.2 Diagonals are designated "d" followed by the height on the centreline of their start point and the angle (usually downwards) that they make to the centreline. Thus d 100 45° is a diagonal that starts on the centreline, 100mm above the dwl and is at an angle of 45° with the centreline.

2.7.3 Diagonals are not often used directly to obtain shapes of items but the are often used to help delineate the shapes of other items.

2.7.4 An offset on a diagonal is measured down the line of the diagonal from the centreline.

2.8 Body Plan & Grid

2.8.1 The body plan shows the outlines of the sections, with the waterlines, buttocks and diagonals drawn as a grid over them.

2.8.2 If you refer to drawing 074/004/07 you will see a body plan (although only a single section is shown) and a basic grid.

2.8.3 The grid is used to obtain the shape of various components and to check them for shape and accuracy once they are made and assembled.

2.9 Setting out the grid

2.9.1 The basic grid as shown on drawing 074/004/07 needs to be drawn out on a flat, level surface. We will call this the "setting out floor". Make all the lines on the grid at least 100mm longer each end than the biggest length required - so that when a component is laid on the setting-out floor, the lines stick out around the edges.

2.9.2 The best type of surface is a board floor - chipboard or plywood is ideal. This should be thick enough to take small nails to bend battens around and also to screw chocks to for laminating. 20mm material is about the right thickness. The floor should be emulsion painted white, so that pencil or ball-point lines show up clearly. As the frames are going to be assembled directly on the floor it is important that it is rigid and flat - and preferably level. Make the floor big enough for the largest assembly, with some to spare - 2 sheets of 1220 x 2440 x 20 chipboard would do fine.

2.9.3 You will need a metre folding rule, a 3 metre steel tape, some 20mm wire nails, a couple of battens (say 2500mm long x 15mm x 10mm - good clean pine with no knots, planed up straight and square) and if possible a few weights (10kg or more). You will also need a straight edge (about 3000mm long x 145mm x 20mm, planed).

2.9.4 Draw the grid out on the setting out floor. Use a pencil or fine ball-point pen. Start with the centreline and then draw the dwl truly at right angles to it. Boatbuilders usually use a 3:4:5 triangle to check for square (90°). So, to check the dwl/centreline for square measure a multiple of 3 (say 900mm) along the dwl from the point of its intersection with the

centreline and mark this on the dwl. Now measure the same multiple of 4 (in this case 1200mm) up the centreline from the point of its intersection with the dwl and mark this off on the centreline. Now join the two points and measure this length (the hypotenuse of the triangle). It should measure the same multiple of 5 (in this case 1500mm) exactly.

2.9.5 Now draw the waterlines above the dwl and parallel to it - these are at heights of 100mm through to 700mm above the dwl.

2.9.6 Now draw the buttock lines each side of the centreline and parallel to it. These are at offsets of 100mm through to 700mm out from the centreline.

2.9.7 Now draw the diagonals. These start on the centreline at heights of 400 through to 800 and are all at 45° to the centreline. This makes it very easy to set out the diagonals because the 800mm diagonal will cross the dwl at an offset of 800mm, the 700mm diagonal at an offset of 700mm and so on.

2.9.8 This is the basic grid and part or all of it is used to mark out most components.

SECTION 3 - FRAME –400

3.1 Setting out the frame.

3.1.1 Refer to drawing 074/004/01. You will see the frame drawn out and, at the top left hand corner, a Table of Offsets.

3.1.2 Examine the Table of Offsets. You will see that it gives dimensions for both faces of the frame (at Positions –400 and –391). Because of the curvature of the boat's hull, the fwd face of the frame is a different size from the aft face. Fwd of the maximum beam, the fwd face is generally smaller than the aft face. Aft of the maximum beam, the fwd face is generally bigger than the aft face. This does not hold good entirely however, because the various curves of the boat start to get bigger or smaller at different places. Also, curves like the sheer for example are getting higher as they go towards the bow and the stern, with a low somewhere in between. So, always check in the Table of Offsets which are the larger measurements.

3.1.3 We shall make the frame to the larger measurements and then bevel (angle) the edges back to the smaller measurements. On this frame, the aft face (Position –400) hull dimensions are all larger, except for the sheer height which is larger on the fwd face

3.1.5 Cut a piece of ply out, of sufficient size to make the frame. Lay this on the setting-out floor in such a position that the edges of the ply will be outside the frame when it is set out, measuring from the centreline and dwl on the setting-out floor. Pin the ply in place on the floor.

3.1.6 Using a straight edge laid over the ply and aligned accurately with the dwl, mark the dwl lightly on the ply. Repeat this with the centreline and whatever other waterlines and buttocks are required to mark out the frame (check this from the Table of Offsets).

3.1.7 Start by marking the Rebate point on the ply. This is at an Offset of 30mm and

a Height of 2mm (the height of 8mm for Position –391 would make a smaller frame). So measure out 30mm from the centreline and 2mm up from the dwl and mark the point.

3.1.8 Now measure and mark the offsets on each of the waterlines from wl 100 through to wl 700. Wl 100 is 102mm, wl 200 is 149mm and so on. Measure each offset out from the centreline.

3.1.9 Measure and mark the sheer point at Offset 284 and Height 760.

3.1.10 Drive a 20mm nail in at each of the points marked. Bend a batten around the outside of the nails and hold in position with weights, or nails driven on the outside of the batten opposite the original nails (do not nail through the batten).

3.1.11 The batten should lay fair around the nails. If it doesn't, then check your measurements - it is very easy to reverse a measurement or to apply a measurement to the wrong line (wl 200's offset measured on wl 300 for example). Also check that your grid is square and correct. If there is still a problem then it is probable that the dimensions given on the drawing are incorrect - usually a mistyping - so call me to check. The batten can depart from the nails for as millimetre or two if it appears to run fairer that way - a computer cannot always predict exactly the run of a timber batten.

3.1.12 Once you are satisfied with the fair run of the batten, draw the outline of the frame in. Repeat this on the other side of the boat. But see ¶3.1.16 before you remove the batten.

3.1.13 Now set out the curve of the foredeck. To do this we measure heights on the buttocks instead of offsets on the waterlines.

3.1.14 So, on the centreline measure a height of 797mm, on b 100 a height of 792mm and on b 200 a height of 776mm. The sheer corner is already marked. Repeat these measurements on the other side of the boat and then draw the line using nails and a batten as before.

3.1.15 Now we shall set out the aperture in the ply. Much of this (and the depth of many parts of the other frames) is a parallel 70mm in from the outside edge. So it is worth making up a 70mm "dummy stick". This is a piece of thin ply, acrylic or "Formica" about 50mm one way and accurately 70mm the other.

3.1.16 Lay the dummy on the ply so that one edge is pressed against the inside of the batten and hold a pencil on the other edge - draw the dummy along the batten and you will mark off 70mm parallel inside the batten - you will of course have to break off for the nails. Once you have removed the batten from the outside of the hull, the dummied lines can be joined up (using a batten if necessary to get a fair line). Repeat the process so that the hull and foredeck areas are dummied off 70mm inside the frame outline. Draw in the bottom of the aperture at 300mm above the dwl.

3.1.17 The easiest way to set out the 70mm radius corners is to draw with a

compass a 70mm radius circle on a piece of stiff card. Cut the circle of card out, making sure the centre is marked. Lay the card circle on the ply and push it up to the inside lines so that the outside of the circle just touches the lines. Prick through the centre of the circle. Draw in the radius on the ply with a compass using the pricked-through centre.

3.1.18 The bottom of the frame is drawn straight across at Height 2mm.

3.1.2 Cutting and bevelling the frame.

3.2.1 Remove the ply from the setting-out floor. Cut out the ply to shape. Use an electric jig saw with the correct blade for a "clean cut" in this thickness of ply. Check that the saw is cutting square and adjust the base if necessary. Check the the "oscillation" of the blade (if any) is set to the recommended amount. Use a sharp blade. Use an "anti-chip" insert in the base of the saw (if available for your saw). Have a test run on some scrap ply to get the best and cleanest cut. Cut closely to the lines, but leaving them showing on the ply frame. Clean up the edges with a plane and spokeshave so that the outlines are still just visible.

3.2.2 Transfer the waterlines and buttocks etc. across to the other face of the ply (this will now become the fwd face).

3.2.3 Look at the Table of Offsets again. Bevels are obtained by finding the difference between the larger and smaller dimensions. Waterline bevels are applied along the waterline (i.e. horizontally) and buttock bevels are applied along the buttock (i.e. vertically). On later frames we shall use diagonals as well - bevels on these are measured along the line of the diagonal.

3.2.4 Start at the bottom at the rebate. This remains at a constant offset (30mm) but the height is bevelled off 6mm (8mm - 2mm), so the underside of the frame is 6mm further above the dwl on the fwd face than it is on the aft face. This bevel will induce a bevel on the edge of the frame, because the 30mm offset will be applied 6mm further up. So measure 6mm up on the fwd face and square this across; measure and mark a 30mm offset on this line.

3.2.5 On wl 100 measure and mark a 6mm bevel in (102mm - 96mm). On wl 200, the bevel is 6mm (149 - 143); on wl 300 the bevel is also 6mm (184 - 178) and in fact remains at 6mm all the way up the hull to the sheer.

3.2.6 There are no bevels on the foredeck (the heights on the buttocks are the same on both faces). The sheer height bevel will in fact be mostly created because of the offset bevel - as the width of the frame decreases so it climbs up the camber of the deck. Because we actually made the frame to the 760mm height at the sheer (to be on the safe side), we might have to take just a stroke of the plane off the top of the frame at the sheer to get to height 759mm on the aft face and height 760mm on the fwd face.

3.2.7 Once the bevels are marked, join them with a batten (held with weights) as before. Plane the outside edges off to the bevels - so that the aft face remains untouched.

If you draw a line on the frame edges just 1mm in from the aft edge and only remove this line with the last few strokes of the spokeshave or plane, you will find that this helps to keep you from planing material off the aft edges by mistake.

3.2.8 The frames on your boat are only 9mm thick, so on most of them the amount of edge bevel will be quite small. Although it is tempting to disregard say a 1mm bevel, it is worthwhile planing the bevels off because you will find that the hull and superstructure skins will then lay on the frames much easier and better.

3.2.9 Go around the inside of the aperture with a 3mm radius cutter in a trimmer or small router. Sand the inside edges smooth.

3.3 Finishing the frame.

3.3.1 We need to cut the notches for the backbone (in this case the apron) and the shelf. Other notches are best left until the hull is skinned and the boat turned over. The limber holes are cut after the backbone is laminated in place.

3.3.2 The notch for the apron is 100mm wide (Offset 50mm). The depth of the notch is given on the drawing for both faces of the frame. So mark off the sides of the notch at 50mm parallel to the centreline and measure 64mm up from the dwl (which has disappeared by now - so measure 36mm down from wl 100) for the bottom of the notch. Cut the notch out. Bevel the bottom 7mm (71 - 64) off the fwd face.

3.3.3 The notches for the shelf are 16mm x 50mm. So, on the aft face of the frame measure in 16mm and draw a line parallel to the hull. When the hull makes an angle with the deck of more than 90° (which it does on all the frames), then the height of the shelf notch will need to be measured from the intersection of the line 16mm in, with the line of the deck. So, from where these two lines intersect, measure down 50mm. Now look at the sheer height bevel which is 1mm. So measure 1mm up (you are working on the aft face still) and mark the bottom of the notch across square to the line of the hull.

3.3.5 Cut out the notch. Bevel the vertical face of the notch the same as the sheer offset bevel (6mm), taking the bevel off the fwd face. Bevel the bottom of the notch the same as the sheer height bevel (1mm), taking the bevel off the aft face.

3.3.6 Sand the frame surfaces up smooth, removing all pencil lines etc. But retain the centreline and a waterline (say wl 100) marked accurately on the edges of the frame. WEST one coat, WESTing both faces and all the edges.

3.3.7 Make and fit the cleat on the aft face of the frame (for the bunk base). Screw (0·75 x 6g countersunk head through from the ply into the cleat) and WEST bond the cleat to the ply. When screwing and bonding, drill off for the screws first (use a Stanley "screwsink") and have a dry run (no glue). Then take the screws out, blow off any drillings. Then assemble finally, with the WEST/#403 and the screws. If you are going to dowel over screw heads, the a Stanley

"plugcutter" makes dowels to match the "screwsink" countersink.

3.3.8 You can leave the ends of the cleat square, because the boat is getting bigger aft of the frame. If the cleat were on the fwd face, then you would need to bevel the ends off so that it cleared the hull. You can extrapolate the bevel from the frame bevel (e.g. 6mm bevel in a 9mm thick frame will extrapolate to 10mm bevel in a 15mm thick cleat).

3.3.9 Sand (and scrape if necessary) the WEST up smooth and WEST coat two more coats. Don't coat the outside edges of the frame or the edges of the notches any more, else they get get a bit "blobby" and lose their sharp shape and accurate dimensions. Do coat the radiused inside edges of the aperture however to fill the end grain of the ply thoroughly.

3.3.10 Mark the centreline and waterline accurately back on to one face of the frame either lightly in pencil or stick masking tape on the face and mark the lines on that. In this case mark on the aft face so that the lines are not obscured by the jig post. Label the aft face, so that you don't get it the wrong way round on the jig.

3.3.11 Store the frame flat (vertically or horizontally) so that it does not become twisted.

SECTION 4 - FRAME –1050

4.1 Making the frame.

4.1.1 This frame is essentially the same as Frame –400, just bigger.

4.1.2 To get the frame out of the width of a sheet of ply (1220mm) you will need to add a wedge shaped sliver to the top corners each side. These can be WEST bonded edge to edge, with a 3mm thick x 10mm wide tongue down the centre of the ply join. Most of the joined-on bit will be cut away with the shelf notch and the rest will be covered by the hull/frame fillet joint.

4.1.3 Alternatively you can make the frame in two halves with a centreline join. Tongue the join at the top. At the bottom, because it is all under the bed, you can just fit a butt strap over the join. Make the butt strap from 9mm ply, about 60mm wide.

4.1.4 Mark and cut the frame out, bevel the edges etc. in exactly the same way as you did for Frame –400. Radius the inner edges around the frame - but not the bottom edge in way of the bunk base.

4.1.5 Cut the notch for the hog. The height of the notch on the aft face is given on the drawing: 123mm below the dwl. The bevel on the bottom of the hog notch will be the same as the height bevel for the Rebate (149 - 147 = 2mm), bevelling off the fwd face (thus arriving at a height of -121mm).

4.1.6 Cut and bevel the notches for the shelves in the same way as for Frame –400.

4.1.7 Don't cut any of the other notches or the limbers at this time.

4.1.8 WEST the frame all over one coat.

4.1.9 Fit, screw and bond the cleating on the fwd face. The ends of the cleating will need to be bevelled off 8mm - or, as they are not seen under the bunk base, you can leave them square ended say 10mm in from the outside line of the hull, so they are well clear.

4.1.10 WEST the frame two further coats (but not the outer edges, nor the edge in way of the bunk top) finishing it as Frame –400. Re-mark the centreline and dwl on the aft face of the frame and label the aft face.

SECTION 5 - FRAME – 1700

5.1 Making the frame.

5.1.1 The frame is made in two halves, joined down the centreline. The join is reinforced by the mast posts on either side so no tongue is necessary.

5.1.2 Note that the frame does not go up into the coachroof - the roof is shown on the frame drawing to show the rest of the structure and the mast posts. When this frame is finished, the posts will stick up above the foredeck beam part of the frame.

5.1.3 Set the frame parts out; make and bevel them as before. This is the first frame to use diagonals - measure offsets on a diagonal down the angle of the diagonal; apply bevels also along the line of the diagonal.

5.1.4 You can radius the inside edges of the frame (as noted on the drawing) now, or perhaps better leave this until the frame is fully assembled so that, on the corner radii approaching the posts for example, you can finish the edge radii just back from where the ply disappears between the posts. In this respect, where something like a radius stops, try to set a common measurement (say 15mm) for the length of square edge material remaining, and use this generally.

5.1.5 The frame posts will finish under the mast runner - so the top ends of the posts can be cut square across at the height of the underside of coachroof top less 16mm (the thickness of the runner). At Position –1700, this is 943mm above the dwl. In the 9mm width of the frame, there is a 1mm height bevel (943 - 942). So in the 20mm width of the posts there will be a 2mm height bevel. This means that the height of the aft face of the aft post will be at 943 + 2 = 945 - 16 (for the runner) = 929. The fwd face of the aft post will be at height 927. The aft face of the fwd post will be at height 926 and the fwd face of the fwd post at height 924.

5.1.6 A piece of 9mm ply 50mm wide will need to be inserted between the posts above the foredeck beam section of the frame.

5.1.7 At the bottom there is no bevel in the thickness of the ply. In the thickness of the posts however, there will be some bevel. Bevel the bottom ends of the posts from -182 on the aft face of the aft post through to -181 on the fwd face. Bevel the fwd post from –181 on the aft face through to -180 on the fwd face.

5.1.8 Cut the hog notches in the two sections of the ply (with the bottom of the notch at -181 as shown on the drawing; no

bevel).

5.1.9 WEST the ply components one coat.

5.1.10 Screw and bond the aft post to the frame ply, making sure the centre join is hard together. Use 0·75" x 6g c/sunk screws, spaced alternately (in each half of the ply) at about 150mm centres. Also make sure the bottom end fwd face finishes exactly flush with the bottom of the hog notch.

5.1.11 Cramp and bond the fwd post on again with its bottom end (aft face) exactly flush with the bottom of the hog notch. You can screw the post if you wish, using 1·25" or 1·5" x 8g c/sunk screws, dowelled over.

5.1.12 Screw and bond the cleating on the fwd face. The bevel to come off the ends will be 5mm - or just leave the ends square but say 10mm in from the hull.

5.1.13 Screw and bond the vertical cleats for the bunk fronts on the aft face of the frame - the bunk divides at this frame. The bottom ends of the cleats can be left square as the hull is getting bigger. If you wished to bevel them you would need to add a height bevel of 2mm to the aft face of the cleats.

5.1.14 Sand the frame clean and WEST a further two coats (though not the outside edges, the edge in way of the bunk, or the notches). Remark the centreline and the dwl. Store the frame flat.

SECTION 6 - FRAME –2305

6.1 Making the frame.

6.1.1 The frame is made in two parts with a join on the centreline. St the top, the join is butted and tongued. At the bottom, the join can have a butt strap on the fwd face, finishing under the cleating. The bottom of the butt strap will have a bevel off it - the same as on the hog notch (1mm)

6.1.2 The bunks finish on the fwd face of this frame and the two small galley units begin on the aft face. The furniture drawings will contain details of the furniture profiles and trim, so that the edges of the ply will be covered. When cutting and finishing these edges it is important that they are straight, square and clean, with sharp corners. The radius on the frame inner edges starts 450mm above the dwl as shown on the drawing - this is just clear of the galley fiddle (which will prevent things sliding over on to the bunks).

6.1.3 Make the frame as usual and bevel the edges. Radius the inner edges from height 450 as noted on the drawing. Cut and bevel the hog and shelf notches. WEST the frame one coat.

6.1.4 Screw and bond the cleating for the bunk tops on the fwd face (at height 150). The offset bevel off the ends will be 1mm - or leave them square 10mm in.

6.1.5 Screw and bond the cleat on the aft face for the sole. This finishes clear of the galley front cleating or ply, to allow the galley fronts to go right down to the hull. The apparent difference between the spacing allowed (10mm to port and 20mm to stbd) is

because to port the front rebates over the ply while to stbd it just sits on the cleating. On the stbd side at the end, the bottom of the cleat is angled off to suit the hull line - no bevel is required.

6.1.6 Screw and bond the vertical cleat for the galley front.

6.1.7 Clean up the frame and WEST it two further coats (only the radiused edges however - none of the others). Re-mark the centreline and the dwl. Store flat.

6.1.8 It would be best to cramp a temporary stiffener across the frame or else it could break easily. Once incorporated into the boat, the frames become part of a very strong and rigid structure, but at the moment they are a little vulnerable. It is best to cramp the brace on the fwd face of the frame then it will not interfere with the jig posts and you will not get screw holes left. If you do not have sufficient cramps to spare, then you can fit a brace on both faces of the frame, screwing the braces together (in the area where there is no frame ply) thus clamping the frame ply between them and just drive a couple of screws right near the outside edges of the ply, where the screw holes will be hidden by the fillet joints (which will have about 25mm legs). When assembling on the jig, you will have to cut a notch out of the jig posts for the section of brace on the aft face - also we must be sure that the boat does not get trapped on the jig, so this part of the brace must be removed before the hull skin reaches it.

SECTION 7 - FRAME -2800

7.1 Making the frame.

7.1.1 This frame forms the aft bulkhead of the camper accommodation.

7.1.2 The frame is made in two parts with a join down the inboard edge of the doorway (i.e. 50mm to stbd of the centreline). The join should be butted and tongued. It will however be stiffened finally by the companionway structure.

7.1.3 Make the ply parts as usual and join them together. WEST them one coat.

7.1.4 The beams at the top are best made and fitted later on, when the boat is the right way up.

7.1.5 Screw and bond the cleating on the fwd face for the galley and sole.

7.1.6 Screw and bond the cleating on the aft face for the seat units. The seat tops will overhang the seat fronts by 60mm, to give the seats additional width clear of the sidedecks.

7.1.7 The cleating to support the sole boards in the open part of the boat is best left until the centrecase is fitted later on.

7.1.8 Sand the frame and WEST it two further coats (but not the edges). Re-mark the dwl and the centreline. Fit a temporary brace across the frame. If you fit this on the fwd face, then it will not interfere with the jig posts. Otherwise fit it in two parts either side of the frame as ¶6.1.8. Store flat.

SECTION 8 -FRAME –3535

8.1 Making the frame.

8.1.1 This frame is cut in half by the centrecase. So make it in two halves and keep it in the two halves until the time comes to set it up on the jig. Then a temporary strap can be screwed across the fwd face to hold the frame together for setting up.

8.1.2 The outside width of the centrecase is 50mm - so leave a 50mm gap between the two parts (25mm off each side of the centreline).

8.1.3 WEST the frame one coat.

8.1.4 Screw and bond the cleating as usual. Note that there is a 10mm gap between the ends of the sole cleating and the vertical cleating for the seat fronts - this is to allow the fronts to pass right down to the hull. There is no appreciable bevel on the ends of the cleats on the hull.

8.1.5 WEST the frame a further two coats, but only the radiused edges, not the other edges. Store flat.

SECTION 9 - FRAME –4270

9.1 Making the frame.

9.1.1 This frame is similar to Frame –3535, except it is in one piece because the centrecase finishes on the fwd face of it.

9.1.2 Make the frame in two halves, joined on the centreline. The centreline join can have a temporary 50mm wide butt strap screwed on, which will be replaced by the centrecase later on. You can leave the frame in two until the time comes to set it up on the jig.

9.1.3 Don't forget that the aft face of the frame is now the smaller - so generally use the fwd face dimensions and then bevel back to the aft face. Check from the Table of Offsets.

9.1.4 As the cleating is on the fwd face, and the boat is now growing bigger fwd of the frame, then there is no need to worry about end bevels. If you fit the sole cleating at this stage, leave a clear 50mm gap in the middle for the centreboard case structure.

9.1.5 WEST, finish and store the frame as usual.

SECTION 10 - FRAME –5005

10.1 Making the frame.

10.1.1 This frame is similar to the previous one except that the frame protrudes above the sole somewhat.

10.1.2 Make the frame in two halves and butt joined with a butt strap across the join on the fwd face of the frame. Because it is so short, make the butt strap from 9mm ply with the grain horizontal and make it 150mm wide, sitting under the sole cleating. No bevel is required on the underside of the butt strap as the boat is growing larger as it goes fwd.

10.1.3 WEST and finish the frame as usual. Screw a temporary brace across the fwd face of the frame, on top of the seat cleating. You can screw into the cleating.

END OF INSTRUCTIONS BOOK 1

See Book 2 for:

Transom.
Jig.
Setting up.
Making the apron.
Making the hog
Making the stem.
Making the keel.
Fitting the shelves.

See Book 3 for:

Skinning the hull.
Centreboard and case.
Rudder and fittings.
Stern knee.
Thwarts
Seats
Floor boards
Sundry items.

See Book 4 for:

Interior furniture.
Finishing the interior.
Finishing the exterior.

See Book 5 for:

Making the spars.
Spar fittings.
Rigging.