SECTION 49 - COLD MOULDED PLANKING

49.1 Inner skin.

49.1.1 The inner skin is 6mm Cedar or Douglas Fir strip planks fitted close.

49.1.2 There are usually three possible types of strip planking available (and in the UK, only in Western Red Cedar).

49.1.3 The first simplest style is square edged - simple rectangular profile planks, say 6 x 15. This is very easy to plane up yourself from baulk material. The only disadvantage with simple rectangular planks is that they need some form of plank-to-plank edge fastening to ensure that they run in line with each other. People (usually manufacturers of profiled systems) may tell you that square edge is unsuitable because a gap will open up on the outside as the planks lay round the girth - this is of course true but the gap is so small as to be of no consideration - in any case it fills naturally with WEST as the skinning continues.

49.1.4 The second type has one convex and one concave edge. The theory is that the convex edge sits in the concave one of the previous plank, which thus helps to keep the planks in line with each other. The concave edge also makes a good reservoir for the WEST, so that it doesn't all run away down the plank faces. Finally the concave/convex edge system is supposed to allow the planks to lay round the girth of the boat better. This last claim is not of practical consideration - and in fact because of the feather edges, convex/concave often produces a less god internal finish that plain square edge carefully done. You will also hear that the concave/convex edges are of a special geometry - again we have not found this to be true. We have found equal success (or otherwise) with stuff machined up ourselves using simple matching convex and concave cutters (which we grind ourselves) in a spindle moulder.

49.1.5 The third type (sometimes called speed strip in the UK) has a tongue on one edge and a groove in the other. It is in fact a slightly modified version of plain old tongue-&-groove matching. The tongue is only about as deep as the groove is wide and has a rounded off edge. This allows the planks to rotate slightly one on the other so that they can lay nicely round the girth. The function of the tongue-&-groove is (as with the convex/concave) to make the planks run nicely together - which it does very successfully. The groove also acts as a reservoir fot the WEST. This type possesses the best features of the previous two types - the nice clean square inner edge of the square edge type and the guiding function, WEST reservoir function and no requirement for edge-to-edge fastenings of the concave/convex. The only criticism that we have heard of this type is that it is possible to get voids (i.e. lack of WEST) in the grooves - but careful attention to pouring the WEST in the grooves should obviate this.

49.1.6 If you can't obtain this tongue-and-groove type - and we do recommend it - then it is not difficult to make yourself (given a spindle moulder). You can grind the cutters yourself from blanks (use the Whitehill type head). You will need to make up a few sample

bits first by hand to get the geometry right - but it is not very complicated. The planks should be 6 x 20, or a bit wider, say 6 x 25. The actual width is not too important as long as they are all the same. You could have two widths - wider for the first 600mm or so from the sheer down, and narrower for the rest of the hull.

49.1.7 Machining your own planking may sound a nuisance, but it does give you greater choice of timber - to get a lighter coloured interior by using Douglas Fir for example, or Yellow Cedar, rather than the rather dark Western Red Cedar.

49.1.8 We are assuming that you are using tongue-&-groove type strip. But there is little procedural difference whichever type you use - just with simple square edge (our next preference after tongue-&-groove) you will need to drive edge fastenings. If you are to do this use brass or stainless panel pins. The longest you can usually obtain these is 30mm, so the widest you planking can be is about 20mm - you wouldn't want to go much wider at only 6mm thick in any case.

49.1.9 However, with square-edge and concave-edge strips it may be that the frames are a little far apart for the strips to run fair. With the tongue-&-groove typr, once the run is established (by the shelf basically) it will tend to hold fair. If you need them, offsets for temporary moulds to go in between the wider-spaced frames are availble.

49.1.10 The first plank will be bonded on with its edge flush with the edge of the sheer. We shall lay the planks groove uppermost, so that we can pour the WEST into the groove and it will mostly stay there. So on this first plank, the tongue will need to be planed off. The planking may not be long enough to go round in one length. There is no need to scarph the length of plank together - just simply butt them. the butts will be well supported by the previous and next planks, as well as the two diagonal outer skins. Stagger the butts well - by a minimum say of 200mm (though in practice a greater distance should be easy to achieve). You can also arrange for some butts to come on frame -1615, which is wide enough to take fastenings in the ends of both sections. The planks will be bonded to the frames (and any other bits of structure available). It is also convenient to nail or staple them to the frames and structures. We prefer nails for this job - brass or stainless panel pins, or nylon nails. Take care driving the nails into the frames as it is easy to get the angle wrong and break out of the sides. If this does happen it is best to deal with it immediately - remove the offending nail.

49.1.11 With a boat of this style, with a traditional stem, the plank ends fwd will have to be fitted. With a more modern style boat the stem is all internal and the planks just run over it to be cut off flush afterwards. The same is true to a certain along the backbone where our skin has to be fitted up to the keel. However, even on a more modern style boat, the planks have to be fitted to each other down the centreline, so here at least we don’t really have any more work. At the transom, the planks can be left just overlength and trimmed back flush later, after the WEST has gone off.

49.1.12 So, fit the first plank, with its edge flush with the top edge of the shelf. Fit the

fwd end first, angled off to suit the stem. Let the aft end overhang the transom a bit (say about 20mm). Bond the plank to the shelf, and the apron and transom faying surfaces fastening it as necessary Wet out the bonding surfaces as usual, including the fwd end of the plank (and any butt ends) and then bond with WEST/#403.

49.1.13 Fit the first plank on the other side. Indeed, we shall always keep the two sides of the boat about evenly planked - don't plank up all one side first, else you may tend to pull the frames out of square.

49.1.14 Get out the second plank and fit the fwd end (and any butts). Wet out the two edges with a small brush (cut the hairs off quite short); wet out the surface of the plank and the ends, the shelf, and the transom and apron faying surfaces. Then run WEST/#403 into the groove of the previous plank and apply WEST/#403 to the surface of the plank etc. Make the WEST/#403 thinnish mayonnaise consistency so that it will pour satisfactorily. Fit the plank up. pushing it well down into the groove of the first plank; fasten as necessary. Repeat on the other side.

49.1.15 With the third plank we are getting away from the shelf and so the planks from here on will be bonded to each other and to the frames, transom and stem. When the plank is being fitted up, mark the frame positions etc. on the plank so that you know where to wet it out. It is usually easier to apply the WEST/#403 to the frame edges and the transom and stem faying surfaces (as well as in the previous plank groove), rather than to the surface of the plank.

49.1.16 It takes a plank or two to establish exactly the best consistency of WEST/#403 and how much to apply so as not to get voids, but on the other hand not to have vast amounts going to waste and running down the planks. Clean off the excess as you go, don't leave it until later. A rag damped with acetone or WEST solvent can also be useful to wipe over the inside off the planking from time to time, but don't be so vigorous with this that you wipe the WEST out of the plank seams.

49.1.17 With square-edge planking you must take care that the planks run flush with each other on the inside, so you will need to hold them while you drive the edge fastenings. If you are working single handed you will almost certainly need to devise clips of some sort to hold them flush together while you nail them. The simplest is a piece of thin ply with a 6mm wide slot cut out of it, which you just push over the planks. If you have a helper, then one of you can hold the planks flush while the other nails

49.1.18 Tongue-&-groove planks should stay running even with each other by virtue of the tongue-&-groove - however just keep a check as you fix the planks to make sure that this is so. Apply a few clips if necessary.

49.1.19 As you proceed with the planking you will find that you will gradually have to apply edge bend to the planks to get them to fit down tightly on the previous plank. The amount of edge bend will gradually increase until you get to the point where it is too much for the plank, or is starting to produce distortion in the planks. At this point we need

to fit some 'stealers' until we are back straight again. We would expect this to occur somewhere about 600mm down from the sheer. You may find that you can go on further than this - or not so far. The reason for all this is basically that the girth of the boat is greater amidships than it is at the ends.

49.1.20 A stealer is a tapered plank that (usually) does not run full length. In this case the stealers will most likely be widest in the middle and taper down each end - rather like a half-moon shape.

49.1.21 To make the first stealer, get a length of plank out, probably about half or three-fifths full length. Let it lay on the previous plank, so that the tongues at the ends are sitting in the grooves in the previous plank. Edge bend the plank so that the maximum gap between it and the previous plank is at the maximum the apparent plank width (i.e. the width you see, which is the total width less the depth of the the tongue). Measure the gap from the mating edge of the stealer, not the edge of the tongue. Tack the plank in position like this. Now, using a dummy which is the apparent width LESS the tongue depth, dummy the shape of the edge of the previous plank on to the stealer. This line will be the edge of the tongue on the stealer.

49.1.22 Remove the plank from the boat and cut it out to the marked shape. Then machine the cut edge to form the tongue. The resultant plank should now fit into the previous plank, with the tongue in the groove all along.

49.1.23 If you are not going to form a tongue on the stealer (because you maybe don't have the necessary spindle or router), then fix the plank up as described in ¶49.1.23 but dummy off the using a dummy the apparent plank width. Then remove the plank and cut to the dummied line, which will remove all the existing tongue and reproduce the just the mating edge. Then when fitting the plank you will need to edge fasten it as if it were the square-edge system. You will need to fill the groove on the previous plank, preferably with a spline of timber WESTed in.

49.1.24 Another alternative is to run a groove in the shaped edge of the stealer and insert a double width tongue - this is probably quicker than fitting a spline in the previous plank groove and rather more satisfactory. And you are more likely to have a grooving cutter available than a tonguing cutter. If you are using a router for this purpose it is much easier if you make up a table and mount the router under it, with the cutter sticking up. Then with a simple fence, you can pass the timber over the router, rather than trying to move the router along the timber. This applies whenever you are routing small, difficult-to-hold, or difficult-to-handle pieces of timber - it is easier to pass them by the router than pass the router over them. If you have a spindle moulder or an overhead or table router, then you don't have a problem.

49.1.25 Continue fitting stealers, each of which will have less edge bend and be longer than the precious one, until you get to full length again with very little, or no, edge bend.

49.1.26 Then start to strip plank again in the usual way. One set of stealers may be sufficient and take enough girth out to get you

to the keel. Or you may have to put a second set in.

49.1.27 There are other methods of setting out strip planking. The most usual alternative is to lay a "king plank" around the bilge, with little or no induced edge bend. You can mark the run of this by bending a wide (but thin) straight edge around the bilge; as the straight edge will not easily edge bend you are finding the shape of a straight line around the boat - it will look a bit like a banana shape on the boat. Fix this king plank and then plank above and below it. Because you are starting in the middle like this you may then be able to plank right out without any stealers, or at most one set down towards the keel. This system works very well, but we don't feel that the internal appearance in the upper part of the hull is so good. Instead of running roughly with the sheer, the planks are sweeping up at the ends, with more and more banana shaped looking planks as they near the sheer amidships. We find this a bit disconcerting, giving the impression of excessive sheer.

49.1.28 Going back to our original method now, as you near the keel, you will start to need to fit the ends to the keel. This will probably happen first up fwd with a gradual transition from fitting the ends to the stem, to fitting them up to the keel. It will also happen aft eventually, so you will be getting (banana shaped) planks that need fitting at both ends.

49.1.29 As you are planking you may find that the shape of the boat looks peculiar. This is because you are looking at curves that you are unused to. We are used to the shapes of diagonals, waterlines and buttocks, but the run of strip planking is none of these, so we do not have any inbuilt expectation of shape or feel for it. These peculiar shapes usually disappear as you complete more and more of the planking and the boat starts to assume its true 3-dimensional surface shape. Only if you think that there is a definite bump or hollow developing do you need to get concerned at all. This shouldn't happen because we know that the boat is fair - the computer says so and, more importantly, previous boats have been so.

49.1.30 There is one area that can get unfair rather easily however and this is around the forefoot. Boats like this with fairly full lines and quite upright stems are changing shape very quickly in this area, so a quite tiny amount of error around the bottom end of Frame -450 can show as an unfairness. The error may not be on the frame itself, indeed it is more likely to be insufficient material cleaned off the apron faying surfaces from about -300 up round to the dwl. If the strip planks seem to be running unfair in this area, then it is worth checking with a batten to try and sort the problem and clean a bit of material off the apron or the frame (whichever you need to cure the problem). Elsewhere, on the boat with the gentler curves, minor errors (indeed often quite big ones) will not show up so much.

49.1.31 Once you have completed the inner skin strip planking and allowed the final WEST to cure off, sand the outside of the hull thoroughly but not heavily. The purpose is to remove any excess WEST, odd bits of timber sticking up, minor angularities etc., not to reshape the boat. More damage (to the hull shape) can be done at this stage with a sander

than one would imagine. Once the hull is smooth, run you hands over it - you will be surprised how sensitive your hands are and how small an inconsistency they can pick up. Mark any areas that you think are unfair and run over them preferably hand sanding, not machine sanding. Trim the ends of the planking off round the transom, flush with the transom aft face. Dust the hull down and WEST fill any crevices, dents etc. Sand gently over again, dust down and WEST coat the entire hull surface. Allow to cure and sand smooth.

49.1.32 You are now ready for the next skin.

49.2 First diagonal skin.

49.2.1 The first diagonal skin is 3mm Khaya veneers laid at about 45º over the outside of the strip planking. The final skin will be the same, but laid at 45º in the other direction (i.e. at about 90º to the first diagonal skin) over the outside of the first diagonal skin. It is immaterial structurally which diagonal you choose first - most people like to have the top ends of the final skin pointing fwd.

49.2.2 The diagonal skins are usually stapled on. the staples can be left in the first diagonal skin, but are removed from the final one. Use stainless, bronze or nylon staples, preferably in an air operated staple gun. The staple should have about a 10mm crown (the distance across the top) with 6mm legs for the inner skin - they can have 8mm or 9mm legs for the outer skin if required. You will need a surprising amount of staples, especially for the inner skin as they do not get a very good hold (poor in Cedar, much better in Douglas Fir). It is difficult to be precise about this - but you will probably need about 30,000 to 40,000 staples in all; they usually come in boxes of 10,000.

49.2.3 Before starting to lay the diagonals, you will need to experiment with the staples and gun. Take a piece of Khaya veneer and try stapling it to a piece of cedar. Staple across the grain of the Khaya. Adjust the air pressure until the gun drives the staple just below the surface of the Khaya. You have to press the nose of the gun firmly against the timber to get a proper drive.

49.2.4 A second tacking stapler is also useful - this is the same type of machine but driving longer staples. You will need lots of squares (say 30 x 30) of thin ply or hardboard and the staples need to be longer by the thickness of these (say 9mm if using 3mm hardboard). You will use these when you want to tack a veneer in place for fitting etc., so that you can easily remove the tacking staples.

49.2.5 The most usual place to start the diagonals is roughly amidships with (as in this case when there are two layers of veneer) the top end pointing aft. The angle is not too important - just guess at 45º. Mark a 45º line at your starting position, using a batten bent round the hull.

49.2.6 Now that the hull is a complete surface, you can veneer one side first and then the other. Do all of the first veneer skin however before proceeding to the second.

49.2.7 Just as the strip planks needed edge bending and then edge fitting, so will the

veneers. Because they are wider however (typically 100mm to 150mm) and thinner, you will not be able to induce much edge bend before they wrinkle up.

49.2.8 There are several methods of fitting the veneers. Perhaps the simplest is to edge fit each one. A common alternative is to edge bend as many as possible, then leave a gap and start straight again and so forth - finally going back and veneering in all the gaps. Some prefer to dry fit a group of veneers and then have one good WESTing session; others prefer to WEST bond each veneer as it is fitted. The method we prefer for a small boat is to edge fit each veneer and bond it on as you go. This is not so tedious as it sounds, because edge fitting is very easy and you are always up-to-date on your WEST bonding. It is probably a little more wasteful of WEST.

49.2.9 So, get the first laminate out at a width that will use your veneers economically - not much narrower than 100mm and not much wider than 150mm. Lay it round the hull with one edge near enough on your starting line marked on the hull. Tack it in place with the end close up to the keel and mark off the keel angle. If you have a helper, then life is much easier because the veneer can usually be held in place, reducing the amount of tacking you need to do. Also mark the sheer line on the veneer.

49.2.10 Remove the veneer and cut the keel angle on the end. Cut the sheer end - leaving it perhaps 25mm long.

49.2.11 Wet out the surface of the veneer and then apply WEST/#403. A good even coat is required; you may find that a notched spreader is useful here - you can make these from bits of plastic laminate with about 3mm notches spaced with 3mm in between. The WEST/#403 consistency should be mayonnaise. The hull has already been WEST coated and sanded so it should not require any wetting out or further attention, apart from a wipe over with a solvent dampened cloth from time to time.

49.2.12 Lay the veneer back on the hull and push the end firmly up to the keel and tack a corner in place. Smooth the veneer down round the hull so that it runs roughly on the 45º line on the hull and tack the top end. Return to the keel end and start to staple the veneer down on to the hull working from the middle line of the veneer out to the edges. You will need staple spaced at about 40mm from each other in both directions. Keep the outer staples just in from the veneer edges. Press the veneer down with you hand as you staple so as not to get bumps of WEST or bubbles of air trapped under the veneer. Once you are about half way to the sheer, remove the tack staple at the sheer, so that the veneer can slide smoothly over the hull. Make sure that you are not driving the staples so hard that they are piercing through inside.

49.2.13 Clean off the excess WEST. As with the strip planking, you will get to know the right amount of WEST to apply so as to get a good wet bond but not too much excess.

49.2.14 Have a feel and tap over the veneer to find any bumps or bubbles. Often these can be fixed with a tacking staple or two through a square of hardboard (covered in parcel tape or similar). If not you can make a cut in the

veneer, perhaps cutting a very thin lens-shaped piece out and then pulling down the edges with staples. If for some reason you miss a defect, it can be dealt with later on when the WEST has cured - especially on this skin which is going to be covered up.

49.2.15 Get out the material for the next veneer and lay it alongside the previous one. Mark and fit the keel end, and cut the sheer end off about 25mm long. The veneer will now lay against the previous one either touching somewhere in the middle and with gaps top and bottom - or gaps in the middle and touching top and bottom. Use a dummy about as wide as the widest gap (an odd bit of veneer does fine for this) and dummy the shape of the edge of the previous veneer on to the new veneer. Take the veneer off the boat and cut the edge to the marked shape. You can use a Stanley knife for this, but we find these tend to run off with the grain rather than follow the line. If the amount is small (an as we are fitting each veneer, it usually is) the a small thumb plane is often the quickest. Or push the veneer through the circular saw, with a small diameter (say 150mm) fine toothed saw in it. We prefer a thumb plane well sharpened and set fairly coarse, and the veneer laid on the bench.

49.2.16 Once you have fitted the edge just try the veneer back in place to check that you have got a good fit. As you get practised, you won't need to do this, just bond the veneer straight on from the first fitting.

49.2.17 Bond and staple the second veneer on alongside the first one. Clean off the excess WEST etc. as usual. Then proceed to the next veneer. Every now and again, say every seven or eight veneers, you may like to go back and trim the sheer off closer to the shelf.

49.2.18 Continue in this way until all the veneers on one side are fitted. As you go fwd, you will gradually be fitting the veneers to the stem rather than the keel. Aft, they will overhang the transom to be cut off once cured. If the angle of the veneers starts to get extreme, then fit a tapered veneer or two to restore it near to 45º.

49.2.19 Veneer the other side in the same way.

49.2.20 Once both sides are veneered and trimmed and the final WEST has cured, sand over the hull to remove excess WEST etc. The edges of the veneers may have curled up a little and these will need sanding down. Any bumps that are full of WEST (i.e. don't tap hollow) can be sanded flat. Any hollow bumps should be cut out and either WEST fill, or have a piece of veneer let in and bonded in. Make sure all the staples are flush (or below) with the surface of the hull. It doesn't matter if you sand the crowns off any that are proud, just leaving the legs in the hull. WEST fill any small gaps, crevices etc. and sand smooth. Dust down the hull and WEST coat all over; sand lightly when cured.

49.3 Outer diagonal skin.

49.3.1 This is fitted at 90º opposed to the first diagonal skin. And this time the staples are removed. Otherwise there is no real difference in the process.

49.3.2 By now you should have got pretty

good at fitting the veneers and bonding them on, which is excellent as we hope to get the best finish possible on this outer skin, so the fewer glitches, bumps etc. the better. Also, the better the edge fit of the final skin veneers, the easier is the final finishing of the hull. With this skin take more care fitting the ends of the veneers to the keel and stem as well

49.3.3 To remove the staples we need to staple them through something. You can use polypropylene binder twine but this tends to leave a dent in the veneer under each staple and often only pulls one leg of the staple out. The best material we have found is heavy duty parcel binding tape. This is usually about 15mm wide, with a nylon crisscross reinforcing laminated in it. It is used in mechanical parcel binders. You do need a heavy duty grade - the lighter grades just split lengthwise when you staple through, or break off when you come to pull the staples out. The tapes are stapled at the keel end and run down the length of the veneer in rows about 40mm apart, with the staples driven through them. With luck and care, when it comes to remove the staples, you can pull on the end of the tape and lift all the staples in that row right out. If at all possible have a test run to ensure that you've got the right tape.

49.3.4 So, proceed with this skin generally as before, making the best job you can of it.

49.3.5 Once the WEST cures, remove the staples - you don't need to wait until the whole skin is finished but can just remove the previous day's batch as you go.

49.3.6 Once this skin is finished, go over it carefully to remove any rogue staples and then sand the whole surface as before. WEST fill any crevices etc. - hopefully not too many on this skin - and re-sand. Ensure that any gaps in the hull skin join with the keel and stem are carefully filled. WEST/#406 silica makes a smoother filler than WEST/#403.

49.3.7 Have a final trim round, sand and dust down - and then WEST the hull one coat. When this is cured, sand lightly.

SECTION 50 – FINISHING OFF

50.1 Glass cloth

50.1.1 Now we have a choice about whether to incorporate a glass cloth membrane in the final WEST coating system. This is not necessary structurally at all but it does provide abrasion resistance and it also helps the WEST coatings to wick over the staple holes (which although very small can be a nuisance with the WEST forming "fish-eyes" round them). So we recommend incorporating a thin woven glass cloth with the second WEST coat.

50.1.2 Use a fairly open weave cloth about 200 g/m^2 to 225 g/m^2 in weight. Your WEST supplier should be able to recommend the most appropriate weave - it mustn't be to tight a weave or else you will have difficulty wetting it out.

50.1.3 You can dry lay or wet lay the cloth. With dry lay you lay the cloth on the dry hull and apply the resin over it and work it down through the cloth. With wet lay, you coat the hull and lay the cloth on the wet resin

and work it up through the cloth We prefer wet lay.

50.1.4 On the hull, the cloth lays best like the diagonal veneers, draped in lengths at about 45º, opposite to the final veneer direction.

50.1.5 The keel, deadwood and stem should be glass clothed before the hull and the cloth allowed to run about 25mm on to the hull skin, to a nice neat finish.

50.1.6 Start with the deadwoods and aft keel area up to to where the ballast keel fits. You may need to radius off the keel and deadwood edges a little more to help the cloth drape easily. The keel edges must remain sharp however in way of the ballast keel. Depending on the width of your cloth this can be covered in a single horizontal run, covering the bottom face and both sides. If not, do each side separately, with a join on the bottom face.

50.1.7 Mask the hull a parallel 25mm away from the keel. Get out the length of cloth you need. Don't bother with the 50 x 60 bit of keel sticking out beyond the aft face of the deadwood as this can either be left without glass or done separately. When you cut the cloth stick a wide length of masking tape where you want to cut and cut down the middle of this - the cloth will then be prevented from fraying out. Large scissors (about 250mm or so blades) are best for cutting glass cloth.

50.1.8 You may find that slow hardener #206 is better for this job as it gives you more working time. You will also need some ribbed rollers (#811) or washer rollers (#812) for wetting the resin through the glass. Wear gloves as you have to handle the glass cloth with WEST on it.

50.1.9 Apply a good heavy coat of WEST on the area to be glassed. Lay the cloth in place over the keel and press it down along the bottom face. Roll it down gently with the ribbed rollers, forcing the WEST to wet through the cloth. Smooth the cloth down the sides of the keel on to the hull and work it into the WEST coating with the ribbed rollers until the cloth is very thoroughly wetted out. As the cloth wets out you will find that it can take up more shape - so go back to any areas that wouldn't lay properly the first time around. With slow hardener you have plenty of working time so don't panic - just keep working on different areas and it will gradually fall into shape.

50.1.10 If there is not enough WEST to come through fully, you can apply some extra on top and work this well in with the ribbed rollers. Don't use the rollers too fiercely or else you will start to fluff the cloth up.

50.1.11 Allow the WEST to cure 'green' before you do any trimming off. It is very easy then to trim excess cloth off with a sharp Stanley knife (and a straight edge for long cuts). Once the WEST has fully cured sand the edges on the hull skin to as feather edge.

50.1.12 Now cloth the area in way of the ballast keel in the same way, running 25mm on to the hull skin.

50.1.13 The stem is a little more difficult and is probably best done in short lengths the width of the cloth wrapped round the stem

horizontally. You can overlap the joins and sand them smooth after they are cured. Or you can wait until the WEST has started to go off but is still just flexible and then cut through both layers of the overlap with a sharp knife and straight edge. Remove the excess from the top layer and then peel back the top layer enough to remove the excess from the bottom layer. Press the top layer down again and it should be a perfect butt join. You will need to apply a little more WEST to the join and lightly roll over it with the ribbed roller. This latter system only works when you have the time to get at the join at just the right moment in the cure process - if you can't manage this, just leave the overlap join and sand it off later.

50.1.14 Cloth the transom, wetting the cloth out so that it is turned on to the hull by 25mm.

50.1.15 Now we can turn to the hull. Start by getting a length of cloth out somewhere amidships. Cut one end to the keel angle and drape the cloth down over the boat. Cut the other end off roughly to the sheer. Leave the cloth a bit over length each end. Get out several such lengths.

50.1.16 WEST the area of hull that you have cut the cloth for. Drape the first piece of cloth and work the WEST through with the ribbed roller. Do the same for the other lengths. Have plenty of WEST at the overlaps.

50.1.17 As the WEST is getting sticky, go back and cut the keel ends of the cloth off to fit just up to the keel side but not turn up it. WEST these ends well down.

50.1.18 Now go over the whole area with the roller, smoothing out any air pockets or any puckered areas. As the cloth wets out it will become more flexible and drape to shape easier.

50.1.19 If you have time, deal with the overlaps now - if not leave until the WEST has fully cured. Do make sure the cloth is thoroughly wetted out - apply extra WEST if needed.

50.1.20 Continue until the whole hull is glass clothed both sides.

50.1.21 Once the WEST has fully cured, go over the whole hull and deal with any defects, sanding off overlaps etc. Tidy up all the edges especially around the transom and up against the keel and stem. The sheer will be finally cleaned off when the boat is the right way up.

50.1.22 Once the hull, keel, stem etc. are smooth and any defects WEST filled and sanded off, apply two further coats of WEST, sanding between coats. This should entirely fill the weave of the cloth and leave a smooth surface. Before the final coating is is a good idea to mark the waterline and boottop - see §50.2

50.1.23 If your cloth was a very open weave this may not be the case. So, after the first of these final coats, skim over the entire hull with WEST filler. WEST/#410 microlight is the easiest to trowel and sand - but it is not recommended if you are going to overcoat with a dark colour. In this case use WEST/#407, perhaps with a small amount of #406 silica mixed in to improve smoothness. Don't apply vast amounts of filler but trowel over the

whole surface with a wide bladed trowel knife, just filling the cloth weave and scraping off as much excess filler as possible. When the filler is well cured, sand over the whole hull and apply one or two more WEST coats.

50.1.24 Finally sand to a smooth matt finish overall, ready to start the final paint systems. Before the final coating is is a good idea to mark the waterline and boottop - see §50.2

50.1.25 If you are not going to lay glass cloth, then we recommend four WEST coatings, sanding between each. You will need to go carefully over the hull after the first (and probably again after the second) coat to spot fill the staple holes. A general trowel over the hull surface (as ¶50.1.23) is possibly the easiest way to catch all these. You can with advantage add #420 aluminium powder or to the final coat, to increase the hardness of the coated surface. Or, below the dwl, you can add #425 copper compound which performs the same function and also increases water resistance and acts as a foundation for the antifouling. Before the final coating is is a good idea to mark the waterline and boottop - see §50.2

50.2 Marking the waterlines

50.2.1 The waterline is marked at 75mm above (nearer the sheer) the dwl. This will be the antifouling line. The boottop (if required) is painted parallel vertically to the waterline. This will mean that the actual width on the planking will vary according to the hull angles, but that viewed level, the boottop will appear parallel.

50.2.2 The waterline and boottop line are marked in pencil before the final WEST coating, so that they are permanent.

50.2.3 Rig up two posts just aft of the transom and two posts just fwd of the stem. The posts should be a reasonable distance apart - say 2000mm - and fixed firmly and braced fore-&-aft. The posts do not need to be dead upright, but it is just as easy to make them so. Nor do they need to be exactly square to the centreline.

50.2.4 Fix a long board (say 25 x 150) across the posts each end. The planks must have a straight top edge and must be set on the posts so that they are level across. They should be positioned vertically so that their top edges are 75mm above the dwl - You can measure this off the jig rails. The planks need to be about 3000mm long if possible, sticking out about equally each side of the boat.

50.2.5 The basic method of marking the waterline is to stretch a thin strong line (like fishing line) from the top of the aft plank to the top of the fwd plank. Adjust the line sideways so that it just touches the hull about amidships. Tick off this point on the hull. The move one end of the line in and the other out, so that the line just touches the hull about 100mm to 150mm away from the first place. Mark this point. Continue in this way, moving the line so that it lies tangential to the hull at about 100mm to 150mm intervals, marking each point off on the hull.

50.2.6 Unless your planks are very long, they will not be wide enough to mark the ends. You will need to set up a third post each side.

These will have a length of level plank fixed to them, the inner end of which can rest on a waterline mark already made on the hull. You will need to set these up first as near the stern as possible and mark the waterline round the hull to the transom. Then move the third set of posts etc. forward and repeat the procedure round on to the stem.

50.2.7 To mark the waterline in fully, you will need a batten and several people to hold it in place. Hold the batten around the hull so that it lays fair over the waterline marks. Mark the waterline in.

50.2.8 To mark a vertically parallel boottop, you follow exactly the same procedure with the planks set the boottop width higher - or easier, with a boottop thickness block held on top of each of the planks. If you use blocks under the line, then you can mark the boottop at the same time as the waterline, which saves setting up the planks etc. twice. A good width for a boottop would be about 60mm.

50.2.10 The waterline can be marked straight across the transom. To look traditional, it can be marked in a half-moon rather than a straight line. Boottops are not usually marked across the transom - and certainly not if the water is marked as a half-moon.

50.2.11 Then have a final sand over the hull and the final full WEST coat.

END.