Mirror Class Dinghy Building Instructions

No 64144

FORWARD

The Mirror Class Dinghy which you are about to build is a One-Class design.

A One-Class boat is one which is identical in shape and measurements to every other boat in that particular class. The main reason for this is that, in a race, the winner is not the one with the most highly developed boat but the one who is most skilful at handling his craft. In other words, as all boats are exactly equal, the skill of the helmsman and crew is the deciding factor.

Because of this, a number of measurements are adopted as a standard for the class and each boat which is entered for a race, must have these exact dimensions and to prove that a boat is thus eligible each owner is issued with an official measurement certificate to qualify him for racing. These offical Rules of Measurement are published annually in the Mirror Class Association Year Book which you will receive if you become a member of the Association.

IT CANNOT BE TOO HIGHLY STRESSED, HOWEVER, THAT THIS BOOK MUST BE REGARDED AS PART OF THE KIT AND NOT THE ACTUAL RULES OF MEASUREMENT THEMSELVES; THIS MANUAL IS SOLELY A SET OF ASSEMBLY INSTRUCTIONS AND NOTHING MORE.

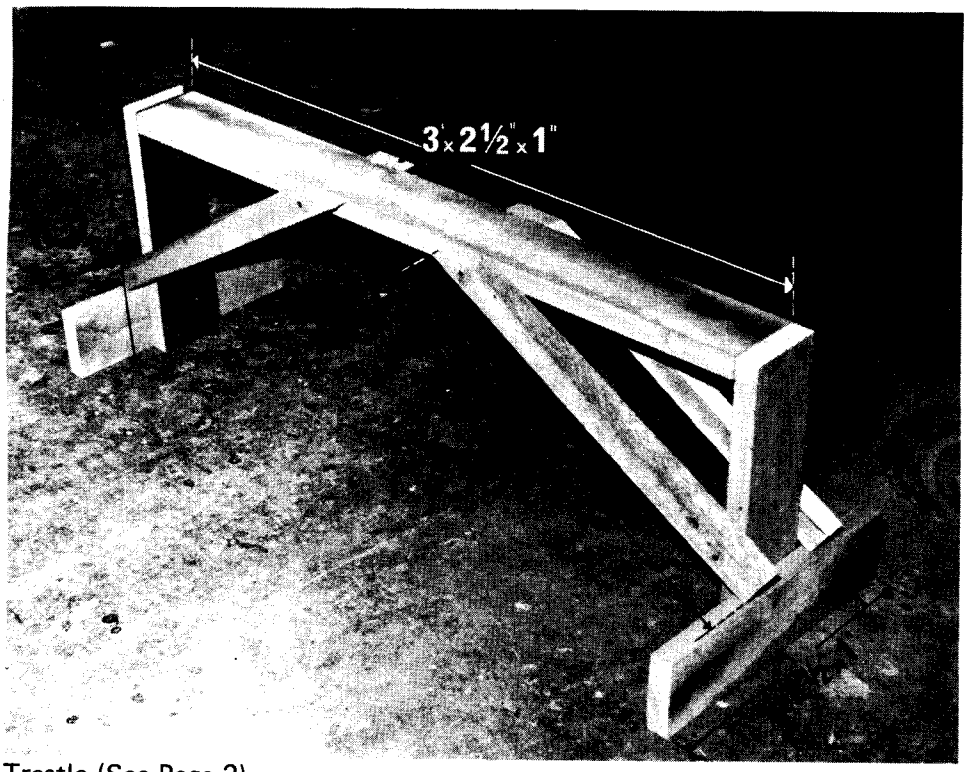
The Kit you have, if assembled correctly according to the instructions which follow, should make a boat which conforms to the rules of measurement and, in due course, after your dinghy has been measured, you will be issued with your official certificate.

Another advantage to the One-Class design is that it never goes out-of-date and, therefore, the second hand price for your boat, if you ever want to sell it, will remain stable.

The Mirror Class Association officially administers the Rules of Measurement conforming to the design copyright so, if you wish to be sure that your dinghy always remains "in class", it is advisable to become a member of the Association. For a small subscription you get the official year book containing all the measurements and rules in detail plus a host of other useful information. You will also receive regular newsletters giving you all the up-to-date information concerning the Mirror Dinghy and its activities. For information about the Mirror Class Association write to Miss S. Karslake, Hon. Sec., Mirror Class Association, "Quernmore", Cowbeech, Hailsham, Sussex.

All this has been said to make life easier for you and to ensure you get the maximum enjoyment from your Mirror Dinghy.

Now that you fully appreciate the target for which you are aiming, let's get on with the actual building!



Trestle (See Page 2)

ENSURE THAT ALL CHEMICALS ARE KEPT WELL OUT OF REACH OF CHILDREN. ie RESIN, CATALYST, GLUE, HARDNER & BRUSH CLEANER.

INTRODUCTION

The kit you now have consists of all the pieces necessary to build a Daily Mirror Class Sailing Dinghy plus several auxiliary components such as glass webbing strip, glue resin, etc.

Sometimes I refrain from using strictly nautical terms because, if you are a complete beginner and unused to the technical jargon, it will make your task somewhat easier if the words of explanation are familiar to you.

I SUGGEST THAT YOU READ THE WHOLE OF THIS BOOKLET BEFORE YOU ACTUALLY GET DOWN TO BUILDING YOUR BOAT, JUST TO ABSORB THE GENERAL PATTERN OF OPERATIONS.

A lot of the jobs connected with putting this kit together can be done single-handed but there is quite a lot of work, especially later on, which needs two pairs of hands. My advice is that you should talk some member of the familyinto giving you their valuable assistance from the word "GO".

Another way to make your building easier, is to construct a pair of rough trestles or cradles, similar to that shown on page 1 by which you can support the boat in all the later stages of building; these cradles have no need to be elaborate affairs, sturdiness is sufficient.

THIS PARAGRAPH IS ONE OF WHICH YOU MUST TAKE MOST CAREFUL HEED! INCLUDED IN THE KIT ARE TWO FIXING AGENTS, A GLUE (AEROLITE) AND A RESIN (FILOBOND).

AEROLITE consists of a glue and liquid hardening solution; it is used to join all the various pieces of wood together, in the same way as carpenters glue. The method of use is to spread the glue evenly over one of the surfaces tc be fixed, using a flat stick. The hardening liquid is spread onto the other surface to be fixed. When the two compounds come together they react and form a fast setting adhesive. To spread the hardener, use a flat stick with a bandage of cloth wrapped and fastened round one end. It should be pointed out that if the hardener liquid dries before the join is sealed it becomes ineffective.

FILOBOND is a resin which is used for bonding and sealing ALL the seams of the boat and making it strong and completely water-tight. The bonding provides the main strength of the boat. The resin consists of two separate compounds which, like a Seidlitz powder only work when they are mixed together. The resin itself is inactive until the liquid catalyst is added to it. It is vital that they should be mixed STRICTLY ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS which are as follows:

> Large amounts of Resin should not be mixed with Catalyst because the mixture will solidify in about twenty minutes and become useless. This of course depends on the temperature you are working in. One pint of Resin requires four cubic centimetres of Catalyst, which is approximately equal to two teaspoonsful. We recommend that half a pint of Resin be mixed with one teaspoonsful of Catalyst. Handle the Catalyst with care as specified on the label.

ENSURE THAT THE CATALYST IS WELL STIRRED INTO THE RESIN CONTINUOUSLY.

The Resin Mixture should not be used in a temperature below 60°F or (15°C). At 68°F the mixture will set in about ½ an hour – 80°F in 15 minutes.

If you get the proportions wrong, ie: too much or too little catalyst, the resin will set very quickly or it can remain tacky for several days. If the latter occurs then it will be necessary for you to apply another mix as soon as you can of the right proportions and this will set off the original application. In winter try to shake the mixture well and stir continually during use. Cold and humidity greatly affect setting times.

If you are forced to use the resin below 60°F you will find it takes longer to set and might not go off in a day or two. If this happens leave as long as you can and put on a further coat with normal mixture in as high a temperature as possible.

GLUE FOR JOINING THE WOODEN PIECES TOGETHER: RESIN FOR BONDING AND SEALING THE SEAMS OF THE BOAT.

Although a lot of the woodwork has been done for you before you receive the kit, you will need a few tools with which to assemble it. If you have a complete tool kit so much the better, but in case you are a strictly non-carpenter type, I now give you a list of tools which are necessary:—

One pin hammer, one top cutter — (a pair of wire cutting pincers), one tenon saw, one smoothing tool (a hand plane with iron sole is recommended), one set square, one pair of broad nose pliers, one drill (hand or electric), glass paper (course or fine), carpenters rule, and a screw driver (the width of the screws and with a square edge to the blade).

A few general hints might not be amiss before you commence the detailed work.

(1) When driving nails or pins make sure that the head of the hammer is clean.

(2) All nails, etc. should be driven in using a flat, firm surface as a backing; something like an iron weight or the side of an old hammer head will do admirably.

(3) The usual practice for screwing two pieces of wood together is to drill a hole the same size as the screw shank in the first piece of wood to be fixed and then a smaller lead hole in the other piece of wood. A screw should never have to be really forced into position. It is commonsense that, in soft wood, lead holes need to be somewhat smaller than ones in hardwood.

(4) On the subject of screws, remember that brass screws are easily twisted and broken if hard pressure is brought to bear.

(5) Do not try to glue wet, greasy or painted wood.

(6) If you are working in an outbuilding in frosty weather, do not let the glue or resin freeze before setting. This particularly applies to joints left to set overnight.

(7) Going to the other extreme, remember that the hotter the atmosphere, the quicker glue and resin set so, if you are working during a heat wave or in a heated room, you will have to apply your glue or resin much more speedily but with the same care as normal.

(8) You will see, eventually, that the fibre glass webbing strip fits tightly to the angles formed by the seams. I must stress, even at this early stage that the strip must be absolutely bonded to the wood at all points with no air bubbles beneath it. Secondly that when it is sanded down this must only be done to the edges of the strip — the bonded corners must be as strong as possible.

(9) Talking of sanding I must mention a technique which I will remind you of later at the appropriate time. Use a softwood block for your glasspaper and sand ACROSS the grain for PAINTED surfaces and with the grain for VARNISHED surfaces, remembering that the finished interior of the boat will all be varished and the exterior will be painted.

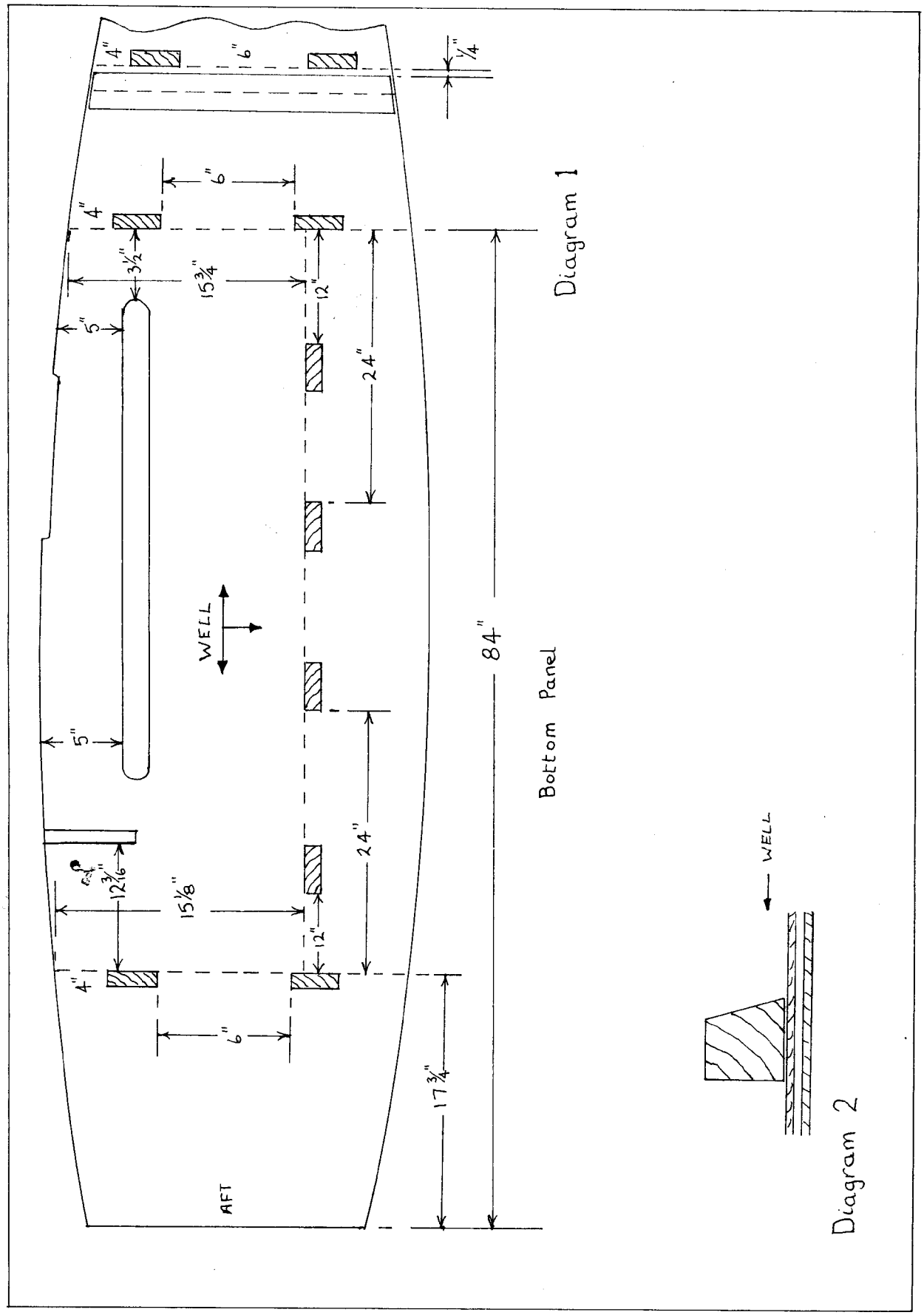
(10) Every wood upon wood joint must be glued as well as pinned or screwed.

(11) Having mixed up a batch of resin and used it on the seams, you might find that you have some left over. Don't throw it away — go over all existing seams once again.

(12) When you finish with the resin wash the brush out in solvent.

(13) Before using resin apply a good barrier cream to your hands or else you will have a terrible job to remove the dried resin from your skin. The liquid cleanser supplied with the kit can be used for removing resin from the brush. A good idea would be to use a pair of expendable plastic gloves.

(14) You will find in your kit two rolls of glass fibre webbing strip, one of which, the larger roll, is of a more open weave than that in the smaller roll. The open strip is


4"
6"
1/4"
6"
4"
3½"
15¾"
12"
5"
24"
WELL
5"
84"
15⅛"
12"
24"
4"
6"
17¾"
AFT
Bottom Panel
Diagram 1
WELL
Diagram 2

used for all seams whilst the close weave strip is used for waterproofing the inside top edges of the decks, etc. I will go into this in more detail later, but I am mentioning this now so that you do not make the error of sealing the body seams with the fine tape.

(15) A lot of people use far more glue than is necessary, thinking that the more adhesive one uses the stronger joint one achieves. This is not true — a thin film of glue is quite sufficient to make the strongest joint.

(16) It would be just as well to memorise the previous fifteen notes because they apply to every stage of construction and to forget any one of them might prove to be a costly blunder.

(17) Lay out the kit in sequence of number if you have the space available with low numbers at the top. Store in a cool, dark place and place flat mahogany parts under weights. Finish off and varnish mast ends, gaff and boom.

(18) Cover the floor of the building area with paper or any covering material. The resin will drip through the seams and stick very firmly to the floor otherwise. Provide adequate ventilation when using the resin, the smell will be obnoxious to some builders early on but you soon become used to it.

HULL

GLUE BLOCKS: Dia. 1.

Before making up of the hull panels it is necessary to mark out the aft and forward bottom panels with guide lines for glue block positions as in floor plan (diagram 1). The glue blocks are now placed on these guide lines. These blocks are fixed with 1" copper nails and glue. Drill 3/32" pilot holes through the blocks and bottom panels. Nail through the blocks into the ply and clench over the ends with a heavy object held against the head.

NOTE: All these glue blocks are bevelled. The bevelled face is positioned as per diagram 2.

FLOOR BATTENS: Dia. 1.

The position for the floor battens is given in diagram 1. Before fixing to bottom panels round the ends and sandpaper. Now you can fix with ¾ " copper nails and glue. Small guide holes 1/16" should be drilled one at each end and then zig zag pattern up the length at 4" spacings. Having applied the glue and the hardener, invert the hull panels and fasten it through bottom panels into floor batten. Hold a heavy weight against the nail head and hammer the clipped end.

HULL PANEL ASSEMBLY: Plate 1.

The two sides of the hull are formed by joining together two long sections of plywood, each consisting of two separate peices (5 and 6). Laying the pieces on the floor you will see that 5 joins 6 at the ends which correspond in measurement. It is advisable to lay out both sets of panels in this manner to check that they form a matching pair of topsides (the exploded picture on the front cover of this book gives you an idea what this layout looks like). Each pair of panels are fixed end to end by means of a butt strap. The butt straps as you will see have already been glued and nailed to the forward panels plate 1. Apply glue to the butt strap and the edge of the forward panel, put hardener on the aft panels and carefully position ensuring there is no gap where the two panels butt together. Nail through in the same way as the butt strap is fixed to the forward panel. To prevent the copper nails coming through the floor it is suggested that with two square pieces of timber you form a bridge on which you rest the joint. Turn the panels over and clench over the nails with a heavy object supporting the head of the nail.

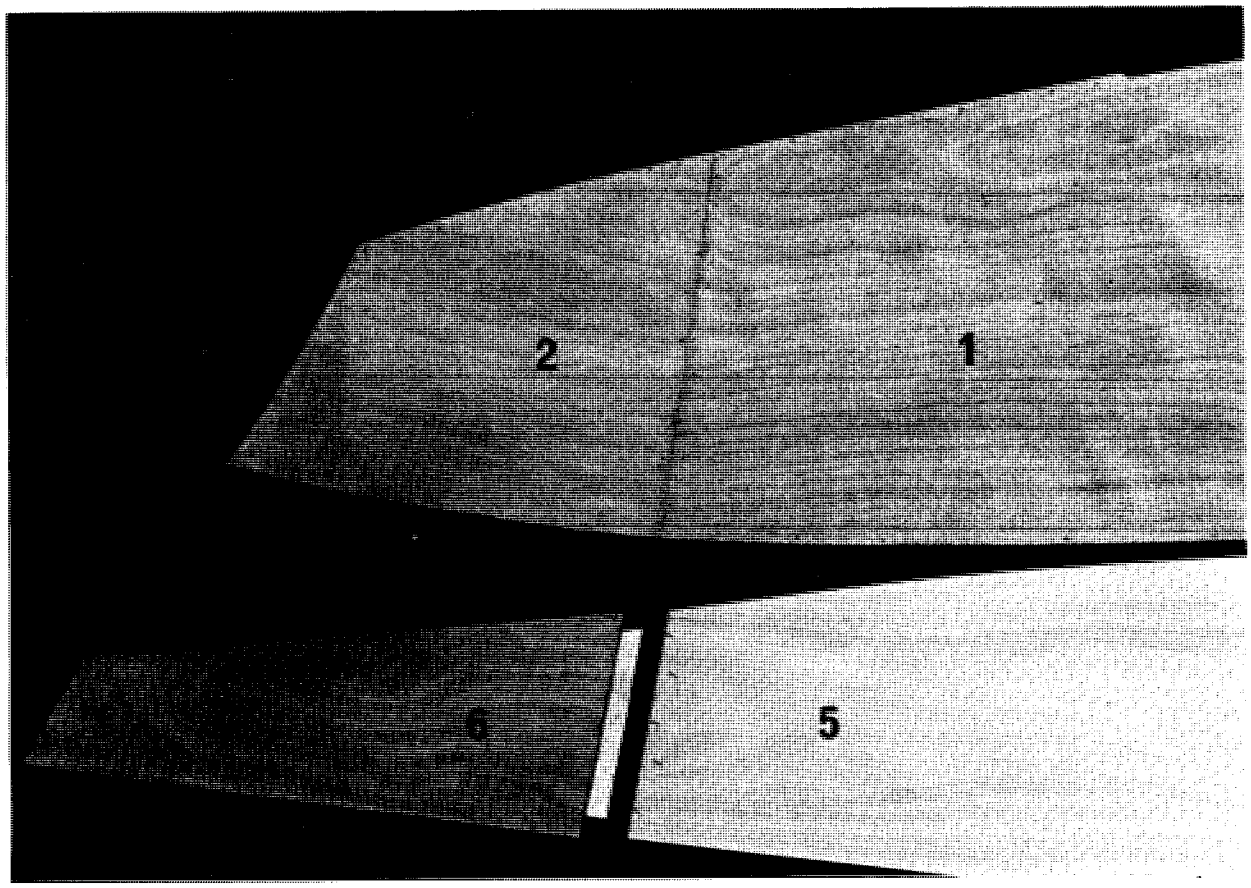


Plate 1

At this point I will mention that the glue jellifies in 10 to 15 minutes so you should remove any surplus that is squeezed from the joints otherwise hardening takes place and increases the difficulty of removing it. In exactly the same way you can join together the sections of the bottom panels (1 and 2); the short edge of the small piece (2) is a continuation of the edge on (1) which has the cut out forming the plate slot. After this you should be able to see the eventual shape of the boat because you will have two long panels which form the underside of the craft and two other narrower ones of a similar length which will form the sides.

ASSEMBLING THE HULL

To give you a general idea of the hull assembly, I can tell you that these panels are now going to be laced together up each seam except where the centre-board slot comes. Perhaps I should explain that the centre-board is a sort of removable keel which drops down through an open slot in the underside of the boat. In the illustration (Plate 2) you can see the slot for the centre-board and in (Plate 19) you may see the centre-board case nearly in position.

To mark the positions of the lacing holes, you should place the one bottom section on top of the other, with butt straps on the inside, so that the two shapes match exactly and the cutaway portions which will form the centre-board slot are together. A pencil line should now be marked ¼" from the edge all the way round the uppermost panel, excluding the centre-board slot. A marking gauge is useful (Plate 3). Along this line at 4" intervals should be marked positions for lacing holes and, to provide extra strength at each corner, the marks should be 1¼" apart.

N.B. THE HOLES ADJACENT TO THE ENDS OF THE CENTRE-BOARD SLOT MUST BE AT LEAST 1½ " AWAY FROM IT.

Using either a hand or electric drill and MAKING SURE THE TWO PANELS ARE EXACTLY IN LINE, holes can be drilled through both panels at the same time – you will need 3/32" bit (Plate 4). While you are doing this your assistant (I am assuming that you have talked somebody into the job) can be cutting the copper wire into pieces 2½" long.

Because the holes on the side panel have to coincide exactly with those on the underside of the hull when one curve is tensioned against another, a slightly different technique is used to mark their positions. Place one side on top of the other (again matching exactly) with the butt straps on the outside: a line, ¼" from the edge, should be drawn along the curving edge of the panel and the two ends of the panel only. You can now pencil in the positions of the lacing holes 4" apart as before BUT FOR ONLY THREE FEET ALONG THE CURVING EDGE FROM THE NARROW END, ie. forward. Along the straight edges at the stern and the bow the holes should be 1¼" apart – the top edge of the side pieces have no holes because they do not form a seam. Holding the two side panels in correct alignment, the holes you have marked can now be drilled. IMPORTANT: WHILE YOU ARE MARKING THE POSITIONS OF LACE HOLES, BEAR IN MIND THAT EACH HOLE ON ONE PANEL MUST, WHEN THE HULL IS ASSEMBLED, BE DIRECTLY OPPOSITE A MATCHING HOLE ON THE ADJOINING PANEL.

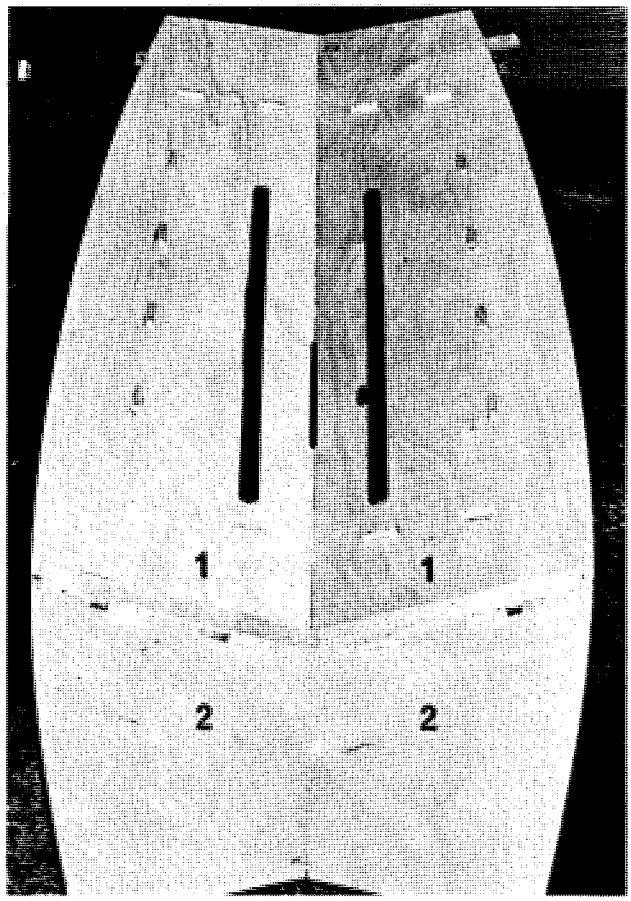


Plate 2

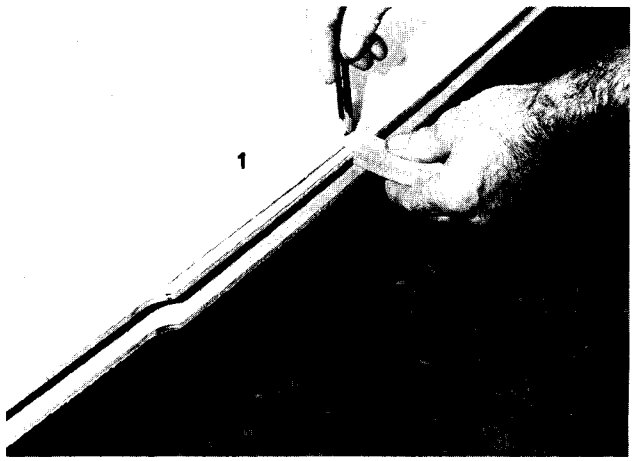


Plate 3

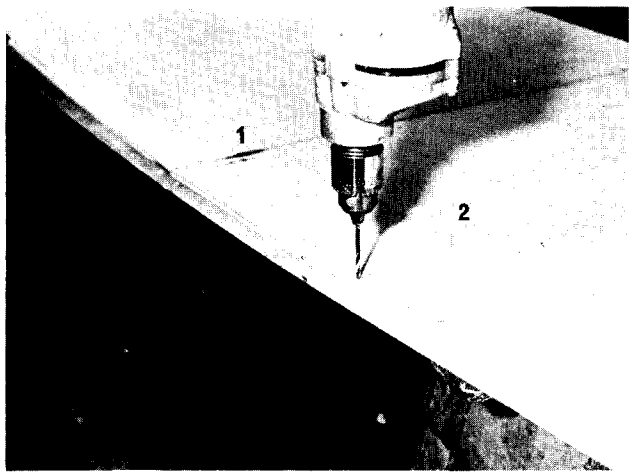


Plate 4

LACING THE HULL: (Plates 2-3-4-5)

If you lay the four long panels on the floor in their respective positions, that is to say the two bottom panels together with cutaways forming the centre-board slot and the side panels either side of the bottom section, you will be able to appreciate fully the next steps.

Putting the two bottom panels together again with butt straps on the inside will bring each pair of corresponding lace holes in line. Through these matching holes, in the edge which contains the centre-board slot, should be threaded the pieces of cut copper wire to link the panels together (Plate 5). For a loose fixing, the ends of each piece of wire should be twisted two or three times. It is better to use the same direction of twisting throughout because it simplifies matters at a later stage.

Open the bottom panels out like a book and you have formed the lower section of the boat (Plate 2). The two joining edges should NOT overlap but fit EXACTLY EDGE TO EDGE. The two cut-out portions should also coincide to form a complete slot.

FITTING OF AFT TRANSOM: Plate (6)

N.B. Aft transom fits INSIDE the Hull Panels.

Take the aft transom (7) and mark a vertical line exactly through the centre on both sides. Using the vertical line on the transom as a guide for matching it to the seam of the bottom panels, mark off corresponding lace holes on the lower edge of transom against the corresponding holes on the after end of the bottom panel – these are also placed ¼" in from the edge. In a similar way the side edges of the transom could be marked, matching each of them with the corresponding stern end of each side piece.

The top 6" of the side panels in contact with the aft transom (7) and aft transom top are nailed and glued together, not wired.

The holes thus marked on the transom can now be drilled.

FIXING AFT TRANSOM: (Plate (7)

Using your trestle supports to hold the joined panel open at the same angle as the bottom edge of the aft transom, rest the transom on the stern and fasten with pieces of copper wire through the corresponding holes (Plate 7). It is important that the aft face of the transom and the after edge of the bottom panels are flush in an upright line.

You may find it necessary to use pliers to ease the wire through the holes. Twist the wire as before but this time it can be done fairly tightly but just enough for rigidity.

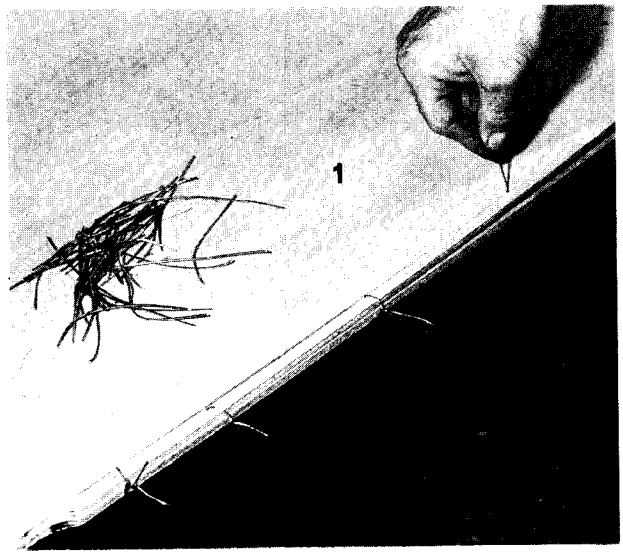


Plate 5

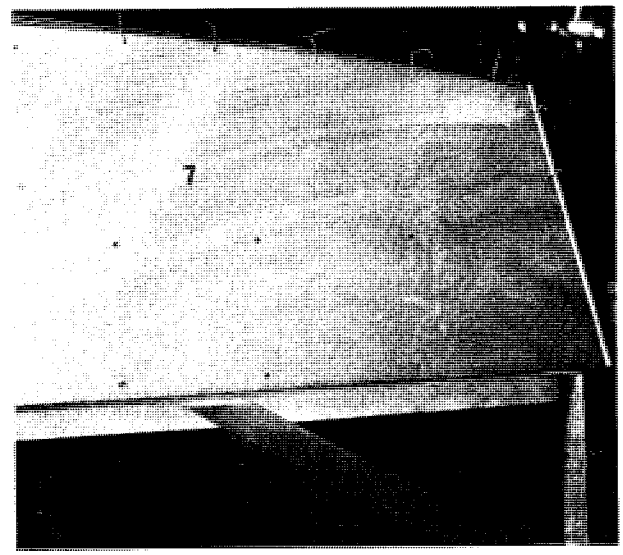


Plate 6

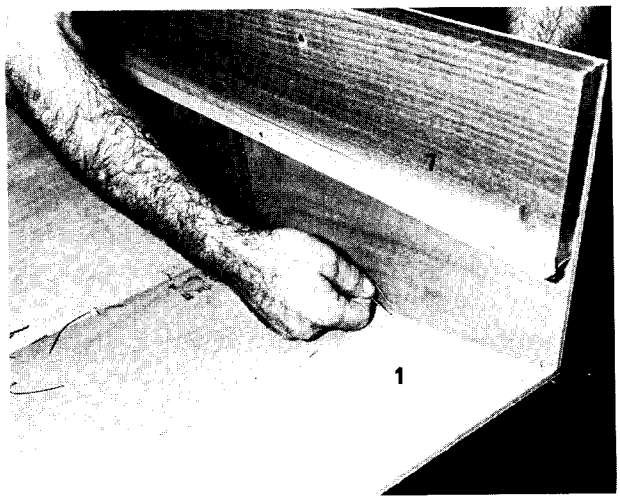


Plate 7

FITTING OF FORE TRANSOM: Plate (8)

N.B. FORE TRANSOM FITS INSIDE THE HULL PANELS

The fore transom (8) can be marked in a similar manner to that used on aft transom but great care must be exercised to ensure a correct fit (Plate 8). Again you will need a vertical line drawn on both sides through the exact centre of the transom so that this can be matched to the centre line of the hull.

A cleaner and tidier joint can be made between the fore transom and the bottom section if one bevels the two curved edges of the transom on the outside.

3/32" holes are now drilled on the link marks.

One side of the fore transom can now be fixed to the corresponding part of the bottom panel, using the copper wire pieces to the same tension as that on the aft transom. You will notice that the ends of the bottom are curved but when they are bent around the transom the two curves cancel each other out and appear to straighten.

The next stage, lacing the other curved edges of the fore transom, needs two people for a successful result. While you tension the bottom panel against the curve of the fore transom and fit in the wire laces, your assistant is tightening them on the outside by twisting (Plate 9). As far as possible, the fore transom should be flush with the bottom panel (Plate 8).

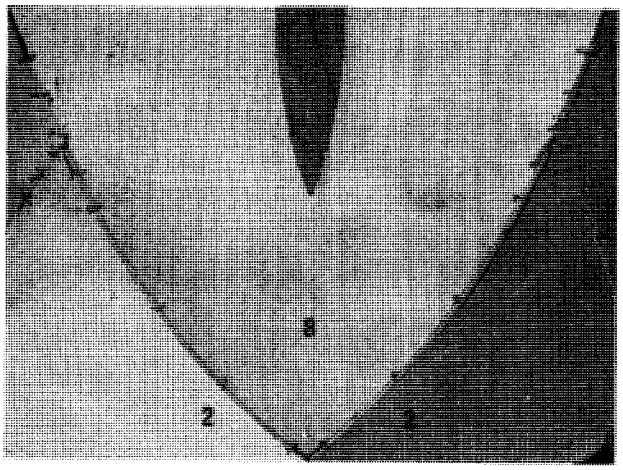


Plate 8

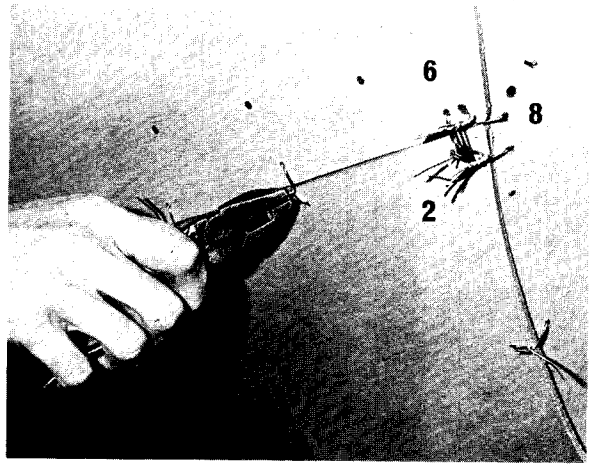


Plate 9

FIXING SIDE PANELS

This again is a two man job, for whilst one is holding the side panel, at the correct angle, the other laces it. Beginning at the narrow end (forward) and progressing to the stern (aft). The after edge of this side panel should be flush with the transom, ie., the transom fits inside the bottom and topside panels. (See (Plate 6).

Now you can lace the lower edge of the side piece to the bottom section through the matching holes so that the curving edges fit exactly (the sides butt to the outside edge of the bottom). It will be realised that because only the first 3' of the side piece has been drilled for lace holes, it is necessary, as you work along the lower edge, to drill holes, corresponding to those in the bottom panel, along the lower edge of the side piece, progressively lacing as you go along. You will notice that there is a notch cut on the edges of the topside; this enables you to switch the topsides from being outside the bottom to being edge to edge, ie., forward of the notch the bottom and side panels butt up together; aft of the notch the side panels overlap the bottom panels. Before you wire the last few holes at the transom apply glue to the side of the transom beam and hardener to the inside face of the topside and nail through the side panel into the transom beam using 3" copper nails 3 each side is sufficient.

In the same way, the other side panel can be fitted into position.

I WILL STRESS AGAIN HOW IMPORTANT IT IS THAT THE SEAMS, THUS LACED, SHOULD BE AS PERFECT A FIT AS POSSIBLE.

ALIGNMENT OF HULL: (Plate 10)

To ensure that the hull is held to the correct shape and is not twisted, one should first place the two shaping cross struts (34 & 35) in position. The shorter one (34) is fixed across the hull at a distance of 27" from the bow corners measured along each side. Measure along top edge of the plywood side panel excluding the hardwood strip on the forward top edge of the foretransom. Measure to the centre of the strut. The strut should be level with the top of the boat and temporarily held to the hull by a screw through the topside into either end of the batten.

The longer cross strut (35) is placed inside the top edge of the side panels at a distance of 52½ " from the stern corners along each side of the hull, a screw at each end holding it firm.

About 4" forward of the longer cross strut should be fixed a vertical prop on either side of the boat. These props are not supplied as part of the kit because any longish piece of wood will do the trick. A screw holds each of these to the hull and the lower end rests on the floor.

Now, if you look along the length of the hull with your eyes just over the aft transom, you will be able to see if the line at the top edge of the fore transom is parallel to the corresponding top edge of the aft transom. More than likely, there will be a slight twist in the hull which can be remedied by adjusting the side props at floor level until the hull is absolutely straight. Although this sounds rather complicated it is, in fact, a matter of a few seconds to get the desired result. IT IS A GOOD IDEA FROM TIME TO TIME DURING ALL THE FOLLOWING STAGES OF CONSTRUCTION TO OCCASIONALLY DO A QUICK SIGHTING CHECK ON THE TWO TRANSOMS. See (Plate 10).

Turn the hull upside down on the cradles and tighten all wire laces, coaxing the edges as flush as possible. Having done this you may now turn the boat upright again and re-adjust vertical props after checking alignment of hull.

The loops formed by the wire laces inside the hull should now be flattened to the shape of the hull; this can be done easily by using a long piece of wood, eg., the handle of a hammer, and pressing it hard into each loop. It is vital, from a sealing point of view, that every loop is completely flat.

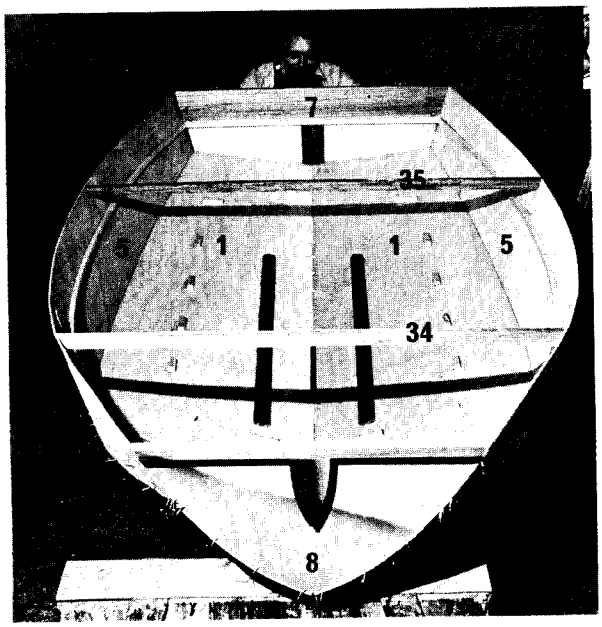


Plate 10

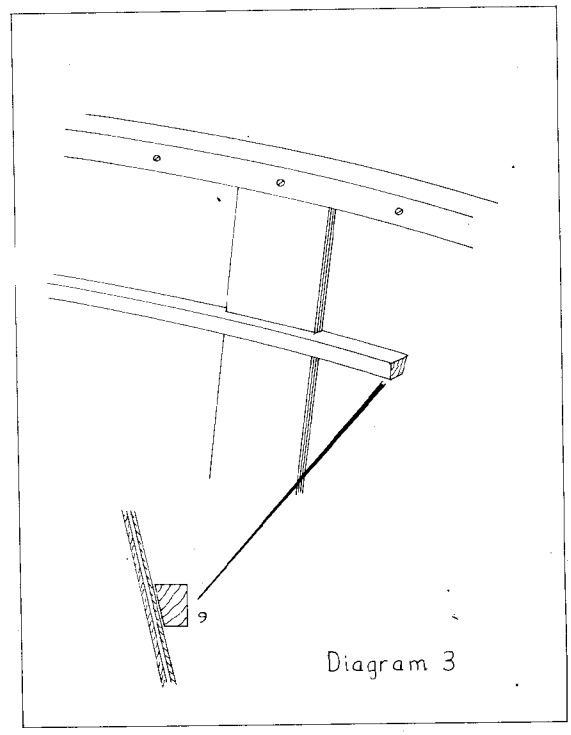


Diagram 3

GUIDE HOLES FOR STRINGERS: (Dia. 3).

The Stringers have to be pinned from the outside of the hull panel. To enable you to do this, guide holes have to be drilled in the topside panel. Using a 1/16" drill bit, drill through the hull ply ¼ " below the guide lines, already marked and at 9" intervals. Place each stringer, with its wide (bevelled) face to the plywood (see dia. 3) below its guide lines and mark it at both sides of the butt strap. The stringer should be notched out to take the butt strap (dia. 3). The stringers can now be glued and pinned using ¾" brass pins. If these stringers do not hold properly around the curve of the hull, try putting an extra pin at the appropriate places. Ensure the fore transom riser is level with the tops of stringers.

MAST STEP WEB – STOWAGE BULKHEAD ASSEMBLY

Glue and nail (1¼" copper nails) the mast step webb to the forward side of stowage bulkhead, fit between the doubling pieices of the cut out in the stowage bulkhead as in Plate 11.

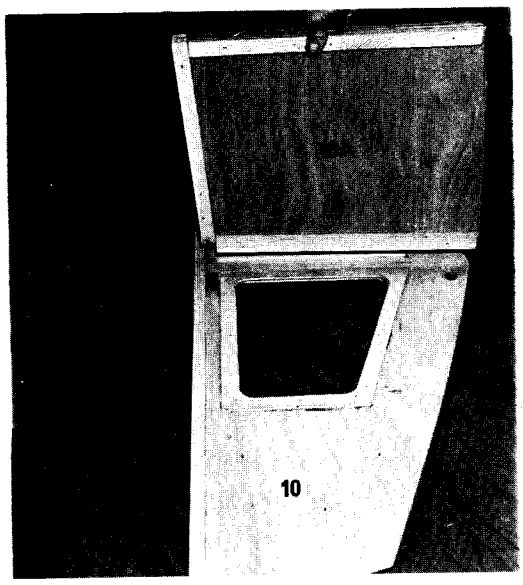


Plate 11

PREPARATION OF BULKHEADS

You will need to enlarge the notch in the plywood at the top corners of all the bulkheads so they fit neatly under the stringers.

SEALING THE STEMS (Plates 12 & 13)

I must repeat, before we go on to this process, that the resin used for sealing the seams be mixed strictly in accordance with the manufacturer's instructions (see pages 2 & 3).

DO NOT MIX TOO LARGE A QUANTITY FOR IT WILL NOT LAST AND CANNOT BE USED LATER. We suggest half of a 1lb. Jam Jar with ½ teaspoonful of catalyst.

The glass cloth webbing is now bonded to the inside of the hull but first check that the hull is straight with no twist along its length. Resin should be applied to the inside of every seam, overlapping on to flat vertical surfaces where necessary. As all the gaps in the seams must be filled it is obvious that a certain amount of resin will run through on to the floor, therefore, one must have some protection for whatever surface you are working on. Having resined the seams, you should lay the webbing sealing strip along the joints, angling it into the shape of the hull and pressing it flat to the resin. Once the webbing is in position more resin must be applied to its top surface pressing it down with a strippling action, right into the weave of the strip.

Make sure there are no air bubbles and the glass strip is fully wetted out. While the resin is hardening it is vital that the hull, AT NO TIME, is moved out of alignment so be careful how you handle it for a while. Care should be taken not to stretch the woven fibre-glass tape when placing it along the joint.

BEFORE THE RESIN SETS IT IS A GOOD IDEA TO FORCE ALL THREE BULKHEADS INTO THEIR RESPECTIVE POSITIONS SO THAT THE HULL PANELS WILL EVENTUALLY CONFORM TO THE CORRECT SHAPE. ALL BULKHEADS NEED TO BE FORCED STRONGLY WELL DOWN INTO THE HULL ESPECIALLY IN THE CENTRE.

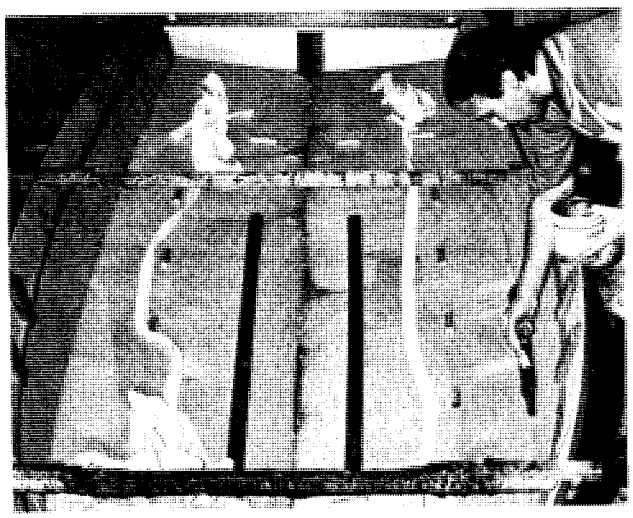


Plate 12

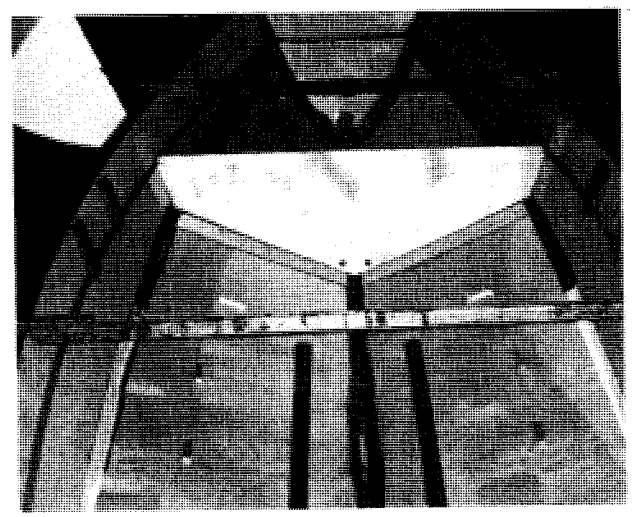


Plate 13

FIXING THE BULKHEADS

Forward Bulkhead: (Plate 13)

The forward bulkhead is positioned between the butt strap and the four forward glue blocks. Glue and nail (¾" brass pins) through the ply bulkhead into glue blocks as shown in (Plate 14). To hold the bulk head down in position it may help you if you pin through the top corners of the bulkhead edges from above and angled into the stringers see (dia. 4) using 1" copper nails.

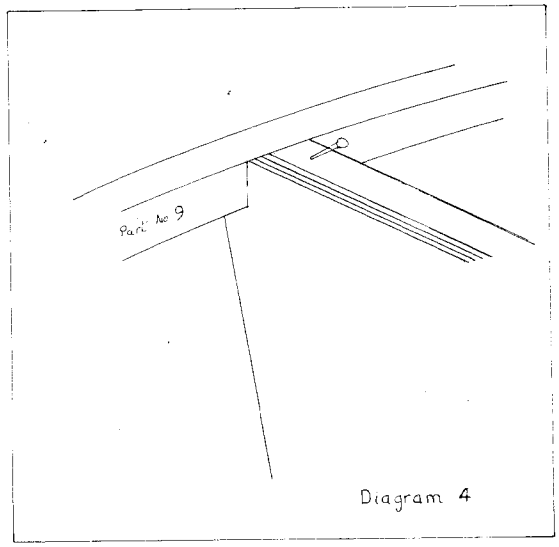


Diagram 4

STOWAGE BULKHEAD & MAST STEP WEB ASSEMBLY: UNITS 10 & 10A.

Stowage Bulkhead & Mast Step Web Assembly: (Plate 15)

Apply glue to glue blocks and forward edge of mast step web, at the same time apply hardener to ply faces opposite glue areas. You can now brass pin (¾") the stowage bulkhead to glue blocks as with forward bulkhead. It is essential to press the underside of the hull upwards to meet the bottom of the stowage bulkhead. Now make sure that the top of the web assembly is level with the forward bulkhead. Using 1" copper nails nail through the forward bulkhead ply into the web uprights in a zig zag pattern.


Plate 14

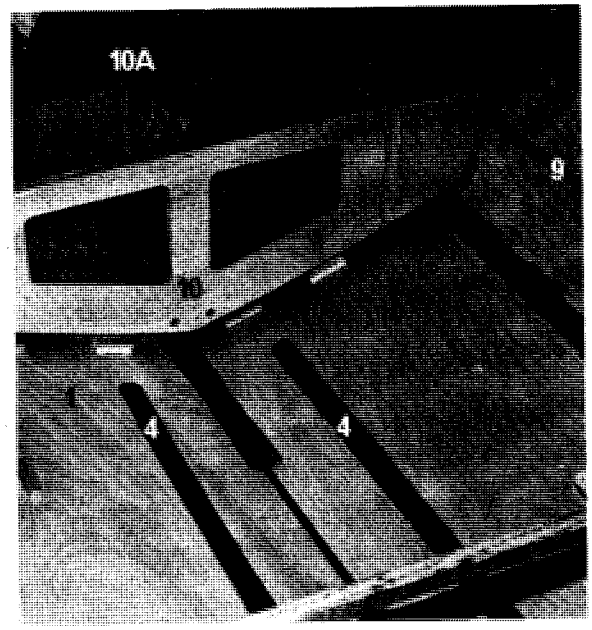


Plate 15

AFT BULKHEAD UNIT 12: (Plate 19)

The aft bulkhead is fitted the same way as the forward bulkhead except the glue blocks are on the aft face of the bulkhead.

SIDE TANK SIDES UNIT 13: (Plate 16)

Offer the side tanks up to the uprights on the aft and stowage bulkheads. These panels may need trimming slightly to fit. Now apply glue and hardener to the uprights and glue blocks, but it is essential to press the underside of the hull upwards to meet the bottom of the side tank sides.

CENTRE CASE UNIT 14: (Plate 17)

Open up the cut-out in the thwart to allow the dagger board to fit into the box. Place the thwart on top of the flat faces of the centrecase, making sure that the cut out in the thwart is level with the slot in the centrecase. The whole unit is fixed together by means of six screws. Drill 4 x 3/16" holes down through the thwart into the battens on top of the centrecase and counterbore. Now screw the thwart to the centrecase using 4 — 1" x 8 brass screws. At a point 1" from the narrow end of the thwart knees drill a 3/16" hole through the centrecase knee sides into the battens. Fix with 2 — 1¼" x 8 brass screws.

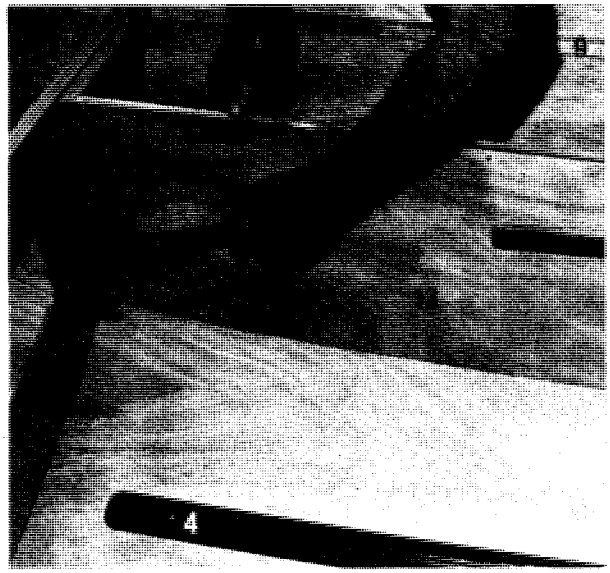


Plate 16

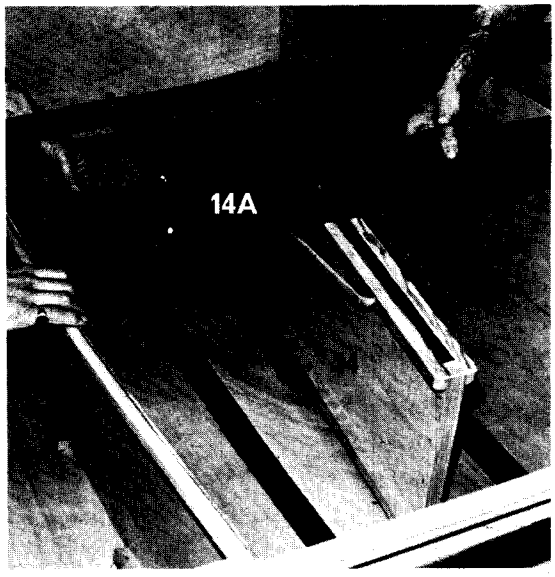


Plate 17

Before putting the unit into the hull you must drill 2 — 3/16" holes at each end of the thwart, ½" in from the ends and 1" in from the sides and counterbore. The unit is now ready to be fixed into the hull. Apply glue to the bottom of the centrecase battens (bevelled edges (Plate 18)) and apply hardener around the slot in the hull panels. You will see that the thwart is longer than the distance between the two side tank sides. At this point you need an assistant to gently pull the side tank sides outwards (Plate 17) enabling the unit to be eased down onto the thwart risers. Make sure that the slot in the hull panels is in line with the centrecase slot in the unit.

You can now screw the ends of the thwart onto the thwart risers, using 4 — 1" x 8 brass screws. Turn the hull over and using ¾" copper nails, nail through the hull ply into the centrecase battens at 2" intervals. (Plate 20). Clean off excess ply at the corners of the slot, to form a clean exit for the dagger board.

Turn hull over.

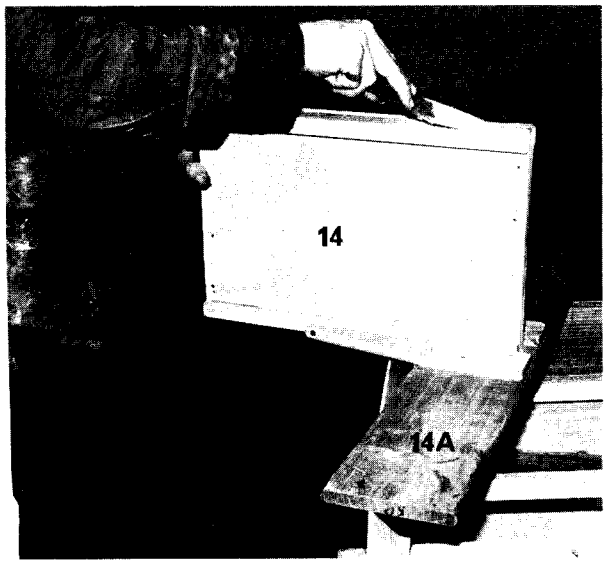


Plate 18

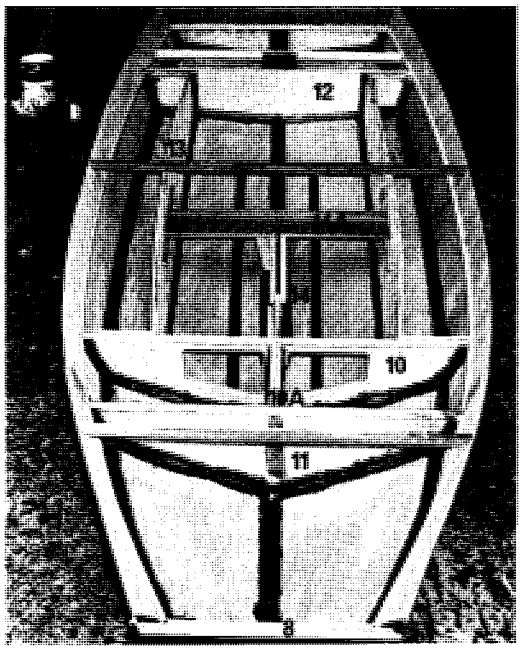


Plate 19

FITTING THE AFT DECK BEAM UNIT 15: (Plate 19)

This is simply fitted centrally across the aft deck compartment, parallel to both transom and bulkhead with the cutaway corners at either end fitting up to the stringers (Plate 19) fastened by an angled pin the same as for bulkheads. As, later on, you will be fixing the aft deck with pins along the line of this beam you will need to be able to locate its position – a mark on the hull above each end of the beam is a good way to do this. You have probably gathered that the function of this is merely a supporting beam for the aft deck. The lower edge of the ply needs to be glass taped to the hull.

PREPARATIONS FOR FIXING DECKS

At this point you will have the hull of the boat with a well in the centre surrounded by what will be four buoyancy tanks and before the decking is placed into position to complete these tanks, the interior seams must be sealed.

So once again prepare your resin and firmly seal all inside seams of all tanks in the same manner as you did the hull originally, giving another coat of resin to all existing seams. This must include BOTH inside and outside of all bulkheads and side tank sides where they meet the hull and also the vertical joins where they meet each other. As the purpose of the webbing and tape inside the tanks is strength you should fix short strips between each pair of glue blocks and NOT one long piece curving round each block.
Webbing and resin must also be placed along the foot of the mast web and that of the aft beam support. It should also be placed around the centre case unit where it meets the hull inside the well of the boat.
The centre line of the well needs not only extra resin but an extra strip of webbing because, during sailing, it gets a great deal of wear from your feet.

The insides of all tanks and the stowage compartment must be painted in order to prevent condensation rotting the wood so, when the interior resin is dry, it can be sanded off slightly and then you can slap on a good coat of bilge paint e.g. International "Danboline".

Any oil base paint will do for this job BUT make sure that every surface inside the tank gets at least two good coats, excluding any top surfaces to which glue will be applied to fix the decking.

The well of the boat is NOT painted.

GUNWALES: (Plate 21)

Although it will be some time before they are used, it is necessary to curve the gunwales roughly to the correct shape.

Using a support (a couple of boxes will do) for each end of the gunwales, lay them flat one on top of the other across the supports then lash down to a heavy weight at a point about 4' from the higher end. You will see that this forms a curve similar to the side of the hull (Plate 21). Left like this for two or three days you will find that, although when released the gunwales resume their original shape, they will, in fact, be less springy to handle.

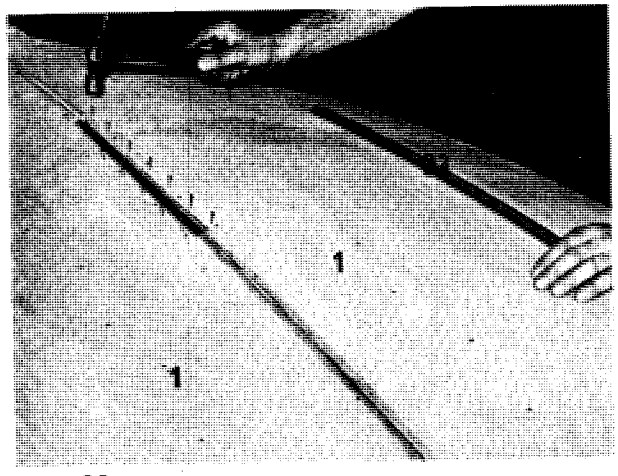


Plate 20

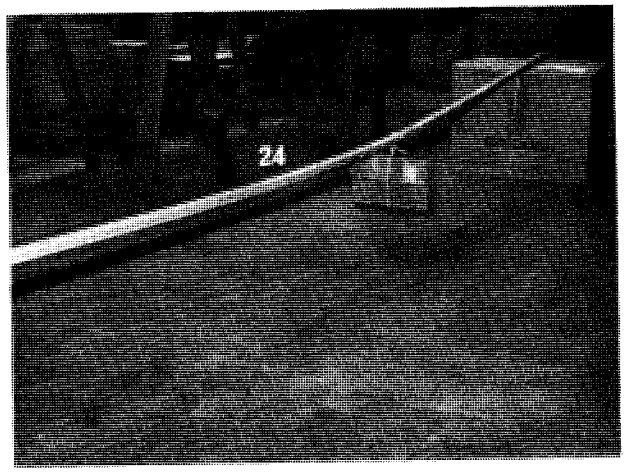


Plate 21

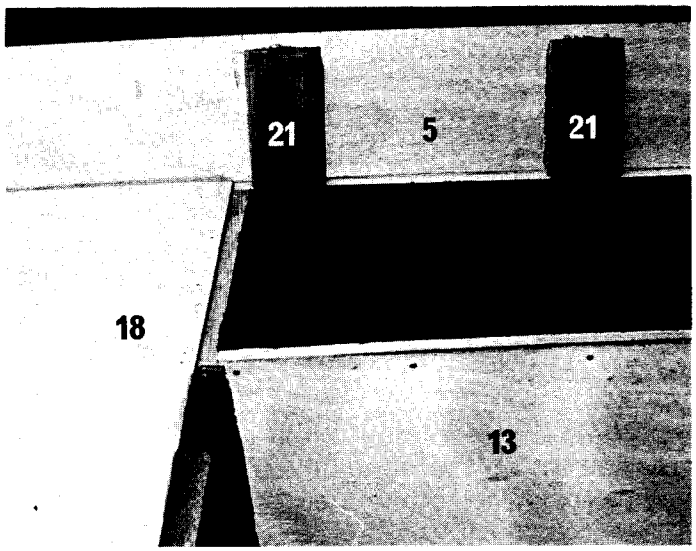


Plate 22

FIXING OF DECKING STRENGTHENERS

As a general note I will point out that each piece of decking, because it is made of thin ply and is liable to receive heavy treatment, needs some form of strengthening beneath it. This is obvious from the fact that you have already fixed in position the aft deck beam which, of course, holds up the aft deck. In the case of the fore deck and the side decks you merely have to fit battens of wood to give a certain rigidity to the ply.

FITTING OF SEAT BATTENS (17)

Each seat batten is fitted lengthwise along the underside of each side deck. Before you do this, however, it might be a good thing if you check to see that the side deck actually fits its appointed position. If you are satisfied with this, nail (¾" brass pins) and glue the seat battens into position along the centre of the side deck. In this particular case the position is not exactly critical.

ASSEMBLY OF FOREDECK (18) Dia. 5

The two pieces which together form the fore deck should be butt strapped together using the same technique as before, but this time with ¾" brass pins. When the deck is finally in position the butt strap (19) will lie on top of the deck along the centreline of the boat.

FORWARD DECK (18)

Offer up the fore deck into the hull and trim where necessary to obtain a good fit to the hull. You will find it necessary to cut a notch in the ply where the butt straps are. I should point out that each of these decks in your kit may be slightly longer than is necessary (up to ½ ") this is to make slight adjustments if required. Before finally fixing it is important to trim the aft edge of the fore deck, so that it lines up with the aft face of the stowage bulkhead ply(Plate 22).

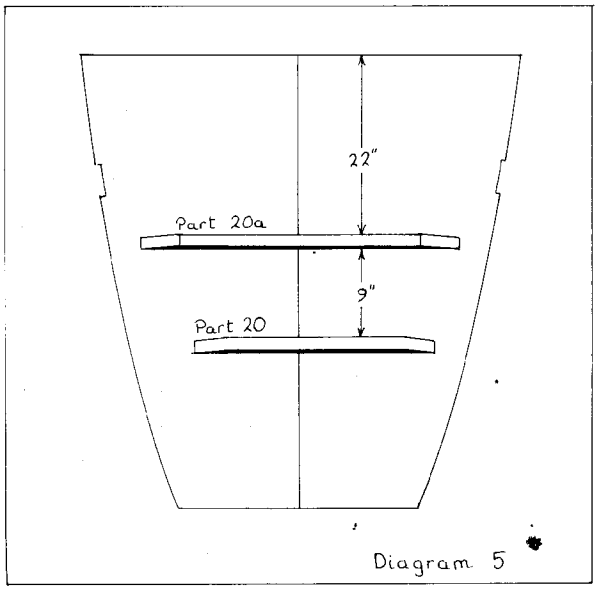
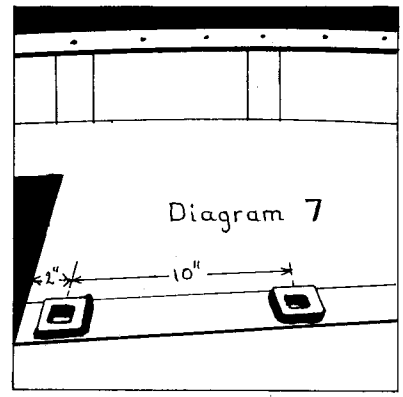


Diagram 5



FIXING FORE DECK BEAMS: (Dia. 5) (Plate 20 & 20A)

You will see from the illustration how these beams are fitted to the underside of the fore deck (Dia. 5). The easiest way of determining the positions of the beam is to mark their outline on the underside of the fore deck. The measurements are shown in the illustration.

The beams, of course, are glued and pinned with ¾" brass pins from the top – where pins come through the beam tap over the ends with a hammer so that they are flush to the surface.

NOTE: THE UNDERSIDES OF EACH PIECE OF DECKING MUST BE PAINTED SO THAT WHEN THE FOUR TANKS ARE ASSEMBLED THE INTERIORS ARE COMPLETELY COVERED WITH PAINT. I WILL REMIND YOU NOT TO PAINT THE EDGES WHICH HAVE TO BE GLUED.

FITTING THE DECKS

When the paint is dry you may fix all the decks in position in the following order.

FOREDECK

This is first pinned with ¾" brass pins and glued along the stowage bulkhead. Then around the stringers and fore transom riser and finally along the mast step webb and foreward bulkhead. All pins are spaced at 2" intervals.

SHROUD BLOCKS: (Plate 23) Part 21

The shroud blocks have rebated ends one which fits over the stringers and the other end into the gunwale recess. These blocks are fixed into the hull by means of four ¾" x 8 brass screws set in the form of a square, from the outside of the hull into the lower half of the block.

Offer up the side decks onto the side tank tops, so that the forward edge of the side deck butts up to the aft edge of the fore deck. Having put the side deck into this position mark the cut outs in the side decks on the vertical side panels (Plate 23). Having removed the side decks, the blocks can now be positioned on marks. You are now ready to drill through the side panels to receive the fixing screws. Drill four 3/16" holes through side and counterbore. Glue and screw blocks into position and finally check position by offering up side decks.

SIDE DECKS

These should be first laid into position before glueing and the length trimmed at the aft end. This end of the side deck must be level with the forward edge of the aft bulkhead. When you fix the side decks you must leave the outer edge until last because when these are fixed to the stringers you must press the side of the boat inwards to form a close fit between the decking and the hull. The simplest way of achieving this is to half fix the pins at intervals along the decking, remove the cross strut, allowing you to move the side of the boat inwards whilst you drive home the pins into the stringers.

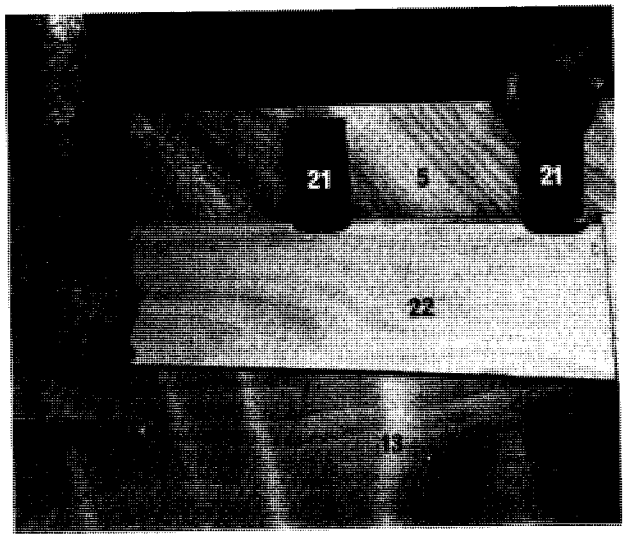


Plate 23

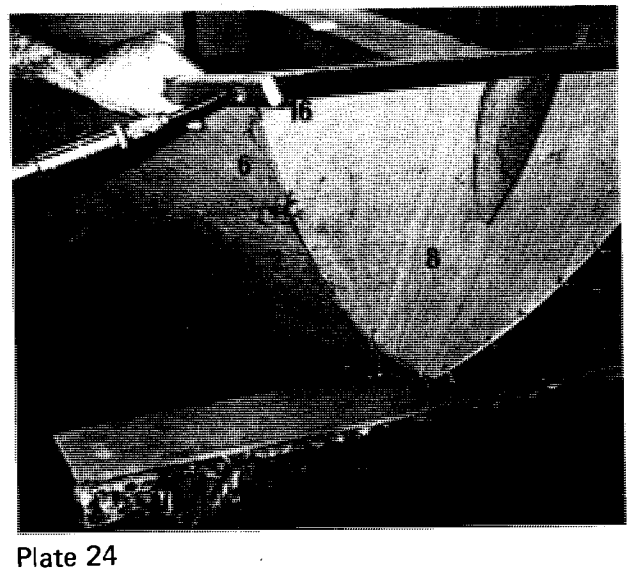


Plate 24

AFT DECK (23)

This is glued and pinned with ¾" brass pins to the aft transom riser, aft bulkhead edge, aft deck beam and the stringers. The aft deck is supplied larger so that it can be trimmed for a neat fit. The forward edge must be level with the forward edge of the aft bulkhead.

FITTING OUTER GUNWALES (16) (Plate 24)

Each gunwale runs round the outside top edge of the hull from corner to corner, as it were.

Now that they have been curved under pressure for two or three days, you should find that they will bend quite easily. In each gunwale a hole for a forward retaining screw 1½"x 8 should be drilled in such a position that the screw will run into the end of the fore transom top (Plate 24). This means that the screw hole must angle in two directions to counteract the curves of the hull.

Having applied glue to the gunwale (and, of course, hardener to the top outside edge of the hull) you should screw it to the bow level with the fore transom and the top edge of it protruding above the side panel of the boat by about ⅛", at bow transom only. The inner gunwales will be left ⅛" below the plywood side panel at this most forward end. This is so that you can plane down from the butt strap forward to obtain a flush level fit at the bows for the bow shapes (27).

Once the forward end is screwed, the gunwale is ¾" copper nailed into place, progressively, a nail at a time, 4" apart gradually bringing the top edge of the gunwale flush with the ply edge of the side. You should achieve this after fixing about 2' of the gunwale.

When the gunwale is in position, it will actually overlap each end slightly.

By the way, should it be necessary, you may clip off any of the metal lacing which would get in the way of your working BUT NO OTHERS.

The after end of the gunwale can now be trimmed flush to the transom.

SEALING THE DECKS

All the decking should now be sealed with webbing tape and resin. This is used exactly as before and completely circles the hull where it joins the deck and also where the side decks meet the fore and aft decks. USE THICKER HULL TAPE FOR ALL DECK/HULL JOINTS.

Up to now you have used only the open-weave webbing but this is where the fine glass fibre strip comes into play. It is used on all the tank joins which are NOT adjacent to the hull, ie., the joins between the fore and side decks, and the ones between the aft and side decks plus the edges of the actual cockpit itself. Fine tape is used in these positions because it is only waterproofing the joins and the final varnished appearance of the boat is improved when the varnish is applied to a fine surface. Before applying the tape to the top edges of the cockpit, they should be smoothed and rounded off. The fine tape should also be used on the foredeck butt strap (19) as in (Plate 25).

There might be one or two small holes around the outer edge of the decking, eg., at the butt strap position; if so fill these first with either wood stopper or a mixture of glue and sawdust.

When the resin is dry, the edges of the webbing should be sanded down to form a level surface. This should not be done in the corners for it will weaken the joints.

FITTING INNER GUNWALES (24)

These are fitted on the inside of the boat opposite the outer gunwales and as I mentioned earlier they have cut out portions which fit over the tops of the shroud blocks. You will see that the cut outs in the inner gunwales have rounded edges. DO NOT SQUARE THESE TO FIT SHROUD BLOCKS, CHISEL THE CORNERS OFF THE SHROUD BLOCKS. In order that you have a bit of leeway with this fitting we have allowed extra wood at either end of the inner gunwale so that you can trim it to fit inside the fore and aft transom. This can now be glued and screwed into place with 1¼" x 8screws spaced as shown in diagram 6. Locate over shroud blocks and screw at this point. Then work out towards the stern and then forward to the bow.

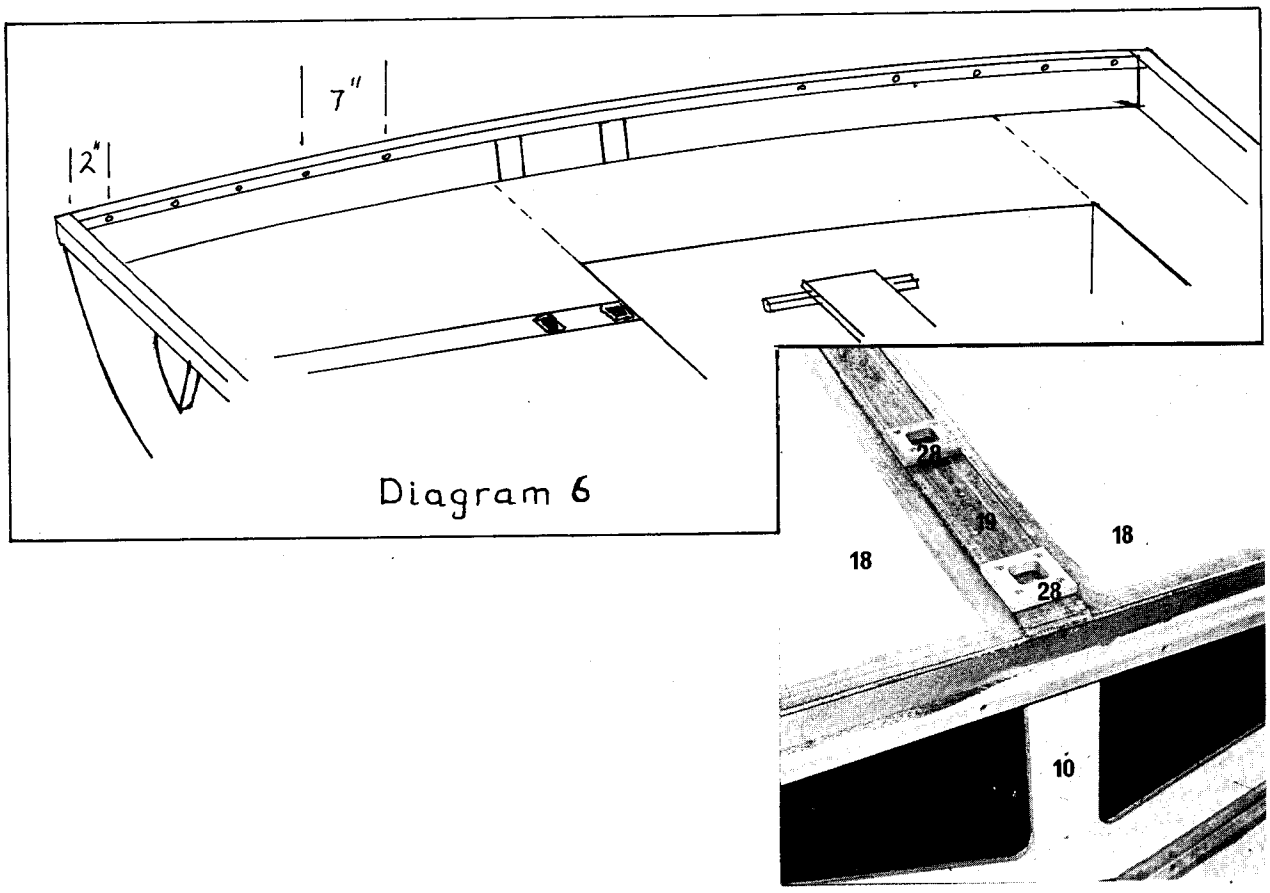


Plate 25

FITTING OF QUARTER KNEES (25) (Plate 26)

These are merely two triangular pieces of wood which fit into the top aft corners of the boat to strengthen the structure.

In turn, put each of these in position and mark where the transom and gunwales must be drilled. The knees should form a flush surface with the top edge of the hull. Drill 3/16" holes, with the knees in position, so that the drill pierces through both parts as a guide for your screws. Now glue and screw. with 1½ " x 8 and 2" x 8 screws, each end into place. Plate 26 will show you how it is done.

FITTING OF BOW SHAPES (27) (Plate 27)

The bow shape strengthening battens (26) are placed under the inside edge of each shape to form a tangent with the curve of the bow shape and lying diagonally across the corners of the bow (Plate 27).

Before fixing these you should smooth off the top corners of the bow to make a flat surface on which the shapes rest. These are fitted and glued into position with 3/4" brass pins, meeting at the centre line of the bow with the side edges running flush along the gunwales.

When the glue is hardened you may trim off the projecting corners of the gunwales, removing first the two forward fixing screws, which can be replaced after trimming.

FITTING OF MAST STEPS (28): (Dia. 7) (Plate 25)

The Mast Steps (28) are two square blocks of plywood which determine the alternative positions of the mast according to the rig under which you are sailing.

You will remember that the mast step web was fixed into position below the fore deck at right angles to and between the forward and stowage bulkheads; the mast steps are situated along the centre line at the distance shown in diagram 7, which brings them directly over the mast step web. These can now be glued and screwed into position, with 1" x 8 screws.

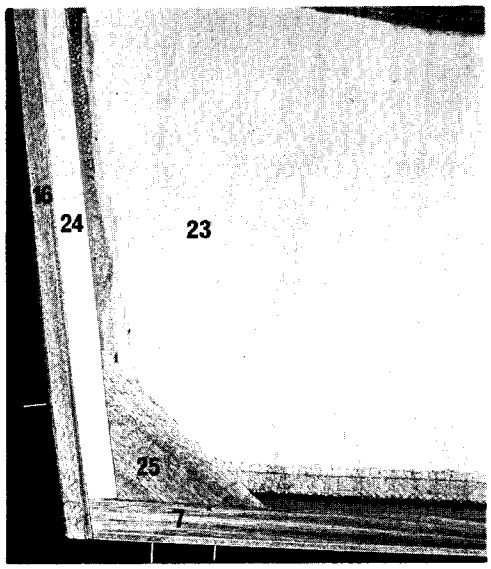


Plate 26

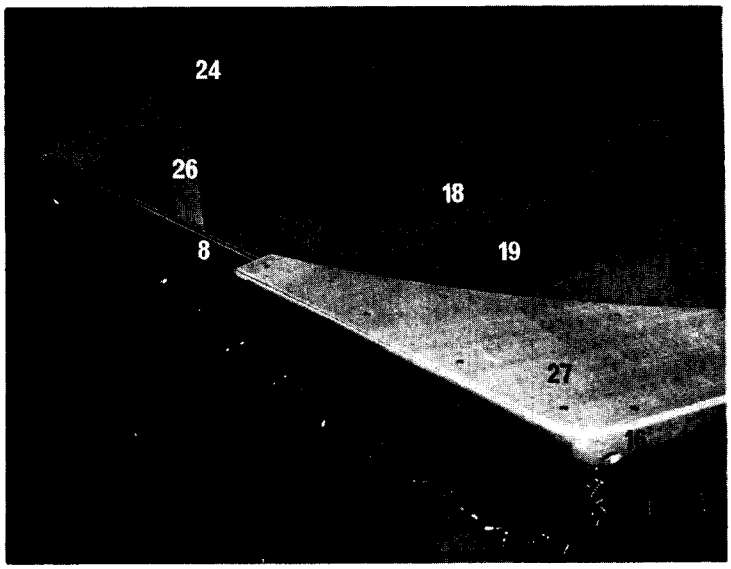


Plate 27

FITTING OF FAIRLEADS (29) AND ROWLOCK CHOCKS (30): (Dia. 8)

From diagram 8 you can see the position for the fairleads and rowlock chocks.

FAIRLEAD (29): These are fixed by means of two 1½" x 8 brass screws screwed through the fairlead into the inner gunwale.

ROWLOCK CHOCKS (30) have a rebate on the bottom edge which fits under the inner gunwale. They are held in position by two ¾" x 8 counter-sunk screws fixed through the top to the gunwale at the inside edge and two counter-sunk screws fixed from the outside of the boat and placed about 3" apart. With regard to the fixing of the first two screws, ¾ " x 8 it is important that space is left to drill a hole which will take the stem of the rowlock itself, a 3/16" hole which should be drilled as close to the skin without touching it.

FITTING OF FOOT REST (31) (Dia. 1)

Draw a vertical centre line down both sides of the foot rest, place it on the floor of the boat with its back edge 12" from the aft bulkhead and parallel to it — the centre line of the rest must coincide with the centre line of the hull. Mark this position with a line drawn right round the foot rest. Now drill 3/16" four evenly spaced holes along this position. Glue and fix with ¾" x 8 brass screws.

FINISHING UNDERSIDE OF HULL : (Plate 28)

Turn the boat upside down and clip off all protruding portions of the wire laces flush to the wood-work (Plate 28). What ends remain have to be smoothed down level to the hull. An iron soled hand plane is best for this job because, although the cutting edge will suffer from the copper wire, the edge will be more uniform — apart from that, it's quicker.

With Surform or file, work along all the outside seams making a smooth surface between panels, trimming off over-hang were necessary. This process includes the overlapping ply of the centre-board slot, which must be filed out flush to the case itself.

Along the centre line of the hull you must create a flat surface about a ½ " wide, being careful not to plane so much away as to weaken the structure.

This flattening of the centre line must be slightly wider at the stern end of the boat (for about 2' 3" of its length) for it is on this portion that we will be fitting the skeg, (32), Plate 29

Use medium glass paper on a block to finish the rounding of the edges and give the butt joints in the skin a thorough sanding in a diagonal direction.

The hull should now be entirely smooth and you are now ready to seal the outside joints.

SEALING THE SEAMS

By this time you should be quite an expert at using the webbing strip and resin for sealing the seams, but I must warn you that you are going to find this particular process rather more difficult than you did before; this is because the corners you are covering curve away from the strip and as webbing tends to be resilient you will soon discover that the edges of the strip persist in lifting off the hull. This is why I insisted that all the outside joints must be absolutely smooth.

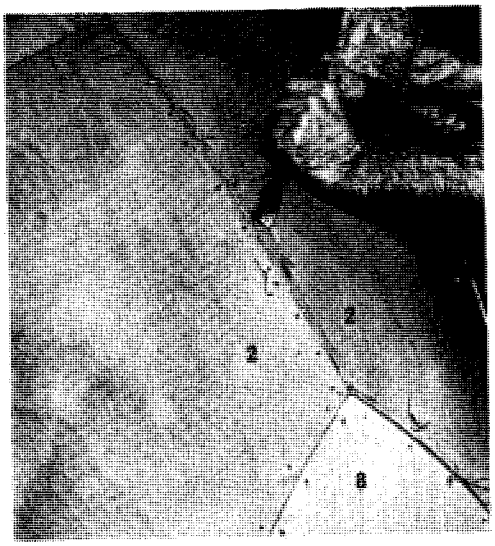


Plate 28

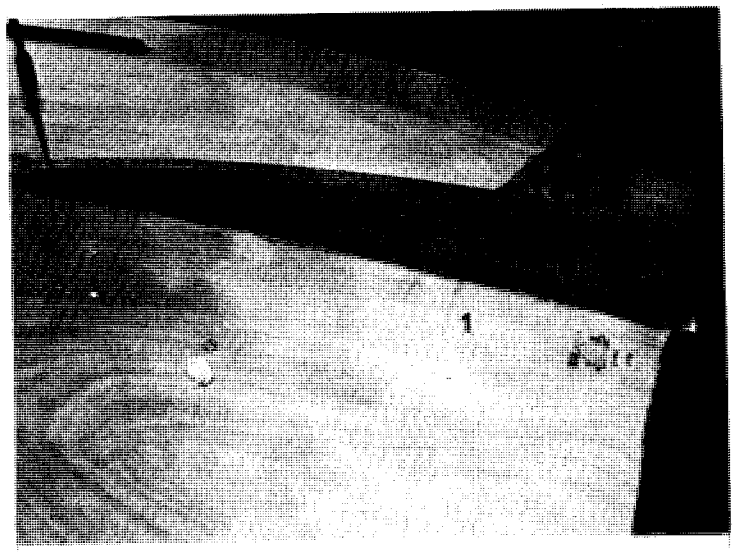


Plate 29

Do not worry if, at the first attempt, the webbing will not lay tight – a bit of patience and continual stippling with the resin, allowing intervals between each application for it to partially set, will achieve the best result, ie., a tightly bonded and smooth seam.

Sufficient tape has been provided to give you two layers both inside and outside along the keel joint. The centrecase slot should have one layer of tape folded into the slot each side.

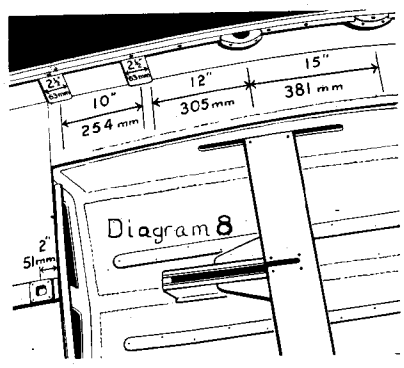
Clean off surplus resin inside the case to avoid scratching the dagger board later.

This means that every single plywood joint has been covered with one layer of tape and ample applications of resin, resulting in a completely waterproof hull.

FITTING THE SKEG (32) (Plate 29)

This piece is fitted while the resin is still wet because it will be held into position entirely by resined webbing. To keep this in place while its resin hardens, you will need a retaining 1¼" copper nail, sloping inwards fixed at aft end. The wider end of the skeg is at the stern of the boat with its edge flush to the aft transom and exactly over the centre line of the hull (Plate 29). The forward end is fixed with a ¾" screw.

Having applied an extra coat of resin to the area which the skeg will cover, screw the piece into position and then apply more webbing and resin to bond its edges down to the boat.



FITTING THE BILGE PIECES (33)

These are fixed to the outside of the hull either side of the centre line; they are actually screwed into the side tank glue blocks which are easily located by looking for a line of three pairs of pins. Drill a 5/32" screw guide hole between each pair and countersink corresponding holes on each Bilge Piece, glue and screw into position with 1" x 6 screws. This is the position for the aft end of the bilge pieces is 15 11/16" from centre line and 30" approx from aft transom (see diagram 9).

FITTING OF BRASS KEEL STRIP

To finish off the underside of the hull a brass keel strip is screwed with ½" x 6 screws along the full length of the lower seam continuing up the fore transom for about 1". The centre board slot has a short strip either side of it. You must ensure that all strips are so cut that the end of each piece has a screw hole close to it. The underside of the skeg should also be edged with brass strip. In the fixing of the keel strip, screws should be about 4½" apart. A lot of people have expressed surprise that considering the early warning I made, we now tell you to actually screw through a fibre glass and resin seam. Well, if you remember, I have not really forbidden screws, and also the seam, by now, is much stronger than it was originally. Even so, this job must be done very carefully and one little tip I can offer is that, before putting the screws in position, they be dipped into resin thereby fully sealing the screw holes. Finally, resin over tips of screws on inside of cockpit and give outside centre seam a coat of resin over the keelbanding.

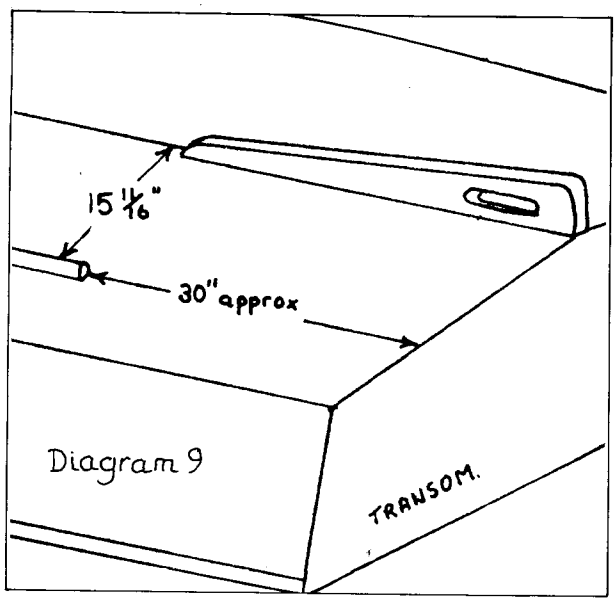
CENTREBOARD AND TILLER ASSEMBLIES

While the resin on the hull is drying off and hardening there are two pieces of equipment which can be assembled.

ASSEMBLING THE CENTREBOARD: (Plate 31)

The centreboard is a kind of removable keel which consists of a rectangular board (36), the bevelled end of which slots down the centreboard slot to protrude through the bottom of the boat. At either side of the top end of the centreboard are finger grips (37) which must be fitted in line with the top edge, glue and fix 1" x 8 screws, the crescent shaping facing downwards — the angled end of each finger grip is placed flush with the cut-off corner (Plate 31).

In the fittings you will find a piece of elastic about 12" long, with either end formed into an eye. With a screw and washer for each eye, fix to the forward edge of the thwart, equidistant either side of the centre case with enough tension to hold it taut and springy. The purpose of this elastic is to hold the centreboard in any given position (it binds on the aft edge of the plate when part way up) and is slipped over the top of the plate when fully down.



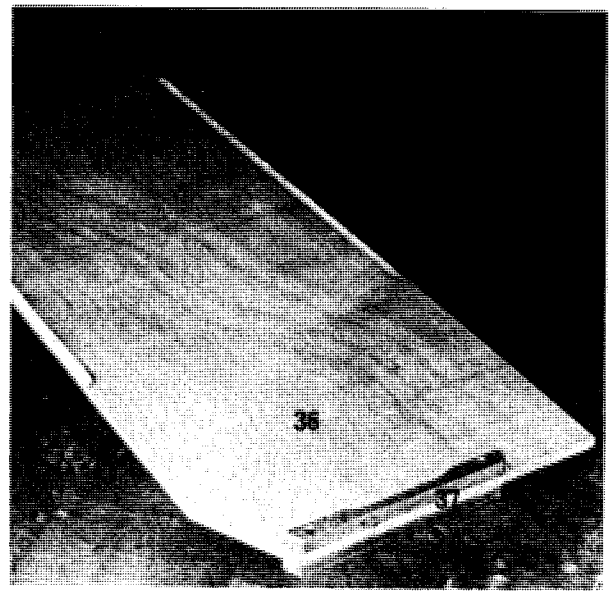


Plate 31

ASSEMBLING THE RUDDER (Plates 32-33) Parts 38-39-40

Measure 1½" from the narrow end of the rudder packing piece (39) down the straight edge. Place the narrow end of one of the rudder cheeks (38) at this mark so that its straight edge lies flush with that of the packing. Mark on the packing a line showing the position of the cheek and a similar line on the cheek showing the outline on the packing. Repeat this with the other cheek.

Glue and screw (1" x 8), the packing piece in correct position to one of the rudder cheeks (Plate 32). This illustration shows one cheek with the packing piece fixed and the other lying beside it.

In the final state the packing piece will sandwich between the top ends of the rudder cheeks with 1½" protruding. Paint the INSIDE portions of the rudder cheeks WHICH WILL BE EXPOSED AFTER ASSEMBLY.

When the paint is dry glue and screw with 1" x 8 the other cheek into position.

The rudder gudgeon can now be fixed to the rudder cheek assembly. The new fitting is in stainless steel (HA/4106) and is angled – not as earlier alloy fittings shown in plate 33.

Line up the first hole in the gudgeon over the holes already drilled in the rudder cheeks (38) to take the pivot bolt. Insert the bolt and draw the closed end of the fitting down until the bottom of the fitting is parallel with the bottom of the rudder cheeks (38). This should be about ¾" up from the bottom of the cheeks. When fitted, tighten up the pivot bolt but not so as to prevent the blade from swinging. Allow for expansion of the timbers in water. The rudder blade should have been thoroughly varnished or painted prior to final fitting into the cheeks. Rivet over the end of the bolt to prevent loss of nut whilst sailing.

You will also have to fit the rudder pintle on the rudder assembly, but this is done in conjunction with the fitting of the transom gudgeon and pintle which are fixed up the vertical centre line of the stern post (Plate 33). The positions are as follows:– there must be 9" between the BEARING SURFACES of each pintle and gudgeon whilst the transom pintle is fixed to the aft transom with its bearing surface 10¼" below the top edge of the transom. The most important point is that the rudder eventually sits vertically on its bearings and arcs freely over a complete half circle.

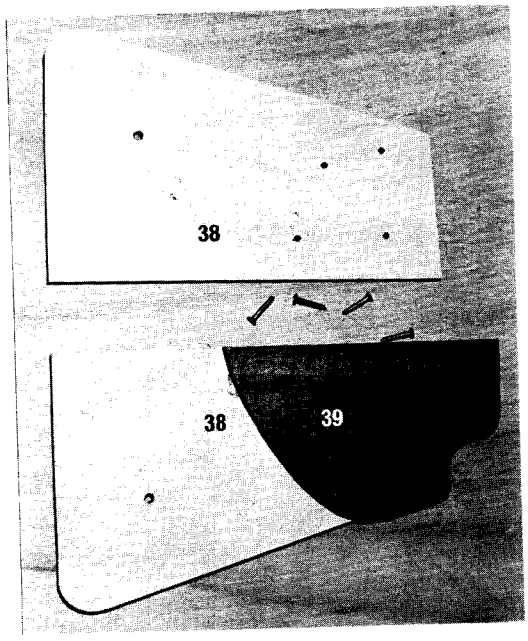


Plate 32

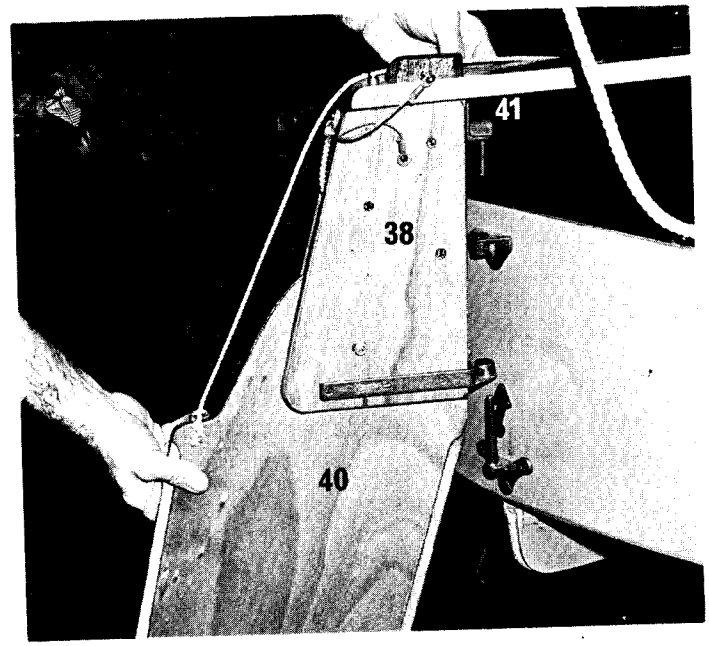


Plate 33

To simplify matters you can partially fix, BY JUST ONE SCREW, each metal fitting in its respective position and thus you can make slight adjustments to achieve the perfect positioning before the final fixing.

The rudder blade (40) is fitted between the rudder cheeks hingeing on a long bolt which runs through the holes you have already drilled.

In your fittings you will find a short piece of elastic with an eye formed in one end. The other end should be nailed with 3 copper nails to the top edge of the shoulder where the curve of the upper part of the rudder blade commences (Diagram 9A shows the rudder assembly so that you can see the inner workings). As you see, the eye in the elastic is led between the rudder cheeks coming out on the aft side where it is fixed, by a screw and washer, aft of the packing piece and as high as possible to exert as much tension as you can. This will ensure that the rudder blade stays down when you are sailing.

So that you are able to retract the rudder blade, a cord is fastened through a hole on the aft top corner of the blade from where it runs up through a metal eye, which is screwed across the end of the tiller and thence on to the trumpet cleat on the side of the tiller. This cleat and the rest of these fittings are shown clearly in the diagram depicting the rudder - tiller assembly.

TILLER ASSEMBLY (Dia. 9A)

The tiller extension (43) is hinged to the tiller with a bolt 5½" from forward (narrow) end of the tiller (41).— it is held away from the tiller by the packing piece (42) which is glued and pinned to the tiller itself. Metal washers on the bolt either side of the extension will ensure free movement.

The tiller pad (44) which merely acts as a hand grip, is ¾ " brass pinned and glued to the end of the extension, a neater job being made if you cut away the surface of the extension slightly to accommodate it. The grip, of course, is on top of the extension when it is all assembled.

The whole of the steering gear can now be assembled. Push the protruding edge of the rudder packing through the slot of the tiller, which needs to be enlarged slightly — to hold this in place a lateral hole should be drilled through the extending packing so that a long split pin can be inserted. This pin is secured by a short cord screwed to the side of the tiller (Diagram 9A).

Once again all corners and sharp edges of these various pieces should be rounded and smoothed off.

A dead-eye is screwed to the upper edge of the aft transom about 9" to starboard of the centre line of the transom (Plate 33).

Lastly, carry holes drilled in aft transom beam through plywood aft transom.

These last two jobs are necessary because the main sheet eventually threads through hole and dead-eye.

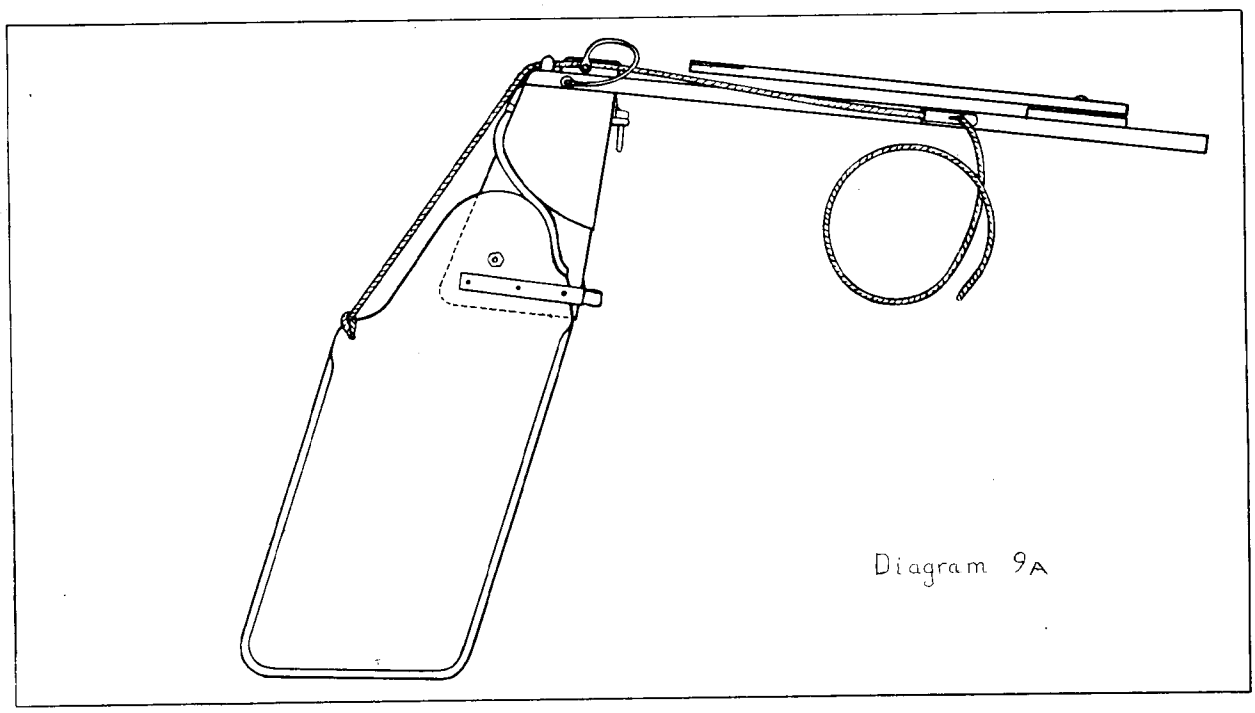


Diagram 9A

FITTING OF ALL SPARS

FITTING UP OF BOOM (51)

Finally plane boom on all four faces then medium glasspaper so that all the corners are rounded including the top corners.

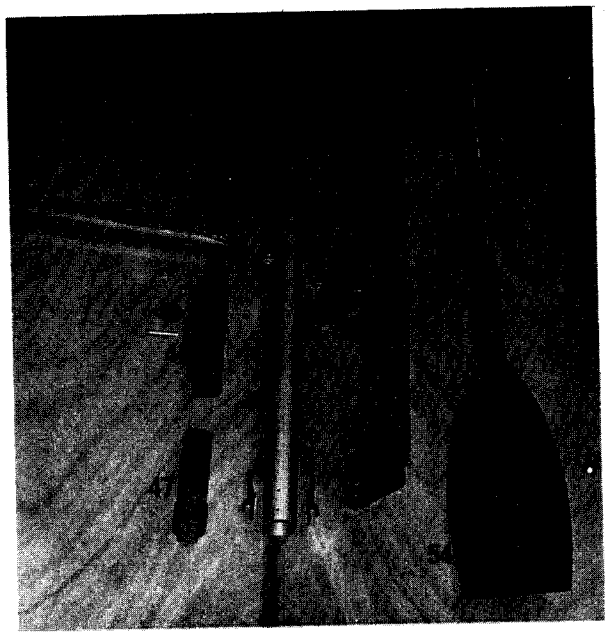


Plate 34

The boom gooseneck fitting clips over theshaped end of the boom so that the arms are screwed to the tapering sides of the boom (Plate 34). Similarly the retaining cord for the gooseneck split pin is also screwed into position. A metal eye(tack-eye) is screwed to the upper forward end of the boom directly above the gooseneck fitting.

Nail and glue kicking strap chock (52) on the upper side of the spar at a distance measured 1' 9" from the end of the boom to the side of the block away from that end. The top end of this block nearest the gooseneck should be rounded right off but the far end should be left as it is, square.

Through the far end of the boom, bore a 5/16" hole from side to side at a distance of 1" from the end of the boom.

Finally a dead-eye is screwed to the underside 1½" from the end of the boom.

FITTING UP OF GAFF (48)

Again all corners and edges are rounded and fine planing is done on the flat surfaces to smooth the whole spar. Drill a hole (5/16") centrally through the spar ¾" from the tapered end going through the widest direction, ie., from side to side of spar.

The gaff band should be screwed to the gaff at a distance of 5' 8" from the tapering end. The arms of the fitting should be either side of the gaff whilst the cross member (to which the mainsail halliard shackle is eventually fixed) should of course, be across the upper surface.

At the wide end of the spar you should taper the front surface for about 6" of the length reducing the end of the spar to measure 1¼" (the "front" surface of the gaff is the one opposite to the grooved side. The grooved side which takes the sail will be facing aft when in use).

ASSEMBLING AND FITTING GAFF JAWS (49) & (50)

The gaff jaw packing (50) holds the actual jaw away from the side of the spar and is placed into position as shown in (Plate 34). The jaws are then glued and screwed with 1" x 8 screws to the gaff as shown in the illustration with the jaws projecting on the same side as the taper on the spar and the straight edge of cheek lying along straight edge of the spar.

FITTING UP OF THE ALLOY MAST

You will find a metal mast is included in the kit with a gooseneck already fitted. Assemble the mast in accordance with these instructions:—

1. Fix sheave in the upper wooden plug. Slot is cut for sheave as standard wooden mast was.
2. Varnish or paint the two wooden plugs before insertion into tube.
3. Use a sealant such as seelastik or bostik to seal the plugs in.
4. It is very important that the two plugs are correctly lined up fore-and-aft. The weld in the tube will help you to do this, the sheave in the top plug must run fore and aft, ie., in line with the gooseneck arms and the step in the bottom plug must be square on to the gooseneck arms.

5. When you are quite sure the two plugs are lined up correctly seal them in and insert the ¾" x 8g. stainless steel pan or round head screw through the hole we have drilled towards the top of the tube for this purpose. The bottom plug is held by the four halliard cleat screws (1" x 6g. csk. hd. st. steel).

The two halliard cleats are screwed either side of the mast at a distance of 1¾" from the lower end (Plate 34 shows these lying beside the mast).

The halliard sheave is like a pulley wheel which fits centrally in the slot at the top end of the mast. You need to drill a hole, laterally through the mast and slot, to take the axle of the sheave.

Make sure that this is at right angles to the slot and exactly central – if this is done wrongly the sheave will not rotate freely within the slot. UNDER NO CIRCUMSTANCES MUST YOU WIDEN THE SLOT ITSELF.

FITTING OF PLATES ETC. TO THE HULL.

A shroud anchor plate HA 3 is fitted in upright position centrally to each shroud block and one other plate is fixed inside the bow to the fore transom vertical to the centre line with the lower edge about 1" from the fore decking.

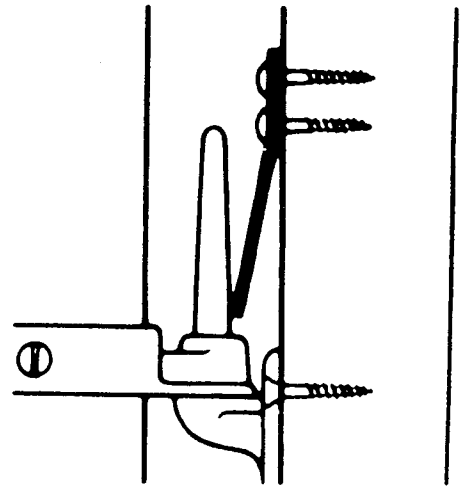
A metal eye HA 88 is screwed in a vertical position 2/3rds down the centre of the stowage bulkhead so that the screws penetrate into the mast step web.

FITTING OF ROWLOCKS

The easiest way to determine the position of the hole which will take the stem of the rowlocks is to fix, centrally over the inner gunwale and rowlock chock, the metal plate for the rowlock housing but do this very loosely. By this method you can mark the starting point of the stem hole through the block. After removing the plate you should have a clean circular pencil mark where you can start drilling. Make sure that the angle of your drill is parallel with the side of the boat or else you might drill a hole in the topsides. Having drilled the hole you can now replace the rowlock plate.

RUDDER RETAINING CLIP (H/A21)

This is screwed to the transom as shown in the diagram and you will see that, in operation, the lower edge of the clip rests above the lower rudder gudgeon retaining the whole rudder assembly in place. To remove the rudder it is only necessary to depress the leaf spring and slide the gudgeon past for fitting.



ASSEMBLING OF OARS

The two sections for the oars come ready shaped to size but must be smoothed before fixing, the blade, of course, being fixed to the tapered end by a row of small screws or copper nails (four evenly spaced will do).

CENTREBOARD RETAINING ELASTIC

The second piece of shock cord with looped ends is fixed, UNDER TENSION, across the forward edge of the thwart, in a central position. When the centreboard is in place and fully down, this elastic runs across the top of the board. To lift the board, one pulls the centreplate. You will discover that the centreplate will hold any position when the elastic is pressed against its aft edge.

GAFF JAW RETAINING ELASTIC

This is a short piece of shock cord with a loop at one end. It is not permanently fixed but passes between the two holes in the forward corners of the gaff jaw, across the front of the mast. It merely ensures that the gaff jaws cannot become accidentally separated from the mast. The cord is held in place by a loop at one end and a knot at the other. Push the plain end of the elastic through the round hole from the inside and knot on the outside. The loop pushes through the slot in the other jaw.

DRAINAGE BUNGS

These nylon fittings are fixed into the drainage holes in the tanks. To ensure a watertight fit, they should be glued and screwed into position, with ½" x 6 screws.

VARNISHING AND PAINTING

A really professional looking boat has it exterior painted and its interior varnished — the interior includes all spars, the centreboard, tiller, rudder assembly and gunwales.

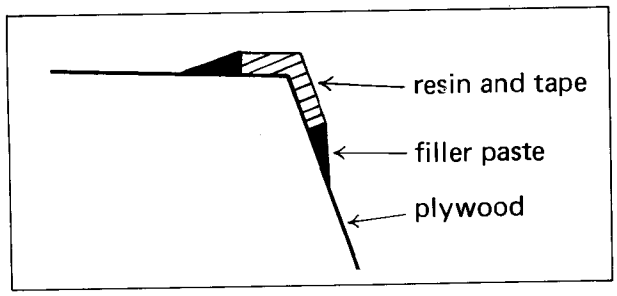
To start with, all metal fittings must be carefully removed from the boat and spars.

Rub down all surfaces with a medium grade glasspaper remembering that all surfaces to be varnished must be sanded ALONG the grain and those to be painted should be sanded DIAGONALLY ACROSS the grain.

I now give you the Golden Rule of painting and varnishing:—

ALL SURFACES MUST BE FREE FROM GREASE, DUST, DIRT, ETC., and must be ABSOLUTELY DRY before paint or varnish is applied.

As glass fibre resin and tape have been used to seal the joins, we recommend that before priming a glass fibre filler paste (Isopon P38, Plastic Padding or similar polyester body filler) is applied to the seams on the outside of the hull. This filler paste is not supplied with the paint kit, and it is used to feather the resin and tape so that it is not so prominent under the paint. Sand smooth with 40 grit paper.



This filler paste must be applied to the untreated timber and resin, and should be used sparingly as it is difficult to sand down because of sandpaper clogging.

DO NOT USE WHERE THE SURFACE IS TO BE VARNISHED.

To start with, apply a coat of varnish (thinned 15-20% with white spirit) to the gaff and boom and immediately upon receipt of the boat kit. This seals the grain and helps prevent warping of these long timbers, then store these items flat in a cool dark place well away from direct sunlight until needed.

Brush on the first coat of varnish on the inside of the boat, decks and the gunwales and this priming coat should be thinned with 15-20% white spirit.

The boat can then be turned over and the first coat of primer, which should also be thinned 15-20% white spirit, can be applied to the outside hull.

After the first coat of primer is dry, stop up all nail and screw holes on the outside of the hull with mahogany stopping. This can also be used on small blemishes on the varnished areas, but we do not advise the stopping up of screws where the timber is to be varnished. Once dry, sand down the primer and stopping on outside of hull ready for the next coat.

The coats of varnish on the inside can alternate with coats of paint on the outside of the hull, but we will continue describing the painting of the outside hull plywood.

The second coat of primer should now be brushed on, and this coat to be of normal consistancy. When this is dry, take the tube of White Trowel Cement. This is best applied with a wide flat blade similar to a wall paper scraper, and must be thinned down with white spirit to the consistancy of cream, or alternatively, by using more white spirit it can be brushed out. This cement is to be used to cover up open grain in the plywood, bad brush marks or small irregularities, amd must be applied over the metallic pink primer. It will not be necessary to trowel all of the hull.

Once dry, the trowel cement and primer must be sanded down to achieve a smooth hard finish to receive the undercoat (use 100 or 150 grit paper).

Over the trowel cement and primer apply two coats of undercoat and one coat of yacht enamel, sanding between each coat with 220 grit paper.

Turning back to the varnish, of which at least three coats are essential, apply the second coat, thinned 5% then sanding down between each coat with nothing harsher than 220 grit paper, apply any subsequent coats of varnish of normal consistancy.

Please note it is not necessary, and often detrimental, to use a power sander – elbow grease is thoroughly recommended!

You are now the proud owner of a bright new Mirror Class Dinghy and can hardly wait to get afloat. May I wish you very happy sailing.

RIGGING AND SAILING INSTRUCTIONS

At the back of the book are instructions on rigging and sailing your Mirror Dinghy.

DAILY MIRROR CLASS DINGHY KIT

Bell Woodworking Co.,
199 Narborough Road South,
Leicester, LE3 2LG.
Tel: 0533 895051

Always refer to Kit/Boat Number on sails and Part No. . . . . when corresponding

Transit damage is very rare indeed but if any part(s) is (are) damaged we have to place our own claim with the carriers within 3 days of delivery so that you must notify us and the carriers within 24 hours of any transit damage for a claim to succeed.

Replacements will be sent for any item which you consider is unsuitable for its purpose but we must be notified within 7 days of receiving the kit, this also applies to any items 'missing'. We may request the return of faulty items in which case carriage will be refunded. Items damaged in transit should always be returned to us consigned "goods damaged in transit returned to senders" and no carriage should be paid on them.

The consignment comprises 3 items:

one cardboard case 8' x 2' x 4" – ¾ cwt.
one package 12' x 6" x 4" – ¼ cwt.
one container of resin 9" x 6" x 6" – 8 lbs.

It is possible that all 3 items may not be offered for delivery at the same time being separated in transit. Delays of several days between the arrival of packages is not unusual. Please notify us if delivery of all or part of the consignment is not completed within 15 days of despatch date.

After unpacking kit store away in a cool place with low numbers uppermost as the kit is assembled in sequence of numbers. Use weight such as a few bricks on mahogany items which might warp – parts nos. 7, 14A and 32 for instance. Finish off and varnish the spars first.

The Sails, ie., Mainsail, Jib, Sailbag and three battens are supplied and packed with the Kit, ifavailable at time of packing kit.

EXPORTS

Above does NOT apply to Export kits.
Export kits are packed in one box and one bundle as above but with resin in 8 one-lb. containers packed inside case.
Any shortage or trouble with roof rack and sails must be taken up direct with the manufacturers.
Paints are not exported.

MIRROR CLASS DINGHY SAILING INSTRUCTIONS

Contents

FOREWARD

Just imagine for a moment that you have been asked to write a book which teaches an absolute novice how to ride a bicycle. What would you tell him?

I suppose you would describe all the various parts of the machine and how they work; after which you would probably discuss the theory of how a cyclist manages to balance upon two wheels as he moves. Then there would follow more complicated manoeuvres and also the rules of the road.

Let us just take one of these things — the balance that a cyclist needs. How on earth would you explain this on paper in such a way that a learner could go out, hop on his bike and pedal away. The more you elaborated on this subject, the more complex it would become and the more discouraged the pupil. Yet everyone who cycles knows that the basic skills of cycling are very easy to learn once one has conquered the problem of remaining upright without falling off. A much greater obstacle is for the teacher to keep his explanation simple and encouraging without omitting any important advice.

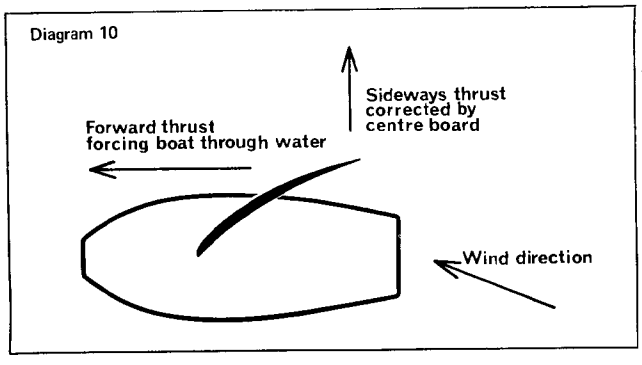
To a certain degree, sailing presents a similar paradox — basically, it is easy to sail a boat yet it is very hard to set out written instructions which are not only explicit but also brief enough not to bog the reader down in complicated verbiage.

The crux of the matter is blindingly obvious. Just as the only way to learn cycling is to mount a bike and ride it, so the only real way to learn sailing is to board a boat and sail it.

Some people might regard this statement as a somewhat dangerous piece of advice because there are, naturally a few essential bits of knowledge one must acquire before one's feet leave terra firma — as Air Force pilots used to remark cynically "The more firma, the less terra!"

There are many excellent books on sailing which cover the subject with varying degrees of elaboration. The following, more modest, work is an attempt to impart sufficient information for you to climb confidently into your dinghy and learn, by actually sailing it, more than any dozen books could teach you.

HOW DOES A BOAT SAIL?



One of the mystifying things to a non-sailor is how a boat can sail apparently against the wind. It is obvious to anybody that, if you have a large sheet of material and allow the wind to blow directly upon it, it will be pushed along. It is not so obvious how a forward movement is obtained when the sheet is angled to the air pressure.

In most books on sailing, at this stage, you are given a lot of geometrical diagrams which illustrate how the various forces are distributed but I think the best way to give a practical demonstration of the magic of sails is to perform a simple experiment.

Diagram 11

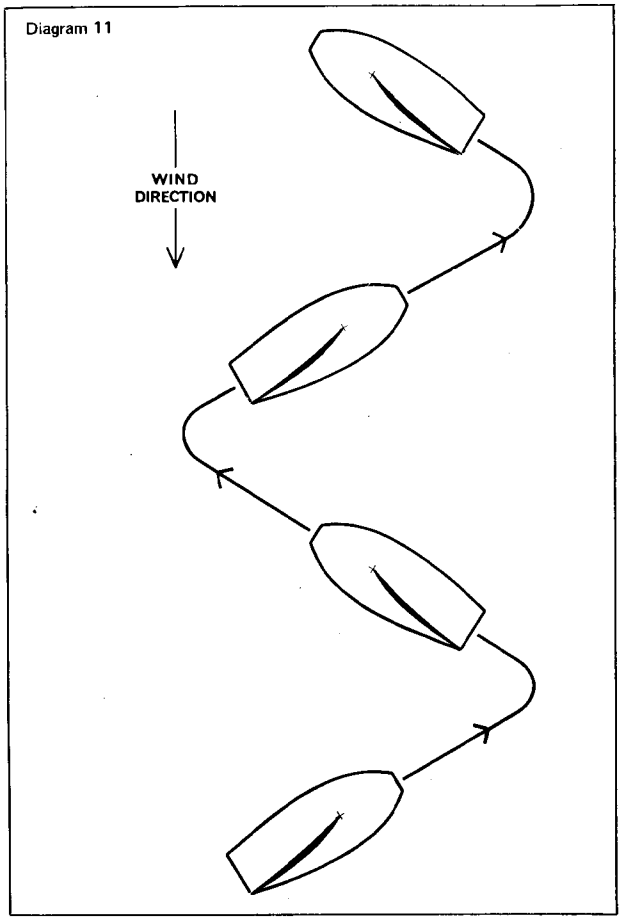
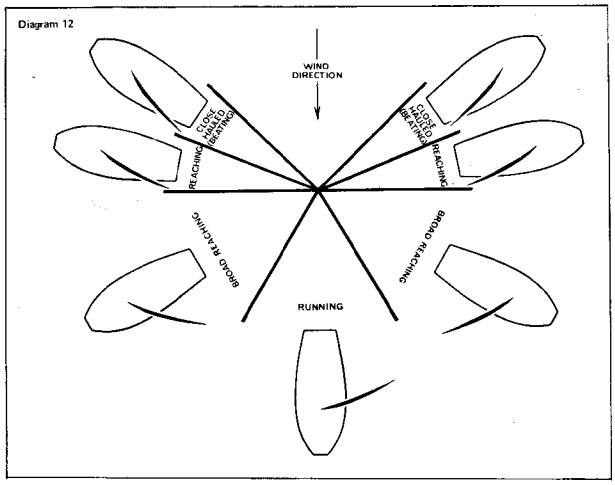


Diagram 12



Using an ordinary postcard, fold one end at right angles to form a base about half an inch wide so that it will stand upright on a table. Withthe card in its standing position, blow squarely on its surface from the side where its foot is — the card will fall over, naturally. Stand it up again and blow it again but this time at an angle to the surface — the card still falls over but this time you will notice that you need more breath to achieve this.

This suggests that, when the wind hits a flat surface at an angle, although it acts as though it were hitting it squarely only a part of the force is working in that direction and, therefore, that the rest of the force must be working elsewhere.

If we transfer this theory to the sails of a boat, we will see how a boat is pushed through the water even by a wind that operates at an angle.

In diagram 1 you can see that the wind is hitting the angled sail and is converted into two forces, one of which pushes the boat forward through the water and the other which tends to move the boat sideways. To stop this sideways motion a large rectangular plate (centre board) sticks out from the underside of the hull into the water acting as a brake against lateral skidding. Thus the angled power of the wind is now being used almost entirely as a propelling force.

By changing the angle of the sail, a boat can be made to move in almost any direction regardless of where the wind is coming from. I say ALMOST ANY DIRECTION because it is impossible for obvious reasons, to sail directly into the wind. In fact, a boat cannot sail directly forward to any point within 45° of either side of the wind direction. This would appear to be a serious drawback if you wish to go to a point from which the wind is blowing.

Surprisingly enough your boat can easily overcome this difficulty by performing a manoeuvre known as "tacking" which provides one of the many delights of sailing.

As I have previously said, it is possible to make headway with the wind coming at you forward of your beam. With this knowledge, you will appreciate that, if you sail a zig-zag course which, overall, heads towards the wind, you are able to position your boat so that your sails are always pulling. Diagram 2 shows a typical "tack" into wind. It will be seen from this illustration that, at each turn, the boat will, at one point, head directly into wind. This problem will be covered fully when we reach the actual techniques of sailing but, for the moment, I will say that what actually happens is that, on each leg, you get sufficient headway for the momentum of the boat to carry you over to the new bearing.

Up to now I have only mentioned the sails and the centreboard as factors controlling the movement of the boat but there is one other — the rudder. This is a flat board immersed in the water capable of being turned through almost a complete half circle. As it is turned, the pressure of the water against it enables the boat to be steered. It can only do its work when the boat is moving through the water.

If the tiller, which is connected to the rudder and controls it, is pushed towards the starboard side the rudder is angled towards the port side causing the boat to turn to port.

Similarly, with the tiller to port, the boat turns to starboard.

It must be obvious, from what you have learnt up to now, that these three controls are designed to work with their surfaces at right angles to the water. The more a boats leans over or heels, the less efficiently do the sails, rudder and centreboard work. It is a fact that a sailing dinghy works at its maximum efficiency when it sails on an even keel.

To round off this short chapter on the theory of sailing, diagram 3 showns not only the different bearings from wind direction that a boat can be sailed but also gives you a few more nautical terms to learn. I have tried to show the approximate sail angle for each manoeuvre so that you can absorb what has gone before in this chapter.

Do not assume that this diagram shows the exact setting line of the sail for a given direction of wind because other factors make further adjustment necessary – I have merely tried to give a rough pictorial impression of the various points of sailing. Again, to simplify matters I have shown the position of the mainsail only but when you have both sails working you will discover that the jib usually takes up a similar setting line.

I have deliberately ignored the top segment of the sailing cirle because that is the area in which, to head out from the centre of the circle, you would have to tack.

Finally, I must mention one of the most important points of sailing, I mentioned that it is impossible to sail directly into wind – this has one advantage. You see, there is no real mechanical method by which you can pull a boat to standstill, as you can a car or bicycle, so people tend to get the idea that, if you do the wrong thing while you are sailing, you cannot slow down or stop to put things right. You will now realise that this is not so because, if you turn your boat into wind, her sails will lose all their pulling power and she will virtually stop dead. The only occasion this will not happen is when the tide is carrying you into wind at a greater speed than the wind itself.

Apart from that, remember when in doubt, turn into wind!

MEET THE MIRROR DINGHY!

Have you heard of the man who, when learning to drive a car, didn't first bother to find out what all the knobs, switches and levers were for?

Of course you haven't! So we will give our new Mirror Dinghy a physical once-over to discover the functions of all the various bits and pieces.

The hull is built from marine plywood and the seams are doubly bonded (inside and out) with fibre glass webbing and resin which give the main strength of the boat. Rigidity and buoyancy are supplied by the four built-in tanks which surround the well and which provide seating.

The bow, you will notice is not sharp, as in a lot of similar boats, but presents a slightly sawn-off appearance. There are two distinct advantages to this, one being that more room can be built into a boat for a given length and the other is that a flat bow gives greater buoyancy forward.

In the centre of the well is the centreboard case through which the centreboard protrudes into the water to act as a keel.

On the fore-deck are two square wooden frames – they are called mast-steps and it is in these the mast rests. To sail with just the mainsail one uses the forward mast-step and the forward shroud eye-plates whilst with both sails aloft, one uses the other one and the after shroud eye-plates. If there were only the one mast-step, the boat would not balance with the alternative rig because of the change in the centre of effort caused by the position of the sails.

Now that we have reached the mast in this summary, you might think that to have this tall spar resting in a small square of wood is a somewhat precarious arrangement. This is not the case however, because there are stays which support the top weight of the mast. There is a forestay which is fixed to the mast head at its upper end and tensioned, at its lower end, to an anchor plate in the bows. To prevent the mast toppling sideways, sidestays (or more correctly, shrouds) run from either side of the

mast down to the shroud anchor plates — there are two sets of these plates to cope with the alternative mast position and they are set abaft of the mast to guard against it falling forwards. The stays are termed standing rigging as opposed to running rigging which consists of all the moving ropes and lines.

The first piece of running rigging to consider is the mainsail halliard which is used to hoist the large mainsail. The upper edge (the head) of this sail has a rope sewn inside it which enables it to be threaded up the groove in the underside of the gaff which is set abaft of the mast so that the gaff jaws half encircle the mast. The halliard is shackled to the gaff band from whence it passes through the slot in the top of the mast containing a sheave (pulley wheel). It runs over the sheave and down the port side to the bottom of the mast where there is a cleat to which it can be belayed. From this description I hope you will see that, by pulling on the lower end of the halliard, the gaff is hoisted aloft together with the head of the mainsail. Now that the halliard is made fast to its cleat we will turn our attention to the lower edge (or foot) of the mainsail which is fastened to another spar called the boom.

On the Mirror Class Dinghy, the mainsail is a loose footed sail, ie., the foot is not fastened along the entire length of the boom. Actually it is lashed at the two ends of the boom with a line passing through a metal eye (cringle) in each corner of the sail. The corner nearest the stern is called the clew and the one nearest the mast is the tack which should be secured first. It is at the tack that the horizontal boom connects with the mast by means of a free moving fitment generally called a goose-neck. This consists of a stainless steel fitment, the two halves of which are linked, like a hinge, with a split pin.

The forward upright edge (the luff) of the mainsail is lashed to the mast as shown in the illustration on the back cover — the aft edge (the leech) is, of course, completely free.

The foresail or jib is hoisted by means of a halliard which runs through a pulley block at the mast-head down to a cleat on the starboard side of the mast. As with the mainsail, its leech is free to move and its luff is clipped to the forestay like a curtain on runners.

From the leech cringle of the foresail run two pieces of rope — these are called sheets. This seems confusing to the layman who, naturally enough, would think that this term referred to the sails but, remember, a sheet is a rope.

The purpose of sheets is to control the angle of the sails in relation to the direction in which you wish to sail coupled with the prevailing wind direction. I think it wise to mention, at this point, that the particular sheet which is actually controlling the sail is always held by the helmsman or crew and NOT lashed permanently to a fairlead — can you imagine setting the position of the handlebars of a cycle while you are riding it and then lashing them tightly to prevent sideways movement?

The other sheet in the dinghy is the mainsheet which is the hand control for the mainsail.

This runs from the hole in the top edge of the aft transom, up through a dead eye in the underside of the boom and then back again through another dead eye on the aft transom edge. If the mainsheet were merely connected to the boom direct, you would find that, on occasions, the amount of strength needed to control the mainsheet was considerable but using this simple pulley system gives you ample power without a great deal of effort.

The last piece of equipment to mention is the tiller and rudder assembly which I have already partly dealt with in the previous chapter. The rudder is hinged to the stern of the boat by means of gudgeons (small eyes) and pintles (long hinge-like posts). In order that you may launch the boat in shallow water, the actual blade of the rudder is retractable and is controlled by a line which runs up to and is made fast to a trumpet cleat on the tiller. The line pulls the blade up at right angles and the elastic shock cord inside will automatically return it to its normal position.

At times you will need to lift the centreboard and have it held in position. Also when it is fully down in the centreboard case one needs some method of preventing it from floating up. To achieve this the dinghy has a length of rubber shock cord which can either loop over the top of the centre plate when fully down, or, when it is half raised, loops around the aft edge holding it in position.

Well, there you are then! That's the end of your short conducted tour over the Mirror Class Dinghy. There are certain things I have omitted to describe such as rowlocks, foot rest and so on, but I consider that these are familiar objects which everyone knows about.

In a chapter on rigging I must write a few paragraphs on your own personal rig because, whereas, in most sports, wearing the correct looking clothes is the thing to do, in sailing, appearance comes second to usefulness.

It is surprising how much cooler it can be on the water, and you are advised to take extra warm woollies whenever you go afloat. You will also need protective clothing to keep off rain and spray. This can be obtained from most sports outfitters, ship's chandlers or through advertisements in the pages of yachting magazines. You will need non-slip canvas shoes and plastic shorts or long trousers, together with a pull-on smock also in plastic. This plastic material wears extremely well and certainly keeps out the water. If you wish to buy more expensive apparel, then similar garments are also made in waterproof Terylene. These can be obtained in gay colours and are lighter and more hardwearing than the plastic.

No matter what the weather, you should always have a life jacket available for everyone in your boat. The life jacket should be worn, and should only be removed if calm conditions prevail and you find it too hot to wear. Because of this, many people put the life jacket on first and outer garments over the top. This enables them, in warm weather, to strip off by degrees, leaving the life jacket as the last item to be removed. There is a tremendous variety of bouyancy jackets on the market but, for dinghy sailing, where it is essential to be able to move freely, we recommend a waistcoat type. The best ones are made from plastic and either have air pockets sealed into them or are filled with materials to give buoyancy. This type of jacket will not necessarily save you if you are knocked unconcious but, since this is extremely unlikely in a small boat, the extra advantages of price and comfort make it a good buy.

Whenever you go afloat, don't forget to take a bailer and sponge with you. The bailer should be tied somewhere in the boat so that if you do capsize, it doesn't float away or sink. Bailers range from special large rubber mugs which can be purchased from any ship's chandler, to cheap, small Polythene buckets. A sponge can make all the difference in keeping your boat dry and comfortable.

Polythene bags are extremely useful in small boats, as they protect your sandwiches and spare clothing from spray.

Now that you have familiarised yourself with all the tackle you use let us now get on to actually putting the boat into the water and making her sail.

YOUR FIRST OUTING

You are, by now, keen to launch your boat and have your first sail so let us, with no further ado, get the boat to the water's edge.

The first job that has to be done is the erection of the mast and rigging. By the way, normally, part of the sailing preparation is carried out with the boat on dry land, then it is placed into the water for the hoisting of the sails, etc., but I suggest that you have at least one practice run of the complete rigging with the boat ashore. I will indicate in this chapter the stage at which you launch the dinghy. A further observation I must make is that you will find that I describe the full rigging of both sails but, again, I suggest that your first trip should be done with the mast set on the forward mast-step and under single sail.

Probably the most important factor in rigging is tidiness, in and out of the water. The bad sailor is most conspicuous by the scruffy look of his boat, sails and rigging. This insistence on neatness is not just for appearance's sake – in a boat there are many moving objects and loose ends of rope which if left to their own devices become tangled and snarled causing, in the confined space, chaos and possibly accident. So make sure your equipment is in good condition and all loose ends of rope are neatly furled but ready for instant use.

Having delivered that lecture, I will now proceed with the task in hand. You have your boat beside the water -- all the gear is nicely laid out on the decks. Step one — point the boat into wind! You will remember that, with the sails hoisted, this is the only direction where the wind has not purchase on your sail area and, therefore, you will have no difficulties with billowing sails or even toppling boats.

The mast, which is at present lying in the boat should be rigged first commencing with the jib strop on the mast head so that the block will hang forward of the mast. This is followed by the two shrouds which are looped over the mast head and finally the forestay which should hang over but clear of the jib strop.

The mainsail halliard is threaded through the slot and over the sheave at the top of the mast so that the free end falls on the forward side of the mast — 1 will remaind you that the other end will eventually hoist the gaff abaft the mast. Similarly, the jib halliard is passed through the block on the jib strop from fore to aft. Make sure that there is quite a lengthy fall of rope because you have to reach it when the mast is erected. The loop at the aft end of the mainsail halliard can now be shackled to the upper side of the gaff band which is situated about three quarters up the length of the gaff.

Now the mast can be erected; two people are needed for this operation. It is placed in the after mast-step and while one person holds the mast upright the other trots round and attaches the stays to their respective eye plates — the forestay is lashed to the one in the bow and the two shrouds are shackled to the after shroud eye plates.

Right, I will assume you have the mast standing erect and firm. The next step is to put on the rudder which needs no explanation except to say that the blade should be horizontal and the controlling line held fast in the trumpet cleat at the side of the tiller. The line which governs the up and down motion of the blade should not be twisted or tangled.

The roped head of the mainsail should now be threaded up the gaff groove so that the peak of the sail can be lashed by its eyelet to the hole at the end of the gaff. It will help you a lot in knowing the wind direction if you fasten a triangular flag to the top of the gaff so that it can fly quite free. (A square flag denotes you are racing).

The gooseneck fitting on the boom can now be connected to the mast fitting. Now the tack cringle should be securely fastened to the metal eye at the forward end of the boom, followed by the clew cringle being loosely lashed to the aft end. You may now hoist the mainsail using the appropriate halliard. There remains the actual luff of the sail which should be laced through each eyelet from the throat to the tack, spiralling around the mast as it goes.

The tension of this luff lacing and that of the clew lacing can be adjusted to achieve a perfect set to the sails, ie., a taut flat surface with no long wrinkles and the luff forming a tight smooth line with no stretching no bagging.

The main sheet (a large white rope with green ends) is now fixed in the manner which I described in the previous chapter and should be left to run loose.

Now for the jib sail! Shackle the tack of the jib to the forward eye plate below the forestay lashing and then working up from the foot connect the nylon hanks to the forestay itself. These are fixed easily by slotting them on the wire whilst holding them at right angles to their final position and then turning them upright. Shackle the forward end of the jib halliard (a hemp rope with red ends) to the peak of the jib. You can now hoist the jib so that the luff is set in tightly (without winkles) along the underside of the forestay. Finally, the jib sheet (a large white rope with green ends) is fastened at its centre to the clew cringle on the jib so that one half of the rope falls on either side. Each half is threaded through its respective fairlead where it is retained by a figure of eight knot in the end which prevents the sheets from sliding out of their housings.

At this stage, with all your lines neatly furled, etc., you are ready to launch the boat so I will describe briefly the modus operandi — I couldn't resist adding one bit of culture to this book.

Before going to the water's edge you will have rigged your mainsail and, having ensured that it sets properly, lowered the gaff so that the sail is folded in the boat.

Now for the water!

Make up your mind from the outset that in launching a boat unless from a pontoon or quayside somebody gets their feet wet – if you try to keep them dry you will botch up the whole operation! The dinghy is eased into the water with its nose to wind and is held in position at the bow by the person you are using as your crew (with single handed sailing you have to do this yourself). You, as helmsman climb aboard to hoist sail, stepping into the middle of the boat so as not to capsize her.

Then making sure that the mainsheet can run free, the mainsail is hoisted fairly tight to the mast head. A greater purchase can be obtained on the halliard by pulling it down as far as you can and then putting a turn on the halliard cleat at the port side of the mast, holding this with the left hand while the right hand reaches up and pulls outward and downward to chieve maximum tension. This achieved, make fast to the cleat but remember – no loose ends! To avoid straggling ends of rope, tuck them in tidily between the standing part of the rope and the cleat.

To keep the boom from cocking up with the wind, a rope called a kicking strap (a short hemp rope with coloured end) is made fast between the chock on the upper surface of the boom and the metal eye at the base of the forward bulkhead. Make sure this is kept really taut on days when there is plenty of wind.

You now have your sail hoisted and are ready to turn your nose away from the wind and get under way.

As I said, you should try the rigging procedure on dry land so that you learn the drill before you venture out on the briny. With this in mind, let us turn to the actual sailing of a boat. I will write this initially as though you, single-handed, are using just the mainsail with the mast in its forward position. From the point where you have launched your dinghy, hoisted your sail and are now on your own, off we go!

As soon as you are in deep enough water to drop your centreboard without fouling it on the bottom, lower it carefully into its case. Similarly, allow the rudder blade to drop into the water so that it is vertical, then make fast on the tiller cleat.

When you are sailing you should sit at one side of the boat with your back to the wind and in such a position that you can control the tiller and the mainsheet, one in each hand, without having to stretch. Always keep the boat trimmed to an even keel. So when sailing single-handed you need to sit well forward. That is why you have an extension on the tiller. The sail, of course, is angled on the oposite side of the boat to you and its position and tautness is determined by the pull you are exerting on the mainsheet. The wind tends to push the sail away but you hold the sail area against this pressure so that, as a consequence, the boat itself has to move. If, however, the wind is rather strong as you still pull hard on the mainsheet, a second tendency will develop – the sails will be forced out of a vertical line and the boat is said to be heeling. You will appreciate that this is undesirable as it reduces the efficiency of the boat but you can correct it by leaning backwards slightly thus applying a balancing weight in the opposite direction. It is possible that your weight is not sufficient to counteract the pressure of the air in which case, to restore the sail to the upright you will need to let out the mainsheet slightly until balance is restored.

You will see now why I originally compared sailing to cycling – the major skill in both is a combination of balance and feel.

To return to this heeling effect. I must mention that it is, naturally, most likely to occur when the wind is directly on your beam – remember the postcard experiment which I told you about earlier! I also said in the same chapter that the more you turned the head of the boat into wind, the less effect it has on your sails until eventually it has no effect at all. You can always tell when your sails are coming into wind – the luff, ie., the front edge, tends to flap so if you watch your sail you'll know how close to the wind you can take your boat.

Obviously this is a further cure for heeling should the wind be so strong that leaning out or slacking off the mainsheet does not provide a convenient solution.

All that I have said up to now would presuppose that the wind maintains a constant speed and direction but, as you yourself know, this is not the case. As a result, in gusty weather, you have to be prepared

for both a sudden increase OR decrease in wind power and, with a little practice, you will soon become adept at anticipating the sudden puff and being ready for it before it arrives.

Let us now leave the generalities and get down to the details of your first trip.

It is always advisable to carry out your initial manoeuvres with the wind either directly on the beam or slightly ahead of it because there are no great complications which can occur. Let us then assume you are moving through the water with the wind blowing on the back of your neck from the port side.

By pushing your tiller slightly away from you the head of the boat can be gradually eased into wind. As you do so heave in on your mainsheet until the end of the boom is over a point between the starboard quarter and the centre line of the boat. Gradually edge the boat round until a light flutter disturbs the sail along the edge closest to the mast — this means you are just a bit too close to the wind so adjust the tiller towards you a trifle until the sail tremors cease. In this position you are sailing close-hauled and are as close to the wind as you can be without losing headway. If possible, practise this little manoeuvre a few times after which you will feel quite confident that you and your boat are now a complete team.

The next thing to try is tacking. To do this you must repeat the previous manoeuvre, turning the boat into wind but this time, instead of edging her back to the original course, carry on turning the head through the wind until it is blowing over the starboard side of the boat. This sounds easy but I have two words of advice before you attempt it. The first is that, remembering the sail must, at one point during the turn, be directly head on to wind, the boat will heave to unless you have sufficient headway or momentum to carry you past this dead spot far enough to fill your sails from the other side. The second reminder is that, as you should always sit with your back to the wind, you will have to cross the boat to the starboard ducking your head under the boom as it swings across.

Now that you have successfully gone from a port tack to a starboard tack get up a bit more speed and repreat the exercise in the opposite direction. To carry on a zig-zag course like this is, as I have said before, described as tacking and is the only way of making headway directly against the wind.

Now for something a little more ambitious — broad reaching and running. Again let us assume that you have the wind coming from your port beam ie., you are reaching on a port tack. Instead of pushing the tiller away from you move it towards you letting your mainsheet run out as you go. This will turn the boat away from the wind which will now be coming at you over the port quarter — hold the boat in this position and you are broad reaching with the sail filling nicely and the boom swinging out over the starboard side. If the front edge of the sail flutters haul in a little to get the maximum power from the wind. If you continue turning the wind will eventually be blowing in over the stern forcing the sail to set almost at right angles to the boat — this is called running before the wind.

It is at this stage I must give you your first serious word of warning — so pay heed!

By this time, it must be obvious that you are able to carry out a similar movement to tacking whilst you have the wind behind you — you can, but reflect for a moment. Your sail is filled with wind and is sticking out over the starboard side — what will happen if you continue to turn the boat so that the wind suddenly hits the starboard face of the sail. If you haven't worked it out for yourself, I'll tell you — the sail and the boom sweep across the stern of the boat to the port side in an almighty rush. Simultaneously, you will be changing your position to the opposite side of the boat. You don't need to be brilliant to realise that if you and the boom collide, you are going to be very sorry.

You need to do two things to prevent decapitation and shipwreck. One, you must expect the boom to whip across so be prepared to move across the boat pretty smartly to balance the sudden change in wind direction. Two, you must duck well below the boom as it swings. This manoeuvre is called gybing and , if it is well-controlled, it is a perfectly good operation to carry out but, if it is done in a slapdash manner or even accidentally, it can be the biggest danger in sailing. When you need to gybe never hesitate, it's fatal. Put your tiller firmly over and gybe. But remember that immediately you've done so the boat will continue to move round trying to head up into the wind. You can always tell by your flag from which side the wind is coming and this will tell you when to gybe.

As you must eventually return to dry land, I will give you a couple of hints on the best way to do this without damaging your craft or anybody else's. Select your landfall so that you have a fair amount of room in which to park and so that when you reach it you can turn your boat head to wind in order to stop its forward momentum. Remember that this is the pinciple way to "apply your brakes" but also you can do this by loosing your sheet and letting the wind out of your sail. When you are sailing up to a beach you must also bear in mind that sticking down well below the boat you have a centreboard and rudder which have to be retracted to prevent damage.

If everything else fails you can always lower your mainsail and paddle the boat ashore – don't be scared that this will make you lose face because it is really the hallmark of a good sailor that he takes no unnecessary chances.

When the boat is nearly up to the waters edge, bring her head to wind, raise centreboard and rudder, jump over the side into the shallow water and control her by hand – this brings you back to where you started with wet feet.

A quick word on sailing under two sails and with a crew member to assist. Firstly, the crew is responsible for holding the boat before you set sail and for finally hopping out to beach it. He is also responsible, while you are sailing, for the jib-sheets and centreboard.

Now sailing with an extra sail is not much more difficult than what you have already experienced. The jib is set at the same angle to the boat as the mainsail so the crew, in tacking for instance, will move across the boat at the same time as you, taking up control of the other jib-sheet as he goes.

When sailing close-hauled the jib should be kept tightly in. The helmsman watches the front part of the jib constantly altering the helm so that the jib is almost fluttering but not quite. You are then sailing as closely into the wind as you can go.

Although he sits on the same side of the boat as you, except in very light weather and can see everything you do, you should always give him a clear indication of a change of course BEFORE you actually make it. In fact, any instructions or intentions must be relayed to him so that he has plenty of time to organise himself. This is particularly important in a manoeuvre such as gybing where quick reactions are needed.

A final tip on coming in to land carrying two sails. If you feel your speed is too great as you approach the shore, you may lower your mainsail and sail in on your jib. This will effectively decrease your forward rush.

I can only ask you to practice these very basic moves including emergency measures until everything becomes a matter of reflexes. Don't leave your crew out in the cold when you are discovering new facts about sailing – you should both work as a complete team with full understanding of each other.

To close this chapter, I have selected a few rules from the "Highway Code" of sailing known as the Rules of the Road which are the basic regulations that all sailors must absorb.

1. A boat close-hauled has right of way over a boat running free. Except when racing when rule no. 2 always applies, whether close-hauled or running free.
2. A boat close-hauled on the starboard tack has right of way over a boat close-hauled on the port tack.
3. When two boats are on the same tack, the boat to windward must give way to the other.
4. When one boat overtakes another, the overtaking boat must keep clear of the overtaken.
5. All powered boats must give way to boats under sail – but you must use your rights here in moderation.

Sail safely and you sail well!

LOOKING AFTER YOUR BOAT

Keeping a boat in good condition should not only be an automatic action with most owners but is also a matter of commonsense so I am not going to bore you with masses of detailed instructions on periodic checks. Instead I will point out the main troubles which are likely to arise.

The two arch-enemies to a well kept boat are water and sun. All hulls, no matter how well painted, absorb a certain amount of water which, if allowed to stay for a long period, will lead to rot. Salt water just to make matters worse, has a corrosive quality which can do a lot of harm.

This leads to the first piece of advice – when your boat is not sailing keep her dry and clean.

By the same token, paintwork which is scratched or chipped permitting water to penetrate must be retouched as soon as possible.

Needless to say, the most apt proverb to remember is "Prevention is better than cure". If you store your boat in good conditions, you will have reduced your maintenance to a minimum. You may, of course, have to leave the dinghy in the open – in this case it should be raised from the ground to permit free circulation of air and covered to protect it from the elements. On dry days (not in hot sun) the cover should be removed to allow any slight condensation to disperse. Frequent inspections should save you a lot of headaches.

A complete one coat paint and varnish job every year is reasonably inexpensive and will pay good dividends to provide carefree sailing. When you do this, remove all fittings from the hull and lightly sand down all surfaces by hand and then on a clean, dry hull apply the protective coat.

Sails and rigging can be checked for wear and tear after each bout of sailing – I say after sailing because this will give you time to remedy any faults before your next outing. Rigging and lines should be inspected for fraying, etc., while sails should be examined for tears. Sails should always be free from salt and dry before they are loosely folded and rolled, by which practice you will be assured of maximum efficient life for them.

By and large, the clean-cut lines of the Mirror Dinghy and the absence of nooks and crannies in which dirt and damp would collect make life much easier for you when maintaining it but do remember that there is a centreboard slot which also has to be clean and dry.

Bearing all this in mind, the result will not only mean a boat with long life but one which everybody admires.

GLOSSARY

ABAFT	Sternwards
ABEAM	At right angles to the line of the boat
AFT	Towards the stern
AMIDSHIPS	Middle of the boat
ASTERN	Behind the boat
ATHWART	Across the boat
BEAM	The width of the boat at the widest point
BEATING	Sailing as close as possible into the wind
BELAY	To make fast a rope
BEND	This can either mean to fasten a sail to its spars or is the name for a type of knot
BLOCK	A type of pulley
BOOM	Spar to which the foot of the mainsail is fastened
BOW	Forward end of the boat
BURGEE	A flag flown at masthead
CAST OFF	Untie rope so that it runs free
CENTREBOARD	A removable keel which drops into the centreboard case to protrude through the underside of the hull, sometimes called a dagger plate
CLEAT	A fitting with two arms about which a rope is belayed
CLEW	The bottom after corner of a sail

CLOSE-HAULED	Sailing as close as possible to the wind
CRINGLE	An eye sewn into a sail through which a rope is passed to secure the sail
EVEN KEEL	The upright sailing position of a boat
FAIRLEAD	A channel through which a sheet is passed
FALL	The free end of a rope which can be gripped
FOOT	To bottom edge of a sail
FURL	To roll up a sail
GAFF	The spar fastened to the head of the mainsail
GOOSENECK	The fitting by which the boom is attached to the mast
GO ABOUT	To change from one tack to another
GOOSEWINGED	A setting of the sails with the mainsail and jib on opposite sides of the boat used for sailing with the wind
GYBING	When turning with the wind astern the mainsail is brought, under control, to the opposite side of the boat
HALYARD	A role used for hoisting a sail (haul-yard)
HEAVE-TO	Trimming the sails so that a boat will come to a standstill, head to wind
HEEL	The listing of a boat usually due to the force of the wind
HELM	The steering gear of a boat, in our case, the tiller
IN IRONS	When a boat is head to wind and the helmsman has no controll over her. If this is a controlled manoeuvre the boat is said to be "in stays".
JIB	Triangular foresail
JIBSHEETS	The ropes which control the trim of the jib
LEECH	The after edge of a sail
LUFF	This either means the forward edge of the sail or to bring a boat into wind
MAINSHEET	The rope by which you control the mainsail
PAINTER	The rope attached to the bow of a boat for mooring purposes
PAY OUT	To slacken a rope
PEAK	The upper corner of a sail
PINCHING	Sailing too close to the wind
PORT	The left side of a boat facing forward
QUARTER	Part of the boat between the beam and the stern
REACH	To sail with the wind on the beam
RUN	To sail before the wind
SHACKLES	A fitting connecting one piece of gear to another
SHEAVE	A small pulley wheel inside a block or spar
SHROUDS	The sidestays which support the mast
SHEETS	The ropes by which sails are trimmed
SLIP	To let go a mooring
SPAR	Wooden support for a sail
STARBOARD	The right side of a boat facing forward
STAY	Fixed wire supporting mast
STEM	The bow of the boat
STEP	The square frame on the fore deck into which the mast is fitted
STERN	After end of boat
TACKING	Sailing towards the wind on a zig-zag course
TACK	Bottom forward corner of a sail
TRIM	To adjust the angle of the sail to the fore and aft line of the boat
WEATHERSIDE	The windward side of a boat

Part No.	No. Rqd.	NAME	FASTENING	Material
1	2	Aft Bottom Panels	32 x ¾" Brass Pins (Jointing Batten)	P
2	2	Fwd. Bottom Panels (Units)	50 Wire Loops (2½" long)	P
3	20	Glue Blocks (Not Numbered)	40 x 1" Copper Nails (Size of Block 3" x ¾" x ⅝")	S
4	2	Floorboards	28 x ¾" Copper Nails	H
5	2	Aft Topside Panels	16 x ¾" Copper Nails (Jointing Batten)	P
6	2	Fwd. Topside Panels (Units)	70 Wire Loops (2½" long)	P
7	1	Aft Transom (Unit)	20 Wire Loops	P
8	1	Fwd. Transom (Unit)	20 Wire Loops	P
9 L.P.	2	Stringers	30 x ¾" Brass Pins	S
10	1	Stowage Bulkhead (Unit)	4 x ¾" Brass Pins. 7 x 1" Copper Nails	P
10a	1	Mast Web (Unit)		P
11	1	Fwd. Bulkhead (Unit)	4 x ¾" Brass Pins. 2 x 1" Copper Nails	P
12	1	Aft Bulkhead (Unit)	4 x ¾" Brass Pins. 2 x 1" Copper Nails	P
13	2	Side Tank Sides (Unit)	16 x ¾" Brass Pins	P
14	1	Central Case (Unit)	12 x ¾" Copper Nails. 8 x 1" x 8s	P
14a	1	Thwart (Unit)	Brass Screws. 2 x 1¼" x 8s Brass Screws	P
15	1	Aft Deck Beam (Unit)	2 x 1" Copper Nails	S
16 L.P.	2	Outer Gunwales	4 x 1½" x 8s Brass Screws 60 x ¾" Copper Nails	H
17	2	Seat Battens	24 x ¾" Brass Pins	S
18	2	Fwd. Decks	40 x ¾" Brass Pins	P
19	1	Fwd. Deck Butt Strap	30 x ¾" Brass Pins	P
20	1	Deck Beam (Short)	40 x ¾" Brass Pins	S
20a	1	Deck Beam (Long)		S
21	4	Shroud Blocks	16 x ¾" x 8s Brass Screws	H
22	2	Side Decks	140 x ¾" Brass Pins	P
23	1	Aft Deck	30 x ¾" Brass Pins	P
24 L.P.	1 pr	Inner Gunwales	40 x 1¼" Brass Screws	S
25	1 pr	Quarter Knees	4 x 1½" x 8s Brass Screws 4 x 2" x 8s Brass Screws	H
26	2	Bow Shape Battens	4 x 1" Copper Nails	S
27	2	Bow Shapes	30 x ¾" Brass Pins	P
28	2	Mast Steps	8 x 1" x 8s Brass Screws	P
29	2	Fairlead's	4 x 1½" x 8s Brass Screws	H
30	2	Rowlock Blocks	8 x ¾" x 8s Brass Screws	H
31	1	Footrest	6 x ¾" x 8s Brass Screws	H
32	1	Skeg	1 x ¾" x 8s Brass Screws. 1 x 1¼" Copper Nail	H
33	2	Bilge Pieces	8 x 1" x 6s Brass Screws	H
34 L.P.	1	Fwd. Cross Strut 41½"	2 x 1" x 8s Brass Screws	H/S RS
35 L.P.	1	Aft Cross Strut 54"	2 x 1" x 8s Brass Screws	H/S RS
36	1	Centreboard		P
37	2	Centreboard Tops	4 x 1" x 8s Brass Screws	S
38	1 pr	Rudder Cheeks	8 x 1" x 8s Brass Screws	P
39	1	Rudder Packing		H
40	1	Rudder Blade	3 x ¾" Copper Nails	P
41	1	Tiller		H
42	1	Tiller Packing	3 x ¾" Brass Pins	H
43	1	Tiller Ext.		H
44	1	Tiller Ext. Pad	3 x ¾" Brass Pins	P
45 L.P.	1	Mast		Alloy
46	1	Mast Top	1 x ¾" x 8s P.H. S/Steel	H/S
47	1	Mast Bottom		H/S
48 L.P.	1	Gaff		S
49	2	Gaff Jaws	6 x 1" x 8s Brass Screws	P
50	2	Gaff Jaws Packing	6 x ¾" Brass Pins	P
51 L.P.	1	Boom		S
52	1	Boom Block (Kicking Strap)	2 x 1" Copper Nails	S
53 L.P.	2	Oar Shafts		S
54	2	Oar Blades	10 x 1" Copper Nails	P

H – HARDWOOD S – SOFTWOOD P – PLYWOOD RS – ROUGH SAWN
L.P. Packed in Separate 12' Bundle (Long Pack)

FASTENINGS, RIGGING AND FITTINGS CHECK LIST

FASTENINGS

Copper Wire	One Coil for Cutting into 2½" Lengths
Brass Panel Pins	460 – ¾" (6 ozs.)
Copper Boat Nails	180 – ¾" x 16 s.w.g. (3½ ozs.)
Copper Boat Nails	72 – 1" x 16 s.w.g.
Copper Boat Nails	5 – 1¼" x 14 s.w.g. 1 only for skeg. 4 only for mast step web
Brass Countersunk Screws	31 – ¾" x No. 8
Brass Countersunk Screws	8 – 1" x No. 6
Brass Countersunk Screws	42 – 1¼" x No. 8
Brass Countersunk Screws	38 – 1" x No. 8
Brass Countersunk Screws	12 – 1½" x No. 8
Brass Countersunk Screws	4 – 2" x No. 8 (Packed with 1" x 6)
Glass Tape, Woven	60 yards 1½" x 18 Thou. (Thick for all seams)
Glass Tape, Woven	28ft. Fine Tape 1½" (for sealing Decks)
Glue	1 Tin Powder Glue 8 ozs.)
Glue Hardeners	1 Bottle 4 ozs.) One Pack
Resin – Filabond (Sent Separately)	8 lbs. (1 Gallon size container 2/3rds full)
Resin Catalyst	1 small Polythene bottle to ½ full (4 ozs.

36 3/8" x 6 or ½" x 6 Brass Countersunk Head Screws for Keelband
4 1" x 6 St. Steel Screws Countersunk Head Screws for Nylon Cleats (Halliards)
2 ¾" x 6 Brass Countersunk Head Screws for Nylon Cleats ('Tiller')
4 1¼" x 8 Brass Countersunk Head Screws for Mainsheet Fairleads ('Dead Eyes')
4 ¾" x 8 St. Steel Countersunk Head Screws for Rowlock Plates
4 ¾" x 6 Brass Countersunk Head Screws for Gaff Band
14 7/8" x 6 or ½" x 6 Brass Countersunk Head Screws for Drain Sockets
1 ¾" x 8 St. Steel Pan Head for Top Mast Plug

Note:– Screws for fastening wooden parts are packed in one polythene bag. Screws for fittings listed above are in a small cellophane bag in the fittings package.

SAILS

1 Main Sail	(Red)	SAILS WILL BE POSTED LATER BY
1 Jib	(Red)	JECKELLS IF NOT AVAILABLE AT
1 Bag	(Any Colour)	TIME OF SENDING KIT
3 Battens	1/20", 2/24"	

CHECK THAT THE NUMBER OF THE SAILS AGREES WITH THE NUMBER STAMPED ON THE TRANSOM TOP (UNIT 7)

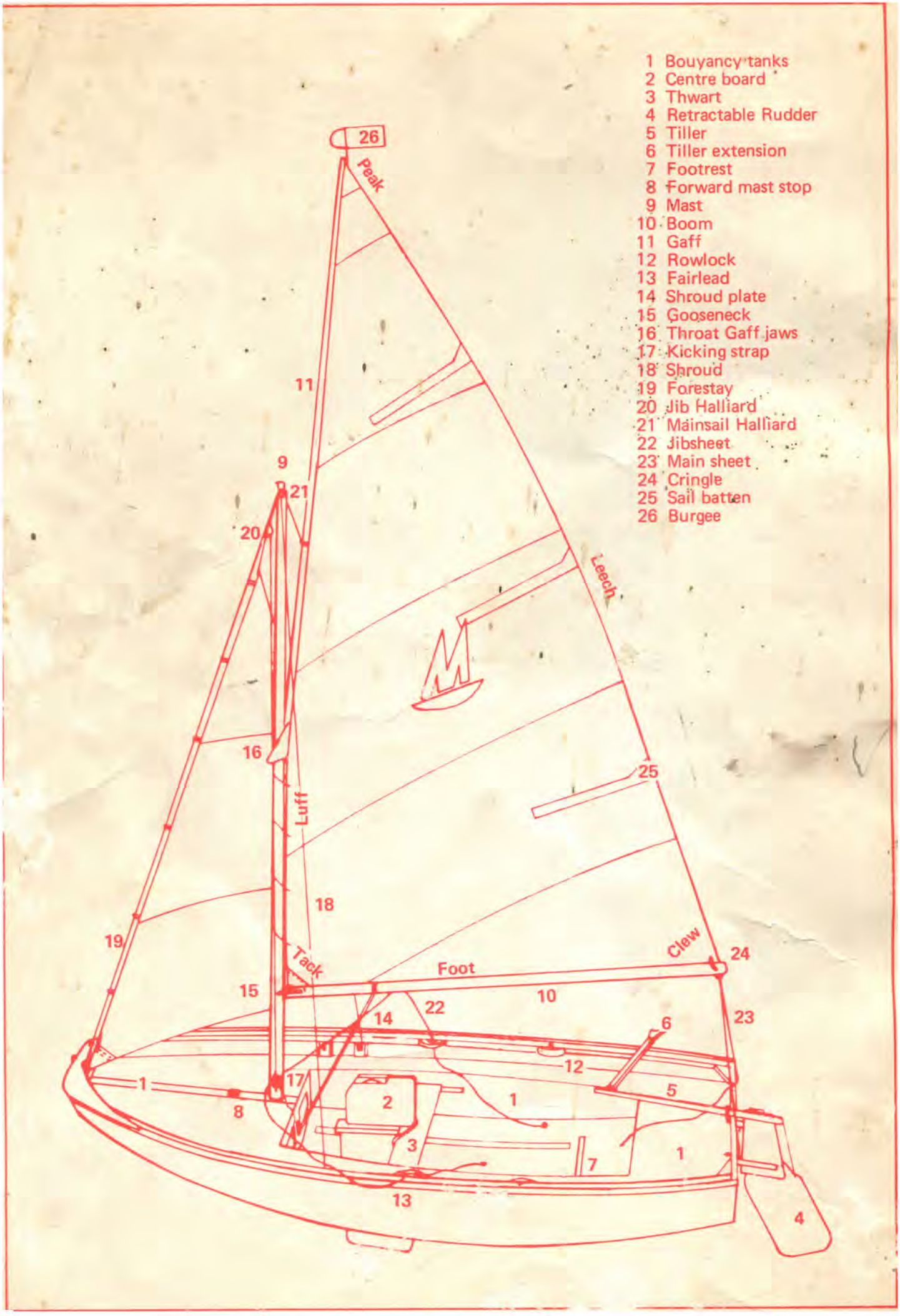
RIGGING – Packed in one Polythene bag

1 Fore Halliard Strop	3/8" circ wire 6½" long, with 1½" dia; soft eye (For Mast) and 3/8" hard eye. (For Pulley Block)	
2 Shrouds	3/8" x 10' 10 3/8" with 2½" dia. soft eye and 1 hard eye Galvd. Wire with Shackles	
1 Forestay	3/8" x 10' 1" with 2½" dia. soft eye and 1 hard eye Wire with Lanyard N.B. Lanyard is spliced to stay	
1 Main Halliard c/w shackle	¾" x 22ft.	
1 Fore Halliard c/w shackle	¾" x 22ft.	
1 Mainsheet	24' x 1" Circ.	
1 Fore Sheet	19' x 1" Circ.	
1 Kicking Strap	7' 6" x ¾" with soft eye to fit 1¾" sq. boom	
1 Rudder Uphaul Lanyard	4' 6" x ½" Hemp	
1 Centreboard Elastic	12" x ¼" 2 eyes Elastic 2 fixing screws and washers	
1 Gaff Elastic	6" x 3/16" 1 eye.	Elastic
1 Rudder retaining Clip	HA/21	Black nylon with 3 fixing screws ½" x 5
1 Tiller retaining Pin with Lanyard		Brass/Hemp
1 Gooseneck Retaining Pin with Lanyard		St. Steel/Hemp
1 Rudder Down haul Elastic	10" x ¼" 1 eye	Elastic 1 fixing screw and nails

Please Note: Rudder retaining clip is packed with 5 shackles in one small Cellophane Packet.

FITTINGS – Packed in one polythene bag (Excepting 2 long lengths of Keelband)

1 Gaff Band		Brass
1 Lacing Eye for Tiller	HA/73	Alloy
1 Part of Gooseneck for Boom Only	HA/4314 – Stainless Steel. Pin for gooseneck is packed in rigging bag with a lanyard attached for screwing to boom. Mast part of gooseneck is rivetted to mast.	
1 Lacing Eye for Sail Tack Lacing	HA/73	Alloy
7 Drain Sockets	HA/123	Nylon
1 Bow Plate	HA/3	Alloy) Packed To-
4 Shroud Anchorages	HA/3	Alloy) gether Pkt. of 5
2 Halliard Cleats	HA/130	Nylon
1 Mast Sheave & Axle	HA/150	Nylon and Alloy
1 Kicking Strap Anchorage	HA/88	Alloy
2 Dead Eyes for Mainsheet	HA/152	Nylon
1 Tiller Cleat Trumpet Type	HA/146	Nylon
2 Rowlack Plates		Galvd.
2 Rowlocks	2"	Galvd.
1 Rudder Gudgeon	HA/4106	St. Steel
1 Rudder Pintle	HA/4317	St. Steel
1 Transom Pintle	HA/4019	St. Steel
1 Transom Gudgeon	HA/4020	St. Steel
2 Pieces of	1 x 4' 6" – ½" x 1/8"	Brass Convex) Packed
2LP Keel Band to Cut 4	2 x 1' 3" – ½" x 1/8"	Brass Convex) in long
	1 x 4' 2" – ½" x 1/8"	Brass Convex) Pack
1 Rudder Blade Pivot Bolt	2" x ¼"	St. Steel Packed with Fitting
1 Tiller Extension Bolt	2" x ¼"	Brass
1 Pulley Block for Jib Halliard	HA/178	Black nylon – attaches to fore halliard strop.


1 Bouyancy tanks
2 Centre board
3 Thwart
4 Retractable Rudder
5 Tiller
6 Tiller extension
7 Footrest
8 Forward mast stop
9 Mast
10 Boom
11 Gaff
12 Rowlock
13 Fairlead
14 Shroud plate
15 Gooseneck
16 Throat Gaff jaws
17 Kicking strap
18 Shroud
19 Forestay
20 Jib Halliard
21 Mainsail Halliard
22 Jibsheet
23 Main sheet
24 Cringle
25 Sail batten
26 Burgee
Peak
Leech
Luff
Tack
Foot
Clew