

## THE COBRA 5 METRE CATAMARAN

### INTRODUCTION

The Cobra is a one design two and/or one man racing catamaran of restricted sail area initially designed as a father and son racer. It was fast realised with the Cobra was outstanding in all respects and the simplicity of the design coupled with the excellent performance has produced a boat of outstanding merit.

The performance of the boat is due, partly to the low weight achieved by using the developed ply (stitch and glue) method of construction. This method must be regarded as a break through in design for besides providing strong, light weight hulls, it is ideally suited for building by the amateur. Perfectly fair, round bilge hulls can be produced in a fraction of the time that would be needed for fibreglass or cold moulded wood.

Alternately top quality fibreglass hulls to any stage of completion in a range of colours are available from the Association's approved builders.

The Cobra may also be purchased in kit form through the Association.

An option that very few boats can offer, either multi or mono hull, is that the Cobra can be sailed one man and/or two man without any alteration to the hulls.

From two up to one up is merely a matter of removing the jib, resteping the mast forward in the two position mast step and adjusting the rake on the mast and away you go single handed.

The Cobra is basically a racing craft, although of course there will be those who build who have no intention of racing. As with any other class a valid measurement certificate is required for racing and these can only be obtained from an official "Measurer". The hull shape for instance, is checked as are the underwater shape of the centreboards and sail dimension,

Practically all dimensions are allowed tolerances and these are sufficient enough to accommodate variations in a reasonably well made boat. Providing the building instructions and plans are closely followed there should be no trouble, but if they are not the results could be disastrous. The building instructions contain simply step by step instructions and read in conjunction with the plans, make a highly informative and comprehensive set of building plans with timber alternatives, suggested glue and resins for use in the construction and even a list of your closest Cobra owners or plan holders.

The Cobra is one of the fastest growing catamaran classes in Australia and soon, we hope, the world. It offers extremely fast, exhilarating performance and class racing, its dimensions make it easily trailable without dismantling and one man can readily handle and rig the boat owing to the low weight factor of the craft.

Cobra owners in Australia and the world are kept well aware of what is happening in their class by a regular journal bringing news of the international and national front, club news and articles contributed by members of the Association themselves.

Cobra offers the person who has never sailed before the chance to get into fact exciting class racing. It can be sailed by just about anyone, owing to its inherent stability, although quite a considerably amount of skill and knowledge is required before a person starts winning races.

Contrary to popular belief the modern catamaran is easily uprighted after capsized due, again to its light weight and the chances of breakage on a carefully built and rigged boat is negligible and will remain so for many seasons of hard close racing.

The purpose of the Cobra and its class Associations is to provide fast exciting class racing in an easily constructed boat at a minimal outlay.

Further enquiries can be made to your nearest class Association:

### GLUE JOINTS

All wood to wood joints are made with modern water proof gap filling glue. If tested to destruction such joints invariably fail in the wood and not along the glue line, and are therefore completely trustworthy. Although the glue is termed "gap filling", a reasonably close fit is still required between the parts to be glued.

The glue should be spread fairly thickly over the glueing area and should ooze out all around when the parts are placed together, ensuring no voids are left. When glueing parts to ply, spread the glue over the parts not the ply. This ensures the joint will be completely covered but no glue will be wasted.

Various types of glue are in general use in different countries so advice should be sought locally on what to use.

THE MANUFACTURERS INSTRUCTIONS SHOULD BE CLOSELY FOLLOWED.

### FIBREGLASS RESIN

It will be seen that two pot Epoxy Resin is specified for all fibreglass work, and although this is much more expensive than polyester resin, on no account use polyester as its adhesion to wood is very poor indeed.

The resin and hardener must be carefully mixed in the correct proportion according to the manufacturers instructions. The working time after adding accelerator may be as little as 20 minutes before the mix starts to gel. This time is a function of temperature. Accelerator must not be added to more than small quantities of total mix otherwise the heat by the chemical reaction will cause the mix to gel very rapidly indeed. The mixed resin should be held in a shallow tray to help dissipate heat.

If working at low temperatures, the cure time may well be longer than 20 hours. The mix will also be too thick to impregnate the glass properly and the resin will have to be heated by placing the container in hot water PRIOR to mixing.

Epoxy resin systems available in Australia and throughout the world are the Araldite systems and advice should be sought on which to use according to climatic conditions.

EXAMPLE: For tropical conditions, Araldite Resin MY 752  
Araldite Hardener HY 943

## MATERIAL LIST

### ALUMINIUM

✓ MAST	Comalco E5308 <del>Alspar</del> C2	24' (7320)
✓ BEAMS	Comalco E5308 <del>Alspar</del> C2	14' (4260)
BOOM & CENTRE BEAM (optional)	2" x .080" (50x2) Tube	16' (4880)
TILLER HANDLES, SPACER & CONNECTING BAR	3/4" x 3/4" (20x20) Square	14' (4260)

*Boom*

### STAINLESS STEEL

✓ MAST ROTATION LEVER	5/16" (8) S/S Rod	30" (762)
DOLPHIN STRIKER ROD	1/2" (6.5) S/S Rod	10'5" (3177)
✓ MAST STEP	4" x 12" x 1/8" (102x305x3) Plate	1 off

### MARINE PLY

✓ SIDES	16'6"x4'x4mm (5030x122x4)	2 Sheets
✓ DECKS, BULKHEADS, <i>Gaboon</i>	8'x4'x4mm (244x122x4)	2 Sheets
✓ C/B CASE SIDES	8'x4'x4mm 2m	1 sheet.

### TIMBER

✓ C/B CASE SPACER	✓ 1"x1-1/8"x9' (25x27x274)	1 Length
✓ STRINGERS	✓ 1"x1" 2 1/4"x3 1/4"x17' (19x19x5180)	7 1/2 Lengths
✓ TRANSOM TOP	✓ 2"x1"x2' (50x25x610)	1 Length
✓ BEAM STIFFENER	✓ 1"x2 1/4"x10' (25x60x3050)	1 Length

(Western Red Cedar - Quandong - Oregon - Maple)

✓ BEAM MOUNTING BLOCKS	1-7/8"x1-7/8"x5' (48x48x1520)	1 Length
(Maple - Hardwood) -	✓ 2"x1"x5' ✓ 6"x1"x5'	
✓ BEAM SUPPORT BLOCK	✓ 1 1/2"x1"x5' 1-7/8"x1-7/8"x10' (48x48x3050)	1 Length

(Quandong - Oregon - Western Red Cedar)

### FIBREGLASS & RESIN

✓ CHOPPED STRAND F/G MATT	3'x6' (910x1830)	1 Piece
✓ 2" (50) FIBREGLASS TAPE	200' (61000)	1 Length
✓ EPOXY RESIN	1 1/2 gal. (5.5 litres)	
✓ EPOXY GLUE	1 lb. (450 grams)	

### MISCELLANEOUS

✓ BOAT NAILS	3/4"x16g. (19x16g.)	1 lb. (450grams)
✓ COPPER WIRE (Soft)	18g.	1 lb. (450grams)
ELECTRICAL BI CONDUIT	3/4" (19) B Class	4 Lengths
(Trampoline & Tiller Extensions)		

Timbers listed above are types available in Australia but if none of these are available check for suitable alternatives at your local timber merchant and/or boat builder.

# FITTINGS LIST

DESCRIPTION	QTY.	RONSTAN	FICO	RILEY
Main Chain Plate	2	RF 8	FG287	RM141
Front Chain Plate	2			RM195
Ring	1	RF124	FG373	
Inspection Port	4	RF530	FG530	RM190
Loop Slide with stop on track	2	RF7376	FG390B	
Swivel Shackle on base	1	RF121	FG132	
Drain Plug	2	RF295	FG364	
Pintle	4	RF255	FG338A	
Rudder Clip	2		FG593	
Ratchet Block	1			RM321
Ratchet Block with becket	2			RM324
Ferrule Top Block	1	RF468		
Swivel Fiddle Block with becket	1	RF172	FG103	
Mast Step	2	RF595		
Trapeze Handle	4	RF 19		
Trapeze Ring	4	RF 48B	FG286	
Sheave	2	RF129		
Paddle Holder 1-3/4" (45)	2			PNP43A
Midget Fairlead	4			PNP24
Mast Cap with Halyard Sheave	1	RF753		
Mast Base	1	RF773		
Halyard Lock	1	RF182		
Mast Yoke	1	RF183	FG212	
Mast Band and Preventer	1			RM185
Diamond Mast Band	1	RF503		
Tang 1" x 4" (25 x 112)	2	RF 47	FG465	
Turnbuckle	2	RF218	FG125	
Vernier Adjuster	2	RF445	FG490	
Split Hook	1	RF535		
Tide Luff Block	3	FG907		
Gooseneck	1	RF560		
Boom Vang Plate	1	RF 18		
Vang Key Plate	1	RF 22		
Vang Mast Plate	1	RF 20		
Small Becket Block	1	RF188	FG462	
Fiddle Block with Jamb	1	RF187	FG463	
Highfield Lever	1	RF 38		
Small Open Cheek Block	1	RF179		
Outhaul Slide	1	RF414		
Block Hangers	3	RF180	FG130	
Block	3	RF158		
Lightweight Block	2	RF582		
Sheave Box	1	RF452		
Gudgeon	2	RF254		
Gudgeon	4	RF439		
Universal Coupling	1	RF 9		
Shackle	6	RF616		
Jam Cleat	2	RF494		
Saddle	2	RF134		
Stud 6" (152)	2	RF212		
Stud 5" (127)	6	RF211		
Plastic Snap Hook	4			PNP56

DESCRIPTION	SIZE	QTY.
Forestay Sidestay Jib	1/8"(3.17)Dia.x 1/19	81' (23510)
Strop Sheet Hawse	S/S Wire	
Main Halyard	3/32"(2.37)Dia.x 7/19	
	S/S Wire	24' (7320)
Trapeze Wire	1/16"(1.59)Dia.x 1/19	
	S/S Wire	72' (21960)
Thimble	RF482	18
Thimble	RF480	12
Swage AA30	1/8"(3.17)Dia. Wire	20
Swage AA28	1/16"(1.59)Dia. Wire	12
Thimble	RF481	2
Swage AA29	3/32"(2.37)Dia. Wire	3
Yacht Braid	1 1/2" (38)	70' (21040)
Monel Metal Pop Rivets	3/16" x 3/8" (4.76 x 9.52)	100
Shock Cord		12 yds. (10970)
		100' (30140)
S/S Self Tappers	10 gauge x 1"(25)	48
S/S R/H X	3/16" x 1" (4.76 x 25)	
	Screws with nuts	8
S/S C/S X	3/16" x 2" (4.76 x 50)	
	Whit. screws with nuts and washers	10
S/S R/H X	1/4" x 1" (6.35 x 25) Whit.	
	screws with nuts and washers	12
S/S R/H X	1/4" x 1 1/2" (6.35 x 38)	
	Whit. screws with nuts and washers	4
S/S C/S Wood Screws	1 1/2" x 8g. (38 x 8g.)	12 1/2
S/S C/S Wood Screws	1/2" x 8g. (12 x 8g.)	4

## FIBREGLASS HULLS

Select the fibreglass shells with care and inspect carefully for any marks etc. and select hulls so that any marks will be on the inside. While the hulls are upside down, using a straight edge and draw the keel line through the recess for the rubber. Drill  $1/8"$  holes on the keel line  $4"$  from rubber ends of the centre board case.

Turn hulls over and set up in position to take building jig. It may be necessary to carefully sand or file the edges of the hull and lugs off the transom before fitting on the building jig.

Select bulkheads 1, 2, 3, 4, 5, 8 and 9, fit into position without forcing bulkhead against the fibreglass. Bulkhead 8 is set at  $49\frac{1}{2}"$  from transom on keel and  $48\frac{1}{2}"$  along gunwhale. I cut a  $3/4" \times 3/4"$  stringer in half giving  $3/8" \times 3/4"$  by  $10'$  long.

Place bulkheads 1, 2, 3, 4, 5, 6, and 7 together so that the edges of right hand side are flush at a point  $8"$  below the gunwhale. Clamp together and cut a recess  $3/4" \times 3/8"$  using a small chisel, repeat method for left hand side. Fit bulkheads and stringers in position. Taper the ends to eliminate a pressure point. Cut  $2"$  strips from the  $1\frac{1}{2}$  oz matting separate in half  $3/4$  oz. and cut to length required for bulkheads. Mix  $1$  lb. of epoxy resin and fibreglass bulkhead in position, allow to gel.

### CENTRE CASE

From scrap centreboard timber  $1-1/16" \times 1"$  cut two blocks about  $2"$  long, mark centreline of  $1-16"$  on blocks and drive a nail into line, leaving an inch protruding, cut off heads. Place blocks in hull with nails protruding through holes drilled on keel. Place centre case in position over blocks, this ensures correct alignment of the bottom of centre case. To align the top take two scrap pieces of ply about  $30"$  long and cut a recess to fit tightly around centre case sides. Fit at front and rear of centre case and secure with G-clamps. Using a string from transom mid point to bow check centre case alignment and correct as necessary by altering G-clamps - when correct fit bulkheads,  $6 \times 7$  fibreglass in position and allow to gel.

With fibreglass shells I use  $1" \times 3/4"$  stringers to give more adhesion to the fibreglass, select two such stringers  $16'3"$  and taper as per stage 9 for timber hulls.

Select a piece of high density timber  $13" \times 3" \times 3/4"$ , a scrap piece of rudder blade to use for transom reinforcing, remove corners to fit neatly at transom top. Cut gaps in timber to take  $1" \times 3/4"$  stringer.

Select the  $2" \times 2"$  hardwood blocks for main and rear beams, G-clamp in position, with a scrap piece of stringer mark the  $3/4"$  spaces necessary to take the stringers. Cut away  $1" \times 3/4"$  from blocks.

Bow chain plate reinforcing. Select a piece of tight grain timber  $2" \times 8" \times 9"$  to make block. I shape mine like an archway so that my hulls can be used for either port or starboard hull should replacement become necessary. Taper to fit in front of bulkhead 2.

Remove building jig and fit stringers to hull - it may be necessary to adjust length or round corners, when right remove stringers. Mix up  $10$  ozs. of araldite epoxy glue, apply to front chain plate reinforcing block and G-clamp in position. Spread the glue along the side of the hull evenly and on the side of the stringer that faces the glass.

Set stringer in position. Next apply glue to main beam support and clamp in position on rear of bulkhead 5. Repeat for rear beam on rear of bulkhead 9. Spread glue on the other side also stringer and transom reinforcing block and clamp. Replace building jig and allow to set overnight.

Note of caution: I always run a strip of mashing tape on the sides of the building jig to avoid damage to the sides and to prevent any excess glue setting the hulls and jig together.

The next step is to fit the deck curve blocks 2" x 2" western red cedar on both sides of the beam support blocks. G- clamp in position, take 2 lengths of 3/4" x 3/4" 7 feet long, place each side of the centre case. Mark the recess to be cut out of the deck - support rear of bulkhead 5 to bulkhead 8 to the front deck support of bulkhead 9. Glue and clamp in position.

The construction from now on is exactly the same as for the timber boats, except I don't recommend planing fibreglass, use a grinder or sander carefully using about 24 grade paper.

To seal the centre case I take a circle of scrap plywood cut in half and place at front and rear of centre case on keel to angle them towards the centre of centre case, seal with strips of mashing tape. I set the hulls up so that the stringer on the bottom of centre case is level, mix up 1 lb. of resin and 3 ozs. of micro hallons, add hardener pour in around centre case, allow to set. Remove the plywood and mashing tape. I give it a final seal using 2" strip of 1 1/2 oz. matting split in half and 4 ozs. of epoxy fibreglass - allow to gel - fill the centre case with water and let it stand overnight. If no leads, prepare to fit the decks.

## BUILDING JIG CONSTRUCTION

Fig. 2, P. 1.

**MATERIALS:** 1 only 9' x 4' x 3/16" Hardboard or Ply.  
(2740 x 1220 x 4)  
3 lengths 1" x 1" x 17' Pine  
(25 x 25 x 5180)  
2 lengths 2" x 1" x 17' Pine  
(50 x 25 x 5180)  
Hardboard Nails  
P.V.A. Glue.

Mark out and cut hardboard sheet in half lengthwise to obtain two 2' x 9' (610 x 2740) sheets.

Butt ends together to obtain one 2' x 18' (610 x 5480) length. Glue and nail 2" x 1" (50 x 25) along edges of sheet making sure the ends of the two sheets are butted firmly together. Glue joint together with a batten of scrap ply about 2" (50) wide.

Cut 1' (305) off the end of the hardboard to make jig 17' (5180) long.

Cut two 2' (610) lengths of 1" x 1" (25 x 25) and glue and nail them across the extreme ends of the sheet on the opposite side to the 2" x 1" (50 x 25).

Run a TIGHT string line down the centre of the sheet.

Starting 3" (76) from one end mark out sheet with lines at 12" (305) intervals and at right angles to C/L. Mark out jig using measurements given on plans.

Fair in marks using a good straight stringer.

Very carefully cut out centre piece with jigsaw and trim with spoke shave or file. Glue and nail 1" x 1" (25 x 25) flush around edge of aperture in jig.

Carefully mark out bulkhead positions on top of building jig.

**IMPORTANT:** MAKE SURE WHEN MARKING BULKHEADS, POSITIONS 5 AND 9 ON JIG THAT THEY ARE EXACTLY AT RIGHT ANGLES TO C/L.

Cut remaining 1" x 1" (25 x 25) into 2' (610) lengths. Glue and nail one of these 6" (152) forward of transom and one 3" (76) back from bow. Space remaining pieces along top of jig making sure they are not in the way of bulkheads or C/B case positions.



CENTREBOARD CASE CONSTRUCTION

DRAWING SHEET 5

STAGE 1 Mark out one side as per Fig. AA P.5.  
Cut out side carefully and plane accurately to size.  
Use this side as template for other three sides.

? X STAGE 2 Chisel out 2" x 3 1/4" (50 x 90) recess for pivot plates.  
Bolt THRU. Fig. BB P.5.  
Plates should sit flush with inside surfaces of case.

2 STAGE 3 Glue on ply strengthener as in Fig. BB P.5.

STAGE 4 Glue and nail bottom stringer to outside surface of C/B  
case sides. Leave 1/8" (3) clearance on bottom of ply  
from stringers.  
Fig. CC P.5.  
Keep nails to top of stringer so bottom may be planed to fit.  
One end of stringers has to be recessed to fit around ply  
strengthener.

\* STAGE 5 Glue and nail 1 1/2" x 1" (25 x 25) spacer to inside faces  
of ONE SIDE OF EACH CASE.  
On the two remaining sides mark out where spacers will sit.  
Paint or varnish inside faces of cases avoiding glueing  
surfaces.  
Glue and nail sides together after paint dries.  
Fit cases to hulls. Sea Building insert Stage 35 and 39.

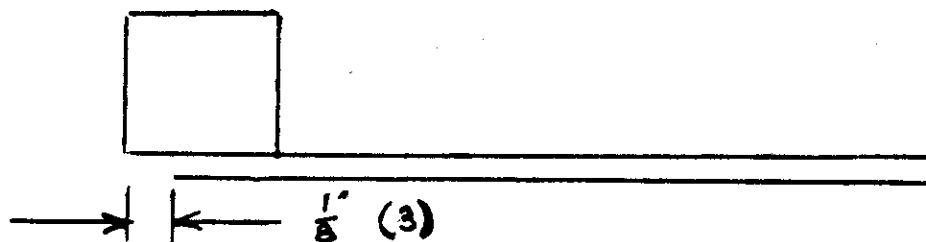
see page 6. notes

## BUILDING INSTRUCTIONS

- STAGE 1      Select sheet of ply to mark out first side.  
Select better side of sheet to go to outside of hull and lay this face down on flat surface.  
Run a tight string line along length of sheet  $\frac{1}{2}$ " (13) in from one edge.  
Use this as a datum line.  
Mark out sheet accurately with lines at 12" (305) intervals and at right angles to datum line (string line).  
Starting at transom mark lines as station "0" through to station "16".
- / Fig. A P.1.
- STAGE 2      Mark out deck measuring down from datum line.  
Fair in marks using a good straight stringer.
- Fig. A P.1.
- STAGE 3      Mark out keel curve measuring down from datum line.  
Fair in mark using a good straight stringer.
- Fig. A P.1.
- STAGE 4      Place bow template on Stn. 15, line up keel curve and trace around template to deck curve.
- Fig. A P.1.
- STAGE 5      Cut out first side carefully and plane to size accurately.  
Use this side as template for other three sides.  
REMEMBER to mark sides opposite to one another as in Fig. A P.1. to keep best surface of ply on outside. Clearly mark inside surface of each side.  
Cut out remaining three sides carefully
- STAGE 6      Clamp four sides together and plane carefully down to template size.
- STAGE 7      While sides are clamped together scribe a line  $\frac{1}{4}$ " (6) in from edge all along keel and up the bow.  
Drill  $\frac{1}{16}$ " (1.5) holes at 2" (50) intervals all along this line.  
Unclamp side and accurately transfer station lines to inside surface of each side.

N.B. Numbers in brackets are millimetre measures.

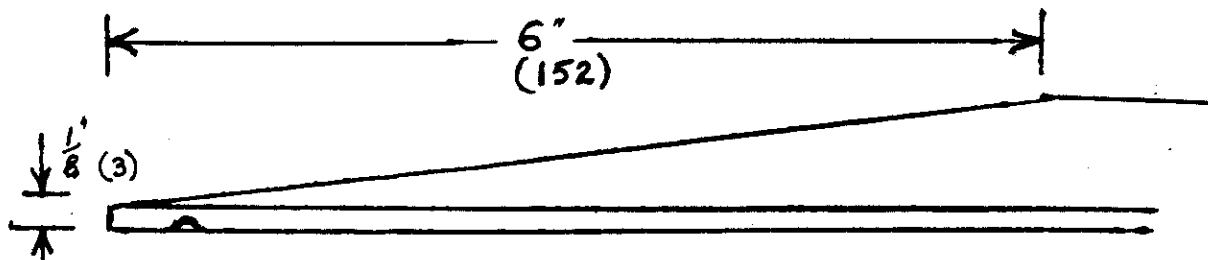
- STAGE 8 Scribe a line  $\frac{1}{8}$ " (3) in from edge of gunwhale stringers and carefully glue gunwhale stringers to INSIDE SURFACE of each side, leaving  $\frac{1}{8}$ " (3) overlap on stringer from ply. REMEMBER GUNWHALES GO ON INSIDE EDGE OF EACH SIDE.



While waiting for glue to dry see:

- (1) C/B case construction,
- (2) Mark and cut out deck pieces (fore deck - working deck - rear deck).

- STAGE 9 Taper gunwhales at bow.

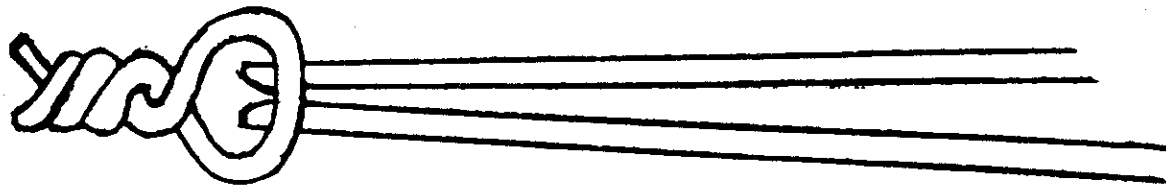


- STAGE 10 Slightly chamfer ply down the bow changing into a radius along inside edge of keel.



Inside Face

- STAGE 11 Lay inside surface of each side of each hull face to face. Thread copper wire through holes and twitch loosely using soft 18g copper wire.



- STAGE 12 Clamp top of bow lightly to prevent wire tearing out of ply during next steps. Open out hull carefully by pushing gunwhales apart and place 36" (914) long spreader between gunwhales at station 8.

Fig. C. P.1.

REMEMBER to adjust clamp on bow so as not to break gunwhale stringers.

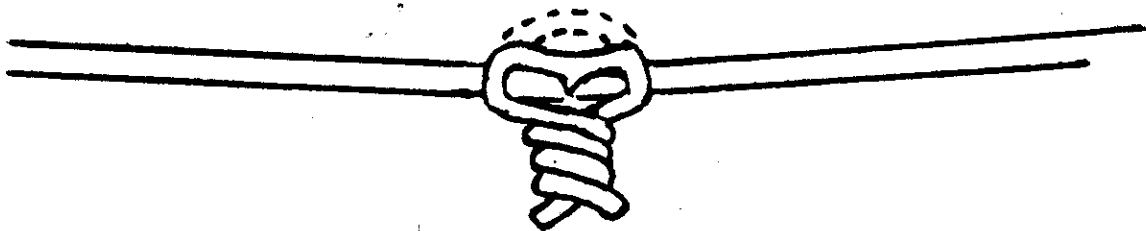
- STAGE 13 Close gap along keel by twisting wires up tighter.

STAGE 14      Fix transom jig. Nail through scrap piece of ply for easy removal later.

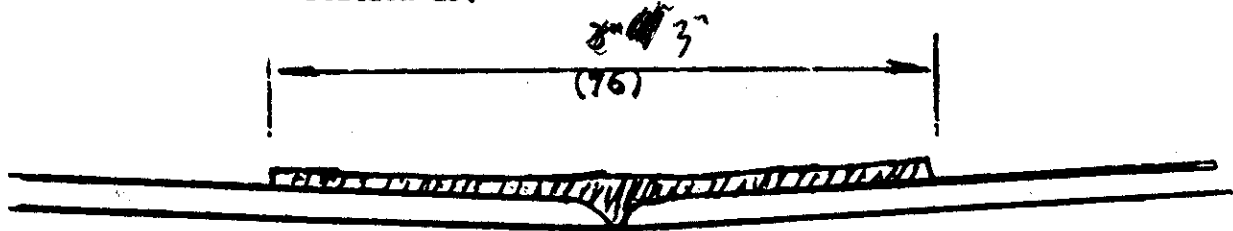
Fig. C. P.1.

STAGE 15      CHECK:  
                 (a) All wires are tight,  
                 (b) Keel edges butt evenly.

STAGE 16      Push wire loops down into vee of keel.  
Do not push them down so hard as to open up keel line again.  
Recheck as for stage 15.



STAGE 17      Cut sufficient 3" (76) wide strips of chopped strand matt to go along inside of keel from transom to station 15.



STAGE 18      Paint 3" (76) wide strip of resin along length of keel to station 15 then follow with chopped strand matt.  
Overlap ends of matt approx. 2" (50).  
Saturate with resin, being careful not to spread or drip resin away from strip as this will cause hard spots in the ply when wrapping hull up.  
Paint just sufficient resin up into bow from station 15 to glue bow together.

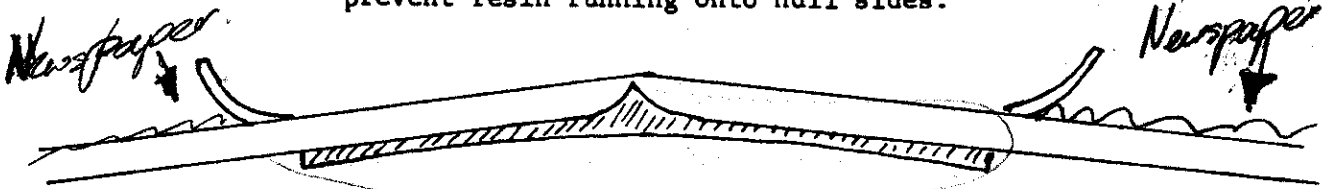
ALL TO SET AND HARDEN

While f/glass hardens:  
~~Mark and cut out bulkheads~~

STAGE 19      Roll hull over and cut wire off on outside of hulls.  
Trim flush, remove excess resin and round off keel and bow by sanding.  
Use approx. 1/8" (3) radius when rounding bows as much less will create problems when glassing in following steps.

STAGE 20

Apply masking tape 1-3/4" (45) from keel along both sides of keel and up bow.  
Curl outer edges of tape up to form a gutter so as to prevent resin running onto hull sides.



STAGE 21

Paint resin along keel between tapes.  
Follow with first layer of 2" (50) tape, offset 1/2" (13) to one side of keel. Tape all along keel and up bow.  
Apply second 2" (50) tape offset 1/2" (13) on opposite side of keel.  
Apply third layer along centreline of keel and up bow.  
Saturate with resin.



STAGE 22

Remove masking tape, roll hull over and allow to set and harden (cure) for 24 hours.

IMPORTANT: PROCEED WITH STAGES 23 - 30 WITHIN 24 HOURS AFTER CURING TIME.

If the fibreglass is left cure any longer than 48 hours, the f/glass along the keel becomes too brittle and there is the possibility of the ply cracking along the f/glass line when wrapping up in stage 24.

WHILE F/GLASS CURES:  
See C/B case construction.

STAGE 23

Remove transom jig and spreader from hulls.

STAGE 24

Starting near transom place stout cords around hulls at approx. 4' (1300) intervals.  
Gradually tighten cords until hull will fit into building jig.

IMPORTANT: Fit hull into jig bow first and work back to transom.

Fig. DE. P.2.

STAGE 25

Untie cords individually and replace them around hull and jig.

Fig. E. P.2.

STAGE 26

Roll unit over carefully and support at suitable working height. Clamp hull to jig. One at bow and two near transom.

Fit clamps under gunwhales and over jig stiffeners.

Cut ply wedge, glue and clamp into bow.

Before tightening clamps make sure hull is pushed as far forward into jig as possible.

Fig. F. P.2.

STAGE 27

Check level across top of hull and jig.

Check for twist, i.e. centerline of transom and bow vertical with plumb line.

Fig. G. P.2.

STAGE 28

Mark back 14' (38) from stern and cut gunwhales away to allow transom to lay forward at top. *optional. 0 - 1 1/2"*

Fig. H. P.2.

STAGE 29

Place transom in position and pencil around fore and aft edges of transom.

Remove transom, apply glue liberally around between pencil marks on hull.

Replace transom on glue line and clamp firmly in position till glue sets.

Fit and glue length of 2" x 1" (50 x 25) across top of transom.

Fig. H. P.2.

F/Glass around inside of transom after glue sets.

STAGE 30

*see p.8.*

Position and fit all bulkheads except Nos. 6, 7, 8. Fibreglass bulkheads in using 2" (50) F/G tape.

IMPORTANT: Fibreglass on forward sides of bulkhead 5 and 9 and rear sides of remaining bulkheads.

BULKHEADS 5 and 9 must be exactly at right angles to C/L of hull.

Make sure gunwhales are glued or glassed to top of bulkheads.

STAGE 31

Cut sufficient strips of chopped strand matt to go from station 15 up into bow.

Make sure bow is straight.

Stand unit (hull and jig) on end, pour liberal amount of resin into bow then work chopped strand into bow using long piece of scrap ply.

Pack plenty of matt saturated with resin into bow.

Allow resin to jell before returning unit to horizontal.

# STAGE 32

Fit beam mounting blocks.

Fit 1-7/8" x 1-7/8" (48 x 48) hardwood blocks to rear sides of Nos. 5 and 9 bulkheads.

Blocks have to be recessed on ends to fit under gunwhales.

Blocks have to be horizontal across top of hull, flush with top of gunwhales and at Right Angles with C/L of hull.

Scribe C/L along length of upper surface of block. Glue and fix in position.

Fig. J. P.2.

see p. 9.

Fit beam/support blocks.

Fit 1-7/8" x 1-7/8" (48 x 48) softwood blocks to both sides of hardwood mounting blocks.

Support blocks protrude 1/2" (32) above gunwhales. Glue and clamp into position.

Fig. K. P.2.

Place piece of mast section on end of blocks and pencil around section on to block. Main beam track faces aft and rear beam track faces forward.

IMPORTANT: ON MAIN BEAM C/L of mast section has to align with C/L on hardwood mounting blocks.

Shape blocks to accept beam.

Fig. K. P.2.

# STAGE 35

Fit centreboard case:

Place case in position with rear end of case 48.5" (1276) from inside of transom.

Lay a pencil flat on the keel and scribe a line on the ends of C/B case, to give angle the bottom of case has to be machined away.

Remove and shape bottom of case till it fits on keel neatly.

Case has to match V of hull as well as the rocker (keel curve).

# STAGE 36

Place case in position and pencil a line on keel around bottom of case. Fit No. 8 bulkhead in position against back of case.

Remove case and place scrap piece of 1" x 1-1/16" (25 x 27) spacer inside case about 2" (50) from bottom to stop case bowing in during following stages.

# STAGE 37

Drill two 3/32" (2) holes exactly through C/L (joint) in keel approx. 2" (5) in from each end of C/B case position making sure holes are drilled vertical.

Jamb a sharpened match or piece of wire in each hole to protrude above matting in next stage by approx. 1" (25). These are used for aligning bottom of case with keel.

(a) Cut two pieces of chopped strand matt to overlap marked area by approx. 1" (25) all around. Place matt in position, really saturate with liberal amounts of resin and then place case in position with rear end of C/B case against No. 8 bulkhead. ~~CHECK~~ rear end of case is still 49.5" (1260) from transom. Fibreglass bulkhead 8 to hull using 2" (50) tape.

(b) Check alignment with keel. Hold a light beneath keel and check alignment by sighting keel through top of case. Natches or wire should be exactly on centreline of bottom of case.

(c) Place two scrap pieces of ply approx. 2" (50) wide across top of C/B case. Nail ends of ply to gunwhales.

Fib. M. P.3.

(d) Run string line from bow to centre of transom. Check top of case for alignment with string line.

(e) Check alignment of bottom of case and keel again, ALLOW TO SET AND HARDEN.

STAGE 39 Seal around bottom of C/B case with extra fibreglass if considered necessary.

STAGE 40 Place piece of 1" x 1-1/16" (25 x 27) spacer along inside of top of case. Fit bulkheads 6 and 7. Glass in with 2" (50) tape.

STAGE 41 Fit and glue 2 pieces 6" x 4" x 4mm ply (150 x 100 x 4 ply) reinforcing for main chainplate in front of bulkhead 6 with top edge hard under gunwhale. Layer of F/G can be used over reinforcing to give even further strength.  
REMEMBER: There is only one main chainplate for each hull which goes on outer most side of hulls.

STAGE 42 Fit and glue reinforcing block for front chainplate to forward side of No. 2 bulkhead.  
REMEMBER: Front chainplate fits on opposite side of hull to main chain plate.  
Fig. L. P.2.

STAGE 43 Remove hull from jig.  
Deck curve template across hull at each bulkhead position. Rest template against face of bulkheads for approx. 1" (25) each side of bulkhead, chisel gunwhale away till it conforms with deck curve template. Then pencil a line around template onto bulkheads.

STAGE 44 Trim top of bulkheads to conform with pencil line. Trim gunwhales to match angle chiselled away at bulkhead position. Check with deck curve template. From No. 2 bulkhead forward deck curve is gradually reduced for easier fixing of deck.



- STAGE 45      Fit and glue top stringers to C/B case.  
Stringers run from bulkhead 9 to softwood block at main beam landing.  
Recess out bulkhead and softwood blocks to accept end of stringers.  
Trim top of C/B case.  
  
Fib. DD. P.5.
- STAGE 46      Glue a block . . between top C/B case stringers at rear of case.  
Block is for securing screws on C/B downhaul jamb cleat.
- STAGE 47      Place front chainplate in position and, allowing for thickness of decking drill mounting holes in side of hull only.  
Place main chainplate in position allowing for thickness for decking and drill mounting holes.
- STAGE 48      ~~Paint or varnish inside of hull avoiding surfaces where deck will be glued on.~~  
*Use botte cote.*
- STAGE 49      Roll hull over to cut centreboard slot in keel.  
Measure back along keel 72" (1803) from transom.  
Drill 3/8" (10) hole making sure it is inside the C/B case.  
Finish off with rasp or sandpaper.
- STAGE 50      Saturate end grains of ply around slot with paint or varnish that will be used for finishing hull.  
Sand and feather out edges of F/G strip along keel to make ready for painting.
- STAGE 51      Roll hull over again.  
Slide scrap piece of 1" x 1-1/16" (25 x 27) spacer into top of C/B case to stop sides bowing in when nailing on deck.  
Glue and nail deck pieces to hull.  
Owing to the curve in deck boat nails are recommended as ordinary copper nails tend to pull away.
- STAGE 52      Trim edges of deck and beam landings.  
Radius gunwhales slightly and finish with F/G tape.
- STAGE 53      Cut out top C/B case slot using same procedure as for Stage 49.

Cut holes for inspection ports, jib lead track and rudder pintles.

55

Cut main and rear beam to length.

**IMPORTANT:** IF USING COMALCO E5308 SECTION OR EQUIVALENT FOR BEAMS plane down a piece of 1" x 2 1/2" x 9 1/2" (25 x 57 x 2794) timber so as it is a neat push fit into beam.

Cut one length 6'10" (2082) long and press it through length of MAIN beam.

Cut remaining timber into two 14" (355) lengths and press into each end of REAR beam.

If using heavier sectioned beam, 14" (355) lengths of timber are fitted only in ends of both main and rear beams.

*use 1/2" φ alum tube as spacers for bolts.*

STAGE 56

Determine centre of beam and then measure and mark 34" (863.5) each way from centre. This gives C/L position of hulls when set up.

Drill 5/16" (8) holes through beam 5" (127) either side of these marks.

STAGE 57

Set up hulls parallel with C/L 68" (1727) apart. Check diagonals are equal (i.e. from tip of bow on left hull to C/L of transom on right hull and vice versa).

Place beams in position and again check C/L and diagonals.

Drill 5/16" (8) holes down through beam into beam mounting blocks on hulls.

**IMPORTANT:** Keep checking C/L and diagonals of hulls till all 8 holes are drilled.

Bolt hulls together.

STAGE 58

Cut centre beam to length.

Cut and shape ends of centre beam to match main and rear beams.

Centre beam needs to be a neat press fit between main and rear beam.

Fig. P. P.3.

STAGE 59

*see p. 11.*  
~~Dismantle beam from hulls and fabricate mast step box section.~~

Fig. QT. P.3.

STAGE 60

Cut dolphin striker rod to length.

Bend around dolphin striker jig and have ends welded together.

Fig. R. P.3.

STAGE 61

Slide box section to centre of main beam.  
Place nylon sheaves on two 5/16" (8) mounting bolts.  
Push bolts into inner most holes on main beam.  
Place dolphin striker rod around ~~nylon~~ <sup>metal</sup> sheaves and under dolphin striker.

Fig. V.

P.3.

STAGE 62

Paint or varnish hulls as required.

STAGE 63

BOLT MAIN BEAM AND DOLPHIN STRIKER ASSY. TO HULLS.  
Locate centre beam into 2" (50) hole in rear of box.  
Place rear beam in position on end of centre beam and bolt rear beam to hulls.  
Make sure box and centre beam are exactly in centre.

STAGE 64

Using strong screwdriver or bar ease rear beam track open on either side and as close as possible to centre beam.  
This is to allow bolt rope in rear end of trampoline to be fed around centre beam.  
File and sand paper off any sharp edges or burrs.

STAGE 65

Attach fittings and rig boat.