Integral Rear Bulkhead

Europa Aviation Ltd

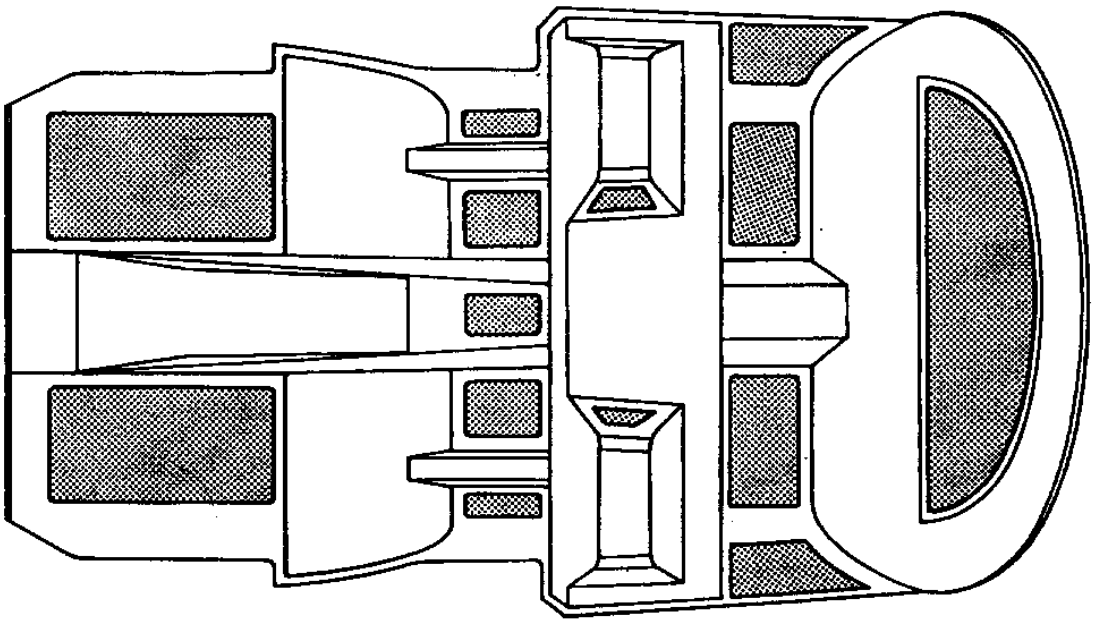


Fig 2. Top view of cockpit module.

This diagram should be compared with the diagram on page 11.2 of the present manual. The installation procedure described on page 17.6 is correct. Instructions for reinforcing the joint between the bulkhead and the top moulding (Page 23M-9 and 23T-6) are correct.

Step 2

Mounting bolt holes.

Mark the hole centres for the two master cylinder mounting bolts onto the starboard side of the cockpit module wheel well and drill two holes right through no larger than 5mm.
See figure 2.

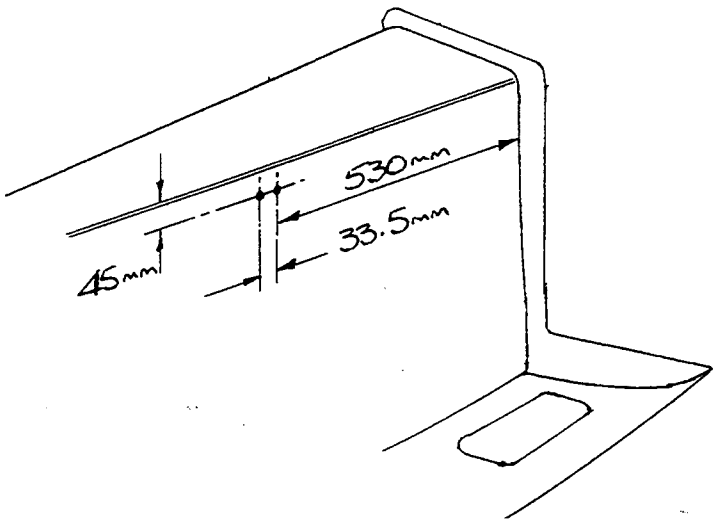


Fig 2. Dimensions for brake master cylinder mounting holes.

Step 3

Reinforcement insert.

Mark the inside skin of the cockpit module wheel well with a rectangle measuring 65mm x 25mm, positioned relative to the holes as shown in figure 3.

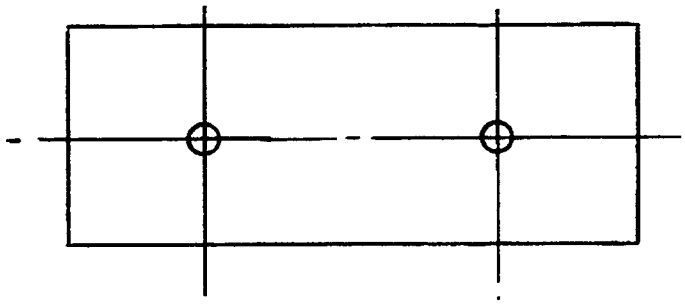


Fig 3. Position of plywood insert relative to holes.

Cut away the *inner skin* and foam, leaving the outer skin intact, then make a piece of 3mm plywood to fit in the recess.

Scuff sand the surrounding skin then bond in the insert with flox, laying up over it, with 2 plies of 'bid' at +/- 45°, lapping 1cm onto the skin. Cover with peel ply and allow it to cure.

Step 4

The master cylinder is to be mounted with the lever at the front, requiring a pull to operate the brake.

Make a slot through the top of the wheel well to allow the lever through making it long enough to accommodate the lever's full range of movement.

Step 5

Next, cut a hole aft of the slot, directly above where the filler plug will be, to enable easy access to top-up brake fluid. Find a suitable easily removable blanking plug to cover the hole.

Step 6

Before fitting the master cylinder, attach the supplied hose to the elbow fitting. Remove the nut which is on the elbow and discard it, then screw on the hose. The seal is made automatically upon tightening the nut.

Open up the original holes in the cockpit module's wheel well with an 8mm drill then, referring to fig. 1, bolt the master cylinder to the inside surface using the two dome headed 8mm set screws. Place an EUR 012 wide area washer on the screws each side of the wheel well side wall and use two AN960-516 standard washers on each bolt to space the master cylinder away from the structure.

Step 7

Make a handle for the lever as required. A hole is provided if a button type is to be used. A second hole lower down the lever may be drilled if a longer shaft type handle is preferred.

Connection to the slave cylinder, filling with fluid and bleeding air from the system is detailed after fitting the main wheel.

Note: *No parking brake valve is provided but one could be fitted if required.*

If you do choose to fit a parking brake valve it is worth pointing out here a note of caution. A simple valve which can be either on or off should be used with care. If the valve is closed, no amount of pulling on the lever will alter the state of the brake, on or off.

A one way valve, which can be switched on for parking but allow more pressure to reach the brakes when required, is the desirable option.

You may also consider mechanical means of holding the lever to keep the brake applied but do make sure that whichever method you decide on the brake cannot be applied in flight.

17. Bonding cockpit module into fuselage

Before the cockpit module is finally bonded into the lower fuselage, there are a few tasks which require to be carried out whilst you have good access to its underside and the inside of the fuselage bottom moulding.

Access Panels

To enable easy access to the fuel outlet fittings it is desirable to fit access panels in the fuselage floor; this is a requirement in the U.K. The maximum diameter for this hole should be 100mm (4").

Reinforcement plies will need to be laid up around the outside of the hole to bring the structure back to its original strength. (The removable panel is not considered as a load carrying item). One method of making the access hole is as follows:

1. Cover the area where the access panel will be with plastic sheet to act as a release film. Lay-up a "splash" (a thin glassfibre moulding), to be used as a mould to make the panel from, onto the release film - (figure 1).

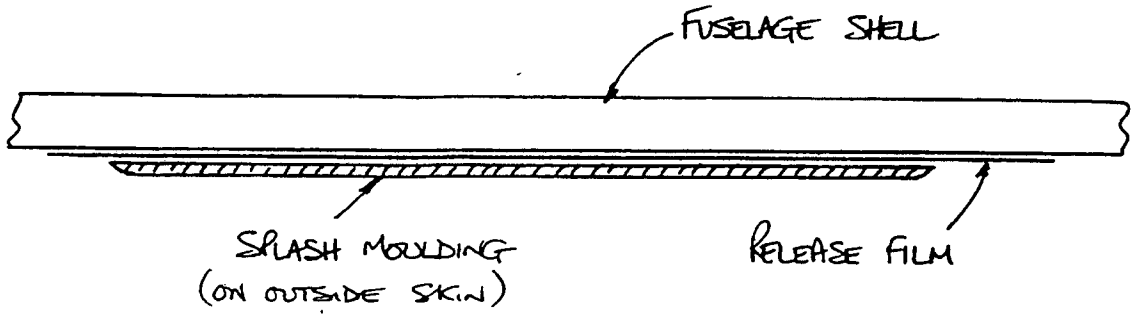


Fig. 1 - Lay-up of 'splash'

2. Cut a hole through the fuselage shell 25mm (1") larger than the desired access hole. The maximum diameter for the access hole should be kept to 100mm (4") - (figure 2).

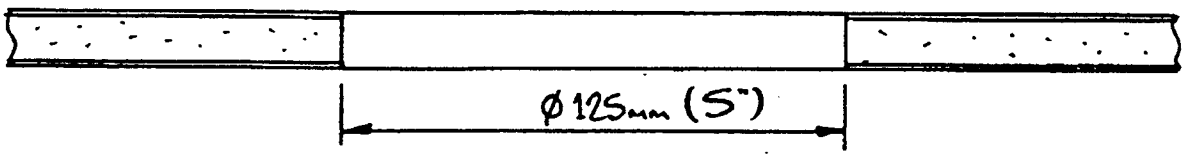


Fig. 2 - Hole cut out

3. Cut the foam core and inside skin back 10 - 15mm (0.4 -0.6") from the hole's edge, then chamfer them back at about 45° - (figure 3).

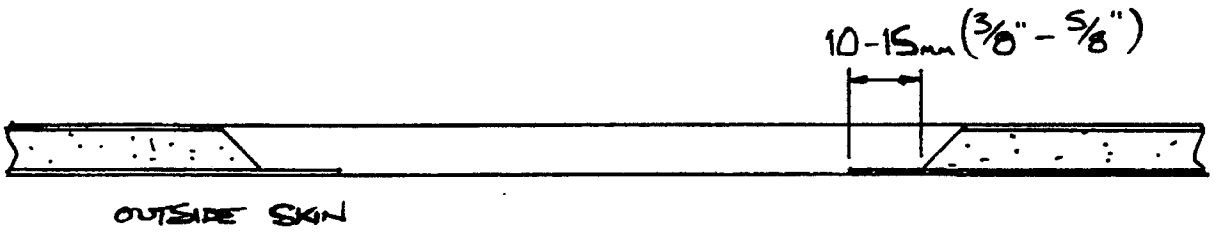


Fig. 3 - Hole chamfer

4. Make a new panel from 2 - 4 plies of 'bid' on the 'splash' mould, and trim to fit the hole.

5. Cover the panel's inside surface with release film or tape, then hold in position in the hole with blobs of rapid epoxy, or hot glue on the outside skin.

6. Lay-up reinforcement plies of 2 plies of 'bid', the second ply being at 45° to the first, around the hole. These plies should lap onto the access panel by about 20 - 30mm (0.8 - 1.2") and be about 20cm (8") in diameter - (figure 4).

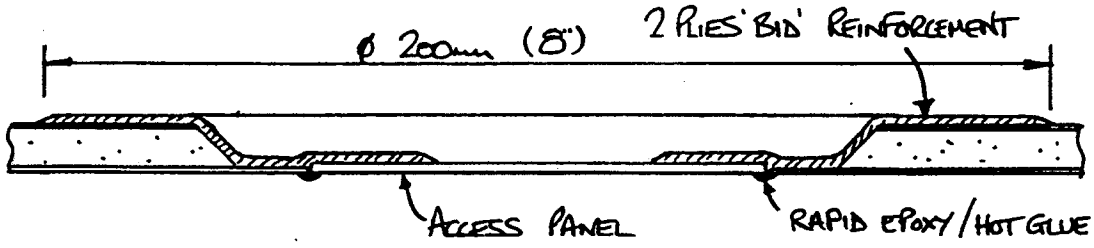


Fig. 4 - Reinforcement

7. After cure, remove the panel and trim the flange around the hole to about 12 - 13mm (1/2") in width - (figure 5).

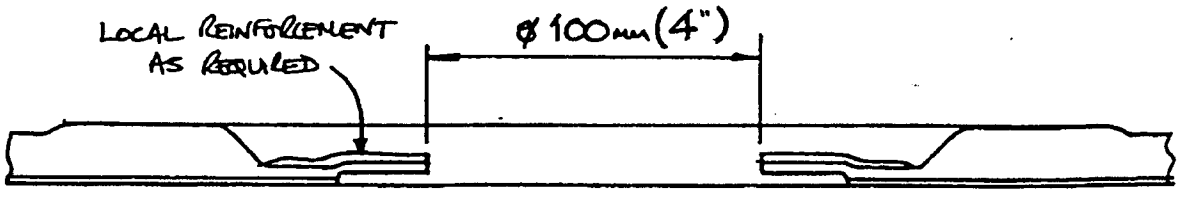


Fig. 5 - Flange trimming

8. Attachment of the panel can be with silicone RTV, screws or clips as desired.

Fuel Filler

Fuel System unique to the “Classic”

Fuel Filler

Cut out a hole 63mm (2.5”) in diameter centred in the circular rebate on the top of the fuselage

Push back the foam between the skins; this gap will be filled with flox later. Scuff sand the uderside of the fuel filler receptacle’s flange and also the flange of the fuselage in preparation for bonding. Apply a Redux / flox mixture between the skins around the fuel filler recepticla opening then bond the receptacle in place, aligning it so the cap opening lever will fold backwards. Push the filler hose onto the boss of the filler cap and, through a hole in the baggage bay rear bulkhead, onto the boss of the fuel tank. Clamp the hose at each end using hose clamps.

Fuel selector valve

See present manual.

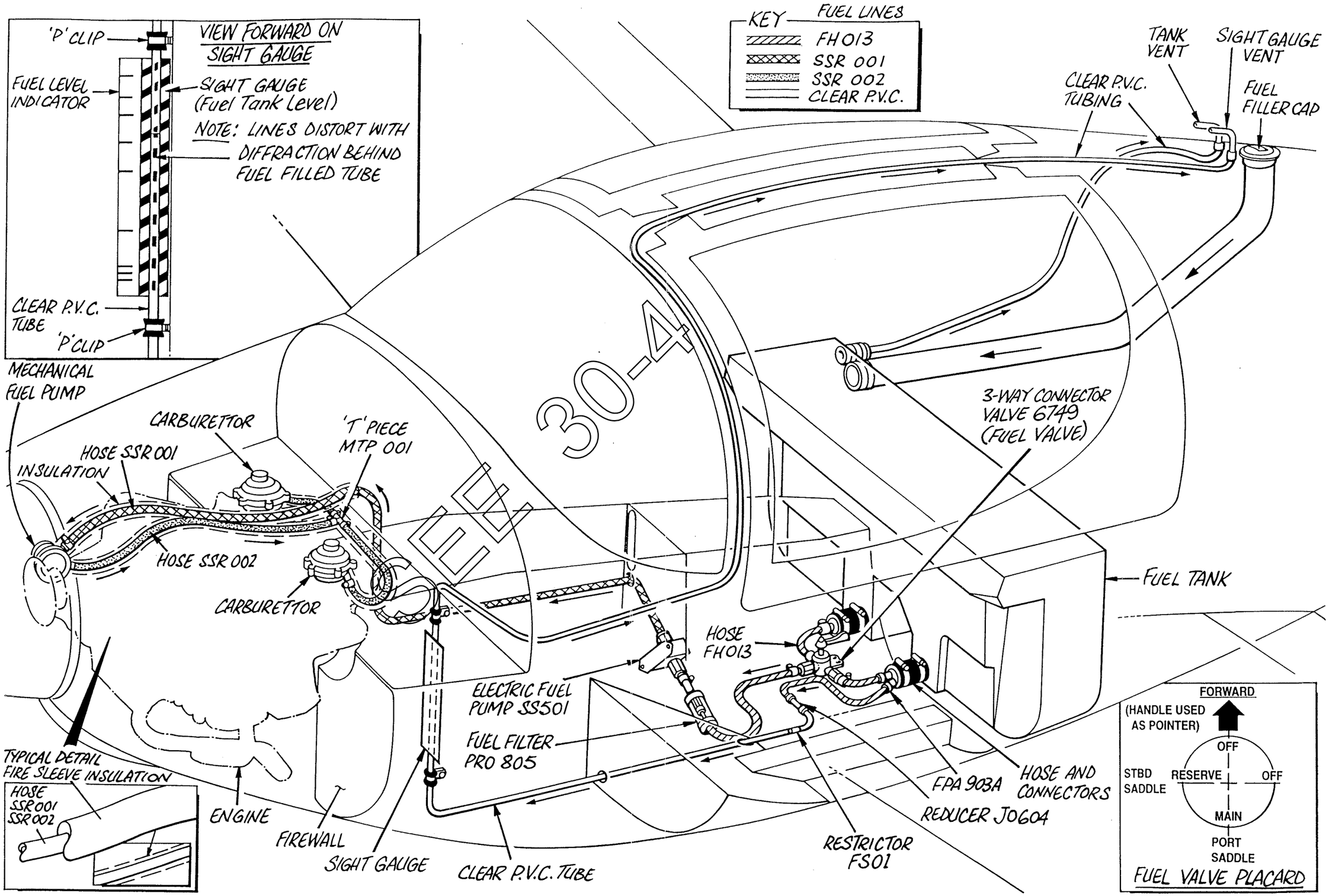
Access to operate the valve is through the opening in the central tunnel just forward of the seat back line so check also that its final position is suitable for this.

Make a block from two pieces of 13mm (1/2”) thick plywood to space the selector valve’s mounting lug from the fuselage floor. Drill two ¼” diameter holes through the upper piece to enable the mounting bolts to pass through and hollow out the lower piece for the bolt heads. Fit two AN4-10A bolts through the upper block, flox the heads in, and glue both halves together.

With the desire position of the valve established, scuff sand the floor and bond the plywood block in place with 5 minute epoxy mixed with flox. Having protected the bolt threads from epoxy contamination, layup 2 plies of ‘bid’ over the block, leaving the bolts proud, and lapping onto the fuselage floor by about 3-4cm (1/2”)

After cure fit three FPA904/A unions to the selector valve. Fit the valve to the mount, using two MS21042-3 stiffnuts.

The general layout is shown on the diagram E7-3 below. See page 30-4 of the present manual for the correct detailed layout including the dual filters.



ROTAX ENGINE
FUEL SYSTEM

2. FIN

Overview

The fin is probably the most straightforward part of your Europa to build so it's best that we start our aeroplane construction careers here.

You will shape the foam fin tip and then layup the skins either side separately to produce your fin. It's as simple as that.

The skills practiced on constructing the fin will make more involved layups easier, however, you'll find none of them difficult.

Foam core preparation

Step 1

Place your fin core on a level bench still in its foam jig block with the other piece removed to reveal the slots in the foam surface. Make sure it's snugly located in the jig block.

You'll notice that the core is quite flexible, due to the slots in its surface so, to make it rigid, mix up some rapid epoxy and apply 3 dabs in each slot, as shown in figure 1, placing the dabs about 10cm (4") from the ends and one in the middle. You can use dry micro here if you're not in a hurry to lay up the skin.

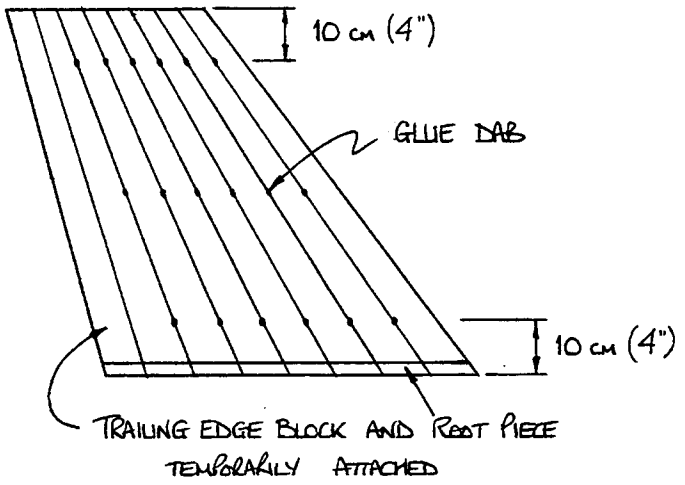


Fig 1. Side view of fin core.

Mask each side of the slot first or you'll need to scrape away any excess from the surface. If you leave blobs proud of the surface you'll end up with bumps in the skin. Leave to cure undisturbed.

Before you put the rapid epoxy away, though, temporarily attach the trailing edge block and the 19mm (3/4") root piece with a few dabs making sure they stay correctly positioned until the adhesive has set. These pieces will be removed later but are necessary to layup the skins on.

Step 2

Find parts of the lightening hole cores that fit snugly in the fin core's tip and cut plugs to about 5cm (2") long except the leading edge one which needs to be about 10cm (4") long. Be careful that you don't use plugs that are too big which will open the slots up. Save a few centimetres of the root of each plug for use later on.

Apply small blobs of rapid epoxy to the fatter end of each plug and push them back inside until they poke out a bit from the tip. Avoid getting epoxy at the tip end as this could create problems when shaping the tip. See fig. 2.

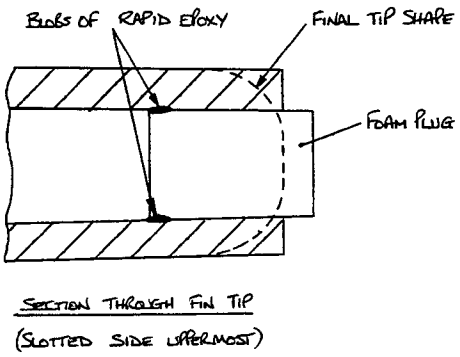


Fig 2. Section through fin tip (slotted side uppermost).

Allow them to cure then sand each plug off flush.

Step 3

With a fine felt tipped pen, which is the best for marking foam with, mark a point 10cm (4") down the leading edge from the tip and another 10cm (4") back along the tip from the leading edge. See fig. 3.

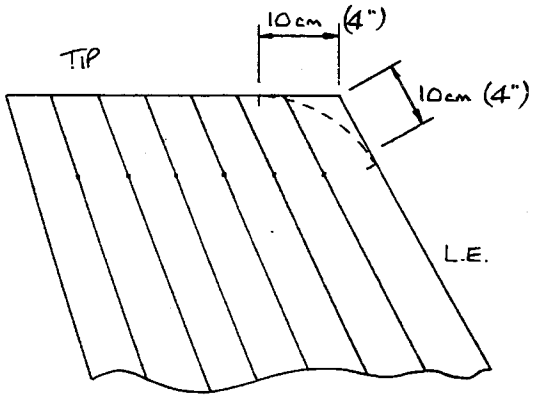


Fig 3. Marking out fin tip shape.

Then mark a curve, by eye, between the two marks and using a hacksaw or surform, remove the foam along your curved line. Next mark a straight line 2.5cm (1") down from and parallel to the fin tip on both sides. Round off the corners of the fin tip with your sanding block, blending them in to the leading edge and making sure the top of the fin remains a straight line.

Cut the leading edge of the jig block back about 75mm (3") to allow access to the other side of the fin leading edge during the first skin layup.

Cut pieces of 'uni' cloth as follows:

1 off full width x 85cm (33")
1 off full width x 130cm (50")
Also cut several 20 - 25cm (8 - 10") lengths of peel ply.

Using double sided tape, small panel pins or nails attach one long strip of peel ply to cover the edge of the 25mm foam root piece and long strips on the trailing edge block up to the cut line. See fig. 4.

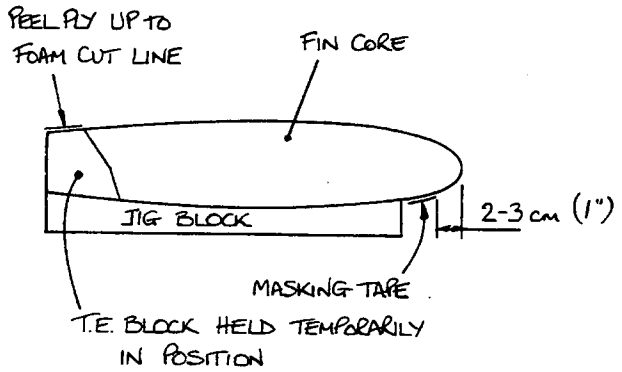


Fig 4. Preparing fin core for the first skin layup.

Stick a strip of masking tape on the underside of the leading edge about 2 - 3cm (1") back to give you a trim reference as in fig. 4. Put masking tape also on the tip as required. The tape can also serve to prevent epoxy running onto the foam core underneath.

You should now get all the necessary tools together for the layup which should take no more than 1 1/2 hours to complete.

First Layup

Step 4

Mix some dry micro and block up the slots and fill any dents in the foam surface. Take care not to get any micro on the peel ply.

Next micro slurry the entire foam surface using a squeegee and remove any excess. This is where some weight can be saved. You cannot take too much slurry off the foam.

If you can scrape some off with a squeegee (without damaging the foam, of course) there was too much on beforehand. Its only purpose here is to fill the broken foam bubbles on the surface and provide a good 'key' for the skin to adhere to.

Don't be tempted to cover the entire surface with peel ply in an attempt to reduce the sanding time later. Applying peel ply will make inspection difficult, and possibly starve the interface between the foam and the skin of resin.

Brush a coat of epoxy onto the foam surface now, wetting out the peel ply, then take the shorter piece of 'uni' and lay it onto the core with the fibres orientated at 90° to the root. See figure 5.

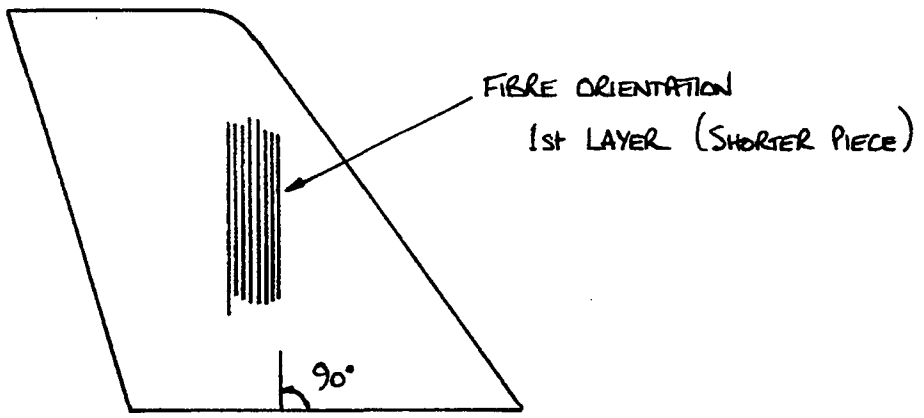


Fig 5. First ply with fibres at 90° to root.

Trim the cloth on the underside of the leading edge just short of the masked line, and the tip about 2 or 3cm (1") beyond the centre line. Trim the root and trailing edge to about 1cm (1/2") o prevent the weight of any excessive overhang causing any bubbles to form. Thoroughly wet out this ply with a squeegee making sure all bubbles under the cloth have been removed. Make sure that the epoxy has wetted beyond the end of the foam core as this will help trimming later.

Now lay the longer piece of 'uni' so that the fibres are orientated parallel to a line between the root leading edge and the tip trailing edge. See figure 6.

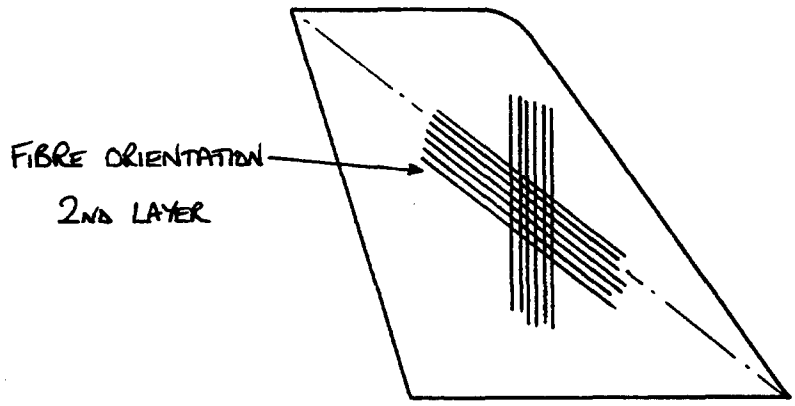


Fig 6. Second ply.

Scissor trim the tip and leading edges to be about 1cm (1/2") shorter than the first ply, to give a gentle transition for the second skin to lap onto later, then wet out and squeegee as before.

Finally remove the masking tape on the leading edge and lay your short strips of peel ply to cover the leading edge and tip, see figure 7, and stipple the epoxy through with a brush. Leave to cure.

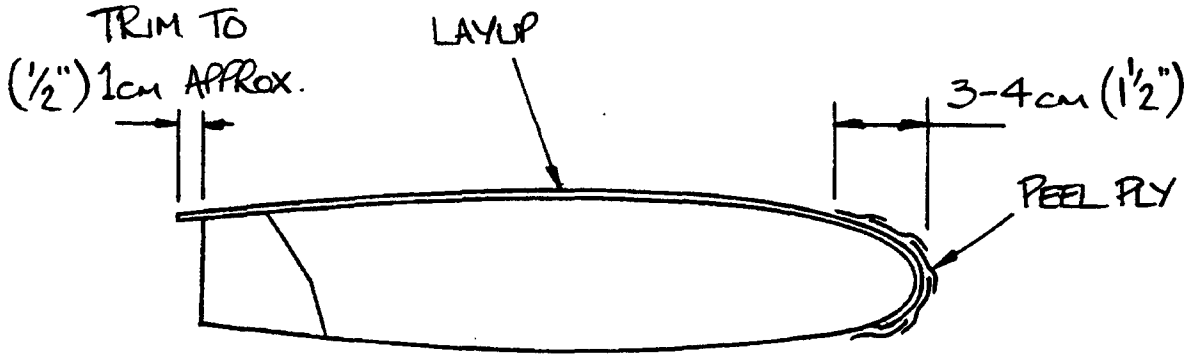


Fig 7. Section through fin (laminate thickness exaggerated).

<u>1st layup summary</u>

-1 ply 90° to root.
-1 ply from L.E. root to T.E. tip.

Step 5

At the appropriate time knife trim the skins at the root and trailing edge back to the foam. After full cure use a sanding block to get the lines nice and straight. Finally, don't forget to tear off the peel ply that's on the outside surface.

Flip the fin over and lay it in the other jig block with the foam side uppermost and carefully sand any bumps off the leading edge and tip, feathering the last 10mm down to allow a smooth transition from foam to laminate - see figure 8. Be careful not to sand into the foam though.

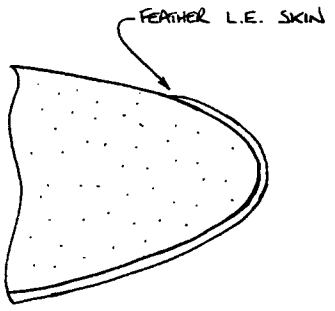


Fig 8. Partial section of leading edge.

Second Layup

Step 6

Attach long strips of peel ply to the 19mm (3/4") wide foam root piece and the trailing edge block as in figure 9, up to the cut line.

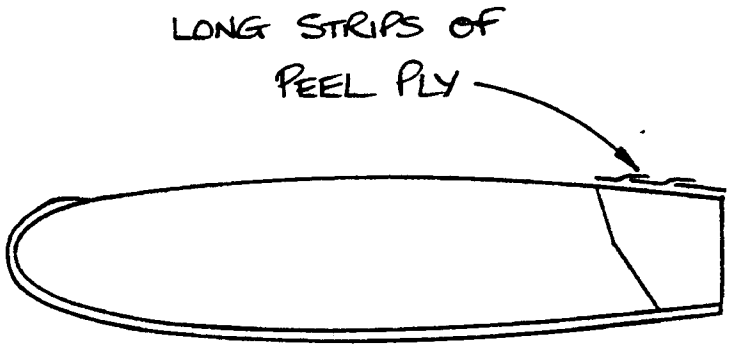


Fig 9. Fin lying in shortened jig block.

Cut pieces of 'uni' as follows:

1 off full width x 85cm (33") long
1 off full width x 130cm (50") long.
and several 20 - 25cm (8 - 10") lengths of peel ply.

Step 7

Dry micro any dents in the core then micro slurry the whole foam surface as before, remembering not to get any onto the peel ply. Brush epoxy on the foam surface, peel ply and over the glass at the tip and leading edge where overlaps will be, then lay your shorter piece of 'uni' at 90° to the root line as in the first layup. Lap this ply over the previous skin and trim to about 2-3cm (1") back from the leading edge, see figure 10, and scissor trim the cloth to overhang about 1cm (1/2") from the trailing edge and root.

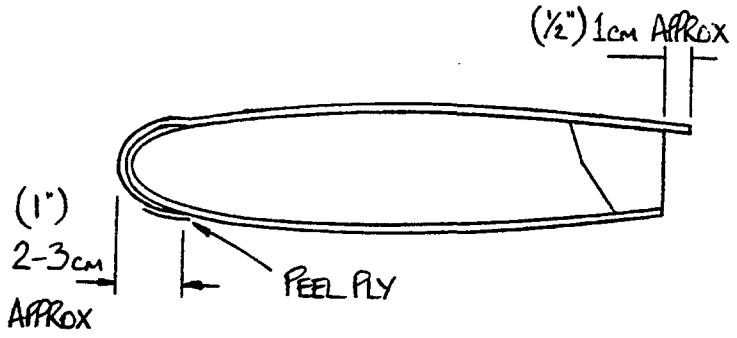


Fig 10. Section showing second ply's overlap.

Wet out this ply and thoroughly squeegee before laying the next ply oriented to the line between tip trailing edge and root leading edge, trimming and wetting out as before. Peel ply the ends of the cloth at the leading edge and tip and allow to cure. At the knife trim stage trim the edges.

2nd layup summary

-1 ply 90° to root.
-1 ply from L.E. root to T.E. tip.

Congratulations, you have now completed your first flying surface.

28. Fin & Rudder Attachment

The fin is to be bonded to the fuselage top moulding permanently. The rudder is attached to the fin via the three hinges using bolts and so is removable as required. A single push-rod, which is connected to the tailwheel steering arm, actuates the rudder. You would be well advised to read the entire chapter through completely before starting work.

Fin attachment

Step 1

Remove the sections of foam in the fin's base and trailing edge to leave the glassfibre flanges exposed then set the fin onto the rear fuselage, locating it with the base flange sitting in the joggle.

Note : *If your fin's base flange is 25mm wide, set the fin on pieces of plywood to raise it sufficiently so that the flange sits in the joggle of the fuselage which is only 19mm wide. Don't trim the fin's flange otherwise the rudder may not fit.*

Using the angle of the rear fuselage as a guide, clamp a long straight edge to the starboard side to aid alignment of the fin. The straight edge should reach the tip.

On the starboard side of the fin, make a mark on the flange near the tip 25mm aft of where the foam core meets the skin. This mark will be used to align the fin on the fuselage and ensure that sufficient flange is left after trimming for the upper hinge.

Position the fin to ensure that the leading edge fairs into the fuselage moulding and that the straight edge lines up with your mark.

Note : *It may be required to tilt the fin forwards or backwards to achieve the required alignment. If this is necessary, ensure the height of the rear shroud is sufficient to allow your rudder to enter. Making the tilting pivot point the fin base trailing edge will help here. The top of the rudder should align with the top of the fin and the bottom of the rudder should fit within the shroud.*

With the correct fin position decided on, mark and trim the bottom flange of the fin as required to fit within the fuselage's joggle. When the fin is properly positioned, drill holes and install clecos through the lower flange to aid relocation.

Step 2

Remove the fin then make a template from paper or card to fit its base and transfer the positions of the lightening holes onto it. Now mark the lightening holes onto the fuselage moulding and cut out the holes to match the fin.

With the fin back in place and located with the clecos, check for any gaps greater than 3mm between the fin base and the fuselage. Cut pieces of plywood shim long enough to equal the fin's base width dimension and place them at the positions between the lightening holes to reduce gaps to 2 or 3 mm. Don't close the gaps completely as a 2 ply 'bid' layup and Redux/flox adhesive will be used to carry out the final fin attachment.

Step 3

Comm radio antenna

No comm radio antenna assembly is provided with the Europa kit as a comm radio is not a necessity in this class of aircraft. However, if a radio is to be fitted, the suggested position for the comm antenna is on the inside of the fin's port side rear flange. A dipole type of antenna, made with 10-16mm (3/8"-5/8") wide copper tape (which is available from most good electrical/electronics component distributors), can be fitted once the fin has been permanently attached, however, it would be sensible to make arrangements for installing the antenna cable, which should be the RG58 type, into the fuselage beforehand.

If required, a complete dipole type antenna kit is available from Europa Aviation. The kit comprises copper tape, RG58 cable, BNC connector, ferrite torroids and shrink wrap tubing.

The total length of the fitted antenna will be approximately 1m (40") long and the cable attaches at its centre, so it can run underneath the fin base.

Drill a hole, large enough for the cable to pass through, in the rear bulkhead near the base of the fin. Provision to support the cable between the rear bulkhead and the fin trailing edge could be added now. Arrange this so that the cable will exit near to the fin's port side trailing edge flange. Details of the antenna may be found in annex C.

Step 4

Bonding the fin to the fuselage

Remove any peel-ply from the fin root flanges or, if none was used, scuff sand the insides of the flanges in preparation for bonding.

Layup 2 plies of 'bid' at +/- 45^{o} to the fin chord line into the fin's base, lapping onto the flange sides. Scissor trim the cloth close to the flange edges and cover the flanges and areas between the lightening holes with peel ply and allow to cure. At the appropriate time, knife trim the cloth covering the lightening holes.

Step 5

Firstly, remove any peel ply still attached to the fin base.

If they are required, bond the plywood shims in place on the fuselage using Redux 420 with flox. Next, generously coat the area of the fuselage where the fin will sit with Redux 420 and flox.

Set the fin in position, locating it with rivets in the cleco holes, and make a final check of its position with the straight edge.

Check that the fin is not leaning and that the rear shroud flanges are straight from the fin tip to fuselage bottom then allow to cure.

After cure, trim the rear flanges to be a straight line, removing the *minimum amount* from the fuselage to clean up the rough edges. Use the fuselage rear edges as a guide as much as possible.

Step 6

Rudder attachment

Mark out and drill the rudder hinges, with 3.3mm (1/8") holes initially for clecos, according to figure 1.

Hold the rudder in place against the fin and mark the positions for the rudder hinges on the fin's starboard flange. File the flange away locally to allow clearance for the hinge pivot and then, with the rudder again in position with the fin drill through the flange with a 3.3mm drill using the holes in the hinge as a guide. Mount the rudder to the fin with a cleco in each hinge.

The rudder will be free to pivot fully to starboard but the port flange of the fin and fuselage will require trimming forwards to enable the full 30° of rudder movement required to port.

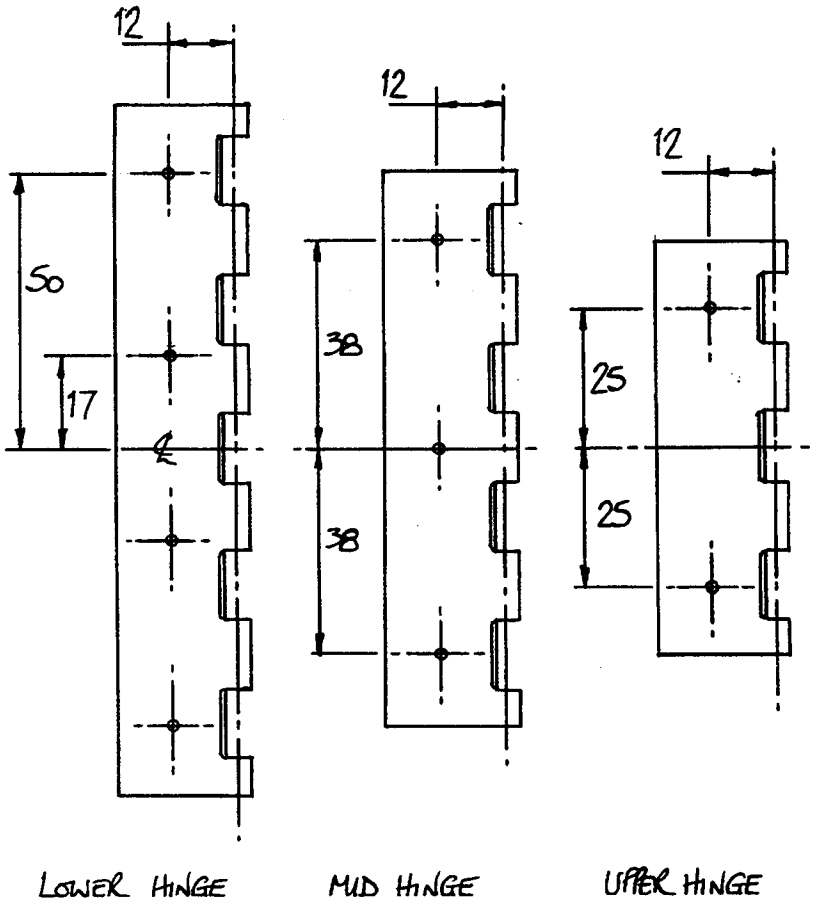


Fig 1. Rudder hinge bolt attachment hole locations.

As the rudder hinge line is angled to the vertical, the rudder will rise relative to the fin as it rotates to port and the leading edge portion of the rudder tip will require sanding to provide clearance for the rudder under the fin's shroud. This reshaping will remove the skin locally and reveal the foam core. Sand sufficient material away for clearance allowing for 2 plies of 'bid', filler and paint then round off any resulting sharp edges to enable the cloth to cover the exposed foam easily.

If, when at 30° port, any part of the rudder's leading edge comes into contact with the foam still exposed at the rear of the fin, make the slight 'vee' shape in the rear face deeper to allow free movement, allowing for 2 plies of 'bid'. Do not remove foam adjacent to the hinge flange, this flange should be as narrow as possible to provide maximum strength but still allow the hinges to be mounted Make sure that the flange does not flex when checking for clearance, giving the false impression of more clearance than you actually have.

Once the required rudder movement can be achieved, with additional clearance, scuff sand the skin surrounding the exposed foam at the tip of the rudder then layup 2 plies of 'bid' over it, lapping about 1cm (½") onto the skin all around.

When you are happy with the rudder's position on the fin and 30° +2°/-0° of movement is achievable port and starboard, enlarge the holes for the mounting screws with a 4.8 mm drill through both fin flange and hinge. Remove the rudder and attach MS21047-3 anchor nuts to the hinge with TAPK 33BS rivets, countersinking the hinge to allow the rivets to be flush. AN525-10R8 bolts can now be used to attach the rudder.

Step 7

Push-rod attachment socket

Cut out the leading edge of the rudder at the position shown in figure 2 and hollow out sufficient foam to accept the push-rod fitting CS29. The sectional view shows how the socket should be positioned. Temporarily bond CS29 into the rudder with small blobs of rapid epoxy in the position indicated.

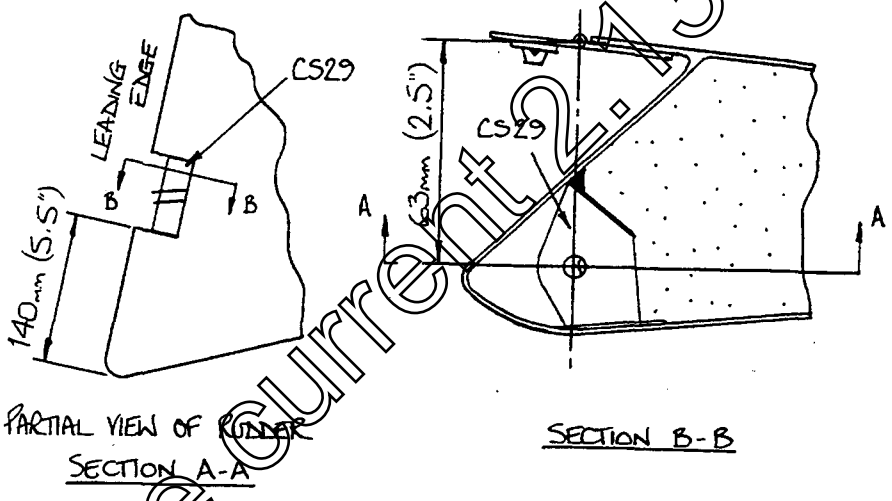


Fig 2. Rudder push-rod fitting position.

Step 8

Rudder push-rod

The rudder push-rod is made from the 54.5cm (21.5") long 1/2" diameter steel tube, however this length may need to be reduced. For now attach one end fitting only to the tube using two AN470-AD4-10 rivets according to figure 3.

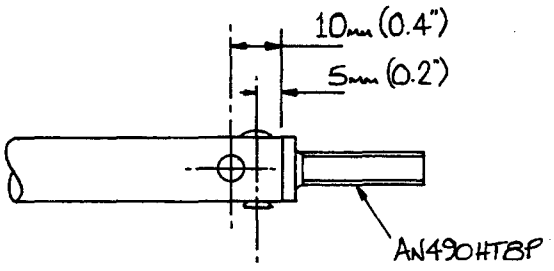


Fig.3 Rivet hole position in rudder push-rod.

Screw on the rod-end and check nut and attach the push-rod to the tailwheel steering arm as shown in figure 4.

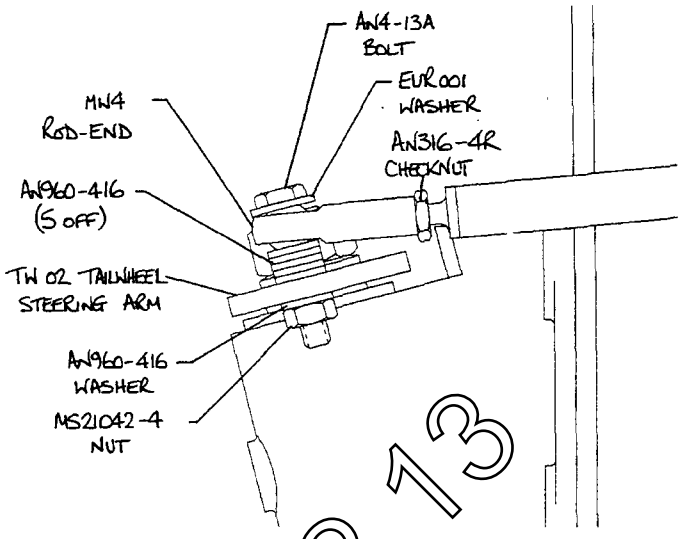


Fig 4. Push-rod attachment to tailwheel steering arm.

Screw the AN490HT8P end fitting and rod-end which will connect to the rudder together and, using an AN4-10A bolt to locate the assembly in the rudder push-rod fitting, slide the end fitting into the open end of the push-rod. Align the tailwheel in the longitudinal axis and check if the rudder can also be aligned. Shorten the push-rod tube as required then rivet the end fitting in place as at the opposite end.

Now check that, with the tailwheel swivelling to each extreme (making sure that the steering arm contacts the stops), the rudder travels 30° +2°/-0° to both port and starboard. If less than 30° movement is achieved, relocate the rudder push-rod fitting in towards the hinge centre until the full travel is obtained. Make a plywood shim as necessary to fill the space between the port side rudder skin and the socket side plate. If differential movement port and starboard is present, the fitting will require repositioning fore or aft to correct it.

Step 9

Having established that the push-rod socket will fit in the cavity, remove it then make a flox corner all around the cut edge of the rudder's skin and layup 2 plies of 'bid' to cover all of the exposed foam finally covering the whole area in peel ply before allowing it to cure.

After cure, remove the peel ply then re-set the socket back in place using small blobs of rapid epoxy, checking again that the full 30° port and starboard movement is achievable.

Next, apply flox around the socket edges, filling any gaps, then layup 2 plies of 'bid' running over the side plates above and below the parallel rod-end attachment plates and onto the previous layup, then allow to cure. See figure 5.

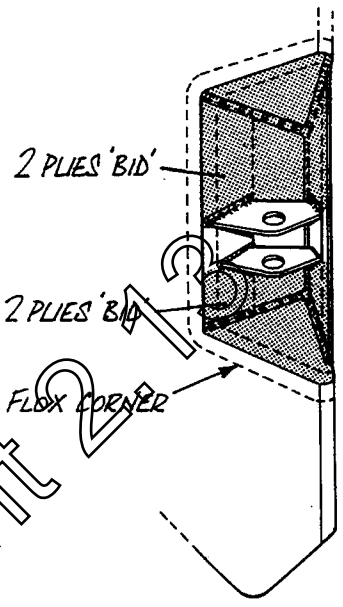


Fig 5. Layup in rudder leading edge.

Step 10

After cure, drill three 3.3mm (1/8") diameter holes through the rudder skin and the outer plate of CS29 and install three TLPD429BS pop rivets as shown in figure 6.

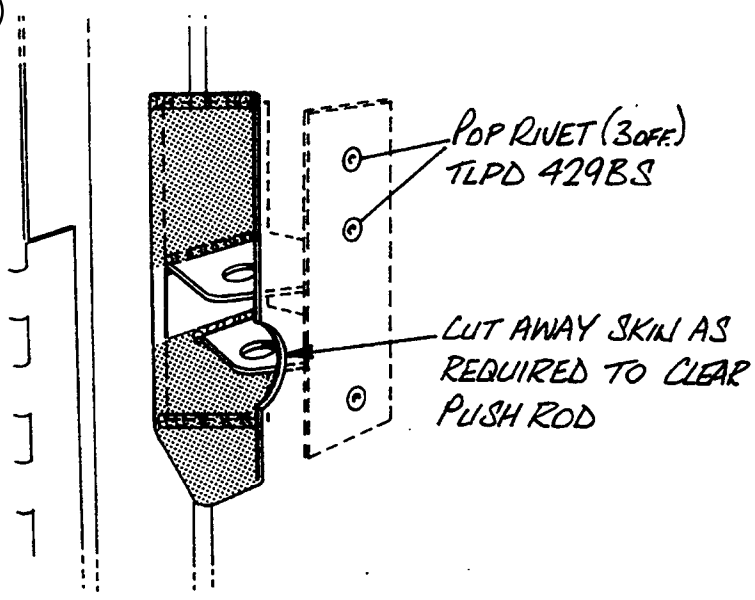


Fig 6. Rivet and push-rod clearance cut away positions.

Fin trailing edge close-out

Step 11

It is very unlikely at this stage that, when viewed from the rear, the flanges of the fin and fuselage upper and lower mouldings will be straight from base to tip. However it is important that they are straight so, before further work for the close-out is done, some support must be provided.

Straight edges of seasoned timber, or even metal box section, approximately 25mm x 25mm (1" x 1"), should be temporarily bonded to the outsides of the flanges to keep them absolutely straight. Using several small dabs of bondo will ensure good adhesion but enable their removal with a sharp tap. Hold the straight edges to the flanges with clamps until the bondo has cured.

Step 12

Cut a piece of 3mm thick plywood to shape to fit in the rear fuselage and continue the line of the foam of the fin's rear face. Make sure that it is possible for the rudder to swing 30° to port then make and position a triangular sectioned strip of foam on to the plywood against the starboard flange to match the fin rear face. This will ensure the lower portion of the starboard flange is kept as narrow as it is on the fin. See figure 7.

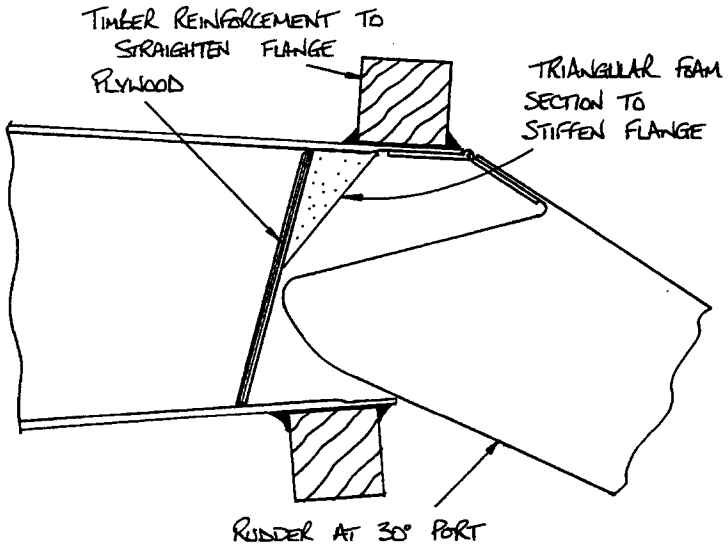


Fig 7. Section through rear fuselage below fin.

Cut a hole in the plywood for the rudder push-rod, allowing for its movement during operation. Ensure that there is adequate clearance all around the push-rod. It is permissible to enlarge this aperture to a maximum of 10cm (4") in height to enable access to the pitch trim servo nuts. The aperture should be no closer to the side flanges than 2cm (3/4").

Step 13

Paint the forward side of the plywood with epoxy to seal it then bond it in position with flox. Either allow the flox to cure to hold the plywood in position first, or use rapid epoxy blobs to stop it moving. Using dry micro bond in the strip of triangular section foam then, referring to figure 8, layup 1 ply of 'bid' at +/-45° on the foam and plywood, lapping onto the rudder shroud flanges.
Next, make 2 ply tapes of 'uni' 50mm (2") wide and lay them, with the fibres running parallel to the fin's trailing edge, on the flanges and running onto the rear close-out face. These plies add lateral stiffness to the fin.

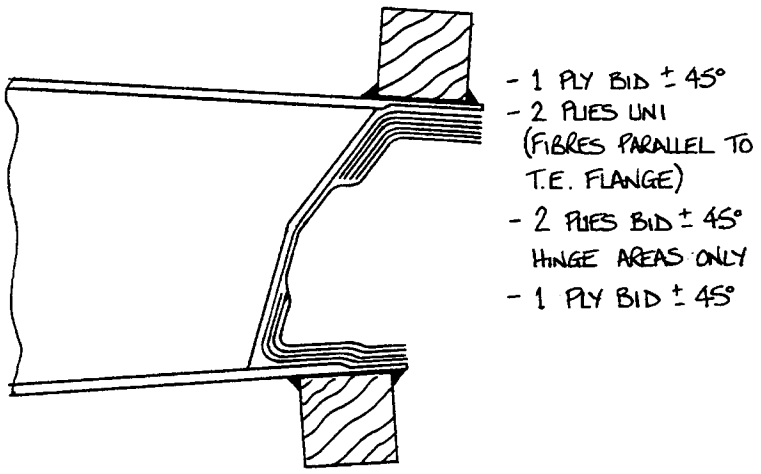


Fig 8. Diagram of fin trailing edge close-out layup.

For hinge reinforcement, lay 2 plies of 'bid' at +/- 45° locally where the hinges attach, each ply being 50mm (2") longer than each hinge and running from the flange and onto the close-out face at least 25mm (1").

Finally, layup 1 ply of 'bid' at +/- 45° over the entire close-out and flanges and allow to cure. After cure, trim the flanges and drill the holes for the rudder attachment bolts then attach the rudder.

Note: *It may be easier to connect the rudder push-rod to the rudder before bolting up the hinges.*

Secure the push-rod to the rudder inserting the AN4-10A bolt from the top of the socket with an AN960-416L washer each side of the rod-end and another washer under the MS21042-4 nut.

Adjust the push-rod length to align the rudder with the tailwheel in the neutral position and make a final check that the push-rod does not come into contact with either of the bulkheads or the tailwheel main fitting at any point during its travel then tighten the check nuts.

Finally, put the tailplanes in place and hold the control column fully forward. Operating the rudder will cause it to contact the anti-servo tabs so material will need removing from their inboard trailing edge corner. Sand the tabs until you have about 6mm (1/4") of clearance between the tab root and the rudder when the rudder is at its maximum deflection. If you have exposed the tab's foam core in obtaining the clearance, dig out the foam to a depth of about 6mm (1/4") and fill the cavity with flox to tie the top and bottom skins back together.

Step 14.

Drainage holes

To ensure that no water can collect in the bottom of the fuselage it is necessary to drill drainage holes. Two holes will be required - one immediately in front of the the rear fuselage close-out bulkhead, and one in front of the tailwheel bulkhead. The holes should be 1/4" diameter, and the exposed foam edges should be sealed with flox to prevent water ingress between the fuselage skins.