4. Anti-servo / trim tab

Overview

Each anti-servo / trim tab is made up of upper and lower skins, tip, and root rib.

The trailing edge has a Flettner strip already moulded into it. (For more information on the purpose of Flettner strips, please refer to the Owner's Manual, section 7).

The four parts are to be bonded together on a flat surface in one operation.

Preparation

Put the top and bottom skins of a pair of tabs together to identify the bond surfaces, then scuff sand these areas on each skin with 80 grit abrasive paper. Do similarly with the ribs, noting that the flanges are oriented away from the centre to enable trimming to fit, and a visual check on bond integrity.

The root rib's flanges align with the edge of the tab's skin, such that the web will be at 90° to the hinge flange. Its position is important, as the drive pin which interfaces with a part on the fuselage, will be attached later.

Note: The lower skin incorporates the leading edge. This skin overlaps the upper skin at the trailing edge (Flettner strip).

Bonding

The sequence of assembly of the tab is first to bond in both ribs, followed by the upper skin. Holding the parts together in the correct relative position can be achieved by using Clecos, but several clamps will be required.

When you are ready, mix 140g of Araldite 420 (100g paste and 40g hardener) and add flox to it to stop it running.

Root rib

Place the lower skin (the one with the leading edge shape) onto a flat surface with the Flettner strip just over the edge. Apply a 10mm (3/8") bead of the adhesive mix around the root rib where it will contact the lower skin, then push it into place, scraping away any excess adhesive as you do so. Align the edge of the rib's flange with the skin, checking that the rib's web is at 90° to the hinge flange.

Tip rib

Installation of the tip rib is essentially similar to that of the root rib, the location not being quite so critical, however. The rib should rest against the foam core of the skin, with a nominal 13mm (½") of bond contact.

Upper skin

Now apply a bead of adhesive to the exposed flanges of the ribs, the hinge flange, and the inside vertical edge of the Flettner strip.

Align the root end of the skin with the root rib, and place the upper skin onto the lower skin. Arrange the Flettner strip part of the upper skin inside that of the lower skin. Press the skin into place, scraping away any excess adhesive.

Clamp all along the hinge flange, and also the root ribs, top and bottom.

If you need to use Clecos, drill through with a 3.3mm (1/8") drill, and remember to coat them lightly with grease so that they don't get stuck.

Note: *Be careful not to drill in the areas where the hinges will go - refer to the next section in this chapter.*

As with the tailplanes, the hollow tabs need to be vented to atmosphere. Drill a 3.3mm (1/8") hole into the tip end of the Flettner strip, or through the tip rib near the trailing edge.

Fill any gaps around the ribs with adhesive, then leave to cure.

Attaching the hinges

The hinges will be attached to the tabs and tailplanes with bolts.

Cut 2 lengths of MS20001-3 hinge 100mm (4") long and 2 lengths 75mm (3") long. As with the rudder always cut your hinge wire separately and about 15mm (½") longer than the hinge allowing for safetying the wire by bending each end and always cut halfway through a lug so the ends are well supported. See figure 1.

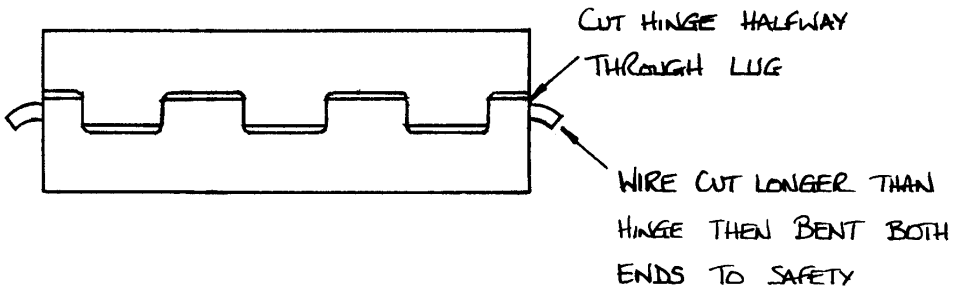

Fig 1. Typical hinge safety technique.

Mark the hinge positions and cutouts onto the outside skin of your tab on the upper surface as in figure 2.

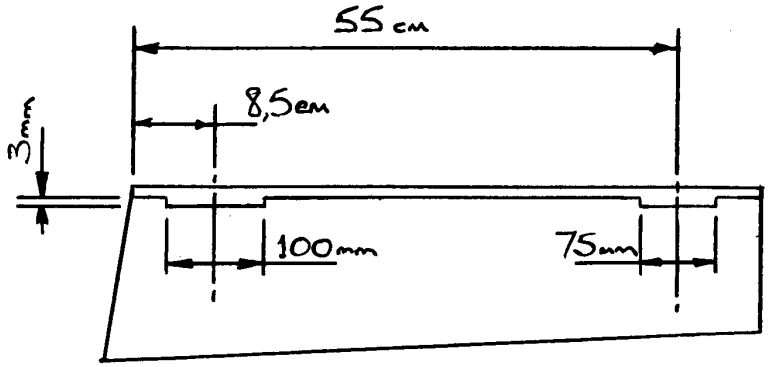

Fig 2. Hinge cutout locations.

Cut these areas away then sand the corners off to about 45° to allow room for the hinge wire. See figure 3.

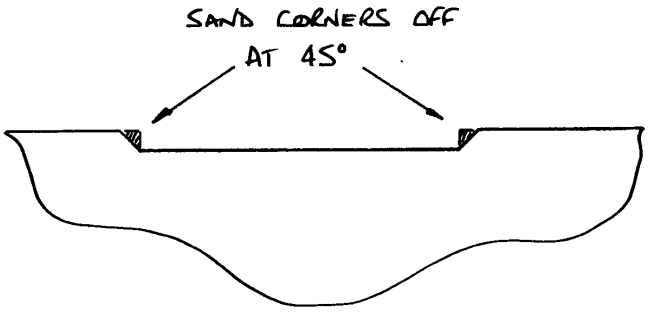

Fig 3. Typical hinge cutout.

Mark the hole centres for the bolts as in figure 4.

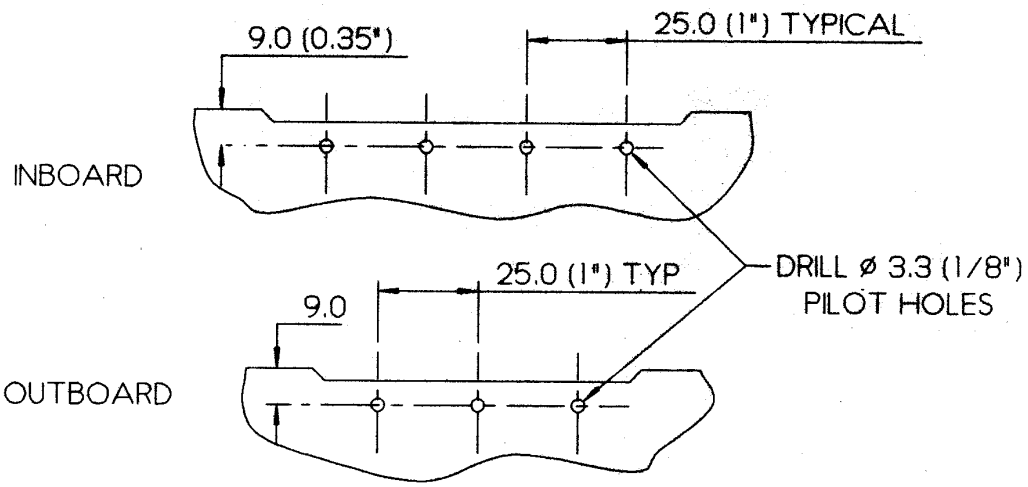

Fig 4. Hole centre dimensions.

Clamp the hinges to a straight edge of sufficient length making sure they are in line with each other, as in figure 5, and in their relevant positions.

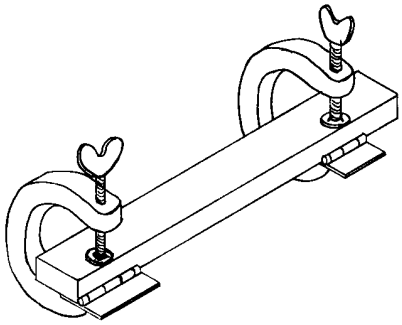

Fig 5. Hinges clamped to straight edge.

Offer the hinges up to the tab slots to ensure they fit snugly. You may have to make some minor adjustments to the cutouts with your sanding block to enable the hinges to fit properly.

When you are happy with the fit hold the hinges in position with their flaps against the glassfibre and drill through with a 3.3mm drill. Use a Cleco to hold the hinge in place then drill the other hinge in a similar manner. With one Cleco in each hinge drill the remaining holes inserting extra Clecos as you go to hold them firmly.

Now position the tab in its correct place relative to the tailplane, lining up the root and tip areas. Cut out the hinge slots in the tailplane as in the tab. Sand the corners of the slots away at about 45° and adjust them until the hinges will fit.

Mark the positions of the bolt hole centres as in figure 4.

Drill through the glassfibre only at first with a 3.3mm pilot drill then hold the tab in place and drill one hole through each of the hinge flaps. Use Clecos to hold the hinges in place, then drill the remaining holes out to 4.8mm. Hold the hinges in place with an AN525-10R8 screw and an MS 21042-3 nut in each, then carefully open the remaining holes out to 4.8mm.

Remove the tab and get rid of any swarf and burrs before replacing it.

Tab drive pins

In this step you will bond the drive pins TP16P and TP16S to the tailplanes' anti-servo/trim tabs.

Remove the tab from one tailplane only and make the template as detailed in figure 6 from alloy or plywood. Non critical dimensions are not shown.

Due to inevitable built-in differences between port and starboard tailplanes one tab drive pin should be set up using the template and the other pin aligned to the installed pin in a second operation. Firstly, drill a few holes through the plates of the drive pins to aid bonding and make them lighter.

Cut away the flange locally to clear the TP16 drive pin.

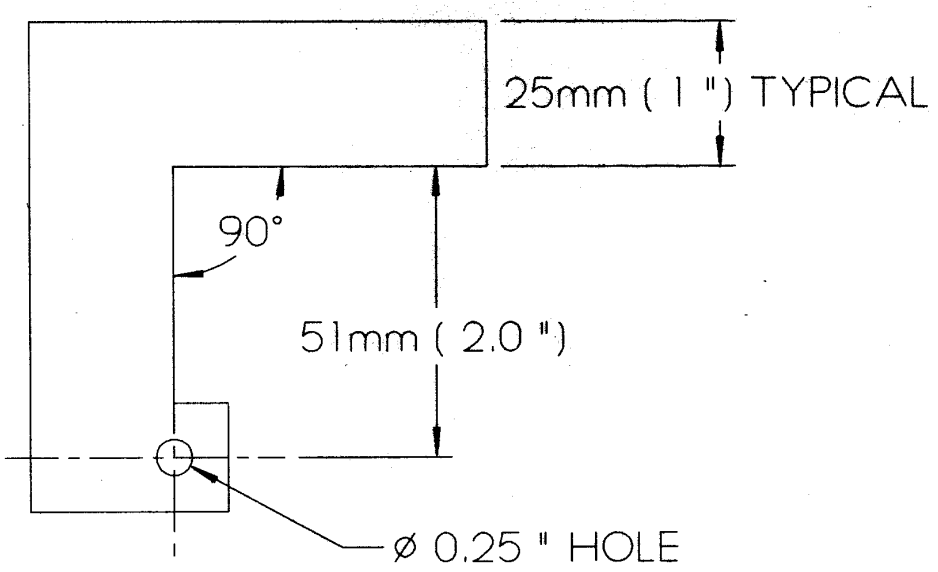

Fig 6. Tab drive pin setting template - not to scale

Referring to figures 7 and 8, and using your template, align the drive pin TP16P or TP16S so that the pin is in line with the hinges. Allow the flox to squeeze through the holes to give a good key then cover the plate with peel ply then allow to cure ensuring alignment is not disturbed.

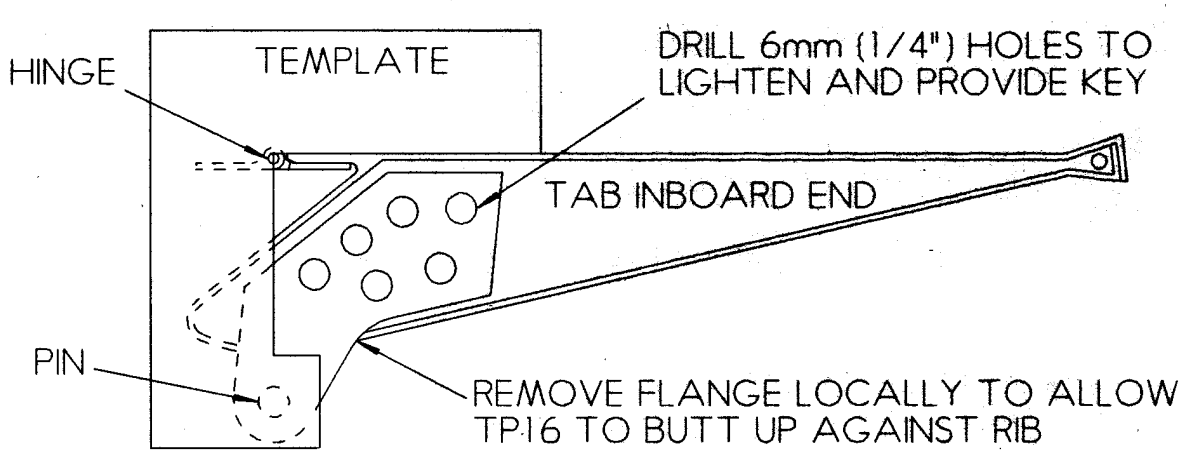

Fig 7. Positioning drive pin in root of tab.

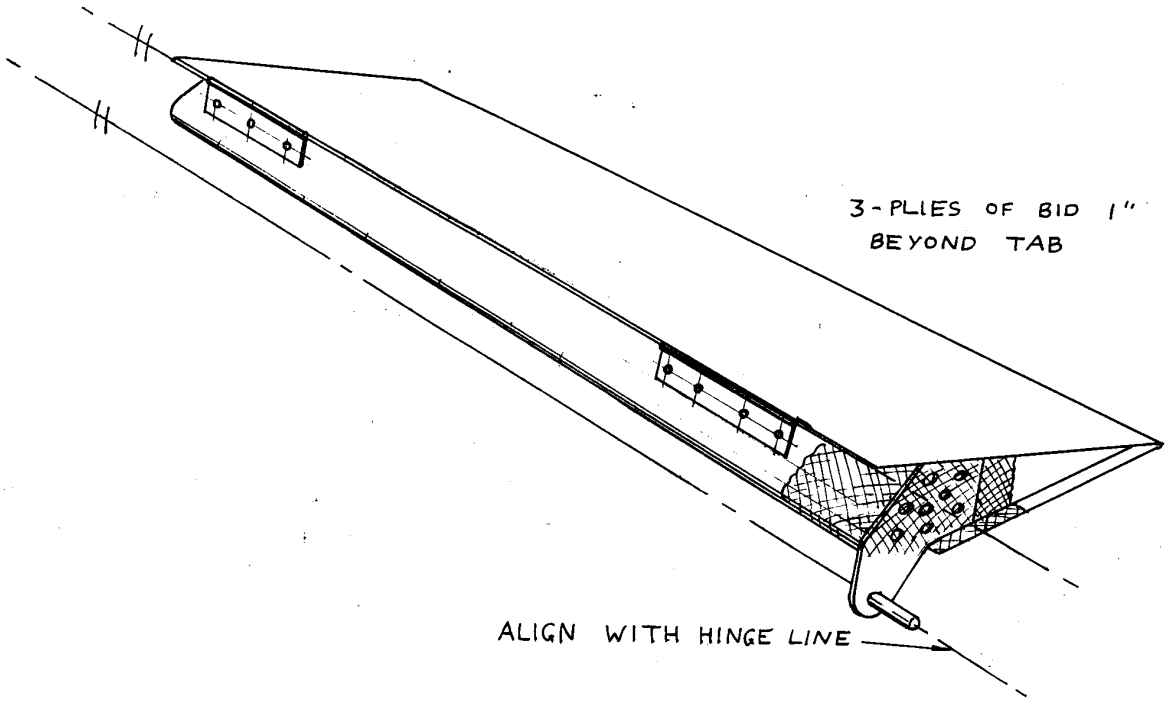

Fig 8. Tab with drive pin attached.

Remove the peel ply, then layup 3 plies of 'bid' at +/- 45° over the TP16, extending this layup around the leading edge of the tab and the top and bottom flanges then peel ply all the edges.

Note: *Apply flox around the plate's edges to avoid air bubbles.*

To attach the second drive pin re-install the tab you removed onto its tailplane, then disassemble the torque tube assembly and put both tailplanes together on your torque tube, pushing them together so the tab drive pin ends are as close as they can be to each other. Ensuring that the tailplanes and tabs are at the same angles of incidence to each other, install the second drive pin to the tab with flox then, using a short piece of 1/4" bore tube or one of the TS06 bushes to link both pins, align the second pin to the first and allow to fully cure before separating the tailplanes to do the layup over the plate as before.

Note: *Label all the parts of the torque-tube assembly including notes on orientation to each other part so re-assembly is straightforward.*