

4.1 Horizontal Stabilizer

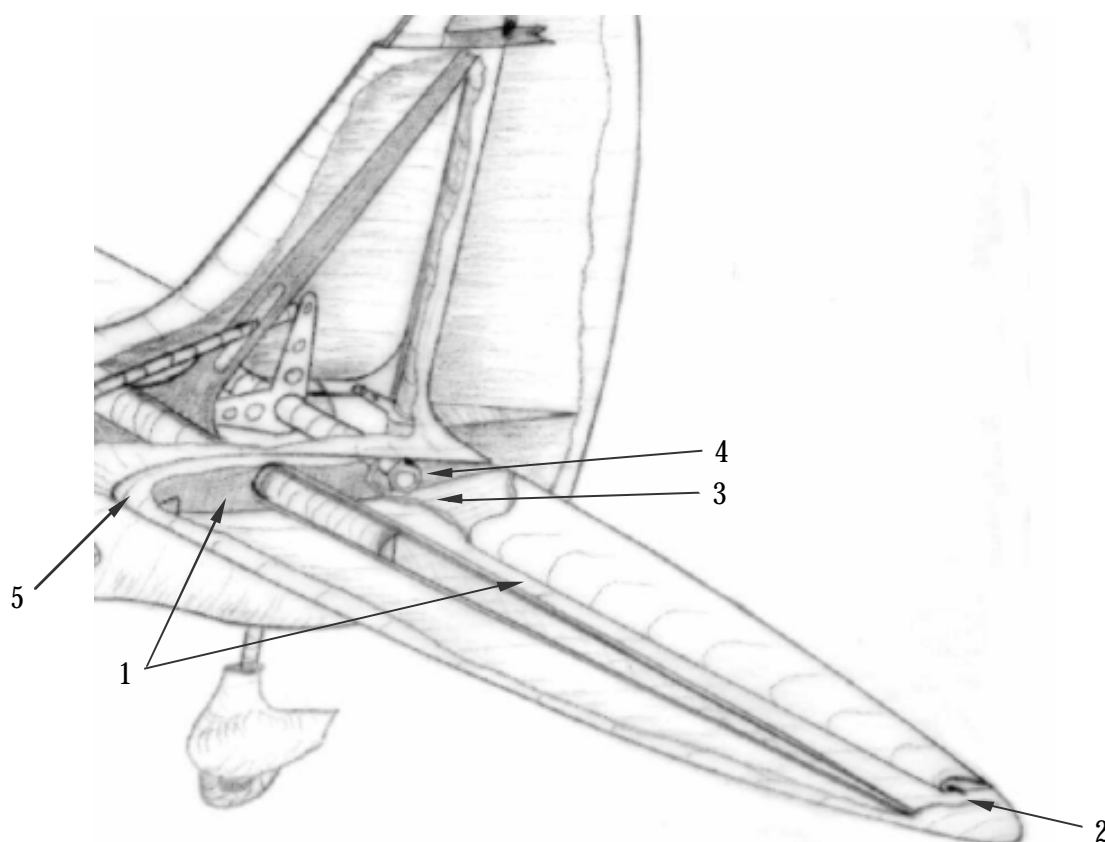
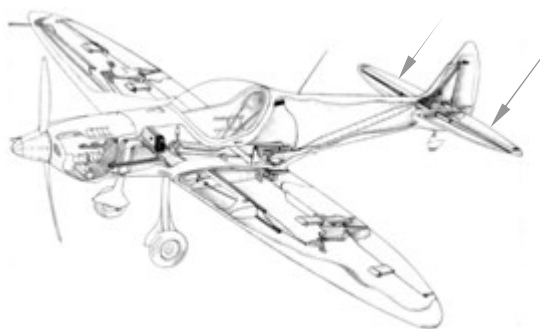
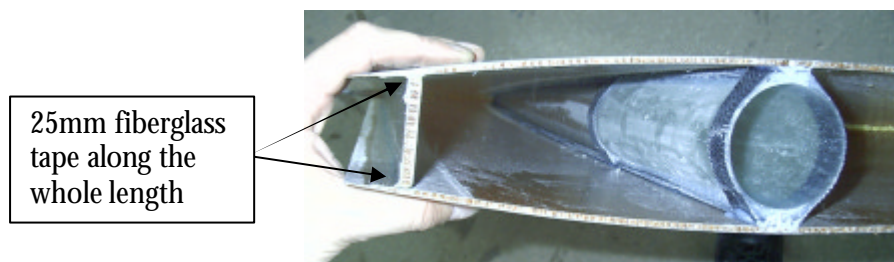


Fig. 4.1.1
Assembling the horizontal
stabilizer, overview

- 4.1.1 Installing the root ribs and laminating the seams
- 4.1.2 Inserting the outer hinge pin and the self-aligning bearing into the fin
- 4.1.3 Installing the elevator supports
- 4.1.4 Installing the fiberglass hexagon tube and the main rib into the elevator
- 4.1.5 Installing the plain bearing for the front elevator torsion tube



4.1.1 Installing the Root Ribs and Laminating the Seams

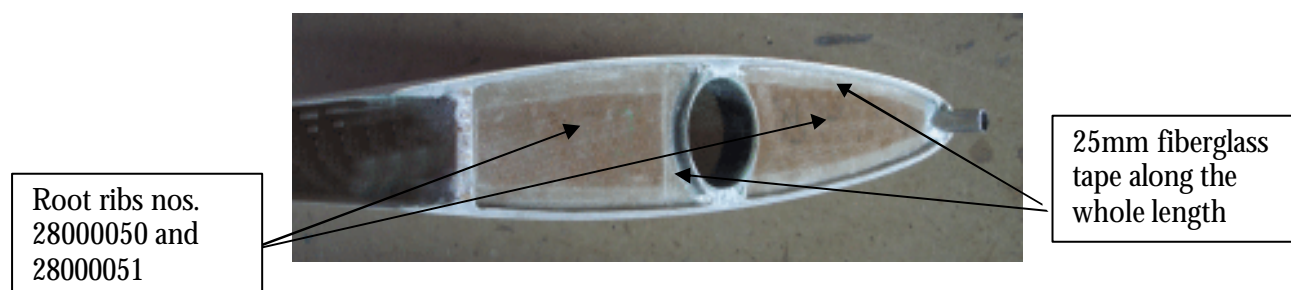


25mm fiberglass tape along the whole length

Fig. 4.1.1.1
Laminating the rear tail unit spar

Note: Compare the contour of the stabilizer shells with that of the receiving part on the fuselage after fixing the ribs. You can make slight corrections to the shell shape by bonding the ribs.

- Fix the root ribs nos. 28000050 and 28000051 with super glue at a distance of 10mm (0.39") parallel to root of the horizontal stabilizer. Then laminate all joints with 25-mm-wide (0.98") fiberglass tape.

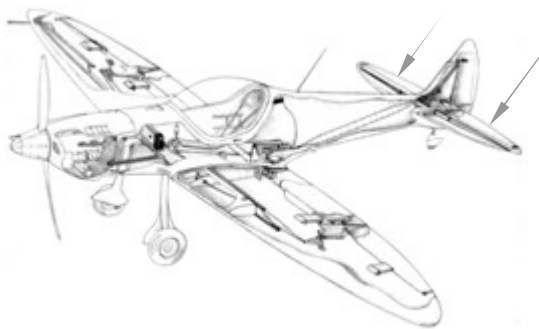


Root ribs nos. 28000050 and 28000051

25mm fiberglass tape along the whole length



Fig. 4.1.1.2
Laminating the root ribs with fiberglass tape



4.1.2 Inserting the Outboard Hinge Pin and the Self-Aligning Bearing into the Fin

- Degrease and roughen hinge pin no. 40610154; mask one side along a length of 15mm (0.59").
- Insert and bond hinge pin no. 40610154 with CF at a distance of 5mm (0.20") parallel to the leading edge of the elevator, as shown in figure 4.1.2.1. The hinge pin projects by 15mm (0.59").

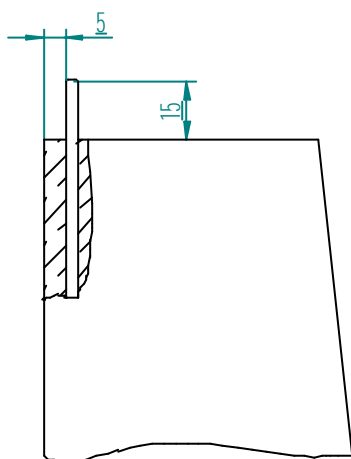


Fig. 4.1.2.1
Inserting and bonding
the outboard hinge pin

Note: The pin must be completely enclosed by CF inside the elevator.

- Roughen the outer black ring of self-aligning bearing no. 48000047 with coarse sanding paper and then push it onto the pin until it touches the elevator.

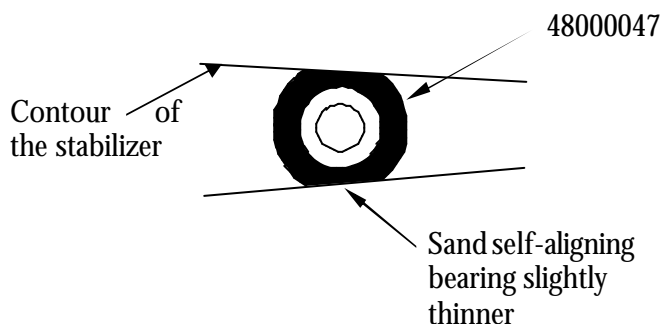
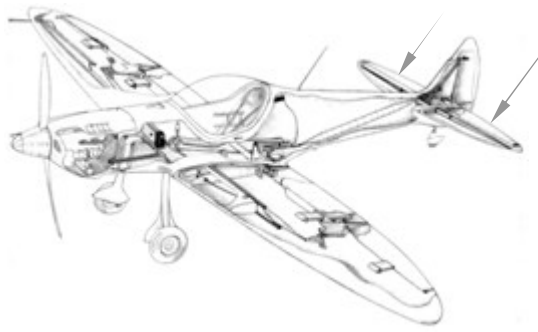
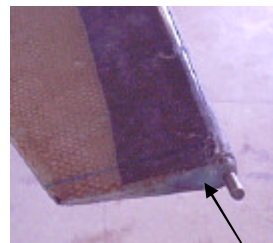


Fig. 4.1.2.2
Fitting self-aligning bearing
no. 48000047 into the
horizontal stabilizer



- Fix the bearing with 5-minute epoxy resin in the tip of the stabilizer, as shown in figure 4.1.2.2. Align the edges of elevator and stabilizer. The gap between the two parts should be at least 2mm (0.08"), see figure 4.1.2.4.
- Separate elevator and stabilizer carefully and fill self-aligning bearing no. 48000047 with cotton resin mix as shown in figures 4.1.2.3 and 4.1.2.4.



CF

Fig. 4.1.2.3
Outboard elevator bearing

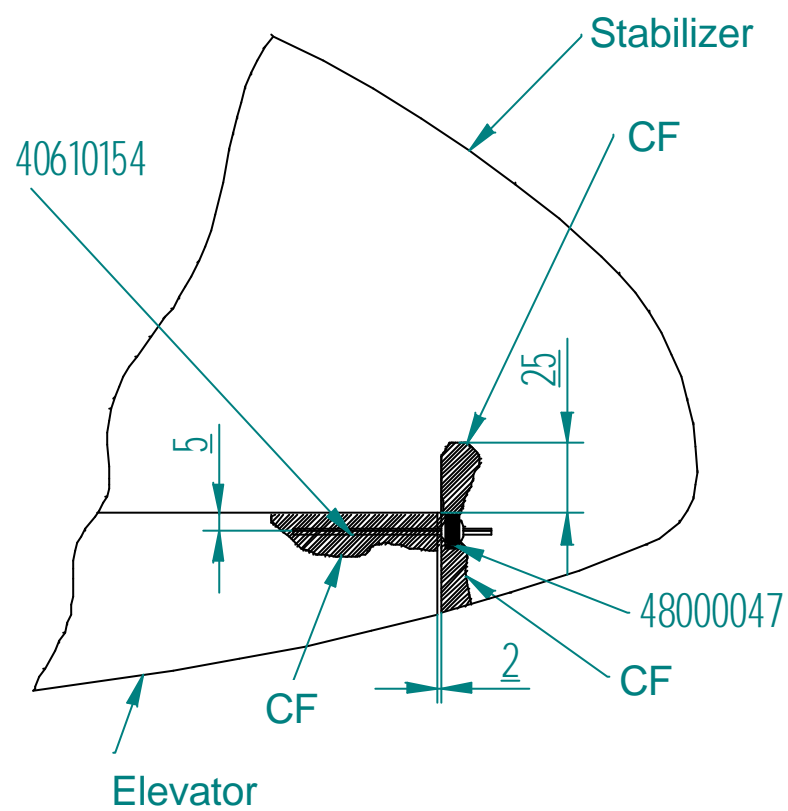
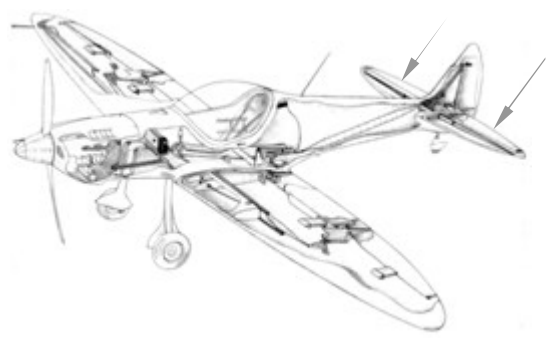
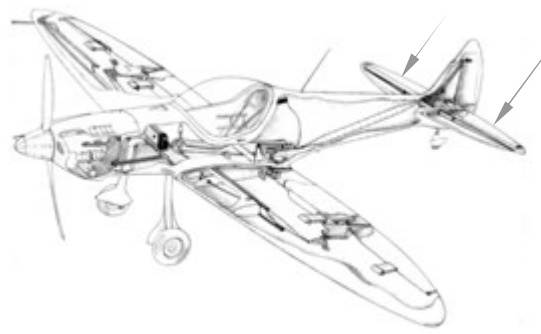


Fig. 4.1.2.4
Outboard elevator bearing,
drawing



4.1.3 Installing the Elevator Supports

1. Fix elevator support rib no. 28000059 with super glue on the horizontal stabilizer.

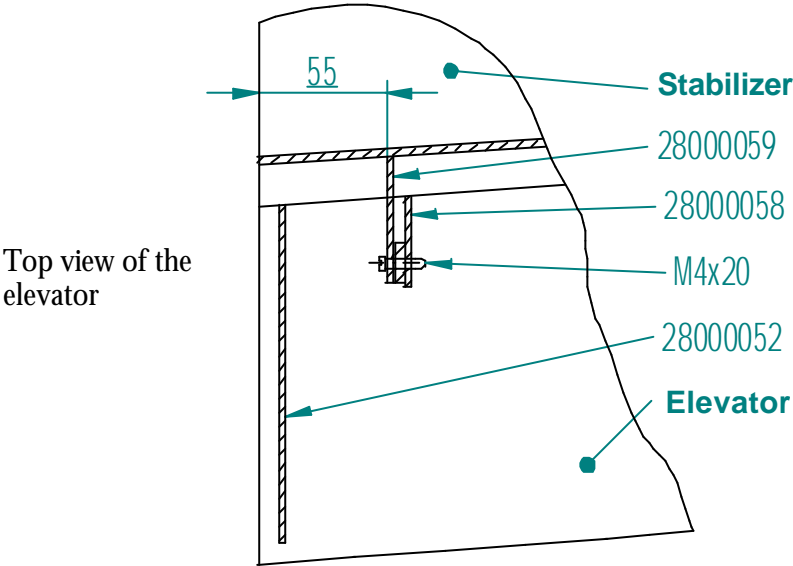
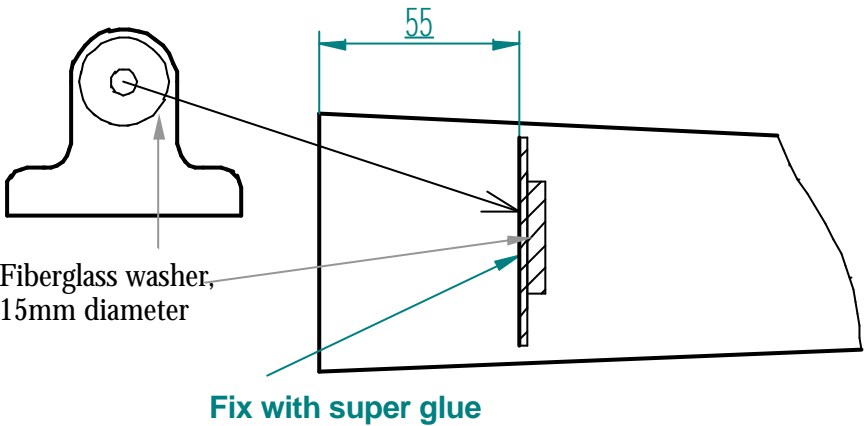
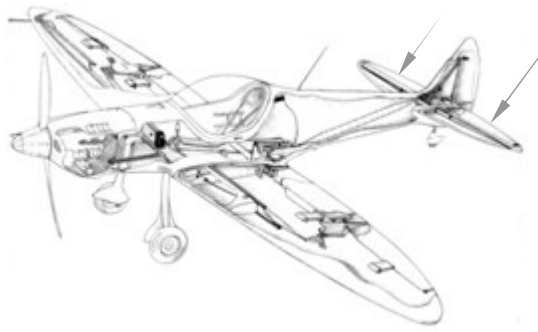


Fig. 4.1.3.1
Bonding the support rib into
the horizontal stabilizer



2. Bond an additional fiberglass washer to the rib to reinforce the threaded hole. As shown in figure 4.1.3.2, scribe and drill the M4 threaded hole 3mm (0.12") behind the trailing edge of the elevator fin.

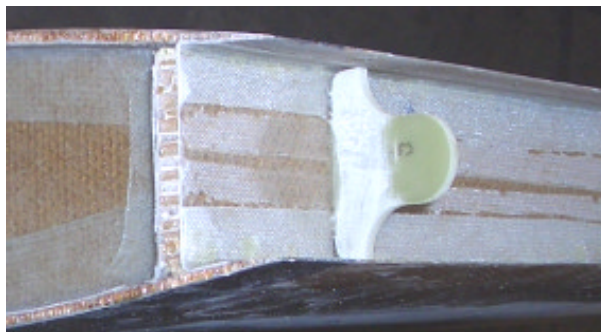
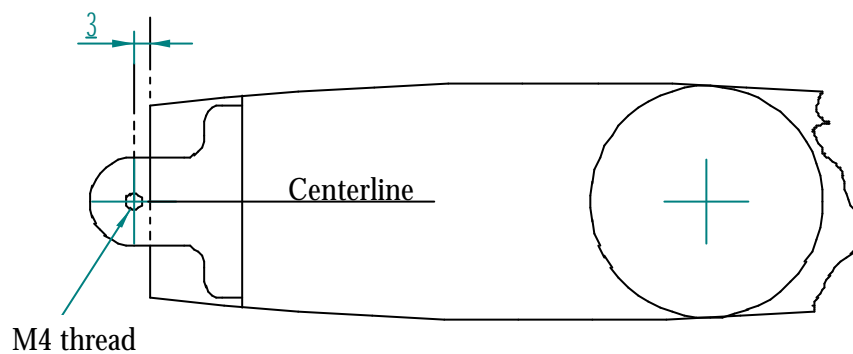


Fig. 4.1.3.2
Scribing the hole for
the support

3. Insert the outboard hinge pin of the elevator into the plastic self-aligning bearing and scribe the position of the support rib in the stabilizer on the elevator.

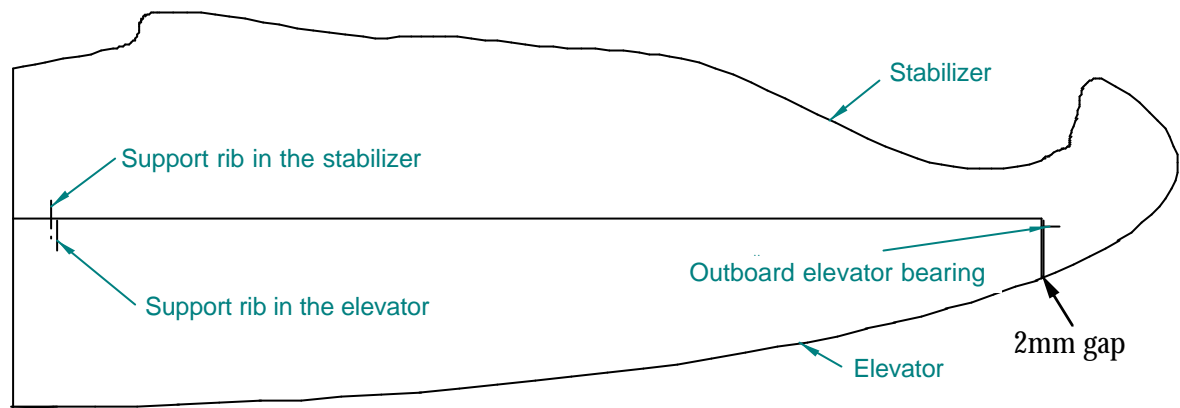
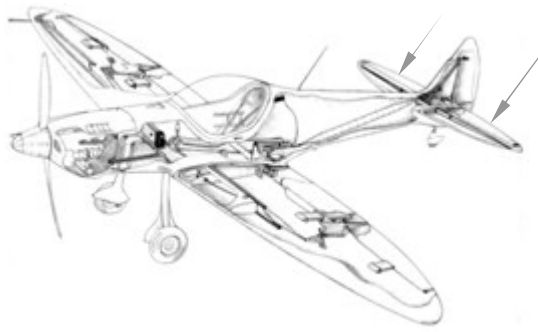


Fig. 4.1.3.3
Scribing the cut-out
on the elevator

4. Cut a notch in the elevator in the area of the stabilizer support rib in such a way that the elevator can move 30° up and 30° down.

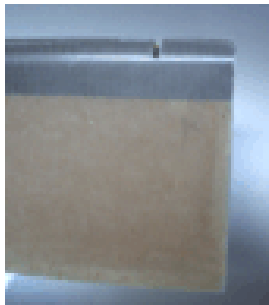
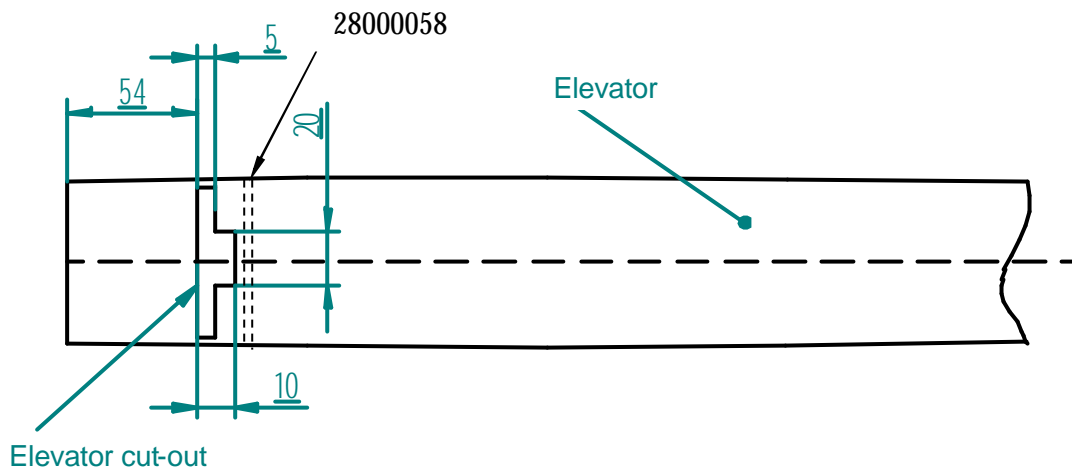
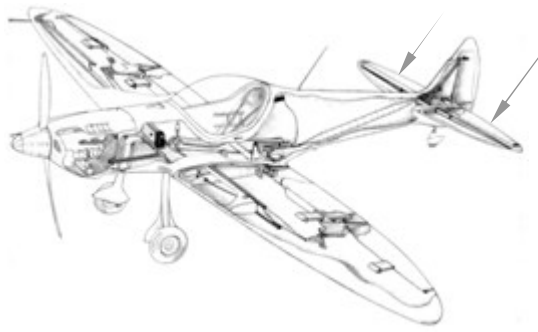


Fig. 4.1.3.4
Elevator cut-out

5. Insert support rib no. 28000058 into the elevator and fix it with super glue.
6. Position the elevator, while it can still be moved. Create a clearance of 371mm (14.61") between the edge of the elevator and the rear edge of the aluminum pipe, as shown in figure 4.1.3.5.
7. After aligning the elevator, carefully drill or scribe support rib no. 28000058 through the 4mm (0.16") threaded hole in rib no. 28000059 with a 3.2mm (0.13") drill. After disassembling the elevator, bore the hole to 4mm (0.16").

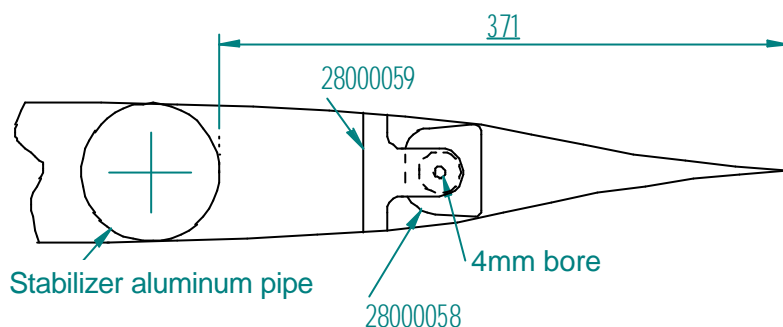
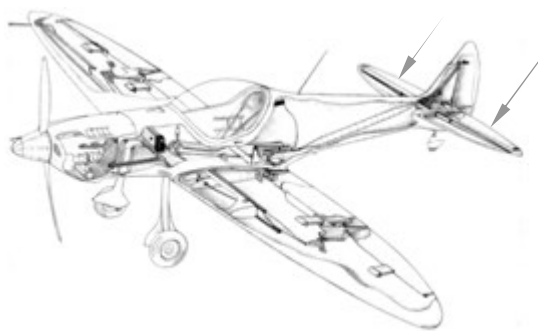


Fig. 4.1.3.5
Positioning the
elevator

8. Fill all ribs with cotton resin mix to a radius of 5mm (0.20") and reinforce them with 25-mm-wide (0.98") fiberglass tape.

4.1.4 Installing the Fiberglass Hexagon Tube and the Root Rib into the Elevator

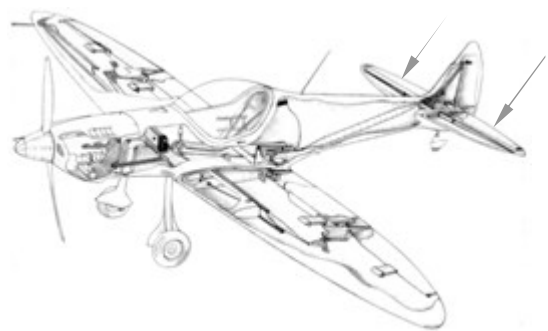
- Tear the peel-ply off fiberglass hexagon tube no. 28000044.
- Roughen the elevator in the area of the hexagon and the root rib.
- In the elevator, make a cut-out corresponding to the hexagon edge which presses into the nose strip of the elevator, as shown in figure 4.1.4.1.



Reinforce the outside of the cut-out for the hexagon with 2 plies of 40-mm-wide fiberglass tape.



Fig. 4.1.4.1
Elevator cut-out



- Coat the aluminum hexagon elevator connector on the fuselage with mold release wax.
- Push the fiberglass hexagon onto the aluminum hexagon.

Note: The fiberglass hexagon tube must fit onto the aluminum hexagon without any play. If there is play between the fiberglass hexagon and the aluminum hexagon, use C-clamps to press the fiberglass tube onto the aluminum hexagon and wind carbon roving around the tube.

- Wind six plies of carbon roving 1610 tex around the hexagon tube and impregnate the roving with resin.
- Pull off the fiberglass hexagon and push it on again, so that the two parts do not bond.
- Move the horizontal stabilizer with installed elevator up to the fuselage. Let the counterweight of the drive arm fall onto the lower rib of the rudder collet and adjust the rudder to 80mm (3.15") upwards of the end strip, as shown in figure 4.1.4.3. Fix the fiberglass hexagon with 5-minute resin to the rudder.

	Distance from the hinge	Upward deflection	Downward deflection
Elevator	180mm	80mm	60mm

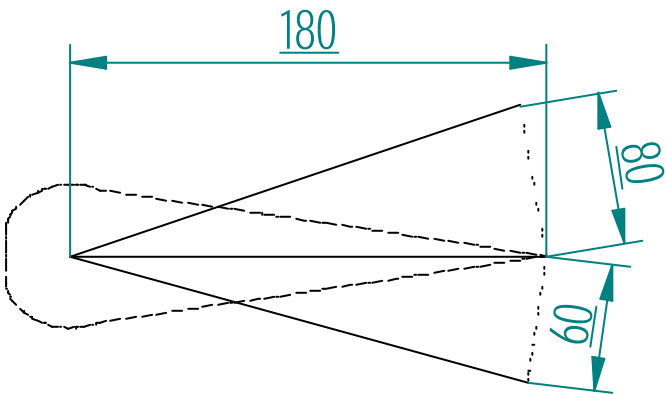
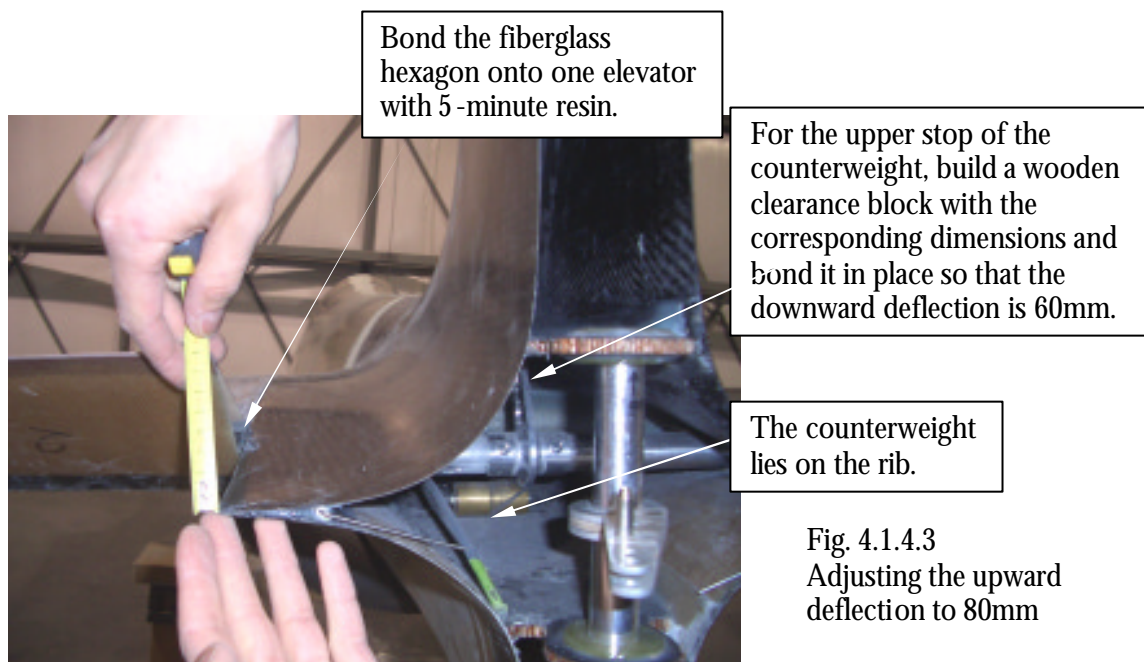
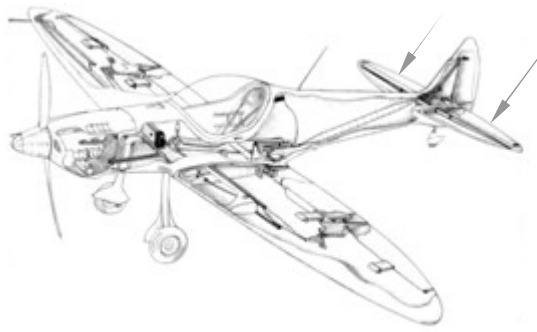


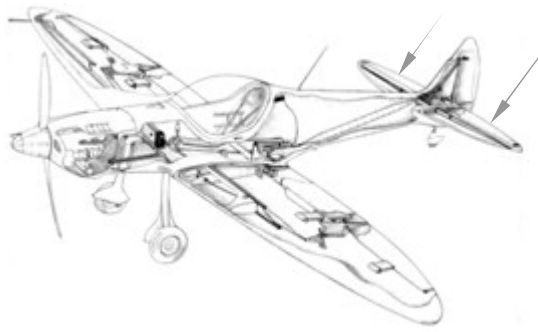
Fig. 4.1.4.2
Checking the maximum
upward and downward
elevator deflection



- Mask the edge of the horizontal stabilizer and the root rib except for the fiberglass sleeve with packaging tape.



Fig. 4.1.4.4
Edge of horizontal stabilizer and root rib masked with packaging tape



- Apply cotton resin mix around the hexagon inside the elevator and on the sleeve to a thickness of approx. 5mm (0.20").
- Position the horizontal stabilizer and elevator flush with the fuselage and clamp the elevator in the neutral position flush with the edge of the stabilizer.

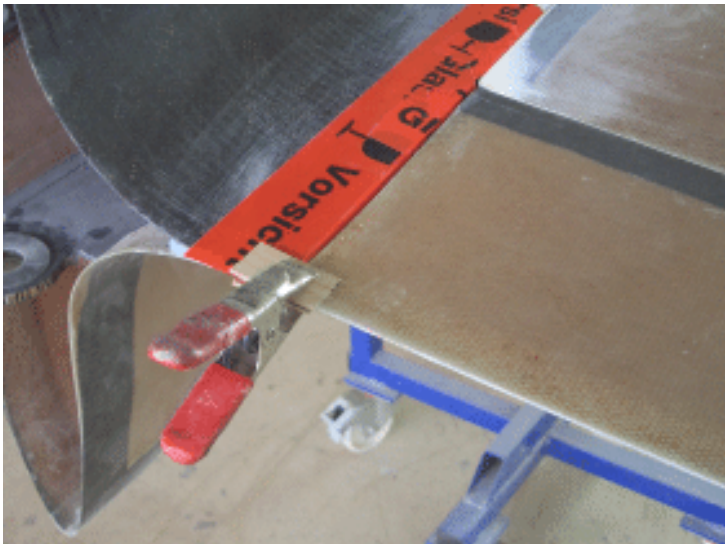


Fig. 4.1.4.5
Fixing the elevator in
neutral position

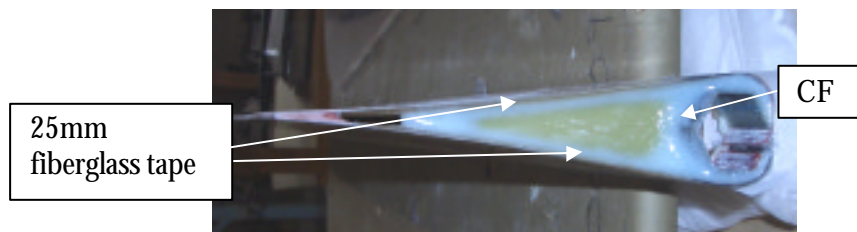
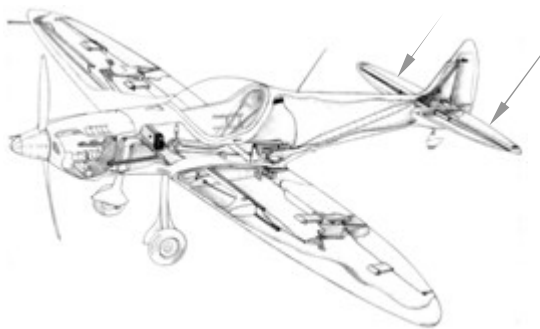


Fig. 4.1.4.6
Elevator with root rib and
fiberglass hexagon installed

**Important:**

After painting, weigh each elevator without the balance weight, which is located in the fuselage. The mass must be between 0.4kg and 0.6kg (0.88lb – 1.32lb).

The residual moment of each elevator must be between 15Ncm and 28Ncm.

Measure the residual moment as follows: Place the rear edge of the elevator on a precise scale and rest the fulcrums of the elevator on thin steel pins so that it moves easily.

	Date	Mass [g]	Lever arm [cm]	Moment [Ncm]
Right elevator				
Left elevator				

4.1.5 Installing the Plain Bearing for the Front Elevator Torsion Tube

- Bore the front hole in the root rib of the horizontal stabilizer unit to a diameter of 24mm (0.94").
- Apply mold release wax to the aluminum pipe in the elevator unit.
- Roughen the outside of plain bearing no. 48000048 and push the bearing onto the pipe.
- Move the horizontal stabilizer up to the fuselage, check the holes for the plain bearings for correct fit and rebore them accordingly.
- Align both elevators with the horizontal stabilizer according to the contour of the root ribs; use a spirit level to check for warping.
- Remove the elevators and coat the plain bearings with CF.
- Coat the hole in the root rib with CF.
- Push the elevators onto the fuselage, align them without warping and let them cure.

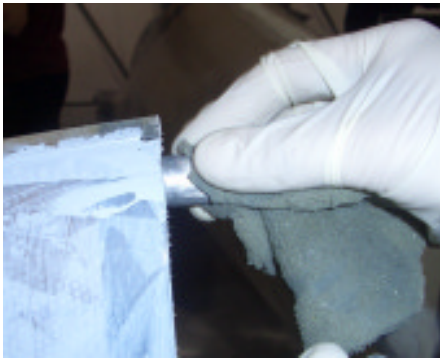
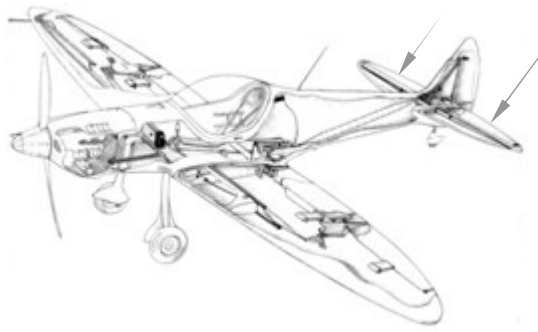


Fig. 4.1.5.1
Applying mold release wax to
the aluminum pipe in the
horizontal stabilizer

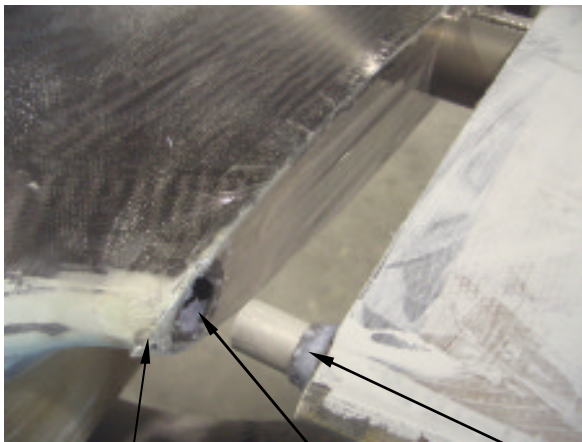


Fig. 4.1.5.2
Bonding the plastic plain
bearing into the root rib on the
fuselage

Root rib masked with
smooth adhesive tape
and then coated with
release wax

Hole coated
with CF

Plastic plain bearing no.
48000048 coated with CF