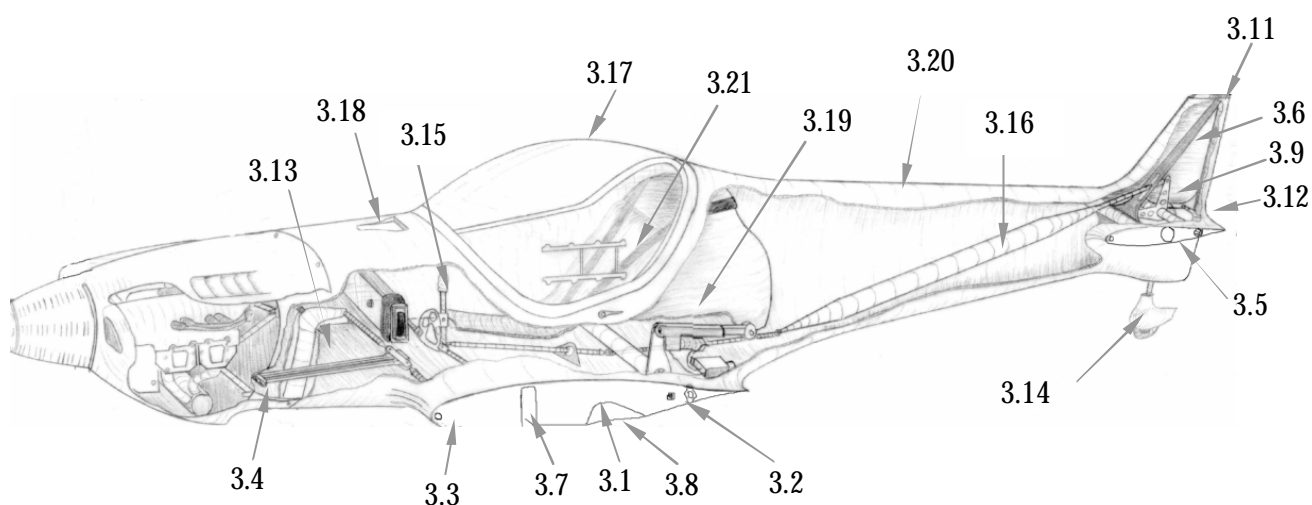
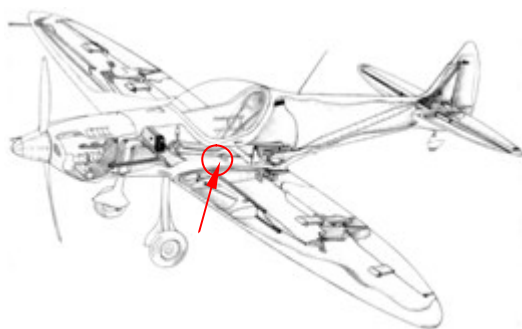


3 Fuselage

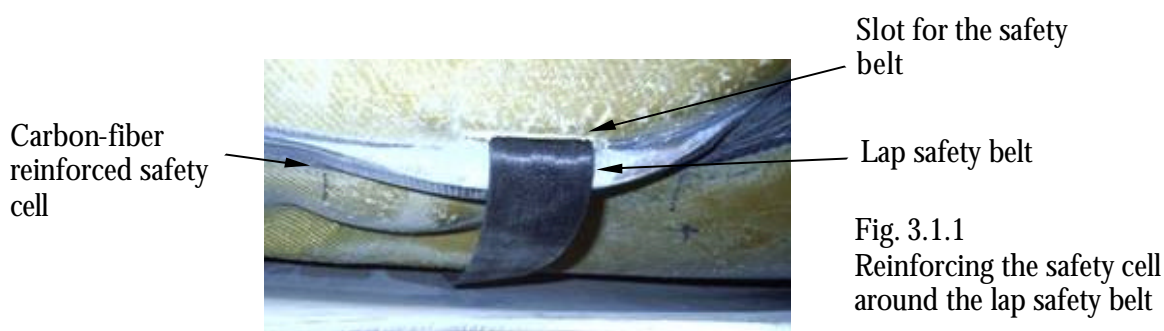
This section describes the following steps for the fuselage:

- 3.1 Reinforcing the safety cell around the lap safety belt
- 3.2 Installing the flap mechanism and the supports for the wing torque tube
- 3.3 Installing the landing-gear struts, wheels and fairings
- 3.4 Installing the landing-gear actuator / Option Installing an undercarriage warning system
PFA MOD 329/007
- 3.5 Installing the horizontal stabilizer with securing wire
- 3.6 Installing the ribs in the rudder assembly
- 3.7 Mounting the wings
- 3.8 Installing the fuselage base
- 3.9 Installing the elevator bellcrank
- 3.10 Assembling the rudder
- 3.11 Installing the upper rudder bearing
- 3.12 Assembling and installing the rudder drive in the rudder
- 3.13 Installing the rudder pedals
- 3.14 Assembling and installing the tail wheel
- 3.15 Installing the elevator push rods incorporating
- 3.16 Assembling and installing the control stick
- 3.17 Assembling and fitting the canopy
- 3.18 Installing the NACA air supply
- 3.19 Installing the trim
- 3.20 Laminating the seams and reinforcing the wheel well
- 3.21 Installing the baggage compartment cover, safety belt and seat pan **PFA MOD329/009**

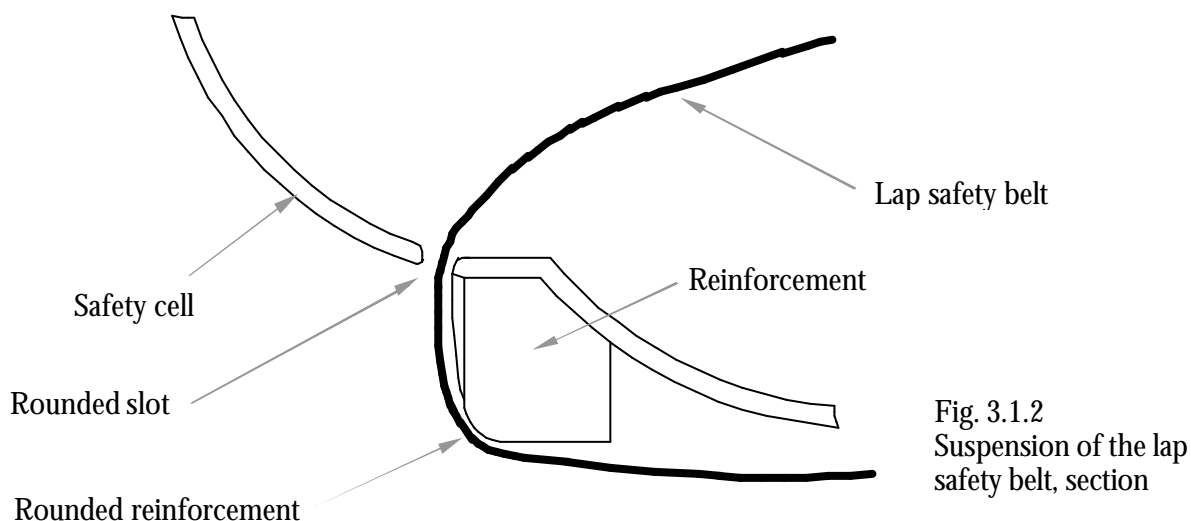


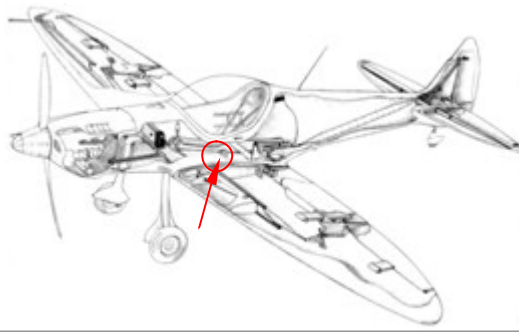


3.1 Reinforcing the Safety Cell around the Lap Safety Belt



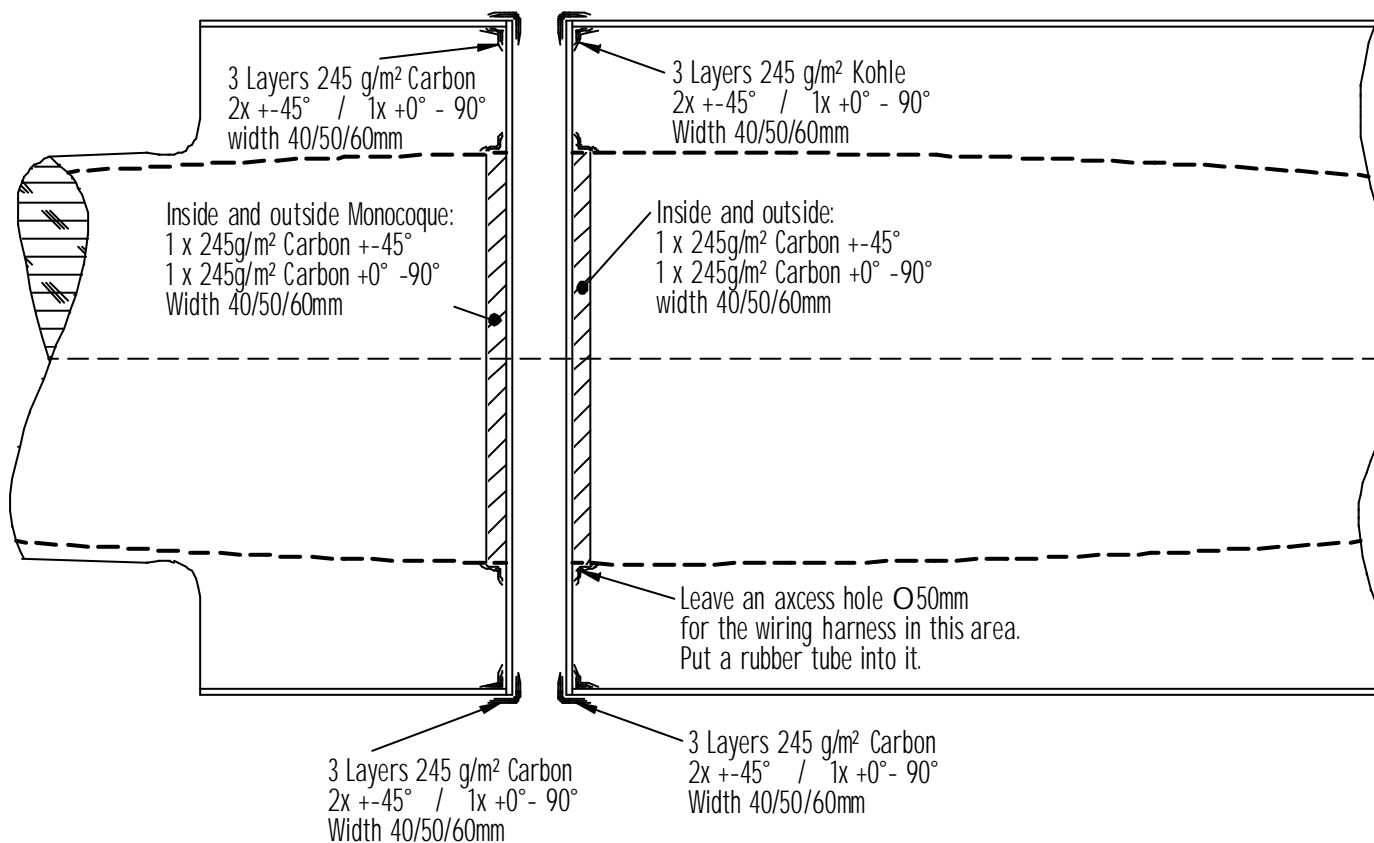
1. Drill through the safety cell from the interior with a 5mm (0.20") drill as indicated by the two bores. Cut and file a slot for the safety belt between the two bores. The safety belt slot between the bores must have a width of approx. 6mm (0.24"). (The narrow buckled end of the belt must fit through the slot.)
2. Fill the open honeycomb and the reinforcement with MB. After the resin has cured, sand the surface around the belt smooth, so that the belt will not chafe against any sharp edges.

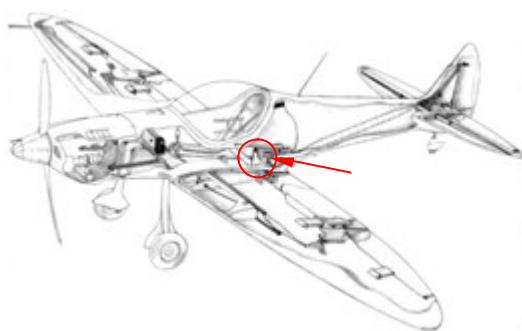




Reinforcing the gaps between wing spar tunnel, fuselage and safety cell.

Important: Remove all the peel ply, sand the gelcoat down to the composite and fill the corners with thicker resin before laminating the carbon cloth.





3.2 Installing the flap mechanism and the supports for the wing torque tube

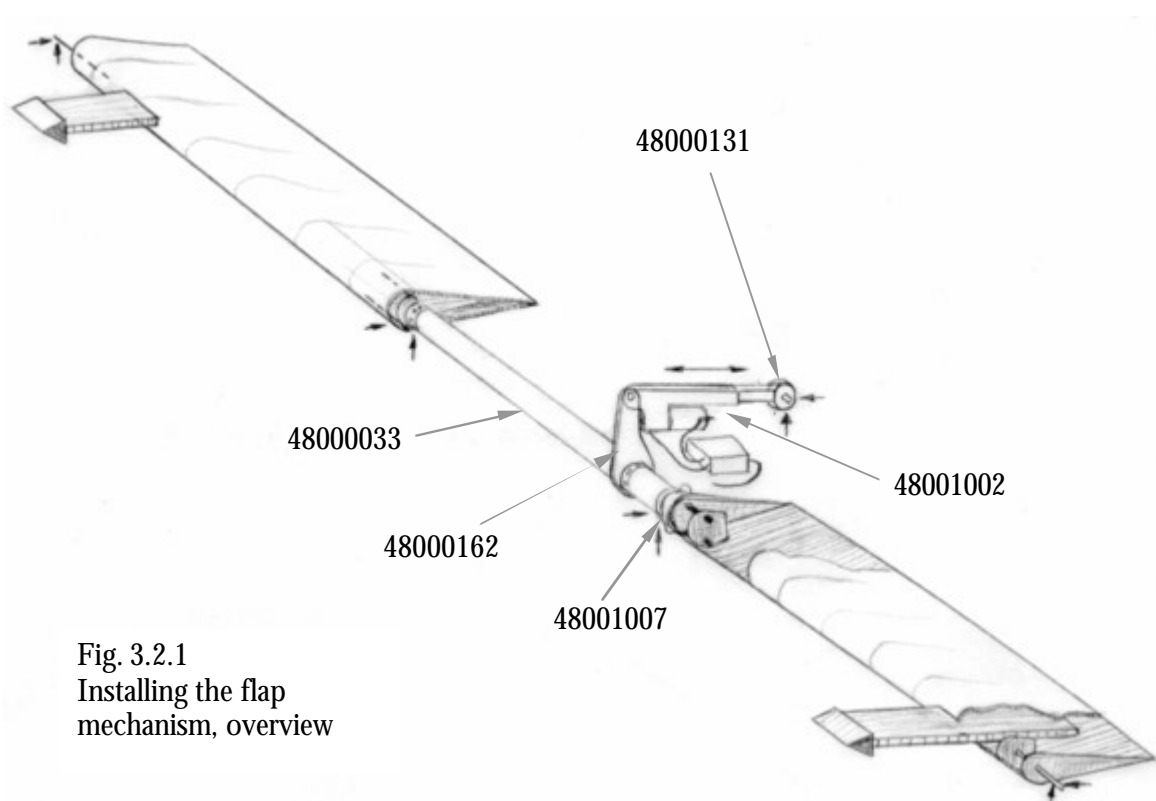


Fig. 3.2.1
Installing the flap
mechanism, overview

1. Scribe a centered bore of 65mm (2.56") diameter for the flap mechanism where the interior of the safety cell shows a slight depression. Cut the bore with a keyhole saw.

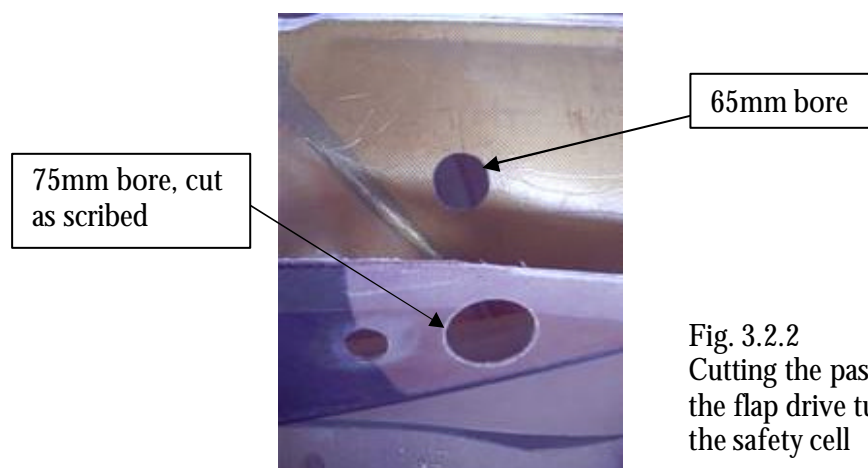


Fig. 3.2.2
Cutting the passage for
the flap drive tube into
the safety cell

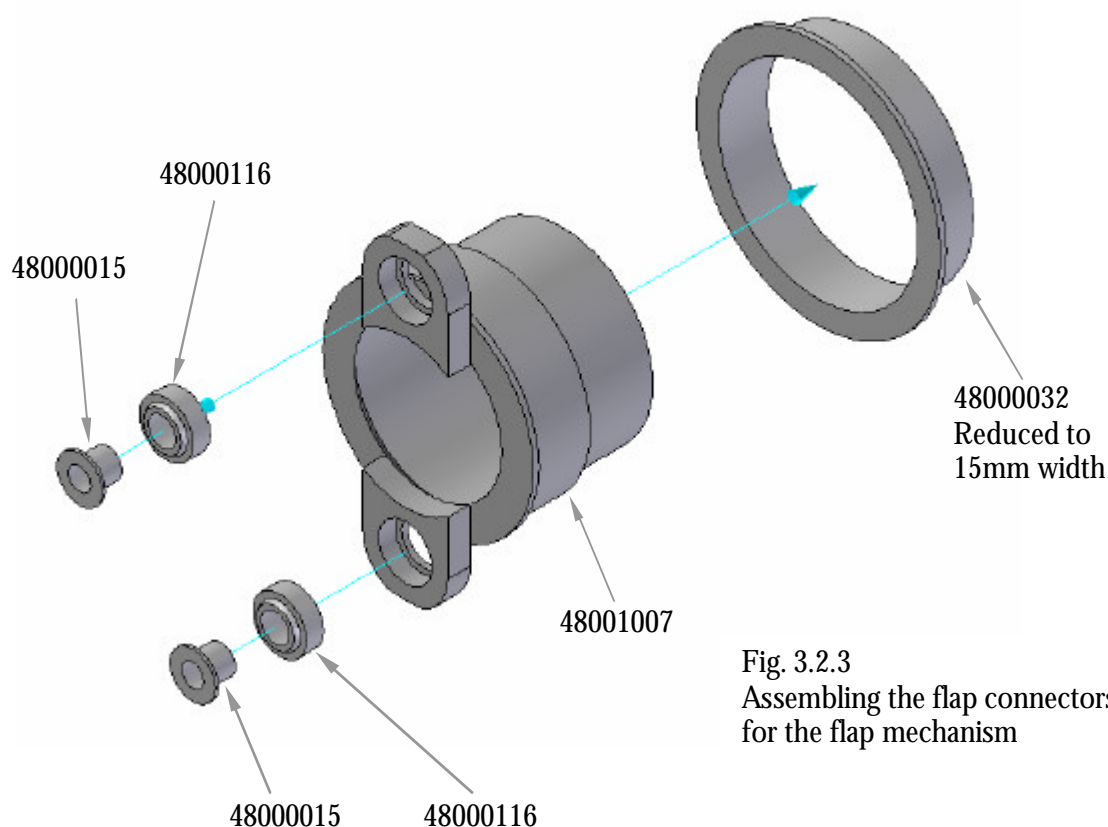
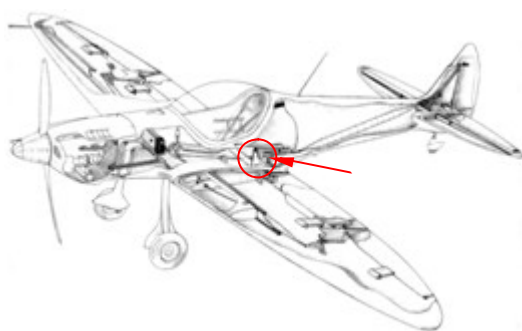


Fig. 3.2.3
Assembling the flap connectors
for the flap mechanism

2. Clamp self-aligning bearing no. 48000116 with a parallel-sided pipe, which only presses against the outer ring of the bearing, in a box-column drilling machine.

Important: Clamping the bearing requires much force. You can heat the flap drive with a hair dryer so that less force will be needed. The outer bearing ring might rupture, if the two clamping faces are not parallel or if the ring is subjected to shocks!

3. Press the plastic bushings no. 48000015 into the self-aligning bearing. In this case you do not need to heat the metal parts.

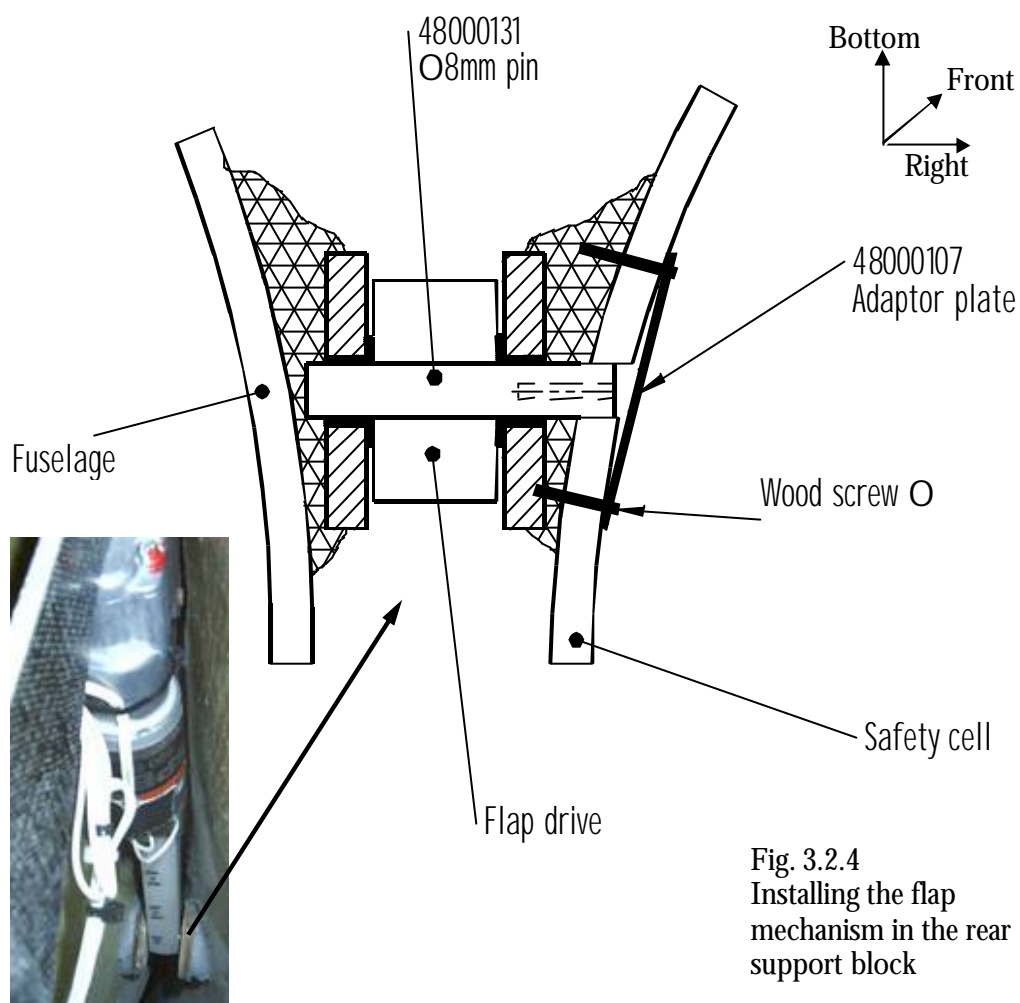
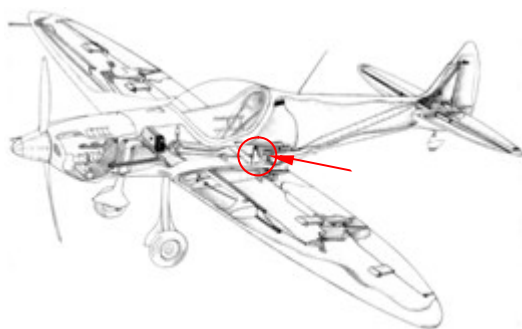


Fig. 3.2.4
Installing the flap
mechanism in the rear
support block

4. Extend the flap drive using the electronic control or by applying a voltage of 12V.
5. Slide the plastic rod between the two discs and have a helper slide pin no. 48000131 from the interior of the safety cell through the drive and into the two discs of the support block.

Important: The threaded bore in the pin must be oriented towards the interior of the safety cell, so that it can be pulled out with an M5 bolt for disassembly.

6. Secure the pin by screwing on cover plate no. 48000107. The pin must be pushed into the rear disc until it stops and secured there. If necessary, insert a spacer ring between the pin and the cover plate.

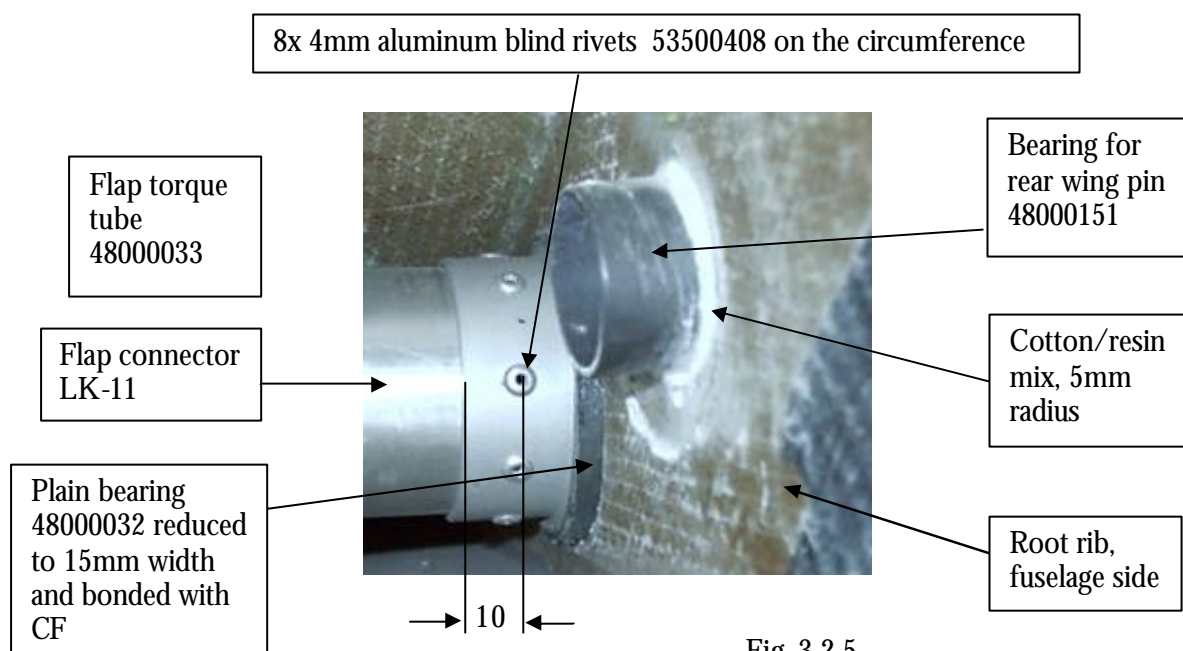
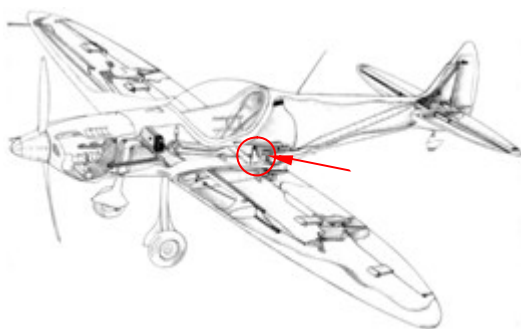
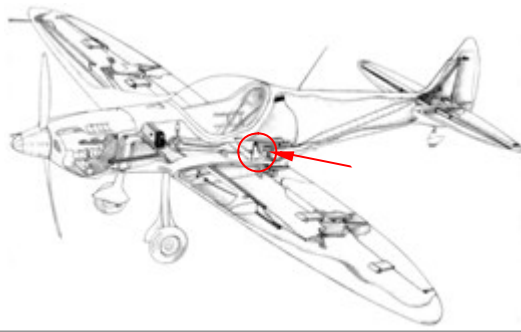


Fig. 3.2.5
Riveting the flap connector to the drive tube

7. Scribe four equidistant points on one quadrant of the circumference of each flap drive no. 48001007 at a distance of 10mm (0.39") from the base as shown in figures 3.2.6 and 3.2.7.
8. Slide the flap connector onto the tube, drill through the tube and deburr the bores. Rivet the connector to the tube (rivets no. 53500408).
9. Cut the scribed 75mm (2.95") bores for the flap drive with a keyhole saw or a cutter as shown in figure 3.2.2.
10. Roughen 75mm (2.95") of the circumference of bearings no. 48000032 and slide them onto the flap connectors.
11. Slide the tube with the connector into the fuselage and slide the connector, which has not yet been riveted, onto the other end of the tube so that the two drives are symmetrical on either side of the bellcrank.

Note: When assembled, the plastic bearings are aligned by the tube and the connectors, so you can bond them with CF in alignment with the tube.

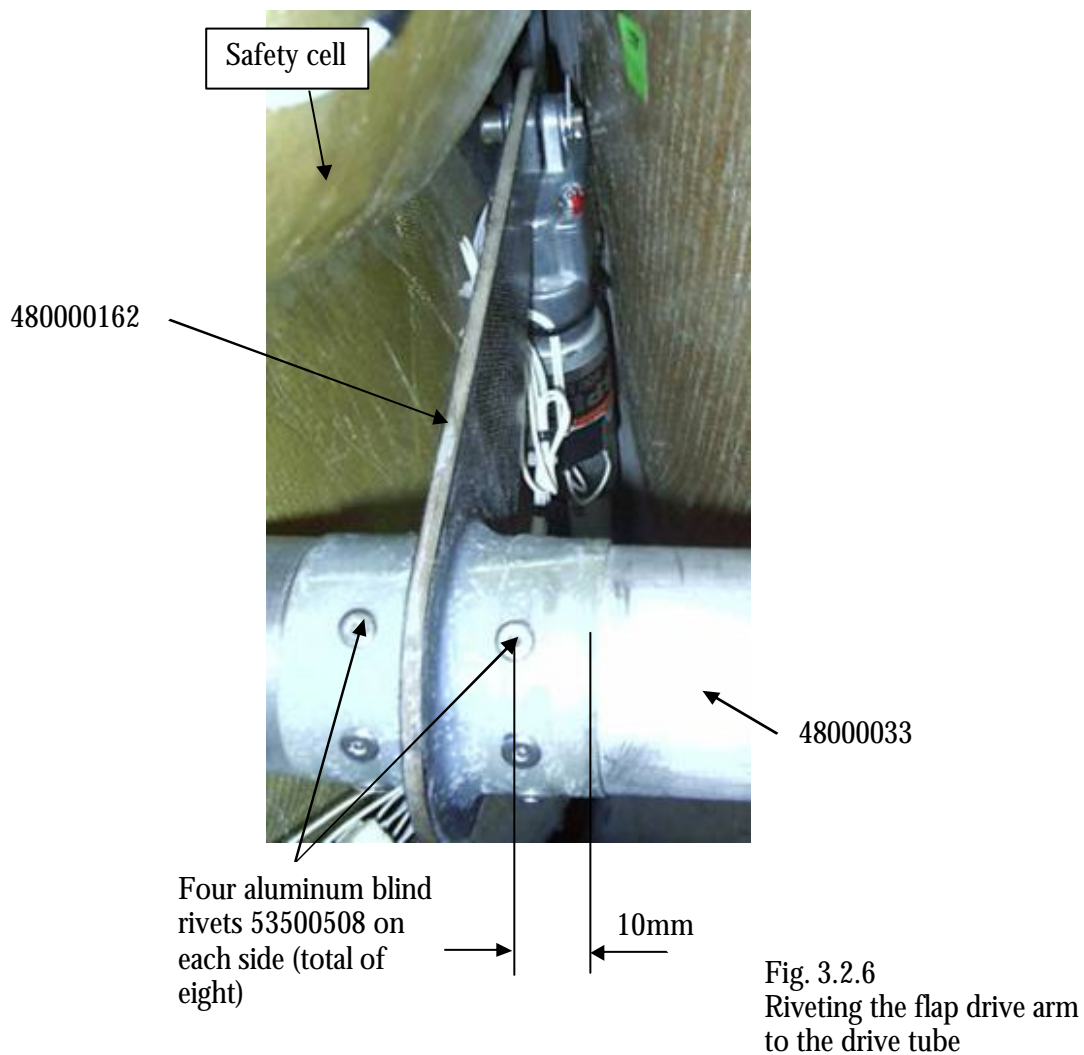


Fuselage

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Note: The tube, drive arm and the unriveted connector are positioned after painting. Move the wings with the flaps to the fuselage, see section 2.1.2. Align the flaps precisely and rivet the second connector onto the tube.

Position the flap drive to 0° deflection using the electronic control and fix the drive arm in place with eight 5mm (0.20") aluminum rivets.



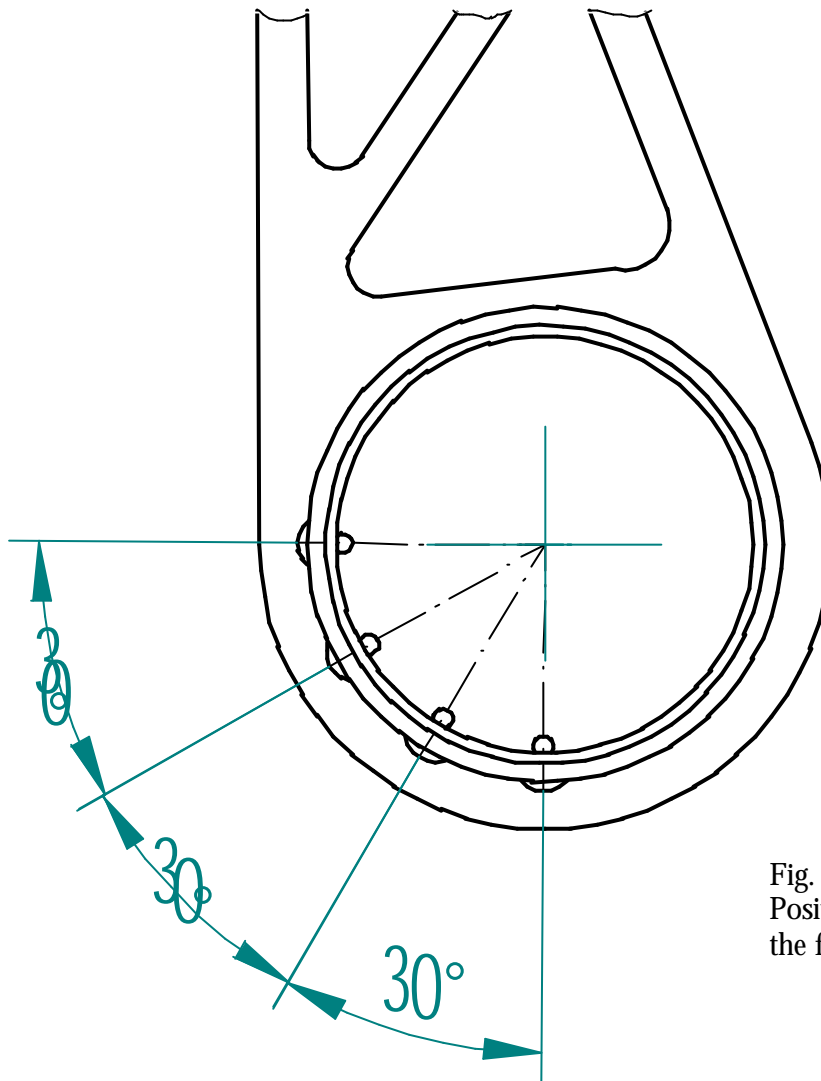
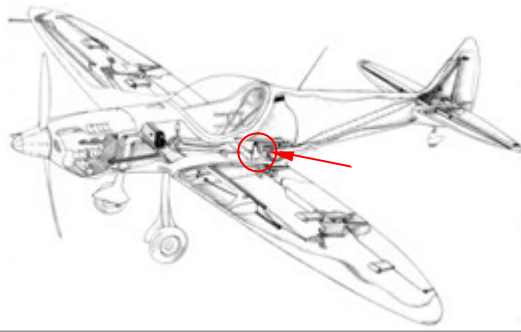
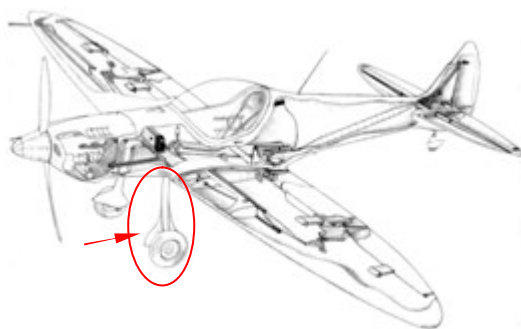


Fig. 3.2.7
Position of the rivets fixing
the flap drive arm

Note: To rivet the arm with the tube, remove the flap drive so that you can turn the arm by at least 90° while riveting. Use a power riveting tool, because there is not enough space for the arms of simple rivet pliers.



3.3 Installing the Landing-Gear Struts, Wheels and Fairings

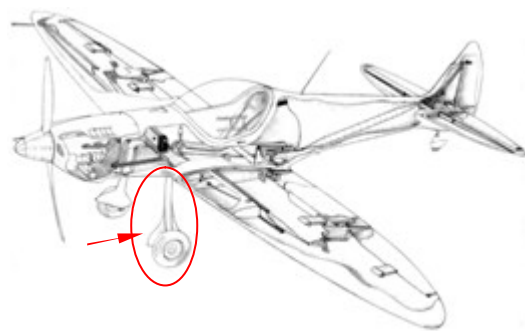
1. Press two plain brass bearings no. 48000063 into each of the 20mm (0.79") bores in the landing-gear struts. **If necessary grind the hole in the glass leg a little bit bigger to reduce the pressing force. If the force is too high, the inside diameter will be too small.**

Important: The strut bores must be free of adhesives and may not be enlarged. The outside diameter of the plastic bearings must be approx. 0.3mm (0.01") larger than the inside diameter of the bore.

2. Slide pivot axle no. 48000062 into the bore to check the fit. You should be able to insert it without play using light pressure.
3. Slide the pivot axle through the bushing in the fuselage bottom and thread it in completely.

Important: Free the thread from foreign matter (dust, chips, sand) and, if necessary, slightly grease it.

4. Thread in the axle pin so that the Allen head screw M6x30 (no. 50063002) can be inserted into the bore and pin. When all parts fit, remove the pin.
5. Adjust the position of the landing-gear strut with thrust washers no. 48000066 and spacer bushing no. 48000081 so that the strut can be retracted and extended without much force (see fig. 3.3.1).
6. Hold the landing-gear strut in the fuselage cut-out and screw the axle pin through the bushing in the fuselage base and the strut into the thread.
7. Thread in the M6x30 screw (no. 50063002) as shown in figure 3.3.2 and secure it with an M6 self-locking nut. Tighten the M6 screw to a torque of 6Nm.



Fuselage

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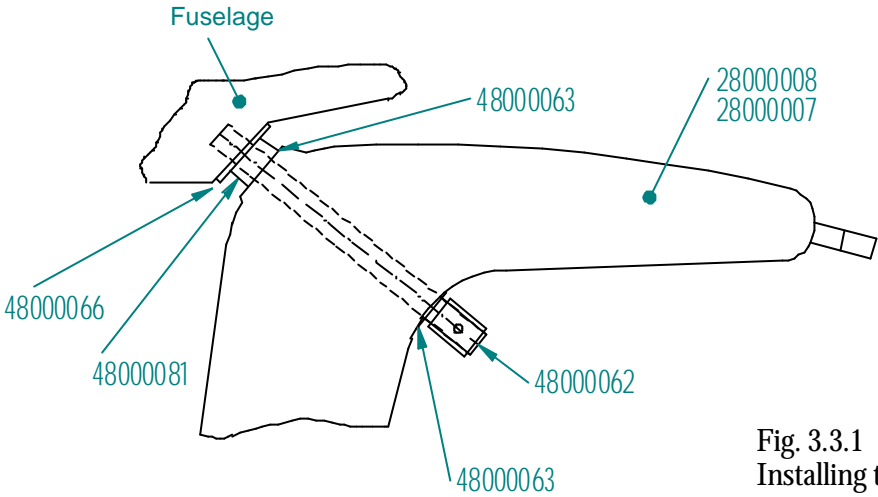


Fig. 3.3.1
Installing the landing-
gear struts

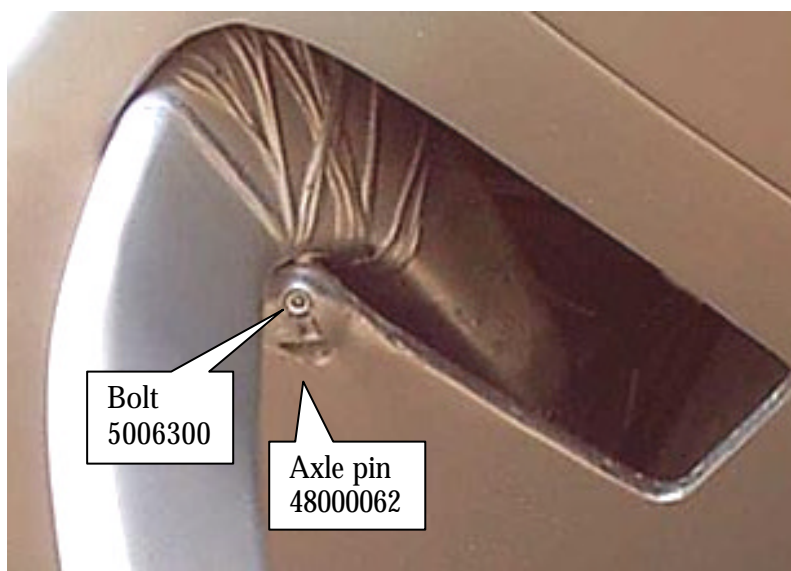
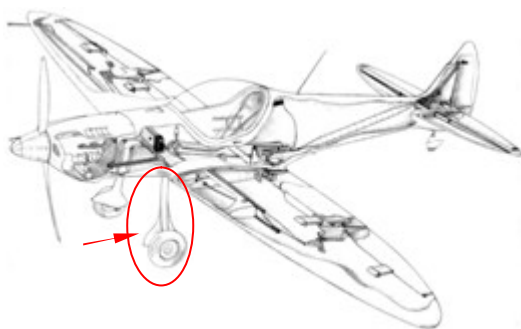
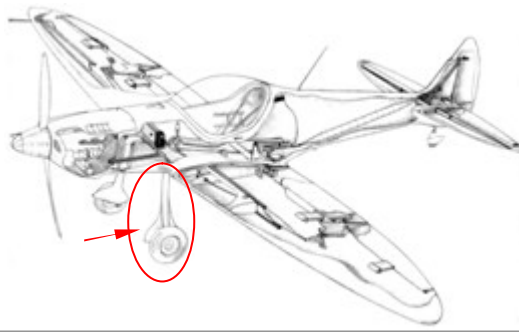


Fig. 3.3.2
Installing the
landing-gear strut

8. Drill through the flange of the wheel axles with an 8mm (0.31mm) drill on a diameter of 45mm (1.77") as shown in figure 3.3.4. Drill the three 6mm (0.24") bores on the strut-facing side. Because the countersunk screw cannot be completely sunk, slightly grind out the strut around the screw heads (see fig. 3.3.4).
9. Align the aluminum brake jaw concentric with the axle as shown in figure 3.3.4 and center-punch it in the area of the four holes.
10. Drill the 8mm (0.31") bore which you have created on the wheel axle as an 8mm (0.31") bore through the brake jaw. Drill the three smaller bores with a 6mm (0.24") drill.
11. Screw the wheel axle onto the brake jaw with three M6 countersunk screws.
12. Hold the brake jaw with the wheel axle on the landing-gear strut as shown in figure 3.3.4, so that it is inclined approx. 120° to the rear (see fig. 3.3.4).



Fig. 3.3.3
Attaching the
wheel hub to
the landing-gear



13. After aligning the parts, drill through the open 8mm (0.31") hole to create a bore in the strut.

Important: Drill only one bore for the 8mm (0.31") screw into the landing-gear strut. The three M6 screws serve only to fix the brake jaw on the wheel axle. If the landing-gear strut is weakened by too many bores, the wheel hub may break.

14. Screw the axle to the strut with an M8x50 screw. Tighten the screw to a torque of 15Nm.

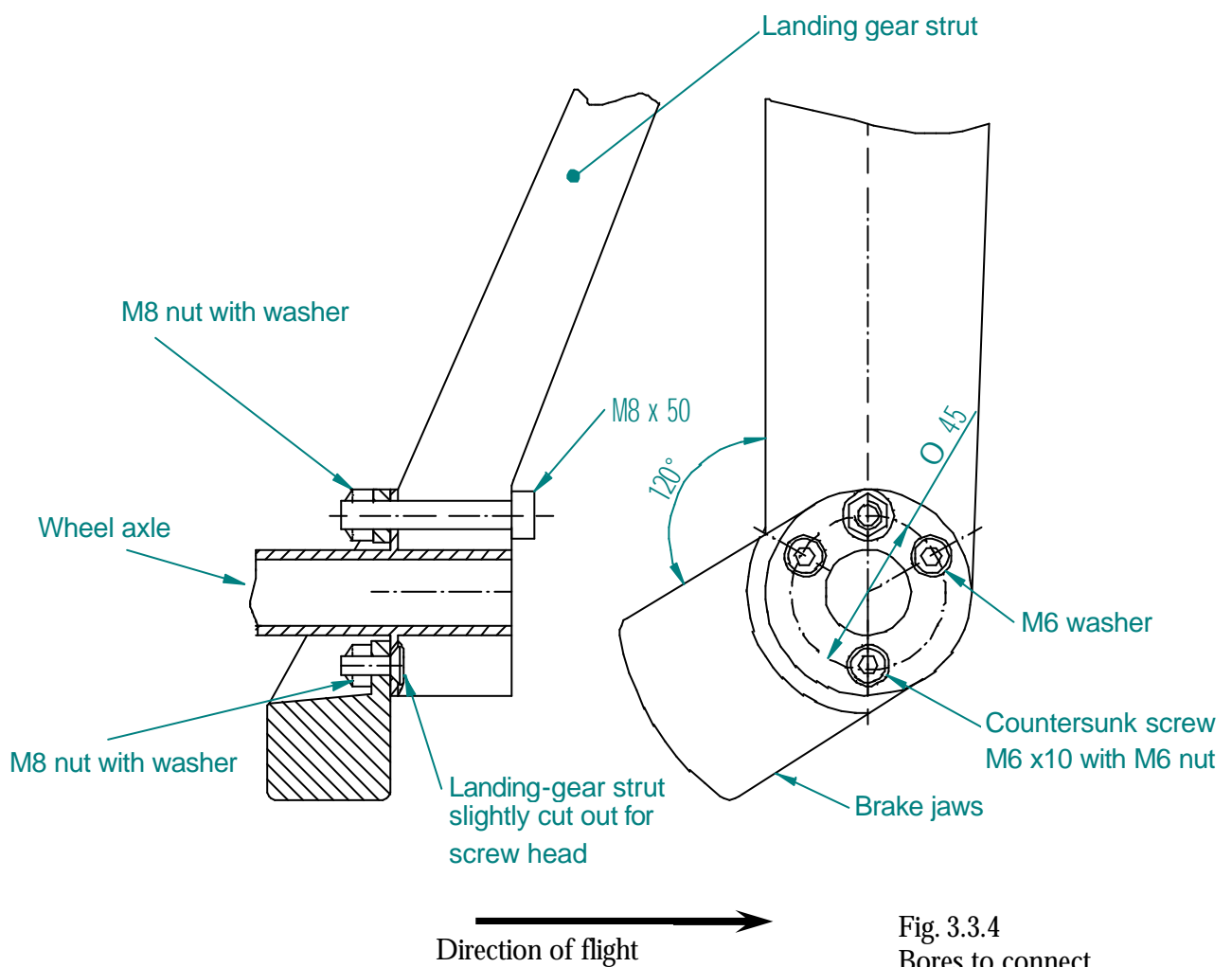
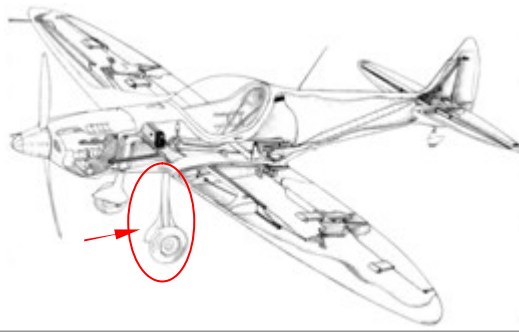


Fig. 3.3.4
Bores to connect
wheel hub and
landing-gear strut



15. Slide the wheels onto the axles and secure them with the aluminum washer and the M6 screw supplied by the tire manufacturer.
16. Cut the part of the axle which projects on the inside so that the axle is flush with the landing-gear strut.

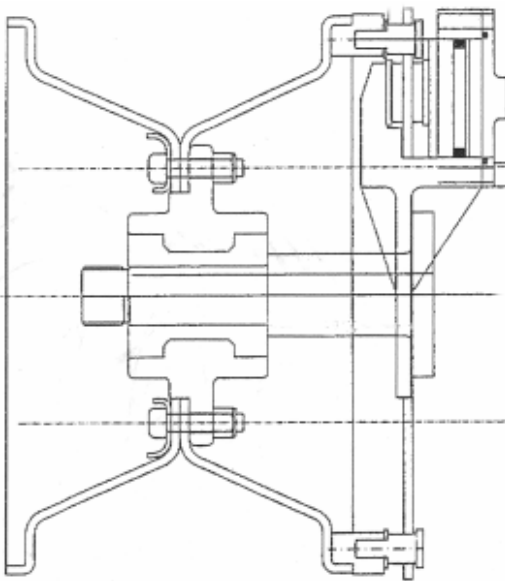
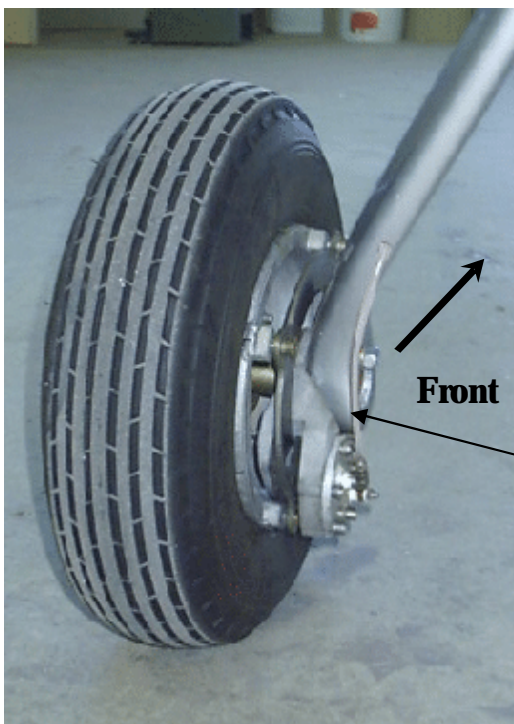
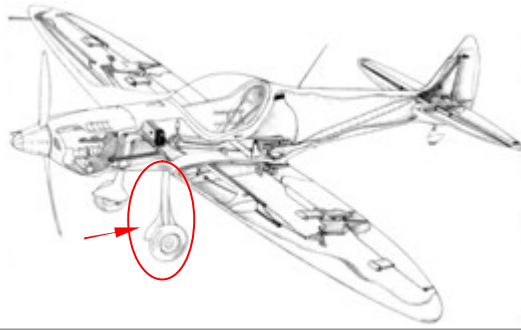


Fig. 3.3.5
Wheel hub with brake jaw
and brake disk, section



Brake hose

Fig. 3.3.6
Mounted wheel with
brake assembly



-
17. Place the landing-gear fairings on the landing-gear strut and push them towards the brake caliper until the fairing is 2mm (0.08") away from the brake hose bolting.
 18. Produce a sheet metal strip of 2mm (0.08") thickness as shown in the drawing, place it on the other side of the landing-gear strut and screw it to the fairing.

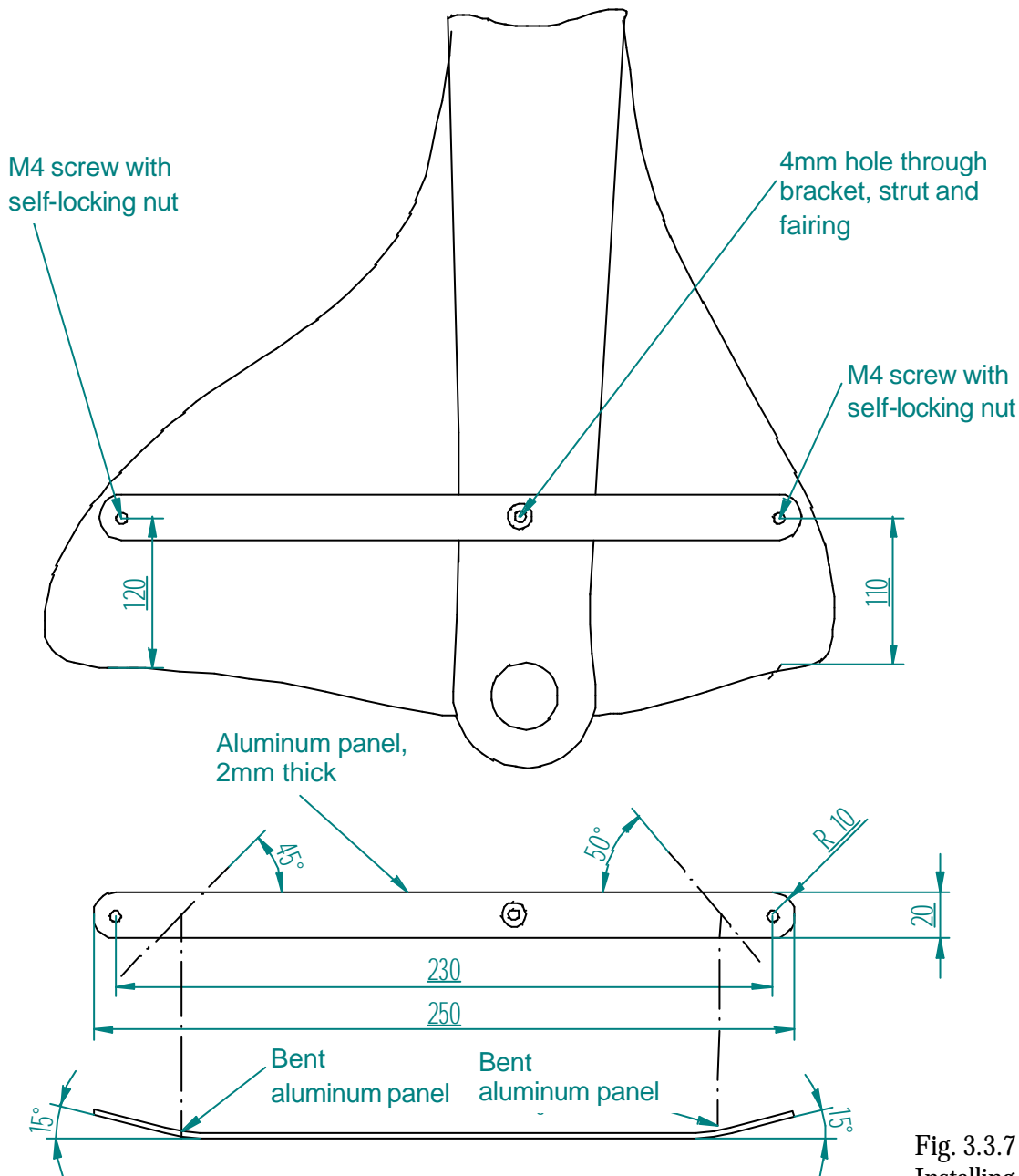
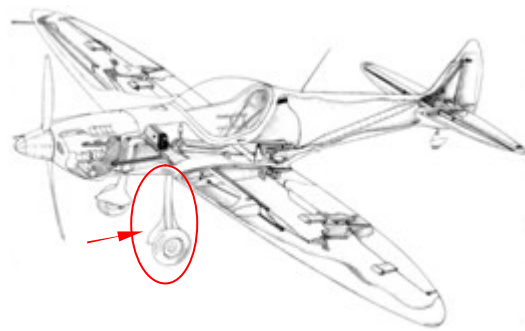
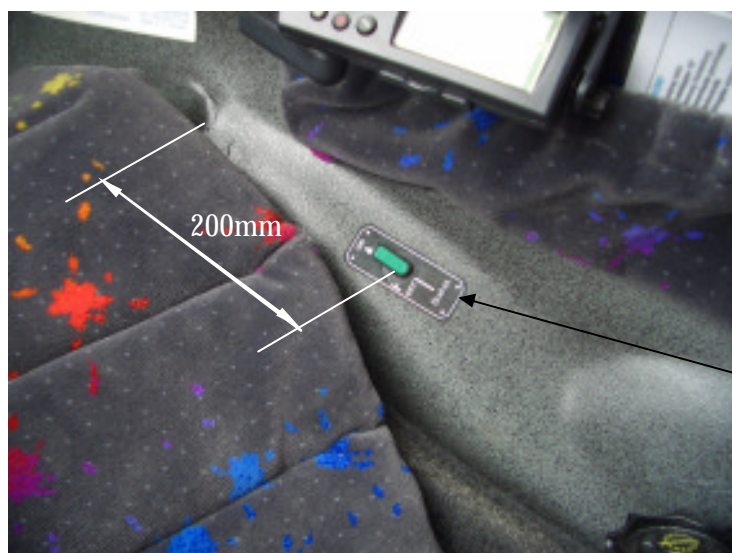
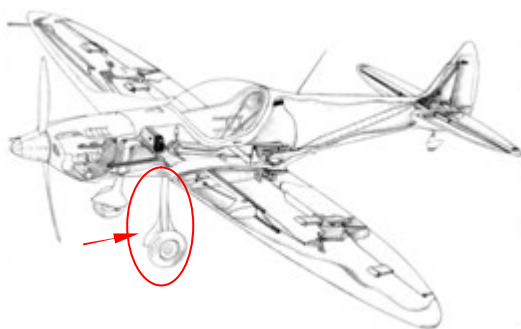


Fig. 3.3.7
Installing
the landing-
gear fairing



Parking brake (installation see fig. 3.3.10)

Fig. 3.3.8
Location of the ball valve
for the parking brake

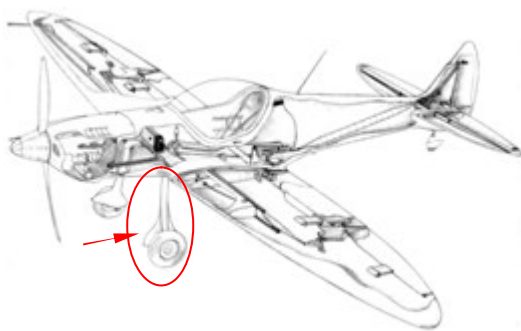


Connect these brake hoses
to the disc brakes on the
wheels.

Connect this brake hose
to the brake actuator.

Fig. 3.3.9
Parking brake hoses

Note: You can simplify the assembly of the brake hoses and hose fittings as follows:
Slide the connection nut of the fitting onto the brake hose.
Heat a nail or a spade drill which has a slightly larger diameter than the inside diameter of the brake hose with a hair dryer and slide it approx. 6mm (0.24") deep into the hose. Now you can easily push the widened end onto the fitting and tighten the connection nut.



19. Install the ball valve in the safety cell as shown in figure 3.3.10.
20. Roughen the outside of plastic plain bearing no. 48000031 and bond it into a corresponding bore with a diameter of 14mm (.055").
21. Use a knife to cut away the bevels at the sides of the black plastic control lever of the ball valve.
22. Bond two plywood blocks to the left and right of the ball valve into the safety cell.

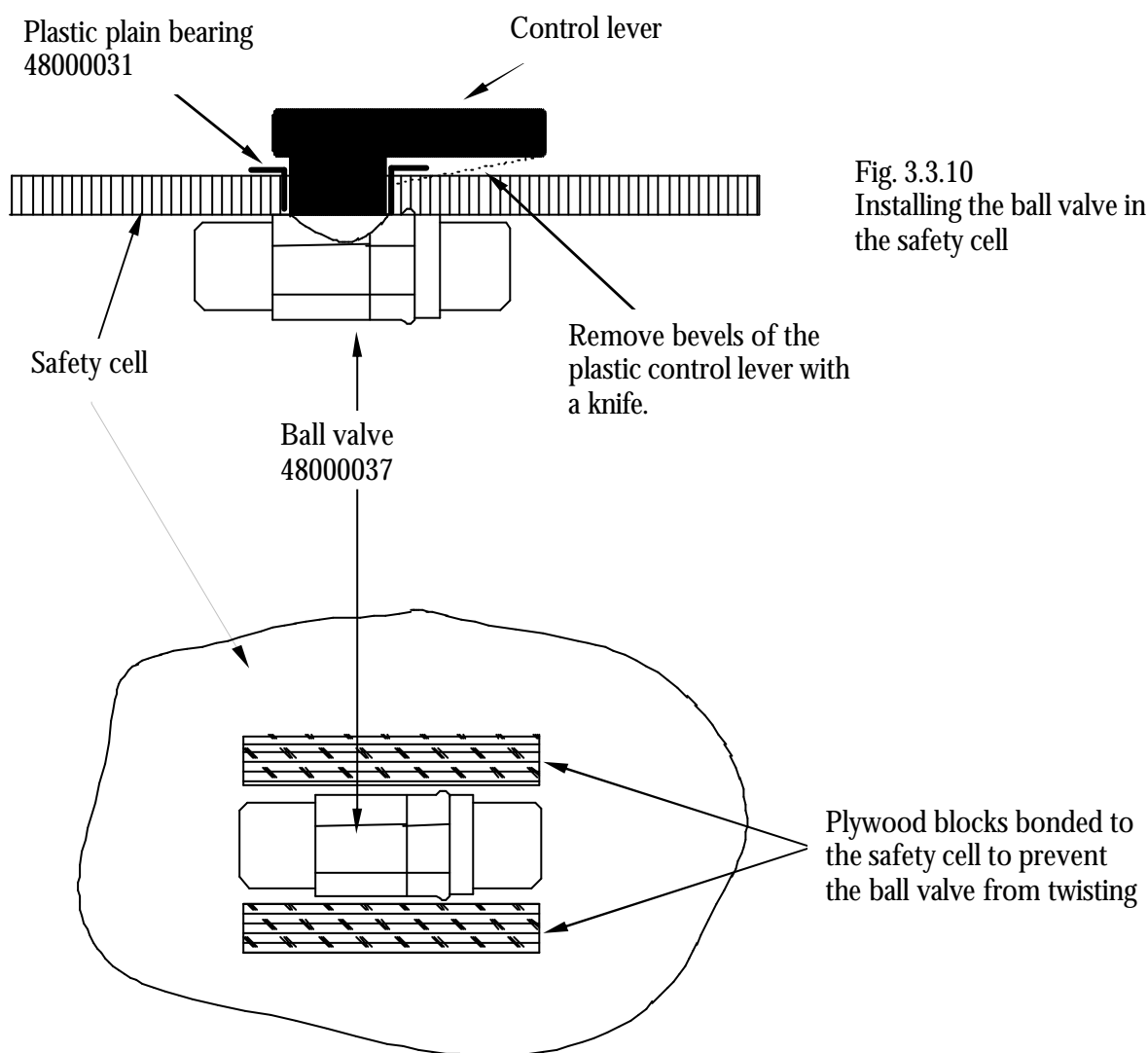
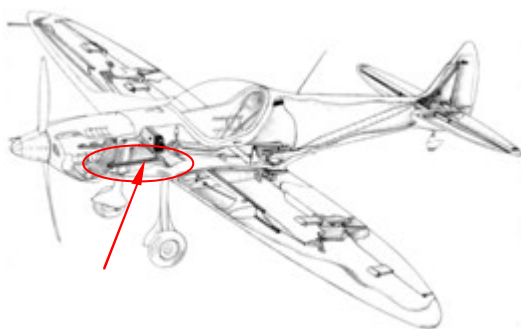


Fig. 3.3.10
Installing the ball valve in
the safety cell



3.4 Installing the Landing-Gear Actuator

Mechanism:

The retractable landing-gear is composed of three main components:

- Landing-gear actuator with mechanical emergency release
- Two landing-gear struts with hinge pins inclined at a specific angle
- Two aluminum push rods (no. 48000113) with rod-end bearings screwed into the ends

The acme-threaded lead screw in the landing-gear actuator is driven by a motor which moves the slide. The slide is stopped at its end positions by limit switches. See figure 3.4.2 for the function diagram.

Note: To ensure error-free operation, the acme-threaded lead screw must always be operated under tension! Therefore the position of the screw is adjustable by approx. 3mm (0.12") in axial direction. The screw retracts and extends the landing-gear.

The slide is fitted with a removable acme-threaded nut which allows manual release in case of an electrical fault. It is released by control cable no. 60000198 which is operated from the cockpit by release handle no. 48001023. Operating the control cable pulls the panel (with the taper-like arranged grooves) towards the pilot, so that the nut opens and the landing-gear is extended.

Note: During normal operation the ball-end of the control cable is secured at the motor with a securing wire (sealing wire) which can easily be removed. It has to be re-secured after each emergency release (see fig. 3.4.15).

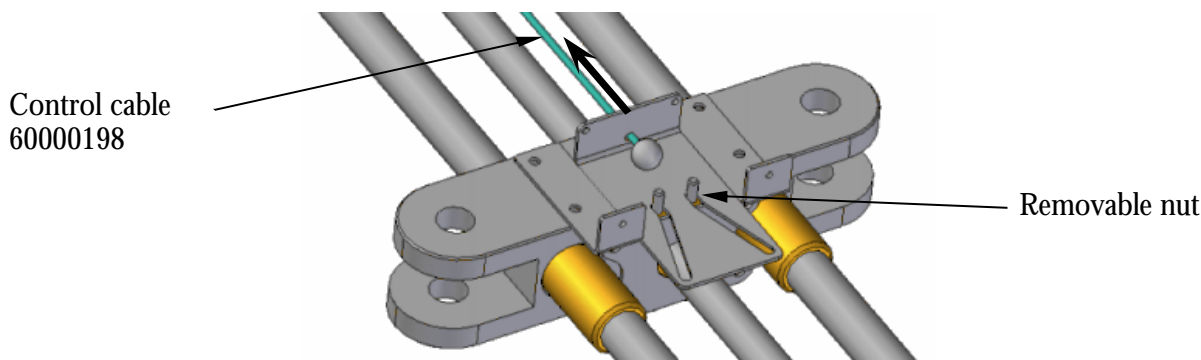
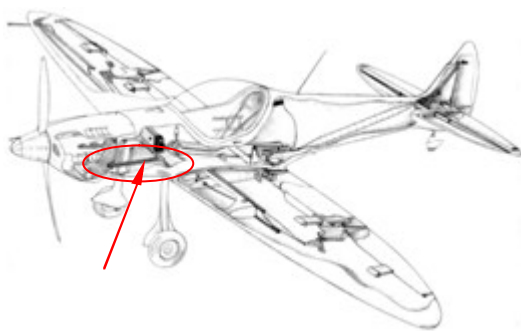


Fig. 3.4.1
Emergency release
for the landing-gear
actuator



Note: Due to the specific lever ratios the landing-gear can be retracted and extended with little force. In the final extended position the actuator is arrested; strong shocks from the landing-gear are directly transferred to adaptor plate no. 48000114, which is laminated onto the spar tunnel (see fig. 3.4.3).

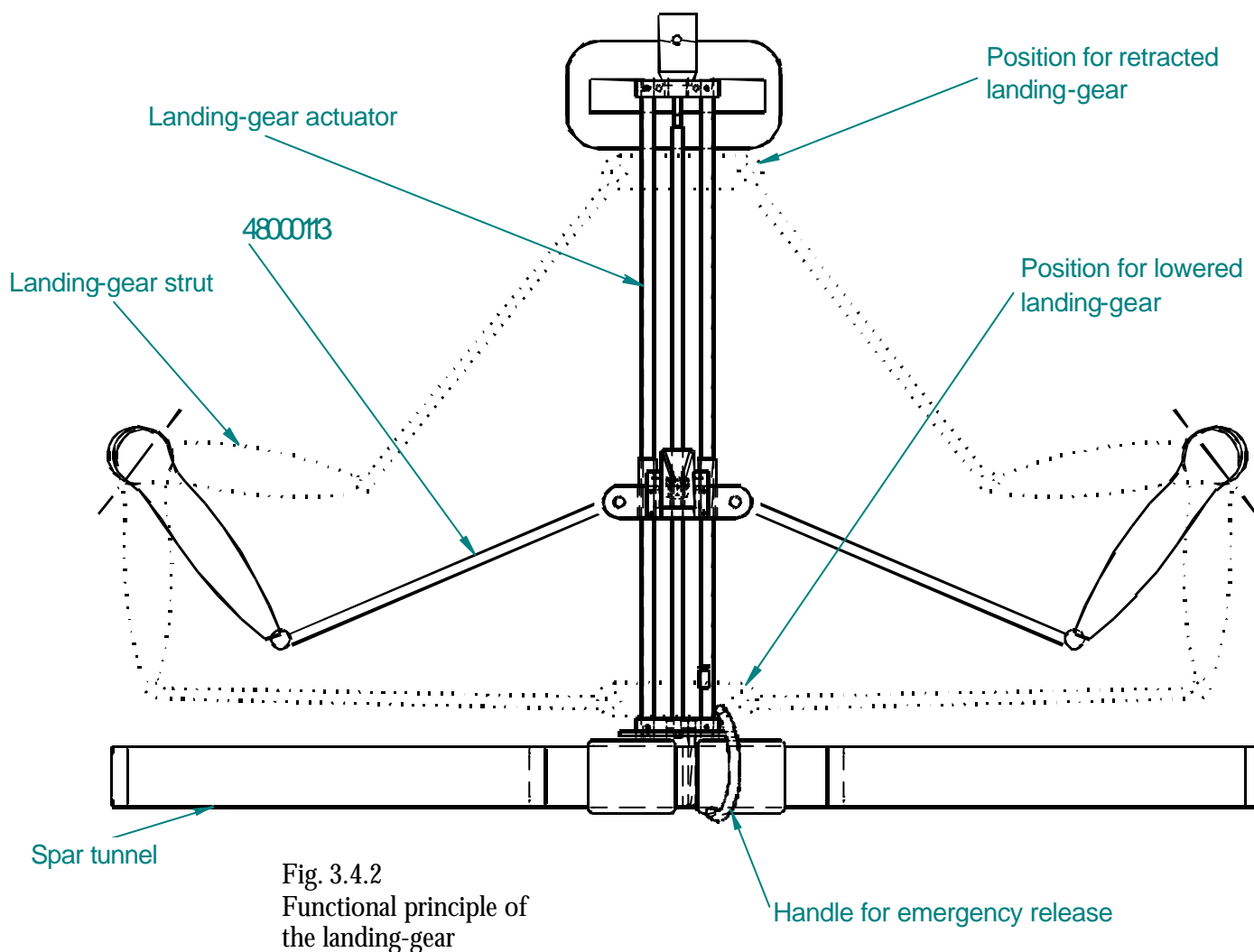
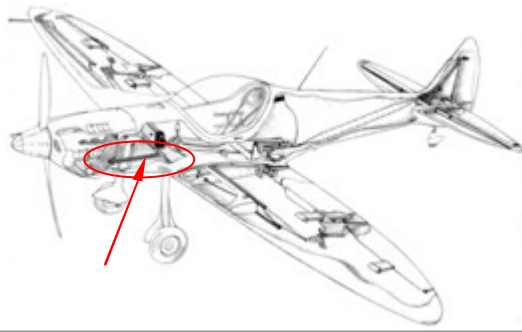


Fig. 3.4.2
Functional principle of
the landing-gear

Important: Do not subject the landing-gear struts to any loads when the slide is not at its stop for the extended gear position. If the actuator is subjected to one-sided loads while the slide is not at the stop, the landing-gear actuator may bend.



1. Scribe the fuselage at the front as shown in figure 3.4.3 and cut it with a keyhole saw.

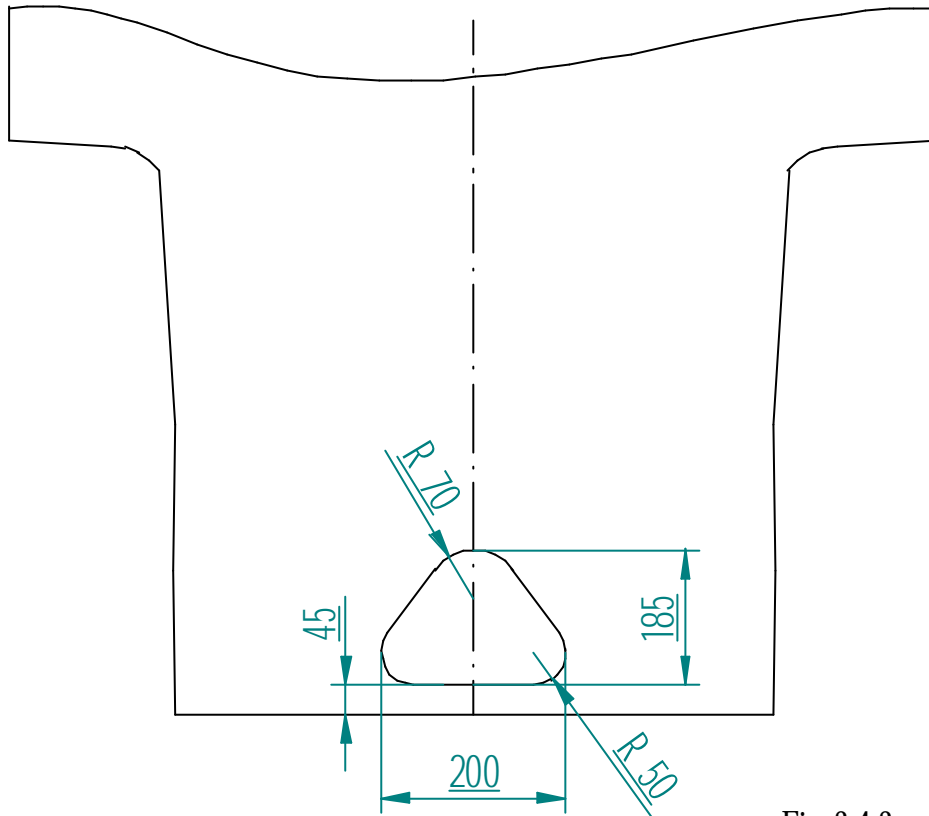


Fig. 3.4.3
Lower fuselage cut-out
behind the firewall



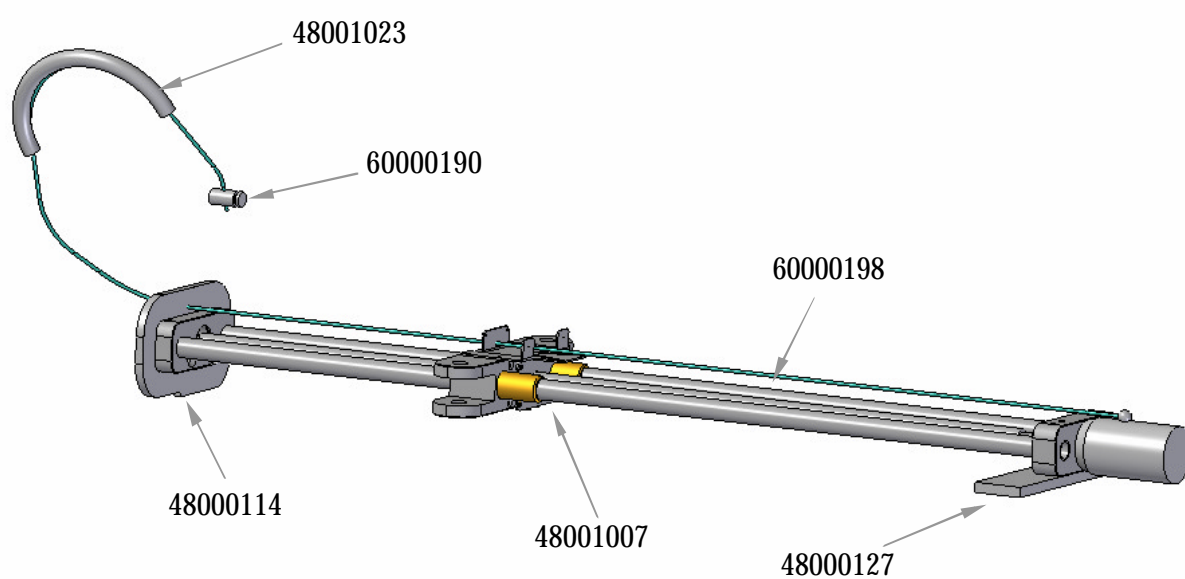
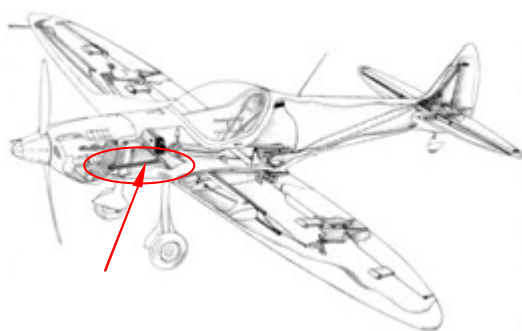
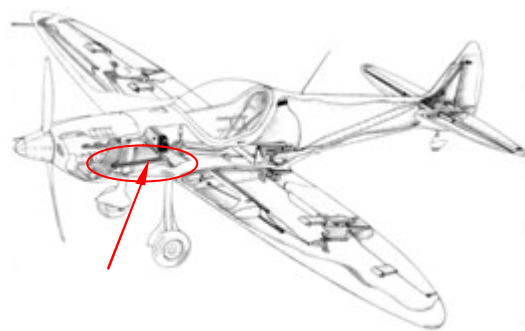


Fig. 3.4.4
Components for
installing the landing-
gear actuator

2. Scribe carbon-fiber reinforced plywood slat no. 48000127 at the locations shown in figure 3.4.5 corresponding to the actuator holes and drill the bores with a 7.5mm (0.30") drill.
3. Insert two M5 threaded inserts into the 7.5mm (0.30") bores from below and secure them with resin.
4. Fix carbon-fiber reinforced slat no. 48000127 with two 40mm (1.57") M5 screws no. 50054002 on the underside of the actuator.



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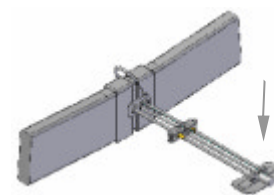
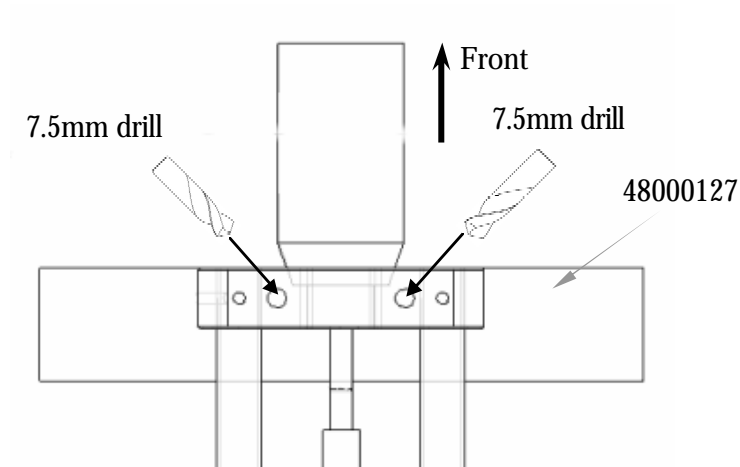


Fig. 3.4.5
Fixing the actuator on
the fuselage, engine
side

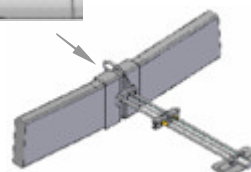
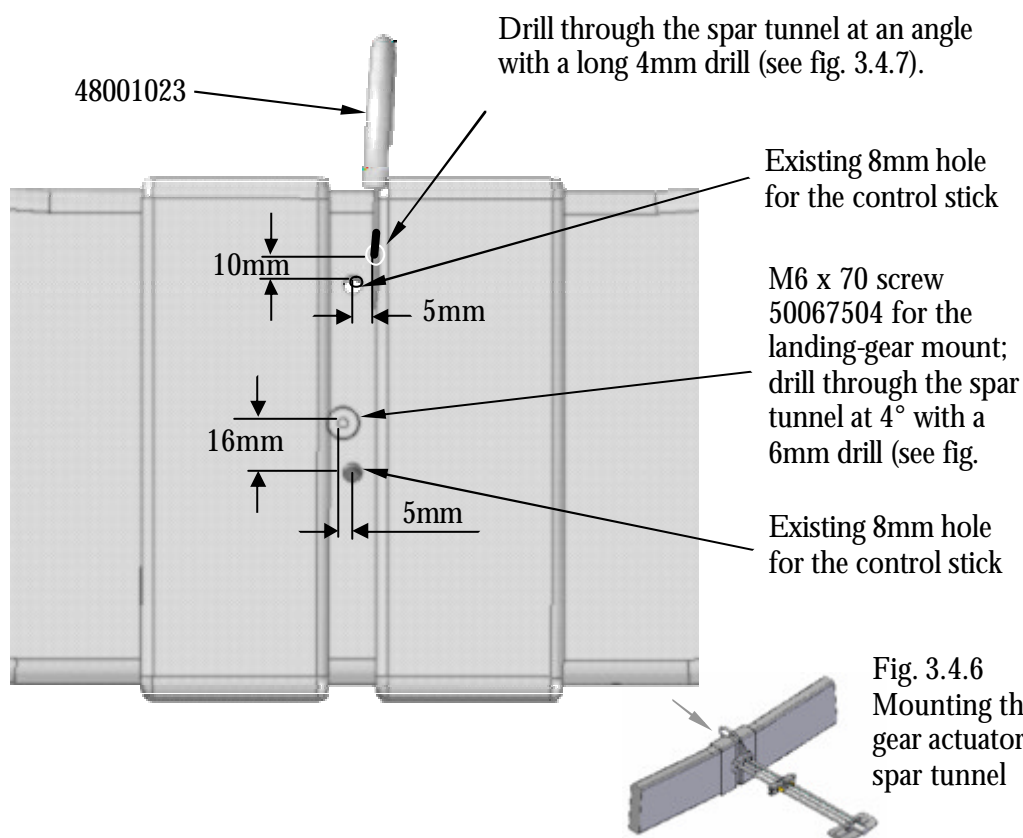


Fig. 3.4.6
Mounting the landing-
gear actuator on the
spar tunnel

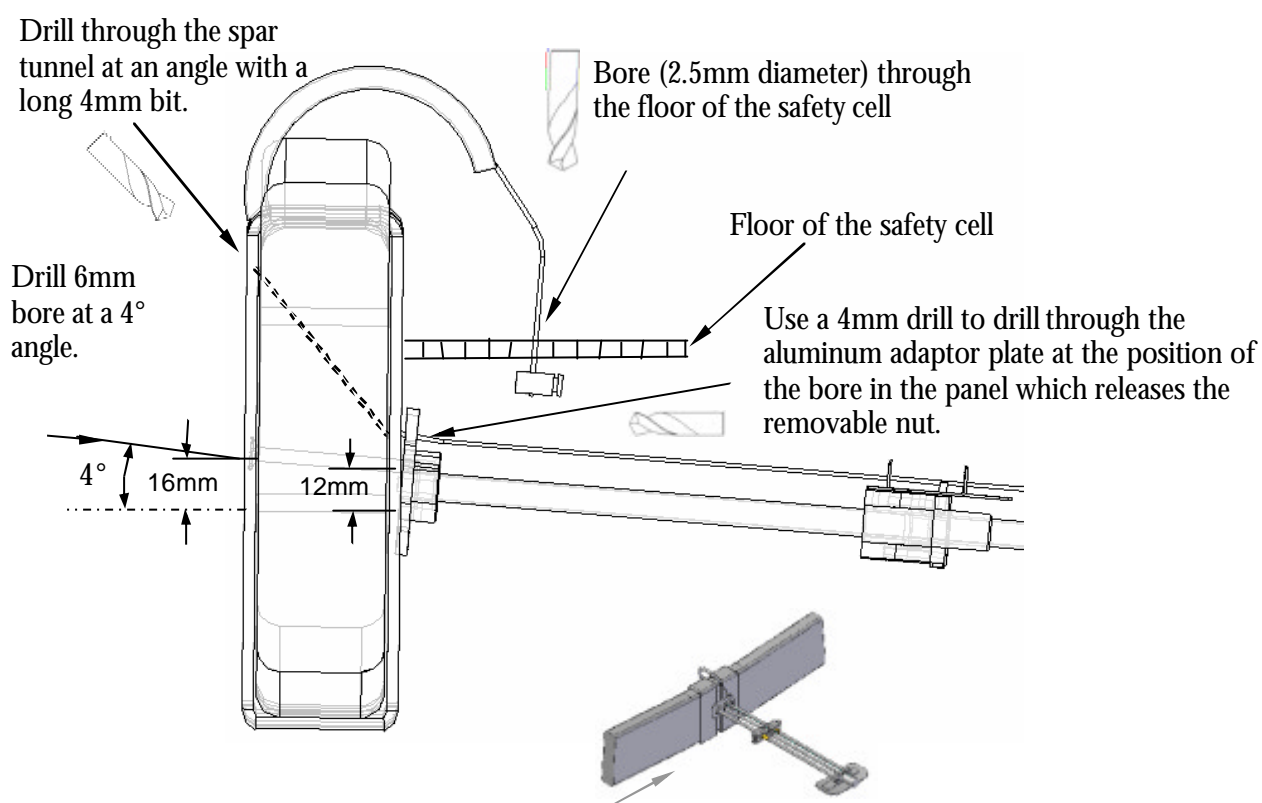
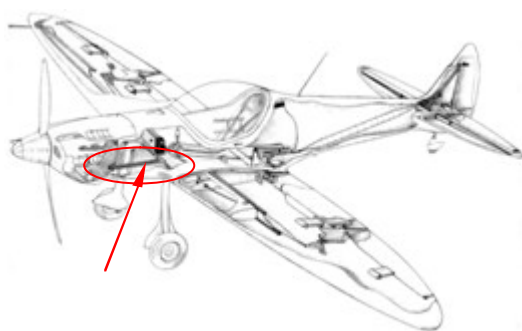


Fig. 3.4.7
Side view for drilling the
control cable duct
through the safety cell

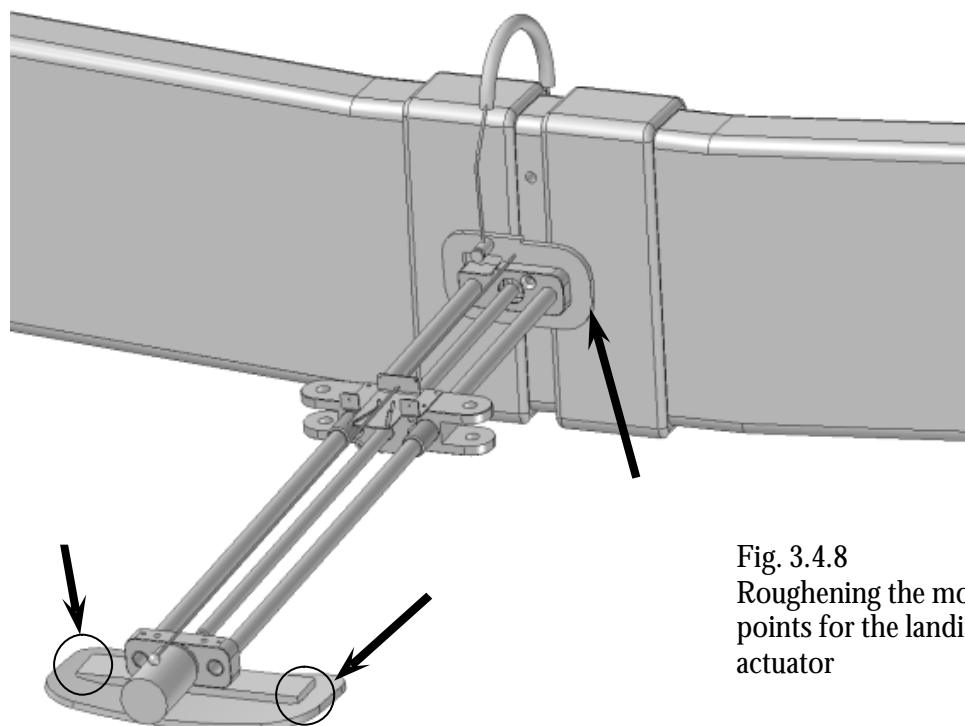
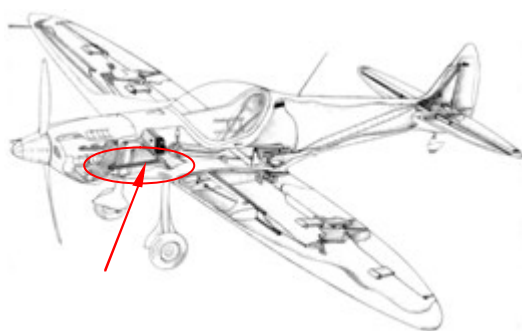


Fig. 3.4.8
Roughening the mounting
points for the landing-gear
actuator

5. Roughen the spar tunnel and the fuselage base with sandpaper in the areas indicated in figure 3.4.8.
6. Apply mold release wax to the landing-gear actuator and mask the actuator with adhesive tape as shown in figure 3.4.9. Slide aluminum adaptor plate no. 48000114 onto the landing-gear actuator. Fix the actuator to the spar tunnel with screw no. 50067504; tighten the screw only slightly. Align the actuator horizontally.

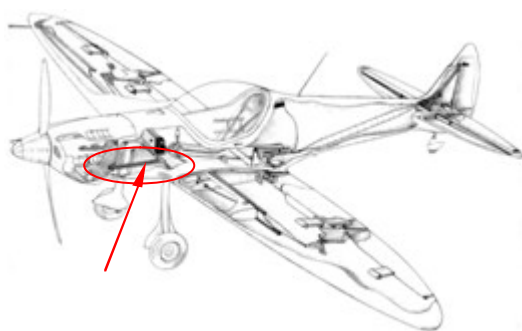


Fig. 3.4.9
Masked actuator with adaptor
plate slid on

7. Thread rod-end bearings no. 48000067 into both ends of push rods no. 48000113 and secure them with flat M10 nuts.
8. Install the push rods in the fuselage as shown in figure 3.4.2. Adjust their length in the extended landing-gear position so that the wheels point exactly in the direction of flight or 0.5° outwards (see fig. 3.4.10).

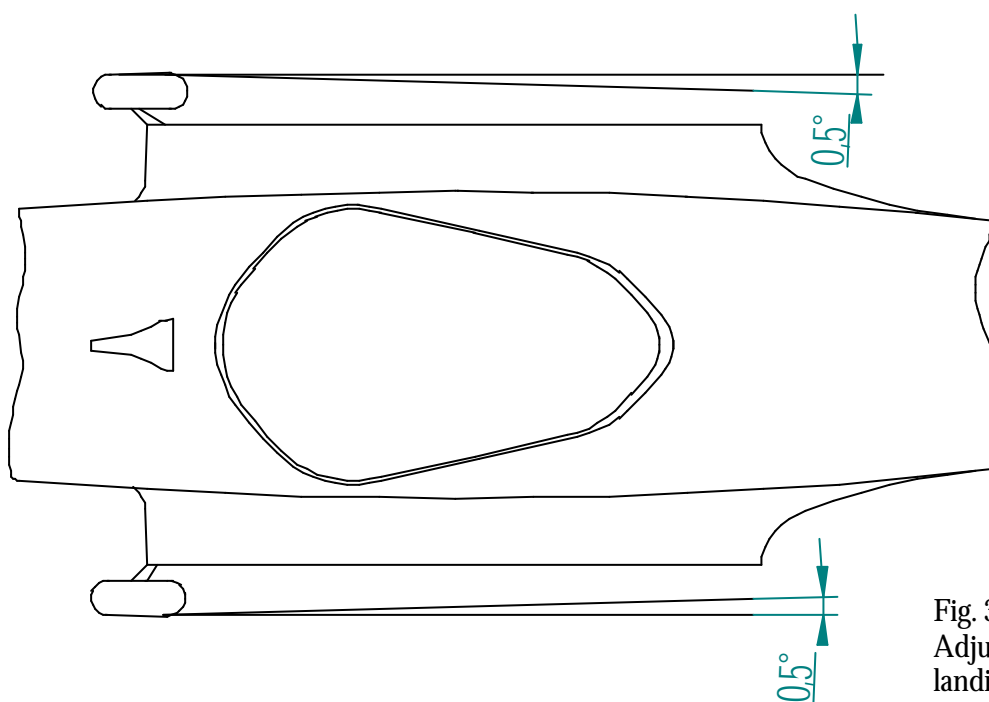
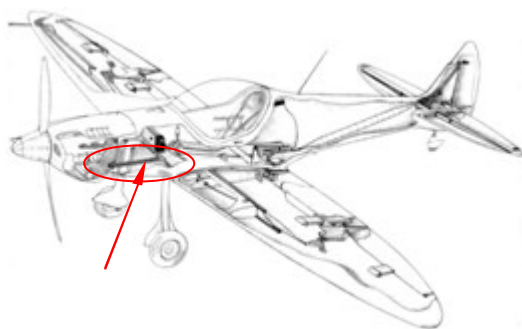


Fig. 3.4.10
Adjusting the
landing-gear trace



9. Retract the landing-gear using a 12V power supply or the electronic control until both landing-gear struts lie along the contour of the fuselage.

Caution: Since the actuator is fixed only on one side, you must support the motor during retraction (see fig. 3.4.11).



Fig. 3.4.11
Supporting the landing-gear actuator

10. Align the landing-gear struts correctly in the retracted position by moving the mechanism on the drive motor to the left or right.

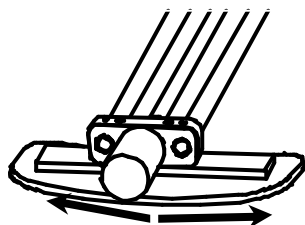


Fig. 3.4.12
Aligning the landing-gear struts in the retracted position

11. After positioning the drive motor, bond adaptor plate no. 48000114 and attachment slat 48000127 to the fuselage with CF.
12. Remove the landing-gear actuator from the fuselage and reinforce the adaptor plate and the attachment slat as shown in figure 3.4.13.

Note: Close the the actuator hole in the adaptor plate with plasticine to prevent resin from entering the hole.

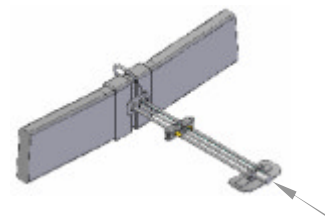
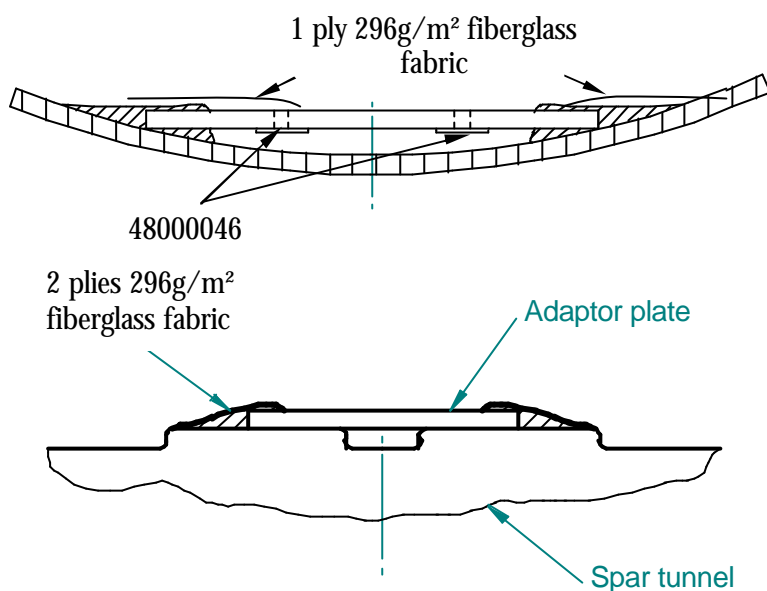
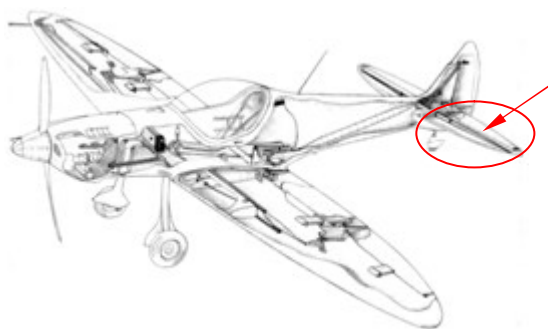
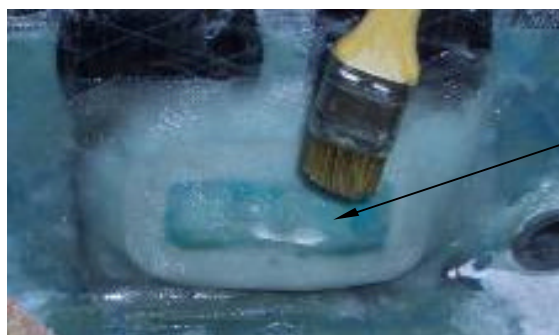
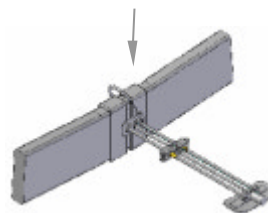


Fig. 3.4.13
Bonding the mounting
points for the landing-
gear actuator



Plasticine (blue)

Fig. 3.4.14
Laminate the adaptor
plate to the spar tunnel

13. To pass the control cable through the spar tunnel, bend a wire as shown in figure 3.4.15 and use this to insert a plastic tube into the emergency release bores in the spar tunnel. Bond the plastic tube into the bores.
14. After painting, pull the control cable through the plastic tubes in the spar tunnel and release handle no. 48001023. Secure the cable under the safety cell with cable clamp no. 60000190 (see fig. 3.4.7).

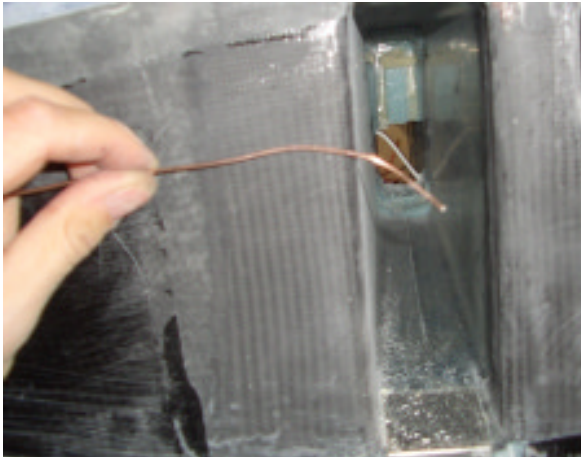
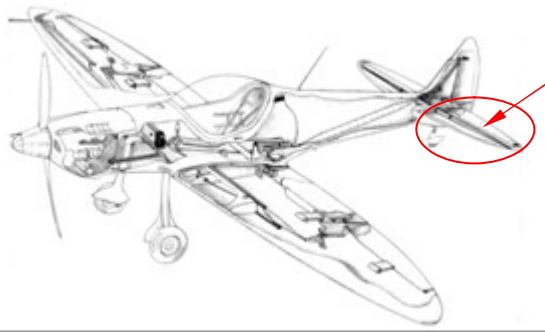


Fig. 3.4.15
Auxiliary wire for inserting
the plastic tubes for the
landing-gear emergency
release



Fig. 3.4.16
Inserted plastic tube for the
landing-gear emergency release

15. Secure the ball-end of the control cable on the motor with a thin wire (sealing wire, diameter less than 0.3mm [0.01"]) as shown in figure 3.4.17.

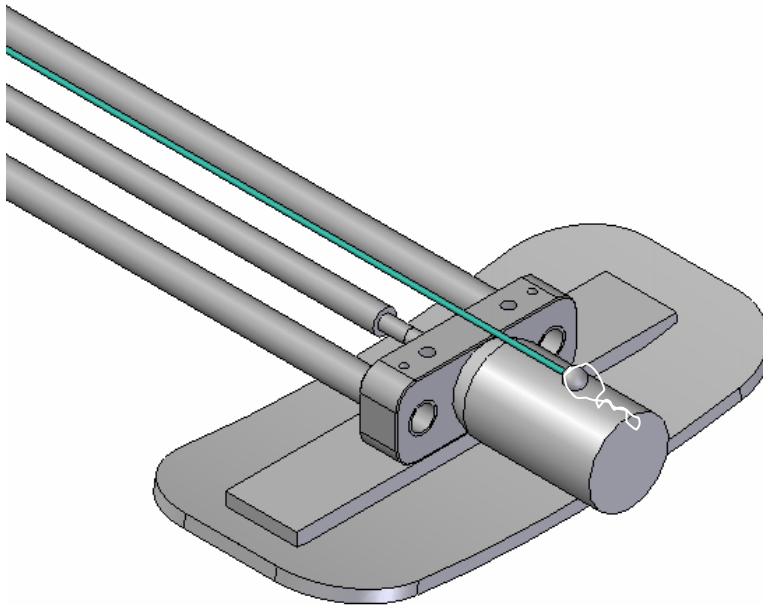
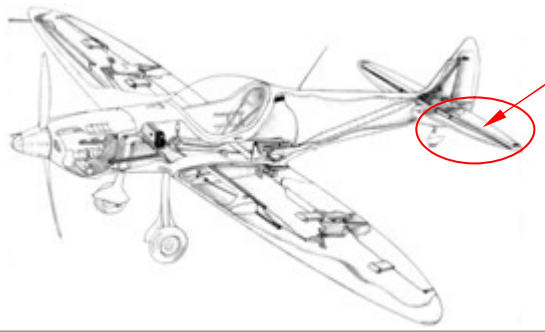


Fig. 3.4.17
Securing the
control cable

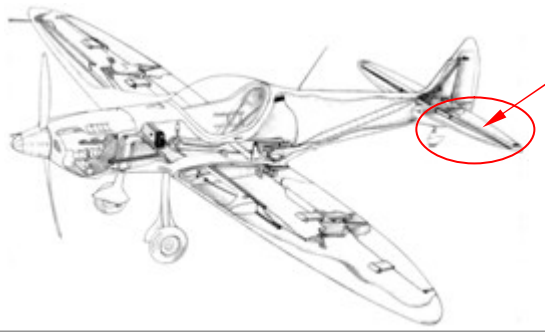
Function test:

Test the manual operation of the retractable landing-gear using the control cable for correct functioning while the fuselage is jacked-up. Switch off the main switch to prevent immediate electrical retraction of the landing-gear. The wings must be mounted for the test to simulate flight conditions.

Important: Since the landing-gear is not subjected to wind pressure when the fuselage is stationary, a helper must slightly push the landing-gear backwards by the wheels, so that it does not fall out suddenly. Otherwise the landing-gear might be damaged.



Fig. 3.4.18
Aircraft jacked-up



3.4 Fitting an Undercarriage warning System PFA MOD 329/007

Due to the undercarriage of the Twister being retractable it is essential that an undercarriage warning system is fitted. The warning system is a simple electric circuit fitted to the flap, throttle and undercarriage systems so that if the flaps are lowered or throttle closed when the gear is up a warning light or claxon will alert the pilot and remind him to lower the undercarriage before landing. The electronic circuit is a simple series of micro switches that are fitted to the aircraft in figs 3.4.1 and 3.4.2. When the aircraft is in an unsafe configuration the micro switch relays are closed and 12 volts from the aircraft main bus bar will be supplied to the warn light or horn.

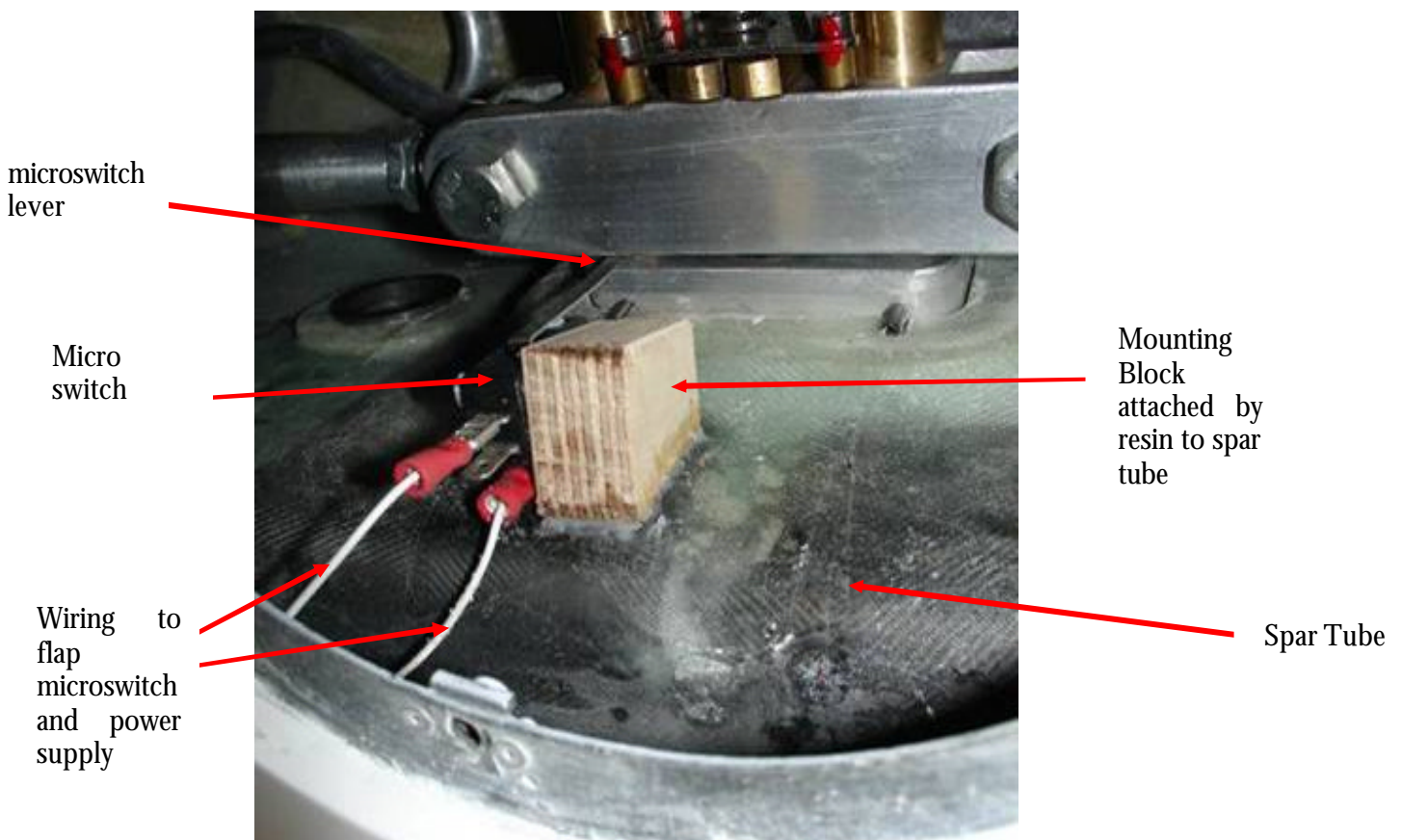
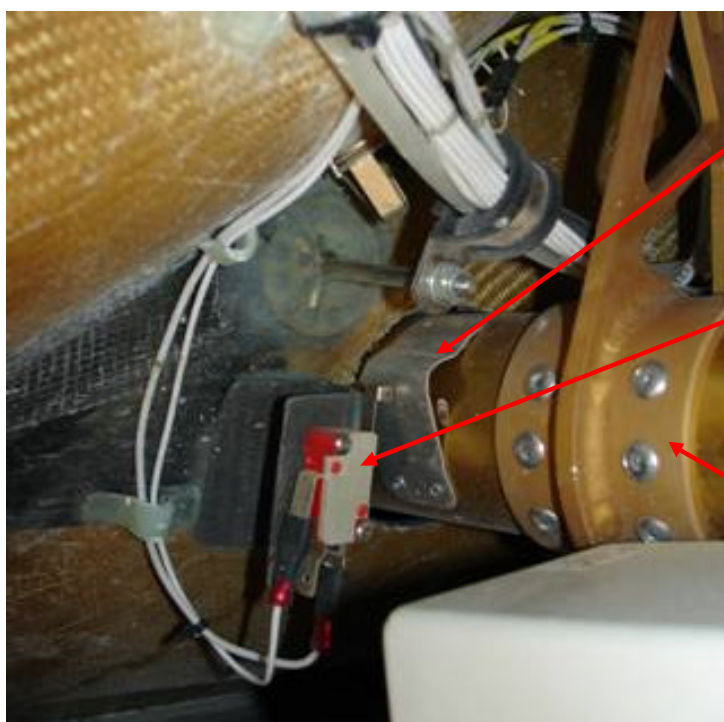
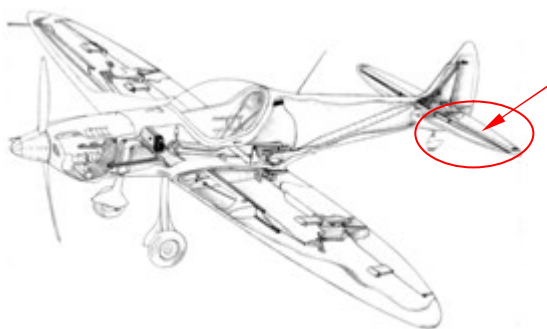


Fig 3.4.1 Gear micro switch viewed from beneath



Ramp to activate
microswitch above 10
degrees flap

Flap micro
switch

Flap torque
tube

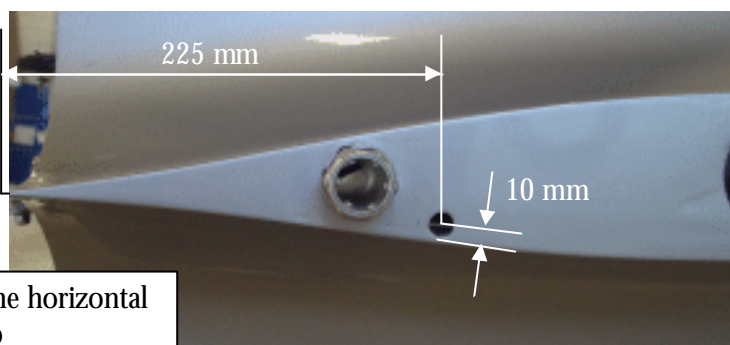
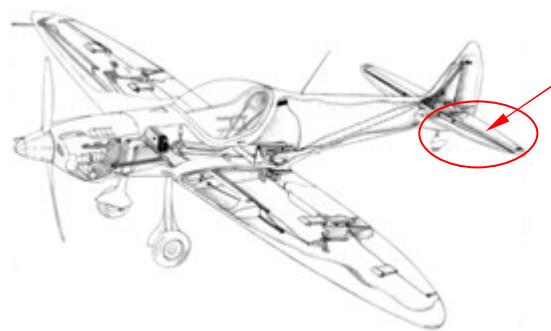
Fig 3.4.2 Flap Micro switch system

3.5 Installing the Horizontal Stabilizer with Securing Wire

Cut the scribed openings into the root rib of the horizontal stabilizer on the fuselage (front torsion pin, hole for the elevator drive).

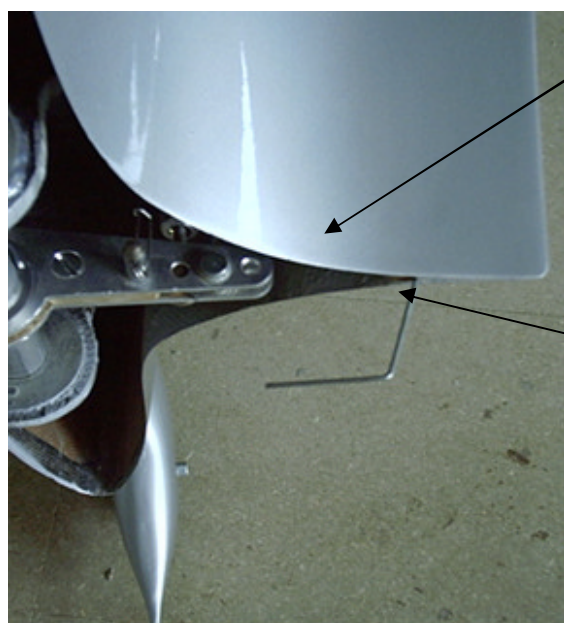
Installing the Securing Wire

Note: Lay a 2mm (0.08") stainless steel wire in a thin, empty tube towards the position of the securing pin for the horizontal stabilizer and bond it in place with CF. Determine and secure the exact position of the pin in the stabilizer by moving the horizontal stabilizer up to the fuselage and bonding the pin.



Trailing end of the horizontal stabilizer root rib

Fig. 3.5.1
Position of the hole
for securing the
horizontal stabilizer



Locking hook
48000115 bonded
with cotton/resin
mix

2mm stainless
steel securing wire
laid in empty
plastic tube

Fig. 3.5.2
Securing wire in extended
position

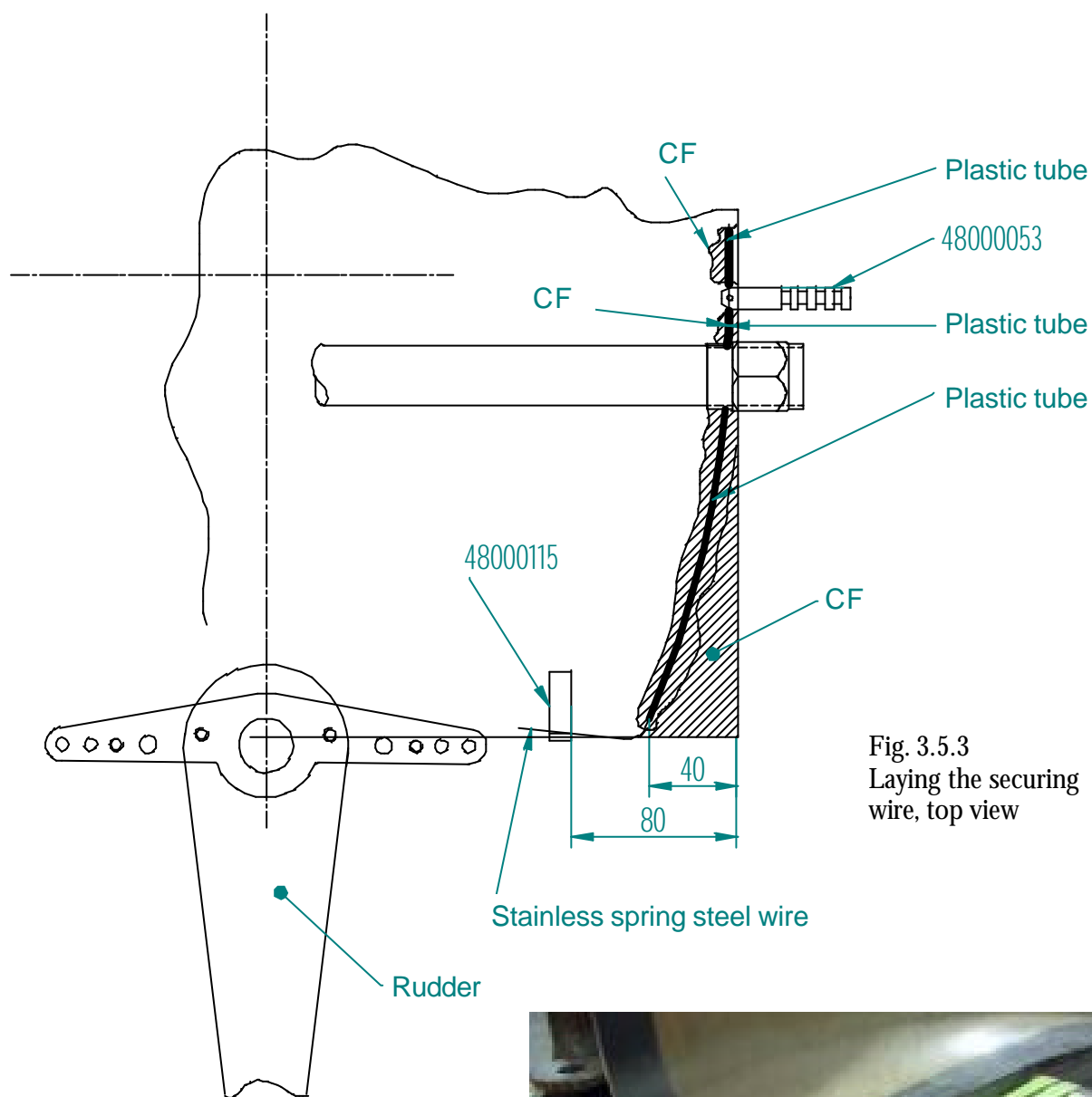
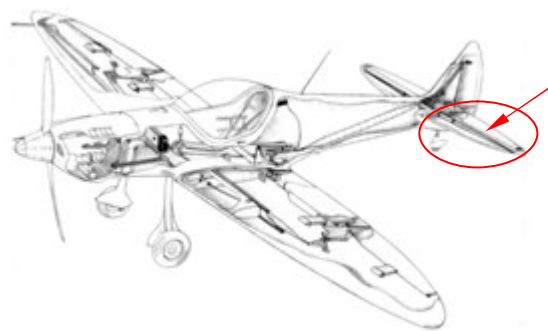
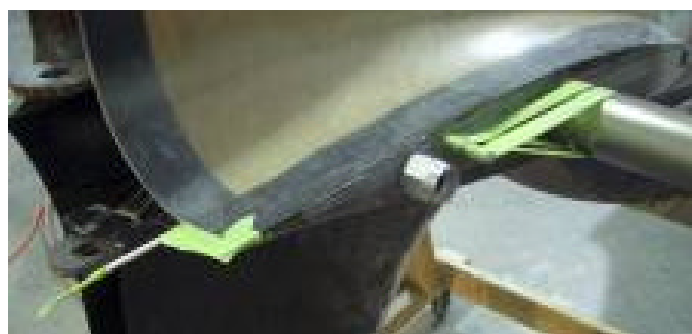
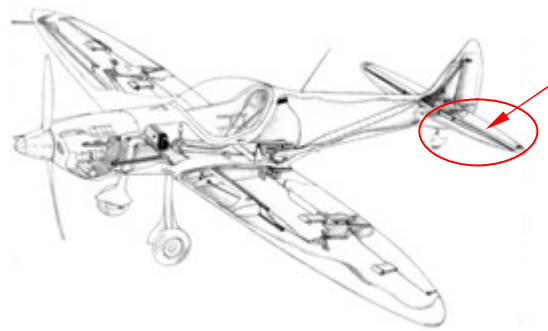


Fig. 3.5.3
Laying the securing
wire, top view

Fig. 3.5.4
Fixing the wire, securing pin
and tube with adhesive tape





Fuselage

3

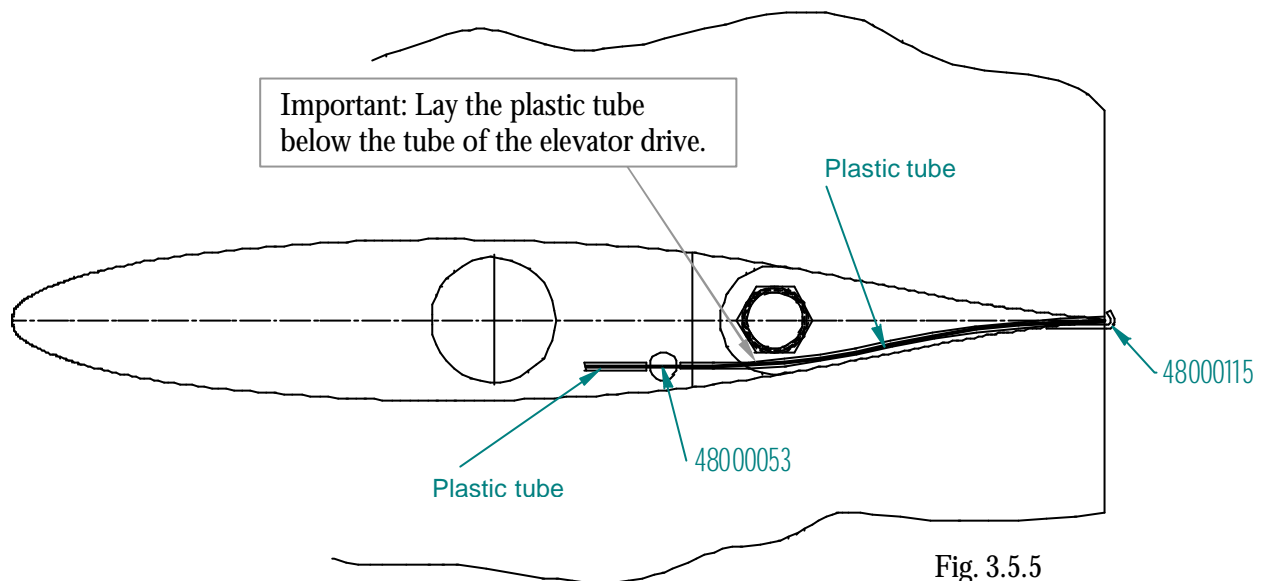


Fig. 3.5.5
Laying the securing
wire, side view



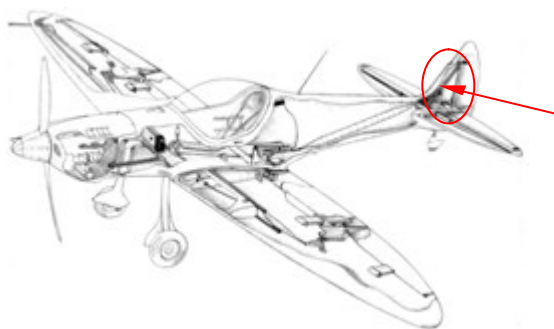
CF

Fig. 3.5.6
Bonding the plastic
tube with CF



Bond the securing pin into the
horizontal stabilizer with CF.
Important: the pin must be
completely enclosed by CF.

Fig. 3.5.7
Test before bonding the
securing pin into the
horizontal stabilizer



3.6 Installing the Ribs in the Rudder Assembly

1. Fit the top and bottom ribs (from set no. 28000004) so that they touch the center of the horizontal stabilizer tube and the sides of the fuselage (see fig. 3.6.1). This requires adjusting the slant of the ribs. (Slide the aluminum pipe into the fiberglass tube to prevent the fiberglass tube from distorting.)
2. Fix both ribs with superglue.
3. Laminate all joins with 40mm (1.57") fiberglass tape. Fill the gaps between the fiberglass tube and the fuselage with CF.

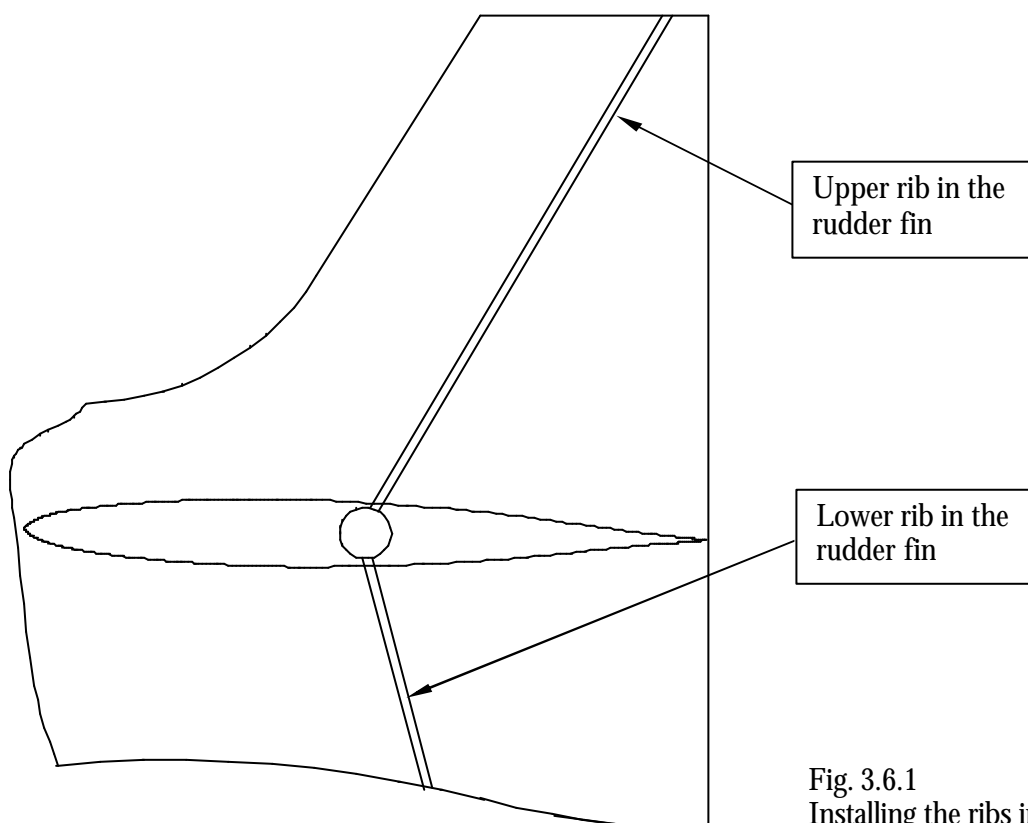
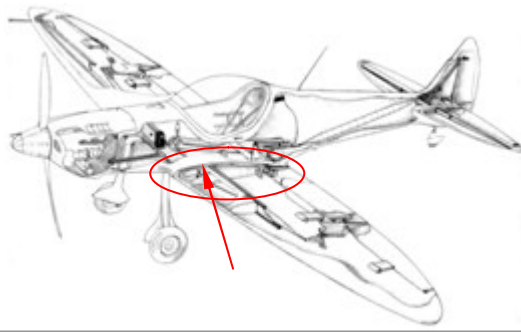
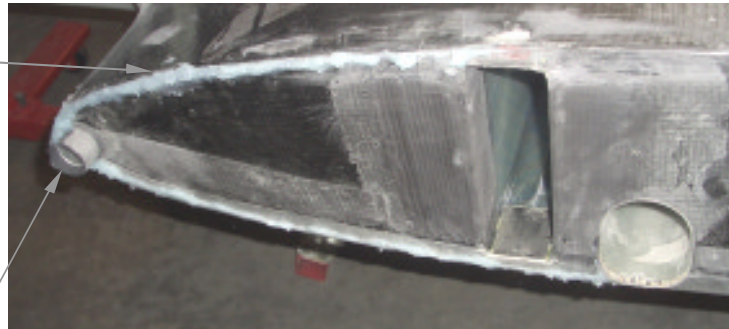


Fig. 3.6.1
Installing the ribs in the
rudder assembly

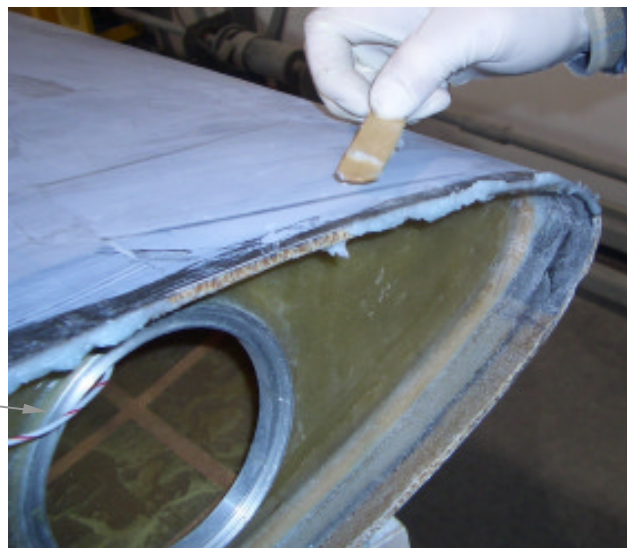


3.7 Mounting the Wings

Mask the contour with adhesive tape, apply mold release wax and coat with CF.



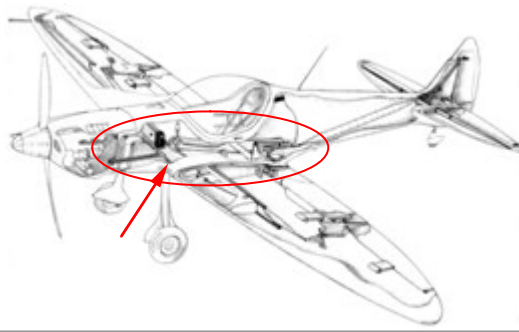
Slide plastic plain bearing 48000151 onto the pins on the fuselage.



Fill the open honeycomb with CF.



After the assembly has cured on the fuselage, sand the excess CF flush to the surface.



3.8 Installing the Fuselage Base

Note: Since the open fuselage allows for easier working, complete all tasks which can be carried out with the fuselage open, before installing the base.

Complete the following tasks before installing the fuselage base:

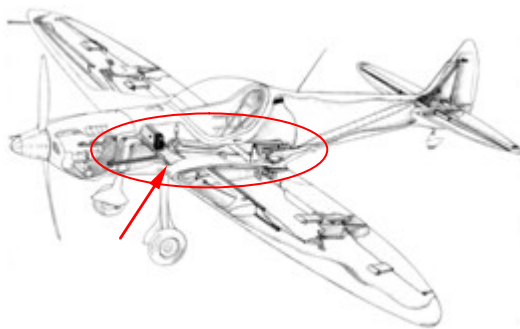
1. Attaching the safety cell to the side walls of the fuselage

Connection with
microballoon/resin
mix in the area of
the pilot's elbow



Fig. 3.8.1
Bonding the side
walls of the safety
cell to the fuselage

2. Installing the landing-gear actuator
3. Mounting the wings on the fuselage
4. Drilling the holes for the eccentric spar pins and inserting the plastic bearings
5. Installing the control stick
6. Installing the flap drive
7. Filling the cavities between fuselage and safety cell for the air supply
8. Creating the chafing-protected ducts for the wiring harness
9. Creating the cut-outs for the aileron drive in the safety cell
10. Fixing the baggage securing eyes in the safety cell



11. All tasks which simplify the final mounting of the safety belts
12. Preparing the installation of the aerals in the back of the fuselage
13. Bond the connection points of the safety cell to the side walls of the fuselage with microballoon/resin mix.
14. Create the airbox for cockpit ventilation by applying PU foam seals in the front area above the safety cell (see fig. 3.8.3). Use a one-component PU foam. With a hose of 500mm (19.69") length you can also reach the more inaccessible areas.

Note: Insert tubes with the same diameter as the air vents into the canopy frame to prevent the PU foam from blocking the vents.

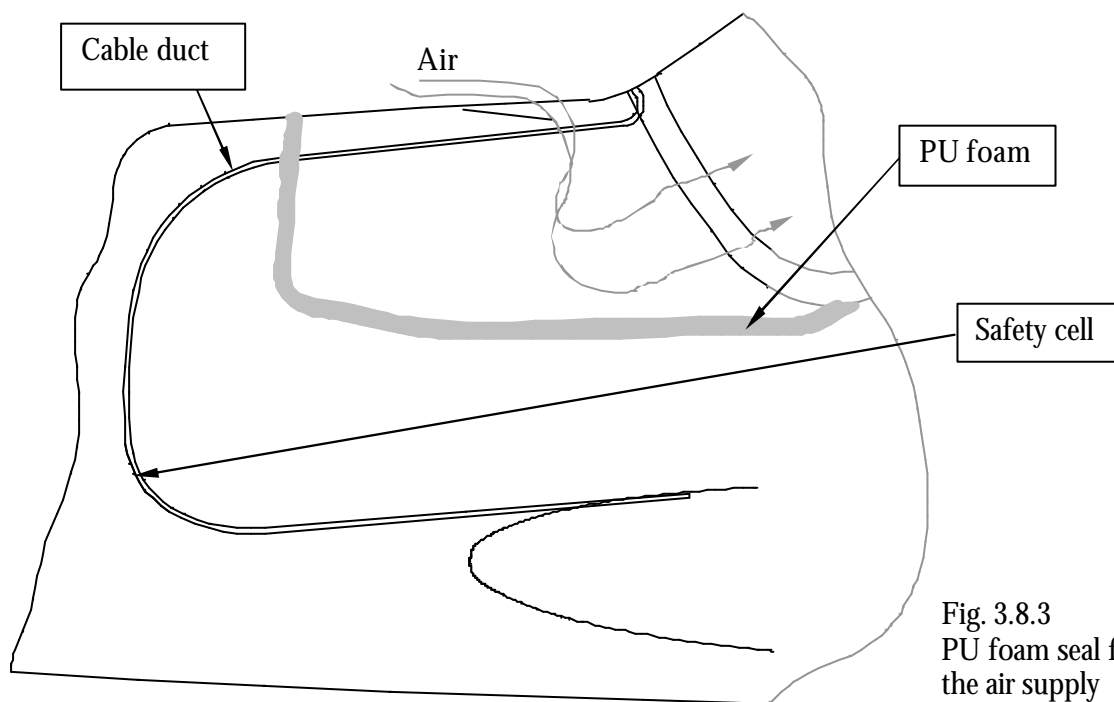
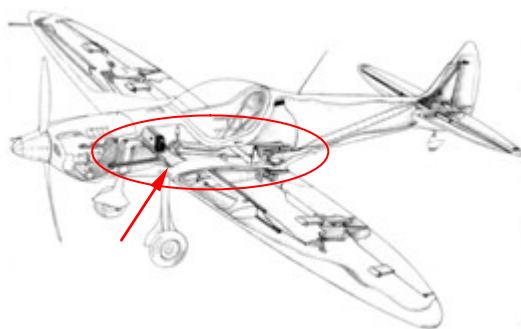


Fig. 3.8.3
PU foam seal for
the air supply

15. Apply mold release wax to both landing-gear bolts and thread them into the landing-gear mount. This aligns the bolt bushings and prevents them from accidental bending during the subsequent assembly of the fuselage bottom.



When all tasks listed above have been completed, you can install the fuselage base.

1. With the wings mounted, scribe and cut the root rib on the underside area flush to the wing contour.
2. Turn the fuselage upside down and place the fuselage base on the fuselage to see which areas need adjustment.
3. Since the fuselage base always has to be tautened somewhat, try to push and pull it into place so that it fits the fuselage as closely as possible, before bonding it. The clamps used for the adjustment should also be used for the subsequent bonding: : C-clamps, ratchet straps, adhesive tape, plywood slats. Place them over the seam on the inside and the outside and bolt them together.

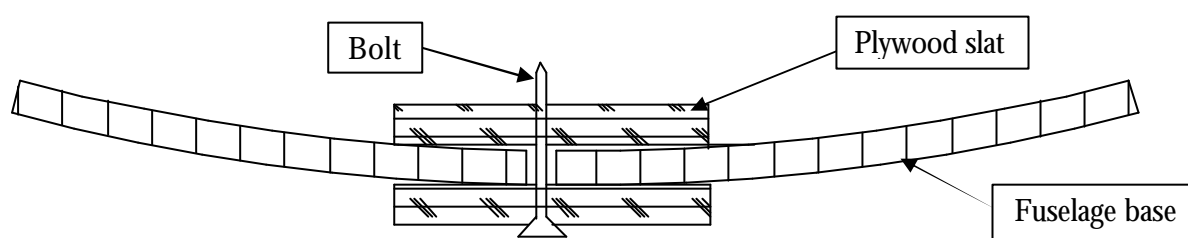


Fig. 3.8.4
Fixing the fuselage base on the
fuselage shells

Note: The fuselage base is tempered and stored as a separate part. Tempering and storage can cause a certain degree of warping in FRP parts, however this warping can be compensated by the clamping methods described in step 3.

4. Bond the fuselage base to the following points: entire edge of the fuselage base, drive mount, spar tunnel, and safety cell (see fig. 3.8.5).

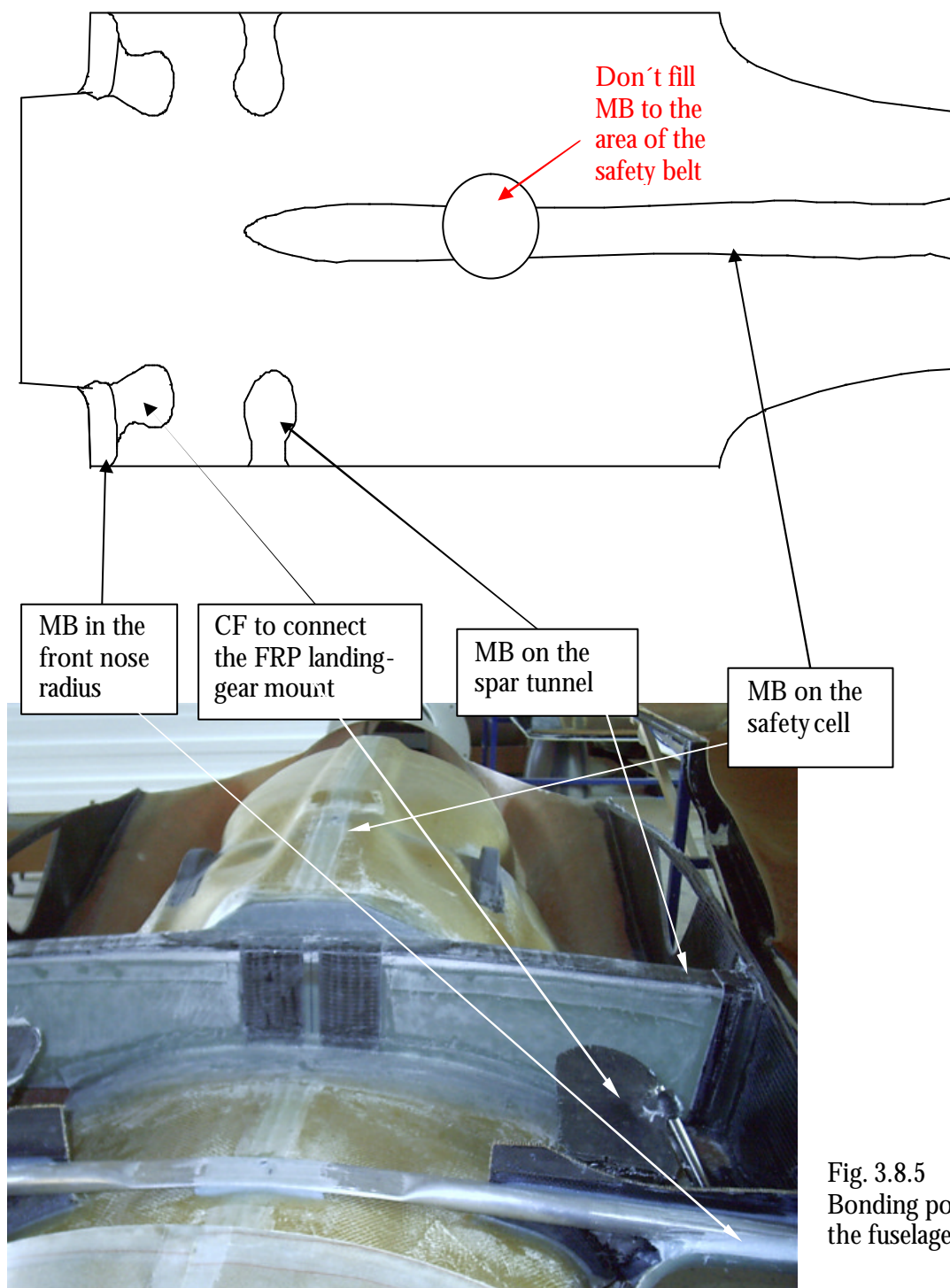
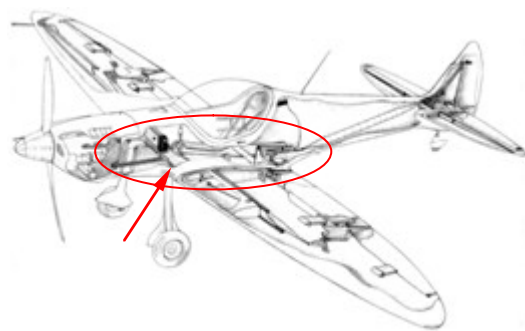
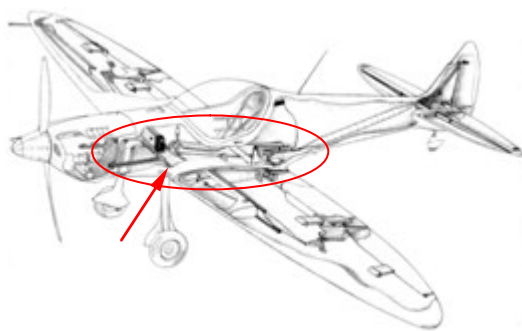


Fig. 3.8.5
Bonding points for
the fuselage base



5. Remove the peel-ply from the bonding surfaces and roughen them.
6. Round the root rib and the fuselage base.

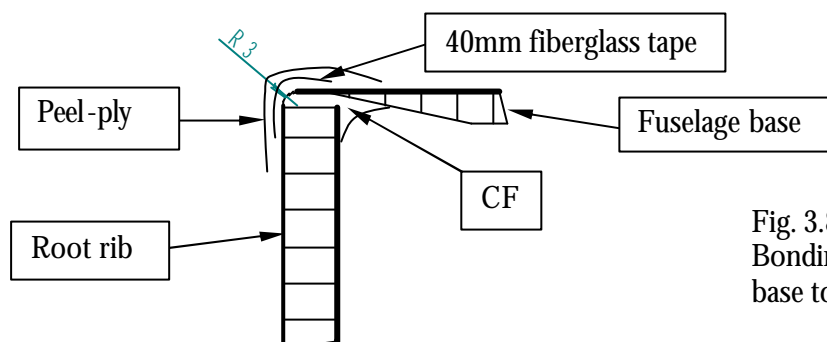
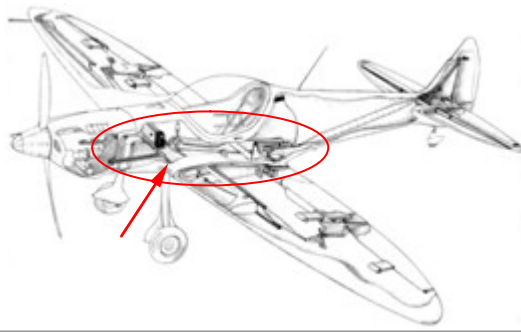


Fig. 3.8.6
Bonding the fuselage
base to the root rib

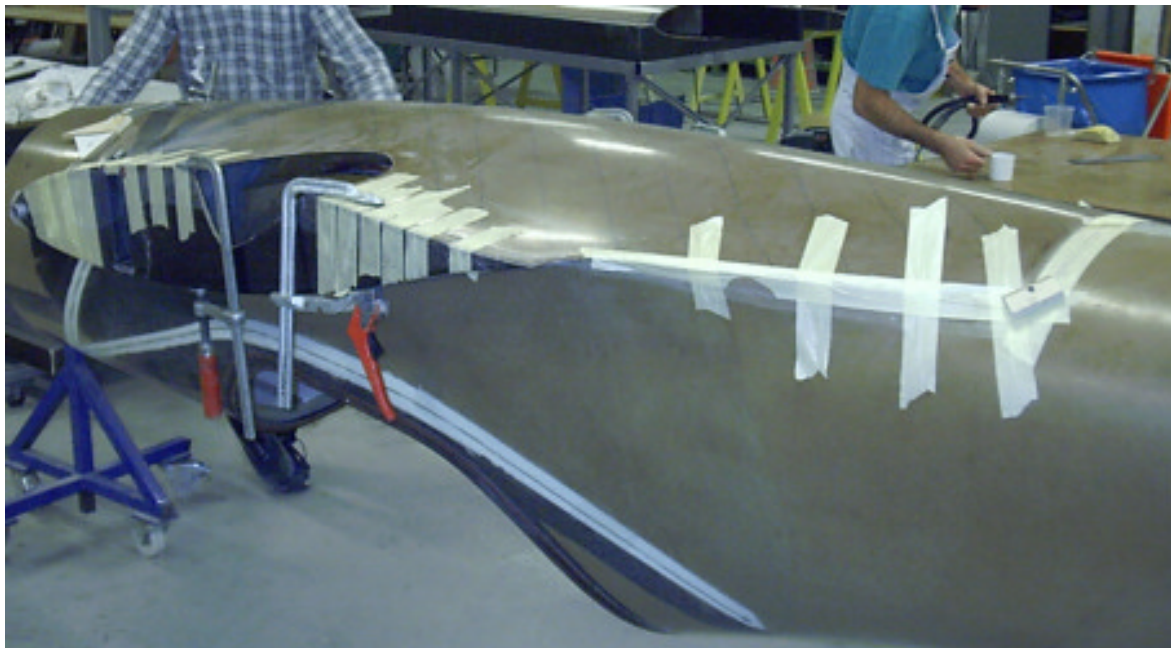
7. Apply cotton/microballoon/resin mix to the safety cell, the root rib, the spar tunnel and the landing-gear mount as shown in figure 3.8.5. Coat the bonding areas of the fuselage base with resin.
8. Position the fuselage base and laminate the seams on the inside and outside with 40mm (1.57") fiberglass tape. At the root rib it is sufficient to apply fiberglass tape only on the outside and to fill the inside corner to a radius of 5mm (0.20") with CF (see fig. 3.8.6).



Fig. 3.8.7
Bonding the
fuselage base



9. Fix the fuselage base as shown in figure 3.8.8. and press it into place using the clamps described and tested in step 3.



10. Cut the service opening for the retractable landing-gear and the fuel pump into the fuselage base with a keyhole saw.

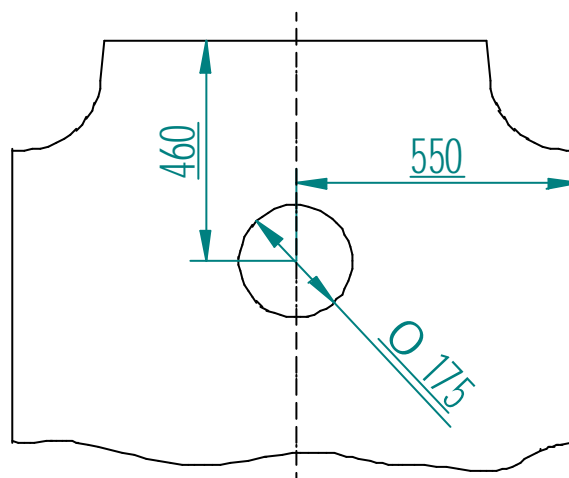
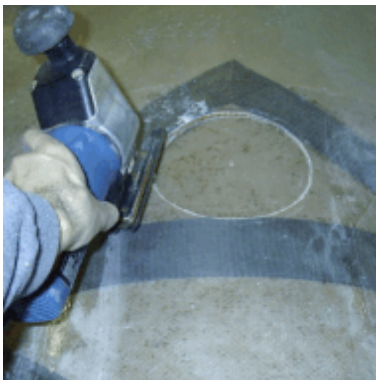
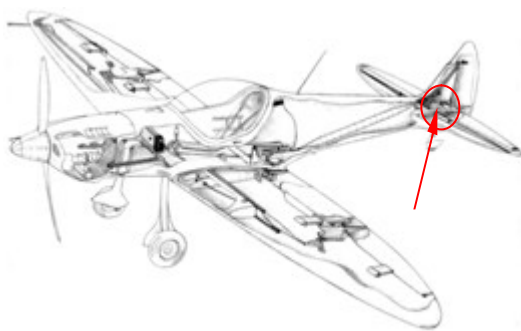


Fig. 3.8.9
Cutting the service opening for
the landing-gear



3.9 Installing the Elevator Bellcrank

1. Clamp self-aligning bearing no. 48000116 with a parallel-sided pipe, which only presses against the outer ring of the bearing, in a box-column drilling machine.

Important: Clamping the bearing requires much force. You can heat the elevator bellcrank with a hair dryer so that less force will be needed. The outer bearing ring might rupture, if the two clamping faces are not parallel or if the ring is subjected to shocks!

2. Secure the bearing against displacement by four center-punch marks from each side as shown in figure 3.9.1.

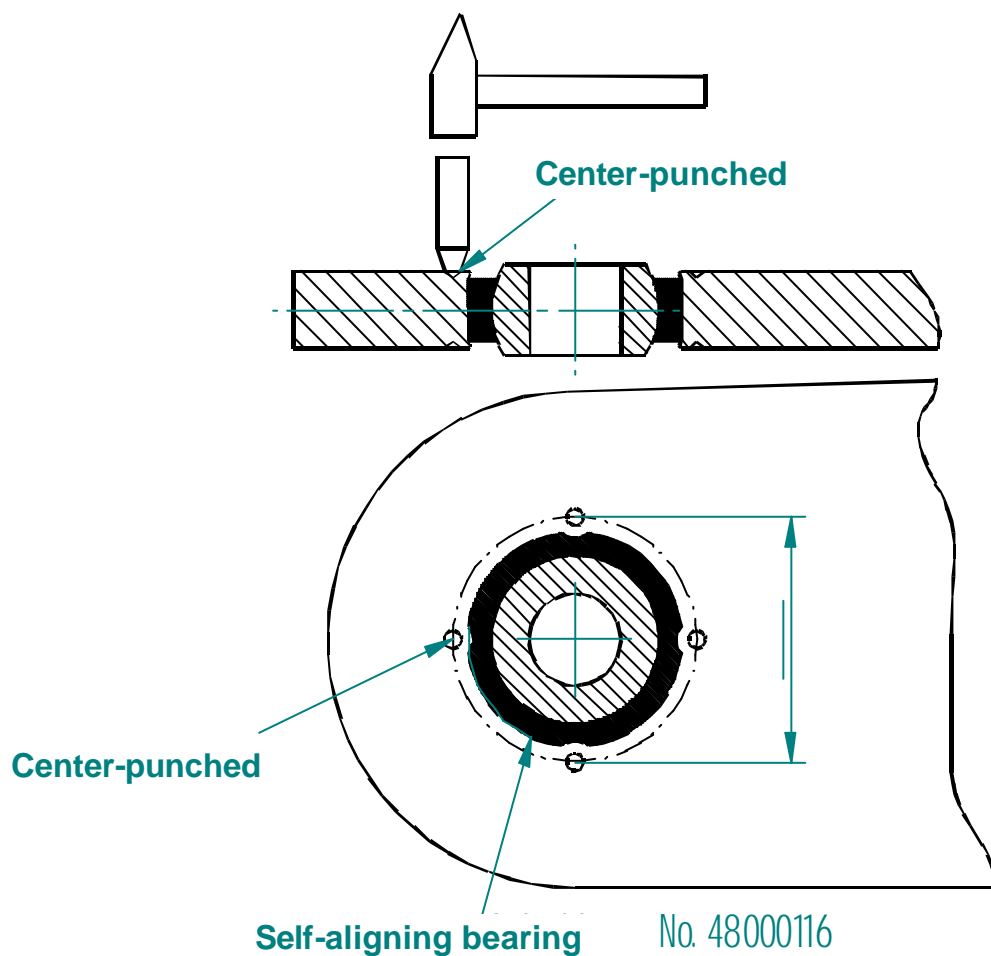


Fig. 3.9.1
Center-punching
the self-aligning
bearing

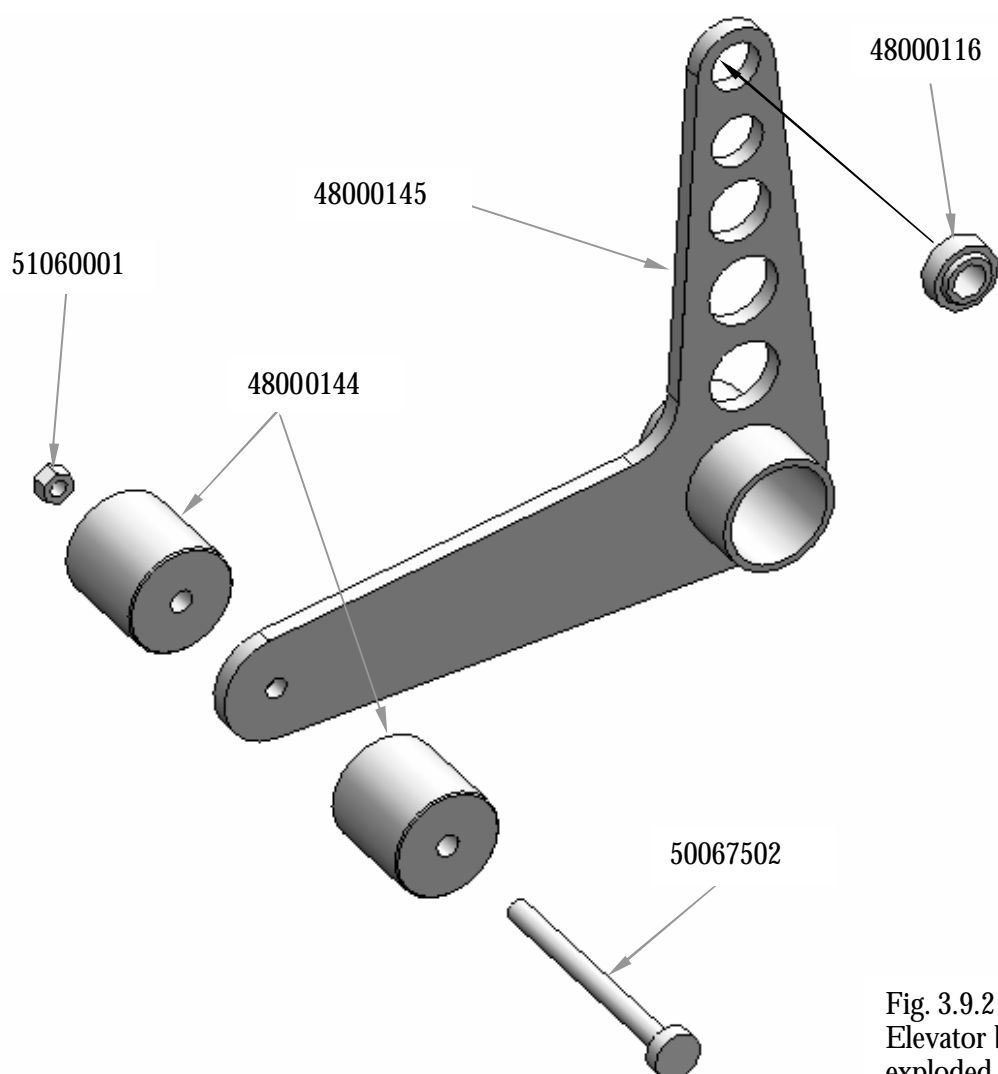
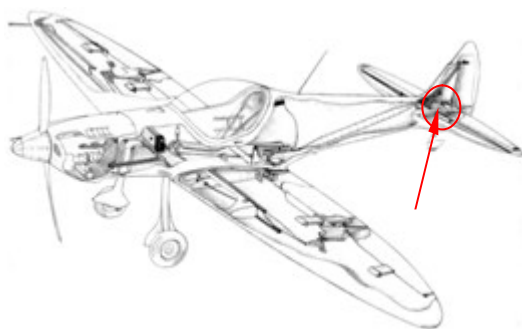


Fig. 3.9.2
Elevator bellcrank,
exploded view

3. Install the counterweights as shown in figure 3.9.2.
4. Fit plain bearings no. 48000003 into the bores in the root rib.

Note: To check the position of the bearing, measure the distance as shown in figure 3.9.3. You can adjust the bearing position slightly by sanding material off the top and bottom of the bore.

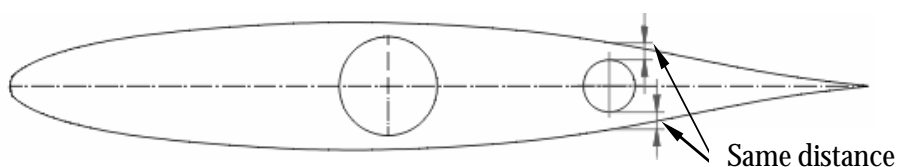
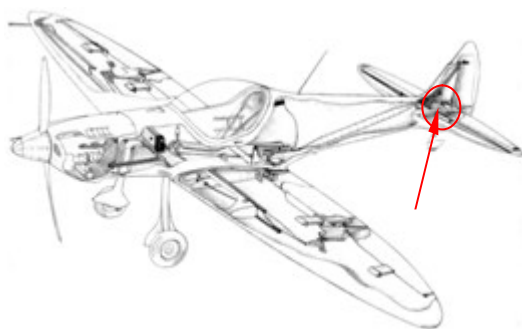


Fig. 3.9.3
Positioning the
bearing for the
elevator bellcrank

5. Drill two 5mm (0.20") bores through the assembled bellcrank and torque tube (see fig. 3.9.4). Separate the two parts and deburr the bores.

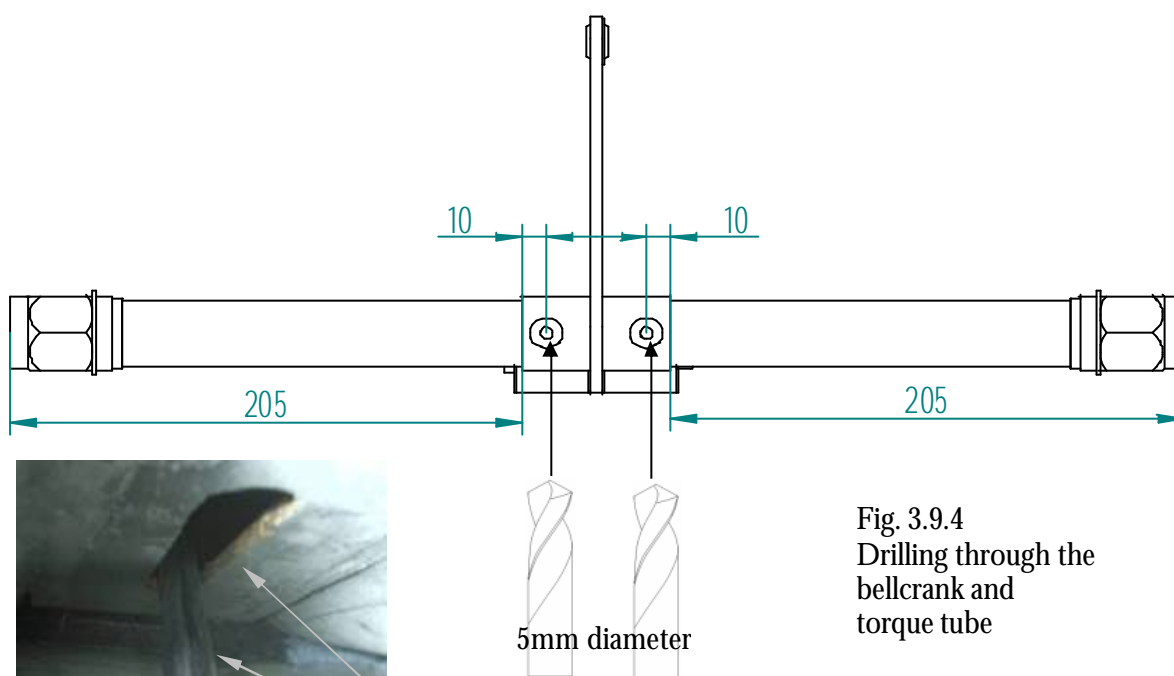


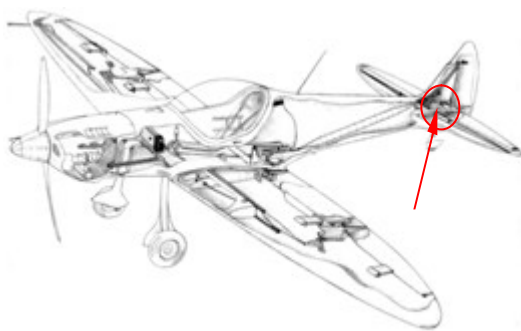
Fig. 3.9.4
Drilling through the
bellcrank and
torque tube

Insert the bellcrank through the
cut-out in the rudder support rib.

6. Insert the whole drive into the tail unit.
7. Bond the bellcrank in the fuselage with Loctite 638; secure it with the two M5 bolts no. 50054002 and the self-locking nuts (see fig. 3.9.5).
8. Slide the plastic bearing bushings onto the hexagons. You should be able to rotate them easily (using just two fingers) on the hexagon connectors.

Note: If the plastic bearings are too tight, you can enlarge the inside diameter slightly by sanding.

Important: Do not remove the hexagon, since otherwise the wear-resistant anodic coating will be stripped.



9. Thoroughly roughen the outside of the plastic bearings and bond them into the root rib with CF. To do so, slide the bearings onto the hexagon connectors and the hexagon connectors onto the tube ends.

Note: Check again for even distance from the upper and lower contour (see fig. 3.9.3).

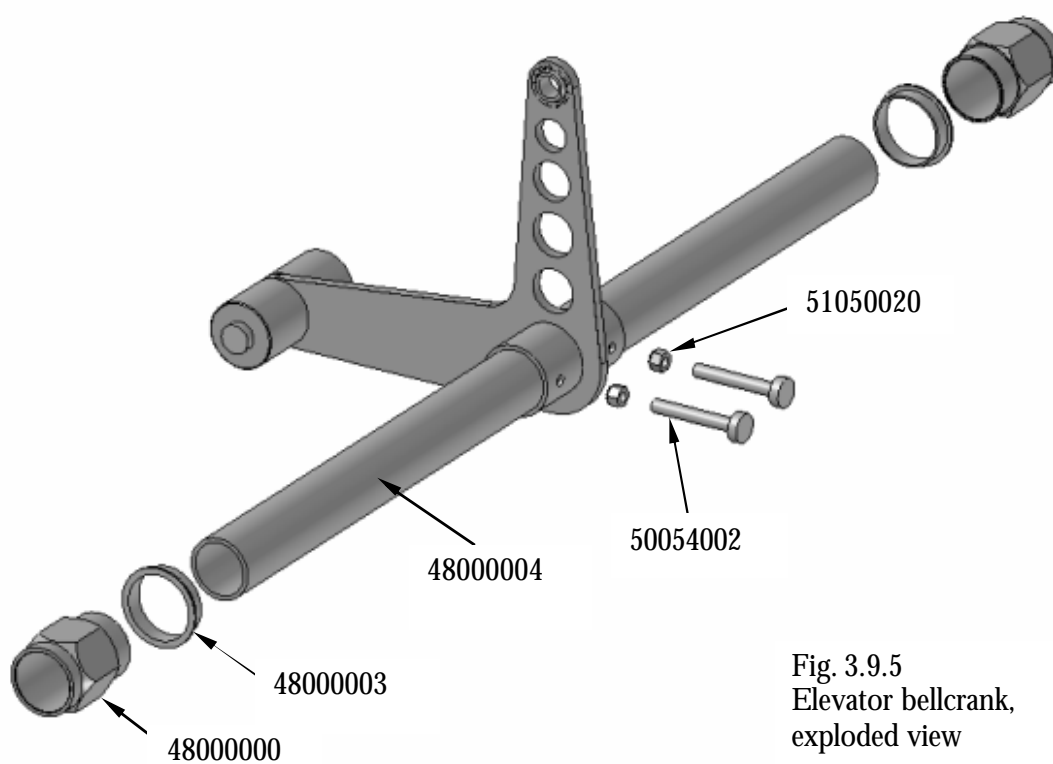
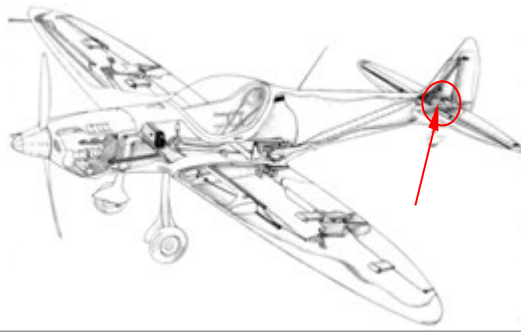


Fig. 3.9.5
Elevator bellcrank,
exploded view

10. After assembling and bonding the bellcrank, rivet the outer edge of the hexagon with six blind rivets no. 53500407 with a diameter of 4mm (0.16") as shown in figure 3.9.6. Bond the hexagon connectors with Loctite 638.

Important: The rivets must not be located at the faces of the hexagon! They must be placed in the extension of the edges of the hexagon, as shown in figure 3.9.6.



Important: The faces of the hexagon must be in the horizontal plane. Accordingly, the bellcrank is positioned at a 90° angle towards the hexagon faces.

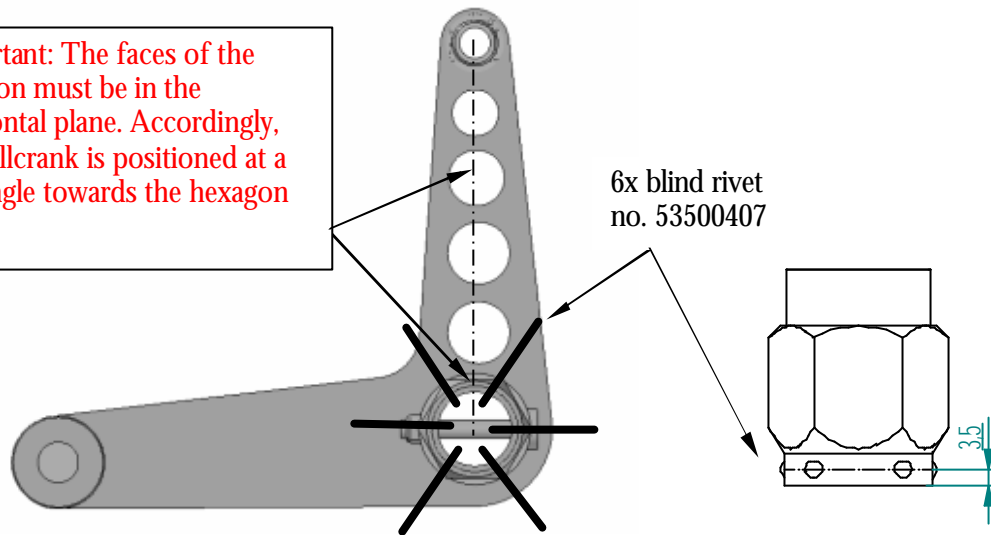
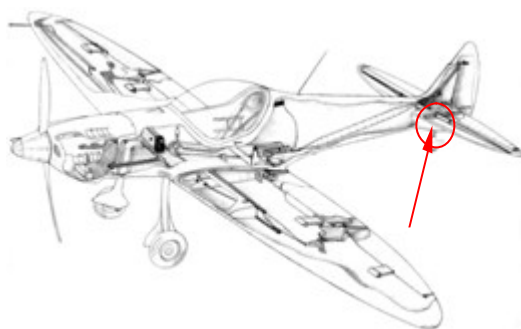


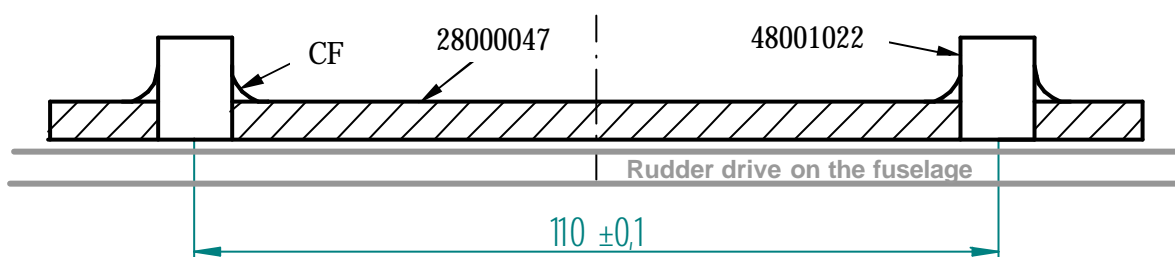
Fig. 3.9.6
Riveting the hexagon
connectors



3.10 Assembling the Rudder

1. Bond the two steel tubes no. 48001022 into the 10mm (0.39") bores in rib no. 28000047.

Important: Check for the correct bore spacing: the rib with the bonded steel tubes must fit onto the steel pins of bolt no. 48000089 (as assembled according to section 3.12). Roughen the steel tubes, slide them onto the pins and then bond them into the bores in the rudder rib.



To compensate the weight, first drill a hole with a diameter of 20mm (0.79") at a distance of 70mm (2.76") from the rudder tip as shown in figure 3.10.1. Fill 250g (8.82oz.) lead pellets into the dotted front area of the rudder and pour 100g (3.53oz.) resin over the pellets.

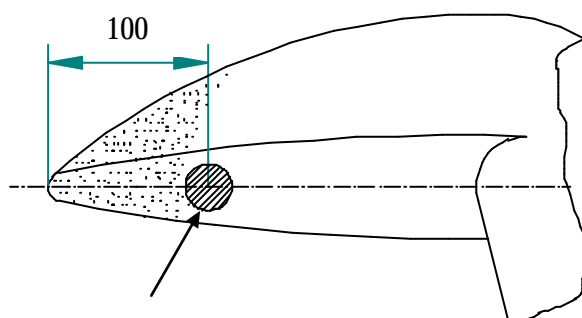
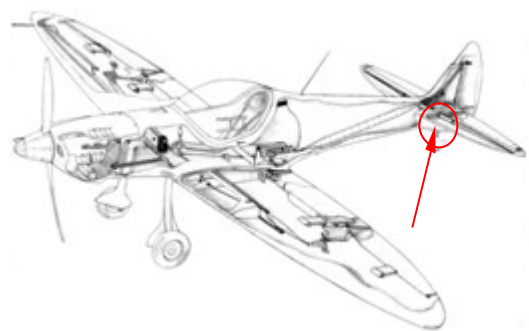


Fig. 3.12.1
Filling counterweight
material into the rudder

2. Remove the peel-ply in order to bond the front seams.
3. Sand the seams to create a smooth transition between the two shells.
4. Laminate 25mm (0.98") fiberglass tape over the seams.
5. Check the rudder counterweight after painting.



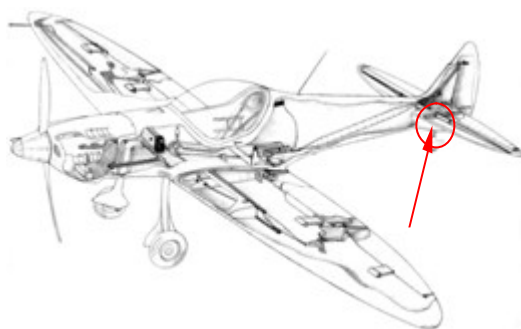
Fuselage

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Important:
After painting, the rudder with the counterweight must weigh 1.45–1.9kg (3.20–4.19lb). The residual moment of the rudder must be between 80 and 135 Ncm. Measure the residual moment as follows: Place the rear edge of the rudder on a precise scale and rest the fulcrums of the elevator on thin steel pins so that it moves easily.

If the measured value is outside the tolerance, increase the weight by filling in more lead pellets.

	Date	Mass [g]	Lever arm [cm]	Moment [Ncm]
Rudder				



3.11 Installing the Upper Rudder Bearing

1. Adjust support rib no. 48000152 to fit the fuselage. (Shorten at the front, if necessary.)
2. Prepare all bonding surfaces.
3. Bond the rib with cotton/resin mix and fill the lower side of the rib to a radius of 5mm (0.20") (see fig. 3.11.1).
4. After curing, scribe the bore for the plastic bearing.
5. The bore is centered 4mm (0.16") behind the trailing edges of the rudder fin and has a diameter of 14mm (0.55").

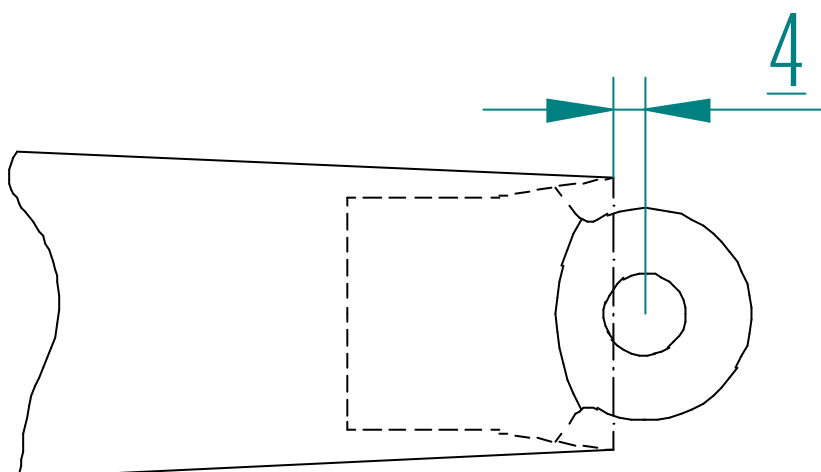
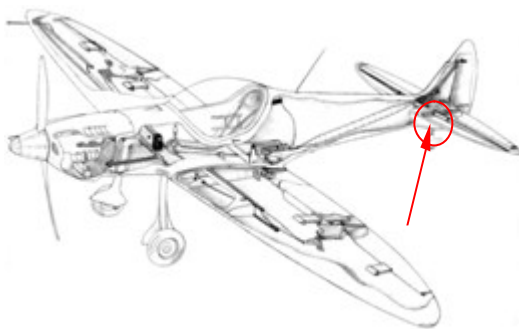


Fig. 3.11.1
Upper rudder bearing



Flanged plain
bearing 48000031



3.12 Assembling and Installing the Rudder Drive in the Rudder

1. Insert the carbon fiber honeycomb ribs (rib set no. 48000004) into the rudder fin as shown in figure 3.12.1 and fix it with super glue. Laminate all joins with 40mm (1.57") fiberglass tape. The carbon fiber ribs in the rudder assembly are aligned according to the bonded brackets.

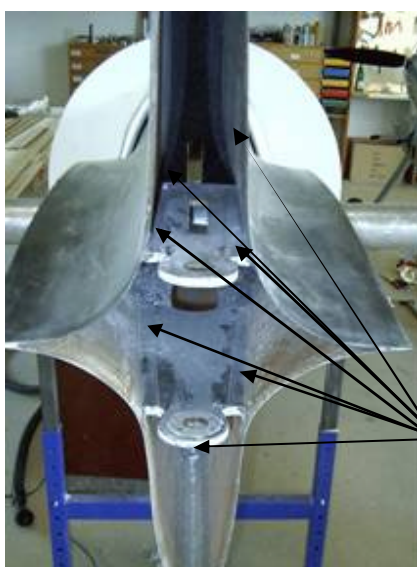


Fig. 3.12.1
Laminating the
rudder bearings

40mm fiberglass tape

2. Bond fiberglass discs nos. 48001020 and 48001021 with CF onto the carbon fiber ribs, see figure 3.10.2. Apply mold release wax to tube no. 48000088 and slide the tube through the 25mm (0.98") bores. The tube centers the discs to be bonded.
3. Assemble the rudder drive as shown in figure 3.12.2.
4. To prevent the securing cotter pin from twisting, drill a bore into the rib as shown in figure 3.10.3. Insert an additional smaller cotter pin into the bore.

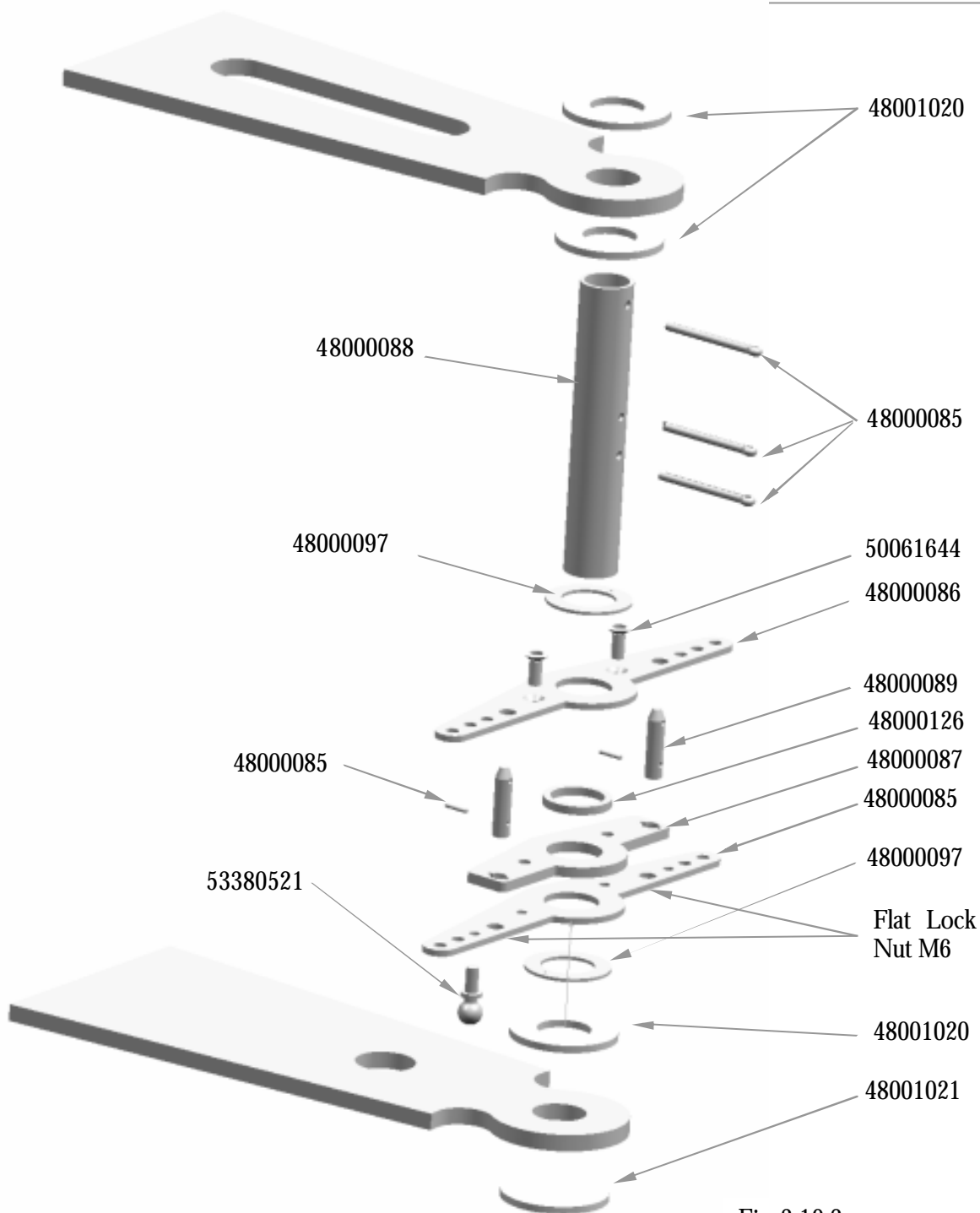
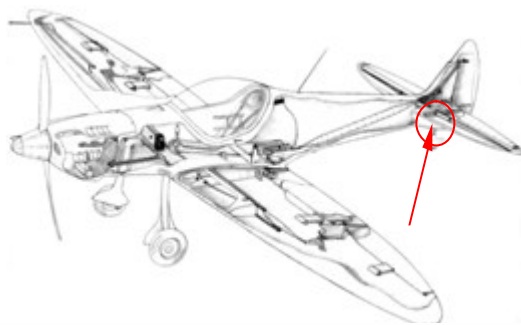
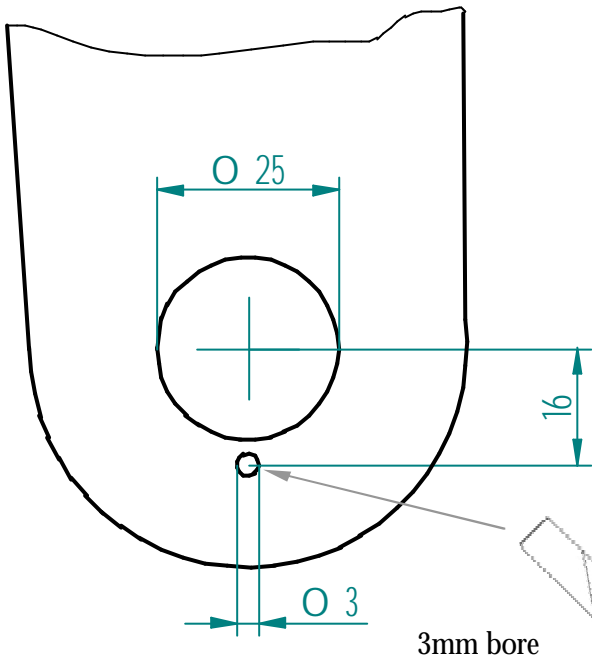
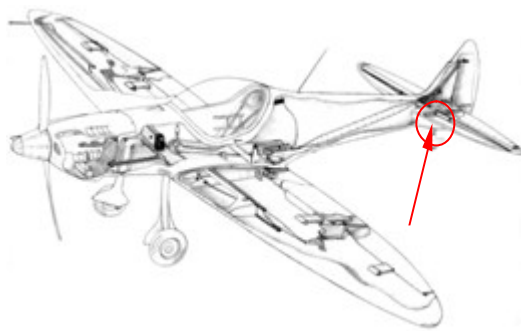
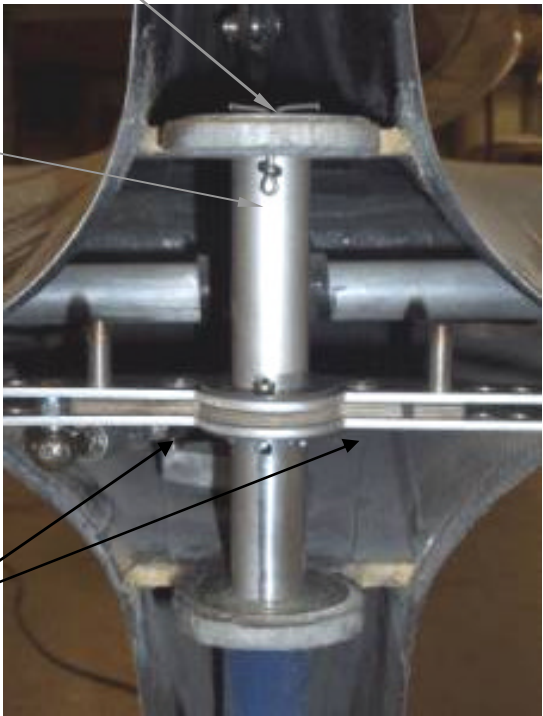


Fig. 3.10.2
Rudder drive,
exploded view

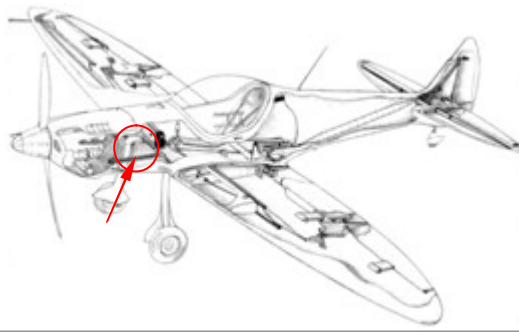


Slide cotter pin 53010340 from below into the eye of the bigger pin and bend it over the rib.

Fig. 3.12.3
Rudder drive installed with anti-twist lock for the support tube



Flat Lock nut M6



3.13 Installing the Rudder Pedals

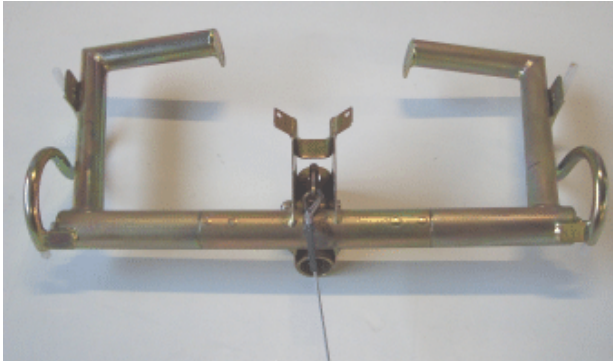
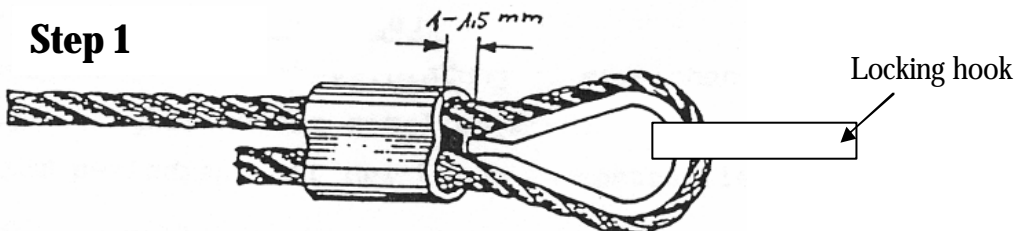


Fig. 3.13.1
Rudder pedal assembly

1. Slide the 1.6mm (0.06") steel cable no. 60000850 for adjusting the pedal length through the locking hooks on the pedal slide (see figure 3.13.1.) and crimp it with Nicropress sleeve no. 53410281 and thimble no. 53400200 as shown in figure 3.13.2. Check the correct fit of the crimping sleeve with a suitable gauge as shown in figure 3.13.3.

Step 1



Step 2

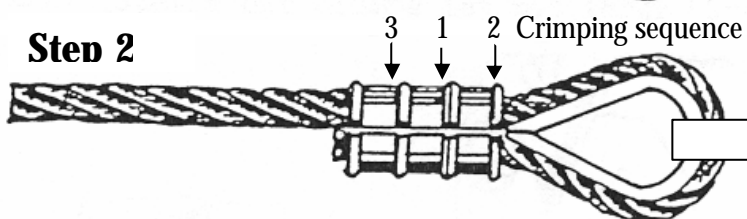


Fig. 3.13.2
Crimping the steel cable
for adjusting pedal length

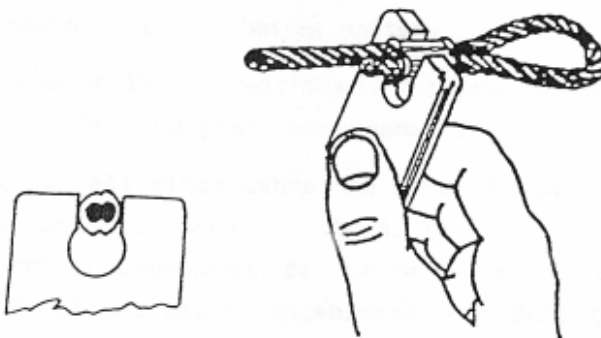
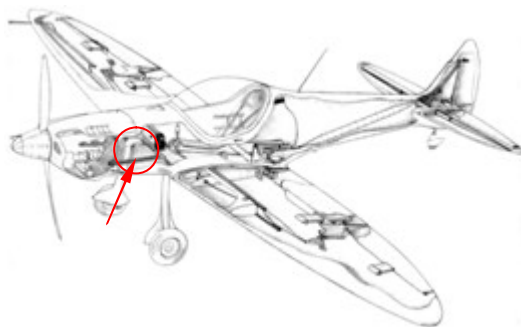
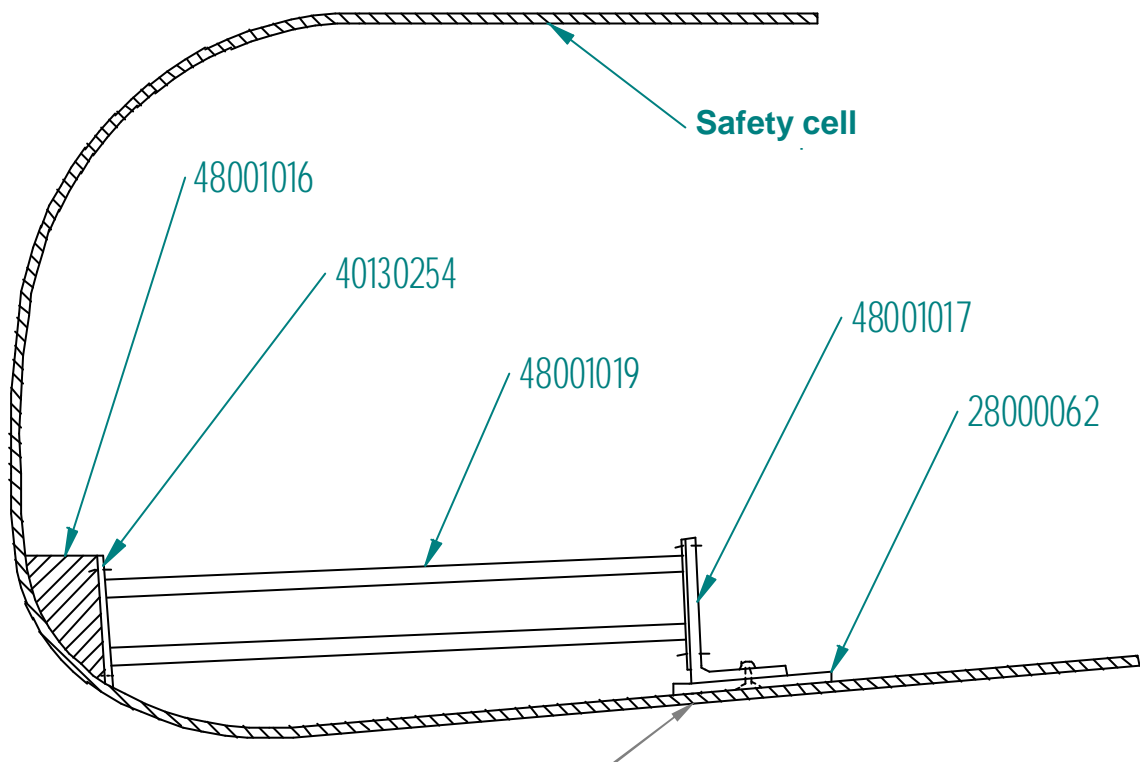
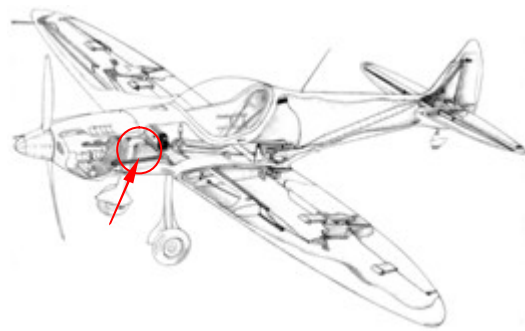


Fig. 3.13.3
Checking the crimping
with a suitable gauge



2. Cut two tubes of 220mm (8.66") length each from polyamide tube no. 30090128 (from the rudder kit) and slide them into the S-shaped tube of the pedal assembly.
3. Screw the guide tubes of the pedal assembly and the welded panel with four 12mm (0.47") M6 screws to aluminum bracket no. 48001017.
4. Screw FRP mounting plate no. 28000062 with two 16mm (0.63") M6 countersunk screws no. 50061604 to the underside of the aluminum bracket. Sink the underside of the mounting plate to fit the countersunk screws.
5. Screw aluminum mounting plate no. 40130254 onto FRP block no. 48001016 (with countersunk screw M6x15 no. 50061604) and slide the guide tubes into the holes up to the FRP block.
6. Align the guide tubes as shown in figures 3.13.4 and 3.13.5 and bond them into the safety cell with CF. Roughen the bonding surfaces of the safety cell and parts nos. 48001016 and 28000062 or remove the peel-ply, as applicable. Insert FRP mounting block no. 48001016 to fit the contour of the safety cell. The guide tubes must be aligned with the seam of the safety cell shells.



Fill the cavities with CF.

Fig. 3.13.4
Installing the pedal assembly
in the safety cell

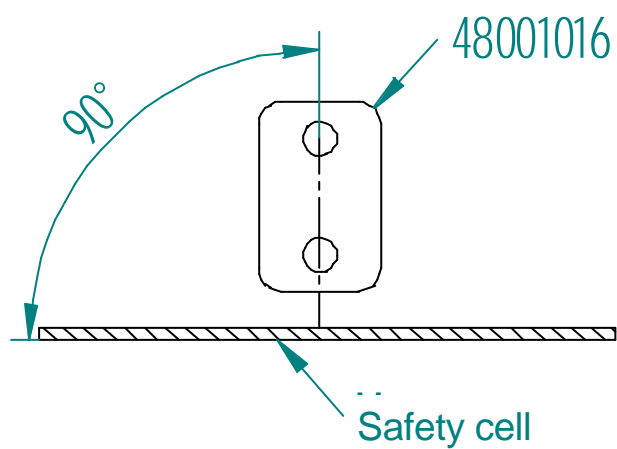
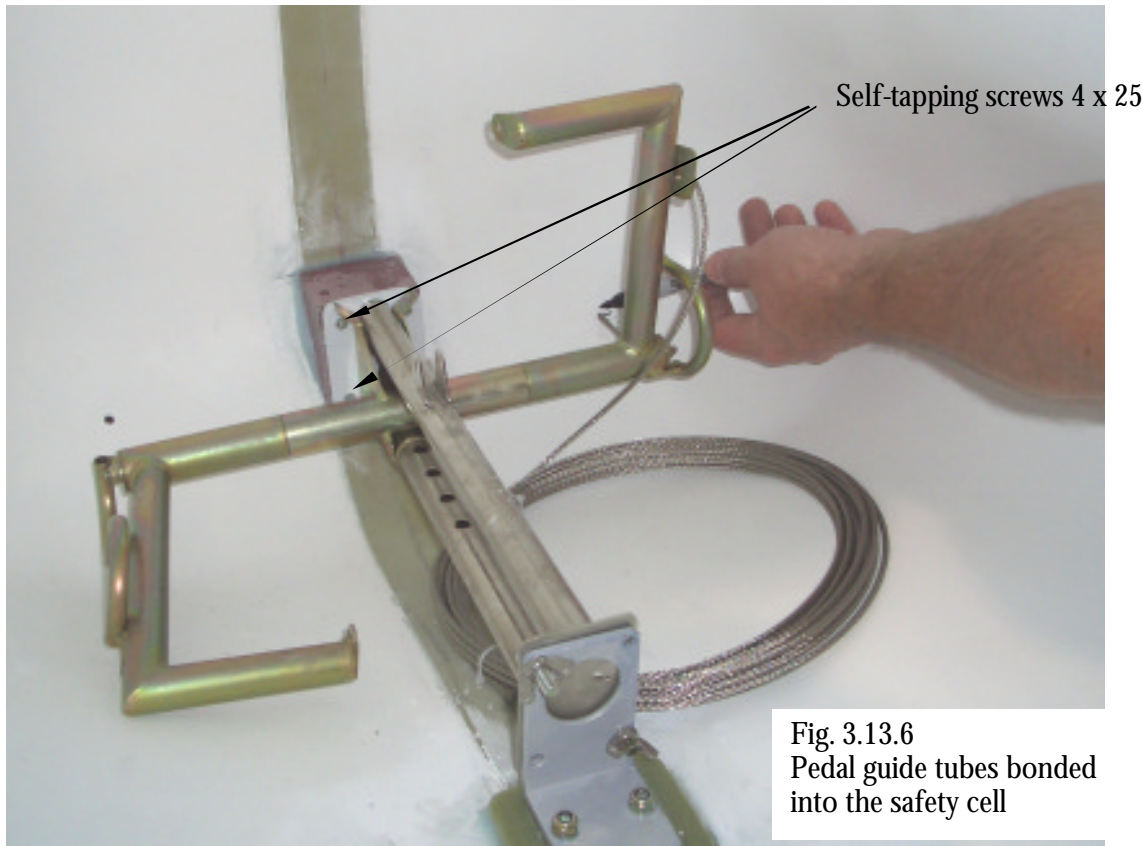
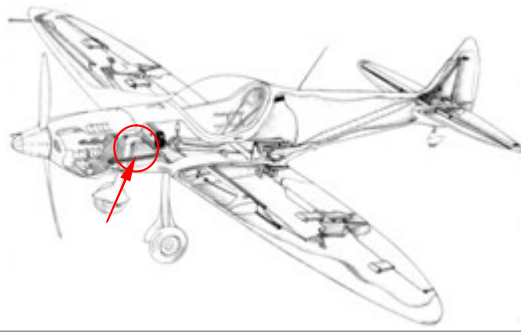


Fig. 3.13.5
Aligning the pedal assembly
at 90° to the floor of the
safety cell



7. After curing, disassemble the support block and slide the pedals onto the tubes.

Note: The pedals will be finally mounted after the safety cell has been painted.

8. To pass the control cable through the wall of the safety cell, cut a slot through the right and the left side wall respectively as shown in figures 3.13.7 and 3.13.8 (use a power cutter).

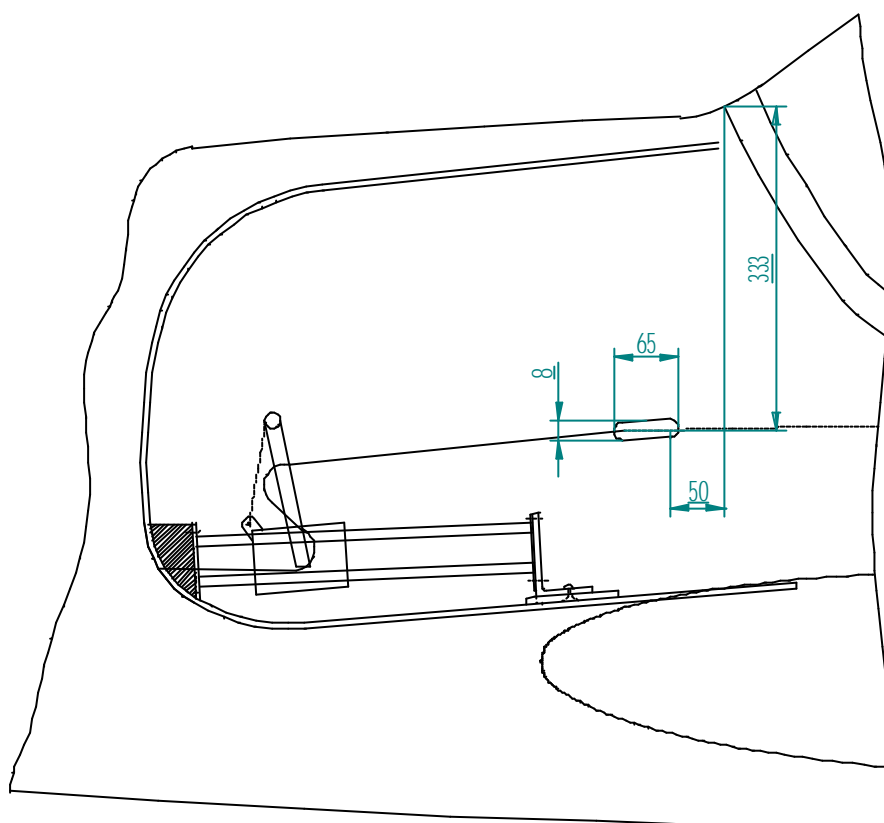
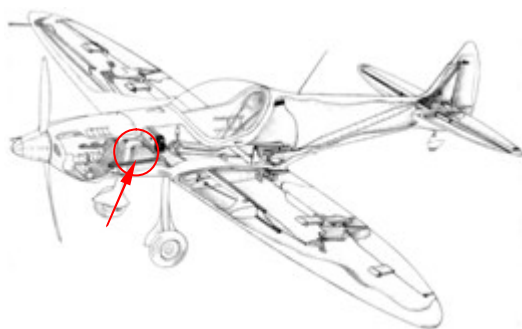
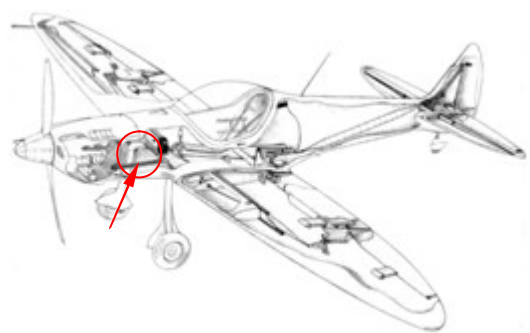


Fig. 3.13.7
Dimensions of the slots
in the safety cell for the
passage of the control
cables



Fuselage

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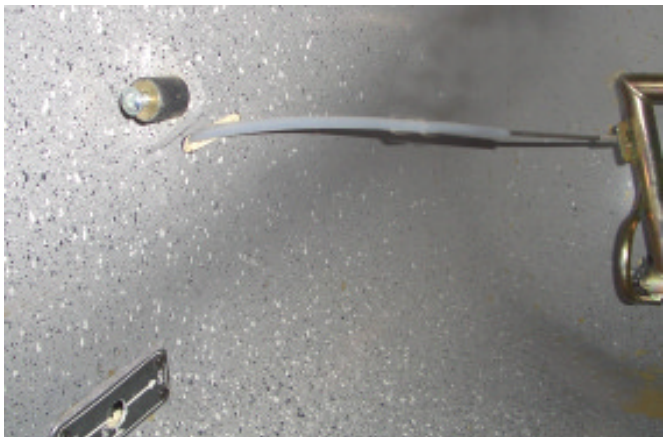


Fig. 3.13.8
Control cable and
polyamide tube installed
in the safety cell

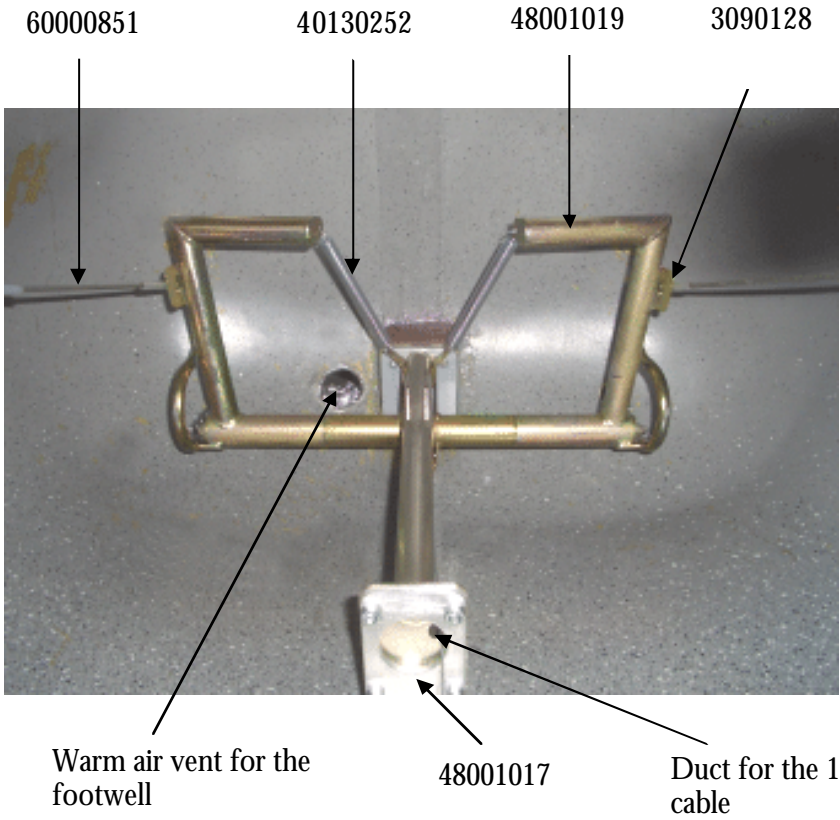
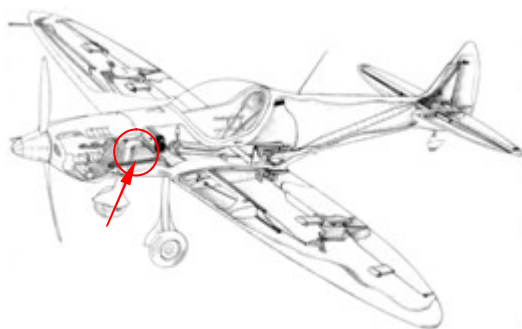


Fig. 3.13.9
Rudder pedals
mounted



9. Cut a 3.5mm fiberglass panel to a length of 70mm and a width of 40mm (2.76" x 1.57"). Round the corners to a radius of 10mm (0.39").
10. Bond the panel behind (from the pilot's point of view) the spar tunnel as shown in figure 3.13.10.
11. Slide the 1.6mm (0.06") steel cable no. 60000850 for the pedal length adjustment through the duct (as shown in figure 3.13.9) and the fiberglass panel.
12. To prevent chafing, insert polyamide tube no. 30090128 between the pedal block and the fiberglass plate as shown in figure 3.13.11.
13. Push the pedal assembly to its most forward position and fix knob no. 40050173 50mm (1.97") in front of the FRP panel with Nicopress sleeve no. 53410281. Close the hole in the knob with plug no. 60000778.
14. Wind spring no. 60000295 around the cable and fix it at the top of the pedal in order to pull the knob back to the FRP panel.

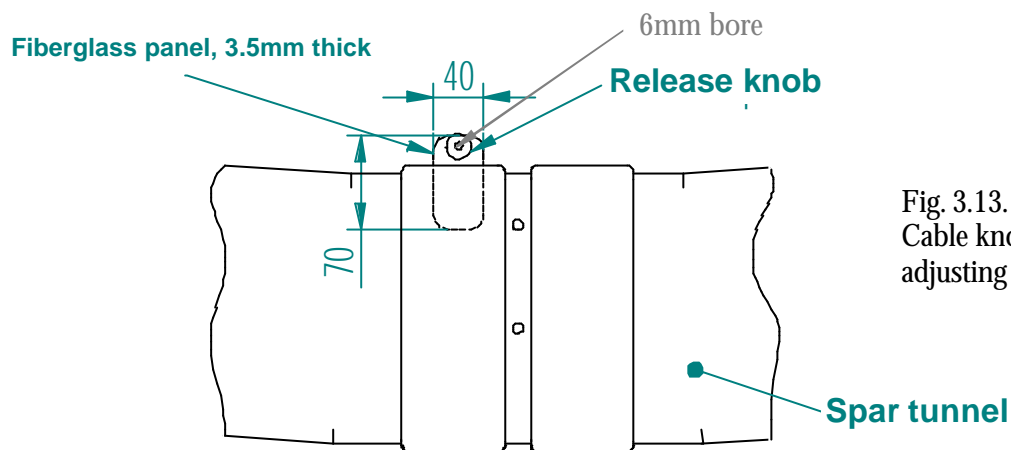
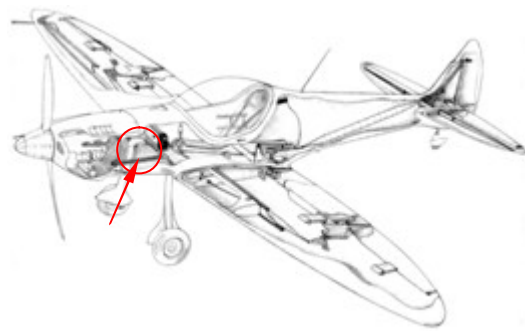


Fig. 3.13.10
Cable knob assembly for
adjusting pedal length

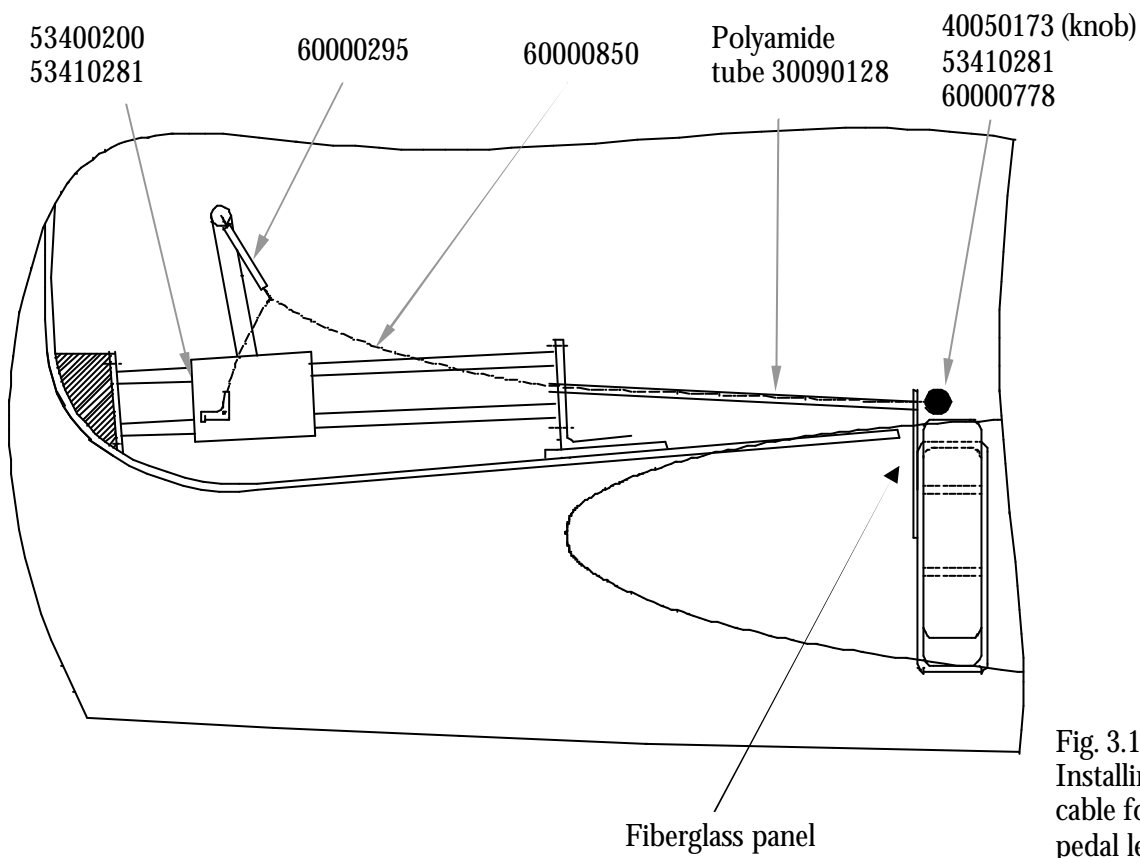


Fig. 3.13.11
Installing the control
cable for adjusting
pedal length

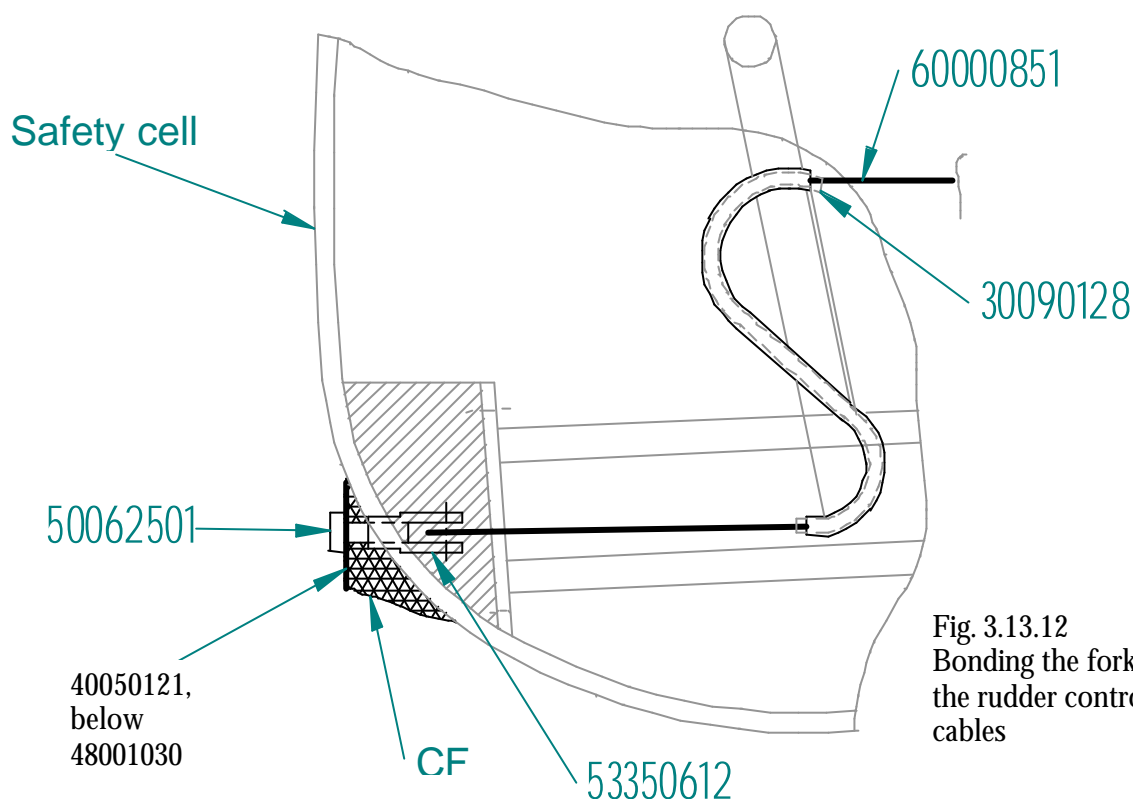
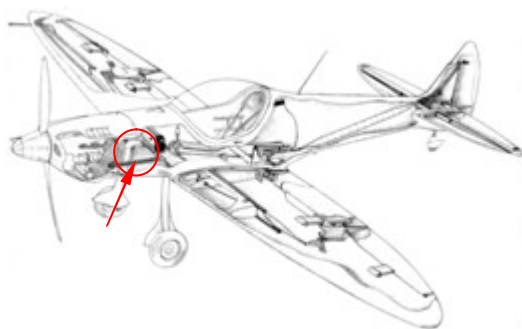


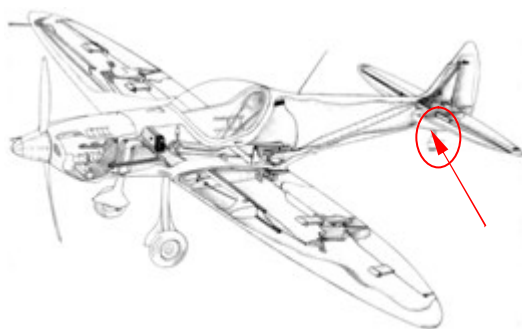
Fig. 3.13.12
Bonding the forks for
the rudder control
cables

15. To attach the control cables to the safety cell, push the pedal assembly into its rearmost position. Scribe the safety cell at the position of the openings in the S-shaped tube and use a 10mm (0.39") bit to drill the bores horizontally in the direction of flight.
16. Slide the two forks through the bores and secure them from the back with a screw and a large washer as shown in figure 3.13.12.
17. Fill the resulting cavity between the safety cell and the washer with CF.

Note: Paint the safety cell before laying the cables.

18. Pass the control cables through the empty tube in the fuselage and through the S-shaped tube at the pedals. Crimp the cables as shown in figure 3.13.2, and check the crimping with the corresponding gauge.

Important: Position the rudder pedals vertically using a spirit level (fuselage in direction of flight). Fix the rudder in neutral position. You can adjust the length of the control cables slightly by twisting them.



3.14 Assembling and Installing the Tail Wheel

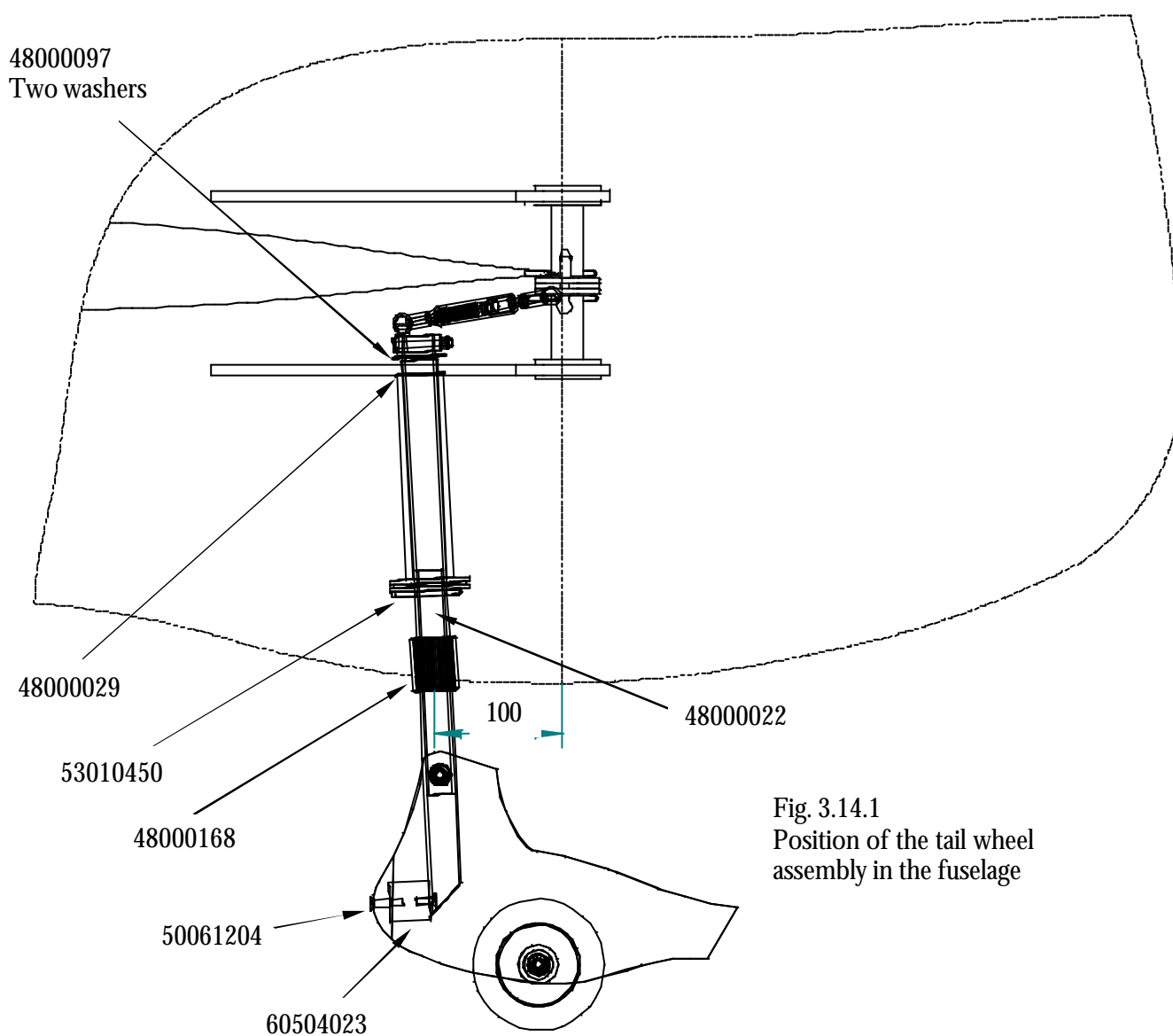


Fig. 3.14.1
Position of the tail wheel
assembly in the fuselage

1. Drill a hole through the bottom radius of the fuselage at a distance of 100mm (3.94") from the trailing edge (see figure 3.14.1) to fit bushing no. 48000168 (outside diameter 35mm [1.38"]).

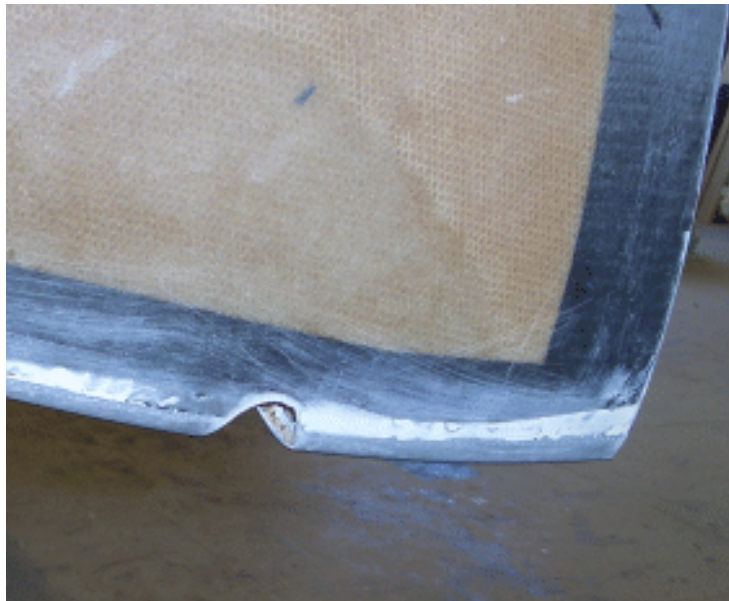
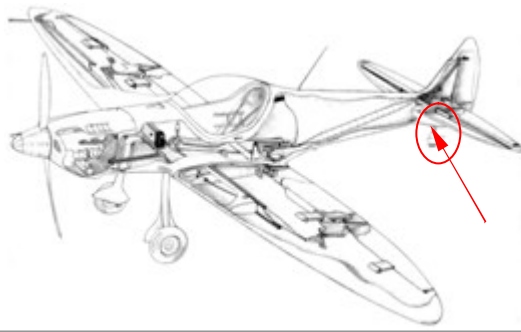
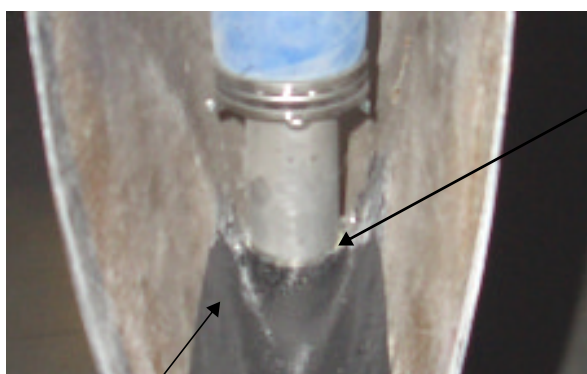
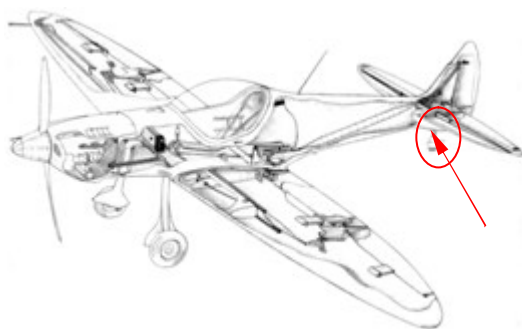


Fig. 3.14.2
Cut-out for the tail
wheel tube

2. Insert plastic bearing no. 48000029 into the 26mm (1.02") bore in the carbon fiber rib of the rudder support (see fig. 3.14.1).
3. Apply mold release wax to tail wheel tube no. 48000022.
4. Slide tail wheel tube no. 48000022 through the bearings nos. 48000168 and 48000029; this aligns the bearings.
5. Bond the bearings with CF. Reinforce the lower bearing with carbon fiber fabric as shown in figure 3.14.4.



Fig. 3.14.3
Bonded bearing sanded
flush with the surface
after curing



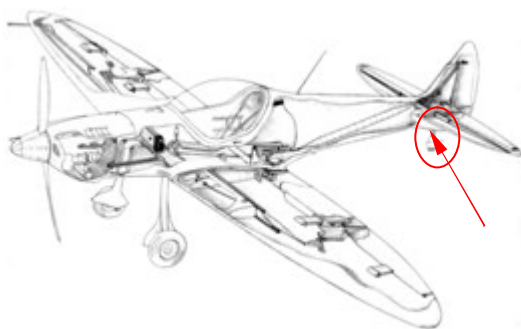
48000168

Reinforcement with 3 plies
200g/m² carbon fiber fabric

Abb. 3.14.4

Reinforcement of the
lower tail wheel guide in
the fuselage

6. Bond tube no. 48000176 into tube no. 48000022 with Loctite 638 or epoxy resin. Before curing, press bushing no. 48000177 through the 10mm (0.39") bores of both tubes; this ensures the exact alignment of the tubes.
7. Drill a 4mm (0.16") bore for cotter pin no. 53010450 through tube no. 48000176.
8. Use a 3mm (0.12") drill to create the bores at the two bearing locations on one side of tail wheel fairing no. 28000048. Place the fairing on a horizontal work surface and drill at a right angle through to the other side with a 10mm (0.39") bit. Press plastic bushings no. 48000015 from the outside into the fairing.
9. Bolt vibration damper no. 60504023 at the lower bore of the tail wheel tube with nut no. 51060020.
10. Drill through the nose radius of the tail wheel fairing with a 6mm (0.24") bit. Paint the fairing.
11. Install the tail wheel and screw the wheel and fairing assembly to the tail wheel tube. Screw the vibration damper to the nose radius of the fairing with screw no. 50061204; sink the screw head.
12. Slide the tube with the tail wheel into the lower bearing on the fuselage, then slide axial ball bearing no. 57001028 and the rubber-fabric tube onto the tube. Slide the tube in completely and slide cotter pin no. 53010450 into the 4mm (0.16") bore below the axial bearing (see fig. 3.14.3).
13. Slide two thrust washers no. 48000097 onto the tube above the carbon fiber rib (lower rudder bearing) and slide actuator arm no. 48000026 onto the end of the tube..
14. Press the fuselage down with a load of approx. 30kg (66.14lb) and push the actuator arm towards the two thrust washers until it stops. Scribe the tube end above the actuator arm.



15. Disassemble the tail wheel tube and fairing and cut off the tube end as scribed.
16. Slide the actuator arm onto the tube end so that it is flush with the end as shown in figure 3.14.4. Drill through the arm with a 5mm (0.20") drill.

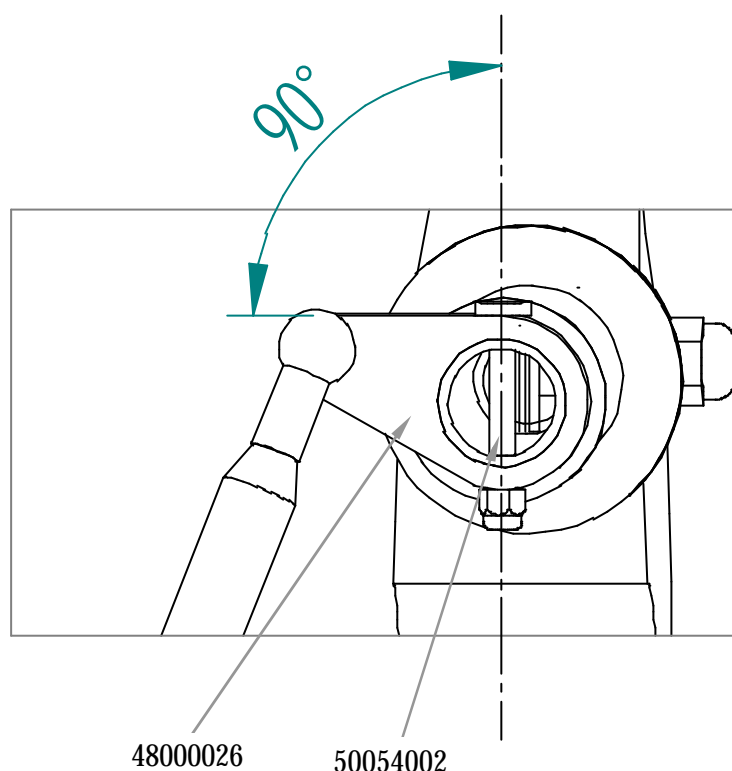


Fig. 3.14.5
Actuator arm,
top view

17. Screw ball joint no. 53380521 flush into the actuator arm and secure it with Loctite.
18. Install the tail wheel assembly.
19. Assemble the push rod in the sequence shown in the exploded view, figure 3.14.8. Bond set screw no. 48001015 with Loctite. To simplify flush mounting you can slot the head of the set screw with an iron saw.
20. Slide the push rod onto the ball heads of the actuator arm and the rudder actuator arm. Adjust the length of the push rod so that the neutral position of the rudder corresponds to the neutral position of the tail wheel.

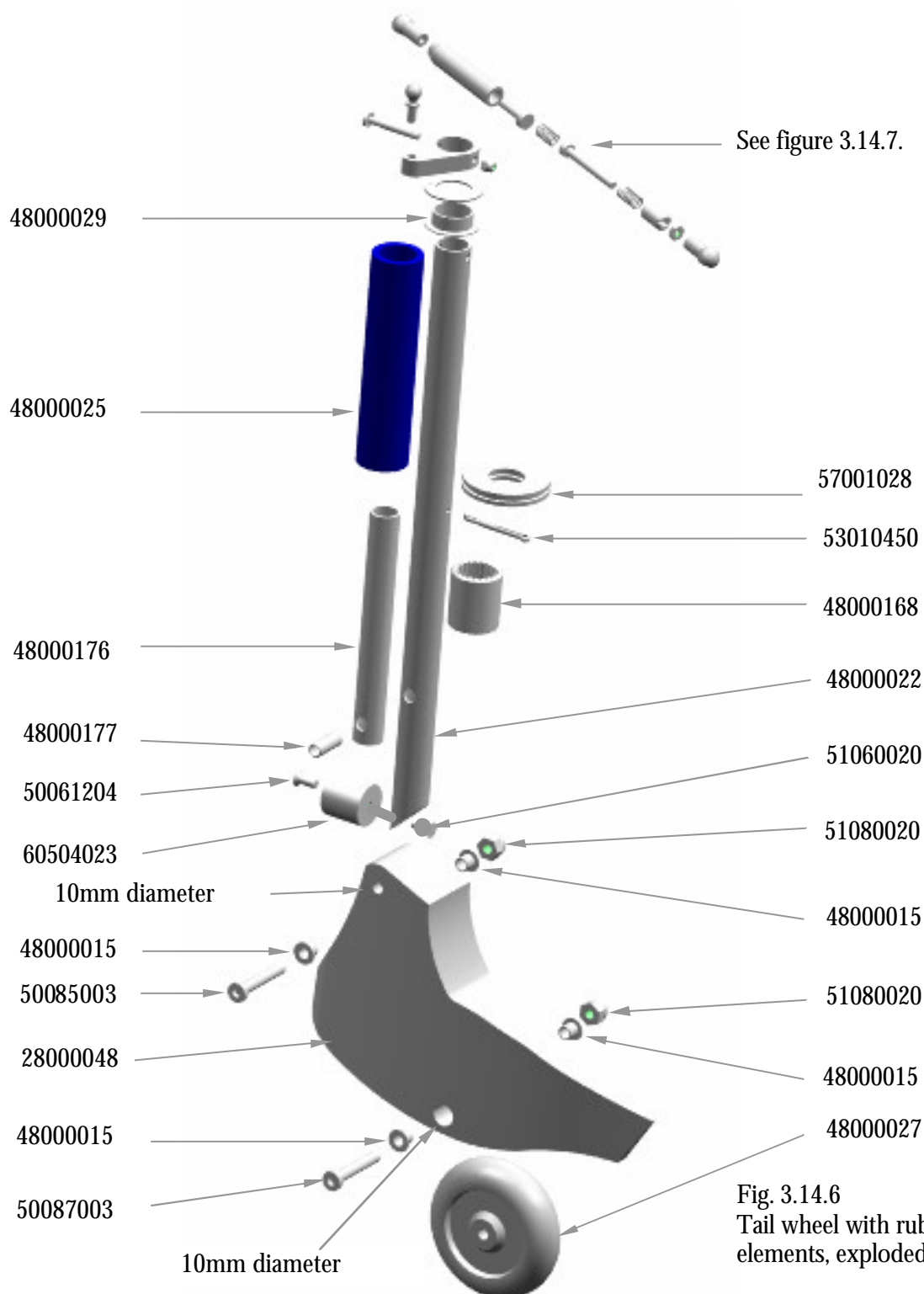
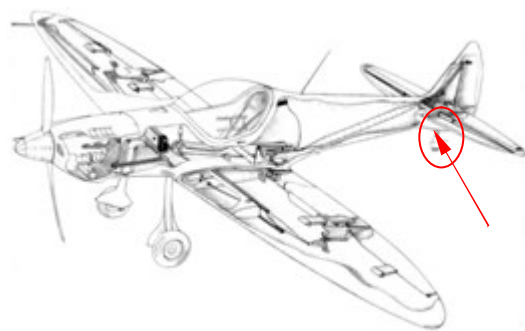
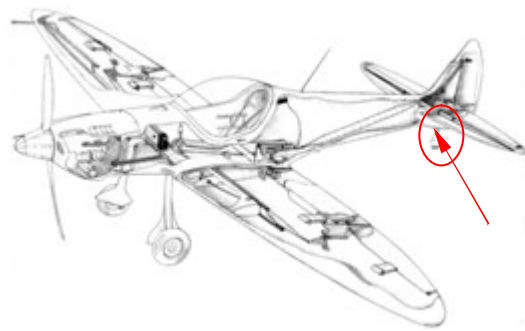


Fig. 3.14.6
Tail wheel with rubber spring
elements, exploded view



Fuselage

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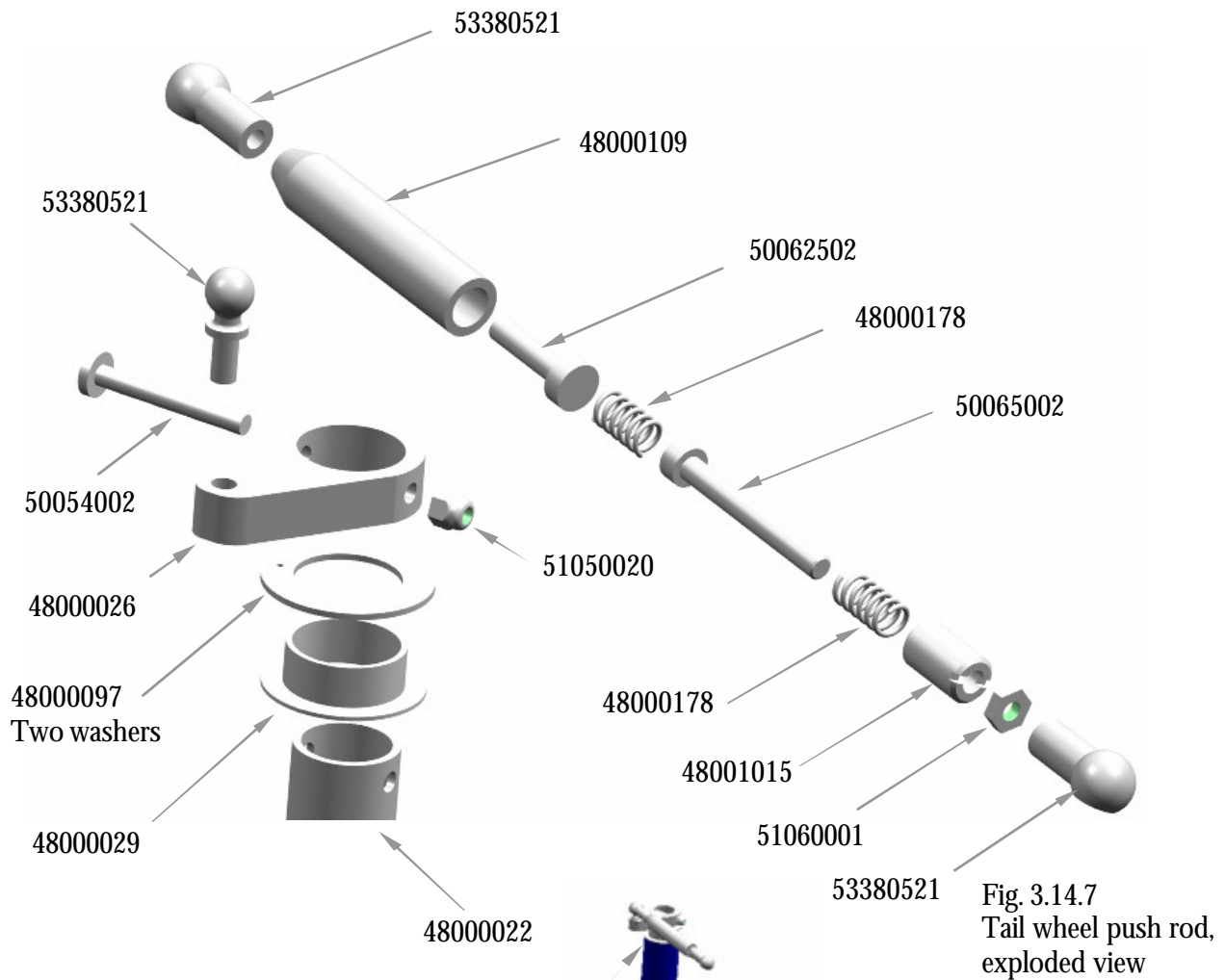
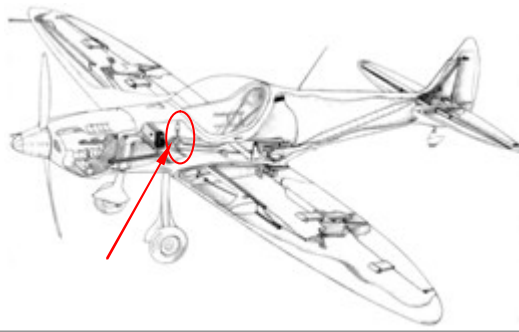


Fig. 3.14.7
Tail wheel push rod,
exploded view

Plastic bushings
bonded into the
fuselage as shown in
figure 3.14.1

Fig. 3.14.8
Completed tail wheel
assembly



3.15 Assembling and Installing the Control Stick

- Assemble the control stick as shown in the exploded view in figure 3.15.2.

1. Slide one ball bearing no. 48000126 onto ball bearing no. 48000017.

Important: To protect the bearing from damage, take great care to slide it on without the use of force (by hand). If you have difficulties to slide the bearing on, sand the cylindrical surface slightly with fine sandpaper.

2. Press the other ball bearing into flange no. 48000014 for the control stick.
3. Slide the cardan joint with the bearing into the flange.
4. Screw lock washer no. 48000019, lock washer no. 52060055 and screw no. 50061601 into the cardan joint. Drill a 2.5mm (0.98") bore at a distance of 7mm (0.28") from the center of the screw through the two lock washers and the cardan joint.
5. Press roll pin no. 53112514 through all three parts so that it projects 2mm (0.08") from the lock washer.
6. Bend the short leg of the lock washer upwards at the hexagon screw head, so that the screw is secured against loosening.
7. Use a vise to press plastic bearings no. 48000015 into the 10mm (0.39") holes of the cardan joint. The flange of the bearing must be located on the inside of the cardan joint (see fig. 3.15.1).

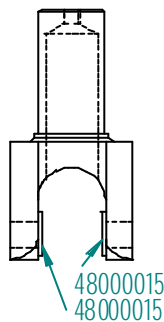
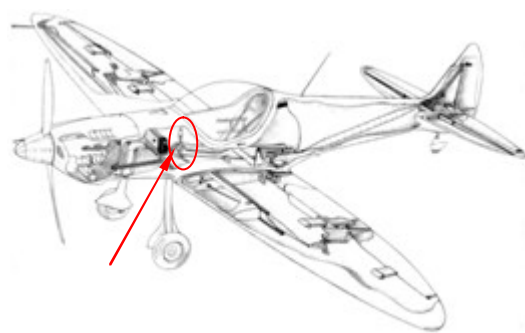


Fig. 3.15.1
Pressing the
plastic bearings
into the joint

8. Position the control stick and slide close tolerance bolt no. 48000141 through the cardan joint and the control stick.
9. Slide washer no. 52060020 onto the thread and thread in nut no. 51060020.
10. Press self-aligning bearings no. 48000116 into the holes in the legs of control stick pivot unit no. 48000020.
11. Secure the control stick on the spar tunnel with two coach bolts no. 48000142, M8 nuts no. 51080020 and washers no. 52080020.



Fuselage

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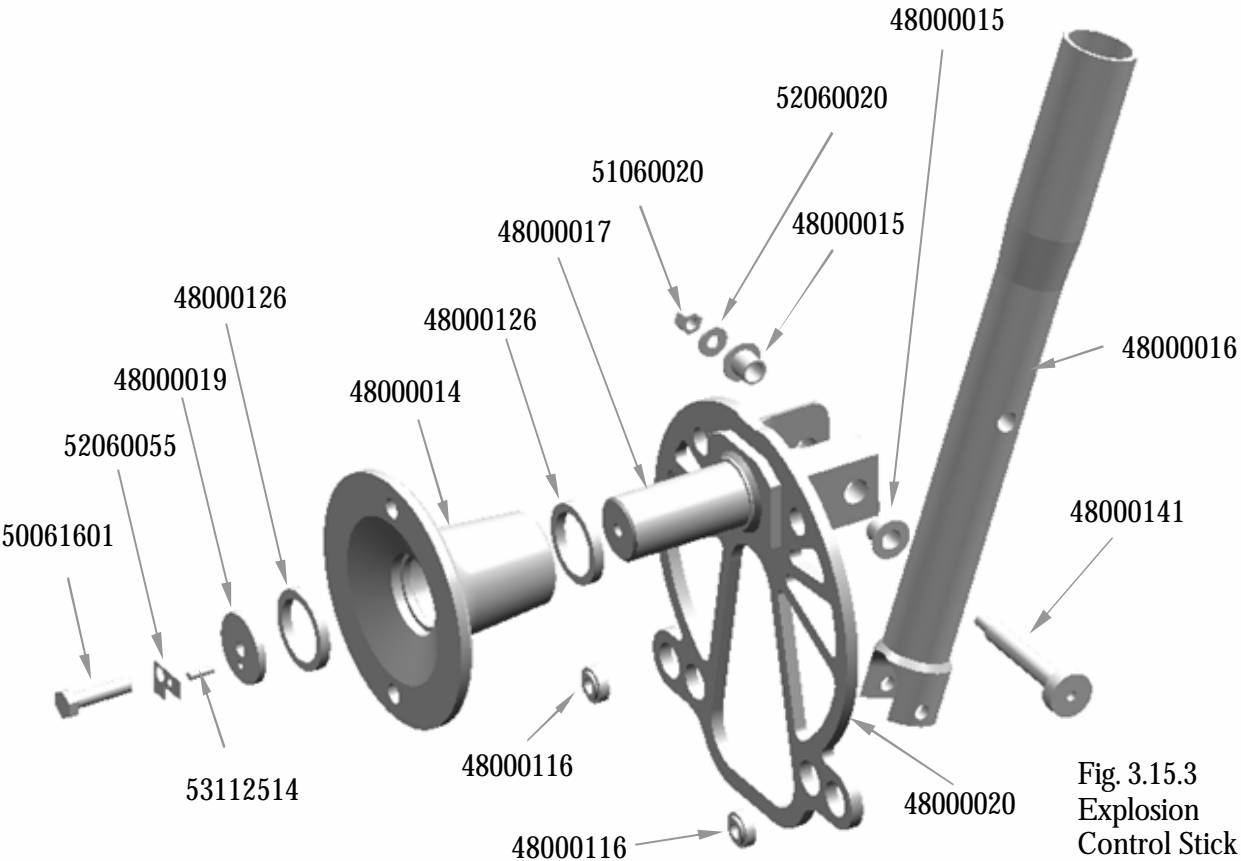
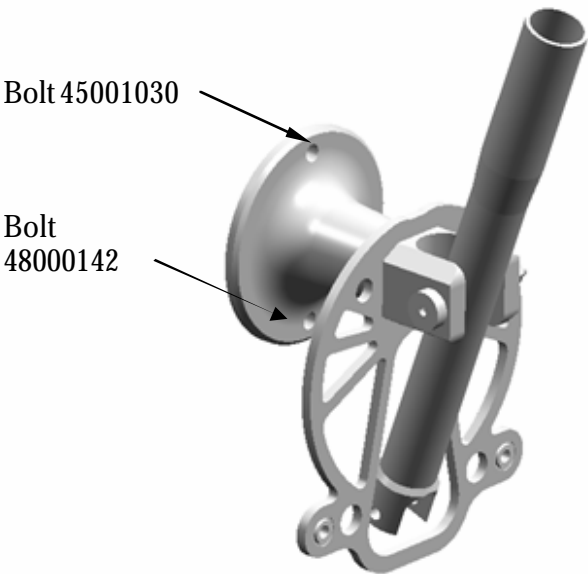
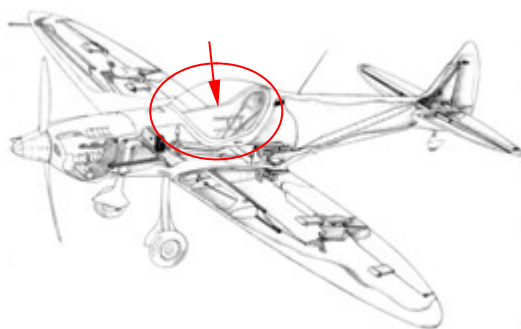


Fig. 3.15.3
Explosion
Control Stick





3.16 Installing the Elevator Push Rods PFA MOD 329/003

1. Attach carbon ring with three plastic roller bearing or PFA Mod. No Zulu 004 to plate 28000054. Place this plate into the curved cut-out of the baggage compartment cut-out as shown in figure 3.16.1 and to bond them into the bottom curve below the seat pan as shown in figure 3.16.2. Below the seat pan the floor of the safety cell has two depressions for support block no. 28000054. The bearing attaches to the face of both mounting plates.

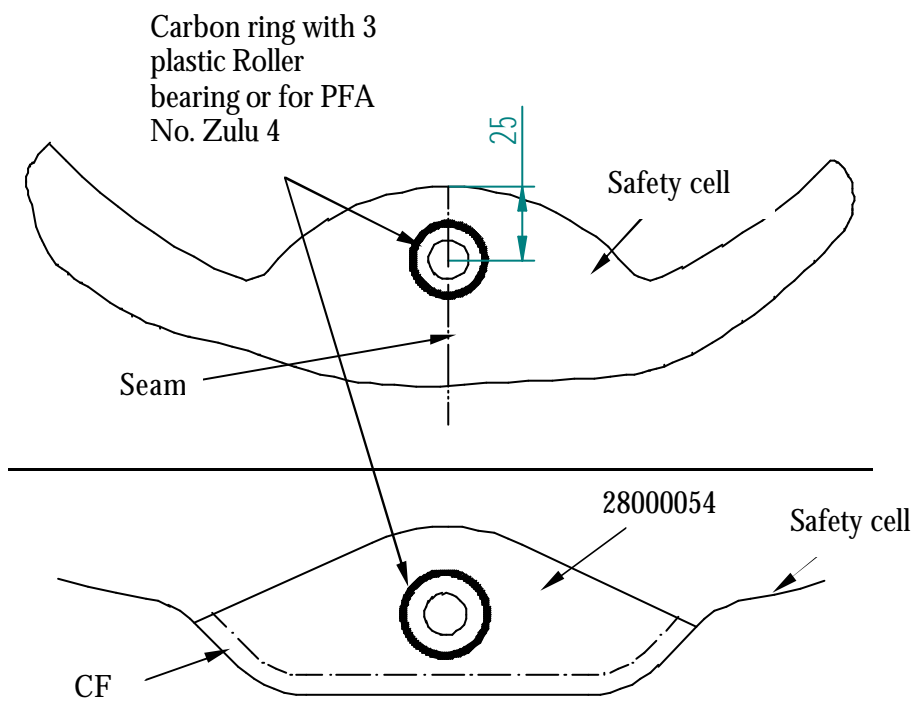
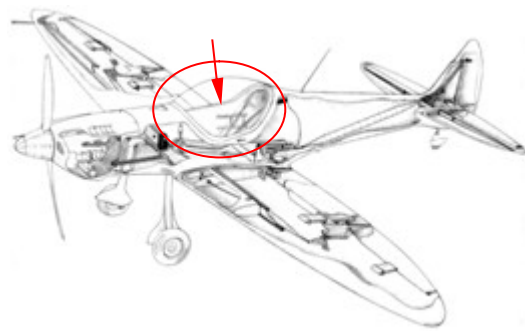


Fig. 3.16.1
Roller bearing
inserted into the
rear cut-out in the
safety cell

Fig. 3.16.2
Roller bearing
inserted into the
support block

2. Install the elevator push rods and the connections in the fuselage and the safety cell as shown in figures 3.16.4, 3.16.5 (3.19.1) and 3.16.6.
3. Thread fork no. 53350612 in until it is flush with the push rod. To connect the push rod and the fork, thread in set screw no. 48000180 and bond it with Loctite 638.

Note: Adjust the length of the push rods precisely before attaching the bearings. The length must be sufficient to permit full forward and backward movement of the control stick; at the forward and backward limits, the counterweights of the elevator drive arm must not touch the ribs of the rudder support. If the push rods are too long, you can shorten them by up to 20mm (0.79") (at the end with the 12mm [0.47"] round aluminum part). In this case re-cut the M6 thread to its original depth.



Fuselage

3

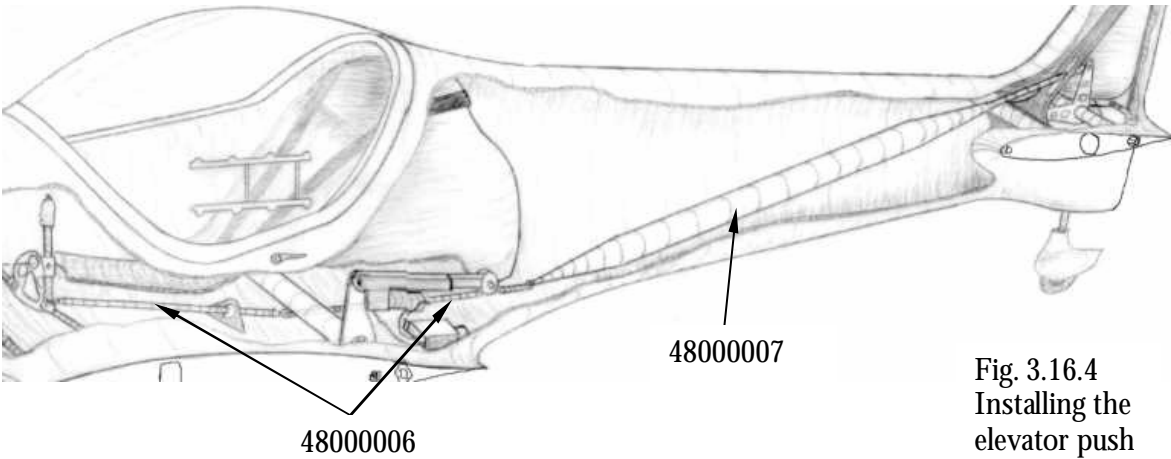


Fig. 3.16.4
Installing the
elevator push
rods

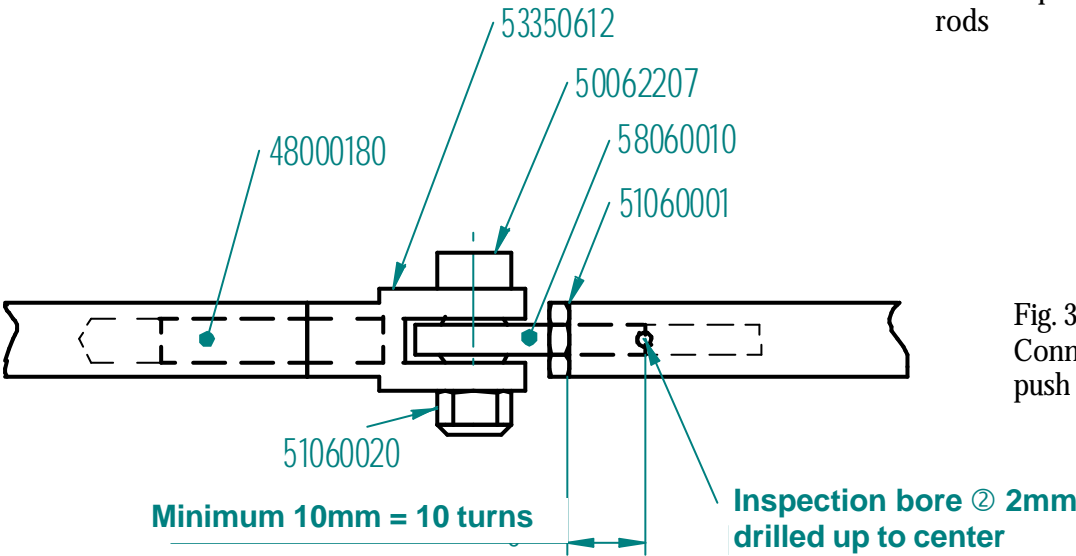


Fig. 3.16.5
Connecting the
push rods

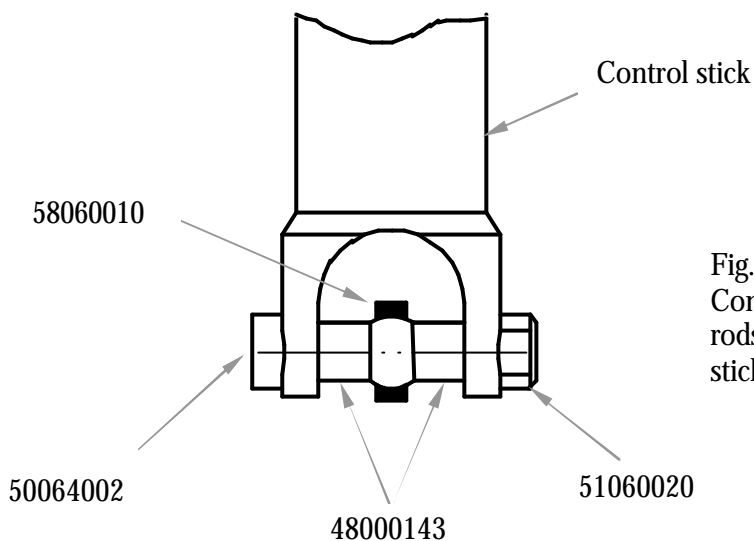
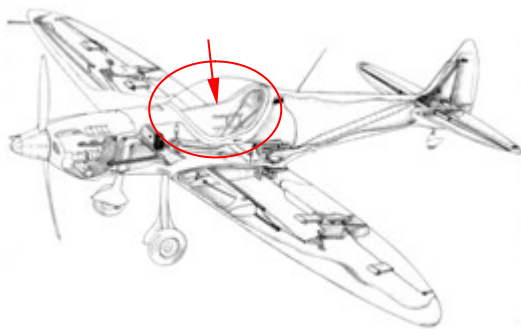
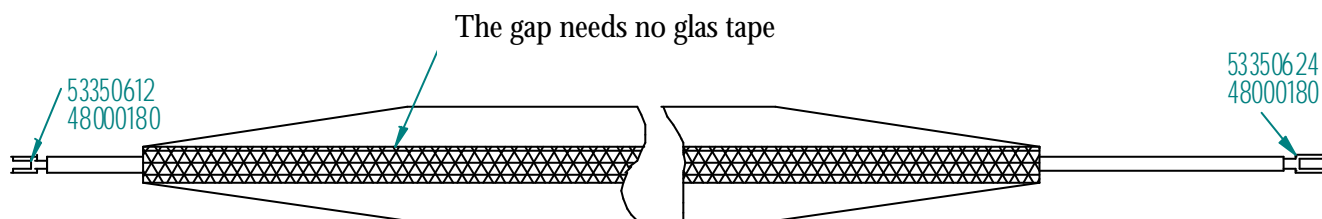


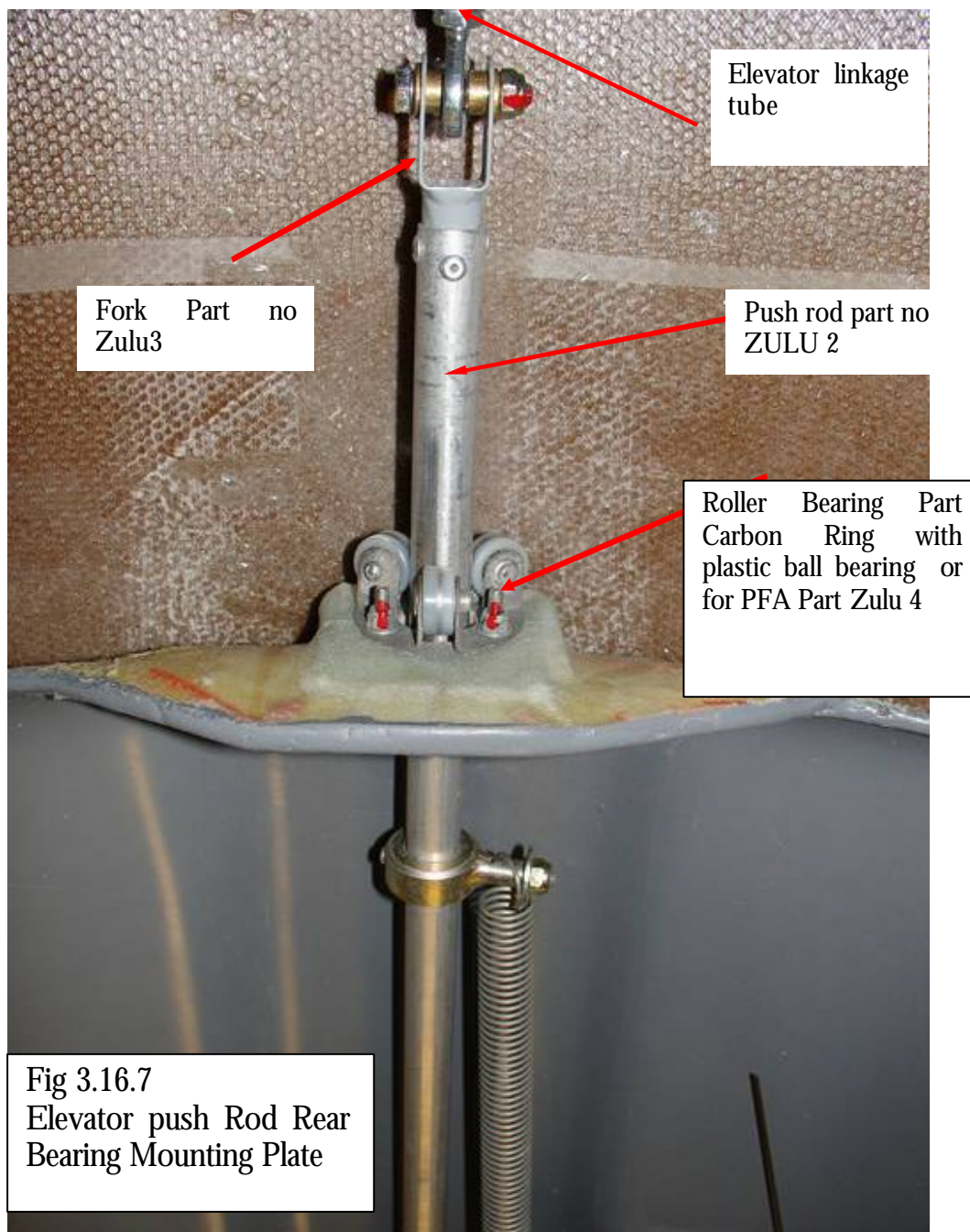
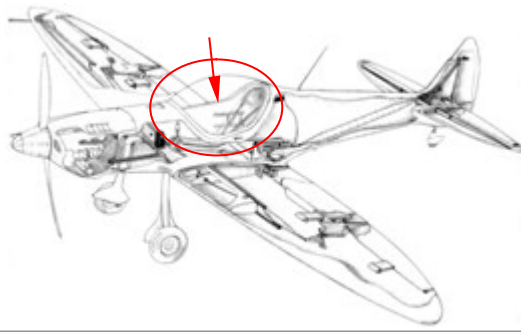
Fig. 3.16.6
Connecting the push
rods with the control
stick

Important: Thread the rod ends into the aluminum rods with at least 10 turns!

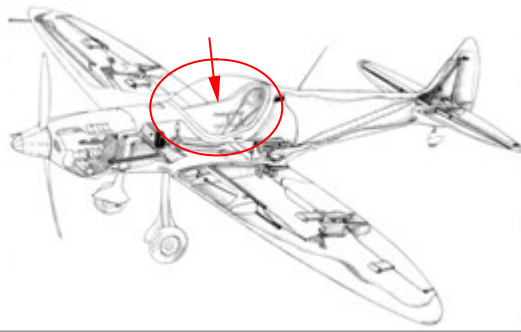
Secure all threaded connections with Loctite!



4. Install a fork M6x12 (no. 53350612) with the set screws (no. 48000180) at the end with the short aluminum connector. Install a fork M6x24 (no. 53350524) at the long end. Check for correct elevator deflection to determine the length of the push rod and then secure the set screws with Loctite.



Revision 1.5



Fuselage

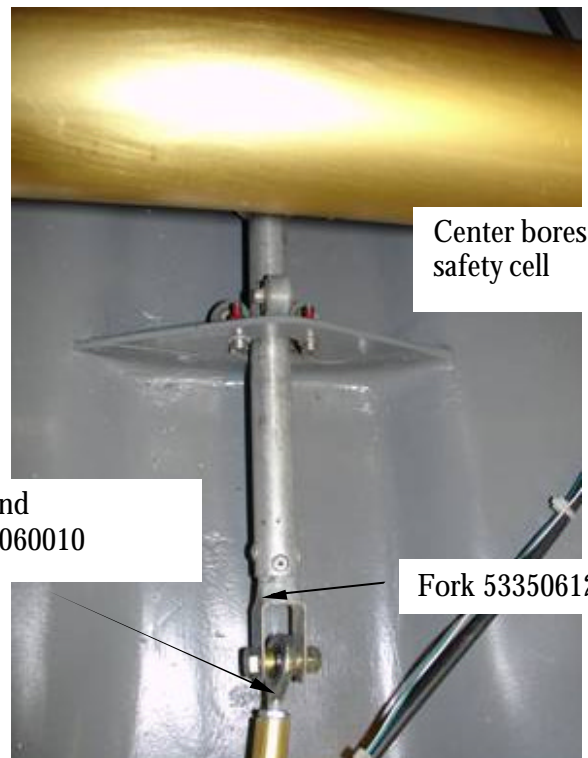
3

No. 28000054
bonded on the seat
pan (see fig. 3.16.2)



Fig 3.16.8
Forward
Roller
Bearing

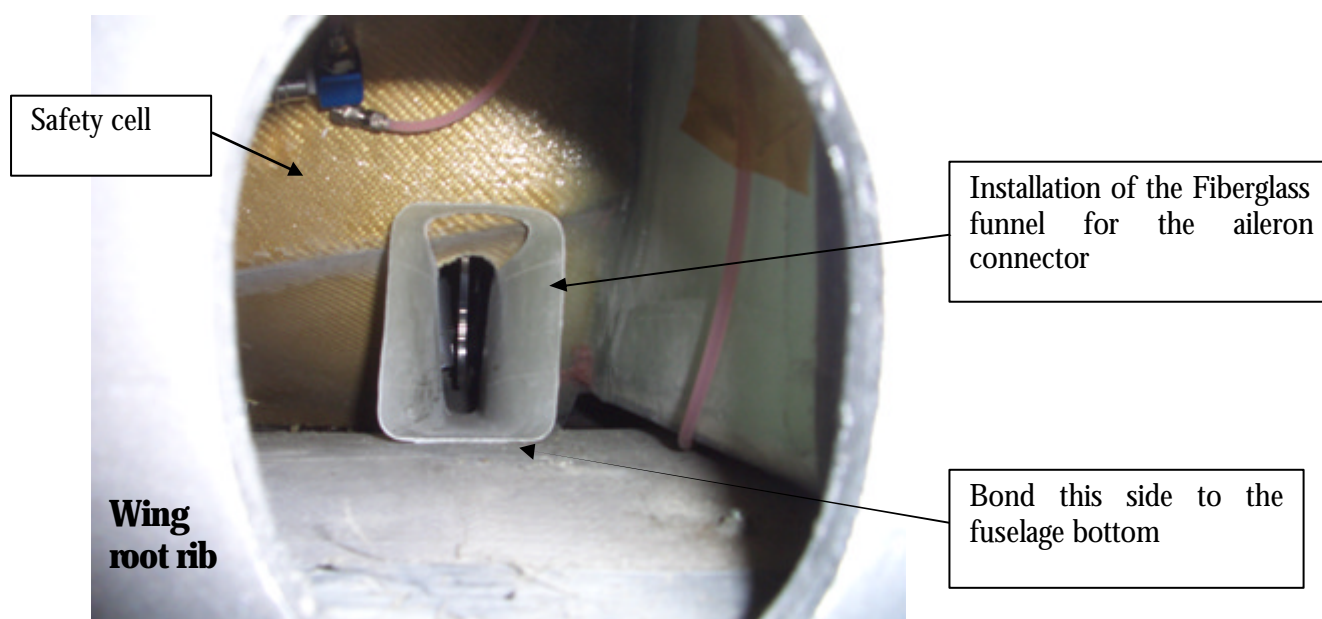
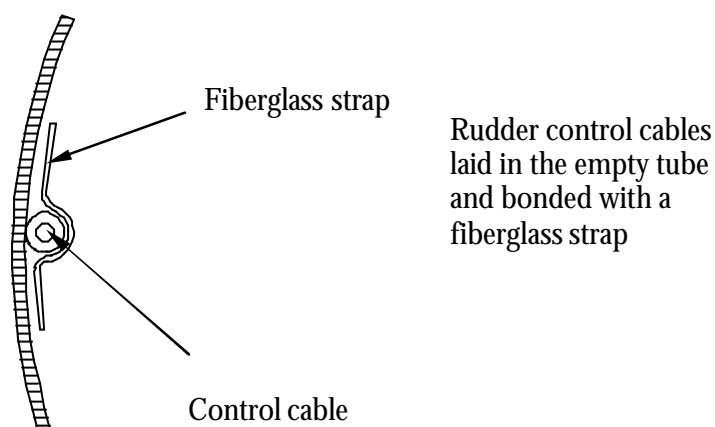
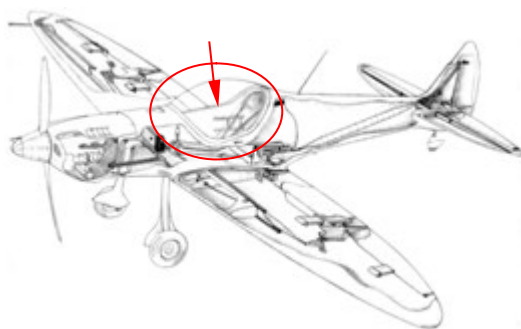
Rod end
no. 58060010



Center bores in the
safety cell

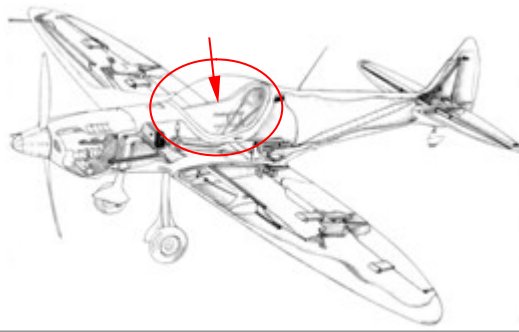
Fork 53350612

Fig 3.16.9 Forward
Elevater Push rod
System



3.17 Assembling and Fitting the Canopy

1. Mask the parts of the canopy frame which touch the fuselage with packaging tape and apply mold release wax.
2. Coat the canopy frame and the fuselage contour with a sufficient amount of MB and press the frame onto the fuselage. Remove excess MB with a spatula. Press the frame onto the fuselage with ratchet straps and let the bond cure.



3. Sand the frame and the fuselage with a sanding block so that they are flush.
4. Remove the frame and round any sharp edges.

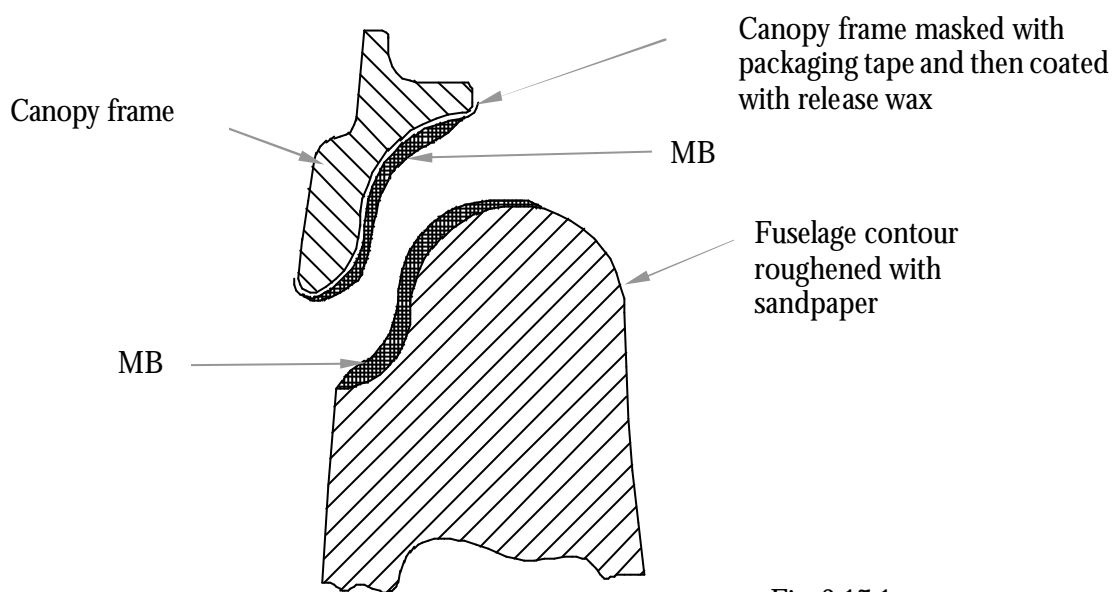
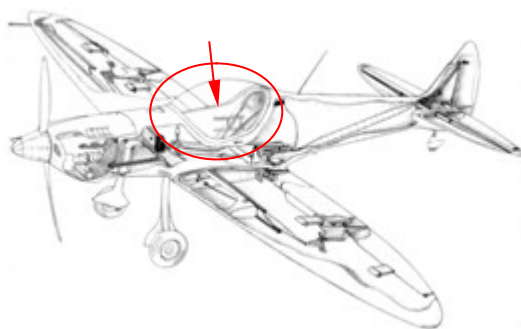


Fig. 3.17.1
Fitting the canopy frame

**Install the canopy lock as follows:**

1. Drill an 18mm (0.71") hole for the lock hinge at an angle of 90° into the outer wall of the fuselage (see fig. 3.17.3). Scribe the hole at a distance of 62mm (2.44") from the edge of the safety cell (see fig. 3.17.4) and at the center of the straight section of the canopy frame (see fig. 3.17.2). Predrill the hole with a smaller drill and check the alignment of the drill with an angle (see fig. 3.17.3). Bore the small hole with an 18mm (0.71") drill or another suitable tool to a diameter of 18mm (0.71").

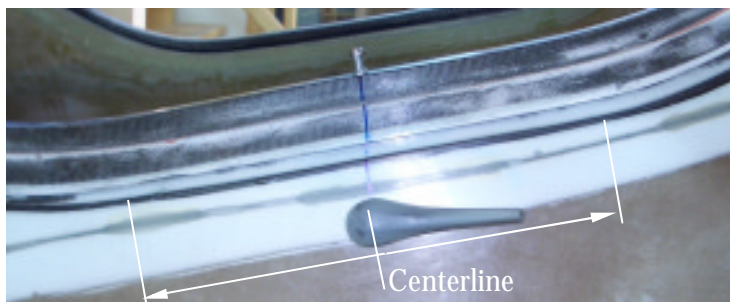
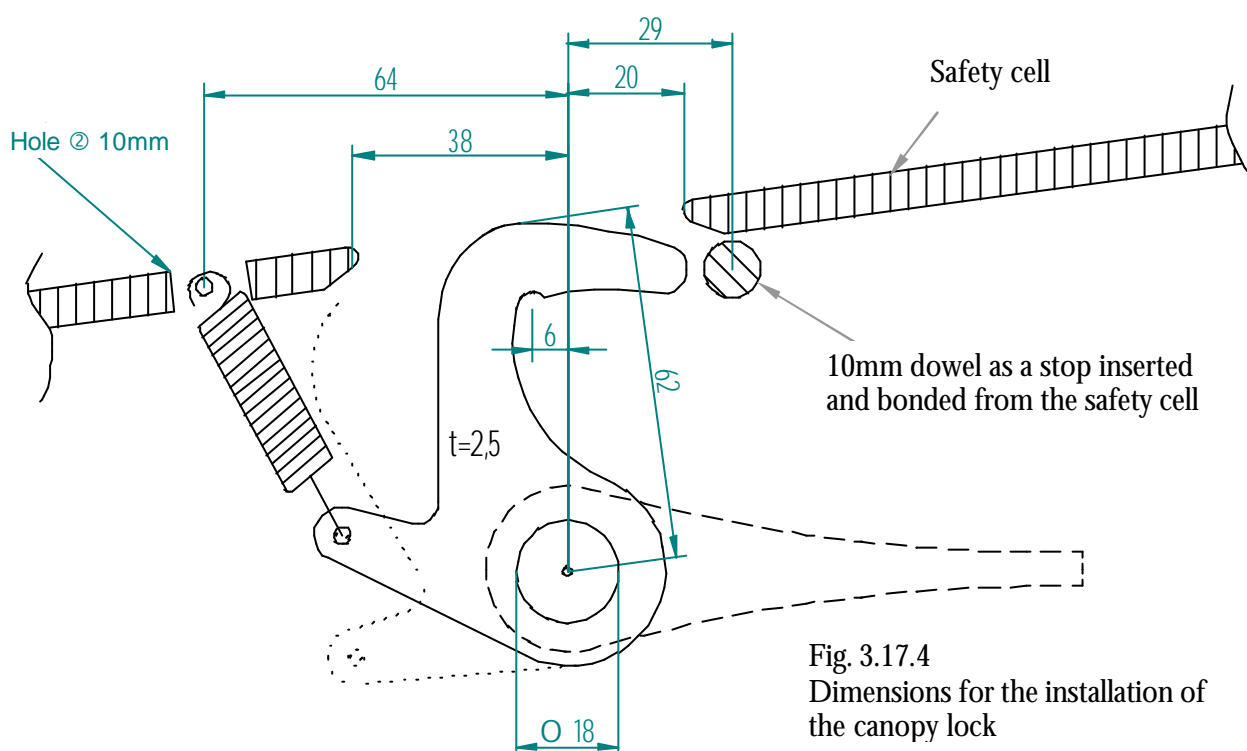
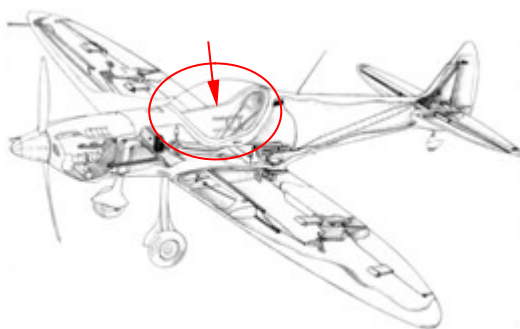


Fig. 3.17.2
Scribing the position for
the lock hinge at the
center of the straight
frame section



Fig. 3.17.3
Drilling the hole for the lock
hinge at a right angle to the
outer fuselage wall



2. Slide the lock hook onto the square end of the canopy catch with the hinge pin. Slide the bushing onto the pin. Screw the handle onto the M8 thread and tighten it securely by hand.
3. Drill through the handle and the hinge pin with a 3mm (0.12") bit as shown in figure 3.17.5.

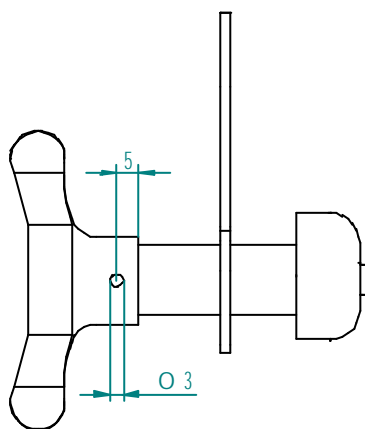
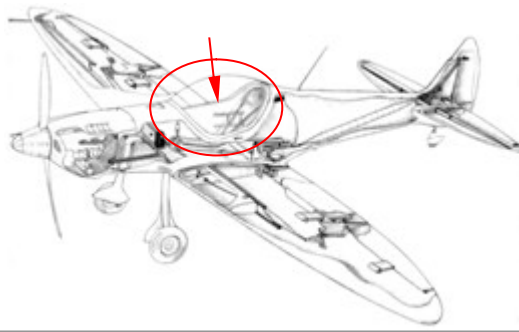


Fig. 3.17.5
Drilling the assembled
canopy lock



4. Disassemble the canopy lock.
5. Roughen the outside of the two plastic bearings and bond them into the 18mm (0.71") hole in the fuselage with CF. Fill the bearing in the domed area of the safety cell with CF (see fig. 3.17.6).
6. To align the bearings, apply mold release wax to the hinge pin and the bushing and insert them into the bearings.

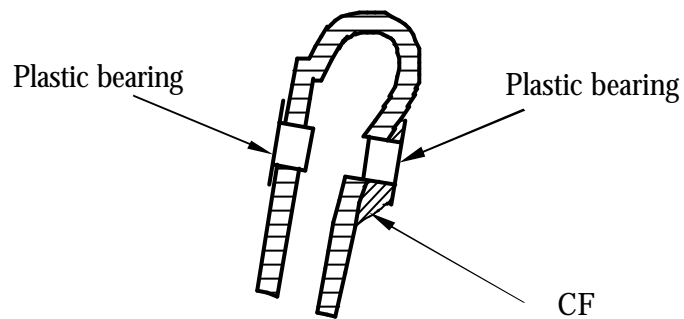


Fig. 3.17.6
Bonding the plastic
bearings

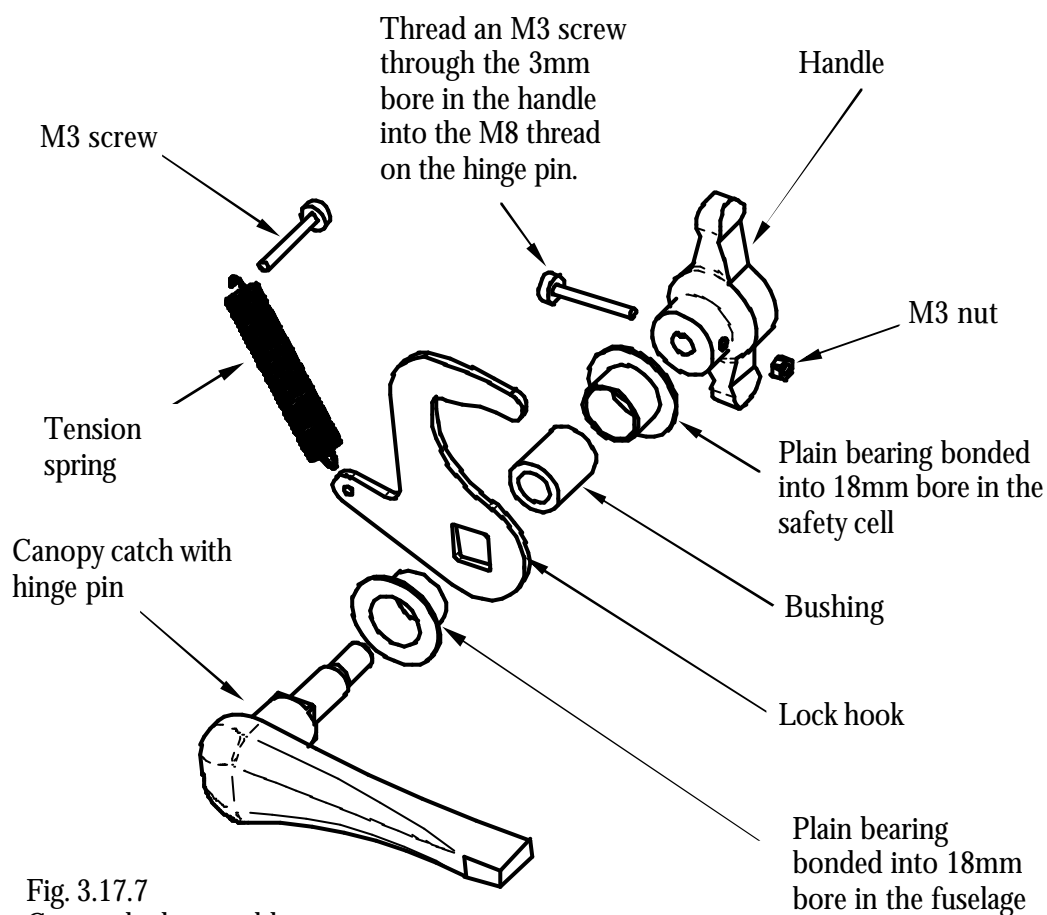
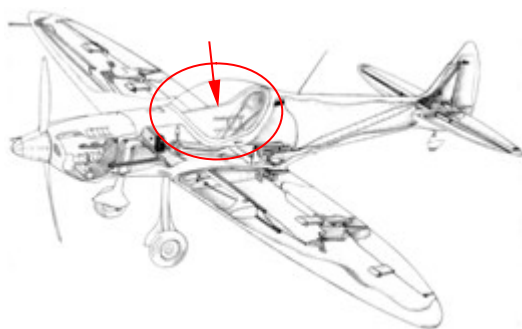


Fig. 3.17.7
Canopy lock assembly

7. Create the cut-out for the lock in the fuselage as shown in figures 3.17.4 and 3.17.9.
8. Install the lock assembly in the fuselage as shown in figure 3.17.7.
9. Bond a dowel into the fuselage as shown in figures 3.17.4 and 3.17.8. The dowel prevents the lock from sliding to far into the fuselage.

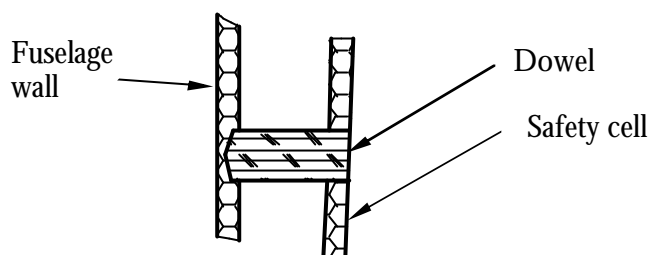
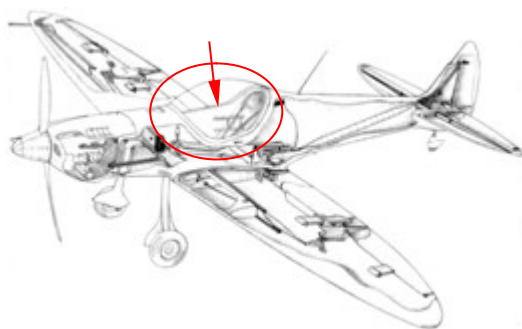
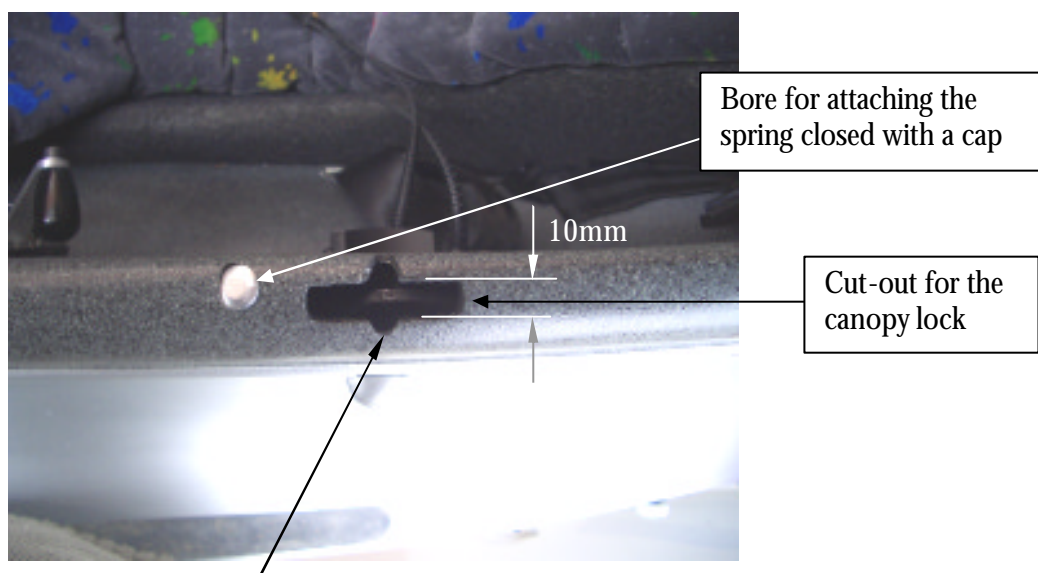


Fig. 3.17.8
Dowel bonded into
the fuselage



Fit the semicircle cut-outs
to the locking hook in the
canopy frame.

Fig. 3.17.9
Cut-out for the canopy hook
in the fuselage

10. Scribe the canopy frame as shown in figures 3.17.10 and 3.17.11. Insert the locking hook into the canopy frame from below and secure it with an M5 self-locking nut.
11. Place the canopy frame on the fuselage and pull the canopy hook down with the canopy lock. Tighten the M5 nuts in such a way that the canopy lock can be operated with the desired tension.

Note: The adjustment of the canopy hook needs to be changed after the aircraft has been painted. Determine the exact position and bond the hook to the thread under the nuts in the frame. This prevents an upward displacement of the hook.

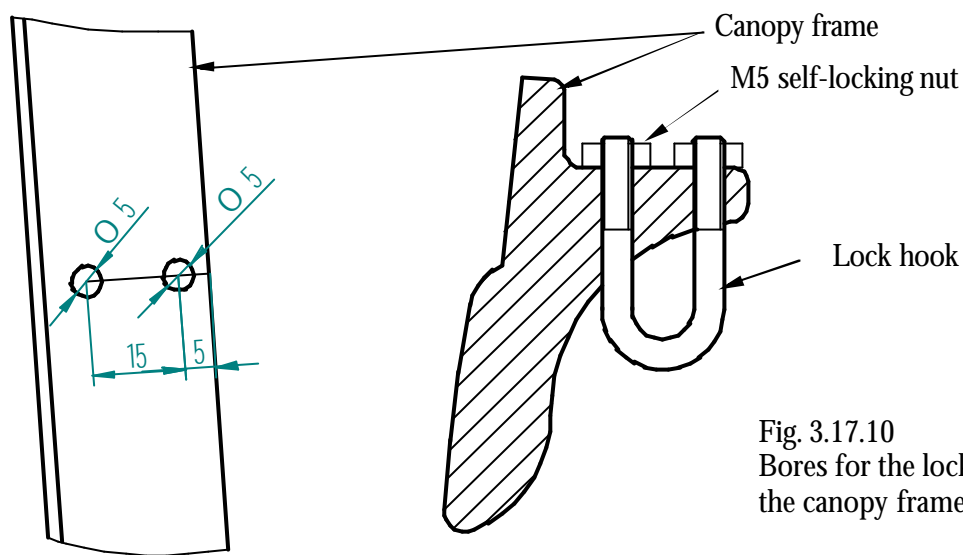
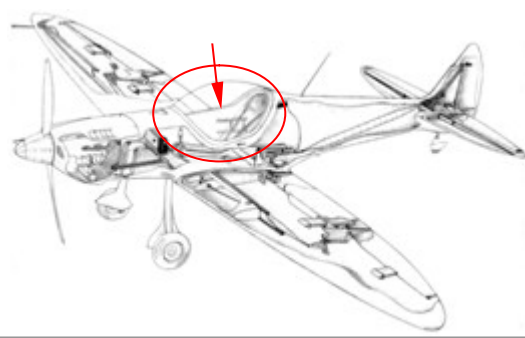


Fig. 3.17.10
Bores for the lock hook in
the canopy frame

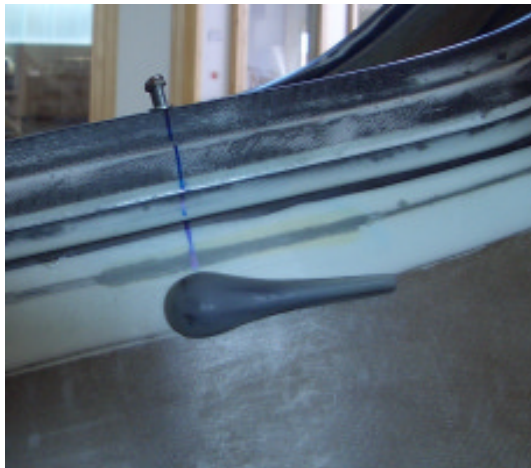


Fig. 3.17.10
Scribing the position of
the lock hook in the
canopy frame

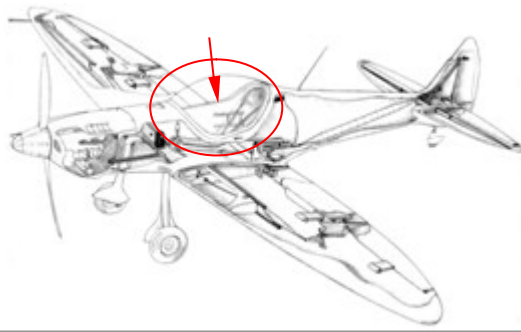


Fig. 3.17.11
Lock hook inserted into the
canopy frame



Fig. 3.17.12
Canopy lock label

Installing the Canopy Hinge

1. Cut the piano hinge to a length of 300mm (11.81"). Round the corners to a radius of 5mm (0.20").
2. Place the piano hinge on the straight section of the canopy frame and scribe the position of the hinge on the fuselage and the frame.

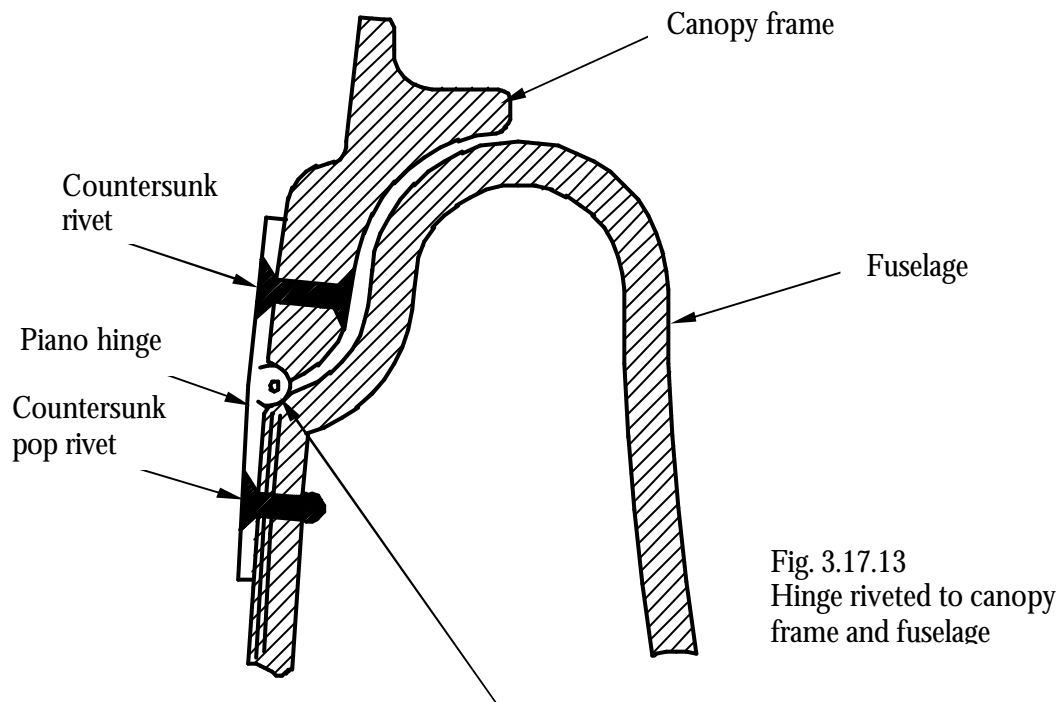
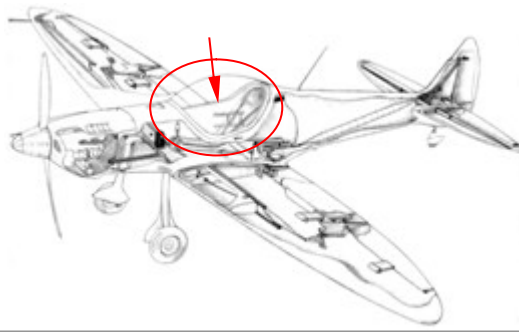


Fig. 3.17.13
Hinge riveted to canopy
frame and fuselage

Grind the fuselage and the canopy frame to
fit the curved contour of the piano hinge.

3. Grind the fuselage and the canopy frame to fit the curved contour of the piano hinge (see fig. 3.17.13 and 3.17.14).
4. Rivet the hinge to the canopy frame.



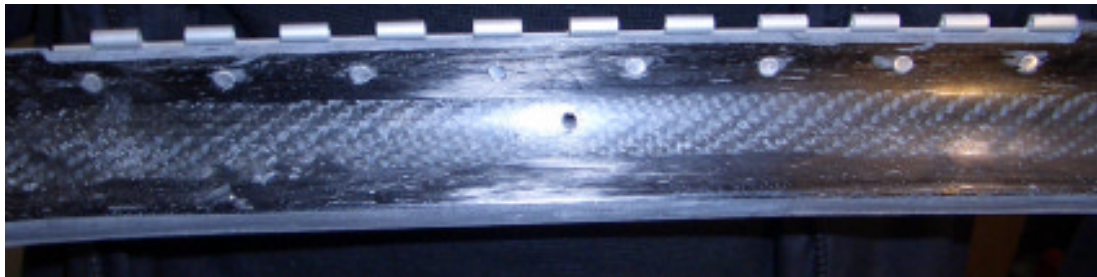
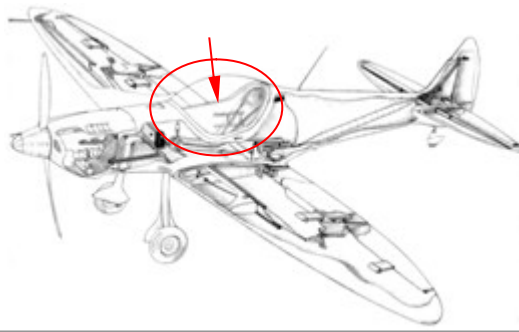


Fig. 3.17.14
Canopy frame with riveted
hinge seen from both sides

5. Cut the securing wire so that is 60mm (2.36") longer than the hinge and bend the remaining 60mm (2.36") to an angle of 90° (see fig. 3.17.15).



Fig. 3.17.15
Wire for canopy
emergency release bent by
90°

6. Cut a segment of the piano hinge to a width of 10mm (0.39") and shape it as shown in figure 3.17.16.

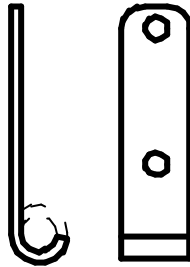
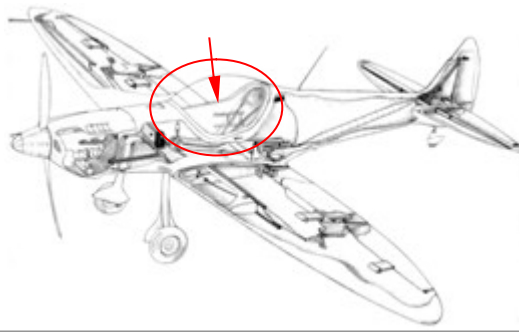
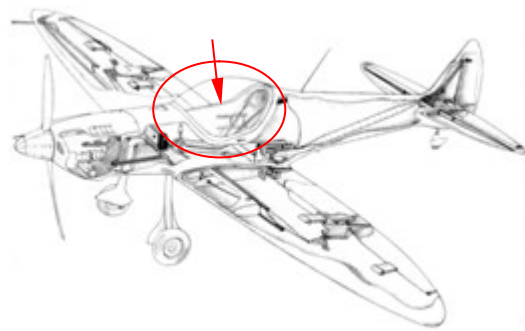


Fig. 3.17.16
Create the securing hook for the canopy
emergency release from a segment of
the piano hinge.

7. Rivet the securing hook to the side of the fuselage. The location of the hook is determined by the hinge wire.



Fig. 3.17.17
Canopy emergency release
showing securing hook and
hinge wire



Installing the Securing Cable for the Canopy

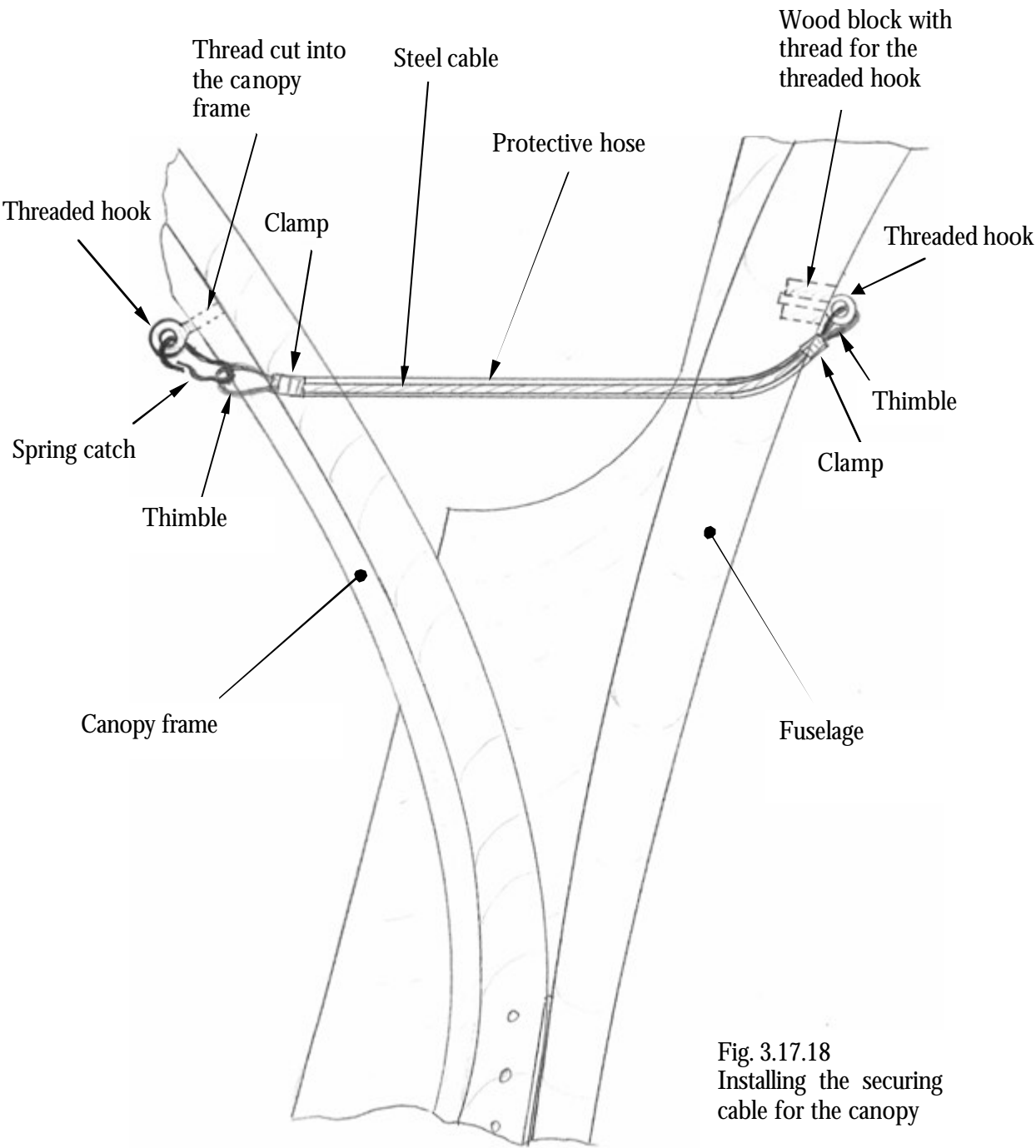
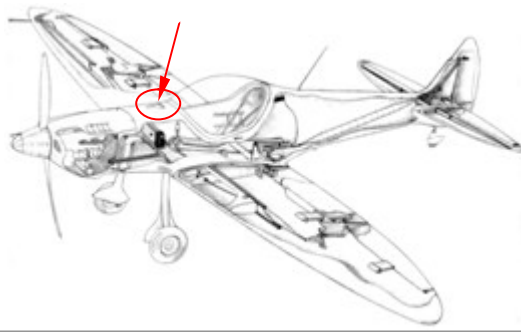


Fig. 3.17.18
Installing the securing
cable for the canopy



3.18 Installing the NACA Air Supply

1. You have to install the NACA Duct made of glass fiber

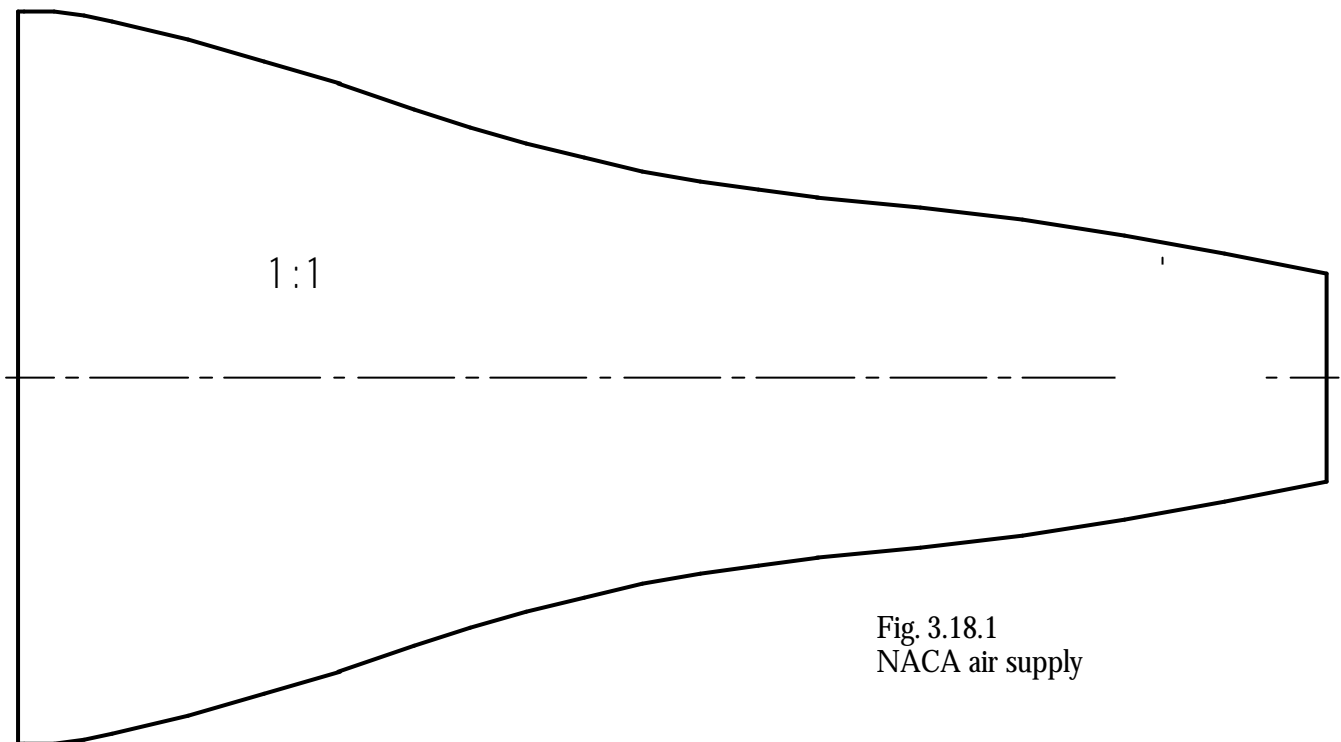


Fig. 3.18.1
NACA air supply

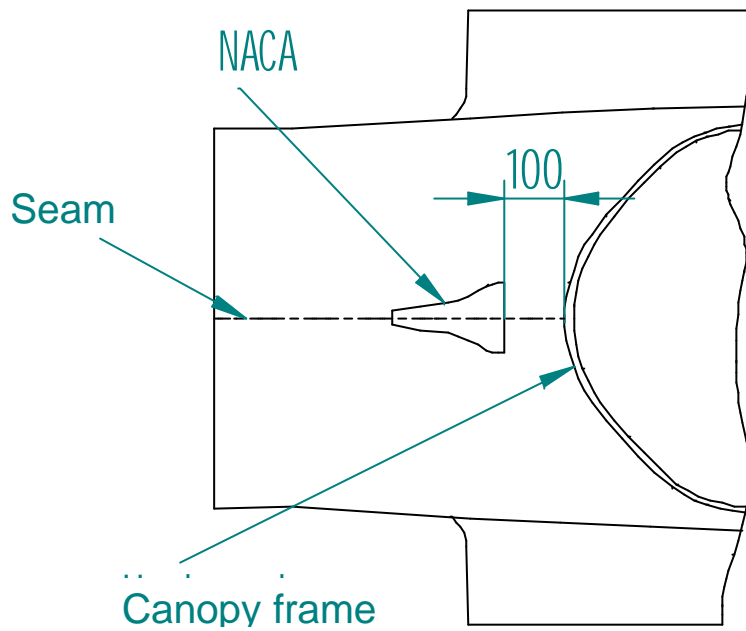
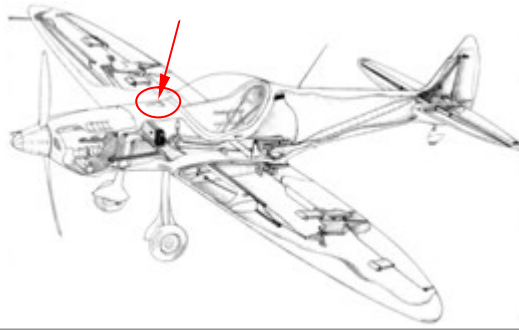
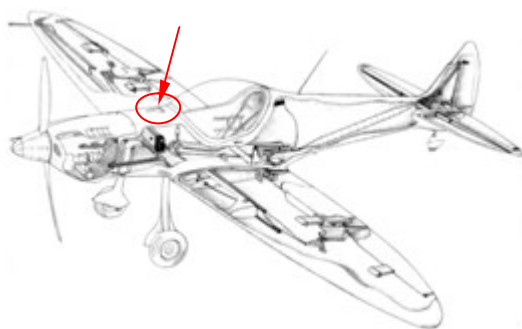


Fig. 3.18.2
Fix the NACA template
on the fuselage

2. Cut contour with a reciprocating saw or a keyhole saw fitted with a thin blade.
3. Bond the glass fiber NACA duct into the hole with thicker resin.

Revision 1.5

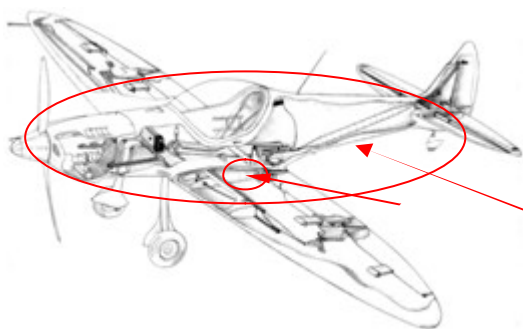


Fuselage

3

Install the Air vent in the shown position.





3.19 Installing the Trim

1. Install trim lock slider no. 40530262.

Screw the mounted trim lock assembly to trim system base plate no. 48000120 as shown in figure 3.19.2.

2. Screw bracket no. 48000117 to the base plate with two M4 countersunk screws.

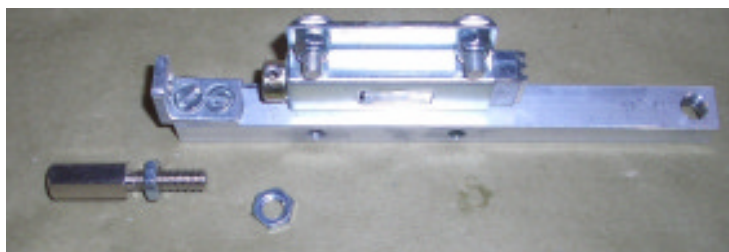


Fig. 3.19.2
Premounted trim



Fig. 3.19.3
Mounted trim,
side view

3. Screw ratchet plate no. 40230320 to the base plate as shown in figure 3.19.3.

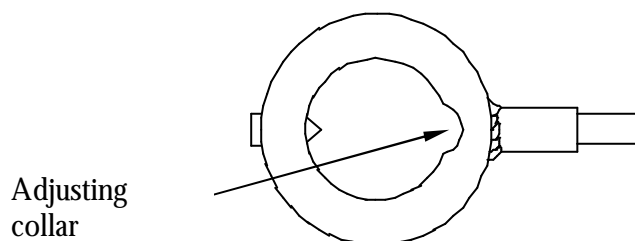
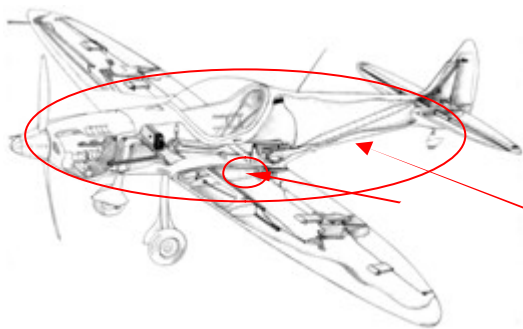


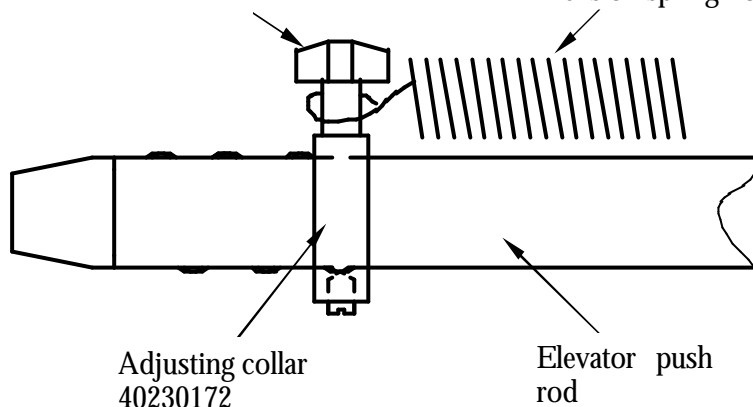
Fig. 3.19.4
Adjusting collar

4. Slide the two collars onto the elevator push rod and tighten the set screw in each collar so that it presses exactly into the hole of the rivet head (see fig. 3.19.5).
5. Install the trim mechanism and the springs on the elevator push rod which is connected to the elevator and control stick (see fig. 3.19.5 and 3.19.6).



Self-locking nut M6
51060020

Tension spring no. 45000687



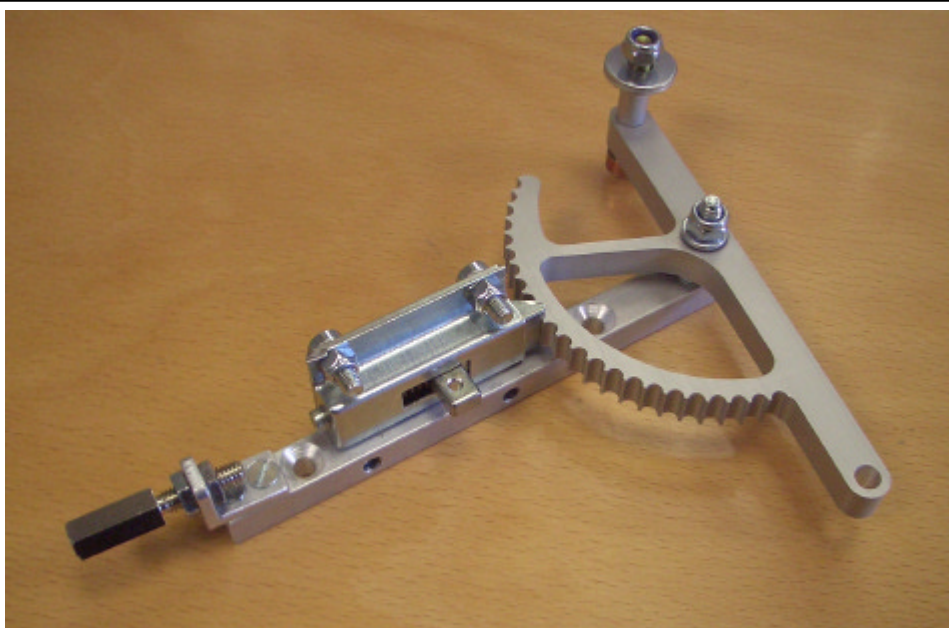
Adjusting collar
40230172

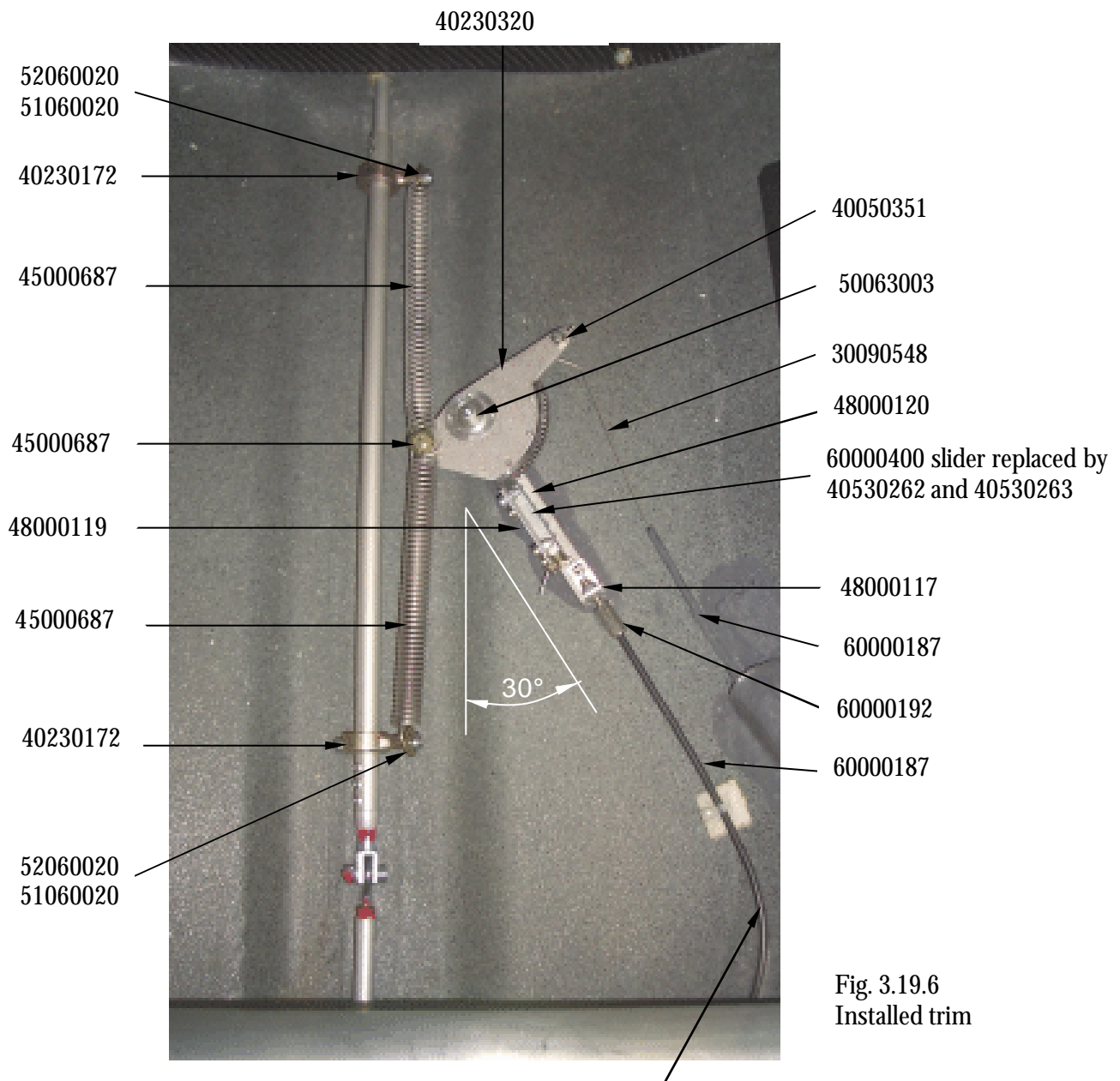
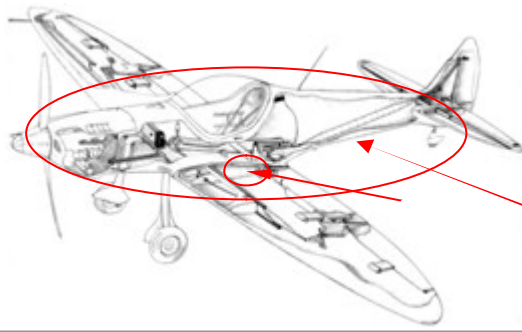
Elevator push
rod

Fig. 3.19.5
Fixing the adjusting collar
on the elevator push rod

6. Adjust the trim mechanism so that the ratchet presses on the center of the tooth segment. (You can move the ratchet plate by an equal distance in both directions.) Position the elevator to approx. 5° (nose-up position).
7. Bond the mechanism to the safety cell at an angle of 30° to the direction of flight as shown in figure 3.19.6. The spring forces determine the position in direction of flight.

Note: For service purposes it is recommended to screw the trim base plate onto a wood slat which is then bonded into the safety cell.





Pass the control cable for the trim ratchet under the seat pan towards the control stick and secure it on the floor of the safety cell with clamps spaced 250mm (9.84") apart.

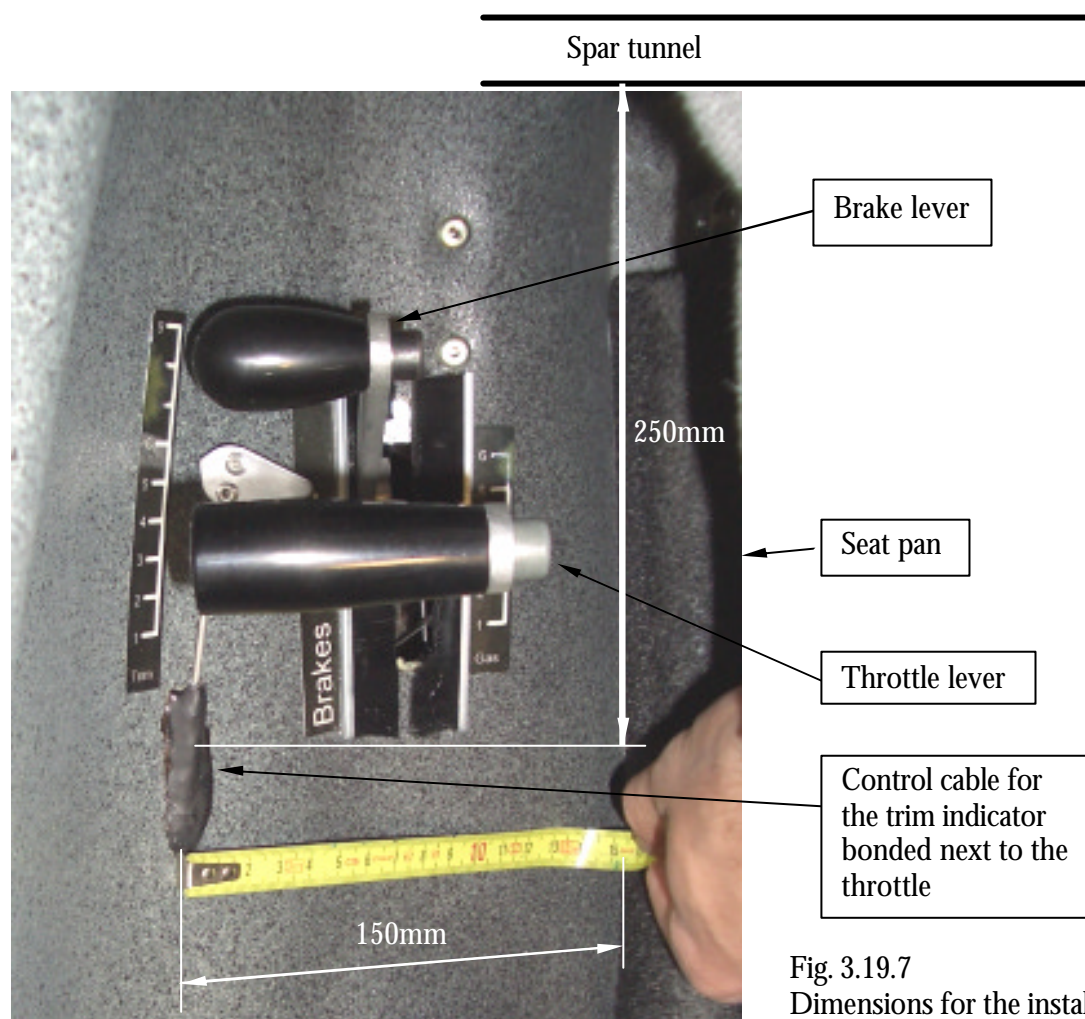
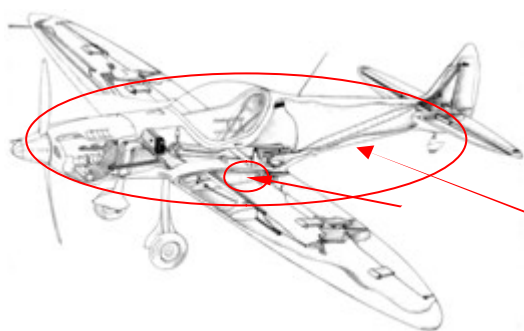


Fig. 3.19.7
Dimensions for the installation
of the trim indicator

8. Install control cable sleeve no. 60000187 next to the throttle and brake assembly. To do so, cut a slot into the safety cell (see fig. 3.19.8) according to the dimensions indicated in figure 3.19.7.

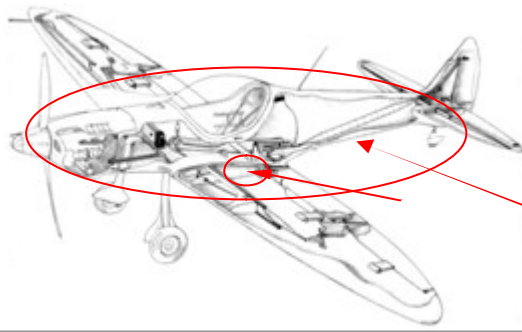
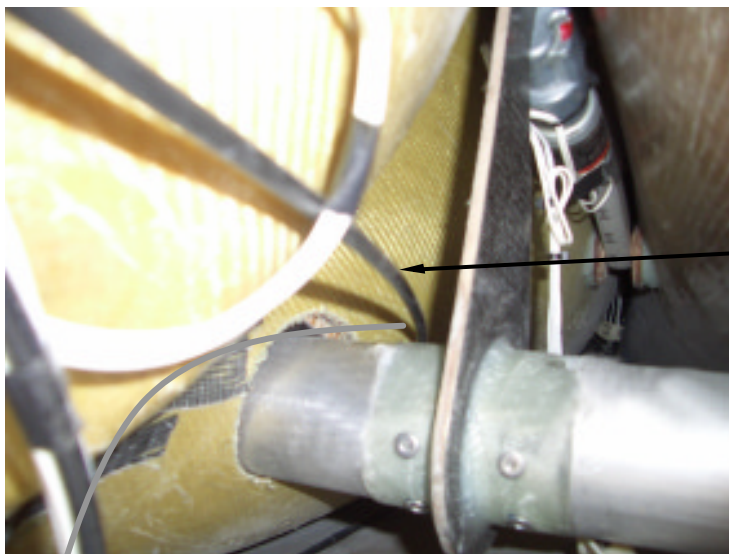


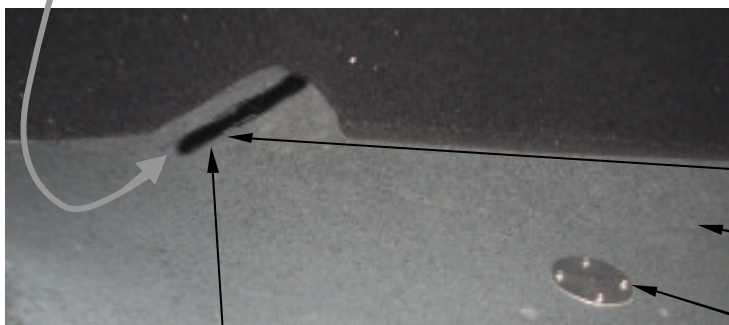
Fig. 3.19.8
Ground slot in the safety cell
with control cable for the trim
indicator

9. Lay the control cable over the torque tube of the flap drive (see fig. 3.19.9) and through a drilled slot back into the safety cell (see fig. 3.19.10).



Control cable for
trim indicator

Fig. 3.19.9
Control cable for trim
indicator laid over the flap
torque tube



Slot for the control cable
ground through the floor of
the baggage compartment

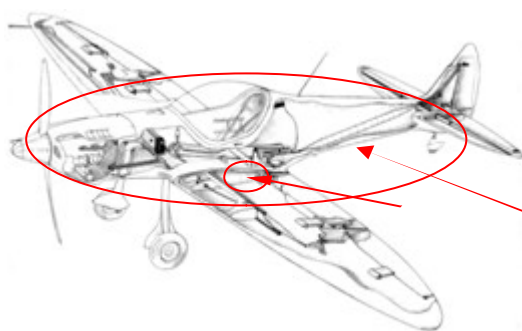
Control cable for trim
indicator

Safety cell

Cover plate for the
bolt in the flap
drive

Slot in the safety cell

Fig. 3.19.10
Control cable for
the trim indicator
in the safety cell



10. Fix trim-release lever no. 40830623 on the control stick handle as shown in figure 3.19.11.
Lay the control cable for the trim release as shown in figure 3.19.12.

Note: When using another type of control stick grip, install the trim-release lever according to the grip model. The trim-release lever must be easy to operate regardless of the grip used.



Trim-release lever

Pivot for the trim-release lever on the control stick grip

Fig. 3.19.11
Trim-release lever fixed on the control stick grip

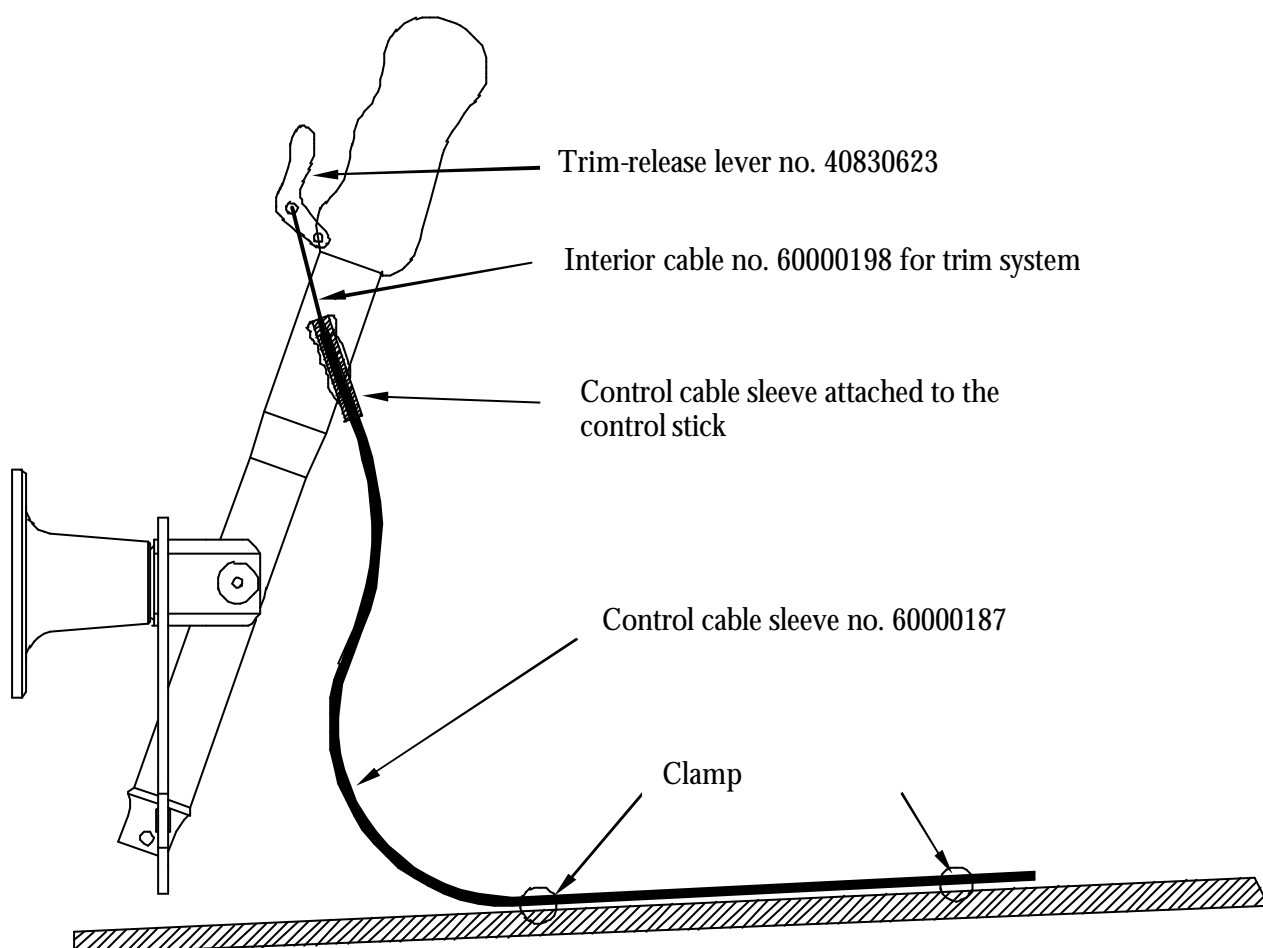
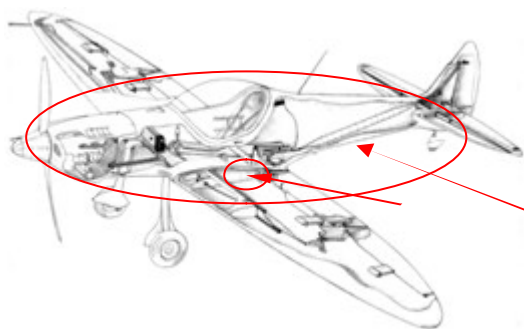
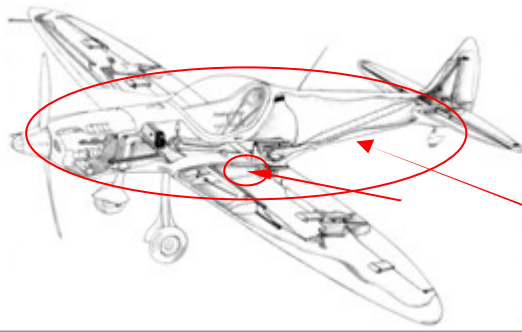
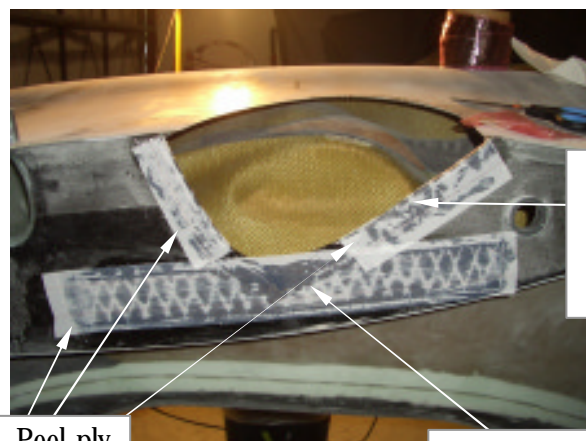
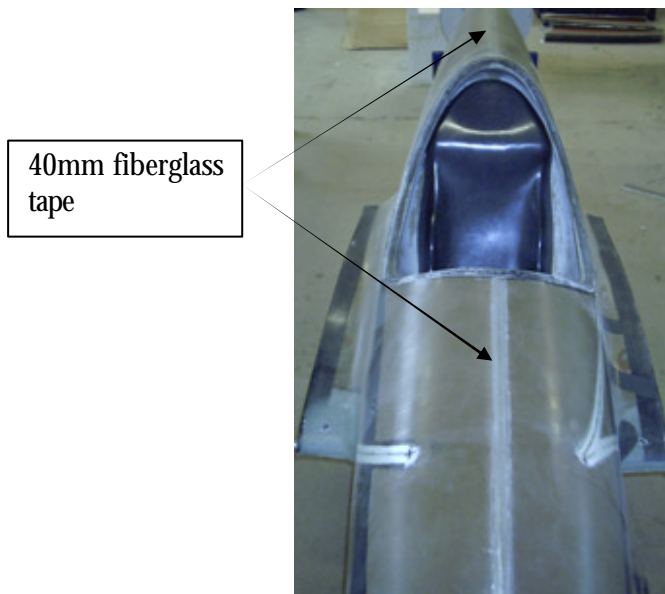


Fig. 3.19.12
Laying the control cable for
the trim release



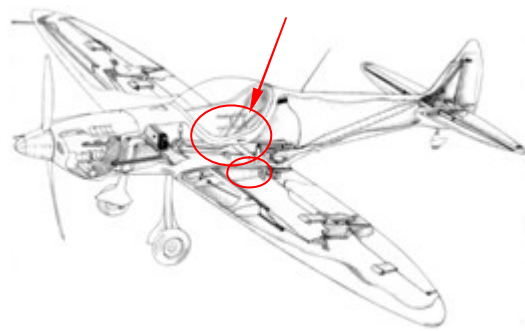
3.20 Laminating the Seams and Reinforcing the Wheel Well

1. Laminate all fuselage seams on the exterior and interior with one ply of 40mm (1.57") fiberglass tape (20g/m²) and peel-ply.
2. Apply one ply of 40mm (1.57") fiberglass tape and peel-ply to the seam between the safety cell and the fuselage in the area of the canopy opening.

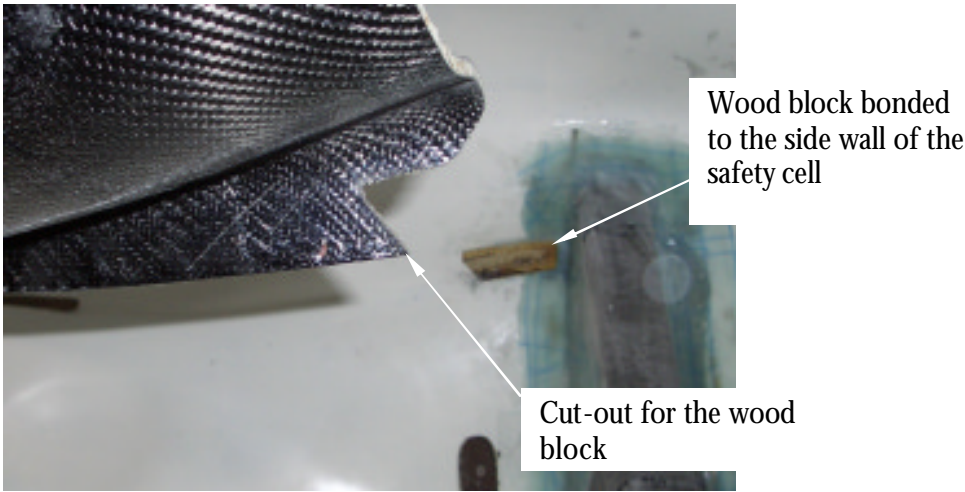
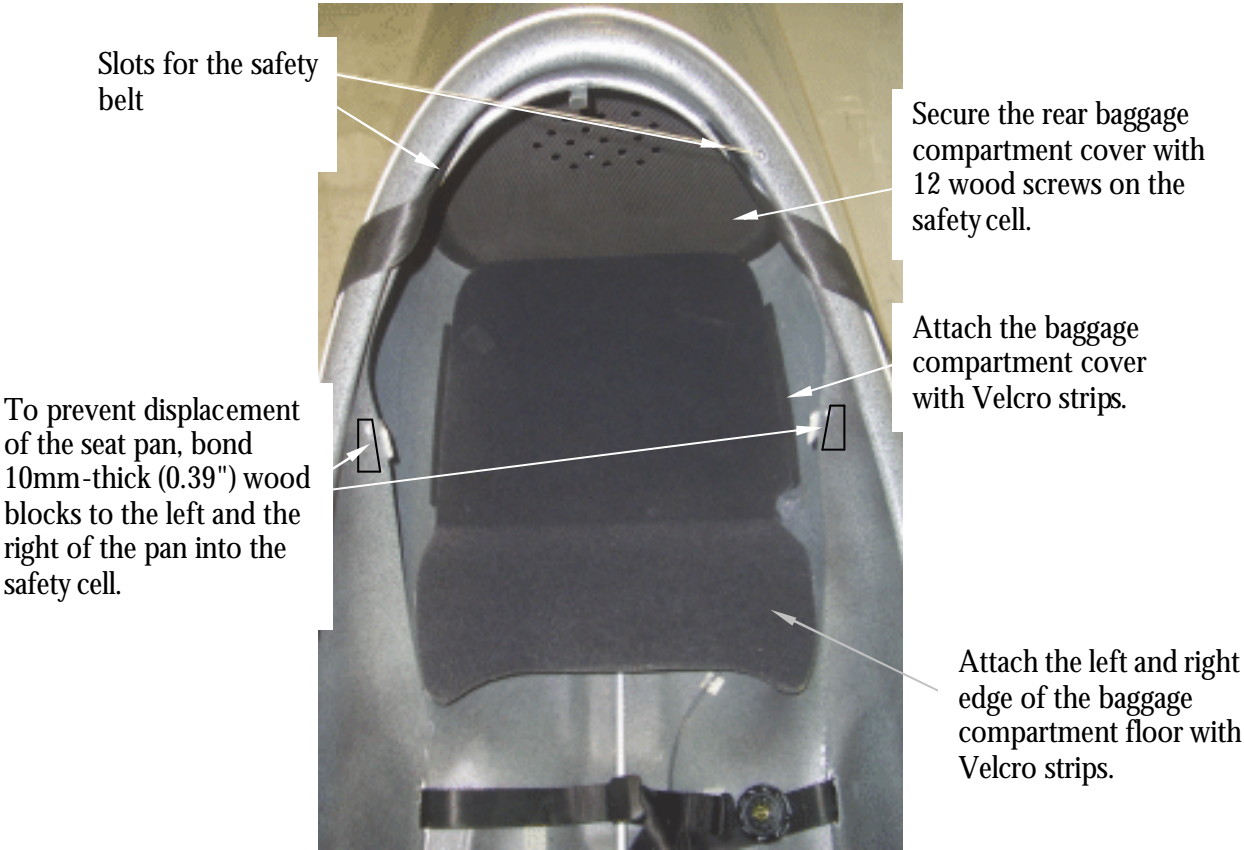


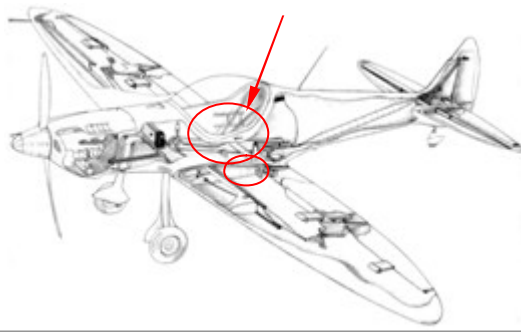
Paste 1 ply of 50mm UD tape centered over the cut-out. Fill the honeycomb with MB.

1 ply 50mm UD on both sides



3.21 Installing the Baggage Compartment Cover, Safety Belt and Seat Pan





3.22 PFA MOD 329/008 Parachute Seatback

The PFA twister can be fitted with an option of a seatback that has a special shape to allow a parachute to be fitted. The seatback is fitted the same as is described in Chapter 3.21 and the following pictures show a completed seat back covered in leather.

