

2.1 Flaps

This section describes the following steps for each of the two flaps:

1. Installing the hinge pin for the flap and the aileron
2. Installing the connecting pins for the automatic flap connection on the fuselage
3. Installing the counterweight
4. Laminating the seams and ribs

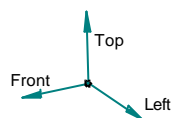
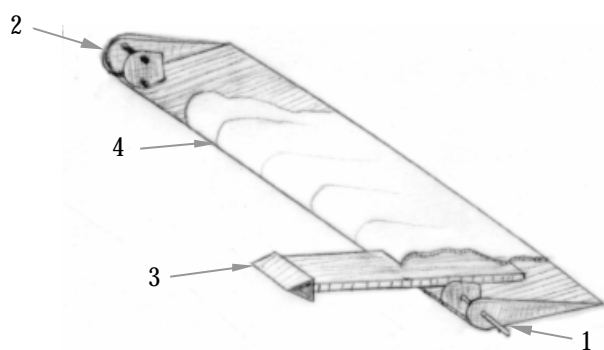
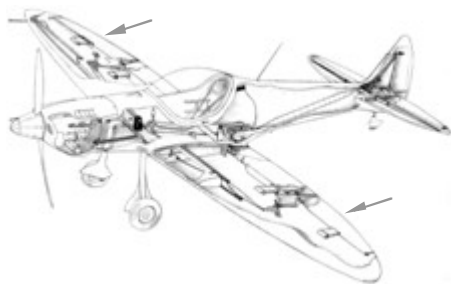


Fig. 2.1
Flap, section
drawing

Note: Flap and aileron are supported by an 8mm (0.31") stainless steel pin. The pin is fixed in the flap and projects out of the flap so that it can be slid through the bearing in the support rib (in the middle of the wing) into the aileron bearing.

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2.1.1 Installing the Hinge Pin for the Flap and the Aileron

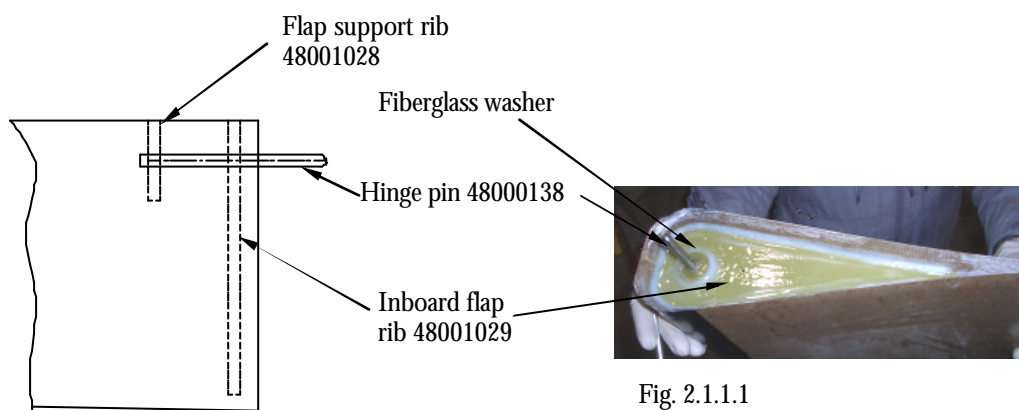


Fig. 2.1.1.1
Installing the hinge pin in the flap

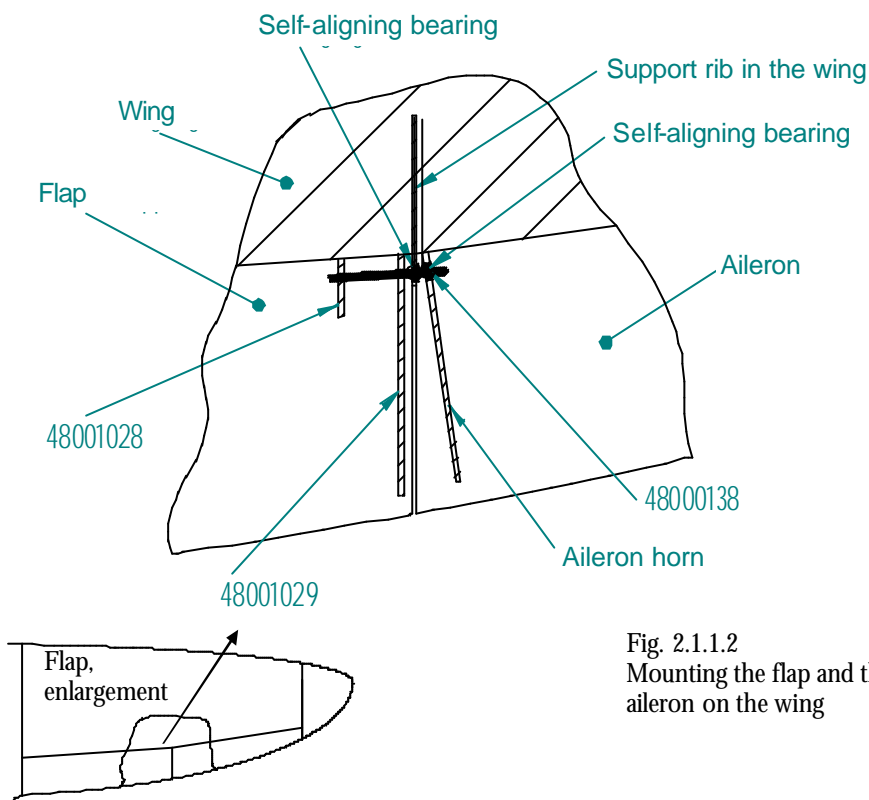
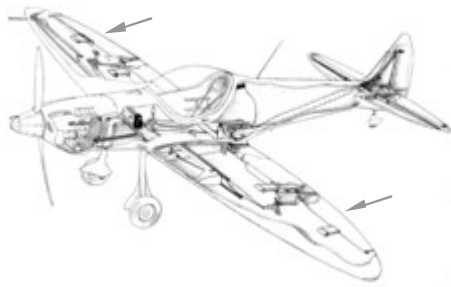


Fig. 2.1.1.2
Mounting the flap and the
aileron on the wing

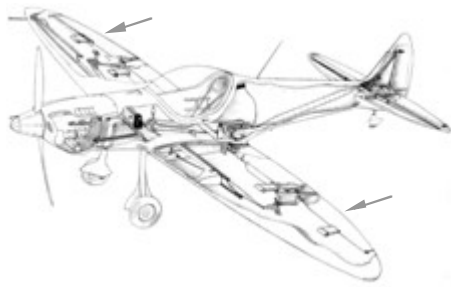
- Fix support rib no. 48001028 at a distance of 90mm (3.54") parallel to the outboard edge of the flap with superglue.

Note: The outboard edge (facing the aileron) is the one with the lower flap depth.

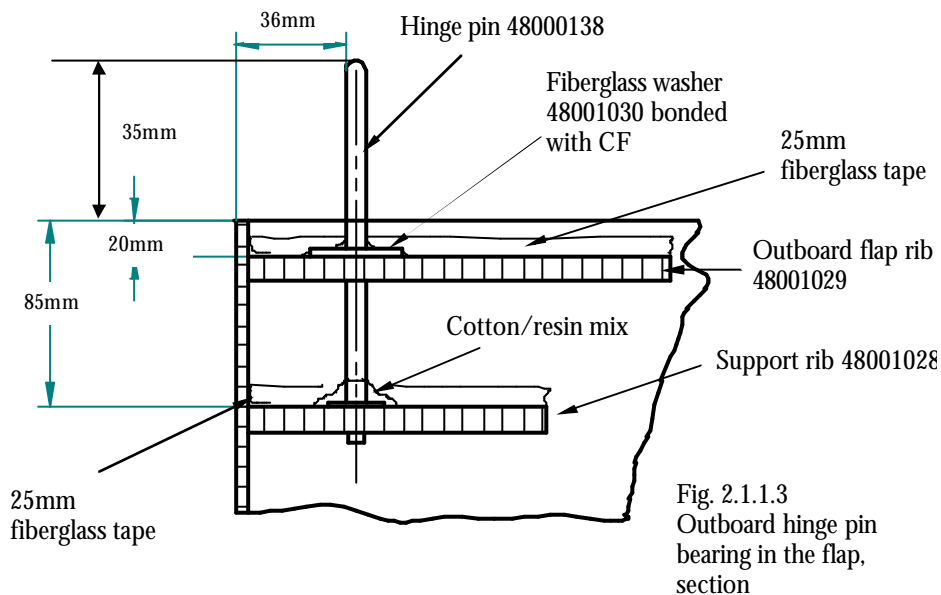
- Mask the rounded end of the hinge pin on a length of 40mm (1.57") with adhesive tape in order to protect the pin from soiling.
- Thoroughly roughen the unmasked portion of the hinge pin with 80 sandpaper or sand-blast it. Protect the pin from soiling by greases and other matter.
- Slide a washer no. 52060020 up to the step onto the pin. The washer prevents the pin from sliding into the rib.
- Mix the resin.

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- Laminate the visible side of the rear support rib along the whole contour touching the flap with 25mm (0.79") fiberglass tape.
- Bond the pin and the washer to the support rib with cotton/resin mix, as shown in the figure.

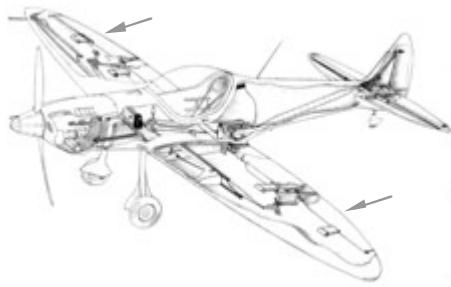


- Slide outboard flap rib no. 48001029 onto the pin and fix it with superglue at a distance of 20mm (0.79") parallel to the outboard edge.

Important: As shown in the drawing, the pin is located at a distance of 36mm (1.42") from the front of the aileron and must lie within the aileron chord. Please fix the washer first with two points superglue and check the position in the assembly.

- Coat the hole in the outboard flap rib and the hinge pin with cotton/resin mix and slide fiberglass washer no. 48001030 onto the pin. Fill in cotton/resin mix to a radius of 5mm (0.20").
- Laminate the rib with 25mm (0.98") fiberglass tape.

Build the right and the left flaps as mirror images of each other.



2.1.2 Installing the Connecting Pins for the Automatic Flap Connection on the Fuselage

Note: Two 8-mm-diameter (0.31") stainless steel hinge pins with a length of 112mm (4.41", lower pin, no. 48000139) and 107mm (4.21", upper pin, no. 48000140) respectively are bonded as in the previous section to the aileron-facing side of the outboard flap rib. Assemble the automatic flap connector (no. 48001007) as described in section 3.2.3. and push it onto the stainless steel pins in the flaps; fix the pins with superglue at their correct position.

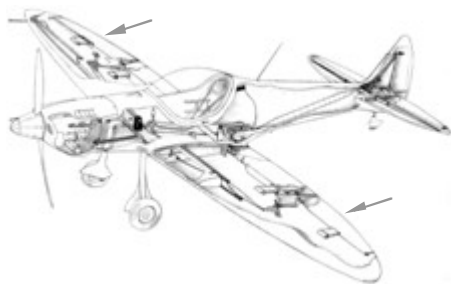
Note that the main bearing of the flap is located on the fuselage. The auxiliary bearing in the wing only serves to prevent the flap from falling out when the wing is separated from the fuselage.

Important: Due to the V shape of the wing the upper pin must be shorter than the lower pin. In this context it is important to check which is the left flap and which the right (see counterweight cut-out). Check that the flap pins are in the flap connector holes with their full length at 0° and 30° flaps.

1. Fix support rib no. 48001031 in the flap with superglue according to the dimensions indicated in figure 2.1.2.1. Create a laminate between the support rib and the flap shell with 27mm (0.98") fiberglass tape.
2. Slide one washer each onto the machined part of the stainless steel pins nos. 48000139 and 48000140 and bond the pins to the support rib with CF. Slide inboard flap rib no. 48001032 onto the bolts and center it in the flap to align the bolts.
3. Bond the inboard flap rib in place according to the dimensions indicated in figure 2.1.2.1 and create a laminate between the rib and the flap shell with CF and 25mm (0.98") fiberglass tape.
4. Assemble the flap connector as described in section 3.2. Slide the flap connector onto the pins to check for the correct spacing of the bolts. If the pins are not correctly spaced you can slightly enlarge the holes in the rib by filing.
5. Slide a fiberglass washer no. 48001033 onto each pin and bond each washer with CF to the inboard flap rib.
6. Place the flap connector on the two pins during curing.

Note: Thoroughly roughen the bonding surfaces of the ribs.

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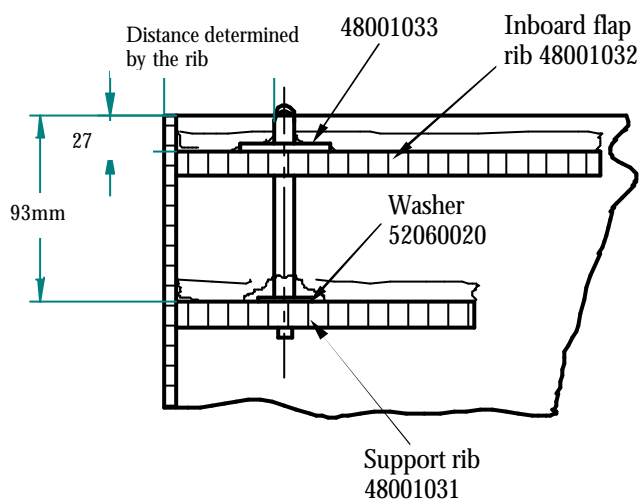
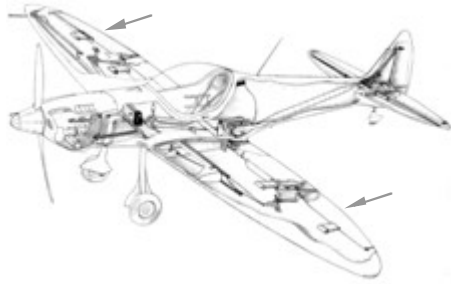


Fig. 2.1.2.1
Flap section



Adjust the spacing of the pins precisely by sliding the assembled flap connector onto the pins.

Fig. 2.1.2.2
View of the inboard flap rib with the pins for the automatic flap connector

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2.1.3 Installing the Counterweight

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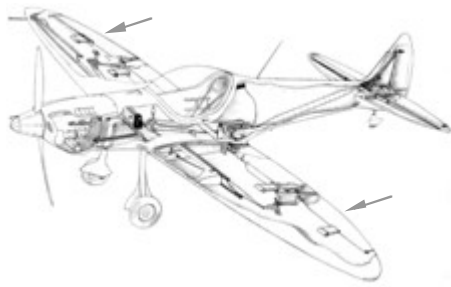
- Saw off the triangular lead profile at a length of 95mm (3.74"). The lead weight must have a mass of 650g (22.93oz) +20g/-0g (+0.71oz/-0oz).
- Cut the 13mm (0.51") carbon fiber panel to a width of 90mm (3.54") and a length of 460mm (18.11").

Important: The fibers in the panel must be oriented lengthwise (460mm [18.11"])!

- Roughen (or sand-blast) the lead weight.
- Tear the **pea**l-ply off the panel.
- Slide the panel into the groove of the counterweight and fix it with superglue.

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Note: At this point you can also prepare the counterweights for the ailerons as described in section 2.2.



- Mix the resin.
- Bond the weight as shown in the figure.

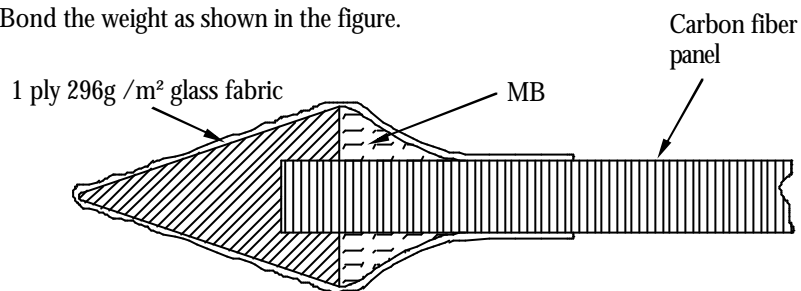


Fig. 2.1.3.1
Building the counterweight
for the flap

The counterweights for both flaps are built identically.

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- Cut the scribed areas out of the flaps.

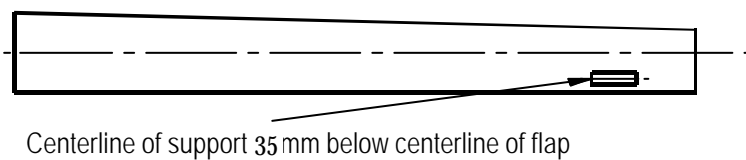
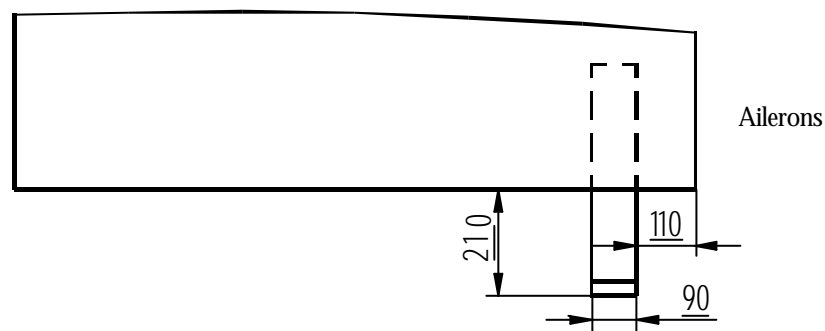
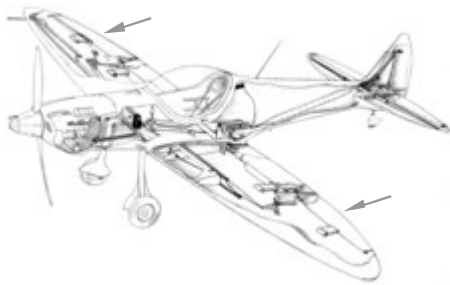


Fig. 2.1.3.2
Creating the
cut-outs for the
counterweights



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- Sand a tapered groove into the rear of the carbon fiber panel's honeycomb as shown in the figure and insert the honeycomb into the hole created in the previous steps. Do not use force to slide carbon fiber panel in, because otherwise the flap might be distorted. If the weight projects more than 210mm (8.27") from the flap, sand the counterweight to the correct length.



- Check both flaps for full deflection before bonding the counterweights in place! Measure from the tip of the flap rib in the closed and open flap positions (see fig. 2.1.3.3).

	<u>Distance from the hinge</u>	<u>Upward deflection</u>	<u>Downward deflection</u>
<u>Flaps</u>	<u>365</u>	<u>=</u>	<u>180 +/-10</u>

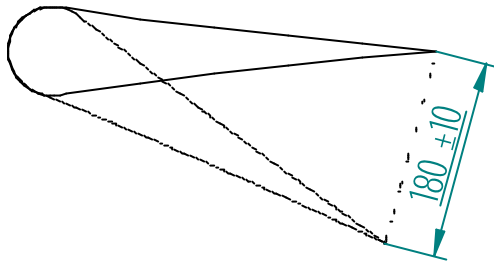
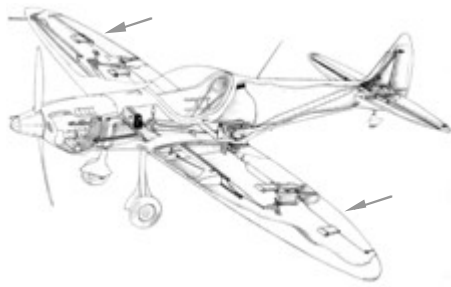


Fig. 2.1.3.3
Checking the flap
deflection

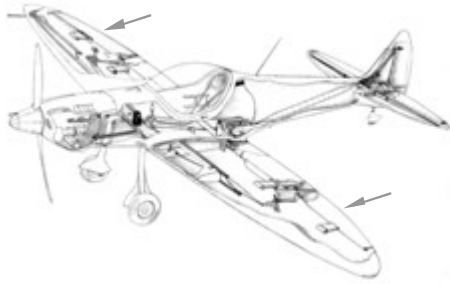


Fig. 2.1.3.4
Checking the
position of the
counterweights

Check that the counterweight does not make contact with any surface when the flaps are fully deployed. If necessary, enlarge the cut-out in the rear spar of the wing or sand some material from the counterweight. However, you must later compensate for the removed mass by applying some resin/lead pellet mix to the honeycomb directly behind the counterweight. Compensate the counterweights only after painting.

- Fill the groove in the panel with MB and bond this end of the panel also with MB. Fill the carbon fiber ply of the panel with MB where it touches the inner surface of the aileron.
- Apply MB to the bearing surface of the panel with a long wooden spatula through the rectangular cut-out in the flap and fill the honeycomb in the rectangular cut-out with MB (see fig. 2.1.3.6).
- Slide the panel into the flap, until the lead weight projects 210mm (8.27") at a right angle from the flap.

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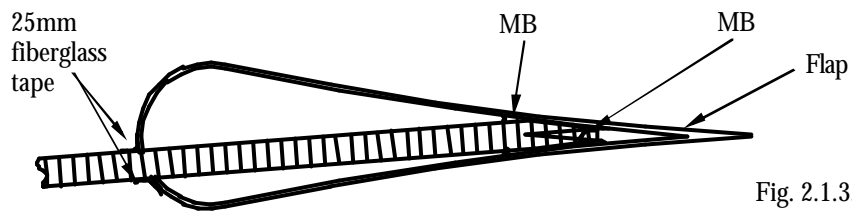


Fig. 2.1.3.5
Inserting the
counterweight into the
flap

- Laminate both sides of the panel along their whole width (90mm [3.54"]) with 40mm (1.57") fiberglass tape. This completes the installation of the counterweights.

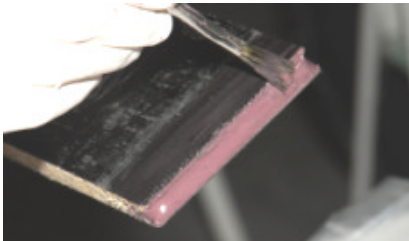
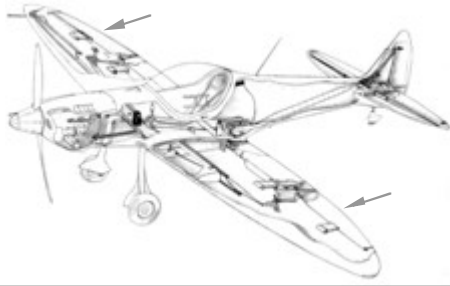


Fig. 2.1.3.6
Filling the tapered groove
with MB

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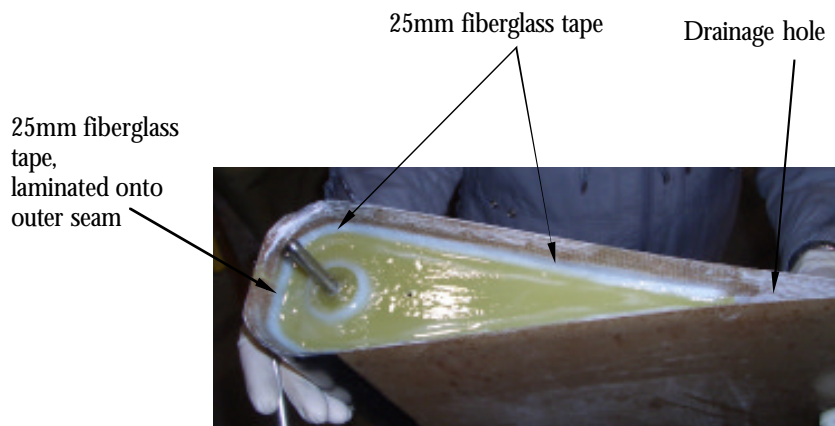


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2.1.4 Laminating the Seams and Ribs

- Apply 25mm (0.98") fiberglass tape to the outer seam of the flap shells and the flap ribs.



2.1.4.1
Laminating the ribs and
seams

Both flaps are built identically, but as mirror images of each other.

Important:

After painting, the flap with the counterweight must weigh 2.4 – 2.95kg (5.29 – 6.50lb).

The residual moment of the flap must be between 40 and 90 Ncm.

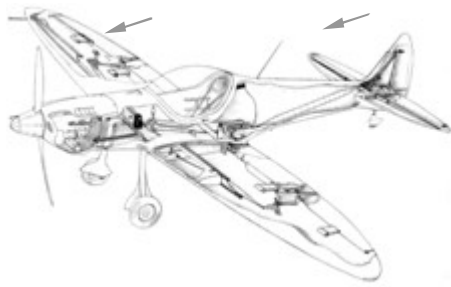
Measure the residual moment as follows: Place the rear edge of the flap on a precise scale and rest the fulcrums of the flap on thin steel pins so that it moves easily.

Multiply the scale reading with 9.81 and the distance from the fulcrum in cm.

Example: For a scale reading of 0.06kg: $0.14\text{kg} * 9.81\text{m/s}^2 * 36.6\text{cm} = 50.26\text{Ncm}$ (This result is between 40 and 90 Ncm and therefore acceptable.)

If the measured value lies outside of the tolerance given above, reduce the mass by sanding material off the counterweight or increase the mass by filling resin/lead pellet mix into the honeycomb directly behind the counterweight.

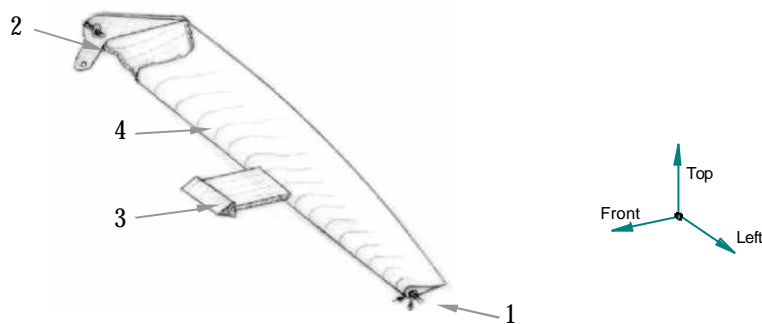
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2.2 Ailerons

This section describes the following steps for each of the ailerons:

- 2.2.1 Installing the hinge pins
- 2.2.2 Installing the aileron horns with self-aligning bearings
- 2.2.3 Installing the counterweights
- 2.2.4 Laminating the seams and bonding the ribs



2.2.1 Installing the Hinge Pin

- Bond stainless steel pin no. 48001026 (diameter 6mm [0.24"], length 90mm [3.54"]) on a length of 70mm (2.76") to the aileron with cotton/resin mix. Position the pin as shown in the figure. The bearing pin projects by 20mm (0.79"). Strongly roughen or sand-blast the pin along the bonding length (like the flap pins).

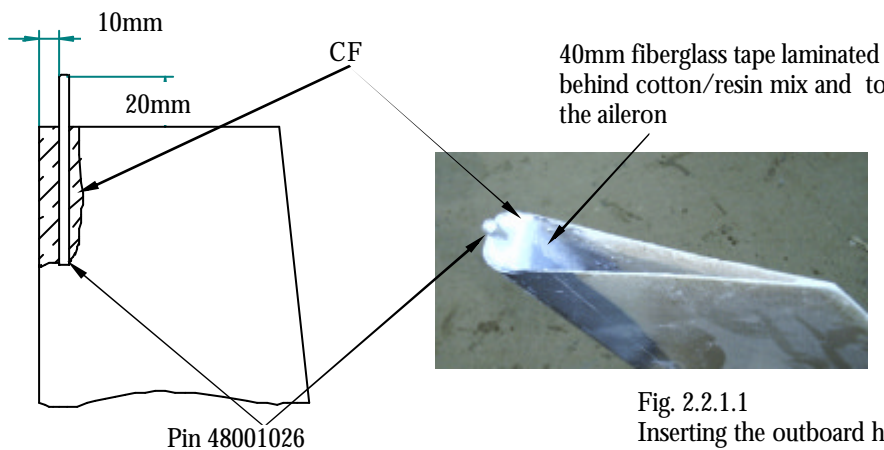
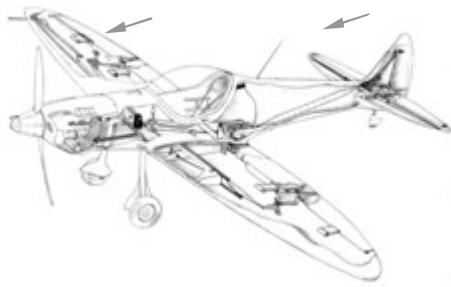


Fig. 2.2.1.1
Inserting the outboard hinge
pin into the aileron



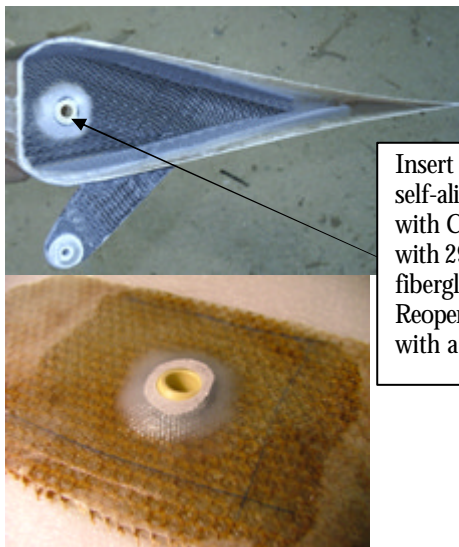
2.2.2 Installing the Aileron Horn with Self-Aligning Bearings

- Cut the scribed area out of the aileron.

Note: You can later re-insert the removed platelet into the resulting gap next to the aileron horn. To do so, shorten the platelet by the thickness of the aileron horn.

- Insert plastic self-aligning bearing no. 48000042 with CF into the corresponding hole in the aileron horn. The bearing projects equally on both sides. Fill the black bearing ring with CF in such a way that the bearing ball can still move freely. Laminate both sides of the bearing completely with 60x60mm (2.36"x 2.36") 296g/m² fiberglass fabric.
- After the resin has cured, sand down the cloth, with a planar dremel tool, to the yellow ball to open the hole.
- Insert a steel rod of approx. 20cm (8") length into the 8mm (0.31") hole to separate the ball from the resin. Turn the rod at an angle of 30°.
- Slide the aileron horn into the cut-out until it goes no further and fix it with superglue.

Note: The aileron horn is not aligned parallel to the aileron's outboard edge but parallel to the scribed cut-out.



Insert the KGLM-08 self-aligning bearing with CF and laminate it with 296g/m² fiberglass fabric. Reopen the closed hole with a drill.

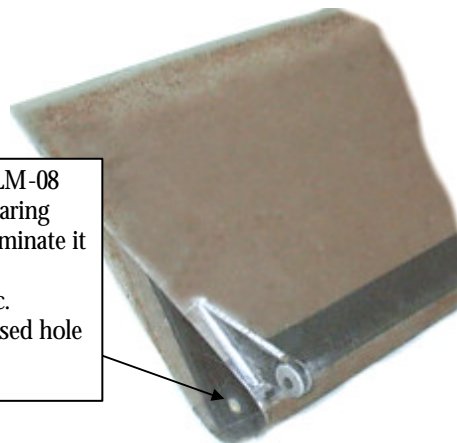
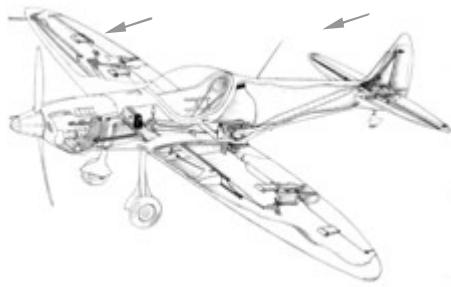


Fig. 2.2.2.1
Inserting the plastic self-aligning bearing into the rib



2.2.3 Installing the Counterweights

Note: Counterweights are critical to prevent the ailerons and wings from fluttering. The exact observance of lever lengths and balance masses is of vital importance for the pilot!

- Saw off the triangular lead profile at a length of 130mm (5.12"). The lead weight must have a mass of 900g (31.75oz) within a tolerance of +20g/-0g (+0.71oz/-0oz).
- Cut the carbon fiber panel with a 13mm (0.51") honeycomb to a width of 125mm (4.92") and a length of 340 mm (13.39").

Important: The panel must have a longitudinal fiber orientation (340mm [13.39"])!

- Roughen (or sand-blast) the lead weight.
- Tear the pull-ply off the panel.
- Slide the panel into the groove of the counterweight and fix it with superglue.
- Mix the resin.
- Bond the weight as shown in the figure.

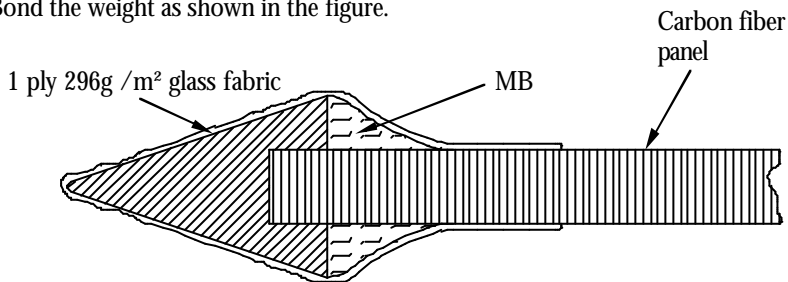
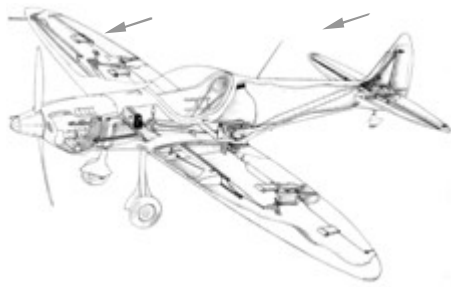


Fig. 2.2.3.1
Building the
counterweights

The counterweights for the right and the left aileron are built in the same way.

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Cut-out the ailerons as scribed.

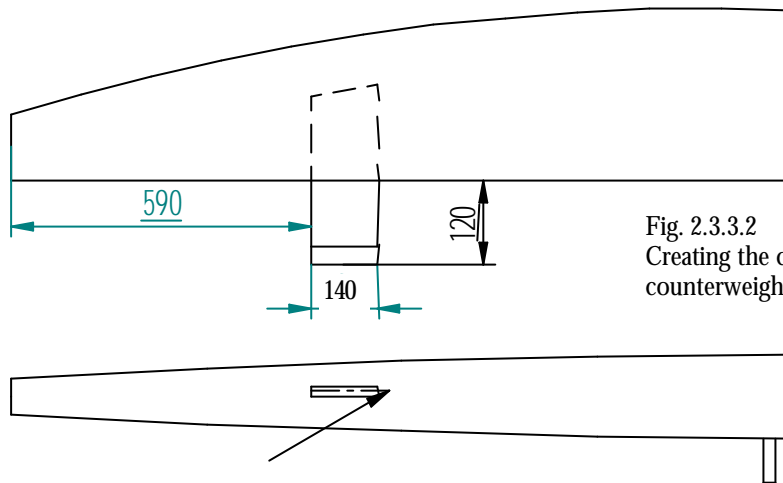
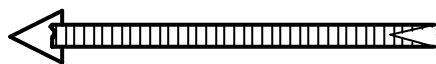


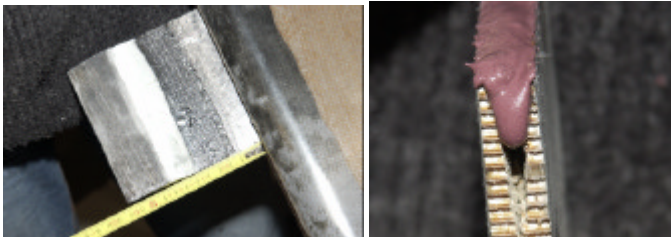
Fig. 2.3.3.2
Creating the cut-outs for the
counterweights

Centerline of support 3mm above centerline of aileron

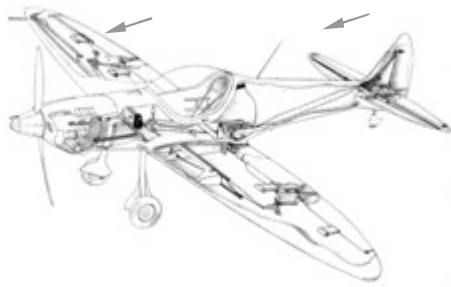
- Sand a tapered groove into the rear of the carbon fiber panel's honeycomb as shown in the figure and insert the honeycomb into the hole created in the previous steps. Do not use force to slide in the carbon fiber panel, because otherwise the aileron might be distorted. If the weight projects more than 120mm (8.27") from the aileron, sand off material until the exact position is reached.



Sand a tapered groove into the
honeycomb



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- Check both ailerons for full deflection before bonding the counterweights!
- If necessary you can grind of the counterweights to get more deflection

	Distance from the hinge	Upward deflection	Downward deflection
Ailerons	335	100 +/- 10	90 +/- 10

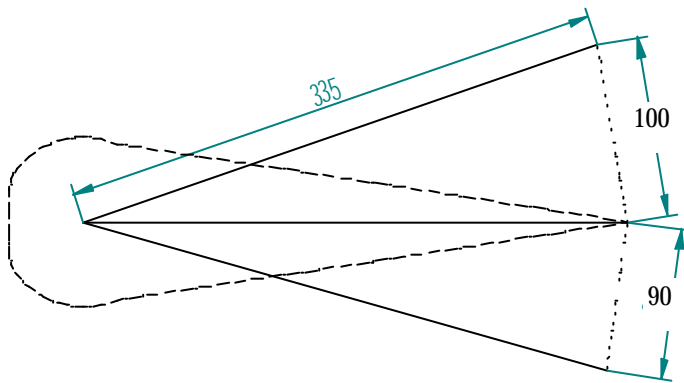


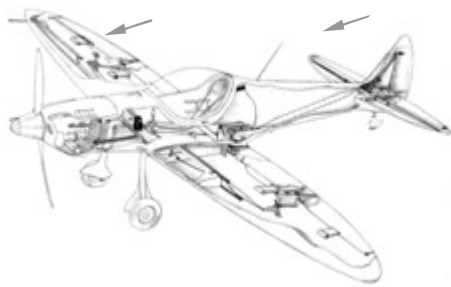
Fig. 2.2.3.3
Checking the
aileron deflection

- Fill the groove in the panel with MB and bond this end of the panel also with MB. Fill the carbon fiber ply of the panel with MB where it touches the inner surface of the aileron.

Note: At this point you can also laminate the seam of the two aileron shells at the front edge of the aileron with 25mm (0.98") fiberglass tape.

- Apply MB to the bearing surface of the panel with a long wooden spatula through the rectangular cut-out in the aileron and fill the honeycomb in the rectangular cut-out with MB (see drawing).
- Slide the panel into the aileron, until the lead weight projects 120mm (8.27") at a right angle from the aileron.

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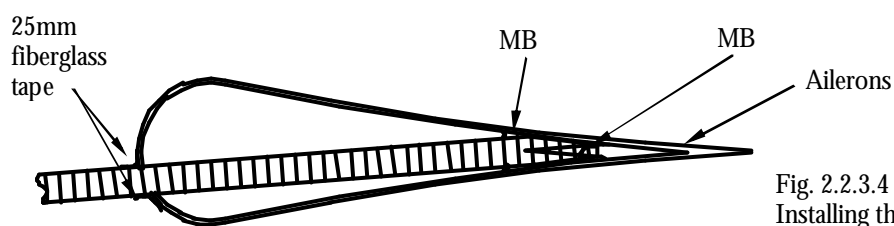
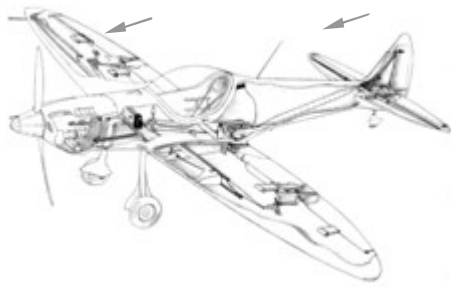


Fig. 2.2.3.4
Installing the
counterweight in the
aileron

- Laminate both sides of the panel along their whole width (125mm [4.92"]) with 25mm (0.98") fiberglass tape. This completes the installation of the counterweights.



2.2.4 Laminating the Seams and Ribs

- Laminate the outer seam of the aileron shells and the aileron rib with 25mm (0.98") fiberglass tape.

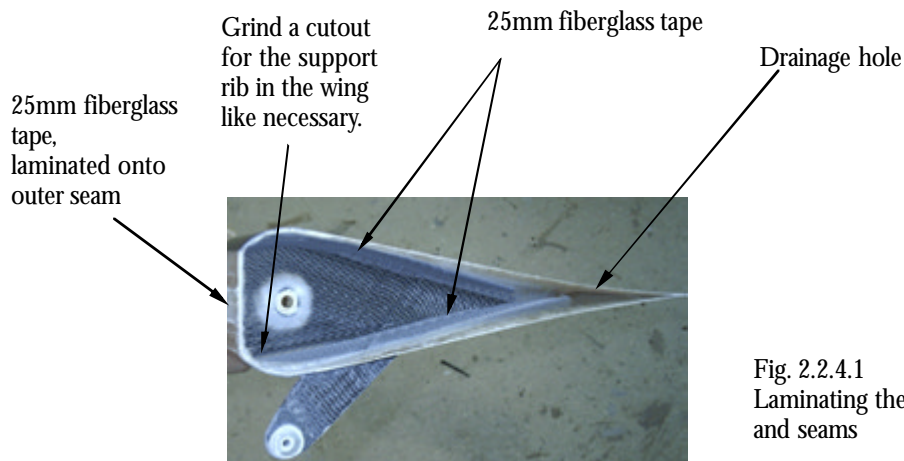


Fig. 2.2.4.1
Laminating the ribs
and seams

Both ailerons are built in the same way. The aileron horn is always located on the underside.

Important:

After painting, the aileron with the balance weight must have a mass of 1.75 – 2.20kg (3.86 –6.50lb). The residual moment of the flap must be between -25 and -5 Ncm.

Measure the residual moment as follows: Place the counterweight of the aileron on a precise scale and rest the fulcrums of the aileron on thin steel pins so that it moves easily. Since the aileron tilts upwards, the moment is prefixed with a minus sign.

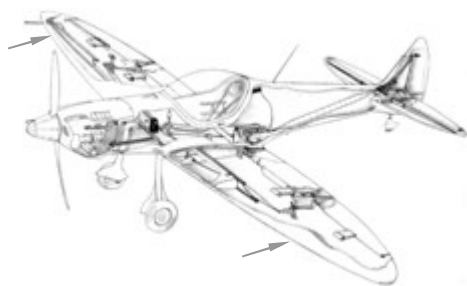
Multiply the scale reading with 9.81 and the distance from the fulcrum in cm.

Example for a scale reading of 0.06kg: $0.06 \text{ kg} * 9.81 \text{ m/s}^2 * 36.6 \text{ cm} = 7 \text{ Ncm}$ (This result is between -25 and -5 Ncm and therefore acceptable.)

If the measured value lies outside of the tolerance given above, reduce the mass by sanding material off the counterweight or increase the mass by filling resin/lead pellet mix into the honeycomb directly behind the counterweight.

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

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2.3 Wings

This section describes the following steps for the wings. The left and the right wing are built as mirror images of each other.

- 2.3.1 Installing the outboard self-aligning bearing for the aileron
- 2.3.2 Installing the mounting bearing for the flap
- 2.3.3 Installing the root rib
- 2.3.4 Cutting the holes for the counterweights
- 2.3.5 Cutting the wheel well (only for retractable landing-gear option)
- 2.3.6 Installing the fuel tanks
- 2.3.7 Installing the aileron drive
- 2.3.8 Installing the flap and the aileron
- 2.3.9 Installing the bearing sleeve for the front wing torsion pin
- 2.3.10 Laminating the seams and ribs
- 2.3.11 Installing the pitot tube (for airspeed indicator)
- 2.3.12 Installing the position lights (optional)

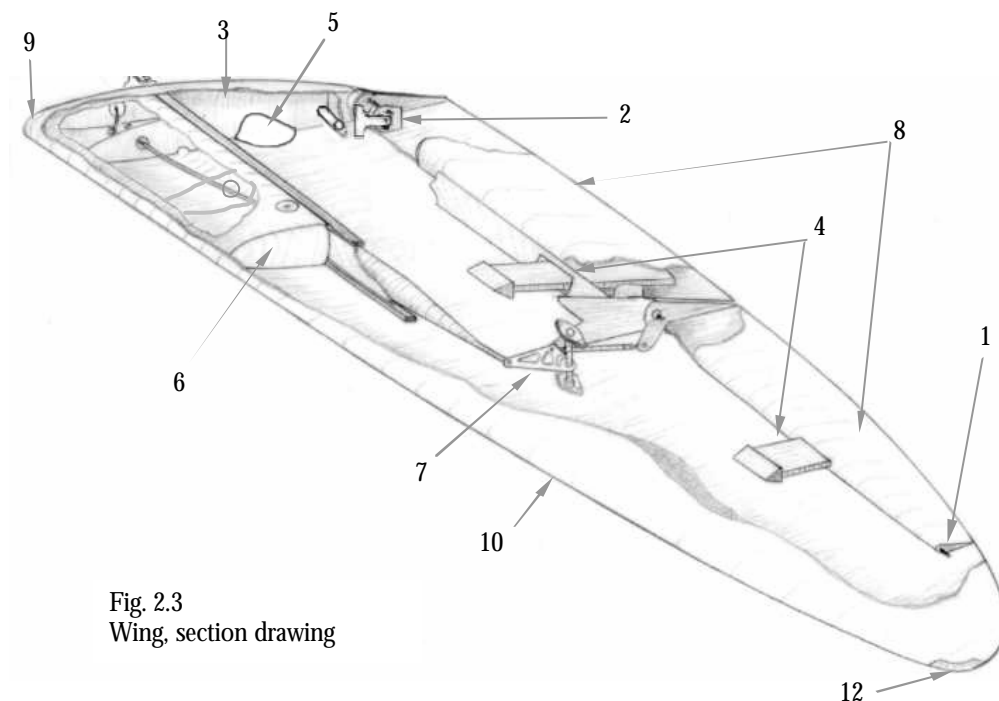
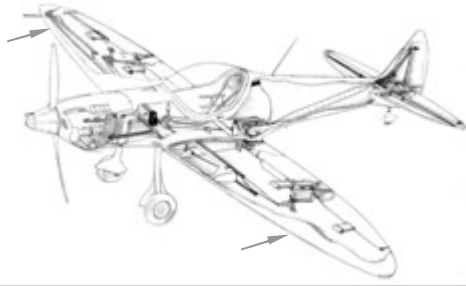


Fig. 2.3
Wing, section drawing



2.3.1 Installing the Outboard Self-Aligning Bearing for the Aileron

- Install the self aligning bearing into the carbon rib with glass cloth on both sides



- Roughen the outer black ring of self-aligning bearing no. 48000043 with coarse sandpaper and then push it onto the hinge pin up to the aileron.
- Fix the bearing with 5-minute epoxy resin in the wing tip with fiberglass rib no. 28000053 mounted as shown in figure 2.3.1.1. The exact position of the bearing is determined by the aileron.

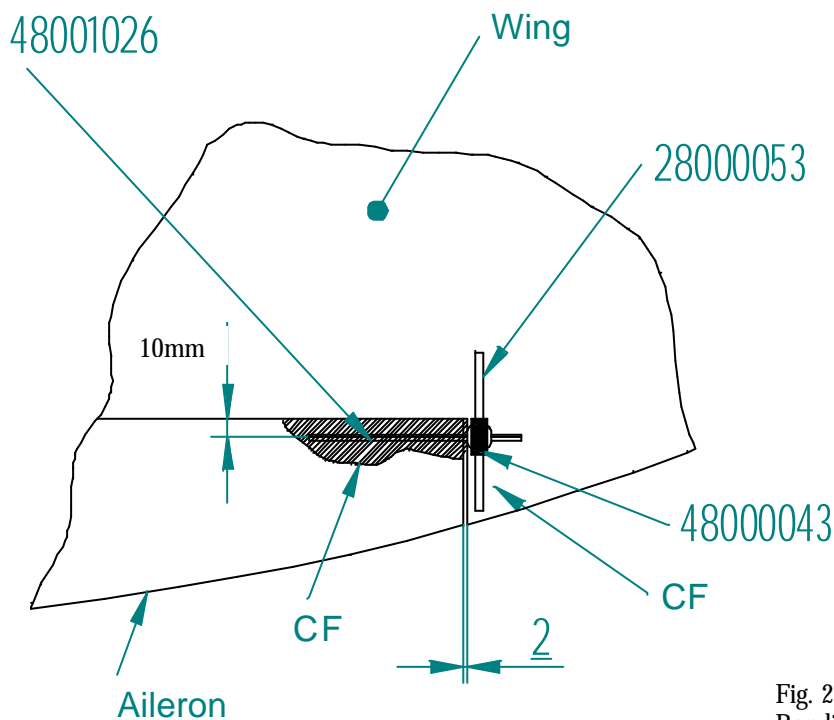
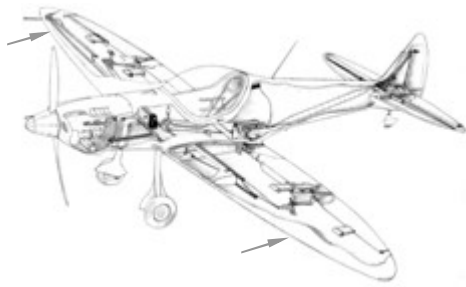


Fig. 2.3.1.1
Bonding the
outboard bearing
for the aileron

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Note: Align the edges of aileron and wing. The aileron and the wing should be separated by at least 2mm (0.08").

- Separate the parts carefully and fill self-aligning bearing no. 48000043 and rib no. 28000053 with cotton/resin mix as shown in figure 2.3.1.2.

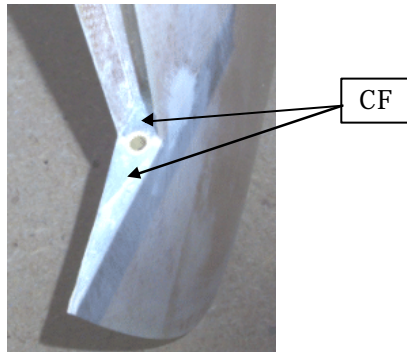
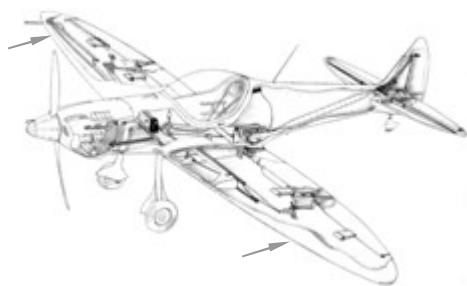


Fig. 2.3.1.2
Bonding the outboard
bearing for the aileron

2.3.2 Installing the Mounting Bearing for the Flap

- Fix bearing support no. 48001036 at a distance of 70mm (2.76") from the wing root at a 90° angle from the trailing edge of the wing on the rear spar; laminate on both sides with 20mm (0.79") fiberglass tape.

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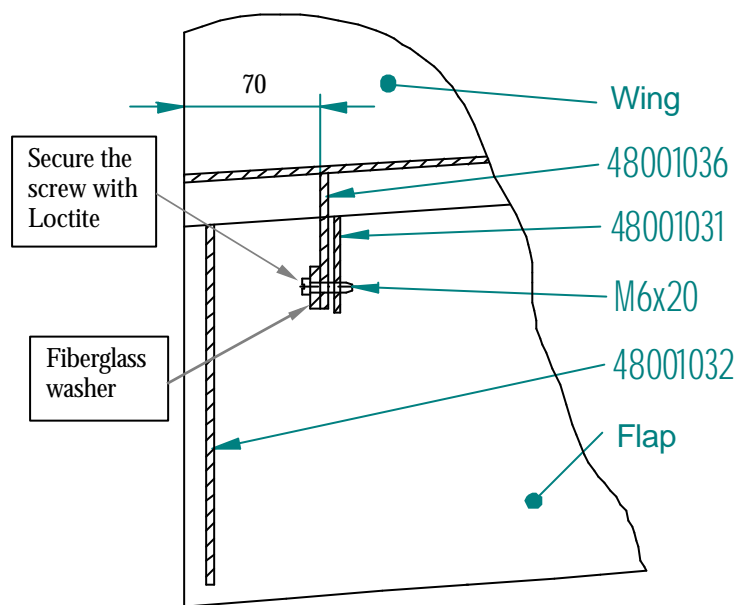
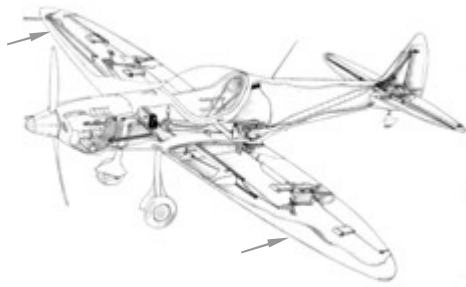


Fig. 2.3.1.3
Bonding the
bearing support for
the flap

- Place a ruler on the trailing edge of the wing and draw a line on the bearing support. Then draw a parallel line offset by 5mm (0.20") towards the rear from the first line. The pivot of the flap lies exactly in the middle between the two trailing edges of the wing.

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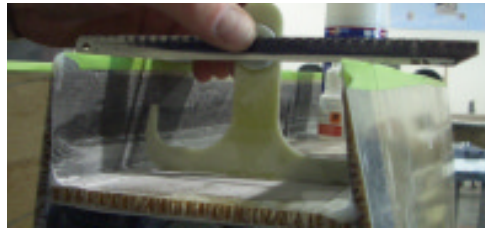
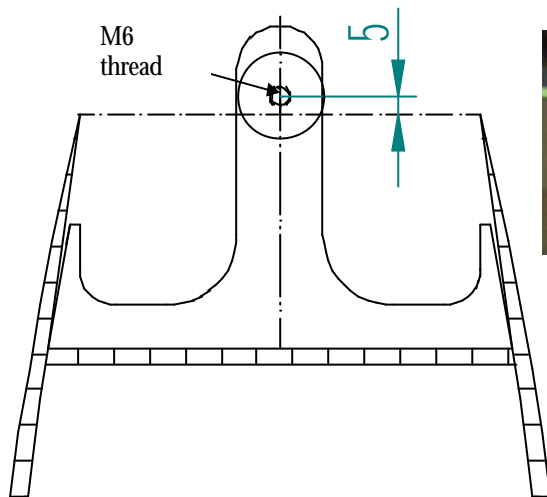


Fig. 2.3.1.4
Scribing the threaded hole in
the flap bearing support

- Drill the M6 thread.
- Position the flap: the distance between the trailing edges of the wing and flap must be 372mm (14.65"). Center the flap at this distance exactly between the upper and lower trailing edges of the wing (see fig. 2.3.1.5).

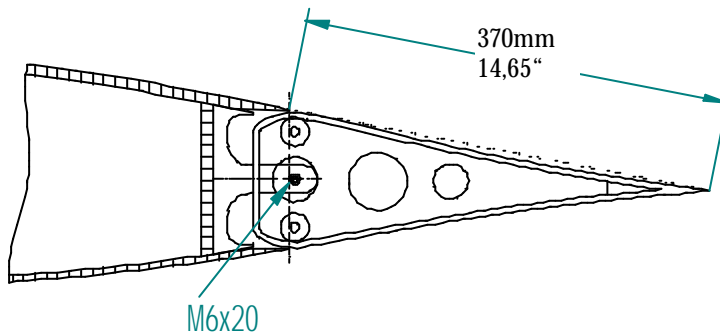
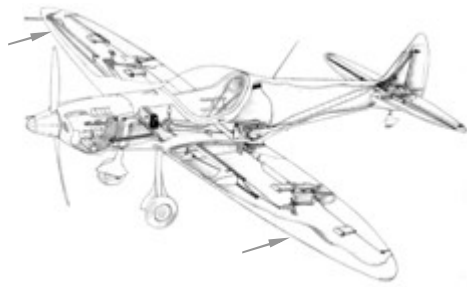


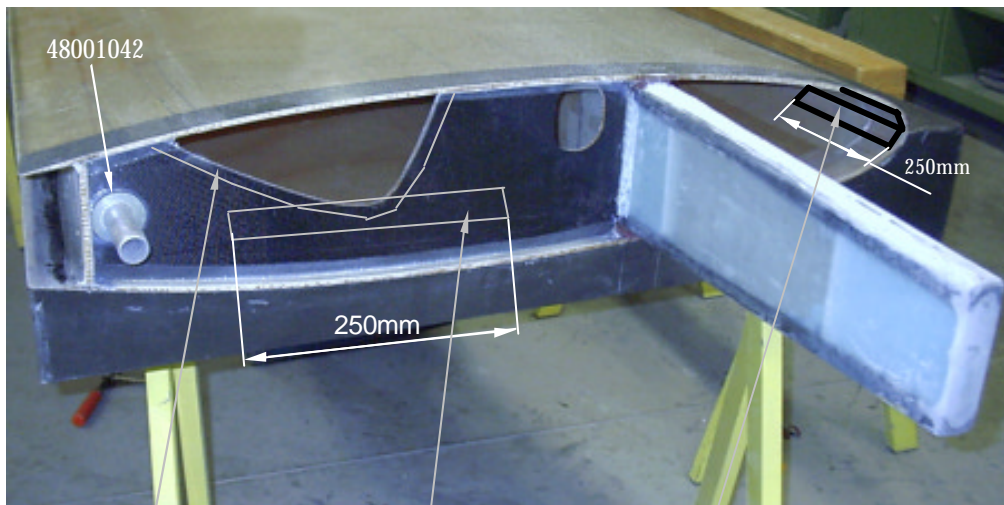
Fig. 2.3.1.5
Positioning the flap on the
wing



- Thread a pointed M6 screw into the previously created hole. The point of the screw scribes a 6mm (0.24") hole on the flap support. Drill a 6mm (0.24") hole at the scribed location and attach the flap to the wing with an M6 screw.

2.3.3 Installing the Root Rib

1. Laminate the root rib with 40mm (1.57") fiberglass tape. Reinforce the rear torsion pin with a fiberglass washer no. 28000065. Fill all corners with CF.
2. Fix the 50mm (1.97") carbon fiber UD tapes (300g/m²) centered over the wheel cut-out and along both sides of the root rib. This step is repeated for the gear wells on the fuselage (see section 3.20).
3. Paste two carbon fiber UD tapes of 50mm (1.97") width and 250mm (9.84") length next to each other into the nose radius. Apply fiberglass tape of 1m (3.28ft) length and 40mm (1.57") width over the inner seam of the nose radius. Cover all surfaces with peel-ply.

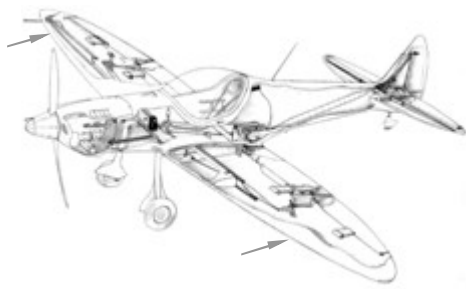


Paste 1 ply of 50mm UD tape centered over the cut-out. Fill the honeycomb with MB. To laminate in the arc, cut the ply and overlap it by 50mm.

1 ply 50mm UD on both sides

Two 50mm UD tapes placed next to each other.
Apply 40mm fiberglass tape onto the inner seam of the wing nose radius 1m deep into the wing.

Fig. 2.3.3.1
Installing the
root rib



2.3.4 Cutting the Holes for the Counterweights

- 1. Cut the holes as scribed on the rear wing spar, see figure 2.3.4.1. If the spar prevents correct aileron deflection after installing the ailerons, adjust the size of the holes.
- 2. The aft spar honeycomb spar web has to be removed nearly complete on one side to get the needed deflection.
- 3. Reinforce both cutout with one layer UD carbon fiber.



	Distance from the hinge	Upward deflection	Downward deflection
Ailerons	335	100	90
Flaps	365	-	210

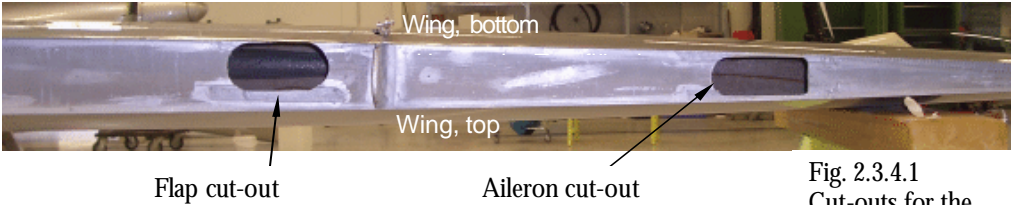
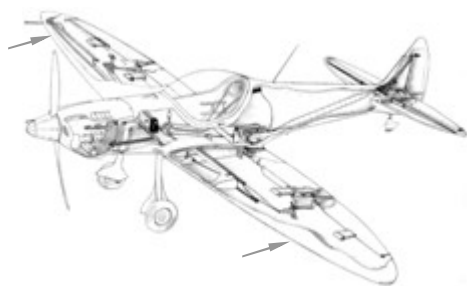


Fig. 2.3.4.1
Cut-outs for the counterweights



2.3.5 Cutting the Wheel Well (Only for retractable landing-gear option)

1. Cut out the wheel wells as factory-scribed. The precise adjustment will be carried out after the undercarriage is installed. To make the adjustments, move the wings up to the fuselage and retract the undercarriage. Inflate the tire to a pressure of 2.5bar (36.26psi). The distance from the edge of the cut-out in the wing must be at least 5mm (0.20"), also while retracting the wheels.

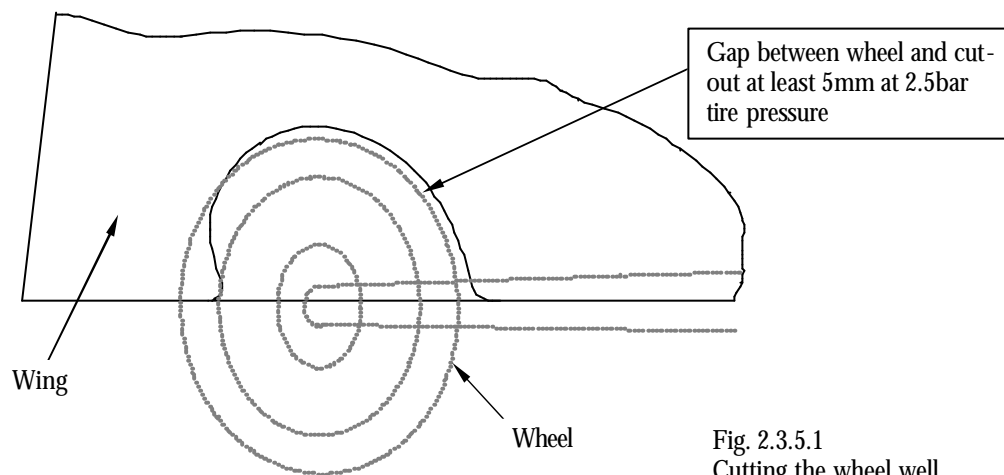
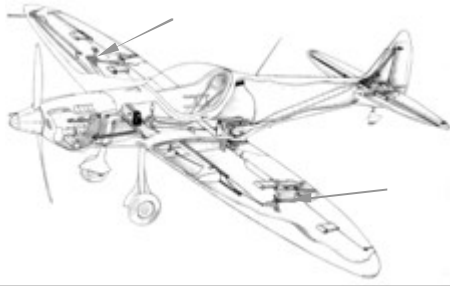


Fig. 2.3.5.1
Cutting the wheel well



2.3.6 Installing the FRP Fuel Tanks

The manufacturer has tested the FRP fuel tanks to an excess pressure of 0.1bar (1.45psi), see figure 2.3.6.1. Before their installation in the wings both tanks are identical. Each can be placed either in the right or the left wing nose. The installation of the fuel cap determines on which side the tank will be installed.

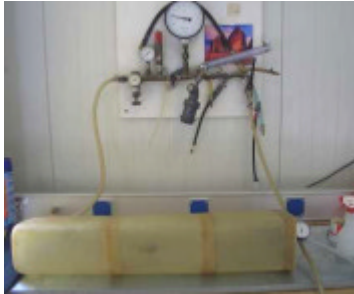


Fig. 2.3.6.1
Pressure test of the fuel tanks carried out by the manufacturer

- Slightly grind the area of the wing nose where the tank will be installed and the tank's contact surfaces with the wing shell with 220 sanding paper.
- Fix copper tape no. 70000160 with a grid spacing of 100mm (3.94") on the tank as shown in figure 2.3.6.2. Solder the tape intersections with soft solder. If you use flux, remove any residues completely with alcohol after soldering.

Important: Apply the tape around the whole tank with the grid spacing stated above. Connect the soldered copper grid to the engine mass with a wire. Solder and bond the wire to the copper tape on the fuel tank rib.

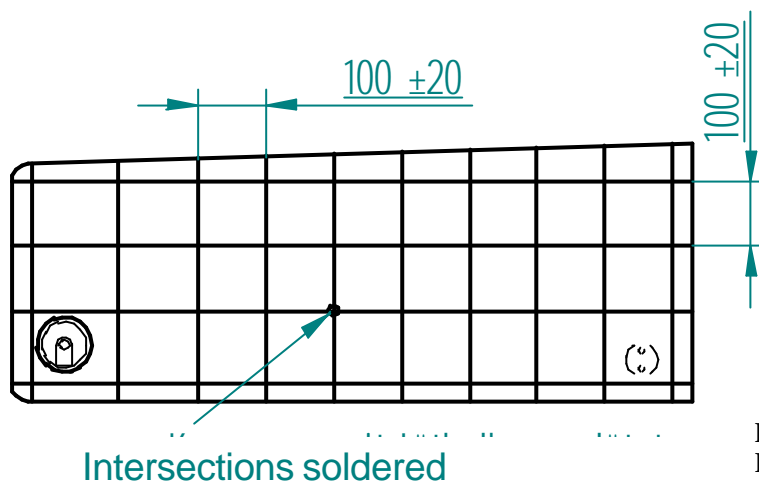
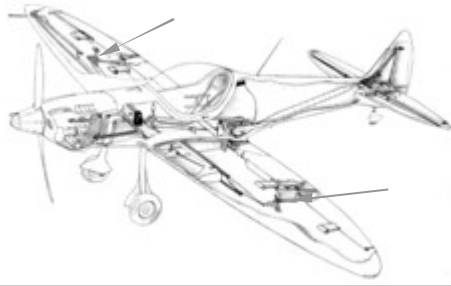


Fig. 2.3.6.2
Diagram for fixing
copper tape on the
fuel tank

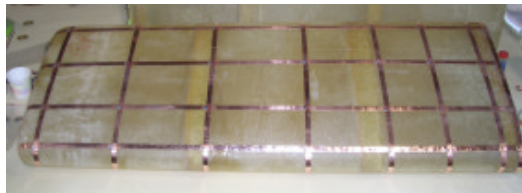


Fig. 2.3.6.3
Fuel tank with fixed and
soldered copper tape

- Evenly coat the contact surfaces of the wing shells and the fuel tanks with PU foam adhesive. Slide the tanks into position in the wing nose according to the dimensions indicated in figure 2.3.6.4. Laminate the contact surfaces of the fuel tank rib and the wing shell with 40mm (.157") fiberglass tape (see fig. 2.3.6.5).

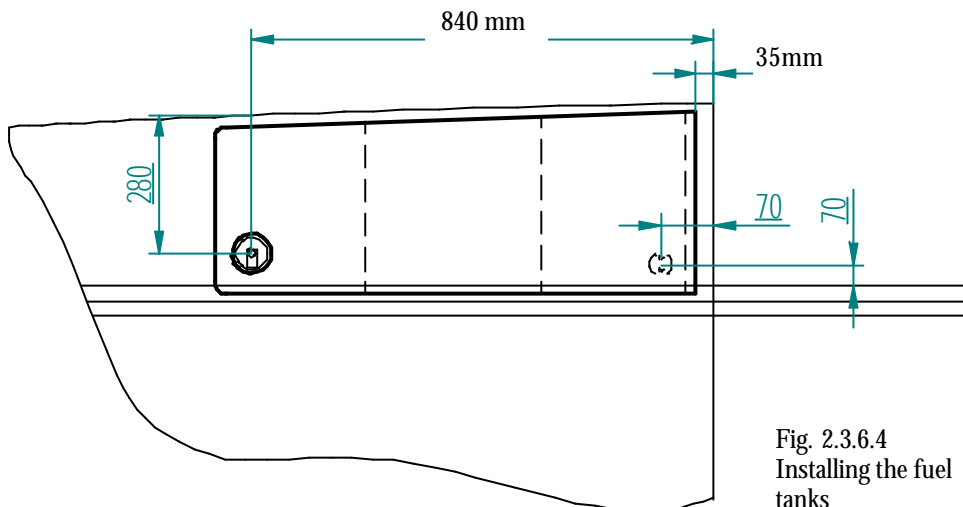
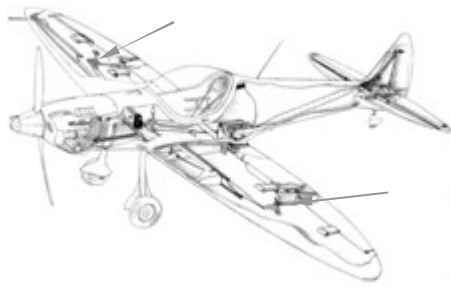


Fig. 2.3.6.4
Installing the fuel
tanks

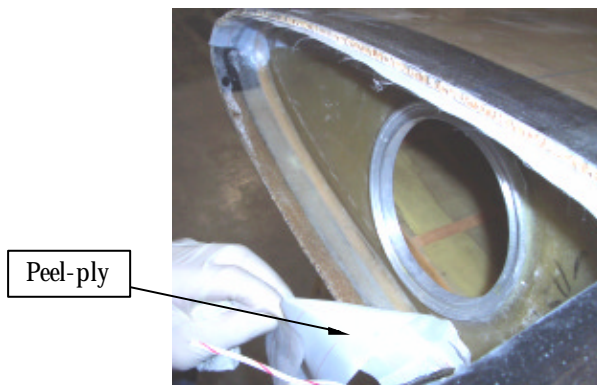
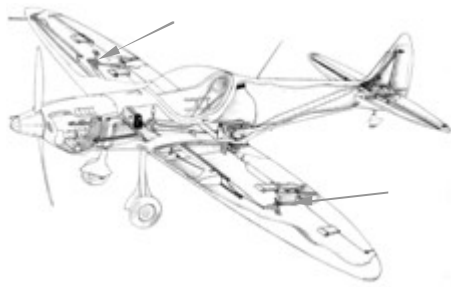
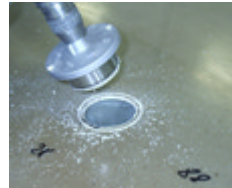


Fig. 2.3.6.5
Laminating the fuel
tank rib with 40mm
(1.57") fiberglass
tape

- Install the fuel cap: Scribe the fuel cap positions. Drill the outer diameter of the fuel cap (88 – 90mm [3.46" – 3.54"]) at a distance of 840mm (33.07") from the root rib and 280mm (11.02") from the nose spar only into the honeycomb wing structure, as shown in figure 2.3.6.4. This leaves the fuel tank intact and creates only a small centered hole for the circle cutter. Drill the inner diameter (75 – 77mm [2.95" – 3.03"]). Remove the cut-out material from the wing with a knife. Roughen the fuel cap (remove the red layer) and insert it with cotton/resin mix flush into the surface. Paste 160g/m² fiberglass fabric over the ring of the fuel cap.



Step 1



Step 2



Step 3

- Install drainer mounting washer no. 48000036 in the same way as the fuel cap, but on the underside of the wing at a distance of 70mm (2.76") from the wing root and 70mm (2.76") from the front edge of the main spar (see figure 2.3.6.4).



Fig. 2.3.6.6
Hole in the wing
and roughened
fuel cap

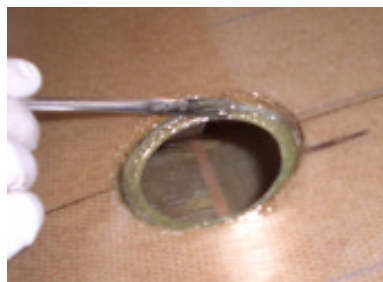


Fig. 2.3.6.7
Before inserting the
fuel cap, coat the hole
rim in the wing with
cotton/resin mix.

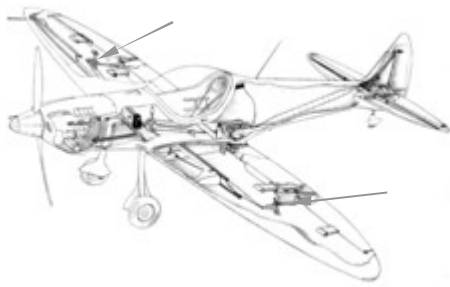
VERY IMPORTANT

Upon completion of installation of the fuel tanks. Both tanks must be checked for any excess resin or debris remaining inside this can be achieved by feeling the inter tank walls, if any roughness is felt the resin must be removed by using a sharp blade or sandpaper.

No excess resin or dust must be left in side the tanks an **ENGINE FAILURE** could result if this instruction is not carried out

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Installing the Aileron Drive

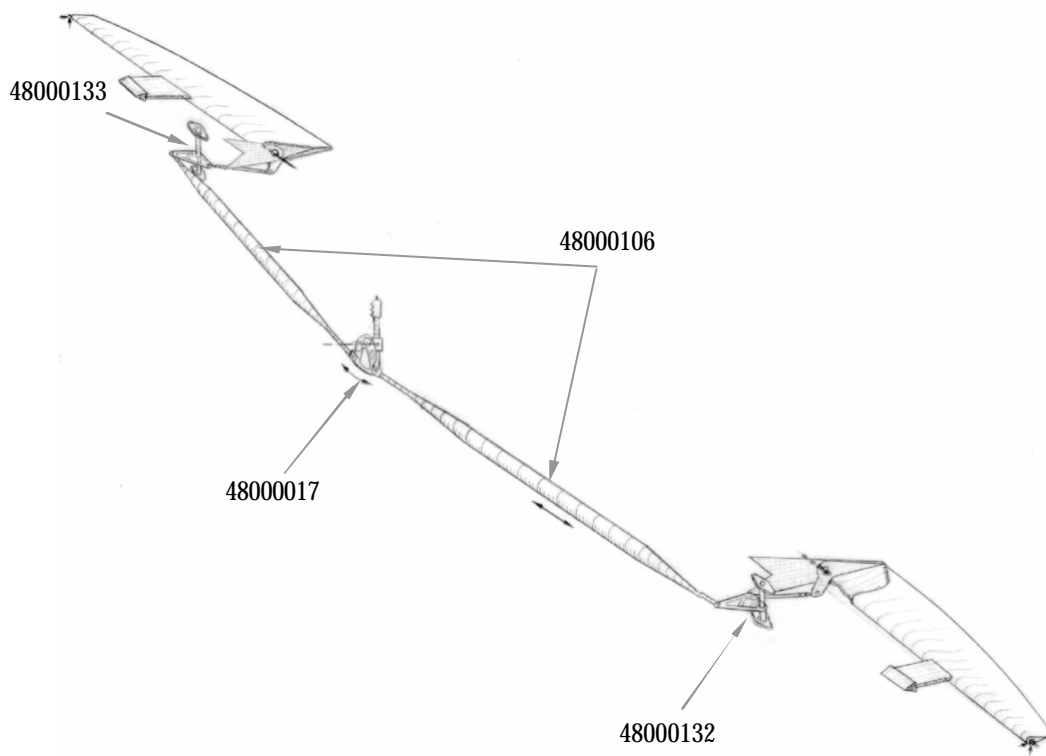
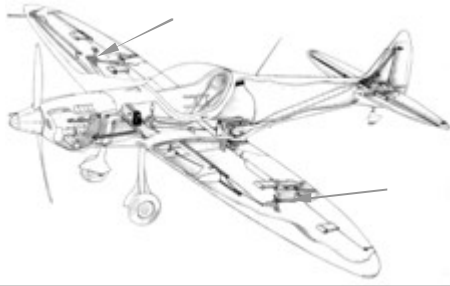


Fig. 2.3.7.1
Aileron assembly,
overview



Installing the Self-Aligning Bearings into the Bellcranks

- Clamp self-aligning bearing no. 48000116 with a parallel-sided pipe in a box-column drilling machine. (The pipe should only press against the outer ring of the bearing).

Note: Clamping the bearing requires much force. You can heat the 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!

- Secure the bearing against displacement from each side as shown in figure 2.3.7.2.

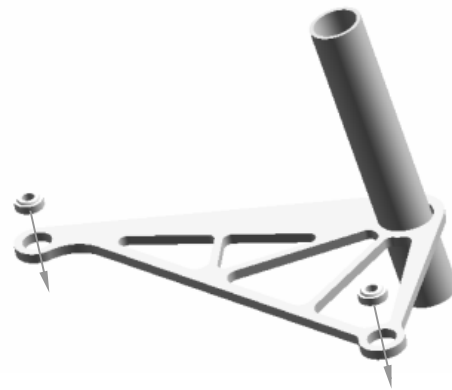
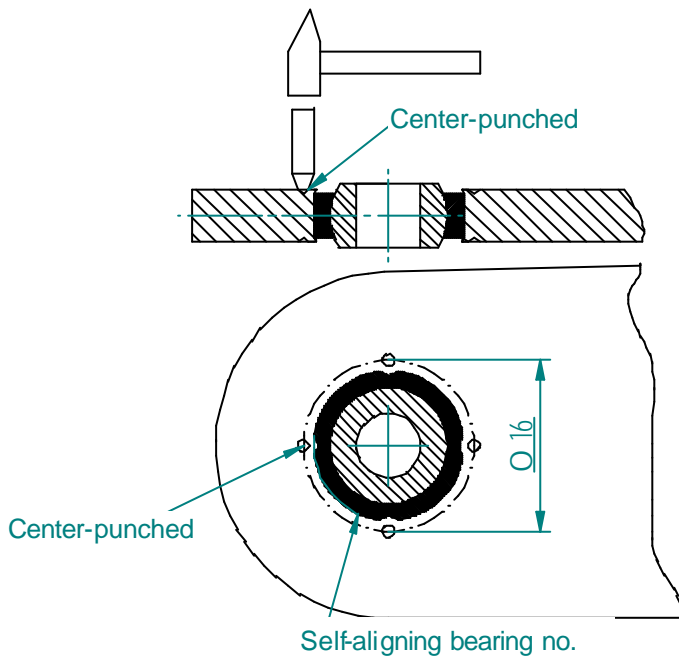
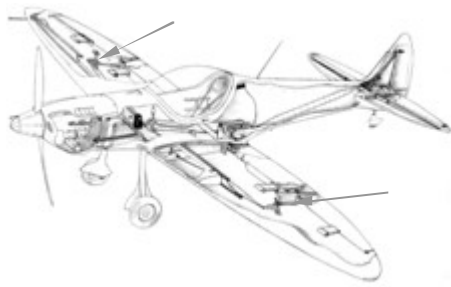


Fig. 2.3.7.2
Center-punching the
self-aligning bearing



Fig. 2.3.7.3
Clamping and center-
punching the self-aligning
bearing with a socket



- Cut the deep holes for the push rods as scribed. Sand a little material off the carbon rib in the hole.
- Slide the bellcrank into the wing and the lower bearing. Tilt the bellcrank and slide it into the upper bearing. Secure the bellcrank with washers and cover plate no. 48000107 (see fig. 2.3.7.8).



Fig. 2.3.7.4
Cutting the hole
for the aileron
push rod



Fig. 2.3.7.5
Grinding the plastic flange
bearings for the aileron
bellcranks

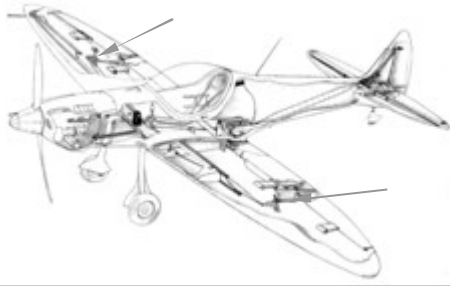


Fig. 2.3.7.6
Inserting the aileron
bellcrank into the bearings
by sliding and tilting



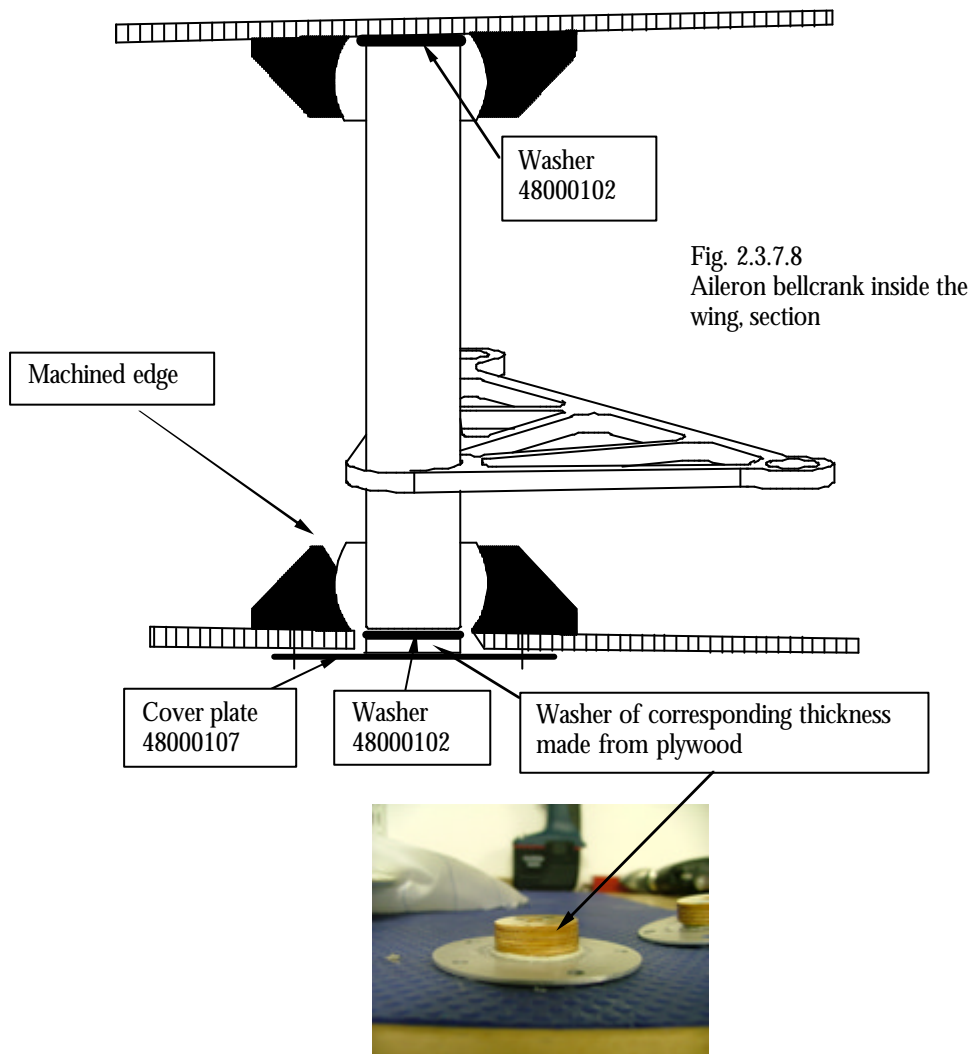
Fig. 2.3.7.7
Slide the bellcrank pipe through
the hole in the lower shell half,
tilt it and slide it into the upper
bearing.

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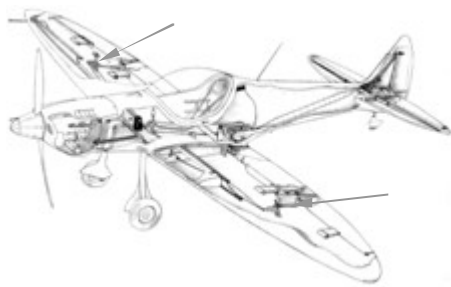
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- Thread the forks and the rod end bearings into the aileron push rods as shown in figure 2.3.7.9.

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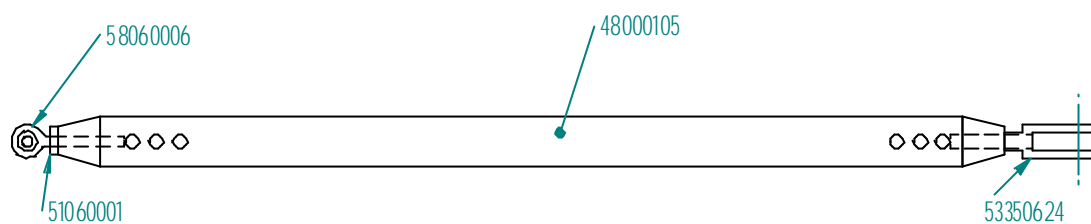
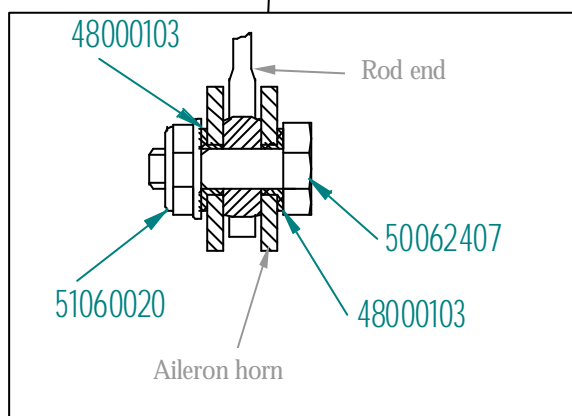


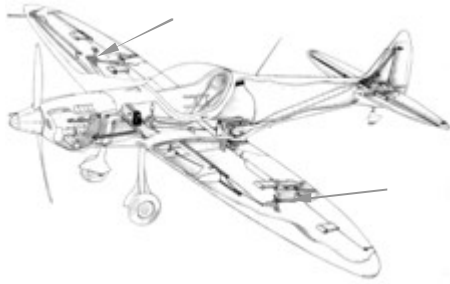
Fig. 2.3.7.9
Assembling the aileron
push rods



Fig. 2.3.7.10
Aileron drive on the
underside of the wing



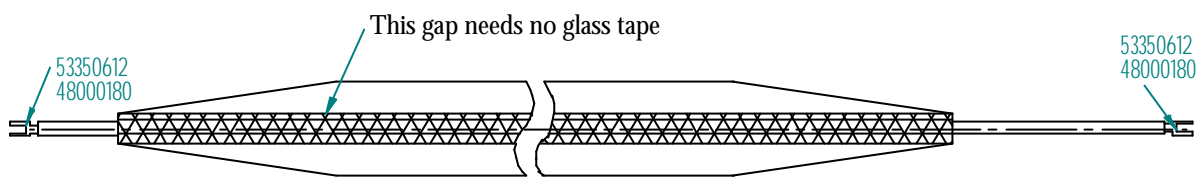
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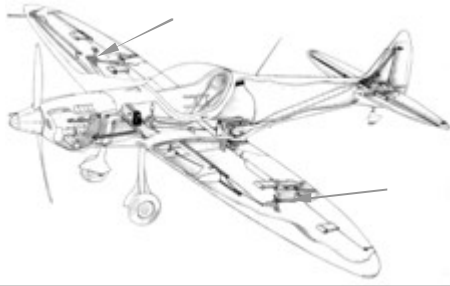
Wings

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- Laminate the seams along the whole length of the carbon fiber aileron push rods with 40mm (1.57") fiberglass tape. Install the forks M6x12 (no. 53350612) with the set screws (no. 48000180). Check for correct aileron deflection to determine the correct push rod length and then fix the set screws with Loctite.



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2.3.7 Installing the Flap and the Aileron

Slide the aileron into the outer bearing in the wing tip. Slide the hinge pin of the flap through the bearing in the wing support rib into the aileron. Secure the flap with an M6 screw in the bearing. When the wing is mounted, the flap connection on the fuselage acts as a bearing for the flap.

2.3.8 Installing the Bearing Sleeve for the Front Wing Torsion Pin

- Roughen the sleeve of front plastic bearing no. 48000151.
- Slide the sleeve onto the aluminum pipe on the fuselage.
- Coat the sleeve with thickened microballoon/resin mix.
- Move the wings to the fuselage to determine the position of the sleeve.

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Fig. 2.3.9.1
Fixing the front
bearing sleeve

Note: At this point you can also bond the rear wing torque bushing and the receiving part with cotton/resin mix.

- After the resin has cured, fill the remaining cavities with microballoon/resin mix.

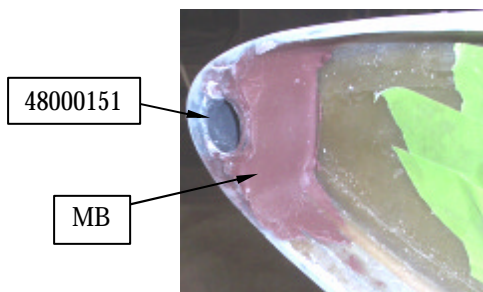
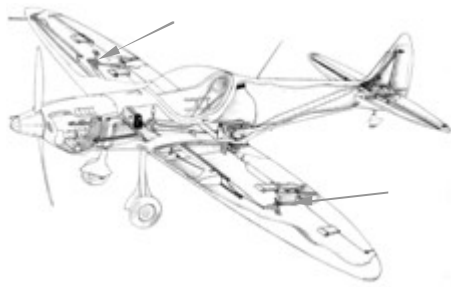


Fig. 2.3.9.2
Filling the bearing
sleeve with MB

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2.3.9 Laminating the Seams and Ribs

Before bonding FRP parts together, ensure that the bonding surfaces are roughened well and that any applied peel-ply is removed. Fill the corners with cotton/resin mix to a radius of 3mm (0.12") and then apply fiberglass tape over the resin.

Apply 40mm (1.57") fiberglass tape to the outer nose radius and all ribs. Then cover the tape with peel-ply. Laminate the rear spar as shown in figure 2.3.10.1 and the inner nose radius as shown in section 2.3.3 and figure 2.3.10.2.

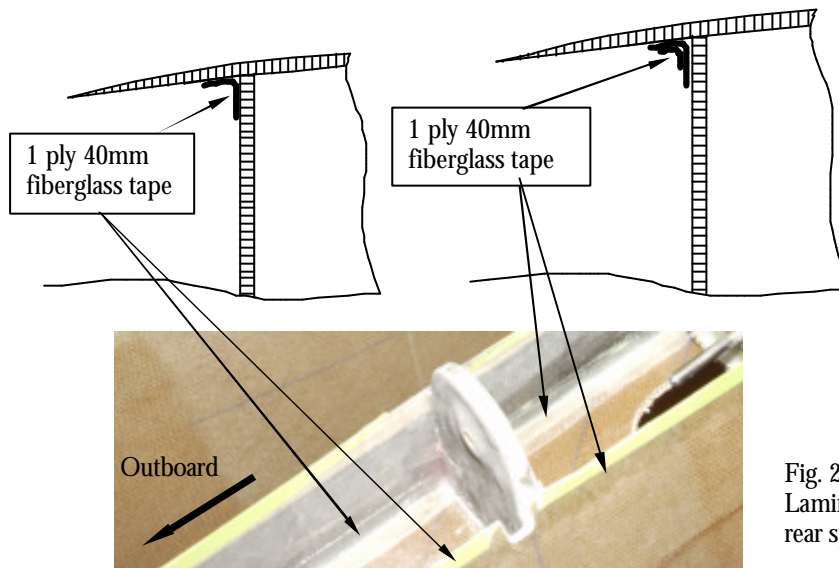


Fig. 2.3.10.1
Laminating the
rear spar

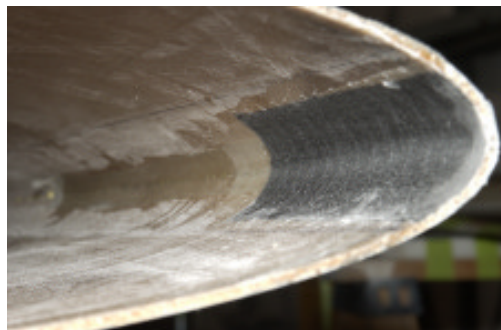
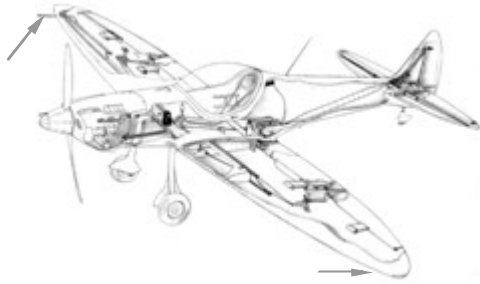


Fig. 2.3.10.2
Laminating the inside
of the nose radius as
described in section
2.3.3



2.3.10 Installing the Pitot Tube (for Airspeed Indicator)

- Scribe the position for the pitot tube as extension of the aileron gap in the direction of flight as shown in figure 2.3.11.1. Drill a hole to fit the diameter of the pitot tube through the nose strip.
- Slide a long drill through the hole in the nose strip and drill a hole through the main spar. Position the pitot tube at a downward angle of 2° as shown in figure 2.3.11.2. You can build the long drill from an aluminum or steel pipe with the necessary diameter. File or cut teeth into the drilling end of the pipe.
- Roughen the parts of the pitot tube which touch the wing structure and bond them with cotton/resin mix.
- Fix the hose on the main spar with clamps and cable ties bonded to the spar.

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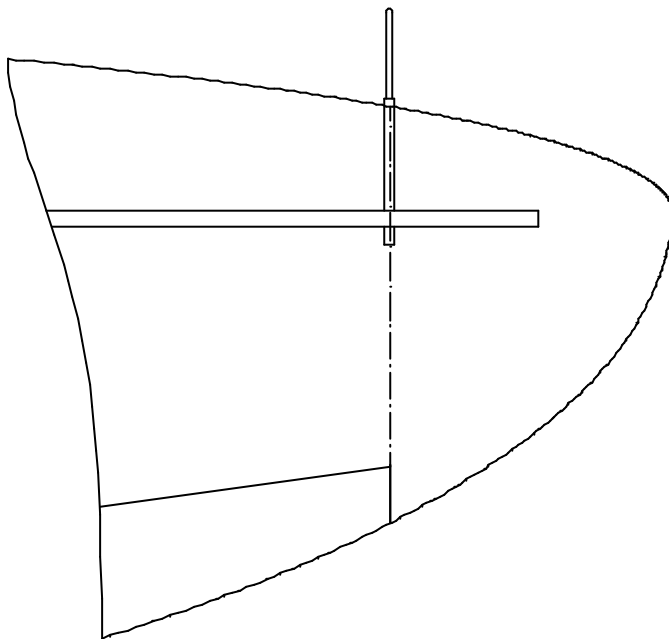


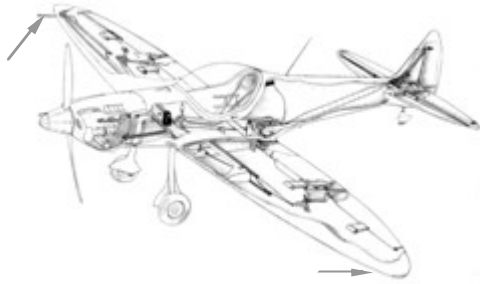
Fig. 2.3.11.1
Scribing the position
of the pitot tube



Fig. 2.3.11.2
Installing the pitot
tube, side view

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2.3.11 Installing the Position Lights (Optional)

- Scribe the shape of the position light on the wing tip. Place the position light and align it exactly with the contour of the wing tip. The beam angle must correspond to figure 2.3.12.1. Make sure that the red light is installed on the left side and the green light on the right side.

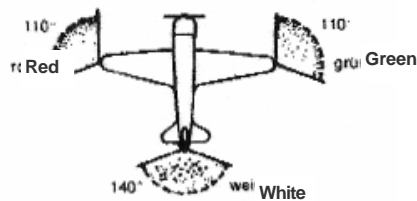


Fig. 2.3.12.1
Beam angles of the
position lights

- Cut the scribed segment out of the wing. To avoid any damage (see contour in figure 2.3.12.3). Verify correct operation of the position light by connecting the leads to the corresponding terminals of a 12V power supply. Lay the cables for the position light and bond the transparent part as flush as possible into the wing with resin. After the resin has cured, sand and reinforce the seam with 20mm (0.79") 105g/m² fiberglass fabric. Fill and sand the edges so that the light is flush with the wing. After the final coating with clear lacquer, polish the light to high gloss.

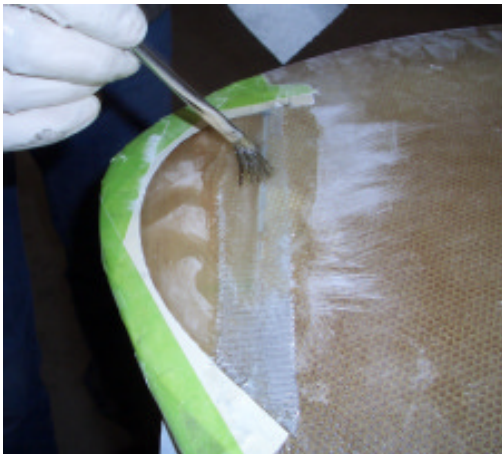
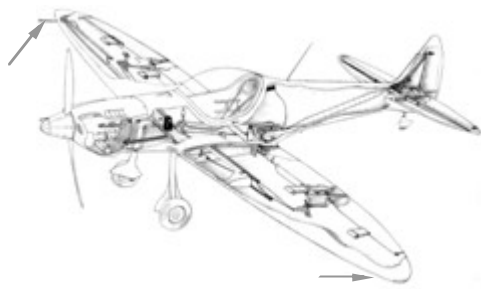


Fig. 2.3.12.2
Position light masked
and reinforced with
fiberglass laminate

Revision 1.5



Wings

2

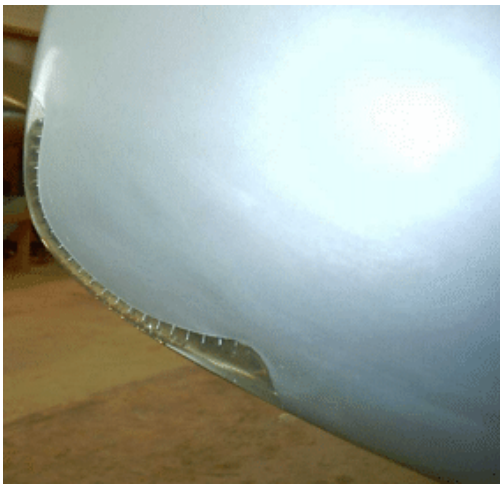


Fig. 2.3.12.3
Position light installed
and lacquered

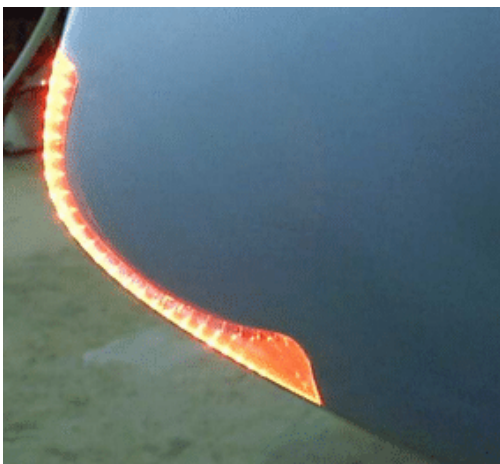


Fig. 2.3.12.4
Position light in
operation