



Pre-Paint>Wings>Fit Z-spar ailerons

Issue Revision Table

Issue	Date:	Change(s):	Issued by:
1			
2			
3	Nov 2021	Adopt "Section Only" Manual System, Add Issue Revision Table and model applicability. Added note re AN3 washers as a backing washer for the rivets to pull up on Added photo of scallop for hinge pin	JC

Model Applicability

Aircraft Model	J-160	J-170	J-230	J-430
Document Applicability			Yes	Yes

Pre-Paint>Wings>Fit Z-spar ailerons

Objectives of this task:

In this task the ailerons and the pre-mould strips will be sized and trimmed, pre fitted, ailerons will be fitted to the wings, then flocked onto the wings and bonded / glassed in place.

Materials and equipment required:

Card #5JT "Aileron" for the hinges

Epoxy resin and flock

2 Lengths of flat timber 1150mm long, about 300 - 400mm wide

Clear or brown packing tape

White masking tape

Pavers or half bricks for weights to hold the pre-mould strip in place while the flock cures

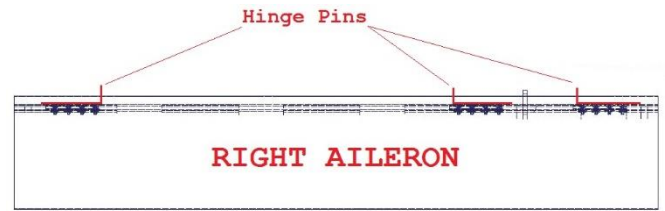
Fitting hinges the Pre-Mold Strip

First the wings should be flipped over up-side-down with foam wedges placed underneath to protect the top surface and steady it, ready for the installation processes to follow.

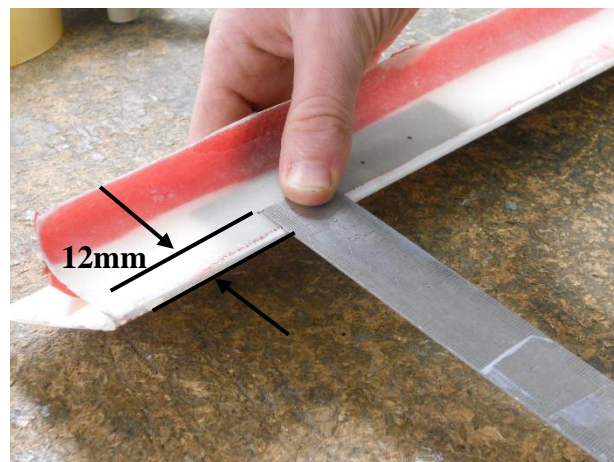
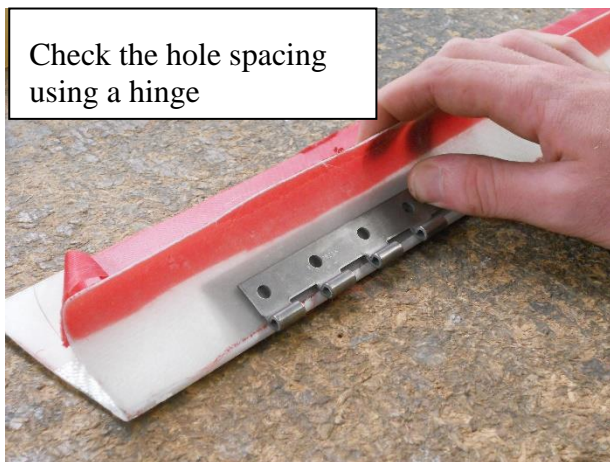


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The holes to be drilled into the pre-mould strips have already been identified within the moldings using a raised mark where the hinges locate, however you should check that the positions marked are correct. (Please ensure the left and right are fitted to the correct wing) see example below.



Take a stainless-steel hinge plate and place it up against the strip to check the spacing of the holes is correct. Also check the hole marks are placed the correct distance from the edge, they should be 12mm in from the visible edge. Re-mark if necessary before drilling.



Remove the peel cloth from the pre-molded strips and sand these areas to roughen them slightly.

Make sure to position a wedge of timber on the other side, this is to prevent the drill bit going too far and damaging the other side of the pre-mold strip. Drill the 2 x outer rivet locations in each hinge leaf using a 1/8" drill pilot drill.

Use a self-tapping screw in the hinge predrilled holes to temporarily secure them into position.



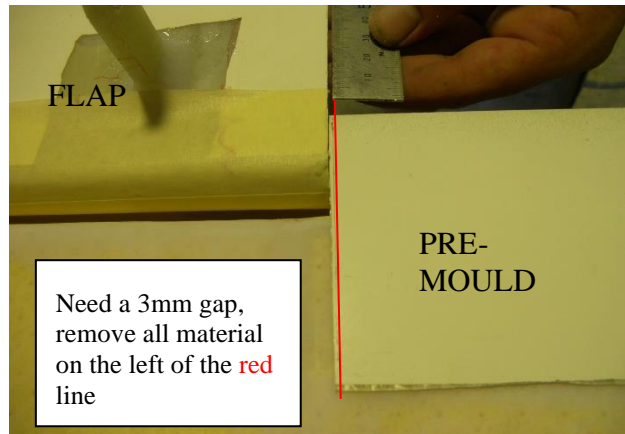
Note: You can either use an thin 1/16"aluminum backing plate or AN3 washers as a backing washer for the rivets to pull up on. If an aluminum plate is used, mark the 4 rivet holes and



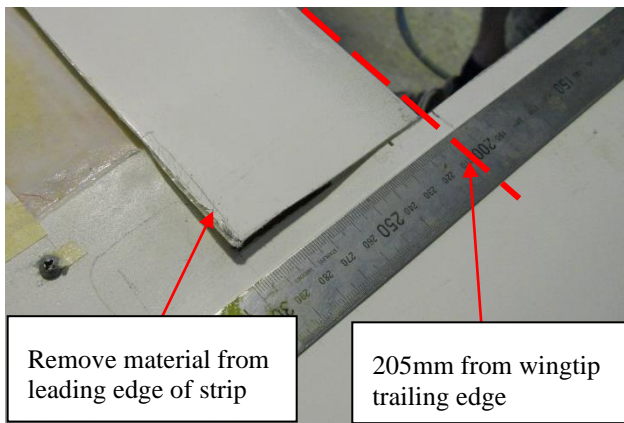
predrill them using the aileron hinge as a guide. If you are using AN3 washers, you can position these in place before pulling up each rivet once all holes are drilled and you are ready to flock the hinge into position.

Pre fitting the Pre-Mold Strip to wing

Now the pre-mold strip is to be adjusted in order to correctly fit it to the wing. Remove material from each side of the pre-mould strip until it fits in between wing tip and the flap, there should be a small gap (about 3mm from the flap end). Material should be removed evenly from both sides, NOT all from one side.

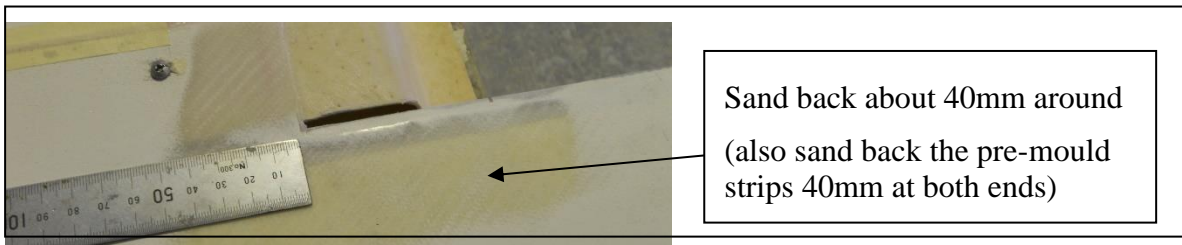


From the wing tip trailing edge and the flap trailing edge mark 200mm plus a 5mm gap (205mm in total) with a pencil. These marks dictate where the trailing edge of the pre-mould strip should align to.



Remove material from the leading edge of the pre-mould strip until the trailing edge comes up to the marks made on the wingtip and flap previously. With all adjustments made to the pre-mould strip it can now be pre fitted to the wing as a dry fit, once again using self-tapping screws to secure it into place.

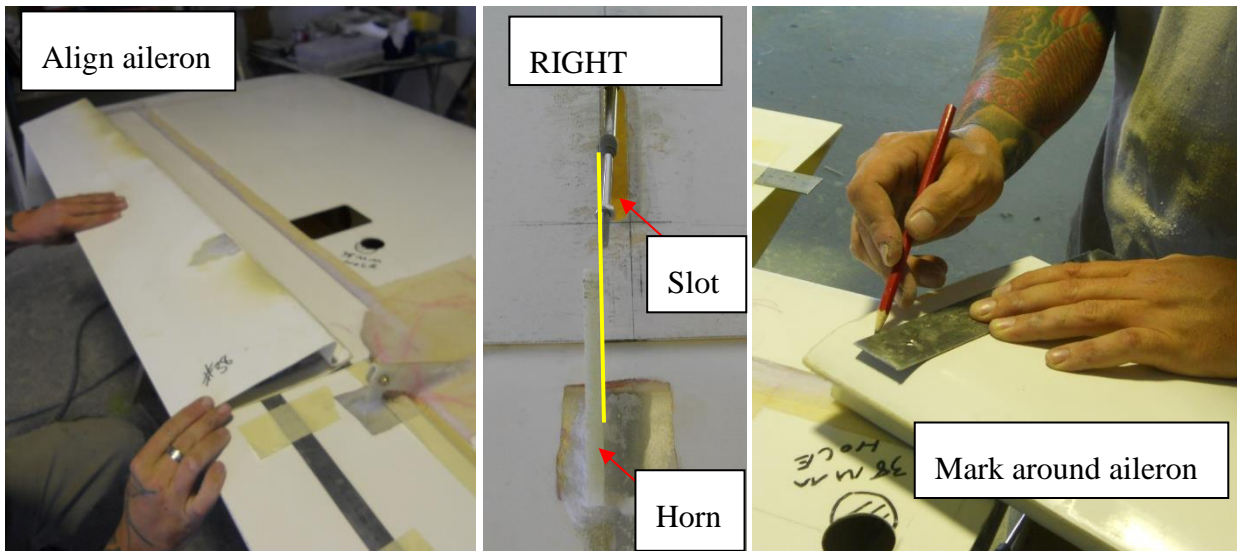
Sand back the area around the wingtip/wing junction. Sand back about 40mm all the way around. Sand back 40mm on both ends of the pre-mould strip.





Size the ailerons

For this step you will measure, trim and prepare the both ailerons for fitting. First place the aileron on the bottom surface of the wing (which is facing up since the wing is upside down). Align the aileron horn with the edge of the aileron cable slot as shown in the picture below (note that the picture shows the right wing, the horn should be on the opposite side for the left wing). With the aileron in this current alignment mark on the trailing edge of the aileron 3mm in from the wing tip and flap edges respectively. This is where you will trim the aileron to. Draw a straight line all the way around the aileron (use masking tape to go around the curved corners). Now cut off the marked sections with a pneumatic saw or jigsaw using a fine tooth or carbide blade.



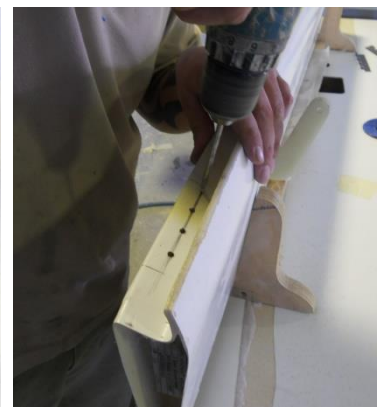
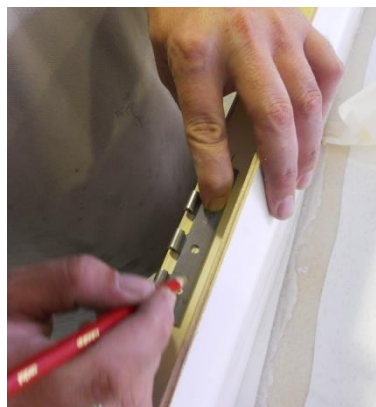
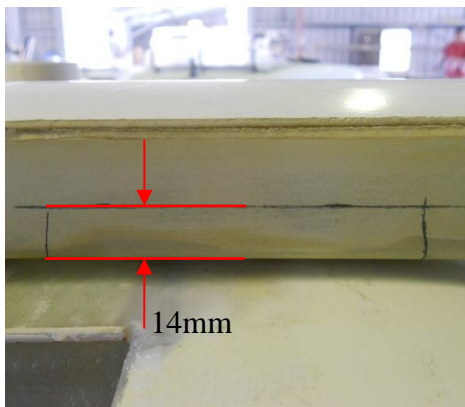
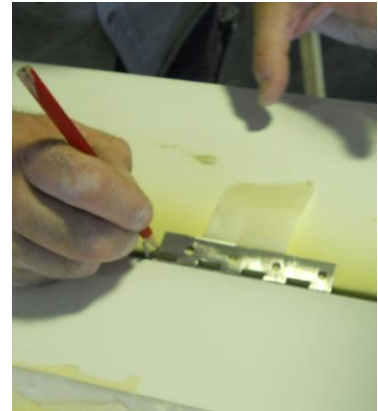


Pre Fit Ailerons

First tape up the aileron hinge plates back onto the wing so they are out of the way. Fit the aileron with the trailing edge aligned with that of the flap and wingtip and apply masking tape to hold the aileron in position. Bring down the aileron hinges and mark the sides on the aileron. Remove aileron, mark down 14mm from the visible edge and draw a line.

Take a hinge plate and align the edges with the marked edges and align the holes with the 14mm line. Mark the positions of the holes.

Pre fit the 3 x aileron hinges using self-tapping screws then attach the aileron to the wing pre-mold. Adjust the hinges if necessary so that all three hinge pins slide through without binding and the gap between the aileron and aileron pre mold it straight and a uniform. When happy with the position, mark the outer circumference of the hinge location.



Drill Aileron hinge holes in pre mold strip and aileron

Remove Aileron pre mold from the wing by removing the self-tapping screws that was used to temporary secure it.

Now drill the 3/16” holes in each of two center remaining hinge holes and insert a 3/16” just to keep the location. Remove the 2 x outer self tapping screws from the hinges and drill to 3/16” in the pre mold. Repeat this step for remaining 2 hinges.

Sand back the gelcoat/ primer around each of the hinge positions.

Repeat steps above for the ailerons.

As noted in Fitting hinges to the Pre-Mould Strip: You can either use an thin 1/16” aluminum backing plate or AN3 washers as a backing washer for the rivets to pull up on. If an aluminum plate is used, mark the 4 rivet holes and predrill them using the aileron



hinge as a guide. If you are using AN3 washers, you can position these in place before pulling up each rivet once all holes are drilled and you are ready to flock the hinge into position.

Prepare and fit hinges to aileron and aileron pre-mould strip

Take each of the six hinges, remove the hinge pins and roughen the flat surface of the hinge plates with a very course sanding wheel. Now the hinge plate can be installed on the wing. Mix up an 80 gram batch of resin, make most of this into flock. Brush resin onto the flat roughened faces of six hinge plates, brush resin onto the attachment positions on the wing (i.e. where the holes were drilled in the pre-mold strip). Apply a 2mm layer of flock to the flat faces of the six hinge plates. Rivet the hinge plates onto the wing using the supplied 3/16” pop rivets (AS 6-6 rivets). Repeat for all six wing hinge plates. Wipe away any excess flock.

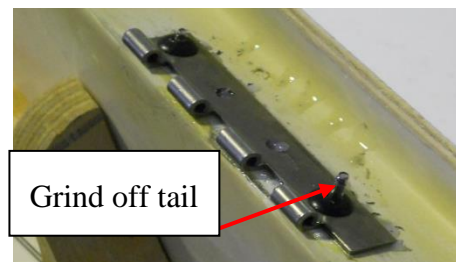
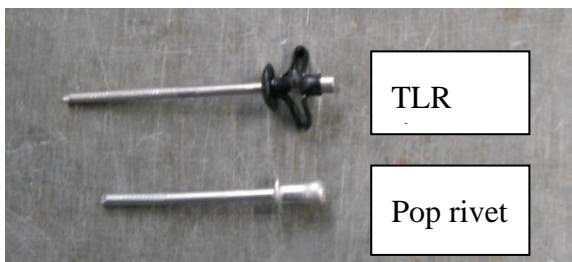
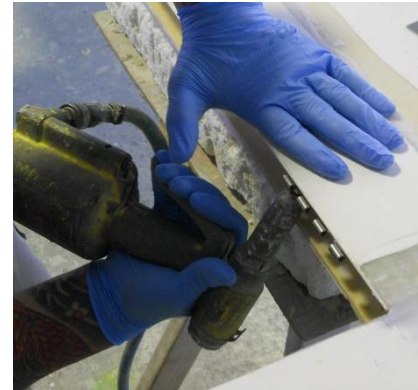
Get a clean rag and lightly sock in Acetone. Wipe the hinge pin barrels on each of the six attached wing hinge plates. Wipe a hinge pin and insert a number of times into each hinge such that the hinge pin barrels are also cleaned inside of any resin or flock that might have gotten there during installation. Install all the loose hinge plates onto those fixed to the wing.



Mix up another 80-gram batch of resin, once again making most of this into flock. Brush resin onto the flat roughened faces of six hinge plates, brush resin onto the sanded attachment positions on the ailerons. Apply a 2mm layer of flock to the flat faces of the six hinge plates. Rivet the hinge plates onto the wing using the supplied 3/16” Alloy rivets, only install two rivets for each hinge at this stage. Check that the hinges are in the correct position by installing the aileron onto the wing with the hinge’s pins, check that the aileron swings freely without excessive friction. Remove the aileron and install the other two rivets, clean away excess flock



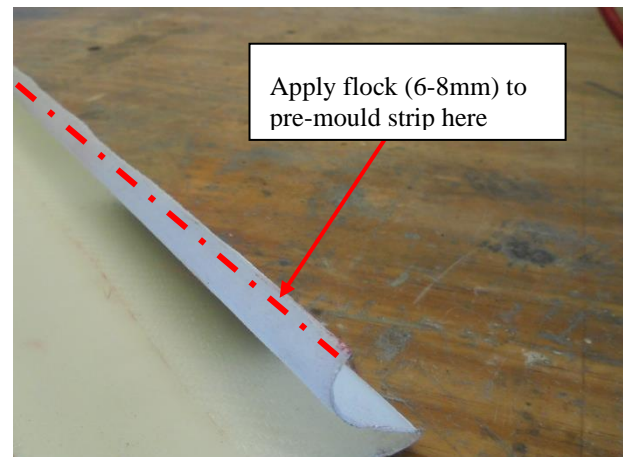
It is of critical importance that you **DO NOT USE REGULAR POP RIVETS** for this installation. As the picture shows, TLR rivets spread three legs which better distribute load. This is required for the aileron since it does not have aluminum backing plates. Ideally TLR rivets should be installed with a specialty rivet gun. Ordinary rivet guns can be used; however they will often break the rivet tail above the rive head surface. If this occurs, you should very carefully grind the remaining tail off.



Fit Aileron pre mold strip to wing

Take both timber lengths and apply brown or clear packing tape across the entire surface of one side. Apply White masking tape to the entire outside face of the pre-mould strip.

Blow away any dust on the wing and pre-mold strip with compressed air. For each wing, mix a 200g batch of resin, and divide into a 160g batch and a 40g batch. Add flock to the 160g batch of resin and mix it in thoroughly. Apply a layer of flock to the recess on the wing – the layer should be around 3 to 5mm above the level of the wing.





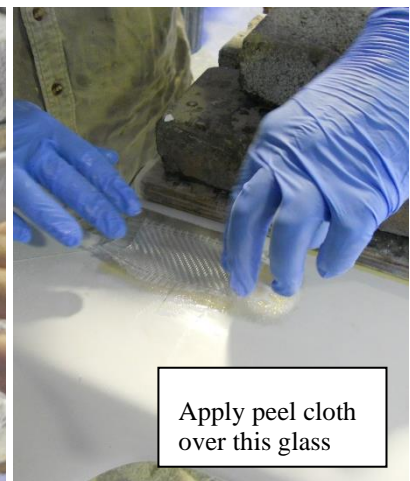
Using the 40g batch of resin, coat the curved part of the wing and the edge of the curved section on the pre-mould strip, then apply a D-shaped layer of flock to the bottom of the curved rib – the layer should be as wide as the bottom of the curve and about 6-8mm deep.

Re fit the aileron pre mold to wing using the self-tapping screws that were used to locate the correct position.

Lay the timber board onto the wing and firmly press it on. Lay pavers or half bricks on top.



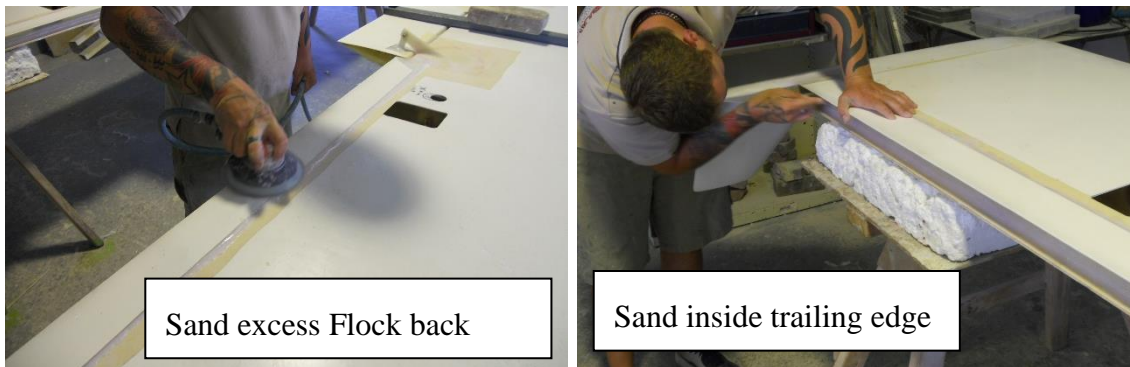
Apply a coat of resin to the back of the curved rib/wing join and lay in a single length of AF303 glass fibre cloth (30mm wide, from the Wing bag). The lower edge of the glass should be slightly in from the trailing edge of the wing. Brush the layer in carefully taking care to avoid any bubbles or gaps. At the wingtip/wing junction coat resin on the sanded areas then apply a single layer of AF303 glass (100x70mm) and brush it on with resin.



Apply peel cloth over this glass

Brush on a piece of peel-cloth to cover the glass. Leave the wing/pre-mould assembly for 24 hours to cure before continuing with the next task.

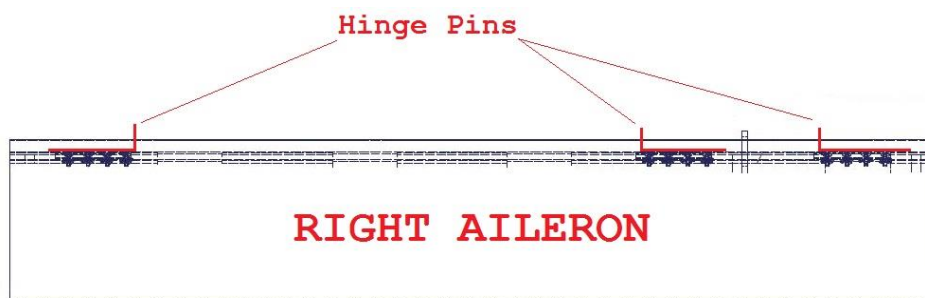
The next day the timber boards can be removed (simply pull them straight off) and remove all the masking tap from the surface of the pre-mould strips (which are now firmly bonded to the wing). Sand the excess flock back to the same level as the pre-mould strip. Sand inside the trailing edge channel (at the join between the wing and the pre-mould strip) to remove excess flock.



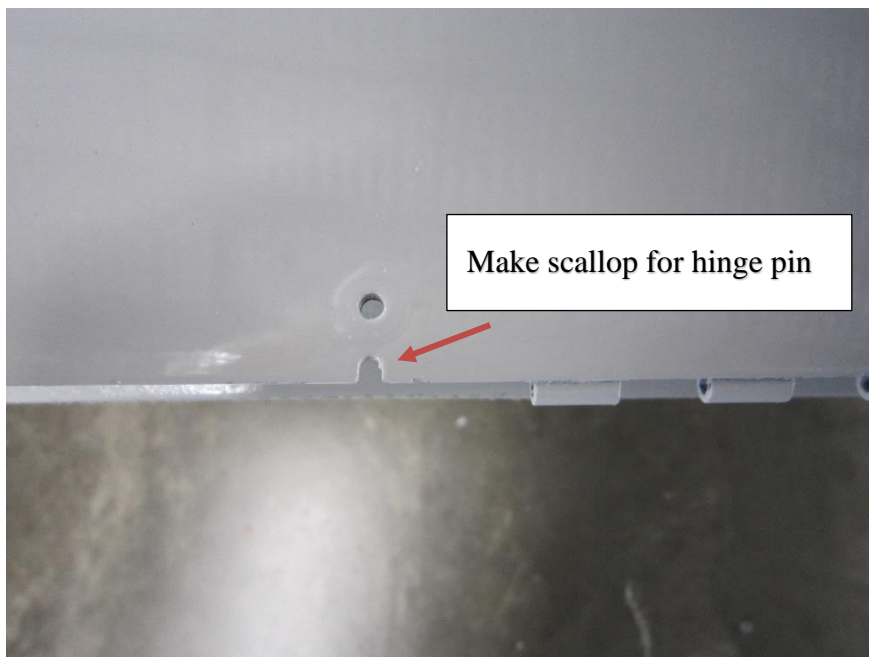
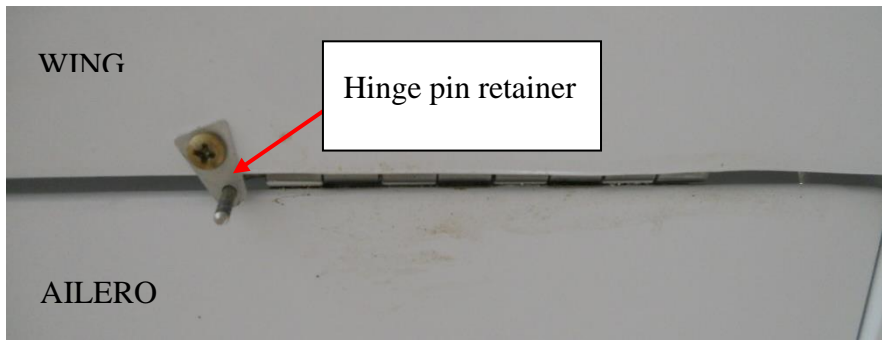
Sand the cut edges smooth, while sanding check that the aileron is square and sand accordingly to achieve good square ends. Check that the aileron fits. If you have the required 3mm gap on either side but the fit is still tight then you may need to remove some material from the wingtip (this is assuming that both your aileron and flap surfaces are square, check first beforehand). If required sand the inside of the wing tip, continually recheck the fit of the aileron so as not to sand too much from the wingtip.

Fit Aileron hinge pin retainers

The final step is to install the hinge pin retainers. First consult the diagram below and note the direction each of the hinge pins are facing (for the left wing it is the opposite). Install the ailerons as such with the bent end of the hinge pins facing outwards. Position the hinge pin retainer over the bent end of the pin and mark the screw position on the wing.



Drill out (**HOLE SIZE**), install the aluminum fairing screw. Fix the hinge pin retainer to the wing with the 5/32dia (8/32”) machined screw. The assembly should resemble that shown in the picture below.



This completes the [Pre-Paint>Wings>Fit ailerons](#) task.



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