



## **Pre-Paint>Wings>Test fit wings**

### **Objectives of this task:**

To test fit the wings and flaps to the fuselage prior to painting. This task is intended purely to make sure of the fit and to make any adjustments that may be required so that there will be no issues during the final fit after the wings and fuselage have been painted.

Each wing will be held in place with 4 bolts in this task and no nuts will be used – this is purely a test fit task after which the wings will be removed and prepared for painting.

In our factory we use 3 people for this task, so ask 2 friends over to help you.

Do **not** try to do this task with less than 3 people or you risk dropping the wing.

### **Equipment required**

2x4” timber for wing support – see the last page of this task for details

### **Preparation**

Place 2 trestles beside the fuselage and lay the wing on them.

It is **very important** that the AN4-14A wing attach bolts fit snugly through the holes in the attach bushes on the wing and the aluminium wing attach lugs on the fuselage. Test fit a bolt in each hole, and if the bolt will not fit through to full depth then **very carefully** ream the holes with a hand reamer out until the bolts fit correctly.

It is also **very important** that the AN175-15A strut attach bolts fit snugly through the holes in the strut attach lug under the wing, the lower fuselage mount and the top and bottom holes in the strut itself. Test fit a bolt in each hole, and if the bolt will not fit through to full depth then **very carefully** ream the holes with a hand reamer out until the bolts fit correctly.

**Do not** ream any more than is absolutely necessary to get a snug fit, and **do not** use a drill in place of a reamer!

These are **critical fit** items and great care must be taken!

Using a sanding block, lightly sand both sides of each wing attach lug and the upper and lower strut mounts to clean any debris away.

Fit the bottom of the strut to the lower fuselage mount with an AN175-15A bolt. Rest the outboard end of the strut against a saw stool as shown at right.

Lay 2 AN4-14A wing attach bolts on top of the fuselage where you can easily reach them.

Now you are ready to test fit the wings.



## Test fit the wing

Because the precise alignment of the wing bolts is **critical** the bushes in the wing attach lugs in the wing root that the bolts pass through are mounted in a bed of flock to allow for fine adjustment during fitting.



The process that we use in our factory is to get the wing prepared and ready to fit, then heat up the wing root bushes and fit the wing. Heating of the bushes is done by placing a soldering iron in each bush as shown above and waiting until the other side of the bush is too hot to touch comfortably. This gives 3 or 4 minutes working time, which is usually enough.



One person holds the outboard end of the wing while the other 2 hold the front and back of the wing root. Walk the wing in to the fuselage and guide the wing attach lugs into the aluminium wing attach brackets on the fuselage. The fit will be tight and it may take some careful positioning of the wing to get them to fit – the outboard end of the wing may need to be moved forward or backwards to get the correct alignment. As soon as one bolt can be fitted though then do so and then that bolt can be used as a pivot to work the other lug into place.

The wing attach bolts are fed in from the front and back of the wing toward the centre of the wing.

The fit of the bolts will be tight and you will have to tap the bolts into place using a soft hammer and a brass drift/punch. Be careful and resist any temptation to tap the bolt too hard but rather **gently** encourage each bolt to pass through the bracket and the wing bush.

While the wing is being fitted the strut mount bush under the wing can be heated by the same method so that it will be ready. Once both wing root bolts are in place the top of the strut can be fitted to the strut mount and the wing is fitted.

The important thing at this stage is to relieve the weight of the wing while the flock cools and sets in the correctly aligned position, and this is done by lifting the outboard end of the wing up about 35mm from the resting position and supporting it overnight.

We use a simple wooden support for this (pictured at right) but an even simpler “T” shape of 2x4 timber cut to length would be fine. Leave the wing undisturbed overnight and the next day the support can be removed and the other wing fitted in exactly the same way.

Once both wings and the flaps and strut fairings have all been satisfactorily test fitted the wings can be removed and set aside for painting.



### Test fit the flaps

We use 2 people in the factory to carry out this step and we recommend that you do the same, as the flap is too long for one person to handle comfortably and safely.

### Flap fitting

Each flap post bolt hole has a short length of Bundy tube spacer fitted inside (*tip*: a smear of grease will hold the spacer in place while fitting) and each post fits into each flap hanger and is held in place with an AN3 bolt.

### Size the inboard end of the flap

The inboard end of each flap is manufactured slightly over length to allow for variations in flap hanger placement and it will now require trimming to allow it to clear the fuselage at full deflection.

Ideally the flap should clear the fuselage by a small amount, nominally 5mm, when at full deflection. Full deflection in this case is defined as being 40° from the fully retracted position.

The first step is to hold the flap in place and check for overall length with the flap in the fully retracted position, then manually lower the flap by hand in stages until the end of the flap touches the side of the fuselage. Take care that you do not scratch the rear window.

Working in small stages, mark and trim the end of the flap until the flap can be lowered to the full deflection position without touching the fuselage. In the factory we find that the use of a marker pen held flat against the fuselage to mark the underside of the flap at each stage can be quite useful. A jigsaw is used to trim the flap.

Remember that the top of the flap will not be trimmed quite as much as the bottom of the flap due to the shape of the fuselage at this location.

Work slowly and in stages until the flaps clear the fuselage by 5mm at full deflection.

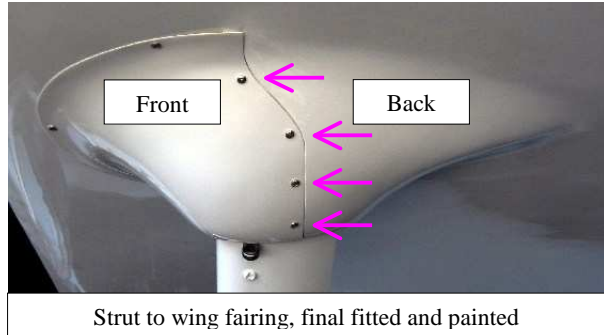
When you are satisfied that the inboard end of each flap is correctly cut and shaped, use a long sanding block to smooth off the cut surfaces.

### Fit the strut to wing fairing

While the wing and strut are fitted the strut to wing fairing can be fitted and the back half of the fairing can be flocked into place on the wing.

Assemble each fairing on the bench – fit the front section over the joggle on the back section and fit the 2 halves together with 4 x 6G stainless steel self-tapping screws on the outside and 1 screw on the inside and then take them apart again. Refer to the photo at right for the outside screw placement.

Now reassemble each fairing around the strut and locate the fairing on the wing: carefully centre the assembled fairing on the strut so that there is an even gap all around the strut and make sure that the fairing is lined up fore and aft.



Mark around the back half of the fairing and tape it into place, then drill 6 evenly spaced holes through the mounting lip of the fairing and through the surface of the wing. **Do not** drill any deeper than 5mm or you risk hitting the fuel tank! Fix the back half in place with a few 6G stainless steel self-tapping screws, then remove the screws and lower the fairing.

Repeat the process on the other wing.

Prepare the surfaces to be bonded: sand both surfaces and ensure that they are clean.

Mix up a small batch of flock and flock the back half of each fairing to the wing, holding it in place with 6G stainless steel self-tapping screws. Leave overnight for the flock to cure, then next day remove the screws – use a soldering iron if necessary to loosen the screws in the flock.

The join between the fairing and the wing will be filled and finished in the *Painting* task.

This completes the *Pre-Paint>Wings>Test fit wings* task.

Congratulations – you have just completed the *Pre-Paint* section of the Manual!