Technical Note TN.JS-023

13 February 2015

TITLE

Fitting of EVO replacement tip to JS1-C inboard wing

DESCRIPTION

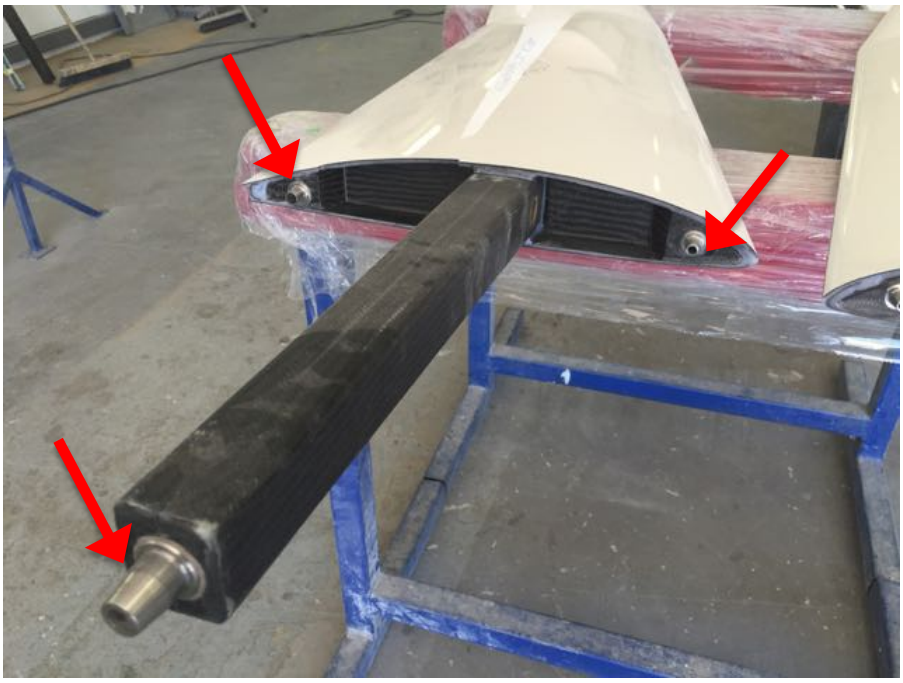
Wingtips are constructed independently from the main wings. Due to the manner in which the parts are constructed, each tip must be integrated to the main wing to ensure adequate fit.

INSTRUCTIONS

This process describes the fitting of EVO replacement wingtips with the lift pins and bushes already bonded:

1. Remove the front and rear lift pins (PN “1C-2.08.81”; “1C-2.08.83) from the junction rib and the junction pin (PN “1C-2.08.85”) from the end of beam
2. Remove the locking bush from the beam
3. Fitting of the tip and bond lift pins and bushes to achieve alignment with the wing.
4. Re-profile the wingtip to match the profile of the main wing

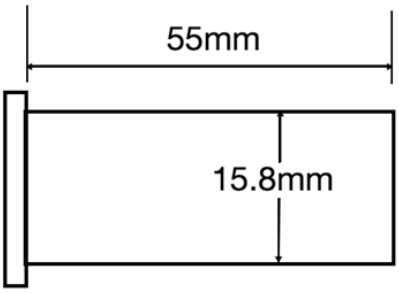
1. Removing junction pins
   a. Insert a steel rod with a diameter matching the inside diameter of the lift pins into each pin.



   b. Heat up the inserted rod with an electrical heat gun or small gas flame until the T_G of the bonding epoxy is exceeded. Take care not to overheat the pin, as too high a temperature may damage the composite structure in the rib.

c. Once bonding resin has softened, the pin is removed from the composite rib. Take care not to damage the outer surface of the pin. It may be necessary to lever the pin from the junction rib by driving a chisel or sharp blade tool between the pin's flange and the rib.
d. Clean off any excess resin from the pins

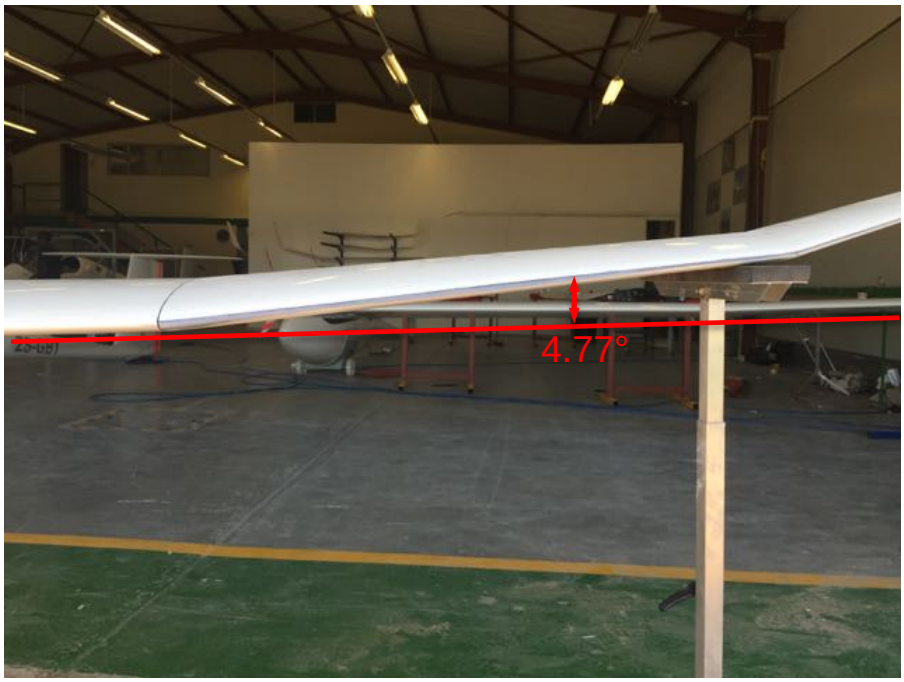
e. Removing bush (PN "1C-2.08.70.7") Manufacture a steel part as illustrated in the sketch below. Ensure the part fits into the bush.



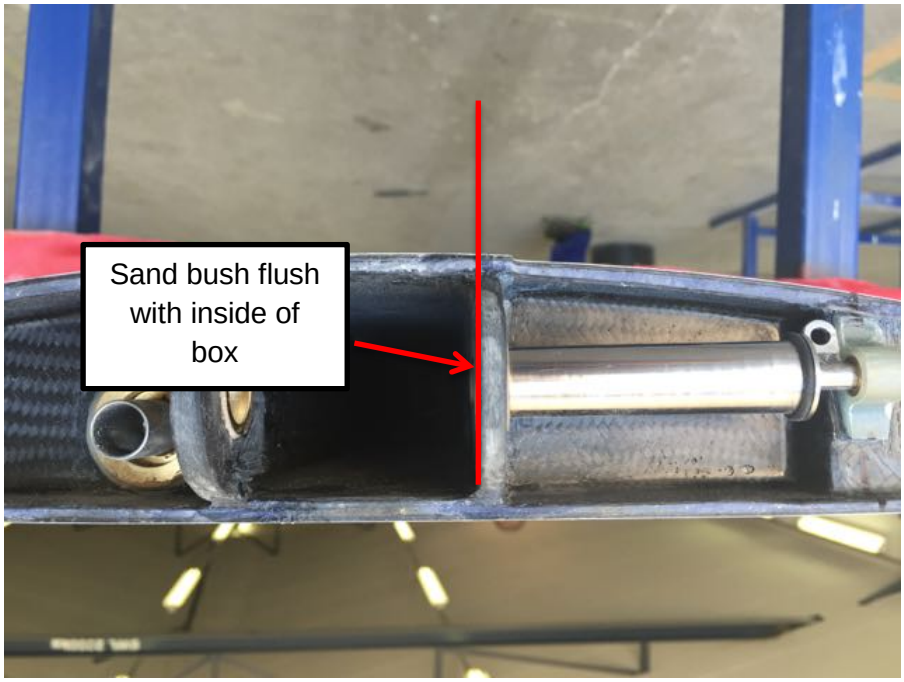
f. Heat up the steal part with a heat gun or gas flame.

g. Insert the heated metal part into the bush from the trailing edge side.
h. Wait until the bonding resin has softened (Smoke coming from the resin or a burning smell is an indication that sufficient heat is transferred to the bonding resin.) Take care not to overheat the composite structure, as this may cause damage.
i. Drive the bush from the beam using a drift and a hammer from the metal part's flange side.
j. Remove excess glue from the bush.

2. Fitting tip to wing
   a. Fit the tip to the wing in such a manner to minimize profiling.
   b. Initially fit the tip to the wing without any pins or bush installed. Some minor trimming may be required to obtain satisfactorily results.
   c. Check that the a dihedral angle of 4.77° can be achieved with the wing and tip profiles matching, as illustrated in the image below.



   d. If the tip cannot achieve alignment with the wing at this angle, it may be necessary to flatten any high spots on the beam.
   e. Check the forward and aft alignment to ensure that the leading edge of the tip matches the leading edge of the wing. It may be required to grind the interfering bush flush with the inside of the junction box as illustrated below.



f. If the beam is still interfering, the beam may be carefully sanded without damaging the structural wrapping layers.
g. Grind the holes in the tip rib to remove previous bonding epoxy
h. Insert the front and rear lift pins into the bushes on the wing side and fit the tip.
i. Slot the holes on the tip side if required. (If the tip is too low with the pins inserted, the holes in the rib must be slotted slightly down and vice versa)
j. Once the tip fits adequately with the two pins inserted, the junction pin is inserted into the junction box. Further slotting may be required on the beam end. Ensure the hole in the end of the beam is not enlarged too much during the slotting process as there is a reinforcing block inside the beam which is crucial to the structure of the beam. See image below for detail.

k. Insert the outer bush in the beam, and check the alignment and dihedral with the junction level locked.

3. Bonding of pins and bushes
    a. Check that all the pins and bushes fit properly by inserting the metals parts and testing the fit of the tip while at the correct dihedral angle.
    b. Apply release agent to the surfaces of the rib and edges of the wing to prevent the tip from bonding to the main wing.
    c. Apply grease to the locking pin, taking care not to contaminate the bonding area.
    d. Apply bonding epoxy to the pins and the holes.
    e. Insert the pins into the bushes in the wing side junction. Ensure the pins are fully seated in the bushes. Insert the main pin inside the junction box on the wing side using a rod of sufficient length. Ensure that this pin is fully bottomed out against the bush inside the box.
    f. Apply cotton flocks and cab-o-sil mix to the outsides of the outer bush and the hole in the beam. Ensure the inside of the bush is kept free of bonding epoxy.
    g. Insert the bush into the beam and remove excess glue.
    h. Slide the tip into position over the pins and check the dihedral angle.
    i. Lock the junction lock mechanism to align the outer bush.
    j. Check the alignment of the wingtip to the profile and adjust as required. Prop the tip up if it is too low in order to ensure correct alignment with wing.
    k. Correct the forward and aft alignment of the tip using the leading edges as reference. The tip can be held in the correct position using masking tape over the split line.
    l. Apply masking type to pull the tip toward the wing while curing. This is important to ensure the junction rib is fully bottomed out over the pins.
    m. Ensure the dihedral angle is maintained whilst curing.
    n. Allow the resin to fully cure.
    o. Unlock the lock mechanism and remove the tip from the wing.

4. Trimming
    a. Use a ball nose mini grinding tool to grind the excess glue away around the pins and bush. Cavities around the bushes must be filled by injecting bonding epoxy into the cavities using a syringe.
    b. Check that the tip fits easily into the wing. Tolerances on the pins may be released using P120 emery tape to sand the pins. Buff the pins up. Apply grease and test fit. Repeat process until the tip fits easily.
    c. Adjust the gap between the main wing and tip by trimming the tip side to give a consistent gap of 1mm. Gaps in excess of 1mm must be filled with a cotton flocks and cab-o-sil mix.

5. Profiling
    a. Profile the tip side to match the main wing.

6. Mylar recess
    a. The Mylar recess needs to be checked.
    b. Where the tip was profiled, apply the correct thickness Mylar to the recess and sand the wing surface down to the Mylar to correct the depth of the recess.

7. Flap alignment
    a. Check the gap between flap 2 and TII flap 3. It must be 1.5mm.
    b. If it is not, the gap must either be grinded to the correct size or filled to the correct size using a 1.5mm plate with release agent.
    c. The trailing edges of the flaps must then be sanded to they are flush.

MATERIAL SUPPLIED

N/A

MATERIAL REQUIRED

- Epoxy: MG Scheufler L 285 / H 287
- Cab-o-Sil (Fumed Silica)
- Cotton flocks
- Bonding Epoxy: Spabond 345 or a bonding epoxy with similar properties

MASS AND BALANCE

No change to mass or balance

MANUALS

No change to Flight or Maintenance Manuals

NOTES

This technical note must be implemented by an approved maintenance technician.