British Gliding Association
Aircraft Inspection

Mandatory

Number:	Issue:
025/02/2002	1

Date: 15th February 2002

Subject: Wing spar corrosion – continued airworthiness inspections

Applicability: Elliots of Newbury Olympia 460 series with metal reinforced main spars

Accomplishment: Part 'A' at the next and every C of A annual inspection after effective date
Part 'B' at FIVE YEAR intervals from the effective date
The effective date of this inspection is 31st March 2002.

Reason: To ensure the continued airworthiness of the wing spar and to provide early detection of any corrosion or deterioration of the joint between the wood and metal elements of the spar. The effective date will allow aircraft that are completing the Annual check now to be completed, but it is recommended that this inspection is carried out this year.

Instructions: All effected aircraft must have had the Mandatory inspection of the wing spar completed TNS 12/96 AND the spar Stabilisation modification BGA/OLY/460 Series 1/97 completed.

Part 'A' see pages 2 & 6
Part 'B' see pages 2, 3, 4, 5 & 6

Approved By
Jim Hammerton, Chief Technical Officer

Thanks to Keith Green and Ian Smith, members of Lasham Gliding Society and the Vintage Glider Club for their assistance in researching this inspection. The inspection also contains requirements from the BGA Technical Committee.

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Part A (1 page)

Annual inspection procedure (to be completed at the next and every annual C of A inspection after the effective date)

1. With the aircraft de-rigged and the wings supported on suitable trestles

2. Remove any paint or other protective coating (including adhesive spew) that prevents a clear view of the top and bottom edges of both the upper and lower spar boom aluminium laminates and the metal/wood interface inboard of the closing rib (the spar stub). Do not scratch the aluminium. **The use of paint stripper is prohibited as this may have a detrimental effect on the spar bonding.**
   Note; removal of ply or wing skin is not required

3. Carefully inspect all bond lines of the aluminium laminates and the wood to aluminium interface. A magnifying glass may be necessary.

4. As far as non-intrusive access allows, inspect the bond lines on the inside of the wing via lower surface access panel using mirror and light or other suitable inspection equipment. Particular attention should be paid to the area around the closing rib.

5. If further investigation is deemed necessary, consider drilling an access hole on the centre line of the closing rib, about two inches in front of the front face of the spar. It will also be necessary to drill through the next rib. A flexible mirror and light source, or endoscope will be required. On some aircraft a tooling hole is present in the fwd closing rib, this may be suitable for inspection access and negate the need for further holes. Any holes cut must be adequately re-protected.
   Any evidence of corrosion or other defects must be investigated and rectified before further flight. Please report any such defects to the BGA.

6. Ensure the 2BA bolts of the mandatory modification are correctly tightened (do not over tighten, the aluminium packs should be straight).

7. Inspect the wing attachment fittings and hardware for correct installation, self-locking nuts in safety and for corrosion.

8. Inspect the wing spar to the closing rib for condition of protective paint finish. Rectify any defects.

9. Restore protective finish to stripped area. (see notes on the use of clear varnish)

10. Complete logbook entry to show compliance with this inspection Part ‘A’.

Part B (2 pages)

Five year check (measurements to be recorded every five years from the effective date of this inspection)

1. Complete Part 'A' of the inspection items 1 to 8.

2. Remove the Stainless Steel protector plate having first removed the wing spigot bush assembly

3. Clean the spar area previously covered by the protector plate in accordance with the instructions in part 'A' item 2.

4. Inspect the spar area previously covered by the protector plate for any signs of corrosion or deterioration in accordance with part 'A' item 3 & 5 as applicable.

5. Inspect the removed wing spigot bush for serviceability.

6. Note the temperature. If the wings are at a lower or higher temperature than ambient note the temperature of the wings. Ideally the temperature of the wings should be allowed stabilize.

7. With a micrometer (preferred) or a digital vernier gauge, measure the width of the spar booms, on the centre line of the boom at positions (A) to (F) as detailed below (see sketch for positions)

8. **Top boom** – position (A), between the two visible 2BA bolts of the mandatory modification.

9. **Top boom** – position (B), between the inboard 2BA bolt and the joint plate.

10. **Top boom** – position (C), between the closing rib and the middle 2BA bolt of the mandatory modification. See note.

11. **Lower boom** – position (D), 1 inch from the closing rib

12. **Lower boom** – position (E), 1 inch from the spar joint plate.

13. **Lower boom** – position (F), at a point midway between point (D) & (E)

    Note: depending on the layout of the stabilization modification it may not be possible to measure position (C) if this is the case a note should be made in the log book when recording the measurements

14. **Record** the positions and measured widths and the temperature in the logbook.

15. The width of the spar, at the various measurement locations, should be compared to previous measurements (after the initial measurements). **If the measurements are increasing, then corrosion in the bond lines should be suspected and a very careful inspection undertaken.** Allowance should be made for the normal dimensional changes brought about by change in water content of the wood and temperature. It is desirable to let the wings stabilise at room temperature before taking the spar width measurements, and note the temperature in the logbook.

16. Restore the protective finish of the stripped area. (see notes on the use of clear varnish)

17. Refit the Stainless Steel protector plate and wing spigot bush. The protector plate may be sealed against water ingress but please remember that it will require removal in another five years.

18. Complete the log book entry to show compliance with this inspection Part ‘A’ and ‘B’ and ensure the measurements and temperature is recorded as these will be required in the future.

Notes (1 page)

1. Do not mark the aluminium with pencil
2. Avoid scratching the surface of the aluminium. Any minor surface scratches should be blended using wet and dry paper or scotch brite.
3. Do not use paint stripper or steel wire brushes.
4. Great care should be exercised in removing the Wing Spigot bush as it is made from a bronze material and may shear if corroded. The drive flats or slots will also be easily damaged by poorly fitting tools.
5. Inspection of four Olympia's (including 460, 463 and 465 types) identified the wood to metal bond, at the point where the spar enters the closing rib, as the area most likely to suffer corrosion.
6. A good spar will present all bond lines as thin dark brown lines. It should not be possible to insert a thin feeler gauge (0.003"). Crack detection fluid (if used), should not identify any voids in the metal/metal or wood/metal bond lines.
7. A corroded spar will present sections of the bond line as grey in colour and it may be possible to insert a thin feeler gauge (0.003") into the bond line at this point. The grey material is the product of corrosion and is more friable than good adhesive.
8. The width of the spar, at the various measurement locations, should be compared to previous measurements. If the measurements are increasing, then corrosion in the bond lines should be suspected and a very careful inspection undertaken. Allowance should be made for the normal dimensional changes brought about by change in water content of the wood and temperature. It is desirable to let the wings stabilise at room temperature before taking the spar width measurements, and note the temperature in the logbook.
9. At the conclusion of the inspection, the stripped area should be carefully sealed.
10. In order to avoid stripping the finish every year, a transparent finish should be considered that is compatible with the other materials involved. The Elliott factory used copal varnish.

Olympia 460 Wing measurement locations