August, 1967.

SLINGSBY SAILPLANES LIMITED, KIRBYMOORSIDE, YORKSHIRE
E N G L A N D.

TECHNICAL INSTRUCTION NO. 30

T.51 DART ALL VARIANTS

Mandatory Modification No.67

INCREASE IN TAILPLANE MASS BALANCE WEIGHT

Object of the Modification: It seems likely that, in two or three incidents, Darts have suffered from fairly high-frequency pitching oscillations when flying fast. A detailed analysis of the dynamic stability confirms this possibility and indicates that a larger mass-balance weight for the all-moving tail is required.

Flight tests have confirmed that, when fitted with modified weights, the aircraft has no tendency to oscillate rapidly in pitch, and if such motions are deliverately induced they rapidly damp out.

The modification therefore consists of replacing the present tailplane mass balance weights by larger weights. This modification is to be carried out as soon as possible and in any case before the 31st October, 1967.

Modification Procedure:

1. Remove the two inspection panels forward of the tailplane in the rear fuselage.

2. Remove the existing elevator mass balance weights via the inspection panels.

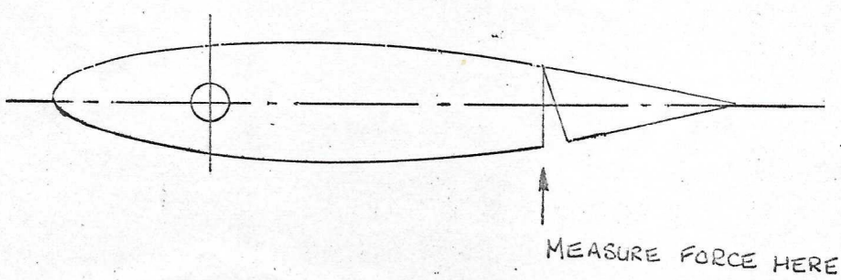
3. Disconnect the rear end of the elevator push rod from the lever in the rear fuselage.

4. Since there are several different types of "Dart" tail-plane, the new balance weights are somewhat too large as supplied, and must be trimmed to suit each aircraft.

5. Fit the new balance weights to the balance weight arm but do not tighten the attachment bolt fully.

6. Fit the tailplanes.

7. Measure the force which has to be applied to the root rib of the tailplane, immediately forward of the leading edge of the tab, to bring the tail to its neutral position.

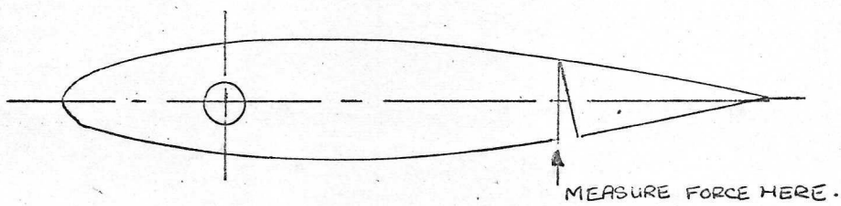


8. Trim the balance weights, taking roughly equal amounts off each, until the upwards force, measured in the manner describrf above, is between 1 and 1.25 lb (0.45 to 0.56 kg).

   Be careful to allow for the effect of friction by taking the mean of the forces which (a) just allow the trailing edge to rise and (b) just push it down.

9. Tighten the balance weight attachment bolt and reconnect the elevator pushrod. Inspect to ensure that the balance weight does not foul the adjacent structure, the push rod or trimmer cables when the tailplane is at the limits of its movement.

10. Check the adjustment of the elevator bias spring attached to the elevator push rod in the vicinity of Frame No. 3 by ensuring that the upwards force whichhas to be applied to the root rib of the tailplane, just forward of the leading edge of the tab, to bring the tail to its neutral position, is between $5\frac{1}{4}$ lb and $5\frac{3}{4}$ lb (2.38 kg to 2.60 kg).



11. Replace the rear fuselage inspection panels.

12. Inspect the tab for backlash.

    Set the cockpit trimmer lever so that the tabs are neutral when the tailplane is neutral. Holding the tailplane in this attitude, apply first an upwards force of 5 lb. (2.26 kg) to the trailing edge of the tab at the root end and then a downwards force of the same amount. The total movement of the tab trailing edge at the root must not exceed 2 mm.

13. Inspect the setting of the tab friction device.

    With the tailplane held neutral observe that the tab control does not move when a downwards force of not less than 5 lb. is applied at the trailing edge of the tab. Repeat with an upward force applied at the trailing edge of the tab.

14. If the tab control does move, the friction device in the rear fuselage should be tightened. Access is obtained by removing the transparent panel on the port side. Do not over-tighten the friction device.

15. The effect of the increased balance weight will be to decrease the maximum permitted cockpit load by about 4 lb. and to increase the minimum permitted cockpit load by about 17 lb. Amend the cockpit placard accordingly.

16. The incorporation of this modification must be supervised and inspected by a BGA Approved Inspector or Senior Inspector. He must make the appropriate entry in the glider log book and must sign and return the enclosed postcard.

Modification Kits are available from Slingsby Sailplanes Ltd., Kirbymoorside, Yorks, price 25/-