BMAA – AIRCRAFT SERVICE BULLETIN

Title: **Implementation of a new elevator friction device.**	
Reference: **SB MAAN 1877/2 issue 1 (Appendix A to MAAN 1877 issue 2)** *Issue date:* **20 June 2005**	*Applicability:* **All Type Approved D, DD and D-SS aircraft.**
Mandatory modification to aircraft	
This SB must be incorporated before the first flight after 20 June 2005	

1. Introduction

1.1. Why has this service bulletin been issued?

It has been discovered that some D-series Shadow aircraft have a tendency towards elevator flutter. This is a dangerous condition which should the pilot fly briefly "hands off" in moderate to severe turbulence or knock the stick whilst conducting a cockpit task, could occur resulting in damage to the pitch control circuit, and potentially loss of the aircraft.

Service Bulletin 1877/1 issue 1 has already been issued which required a flight test of all aircraft before further flight by 20 June 2005, and then in any case grounded all affected aircraft from 20 June 2005. This new Service Bulletin is additional to that, and describes a modification to the aircraft which will allow all affected Shadow aircraft to fly, subject to the normal conditions of a Permit to Fly.

1.2. What parts are affected?

No parts are removed, but a new elevator friction damper device has to be fitted into the tail of the aircraft.

1.3. What documents are affected?

An amendment to the maintenance manual is required, including the regular requirement to check adjustment of the new elevator friction device.

2. Qualifications

2.1. Who may implement this Service Bulletin?

This Service Bulletin can be implemented by any person competent to do so, and authorised by the owner of the aircraft.

2.2. Who may certify that this Service Bulletin has been properly carried out?

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Correct implementation of this SB must be checked by a BMAA inspector authorised in category B. That inspector must not be the person who fitted the parts to the aircraft.

No flight test is required.

2.3. Where must record be made of the SB?

Correct incorporation of this SB must be recorded in the relevant section of the aircraft logbook, and subsequently on the form BMAA/AW/001 at each permit renewal. A copy of this SB, and also the installation drawing (supplied with the mod kit) signed by the inspector, are to be retained in the aircraft logbook.

3. What is required to implement this SB?

3.1. List of Parts Required

A modification kit is required, this is available at a cost of £100 including VAT and postage (to UK) from:-

Broom Development Engineering
Easton Neston
Towcester
Northamptonshire
NN12 7HS
United Kingdom
Phone 01327 353023

Email broom.engineering@btinternet.com

3.2. List of Equipment Required

You will require:-

- Two small G-clamps (or similar temporary clamping device)
- Hand drill, with 4mm diameter HSS bit
- Small deburring tool
- Metric Allen key set.
- 10mm open end spanner.
- Synthetic multi-purpose grease (e.g. Albida RL2)

- (Recommended) Bottle of "Loctite blue" or similar thread locking compound.

3.3. Inspection Requirements

You will need a spring balance, capable of reading up to 3kg (6lb) or greater.

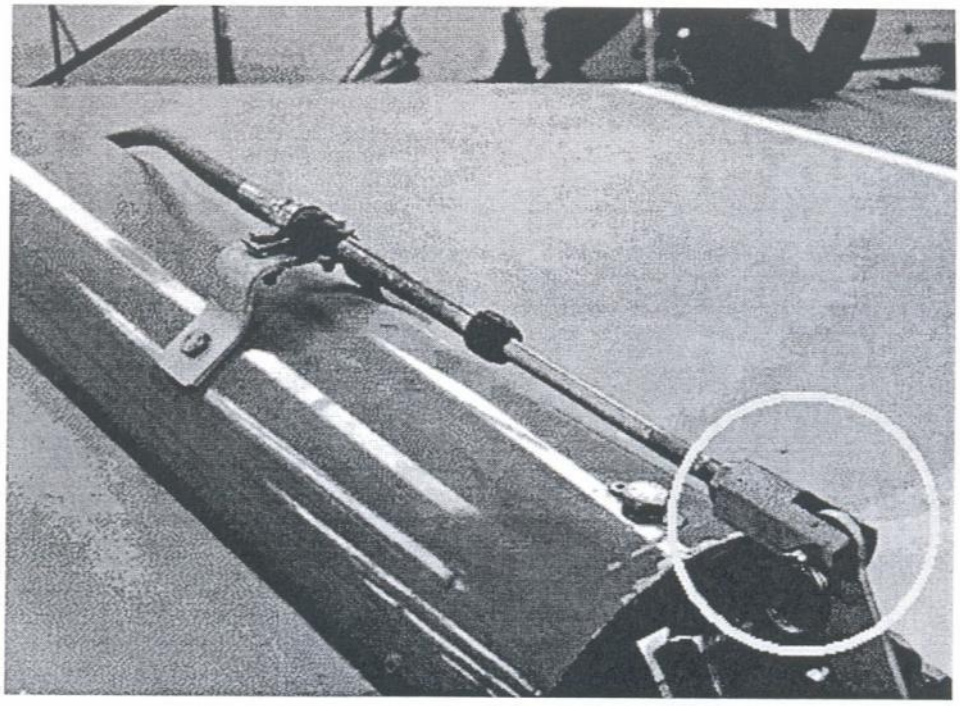
4. How to incorporate this Service Bulletin

IMPORTANT: Work in a clean environment, do not discard or damage any part that is removed from the aircraft – every part must be refitted in flying condition.

(A) Carefully loosen or disassemble the elevator damper mechanism, smear all bearing surfaces with a thin layer of grease, re-assemble in the original order.

(B) Disconnect the elevator Teleflex cable by removing the single pin and clevis ring at the top elevator horn (see Figure 1 below)

Figure 1, Elevator teleflex cable rear end and horn attachment



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(C) Whilst supporting the elevator, disconnect QTY4 elevator hinge pins.

(D) Carefully disconnect the elevator trimmer plug (square electrical connector) by squeezing the locking pins and gently pulling it out.

(E) Remove elevator, set to one side.

(F) (i) Remove the lower safety pin from the elevator trailing edge locking bolt.
(ii) Carefully pushing the end of the elevator Teleflex to one side, remove the tail plane trailing edge locating bolt. You may need to tap it gently from underneath with a soft faced mallet or block of wood to encourage it.

(G) Take the new elevator damper unit and place it so that the side with two brackets is around the fixed tail plane trailing edge spar with the hole through the trailing edge spar tube (see Figure 2 & Figure 3 below) [Note: photo below shows the elevator fitted, this is not how you should see it.]. **NOTE**: the damper rotating arm is vertically handed to match the elevator horn and that the assembly has a horizontal offset arranged by odd thickness friction washers to ensure that the rotating arm lines up with the horn when assembled and ready to be drilled/fitted.

(H) Push the tail plane trailing edge vertical locating bolt back through the boom tube from the top so that it goes through. Refit the safety pin at the bottom (see Figure 3 below, elevator stop omitted for clarity).

Figure 2, damper in place with vertical bolt refitted.

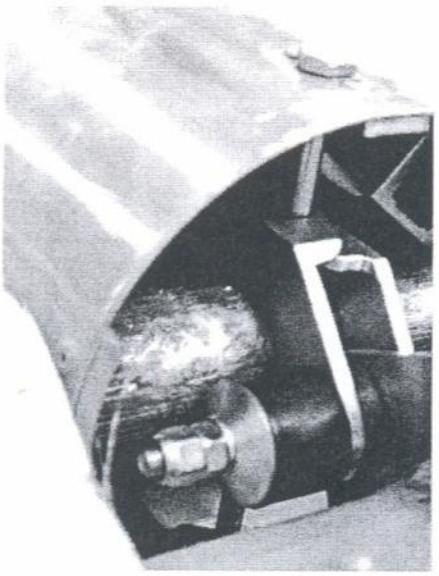
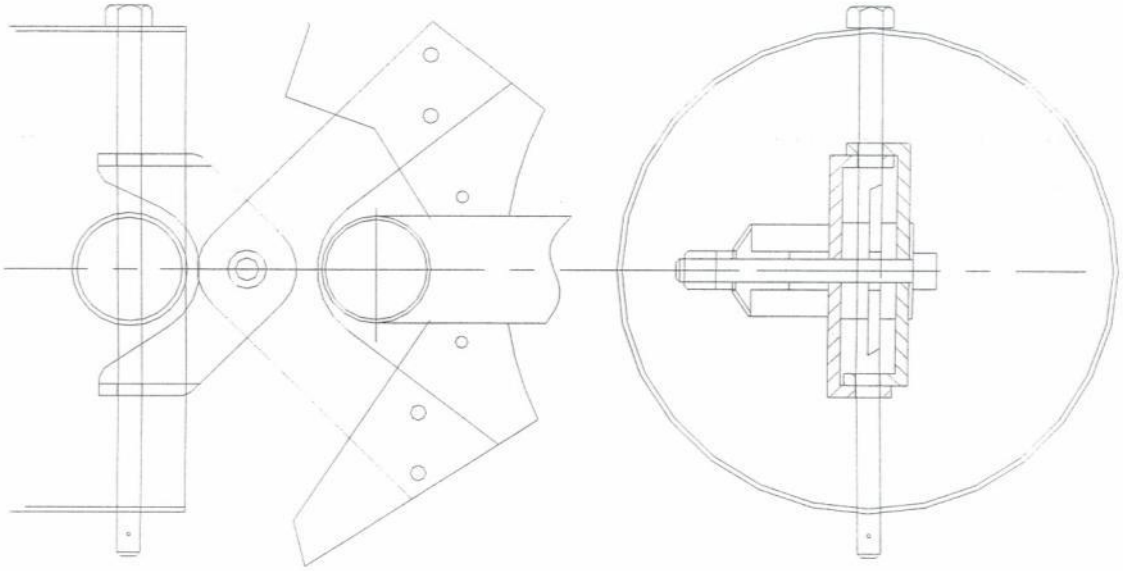
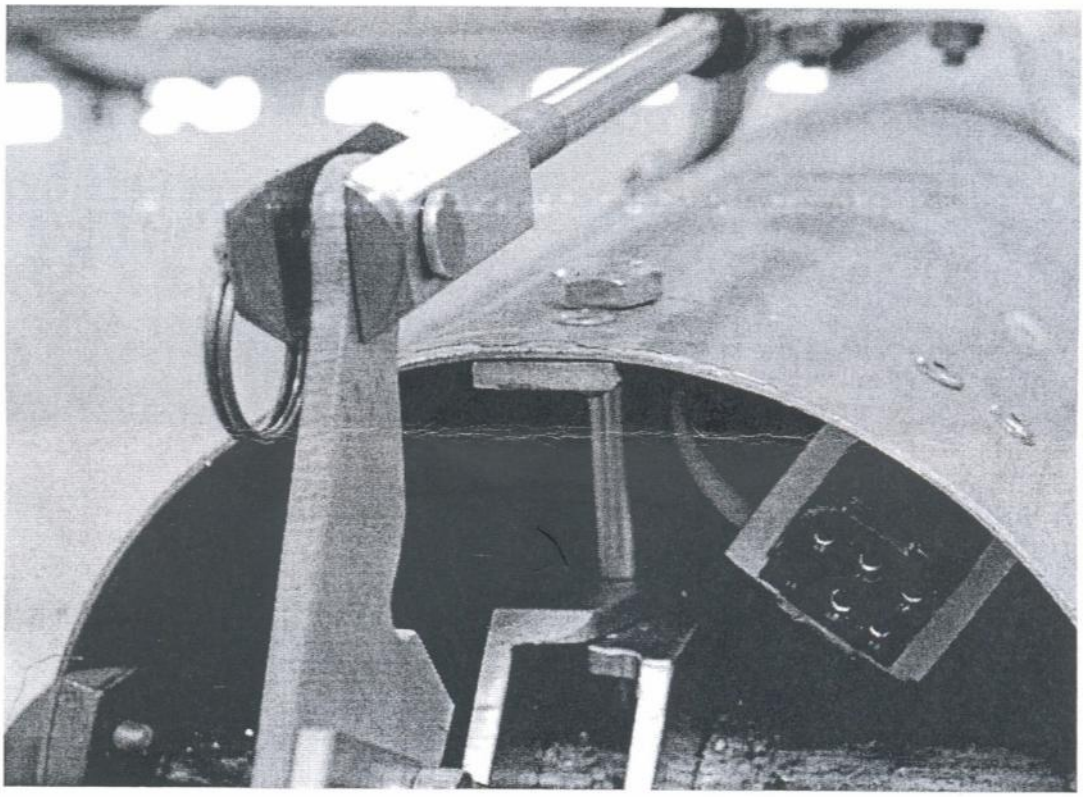


Figure 3, Drawing of end of boom tube with elevator damper in place (elevator stop not shown)



(I) Refit the elevator, taking care to reconnect QTY4 elevator hinge pins (including their safety pins), then re-attach the elevator Teleflex attachment and clevis ring (see Figure 4 below).

Figure 4, Re-fitted teleflex attachment with damper in place



(J) Place a G-clamp (or similar temporary clamping device) across the lower elevator damper arms and the elevator arm so that they are rigidly flush with each other, with the edges flush. IMPORTANT: Take care to ensure that the clamp jaw is covered with card, etc. to avoid scoring the aluminium alloy surface.

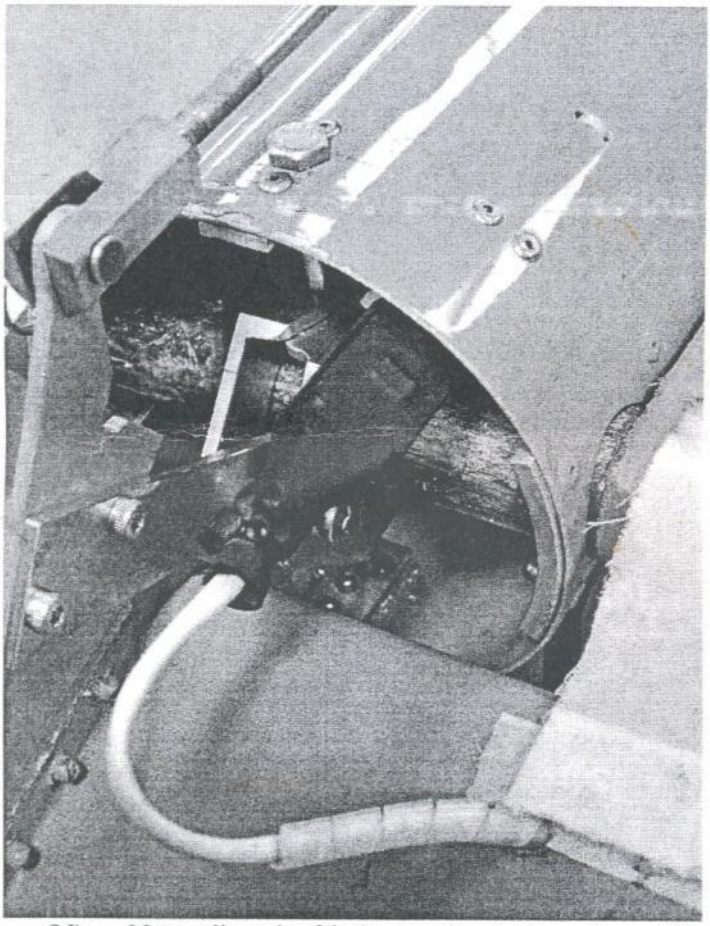
(K) At the upper side there will be two holes drilled in the elevator damper arm. Ensuring that this arm and the elevator control horn are flush against each other by putting a small G-clamp (or similar) over the other hole drill through each hole with a 4mm HSS twist drill. After drilling the first hole carefully debur then fit the supplied caphead (Allen) screw and self locking nut. Tighten, then drill and debur second hole before fitting the screw to that hole. (Figure 5 below.)

Figure 5, Matched up arms, drilled with first screw in place

(L) Repeat this process for the underside arms. (Note: if available, it is permissible to add a drop of "loctite blue" or similar thread locking compound to the screws and nuts during fitting.

(M) Re-attach elevator trim tab electrical connector plug and socket (see Figure 6 below)

Figure 6, Fully assembled parts at rear of fuse tube.



(N) Now adjust the friction on the device using a 10mm open-end spanner and Allen key (see photo) so that with the elevator horizontal, you need 2.5 - 2.6 kg [5.5 – 5.7 lbf]of pull upwards (at the trailing edge of the elevator centreline, next to the trim tab hinge) to move the elevator. After the correct adjustment is found tighten the 6mm nylock locking nut against the aduster nut to secure. (Figure 7 below.)

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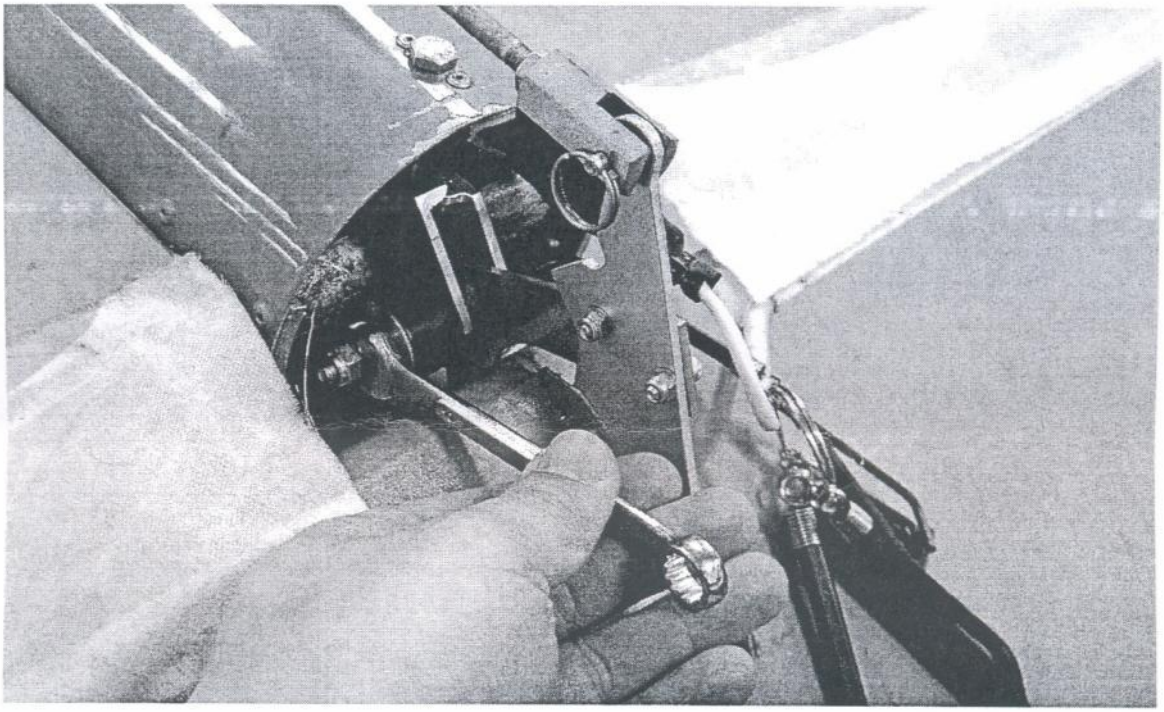
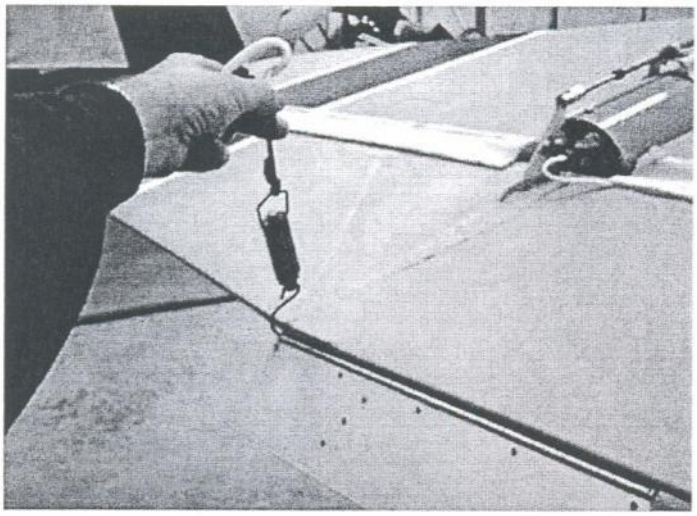
Figure 7, Making adjustments to the damper mechanism,





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(O) Re-check all of the fastenings and confirm correct functioning of the elevator trim tab, and full range movement of the elevator.

5. Changes to Operating Data

5.1. Changes to Weight and Balance

The aircraft weight and balance is modified by the addition of 0.12 kg at 143 inches aft of datum; this will move the CG aft by about 0.05", and is not sufficiently significant to require preparation of a new W&CG report.

5.2. Changes to Operators Manual

No change is required to the Operators Manual.

5.3. Changes to Maintenance Manual

Replace page 16-6 of the maintenance manual with that contained at Appendix A to this Service Bulletin.

5.4. Changes to Placards.

No changes are required to placards.

6. Authorisation

Prepared by:	Authorised by
G B Gratton Chief Technical Officer British Microlight Aircraft Association	J A F Viner Deputy Chief Technical Officer British Microlight Aircraft Association

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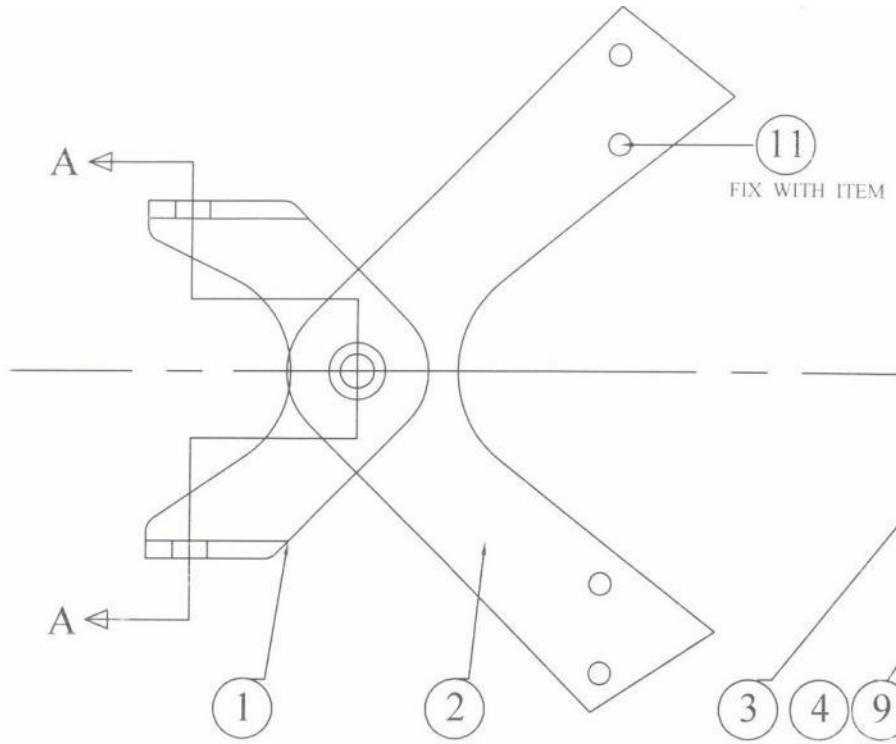
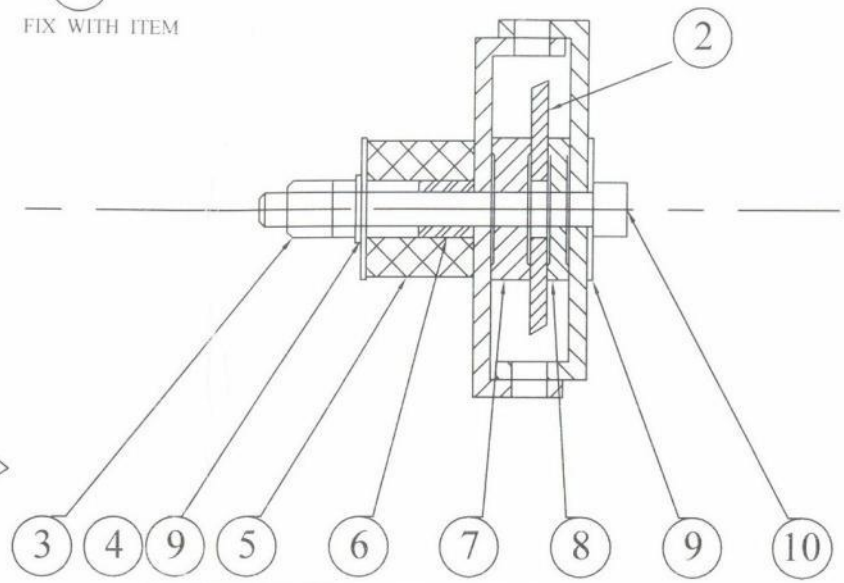
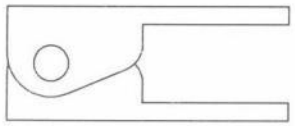
List of Annexes to this Service Bulletin

Ref:	Title	No. Pages
Annex A	Amended page 6-16 of Shadow C-D Maintenance Manual When used for Shadow D, DD and D-SS aircraft.	1



SECTION A-A





Itemref	Quantity	Title/Name, designation, material, dimension etc	Material Supply Reference
11	4/4	M4 x 12 Cap Head Screw plus M4 Full Nylock Nut	2009 / 2128
10	1	M6 x 60 Cap Head Screw Plated	2011
9	2	6MM Penny Washer 25mm O.D.	2179
8	1	Friction Washer - Nylatron 25 x 4 mm x 6.5 Hole	MB - 1C
7	1	Friction Washer - Nylatron 25 x 7 mm x 6.5 Hole	MB - 1C
6	1	Centralising Spacer Nylon - 6	1565
5	1	Spring Black Rubber 50-70 Shore	1573
4	1/1	6MM Nut / 6MM plain Washer	2136 / 2132
3	1	6MM Nylock Full Nut	2144
2	1	Damper Rotary Arm 3MM Sheet 6082-T6	MB - 1B
1	2	Damper Fixed Arm 2 .5" x 1" x 1/8" Channel 6082-T6	MB -1A

MASS 120 Grams
NATURAL FINISH
REMOVE ALL SHARP CORNERS
TOLERANCE UNLESS STATED
OPEN DIM ±1.00
0.0 DIM ±0.5
0.00 DIM±0.05

FITTED TO AIRCRAFT G-MGTW

SELLER TO COMPLETE AND SEND A COPY TO BMAA

1	Issued for Manufacture	21/6/05	M.B.	
Initial	Issued for discussion and Approval	8/4/05	M.B.	
Issue No	Revision note	Date	Signature	Checked

Inspected and Approved for the BMAA
Retain Paperwork with Part / Log book

BMAA Inspector / No.

Signature / date

The Part(s) issued with this drawing has been inspected
Certified as correct to Drawing and Released for Fitment

Batch No. ONE

Signature M Broom

Designed by	Checked by	BMAA Approval issue/date	Inspection Date	Scale
N. Beale.	M.Broom.	MAAN 1877 JUNE 2005	21-6-05	NTS

BROOM DEVELOPMENT ENGINEERING
EASTON NESTON
TOWCESTER
NN12 7HS 01327 353023

Elevator Damper Assembly

MB - 1

Issue No Initial: ONE

Sheet: ONE