

BRITISH AEROSPACE MILITARY AIRCRAFT AND AEROSTRUCTURES
MILITARY BUSINESS UNIT
Greengate, Middleton, Manchester, M24 1SA, England.

BAe AIRCRAFT
BULLETIN FOR DE HAVILLAND MOTH AIRCRAFT

DOCUMENT TYPE AND REF No TECHNICAL NEWS SHEET CT (MOTH) No 29 Issue 3

TITLE: FUSELAGE: LATERAL TIE RODS - FRACTURE AT WING JOINT FITTINGS.	CLASSIFICATION MANDATORY
1. PLANNING INFORMATION A. Effectivity All Variants of DH 60, 82, 82A, Queen Bee and 83 Moth Aircraft B. Reason During routine maintenance on a DH 82 aircraft it was found that the lateral Fuselage Tie Rod at the aft position had sheared at its location with the spar attachment fitting. Subsequent investigation found the failure was a result of fatigue cracking in the thread root. In addition the forward Tie Rod (which had not fractured) was distorted and found to have been manufactured from material of incorrect specification with a lower tensile strength. C. Description This Technical New Sheet (TNS) CT (MOTH) No 29 Issue 3 calls for both lateral Fuselage Tie Rods to become "lifed items" restricted to a service life of 2000 flying hours or 18 years (whichever is sooner) and introduces a procedure for the examination of the aircraft structure following a heavy landing, following undercarriage trauma and at annual inspection. Undercarriage trauma is defined as hitting an obstacle or a deep rut in the landing or taxi area, distortion, buckling or other impact damage to the undercarriage, including collapse. DATED 1st March 1999 PAGE 1 OF 7	

CONTINUATION SHEET**DOCUMENT TYPE AND REF No TECHNICAL NEWS SHEET CT (MOTH) No 29 Issue 3****D. Compliance**

- (1) The work detailed within the Accomplishment Instructions of this Technical News Sheet (TNS) CT (MOTH) No 29 Issue 3 has been classified **MANDATORY** by the United Kingdom Civil Aviation Authority (CAA).
- (2) Paragraph 2.A (Work Required - Tie Rod Removal) must be carried out within 2000 flying hours or 18 years, whichever is sooner from last Tie Rod renewal. In cases where no evidence of last renewal date is found to exist, paragraph 2.A must be complied with within six months or 100 flying hours from the issue date of this TNS whichever is sooner. Thereafter repeat applications of paragraph 2.A must be carried out at intervals of 2000 flying hours or 18 years whichever is sooner from the last Tie Rod renewal.
- (3) Paragraph 2.D (Work Required - Manuals) must be carried out within 3 months of the issue date of this TNS in order to introduce an expanded heavy landing inspection and additional requirements for the annual inspection into the Recommended Maintenance Schedule and an amendment to the details of replacement Tie Rods and Nuts in the Maintenance and Repair Manual.
- (4) Operators may wish to consider embodying TNS 29 at the same time as TNS 28.

E. Approval

The contents of this Technical News Sheet (TNS) CT (MOTH) No 29 Issue 3 have been approved under the authority of the United Kingdom Civil Aviation Authority approval ref: DAI/9402/92.

F. References

Figure 1 attached.

G. Publications Affected

- (1) Maintenance Schedule - amendment to the Heavy Landing Inspection and Repeat application of TNS 29 Issue 3 at 2000 flying hours or 18 years whichever is sooner.
- (2) Maintenance Schedule - amendment to the Annual Inspection requirements.

H. Material Information

DH Queen Bee	-	Rod Pt No 43210, Nut Pt No H 25486
DH 60 MIII, Mk II & GIII	-	Rod Pt No H 33746, Nut Pt No H 25486
DH 82, 82A and 60T	-	Rod Pt No H 37869A, Nut Pt No H 37870
DH 60 M	-	Rod Pt No H 25487, Nut Pt No H 25486
DH 83	-	Rod Pt No H 37863, Nut Pt No H 37870
DH 60, 60X and 60G	-	Rod Pt No H 11456, Nut Pt No A.27ES

NOTE: All Rods to be manufactured as shown in Figure 1. Operators with queries regarding applicability of parts should contact BAe in accordance with Paragraph 4 (REPORTING).

2. ACCOMPLISHMENT INSTRUCTIONS

A. Work Required - Tie Rod Removal

- (1) Remove or stow the wings in accordance with the Maintenance and Repair Manual.
- (2) Refer to Figure 1 attached and locate the Spar Joint Fittings applicable to type at fuselage joint indicated, on both the Port and Starboard sides of the aircraft.
- (3) Remove the securing nuts and withdraw the two lateral Fuselage Tie Rods.
- (4) Using cleaning fluid and a lint free cloth remove all grease and dirt from the surface of the Spar Joint Fittings particularly around the periphery of the Tie Rod location holes.
- (5) Examine the Tie Rod location holes using a strong light source and 10 X magnifier for signs of ovality. Where these holes are found to be elongated the fitting should be declared scrap and replaced with an appropriate new item.

NOTE: If the Tie Rod location holes are satisfactory but the undercarriage or wing attachment holes are found elongated, repair may be accomplished by embodiment of repair drawing R4555 Issue 1.

- (6) Look carefully for any split or fracture of wood at the location where rods pass through fuselage lower longerons Port and Starboard. Where signs of damage or deterioration are found to exist carry out rectification in accordance with the approved Repair Manual.
- (7) In the case of metal tubular fuselage construction, examine the location where the rods pass through the fuselage lower longerons Port and Starboard for buckled or dented section and broken welds. Where signs of damage or deterioration are found to exist carry out rectification in accordance with the approved Repair Manual.
- (8) Refer to the table on Figure 1 attached. Identify and obtain appropriate new Tie Rods and Nuts, from a manufacturing organisation approved by the local Airworthiness Authority

B. Work Required - Heavy Landing Inspection, Undercarriage trauma (see Para 1.C) and additional annual inspection requirements.

- (1) Place the aircraft on level ground and view from the front. Determine if the aircraft is sitting level.
- (2) Check the angle of the wheels and look for evidence of toe-in/toe-out and vertical alignment to determine if the stub axle is bent.
- (3) Trestle the aircraft to lift the wheels clear of the ground. Check the undercarriage radius rod front swivel bolt and fitting at the lower bulkhead and rear attachment lug on the compression leg for security, distortion and elongation of the bolt hole.
- (4) Check centre section bracing wires for tension. If slack, check all attachment lugs, including those on the centre section spars (front and rear) and cabane struts for distortion or bowing.

CAUTION: Do not attempt to tension wires without ascertaining the cause of slackness.

- (5) Check the mainplane bracing wires especially flying (lift) wires and interplane bracing wires for tension. If slack carry out further investigation to lugs/spars as required.
- (6) Check all bolts at joint E and both internal and external angle brackets and associated bolts at joint C (lower front frame) for security.
- (7) Examine undercarriage bolt holes in wing attachment fittings for elongation.
- (8) Check vertical member between joints H - G in the fuselage side frame at the front cockpit for bending and cracked or flaking paint.

NOTE: The most likely place for such damage is where the tie rods pass through the longeron. On wooden longerons look for split or fractured wood. On metal longerons look for buckles or broken welds and bending of the tie rods.

- (9) Check all tubes of the engine mounting frame for distortion/bending to include the engine bearer feet.
- (10) Remove the lower compression leg pin to the axle member and examine for bending. If bending is observed, remove the upper compression leg bolt and dismantle the unit. Check for broken springs. Remove gaiter from lower leg and check for bending of the sliding tube. With the springs removed, determine that the tube slides freely.
- (11) Rotate the collar with the lug for the compression leg around the sleeve on the axle member, feeling for any tight spots indicating bending of the axle.
- (12) Remove the bolt from the trunnion carrying the compression leg. It should slide out easily.

CONTINUATION SHEET**DOCUMENT TYPE AND REF No TECHNICAL NEWS SHEET CT (MOTH) No 29 Issue 3**

- (13) Check 'V' undercarriage strut for alignment and distortion. If necessary remove the strut and examine the attachment legs and bolts into the cross tube.
- (14) Check the fabric around the wing attachment fittings for slackness/wrinkling.
- (15) Check the wing attachment fittings for displacement evidenced by cracking paint film around their edges. Examine the lower longeron tubes for distortion and cracking/flaking paint. On wooden fuselages overload failure of the wing attachment fitting may result in the fitting being displaced around the bottom lower longeron/cross tube attachment structure and internal fittings, bending the tie rods.
- (16) Gain internal access to the tie rods by removing the front seat pan and check the integrity and condition of the tie rods and tie rod nuts for displacement and damage.
- (17) Check lower wing attachment fittings on rear spars for bending.
- (18) In the event of a wing-tip coming into contact with the ground, in addition to the checks described in the Maintenance Manual, check for signs of wrinkled/loose fabric to both wings.

NOTE: The most likely damage to occur is fracture of the spars where the interplane struts are attached, or in the case of the bottom rear spar, at the point around the aileron inner hinge. Make right angle cuts in the fabric at these points and examine the spars. If correct, repair the fabric by sewing and patching in accordance with DHTM 1, Section 1, Page 25, Para 17.

C. Work Required - Tie Rod Replacement

- (1) Install new tie rods and run up the securing nuts by hand "finger tight". Tighten and torque load the nuts to 2 - 2.5 lbf ft (2.71 - 3.39 Nm) on wood constructed aircraft and 7.5 - 8.5 lbf ft (10.17 - 11.52 Nm) on metal constructed aircraft. A little further tightening may be necessary so that the next slot aligns with the split pin hole. Secure with a split pin and apply protective treatment.
- (2) Refit wings and re-rig the aircraft in accordance with the Maintenance and Repair Manual.

D. Work Required - Manuals

- (1) For variants of the DH 82 and the Queen Bee, delete the final sentence ("*Each consists..... 12.5 mm*") from the Maintenance and Repair Manual, DHTM 1, Section 2, Page 5, Paragraph 8.
Insert the following text "*Refer to Technical News Sheet CT (Moth) No 29 Issue 3, paragraph 2.A.(8).*".

CONTINUATION SHEET**DOCUMENT TYPE AND REF No TECHNICAL NEWS SHEET CT (MOTH) No 29 Issue 3**

- (2) Manual of Instructions (INSPECTION - AFTER A BAD LANDING) for variants of the DH60 and DH83 should be hand amended to state "*Tie rods to be manufactured and replaced in accordance with Technical New Sheet CT (Moth) No 29 Issue 3*".
- (3) Amend the Recommended Maintenance Schedule (for the variants of the DH82 and the Queen Bee contained within Maintenance and Repair Manual, DHTM 1), Paragraph 17 (Heavy Landing Inspection) to insert new Sub Para. (v) text:- "*Refer to TNS 29 Issue 3, Paragraph 2.B (Heavy Landing Inspection).*"
- (4) Amend the Heavy Landing Inspection within the manual of instructions (INSPECTION - AFTER A BAD LANDING) for variants of the DH60 and DH83 to insert new inspection:- "*Refer to TNS 29 Issue 3, Paragraph 2.B (Heavy Landing Inspection).*"
- (5) For all aircraft types, amend the Recommended Maintenance Schedule to add TNS 29 Issue 3, Para 2.B to the existing annual inspection requirements.
- (6) For all aircraft types, amend Recommended Maintenance Schedule to include the requirement to repeat TNS 29 Issue 3, Paragraph 2.A every 2000 Flying Hours or 18 Years whichever is the sooner.

3. RECORDING

- A. Record compliance with this TNS No 29 Issue 3 in the appropriate aircraft technical records, detailing last Tie Rod renewal date or flying hours to date.
- B. Whenever a Technical New Sheet is issued or an earlier TNS is re-issued, operators are required to hand amend the copy they hold of TNS CT (Moth) No 1, "LISTING OF TECHNICAL NEWS SHEETS" to ensure an up-to-date index is maintained.

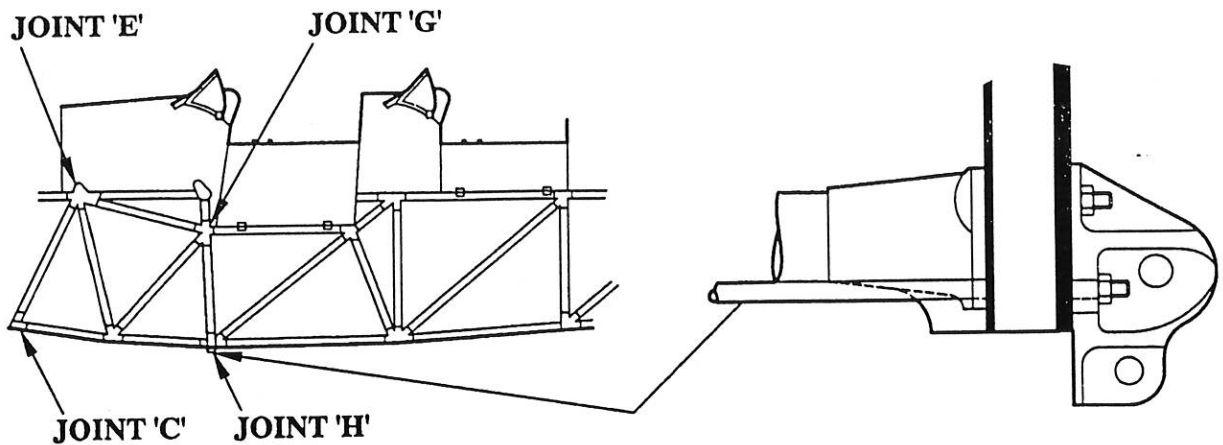
4. REPORTING

- A. When reporting details of faults found, or in cases where technical advice is required contact:

The Engineering Support Manager
British Aerospace Military Aircraft and Aerostructures
Military Business Unit - Chadderton Works
Greengate, Middleton
Manchester
M24 1SA Telephone +44 (0)161 9558789
England Fax: +44 (0)161 9558798

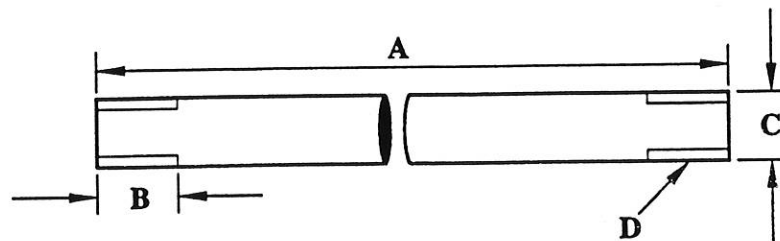
CONTINUATION SHEET

DOCUMENT TYPE AND REF No TECHNICAL NEWS SHEET CT (MOTH) No 29 Issue 3



LATERAL FUSELAGE TIE RODS
Refer to table for details

JOINT FITTING (Pt No H34640/1)
Examine holes for signs of elongation



FUSELAGE CROSS TUBE (Pt No H22411A)
Except DH 60, 60X and 60G

A/C TYPE	ROD Pt No	A	B ^{+0.0/-0.015}	C	D	NUT
DH60 **	H11456	26.5"	.8125"	1/4"	1/4" B.S.F.	A.27ES
DH60X **	H11456	26.5"	.8125"	1/4"	1/4" B.S.F.	A.27ES
DH60G **	H11456	26.5"	.8125"	1/4"	1/4" B.S.F.	A.27ES
DH60 Mk II	H33746	27.1"	0.625"	5/16"	5/16" B.S.F.	H 25486
DH60 GIII	H33746	27.1"	0.625"	5/16"	5/16" B.S.F.	H 25486
DH60M	H25487	26.5"	0.625"	5/16"	5/16" B.S.F.	H 25486
DH60T	H37869A	26.95"	0.500"	8 mm	8mm x 1mm pitch	H 37870
DH82	H37869A	26.95"	0.500"	8 mm	8mm x 1mm pitch	H 37870
DH82A	H37869A	26.95"	0.500"	8 mm	8mm x 1mm pitch	H 37870
DH Queen Bee	43210	27.31"	0.73"	5/16"	5/16" B.S.F.	H 25486
DH83	H37863	39.15"	0.500"	8 mm	8mm x 1mm pitch	H 37870

** Material Spec = S 1 Cadmium Finish
Material Spec = S 154 'D' Condition - HTS Cadmium Finish
Thread: Die or Rolled thread Finish.
1/16" x 3/4" split pin required.

FIGURE 1

DATED 1st March 1999

PAGE 7 OF 7

