Transport Canada Transports Canada

TP 7245E

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AIRWORTHINESS DIRECTIVE

The following airworthiness directive (AD) may be applicable to an aircraft which our records indicate is registered in your name. ADs are issued pursuant to ***Canadian Aviation Regulation*** **(CAR) 521 Division X**. Pursuant to **CAR 605.84** and the further details of **CAR Standard 625, Appendix H**, the continuing airworthiness of a Canadian registered aircraft is contingent upon compliance with all applicable ADs. Failure to comply with the requirements of an AD may invalidate the flight authorization of the aircraft. Alternative means of compliance shall be applied for in accordance with **CAR 605.84** and the above-referenced **Standard**.

This AD has been issued by the Continuing Airworthiness Division (AARDG), National Aircraft Certification Branch, Transport Canada, Ottawa, telephone (613) 952-4357.

Number: **CF-2002-26R2**

Subject: **Bombardier DHC-8 – Flap Drive Actuator Assembly**

Effective: 17 May 2010

Revision: Supersedes Airworthiness Directive CF-2002-26R1, issued on 6 October 2003.

Applicability: Bombardier DHC-8 aircraft, Models 102, 103, 106, 201, 202, 301, 311, 314 and 315, serial numbers 003 and subsequent.

Note: All installed flap drive actuators, Part Numbers 734181, 734374 and 755216, are subject to this revision, irrespective of serial number.

Compliance: When indicated.

Background: Field reports indicate that the ballscrew and nut assembly of the flap drive actuators may wear to the extent that the ballscrew mechanically disconnects from the ballnut (ballscrew translation with no input shaft rotation). If both actuators of an extended flap panel should disconnect, the affected panel may be aerodynamically backdriven, resulting in asymmetric flaps.

Analysis of new data has revealed that the interval for future functional checks of flap ballscrew actuators for backlash must be reduced from "2C" check, currently a maximum of 10,000 flight hours, to 3000 flight cycles. However, depending upon measured backlash, up to a maximum permitted value of 0.069 inch for continued operation, and calculated wear rate, a check interval of less than 3000 flight cycles may be required.

Revision 1 of this directive introduced new lubrication tools and specified the use of Aeroshell 17 grease in order to improve lubrication of the flap actuators and consequently reduce the possibility of component wear. It also revised the applicability and compliance time criteria for the actuator backlash checks. All installed actuators were subject to an initial phase-in backlash check, followed by repeat checks, in accordance with Revision 1.

Revision 2 provides the following alternative grease and backlash check instructions:

- alternative grease Syn-Tech NS-5806-G for lubrication of the flap actuators.
- alternative instructions, Section 05-50-98 of the Aircraft Maintenance Manual (AMM), for determination of the next backlash check interval.
- alternative instructions, Task Number 2750/18 in the Maintenance Task Card Manual (MTCM), for the repeat backlash checks.

Several non-technical editorial changes, including renumbering of the existing Notes, have also been made. These changes have not been identified with a revision bar.

Corrective Action:

Part A. Lubrication

1. Within 30 days after the effective date of Revision 1 of this directive, 29 October 2003, unless already accomplished, amend the Transport Canada approved maintenance schedule by incorporating the lubrication task as detailed in the applicable Temporary Revisions (TR) of the DHC-8 Maintenance Program Manual (MPM) specified below:

A/C Series	PSM No.	TR No.	Task No.	Task Description
100	1-8-7	MRB-143	2750/04	Flap Actuator Lubrication
200	1-82-7	MRB 2-21	2750/04	Flap Actuator Lubrication
300	1-83-7	MRB 3-152	2750/04	Flap Actuator Lubrication

2. For any actuator which has exceeded the lubrication interval specified in the above Temporary Revisions since its most recent lubrication, accomplish the next lubrication no later than during the next A-check after the effective date of Revision 1 of this directive, 29 October 2003.

3. Commencing 12 months after the effective date of Revision 1 of this directive, 29 October 2003, lubrication tools, Part Number AGE 13622, AGE 13623 or AGE 13624, as applicable, or equivalent tools manufactured using Hamilton Sundstrand Drawing Nos. AGE 13622, AGE 13623 or AGE 13624, must be used during flap actuator lubrication.

   Note 1: The only greases specified for lubrication of the flap actuators are Aeroshell 17 and Syn-Tech NS-5806-G.

   Note 2: Although use of the tools specified above is not mandated immediately, it is recommended that they are used as soon as possible to improve actuator lubrication and reduce the possibility of component wear.

   Note 3: When switching from the previously permitted alternative greases MIL-G-23827 and MIL-G-81322 to Aeroshell 17 or Syn-Tech NS-5806-G, it is recommended that the tools specified above are used in order to maximize purging of the old grease and obtain maximum penetration of the Aeroshell 17 or Syn-Tech NS-5806-G grease.

   Note 4: The MPM TRs specified in Part A, Paragraph 1 above, have since been incorporated into the latest revision of each of the referenced manuals, PSM 1-8-7, 1-82-7 and 1-83-7.

   Note 5: Use of either grease, Aeroshell 17 or Syn-Tech NS-5806-G, is now specified in the MTCM for Flap Actuator Lubrication Task No. 2750/04 and also in the AMM lubrication instructions for the flap actuators.

Part B. Initial Phase-In Backlash Check

1. Perform a backlash check of each installed actuator at or before the compliance time specified in the applicable sub-paragraph (a) to (h) below. Accomplishment shall be in accordance with the Accomplishment Instructions of Bombardier Alert Service Bulletin A8-27-98, dated 20 February 2003, or later revisions approved by the Chief, Continuing Airworthiness, National Aircraft Certification, Transport Canada.

   Note 1: For detailed backlash check instructions, refer to paragraph 2.A.(1) of the applicable Hamilton Sundstrand Service Bulletin, 734181-27-A5 or 734374-27-A5, both of which form part of Bombardier Alert Service Bulletin A8-27-98.

   Note 2: For determination of backlash check intervals, refer to paragraph 2.A.(4)(b) and Figure 4 of the applicable Hamilton Sundstrand Service Bulletin, 734181-27-A5 or 734374-27-A5, both of which form part of the Bombardier Alert Service Bulletin A8-27-98.

Note 3: The most recent actuator backlash measurement, made in accordance with one of the following instructions prior to the effective date of Revision 1 of this directive, 29 October 2003, may be utilized when determining the compliance time, as instructed in sub-paragraphs (a) to (e) below:

- Original issue of Transport Canada Airworthiness Directive CF-2002-26, dated 2 May 2002.
- Bombardier Alert Service Bulletin A8-27-95, dated 31 October 2001.
- Bombardier Alert Service Bulletin A8-27-95, Revision A, dated 17 April 2002.
- Bombardier Alert Service Bulletin A8-27-98, dated 20 February 2003.
- DHC-8 Maintenance Task Card Manual, Task No. 2750/18, dated 23 November 2001 or later.

(a) If the most recent backlash measurement (refer to Part B, Note 3) was recorded as being 0.027 inch or less:

Accomplish the check within 3000 flight cycles since the most recent backlash check, or within 90 days after the effective date of Revision 1 of this directive, 29 October 2003, whichever occurs later.

(b) If the most recent backlash measurement (refer to Part B, Note 3) was recorded as being greater than 0.027 inch but less than 0.060 inch, and the wear rate was recorded or can be calculated in accordance with the instructions in Bombardier Alert Service Bulletin A8-27-98:

Determine the applicable backlash check interval (refer to Part B, Note 2). Accomplish the check within this interval from the most recent backlash check, or within 90 days after the effective date of Revision 1 of this directive, 29 October 2003, whichever occurs later.

(c) If the most recent backlash measurement (refer to Part B, Note 3) was recorded as being greater than 0.027 inch but less than 0.060 inch, but the wear rate is unknown or cannot be calculated due to lack of data:

Determine the applicable backlash check interval (refer to Part B, Note 2), using a wear rate of 0.0110 inch per 1000 flight cycles. Accomplish the check within this interval from the most recent backlash check, or within 90 days after the effective date of Revision 1 of this directive, 29 October 2003, whichever occurs later.

(d) If the most recent backlash measurement (refer to Part B, Note 3) was recorded as being 0.060 inch or greater but less than 0.070 inch, and the wear rate was recorded or can be calculated in accordance with the instructions in Bombardier Alert Service Bulletin A8-27-98:

Determine the applicable backlash check interval (refer to Part B, Note 2). Accomplish the check within this interval from the most recent backlash check, or within 30 days after the effective date of Revision 1 of this directive, 29 October 2003, whichever occurs later.

(e) If the most recent backlash measurement (refer to Part B, Note 3) was recorded as being 0.060 inch or greater but less than 0.070 inch, but the wear rate is unknown or cannot be calculated due to lack of data:

Determine the applicable backlash check interval (refer to Part B, Note 2), using a wear rate of 0.0110 inch per 1000 flight cycles. Accomplish the check within this interval from the most recent backlash check, or with 30 days after the effective date of Revision 1 of this directive, 29 October 2003, whichever occurs later.

(f) If the most recent backlash measurement was made in accordance with one of the instructions specified in Part B, Note 3, but the specific value was not recorded since it was less than 0.050 inch, a wear rate calculation is not possible due to lack of previous data:

Accomplish the check within 1000 flight cycles from the most recent backlash check, or within 90 days from the effective date of Revision 1 of this directive, 29 October 2003, whichever occurs later.

(g) If no backlash measurement has been made in accordance with one of the instructions specified in Part B, Note 3, and the actuator has been subjected to 3000 flight cycles or less since new or overhaul:

Accomplish the check within 3000 flight cycles since new or since overhaul, or within 180 days after the effective date of Revision 1 of this directive, 29 October 2003, whichever occurs later.

(h) If no backlash measurement has been made in accordance with one of the instructions specified in Part B, Note 3, and the actuator has been subjected to more than 3000 flight cycles since new or overhaul:

Accomplish the check within 60 days after the effective date of Revision 1 of this directive, 29 October 2003.

2. Remove any actuator with a measured backlash of 0.070 inch or greater from service before further flight. Install a serviceable replacement actuator (i.e. new, newly overhauled or with a recorded backlash of less than 0.070 inch) in its place.

3. Record the backlash measurement for each installed actuator.

Note 4: It is not necessary to determine the next backlash check interval for the installed actuators, or to report the backlash check results to Bombardier / Hamilton Sundstrand, in order to complete Part B and return the aircraft to service. These tasks are covered in Parts C and E respectively.

Part C. Determination of Next Backlash Check Interval

Following accomplishment of each actuator backlash check, in accordance with either Part B or Part D, determine the next backlash check interval for each actuator, as specified in the applicable sub-paragraphs 1 to 4 below, and record the results.

Note 1: For determination of backlash check intervals, refer to one of the following:

- Paragraph 2.A.(4)(b) and Figure 4 of the applicable Hamilton Sundstrand Service Bulletin, 734181-27-A5 or 734374-27-A5, both of which form part of Bombardier Alert Service Bulletin A8-27-98, or
- Bombardier spreadsheet, document number BM_DHI_RM_APP01, or
- Section 05-50-98 of the AMM.

Note 2: Section 05-50-98 of the AMM was introduced by TR 05-015 to PSM 1-8-2 for Series 100 aircraft, TR 05- 013 to PSM 1-82-2 for Series 200 aircraft and TR 05-018 to PSM 1-83-2 for Series 300 aircraft, all approved by Transport Canada and dated 1 June 2009. Each of the three TR's has since been incorporated into the latest revision of the applicable manual. Section 05-50-98 includes a statement that the procedure is mandated by Airworthiness Directive and cannot be escalated under any circumstances without local authority approval. All subsequent revisions will also be subject to approval by Transport Canada.

1. If the recorded backlash is 0.060 inch or greater but less than 0.070 inch, determine the next backlash check interval (refer to Part C, Note 1) within 45 flight cycles after completion of the backlash check.

2. If the recorded backlash is greater than 0.027 inch but less than 0.060 inch, determine the next backlash check interval (refer to Part C, Note 1) within 30 days after completion of the backlash check.

3. If the recorded backlash is 0.027 inch or less, the next backlash check interval is 3000 flight cycles.

4. If the actuator was new or newly overhauled when installed, the next backlash check interval is 3000 flight cycles.

   Note 3: Accomplishment of Part C does not require individual aircraft maintenance release action in the aircraft technical records.

Part D. Repeat Backlash Checks

1. For each installed actuator, accomplish subsequent repeat backlash checks at or before expiry of the "next backlash check interval" (as determined per Part C) following the previous backlash check. Accomplishment shall be in accordance with either:

   - The Accomplishment Instructions of Bombardier Alert Service Bulletin A8-27-98, dated 20 February 2003, or later revisions approved by the Chief, Continuing Airworthiness, National Aircraft Certification, Transport Canada (Refer to Part B, Note 1), or

   - Task Number 2750/18 in the MTCM.

   Note 1: Task Number 2750/18 was revised by TR MTC-105 to PSM 1-8-7TC for Series 100 aircraft, TR MTC2-89 to PSM 1-82-7TC for Series 200 aircraft and TR MTC3-95 to PSM 1-83-7TC for Series 300 aircraft, all approved by Transport Canada and dated 1 June 2009. All subsequent revisions will also be subject to approval by Transport Canada.

2. Remove any actuator with a measured backlash of 0.070 inch or greater from service before further flight. Install a serviceable actuator (i.e. new, newly overhauled or with a recorded backlash of less than 0.070 inch) in its place.

3. Record the backlash measurement for each installed actuator.

   Note 2: It is not necessary to determine the next backlash check interval for the installed actuators, or to report the backlash check results to Bombardier / Hamilton Sundstrand, in order to complete Part D and return the aircraft to service. These tasks are covered in Parts C and E respectively.

Part E. Reporting of Backlash Check Results

Report the results of all backlash checks, accomplished in accordance with Parts B and D, to Bombardier and/or Hamilton Sundstrand within 90 days after completion of each check, using one of the two methods detailed below:

1. The backlash check data sheet provided in Bombardier Alert Service Bulletin A8-27-98; i.e. Figure 3 of the applicable Hamilton Sundstrand Service Bulletin 734181-27-A5 or 734374-27-A5. Submit the data sheet to Hamilton Sundstrand at the address specified in the Alert Service Bulletin.

   or, preferably

2. Bombardier spreadsheet, document number BM_DHI_RM_APP01. Submit the spreadsheet electronically via e-mail to Bombardier edsedata.bombardier@dehavilland.ca and Hamilton Sundstrand SERockford@hs.utc.com.

   Note: Accomplishment of Part E does not require individual aircraft maintenance release action in the aircraft technical records.

Authorization: For Minister of Transport, Infrastructure and Communities

ORIGINAL SIGNED BY

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