AIRWORTHINESS DIRECTIVE

This Airworthiness Directive (AD) is issued pursuant to Canadian Aviation Regulation (CAR) 521.427. No person shall conduct a take-off or permit a take-off to be conducted in an aircraft that is in their legal custody and control, unless the requirements of CAR 605.84 pertaining to ADs are met. Standard 625 - Aircraft Equipment and Maintenance Standards Appendix H provides information concerning alternative means of compliance (AMOC) to ADs.

Number:

CF-2011-24R1

Effective Date:

4 February 2019

ATA:

57

Type Certificate:

A-142

Subject:

Wings – Wing to Fuselage Attachment Joints - Barrel Nut Cracking

Replacement:

Supersedes AD CF-2011-24, issued 21 July 2011.

Applicability:

Bombardier Inc. model DHC-8-400, -401 and -402 aeroplanes, serial numbers 4001 through 4437.

Compliance:

As indicated below, unless already accomplished.

Background:

There have been several in-service reports of cracked barrel nuts found at the front spar locations of the wing to fuselage attachment joints. Additionally, three operators have reported finding a loose washer in the barrel nut assembly. Failure of the barrel nuts could compromise the structural integrity of the wing to fuselage attachments.

The investigation determined that these cracks are due to hydrogen embrittlement.

The original version of this AD mandated initial and repetitive detailed inspections of the barrel nuts, part number (P/N) DSC228-16.

Since the original version of this AD, Bombardier Inc. has developed a design change to address the root cause of the failure of the barrel nuts. This design change replaces the existing wing front spar barrel nuts, P/N DSC228-16, with new Inconel 718 barrel nuts, P/N B0203072-16S, which are more resistant to hydrogen embrittlement. The design change also includes new bolts and new pre-load indicating washers.

Revision 1 of this AD mandates this design change as a terminating action to the repetitive inspection requirements of Part II of this AD. A torque verification has also been introduced to address loose washers in the barrel nut assembly.

Corrective Actions:

Part I – Initial Inspection

A. Conduct a torque check and detailed visual inspection of each barrel nut in accordance with Part A of the accomplishment instructions in Bombardier Alert Service Bulletin (ASB) A84-57-25, Revision A, dated 16 July 2018, or later revisions approved by the Chief, Continuing Airworthiness, Transport Canada, in accordance with the following schedule:

1. For aeroplanes that have accumulated 1900 or more total hours air time or 12 months or more in service since new as of the effective date of the original version of this AD, 8 August 2011: within 100 hours air time or 10 days, whichever occurs first, from the effective date of the original version of this AD, 8 August 2011.
2. For aeroplanes that have accumulated less than 1900 total hours air time or less than 12 months in service since new as of the effective date of the original version of this AD, 8 August 2011: prior to reaching 2000 total hours air time or 12 months in service since new, whichever occurs first.

Aeroplanes that have completed a torque check and detailed visual inspection of each barrel nut, or have had barrel nuts replaced, in accordance with any of the following Service Bulletins (SBs) since 1 June 2011 meet the requirements of Part I of this AD; proceed to Part II of this AD:

a) ASB A84-57-25 Initial Issue, dated 20 July 2011; or

b) ASB A84-57-19 Initial Issue, dated 1 February 2008; Revision A, dated 8 February 2008; Revision B, dated 6 March 2008; Revision C, dated 20 August 2008; Revision D, dated 12 August 2011, or later revisions approved by the Chief, Continuing Airworthiness, Transport Canada.

B. If the bolt preload is incorrect, or if the barrel nut or barrel nut cradle is cracked or corroded, replace the barrel nut and attachment hardware in accordance with section 3.B of SB 84-57-26, Revision C, dated 16 July 2018, or later revisions approved by the Chief, Continuing Airworthiness, Transport Canada, prior to further flight. Proceed to Part II of this AD.

Aeroplanes that have replaced the barrel nut and attachment hardware in accordance with any of the following SBs prior to the effective date of this AD meet the intent of this paragraph; proceed to Part II of this AD:

a) ASB A84-57-25 Initial Issue, dated 20 July 2011; or Revision A, dated 16 July 2018; or

b) SB 84-57-26 Initial Issue, dated 21 March 2013; Revision A, dated 18 July 2014; or Revision B, dated 26 February 2015.

C. If each bolt preload is correct and none of the barrel nuts or barrel nut cradles are cracked or corroded, proceed to Part II of this AD.

Part II – Repetitive Inspections

At intervals not to exceed 2000 hours air time or 12 months, whichever occurs first, from the last inspection or last replacement of barrel nut P/N DSC228-16, repeat the torque check and detailed visual inspection of each remaining P/N DSC228-16 barrel nut in accordance with Part A of the accomplishment instructions in ASB A84-57-25, Revision A, dated 16 July 2018, or later revisions approved by the Chief, Continuing Airworthiness, Transport Canada.

If the bolt preload is incorrect, or if the barrel nut or barrel nut cradle is cracked or corroded, replace the affected barrel nut and attachment hardware in accordance with section 3.B of SB 84-57-26, Revision C, dated 16 July 2018, or later revisions approved by the Chief, Continuing Airworthiness, Transport Canada, before further flight. Replacement of barrel nuts and attachment hardware in accordance with section 3.B of the following revisions of SB 84-57-26, prior to the effective date of this AD, is acceptable: Initial Issue, dated 21 March 2013; Revision A, dated 18 July 2014; or Revision B, dated 26 February 2015.

This paragraph gives credit for the completion of a torque check and detailed visual inspection of the barrel nuts and replacement of barrel nuts, before the effective date of this AD, in accordance with ASB A84-57-25, Initial Issue, dated 20 July 2011.

Part III – Terminating Action to the Repetitive Inspections

A. Inspection and Replacement of Barrel Nut and Related Hardware.

1. Within 12 000 hours air time or 72 months, whichever occurs first, from the effective date of this AD, perform the inspections and part replacements in accordance with the section 3.B. of SB 84-57-26, Revision C, dated 16 July 2018, or later revisions approved by the Chief, Continuing Airworthiness, Transport Canada.
2. This paragraph gives credit for the completion of inspections and part replacements carried out before the effective date of this AD in accordance with SB 84-57-26 Initial Issue, dated 21 March 2013; Revision A, dated 18 July 2014; or Revision B, dated 26 February 2015.
3. If any damage or corrosion is found during the inspections, contact the Bombardier Technical Help Desk for an approved repair. The approved repair must specifically reference this AD.

B. Accomplishment of Part III of this AD at all four barrel nut locations constitutes a terminating action to the repetitive inspection requirements of Part II of this AD.

Part IV – Part Installation Prohibition

As of the effective date of this AD, no person shall permit the installation of a barrel nut with P/N DSC228-16 on the aeroplanes identified in the Applicability section of this AD.

Authorization:

For the Minister of Transport,

ORIGINAL SIGNED BY

Rémy Knoerr
Chief, Continuing Airworthiness
Issued on 21 January 2019

Contact:

Daniel Gosselin, Continuing Airworthiness, Ottawa, telephone 888-663-3639, facsimile 613-996-9178 or e-mail AD-CN@tc.gc.ca or any Transport Canada Centre.