



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) with ADs.

Number:

CF-2024-40

Effective Date:

17 December 2024

ATA:

62

Type Certificate:

H-88

Subject:

Main Rotor – Pitch Link Assembly Clevis Fracture

Replacement:

Supersedes AD CF-2021-26, issued 26 July 2021

Applicability:

Bell Textron Canada Limited (Bell) model 430 helicopters, serial numbers 49001 through 49129.

Compliance:

As indicated below, unless already accomplished.

Background:

In January 2021, a model 430 helicopter experienced an in-flight failure of a main rotor pitch link clevis resulting in loss of control of the helicopter and fatal injury to the five occupants on-board. The main rotor pitch link clevis part number (P/N) 430-010-432-101 fractured at the exposed thread area above the nut and the fracture was consistent with fatigue damage. A similar accident previously occurred in September 2016 on a model 430 helicopter where the main rotor pitch link clevis was found to have fractured at the neck area via fatigue damage that originated at a corrosion pit.

Inspection of the failed part from the 2021 accident determined that the universal bearing P/N 212-010-412-001 of the main rotor pitch link assembly was found with excessive wear and had increased resistance to rotation. Restriction in freedom of movement of the universal bearing can cause increased loads on the main rotor pitch link assembly and subsequent fatigue failure of the clevis prior to its life limit.

This condition, if not corrected, could lead to crack initiation at the main rotor pitch link clevis neck or threaded area and consequent failure of the main rotor pitch link, resulting in loss of control of the helicopter.

To mitigate this unsafe condition, AD CF-2021-26 required an initial special detailed inspection (SDI) of the main rotor pitch link clevises and detailed inspection (DI) of the universal bearings, and rectification, as required. AD CF-2021-26 also mandated a repetitive DI of the main rotor pitch link clevises and universal bearings, and rectification, as required. Bell had issued Alert Service Bulletin (ASB) 430-21-60 providing instructions for inspection and replacement of the affected parts. AD CF-2021-26 was considered an interim action.

Since then, Bell has revised Chapter 4, Airworthiness Limitations Schedule (ALS) of the Bell 430 Maintenance Manual, BHT-430-MM-2. Revision 23 of the ALS, dated 28 September 2023, reduced the airworthiness life limits of the main rotor pitch link clevises, the universal bearings and the universal to pitch link bolts. Bell also issued ASB 430-22-61, which superseded and replaced ASB 430-21-60, to require re-identification of the main rotor pitch link assembly and sub-components, reduction of the airworthiness life limits of the main rotor pitch link clevises, the universal bearings and the universal to pitch link bolt, and initial and recurring DI of the main rotor pitch link assembly.

This AD, CF-2024-40, mandates the reduced airworthiness life limits of the ALS in addition to the requirements of ASB 430-22-61.

Corrective Actions:

For the purpose of this AD, the following definitions apply:

The Bell ASB: Bell ASB 430-22-61, Basic Issue, dated 6 November 2023, or later revisions approved by the Chief, Continuing Airworthiness, Transport Canada.

The applicable ALS: Bell 430 Maintenance Manual BHT-430-MM-2, Chapter 4, ALS, Revision 23, dated 28 September 2023, or later revisions approved by Transport Canada.

Serviceable part: A serviceable main rotor pitch link clevis is a new main rotor pitch link clevis P/N 430-010-432-101 or a main rotor pitch link clevis P/N 430-010-432-101 that has been inspected in accordance with the requirements of this AD, found acceptable and that has not exceeded the airworthiness life limit as defined in Table 4-1 of the applicable ALS.

A serviceable universal bearing is a new universal bearing P/N 212-010-412-103 or a universal bearing P/N 212-010-412-103FM that has been inspected in accordance with the requirements of this AD, found acceptable and that has not exceeded the airworthiness life limit as defined in Table 4-1 of the applicable ALS.

A serviceable universal to pitch link bolt is a new universal to pitch link bolt P/N 50-047C6-28 or a universal to pitch link bolt P/N 50-047C6-28 that has been inspected in accordance with the requirements of this AD, found acceptable and that has not exceeded the airworthiness life limit as defined in Table 4-1 of the applicable ALS.

Part I – Introduction of New Airworthiness Life Limits, Re-identification and Initial Inspection

- A. Within 50 hours air time or 60 days, whichever occurs first, from the effective date of this AD, perform the following actions:
1. Verify the rotorcraft technical records and the historical service records to determine the accumulated life of the installed main rotor pitch link assemblies P/N 430-010-411-105 and P/N 430-010-411-107, and their sub-components, in accordance with Part I of the Accomplishment Instructions of the Bell ASB.
 2. For main rotor pitch link clevis P/N 430-010-432-101 having accumulated more than 2500 total hours air time, or if the total hours air time of the component is not known, replace the main rotor pitch link clevis P/N 430-010-432-101 with a serviceable part before further flight, in accordance with Part I of the Accomplishment Instructions of the Bell ASB.
 3. For universal bearing P/N 212-010-412-001 having accumulated more than 1250 total hours air time, or if the total accumulated hours air time of the component is not known, replace the universal bearing P/N 212-010-412-001 with a serviceable part before further flight, in accordance with Part I of the Accomplishment Instructions of the Bell ASB.
 4. For universal to pitch link bolt P/N 50-047C6-28 having accumulated more than 2500 total hours air time, or if the total hours air time of the component is not known, replace the universal to pitch link bolt P/N 50-047C6-28 with a serviceable part before further flight, in accordance with Part I of the Accomplishment Instructions of the Bell ASB.
 5. Perform a DI of the pitch link tube assembly, the rod end assembly and the universal to pitch link bolt for wear and damage, and replace any component that does not meet the published inspection criteria before further flight, in accordance with Part I of the Accomplishment Instructions of the Bell ASB.
 6. Perform a DI of the main rotor pitch link clevises for cracks, corrosion and mechanical damage, and rectify any defect as required before further flight, in accordance with Part II of the Accomplishment Instructions of the Bell ASB.
 - i. If any suspected defects are found as a result of the DI, perform a Magnetic Particle Inspection (MPI) of the affected main rotor pitch link clevis, and rectify any defect as required before further flight, in accordance with Part IV of the Accomplishment Instructions of the Bell ASB.
 - ii. If the main rotor pitch link clevis is found serviceable following the MPI, before further flight, replace any missing cadmium plating by carrying out selective brush cadmium plating and by applying chromate conversion coating, in accordance with Part IV of the Accomplishment Instructions of the Bell ASB.

7. Perform a DI of the universal bearings for signs of binding or stiffness, wear, damage, looseness, excess axial and radial play and a DI of the hardware for signs of wear and damage, and rectify any defect as required before further flight, in accordance with Part III of the Accomplishment Instructions of the Bell ASB.
 8. Purge grease the bearings of each universal bearing ensuring all four grease fittings allow for grease purging.
 9. Re-identify the main rotor pitch link assemblies and sub-components, in accordance with Part I of the Accomplishment Instructions of the Bell ASB.
- B. Thereafter, replace each component listed in Table 1 of the Bell ASB before exceeding the applicable airworthiness life limit indicated in Table 4-1 of the applicable ALS.

Part II – Repetitive DI of Main Rotor Pitch Link Assembly Clevises

- A. At intervals not to exceed 50 hours air time or 60 days, whichever occurs first, after the accomplishment of Part I of this AD, perform a DI of the main rotor pitch link clevises for cracks, corrosion and mechanical damage, and rectify any defect as required before further flight, in accordance with Part II of the Accomplishment Instructions of the Bell ASB.
- B. If any suspected defects are found as a result of the DI, perform a MPI of the affected main rotor pitch link clevis, and rectify any defect as required before further flight, in accordance with Part IV of the Accomplishment Instructions of the Bell ASB.
- C. If the main rotor pitch link clevis is found serviceable following the MPI, before further flight, replace any missing cadmium plating by carrying out selective brush cadmium plating and by applying chromate conversion coating, in accordance with Part IV of the Accomplishment Instructions of the Bell ASB.

Part III – Repetitive DI of Main Rotor Pitch Link Assembly Universal bearings

At intervals not to exceed 150 hours air time or 12 months, whichever occurs first, after the accomplishment of Part I of this AD, accomplish the following:

- A. Perform a DI of the universal bearings for signs of binding or stiffness, wear, damage, looseness, excess axial and radial play and a DI of the hardware for signs of wear and damage, and rectify any defect as required before further flight, in accordance with Part III of the Accomplishment Instructions of the Bell ASB.
- B. Purge grease the bearings of each universal bearing ensuring all four grease fittings allow for grease purging.

Authorization:

For the Minister of Transport,

ORIGINAL SIGNED BY

Jenny Young
Chief, Continuing Airworthiness
Issued on 3 December 2024

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