



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-2016-21

Effective Date:

7 July 2016

ATA:

65

Type Certificate:

H-92

Subject:

Tail Rotor Drive System – Failure of Tail Rotor Drive Shaft Splined Connection

Applicability:

Bell Helicopter Textron Canada Limited (BHTC) model 407 helicopters – all serial numbers.

Compliance:

As indicated below, unless already accomplished.

Background:

A model 407 helicopter experienced in-flight failure of the tail rotor drive system, resulting in loss of directional control. A safe landing was completed but there was substantial damage to the tail rotor segmented shaft and adapter splines, coupling, and hanger bearings.

Investigation revealed that the splines which connect the adapter part number (P/N) 406-040-328-105, to the shaft assembly P/N 407-040-330-107, were severely worn and no longer capable of performing their function. An inspection of other model 407 helicopters in the Operator's fleet revealed axial and radial play or looseness at some tail rotor drive shaft splined connections. There should be no detectable looseness between these parts – they are clamped together with threaded fasteners.

It is suspected that looseness at the splined connection developed on the occurrence helicopter, which led to wear. The looseness and wear were not detected and the condition of the parts deteriorated until failure occurred.

Undetected looseness in the splined connection of the tail rotor drive shaft can lead to wear and eventual loss of directional control of the helicopter.

Corrective Actions:

1. For helicopters with more than 4000 hours air time since new, accomplish the following within 50 hours air time from the effective date of this AD. For helicopters with 4000 hours air time or less since new, accomplish the following within 100 hours air time from the effective date of this AD.
 - a. Inspect tail rotor driveshaft segment assemblies for play and perform torque check of tail rotor adapter retention nuts in accordance with the Accomplishment Instructions in BHTC Alert Service Bulletin (ASB) 407-16-113 dated 12 February 2016 or later revisions approved by the Chief, Continuing Airworthiness, Transport Canada.
 - b. If rotational or axial play is noted or minimum torque is not met, prior to next flight rectify the discrepancies in accordance with the Accomplishment Instructions in the ASB noted above. Note the requirement to use a new retention nut during reassembly.
2. Repeat the inspection for play and applicable follow-on rectification actions of paragraph 1.a. and 1.b. of this AD at intervals not to exceed 330 hours air time. It is not necessary to perform the torque check referenced in the ASB during this recurring inspection.

3. Where the aircraft is required to be maintained in accordance with a Transport Canada Civil Aviation approved maintenance schedule (or equivalent program approved by a foreign Civil Aviation Authority), inclusion of repetitive inspections and actions equivalent to those identified in paragraph 2 of this AD in that program is considered a terminating action for paragraph 2 of this AD. The addition of equivalent requirements to the Progressive / Periodic Inspection Programs contained in Chapter 5 of the BHTC Maintenance Manual BHT-407-MM-1 and incorporation of those requirements to the operator's maintenance schedule is an alternative terminating action to the requirements of paragraph 2 of this AD. Requirements that are equivalent to paragraph 2 of this AD are the requirements from steps 3 and 7 of the Accomplishment Instructions of the ASB noted above.

Authorization:

For the Minister of Transport,

ORIGINAL SIGNED BY

Rémy Knoerr
Chief, Continuing Airworthiness
Issued on 23 June 2016

Contact:

Ross McGowan, Continuing Airworthiness, Ottawa, telephone 1-888-663-3639, facsimile 613-996-9178 or e-mail AD-CN@tc.gc.ca or any Transport Canada Centre.