



No.	CF-2002-18R3	1/3
Issue Date	26 March 2004	

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) 593**. 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), Aircraft Certification Branch, Transport Canada, Ottawa, telephone (613) 952-4357.

Number: CF- 2002-18R3

Subject: Bell 407 – Tail Rotor Drive Shaft Bearings

Effective: 15 March 2002

Revision: Supersedes Airworthiness Directive (AD) CF-2002-18R2.

Applicability: Bell Helicopter Textron Canada (BHTC) Model 407 helicopters:

Parts A and C: Model 407 Helicopters serial numbers 53000 through 53518.

Parts B and D: Model 407 Helicopters all serial numbers.

Parts E and F: Model 407 Helicopters serial numbers 53000 through 53590.

Compliance: Parts A and B as indicated.

Part C to be accomplished by 31 May 2003.

Part D to be accomplished by 31 December 2002.

Part E and F to be accomplished as indicated.

Background: Airworthiness Directive (AD) CF-99-08 mandated the replacement of the oil cooler blower shaft bearings P/N 406-040-339-ALL. Airworthiness Directive CF-2000-02 mandated a revised inspection and lubrication schedule for the new bearings. Subsequent to the issue of these ADs, service history has shown high failure rates of bearings, P/N 407-340-339-101 and -103, at the oil cooler blower location. Service history also indicates that bearings, P/N 407-340-339-103, located on the tail rotor drive shaft have failed in flight.

Recent flight-testing has revealed that under certain hover and vertical flight conditions, exhaust gases can be ingested into the aft fairing inlet resulting in higher than expected zonal temperatures. Exposure to higher temperatures will adversely affect the bearing lubricant resulting in premature failure. Exhaust gas ingestion can also result in an engine and transmission oil temperature exceedance. Recent research has also determined that overgreasing of the bearing can result in elevated bearing temperatures.

The initial AD (CF-2002-18) mandated: Specific downwind hover and vertical flight limitations to avoid overheating in the oil cooler blower area (these limitations are an interim measure pending design changes); replacement of bearing, P/N 407-340-339-103, at the oil cooler locations and a specific inspection and lubrication schedule for the replacement bearing; and, inspection and lubrication schedules for bearings at other hanger bearing locations.

Revision 1 of CF-2002-18 provided relief to the flight limitations with the incorporation of oil cooler blower inlet ducts and bearing airflow shields.

Revision 2 removes bearing 407-340-339-101, installed as part of the oil cooler blower assembly (forward two hanger bearings).

A recent in-flight failure of a 407-340-339-101 bearing located on the segmented tail rotor drive shaft has contributed to a separation of the tail rotor drive shaft.

This revision mandates the removal of bearings 407-340-339-101 and -103 at all tail rotor drive shaft locations, which includes the oil cooler blower locations. The effective date remains unchanged to maintain effectivity date for Parts A, B, C and D.

**Corrective
Action:**

Part A: Flight Limitations

- (i) Within 7 days from the effective date of this directive, incorporate Temporary Revision (TR-9) into Flight Manual BHT-407-FM-1.
- (ii) If the limitation or the caution identified in Temporary Revision (TR-9) has been exceeded, conduct the maintenance actions identified in Alert Service Bulletin 407-02-49, or later revisions approved by the Chief, Continuing Airworthiness, Transport Canada.

Part B: Bearing Replacement, Inspection and Lubrication

(i) For the Oil Cooler Blower Shaft Bearings (forward two hanger bearings)

1. Replacement: For Model 407 helicopters, S/Ns 53000 through 53483, within 300 hours air time but no later than 30 April 2002, unless already accomplished, replace bearings, P/Ns 406-040-339-ALL or 407-340-339-103, installed on the oil cooler blower assembly with bearings P/N 407-340-339-101 in accordance with BHTC Alert Service Bulletin (ASB) 407-01-44, Revision A.

2. Inspection: Within 25 hours air time, after the effective date of this directive, unless already accomplished, and at intervals not to exceed 25 hours air time, check for rough running forward and aft oil cooler blower shaft bearings in accordance with BHTC Alert Service Bulletin 407-01-44, Revision A.

3. Lubrication:

(a) Prior to completion of Part B (i) (1) of this directive, lubricate oil cooler blower bearings P/N 406-040-339-ALL or 407-340-339-103 within 25 hours air time, after the effective date of this directive and at intervals not to exceed 25 hours air time thereafter in accordance with Temporary Revision 407-10 to Chapter 12 of the Maintenance Manual BHT-407-MM-2.

(b) After completion of Part B (i) (1) of this directive, lubricate bearings 407-340-339-101 at intervals specified and in accordance with Alert Service Bulletin (ASB) 407-01-44, Revision A.

(ii) For the Tail Rotor Segmented Drive Shaft Bearings (aft four hanger bearings)

1. Inspection: Within 25 hours air time, after the effective date of this directive, and subsequently at intervals not to exceed 25 hours air time for bearings, P/N 406-040-339-ALL and 407-340-399-103, and not to exceed 100 hours air time for bearing, P/N 407-340-399-101, check for rough running bearings in accordance with BHTC Alert Service Bulletin (ASB) 407-01-47. Before further flight, replace bearings showing any sign of roughness.

2. Lubrication: Within 25 hours air time, after the effective date of this directive, and subsequently at intervals specified in Alert Service Bulletin 407-01-47, lubricate in accordance with BHTC Alert Service Bulletin (ASB) 407-01-47, or later revisions approved by the Chief, Continuing Airworthiness, Transport Canada.

Part C: Revised Flight Limitations

The Flight Limitations identified in Part A above are superseded with incorporation of the following:

- (i) Install oil cooler blower inlet ducts in accordance with Alert Service Bulletin 407-02-54 Revision A, or later revisions approved by the Chief, Continuing Airworthiness, Transport Canada;
- (ii) Install bearing airflow shields in accordance with Alert Service Bulletin 407-02-54, Revision A, or later revisions approved by the Chief, Continuing Airworthiness; and,
- (iii) Incorporate Temporary Revision TR-10, Revision A, or later approved revisions into Flight Manual BHT-407-FM-1.

Part D: Revised Lubrication and Inspection Requirements

The lubrications and inspection requirements identified in Part B above are superseded by the following:

Inspect and lubricate the tail rotor driveshaft bearings, P/N 406-040-339-ALL, 407-340-339-101 and 407-340-339-103, which includes the oil cooler assembly bearings, in accordance with Alert Service Bulletin 407-01-47, Revision A, or later revisions approved by the Chief, Continuing Airworthiness, Transport Canada.

Part E: Oil Cooler Blower Assembly and Segmented Tail Rotor Drive Shaft Bearing Replacement

Within the next 200 hours or by May 31, 2004, whichever comes first, accomplish the following:

1. Ensure that oil cooler blower inlet ducts and bearing airflow shields are installed in accordance to Part C of this directive.
2. Replace bearings P/N 407-340-339-101 and 407-340-339-103 at all tail rotor hanger bearing locations including the oil cooler blower assembly locations (forward two hanger bearings) unless already accomplished, in accordance with Alert Service Bulletin 407-04-63, Revision A, or later revisions approved by the Chief, Continuing Airworthiness, Transport Canada.
3. Inspect and lubricate the tail rotor driveshaft bearings in accordance with Alert Service Bulletin 407-04-63, Revision A, or later revisions approved by the Chief, Continuing Airworthiness, Transport Canada.
4. Replace existing lubrication decal with new decal 31-116-1 when the bearing is replaced in accordance with Alert Service Bulletin 407-04-63, Revision A, or later revisions approved by the Chief, Continuing Airworthiness, Transport Canada.

Part F: Lubrication Decal Replacement

Within 50 flight hours or by April 30 2004, whichever occurs first, replace the existing lubrication decal with decal 31-116-1 at all locations where bearing 407-340-339-107 is presently installed. This activity is to be done in accordance with Alert Service Bulletin 407-04-63, Revision A, or later revisions approved by the Chief, Continuing Airworthiness, Transport Canada.

Authorization: For Minister of Transport



R.A. Raoux
for B. Goyaniuk
Chief, Continuing Airworthiness

Contact: Mr. Bill Taylor, Continuing Airworthiness, Ottawa, telephone (613) 952-4366, facsimile (613) 996-9178 or e-mail taylorw@tc.gc.ca or any Transport Canada Centre.