
AIRWORTHINESS DIRECTIVE

For the reasons set out in the background section, the CASA delegate whose signature appears below issues the following Airworthiness Directive (AD) under subregulation 39.001(1) of CASR 1998. The AD requires that the action set out in the requirement section (being action that the delegate considers necessary to correct the unsafe condition) be taken in relation to the aircraft or aeronautical product mentioned in the applicability section: (a) in the circumstances mentioned in the requirement section; and (b) in accordance with the instructions set out in the requirement section; and (c) at the time mentioned in the compliance section.

Brantly B-2 Series Helicopters

AD/B-2/32

Tail Rotor Gearbox

**7/2006
TX**

Applicability: Brantly Helicopter, Inc. Model B-2, B-2A, and B-2B helicopters, serial number 2001 and larger, with a vertical shaft (shaft), part number (P/N) 249-10, or any serial-numbered helicopter with a shaft, P/N 249-10, that was purchased after 1994.

- Requirement:**
1. To detect fatigue cracking of the shaft and prevent failure of the shaft and subsequent loss of control of the helicopter, accomplish the following:
 - (a) Remove the tail rotor vertical gearbox (gearbox), P/N 278- 200; shaft, P/N 249-10; vertical shaft housing (housing), P/N 249-3; and the intermediate gearbox bushing (bushing), P/N 252-4, from the helicopter.
 - (b) Inspect the flange retainer, part number (P/N) 15-17, located at the top of the shaft housing for deformation and measure the inside diameter. Replace the flange retainer with an airworthy flange retainer if the part is deformed or if the inside diameter is not 1.5050 to 1.5060 inches, before further flight.
 - (c) Inspect the housing, P/N 249-3, for deformation and measure the outer diameter at each end and at the centre of its span.

Replace the housing with an airworthy housing, before further flight if:

 - (i) The housing is deformed;
 - (ii) Any outer diameter not on the flared end is not 1.497 to 1.500 inches; or
 - (iii) The outer diameter of the flared end is not 1.844 to 1.875 inches.
 - (d) Inspect the bushing, P/N 252-4, for nicks or scoring, and measure the bushing's length. If the length of the bushing is not .292 to .302 inch or if nicks or scoring is found, replace the bushing with an airworthy bushing, before further flight.
 - (e) Inspect the bevel pinion gear (gear), P/N 15-8, paying particular attention to the bore, for nicks, scoring, burrs, or misalignment. Measure the diameter of the bolt hole and the bore. Replace the gear with an airworthy gear before further flight if:
 - (i) You find misalignment,

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- (ii) You cannot remove all nicks, scoring, or burrs with light hand polishing using Scotch Brite (maroon or white) and maintain all tolerances and a 32 root mean square (rms) finish,
 - (iii) The diameter of the bolt hole is not .1894 to .1899 inch, or
 - (iv) The bore diameter is not .6248 to .6250 inch.
- (f) Inspect the shaft attachment bolt, P/N 15-201, that inserts into the pinion, and the attachment bolt, P/N 249-11, that inserts into the male coupling, for fretting or nicks in the area where the bolts contact the shaft and measure the grip diameter. If a bolt has fretting or nicks or if the grip diameter is not .1889 to .1894 inch, replace the bolt with an airworthy bolt, before further flight.
- (g) Inspect the male coupling, P/N 249-9, paying particular attention to the bore for nicks, scoring, keyway elongation, burrs, or misalignment and measure the bolt hole diameter and the bore diameter. Replace the male coupling with an airworthy male coupling before further flight if:
- (i) You find misalignment;
 - (ii) The keyway has elongation;
 - (iii) You cannot remove all nicks, scoring, or burrs with light hand polishing using Scotch Brite (maroon or white) and maintain all tolerances and a 32 rms finish;
 - (iv) The diameter of the bolt hole is not .1894 to .1899 inch; or
 - (v) The bore diameter is not .6250 to .6260 inch.
- (h) Inspect the shaft, P/N 249-10, for misalignment. Measure the diameter of the bolt holes. Inspect for straightness of the shaft by placing the shaft on a flat surface plate calibrated to work surface accuracy tolerance of .001 inch, rolling the shaft, and measuring the greatest gap between the shaft and the flat surface table. Magnetic particle inspect the shaft for a crack, paying particular attention to the bolt holes. Visually inspect the shaft, paying particular attention to a circular area of .500 inch radius from the centre of the bolt holes for the following damage: nicks, scoring, fretting, burrs, or misalignment. Before further flight, replace the shaft if:
- (i) You find misalignment,

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- (ii) You cannot remove all nicks, scoring, fretting, or burrs with light hand polishing using Scotch Brite (maroon or white) and maintaining all tolerances and a 32 rms finish,
 - (iii) The diameter of the bolt hole is not .1894 to .1899 inch,
 - (iv) The outer diameter of the shaft is not .6240 to .6250 inch at all points,
 - (v) The shaft is not straight and the maximum gap between the shaft and the flat surface table exceeds .007 inch, or
 - (vi) You find a crack, a surface or subsurface discontinuity, or pitting.
- (i) Assemble and inspect the gearbox, P/N 278-200, the shaft, P/ N 249-10, and the housing, P/N 249-3, by following Part 2, paragraph 2.6 of Brantly International Inc. Service Bulletin No. 105, Revision A, dated August 3, 2005 (SB). Before assembling the pinion gear and the male coupling to the shaft, thoroughly inspect the bore for foreign objects or burrs. Clean and deburr the bore. If the assembly fails any inspection required by this paragraph, replace the gearbox, shaft, and housing with airworthy parts before further flight and before complying with the remainder of this AD. When the SB uses the term "check", for purposes of this AD, it means "inspect." Also, you are not required to contact the factory as stated in the SB.
2. Align and bolt down the intermediate gearbox, P/N 278-100, its cover, P/N 252-3, and the bushing, P/N 252-4, the long horizontal shaft housing, P/N 14-13, and its retainer flange, P/N 15-17, without making any adjustment for the gearbox (upper), shaft (vertical), or housing.

Note 1: See the applicable maintenance manual for installation instructions.

3. Install and inspect the gearbox, P/N 278-200, by following paragraphs 2.7 1 through 4, and Figure SB- 105-2 of the SB. If the gearbox fails any portion of the installation procedures or any inspection tolerance required by this paragraph, the installation is not airworthy and the helicopter is grounded until the installation complies with the requirements of this paragraph.
4. After an airworthy installation of the gearbox is complete, inspect the tail rotor rigging control and correct it, if necessary.

Note 2: See the applicable maintenance manual for tail rotor control rigging instructions.

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5. Report any discrepancies for the items listed below via the service difficulty reporting system, noting this AD number in the report.
 - Flange Retainer part number (P/N) 15-17
 - Shaft Housing, P/N 249-3
 - Bushing, P/N 252-4
 - Bevel Pinion, P/N 15-8
 - Bolt, P/N 15-201
 - Bolt 249-11
 - Male Coupling, P/N 249-9
 - Shaft, P/N 249-10
 - Tail Rotor Gearbox Assembly, P/N 278-200
 - Installation of Tail Rotor Gearbox Assembly

Note 3: FAA AD 2006-08-07 Amendment 39-14562 refers.

- Compliance:
1. Within the next 10 hours time-in-service (TIS) and before further flight after any hard landing or any main or tail rotor sudden stoppage. Compliance times for replacement of parts is as detailed in the applicable paragraph of Requirement 1 of this AD.
 2. Before installing the gearbox (upper).
 3. Before further flight after the effective date of this AD.
 4. Before further flight after the effective date of this AD.
 5. Within 7 work days of conducting the inspections and measuring the affected parts.

This Airworthiness Directive becomes effective on 8 May 2006.

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Background: This AD is prompted by an accident and an incident report of fatigue cracking of a shaft. The actions specified in this AD are intended to prevent fatigue cracking of a shaft, failure of a shaft, and subsequent loss of control of the helicopter.

A handwritten signature in black ink, appearing to read 'James Coyne', with a stylized flourish at the end.

James Coyne
Delegate of the Civil Aviation Safety Authority

4 May 2006