

## DEPARTMENT OF TRANSPORTATION

### Federal Aviation Administration

#### 14 CFR Part 39

[Docket No. FAA-2024-0237; Project Identifier AD-2023-00491-R; Amendment 39-22853; AD 2024-19-11]

RIN 2120-AA64

#### Airworthiness Directives; Robinson Helicopter Company Helicopters

##### AGENCY:

Federal Aviation Administration (FAA), DOT.

##### ACTION:

Final rule.

##### SUMMARY:

The FAA is adopting a new airworthiness directive (AD) for all Robinson Helicopter Company Model R44 and R44 II helicopters. This AD was prompted by reports of a fractured clutch shaft forward yoke (yoke) on the main rotor (M/R) drive due to fatigue cracking. This AD requires visually inspecting a certain part-numbered flex plate assembly (flex plate) and certain part-numbered yokes, including each flex plate bolt, and depending on the inspection results, removing an affected part from service and replacing an affected part with an airworthy part. This AD also requires removing a certain part-numbered yoke from service after accumulating a certain number of hours time-in-service (TIS) or a certain number of years, or as an alternative to removing the part from service, performing a 10× or higher power magnification visual inspection and, if needed, a magnetic particle inspection. The FAA is issuing this AD to address the unsafe condition on these products.

##### DATES:

This AD is effective October 31, 2024.

##### ADDRESSES:

*AD Docket:* You may examine the AD docket at *regulations.gov* under Docket No. FAA-2024-0237; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this final rule, any comments received, and other

information. The address for Docket Operations is U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC 20590.

*Related Material:* For Robinson material identified in this AD, contact Robinson Helicopter Company, Technical Support Department, 2901 Airport Drive, Torrance, CA 90505; phone: (310) 539-0508; fax: (310) 539-5198; email: [ts1@robinsonheli.com](mailto:ts1@robinsonheli.com); or at [robinsonheli.com](http://robinsonheli.com).

## FOR FURTHER INFORMATION CONTACT:

Eric Moreland, Aviation Safety Engineer, FAA, 3960 Paramount Boulevard, Lakewood, CA 90712; phone: (562) 627-5364; email: [Eric.R.Moreland@faa.gov](mailto:Eric.R.Moreland@faa.gov).

## SUPPLEMENTARY INFORMATION:

### Background

After receiving a report of a failed yoke in the M/R drive system, the FAA issued Special Airworthiness Information Bulletin AIR-22-08, dated April 11, 2022 (SAIB) to remind owners and operators of any Robinson Helicopter Company Model R44 helicopters of the importance of adhering to existing inspection procedures in the applicable operating handbooks and maintenance manuals. According to Robinson Helicopter Company, the yoke had fractured due to fatigue cracking and improper torque at the bolt hole and the yoke cross-section. After the FAA issued the SAIB, Robinson Helicopter Company reported an additional incident on a Model R44 helicopter where the yoke was fractured and separated from the drive train, again due to fatigue cracks and improper torquing.

Accordingly, the FAA issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 by adding an AD that would apply to all Robinson Helicopter Company Model R44 and R44 II helicopters. The NPRM published in the **Federal Register** on February 28, 2024 (89 FR 14596). In the NPRM, the FAA proposed to require visually inspecting a certain part-numbered flex plate for any loose fasteners, cracks, fretting, corrosion, wear, and to ensure that the washers are bonded to both sides of the flex plate arms and depending on the inspection results, removing the flex plate from service and replacing it with an airworthy flex plate.

In the NPRM, the FAA also proposed to require visually inspecting certain part-numbered yokes for any cracks, corrosion, and fretting, and depending on the inspection results, removing the yoke from service and replacing it with an airworthy yoke. Additionally, the FAA proposed to require visually inspecting each yoke bolt for a torque stripe, loose fastener, loose nut, and to determine if a certain part-numbered nut and palnut are installed. If there are any missing torque stripes, loose fasteners, loose nuts, or if certain nuts or palnuts are not installed, the FAA proposed to require removing the associated yoke from service and replacing it with an airworthy yoke.

Additionally in the NPRM, the FAA proposed to require removing from service certain part-numbered yokes that have accumulated more than 12 years or 2,200 total hours TIS, whichever occurs first since first installation on any helicopter, and replacing them with a certain-part-numbered yoke that has accumulated less than 2,200 total hours TIS or 12 years, whichever occurs first since first installation on any helicopter. As an alternative to replacing any yoke that has accumulated more than 12 years or 2,200 total hours TIS since first installation on a helicopter, the FAA proposed to allow removing paint from the yoke and using 10× or higher power magnifying glass to inspect for any crack, seam, lap, shut, missing cadmium plating, or any flaw which is open

to the surface, and depending on the inspection results, removing the yoke from service and replacing it with an airworthy yoke. If the yoke is not replaced as a result of the alternate inspection, the FAA proposed to require performing a magnetic particle inspection of the yoke for any crack, seam, lap, shut, or any flaw which is open to the surface, and depending on the inspection results, removing the yoke from service and replacing with an airworthy yoke.

Finally, if the yoke is replaced as a result of the actions required by the NPRM, the FAA proposed to require torquing each bolt, nut, and palnut using the torque value information in Appendix 1 to the proposed AD. The FAA is issuing this AD to address the unsafe condition on these products.

## **Discussion of Final Airworthiness Directive**

### **Comments**

The FAA received comments from two commenters. The following presents the comments received on the NPRM and the FAA's response to each comment.

#### **Comment Supporting the NPRM**

One individual commenter supported the NPRM without change.

#### **Comments Requesting Changes to the Required Actions**

*Request:* Robinson Helicopter Company stated the 2,200 hours TIS requirement to replace the affected part or to perform the magnetic particle inspection in the proposed AD corresponds with the engine overhaul, service life limit, and interval for additional maintenance. However, Robinson Helicopter Company stated for Model R44 Cadet helicopters, the hours TIS requirement to replace the affected part or to perform the magnetic particle inspection is a 2,400 hours TIS requirement because of that model's more restrictive operating limitations on maximum takeoff weight and engine power. Therefore, Robinson Helicopter Company requested the FAA increase the hours TIS interval for the replacement of the affected part or the magnetic particle inspection to 2,400 hours TIS for Model R44 Cadet helicopters to allow the operator to coordinate the airworthiness directive requirements with other mandatory maintenance requirements.

*FAA Response:* The FAA partially agrees with the request. The FAA disagrees with revising this final rule to refer to Model R44 Cadet helicopters because the "Cadet" is not a recognized type-certificated model on the FAA type certificate data sheet. However, the FAA agrees to allow Model R44 helicopters having serial numbers (S/N) 30001 and subsequent (also known as "Cadet" helicopters) to have 2,400 hours TIS to replace an affected part or to perform a magnetic particle inspection. The FAA has revised paragraphs (g)(2) and (3) of this final rule accordingly to reflect that Model R44 helicopters having S/Ns 30001 and subsequent, on which a yoke replacement as specified in this final rule was not accomplished is required to remove that yoke from service and replace it with an airworthy yoke, prior to the accumulation of 2,400 total hours TIS or within 12 years since first installation, whichever occurs first.

*Request:* Robinson Helicopter Company stated paragraph (g)(3)(i) of the proposed AD requires the yoke to be replaced if there is any missing cadmium plating. Robinson Helicopter Company stated cadmium plating provides corrosion protection without complete coverage and also can be inadvertently removed during installation and removal of hardware. Robinson Helicopter Company further stated that the requirement to remove the yoke if there is any missing cadmium plating will cause the unnecessary removal of many yokes. Therefore, Robinson Helicopter Company requested

the FAA add an exception for cadmium plating and the removal of the yoke from service due to cadmium plating.

*FAA Response:* The FAA agrees and has revised this AD accordingly by not adopting the inspection and corrective actions associated with cadmium plating proposed in the NPRM.

*Request:* Robinson Helicopter Company stated paragraph (g)(1)(iii) of the proposed AD requires ensuring that nut part number (P/N) D210-6 and palnut P/N B330-19 are installed. Robinson stated that per type design, only the two bolts on the flex plate assembly have palnut P/N B330-19 installed. Robinson Helicopter Company stated the wording in the proposed AD could cause some Model R44 helicopters to replace a yoke unnecessarily. Robinson Helicopter Company requested the FAA revise paragraph (g)(1)(iii) of the final rule to only apply to bolts shared with the flex plate assembly. Robinson Helicopter Company further stated it is possible some yokes do not have nut P/N D210-6 installed and would therefore also be subject to an unnecessary yoke replacement. Robinson Helicopter Company requested the FAA revise the wording of paragraph (g)(1)(iii) in the final rule to remove the reference to nut P/N D210-6.

*FAA Response:* The FAA agrees with these requests and revised paragraph (g)(1)(iii) of this AD to clarify that the inspection area is only for the flex plate assembly bolts and to remove any references to nut P/N D210-6.

## **Conclusion**

The FAA reviewed the relevant data, considered any comments received, and determined that air safety requires adopting this AD as proposed. Accordingly, the FAA is issuing this AD to address the unsafe condition on these products. Except for minor editorial changes, any other changes described previously, and a clarification note added to paragraph (g)(1)(i) of this final rule, this AD is adopted as proposed in the NPRM. None of the changes will increase the economic burden on any operator.

## **Related Material**

The FAA reviewed Robinson Helicopter Company R44 Maintenance Manual and Instructions for Continued Airworthiness, Volume 1, Chapter 2 and Chapter 23, dated September 2023, which specifies procedures for inspecting the yoke and flex plate of the M/R drive, removing paint, applying torque, and performing a magnetic particle inspection. This material also contains the information specified in Appendix 1 to this AD, which specifies torque values, and Figure 1 to paragraph (g)(1) of this AD, which depicts the areas for the flex plate inspection.

## **Costs of Compliance**

The FAA estimates that this AD affects 1,725 helicopters of U.S. registry. The FAA estimates the following costs to comply with this AD. Labor costs are estimated at \$85 per work-hour.

Visually inspecting a flex plate will take approximately 0.25 work-hour for an estimated cost of \$21 per helicopter and \$36,225 for the U.S. fleet.

Visually inspecting a yoke, including inspecting each yoke bolt, will take approximately 1.25 work-hours for an estimated cost of \$106 per helicopter and \$182,850 for the U.S. fleet.

Replacing a yoke will take approximately 6 work-hours and parts will cost approximately \$890 for

an estimated cost of \$1,400 per helicopter.

Removing paint and inspecting a yoke using 10X or higher power magnifying glass will take approximately 1.5 work-hours for an estimated cost of \$128 per helicopter.

Performing a magnetic particle inspection will take approximately 1.5 work-hours for an estimated cost of \$128 per helicopter.

Applying torque to one bolt, nut, and palnut will take approximately 1 work-hour for an estimated cost of \$85 per hardware set.

If required, replacing a flex plate will take approximately 1 work-hour and parts will cost approximately \$1,240 for an estimated cost of \$1,325 per helicopter.

### **Authority for This Rulemaking**

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII: Aviation Programs, describes in more detail the scope of the Agency's authority.

The FAA is issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: General requirements. Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

### **Regulatory Findings**

This AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that this AD:

- (1) Is not a “significant regulatory action” under Executive Order 12866,
- (2) Will not affect intrastate aviation in Alaska, and
- (3) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

### **List of Subjects in 14 CFR Part 39**

- Air transportation
- Aircraft
- Aviation safety
- Incorporation by reference
- Safety

### **The Amendment**

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 14 CFR



part 39 as follows:

## **PART 39—AIRWORTHINESS DIRECTIVES**

**1.** The authority citation for part 39 continues to read as follows:

**Authority:** 49 U.S.C. 106(g), 40113, 44701.

### **§ 39.13 [Amended]**

**2.** The FAA amends § 39.13 by adding the following new airworthiness directive:

**2024-19-11 Robinson Helicopter Company:** Amendment 39-22853; Docket No. FAA-2024-0237; Project Identifier AD-2023-00491-R.

#### **(a) Effective Date**

This airworthiness directive (AD) is effective October 31, 2024.

#### **(b) Affected ADs**

None.

#### **(c) Applicability**

This AD applies to Robinson Helicopter Company Model R44 and R44 II helicopters, certificated in any category.

#### **(d) Subject**

Joint Aircraft System Component (JASC) Code: 6310, Engine/Transmission coupling.

#### **(e) Unsafe Condition**

This AD was prompted by reports of a fractured clutch shaft forward yoke (yoke) on the main rotor (M/R) drive due to fatigue cracking. The FAA is issuing this AD to detect fatigue cracking on the yoke. The unsafe condition, if not addressed, could result in loss of M/R drive and subsequent loss of control of the helicopter.

#### **(f) Compliance**

Comply with this AD within the compliance times specified, unless already done.

#### **(g) Required Actions**

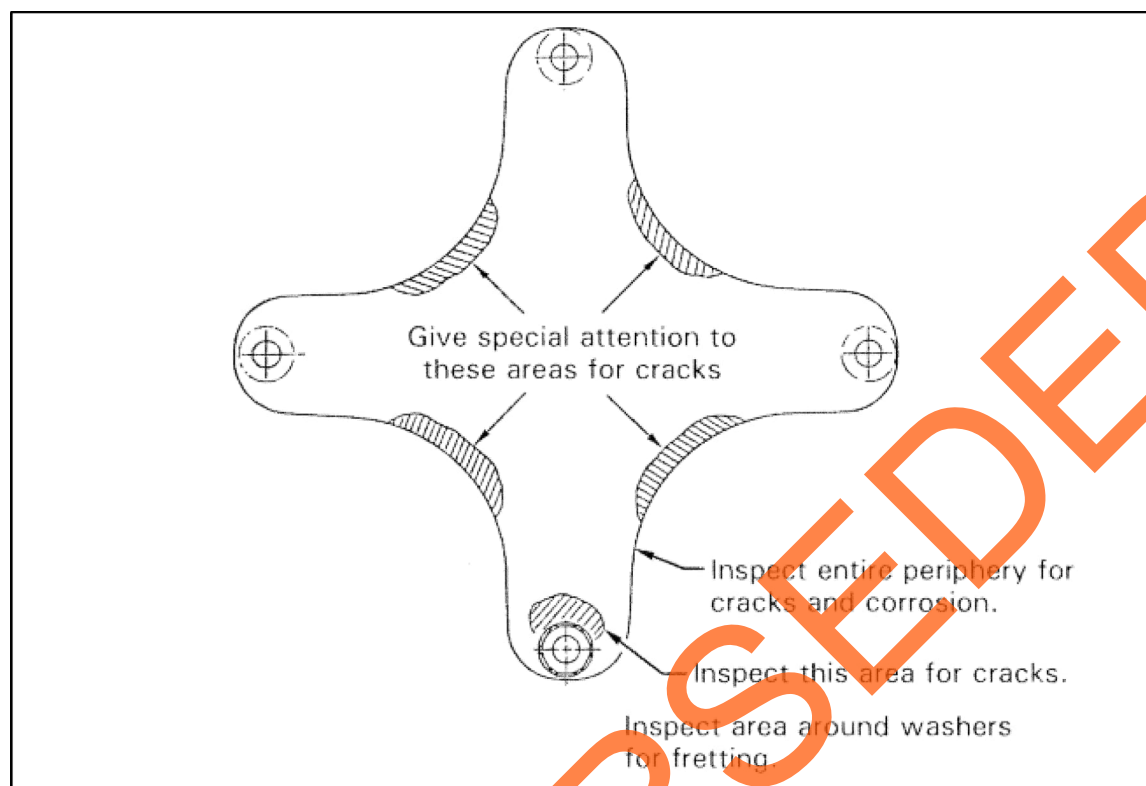
(1) Within 100 hours time-in-service (TIS) after the effective date of this AD, accomplish the actions required by paragraphs (g)(1)(i) through (iii) of this AD.

(i) Visually inspect forward flex plate assembly (flex plate) part number (P/N) C947-1 for any loose fasteners, cracks, fretting, corrosion, wear, and to ensure that the washers are bonded to both sides of each flex plate arm, in the areas depicted in Figure 1 to paragraph (g)(1)(i) of this AD. If there is any loose fastener (can be moved by hand), crack, fretting, corrosion, or wear that consists of the

washers not securely bonded to both sides of each flex plate arm, before further flight, remove the flex plate from service and replace with an airworthy flex plate.

**Note 1 to paragraph (g)(1)(i):** The flex plate may be installed in order to accomplish the visual inspection.

Figure 1 to Paragraph (g)(1)(i)—Flex Plate Inspection



(ii) Visually inspect yoke P/N C907-1 or C907-2, as applicable to your model helicopter, and yoke P/N C908-1, for any cracks, corrosion, and fretting. If there is any crack, corrosion, or fretting, before further flight, remove the yoke from service and replace it with an airworthy yoke, and torque each newly-installed bolt, nut, and palnut using the torque value information in Appendix 1 to this AD.

(iii) Visually inspect each flex plate bolt for a torque stripe, loose fastener, and a loose nut, and to ensure that palnut P/N B330-19 is installed. If there is a missing torque stripe, loose fastener on any nut (can be moved by hand), or if any nut is loose (nut can be turned by hand), or if palnut P/N B330-19 is not installed, before further flight, remove the associated yoke from service and replace it with an airworthy yoke, and torque each newly-installed bolt, nut, and palnut using the torque value information in Appendix 1 to this AD.

(2) For Model R44 helicopters having serial number 0002, or 0004 through 9999 inclusive, except not 1140, and R44 II helicopters having serial number 1140 or 10001 through 29999 inclusive on which a yoke replacement as specified in paragraph (g)(1)(ii) or (iii) of this AD was not accomplished: Prior to the accumulation of 2,200 total hours TIS on any yoke P/N C907-1 or C907-2 or within 12 years since first installation of yoke P/N C907-1 or C907-2 on any helicopter, whichever occurs first; or within 100 hours TIS after the effective date of this AD; whichever occurs later, remove that yoke from service and replace it with an airworthy yoke, and torque each newly-installed bolt, nut, and palnut using the torque value information in Appendix 1 to this AD.

(3) For Model R44 helicopters having serial number 30001 and subsequent, on which a yoke replacement as specified in paragraph (g)(1)(ii) or (iii) of this AD was not accomplished: Prior to

the accumulation of 2,400 total hours TIS on any yoke P/N C907-1 or C907-2 or within 12 years since first installation of yoke P/N C907-1 or C907-2 on any helicopter, whichever occurs first; or within 100 hours TIS after the effective date of this AD; whichever occurs later, remove that yoke from service and replace it with an airworthy yoke, and torque each newly-installed bolt, nut, and palnut using the torque value information in Appendix 1 to this AD.

(4) As an alternative to removing the yoke from service as required by paragraph (g)(2) or (3) of this AD as applicable, remove yoke P/N C907-1 or C907-2, as applicable to your model helicopter, remove the paint on the yoke using Cee-Bee stripper A-292, without using a plastic media abrasive paint stripper, and accomplish paragraphs (g)(4)(i) and (ii) of this AD, as applicable.

(i) Using 10X or higher power magnifying glass, visually inspect the yoke for any crack, seam, lap, shut, and any flaw which is open to the surface. If there is any crack, seam, lap, shut, or flaw, before further flight, remove the yoke from service and replace it with an airworthy yoke, and torque each newly-installed bolt, nut, and palnut using the torque value information in Appendix 1 to this AD.

(ii) If the yoke is not removed from service as a result of the actions required by paragraph (g)(4)(i) of this AD, inspect it for any crack, seam, lap, shut, or any flaw which is open to the surface by performing a magnetic particle inspection using a method in accordance with FAA-approved procedures. If there is any crack, seam, lap, shut, or flaw, before further flight, remove the yoke from service and replace with an airworthy yoke, and torque each newly-installed bolt, nut, and palnut using the torque value information in Appendix 1 to this AD.

#### **(h) Special Flight Permit**

A one-time flight permit may be issued in accordance with 14 CFR 21.197 and 21.199 in order to fly to a maintenance area to perform the required actions in this AD, provided there are no passengers onboard.

#### **(i) Alternative Methods of Compliance (AMOCs)**

(1) The Manager, West Certification Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the West Certification Branch, send it to the attention of the person identified in paragraph (j) of this AD. Information may be emailed to: [AMOC@faa.gov](mailto:AMOC@faa.gov).

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

#### **(j) Related Information**

For more information about this AD, contact Eric Moreland, Aviation Safety Engineer, FAA, 3960 Paramount Boulevard, Lakewood, CA 90712; phone: (562) 627-5364; email: [Eric.R.Moreland@faa.gov](mailto:Eric.R.Moreland@faa.gov).

#### **(k) Material Incorporated by Reference**

None.



**NOTE**

1. Torque values are in inch-pounds unless otherwise specified.
2. Torque values include nut self-locking torque.
3. Increase torque values 10% if torqued at bolt head.
4. Wet indicates threads lubricated with A257-9 anti-seize.
5. For elbow and tee fittings which require alignment, torque to indicated value, then tighten to desired position.
6. Tolerance is  $\pm 10\%$  unless range is specified.
7. Unless otherwise specified, thread sizes 8-32 and smaller are not used for primary structure and do not require control of torques.

FASTENER SERIES		SIZE	EXAMPLE FASTENER	TORQUE (IN.-LB)
NAS6603 thru NAS6608 Bolts NAS1303 thru NAS1308 Bolts NAS623 Screws NAS1351 & NAS1352 Screws NAS600 thru NAS606 Screws		10-32	NAS6603	50
		1/4-28	NAS6604	120
		5/16-24	NAS6605	240
		3/8-24	NAS6606	350
		7/16-20	NAS6607	665
		1/2-20	NAS6608	995
A142 screws AN3 Bolts AN4 Bolts AN6 Bolts AN8 Bolts	AN502 Screws AN503 Screws AN509 Screws AN525 Screws MS24694 Screws MS27039 Screws	10-32	A142-1, -3, -4; AN3	37
		1/4-28	AN4	90
		3/8-24	AN6	280
		1/2-20	AN8	795
STAMPED NUTS (PALNUTS)  Palnuts are to be used only once and replaced with new when removed.		10-32	B330-7 (MS27151-7)	6-15
		1/4-28	B330-13 (MS27151-13)	11-25
		5/16-24	B330-16 (MS27151-16)	20-40
		3/8-24	B330-19 (MS27151-19)	29-60
		7/16-20	B330-21 (MS27151-21)	42-85
		1/2-20	B330-24 (MS27151-24)	54-110
TAPERED PIPE THREADS		1/8-27	See note 5	60
			Straight fittings only	120
		1/4-18	See note 5	85
			Straight fittings only	170
		3/8-18	See note 5	110
			Straight fittings only	220
		1/2-14	See note 5	160
			Straight fittings only	320
ROD END JAM NUTS (AN315 and AN316)		3/4-14	See note 5	230
			Straight fittings only	460
		10-32	AN315-3	15
		1/4-28	AN316-4	40
		5/16-24	AN316-5	80
		3/8-24	AN316-6	110

Issued on September 19, 2024.

Victor Wicklund,

Deputy Director, Compliance & Airworthiness Division, Aircraft Certification Service.

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