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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2017-0141; Product Identifier 2016-SW-067-AD; Amendment 39-19154; AD 2018-02-01]

RIN 2120-AA64

Airworthiness Directives; The Enstrom Helicopter Corporation Helicopters

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: We are superseding Airworthiness Directive (AD) 2015-08-51 for the Enstrom Helicopter Corporation (Enstrom) Model F-28A, 280, F-28C, F-28C-2, F-28C-2R, 280C, F-28F, F-28F-R, 280F, 280FX, and 480 helicopters. AD 2015-08-51 required an inspection of the main rotor spindle (spindle) and reporting the inspection results to the FAA. This new AD was prompted by additional reports of cracked spindles and requires establishing a life limit and a recurring inspection. The actions of this AD are intended to prevent the unsafe condition on these products.

DATES: This AD is effective February 21, 2018.

ADDRESSES: For service information identified in this final rule, contact Enstrom Helicopter Corporation, 2209 22nd Street, Menominee, MI; telephone (906) 863-1200; fax (906) 863-6821; or at www.enstromhelicopter.com. You may view this referenced service information at the FAA, Office of the Regional Counsel, Southwest Region, 10101 Hillwood Pkwy., Room 6N-321, Fort Worth, TX 76177.

Examining the AD Docket

You may examine the AD docket on the internet at http://www.regulations.gov in Docket No. FAA-2017-0141; or in person at the Docket Management Facility between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this AD, the economic evaluation, any comments received, and other information. The address for the Docket Office (phone: 800-647-5527) is Document Management Facility, U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC 20590.

FOR FURTHER INFORMATION CONTACT: Manzoor Javed, Senior Aerospace Engineer, Chicago ACO Branch, Compliance and Airworthiness Division, FAA, 2300 East Devon Ave., Des Plaines, IL 60018; telephone (847) 294-8112; email manzoor.javed@faa.gov.

SUPPLEMENTARY INFORMATION:

Discussion

We issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 to remove AD 2015-08-51, Amendment 39-18160 (80 FR 28172, May 18, 2015) (AD 2015-08-51) and add a new AD. AD 2015-08-51 applied to Enstrom Model F-28A, 280, F-28C, F-28C-2, F-28C-2R, 280C, F-28F, F-28F-R, 280F, 280FX, and 480 helicopters with a spindle part number (P/N) 28-14282-11 or 28-14282-13 installed. AD 2015-08-51 required conducting a one-time magnetic particle inspection (MPI) of the spindle for cracks and reporting the inspection results to the FAA. AD 2015-08-51 was prompted by a fatal accident and reports of spindles with cracks. AD 2015-08-51 was issued as an interim action and was intended to detect a crack in a spindle and prevent loss of a main rotor blade and subsequent loss of control of the helicopter.

The NPRM published in the Federal Register on March 2, 2017 (82 FR 12308). The NPRM was prompted by additional reports of cracked spindles. Based on review of in-service data and a fatigue analysis, the FAA determined a life limit and recurring MPIs are necessary to reduce the risk of a crack developing in a spindle. We also determined the reporting requirement in AD 2015-08-51 is no longer necessary. Accordingly, the NPRM proposed to require an MPI of the spindle every 500 hours time-in-service (TIS) until the spindle reaches its new life limit of 1,500 hours TIS.

Since the NPRM was issued, the FAA's Aircraft Certification Service has changed its organizational structure. The new structure replaces product directorates with functional divisions. We have revised some of the office titles and nomenclature throughout this Final rule to reflect the new organizational changes. Additional information about the new structure can be found in the Notice published on July 25, 2017 (82 FR 34564).

Comments

After our NPRM was published, we received comments from 50 commenters.

A. Support for the NPRM

One commenter supported the 500-hour repetitive inspection proposed by the NPRM.

B. Comments Regarding the FAA's Justification of the Unsafe Condition

Many commenters, including Enstrom, disagreed with the FAA's determination that an unsafe condition exists and requested the FAA provide more information about the additional cracks that prompted this AD.

Request: A few commenters noted the entire fleet has been inspected in accordance with AD 2015-08-51 and no additional cracks were found. Other commenters stated no additional cracks have been found in the area of a spindle where a failure could cause a catastrophic accident. A few commenters, including Enstrom, stated no additional cracking has been reported in the same location as that of the accident spindle.

Other commenters requested the FAA provide information about the number of additional reported cracks and whether there is any correlation between cracks and manufacturing dates or suppliers. Enstrom stated the cracked spindles discovered after the accident were manufactured between 1975 to 1980 by two specific suppliers.

FAA Response: We agree to provide information about the cracks that prompted this AD. Contrary to the public comments stating there were no additional cracks found by the inspections required by AD 2015-08-51, those inspection results revealed 34 cracked spindle assemblies. The commenters are correct that the additional cracking was not in the same location as that of the accident spindle. The location of the additional 34 spindle cracks was at the hole for the cotter pin securing the lamiflex bearing nut. However, we disagree that the additional cracks were not in an area where a failure could cause a catastrophic accident. A spindle assembly is a primary structural element and a critical part. Flight with any known crack is prohibited in primary structural elements including spindle assemblies. Regardless of the location of the crack, failure of a spindle assembly could result in loss of a main rotor blade.

We agree with Enstrom's comment that the cracked spindles discovered after the accident were manufactured between 1975 to 1980 by two specific suppliers. However, the accident helicopter had two cracked and one failed spindle that were manufactured in 1984 by a third manufacturer. The identities of the manufacturers are unknown. The parts were marked differently with a letter designation at the end depending on the manufacturer, but no manufacturing records exist to indicate which letter corresponds to which manufacturer. Therefore, no investigation could be conducted as to what manufacturing processes or specifications used by these suppliers may have resulted in the cracking. Accordingly, we cannot draw a conclusion as to whether the manufacturer and date range are causal factors in the accident.

Request: One commenter questioned whether the FAA investigated the possibility that the cracked spindle resulted from improper maintenance action or procedures.

FAA's Response: As part of the accident investigation, the NTSB lab inspected the three spindles from the accident aircraft for any tool marks that might indicate an initiation point that was maintenance related. They were unable to find such marks. Based on the number of cracks found in the field and the fact that they were not all maintained by the same organization, there is no data to suggest that this resulted from improper maintenance.

C. Comments Regarding the Required Actions

Request: Thirty-eight commenters, including Enstrom, requested the AD not require the 1,500-hour life limit because it would be burdensome and unnecessary. Most of these commenters also stated that the repetitive inspections specified by Enstrom would be effective in identifying cracks and removing any cracked spindles from service. Four commenters requested the life limit be higher than 1,500 hours, and proposed alternative life limits of 4,000 hours, 6,750 hours, between 8,000 and 9,000 hours, and 15,000 hours.

FAA Response: We disagree. The corrective action outlined in the Enstrom service information did not reduce the risk to an acceptable level. Consequently, we used the crack data to conduct a risk assessment in accordance with the FAA's Rotorcraft Risk Analysis Handbook, Revision 3, dated September 10, 2014. The accident investigation and inspection results from AD 2015-08-51 show cracked spindles from 1,800 hours up to 9,300 hours (on the accident helicopter). A Weibull analysis identified a life limit of approximately 800 hours. But the goodness of fit was not high as the times on these parts historically have not been tracked, so we assumed the part time to be the time on the airframe, which may not be accurate. We therefore applied an additional method to determine an appropriate life limit. We used inspection results as baseline data to conduct a fatigue analysis using standard fatigue methodology and scatter factors found in Advisory Circular (AC) 23-13A, “Fatigue, Fail-Safe, and Damage Tolerance Evaluation of Metallic Structure For Normal, Utility, Acrobatic, and Commuter Category Airplanes.” While this AC was written for small aircraft, its approach for establishing a life limit is conventional and was the most computationally valid method considered. This analysis resulted in a life limit of 1,500 hours. We also reviewed the potential for higher life limits, but these resulted in unacceptably short inspection intervals. For example, a retirement age of 10,000 hours with an initial inspection at 1,500 hours would require repetitive inspections every 75 hours to maintain an acceptable level of risk. We rejected these short inspection frequencies because

of the potential for increased maintenance errors. Additionally, we considered the life limit of 1,500 hours is similar to those for spindles used in other rotorcraft.

Request: Twenty-three commenters, including Enstrom, disagreed with the compliance time for the 500-hour initial inspection. To support this disagreement, most of these commenters stated no cracks have been reported on spindles with less than 1,800 hours TIS. The commenters requested that the AD require the initial inspection within 1,500 hours as specified in Enstrom's service information.

FAA Response: We disagree. While the commenters are correct that no cracks have been reported on spindles with less than 1,800 hours TIS, this factor is less significant than those discussed above. Standard practice in addressing fatigue and life limits require inspection intervals that provide two inspection opportunities to detect a crack before a life limit is reached. Because the FAA determined a life limit of 1,500 hours TIS is required for the spindles, it follows that at a minimum initial and repetitive inspections every 500 hours TIS are necessary.

Request: One commenter requested the AD require the spindle life limit of 7,500 cycles instead of 1,500 flight hours.

FAA Response: We disagree. All data considered and analysis conducted for this AD has been determined using flight hours. The commenter states he used figure AC 27 MG 11-9 from AC 27-1B, “Certification of Normal Category Rotorcraft,” for his conversion. The spectrum in that figure is an example and therefore we do not find the commenter's conversion the most appropriate in this case.

Request: Two commenters disagreed with the AD because of the service history of their helicopters and Enstrom's history in general.

FAA Response: The fact that the individual helicopters owned or operated by some commenters have not experienced cracking does not negate the existence of an unsafe condition. The risk analysis used to support the requirements of this AD was based on in-service data reported as a result of AD 2015-04-51. This data represents the actual service state of the current Enstrom fleet, which is more accurate than the factors mentioned by the commenters.

D. Requests To Allow Alternative Actions

Request: Many commenters, including Airwolf Aerospace (Airwolf), requested the AD allow installing an Airwolf tension-torsion strap assembly (TT strap) as a means of complying with or terminating the AD. In support of this request, Airwolf stated that TT strap installation completely removes the threaded area of the spindle, leaving nothing left to inspect.

FAA Response: We disagree. The commenter's request is unnecessary. The Airwolf TT strap installation modifies the helicopter and the spindle, changing the P/N of the spindle, such that the AD would no longer apply.

Request: One commenter requested that instead of a life limit, the AD require a visual inspection of the cotter pin hole at each 100-hour or annual inspection. No technical data supporting this request was provided by the commenter.

FAA Response: We disagree. As explained above, the FAA has determined a life limit is required to correct the unsafe condition. Inspection programs alone are not sufficient to lower the risk to an acceptable level.

Request: Four commenters stated they have already inspected the spindles in accordance with AD 2015-08-51. One commenter requested the AD allow a 300-hour grace period for spindles that have already been inspected.

FAA Response: We disagree. Providing a grace period within which to comply with a life limit essentially extends the life limit and would not be appropriate.

E. Comments Regarding Costs of Compliance With This AD

Request: Many commenters stated that the cost to comply with this AD is underestimated or inaccurate. These commenters stated the cost should include the costs associated with loss of utility; should reflect a replacement cost of $24,492 for three spindles; and should increase the labor rate.

FAA's Response: We disagree. The cost analysis in AD rulemaking actions typically includes only the costs associated with complying with the AD, which does not include indirect costs such as down-time and loss of revenue.

The parts costs for this AD were provided by the manufacturer. We do not control any price differences or retail pricing.

The labor rate of $85 per hour is provided by the FAA Office of Aviation Policy and Plans for the FAA to use when estimating the labor costs of complying with AD requirements.

Request: Several commenters requested the FAA not issue the AD because the extremely high cost will cause small operators to cease operations.

FAA's Response: We disagree. Although the FAA sympathizes with owners and the economic impact this AD may have, it does not negate the need to correct the identified unsafe condition. The applicable spindles in this design are critical for safe flight.

FAA's Determination

We have reviewed the relevant information and determined that an unsafe condition exists and is likely to exist or develop on other helicopters of these same type designs and that air safety and the public interest require adopting the AD requirements as proposed.

Related Service Information

We reviewed Enstrom Service Directive Bulletin No. 0119, Revision 3, dated June 24, 2016, for Model F-28A, F-28C, F-28F, 280, 280C, 280F, and 280FX helicopters with a spindle P/N 28-14282-11 or 28-14282-13. We also reviewed Enstrom Service Directive Bulletin No. T-050, Revision 3, dated June 24, 2016, for Model 480 helicopters, serial numbers 5001 through 5004 and 5006, and with a spindle P/N 28-14282-13, except those aircraft modified with tension-torsion straps. Both service directive bulletins specify sending the spindle to Enstrom for an MPI before the spindle reaches 1,500 hours TIS, or within 5 hours TIS for those spindles with 1,500 or more hours TIS. Thereafter, the service directive bulletins specify returning the spindle to Enstrom for an MPI every 500 hours.

Differences Between This AD and the Service Information

This AD requires establishing a spindle life limit of 1,500 hours TIS. The service information does not specify a life limit.

This AD requires that the MPI be conducted by a Level II or Level III inspector or equivalent. The service information specifies sending the spindle to Enstrom for an MPI.

This AD requires an initial MPI before further flight for a spindle with 500 or more hours TIS, unless an MPI has been done within the last 500 hours TIS. The service information specifies an initial MPI compliance time of within 5 hours TIS for a spindle with 1,500 or more hours TIS.

Costs of Compliance

We estimate that this AD affects 323 helicopters of U.S. Registry. We estimate that operators may incur the following costs in order to comply with this AD. Labor costs are estimated at $85 per work-hour. Inspecting the spindles takes about 15 work-hours for an estimated cost of $1,275 per helicopter and $411,825 for the U.S. fleet per inspection cycle. Replacing a cracked spindle costs $8,164 for parts and no additional work-hours. Replacing a set of three spindles that have reached their life limit takes about 14 work-hours and parts will cost $17,500 for a total cost of $18,690 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.

We are 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

We have determined that 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) Is not a "significant rule" under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979);

(3) Will not affect intrastate aviation in Alaska to the extent that a regulatory distinction is required; and

(4) 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.

Adoption of 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 removing Airworthiness Directive (AD) 2015-08-51, Amendment 39-18160 (80 FR 28172, May 18, 2015), and adding the following new AD:

2018-02-01 The Enstrom Helicopter Corporation (Enstrom): Amendment 39-19154; Docket No. FAA-2017-0141; Product Identifier 2016-SW-067-AD.

(a) Applicability

This AD applies to Enstrom Model F-28A, 280, F-28C, F-28C-2, F-28C-2R, 280C, F-28F, F-28F-R, 280F, and 280FX helicopters, all serial numbers; and Enstrom Model 480 helicopters, serial numbers 5001 through 5006; with a main rotor spindle (spindle) part number (P/N) 28-14282-11 or 28-14282-13, installed, certificated in any category.

(b) Unsafe Condition

This AD defines the unsafe condition as a crack in a spindle, which, if not detected, could result in loss of a main rotor blade and subsequent loss of control of the helicopter.

(c) Affected ADs

This AD supersedes AD 2015-08-51, Amendment 39-18160 (80 FR 28172, May 18, 2015).

(d) Effective Date

This AD becomes effective February 21, 2018.

(e) Compliance

You are responsible for performing each action required by this AD within the specified compliance time unless it has already been accomplished prior to that time.

(f) Required Actions

(1) Before further flight, remove from service any spindle P/N 28-14282-11 or 28-14282-13 that has 1,500 or more hours time-in-service (TIS). If the hours TIS of a spindle is unknown, use the TIS of the helicopter. Thereafter, remove from service any spindle P/N 28-14282-11 or 28-14282-13 before accumulating 1,500 hours TIS.

(2) For each spindle with 500 or more hours TIS, using the hours TIS of the helicopter if the hours TIS of the spindle is unknown:

(i) Before further flight, unless already done within the last 500 hours TIS, conduct a magnetic particle inspection (MPI) of the spindle for a crack, paying particular attention to the threaded portion of the spindle. The MPI of the spindle must be conducted by a Level II or Level III inspector qualified in the MPI in the Aeronautics Sector according to the EN4179 or NAS410 standard or equivalent. If there is a crack in the spindle, replace it with an airworthy spindle before further flight.

(ii) Thereafter at intervals not to exceed 500 hours TIS, repeat the MPI specified in paragraph (f)(2)(i) of this AD.

(g) Alternative Methods of Compliance (AMOCs)

(1) The Manager, Chicago ACO Branch, FAA, may approve AMOCs for this AD. Send your proposal to: Manzoor Javed, Senior Aerospace Engineer, Chicago ACO Branch, Compliance and Airworthiness Division, FAA, 2300 East Devon Ave., Des Plaines, IL 60018; telephone (847) 294-8112; email manzoor.javed@faa.gov.

(2) For operations conducted under a 14 CFR part 119 operating certificate or under 14 CFR part 91, subpart K, we suggest that you notify your principal inspector, or lacking a principal inspector, the manager of the local flight standards district office or certificate holding district office, before operating any aircraft complying with this AD through an AMOC.

(h) Additional Information

Enstrom Service Directive Bulletin Nos. 0119 and T-050, both Revision 3 and both dated June 24, 2016, which are not incorporated by reference, contain additional information about the subject of this AD. For service information identified in this AD, contact Enstrom Helicopter Corporation, 2209 22nd Street, Menominee, MI; telephone (906) 863-1200; fax (906) 863-6821; or at www.enstromhelicopter.com. You may review a copy of the service information at the FAA, Office of the Regional Counsel, Southwest Region, 10101 Hillwood Pkwy., Room 6N-321, Fort Worth, TX 76177.

(i) Subject

Joint Aircraft Service Component (JASC) Code: 6220, Main Rotor Head.

Issued in Fort Worth, Texas, on January 8, 2018.
James A. Grigg,
Acting Director, Compliance & Airworthiness Division,
Aircraft Certification Service.