



DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2020-0592; Project Identifier AD-2020-00251-E; Amendment 39-21352; AD 2020-25-10]

RIN 2120-AA64

Airworthiness Directives; General Electric Company Turbofan Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: The FAA is adopting a new airworthiness directive (AD) for all General Electric Company (GE) GENx-1B64/P2, GENx-1B67/P2, GENx-1B70/75/P2, GENx-1B70/P2, GENx-1B70C/P2, GENx-1B74/75/P2, GENx-1B76/P2, GENx-1B76A/P2, and GENx-2B67/P model turbofan engines with a certain high-pressure turbine (HPT) rotor stage 2 disk installed. This AD was prompted by a report of the potential for undetected subsurface anomalies formed during the manufacturing process that could result in uncontained failure of the HPT rotor stage 2 disk. This AD requires an immersion ultrasonic inspection (USI) of the HPT rotor stage 2 disk and, depending on the results of the inspection, replacement of the HPT rotor stage 2 disk with a part eligible for installation. The FAA is issuing this AD to address the unsafe condition on these products.

DATES: This AD is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

The Director of the Federal Register approved the incorporation by reference of certain publications listed in this AD as of [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: For service information identified in this final rule, contact General Electric Company, GE Aviation, Room 285, 1 Neumann Way, Cincinnati, OH 45215; phone: (513) 552-3272; email: aviation.fleetsupport@ge.com. You may view this service information at the FAA, Airworthiness Products Section, Operational Safety Branch,

1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (781) 238-7759. It is also available at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2020-0592.

Examining the AD Docket

You may examine the AD docket at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2020-0592; 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.

FOR FURTHER INFORMATION CONTACT: Mehdi Lamnyi, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7743; fax: (781) 238-7199; email: Mehdi.Lamnyi@faa.gov.

SUPPLEMENTARY INFORMATION:

Background

The FAA issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 by adding an AD that would apply to all GE GENx-1B64/P2, GENx-1B67/P2, GENx-1B70/75/P2, GENx-1B70/P2, GENx-1B70C/P2, GENx-1B74/75/P2, GENx-1B76/P2, GENx-1B76A/P2, and GENx-2B67/P model turbofan engines with a certain HPT rotor stage 2 disk installed. The NPRM published in the *Federal Register* on June 12, 2020 (85 FR 35816). The NPRM was prompted by a report of the potential for undetected subsurface anomalies formed during the manufacturing process that could result in uncontained failure of the HPT rotor stage 2 disk. In the NPRM, the FAA proposed to require an immersion USI of the HPT rotor stage 2 disk and, depending on the results of the inspection, replacement of the HPT rotor stage 2 disk with a part eligible for installation. 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 six commenters. The commenters were Air Line Pilots Association, International (ALPA); The Boeing Company (Boeing); Cargolux Airlines International S.A. (Cargolux); GE Aviation; United Airlines (UAL) Engineering; and Qantas Airways Limited (Qantas). One commenter requested that the FAA update the Affected ADs paragraph of this AD. One commenter requested that the HPT rotor stage 2 disks be replaced instead of inspected. One commenter requested that the FAA update the Definitions paragraph of this AD. Two commenters requested adding credit for previous action. Three commenters supported the AD. The following presents the comments received on the NPRM and the FAA's response to each comment.

Request to Update Affected ADs

UAL Engineering requested that the FAA update paragraph (b), Affected ADs, of this AD to note the impact of the reduced life limits imposed by AD 2020-20-11 (85 FR 60898, September 29, 2020) (AD 2020-20-11) when complying with this AD. UAL Engineering reasoned that multiple HPT rotor stage 2 disks are affected by both rules, and leaving paragraph (b) blank creates ambiguity for operators generating compliance documentation for the dual-affected disks and engines.

The FAA disagrees. Paragraph (b) of this AD identifies superseded or revised ADs, or other ADs if the requirements of those ADs are affected (i.e. terminating actions). This AD does not meet any of those conditions. Although this AD affects certain HPT rotor stage 2 disks that also affected AD 2020-20-11, the ADs address separate root causes and have different compliance actions and times. To comply with this AD, the affected HPT rotor stage 2 disks must be inspected and replaced if a rejectable indication is found. If, in accordance with AD 2020-20-11, an affected HPT rotor stage 2 disk has already been removed from service, then no further action is necessary to comply with the requirements of this AD.

Request to Replace Certain HPT Rotor Stage 2 Disks

GE Aviation requested that HPT rotor stage 2 disks with serial numbers TMT3UA34, TMT3UA55, TMT4CT46, or TMT4CT47, be replaced instead of inspected.

GE reasoned that AD 2020-20-11 supersedes this AD, and the disks should be replaced in accordance with AD 2020-20-11.

The FAA disagrees. AD 2020-20-11 does not supersede this AD. Both ADs address separate root causes and have different compliance actions and times. AD 2020-20-11 requires replacement of certain HPT rotor stage 2 disks before accumulating a specified number of cycles since new. This AD requires a USI of certain HPT rotor stage 2 disks and, depending on the results of the inspection, replacement of the HPT rotor stage 2 disk. This AD may require replacement of an HPT rotor stage 2 disk prior to the required compliance time specified in AD 2020-20-11. If, however, an HPT rotor stage 2 disk is removed from service per AD 2020-20-11, then the affected turbofan engine would no longer have an affected HPT rotor stage 2 disk installed and would fall outside of the applicability of this AD.

Request to Update Definition of Engine Shop Visit

Qantas requested that the FAA update the definition of an “engine shop visit” to exclude engines with 2,000 or fewer cycles since new (CSN) that install the new retaining clips for the HPT stage 2 nozzle assembly (retaining clips) introduced in GENx-1B Service Bulletin (SB) 72-0398 during a “Quick Turn” shop visit. Qantas reasoned that the definition of an “engine shop visit” in the NPRM would require the removal and inspection of an affected HPT rotor stage 2 disk during their planned low-time engine elective “Quick Turn” shop visit for installation of the new retaining clips. Qantas concluded that additional disassembly, cost, and engine shop turn time will significantly affect the viability of the GE retaining clip “Quick Turn” program.

The FAA disagrees with excluding low-time engines that install the new retaining clips for the HPT Stage 2 Nozzle Assembly during a “Quick Turn” shop visit. Changing the definition to exclude the “Quick Turn” shop visit would possibly postpone the immersion USI of the HPT rotor stage 2 disk required by this AD until a subsequent shop visit. As a result, the risk of failure of the HPT rotor stage 2 disk would increase. Qantas did not provide documentation to show that excluding the “Quick Turn” shop visit from the definition of an engine shop visit offers an acceptable level of safety. The FAA,

however, will consider requests for alternative methods of compliance if submitted documentation supports an acceptable level of safety.

Request to Add Credit for Previous Action

Cargolux and GE Aviation requested credit for previous performance of the immersion USI of the HPT rotor stage 2 disk using GE GENx-1B Cleaning, Inspection and Repair Manual (CIR) 72-53-41, Special Procedure 001, or GE GENx-2B CIR 72-53-41, Special Procedure 001. Cargolux reasoned that GE GENx-2B SB 72-0402 R00, dated November 20, 2019, refers to GENx-2B CIR 72-53-41, Special Procedure 001.

The FAA disagrees. This AD does not require the use of GE GENx-1B CIR GEK112862, CIR 72-53-41, Special Procedure 001, Rev 31, dated January 31, 2020, or GE GENx-2B CIR GEK114120, CIR 72-53-41, Special Procedure 001, Rev 24, dated January 31, 2020, to perform the immersion USI of the HPT rotor stage 2 disk. The CIR are referred to in the service information referenced in paragraph (i), Credit for Previous Action. Therefore, if an operator performs the actions using the CIR, the operator is performing the action using the service information and has complied with this AD. The FAA did not change this AD.

Support for the AD

ALPA, Boeing, and UAL Engineering expressed support for the AD as written.

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.

Related Service Information under 1 CFR part 51

The FAA reviewed GE GENx-1B SB 72-0463 R01, dated January 6, 2020, and GE GENx-2B SB 72-0402 R01, dated January 8, 2020. This service information describes procedures for performing an immersion USI of the affected HPT rotor stage 2 disks on GENx-1B and GENx-2B model turbofan engines, respectively. This service information is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in ADDRESSES.

Costs of Compliance

The FAA estimates that this AD affects 276 engines installed on airplanes of U.S. registry.

The FAA estimates the following costs to comply with this AD:

Estimated costs

Action	Labor Cost	Parts Cost	Cost per product	Cost on U.S. operators
USI of HPT rotor stage 2 disk	8 work-hours x \$85 per hour = \$680	\$0	\$680	\$187,680

The FAA estimates the following costs to do any necessary replacements that would be required based on the results of the required inspection. The agency has no way of determining the number of aircraft that might need this replacement:

On-condition costs

Action	Labor Cost	Parts Cost	Cost per product
Remove and replace the HPT rotor stage 2 disk	2 work-hours x \$85 per hour = \$170	\$458,900	\$459,070

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:

2020-25-10 General Electric Company: Amendment 39-21352; Docket No. FAA-2020-0592; Project Identifier AD-2020-00251-E.

(a) Effective Date

This airworthiness directive (AD) is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

(b) Affected ADs

None.

(c) Applicability

- (1) This AD applies to all General Electric Company (GE) GEnx-1B64/P2, GEnx-1B67/P2, GEnx-1B70/75/P2, GEnx-1B70/P2, GEnx-1B70C/P2, GEnx-1B74/75/P2,

GENx-1B76/P2, and GENx-1B76A/P2 model turbofan engines that have a high-pressure turbine (HPT) rotor stage 2 disk, part number (P/N) 2383M86P02, and a serial number (S/N) listed in paragraph 4, Appendix - A, Table 1, Table 2, or Table 3, of GE GENx-1B Service Bulletin (SB) 72-0463 R01, dated January 6, 2020, installed.

(2) This AD applies to all GE GENx-2B67/P model turbofan engines that have a HPT rotor stage 2 disk, P/N 2383M86P02, and a S/N listed in paragraph 4, Appendix - A, Table 1, Table 2, or Table 3, of GE GENx-2B SB 72-0402 R01, dated January 8, 2020, installed.

(d) Subject

Joint Aircraft System Component (JASC) Code 7250, Turbine Section.

(e) Unsafe Condition

This AD was prompted by a report of the potential for undetected subsurface anomalies formed during the manufacturing process that could result in uncontained failure of the HPT rotor stage 2 disk. The FAA is issuing this AD to prevent failure of the HPT rotor stage 2 disk. The unsafe condition, if not addressed, could result in uncontained HPT rotor stage 2 disk release, damage to the engine, and damage to the airplane.

(f) Compliance

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

(g) Required Actions

(1) For affected GE GENx-1B engines, at the next engine shop visit after the effective date of this AD, or before the HPT rotor stage 2 disk has accumulated 6,500 cycles since new (CSN), whichever occurs first, perform an immersion ultrasonic inspection (USI) of the HPT rotor stage 2 disk using paragraph 3.B.(1) of GE GENx-1B SB 72-0463 R01, dated January 6, 2020.

(2) If, during the USI required by paragraph (g)(1) of this AD, a rejectable indication is found, before further flight, remove the HPT rotor stage 2 disk from service and replace it with a part eligible for installation.

(3) For affected GE GENx-2B engines, at the next engine shop visit after the effective date of this AD, or before the HPT rotor stage 2 disk has accumulated 6,500

CSN, whichever occurs first, perform an immersion USI of the HPT rotor stage 2 disk using paragraph 3.B.(1) of GE GENx-2B SB 72-0402 R01, dated January 8, 2020.

(4) If, during the USI required by paragraph (g)(3) of this AD, a rejectable indication is found, before further flight, remove the HPT rotor stage 2 disk from service and replace it with a part eligible for installation.

(h) Definitions

(1) For the purpose of this AD, an “engine shop visit” is when a major engine flange is separated for purposes other than the removal of the fan for transportation.

(2) For the purposes of this AD, a “part eligible for installation” is:

(i) An HPT rotor stage 2 disk that does not have an S/N listed in paragraph 4, Appendix - A, Table 1, Table 2, or Table 3, of GE GENx-1B SB 72-0463 R01, dated January 6, 2020, or GE GENx-2B SB 72-0402 R01, dated January 8, 2020; or,

(ii) An HPT rotor stage 2 disk that has successfully passed the immersion USI required by paragraph (g)(1) or (3) of this AD, or passed the immersion USI using GE GENx-1B SB 72-0463 R00, dated November 20, 2019, or GE GENx-2B SB 72-0402 R00, dated November 20, 2019, before the effective date of this AD.

(i) Credit for Previous Action

You may take credit for the immersion USI of the HPT rotor stage 2 disk required by paragraph (g)(1) or (3) of this AD if you performed this inspection before the effective date of this AD using GE GENx-1B SB 72-0463 R00, dated November 20, 2019, or GE GENx-2B SB 72-0402 R00, dated November 20, 2019.

(j) Alternative Methods of Compliance (AMOCs)

(1) The Manager, ECO 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 certification office, send it to the attention of the person identified in Related Information. You may email your request to: ANE-AD-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.

(k) Related Information

For more information about this AD, contact Mehdi Lamnyi, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7743; fax: (781) 238-7199; email: Mehdi.Lamnyi@faa.gov.

(l) Material Incorporated by Reference

(1) The Director of the Federal Register approved the incorporation by reference (IBR) of the service information listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this service information as applicable to do the actions required by this AD, unless the AD specifies otherwise.

(i) General Electric Company (GE) GEnx-1B Service Bulletin (SB) 72-0463 R01, dated January 6, 2020, and

(ii) GE GEnx-2B SB 72-0402 R01, dated January 8, 2020.

(3) For GE service information identified in this AD, contact General Electric Company, GE Aviation, Room 285, 1 Neumann Way, Cincinnati, OH 45215; phone: (513) 552-3272; email: aviation.fleetsupport@ge.com.

(4) You may view this service information at FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (781) 238-7759.

(5) You may view this service information that is incorporated by reference at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email fedreg.legal@nara.gov, or go to: <https://www.archives.gov/federal-register/cfr/ibr-locations.html>.

Issued on December 3, 2020.

Gaetano A. Sciortino, Deputy Director for Strategic Initiatives,
Compliance & Airworthiness Division,
Aircraft Certification Service.

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