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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2015-7491; Directorate Identifier 2015-NE-39-AD; Amendment 39-18854; AD 2017-08-05]

RIN 2120-AA64

Airworthiness Directives; General Electric Company Turbofan Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: We are superseding Airworthiness Directive (AD) 2016-13-05 for all General Electric Company (GE) GE90-76B, GE90-77B, GE90-85B, GE90-90B, and GE90-94B turbofan engines. AD 2016-13-05 required eddy current inspection (ECI) of the high-pressure compressor (HPC) stage 8-10 spool at each shop visit for all affected engines and ECI or ultrasonic inspection (USI) for certain affected engines. This new AD requires initial and repetitive on-wing USIs of the HPC stage 8-10 spool for certain engines prior to shop visit and ECI of all affected engines at each shop visit. This AD was prompted by analysis that the risk of the failure of an HPC stage 8-10 spool was excessive without repetitive USI prior to shop visit. We are issuing this AD to correct the unsafe condition on these products.

DATES: This AD is effective May 19, 2017.

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; fax: 513-552-3329; email: geae.aoc@ge.com. You may view this service information at the FAA, Engine & Propeller Directorate, 1200 District Avenue, Burlington, MA. For information on the availability of this material at the FAA, call 781-238-7125.

Examining the AD Docket

You may examine the AD docket on the Internet at http://www.regulations.gov by searching for and locating Docket No. FAA-2015-7491; 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 regulatory 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: John Frost, Aerospace Engineer, Engine Certification Office, FAA, Engine & Propeller Directorate, 1200 District Avenue, Burlington, MA 01803; phone: 781-238-7756; fax: 781-238-7199; email: john.frost@faa.gov.

SUPPLEMENTARY INFORMATION:

Discussion

We issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 to supersede AD 2016-13-05, Amendment 39-18569 (81 FR 41208, June 24, 2016; corrected 81 FR 42475, June 30, 2016), ("AD 2016-13-05"). AD 2016-13-05 applied to all GE GE90-76B, GE90-77B, GE90-85B, GE90-90B, and GE90-94B turbofan engines. The NPRM published in the Federal Register on December 19, 2016 (81 FR 91880). The NPRM was prompted by an uncontained failure of the HPC stage 8-10 spool, leading to an airplane fire. The NPRM proposed to require an ECI or USI of the HPC stage 8-10 spool and removing from service those parts that fail inspection. We are issuing this AD to prevent failure of the HPC stage 8-10 spool, uncontained rotor release, damage to the engine, and damage to the airplane.

Comments

We gave the public the opportunity to participate in developing this AD. The following presents the comments received on the NPRM and the FAA's response to each comment.

Request To Revise Compliance

The Boeing Company (Boeing) and GE requested paragraph (f)(1)(i) be changed to apply to ECIs performed between January 2016 and July 29, 2016. Boeing and GE stated that operators who performed an ECI between January 2016 and July 29, 2016 are in accordance with GE GE90 Service Bulletin (SB) 72-1151, Initial issue or Revision 1.

We agree. Credit should be given for ECIs performed in accordance with GE GE90 SB 72-1151, Initial issue or Revision 1. We added paragraph (f)(2)(iii) to the Compliance section.

Request To Revise Compliance Time

Boeing and GE requested paragraph (f)(1)(ii) be changed to state that if it has been more than 400 cycles since the qualified initial USI inspection, then, inspect within 100 cycles from the effective date of this AD. Boeing and GE stated that this provides the operators with a reasonable amount of time to perform the USI.

We disagree. The date for the initial inspection was based on the effective date of AD 2016-13-05. The USI requirement is unchanged, so the 500 cycle allowance mandated in AD 2016-13-05 is also mandated by this AD. We did not change this AD.

Request To Revise Service Information

Boeing, GE, and Japan Air Lines (JAL) requested updating the Related Information section to reflect the latest version of the GE SB. GE SB 72-1151 was revised to Revision 01 on September 13, 2016 and includes the most recent details and aligns with this AD.

We agree. GE GE90 SB 72-1151, Revision 01, dated September 13, 2016, includes the most recent details, aligns with this AD, and also meets the risk analysis performed. We added GE GE90

SB 72-1151, Revision 01, dated September 13, 2016 and GE GE90 SB 72-1151, Revision 0, dated June 10, 2016 to paragraph (i)(2) of this AD.

Request To Revise Service Information

JAL requested updating paragraph (i)(2) Related Information, to perform an ECI in accordance with future revisions of the service information. JAL also requested updating paragraph (i)(2) Related Information, to add "and later" to the revision number relating to Chapter 72-31-08; Special Procedure 003 and 72-00-31 Special Procedure 006 in GE GE90 Engine Manual, GEK100700, Revision 68, dated September 1, 2016.

We disagree. We are only authorized to mandate use of service information that we have reviewed and which are published. Since future revisions of service information are not yet published, we are not authorized to mandate their use. We did not change this AD.

Conclusion

We reviewed the relevant data, considered the comments received, and determined that air safety and the public interest require adopting this AD with the changes described previously. We have determined that these minor changes:

- Are consistent with the intent that was proposed in the NPRM, for correcting the unsafe condition; and
- Do not add any additional burden upon the public than was already proposed in the NPRM.

We also determined that these changes will not increase the economic burden on any operator or increase the scope of this AD.

Related Service Information

We reviewed GE GE90 SB 72-1151, Revision 01, dated September 13, 2016. The SB describes procedures for an on-wing USI of the stage 8 web of the stage 8-10 spool. 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 the ADDRESSES section.

We also reviewed Chapter 72-31-08, Special Procedures 003; and Chapter 72-00-31, Special Procedures 006, in the GE GE90 Engine Manual, GEK100700, Revision 68, dated September 1, 2016. These procedures describe how to perform ECI of the stage 8 aft web of the stage 8-10 spool.

Interim Action

We consider this AD interim action. GE is determining the root cause for the unsafe condition identified in this AD. Once a root cause is determined, we will consider additional rulemaking.

Costs of Compliance

We estimate that this AD affects 54 engines installed on airplanes of U.S. registry.

We estimate the following costs to comply with this AD:

Estimated Costs

Action	Labor cost	Parts cost	Cost per product	Cost on U.S. operators
Inspection	7 work-hours × $85 per hour = $595 per inspection cycle	$0	$595 per inspection cycle	$32,130 per inspection cycle.

We estimate the following costs to do any necessary replacements that would be required based on the results of the inspection. We have no way of determining the number of engines that might need this replacement:

On-Condition Costs

Action	Labor cost	Parts cost	Cost per product
Replacement of spool	0 work-hours × $85 per hour = $0	$780,000	$780,000

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 it justifies making a regulatory distinction, 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) 2016-13-05, Amendment 39-18569 (81 FR 41208, June 24, 2016; corrected 81 FR 42475, June 30, 2016), and adding the following new AD:

2017-08-05 General Electric Company: Amendment 39-18854; Docket No. FAA-2015-7491; Directorate Identifier 2015-NE-39-AD

(a) Effective Date

This AD is effective May 19, 2017.

(b) Affected ADs

This AD replaces AD 2016-13-05, Amendment 39-18569 (81 FR 41208, June 24, 2016; corrected June 30, 2016, 81 FR 42475).

(c) Applicability

This AD applies to General Electric Company (GE) GE90-76B, GE90-77B, GE90-85B, GE90-90B, and GE90-94B turbofan engines with a high-pressure compressor (HPC) stage 8-10 spool, part numbers (P/Ns) 1694M80G04, 1844M90G01, or 1844M90G02, installed.

(d) Subject

Joint Aircraft System Component (JASC) Code 7230, Engine Compressor Section.

(e) Unsafe Condition

This AD was prompted by an uncontained failure of the HPC stage 8-10 spool. We are issuing this AD to prevent failure of the HPC stage 8-10 spool, uncontained rotor release, damage to the engine, and damage to the airplane.

(f) Compliance

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

(1) For HPC stage 8-10 spool, P/N 1694M80G04, all serial numbers (S/Ns), or HPC stage 8-10 spool, P/N 1844M90G01 or 1844M90G02, with a S/N listed in Figure 1 to paragraph (f) of this AD; perform an on-wing ultrasonic inspection (USI) of the stage 8 aft web upper face as follows:

(i) Perform an initial USI after reaching 8,000 cycles since new (CSN), but, before exceeding 9,000 CSN, or within 500 cycles in service after July 29, 2016, whichever occurs later.

(ii) Thereafter, perform a USI of the stage 8 aft web upper face every 500 cycles since last inspection.

(iii) Compliance with paragraph (f)(2)(i) or (f)(2)(iii) of this AD is terminating action for the initial and repetitive USIs specified by paragraphs (f)(1)(i) and (ii) of this AD.

Figure 1 to Paragraph (f)–HPC Stage 8-10 Spool S/Ns

Part Nos.	Serial Nos.				
1844M90G01	GWN005MF	GWNBK753	GWNBS077	GWNBS497	GWNBS724
	GWN005MG	GWNBK754	GWNBS078	GWNBS499	GWNBS794
	GWN0087M	GWNBK841	GWNBS079	GWNBS500	GWNBS810
	GWN0087N	GWNBK842	GWNBS080	GWNBS501	GWNBS811
	GWN00DGK	GWNBK843	GWNBS081	GWNBS502	GWNBS812
	GWN00DGL	GWNBK844	GWNBS157	GWNBS609	GWNBS813
	GWNBJ992	GWNBK952	GWNBS158	GWNBS610	GWNBS814
	GWNBK667	GWNBK953	GWNBS159	GWNBS611	GWNBS910
	GWNBK674	GWNBK954	GWNBS160	GWNBS612	GWNBS911
	GWNBK675	GWNBK955	GWNBS266	GWNBS613	GWNBS912
	GWNBK743	GWNBK956	GWNBS267	GWNBS614	GWNBS914
	GWNBK744	GWNBK957	GWNBS268	GWNBS721	GWNBS915
	GWNBK751	GWNBK958	GWNBS269	GWNBS722	GWNBS982
	GWNBK752	GWNBK959	GWNBS270	GWNBS723	GWNBS983
1844M90G02	GWN00C2T	GWN01C5N	GWN02N8D	GWN03RTM	GWN04E21
	GWN00C2V	GWN01GE2	GWN02T3R	GWN03RTP	GWN04GHT
	GWN00G2N	GWN01GE3	GWN02WGM	GWN040RL	GWN04GHW
	GWN00G2P	GWN01GE4	GWN0311K	GWN040RM	GWN04GJ0
	GWN00PFP	GWN01GE6	GWN035PP	GWN040RN	GWN04JW6
	GWN00PFR	GWN01WH1	GWN038TD	GWN040RP	GWN04JW7
	GWN00T2N	GWN02688	GWN039TG	GWN04202	GWN04JW8
	GWN00YHV	GWN02689	GWN03G2R	GWN0435W	GWN04L7K
	GWN0125G	GWN0268A	GWN03G2W	GWN04360	GWN04L7L
	GWN0125H	GWN02DP2	GWN03G30	GWN04361	GWN04MT7
	GWN0166K	GWN02DP3	GWN03JPC	GWN04362	GWN04MT8
	GWN01C5K	GWN02F9F	GWN03JPD	GWN04ATG	GWNBS984
	GWN01C5L	GWN02F9G	GWN03N8P	GWN04ATH	
	GWN01C5M	GWN02L9T	GWN03N8R	GWN04E20	

(2) For all HPC stage 8-10 spools, P/N 1694M80G04, 1844M90G01, or 1844M90G02, perform an eddy current inspection (ECI) of the stage 8 aft upper face as follows:

(i) Perform an initial ECI of the stage 8 aft web upper face at the next shop visit after the effective date of this AD.

(ii) Thereafter, perform an ECI of the stage 8 aft web upper face at each subsequent shop visit.

(iii) If you performed an ECI of the stage 8 aft web upper surface before the effective date of the AD, you met the requirements of paragraph (f)(2)(i) of this AD.

(3) Remove from service any HPC stage 8-10 spool that fails the inspection required by paragraphs (f)(1) or (2) of this AD, and replace with a spool eligible for installation.

(g) Definition

For the purpose of this AD, an engine shop visit is the induction of an engine into the shop for maintenance during which the compressor discharge pressure seal face is exposed.

(h) Alternative Methods of Compliance (AMOCs)

The Manager, Engine Certification Office, FAA, may approve AMOCs for this AD. Use the procedures found in 14 CFR 39.19 to make your request. You may email your request to: ANE-AD-AMOC@faa.gov.

(i) Related Information

(1) For more information about this AD, contact John Frost, Aerospace Engineer, Engine Certification Office, FAA, 1200 District Avenue, Burlington, MA 01803; phone: 781-238-7756; fax: 781-238-7199; email: john.frost@faa.gov.

(2) GE GE90 Service Bulletin (SB) 72-1151, Revision 01, dated September 13, 2016; GE GE90 SB 72-1151, Revision 0, dated June 10, 2016; Chapter 72-31-08, Special Procedures 003; and Chapter 72-00-31, Special Procedures 006, in GE GE90 Engine Manual, GEK100700, Revision 68, dated September 1, 2016, can be obtained from GE using the contact information in paragraph (i)(3) of this AD. These SBs describe procedures for an on-wing USI of the stage 8 web of the stage 8-10 spool. These engine manual procedures describe how to perform ECI of the stage 8 aft web of the stage 8-10 spool.

(3) For service information identified in this AD, contact General Electric Company, GE-Aviation, Room 285, 1 Neumann Way, Cincinnati, OH 45215, phone: 513-552-3272; fax: 513-552-3329; email: geae.aoc@ge.com.

(4) You may view this service information at the FAA, Engine & Propeller Directorate, 1200 District Avenue, Burlington, MA. For information on the availability of this material at the FAA, call 781-238-7125.

(j) Material Incorporated by Reference

None.

Issued in Burlington, Massachusetts, on April 5, 2017.
Carlos A. Pestana,
Acting Manager, Engine & Propeller Directorate,
Aircraft Certification Service.