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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2010-0562; Directorate Identifier 2009-NE-29-AD; Amendment 39-16669; AD 2011-09-07]

RIN 2120-AA64

Airworthiness Directives; Rolls-Royce plc (RR) RB211-524 Series and RB211 Trent 500, 700, and 800 Series Turbofan Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: We are adopting a new airworthiness directive (AD) for the products listed above. This AD results from mandatory continuing airworthiness information (MCAI) issued by an aviation authority of another country to identify and correct an unsafe condition on an aviation product. The MCAI describes the unsafe condition as:

> During manufacture of a number of HP Compressor Stage 1 and 2 discs with axial dovetail slots, anomalies at the disc post corners have been found. Fatigue crack initiation and subsequent crack propagation at the disc post may result in release of two blades and the disc post. This may potentially be beyond the containment capabilities of the engine casings. Thus, these anomalies present at the disc posts constitute a potentially unsafe condition.

We are issuing this AD to detect cracks in the high-pressure compressor (HPC) Stage 1 and 2 disc posts, which could result in failure of the disc post and release of HPC blades, release of uncontained engine debris, and damage to the airplane.

DATES: This AD becomes effective June 7, 2011. The Director of the Federal Register approved the incorporation by reference of certain publications listed in this AD as of June 7, 2011.

ADDRESSES: The Docket Operations office is located at Docket Management acility, U.S. Department of Transportation, 1200 New Jersey Avenue, SE., West Building Ground Floor, Room W12-140, Washington, DC 20590-0001.

FOR FURTHER INFORMATION CONTACT: Alan Strom, Aerospace Engineer, Engine Certification Office, FAA, Engine and Propeller Directorate, 12 New England Executive Park, Burlington, MA 01803; e-mail: alan.strom@faa.gov; telephone (781) 238-7143; fax (781) 238-7199.

SUPPLEMENTARY INFORMATION:

Discussion

We issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 to include an AD that would apply to the specified products. That NPRM was published in the Federal Register on June 15, 2010 (75 FR 33738). That NPRM proposed to correct an unsafe condition for the specified products. The MCAI states that:

> During manufacture of a number of HP Compressor Stage 1 and 2 discs with axial dovetail slots, anomalies at the disc post corners have been found. Fatigue crack initiation and subsequent crack propagation at the disc post may result in release of two blades and the disc post. This may potentially be beyond the containment capabilities of the engine casings. Thus, these anomalies present at the disc posts constitute a potentially unsafe condition.
>
> For the reasons described above, this AD requires repetitive inspections of the axial dovetail slots and follow-on corrective action, depending on findings.

Comments

We gave the public the opportunity to participate in developing this AD. We considered the comments received.

Request To Change the Definition of a Shop Visit

Five commenters request that we change the criteria for carrying out the inspections to be consistent with the European Aviation Safety Agency (EASA) AD. The commenters ask that we require performing the inspections at the first shop visit after accumulating 1,000 hours-since-new (HSN) and whenever a Level 3 (Refurbishment) or Level 4 (Overhaul) shop visit occurs. The commenters feel that requiring the inspections any time a major flange is separated would result in more inspections than required by the EASA AD. Some of the inspections would cost significantly more than what is estimated in the Costs of Compliance section of the proposed AD.

We partially agree. We agree that the current wording would result in more inspections than required by the EASA AD, and some of the inspections would cost significantly more than what we estimated in the Costs of Compliance section of the proposed AD. We do not agree with using the Level 3 or Level 4 criteria as a definition of "engine shop visit" for the purpose of this AD. The definitions of Level 3 and Level 4 are not specific enough to ensure the inspections are conducted frequently enough to prevent the unsafe condition. We changed the definition of shop visit in paragraph (f) of the proposed AD from "For * * * an "engine shop visit" is the induction of an engine into the shop for maintenance involving the separation of pairs of major mating engine flanges, * * *" to "For * * * an "engine shop visit" is whenever the engine high-pressure compressor module is separated from the intermediate case."

Request To Change the Summary of the Proposed AD

One commenter, RR, asks us to consider changing the Summary from "Thus, these anomalies present at the disc posts constitute a potentially unsafe condition" to "Thus, if these anomalies are

present at the disc posts, they constitute a potentially unsafe condition." The commenter believes that the MCAI description implies that all discs have the anomalies in question. The AD does not assume that to be true.

We don't agree. The second paragraph of the Summary quotes the EASA AD. We did not change the AD.

Request To Correct a Disc Part Number

The same commenter asks us to change paragraph (c)(1) part number (P/N) "FK20195" to "FW20195." The commenter states that the NPRM contains a typographical error.

We agree. We changed the part number in paragraph (c)(1) of the proposed AD from "FK20195" to "FW20195."

Request To Change the Unsafe Condition Statement

The same commenter asks us to change the unsafe condition statement in the Summary and in paragraph (d) of the proposed AD from "* * * failure of the disc post, which could result in failure of the disc post and HPC blades, release * * * airplane" to "* * * failure of the disc post, resulting in release of HPC blades, release * * * airplane." The commenter states the NPRM implies that high-pressure compressor blades may themselves fail, when in fact they are released as a result of disk post failure.

We agree. We changed the unsafe condition statement in the Summary and in paragraph (d) of the proposed AD to "which could result in failure of the disc post, release of HPC blades, release of uncontained debris, * * * airplane."

Request To Ensure the Disc is Cleaned before Inspection

The same commenter asks us to change paragraph (e)(1) of the proposed AD from "Perform a * * * later. Use paragraph 3.E.(1) through 3.E.(10)(i) * * * inspections" to "Clean and perform * * * later. Use paragraph 3.A through 3.E.(10)(i) * * * inspections." The commenter believes the change will ensure adequate cleaning before inspection, which is essential to make sure the small cracks are visible.

We agree. Because the corrective action is looking for small cracks underneath a dry film lubricant coating, the cleaning procedure prior to fluorescent penetrant inspection (FPI) is critical to the corrective action. We changed paragraph (e)(1) of the proposed AD to "Clean and perform * * * later. Use paragraph 3.A through 3.E.(11) * * * inspections." We also added paragraph 3.E.(11) to ensure that the blades will be re-coated prior to re-installation.

Request To Change Nomenclature of HPC Rotor Shaft

One commenter, Hawaiian Airlines, asks us to change "HPC rotor shaft" to "HP compressor drum." The commenter states that the HPC drum in the Trent 700 engine is a six stage rotor and is referred to as the "HPC rotor shaft." Since each engine model has different nomenclature, they request that we use a common name when we refer to the subject part such as "HP compressor Drum." The commenter believes that this will ensure a common understanding of the parts involved.

We don't agree. While the service bulletin uses the term "HPC drum," the AD consistently refers to the HPC disks by stage number.

Conclusion

We reviewed the available data, including the comments received, and determined that air safety and the public interest require adopting the AD with the changes described previously. We

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

Costs of Compliance

Based on the service information, we estimate that this AD would affect about 371 products of U.S. registry. We also estimate that it would take about 20 work-hours per product to comply with this AD. The average labor rate is $85 per work-hour. No parts would be required per product. Based on these figures, we estimate the cost of the AD on U.S. operators to be $630,700.

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 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 this AD:

1. Is not a "significant regulatory action" under Executive Order 12866;

2. Is not a "significant rule" under the DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979); 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.

We prepared a regulatory evaluation of the estimated costs to comply with this AD and placed it in the AD docket.

Examining the AD Docket

You may examine the AD docket on the Internet at http://www.regulations.gov; or in person at the Docket Operations office 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 street address for the Docket Operations office (phone (800) 647-5527) is provided in the ADDRESSES section. Comments will be available in the AD docket shortly after receipt.

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 adding the following new AD:

2011-09-07 Rolls-Royce plc (RR): Amendment 39-16669. Docket No. FAA-2010-0562; Directorate Identifier 2009-NE-29-AD.

Effective Date

(a) This airworthiness directive (AD) becomes effective June 7, 2011.

Affected ADs

(b) None.

Applicability

(c) This AD applies to RR model RB211-524G2-T-19, -524G3-T-19, -524H-T-36, and -524H2-T-19; and RB211 Trent 553-61, 553A2-61, 556-61, 556A2-61, 556B-61, 556B2-61, 560-61, 560A2-61; RB211 Trent 768-60, 772-60, 772B-60; and RB211 Trent 875-17, 877-17, 884-17, 884B-17, 892-17, 892B-17, and 895-17 turbofan engines that have a high-pressure (HP) compressor stage 1 to 4 rotor disc with a part number (P/N) listed in Table 1 of this AD. These engines are installed on, but not limited to, Boeing 747, 767, and 777 series airplanes and Airbus A330 and A340 series airplanes.

Table 1–Affected HP Compressor Stage 1 to 4 Rotor Disc P/Ns by Engine Model

Engine model	HP compressor stage 1 to 4 rotor disc P/N
(1) RB211-524G2-T-19, -524G3-T-19, -524H-T-36, and -524H2-T-19.	FW20195, FK25502, or FW23711.
(2) RB211 Trent 553-61, 553A2-61, 556-61, 556A2-61, 556B-61, 556B2-61, 560-61, and 560A2-61.	FK30524.
(3) RB211 Trent 768-60, 772-60, and 772B-60.	FK22745, FK24031, FK26185, FK23313, FK25502, FK32129, FW20195, FW20196, FW20197, FW20638, or FW23711.
(4) RB211 Trent 875-17, 877-17, 884-17, 884B-17, 892-17, 892B-17, and 895-17.	FK24009, FK26167, FK32580, FW11590, or FW61622.

Reason

(d) This AD results from reports that:

During manufacture of a number of HP Compressor Stage 1 and 2 discs with axial dovetail slots, anomalies at the disc post corners have been found. Fatigue crack initiation and subsequent crack propagation at the disc post may result in release of two blades and the disc post. This may potentially be beyond the containment capabilities of the engine casings. Thus, these anomalies present at the disc posts constitute a potentially unsafe condition.

We are issuing this AD to detect cracks in the high-pressure compressor (HPC) Stage 1 and 2 disc posts, which could result in failure of the disc post and release of HPC blades, release of uncontained engine debris, and damage to the airplane.

Actions and Compliance

(e) Unless already done, do the following actions.

(1) Clean and perform a fluorescent penetrant inspection of the HP compressor stage 1 to 4 rotor discs at the first shop visit after accumulating 1000 cycles since new on the stage 1 to 4 rotor disks or at the next shop visit after the effective date of this AD, whichever occurs later. Use paragraph 3.A through 3.E.(11) of the Accomplishment Instructions of Rolls-Royce Alert Service Bulletin (ASB) RB.211-72-AF964, Revision 1, dated June 6, 2008 to do the inspections.

(2) Thereafter at every engine shop visit, perform the inspection specified by paragraph (e)(1) of this AD.

Definitions

(f) For the purpose of this AD, an "engine shop visit" is whenever the engine high-pressure compressor module is separated from the intermediate case.

Other FAA AD Provisions

(g) Alternative Methods of Compliance (AMOCs): The Manager, Engine Certification Office, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19.

Related Information

(h) See European Aviation Safety Agency Airworthiness Directive 2009-0073R1, dated April 8, 2009, for related information.

(i) Contact Alan Strom, Aerospace Engineer, Engine Certification Office, FAA, Engine and Propeller Directorate, 12 New England Executive Park, Burlington, MA 01803; e-mail: alan.strom@faa.gov; telephone (781) 238-7143; fax (781) 238-7199, for more information about this AD.

Material Incorporated by Reference

(j) You must use Rolls-Royce Alert Service Bulletin RB.211-72-AF964, Revision 1, dated June 6, 2008, to do the actions required by this AD, unless the AD specifies otherwise.

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

(2) For service information identified in this AD, contact Rolls-Royce plc, P.O. Box 31, Derby, DE24 8BJ, United Kingdom; phone: 011 44 1332 242424, fax: 011 44 1332 249936; e-mail: royce.com">tech.help@rolls-royce.com.

(3) You may review copies at the FAA, New England Region, 12 New England Executive Park, Burlington, MA; or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call (202) 741-6030, or go to: http://www.archives.gov/federal-register/cfr/ibr-locations.html.

Issued in Burlington, Massachusetts, on April 12, 2011.

Peter A. White,

Acting Manager, Engine and Propeller Directorate,

Aircraft Certification Service.