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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2010-0993; Directorate Identifier 2010-NE-08-AD; Amendment 39-16849; AD 2011-22-07]

RIN 2120-AA64

Airworthiness Directives; Rolls-Royce plc RB211-524 Series, RB211-Trent 700 Series, and RB211-Trent 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:

Cracking has been found on the inner wall between intermediate dilution chutes on a total of five front combustion liners of the standard corresponding to Rolls-Royce RB211 Service Bulletin No. 72-D133. The lives of two of these liners were confirmed to be below the currently valid borescope inspection interval. Ultimately, crack propagation could result in hot gas breakout with potential of downstream component distress and multiple turbine blade release beyond containment capabilities of the engine casings. Thus, cracking of this nature constitutes a potentially unsafe condition.

Since Rolls-Royce Service Bulletin No. 72-E902 introduces further developments of Rolls-Royce RB211 Service Bulletin No. 72-D133, engines incorporating Rolls-Royce RB211 Service Bulletin No. 72-E902 are also considered to be potentially affected and are therefore included in the applicability of this AD.

We are issuing this AD to detect cracks in the front combustion liner, which could result in hot section distress, multiple blade release, and possible damage to the airplane.

DATES: This AD becomes effective November 29, 2011. The Director of the Federal Register approved the incorporation by reference of certain publications listed in this AD as of November 29, 2011.

ADDRESSES: The Docket Operations office is located at Docket Management Facility, 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 & Propeller Directorate, 12 New England Executive Park, Burlington, MA 01803; e-mail: alan.strom@faa.gov; phone: 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 October 5, 2010 (75 FR 61363). That NPRM proposed to correct an unsafe condition for the specified products. The MCAI states that:

Cracking has been found on the inner wall between intermediate dilution chutes on a total of five front combustion liners of the standard corresponding to Rolls-Royce RB211 Service Bulletin No. 72-D133. The lives of two of these liners were confirmed to be below the currently valid borescope inspection interval. Ultimately, crack propagation could result in hot gas breakout with potential of downstream component distress and multiple turbine blade release beyond containment capabilities of the engine casings. Thus, cracking of this nature constitutes a potentially unsafe condition.

Since Rolls-Royce Service Bulletin No. 72-E902 introduces further developments of Rolls-Royce RB211 Service Bulletin No. 72-D133, engines incorporating Rolls-Royce RB211 Service Bulletin No. 72-E902 are also considered to be potentially affected and are therefore included in the applicability of this AD.

This AD requires a change to the initial and repeat borescope inspection intervals for the front combustion liner.

Comments

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

Request To Expand Address for Service Information

One commenter, Rolls-Royce plc (RR), asked us to consider changing the information for getting the service information to "For any questions concerning the technical content of the requirements in this AD (NPRM), please contact your designated Rolls-Royce representative for a copy of the service information, please download the publication from your Aeromanager account at <http://www.aeromanager.com>. If you do not have a designated representative or an Aeromanager account, please contact Corporate Communications at Rolls-Royce plc, PO Box 31, Derby, DE24 8BJ, United Kingdom, phone: 011-44-1331-242424, fax: 011-44-1332-249936, or e-mail: http://www.rolls-royce.com/contact/civil_team.jsp identifying the correspondence as being related to Airworthiness Directives." RR states that this should make sure that any questions from operators of their engines and those from other parties are directed to the area best equipped to answer.

We partially agree. We agree that operators and maintenance providers need to get timely and accurate service information, and that additional information is worth including. We changed

paragraph (k) of the AD to state "* * * contact Corporate Communications at Rolls-Royce plc PO Box 31, Derby, DE24 8BJ, United Kingdom, Phone: 011-44-1331-242424, fax 011-44-1332-249936 or e-mail from http://www.rolls-royce.com/contact/civil_team.jsp identifying the correspondence as being related to Airworthiness Directives."

We do not agree that operators or maintenance providers should contact RR for questions about this AD. We did not include that information in the AD.

Requests To Change References to the Service Bulletin That Is Incorporated by Reference

Two commenters, American Airlines (AA) and The Boeing Company (Boeing), asked us to add "or later revision" after "Service Bulletin No. RB.211-72-AF458, Revision 2, dated December 21, 2007." Boeing stated the latest revision of Service Bulletin (SB) No. RB.211-72-AF458 is Revision 4. Boeing stated that airlines have been inspecting their combustion liners to Revision 4 of the SB and the compliance intervals specified in the NPRM are consistent with RR SB RB.211-72-AF458, Revision 4 and EASA AD 2009-0243R1. AA stated the borescope inspection is the same on later revisions, so the life should be counted from the latest SB revision.

We do not agree. On review of the SB, we determined that the inspection requirements and limits called out in the SB are already in the engine and aircraft maintenance manuals. We changed the AD to remove the incorporation by reference of the SB.

One commenter, AA, asked us to revise paragraph (f) of the AD to specifically call out which paragraphs of SB RB.211-72-AF458 are incorporated by reference. AA stated the NPRM called out all of section 3 of the SB, which is too prescriptive given the nature of the inspections.

We do not agree. On review of the SB, we found incorporation by reference unnecessary. We changed the AD to remove the incorporation by reference of the SB.

Request To Remove an Engine Model From the Applicability

One commenter, AA, asked us to remove the RR RB211-535 engine model from the applicability of the proposed AD. AA stated they have recorded no crack findings against the RB211-535 model.

We agree. The thermal, acoustical, and vibratory stress environment of the RB211-535 combustion liner is different from that of the other engines to which this AD applies. We removed the RB211-535E4-37, RB211-535E4-B-37, RB211-535E4-C-37, and RB211-535E4-B-75 from the Applicability paragraph (c) of this AD, and updated our cost estimate to reflect the fewer affected engines.

Request To Change the Number of Cracking Events

One commenter, Boeing, asked us to change paragraph (d) of the proposed AD to specify that six cracking events have been found instead of five. Boeing states that changing paragraph (d) of the proposed AD will more accurately reflect the need for the inspections.

We agree. Although an additional cracking event has occurred, the AD was prompted by the investigation of five events. We changed paragraph (d) of this AD to reflect six known cracking events.

Request To Add a Grace Period for Compliance

One commenter, Boeing asked us to change paragraphs (f)(1)(i) and (f)(1)(iii) of the proposed AD to add "within 15 cycles of the date of issue of the AD" before the word "or." Boeing states that adding the 15 cycle grace period will give operators time to get back to base for the inspection.

We partially agree. No additional grace period is required. This AD does not require inspecting any engine earlier than 250 cycles after the effective date of the AD. We clarified the wording of paragraph (f) to make this clearer.

Statement of the Possibility of Cost and Operational Impact Increasing

One commenter, Federal Express, stated that cost and operational impact could increase if certain RB211-535 models are added to the applicability of the proposed AD. The commenter provided no reason for its statement.

We agree. However, additional engine models are not being added, and we are specifically excluding the RB211-535 engine in response to another comment. We did not change the AD in response to this comment.

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 will affect about 46 products of U.S. registry. We also estimate that it will take about 1.5 work-hours per product to comply with this AD. The average labor rate is \$85 per work-hour. No parts are required so parts will cost \$0 per product. Based on these figures, we estimate the cost of the AD on U.S. operators to be \$5,865.

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),
3. Will not affect intrastate aviation in Alaska, 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.

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:



2011-22-07 Rolls-Royce: Amendment 39-16849. Docket No. FAA-2010-0993; Directorate Identifier 2010-NE-08-AD.

Effective Date

- (a) This airworthiness directive (AD) becomes effective November 29, 2011.

Affected ADs

- (b) None.

Applicability

(c) This AD applies to Rolls-Royce (RR) turbofan engine models RB211-524G2-T-19, RB211-524G3-T-19, RB211-524H2-T-19, RB211-524H-T-36, RB211-Trent 768-60, RB211-Trent 772-60, RB211-Trent 772B-60, RB211-Trent 875-17, RB211-Trent 877-17, RB211-Trent 884-17, RB211-Trent 884B-17, RB211-Trent 892-17, RB211-Trent 892B-17 and RB211-Trent 895-17 that incorporate RR Service Bulletin (SB) RB.211-72-D133 or RB.211-72-E902. These engines are installed on, but not limited to, Airbus A330 series airplanes; Boeing 747-400 series, 767 series, and 777 series airplanes.

Reason

- (d) This AD results from:

Cracking has been found on the inner wall between intermediate dilution chutes on a total of five front combustion liners of the standard corresponding to Rolls-Royce RB211 Service Bulletin No. 72-D133. The lives of two of these liners were confirmed to be below the currently valid borescope inspection interval. Ultimately, crack propagation could result in hot gas breakout with potential of downstream component distress and multiple turbine blade release beyond containment capabilities of the engine casings. Thus, cracking of this nature constitutes a potentially unsafe condition.

Since Rolls-Royce Service Bulletin No. 72-E902 introduces further developments of Rolls-Royce RB211 Service Bulletin No. 72-D133, engines incorporating Rolls-Royce RB211 Service Bulletin No. 72-E902 are also considered to be potentially affected and are therefore included in the applicability of this AD.

Since EASA issued its AD, another cracking event has occurred, bringing to six the total of crack events of which we are aware. We are issuing this AD to detect cracks in the front combustion liner, which could result in hot section distress, multiple blade release, and possible damage to the airplane.

Actions and Compliance

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

Initial Inspection

(f) Perform a borescope inspection of the front combustion liner inner wall, before accumulating the cyclic limits specified in paragraphs (f)(2) and (f)(3) of this AD.

(1) If you incorporated paragraph 3.A.(2)(a) of RR Alert Service Bulletin (ASB) RB.211-72-AF458, Revision 4, dated March 9, 2009, or ASB RB.211-72-AF458, Revision 5, dated April 20, 2011, you have satisfied the requirements of paragraph (f) of this AD.

(2) If the engine has a combustion liner installed with:

(i) A LIFE on the effective date of this AD, that is equal to or greater than the initial inspection threshold specified in column (b) of Table 1 of this AD or a LIFE on the effective date of this AD, that is not known, within 250 cycles after the effective date of this AD, perform a borescope inspection as specified in paragraph (f) of this AD.

(ii) A LIFE on the effective date of this AD, that is less than the initial inspection threshold specified in column (b) of Table 1 of this AD, perform the borescope inspection before the LIFE exceeds the limit specified in column (c) of Table 1 of this AD.

Repeat Inspection

(3) Thereafter, repeat the borescope inspection specified in paragraph (f) of this AD at intervals not to exceed the cycles specified in column (d) of Table 1 of this AD.

Table 1—Initial Inspection Thresholds and Limits

Column (a)	Column (b)	Column (c)	Column (d)
Engine model	Initial inspection threshold	Initial inspection limit if LIFE is less than the initial inspection threshold	Repeat inspection interval
(i) RB211-524G2-T-19, 524G3-T-19 and 524H2-T-19	1,150 cycles	1,400 cycles	1,400 cycles.
(ii) RB211-524H-T-36	550 cycles	800 cycles	800 cycles.
(iii) RB211-Trent 768-60, 772-60 and 772B-60	1,250 cycles	1,500 cycles	1,500 cycles.
(iv) RB211-Trent 892-17, RB211-Trent 884-17, RB211-Trent 884B-17, RB211-Trent 877-17, RB211-Trent 875-17, RB211-Trent 892B-17 and RB211-Trent 895-17 engines.	750 cycles	1,000 cycles	1,000 cycles.

Definitions

(g) This AD defines LIFE as the lowest of:

(1) The number of cycles-since-new of the combustion liner, or

(2) The number of cycles-in-service (CIS) since replacement of the inner wall, or

(3) The number of CIS since the inner wall of the combustion liner was last borescope-inspected, or inspected by performing paragraph 3.A.(2)(a) of RR ASB RB.211-72-AF458, Revision 4, dated March 9, 2009 or ASB RB.211-72-AF458, Revision 5, dated April 20, 2011.

FAA AD Differences

(h) This AD differs from the Mandatory Continuing Airworthiness Information (MCAI) in that the MCAI AD applies to the RB211-Trent 772C-60 engine, which is not type certificated in the United States. The MCAI also allows use of later revisions of the SBs. This AD does not.

Other FAA AD Provisions

(i) 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

(j) Refer to MCAI European Aviation Safety Agency Airworthiness Directive 2009-0243R2, Corrected, dated February 22, 2011, for related information.

(k) Rolls-Royce ASB RB.211-72-AF458, Revision 4, dated March 9, 2009, or ASB RB.211-72-AF458, Revision 5, dated April 20, 2011, provide information on how to do the actions required by this AD. For service information identified in this AD, contact Corporate Communications at Rolls-Royce plc, PO Box 31, Derby, DE24 8BJ, United Kingdom, phone: 011-44-1331-242424, fax: 011-44-1332-249936, or e-mail: http://www.rolls-royce.com/contact/civil_team.jsp identifying the correspondence as related to airworthiness directives.

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

Material Incorporated by Reference

(m) None.

Issued in Burlington, Massachusetts, on October 18, 2011.

Peter A. White,
Manager, Engine and Propeller Directorate,
Aircraft Certification Service.