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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2013-0029; Directorate Identifier 2013-NE-01-AD; Amendment 39-17599; AD 2013-19-17]

RIN 2120-AA64

Airworthiness Directives; Rolls-Royce plc Turbofan Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: We are adopting a new airworthiness directive (AD) for all Rolls-Royce plc (RR) RB211-535E4-B-37 series turbofan engines. This AD requires removal of affected parts using a drawdown plan. This AD was prompted by recalculating the lives of certain rotating life limited parts (LLPs) operated to certain flight profiles. We are issuing this AD to prevent the failure of rotating LLPs, which could result in uncontained failure of the engine and damage to the airplane.

DATES: This AD becomes effective November 7, 2013. The Director of the Federal Register approved the incorporation by reference of certain publications listed in this AD as of November 7, 2013.

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.

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 mandatory continuing airworthiness information (MCAI), 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.

FOR FURTHER INFORMATION CONTACT: Robert Green, Aerospace Engineer, Engine Certification Office, FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA 01803; phone: 781-238-7754; fax: 781-238-7199; email: robert.green@faa.gov.

SUPPLEMENTARY INFORMATION:

Discussion

We issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 by adding an AD that would apply to the specified products. The NPRM was published in the Federal Register on April 5, 2013 (78 FR 20509). The NPRM proposed to correct an unsafe condition for the specified products. The MCAI states:

> Flight Profiles (FP) define the limits of engine operation within which the engine will qualify for use of an associated set of Critical Parts life limits. The Rolls-Royce RB211-535E4-B-37 engine previously had only one such FP and associated set of life limits published in the applicable RR Time Limits Manual.
>
> However, a recent review of operational flight data has revealed that some engines may have been operated beyond the currently valid datum FP.
>
> Failure to account for the correct rate of fatigue damage associated with engine operation may lead to Critical Parts failure, possibly resulting in release of high energy debris, damage to the aeroplane and/or injury to occupants.

Comments

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

Agreement With the AD

The Boeing Company expressed support for the NPRM (78 FR 20509, dated April 5, 2013).

Request To Be Less Specific About Service Bulletin Revision Level and Date

Texas Aero Engine Service LLC, RR, and United Airlines (UAL) requested that we not include the revision level and date of RR Alert Non-Modification Service Bulletin (NMSB) No. RB.211-72-AG875, or that we add the words "or later revision" because service bulletins can be revised often.

We disagree. RR Alert NMSB No. RB.211-72-AG875, dated December 13, 2012, contains unique methods that require incorporation by reference, requiring that we specify revision level and date. We do not know how the NMSB may be revised in the future, and therefore cannot add the words "or later revision." We did not change this AD.

Request To Change the Definition of Engine Shop Visit (ESV)

RR and UAL requested that we change our definition of ESV in paragraph (g) of this AD by replacing the words "separation of flanges" with "deblading of the affected rotor disc." They noted that our definition of ESV is not consistent with the instructions in RR Alert NMSB No. RB.211-72-AG875, dated December 13, 2012, which only applies when the rotor is debladed. Our ESV definition will result in the removal of parts earlier than would occur using the RR NMSB. RR noted that this is not necessary based on their risk assessment of a possible failure. In a subsequent

comment, RR asked that the ESV definition be based on the deblading of the high pressure turbine disc since this better defines an engine refurbishment shop visit.

We disagree. We defined ESV as the separation of a pair of major mating engine module flanges in order to satisfy our safety concerns while minimizing the impact to the public. The redefined, reduced cyclic life limits are needed to correct an unsafe condition. We have determined that corrective actions can be practicably implemented at next ESV and that these actions will provide an acceptable level of safety. We did not change this AD.

Request To Exempt an External Gearbox Removal From the ESV Definition

RR requested that we clarify that the separation of a pair of major mating engine module flanges in paragraph (g) of this AD does not include the separation of an engine external gearbox from the engine, which would not constitute a refurbishment shop visit.

We agree. We changed paragraph (g) of this AD to state: "For the purpose of this AD, ESV is whenever engine maintenance performed prior to reinstallation requires the separation of a pair of major mating engine module flanges. Separation of flanges solely for the purpose of shipment without subsequent internal maintenance is not an ESV. Separation of the external gearbox engine mating flanges or removal of the external gearbox is also not classified as a shop visit."

Request To Delay Implementation of Reduced Rotating Parts Life Limits

American Air Lines (AAL) and RR asked that we revise or remove paragraph (e)(2) of this AD to eliminate the requirement to assign the reduced maximum approved lives within 30 days of the effective date of this AD and allow the current lives as published in the Time Limits Manual (TLM) to remain in effect until November 30, 2016. AAL stated that the AD requirement will cause problems for operator life limit tracking systems, causing confusion and possibly the grounding of aircraft. Operator life limit tracking systems prevent the operation of parts beyond their maximum approved lives.

We disagree. Operating beyond the redefined, reduced cyclic life limits represents an unsafe condition. LLPs that exceed the reduced life limits should be removed from service as soon as practicable to correct an unsafe condition. We did not change this AD.

Request To Clarify Wording Regarding Compliance Date and Life Limits

AAL and RR requested that we clarify wording in paragraph (e)(5) of this AD regarding removal of affected parts by the compliance date, and that the parts cannot exceed current life limits. One commenter stated that this paragraph could potentially allow parts to operate beyond both the current and reduced life limits.

We partially agree. We agree that paragraph (e)(5) of this AD could be misinterpreted because we did not specify that paragraph (e)(4) of this AD applies to those engines which have an engine shop visit prior to reaching the reduced life.

We do not agree that the compliance wording could potentially allow parts to operate beyond their current life limits because the life limits, as published in the TLM for RR RB211 engines, cannot be exceeded.

We changed paragraph (e)(4) of this AD by inserting "before reaching the part life assigned in paragraph (e)(2)". The paragraph now reads: "(4) After the effective date of this AD, for engines that incorporate an LP turbine disc stage 2, IP compressor rotor shaft (stage 1 to 6), HP compressor rear rotor shaft assembly, or HP turbine disc whose part life is defined by paragraph (e)(1) of this AD, that have an engine shop visit (ESV) before reaching the part life assigned in paragraph (e)(2) of this AD, remove each part from service before the part exceeds the part life assigned in paragraph (e)(2)."

Request To Change Compliance To Be Consistent With the RR NMSB

AAL, RR, and UAL requested that we change the compliance to be consistent with RR Alert NMSB No. RB.211-72-AG875, dated December 13, 2012. AAL noted that the risk assessment conducted by RR supports the continued use of the current life limits for parts not exposed during a shop visit, and demonstrated an acceptable level of safety. AAL further stated that the AD as proposed (78 FR 20509, April 5, 2013) will result in significant shop visit costs in comparison to the shop visit costs associated with the RR Alert NMSB.

We disagree. The redefined, reduced cyclic life limits are needed to correct an unsafe condition. We have determined that corrective actions can be practicably implemented at next ESV and that these actions will provide an acceptable level of safety. We did not change this AD.

Request To Change Compliance Time

UAL requested that we change the compliance time in paragraphs (e)(1) and (e)(2) of this AD from "within 30 days" to "within 90 days" because for UAL's fleet of 137 engines, 30 days is too short of a compliance period.

We disagree. The recommended timeframe for completion in RR Alert NMSB No. RB.211-72-AG875, dated December 13, 2012, was 6 weeks. The new lives of the rotating LLPs could have been recalculated starting from when the NMSB was issued. In addition, the effective date of this AD is 35 days after the date of publication in the Federal Register, which provides additional time beyond the 30 days mandated in this AD. We did not change this AD.

Request To Change the Costs of Compliance

AAL requested that we change the costs of compliance to include the labor costs associated with replacing the parts (i.e., engine disassembly costs). AAL states that the AD requires replacement of parts in modules that are not related to an engine removal cause, resulting in additional labor costs to access and replace those parts.

We disagree. We consider the actual costs of this AD, which are associated with the prorated reduction in the lives of the LLPs. We do not consider the engine disassembly costs, which will vary depending on the category of the ESV. We did not change this AD.

Conclusion

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

Costs of Compliance

We estimate that this AD will affect about 377 engines of U.S. registry. Of these 377 engines, we estimate 95 engines operate to Flight Profile D or E. The average labor rate is $85 per hour. We do not estimate any labor cost is associated with this AD because the affected parts are replaced at the next shop visit. Prorated cost of parts adjusted to Flight Profile D operation, will cost about $77,672 per engine. Prorated cost of parts, adjusted to Flight Profile E operation, will cost about $204,981 per engine. Based on these figures, we estimate the cost of this AD on U.S. operators to be $11,834,655.

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 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.

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

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 airworthiness directive (AD):

CORRECTED: The regulatory portion of this AD lists the AD number as "200X-19-17"; we have corrected this copy, and will issue a correction to the Federal Register.

2013-19-17 Rolls-Royce plc Amendment 39-17599; Docket No. FAA-2013-0029; Directorate Identifier 2013-NE-01-AD.

(a) Effective Date

This AD becomes effective November 7, 2013.

(b) Affected ADs

None.

(c) Applicability

This AD applies to all Rolls-Royce plc (RR) RB211-535E4-B-37 series turbofan engines.

(d) Unsafe Condition

This AD was prompted by recalculating the lives of certain rotating life limited parts (LLPs) operated to certain flight profiles. We are issuing this AD to prevent the failure of rotating LLPs, which could result in uncontained failure of the engine and damage to the airplane.

(e) Actions and Compliance

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

(1) Within 30 days after the effective date of this AD, for engines that have operated to Flight Profile D or E, recalculate the life of the low-pressure (LP) turbine disc stage 2, intermediate-pressure (IP) compressor rotor shaft (stage 1 to 6), high-pressure (HP) compressor rear rotor shaft assembly, and HP turbine disc installed on that engine. Use the part lives, prorated life formulas, and flight profiles in Appendices 2, 4, and 5 of RR Alert Non-Modification Service Bulletin (NMSB) No. RB.211-72-AG875, dated December 13, 2012, to make that calculation.

(2) Within 30 days after the effective date of this AD, for engines that will operate to Flight Profile D or E, assign the maximum approved lives defined in Appendix 2 of RR Alert NMSB No. RB.211-72-AG875, dated December 13, 2012, to the LP turbine disc stage 2, IP compressor rotor shaft (stage 1 to 6), HP compressor rear rotor shaft assembly, and HP turbine disc based on the flight profile that will be flown.

(3) For engines that have only operated to, and will continue to operate to, Flight Profile C, as defined in Appendix 5 of RR Alert NMSB No. RB.211-72-AG875, dated December 13, 2012, no further action is required by this AD.

(4) After the effective date of this AD, for engines that incorporate an LP turbine disc stage 2, IP compressor rotor shaft (stage 1 to 6), HP compressor rear rotor shaft assembly, or HP turbine disc whose part life is defined by paragraph (e)(1) of this AD, that have an engine shop visit (ESV) before

reaching the part life assigned in paragraph (e)(2) of this AD, remove each part from service before the part exceeds the part life assigned in paragraph (e)(2).

(5) For those engines that incorporate an LP turbine disc stage 2, IP compressor rotor shaft (stage 1 to 6), HP compressor rear rotor shaft assembly, or HP turbine disc whose part life is defined by paragraph (e)(1) of this AD, that do not have an ESV after the effective date of this AD before the part exceeds the part life assigned in paragraph (e)(2) of this AD, remove the part from service at the next ESV.

(f) Installation Prohibition

Any LP turbine disc stage 2, IP compressor rotor shaft (stage 1 to 6), HP compressor rear rotor shaft assembly, or HP turbine disc whose part life is defined by paragraph (e)(1) of this AD that is re-installed in any engine after the effective date of this AD must be removed from service before the part exceeds the part life assigned in paragraph (e)(2) of this AD.

(g) Definition

For the purpose of this AD, ESV is whenever engine maintenance performed prior to reinstallation requires the separation of a pair of major mating engine module flanges. Separation of flanges solely for the purpose of shipment without subsequent internal maintenance is not an ESV. Separation of the external gearbox engine mating flanges or removal of the external gearbox is also not classified as a shop visit.

(h) Alternative Methods of Compliance (AMOCs)

The Manager, Engine Certification Office, may approve AMOCs for this AD. Use the procedures found in 14 CFR 39.19 to make your request.

(i) Related Information

(1) For more information about this AD, contact Robert Green, Aerospace Engineer, Engine Certification Office, FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA 01803; phone: 781-238-7754; fax: 781-238-7199; email: robert.green@faa.gov.

(2) Refer to European Aviation Safety Agency AD 2012-0265, dated December 18, 2012, for related information. You may examine the AD on the Internet at http://www.regulations.gov/#!documentDetail;D=FAA-2013-0029-0007.

(j) 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) Rolls-Royce plc Alert Non-Modification Service Bulletin No. RB.211-72-AG875, dated December 13, 2012.

(ii) Reserved.

(3) For Rolls-Royce plc service information identified in this AD, contact Rolls-Royce plc, Corporate Communications, P.O. Box 31, Derby, England, DE248BJ; phone: 011-44-1332-242424; fax: 011-44-1332-249936; email: http://www.rolls-royce.com/contact/civil_team.jsp; or download from https://www.aeromanager.com.

(4) You may view this service information at FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA. For information on the availability of this material at the FAA, call 781-238-7125.

(5) You may view this service information 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 September 16, 2013.

Carlos A. Pestana,

Acting Directorate Assistant Manager, Engine & Propeller Directorate,

Aircraft Certification Service.