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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2007-29343; Directorate Identifier 2000-NE-13-AD; Amendment 39-15721; AD 2008-22-24]

RIN 2120-AA64

Airworthiness Directives; Rolls-Royce plc RB211-535E4-37, RB211-535E4-B-37, and RB211-535E4-B-75 Series Turbofan Engines

AGENCY: Federal Aviation Administration (FAA), Department of Transportation (DOT).

ACTION: Final rule.

SUMMARY: The FAA is superseding an existing airworthiness directive (AD) for Rolls-Royce plc (RR) RB211-535E4-37, RB211-535E4-B-37, and RB211-535E4-B-75 series turbofan engines. That AD currently requires initial and repetitive ultrasonic inspections of installed low pressure compressor (LPC) fan blade roots on-wing and during overhaul, and relubrication according to accumulated life cycles. Also, that AD introduces application of Metco 58 blade root coating as an optional terminating action. This AD requires the same actions but adds compliance paragraphs to relax the compliance schedule for repetitive inspections for fan blades operating within RB211-535E4 flight profiles A and B, if certain requirements are met. This AD also relaxes the initial compliance threshold by extending the cycles at which an initial inspection is required. This AD results from RR issuing Mandatory Service Bulletin (MSB) No. RB.211-72-C879, Revision 5 and Revision 6, that introduced a relaxed repetitive compliance schedule for fan blades operating within RB211-535E4 flight profiles A and B, if certain requirements are met, and introduced a relaxed initial compliance threshold. We are issuing this AD to detect cracks in LPC fan blade roots, which if not detected, could lead to uncontained multiple fan blade failure, and damage to the airplane.

DATES: This AD becomes effective December 9, 2008. The Director of the Federal Register approved the incorporation by reference of certain publications listed in the regulations as of December 9, 2008.

ADDRESSES: You can get the service information identified in this AD from Rolls-Royce plc, PO Box 31, Derby, England, DE248BJ; telephone: 011-44-1332-242-424; fax: 011-44-1332-249-936.

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: Ian Dargin, Aerospace Engineer, Engine Certification Office, FAA, Engine and Propeller Directorate, 12 New England Executive Park, Burlington, MA 01803; e-mail: ian.dargin@faa.gov; telephone: (781) 238-7178; fax: (781) 238-7199.

SUPPLEMENTARY INFORMATION: The FAA proposed to amend 14 CFR part 39 by superseding AD 2005-02-05, Amendment 39-13950 (70 FR 3863, January 27, 2005), with a proposed AD. The proposed AD applies to RR RB211-535E4-37, RB211-535E4-B-37, and RB211-535E4-B-75 series turbofan engines. We published the proposed AD in the Federal Register on October 25, 2007 (72 FR 60606). That action proposed to require initial and repetitive ultrasonic inspections of installed LPC fan blade roots on-wing and during overhaul, and relubrication according to accumulated life cycles. That action also proposed to add compliance paragraphs to relax the compliance schedule for repetitive inspections for RB211-535E4 engines operating in flight profiles A and B, if certain requirements are met.

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 (telephone (800) 647-5527) is provided in the ADDRESSES section. Comments will be available in the AD docket shortly after receipt.

Comments

We provided the public the opportunity to participate in the development of this AD. We have considered the comment received.

One commenter states that Rolls-Royce plc issued Mandatory Service Bulletin No. RB.211-72-C879, Revision 6, dated December 14, 2007, while the proposed AD comment period was still open, and the AD should reference Revision 6.

We agree. Revision 6 contains the changes from Revision 5, and relaxes the initial compliance threshold by extending the cycles at which an inspection is required. We changed the AD to reference Revision 6, and made the following changes based on Revision 6:

- We deleted proposed AD paragraph (f), which referenced full sets of fan blades modified using RR Service Bulletin No. RB.211-72-C946, Revision 2, dated September 26, 2002, as the reference is unnecessary. As a result we recodified paragraphs (f) through (n).
- We clarified that the ultrasonic inspection is performed on the fan blade roots.
- Proposed AD paragraph (g) is changed from "On RB211-535E4 engines, operated to Flight Profile A, ultrasonically inspect, and if required, relubricate using the following Table 2" to the following:

"(f) On RB211-535E4 engines, operated to Flight Profile A:

(1) Ultrasonically inspect the fan blade root, and if required, relubricate using one of the methods in Table 2 of this AD.

(2) If the initial inspection is complete prior to 18,600 cycles-since-new (CSN), then the next inspection may be postponed until 20,000 CSN."

Proposed AD paragraph (h) is changed from "On RB211-535E4 engines, operated to Flight Profile B, ultrasonically inspect, and if required, relubricate using the following Table 3:" to the following:

"(g) On RB211-535E4 engines, operated to Flight Profile B:

(1) Ultrasonically inspect the fan blade root, and if required, relubricate using one of the methods in Table 3 of this AD.

(2) If the initial inspection is complete prior to 14,150 CSN, then the next inspection may be postponed until 15,000 CSN."

Proposed AD paragraph (i) is changed from "On RB211-535E4 engines, operated to Flight Profile A and B, ultrasonically inspect, and if required, relubricate using the following Table 4:" to the following:

"(i) For fan blades operated to any combination of RB211-535E4 Flight Profile A, -535E4 Flight Profile B, -535E4-B, -535E4-B and -535E4-C engines:

(1) Calculate an equivalent CSN as defined in the Time Limits Manual. See References Section 1.G.(3), of MSB RB.211-72-C879, Revision 6, dated December 14, 2007.

(2) For fan blades that are currently flying in Profile A, inspect using paragraph (f) and Table 2 of this AD using equivalent CSN.

(3) For fan blades that are currently flying in Profile B, inspect using paragraph (g) and Table 3 of this AD using equivalent CSN.

(4) For fan blades that are currently flying in an RB211-535E4-B engine, inspect using paragraph (h) and Table 4 of this AD using equivalent CSN."

- We deleted proposed AD Table 4 because the information in it was redundant. We recodified proposed AD Table 5 to Table 4.

- We clarified in three of the proposed AD tables that relubrication is to be done at shop visit if blade life is more than 19,650 cycles, 14,650 cycles, and 19,650 respectively.

- Proposed AD paragraph (j) is changed from "For RB211-535E4 engines that are currently flying in Profile A, if the initial inspection is completed before X minus 1,400 cycles then the next inspection may be delayed to X, where X is 65% of the revised life limit" to "(i)(2) For fan blades that are currently flying in Profile A, inspect using paragraph (f) and Table 2 of this AD using equivalent CSN".

- Proposed AD paragraph (k) is changed from "For RB211-535E4 engines that are currently flying in Profile B, if the initial inspection is completed before X minus 850 cycles then the next inspection may be delayed to X, where X is 65% of the revised life limit" to "(i)(3) For fan blades that are currently flying in Profile B, inspect using paragraph (g) and Table 3 of this AD using equivalent CSN".

- Proposed AD paragraph (l) is deleted and incorporated into paragraph (i).

- Proposed AD paragraph (m) is changed from "On RB211-535E4-B engines, ultrasonically inspect, and if required, relubricate using the following Table 5:" to the following:

"(h) On RB211-535E4-B engines:

(1) Ultrasonically inspect the fan blade root, and if required, relubricate using one of the methods in Table 4 of this AD.

(2) If the initial inspection is complete prior to 18,800 CSN, then the next inspection may be postponed until 20,000 CSN."

In addition, we updated our estimate of the total cost of the AD to U.S. operators to \$441,280. The proposed AD estimated the total cost of the AD to U.S. operators to be \$358,540. The estimate in the proposed AD was based on an estimated average labor rate of \$65 per work-hour. The latest estimated average labor rate is \$80 per work-hour.

Conclusion

We have carefully reviewed the available data, including the comment received, and determined that air safety and the public interest require adopting the AD with the change described previously. We have determined that these changes will neither increase the economic burden on any operator nor increase the scope of the AD.

Costs of Compliance

We estimate that this AD will affect 788 engines installed on airplanes of U.S. registry. We also estimate that it will take about 7 work-hours per engine to perform the actions, and that the average labor rate is \$80 per work-hour. Based on these figures, we estimate the total cost of the AD to U.S. operators to be \$441,280.

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); 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 summary of the costs to comply with this AD and placed it in the AD Docket. You may get a copy of this summary at the address listed under ADDRESSES.

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 Federal Aviation Administration 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 Amendment 39-13950 (70 FR 3863, January 27, 2005), and by adding a new airworthiness directive, Amendment 39-15721, to read as follows:



2008-22-24 Rolls-Royce plc: Amendment 39-15721. Docket No. FAA-2007-29343; Directorate Identifier 2000-NE-13-AD.

Effective Date

(a) This airworthiness directive (AD) becomes effective December 9, 2008.

Affected ADs

(b) This AD supersedes AD 2005-02-05, Amendment 39-13950.

Applicability

(c) This AD applies to Rolls-Royce plc (RR) RB211-535E4-37, RB211-535E4-B-37, and RB211-535E4-B-75 series turbofan engines with low pressure compressor (LPC) fan blades with the part numbers (P/Ns) listed in Table 1 of this AD. These engines are installed on, but not limited to, Boeing 757 and Tupolev Tu204 series airplanes. Table 1 follows:

Table 1 - Applicable LPC Fan Blade P/Ns

UL16135	UL16171	UL16182	UL19643	UL20044
UL20132	UL20616	UL21345	UL22286	UL23122
UL24525	UL24528	UL24530	UL24532	UL24534
UL27992	UL28601	UL28602	UL29511	UL29556
UL30817	UL30819	UL30933	UL30935	UL33707
UL33709	UL36992	UL37090	UL37272	UL37274
UL37276	UL37278	UL38029	UL38032	

Unsafe Condition

(d) This AD results from RR issuing Mandatory Service Bulletin (MSB) No. RB.211-72-C879, Revision 5 and Revision 6, that introduced a relaxed repetitive compliance schedule for fan blades operating within RB211-535E4 flight profiles A and B, if certain requirements are met, and introduced a relaxed initial compliance threshold. We are issuing this AD to detect cracks in low pressure compressor (LPC) fan blade roots, which if not detected, could lead to uncontained multiple fan blade failure, and damage to the airplane.

Compliance

(e) You are responsible for having the actions required by this AD performed within the compliance times specified unless the actions have already been done.

(f) On RB211-535E4 engines, operated to Flight Profile A:

(1) Ultrasonically inspect the fan blade root, and if required, relubricate using one of the methods in Table 2 of this AD.

(2) If the initial inspection is complete prior to 18,600 cycles-since-new (CSN), then the next inspection may be postponed until 20,000 CSN.

Table 2 - RB211-535E4 Flight Profile A

Engine Location	Initial Inspection Within (CSN)	Type Action	In Accordance With Mandatory Service Bulletin (MSB)	Repeat Inspection Within Cycles Since Last Inspection (CSLI).
(1) On-wing.	20,000.	(i) Root Probe inspect, OR	RB.211-72-C879 Revision 6, 3.A.(1) through 3.A.(7), dated December 14, 2007.	1,400.
		(ii) Wave Probe inspect.	RB.211-72-C879 Revision 6, 3.B.(1) through 3.B.(7), dated December 14, 2007.	1,150.
(2) In shop.	20,000.	Root Probe inspect. Relubricate if blade life is more than 19,650 cycles.	RB.211-72-C879 Revision 6, 3.C.(1) through 3.C.(4), dated December 14, 2007.	1,400.

(g) On RB211-535E4 engines, operated to Flight Profile B:

(1) Ultrasonically inspect the fan blade root, and if required, relubricate using one of the methods in Table 3 of this AD.

(2) If the initial inspection is complete prior to 14,150 CSN, then the next inspection may be postponed until 15,000 CSN.

Table 3 - RB211-535E4 Flight Profile B

Engine Location	Initial Inspection Within (CSN)	Type Action	In Accordance With MSB	Repeat Inspection Within CSLI
(1) On-wing.	15,000.	(i) Root Probe inspect, OR	RB.211-72-C879 Revision 6, 3.A.(1) through 3.A.(7), dated December 14, 2007.	850.
		(ii) Wave Probe inspect.	RB.211-72-C879 Revision 6, 3.B.(1) through 3.B.(7), dated December 14, 2007.	700.
(2) In shop.	15,000.	Root Probe, inspect. Relubricate if blade life is more than 14,650 cycles.	RB.211-72-C879 Revision 6, 3.C.(1) through 3.C.(4), dated December 14, 2007.	850.

(h) On RB211-535E4-B engines:

(1) Ultrasonically inspect the fan blade root, and if required, relubricate using one of the methods in Table 4 of this AD.

(2) If the initial inspection is complete prior to 18,800 CSN, then the next inspection may be postponed until 20,000 CSN.

Table 4 - RB211-535E4-B

Engine Location	Initial Inspection Within (CSN)	Type Action	In Accordance With MSB	Repeat Inspection Within (CSLI)
(i) On-wing.	20,000.	(A) Root Probe inspect, OR	RB.211-72-C879 Revision 6, 3.A.(1) through 3.A.(7), dated December 14, 2007.	1,200.
		(B) Wave Probe inspect.	RB.211-72-C879 Revision 6, 3.B.(1) through 3.B.(7), dated December 14, 2007.	1,000.
(ii) In shop.	20,000.	Root Probe inspect. Relubricate if blade life is more than 19,650 cycles.	RB.211-72-C879 Revision 6, 3.C.(1) through 3.C.(4), dated December 14, 2007.	1,200.

(i) For fan blades operated to any combination of RB211-535E4 Flight Profile A, -535E4 Flight Profile B, -535E4-B, -535E4-B and -535E4-C engines:

(1) Calculate an equivalent CSN as defined in the Time Limits Manual. See References Section 1.G.(3), of MSB RB.211-72-C879, Revision 6, dated December 14, 2007.

(2) For fan blades that are currently flying in Profile A, inspect using paragraph (f) and Table 2 of this AD using equivalent CSN.

(3) For fan blades that are currently flying in Profile B, inspect using paragraph (g) and Table 3 of this AD using equivalent CSN.

(4) For fan blades that are currently flying in an RB211-535E4-B engine, inspect using paragraph (h) and Table 4 of this AD using equivalent CSN.

Optional Terminating Action

(j) Application of Metco 58 blade root coating using RR SB No. RB.211-72-C946, Revision 2, dated September 26, 2002, constitutes terminating action to the repetitive inspection requirements specified in paragraphs (f), (g), (h), and (i) of this AD.

Alternative Methods of Compliance

(k) The Manager, Engine Certification Office, has the authority to approve alternative methods of compliance for this AD if requested using the procedures found in 14 CFR 39.19.

Previous Credit

(l) Inspections and relubrication done before the effective date of this AD that use AD 2003-12-15 (Amendment 39-13200, 68 FR 37735, June 25, 2003), RR MSB No. RB.211-72-C879, Revision 3, dated October 9, 2002, MSB No. RB.211-72-C879, Revision 4, dated April 2, 2004, or MSB No. RB.211-72-C879, Revision 5, dated March 8, 2007, comply with the requirements specified in this AD.

Related Information

(m) United Kingdom Civil Aviation Authority airworthiness directive AD 002-01-2000, dated October 9, 2002, also addresses the subject of this AD.

(n) Contact Ian Dargin, Aerospace Engineer, Engine Certification Office, FAA, Engine and Propeller Directorate, 12 New England Executive Park, Burlington, MA 01803; e-mail: ian.dargin@faa.gov; telephone: (781) 238-7178; fax: (781) 238-7199, for more information about this AD.

Material Incorporated by Reference

(o) You must use Rolls-Royce plc Mandatory Service Bulletin No. RB.211-72-C879, Revision 6, dated December 14, 2007 to perform the inspections and relubrication required by this AD. The Director of the Federal Register approved the incorporation by reference of this service bulletin in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Contact Rolls-Royce plc, PO Box 31, Derby, England, DE248BJ; telephone: 011-44-1332-242424; fax: 011-44-1332-249936, for a copy of this service information. 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 October 23, 2008.
Peter A. White,
Assistant Manager, Engine and Propeller Directorate,
Aircraft Certification Service.