



[4910-13-P]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2018-0538; Product Identifier 2012-NE-47-AD; Amendment 39-19885; AD 2020-06-16]

RIN 2120-AA64

Airworthiness Directives; Rolls-Royce, Deutschland Ltd. & Co. KG (formerly Rolls-Royce plc) Turbofan Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: The FAA is superseding Airworthiness Directive (AD) AD 2017-03-02 for certain Rolls-Royce, Deutschland Ltd. & Co. KG RB211 Trent 768-60, 772-60, and 772B-60 model turbofan engines. AD 2017-03-02 required initial and repetitive ultrasonic inspections (UIs) of the affected low-pressure (LP) compressor blades. This AD requires initial and repetitive UIs of the affected LP compressor blades and, depending on the results of the UIs, their replacement with a part eligible for installation. This AD was prompted by LP compressor blade partial airfoil release events. The FAA is issuing this AD to address the unsafe condition on these products.

DATES: This AD is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

The Director of the Federal Register approved the incorporation by reference of a certain publication listed in this AD as of [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: For service information identified in this final rule, contact Rolls-Royce, Deutschland Ltd. & Co. KG, Eschenweg 11, 15827 Blankenfelde-Mahlow, Germany;

phone: +49 (0) 33 708 6 0; email: <https://www.rolls-royce.com/contact-us.aspx>. You may view this service information at the FAA, Engine and Propeller Standards Branch, 1200 District Avenue, Burlington, MA, 01803. For information on the availability of this material at the FAA, call 781-238-7759. It is also available on the Internet at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2018-0538.

Examining the AD Docket

You may examine the AD docket on the Internet at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2018-0538; or in person at Docket Operations 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 address for Docket Operations is 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: Stephen Elwin, Aerospace Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA, 01803; phone: 781-238-7236; fax: 781-238-7199; email: Stephen.L.Elwin@faa.gov.

SUPPLEMENTARY INFORMATION:

Discussion

The FAA issued a supplemental notice of proposed rulemaking (SNPRM) to amend 14 CFR part 39 to supersede AD 2017-03-02, Amendment 39-18793 (82 FR 10701, February 15, 2017), (“AD 2017-03-02”). AD 2017-03-02 applied to Rolls-Royce, Deutschland Ltd. & Co. KG (formerly Rolls-Royce plc) RB211 Trent 768-60, 772-60, and 772B-60 turbofan engines, with LP compressor blade, part number (P/N) FK23411, FK25441, FK25968, FW11901, FW15393, FW23643, FW23741, FW23744, KH23403, or KH23404, installed. The SNPRM published in the Federal Register on November 15,

2019 (84 FR 62482). The FAA preceded the SNPRM with an NPRM that published in the Federal Register on August 14, 2018 (83 FR 40161). The NPRM proposed to continue to require initial and repetitive UIs of the affected LP compressor blades at a reduced interval. The SNPRM proposed to require initial and repetitive UIs of the affected LP compressor blade and replacement of the LP compressor blade with a part eligible for installation if the LP compressor blade fails a UI. The FAA is issuing this AD to address the unsafe condition on these products.

The European Union Aviation Safety Agency (EASA), which is the Technical Agent for the Member States of the European Community, has issued EASA AD 2018-0188R1, dated September 5, 2018 (referred to after this as “the MCAI”), to address the unsafe condition on these products. The MCAI states:

Occurrences have been reported of LP compressor partial aerofoil blade release events on RR Trent 700 engines. While primary containment of the released sections was achieved in each case, some of the releases did exhibit secondary effects that are considered to present a potential hazard.

This condition, if not detected and corrected, could lead to LP compressor blade release with possible consequent loss of the engine nose cowl, under cowl fires and forward projection of secondary debris, possibly resulting in damage to the aeroplane and/or injury to persons on the ground.

To address this potential unsafe condition, RR published NMSB RB.211-72-G872, providing inspection instructions and, consequently, EASA issued AD 2012-0247 to require a one-time inspection of the higher life LP compressor blades. After identification of a population of these LP compressor blades that

were incorrectly inspected, RR issued NMSB RB.211-72-H311 and, consequently, EASA issued AD 2013-0060, retaining the requirements of EASA AD 2012-0247, which was superseded, to require a one-time re-inspection of the affected blades.

After that AD was issued, to mitigate the risk of further partial LP compressor blade release events, RR issued NMSB RB.211-72-AH465, providing instructions for ultrasonic inspection of the affected parts to detect sub-surface anomalies in the aerofoil.

Consequently, EASA issued AD 2014-0031, superseding [EASA] AD 2013-0060, to require repetitive inspections of all affected LP compressor blades and, depending on findings, replacement.

Thereafter, EASA issued AD 2016-0141, retaining the requirements of [EASA] AD 2014-0031, which was superseded, to reduce inspection threshold (RR Alert NMSB RB.211-72-AH465 Revision 2). Prompted by further analysis, EASA issued AD 2017-0241, retaining the requirements of EASA AD 2016-0141, which was superseded, further reducing the inspection threshold and interval (RR Alert NMSB RB.211-72-AH465 Revision 4).

Since EASA AD 2017-0241 was issued, RR issued the NMSB to distinguish between standard operations and NSO and to determine the applicable inspection threshold and interval. The flight cycles (FC) accumulated by operators conducting NSO have to be calculated using the beta factor shown in Table of the NMSB. The NMSB also introduces, for engines that have accumulated more than 600 FC or standard duty cycles (SDC, for engines used in

NSO), a closing date by which these have to be inspected at least once.

For the reason described above, this [EASA] AD retains the requirements of EASA AD 2017-0241, which is superseded, and requires implementation of the changes introduced.

You may obtain further information by examining the MCAI in the AD docket on the Internet at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2018-0538.

Comments

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

Request to Update Service Information

Rolls-Royce plc (RR), American Airlines (American), and Delta Air Lines (Delta) requested that RR Alert Non-Modification Service Bulletin (NMSB) RB.211-72-AH465, Revision 6, dated November 29, 2019 ("the NMSB"), be referenced in this AD instead of Revision 5 of the NMSB. Delta and American commented Revision 6 offers an optional water-coupled phased array inspection that provides a more reliable and repeatable technique and increases detection sensitivity to identify smaller defects. RR further commented that Revision 6 has been approved by the European Aviation Safety Agency.

The FAA agrees. RR published Revision 6 of the NMSB to allow an alternative water-coupled phased array inspection. Operators may still use the C-scan and gel-coupled phased array inspection techniques as specified in Revision 6, or earlier versions, of the NMSB.

Request to Allow Use of Later Versions of Service Information

Delta requested that this AD allow the use of later approved revisions of RR Alert NMSB RB.211-72-AH465. Delta indicated that this is something that has been achieved before in other FAA ADs when an FAA AD incorporates by reference the EASA AD.

The FAA disagrees. As set forth in Title 1 of the Code of Federal Regulations, Section 51.1(f), incorporation by reference of a publication is limited to the edition of the publication that is approved. Future amendments or revisions of the publication are not included. Further, this AD does not incorporate by reference the EASA AD.

Support for the AD

The Air Line Pilots Association commented that it supports the AD as proposed.

Conclusion

The FAA reviewed the relevant data, considered the comments received, and determined that air safety and the public interest require adopting this AD with the change described previously.

Related Service Information under 1 CFR Part 51

The FAA reviewed RR Alert NMSB RB.211-72-AH465, Revision 6, dated November 29, 2019. The NMSB describes procedures for performing a UI of the LP compressor blades. 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.

Costs of Compliance

The FAA estimates that this AD affects 56 engines installed on airplanes of U.S. registry.

The FAA estimates the following costs to comply with this AD:

Estimated costs

Action	Labor cost	Parts cost	Cost per	Cost on U.S.
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			product	operators
Inspect LP compressor blade	44 work-hours X \$85 per hour = \$3,740	\$0	\$3,740	\$209,440

The FAA estimates the following costs to do any necessary replacements that would be required based on the results of the inspection. The FAA has no way of determining the number of engines that might need this replacement.

On-condition costs

Action	Labor cost	Parts cost	Cost per product
Replace LP compressor blade (one blade per 77 engine sets)	6 work-hours X \$85 per hour = \$510	\$103,000	\$103,510

According to the manufacturer, some of the costs of this AD may be covered under warranty, thereby reducing the cost impact on affected individuals. The FAA does not control warranty coverage for affected individuals. As a result, the FAA has included all costs in our cost estimate.

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.

The FAA is 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

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) Will not affect intrastate aviation in Alaska, 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.

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 part 39 of the Federal Aviation Regulations (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) 2017-03-02, Amendment 39-18793 (82 FR 10701, February 15, 2017), and adding the following new AD:

2020-06-16 Rolls-Royce, Deutschland Ltd. & Co. KG (formerly Rolls-Royce plc):

Amendment 39-19885; Docket No. FAA-2018-0538; Product Identifier 2012-NE-47-AD.

(a) Effective Date

This AD is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

(b) Affected ADs

This AD replaces AD 2017-03-02, Amendment 39-18793 (82 FR 10701, February 15, 2017).

(c) Applicability

This AD applies to Rolls-Royce Deutschland Ltd. & Co. KG (formerly Rolls-Royce plc) RB211 Trent 768-60, 772-60, and 772B-60 turbofan engines, with low-pressure (LP) compressor blade, part number (P/N) FK23411, FK25441, FK25968, FW11901, FW15393, FW23643, FW23741, FW23744, KH23403, or KH23404, installed.

(d) Subject

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

(e) Unsafe Condition

This AD was prompted by LP compressor blade partial airfoil release events. While released sections were contained in each case, projection of secondary debris and effects could present a potential hazard. The FAA is issuing this AD to prevent LP compressor blade airfoil separation. The unsafe condition, if not addressed, could result in damage to the engine and damage to the airplane.

(f) Compliance

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

(g) Required Actions

(1) Within the compliance time specified in Figure 1 to paragraph (g)(1) of this AD and thereafter, at intervals not to exceed 1,200 flight cycles (FCs) or Standard Duty Cycles (SDCs) for Non-Standard Operations (NSO), as applicable, since the last ultrasonic inspection (UI), perform a UI of each affected LP compressor blade in accordance with the Accomplishment Instructions, paragraph 3, of Rolls-Royce plc (RR) Alert Non-Modification Service Bulletin (NMSB) RB.211-72-AH465, Revision 6, dated November 29, 2019.

Note 1 to paragraph (g)(1): Paragraph 1.D of RR Alert NMSB RB.211-72-AH465, Revision 6, dated November 29, 2019, describes how to determine the applicable SDCs. The Time Limits Manual (TLM), 05-00-01, defines NSO.

Figure 1 to paragraph (g)(1) – Inspection Threshold

FCs/SDC Accumulated Since New or Since Last Inspection Required by paragraph (g)(1)	Compliance Times
Less than 1,100 FCs/SDCs	Before exceeding 1,200 FCs/SDCs since new.
1,100 FCs/SDCs or greater	Within 100 FCs/SDCs after the effective date of this AD, or before exceeding 2,400 FCs/SDCs since new, whichever occurs first.

(2) If, during any inspection required by paragraph (g)(1) of this AD, a LP compressor blade is rejected by the UI, as defined in Accomplishment Instructions, paragraph 3, of RR Alert NMSB RB.211-72-AH465, Revision 6, dated November 29, 2019, before further flight, or before returning the LP compressor blade to service, whichever occurs first, remove the affected LP compressor blade from service and replace with a part eligible for installation.

(h) Installation Prohibition

After the effective date of this AD, do not install an affected LP compressor blade on an engine unless the LP compressor blade meets the conditions specified in paragraphs (h)(1) or (2) of this AD, as applicable.

(1) The affected part has not exceeded 1,200 FC or SDCs (for NSO) since new, or since an inspection performed in accordance with either RR Alert NMSB RB.211-72-AH465, Revision 6, dated, November 29, 2019, or with any of the service information referenced in paragraph (j)(1) and (2) of this AD.

(2) Prior to installation, the affected part has passed an ultrasonic inspection in accordance with paragraph (g)(1) of this AD.

(i) No Reporting Requirement

The reporting requirements in the Accomplishment Instructions, paragraph 3 of RR Alert NMSB RB.211-72-AH465, Revision 6, dated November 29, 2019, are not required by this AD.

(j) Credit for Previous Actions

You may take credit for LP compressor blade UIs required by paragraph (g)(1) of this AD, if you performed the UI before the effective date of this AD using:

(1) For initial inspections: RR NMSB RB.211-72-G702, dated May 23, 2011; RR NMSB RB.211-72-G872, Revision 2, dated March 8, 2013, or earlier versions; RR NMSB RB.211-72-H311, dated March 8, 2013; RR NMSB RB.211-72-AH465, Revision 5, dated July 26, 2018, or earlier versions; RR Engine Manual E-Trent-1RR, Task 72-31-11-200-806; or Airbus A330 Aircraft Maintenance Manual (AMM) Task 72-31-41-270-801, or AMM Task 72-31-41-270-802.

(2) For repetitive inspections: The instructions referenced in the mandatory inspection paragraph of the applicable engine TLM, provided the compliance times of this AD are not exceeded.

(k) Alternative Methods of Compliance (AMOCs)

(1) The Manager, ECO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the ECO Branch, send it to the attention of the person identified in paragraph (l)(1) of this AD. You may email your request to: ANE-AD-AMOC@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

(l) Related Information

(1) For more information about this AD, contact Stephen Elwin, Aerospace Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA, 01803; phone: 781-238-7236; fax: 781-238-7199; email: Stephen.L.Elwin@faa.gov.

(2) Refer to European Union Aviation Safety Agency (EASA) AD 2018-0188R1, dated September 5, 2018, for more information. You may examine the EASA AD in the AD docket on the Internet at <https://www.regulations.gov> by searching for and locating it in Docket No. FAA-2018-0538.

(m) 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 (RR) Alert Non-Modification Service Bulletin RB.211-72-AH465, Revision 6, dated November 29, 2019.

(ii) [Reserved]

(3) For RR service information identified in this AD, contact Rolls-Royce Deutschland Ltd & Co KG, Eschenweg 11, 15827 Blankenfelde-Mahlow, Germany; phone: +49 (0) 33 708 6 0; email: <https://www.rolls-royce.com/contact-us.aspx>.

(4) You may view this service information at FAA, Engine and Propeller Standards Branch, 1200 District Avenue, Burlington, MA, 01803. For information on the availability of this material at the FAA, call 781-238-7759.

(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, email: fedreg.legal@nara.gov, or go to: <https://www.archives.gov/federal-register/cfr/ibr-locations.html>.

Issued on March 26, 2020.

Gaetano A. Sciortino, Deputy Director for Strategic Initiatives,
Compliance & Airworthiness Division,
Aircraft Certification Service.

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