



Airworthiness Directive

AD No.: 2018-0049

Issued: 02 March 2018

Note: This Airworthiness Directive (AD) is issued by EASA, acting in accordance with Regulation (EC) 216/2008 on behalf of the European Union, its Member States and of the European third countries that participate in the activities of EASA under Article 66 of that Regulation.

This AD is issued in accordance with Regulation (EU) 748/2012, Part 21.A.3B. In accordance with Regulation (EU) 1321/2014 Annex I, Part M.A.301, the continuing airworthiness of an aircraft shall be ensured by accomplishing any applicable ADs. Consequently, no person may operate an aircraft to which an AD applies, except in accordance with the requirements of that AD, unless otherwise specified by the Agency [Regulation (EU) 1321/2014 Annex I, Part M.A.303] or agreed with the Authority of the State of Registry [Regulation (EC) 216/2008, Article 14(4) exemption].

Design Approval Holder's Name:

ROLLS-ROYCE plc

Type/Model designation(s):

RB211 Trent 700 engines

Effective Date: 09 March 2018

TCDS Number(s): EASA.E.042

Foreign AD: Not applicable

Supersedure: None

ATA 72 – Engine – Intermediate Pressure Compressor Rotor Shaft and Balance Weights – Inspection / Modification

Manufacturer(s):

Rolls-Royce plc (RR)

Applicability:

RB211 Trent 768-60, 772-60, 772B-60 and 772C-60 engines, all serial numbers.

These engines are known to be installed on, but not limited to, Airbus A330 series aeroplanes.

Definitions:

For the purpose of this AD, the following definitions apply:

The NMSB: RR NMSB RB.211-72-AG270 Revision 5 dated 8 November 2017, which defines the applicable compliance time(s). Although the NMSB has an 'A' (Alert) in the number, an earlier or later revision may not have that 'A', which does not effectively alter the publication references in this AD.

NSO: Non-Standard Operations (NSO), as defined in the RR Trent 700 Time Limits Manual (TLM), section 05-00-01.



The TLM: RR Trent 700 TLM, which provides instructions on how to determine whether standard operations or NSO are conducted.

Qualified shop visit: A shop visit in which the intermediate pressure (IP) compressor module is scheduled for a module check and repair, module overhaul, or engine refurbishment; or where the engine is disassembled sufficiently to expose the rear face of the IP compressor module.

Reason:

Cracks were found on the rear balance land feature of the IP compressor rotor shaft of two in-service Trent 800 engines and on one in-service Trent 700 engine. The cracking had initiated from fretting marks caused by balance weights, but the key factors behind the crack propagation are not fully understood. Stress analysis of the damage condition has shown that it presents a possible threat to the rotor integrity.

This condition, if not detected and corrected, could lead to IP compressor rotor shaft failure and consequent non-contained high energy debris, possibly resulting in damage to the aeroplane.

EASA initially issued AD 2007-0052 to address this unsafe condition with visual inspections of the balance land. Subsequently, RR improved the inspection methods for the Trent 700 and 800 engines and developed a modification for those engines, accomplishment of which terminates the need for on-wing inspections. EASA issued AD 2010-0266 (later revised), which incorporated these changes, superseded EASA AD 2007-0052, and required, for Trent 700 and 800 engines, repetitive on-wing borescope and in-shop eddy current (EC) inspections of the IP compressor rotor shaft for discrepancies and, depending on findings, corrective actions. After EASA AD 2010-0266R1 was issued, efforts to develop an on-wing EC inspection, intended to increase the effectiveness of the programme for Trent 700 and 800 engines, failed. Consequently, EASA issued AD 2011-0221 (later revised), superseding EASA AD 2010-0266R1 and partially retaining its requirements, to require introduction of new balance weight design for Trent 700 and 800 engines.

Subsequently, EASA issued AD 2013-0002, retaining the requirements of EASA AD 2011-0221R1, which was superseded, expanding the Applicability to include all Trent 900 engines, and adding repetitive on-wing inspections for Trent 500 and Trent 900 engines to the requirements. After EASA AD 2013-0002 was issued, it was found that for post-modification (mod) 72-G401 Trent 800 engines and post-mod 72-G402 Trent 700 engines, which were excluded from the Applicability of that AD, the in-shop inspections must remain required. Those modifications constitute terminating action only for the repetitive on-wing inspections. Consequently, EASA issued AD 2014-0152 (later corrected), retaining the requirements of EASA AD 2013-0002, which was superseded, to clarify that modification does not constitute terminating action for the repetitive in-shop inspections.

Since EASA AD 2014-0152 was issued, RR published the NMSB to make distinction between standard operations and NSO, which affects the compliance times for the repetitive on-wing inspections. In addition, it was agreed that the modification requirements could be relaxed.

For the reason described above, this AD takes over the requirements for RB211 Trent 700 engines from EASA AD 2014-0152, extends the compliance time for modification by removing the 90 months limit, and changes the on-wing inspection compliance time for NSO. EASA AD 2014-0152 has been revised accordingly, removing Trent 700 engines from its Applicability.



Required Action(s) and Compliance Time(s):

Required as indicated, unless accomplished previously:

On-Wing Inspection(s):

- (1) Within the applicable compliance time as specified in the NMSB in flight cycles (FC, for standard operations) or standard duty cycles (SDC, for NSO) after 20 January 2011 [the effective date of EASA AD 2010-0266R1] and, thereafter, at intervals not to exceed the applicable FC or SDC as specified in the NMSB, depending on operation of the engine, accomplish an on-wing visual borescope inspection of the IP compressor rotor shaft for discrepancies in accordance with the instructions of the NMSB. Section 1.D of the NMSB contains the details on how to determine the applicable SDC.

In-Shop Inspections:

- (2) During each qualified shop visit after the effective date of this AD in which the engine is sufficiently disassembled to expose the IP compressor module rear face, accomplish an EC inspection of the IP compressor rotor shaft for discrepancies in accordance with the instructions of RR NMSB RB.211-72-AG085 Revision 2.

Alternative Actions:

- (3) An EC inspection accomplished in shop, as specified in paragraph (2) of this AD, is acceptable in lieu of an on-wing visual borescope inspection as required by paragraph (1) of this AD.
- (4) If an engine is insufficiently disassembled to expose the rear face of the IP compressor module, an in-shop visual borescope inspection of that engine, using the instructions of the NMSB, is acceptable in lieu of an on-wing inspection as required by paragraph (1) of this AD for that engine.

Corrective Action(s):

- (5) If, during any inspection as required by paragraph (1) or (2) of this AD, or as specified in paragraph (4) of this AD, discrepancies (as detailed in the NMSB, or in NMSB RB.211-72-AG085, as applicable) are detected, within the time period specified in the NMSB, or before release to service of the engine, as applicable, accomplish the applicable corrective action(s), depending on findings, as detailed in the NMSB, or NMSB RB.211-72-AG085, as applicable, or replace the affected parts with serviceable parts.

Modification:

- (6) During the next qualified shop visit after 28 November 2011 [the effective date of EASA AD 2011-0221], modify the engine (introduction of new balance weight design) in accordance with the instructions of RR SB RB.211-72-AG402.

Terminating Action:

- (7) Modification of an engine as required by paragraph (6) of this AD constitutes terminating action for the repetitive on-wing inspections as required by paragraph (1) of this AD for that engine.

Credit:

- (8) Inspection(s) and corrective action(s) on an engine, accomplished before the effective date of this AD in accordance with the instructions of RR NMSB RB.211-72-AG270 at Revision 4 or



earlier, are considered acceptable to comply with the initial requirements of paragraphs (1), (4) and (5) of this AD for that engine.

Ref. Publications:

Rolls-Royce NMSB RB.211-72-AG085 Revision 2 dated 07 July 2011.

Rolls-Royce NMSB RB.211-72-AG270 Revision 4 dated 21 March 2011, or Revision 5 dated 8 November 2017.

Rolls-Royce SB RB.211-72-AG402 Revision 2 dated 07 July 2011, or Revision 3 dated 08 July 2014.

The use of later approved revisions of the above-mentioned documents is acceptable for compliance with the requirements of this AD.

Remarks:

1. If requested and appropriately substantiated, EASA can approve Alternative Methods of Compliance for this AD.
2. This AD was posted on 26 January 2018 as PAD 18-010 for consultation until 23 February 2018. The Comment Response Document can be found in the [EASA Safety Publications Tool](#), in the compressed (zipped) file attached to the record for this AD.
3. Enquiries regarding this AD should be referred to the EASA Safety Information Section, Certification Directorate. E-mail: ADs@easa.europa.eu.
4. For any question concerning the technical content of the requirements in this AD, please contact your designated Rolls-Royce representative, or download the publication from your Rolls-Royce Care account at <https://customers.rolls-royce.com>.

If you do not have a designated representative or Rolls-Royce Care account, please contact **Corporate Communications** at **Rolls-Royce plc**, P.O. Box 31, Derby, DE24 8BJ, United Kingdom Telephone +44 (0)1332 242424, or

send an email through http://www.rolls-royce.com/contact/civil_team.jsp identifying the correspondence as being related to **Airworthiness Directives**.

