



Airworthiness Directive

AD No.: 2016-0193

Issued: 30 September 2016

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 900 Engines

Effective Date: 14 October 2016

TCDS Number(s): EASA.E.012

Foreign AD: Not applicable

Supersedure: This AD supersedes EASA AD 2013-0240 issued 30 September 2013, including its Correction dated 04 October 2013.

ATA 72 – Engine – Low Pressure Turbine Exhaust Case and Support Assembly (Tail Bearing Housing) – Inspection / Replacement

Manufacturer(s):

Rolls-Royce plc (RR)

Applicability:

RB211 Trent 970-84, 970B-84, 972-84, 972B-84, 977-84, 977B-84 and 980-84 engines, all serial numbers. These engines are known to be installed on, but not limited to, Airbus A380 aeroplanes.

Reason:

RR performed a re-analysis of the structural features of the Trent 900 low pressure turbine exhaust case and support assembly (also known as Tail Bearing Housing, or TBH). The result of this re-analysis indicated that the TBH may not retain full limit load capability in all fail-safe conditions. In addition, during previous inspections of Trent 900 TBH mounts and vanes, cracks were found in the outer annulus leading edge (LE) fillet of some vanes.

These conditions, if not detected and corrected, could lead to disconnection of the TBH structural ring from the mounts, possibly resulting in damage to, or reduced control of, the aeroplane.

To address this potential unsafe condition, RR published Alert Non-Modification Service Bulletin (NMSB) RB.211-72-AG971 and NMSB RB.211-72-AH154, providing inspection instructions and criteria for replacement of parts.



Consequently, EASA issued AD 2013-0240, to require on-wing and in-shop inspections of the TBH structural features to detect cracks or damage and, depending on findings, the accomplishment of applicable corrective action(s).

Since that AD was issued, further inspection results were analysed, and concluded that on-wing inspections of the Fail Safe Catcher are no longer necessary, but that in-shop inspections of the Central Male Catcher Run-out should be required. In addition, a modification (mod) of the TBH was developed by RR, available for in-service engines through Service Bulletin (SB) RB.211-72-J024, introducing a cutback of the leading edge profile through rework of existing parts, which reduces the stress and minimises the risk of cracking. An inspection regime for post-mod 72-J024 engines was therefore developed and RR published Alert NMSB RB.211-72-AJ101 accordingly. In addition, further analysis has shown that a TBH life limit is no longer necessary. In addition, RR developed a modification (mod 72-J055), made available for in-service engines through SB RB.211-72-J055, which introduces a TBH with increased strength capability, deleting the need for inspections.

For the reasons described above, this AD partially retains the requirements of EASA AD 2013-0240, which is superseded, deleting the TBH life limits previously imposed by that AD, changing certain inspection requirements, introducing repetitive inspections for post-SB 72-J024 engines, and specifying the (optional) terminating action.

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

Required as indicated, unless accomplished previously:

Note 1: Where, in this AD, reference is made to a RR mod, SB or NMSB with an 'A' (Alert) in the number, it should be recognised that an earlier or later revision may not have that 'A'. This kind of change does not effectively alter the publication references for the purpose of this AD.

Note 2: The TBH affected by this AD are identified by Part Number (P/N):

- pre-mod 72-J024: P/N FW27718, P/N FW35923 and P/N FW51434
- post-mod 72-J024: P/N KH45090, P/N KH46677 and P/N KH46678.

On-wing Inspections:

- (1) Within the compliance times specified in Appendix 1 of this AD, as applicable to the TBH P/N, accomplish on-wing inspections of the TBH features in accordance with the instructions of the specified sections of the applicable RR Alert NMSB, as referenced in Appendix 1 of this AD.

In-shop Inspections:

- (2) Within the compliance times specified in Appendix 2 of this AD, as applicable to the TBH P/N, accomplish in-shop inspections of the TBH features in accordance with the instructions of the specified sections of the applicable RR Alert NMSB, as referenced in Appendix 2 of this AD.

Corrective Action(s):

- (3) If, during any on-wing inspection of the TBH as required by paragraph (1) of this AD, any crack is found on the TBH Mount Lug Run-outs or on the Central Male Catcher Run-outs, in accordance with the criteria and within the compliance times defined in paragraph 3.A.(1) or 3.A.(2), as applicable, of RR Alert NMSB RB.211-72-AG971, remove the engine from service,



contact RR for approved corrective action instructions and, before release to service of that engine, accomplish those actions accordingly.

- (4) If, during any in-shop inspection of the TBH as required by paragraph (2) of this AD, any crack is found on the TBH Mount Lug Run-outs or on the Central Male Catcher Run-outs, before release to service of the engine, replace the TBH with a serviceable TBH.
- (5) If, during any in-shop inspection of the TBH as required by paragraph (2) of this AD, any crack is found on the Top Core Vanes, before release to service, repair the engine in accordance with the instructions of section 3.C.(1) of RR Alert NMSB RB.211-72-AG971.
- (6) If, during any on-wing inspection of a pre-mod 72-J024 TBH (see Note 2 of this AD) as required by paragraph (1) of this AD, any crack or damage is found on the TBH Mount Lug Forging LE Areas, in accordance with the criteria and within the compliance times defined in section 3.A.(3) of RR Alert NMSB RB.211-72-AH154, re-inspect the engine, or remove the engine from service, contact RR for approved corrective action instructions and, before release to service of that engine, accomplish those actions accordingly.
- (7) If, during any in-shop inspection of a pre-mod 72-J024 TBH (see Note 2 of this AD) as required by paragraph (2) of this AD, any crack or damage is found on the TBH Mount Lug Forging LE Areas, before release to service, repair the engine in accordance with the instructions of section 3.B.(2) of RR Alert NMSB RB.211-72-AH154, or of section 3.C.(1) of RR Alert NMSB RB.211-72-AG971, as applicable.
- (8) If, during any on-wing inspection of a post-mod 72-J024 TBH (see Note 2 of this AD) as required by paragraph (1) of this AD, any crack is found on the TBH Mount Lug Forging LE or Cutback Areas, as applicable, in accordance with the criteria and within the compliance times defined in paragraph 3.A.(3) of RR Alert NMSB RB.211-72-AJ101, re-inspect the engine, or remove the engine from service, contact RR for approved corrective action instructions and, before release to service of that engine, accomplish those actions accordingly.
- (9) If, during any in-shop inspection of a post-mod 72-J024 TBH (see Note 2 of this AD) as required by paragraph (2) of this AD, any crack is found on the TBH Mount Lug Forging LE or Cutback Areas, as applicable, before release to service, repair the engine in accordance with the instructions of section 3.B.(2) of RR Alert NMSB RB.211-72-AJ101, or of section 3.C.(1) of RR Alert NMSB RB.211-72-AG971, as applicable.

Credit:

- (10) Inspections and corrective actions, accomplished on an engine before the effective date of this AD, in accordance with the instructions of applicable sections of earlier issues of RR Alert NMSB RB.211-72-AG971, or earlier issues of RR Alert NMSB RB.211-72-AH154, as applicable, are acceptable to comply with the initial requirements of paragraphs (1) and (2) of this AD, as applicable to that engine.



Terminating Action:

- (11) Accomplishment of corrective actions on an engine, as required by paragraph (3), (4), (5), (6), (7), (8) or (9) of this AD, as applicable, does not constitute terminating action for the repetitive inspections required by paragraphs (1) and (2) of this AD for that engine.
- (12) Modification of an engine in accordance with the instructions of RR SB RB.211-72-J055 constitutes terminating action for the repetitive inspections required by paragraph (1) and (2) of this AD for that engine, provided that, following modification, no affected TBH (see Note 2 of this AD) is installed on that engine.
- (13) No actions are required by this AD for an engine that embodies RR mod 72-J055 in production, provided that, after entry into service, no affected TBH (see Note 2 of this AD) is installed on that engine.

Ref. Publications:

Rolls-Royce Alert NMSB RB.211-72-AG971 original issue dated 20 September 2012, or Revision 1 dated 27 September 2013, or Revision 2 dated 05 May 2016.

Rolls-Royce Alert NMSB RB.211-72-AH154 original issue dated 29 May 2013, or Revision 1 dated 18 June 2013, or Revision 2 dated 19 September 2014, or Revision 3 dated 23 September 2014, or Revision 4 dated 07 July 2015, or Revision 5 dated 05 May 2016.

Rolls-Royce Alert NMSB RB.211-72-AJ101 original issue dated 05 May 2016.

Rolls-Royce SB RB.211-72-J024 original issue dated 01 March 2016.

Rolls-Royce SB RB.211-72-J055 original issue dated 22 March 2016.

The use of later approved revisions of these 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 13 June 2016 as PAD 16-088 for consultation until 27 June 2016, and republished on 17 August 2016 as PAD 16-088R1 for additional consultation until 31 August 2016. The Comment Response Document can be found at <http://ad.easa.europa.eu>.
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**.

REVISED



Notes for the purpose of Appendix 1 and Appendix 2 of this AD:

Note A1: Since new = FC accumulated by the TBH since first installation on an engine.

Note A2: Rolls-Royce NMSB RB.211-72-AG971 Rev 2 Section 3.B provides instructions for in-shop inspections of Mount Lug Run-out, as Section 3.C provides instructions for in-shop inspection of the full TBH.

Appendix 1 – TBH **On-wing** Inspections

Affected TBH P/N (see Note 2 of this AD) – Feature	Applicable NMSB and Section	Alternative NMSB and Section (see Note A2)	Compliance Time	
			Initial Inspection	Interval (not to exceed)
All – Mount Lug Run-outs	RB.211-72-AG971 Rev 2, Section 3.A	In-shop: RB.211-72-AG971 Rev 2, Section 3.B or 3.C	Before exceeding 2 200 flight cycles (FC) since new (see Note A1)	2 200 FC
Pre-mod 72-J024 TBH – Mount Lug Forging LE Areas - <i>For a TBH that has not exceeded 900 FC since new (see Note 2) on 14 October 2013 [the effective date of EASA AD 2013-0240]</i>	RB.211-72-AH154 Rev 5, Section 3.A	In-shop: RB.211-72-AH154 Rev 5 Section 3.B, or RB.211-72-AG971 Rev 2 Section 3.C	Before exceeding 1 000 FC since new (see Note A1)	1 000 FC
Pre-mod 72-J024 TBH – Mount Lug Forging LE Areas - <i>For a TBH that has exceeded 900 FC since new (see Note 2) on 14 October 2013 [the effective date of EASA AD 2013-0240]</i>	RB.211-72-AH154 Rev 5, Section 3.A	In-shop: RB.211-72-AH154 Rev 5, Section 3.B, or RB.211-72-AG971 Rev 2, Section 3.C	Within 100 FC after 14 October 2013 [the effective date of EASA AD 2013-0240]	
Post-mod 72-J024 TBH – Mount Lug Forging LE and Cutback Areas	RB.211-72-AJ101, Section 3.A	In-shop: RB.211-72-AG971 Rev 2, Section 3.C, or RB.211-72-AJ101, Section 3.B	Before exceeding 1 000 FC since mod 72-J024 embodiment	



Appendix 2 – TBH In-shop Inspections

Affected TBH P/N (see Note 2 of this AD) – Feature	Applicable NMSB and Section	Alternative NMSB and Section (see Note A2)	Compliance Time	
			Initial Inspection	Interval (not to exceed)
All – Mount Lug Run-outs	RB.211-72-AG971 Rev 2, Section 3.B	On-wing: RB.211-72-AG971 Rev 2, Section 3.A, <u>or</u> In-shop: RB.211-72-AG971 Rev 2 Section 3.C	Before exceeding 2 200 FC since new (see Note A1)	2 200 FC
All – Top Core Vanes and Central Male Catcher Run-outs	RB.211-72-AG971 Rev 2, Section 3.C	None	Before exceeding 3 800 FC since new (see Note A1)	3 800 FC
Pre-mod 72-J024 TBH – Mount Lug Forging LE Areas - <i>For a TBH which has not exceeded 900 FC since new (see Note 2) on 14 October 2013 [the effective date EASA AD 2013-0240]</i>	RB.211-72-AH154 Rev 5, Section 3.B	On-wing: RB.211-72-AH154 Rev 5, Section 3.A, <u>or</u> In-shop: RB.211-72-AG971 Rev 2, Section 3.C	Before exceeding 1 000 FC since new (see Note A1)	1 000 FC
Pre-mod 72-J024 TBH – Mount Lug Forging LE Areas - <i>For a TBH which has exceeded 900 FC since new (see Note 2) on 14 October 2013 [the effective date of EASA AD 2013-0240]</i>	RB.211-72-AH154 Rev 5, Section 3.B	On-wing: RB.211-72-AH154 Rev 5, Section 3.A, <u>or</u> In-shop: RB.211-72-AG971 Rev 2, Section 3.C	Within 100 FC after the effective date of this AD	
Post-mod 72-J024 TBH – Mount Lug Forging LE and Cutback Areas	RB.211-72-AJ101, Section 3.B	On-wing: RB.211-72-AJ101, Section 3.A, <u>or</u> In-shop: RB.211-72-AG971 Rev 2 Section 3.C	Before exceeding 1 000 FC since mod 72-J024 embodiment	

