



## Notification of a proposal to issue an Airworthiness Directive

**PAD No.: 16-088R1**

**Issued: 17 August 2016**

Note: This Proposed Airworthiness Directive (PAD) 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.

In accordance with the EASA Continuing Airworthiness Procedures, the Executive Director is proposing the issuance of an EASA Airworthiness Directive (AD), applicable to the aeronautical product(s) identified below.

All interested persons may send their comments, referencing the PAD Number above, to the e-mail address specified in the 'Remarks' section, prior to the consultation date indicated.

**Design Approval Holder's Name:**

ROLLS-ROYCE plc

**Type/Model designation(s):**

RB211 Trent 900 Engines

**Effective Date:** [TBD - standard: 14 days after AD issue date]

**TCDS Number(s):** EASA.E.012

**Foreign AD:** Not applicable

**Supersedure:** This AD supersedes 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 has been 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.

Shortly after EASA PAD 16-088 was published for consultation, it was found necessary to clarify that RR had developed a modification (mod 72-J055), made available for in-service engines through Service Bulletin (SB) RB.211-72-J055, which introduces a TBH with increased strength capability, deleting the need for inspections.

For the reasons described above, this revised PAD proposes to partially retain the requirements of EASA AD 2013-0240, which will be superseded, to delete the TBH life limits previously imposed by that AD, to change certain inspection requirements, to introduce repetitive inspections for post-SB 72-J024 engines, and to specify 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) Corrective actions on an engine, as required by paragraph (3), (4), (5), (6), (7), (8) or (9) of this AD, as applicable, do 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. This Proposed AD will be closed for consultation on 31 August 2016.
2. Enquiries regarding this PAD should be referred to the EASA Safety Information Section, Certification Directorate. E-mail: [ADs@easa.europa.eu](mailto:ADs@easa.europa.eu).
3. 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](http://www.rolls-royce.com/contact/civil_team.jsp) identifying the correspondence as being related to **Airworthiness Directives**.



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	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 (see Note A2)	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, <b><u>or</u></b> RB.211-72-AG971 Rev 2 Section 3.C (see Note A2)	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, <b><u>or</u></b> RB.211-72-AG971 Rev 2, Section 3.C (see Note A2)	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	RB.211-72-AG971 Rev 2, Section 3.C (see Note A2)	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	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 In-shop: RB.211-72-AG971 Rev 2 Section 3.C (see Note A2)	Before exceeding 2 200 FC since new (see Note A1)	2 200 FC
All – Top Core Vanes	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 In-shop: RB.211-72-AG971 Rev 2, Section 3.C (see Note A2)	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 In-shop: RB.211-72-AG971 Rev 2, Section 3.C (see Note A2)	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	RB.211-72-AG971 Rev 2 Section 3.C (see Note A2)	Before exceeding 1 000 FC since mod 72-J024 embodiment	

