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| EASA | AIRWORTHINESS DIRECTIVE |
|  | <p>AD No.: 2012-0057R1</p> <p>Date: 22 January 2013</p> <p>Note: This Airworthiness Directive (AD) is issued by EASA, acting in accordance with Regulation (EC) No 216/2008 on behalf of the European Community, its Member States and of the European third countries that participate in the activities of EASA under Article 66 of that Regulation.</p> |
| <p>This AD is issued in accordance with EC 1702/2003, Part 21A.3B. In accordance with EC 2042/2003 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 [EC 2042/2003 Annex I, Part M.A.303] or agreed with the Authority of the State of Registry [EC 216/2008, Article 14(4) exemption].</p> | |
| <p>Type Approval Holder's Name :</p> <p>ROLLS-ROYCE PLC</p> | <p>Type/Model designation(s) :</p> <p>RB211 Trent 900 engines</p> |
| TCDS Number: | EASA.E.012 |
| Foreign AD: | Not applicable |
| Revision: | This AD revises EASA AD 2012-0057 dated 03 April 2012 (including the Correction dated 20 April 2012), which superseded EASA AD 2010-0008R1 dated 04 August 2010. |
| ATA 72 | Engine – Intermediate Pressure Shaft Coupling – Inspection / Replacement |
| Manufacturer(s): | Rolls-Royce plc |
| Applicability: | <p>RB211 Trent 970-84, 970B-84, 972-84, 972B-84, 977-84, 977B-84 and 980-84 engines, all serial numbers.</p> <p>These engines are known to be installed on, but not limited to, Airbus A380 aeroplanes.</p> |
| Reason: | <p>Wear, beyond Engine Manual limits, has been identified on the abutment faces of the splines on the Trent 900 Intermediate Pressure (IP) shaft rigid coupling on several engines during strip. The shaft to coupling spline interface provides the means of controlling the turbine axial setting and wear through of the splines would permit the IP turbine to move rearwards.</p> <p>Rearward movement of the IP turbine would enable contact with static turbine components and would result in loss of engine performance with potential for in-flight shut down, oil migration and oil fire below the LP turbine discs prior to sufficient indication resulting in loss of LP turbine disc integrity. Some of these conditions present a potential unsafe condition to the aeroplane.</p> <p>EASA issued AD 2010-0008R1 to require inspection of the IP shaft coupling splines and, depending on the results, further repetitive inspections or corrective actions.</p> <p>Since issuance of that AD, it has been found that when an engine is removed from one aeroplane engine position and is re-installed in a different aeroplane</p> |

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| | <p>and/or engine position, it may exhibit a change in wear rate. It has therefore been found necessary to introduce specific inspection requirements to address these cases.</p> <p>Rolls-Royce (RR) have also introduced a modification to the design of the IP shaft coupling through Service Bulletin (SB) RB211-72-G585 in order to reduce the spline wear rate to an acceptable level. This modification is intended to constitute eventually the terminating action for this AD.</p> <p>However, until service experience has confirmed its efficacy, it has been deemed necessary to also require repetitive inspections of engines that have been modified in accordance with RR SB 72-G585, but with extended intervals compared with those for engines not incorporating that modification. The inspection technique for engines incorporating the modification differs from that for engines not incorporating the modification.</p> <p>For the reasons described above, this AD retains the requirements of EASA AD 2010-0008R1, which is superseded, and adds post-SB 72-G585 repetitive inspections.</p> <p>This AD has been revised to insert a reference to the effective date of EASA AD 2010-0008R1 into Appendix 1, which was inadvertently omitted.</p> |
| Effective Date: | <p>Revision 1: 22 January 2013</p> <p>Original issue: 17 April 2012</p> |
| Required Action(s) and Compliance Time(s): | <p>Required as indicated, unless already accomplished:</p> <p>(1) For engines <u>not</u> incorporating modification SB 72-G585:</p> <ul style="list-style-type: none"> ▪ On-wing - Within the applicable compliance times indicated in Appendix 1 of this AD, accomplish the actions specified in that Appendix, as applicable, in accordance with the instructions of sections 1.D(1)(a) and 3.A of RR RB211-Trent 900 Alert Non Modification Service Bulletin (NMSB) 72-AG329 Revision 4. ▪ Each time the engine is inducted into an engine shop (In-shop), accomplish the actions specified in sections 1.D(1)(b) and 3.B of RR RB211-Trent 900 NMSB 72-AG329 Revision 4. <p>(2) For engines incorporating modification SB 72-G585:</p> <ul style="list-style-type: none"> ▪ On-wing - Within the applicable compliance times indicated in Appendix 1 of this AD, accomplish the actions specified in that Appendix, as applicable, in accordance with the instructions of sections 1.D(1) and 3.A of RR RB211-Trent 900 Alert NMSB 72-AG871 Initial Issue. ▪ Each time the engine is inducted into an engine shop (In-shop), accomplish the actions specified in sections 1.D(2) and 3.B of RR RB211-Trent 900 Alert NMSB 72-AG871 Initial Issue. <p>(3) For an engine where a new IP shaft coupling (pre- or post-SB 72-G585 standard) has been installed during an in-shop inspection, or the IP shaft coupling has passed the In-shop inspection, as required by paragraph (1) or (2) of this AD, except those as specified in paragraph (4) of this AD, within 400 flight cycles (FC) after this last In-shop inspection, accomplish on-wing inspections as required by paragraph (1) or (2) of this AD, as applicable.</p> <p>(4) For an engine where the pre-SB 72-G585 standard IP shaft coupling has passed the borescope inspection in accordance with the instructions of NMSB 72-AG329 Rev 4, accomplish the next on-wing inspection, as required by paragraph (1) of this AD, within the time specified in NMSB72-AG329 Rev 4 Fig 10, and thereafter as specified in Appendix 1 of this AD.</p> |

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| | <p>(5) If, during any inspection as required by this AD, discrepancies are found, exceeding the criteria, as specified in RR RB211-Trent 900 NMSB 72-AG329 Revision 4 or RR RB211-Trent 900 Alert NMSB 72-AG871 Initial Issue, as applicable, that would allow an IP shaft coupling to remain in service or return to service, before next flight (on wing inspection), or before release to service of the engine (in-shop inspection), as applicable, replace the affected IP shaft coupling with a serviceable part.</p> <p>(6) Inspections and corrective actions, accomplished prior to 17 April 2012 [the effective date of the original issue of this AD], in accordance with the instructions of RR NMSB 72-AG329 original issue, Revision 1, Revision 2 or Revision 3, are acceptable to comply with the requirements of paragraph (1) of this AD. After 17 April 2012 [the effective date of the original issue of this AD], repetitive inspections and corrective actions must be accomplished in accordance with the instructions of RR NMSB 72-AG329 Revision 4 and RR NMSB 72-AG871 Initial Issue.</p> <p>(7) Replacement of an IP shaft coupling as required by paragraph (5) of this AD, or replacement of an engine with a serviceable engine, does not constitute terminating action for the repetitive inspections required by this AD.</p> |
| Ref. Publications: | <p>RR RB211-Trent 900 NMSB 72-AG329 Revision 4, dated 23 March 2012.</p> <p>RR RB211-Trent 900 NMSB 72-AG871 Initial Issue, dated 23 March 2012.</p> <p>The use of later approved revisions of these documents is acceptable for compliance with the requirement of this AD.</p> |
| Remarks : | <ol style="list-style-type: none"> 1. If requested and appropriately substantiated, EASA can approve Alternative Methods of Compliance for this AD. 2. Based on the required actions and the compliance time, EASA have decided to issue a Final AD with Request for Comments, postponing the public consultation process until after publication. 3. Enquiries regarding this AD should be referred to the Safety Information Section, Executive Directorate, EASA. 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 Aeromanager account at www.aeromanager.com. If you do not have a designated representative or Aeromanager account, please contact Corporate Communications at Rolls-Royce plc, P.O. Box 31, Derby, DE24 8BJ, The United Kingdom. Telephone: +44 (0) 1332 242424, or e-mail from http://www.rolls-royce.com/contact/civil_team.jsp identifying the correspondence as being related to Airworthiness Directives. |

Appendix 1 - On-wing Borescope Inspection – Initial and Repetitive Inspection

| Engine Configuration | Condition, on 18 August 2010 [the effective date of EASA AD 2010-0008R1] | Action | Compliance Time for Initial Inspection | Compliance Time for Repetitive Inspections |
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| Not incorporating modification per SB 72-G585 | Engines where the coupling life is 250 FC or less (see Note 1) | Inspect the IP shaft coupling splines – measurement of spline crest – in accordance with section 3.A of Rolls-Royce NMSB 72-AG329 revision 4 | Before the engine has accumulated 400 FC since new | As specified in section 1.D(1)(a) and 3.A and Figure 9 and 10 of Rolls-Royce NMSB 72-AG329 Revision 4 |
| | Engines where the coupling life is more than 250 FC (see Note 1) | | Within 150 flight cycles after 18 August 2010 [the effective date of AD 2010-0008R1] | |
| Incorporating modification per SB 72-G585 | All | Inspect the IP shaft coupling spline wear (see Note 2) in accordance with section 3.A of Rolls-Royce NMSB 72-AG871 Initial Issue | Before the engine has accumulated 400 FC since new | As specified in section 1.D(1)(b) and 3.A of Rolls-Royce NMSB 72-AG871 Initial Issue |

Note 1: Coupling life is the time since new, or since last inspection of the coupling in accordance with the Cleaning, Inspection and Repair Manual. If the coupling life cannot be determined, the life since last shop visit should be used to establish the inspection threshold.

Note 2: Due to the differences in design of IP shaft coupling, the inspection of coupling spline wear for engines modified with SB 72-G585 consists in measuring distance from the end face of the IP turbine seal segment to the front seal fin of the IP turbine blades.