| EASA | NOTIFICATION OF A PROPOSAL TO ISSUE AN AIRWORTHINESS DIRECTIVE |
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| | **PAD No.: 11-104**<br><br>**Date: 04 October 2011**<br><br>Note: This Proposed Airworthiness Directive (PAD) 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. |

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 closing date indicated.

| **Type Approval Holder's Name :** | **Type/Model designation(s) :** |
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| ROLLS-ROYCE PLC | RB211 Trent 500, 700 and 800 engines |

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| TCDS Number : | EASA E.042, EASA.E.060 and UK CAA 1051 |
| Foreign AD : | Not applicable |
| Supersedure : | This AD supersedes EASA AD 2010-0266R1 dated 06 January 2011. |

| **ATA 72** | **Engine – Intermediate Pressure Compressor Rotor Shaft and Balance Weights – Inspection / Modification** |
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| Manufacturer(s): | Rolls-Royce plc |
| Applicability: | Models RB211 Trent 553-61, 553A2-61, 556-61, 556A2-61, 556B-61, 556B2-61, 560-61 and 560A2-61 engines, all serial numbers.<br>These engines are known to be installed on, but not limited to, Airbus A340-500 and A340-600 series aeroplanes.<br>Models RB211 Trent 768-60, 772-60, 772B-60 and 772C-60 engines, all serial numbers.<br>These engines are known to be installed on, but not limited to, Airbus A330 series aeroplanes.<br>Models RB211 Trent 875-17, 877-17, 884-17, 884B-17, 892-17, 892B-17 and 895-17 engines, all serial numbers.<br>These engines are known to be installed on, but not limited to, Boeing 777 series aeroplanes. |
| Reason: | Cracks have been found on the rear balance land feature of the Intermediate Pressure (IP) Compressor rotor shaft of two in-service Trent 800 engines and on one in-service Trent 700 engine. The cracking had initiated from frettage marks caused by balance weights, but the key factors behind the crack propagation are not fully understood.<br>Stress analysis of the damage condition has shown that it presents a possible threat to the rotor integrity.<br>This condition, if not detected and corrected, could lead to IP Compressor rotor shaft failure and consequent non-contained high energy debris, possibly |

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| | resulting in damage to the aeroplane.<br>EASA initially issued AD 2007-0052 to address this unsafe condition with visual inspections of the balance land.<br>Rolls-Royce subsequently improved the inspection methods for the Trent 700 and 800 engines and produced a modification for those engines, accomplishment of which terminated the need for on-wing inspections. EASA AD 2010-0266 incorporated these changes and superseded EASA AD 2007-0052 requiring, for the Trent 700 and 800 engines, repetitive on-wing borescope and in-shop Eddy Current inspections of the IP Compressor rotor shaft for discrepancies and, depending on findings, corrective actions.<br>For the Trent 500 engines, EASA AD 2010-0266 required repetitive in-shop visual inspections, in accordance with Rolls-Royce Alert Non-Modification Service Bulletin (NMSB) RB211-72-AF260 at Revision 4 or, alternatively, in-shop Eddy Current inspections in accordance with Rolls-Royce NMSB RB211-72-G448 Revision 1, to detect discrepancies in the IP Compressor rotor shaft and, depending on findings, corrective actions.<br>EASA AD 2010-0266R1 was issued to confirm that accomplishment of the actions of the on-wing inspection during a shop visit is acceptable to comply with the requirement of paragraph (1) of this AD.<br>Since issuance of EASA AD 2010-0266R1, for Trent 700 and 800 engines, efforts to develop an on-wing eddy-current inspection have failed which were intended to have increased the effectiveness of the on-wing inspection programme.<br>For the reasons described above, this AD, which supersedes EASA AD 2010-0266R1, partially retaining its requirements, requires accomplishment of the modification (introduction of new balance weight design) at the next qualifying shop visit, for Trent 700 and 800 engines. For Trent 500 engines there are editorial changes only for consistency, the requirements are not changed technically relative to EASA AD 2010-0266R1. |
| Effective Date: | [TBD: 14 days after final AD issue date] |
| Required Action(s) and Compliance Time(s): | Required as indicated, unless already accomplished:<br>**Trent 700 and Trent 800 engines:**<br>(1) Within the time period indicated in Table 1 or Table 2 of this AD, as applicable to engine type, accomplish inspections (on-wing or in-shop) of the IP Compressor rotor shaft for discrepancies, in accordance with the instructions of the associated Non Modification Service Bulletin (NMSB): |

Table 1 – Trent 700 engines inspections

| Inspection | Compliance time | NMSB |
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| Initial | Within 625 Flight Cycles (FC) after 20 January 2011 [the effective date of AD 2010-0266R1] | RB211-72-AG270 Revision 4 or RB211-72-AG085 Revision 2. |
| Repetitive | At intervals not to exceed 625 FC | |

Table 2 – Trent 800 engines inspections

| Inspection | Compliance time | NMSB |
|---|---|---|
| Initial | Within 475 FC after 20 January 2011 [the effective date of AD 2010-0266R1] | RB211-72-AG264 Revision 5 or RB211-72-AG085 Revision 2. |
| Repetitive | At intervals not to exceed 475 FC | |

(2) During each shop visit after 20 January 2011 [the effective date of AD 2010-0266R1] in which the engine is sufficiently disassembled to expose the IP Compressor module rear face, inspect the IP Compressor rotor shaft and balance weights for discrepancies, in accordance with the instructions of NMSB RB211-72-AG085 Revision 2.

(3) If, during any inspection as required by paragraph (1) or (2) of this AD, discrepancies (as detailed in NMSB RB211-72-AG264, NMSB RB211-72-AG270, or NMSB RB211-72-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 appropriate corrective action(s) (depending on findings as detailed in NMSB RB211-72-AG264, NMSB RB211-72-AG270, or NMSB RB211-72-AG085, as applicable) or replace the affected parts with serviceable parts.

(4) At the next shop visit in which any level of inspection or strip is scheduled to be carried out on the IPC module, or within 96 months, whichever occurs first after the effective date of this AD, modify the engine in accordance with the instructions of SB RB211-72-AG401 Revision 2 (for RB211 Trent 800) or SB RB211-72-AG402 Revision 2 (for RB211 Trent 700) (introduction of new balance weight design).

(5) Modification of an engine as required by paragraph (4) of this AD constitutes terminating action for the repetitive inspections required by paragraph (1) of this AD for that engine.

(6) Inspections and modification of the engine (introduction of new balance weight design) accomplished before the effective date of this AD, in accordance with all referenced SBs and NMSBs at any previous revisions, are considered acceptable for compliance with the requirements of paragraph (1), (2) and (3) of this AD for that engine.

**Trent 500 engines:**

(7) During each shop visit after 20 January 2011 [the effective date of AD 2010-0266R1] in which the engine is sufficiently disassembled to expose the IP Compressor module rear face, inspect the IP Compressor rotor shaft and balance weights for discrepancies in accordance with the instructions of NMSB RB211-72-AF260 Revision 4.

(8) As an alternative to each inspection as required by paragraph (7) of this AD, an Eddy Current inspection of the IP Compressor rotor shaft and visual inspection of the balance weights can be accomplished in accordance with the instructions of NMSB RB211-72-G448 Revision 1.

(9) If, during any inspection as required by paragraph (7) or (8) of this AD, discrepancies (as detailed in NMSB RB211-72-AF260 or NMSB RB211-72-G448, as applicable) are detected, before release to service of the engine, accomplish the appropriate corrective action(s) (depending on findings as detailed NMSB RB211-72-AF260 or NMSB RB211-72-G448, as applicable) or replace the affected parts with serviceable parts.

Note: Corrective action as required by this AD paragraph does not constitute terminating action for the repetitive inspections required by this AD for that engine.

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| Ref. Publications: | Rolls-Royce NMSB RB211-72-AF260 Revision 5 dated 7 July 2011.<br>Rolls-Royce NMSB RB211-72-AG085 Revision 2 dated 7 July 2011.<br>Rolls-Royce NMSB RB211-72-AG264 Revision 5 dated 21 March 2011.<br>Rolls-Royce NMSB RB211-72-AG270 Revision 4 dated 21 March 2011.<br>Rolls-Royce NMSB RB211-72-G448 Revision 3 dated 7 July 2011.<br>Rolls-Royce SB RB211-72-AG401 Revision 2 dated 5 July 2011.<br>Rolls-Royce SB RB211-72-AG402 Revision 2 dated 7 July 2011.<br>The reference number of the applicable Rolls-Royce NMSB/SB might change to incorporate an “A” (indicating categorisation as “Alert”, within the Rolls-Royce system).<br>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 01 November 2011.<br>2. Enquiries regarding this PAD should be referred to the Safety Information Section, Executive Directorate, EASA. E-mail ADs@easa.europa.eu.<br>3. For any question concerning the technical content of the requirements in this PAD, 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. PO Box 31, Derby, DE24 8BJ, United Kingdom, telephone: +44 (0) 1332 242424, or send an e-mail through http://www.rolls-royce.com/contact/civil_team.jsp identifying the correspondence as being related to Airworthiness Directives. |