Airworthiness Directive

AD No.: 2016-0215

Issued: 27 October 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):
Trent 1000 engines

Effective Date: 10 November 2016
TCDS Number(s): EASA.E.036
Foreign AD: Not applicable
Supersedure: None

ATA 72 – Engine – High Pressure Turbine Blades – Inspection / Replacement

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Manufacturer(s):
Rolls-Royce plc (RR)

Applicability:
Trent 1000-A, Trent 1000-C, Trent 1000-D, Trent 1000-E, Trent 1000-G, Trent 1000-H, Trent 1000-AE, and Trent 1000-CE engines, all serial number.

These engines are known to be installed on, but not limited to, Boeing 787 aeroplanes.

Reason:
Occurrences were reported involving high engine vibration indication experienced during climb. Subsequent investigation of affected engines identified damage to some high pressure turbine (HPT) blades. These events have been attributed to cracks, which originated at the tip of the leading edge, and at the mid-height pressure surface, of the HPT blades. Investigation also determined that HPT blades Part Number (P/N) FW63853 (corresponding to RR Service Bulletin (SB) SB 72-G275 modification standard) are affected by this phenomenon. Four occurrences have been reported within the last two years.

This condition, if not detected and corrected, could lead to high vibration indication and commanded in-flight shut-down, possibly resulting in reduced control of the aeroplane.

To address this potentially unsafe condition, RR published Non-Modification-Service-Bulletin (NMSB) TRENT 1000 72-J039 (now at Revision 2) to provide inspection instructions applicable to HPT blades. RR also developed an improved HPT blade designs, P/N KH15741 or P/N KH60816, which are more resistant to premature crack initiation and available for installation in-service through RR SB TRENT 1000 72-H114 or RR SB TRENT 1000 72-J249 (now both at Revision 1), respectively.

For the reasons described above, this AD requires repetitive inspections of the HPT blades P/N FW63853 and, depending on findings, corrective action. This AD also requires replacement of HPT blades P/N FW63853 with improved blades P/N KH15741 or P/N KH60816.

Required Action(s) and Compliance Time(s):
Required as indicated, unless accomplished previously:

RR Trent 1000 engines equipped with HPT blades P/N FW63853 (RR mod/SB 72-G275 standard):

(1) Before exceeding the threshold as defined in Table 1 of this AD and, thereafter, at intervals not to exceed 250 engine flight cycles (EFC) or 1 125 engine flight hours (EFH), whichever occurs first, inspect each HPT blade in accordance with the instructions of the RR NMSB TRENT 1000 72-J039 Revision 2.

Table 1 – Initial Inspection Threshold

Compliance Time (**A** or **B** whichever occurs later)	
A	1 750 EFC or 11 000 EFH, whichever occurs first
B	30 days after the effective date of this AD

Note: The EFC and EFH referred to in Table 1 of this AD are those accumulated by the HPT blades since new.

(2) If, during any inspection as required by paragraph (1) of this AD, any discrepancy is detected, as defined in the RR NMSB TRENT 1000 72-J039 Revision 2, before next flight, accomplish all applicable corrective actions and, thereafter accomplish follow-on inspections within reduced interval, as applicable, in accordance with the instructions of RR NMSB TRENT 1000 72-J039 Revision 2.

(3) Inspection(s) and corrective action(s) accomplished on an engine, before the effective date of this AD, in accordance with the instructions of RR NMSB TRENT 1000 72-J039 original issue or Revision 1, are acceptable to comply with the initial requirements of paragraphs (1) and (2) of this AD, for that engine.

(4) During the next shop visit, when the HPT blades are removed from the HPT disc, replace each HPT blade P/N FW63853 (RR SB 72-G275 modification standard) with a serviceable HPT blade P/N KH15741 in accordance with the instructions of RR SB TRENT 1000 72-H114 or with a serviceable HPT blade P/N KH60816 in accordance with the instructions of RR SB TRENT 1000 72-J249.

(5) Installation of a HPT blade standard, approved after the effective date of this AD, on an engine is equal to compliance with paragraph (4) of this AD, provided the conditions as specified in paragraphs (5.1) and (5.2) of this AD are met.

(5.1) The HPT blade design must be approved by EASA or approved under RR Design Organisation Approval (DOA) privileges; and

(5.2) The installation must be accomplished in accordance with engine modification instructions approved by EASA or approved under RR DOA privileges.

All RR Trent 1000 engines:
(5) From the effective date of this AD, do not install an HPT blade P/N FW63853 on any engine.

Ref. Publications:
RR TRENT 1000 NMSB 72-J039 original issue dated 29 May 2015, or Revision 1 dated 09 November 2015, or Revision 2 dated 01 June 2016.

RR SB TRENT 1000 72-H114 original issue dated 17 April 2013, or Revision 1 dated 14 October 2013.

RR SB TRENT 1000 72-J249 original issue dated 14 April 2016, or Revision 1 dated 29 September 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 15 September 2016 as PAD 16-133 for consultation until 13 October 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**.