EASA Safety Information Notice



No.: 2007-52

Issued: 21 December 2007

Subject: Non Compliance of Engine Group A Parts with required Magnetic Particle Inspection (MPI) instructions

- **Ref. Publication:** Letter from Rolls-Royce (RR) plc dated 19 December 2007 (copy attached).
- Introduction: According to Article 15(1) of Regulation (EC) No 1592/2002 of the European Parliament and of the Council of 15 July 2002 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, EASA has only taken over Member States obligations that are related to design approval. EASA has determined that the above referenced non-compliance is not related to design approval, as it is the result of misinterpretation of existing (approved) maintenance instructions and that the type design is therefore not affected. However, this matter is serious enough to warrant the publication of this Safety Information.

The National Aviation Authorities of the ICAO member states are hereby informed that the Agency finds the RR position acceptable. No additional in-service action is required to ensure the continued airworthiness of the affected engines.

- Applicability: Rolls-Royce RB211-524, RB211-535E4, RB211 Trent 500, RB211 Trent 700 and RB211 Trent 800 series engines. The affected parts have been identified and the operators on whose engines these parts are installed are being contacted by the companies that performed the described maintenance actions. Full lists of the affected parts can be obtained upon request from RR, contact details in the attached letter to EASA.
- **Recommendation:** This Safety Information Notice is for information only.
- Contact:
 For further information contact the Airworthiness Directives, Safety and Research Section, Certification Directorate, EASA. E-mail: <u>ADs@easa.europa.eu</u>.



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 Date:
 19-Dec-2007

Dear Sir,

Subject: Inspection of RB211 and Trent Group A Parts by MPI Without Removal of Corrosion Protection

In 2003 the CAA mandated focused inspections of Group A parts in the overhaul shop for components stripped to piece part level (G-2003-0003, 4, 5, 7 & 9), which is currently carried out using a Magnetic Particle Inspection (MPI) technique. It has recently been brought to Rolls-Royce's attention that the MPI of certain Group A parts have been carried out without the removal of corrosion protective coating, which reduces the effectiveness of the inspection.

Corrosion protective coating is used to protect steel Group A parts. Steel mainline shafts and IP Compressor Rear Stub Shafts may be affected by this issue on Trent 500, 700, 800, and RB211-524 and 535E4 engine marks. It should be noted that some high stress areas of these components, such as splines and curvic teeth, are not corrosion protected, so will not be affected by this issue since they will have had a full inspection in accordance with the Engine Manual instructions.

For the affected parts, component life predictions do not rely on inspection in service to determine the declared life of the components. The focused inspections are used as a proactive check on a Group A part design to find any unexpected issues, and also to ensure parts have not been damaged either in service or during engine overhaul. The MPI inspection is only required when the component has been stripped to piece part level. This is defined as when all bolted assemblies and inserts have been removed as shown in the engine Illustrated Parts Catalogue.

Trent

In over twenty million hours of Trent service operation, Rolls-Royce has not been made aware of any anomalies with the identified components in areas subject to corrosion protection. For the affected Trent components there are no hazardous failure modes associated with the affected features. Features with potentially hazardous failure modes which are subject to focus inspection are not painted and hence have been correctly inspected. Other overhaul bases have been inspecting these components with paint removed and have not reported any cracks.

<u>RB211</u>

Specific Turbine Shafts have been identified as having MPI inspection without having the protective coating removed.

- RB211-G/H-T and RB211-535E4 IP Turbine Shaft There are no hazardous failure modes from painted features.
- RB211-524 LPT Shafts The RB211 LPT shafts have shown some anomalies in service and these are the subject of an EASA AD (ref 2007-0310, effective 2nd January 2008). The inspection history on these shafts has been reviewed and deemed acceptable, as the AD will require full FPI inspection at next overhaul.

In addition to this Rolls-Royce has assessed the sensitivity of the MPI to coating thickness, using a series of specimen tests. This has shown a small but acceptable reduction in sensitivity.

No additional service action is necessary to address this issue, either for engines currently on-wing or for components which have already been reassembled into modules at overhaul. It is not necessary to remove the affected engines before the next scheduled removal date when the components will be removed and subjected to the appropriate focused inspections. Where future Magnetic Particle Inspections are required, this must be done with corrosion protective coating removed.

Yours sincerely for Rolls-Royce plc

ORIGINAL SIGNED

lan Child Chief Engineer – Trent 800 & RB211 Rolls-Royce plc.