



EASA Safety Information Notice

No.: 2007-20
Issued: 08 August 2007

Subject: Pratt & Whitney JT9D-7A and -7J Series Engines – Maintenance of the High Pressure Turbine (HPT) 2nd Stage Vane Assemblies

Ref. Publication: FAA Special Airworthiness Information Bulletin (SAIB) NE-07-41.

Introduction: This SIN refers to FAA Special Airworthiness Information Bulletin (SAIB) No. NE-07-41 (attached to this document as pages 2 and 3). This document describes an engine separation event which occurred on a Boeing 747 aircraft, following an HPT 2nd stage disk rim release. The root cause of the disk rim release was incorrect installation of the HPT 2nd stage vane assembly, causing it to lean back and contact the disc during engine operation. This resulted in circumferential grooves and scoring, from which several cracks initiated and grew until the disc failed.

Applicability: Pratt & Whitney JT9D-7A and -7J Series Engines, known to be installed on, but not limited to, Boeing 747 series aircraft.

Recommendation: EASA fully endorses the FAA recommendations contained in the attached SAIB.

This Safety Information Notice is for information only. No AD action by NAAs is required.

Contact: For further information contact the Section Airworthiness Directives, Certification Directorate, EASA.
E-mail: ADs@easa.europa.eu.



SAIB: NE-07-41

SUBJ: Pratt & Whitney (P&W) JT9D HPT 2nd Stage Vane/Disk Failures

Date: August 3, 2007

This is information only. Recommendations aren't mandatory.

Introduction

This Special Airworthiness Information Bulletin alerts you, owners, operators, and repair facilities of **Pratt & Whitney JT9D-7A and -7J series engines** and Principal Maintenance Inspectors in the FAA Flight Standards District Offices (FSDOs), of improper maintenance of the high pressure turbine (HPT) 2nd stage vane assemblies. An uncontained engine failure due to a fracture in an HPT 2nd stage disk can potentially occur if maintenance is performed improperly. In an extreme case, the engine may separate from the airplane.

Background

On October 22, 2004, a Boeing 747 freighter experienced an engine separation event. A teardown of the engine showed that a significant portion of the HPT 2nd stage disk rim failed, causing an imbalance that overloaded the forward and aft engine mounts. The root cause of this disk failure was the incorrect installation of the 2nd stage vane assembly, causing it to lean back and contact the disk during operation. This resulted in circumferential grooves and scoring, from which several cracks initiated and grew until the disk failed.

It is likely that the HPT 2nd stage vane bolts were not properly torqued to the correct value at the last maintenance visit. This could have occurred for several reasons: old bolts were reused, different lubricant used, bolts were torqued in an incorrect order, or the torque wrench was not within calibration. Incorrect installation of lock-wire can also lead to the bolts becoming loose over time.

The engine manual contains a warning since 2000 stating that:

“Improperly seated second stage vanes can cause lean back of the second stage inner shroud and result in contact with the second stage hub. Contact can cause wear in the hub web and eventually result in second stage hub fracture and liberation.”

The FAA is currently reviewing fleet data to identify whether there is a suspect population beyond this event. As no additional population has been identified at this time, the airworthiness concern has not been determined to be an unsafe condition that would warrant airworthiness directive (AD) action under Title 14 of the Code of Federal Aviation Regulations (14 CFR) part 39.

Recommendations

Each operator should:

1. Review their HPT 2nd stage vane installation procedures to ensure they use only P&W or similar FAA-approved procedures.
2. Remove immediately from service any engine suspected to have improperly torqued HPT 2nd stage vane bolts.
3. At next exposure, inspect the HPT 2nd stage disk visually and remove the disk from service if there is any sign of circumferential disk scoring.

Additionally, P&W is developing an on-wing borescope inspection to check for leading indicators of 2nd stage vane leanback.

For Further Information Contact

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For Related Service Information Contact

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