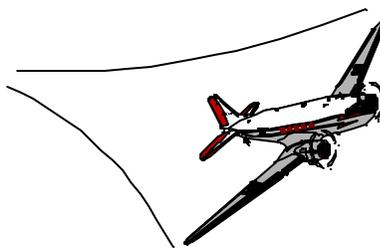


# SPECIAL AIRWORTHINESS INFORMATION BULLETIN



U.S. Department  
of Transportation

**Federal Aviation  
Administration**

No. NE-02-22  
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Aircraft Certification Service  
Washington, DC

*We post SAIBs on the internet at "av-info.faa.gov"*

*This is information only. Recommendations are not mandatory.*

## **Introduction**

This Special Airworthiness Information Bulletin (SAIB) alerts you, operators, repair stations and principal maintenance inspectors (PMI's) of cracks found in Pratt & Whitney JT8D-200 series high pressure compressor (HPC) front hubs (C-8) hubs. We want to present background information, identify the affected configurations, and provide recommendations for operators to incorporate into their continuous airworthiness maintenance programs.

## **Background**

Cracks have been found in JT8D-200 series C-8 hubs on the rear face of the tierrod hole. The cracks are occurring at the interface of the C-8 hub and the stage 8<sup>th</sup> to 9<sup>th</sup> spacer (C8-9 spacer). To date, 16 cracked hubs have been found. The cause of the cracking appears to be fretting induced fatigue. The fretting is believed to be the result of spalling of the PWA-110 coating in the spacer-hub interface as a result of normal relative motion between the hub and the spacer. The spalled coating material, trapped between the hub and spacer, produces high contact stresses which results in the fretting and ultimately cracking of the hub. Because of this cracking mechanism, cracks have only been found on configurations that incorporate PWA-110 coating on the spacer and Nickel-Cadmium (NiCd) coating on the hub. This configuration has been the production configuration for JT8D-217C's and JT8D-219's since 1987. It is unclear at this time whether the same mechanism occurs on a PWA-110 coated hub combined with a PWA-110 coated spacer. It is reasonable to assume that the same mechanism may exist with a PWA-110 coated spacer on a PWA-110 coated hub configuration, however more inspection data is needed for this configuration.

The cracked hubs are typically found on high-time HPC's; all exceeded 13,000 cycles in service since new or since last HPC overhaul. The cracks appear in the aft face of the hub between the 9 to 11 o'clock and 1 to 3 o'clock positions adjacent to the tierrod holes. The clock position on the tierrod hole is defined by viewing the hub from the aft facing forward with 12 o'clock located on the tierrod hole circumference nearest the OD of the hub. Figure 1 illustrates the location of the spacer-hub interface where cracks are found on the C-8 hubs. Figure 2 shows the typical locations of the cracks relative to the tierrod hole.

Further information and background on this situation can be found in Pratt & Whitney All Operator Wires (AOW's) C2037-G48388 XFR, dated 02/06/02; C2009-G63027 XFR, dated 01/09/02; and C1277-G41279 XFR dated 10/4/01.

In summary, the following conditions have been found to produce cracks in C-8 hubs in JT8D-200 series engines:

1. PWA-110 coated C8-9 spacers used in conjunction with NiCd coated C-8 hubs or PWA-110 coated C-8 hubs. JT8D-219/-217C engines produced since 1987 will have one of these configurations

- Greater than 13,000 cycles since new or last full HPC overhaul, where the C-8 hub and C8-9 spacer were stripped, inspected and recoated.

The FAA will be developing a field management plan (FMP) to incorporate into an airworthiness directive. In the interim, the FAA makes the following recommendations to operators so that any data they collect can be used to develop the appropriate FMP and they will be also be in a position to incorporate the final FMP more easily.

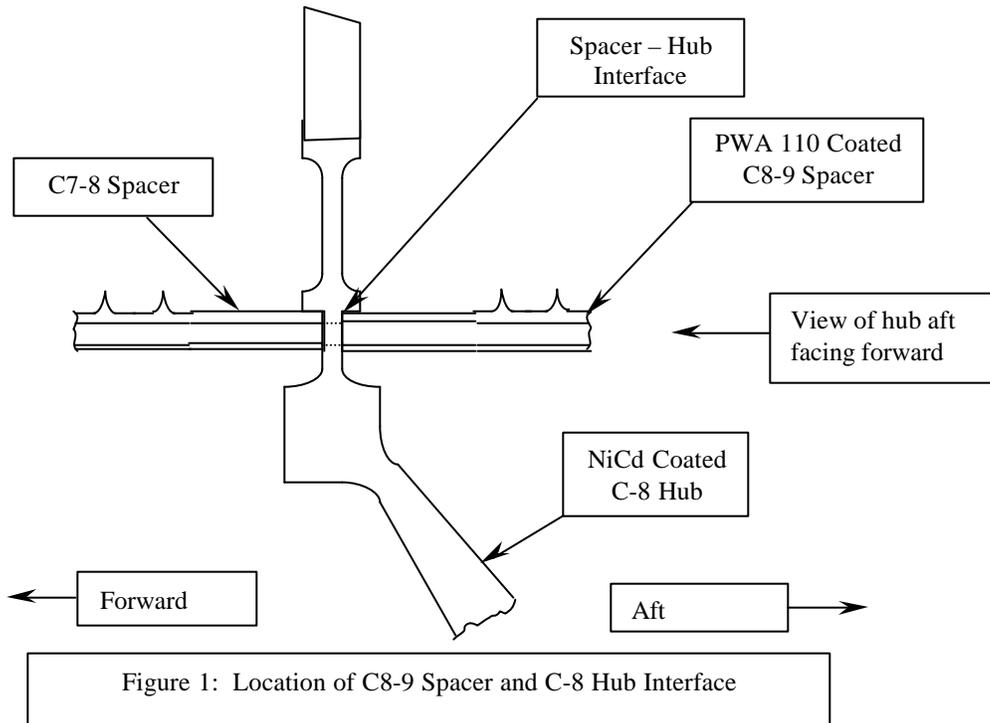


Figure 1: Location of C8-9 Spacer and C-8 Hub Interface

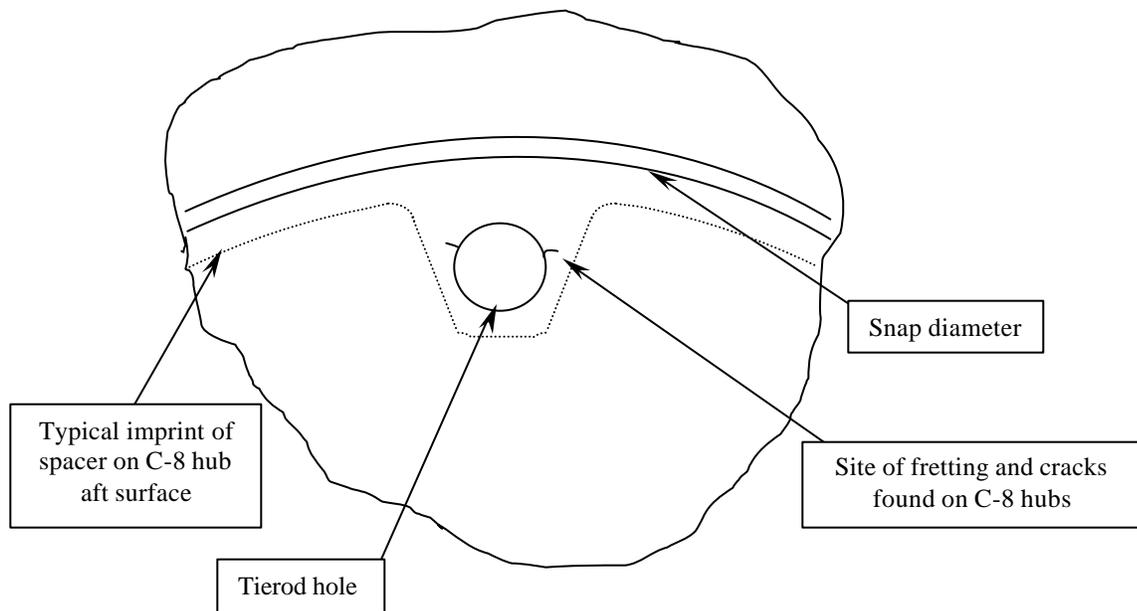


Figure 2: Location of Fretting and Cracks Found on Aft Face of C-8 Hubs

## **Recommendations**

We are alerting all operators, repair stations and their respective PMI's of cracks found in JT8D-200 series C-8 hubs. Pending airworthiness directive action, the FAA offers the following recommendations to operators of JT8D-200 series engines:

1. Determine the time and cycles since last full compressor overhaul of your JT8D-200 fleet of engines. Pay close attention to those engines with the conditions summarized above. Perform a full compressor overhaul at the next engine shop visit for those engines meeting the high-risk criteria. Develop a schedule for early removals of highest time engines, which are over 13,000 cycles since last full compressor overhaul.
2. Review your current C-8 hub fluorescent magnetic particle inspection (FMPI) techniques to be sure that they establish the correct magnetic fields to find cracks in the circumferential orientation. Refer to PW Engine Manual PN 773128, section 72-36-42, inspection -03 and PW Standard Practices Manual, Service Process Operation Procedure (SPOP) 115, step E.
3. Institute focused visual and FMPI inspections in the area of the hubs susceptible to fretting and cracking when the hubs become available in the shop (refer to NDIP 1052 contained in AOW C2009-G63027 XFR.)
4. Report inspection findings to Pratt & Whitney as requested in AOW C2009-G63027 XFR.
5. Report all cracks in accordance with your established FMD reporting procedures.
6. Look for forthcoming Pratt & Whitney updates to their recommendations and inspection techniques.

## **For Further Information Contact**

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