

# SERVICE BULLETIN

**Subject:** Liberated Head of Tubular Rivet PN 800162WE, installed in JT8D Engine 7<sup>th</sup> Stage High Pressure Compressor (HPC), (reference SIL 130418-001, dated 4/18/2013).

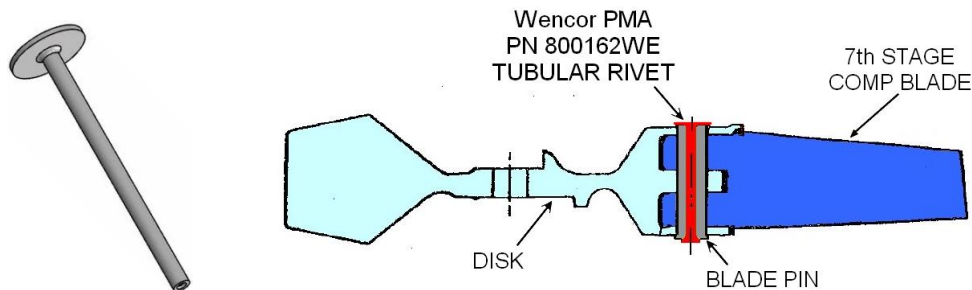
## 1. Planning

### a. Effectivity

Wencor P/N	NHA P/N	NHA Description	ATA	Engine Application
800162WE	815707 5006007-02 and similar	Disk-Compressor Rotor, 7 <sup>th</sup> Stage	72-36-00	JT8D-ALL

### b. Reason

Between January and July 2013, two customers have discovered a total of 13 Wencor Tubular Rivets that had liberated the rivet head after an unknown time in service. The rivets were installed in the 7<sup>th</sup> stage HPC section of JT8D series engines, and were assembled between January 2011 thru December 2011. On 9 engines a single rivet head out of 60 total rivets was found missing and on 2 engines two rivet heads were found missing. No engine related failures or detectable loss of performance in engine operation has been caused by the failed (liberated head) rivets at any customer.



**Figure 1, Rivet ISO View & Section View of Installed Rivet**

Revision: Original  
 Date: July 12, 2013

Service Bulletin No: 130617-001  
 Page 1 of 4

### c. Background

The function of the Wencor Tubular Rivet PN 800162WE is to prevent forward axial movement of the 7<sup>th</sup> stage HPC blade pin.

The headless rivets were discovered during maintenance for non-related reasons when the engine was rotated to the vertical position and due to gravity, the blade pin fell out of the 7<sup>th</sup> stage disk or was discovered during boroscope inspection of the 7<sup>th</sup> stage HPC section before engine removal.

The 7<sup>th</sup> stage HPC assemblies that had liberated rivet heads were built between January to December 2011. The affected engines had been in service between 1,108 to 5,083 hours prior to discovery of the failed rivets.

After an exhaustive investigation, Wencor has not been able to conclusively determine a single root cause of the failed rivet heads. However, improvements in product manufacturing and inspection as well as recommended improvements in the installation process (per SIL 130620-001) have been implemented to prevent reoccurrence.

### d. Safety

Loss of the rivet head could allow the affected 7<sup>th</sup> stage blade pin to move forward out of the 7<sup>th</sup> stage disk. Due to the blade-to-disk retention design, the blade pin would need to move forward at least half the length of the blade pin before the 7<sup>th</sup> stage blade could be liberated due to fracture of the disk rail. A liberated 7<sup>th</sup> stage blade would result in an engine shut down.

Although this forward movement is theoretically possible, none of the recorded rivet failures have shown forward movement of the blade pin. The radial force of the blade mass under centrifugal loading during engine operation has the tendency to retain the blade pin in place as shown in each of the recorded rivet failures. Without exception, on-wing borescope inspections of failed rivets have established that the blade pins remain in place, without any axial movement after a rivet head failure. Therefore, post-rivet failure movement of the blade pin is considered unlikely.

None of the recorded rivet failures have resulted in significant engine operational effect or reduced safety of flight and the probability of an engine shut down from a liberated rivet head is highly unlikely. However, the liberated rivet heads in some cases have resulted in minor damage to downstream stages of the HPC due to domestic object damage (DOD).

## 2. Recommended Actions

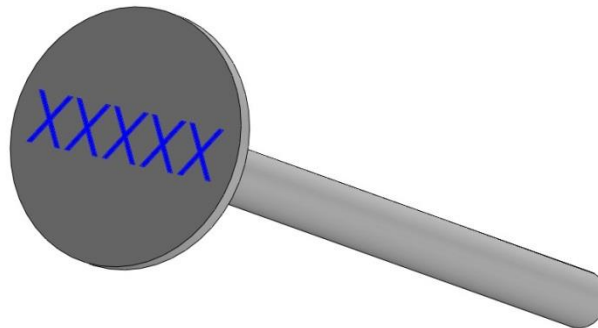
### a. Preemptive Borescope Inspection

Within the compliance time described in section 3a, perform a preemptive borescope inspection of JT8D engines that have undergone a 7<sup>th</sup> stage HPC blade replacement using Wencor Tubular Rivets PN 800162WE any time between August 1, 2010 and December 31, 2011. Inspect the 7<sup>th</sup> stage Tubular Rivet heads from the aft side of the 7<sup>th</sup> stage HPC disk.

### b. Repetitive Borescope Inspection

Within the compliance time described in section 3b, implement an operator defined, on-going borescope inspection plan such as at every B check, where the 7<sup>th</sup> stage HPC section is inspected for Wencor Turbular Rivets PN 800162WE that may have missing rivet heads.

The repetitive borescope inspection may cease when all Wencor rivets that do not have any marking on the rivet head as shown below in Figure 2 have been removed from service. Rivets with marking on the rivet head have been inspected for cracks under the rivet head and screened for proper manufacturing.



**Figure 2:** Wencor Rivets with Marking on Rivet Head

### c. Discovered Headless Rivet

If a rivet head is found missing from either inspection described above, remove the affected engine within 50 flight hours and report the results to Wencor Continued Operational Safety (COS) Administrator Carl James at [cjames@wencor.com](mailto:cjames@wencor.com) or 1-801-489-2083.



1625 North 1100 West  
Springville, UT 84663  
801-489-2000

### 3. Compliance

- a. Within 1,500 engine flight hours (EFH) from the date of this SB, implement recommended action described in section 2a.
- b. Within 90 days of the date of this SB, implement recommended action described in section 2b.

### 4. Material

Any Wencor Tubular Rivet that requires replacement as a result of this Service Bulletin will be covered free of charge under the Wencor material warranty. If there are any questions regarding this Service Bulletin, please contact the applicable Wencor representative by calling 801-489-2000 or email: [sales@wencor.com](mailto:sales@wencor.com).

Revision: Original  
Date: July 12, 2013

Service Bulletin No: 130617-001  
Page 4 of 4