

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2010-0452; Directorate Identifier 98-ANE-80-AD; Amendment 39-16639; AD 2011-07-02]

RIN 2120-AA64

Airworthiness Directives; Pratt & Whitney JT8D-209, -217, -217A, -217C, and -219 Series Turbofan Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: We are superseding an existing airworthiness directive (AD) for the products listed above. That AD currently requires initial and repetitive torque inspections of the 3rd stage and 4th stage low-pressure turbine (LPT) blades for shroud notch wear and replacement of the blade if wear limits are exceeded. That AD also requires replacing LPT-to-exhaust case bolts and nuts with bolts and nuts made of Tinidur material. This new AD requires the same torque inspection, blade, and Tinidur nut replacement actions, but requires replacement of the LPT-to-exhaust case bolts with longer bolts made of Tinidur material. This AD also requires installation of crushable sleeve spacers on the bolts. This AD was prompted by nine reports of failure of Tinidur material LPT-to-exhaust case bolts, as a result of blade failure, since AD 2005-02-03 became effective. We are issuing this AD to prevent turbine blade failures that could result in uncontained engine debris and damage to the airplane.

DATES: This AD is effective April 28, 2011. The Director of the Federal Register approved the incorporation by reference of certain publications listed in the AD as of April 28, 2011.

ADDRESSES: For service information identified in this AD, contact Pratt & Whitney, 400 Main St., East Hartford, CT 06108; phone: (860) 565-8770, fax: (860) 565-4503. You may review copies of the referenced service information at the FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA. For information on the availability of this material at the FAA, call 781-238-7125.

Examining the AD Docket

You may examine the AD docket on the Internet at <http://www.regulations.gov>; or in person at the Docket Management Facility between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this AD, the regulatory evaluation, any comments received, and other information. The address for the Docket Office (phone: 800-647-5527) is Document Management Facility, U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue, SE., Washington, DC 20590.

FOR FURTHER INFORMATION CONTACT: Ian Dargin, Aerospace Engineer, Engine Certification Office, FAA, Engine and Propeller Directorate, 12 New England Executive Park; Burlington, MA 01803; phone: 781-238-7178; fax: 781-238-7199; e-mail: ian.dargin@faa.gov.

SUPPLEMENTARY INFORMATION:

Discussion

We issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 to supersede AD 2005-02-03, Amendment 39-13948 (70 FR 3867, January 27, 2005). That AD applies to the specified products. The NPRM published in the Federal Register on July 1, 2010 (75 FR 38052). That NPRM proposed the same torque inspection, blade, and LPT-to-exhaust case retaining nut replacement actions as the superseded AD, but would also require replacement of the LPT-to-exhaust case bolts with longer bolts made of Tinidur material. That NPRM also proposed to require installation of crushable sleeve spacers on the LPT-to-exhaust case bolts.

Comments

We gave the public the opportunity to participate in developing this AD. We have considered the comments received.

Request to Include Other FAA-Approved Methods

One commenter, American Airlines, requested that paragraph (s) of the proposed AD be revised to include other FAA-approved methods not published in the OEM's engine manual.

We agree and changed paragraph (t) to state: "For the purpose of this AD, "refurbished" is defined as restoration of the shrouds and/or blade re-twist per the JT8D-200 Engine Manual, Part No. 773128, or per an operator's approved manual system."

Request To Allow Compliance to Alert Service Bulletin (ASB) Revision 5 or Revision 6

One commenter, Delta Airlines, requested that we allow compliance using either PW ASB No. JT8D A6224, Revision 5, dated June 11, 2004, or Revision 6, dated May 3, 2007. They stated that their experience with back-to-back testing both with and without notch gauge support did not show any measurable differences. Revision 6 introduced the notch gauge support.

We do not agree. Revision 6 of the ASB provides an improved method of inspection that ensures that the arm of the inspection tool is parallel to the engine center line during the inspection. This yields more accurate inspection results. We do allow previous credit using Revision 5 of the ASB for performing an initial inspection before the effective date of the AD. We did not change the AD.

Request To Change “Modified” to “As-Cast”

One commenter, Turborreactores S.A. de C.V., stated that in Table 4, item 5, the term “Modified” should be changed to “As-Cast” to correctly identify the blades.

We do not agree. PW Service Bulletin No. JT8D 6090 is referenced in ASB No. JT8D A6224. PW Service Bulletin No. JT8D 6090 released both a new “as-cast” blade and instructions for a field modification of existing blades, which could result in “modified” blades in the field. We did not change the AD.

Suggestion That Proposed AD Does Not Address Root Cause

One commenter, Scandinavian Airlines System, suggested that the proposed AD does not address the root cause of LPT failures, which they state is stage 3/stage 4 LPT turbine blades shroud wear and subsequent high-cycle fatigue. They suggested that the proposed AD will probably improve containment with the new design of longer case bolts with crushable sleeves, but they will not eliminate the root cause of LPT failures.

We do not agree. This AD addresses the stage 3 and stage 4 turbine blade shroud notch wear with initial and repetitive torque inspections. The longer Tinidur material LPT case bolts with crushable spacers will prevent bolt fractures and/or case ripping near the flange, and will result in only a 2.02 pound weight increase. We did not change the AD.

Conclusion

We reviewed the relevant data, considered the comments received, and determined that air safety and the public interest require adopting the AD with the change described previously. We have determined that this change will neither increase the economic burden on any operator nor increase the scope of the AD.

Costs of Compliance

We estimate that this AD will affect 1,143 engines installed on airplanes of U.S. registry. We also estimate that it will take about 1 work-hour per engine to perform the 3rd and 4th stage LPT blade inspection, and 1.5 work-hours per engine to replace the LPT-to-exhaust case bolts and nuts and install the crushable sleeve spacers. Required bolts, nuts, and sleeve spacers will cost about \$4,576 per engine. We anticipate that 61 engines will also require blade replacement each year. Required blades will cost about \$131,560 per engine. The average labor rate is \$85 per work-hour. Based on these figures, we estimate the total cost of the AD to U.S. operators to be \$13,617,671.

Authority for This Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, Section 106, describes the authority of the FAA Administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of the Agency's authority.

We are issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701, “General requirements.” Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

Regulatory Findings

We have determined that this AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that this AD:

- (1) Is not a “significant regulatory action” under Executive Order 12866;
- (2) Is not a “significant rule” under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979); and
- (3) Will not affect intrastate aviation in Alaska, and
- (4) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

Adoption of the Amendment

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 14 CFR part 39 as follows:

PART 39—AIRWORTHINESS DIRECTIVES

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

§ 39.13 [Amended]

2. The FAA amends § 39.13 by removing airworthiness directive (AD) 2005-02-03, Amendment 39-13948 (70 FR 3867, January 27, 2005), and adding the following new AD:



2011-07-02 Pratt & Whitney: Amendment 39-16639. Docket No. FAA-2010-0452; Directorate Identifier 98-ANE-80-AD.

Effective Date

- (a) This airworthiness directive (AD) is effective April 28, 2011.

Affected ADs

- (b) This AD supersedes AD 2005-02-03, Amendment 39-13948.

Applicability

(c) This AD applies to Pratt & Whitney (PW) JT8D-209, -217, -217A, -217C, and -219 series turbofan engines. These engines are installed on, but not limited to, Boeing 727 series and McDonnell Douglas MD-80 series airplanes.

Unsafe Condition

(d) This AD results from nine reports of failure of Tinidur material LPT-to-exhaust case bolts, as a result of blade failure, since AD 2005-02-03 became effective. We are issuing this AD to prevent turbine blade failures that could result in uncontained engine debris and damage to the airplane.

Compliance

(e) You are responsible for having the actions required by this AD performed within the compliance times specified unless the actions have already been done.

Requirements of AD 2005-02-03

Initial Torque Inspection for JT8D-209, -217, and -217A Engines

(f) For JT8D-209, -217, and -217A engines, perform the initial torque inspection of 3rd and 4th stage LPT blades for shroud notch wear. Use the procedures described in Accomplishment Instructions, Part 1, Paragraphs 1 through 3, of PW Alert Service Bulletin (ASB) No. JT8D A6224, Revision 6, dated May 3, 2007, at the applicable threshold in the following Table 1:

Table 1—Initial Torque Inspection Threshold for JT8D-209, -217, and -217A Engines

| Blade Type | Hours Time-In-Service (TIS) as of March 3, 2005 (the effective date of AD 2005-02-03) | Inspection Threshold |
|--|--|---|
| (1) New pre-Service Bulletin (SB) No. 5867 (small notch) 3 rd stage turbine blades. | Any number. | Within 6,000 hours TIS. |
| (2) Refurbished pre-SB No. 5867 (small notch) 3 rd stage turbine blades. | (i) Fewer than 3,000. | Within 4,000 hours TIS. |
| | (ii) 3,000 or more. | Within 6,000 hours TIS, or within 1,000 hours TIS from March 3, 2005, whichever occurs first. |
| (3) New post-SB No. 5867 (large notch) 3 rd stage turbine blades. | Any number. | Within 10,000 hours TIS. |
| (4) Refurbished post-SB No. 5867 (large notch) 3 rd stage turbine blades. | (i) Fewer than 6,000. | Within 7,000 hours TIS. |
| | (ii) 6,000 or more. | Within 8,000 hours TIS, or within 1,000 hours TIS from March 3, 2005, whichever occurs first. |
| (5) New pre-SB No. 6029 (small notch) 4 th stage turbine blades. | Any number. | Within 6,000 hours TIS. |
| (6) Refurbished pre-SB No. 6029 (small notch) 4 th stage turbine blades. | (i) Fewer than 3,000. | Within 4,000 hours TIS. |
| | (ii) 3,000 or more. | Within 6,000 hours TIS, or within 1,000 hours TIS from March 3, 2005, whichever occurs first. |
| (7) New post-SB No. 6029 or new post-SB No. 6308 (large notch) 4 th stage turbine blades. | Any number. | Within 10,000 hours TIS. |
| (8) Refurbished post-SB No. 6029 or refurbished post-SB No. 6308 (large notch) 4 th stage turbine blades. | (i) Fewer than 6,000. | Within 7,000 hours TIS. |
| | (ii) 6,000 or more. | Within 8,000 hours TIS, or within 1,000 hours TIS from March 3, 2005, whichever occurs first. |

Repetitive Torque Inspections for JT8D-209, -217, and -217A Engines

(g) For JT8D-209, -217, and -217A engines, perform repetitive torque inspections of 3rd and 4th stage LPT blades for shroud notch wear. Use the procedures described in Accomplishment

Instructions, Part 1, Paragraph 1 of PW ASB No. JT8D A6224, Revision 6, dated May 3, 2007, at the applicable intervals in the following Table 2 and Table 3:

Table 2—3rd Stage Repetitive Torque Inspection Intervals for JT8D-209, -217, and -217A Engines

| Inspection Torque Readings | Number of Readings | Disposition |
|---|---------------------------|--|
| Greater than or equal to 15 LB-IN (1.695 N.m). | All. | Repeat torque inspection within 1,000 hours TIS since last inspection. |
| Less than 15 LB-IN (1.695 N.m) but greater than or equal to 10 LB-IN (1.130 N.m). | One or more. | Repeat torque inspection within 500 hours TIS since last inspection. |
| Less than 10 LB-IN (1.130 N.m) but greater than or equal to 5 LB-IN (0.565 N.m). | One to three. | Repeat torque inspection within 125 hours TIS since last inspection. |
| Less than 10 LB-IN (1.130 N.m) but greater than or equal to 5 LB-IN (0.565 N.m). | Four or more. | Remove engine from service within 20 hours TIS since last inspection. |
| Less than 5 LB-IN (0.565 N.m). | One or more. | Remove engine from service within 20 hours TIS since last inspection. |

Table 3—4th Stage Repetitive Torque Inspection Intervals for JT8D-209, -217, and -217A Engines

| Inspection Torque Readings | Number of Readings | Disposition |
|---|---------------------------|--|
| Greater than or equal to 15 LB-IN (1.695 N.m). | All. | Repeat torque inspection within 1,000 hours TIS since last inspection. |
| Less than 15 LB-IN (1.695 N.m) but greater than or equal to 10 LB-IN (1.130 N.m). | One or more. | Repeat torque inspection within 500 hours TIS since last inspection. |
| Less than 10 LB-IN (1.130 N.m) but greater than or equal to 5 LB-IN (0.565 N.m). | One to six. | Repeat torque inspection within 125 hours TIS since last inspection. |
| Less than 10 LB-IN (1.130 N.m) but greater than or equal to 5 LB-IN (0.565 N.m). | Seven or more. | Remove engine from service within 20 hours TIS since last inspection. |
| Less than 5 LB-IN (0.565 N.m). | One or more. | Remove engine from service within 20 hours TIS since last inspection. |

(h) Subsequent repeat inspection intervals must not exceed the previous inspection interval.

JT8D-209, -217, and -217A Engines Removed From Service

(i) JT8D-209, -217, and -217A engines removed from service may be returned to service after a detailed inspection and repair or replacement of all blades of the failed stage, that exceed Engine Manual limits, is done. Information on repairing or replacing turbine blades can be found in Sections 72-53-12 through 72-53-13 of the JT8D-200 Engine Manual, Part No. 773128.

Initial Inspection for JT8D-217C and -219 Engines

(j) For JT8D-217C and -219 engines, perform the initial torque inspection of 4th stage LPT blades for shroud notch wear. Use the procedures described in Accomplishment Instructions, Part 2, Paragraphs 1 through 3 of PW ASB No. JT8D A6224, Revision 6, dated May 3, 2007, at the applicable threshold in the following Table 4:

Table 4—Initial Torque Inspection Threshold for JT8D-217C and -219 Engines

| Blade Type | TIS as of March 3, 2005 | Inspection Threshold |
|--|----------------------------|---|
| (1) New pre-SB No. 6090 (small notch) 4 th stage turbine blades. | Any number. | Within 5,000 hours TIS. |
| (2) Refurbished pre-SB No. 6090 (small notch) 4 th stage turbine blades. | (i) Fewer than 3,000. | Within 4,000 hours TIS. |
| | (ii) 3,000 or more. | Within 5,000 hours TIS, or within 1,000 hours TIS from March 3, 2005, whichever occurs first. |
| (3) New post-SB No. 6090, new post-SB No. 6402, or new post-SB No. 6412 (large notch) 4 th stage turbine blades. | Any number. | Within 10,000 hours TIS. |
| (4) Refurbished “As-Cast” post-SB No. 6090, post-SB No. 6402, or post-SB No. 6412 (large notch) 4 th stage turbine blades. | Any number. | Within 7,000 hours TIS. |
| (5) Refurbished “Modified” post-SB No. 6090, post-SB No. 6402, or post-SB No. 6412 (large notch) 4 th stage turbine blades. | (i) Fewer than 3,000. | Within 4,000 hours TIS. |
| | (ii) 3,000 or more. | Within 7,000 hours TIS, or within 1,000 hours TIS from March 3, 2005, whichever occurs first. |

Repetitive Torque Inspections for JT8D-217C and -219 Engines

(k) For JT8D-217C and -219 engines, perform repetitive torque inspections of 4th stage LPT blades for shroud notch wear. Use the procedures described in Accomplishment Instructions, Part 2, Paragraph 1 of PW ASB No. JT8D A6224, Revision 6, dated May 3, 2007, at the applicable intervals in the following Table 5:

Table 5—Repetitive Torque Inspection Intervals for JT8D-217C and -219 Engines

| Inspection Torque Readings | Number of Readings | Disposition |
|---|--------------------|--|
| Greater than or equal to 15 LB-IN (1.695 N.m). | All. | Repeat torque inspection within 1,000 hours TIS since last inspection. |
| Less than 15 LB-IN (1.695 N.m) but greater than or equal to 10 LB-IN (1.130 N.m). | One or more. | Repeat torque inspection within 500 hours TIS since last inspection. |
| Less than 10 LB-IN (1.130 N.m) but greater than or equal to 5 LB-IN (0.565 N.m). | One to six. | Repeat torque inspection within 125 hours TIS since last inspection. |
| Less than 10 LB-IN (1.130 N.m) but greater than or equal to 5 LB-IN (0.565 N.m). | Seven or more. | Remove engine from service within 20 hours TIS since last inspection. |
| Less than 5 LB-IN (0.565 N.m). | One or more. | Remove engine from service within 20 hours TIS since last inspection. |

(l) Subsequent repeat inspection intervals must not exceed the previous inspection interval.

JT8D-217C and -219 Engines Removed From Service

(m) JT8D-217C and -219 engines removed from service may be returned to service after a detailed inspection and repair or replacement of all blades of the failed stage, that exceed Engine Manual limits, is done. Information on repairing or replacing turbine blades can be found in Sections 72-53-12 through 72-53-13 of the JT8D-200 Engine Manual, Part No. 773128.

Other Criteria for All Engine Models Listed in This AD

(n) Whenever a refurbished or used blade is intermixed with new blades in a rotor, use the lowest initial inspection threshold that is applicable.

(o) The initial torque inspection or the repetitive inspection intervals for a particular stage may not be reset, unless the blades for that stage are refurbished or replaced.

(p) Whenever a used (service run) blade is reinstalled in a rotor, the previous used time should be subtracted from the initial torque inspection threshold.

What This AD Changes

LPT-to-Exhaust Case Bolts and Nuts Replacement, and Crushable Sleeve Spacer Installation

- (q) At next accessibility to the LPT-to-Exhaust Case bolts and nuts, do the following:
 - (1) Replace the bolts with part number (P/N) MS9557-26 bolts; and
 - (2) Replace the nuts with P/N 375095 nuts or P/N 490270 nuts; and
 - (3) Install crushable sleeve spacers, P/N 822903, under the head of the bolts.
- (r) Guidance on replacing the bolts and nuts and installing the crushable sleeve spacers can be found in PW ASB No. JT8D A6494, Revision 1, dated January 26, 2010.

Previous Credit

- (s) Initial inspections performed before the effective date of this AD using PW ASB No. JT8D A6224, Revision 5, dated June 11, 2004, or Revision 6, dated May 3, 2007, satisfy the initial inspection requirements of this AD.

Definitions

- (t) For the purpose of this AD, "refurbished" is defined as restoration of the shrouds and/or blade re-twist per the JT8D-200 Engine Manual, Part No. 773128, or per an operator's approved manual system.
- (u) For the purpose of this AD, "As-Cast" refers to blades that were machined from new castings, and "Modified" refers to blades that were derived from the pre-SB No. 6090 configuration.
- (v) For the purpose of this AD, "accessibility to the LPT-to-exhaust case bolts" refers to when the inner turbine fan ducts are removed.

Alternative Methods of Compliance

- (w) The Manager, Engine Certification Office, has the authority to approve alternative methods of compliance (AMOCs) for this AD if requested using the procedures found in 14 CFR 39.19. AMOCs approved for the initial and repetitive inspection requirements of AD 2005-02-03 are approved as AMOCs for this AD.

Related Information

- (x) For information about this AD, contact Ian Dargin, Aerospace Engineer, Engine Certification Office, FAA, Engine and Propeller Directorate, 12 New England Executive Park; Burlington, MA 01803; phone: 781-238-7178; fax: 781-238-7199; e-mail: ian.dargin@faa.gov.

Material Incorporated by Reference

- (y) You must use Pratt & Whitney Alert Service Bulletin No. JT8D A6224, Revision 6, dated May 3, 2007, to perform the torque inspections required by this AD.
 - (1) The Director of the Federal Register approved the incorporation by reference of this service bulletin in accordance with 5 U.S.C. 552(a) and 1 CFR part 51.
 - (2) For service information identified in this AD, contact Pratt & Whitney, 400 Main St., East Hartford, CT 06108; phone: 860-565-8770, fax: 860-565-4503, for a copy of this service information.
 - (3) You may review copies of the service information at the FAA, New England Region, 12 New England Executive Park, Burlington, MA. For information on the availability of this material at the FAA, call 781-238-7125.

(4) You may also review copies of the service information that is incorporated by reference at the National Archives and Records Administration (NARA). For information on the availability of this material at an NARA facility, call 202-741-6030, or go to http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

Issued in Burlington, Massachusetts on March 14, 2011.

Peter A. White,

Acting Manager, Engine and Propeller Directorate, Aircraft Certification Service.

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