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## **DEPARTMENT OF TRANSPORTATION**

### **Federal Aviation Administration**

#### **14 CFR Part 39**

**[Docket No. FAA-2008-1095; Directorate Identifier 2008-NE-34-AD; Amendment 39-16924; AD 2012-02-01]**

**RIN 2120-AA64**

#### **Airworthiness Directives; Pratt & Whitney (PW) Turbofan Engines**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Final rule.

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**SUMMARY:** We are adopting a new airworthiness directive (AD) for Pratt & Whitney (PW) PW2037, PW2037(M), and PW2040 turbofan engines with certain fan blades with a cutback leading edge, installed. This AD was prompted by reports from PW that fan blade leading edge erosion can result in a fan thrust deterioration mode (FTDM) condition, a condition that cannot be detected by the crew, and that reduces the engine's capability of producing required thrust. This AD requires initial and repetitive maintenance to the leading edge of cutback fan blades or applying performance decrements as specified in the Airplane Flight Manual. We are issuing this AD to correct undetectable fan thrust deterioration on these PW products.

**DATES:** This AD is effective April 24, 2012.

The Director of the Federal Register approved the incorporation by reference of certain publications listed in the AD as of April 24, 2012.

**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 or Boeing Commercial Airplanes, Attention: Data & Services Management, P.O. Box 3707, MC 2H-65, Seattle, WA 98124-2207; phone: (206) 544-5000, extension 1; fax: (206) 766-5680; email: me.boecom@boeing.com; Internet: <https://www.myboeingfleet.com>. 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 & Propeller Directorate, 12 New England Executive Park, Burlington, MA 01803; phone: (781) 238-7178; fax: (781) 238-7199; email: [ian.dargin@faa.gov](mailto:ian.dargin@faa.gov).

## **SUPPLEMENTARY INFORMATION:**

### **Discussion**

We issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 to include an AD that would apply to the specified products. That NPRM published in the Federal Register on March 25, 2010 (75 FR 14377). That NPRM proposed to require initial and repetitive maintenance to restore the leading edge contour of PW2000 fan blade part numbers (P/Ns) 1B6531, 1B6231-001, or 1A9031-001 (fan blade set P/Ns 1B6521, 1B6221-001, and 1A9721-001).

### **Comments**

We gave the public the opportunity to participate in developing this AD. The following presents the comments received on our proposal and the FAA's response to each comment.

### **Request for Additional Alternative Methods of Compliance (AMOCs)**

Three commenters, UPS, Cheshire Engine Center, and Delta Tech Ops, asked us to include Engine Manual, 1A6231, Chapter/Section 72-31-12, Repair-18, and PW Service Bulletin (SB) PW2000 72-513, Revision 4, dated August 20, 1997, as an AMOC to the AD. The commenters stated that Repair-18 is a bench repair that removes erosion damage and restores the leading edge contour on fan blades with cutback leading edges. The commenters stated that Repair-18 results in a restored leading edge similar to Repair-14, which is already included in the proposed rule as an AMOC. The commenters stated that Repair-14 is a patch weld repair used to restore the cutback leading edge.

We agree that Repair-18 and PW SB PW2000 72-513, Revision 4, dated August 20, 1997 are acceptable methods of resolving the fan thrust deterioration. We changed paragraph (f) of the AD to include Pratt & Whitney PW2037, PW2040, PW2240, PW2337 Turbofan Engine Manual, Part No. 1A6231, Chapter/Section 72-31-12, Repair-14 and Repair-18, and PW SB PW2000 72-513, Revision 4, dated August 20, 1997, as additional methods with which to comply with this AD.

One commenter, The Boeing Company (Boeing), asked us to add Airplane Flight Manual (AFM) D631N007, Section 1, page 11, Code 0P00 (Operation with Cutback Fan Blades) to the AMOC already published in the NPRM. The commenter stated that the performance adjustments for the PW2000 series engines that are installed on 757-300 airplanes are not in AFM D631N002, Appendix 24. They are in AFM D631N007, Section 1, Code 0P00.

We partially agree. We changed paragraph (f) of this AD to include "Boeing 757 Airplane Flight Manual (AFM), Document D631N002" and "Boeing 757 Airplane Flight Manual, Document D631N007" as additional methods with which to comply with this AD. We also changed paragraphs (f)(1)(vi) and (f)(1)(vii) of this AD to clarify that the method of compliance with those paragraphs is to revise the AFM. In addition, we changed paragraph (f)(3) of this AD to provide for removing

certain information from the AFM when that information is included in the general revisions of the AFM. We coordinated all changes to the AFM with the FAA Transport Airplane Directorate.

One commenter, Delta Tech Ops, asked us to include PW SB PW2000 72-737 in the Alternative Methods of Compliance section. The commenter stated that PW SB PW2000 72-737 modifies the cutback fan blades affected by the AD to the non-cutback configuration.

We disagree. If the cutback fan blades affected by the AD are modified to return them to the non-cutback configuration, they are no longer affected by this AD. This AD only applies to fan blade, P/Ns 1B6531, 1B6231-001, or 1A9031-001 (fan blade set P/Ns 1B6521, 1B6221-001, and 1A9721-001), with a cutback leading edge. We didn't change the AD.

### **Request To Clarify Compliance Time**

Two commenters, United Airlines and Delta Tech Ops, asked us to clarify that the AD repair doesn't have to be performed immediately if the blade leading edge has recently been cutback or restored. The commenters made this request to recognize that some blade leading edges have been recently cutback using PW SB PW2000 72-513 or restored using engine manual Repair-14 or Repair-18.

We agree. This AD is to ensure that cutback blades are repaired within 1,000 cycles-in-service after the last leading edge restoration. We changed paragraph (f) to "Within 500 cycles-in-service (CIS) after the effective date of this AD or within 1,000 CIS after the last leading edge restoration, whichever occurs later, do one of the following."

### **Request To Allow Additional Cycles for the PW2037 and PW2037(M) Engines**

One commenter, United Airlines, asked us to match the compliance time in the AD with PW ASB PW2000 A72-729 to allow an additional 500 CIS for the PW2037 and PW2037(M) engines as compared to the compliance time for the PW2040 engines.

We disagree. The additional 500 CIS allowed for PW2037 and PW2037(M) engines was applicable when the alert service bulletin was first published in June 2008. This AD is to ensure cutback blades are repaired within 1,000 CIS after the last leading edge restoration. We didn't change the AD.

### **Request To Address Consequence of Performing the Cutback Leading Edge Repair on a Non-Cutback Blade**

One commenter, United Airlines, asked us to address the consequence of the cutback blade leading edge repair being mistakenly performed on a non-cutback blade. The commenter felt that because of overlap in dimensional requirements, discerning a cutback blade from a non-cutback blade either visually or by measuring the chord length, is difficult. The commenter also stated that the "cb" marking for a cutback blade may become illegible after engine operation and that the cutback blade tooling can fit on non-cutback blades and cause damage.

We disagree. Each operator must ensure that their personnel are properly trained and certificated to perform this maintenance. We didn't change the AD.

### **Eratta**

During review of the comments we received, we discovered that we had referred to additional methods of compliance in the NPRM as Alternative Methods of Compliance (AMOCs). AMOC, in the aviation industry, has a specific and unique meaning. We changed the compliance section of this AD to indicate that operators may choose from several corrective action(s), which are additional methods of compliance, to resolve the unsafe condition. We also emphasized that operators must

choose one method and then they must use the complete method. We did not add or remove any requirements when we made this correction.

We also rephrased the unsafe condition statement to clearly indicate the unsafe condition this AD addresses.

## **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 changes described previously.

We also determined that these changes will not increase the economic burden on any operator or increase the scope of the AD.

## **Costs of Compliance**

We estimate that this AD affects 480 engines installed on airplanes of U.S. registry. We also estimate that it will take about 12 work-hours per engine to perform the actions, and that the average labor rate is \$85 per work-hour. No parts are required. Based on these figures, we estimate the total cost of the AD to U.S. operators to be \$489,600 per year.

## **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**

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),
- (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 adding the following new airworthiness directive (AD):



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**2012-02-01 Pratt & Whitney:** Amendment 39-16924; Docket No. FAA-2008-1095; Directorate Identifier 2008-NE-34-AD.

**(a) Effective Date**

This AD is effective April 24, 2012.

**(b) Affected ADs**

None.

**(c) Applicability**

This AD applies to Pratt & Whitney (PW) PW2037, PW2037(M), and PW2040 turbofan engines with six or more fan blades, part numbers (P/Ns) 1B6531, 1B6231-001, or 1A9031-001 (fan blade set P/Ns 1B6521, 1B6221-001, and 1A9721-001), with a cutback leading edge, installed.

**(d) Unsafe Condition**

This AD was prompted by reports from PW that fan blade leading edge erosion can result in a fan thrust deterioration mode (FTDM) condition, a condition that cannot be detected by the crew, and that reduces the engine's capability of producing required thrust. We are issuing this AD to correct undetectable fan thrust deterioration on these PW products.

**(e) Compliance**

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

**(f) Restoration of the Fan Blade Leading Edge Contour**

(1) Within 500 cycles-in-service (CIS) after the effective date of this AD or within 1,000 CIS after the last leading edge restoration, whichever occurs later, do one of the following. Whichever method you choose, you must implement the method in full.

(i) For engines installed on the airplane, perform the initial restoration using Accomplishment Instructions For Engines Installed on Aircraft, paragraphs 1. through 1.T. of PW Alert Service Bulletin (ASB) PW2000 A72-729, Revision 2, dated October 13, 2010.

(ii) For engines that are not installed on the airplane, perform the initial restoration using Accomplishment Instructions For Engines Not Installed on Aircraft, paragraphs 1. through 1.S. of PW ASB PW2000 A72-729, Revision 2, dated October 13, 2010.

(iii) Perform Repair-14, dated February 1, 2006, from a Pratt & Whitney PW2037, PW2040, PW2240, PW2337 Turbofan Engine Manual, Part No. 1A6231, Chapter/Section 72-31-12.

(iv) Perform Repair-18, dated February 1, 2004, from a Pratt & Whitney PW2037, PW2040, PW2240, PW2337 Turbofan Engine Manual, Part No. 1A6231, Chapter/Section 72-31-12.

(v) Perform PW Service Bulletin PW2000 72-513, Revision 4, dated August 20, 1997.

(vi) Revise the Limitations Section of the Boeing 757 Airplane Flight Manual (AFM), Document D631N002, to include the following limitation. This may be done by inserting a copy of this AD into the AFM.

### **OPERATION WITH CUTBACK FAN BLADES**

Pratt & Whitney 2000 series engines with 3 or more pairs of Cutback Fan Blades that have accumulated greater than 1,000 cycles since new, or since fan blade leading edge contour restoration refurbishment was performed per Pratt & Whitney Alert Service Bulletin PW2000 A72-729, must use the performance decrements specified in Appendix 24, Performance for Operation of PW2000 Series Engines with Cutback Fan Blades Installed 757-200, of the Boeing 757 Airplane Flight Manual, Document D631N002.

(vii) Revise the Limitations Section of the Boeing 757 Airplane Flight Manual, Document D631N007, to include the following limitation. This may be done by inserting a copy of this AD into the AFM.

### **OPERATION WITH CUTBACK FAN BLADES**

Pratt & Whitney 2000 series engines with 3 or more pairs of Cutback Fan Blades that have accumulated greater than 1,000 cycles since new, or since fan blade leading edge contour restoration refurbishment was performed per Pratt & Whitney Alert Service Bulletin PW2000 A72-729, must use the performance decrements specified in Flight Crew Operations Manual Bulletin, Document NWA-67, Performance Adjustments for Thrust Shortfall of PW2000 Series Powered Airplanes with Cutback Fan Blades Installed.”

(2) If you chose one of the methods in paragraphs (f)(1)(i) through (f)(1)(v) of this AD, thereafter, within 1,000 CIS, repeat one of the methods in paragraphs (f)(1)(i) through (f)(1)(v) of this AD. Whichever method you choose, you must implement the method in full.

(3) If you chose one of the methods in paragraphs (f)(1)(vi) or (f)(1)(vii) of this AD, you have fully complied with the requirements of this AD and no further action is required. When a statement identical to that in paragraph (f)(1)(vi) or (f)(1)(vii) of this AD has been included in the Limitations Section of the general revisions of the AFM, the general revisions may be inserted into the AFM, and the copy of this AD may be removed from the AFM.

### **(g) Alternative Methods of Compliance**

The certification office specified in paragraph (g)(1) or (g)(2) of this AD, as applicable, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19.

(1) For paragraphs (f)(1)(vi) and (f)(1)(vii) of this AD: The Manager, Seattle Aircraft Certification Office (ACO), FAA. Send information to ATTN: Chris R. Parker, Aerospace Engineer, Propulsion Branch, ANM-140S, FAA, Seattle ACO, 1601 Lind Avenue SW., Renton, Washington 98057-3356; phone: 425-917-6496; fax: 425-917-6590. Information may be emailed to: 9-ANM-Seattle-ACO-AMOC-Requests@faa.gov.

(2) For requirements of paragraphs of this AD other than those identified in paragraph (g)(1) of this AD: The Manager, Engine Certification Office (ECO), FAA. Send information to ATTN: Ian Dargin, Aerospace Engineer, FAA, ECO, 12 New England Executive Park, Burlington, MA 01803; phone: (781) 238-7178; fax: (781) 238-7199.

### **(h) Related Information**

(i) The Boeing 757 Airplane Flight Manual, Document D631N002, and the Boeing 757 Airplane Flight Manual, Document D631N007 pertain to the subject of this AD. Contact Boeing Commercial Airplanes, Attention: Data & Services Management, P.O. Box 3707, MC 2H-65, Seattle, WA 98124-2207; phone: (206) 544-5000, extension 1; fax: (206) 766-5680; email: me.boecom@boeing.com; Internet: <https://www.myboeingfleet.com>, for a copy of this service information.

(ii) For more information about this AD, contact Ian Dargin, Engine Certification Office, FAA, 12 New England Executive Park, Burlington, MA 01803; phone: (781) 238-7178; fax: (781) 238-7199; email: ian.dargin@faa.gov.

### **(i) Material Incorporated by Reference**

(1) You must use the following service information to do the actions required by this AD, unless the AD specifies otherwise. The Director of the Federal Register approved the incorporation by reference (IBR) of the following service information under 5 U.S.C. 552(a) and 1 CFR part 51 on the date specified:

(i) Pratt & Whitney Alert Service Bulletin PW2000 A72-729, Revision 2, dated October 13, 2010, approved for IBR April 24, 2012.

(ii) Pratt & Whitney Service Bulletin PW2000 A72-513, Revision 4, dated August 20, 1997, approved for IBR April 24, 2012.

(iii) LPC First Stage Blade Assembly Repair-14, dated February 1, 2006, of the Pratt & Whitney PW2037, PW2040, PW2240, PW2337 Turbofan Engine Manual (“PW2000 Series Engine Manual”), Part No. 1A6231, revision 102, dated February 1, 2012, approved for IBR April 24, 2012.

(iv) LPC First Stage Blade Assembly Repair-18, dated February 1, 2004, of the Pratt & Whitney PW2037, PW2040, PW2240, PW2337 Turbofan Engine Manual (“PW2000 Series Engine Manual”), Part No. 1A6231, revision 102, dated February 1, 2012, approved for IBR April 24, 2012.

(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.

(3) You may review copies of the service information at the FAA, 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](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

Issued in Burlington, Massachusetts, on January 13, 2012.

Peter A. White,  
Manager, Engine & Propeller Directorate,  
Aircraft Certification Service.