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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. 2002-NE-15-AD; Amendment 39-13131; AD 2003-09-02]

RIN 2120-AA64

Airworthiness Directives; Pratt and Whitney PW4000 Series Turbofan Engines

AGENCY: Federal Aviation Administration, DOT.

ACTION: Final rule.

SUMMARY: This amendment adopts a new airworthiness directive (AD), that is applicable to certain serial number (SN) Pratt and Whitney (PW) models PW4164, PW4168, and PW4168A turbofan engines. This amendment requires operators to initially and repetitively borescope-inspect 14th and 15th stage rubstrips located on the 13th and 14th stage stator set for wear. This amendment is prompted by reports of high pressure compressor (HPC) surges during the takeoff phase of flight that have been attributed to increased stage 14 and stage 15 HPC blade tip clearances caused by excessive wear on the HPC inner rear case rear hook. The actions specified by this AD are intended to prevent engine power loss during takeoff due to HPC surge.

DATES: Effective June 3, 2003. The incorporation by reference of certain publications listed in the regulations is approved by the Director of the Federal Register as of June 3, 2003.

ADDRESSES: The service information referenced in this AD may be obtained from Pratt & Whitney, 400 Main St., East Hartford, CT 06108, telephone (860) 565-6600; fax (860) 656-4503. This information may be examined, by appointment, at the Federal Aviation Administration (FAA), New England Region, Office of the Regional Counsel, 12 New England Executive Park, Burlington, MA; or at the Office of the Federal Register, 800 North Capitol Street, NW., suite 700, Washington, DC.

FOR FURTHER INFORMATION CONTACT: Keith Lardie, Aerospace Engineer, Engine Certification Office, FAA, Engine and Propeller Directorate, 12 New England Executive Park, Burlington, MA 01803-5299; telephone (781) 238-7189; fax (781) 238-7199.

SUPPLEMENTARY INFORMATION: A proposal to amend part 39 of the Federal Aviation Regulations (14 CFR part 39) to include an AD that is applicable to certain SN PW models PW4164, PW4168, and PW4168A turbofan engines was published in the Federal Register on September 20, 2002 (67 FR 59215). That action proposed to require operators to initially and repetitively borescope-

inspect 14th and 15th stage rubstrips located on the 13th and 14th stage stator set for wear in accordance with Pratt & Whitney Alert Service Bulletin (ASB) PW4G-100-A72-170, Revision 2, dated June 24, 2002. That action also proposed that installation of an HPC inner rear case assembly in accordance with Pratt & Whitney service bulletin (SB) No. PW4G-100-72-159, Revision 1, dated July 12, 2000, be terminating action for the repetitive borescope inspections of this AD.

Comments

Interested persons have been afforded an opportunity to participate in the making of this amendment. Due consideration has been given to the comments received.

Terminating Action Too Specifically Tied to SB

One commenter states that the proposed terminating action to modify or repair the HPC inner rear case hook recognizes only one method of compliance, which is in accordance with PW SB PW4G-100-72-159. The commenter requests the addition of Chromalloy Florida Repair Procedure 00-CFL-039-0 as an approved method to repair the HPC inner rear case.

The FAA agrees. Therefore, the terminating action of the final rule includes both PW SB PW4G-100-72-159 and Chromalloy Florida Repair Procedure 00-CFL-039-0, as approved methods to modify or replace the HPC inner rear case.

Include HPC Inner Rear Case Assembly P/N 58H559-01

One commenter suggests including HPC inner rear case assembly P/N 58H559-01 as an installation option to installing HPC inner rear case assembly P/N 58H026-01, because P/N 58H559-01 also introduces the rear hook made from Haynes 242 material, as specified in PW SB No. PW4G-100-72-187.

The FAA agrees. Therefore, SB PW4G-100-72-187, which incorporates an HPC inner rear case assembly with an improved durability rear hook, is added as an additional method for terminating action for the repetitive borescope inspections of this AD.

Allow for Engines Already Inspected

The same commenter suggests that another category be added to Table 1 that makes allowances for engines already inspected per ASB PW4G-100-A72-170 before the effective date of this AD. The proposal as-written has no condition stated for engines already inspected per ASB PW4G-100-A72-170.

The FAA agrees. However, instead of modifying Table 1, a paragraph has been added to the final rule that states that engines borescope-inspected before the effective date of this AD, in accordance with PW ASB PW4G-100-A72-170, Revision 1, dated November 21, 2001, or Revision 2, dated June 24, 2002, must perform actions in accordance with the wear limits and disposition instructions of this AD.

Change Replacement Wording and Supply Definition Paragraph

The same commenter suggests that the last phrase in paragraph (c)(2) be changed from requiring the replacement of the engine with an engine not affected by this AD, to requiring the replacement of the engine with a "non-worn" engine. The commenter also suggests supplying a definition for the term "non-worn" engine. The commenter's reason for this suggestion is that he believes that engines that do not exhibit wear should be acceptable replacements, rather than mandating as acceptable replacements only engines that have incorporated the new material hooks.

The FAA partially agrees. The risk analysis assumes that all engines containing HPC inner rear case rear hooks made from Greek Ascoloy would be inspected at least every 600 cycles-in-service (CIS) after the effective date of this AD. The intent of the AD is to remove engines showing wear of the HPC inner rear case rear hook before a surge event is caused. Therefore, paragraph (c) is rewritten to require the replacement of "engines with HPC inner rear case hook wear beyond limits" with "a serviceable engine". A definition of serviceable engine has also been added.

Delete Paragraphs for Borescope Inspections of Uninstalled Engines

The same commenter suggests deleting the paragraphs for borescope inspections of uninstalled engines, because the wear limits are already covered previously in the compliance section.

The FAA agrees. The risk analysis treats uninstalled and installed engines equally by using an average utilization rate. These paragraphs as originally proposed may result in misinterpretation. Therefore, these paragraphs are deleted from the final rule.

ASB PW4G-100-A72-170 Revised

Although the proposal incorporated the Accomplishment Instructions of ASB PW4G-100-A72-170, Revision 2, dated June 24, 2002, by reference, this final rule incorporates the Accomplishment Instructions of ASB PW4G-100-A72-170, Revision 3, dated January 31, 2003 by reference. Revision 3 of ASB PW4G-100-A72-170 includes changes for clarification purposes and does not affect the original intent of the ASB. These changes include treating installed and uninstalled engines alike as discussed in the preceding comments, adding P/N 58H559-01 to the new material list, and simplifying Table 1.

Move Applicability Information

For clarification, the FAA has deleted paragraph (a) as it appeared in the proposal and has expanded the Applicability paragraph in the final rule to state that this AD is applicable to PW models PW4164, PW4168, and PW4168A turbofan engines, serial numbers P733301 through P733500 that have HPC inner case assembly P/N 53H272-01 which incorporates an HPC inner case rear hook susceptible to excessive wear.

Change to Table 1

Table 1 has been simplified to eliminate redundant and potentially confusing information. The compliance categories for "engines with between 900 and 1,500 CSN or CSR" and "engines with over 1,500 CSN or CSR" have been combined.

Tables 2 and 3 added

Tables 2 and 3 have been added to clarify the repetitive borescope inspection and removal schedules as outlined in ASB PW4G-100-A72-170. This information was referenced previously and does not constitute additional compliance requirements.

After careful review of the available data, including the comments noted above, the FAA has determined that air safety and the public interest require the adoption of the rule with the changes described previously. The FAA has determined that these changes will neither increase the economic burden on any operator nor increase the scope of the AD.

Economic Analysis

There are approximately 90 Pratt & Whitney models PW4164, PW4168, and PW4168A turbofan engines of the affected design in the worldwide fleet. The FAA estimates that 21 engines installed on airplanes of U.S. registry would be affected by this AD. The FAA also estimates that it would take approximately 3 work hours per engine to perform the inspection, and that the average labor rate is \$60 per work hour. Assuming an average accumulation of 100 cycles-in-service per month per engine, the FAA estimates an average of two borescope inspections be required per engine per year. Parts cost is not included in this analysis, as this AD requires inspection. Based on these figures, the total cost of the AD to U.S. operators is estimated to be \$7,560.

Regulatory Analysis

This final rule does not have federalism implications, as defined in Executive Order 13132, because it would 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. Accordingly, the FAA has not consulted with state authorities prior to publication of this final rule.

For the reasons discussed above, I certify that this action (1) is not a "significant regulatory action" under Executive Order 12866; (2) is not a "significant rule" under the DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979); and (3) 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. A final evaluation has been prepared for this action and it is contained in the Rules Docket. A copy of it may be obtained by contacting the Rules Docket at the location provided under the caption ADDRESSES.

List of Subjects in 14 CFR Part 39

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

Adoption of the Amendment

Accordingly, pursuant to the authority delegated to me by the Administrator, the Federal Aviation Administration amends part 39 of the Federal Aviation Regulations (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. Section 39.13 is amended by adding a new airworthiness directive to read as follows:

AIRWORTHINESS DIRECTIVE



Aircraft Certification Service
Washington, DC

U.S. Department
of Transportation
**Federal Aviation
Administration**

We post ADs on the internet at "www.faa.gov"

The following Airworthiness Directive issued by the Federal Aviation Administration in accordance with the provisions of Title 14 of the Code of Federal Regulations (14 CFR) part 39, applies to an aircraft model of which our records indicate you may be the registered owner. Airworthiness Directives affect aviation safety and are regulations which require immediate attention. You are cautioned that no person may operate an aircraft to which an Airworthiness Directive applies, except in accordance with the requirements of the Airworthiness Directive (reference 14 CFR part 39, subpart 39.3).

2003-09-02 Pratt & Whitney: Amendment 39-13131. Docket No. 2002-NE-15-AD.

Applicability

This airworthiness directive (AD) is applicable to Pratt and Whitney (PW) models PW4164, PW4168, and PW4168A turbofan engines, serial numbers P733301 through P733500, that have HPC inner case assembly part number (P/N) 53H272-01 installed. These engines are installed on, but not limited to Airbus Industrie A330 airplanes.

Note 1: This AD applies to each engine identified in the preceding applicability provision, regardless of whether it has been modified, altered, or repaired in the area subject to the requirements of this AD. For engines that have been modified, altered, or repaired so that the performance of the requirements of this AD is affected, the owner/operator must request approval for an alternative method of compliance in accordance with paragraph (g) of this AD. The request should include an assessment of the effect of the modification, alteration, or repair on the unsafe condition addressed by this AD; and, if the unsafe condition has not been eliminated, the request should include specific proposed actions to address it.

Compliance

Compliance with this AD is required as indicated, unless already done.

To prevent engine power loss during takeoff due to high pressure compressor (HPC) surge, do the following:

(a) Borescope-inspect in accordance with paragraphs 1.A. through 1.I of the Accomplishment Instructions, Borescope Inspection of Pratt & Whitney (PW) Alert Service Bulletin (ASB) PW4G-100-A72-170, Revision 3, dated January 31, 2003, using schedules in the following Table 1:

TABLE 1.—INSTALLED-ENGINE INITIAL BORESCOPE INSPECTION SCHEDULE

Accumulated engine cycles on the effective date of this AD:	Initial borescope-inspect 14th and 15th stage rubstrips:
(1) Fewer than 900 cycles-since-new (CSN) or cycles-since-refurbishment (CSR) of the HPC inner rear case assembly.	Before accumulating 1,500 CSN or CSR, whichever occurs later.
(2) 900 or more CSN or CSR	Within 600 cycles-in-service (CIS) after the effective date of this AD.

(b) Perform the applicable action as specified in the following Table 2:

TABLE 2.—BORESCOPE INSPECTION RESULTS AND REQUIRED ACTION

Results observed at last borescope inspection:	Action:
(1) 14th stage rubstrip shows wear through to the parent material of the stator, with the circumferential length of the wear being 1.0" or more.	Remove engine from service within 250 CIS.
(2) 15th stage rubstrip shows wear through to the parent material of the stator, with the circumferential length of the wear being 2.0" or more.	Remove engine from service within 250 CIS.
(3) 14th stage rubstrip shows wear through to the parent material of the stator, with the circumferential length of the wear being less than 1.0".	Reinspect every 300 CIS.
(4) 15th stage rubstrip shows wear through to the parent material of the stator, with the circumferential length of the wear being less than 2.0".	Reinspect every 300 CIS.
(5) Both 14th and 15th stage rubstrips show no wear through to the parent material of the stator.	Reinspect every 600 CIS.

Airplanes With Two Affected Engines Installed

(c) For airplanes with two affected engines installed, perform the actions as specified in following Table 3:

TABLE 3.—BORESCOPE INSPECTION RESULTS AND REQUIRED ACTIONS FOR TWO AFFECTED ENGINES

First engine borescope results:	Second engine borescope schedule:	Second engine borescope results:	Action:
(1) Wear as specified in Table 2, Steps (1) through (4).	Within 10 CIS since borescope inspection of first engine.	Wear as specified in Table 2, Steps (1) through (4).	Remove either the first or second engine from service within 25 CIS since borescope inspection of the second engine and replace with a serviceable engine. Remove or reinspect in accordance with Table 2 for remaining engine and if still applicable perform actions as specified in paragraph (c).
(2) Wear as specified in Table 2, Steps (1) through (4).	Within 10 CIS since borescope inspection of first engine.	Wear as specified in Table 2, Step (5).	For both engines, remove or reinspect in accordance with Table 2 and, if still applicable, perform actions as specified in paragraph (c).
(3) Wear as specified in Table 2, Step (5).	Inspect as specified in Table 1.	Wear as specified in Table 2.	For both engines, remove or inspect in accordance with Table 2 and, if still applicable, perform actions as specified in paragraph (c).

Definition of Serviceable Engine

(d) For the purposes of this AD, a serviceable engine is:

- (1) An engine that incorporates an HPC with zero CSN; or
- (2) An engine covered by the Terminating Action in accordance with paragraph (f) of this AD; or
- (3) An engine inspected as specified in paragraphs (a) through (c) of this AD, and is following the 600 CIS re-inspection interval as specified in Table 2 of this AD.

Engines Borescope-Inspected Before the Effective Date of This AD

(e) Engines borescope-inspected before the effective date of this AD in accordance with PW ASB PW4G-100-A72-170, Revision 1, or Revision 2, must follow the requirements of paragraphs (a) through (c) of this AD, after the effective date of this AD.

Terminating Action

(f) Replacement of HPC inner rear case assembly with an HPC inner rear case assembly containing a Haynes 242 rear hook, including assemblies modified or replaced by PW SB No. PW4G-100-72-159, PW SB No. PW4G-100-72-187, or Chromalloy Repair Procedure 00-CFL-039-0, constitutes terminating action for the repetitive engine borescope inspections of this AD.

Alternative Methods of Compliance

(g) An alternative method of compliance or adjustment of the compliance time that provides an acceptable level of safety may be used if approved by the Manager, Engine Certification Office (ECO). Operators must submit their request through an appropriate FAA Principal Maintenance Inspector, who may add comments and then send it to the Manager, ECO.

Note 2: Information concerning the existence of approved alternative methods of compliance with this airworthiness directive, if any, may be obtained from the ECO.

Special Flight Permits

(h) Special flight permits may be issued in accordance with §§ 21.197 and 21.199 of the Federal Aviation Regulations (14 CFR 21.197 and 21.199) to operate the airplane to a location where the requirements of this AD can be done.

Documents That Have Been Incorporated by Reference

(i) The inspections must be done in accordance with Pratt & Whitney alert service bulletin PW4G-100-A72-170, Revision 3, dated January 31, 2003. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from Pratt & Whitney, 400 Main St., East Hartford, CT 06108, telephone (860) 565-6600; fax (860) 656-4503. Copies may be inspected at the FAA, New England Region, Office of the Regional Counsel, 12 New England Executive Park, Burlington, MA; or at the Office of the Federal Register, 800 North Capitol Street, NW., suite 700, Washington, DC.

(j) This amendment becomes effective on June 3, 2003.

Issued in Burlington, Massachusetts, on April 21, 2003.
Robert Guyotte,
Acting Manager, Engine and Propeller Directorate, Aircraft Certification Service.
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