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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2005-23392; Directorate Identifier 2005-NE-47-AD; Amendment 39-14776; AD 2006-20-07]

RIN 2120-AA64

Airworthiness Directives; Rolls-Royce Corporation Models 250-C30, 250-C40, and 250-C47 Series Turboshaft Engines

AGENCY: Federal Aviation Administration (FAA), Department of Transportation (DOT).

ACTION: Final rule.

SUMMARY: The FAA is adopting a new airworthiness directive (AD) for Rolls-Royce Corporation (RRC) models 250-C30, 250-40, and 250-C47 series turboshaft engines with a third-stage turbine wheel, part number (P/N) 6898663 or P/N 23065843 installed, or a fourth-stage turbine wheel, P/N 6892764 or P/N 23066744, installed. This AD adds an additional life limit for third- and fourth-stage turbine wheels. This AD results from analysis by RRC of failures of third-stage turbine wheels. We are issuing this AD to prevent loss of power, possible engine shutdown, or uncontained engine failure.

DATES: This AD becomes effective November 2, 2006. The Director of the Federal Register approved the incorporation by reference of certain publications listed in the regulations as of November 2, 2006.

ADDRESSES: You can get the service information identified in this AD from Rolls-Royce Corporation, P.O. Box 420, Indianapolis, IN 46206-0420; telephone (317) 230-6400; fax (317) 230-4243.

You may examine the AD docket on the Internet at http://dms.dot.gov or in Room PL-401 on the plaza level of the Nassif Building, 400 Seventh Street, SW., Washington, DC.

FOR FURTHER INFORMATION CONTACT: John Tallarovic, Aerospace Engineer, Chicago Aircraft Certification Office, FAA, 2300 East Devon Avenue, Des Plaines, IL 60018-4696; telephone (847) 294-8180; fax (847) 294-7834.

SUPPLEMENTARY INFORMATION: The FAA proposed to amend 14 CFR part 39 with a proposed AD. The proposed AD applies to RRC models 250-C30, 250-40, and 250-C47 series turboshaft engines. We published the proposed AD in the Federal Register on January 25, 2006 (71 FR 4065). That action proposed to add an additional life limit for third- and fourth-stage turbine wheels.

Examining the AD Docket

You may examine the docket that contains the AD, any comments received, and any final disposition in person at the Docket Management Facility Docket Office between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The Docket Office (telephone (800) 647-5227) is located on the plaza level of the Department of Transportation Nassif Building at the street address stated in ADDRESSES. Comments will be available in the AD docket shortly after the DMS receives them.

Comments

We provided the public the opportunity to participate in the development of this AD. We have considered the comments received.

Request to Correct Factual Errors

One commenter, RRC, requests that we correct factual errors in the NPRM and revise the Discussion paragraph, to state that:

- Only third-stage turbine wheels actually failed in the past; and
- Only the third-stage turbine wheel (not the third-and-fourth-stage turbine wheels) could prematurely fail if operated too many times in the transient overspeed region.

We agree with these factual corrections. We changed the AD by removing certain references to the fourth-stage turbine wheel and changing the AD to state that it results from analysis by RRC of failures of third-stage turbine wheels.

Final Rule Should Include the Lower-Speed Avoidance Range

A private citizen states that the final rule should include the lower-speed avoidance range (68.4% to 87.1%) in addition to the high-speed transient range, when counting speed excursions and retiring turbine wheels. The commenter gave three reasons for the request:

First, that operation in the lower-speed avoidance range probably does more cumulative damage to the turbine wheel than operation in the high-speed excursion range. The commenter bases this on data that he claims shows higher stress levels at the low-speed transient range compared to the high-speed transient range.

Second, the fact that the engine control unit does not record operation in the low-speed avoid range, emphasizes the importance to inform operators about the danger of cumulative damage.

Third, the current commercial engine bulletin gives no information about cumulative damage in the low-speed avoid range. The commenter states that currently there is no warning to operators of the potential damage to turbine wheels operated for any length of time in the avoid range which may cause more cumulative damage than high-speed excursions.

We do not agree. The supporting data the commenter provided includes information from a manufacturer development configuration that does not represent the current production configuration. The data also does not represent the manufacturer's current, more detailed, knowledge of the stresses on the turbine airfoils. Transients in the low-speed range do not need to be tracked and used to retire turbine wheels. The low-speed range from 22,000 rpm to 28,045 rpm is a speed range that is

normally passed through transiently, during the start up and shutdown procedures. The rate of speed change during the start up or shutdown is high enough that no significant time is spent at any resonant speed and no significant dynamic stresses are encountered that would lead to damage. In comparison to the low-speed excursions, if an operational situation occurs that results in a speed excursion above the maximum continuous speed, the rate of change of speed goes from positive to negative as it accelerates up to the maximum speed before returning back to the continuous operating range. During this transition, speed may hold close to constant, or only change very slowly, for a number of seconds. In this case, there could be sufficient time for the dynamic stresses to build to their full resonant values and potentially cause some level of damage to a turbine wheel. This difference between a fast acceleration or deceleration through a resonant speed, and a potential slow motion or hold in a resonant speed is why counting of occurrences in the low speed range is unnecessary.

Finally, the inclusion of a specific "steady state operation prohibited" speed avoid zone denotes that failure could occur if operation outside of the defined continuous operating range was performed. RRC SB No. CEB A-72-3272, CEB A-72-5048, and CEB A-72-6054 (combined in one document), all Revision 2, dated June 27, 2006, clearly instruct operators to avoid the low-speed region. As stated above, this speed range is not of concern for normal transient operation of the engine. We did not change the AD.

Conclusion

We have carefully reviewed the available data, including the comments received, and determined that air safety and the public interest require adopting the AD with the changes described previously. We have determined that these changes 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 1,300 engines installed on airplanes of U.S. registry. We also estimate that it will take about 42 work-hours per engine to replace the third- and fourth-stage turbine wheels, and that the average labor rate is $65 per work-hour. Required parts will cost about $25,000 per engine. We estimate that only 10% of all turbine wheel replacements will result from operators exceeding the new transient overspeed event limits. Based on these figures, we estimate the total potential maximum cost of the AD to U.S. operators to be $3,604,900.

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 have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

We prepared a summary of the costs to comply with this AD and placed it in the AD Docket. You may get a copy of this summary at the address listed under ADDRESSES.

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 Federal Aviation Administration 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:

2006-20-07 Rolls-Royce Corporation (formerly Allison Engine Company, Allison Gas Turbine Division, and Detroit Diesel Allison): Amendment 39-14776. Docket No. FAA-2005-23392; Directorate Identifier 2005-NE-47-AD.

Effective Date

(a) This airworthiness directive (AD) becomes effective November 2, 2006.

Affected ADs

(b) None.

Applicability

(c) This AD applies to Rolls-Royce Corporation (RRC) models 250-C30, -C30G, -C30G/2, -C30M, -C30P, -C30R, -C30R/1, -C30R/3, -C30R/3M, -C30S, -C30U, -C40B, -C47B, and -C47M turboshaft engines, with a third-stage turbine wheel, part number (P/N) 6898663 or P/N 23065843 installed, or a fourth-stage turbine wheel, P/N 6892764 or P/N 23066744, installed. These engines are installed on, but not limited to, Bell 206L-3, Bell 206L-4, Bell 230, Bell 407, Bell 430, MDHI 369F, MDHI 369FF, MDHI 600N, and Sikorsky S-76A helicopters.

Unsafe Condition

(d) This AD results from analysis by RRC of failures of third-stage turbine wheels. We are issuing this AD to prevent loss of power, possible engine shutdown, or uncontained failure.

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.

(f) Within 30 days after the effective date of this AD, record each time the third- and fourth-stage turbine wheels enter into the speed range between "Event Threshold" and "Maximum Overspeed Transient". Use paragraph 2.A. through 2.A.(5) of the Accomplishment Instructions and the applicable Figures 1 through 5 of RRC Alert Commercial Engine Bulletins (CEBs) No. CEB A-72-3272, No. CEB A-72-5048, and No. CEB A-72-6054 (combined in one document), all Revision 2, dated June 27, 2006, to determine the speed range.

(g) Remove and retire any third-stage turbine wheel or fourth-stage turbine wheel after the sixth time the wheel enters into the speed range between "Event Threshold" and "Maximum Overspeed Transient".

Third- and Fourth-Stage Turbine Wheel Life Limits

(h) The retirement criteria in this AD are in addition to the existing third- and fourth-stage turbine wheel hour and cycle life limits. You must retire the wheels when you exceed any published life limit (transient speed excursions, hours, or cycles).

Alternative Methods of Compliance

(i) The Manager, Chicago Aircraft Certification Office, has the authority to approve alternative methods of compliance for this AD if requested using the procedures found in 14 CFR 39.19.

Related Information

(j) None.

Material Incorporated by Reference

(k) You must use Rolls-Royce Corporation Alert Commercial Engine Bulletins No. CEB A-72-3272, No. CEB A-72-5048, and No. CEB A-72-6054 (combined in one document), all Revision 2, dated June 27, 2006, to perform the actions required by this AD. 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. Contact Rolls-Royce Corporation, P.O. Box 420, Indianapolis, IN 46206-0420; telephone (317) 230-6400; fax (317) 230-4243 for a copy of this service information. You may review copies at the FAA, New England Region, Office of the Regional Counsel, 12 New England Executive Park, Burlington, MA; or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal-register/cfr/ibr-locations.html.

Issued in Burlington, Massachusetts, on September 20, 2006.
Francis A. Favara,
Manager, Engine and Propeller Directorate, Aircraft Certification Service.
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