U.S. Department of Transportation
Federal Aviation Administration

Memorandum

Subje **INFORMATION**: Policy for Design Approval Procedures for Parts Manufacturer Approval of Critical Engine and Propeller Parts.

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From Manager, Engine and Propeller Directorate, Aircraft Certification Service

Reply to Attn. of: Karen Grant, ANE-110 (781) 238-7119 or karen.m.grant@faa.gov

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To: Manager, Aircraft Manufacturing Division, AIR-200
Manager, Certification Procedures Branch, AIR-110
Manager, Brussels Aircraft Certification Staff, AEU-100
Manager, Engine Certification Office, ANE-140
Manager, Engine Certification Branch, ANE-141
Manager, Engine Certification Branch, ANE-142
Manager, Airframe and Propulsion Branch, ANE-171
Manager, Rotorcraft Directorate, ASW-100
Manager, Rotorcraft Standards Staff, ASW-110
Manager, Special Certification Office, ASW-190
Manager, Small Airplane Directorate, ACE-100
Manager, Small Airplane Standards Office, ACE-110
Manager, Atlanta Aircraft Certification Office, ACE-115A
Manager, Airframe and Propulsion Branch, ACE-117A
Manager, Chicago Aircraft Certification Office, ACE-115C
Manager, Propulsion Branch, ACE-118C
Manager, Systems and Propulsion Branch, ACE-116W
Manager, Transport Airplane Directorate, ANM-100
Manager, Transport Standards Staff, ANM-110
Manager, Airframe and Propulsion Branch, ANM-112
Manager, Propulsion Branch, ANM-140S
Manager, Propulsion Branch, ANM-140L

1. PURPOSE.

a. This policy memorandum provides guidance to Aircraft Certification Offices (ACOs) when establishing their process for evaluating Parts Manufacturer Approval (PMA) applications for critical engine and propeller parts. This policy also requires applicants to complete a safety assessment and to consider the development of a Continuous Operational Safety (COS) plan for all engine and propeller PMA proposed parts.

b. This policy does not supersede previous ANE-110, Engine & Propeller Directorate (E&PD) policy regarding PMA parts. However, the Federal Aviation Administration is in the process of revising FAA Orders 8110.4 and 8110.42. After these orders are issued, we will review all E&PD PMA policy, including this policy statement, and cancel or revise as necessary.

c. This policy memorandum applies to critical engine and propeller parts governed by Parts 33 and 35, respectively. For the purpose of this memorandum, critical parts include life-limited parts.

2. RELATED DOCUMENTS.

a. Policy for Parts Manufacturer Approval (PMA) of Reciprocating Engine Critical, Highly Stressed or Complex Parts or Components.

b. Policy for the Design Approval of Parts Manufacturer Approval (PMA) of Critical and Life-Limited Aircraft Turbine Engine Parts.

c. ACO Guide, How ACOs Will Work With Other ACOs.

d. Order 8110.42, Parts Manufacturer Approval Procedures.

e. Order 8110.4, Type Certification.

f. Parts Manufacturer Approval (PMA) for Critical Propeller Parts – Policy No. ANE-2001-35.1-R0.

g. Policy for Propeller Safety Analysis – Policy No. ANE-2002-35.15-R0.

h. Guidance Material for 14 CFR § 33.19, Durability, for Reciprocating Engine Redesigned Parts, Advisory Circular (AC) 33.19-1.

3. BACKGROUND.

a. Over the past several years, the E&PD Standards Staff has been involved in evaluating PMA applications for critical engine and propeller parts. We have seen that PMA applicants are pursuing approvals for more complex parts with higher safety criticality. We have concluded that the existing guidance is insufficient.

b. Recently, we worked on a number of service difficulty subjects, which involved both original equipment manufacturer and PMA parts. We observed misconceptions within the PMA industry as to what PMA holders' obligations should be for the continued airworthiness of their products. Our review of PMA guidance shows that insufficient information is available to adequately address the observed misconceptions.

c. We also noted confusion about the processing of applicants' PMA applications for critical engine and propeller parts. Order 8110.42 requires the Project ACO (PACO) to coordinate with the Certificate Management ACO (CMACO) on critical PMA projects, to the extent that the CMACO is required to verify completeness of the applicant's design data. The CMACO has first-hand knowledge about the part and the product design critical features, which supports this necessary review for critical parts. However, the effort creates redundancy by having two ACOs doing the same work. It also leads to confusion about who has the ultimate authority and responsibility for the PMA design approval. Further, this process has not always been followed for all engine and propeller PMA projects involving critical parts.

d. Although revision efforts are ongoing, interim guidance to cover these shortfalls is needed.

4. POLICY STATEMENT. The following methods provide an acceptable means for compliance with the situations specified:

a. Safety Assessment.

(1) Order 8110.4 requires the PACO to coordinate with the CMACO on certain parts identified as critical. However, that list may not be comprehensive and the use of Order 8110.42 is still required to determine the criticality for all other parts.

(2) To help decide what parts are critical, applicants must complete a safety assessment for all engine and propeller PMA proposed parts. Applicants should ensure that their safety assessment includes, at a minimum, the effects of key characteristics, processes, maintenance procedures and inspections when these are failed, omitted or are non-conforming. In addition, the safety assessment must evaluate the impact of these effects on the part, its next higher assembly, related part lives if applicable, and the product on which the part is installed.

(3) The outcome of the safety assessment must be evaluated against the pass-fail criteria of § 33.75 (a) through (d) for turbine engine parts and policy memorandum No. ANE-2002-35.15-R0 (reference 2.g. above) for propeller parts to determine if the part is critical.

These assessments do not override the identification as critical of those parts listed in FAA Order 8110.4, policy memorandum No. ANE-2001-35.1-R0, or in the applicable parts section of AC 33.19-1 (references 2.e., 2.f. and 2.h. above).

b. Processing of Critical PMA Projects. We have determined that PMA applications for life-limited parts will be transferred from the PACO to the appropriate CMACO for processing and follow-on responsibility. All non-life-limited critical PMA applications for engine and propeller parts will be evaluated on a case-by-case basis for transfer of the project from the PACO to the CMACO after a certification program notification has been issued. Transference of the project will be determined by consensus between the CMACO, the PACO and the appropriate E&PD Standards Staff. The decision will be based on the failure effects of the part and the complexity of the part design and manufacturing. For those projects determined to remain with the PACO, coordination with the CMACO is still required. For all projects transferred to the CMACO, we recommend coordination with the PACO when the PACO has a previously established relationship with the applicant.

c. Continued Operational Safety.

(1) Applicants should consider how they intend to comply with 14 CFR §§ 21.3, 21.50, and 21.99 requirements. The continued airworthiness of a PMA part remains the responsibility of a PMA holder, as noted in the related documents in Paragraph 2. However, those documents do not discuss the need to develop an acceptable COS plan for all critical engine and propeller PMA parts.

(2) To establish an effective COS plan, an applicant should have the ability to assess design, manufacturing, and maintenance issues related to the operation of the product on which the PMA part is installed. The applicant should develop a suitable in-service management plan that includes continuous assessment of the part's performance in-service relative to the applicant's design assumptions. In addition, applicants should demonstrate the ability to evaluate failure modes and effects (safety assessment). If a failure condition is identified, applicants should have appropriate methods and resources to identify the cause, develop corrective actions, and implement those actions, based on a risk assessment, in a timely manner. Applicants should also validate that these corrective actions when implemented are in compliance with the risk assessment.

(3) An applicant's ability to develop and support an adequate COS plan and solution depends on the applicant's level of knowledge of their proposed PMA part. For critical engine and propeller parts, this knowledge should include, but is not limited to, all aspects of the function, manufacturing, and integration of the part to its next higher assembly and to the product on which the part is to be installed, including knowledge of the product's operating environment. In addition, an applicant should develop and obtain FAA approval of a risk assessment methodology and a life methodology when applicable, as part of their COS plan.

(4) Applicants should develop a COS plan that addresses these COS related requirements. Applicants should provide the plan during the design approval phase of the PMA

process. ACO engineers must determine the adequacy of the PMA holder's plan before issuing the design approval.

5. EFFECT OF POLICY. The general policy stated in this document does not constitute a new regulation or create a "binding norm." Whenever an applicant's proposed method of compliance differs from this policy, the proposal must be coordinated with the Engine & Propeller Directorate Standards Office, ANE-110. In addition, if an office believes that an applicant's proposal that meets this policy should not be approved, that office must coordinate its response with the Engine & Propeller Directorate Standards Office, ANE-110.

6. CONCLUSION AND RECOMMENDATIONS.

a. The Engine and Propeller Directorate recommends the implementation of this policy upon receipt. Any applicant proposals outside the scope of this policy should be coordinated with the Engine and Propeller Standards Staff.

b. In summary, we propose that:

(1) The PACO should contact the CMACO if in doubt about an engine or propeller part's criticality after reviewing the applicant's safety assessment.

(2) Applicants must complete a safety assessment of all engine and propeller PMA proposed parts.

(3) All PMA applications for life-limited engine and propeller parts that are presented to the PACO will be transferred to the applicable CMACO for processing, design approval, and follow-on responsibility.

(4) All non-life-limited critical PMA applications of engine and propeller parts will be evaluated on a case-by-case basis for transfer to the CMACO.

(5) PMA applicants should consider how they intend to comply with 14 CFR §§ 21.3, 21.50, and 21.99 requirements during the design approval process.

(6) ACO engineers must determine the adequacy of the PMA applicant's COS plan before issuing the design approval.

//signed by Jay Pardee on 3/4/05//
Jay J. Pardee
Manager, Engine & Propeller Directorate
Aircraft Certification Service