



# Federal Aviation Administration

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## Memorandum

Date: Draft

From: Manager, Engine and Propeller Directorate, Aircraft Certification Service

To: SEE DISTRIBUTION

Prepared by: Karen Grant, ANE-110, (781) 238-7119 or karen.m.grant@faa.gov

Subject: **INFORMATION**: Policy for Repair and Alteration of Rotating Turbine Engine Life Limited Parts, § 33.3 [Policy Number ANE-200X-33.3-X]

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### 1. PURPOSE.

a. This proposed policy memorandum establishes that the Federal Aviation Administration (FAA) will treat all repairs and alterations of rotating turbine engine-life limited parts (RTE-LLPs) as major repairs and major alterations. We are also proposing that all RTE-LLP repair and alteration data must include a life methodology to assess the life of the repaired or altered part and the continued operational safety (COS) of the repaired product. This proposed policy provides guidance for:

(1) Technical substantiation for repair or alteration of RTE-LLPs.

(2) Aircraft Certification Offices (ACOs) and Designated Engineering Representatives (DERs) to evaluate and approve repair and alteration data.

b. This policy memorandum applies to repair and alteration of rotating turbine engine life limited parts governed by 14 Code of Federal Regulations Part 33.

**2. BACKGROUND.** During the past year, we reviewed the technical data for numerous RTE-LLP repairs. We observed shortcomings in the data for many of these repairs. We also noted that many repairs were improperly assessed as minor and were not properly coordinated with the appropriate ACOs. Although the Engine & Propeller Directorate (E&PD) Standards Staff is in the process of creating guidance for turbine engine repairs and alterations, there is a need for interim guidance to improve coordination and technical data for RTE-LLP repairs and alterations.

DRAFT: This document does not represent final agency action on this matter and should not be viewed as a guarantee that any final action will follow in this or any other form.

### 3. RELATED DOCUMENTS.

- a. Order 8110.37, Designated Engineering Representative (DER) Guidance Handbook.
- b. Order 8110.4, Type Certification.

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

a. Processing of Repairs and Alterations of Rotating Turbine Engine Life Limited Parts. In accordance with Order 8110.37, an authorized DER may approve technical data for major repairs and alterations without first notifying the Project Aircraft Certification Office (PACO), except when the part is critical, life limited, or the work will be done outside the United States. For major repairs or major alterations of critical or life limited parts, the DER must contact the PACO for guidance. Order 8110.4 requires the PACO to coordinate with the Certificate Management ACO (CMACO) on parts identified as critical, which includes life limited parts. The E&PD has determined that due to the technical issues involved, the applicant must submit repair and alteration data for RTE-LLPs to the CMACO for evaluation and approval unless a life methodology has been approved and authority to make subsequent findings to that methodology has been delegated to the DER.

b. Technical Data for Design Substantiation.

(1) An applicant considering a repair or alteration to an RTE-LLP must have data to substantiate that the proposed repair or alteration does not have a detrimental effect on the life, the function, or other characteristics of the part that might affect the continued airworthiness of the product on which the repaired part is installed.

(2) In accordance with § 33.14, a procedure, i.e. a life methodology, must be approved to establish life limits for each rotor structural part whose failure could produce a hazard to the aircraft. To support the approval and COS of a proposed RTE-LLP repair or alteration, the applicant must submit a life methodology for approval. This methodology should assess the impact of the proposed repair or alteration on the life of the part and should be incorporated into the applicant's technical approach to COS. The life methodology must take into consideration the effects of the applicant's repair or alteration on the material and surface conditions of the repaired or altered part.

(3) No two life methodologies will predict the same life for the same part. The applicant should establish a "repair ratio" using its own life system. The repair ratio is the calculated life of the part at the repaired location divided by the calculated life of the non-repaired part at the critical location (lowest life location). This will determine the "relative" change in part life due to the repair or alteration based on the applicant's life system. The applicant must:

- (a) Ensure the original part's functional capability is retained.

(b) If the repair ratio is less than 1, the applicant must establish a life limit for the repaired or altered part location, which for other than the TC holder is the product of the current published life and the “repair ratio.” If the repaired part life limit is lower than the current published life, then the applicant must establish a new life limit and apply for a Supplemental Type Certificate.

(c) Show compliance with all remaining applicable sections of part 33.

(d) Provide adequate repair or alteration instructions to ensure that the proposed procedure can be performed in a consistent and repeatable manner.

(e) Identify the critical steps in the repair or alteration process that need source qualification and establish the pertinent criteria.

(f) Assess the operational, installation and durability impact of the repaired or altered part on the other engine parts including on the next higher assembly and on the product on which the repaired part is installed.

(g) Provide instructions to re-mark the part and update the engine records, so that if a problem occurs all affected parts can be identified and tracked.

(h) Maintain an engine fleet management procedure to manage any continued airworthiness issues associated with the parts affected by the applicant’s procedure.

(i) Assume responsibility for any and all portions of the repaired part, including its next higher assembly and the product on which the repaired part is installed, if directly or indirectly affected by the applicant’s repair procedure.

(4) An applicant should possess, at a minimum, the following organizational skills to develop the proposed repair procedure for RTE-LLPs and to ensure the integrity of those parts:

- Engineering (Design & Lifting)
- Material Engineering
- Non-Destructive Inspection
- Quality Assurance
- Product Support Engineering
- Repair Development Engineering

**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 E&PD Standards

Staff, 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 E&PD Standards Staff.

## **6. CONCLUSION AND RECOMMENDATIONS.**

a. We recommend the implementation of this policy upon receipt. Any applicant proposals outside the scope of this policy should be coordinated with the E&PD Standards Staff.

b. In summary, we propose that:

(1) All repairs and alterations of RTE-LLPs are to be considered major and require FAA approval of data.

(2) Repair and alteration data for RTE-LLPs must include a life methodology.

(3) Repair and alteration data for RTE-LLPs must be submitted to the CMACO for evaluation and approval unless a life methodology has been approved and authority to make subsequent findings to that methodology has been delegated to the DER.

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