

Memorandum

U.S. Department of Transportation
Federal Aviation Administration

Subject: ACTION: Policy for Rule and Advisory Material Development under Title 14 of the Code of Federal Regulations (14 CFR) Parts 33 and 35

Date: 5-24-99

From: Manager, Engine and Propeller Directorate, Aircraft Certification Service, ANE-100

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Policy No. 1999-33/35-R0

Recent harmonization debates have questioned whether Title 14 of the Code of Federal Regulations (14 CFR) parts 33 and 35 should consider the assessment of engine and propeller failure effects at the aircraft level. The intent of this memorandum is to provide official Engine and Propeller Directorate policy on the issue.

Parts 33 and 35 delineate the certification requirements of engines and propellers, respectively. Within the certification procedure, a single engine or a single propeller is addressed, and the effects of failures are assessed at the engine or propeller level. Once the product passes into the certification environment of the aircraft, specifics of the particular installation are used to address the issues of powerplant redundancy or the effects of various failure conditions. It has always been within the purview of aircraft certification (14 CFR parts 23, 25, 27 or 29) to provide regulations governing the aircraft-level effects of all parts of the aircraft, including engines and propellers.

Given the certification framework described above, revisions to parts 33 and 35 shall be consistent with the following policy points:

1. The term "catastrophic" shall not be used with parts 33 or 35 due to its implicit connotation of aircraft-level effects or requirements, which are not evaluated under parts 33 or 35. Certain failure conditions which represent a threat to continued safe operation of the engine and propeller are appropriately addressed within parts 33 or 35 independent of any aircraft requirements. There is no actual or implied limitation on the probabilities of occurrence, including 10⁻⁹ or "extremely improbable," associated with engine or propeller-level requirements.

2. If the terms "hazardous," "major" or "minor" are used within parts 33 or 35 to describe engine or propeller-level assessments of failure conditions, those terms shall either:

i) be defined within or for the individual rule, or

ii) be replaced with alternative terminology because of the intent to avoid the implication of an aircraft-level assessment.

3. It is entirely appropriate and desirable that guidance material for the engine and propeller rules indicates that:

i) aircraft-level requirements for individual failure conditions may be more severe than the engine or propeller-level requirements due to installation considerations, and

ii) early coordination between the engine and/or propeller manufacturer(s) and the aircraft manufacturer is highly recommended to ensure an installable engine and/or propeller.

Guidance material for engine or propeller rules may also indicate when and where more stringent aircraft-level requirements may exist.

4. There are currently, and can continue to be, rules within parts 33 and 35 which impose more stringent requirements than the engine and propeller safety analysis rules (33.75 current and draft, 35.15 draft). Examples include the bird ingestion, rain/hail ingestion, and controls rules. These rules have specific single-engine requirements designed to mitigate against common-cause or common-mode multiple-engine effects at the aircraft level. For example, for large transport engine applications, it is permissible to require level A software in the part 33 requirements to mitigate against potential common-cause or common-mode faults.

Rule and Advisory Circular content being developed by the Harmonization Working Groups shall reflect the above policy. For additional information, contact Ann Azevedo, Engine and Propeller Standards Staff, at (781) 238-7117.

Original signed by:
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