



U.S. Department
of Transportation

**Federal Aviation
Administration**

Memorandum

Subject: **INFORMATION**: Clarification on Engine Failure
Criticality based on 14 CFR part 23 airplane class

Date: MAY 06 1998

From: Manager, Standards Office
Small Airplane Directorate, ACE-110

Reply
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This memorandum is in response to an inquiry by an Aircraft Certification Office (ACO), regarding the interpretation of engine failure criticality for airplanes defined in 14 CFR part 23. The airplane classes defined by 14 CFR part 23 are--Single Reciprocating Engine (SRE), Multi Reciprocating Engines (MRE), Single Turbine Engine (STE), Multi Turbine Engines (MTE), and Commuter. Each airplane class has different certification requirements, approaches, and compensating features to mitigate the potential safety of flight (catastrophic) condition of an engine failure. The requirements, approaches, and compensating features reduce the engine failure criticality to either a hazardous or major failure classification.

A SRE or a STE airplane that experiences an engine failure is mitigated by providing airplane compensating features defined in 14 CFR part 23 and operational requirements. The airplane features include, but are not limited to--low stall speed (61 knots or less) or equivalent, airplane handling and stability requirements, performance data, emergency landing procedures, and crashworthiness airframe technologies. Operational requirements include pilot training. The mitigating factors do not guarantee safety when an engine failure occurs, but instead provides level of assurance that a pilot can reasonably fly the airplane to a safe landing. This approach was first developed by the early certification authorities over 70 years ago, and later refined over the years to today's standards.

A MRE airplane that experiences an engine failure typically has the remaining engine to continue flight to a safe landing. It is recognized that some light MRE airplanes may not be able to sustain flight on one engine during certain flight conditions or operations, but can extend the airplane descent. Even though this is true, 14 CFR part 23 requirements provide compensating features to provide a level of assurance that the pilot can fly the airplane to a safe landing. These features are similar to the SRE airplane class cited above.

The Small Airplane Directorate has conducted a review to determine the effectiveness of this long standing philosophy. A recent Engine and Propeller Directorate Study show that reciprocating engine shutdowns and/or power losses result in safe landings over 87% of the time. Non-fatal accidents occur approximately 12% of the time, and fatal accidents less than 1% of the time. Service history confirms this long standing philosophy provides an acceptable level of safety for SRE, STE, and MRE airplane classes.

A MTE airplane has additional 14 CFR part 23 requirements to ensure sufficient performance margins (if an engine failure occurs) to sustain flight to a safe landing.

Commuter airplanes have additional 14 CFR part 23 requirements to ensure that if an engine failure occurs, the remaining engine can maintain sustained airplane flight and climb on one engine. The crew can operate the airplane to a safe landing.

If you have any questions, please contact Mr. Tim Smyth, Regulations and Policy Section at (816) 426-6941.

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