



U.S. Department
of Transportation
**Federal Aviation
Administration**

Policy Statement

Subject: Risk Assessment Methodology
for Transport Category Airplanes

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Initiated By:
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Summary

To support implementation of a Safety Management System (SMS) within the Aircraft Certification Service (AIR), AIR released Order 8110.107, Monitor Safety/Analyze Data (MSAD), on March 12, 2010. That order provides requirements and guidance for a standardized, SMS-based, continued-operational-safety process to be used across the service.

The MSAD order requires each aircraft directorate to—

Develop product-specific continued-operational-safety risk-analysis methodology and guidelines by which risk can be reported in terms of the statistical probability of a fatal accident. This methodology must be quantitative, or it must be structured in such a way that it can evolve into a quantitative methodology.

An intra-directorate team was formed and chartered by the Transport Airplane Directorate in 2002 to develop a transport-airplane-specific risk-analysis process. The result of that multi-year team development is the Transport Airplane Risk Assessment Methodology (TARAM). The TARAM has evolved significantly from lessons learned, and from comments and suggestions from many sources. The TARAM has also been reduced in scope to be compatible with, and to support, the MSAD process, which is described in the attached TARAM Handbook.

The TARAM is to be used within the MSAD process for risk analysis and risk management. Aircraft-certification offices will use it to resolve issues of continued operational safety for transport-category airplanes.¹ This methodology may also be used by design-approval holders, in whole or in part, by agreement with the applicable aircraft-certification office.

¹ Continued-operational-safety risk analyses for engine and propeller, small airplane, and rotorcraft issues will be accomplished using the applicable directorate-defined methodology.

Current Regulatory and Advisory Material

In general, the regulatory basis and roles and requirements for transport-airplane continued operational safety can be found throughout 14 CFR parts 21, 39, 91, 121, and 135. Mandatory corrective actions to address unsafe conditions are addressed by airworthiness directives as prescribed by 14 CFR part 39. Existing guidance for risk assessments for powerplant continued operational safety is contained in Advisory Circular (AC) 39-8, “Continued Airworthiness Assessments of Powerplant and Auxiliary Power Unit Installations of Transport Category Airplanes.”² Order 8110.107 outlines a standardized process that aircraft-certification offices will use for safety decision-making and resulting airworthiness-directive action.

Relevant Past Practice

Previously, no formal process, guidance, or policy was in place for transport-airplane continued-operational-safety risk analyses/management beyond that contained in AC 39-8 for powerplant continued operational safety. Transport-airplane continued-operational-safety risk determinations are currently based on engineering judgment and, to a lesser extent, derived very loosely from the certification guidance given in AC 25.1309-1A.

To fill the need for such guidance, as part of AIR SMS development, the AIR SMS MSAD team has now created a standardized and documented continued-operational-safety process for each aircraft-certification office/directorate to use identifying and resolving safety issues. That process is contained in Order 8110.107. Integral to that process is the analysis of risk and the comparison of that risk to the product-specific risk guidelines that the directorates have developed. The risk-assessment methodology and risk guidelines for transport category airplanes are found in the TARAM Handbook, attached.

Policy

The methodology in the attached TARAM Handbook is meant to be used by FAA aerospace-safety engineers within the MSAD process. It is important that the public and affected design approval holders also know how the risk associated with transport-airplane continued-operational-safety issues will be analyzed and considered within that overall process. In addition, affected design-approval holders should know, in general, the data and information that could be requested from them when aircraft-certification offices are analyzing the risk associated with continued-operational-safety issues (failure rates, failure mode/physics of failure, root cause, potential accident sequence [causal chain], fault-trees, conditional probabilities, affected fleet size, etc.). Design-approval holders may request to perform, or be asked to perform, all or part of the TARAM process pursuant to an organization delegation approval or negotiated continued-operational-safety-management agreement. In those cases, the design-approval holder will need to understand the details of the TARAM contained in the TARAM Handbook.

² The certification-guidance material for § 25.1309 (e.g., AC 25.1309-1A) contains no continued-operational-safety guidance

Accordingly, for the purposes of public and design-approval-holder awareness, review, and comment, the TARAM Handbook is attached to this policy statement. The TARAM Handbook is intended as a job aid for FAA aerospace-safety engineers. It provides detailed instructions and guidance. Members of the public who want to understand the risk-analysis methodology and risk-level guidelines that support the MSAD process, without reviewing the entire handbook, will find an explanation of those concepts in these sections of the TARAM Handbook:

- Section 5.0, Risk Analysis, including Appendix B, C, and D
- Sections 6.1 and 6.2, Fail-Safe Design and Risk Level Guidance

Effect of Policy

This policy does not change or contravene the guidance in AC 39-8. For issues related to powerplant or auxiliary power unit (APU) continued operational safety, see AC 39-8. That AC describes the recommended methodology for identifying, analyzing, prioritizing, and resolving unsafe conditions on transport-category airplane power plants and APUs.

FAA safety determinations, as described throughout 14 CFR parts 21 and 39, are an important function of the Administrator, yet the Administrator has a great deal of flexibility and latitude when making safety determinations. The TARAM Handbook provides guidance for considering risk as a factor when determining whether a condition found in the transport-airplane fleet is safe or unsafe. This guidance is only one thing to consider in the safety decision-making process and does not constitute the sole basis for unsafe-condition determination nor limit, in any way, the FAA prerogative to make such determinations.

The TARAM Handbook, in conjunction with Order 8110.107, guides and standardizes transport-airplane-related safety decision-making. Neither the TARAM Handbook nor Order 8110.107 requires or obligates the FAA to perform any part of the TARAM process before issuing an airworthiness directive.

The general policy stated in this document does not constitute a new regulation. The FAA individual who implements policy should follow this policy when it is applicable to a specific action. Whenever safety decision-making is outside this established policy, that individual must coordinate the decision-making with the policy-issuing office. Similarly, if an implementing office becomes aware of reasons that an applicant's proposal that is based on the guidance in this policy should not be approved, that implementing office must coordinate its response with the policy-issuing office.

Design-approval holders should expect that regulating officials will consider this policy when making safety findings and issuing airworthiness directives. In addition, as with all advisory material, this statement of policy identifies one means, but not the only means, of accomplishing safety decision-making.

Implementation

This policy discusses methods that should be applied during continued-operational-safety decision-making for transport-category airplanes certificated in the United States, except where the guidance of Advisory Circular 39-8 is applicable.

Direct your questions or comments to Forrest Keller, Transport Directorate Standards Staff, Safety Management Branch, ANM-117, phone 425-227-2790.

/s/ Ali Bahrami

Ali Bahrami
Manager, Transport Airplane Directorate
Aircraft Certification Service

Attachments

Attachment 1

Terms

Table A-1 defines the use of key terms in this policy statement. The table describes the intended functional impact.

Table A-1 Definition of Key Terms

	Regulatory Requirements	Acceptable Methods of Compliance (MOC)	Recommendations
Term	Must	Should	Recommend
Meaning	Refers to a regulatory requirement that is mandatory for design approval	Refers to instructions for a particular MOC	Refers to a recommended practice that is optional
Functional Impact	No Design Approval if not met	Alternative MOC has to be approved by issue paper.	None, because it is optional