

Appendix G

FAA ORDER 8040.4

ORDER

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

8040.4

6/26/98

SUBJ: SAFETY RISK MANAGEMENT

1. **PURPOSE.** This order establishes the safety risk management policy and prescribes procedures for implementing safety risk management as a decision making tool within the Federal Aviation Administration (FAA). This order establishes the Safety Risk Management Committee.

2. **DISTRIBUTION.** This order is distributed to the division level in the Washington headquarters, regions, and centers, with limited distribution to all field offices and facilities.

3. **DEFINITIONS.** Appendix 1, Definitions, contains definitions used in this order.

4. **SCOPE.** This order requires the application of a flexible but formalized safety risk management process for all high-consequence decisions, except in situations deemed by the Administrator to be an emergency. A high-consequence decision is one that either creates or could be reasonably estimated to result in a statistical increase or decrease, as determined by the program office, in personal injuries and/or loss of life and health, a change in property values, loss of or damage to property, costs or savings, or other economic impacts valued at \$100,000,000 or more per annum. The objective of this policy is to formalize a common sense approach to risk management and safety risk analysis/assessment in FAA decisionmaking. This order is not intended to interfere with regulatory processes and activities. Each program office will interpret, establish, and execute the policy contained herein consistent with its role and responsibility. The Safety Risk Management Committee will consist of technical personnel with risk assessment expertise and be available for guidance across all FAA programs.

5. **SAFETY RISK MANAGEMENT POLICY.** The FAA shall use a formal, disciplined, and documented decisionmaking process to address safety risks in relation to high-consequence decisions impacting the complete product life cycle. The critical information resulting from a safety risk management process can thereby be effectively communicated in an objective and unbiased manner to decisionmakers, and from decisionmakers to the public. All decisionmaking authorities within the FAA shall maintain safety risk management expertise appropriate to their operations, and shall perform and document the safety risk management process prior to issuing the high-consequence decision. The choice of methodologies to support risk management efforts remains the responsibility of each program office. The decisionmaking authority shall determine the documentation format. The approach to safety risk management is composed of the following steps:

a. **Plan.** A case-specific plan for risk analysis and risk assessment shall be predetermined in adequate detail for appropriate review and agreement by the decisionmaking authority prior to commitment of resources. The plan shall additionally describe criteria for acceptable risk.

b. Hazard Identification. The specific safety hazard or list of hazards to be addressed by the safety risk management plan shall be explicitly identified to prevent ambiguity in subsequent analysis and assessment.

c. Analysis. Both elements of risk (hazard severity and likelihood of occurrence) shall be characterized. The inability to quantify and/or lack of historical data on a particular hazard does not exclude the hazard from this requirement. If the seriousness of a hazard can be expected to increase over the effective life of the decision, this should be noted. Additionally, both elements should be estimated for each hazard being analyzed, even if historical and/or quantitative data is not available.

d. Assessment. The combined impact of the risk elements in paragraph 5c shall be compared to acceptability criteria and the results provided for decisionmaking.

e. Decision. The risk management decision shall consider the risk assessment results conducted in accordance with paragraph 5d. Risk assessment results may be used to compare and contrast alternative options.

6. PRINCIPLES FOR SAFETY RISK ASSESSMENT AND RISK CHARACTERIZATION. In characterizing risk, one must comply with each of the following:

a. General. Safety risk assessments, to the maximum extent feasible:

- (1) Are scientifically objective.
- (2) Are unbiased.
- (3) Include all relevant data available.
- (4) Employ default or conservative assumptions only if situation-specific information is not reasonably available. The basis of these assumptions must be clearly identified.
- (5) Distinguish clearly as to what risks would be affected by the decision and what risks would not.
- (6) Are reasonably detailed and accurate.
- (7) Relate to current risk or the risk resulting from not adopting the proposal being considered.
- (8) Allow for unknown and/or unquantifiable risks.

b. Principles. The principles to be applied when preparing safety risk assessments are:

(1) Each risk assessment should first analyze the two elements of risk: severity of the hazard and likelihood of occurrence. Risk assessment is then performed by comparing the combined effect of their characteristics to acceptable criteria as determined in the plan (paragraph 5a).

(2) A risk assessment may be qualitative and/or quantitative. To the maximum extent practicable, these risk assessments will be quantitative.

- (3) The selection of a risk assessment methodology should be flexible.
- (4) Basic assumptions should be documented or, if only bounds can be estimated reliably, the range encompassed should be described.
- (5) Significant risk assessment assumptions, inferences, or models should:
 - (a) Describe any model used in the risk assessment and make explicit the assumptions incorporated in the model.
 - (b) Identify any policy or value judgments.
 - (c) Explain the basis for choices.
 - (d) Indicate the extent that the model and the assumptions incorporated have been validated by or conflict with empirical data.
- (6) All safety risk assessments should include or summarize the information of paragraphs 6a (3) and 6a(4) as well as 6b (4) and 6b (5). This record should be maintained by the organization performing the assessment in accordance with Order 1350.15B, Records Organization, Transfer, and Destruction Standards.

7. ANALYSIS OF RISK REDUCTION BENEFITS AND COSTS. For each high-consequence decision, the following tasks shall be performed:

- a. Compare the results of a risk assessment for each risk-reduction alternative considered, including no action, in order to rank each risk assessment for decisionmaking purposes. The assessment will consider future conditions, e.g., increased traffic volume.
- b. Assess the costs and the safety risk reduction or other benefits associated with implementation of, and compliance with, an alternative under final consideration.

8. SUBSTITUTION RISKS. Safety risk assessments of proposed changes to high-consequence decisions shall include a statement of substitution risks. Substitution risks shall be included in the risk assessment documentation.

9. SAFETY RISK MANAGEMENT COMMITTEE. This order establishes the Safety Risk Management Committee. Appendix 2, Safety Risk Management Committee, contains the committee charter. The committee shall provide a service to any FAA organization for safety risk management planning, as outlined in appendix 2, when requested by the responsible program office. It also meets periodically (e.g., two to four times per year) to exchange risk management ideas and information. The committee will provide advice and counsel to the Office of System Safety, the Assistant Administrator for System Safety, and other management officials when requested.

Jane F. Garvey
Administrator

APPENDIX 1. DEFINITIONS.

1. **COSTS.** Direct and indirect costs to the United States Government, State, local, and tribal governments, international trade impacts, and the private sector.
2. **EMERGENCY.** A circumstance that requires immediate action to be taken.
3. **HAZARD.** Condition, event, or circumstance that could lead to or contribute to an unplanned or undesired event.
4. **HAZARD IDENTIFICATION.** Identification of a substance, activity, or condition as potentially posing a risk to human health or safety.
5. **HIGH-CONSEQUENCE DECISION.** Decision that either creates or could be reasonably estimated to result in a statistical increase or decrease in personal injuries and/or loss of life and health, a change in property values, loss of or damage to property, costs or savings, or other economic impacts valued at \$100,000,000 or more per annum.
6. **PRODUCT LIFE CYCLE.** The entire sequence from precertification activities through those associated with removal from service.
7. **MISHAP.** Unplanned event, or series of events, that results in death, injury, occupational illness, or damage to or loss of equipment or property.
8. **RISK.** Expression of the impact of an undesired event in terms of event severity and event likelihood.
9. **RISK ASSESSMENT.**
 - a. Process of identifying hazards and quantifying or qualifying the degree of risk they pose for exposed individuals, populations, or resources; and/or
 - b. Document containing the explanation of how the assessment process is applied to individual activities or conditions.
10. **RISK CHARACTERIZATION.** Identification or evaluation of the two components of risk, i.e., undesired event severity and likelihood of occurrence.
11. **RISK MANAGEMENT.** Management activity ensuring that risk is identified and eliminated or controlled within established program risk parameters.
12. **SAFETY RISK.** Expression of the probability and impact of an undesired event in terms of hazard severity and hazard likelihood.
13. **SUBSTITUTION RISK.** Additional risk to human health or safety, to include property risk, from an action designed to reduce some other risk(s).

APPENDIX 2. SAFETY RISK MANAGEMENT COMMITTEE

1. PURPOSE. The Safety Risk Management Committee provides a communication and support team to supplement the overall risk analysis capability and efficiency of key FAA organizations.

2. RESPONSIBILITIES. The Committee supports FAA safety risk management activities. It provides advice and guidance, upon request from responsible program offices, to help them fulfill their authority and responsibility to incorporate safety risk management as a decisionmaking tool. It serves as an internal vehicle for risk management process communication, for coordination of risk analysis methods, and for use of common practices where appropriate. This includes, but is not limited to:
 - a. Continuing the internal exchange of risk management information among key FAA organizations.
 - b. Fostering the exchange of risk management ideas and information with other government agencies and industry to avoid duplication of effort.
 - c. Providing risk analysis/management advice and guidance.
 - d. Identifying and recommending needed enhancements to FAA risk analysis/management capabilities and/or efficiencies upon request.
 - e. Maintaining a risk management resources directory that includes:
 - (1) FAA risk methodologies productively employed,
 - (2) Specific internal risk analysis/management expertise by methodology or tool and organizational contact point(s), and
 - (3) A central contact point for resource identification assistance.
 - f. Encouraging the establishment of an international directory of aviation safety information resources via the Internet.
 - g. Assisting in the identification of suitable risk analysis tools and initiate appropriate training in the use of these tools.

3. COMPOSITION. The Safety Risk Management Committee is composed of safety and risk management professionals representing all Associate/Assistant Administrators and the Offices of the Chief Counsel, Civil Rights, Government and Industry Affairs, and Public Affairs. The Assistant Administrator for System Safety will designate an individual to chair the committee. The chairperson is responsible for providing written notice of all meetings to committee members and, in coordination with the executive secretary, keeping minutes of the meetings.

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Appendix 2

4. ASSIGNMENTS. The Safety Risk Management Committee may form ad hoc working groups to address specific issues when requested by the responsible program office. Composition of those working groups will consist of member representatives from across the FAA. Working groups will be disbanded upon completion of their task. The Office of System Safety shall provide the position of executive secretary of the committee. The Office of System Safety shall also furnish other administrative support.

5. FUNDING. Resources for support staff and working group activities will be provided as determined by the Assistant Administrator for System Safety. Unless otherwise stated, each member is responsible for his/her own costs associated with committee membership.