Safety Management System (SMS)

Delta Air Lines, Inc.

SMS: Constantly Evolving and Improving

Structure:

1. Keep it simple.
2. Limit SMS to operational divisions.
3. Develop an SMS manual.
4. Keep a formal log of safety actions taken (Tracking and documentation).
5. Lessons learned during FAA “pilot program.”

Implementation Methodology

Implementation

1. CEO Commitment.
    - Safety Policy.
    - Establishing Safety Management System.
    - Voluntary Hazard Reporting (non-punitive).
2. Aviation Safety Initiative.
3. Liaisons and Program Managers.
4. Commitment from Operational leaders.
5. Integrated Safety Round Table.
6. Divisional Safety Round Tables.
7. SRT Action Log.

SMS Guidance: ICAO Safety Management Manual

Serves as the core reference document.

Provides thorough discussion of modern safety concepts.

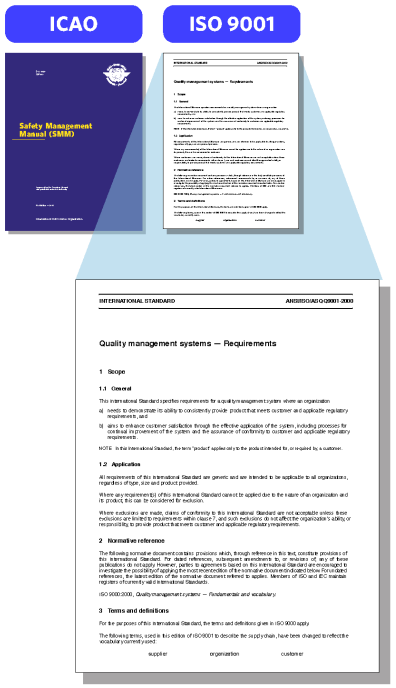
Establishes the following minimum requirements for an SMS program:

1. Identifies safety hazards.
2. Ensures that remedial action is implemented.
3. Provides for continuous monitoring of safety level achieved.
4. Defines lines of safety accountability (including senior management).

SMS Guidance: ISO 9001:2000

SMS includes quality management components to ensure the program meets the needs of the organization.

ISO 9001:2000 provides a set of standardized best practices for quality management systems.



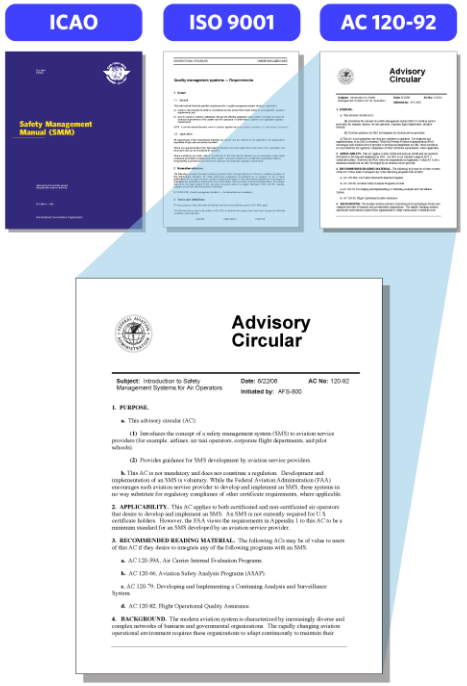
SMS Guidance: AC 120-92

Purpose:

1. Introduce SMS concepts to aviation service providers.
2. Provide guidance for SMS development.

Content (Main Document):

1. SMS principles.
2. Organizational functions.
3. Reasons for and implementation of the “SMS Standard.”



SMS Guidance: AC 120-92 (Appendix 1)

Purpose:

1. Introduce SMS concepts to aviation service providers.
2. Provide guidance for SMS development.

Content (Main Document):

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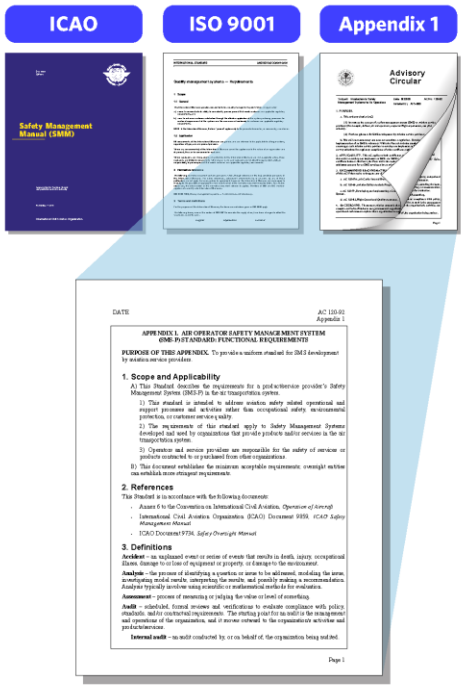
2. Organizational functions.
3. Reasons for and implementation of the “SMS Standard.”

Content:

1. Establishes minimum standards for US aviation service providers.



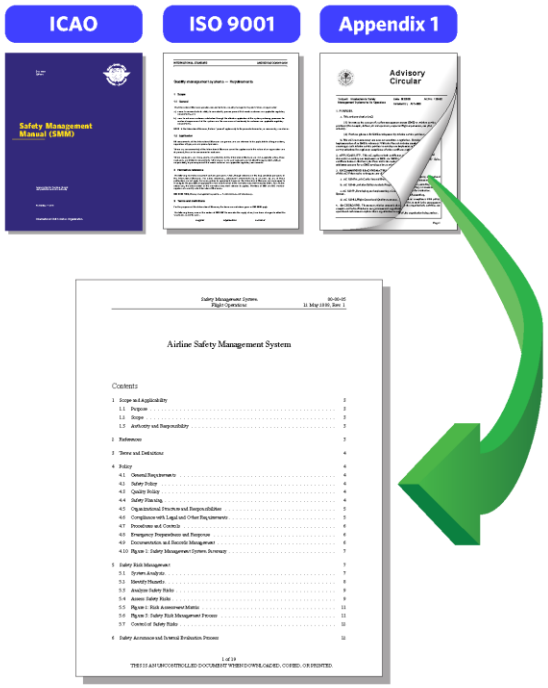
SMS Guidance: Company SMS Manual

Corporate Manual/Divisional Manuals.

Follows structure of AC 120-92 (Appendix 1)

Purpose: (Four Pillars)

1. Communicates **policies**.
2. Provides processes for **risk management**.
3. Provides processes for **safety assurance**.
4. Describes tools used to **promote safety** within the organization.

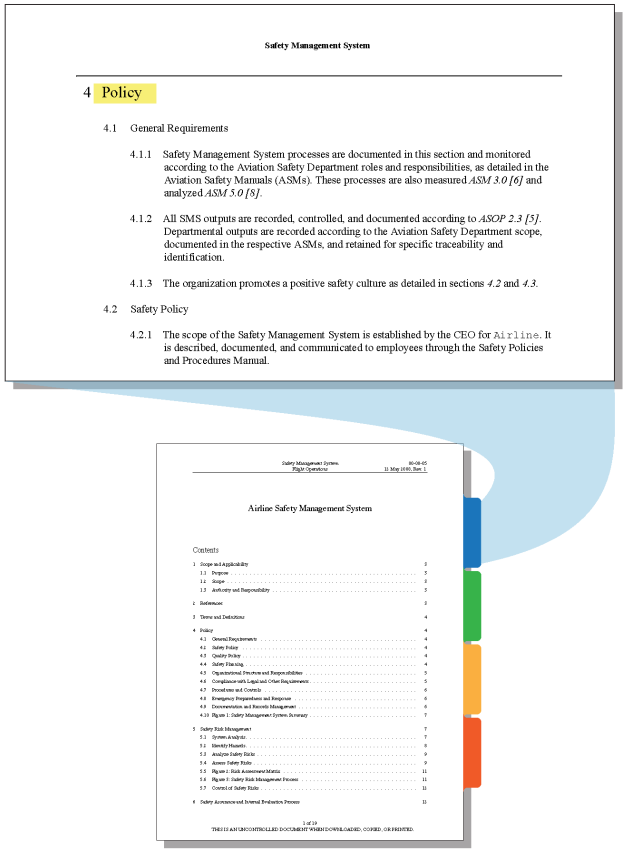


Pillar 1: Safety Policy

Senior management commitment.

Demonstrates commitment to:

1. Implement SMS.
2. Manage safety risks.
3. Implement employee self-reporting system (voluntary and non-punitive).
4. Establish clear standards for behavior.
5. Identify areas of authority and responsibility.



Safety Management System

4 Policy

4.1 General Requirements

4.1.1 Safety Management System processes are documented in this section and monitored according to the Aviation Safety Department roles and responsibilities, as detailed in the Aviation Safety Manuals (ASMs). These processes are also measured *ASM 5.0 [6]* and analyzed *ASM 5.0 [8]*.

4.1.2 All SMS outputs are recorded, controlled, and documented according to *ASOP 2.3 [5]*. Departmental outputs are recorded according to the Aviation Safety Department scope, documented in the respective ASMs, and retained for specific traceability and identification.

4.1.3 The organization promotes a positive safety culture as detailed in sections *4.2* and *4.3*.

4.2 Safety Policy

4.2.1 The scope of the Safety Management System is established by the CEO for `Airline`. It is described, documented, and communicated to employees through the Safety Policies and Procedures Manual.

Airline Safety Management System

Contents

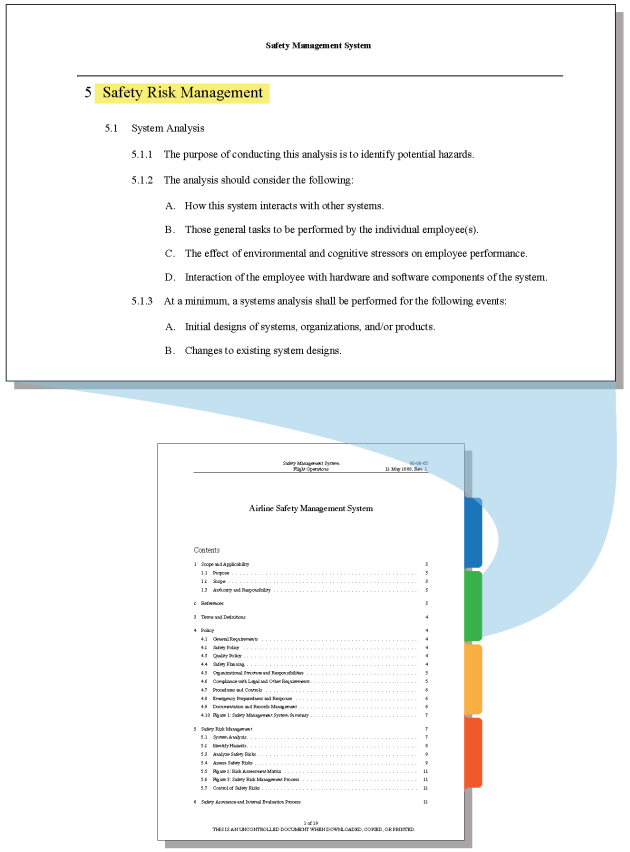
Pillar 2: Safety Risk Management

Prioritize.

“Focuses efforts on those hazards posing the greatest risk.” (ICAO SMM, 2006)

Process consists of:

1. Identifying hazards.
2. Assessing risk.
3. Prioritizing hazards.
4. Developing safety action.
5. Controlling safety risks and monitoring effects of safety action.



Safety Management System

5 Safety Risk Management

5.1 System Analysis

5.1.1 The purpose of conducting this analysis is to identify potential hazards.

5.1.2 The analysis should consider the following:

A. How this system interacts with other systems.

B. Those general tasks to be performed by the individual employee(s).

C. The effect of environmental and cognitive stressors on employee performance.

D. Interaction of the employee with hardware and software components of the system.

5.1.3 At a minimum, a systems analysis shall be performed for the following events:

A. Initial designs of systems, organizations, and/or products.

B. Changes to existing system designs.

Airline Safety Management System

Contents

Risk Management: Identifying Hazards

Includes hazards “identified for the entire scope of the system...” (AC 120-92, 2006)

Reactive:

1. Formal investigations.
2. Industry sources.

Proactive:

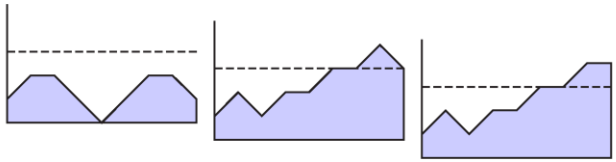
1. Data analysis.
2. Task analyses.
3. Monitoring the system.

Predictive:

1. Confidential and voluntary safety reports.
2. Advanced statistical analyses (SHARE).
3. Subject matter experts.

Reactive: Investigations

Proactive: Data Analysis



Predictive: Confidential, Non-Punitive Reporting Program

Risk Management: Assessing Risk

Designed to reflect the operational environment of the service provider.

Includes realistic (not worst case) assessment of probability and severity.

Severity levels can be assigned by category (i.e., injury, damage to environment, damage to assets, etc.) to gain greater insight during analysis.

RISK ASSESSMENT MATRIX

SEVERITY LEVELS						LIKELIHOOD LEVELS				
RATING	PHYSICAL INJURY	DAMAGE TO THE ENVIRONMENT	DAMAGE TO ASSETS	POTENTIAL INCREASED COST OR REVENUE LOSS	DAMAGE TO COMPORATE REPUTATION	A UNKNOWN BUT POSSIBLE IN THE AVIATION INDUSTRY	B KNOWN IN THE AVIATION INDUSTRY	C OCCURRED IN THE COMPANY	D REPORTED >3X/YR WITHIN THE COMPANY	E REPORTED >3X/YR AT A PARTICULAR LOCATION
0	No Injury	No Effect	No Damage	No Increased Cost Or Lost Revenue	No Implication	ACCEPTABLE				
1	Minor Injury	Minor Effect	Minor Damage < US $50K	Minor Loss < US $50K	Limited Localized Implication					
2	Serious Injury	Contained Effect	Substantial Damage < US $250K	Substantial Loss < US $250K	Regional Implication			ACCEPTABLE WITH MITIGATION		
3	Single Fatality	Major Effect	Major Damage < US $1M	Major Loss < US $1M	National Implication				UNACCEPTABLE	
4	Multiple Fatalities	Massive Effect	Catastrophic Damage ≥ US $1M	Massive Loss ≥ US $1M	International Implication					

Risk Management: Risk Acceptability

Results in the categorization of risk acceptability:

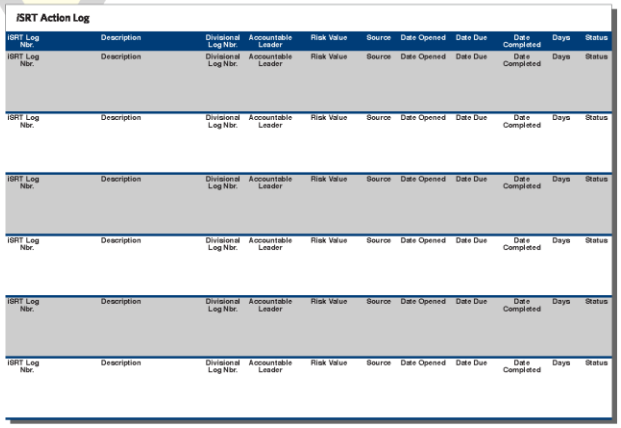
1. **Unacceptable:** Stop the operation and address the risk.
2. **Acceptable with Mitigation:** The operation may continue under defined conditions.
3. **Acceptable:** The operation may continue “as is.” (These items should be considered for continuous improvement.)

Prioritization: Process is designed to allocate limited resources to hazards representing the greatest risk.

Risk Management: Controlling Safety Risks

Document hazards and safety action to:

1. Evaluate efficacy of solutions.
2. Facilitate periodic and mandatory review process.
3. Archive for aggregate analysis.
4. Provide reference for next generation of managers.
5. Validate and verify control.



Risk Management: Safety Action Group

Group tasked by operational leader to:

1. Identify hazards.
2. Conduct risk assessment.
3. Prioritize issues.
4. Develop safety action.
5. Assign accountability.
6. Review performance of previous action.

Membership includes department leaders, subject matter experts, representatives from oversight organization, and employee representatives.

Risk Management: Integrating Safety Action

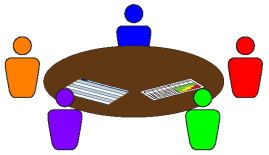
"Safety Action Groups" exist in all operational units.

1. Airport Customer Service.
2. Cargo.
3. Dispatch.
4. Flight Ops.
5. In-Flight Service.
6. Technical Ops.

Divisional leaders belong to the "Integrated Safety Action Group."

Purpose is to:

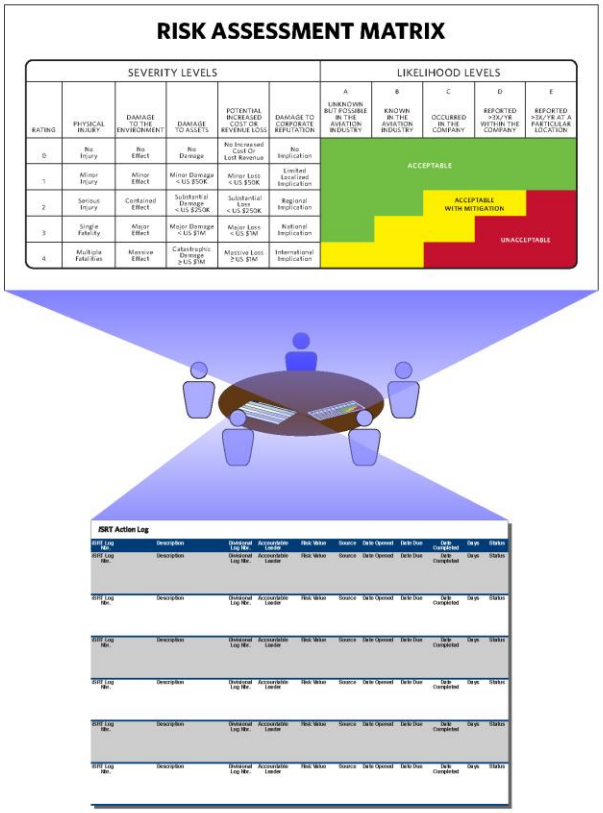
1. Share safety information.
2. Communicate cross-divisional concerns.
3. Assign safety action to appropriate division.



Risk Management – Cost Analysis

Examples.

1. Door Procedures.
    - In conjunction with integration and fleet complexity.
    - Change is forward thinking.
    - Viable option.
    - Analysis and trending – reduction of Cat 1 damage.
    - Cost of damages (YOY), slide deployment, and gap analysis.
2. Improved performance.
    - Flight exceptions – system to rate and manage goal.
    - Pain cost factors – published ATA data and Delta financial data.
    - Cost variance from exceptions.
    - Cost benefit based on improved performance.



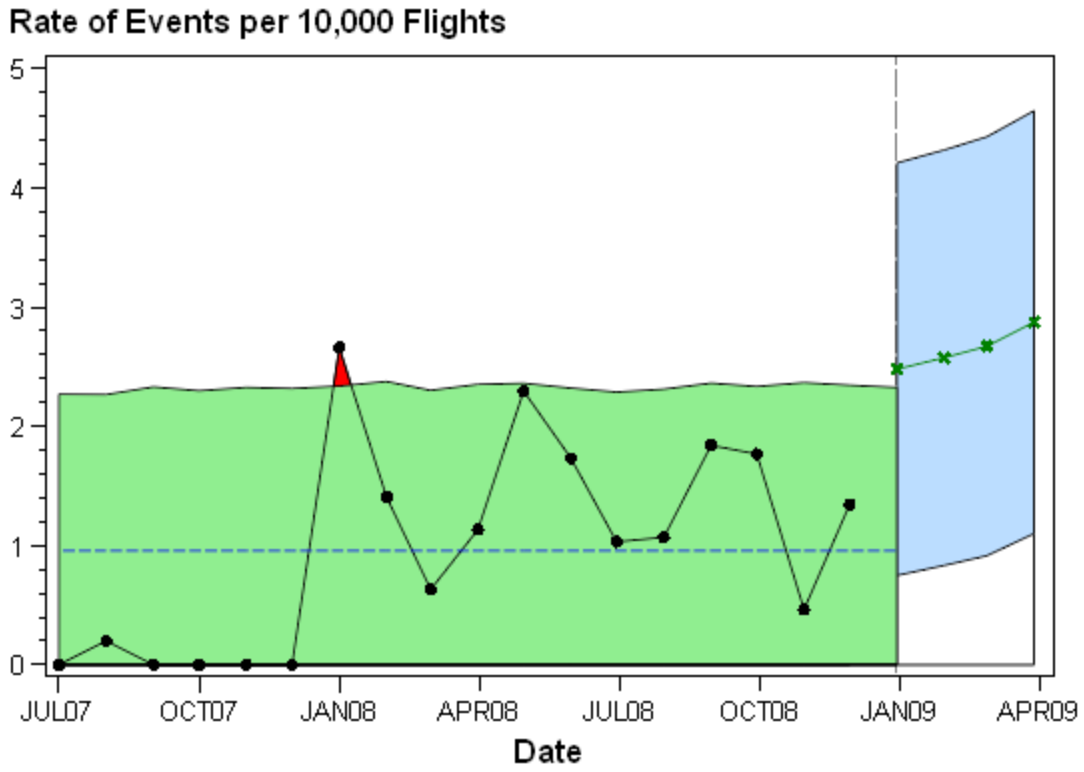
Proactive to Predictive

Proactive

1. Data trending for process failures.
2. Identification of quarterly and seasonal changes.

Predictive

1. Displays current direction of performance.
2. Incorporates seasonal fluctuations.



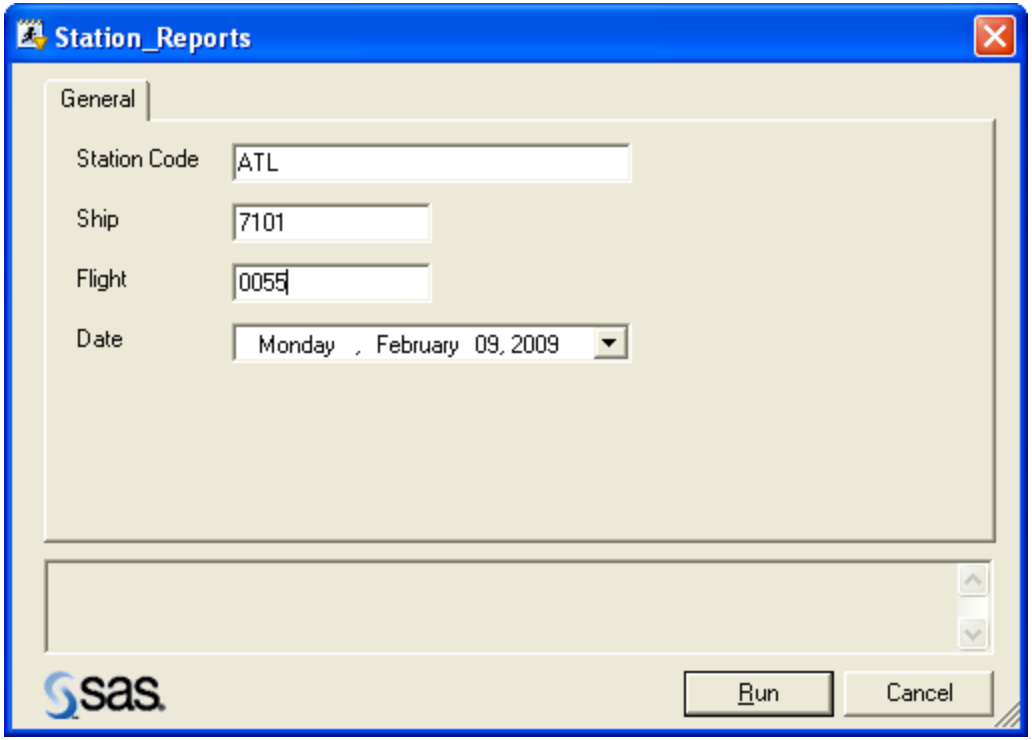
Removing Barriers

Data Access

1. Flight, ship, and station information associated with safety event.
2. Operational and weather data that might affect workload management or situational awareness.

Efficiency

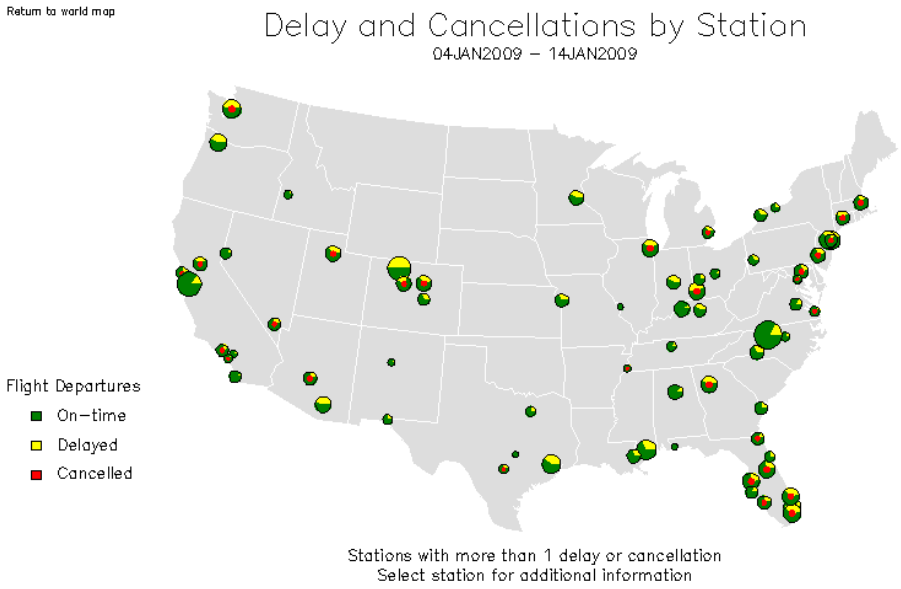
1. Single source.
2. More than you thought you needed.

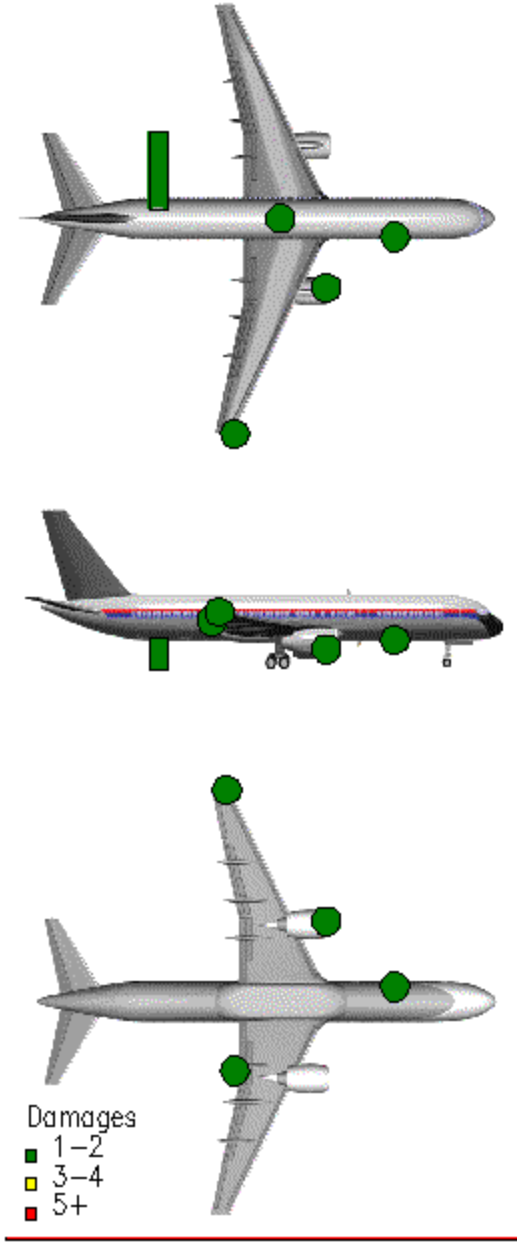


Visual Analysis

View data in quickly identify problem areas.

Information drill downs for quick review of events by subject matter experts.





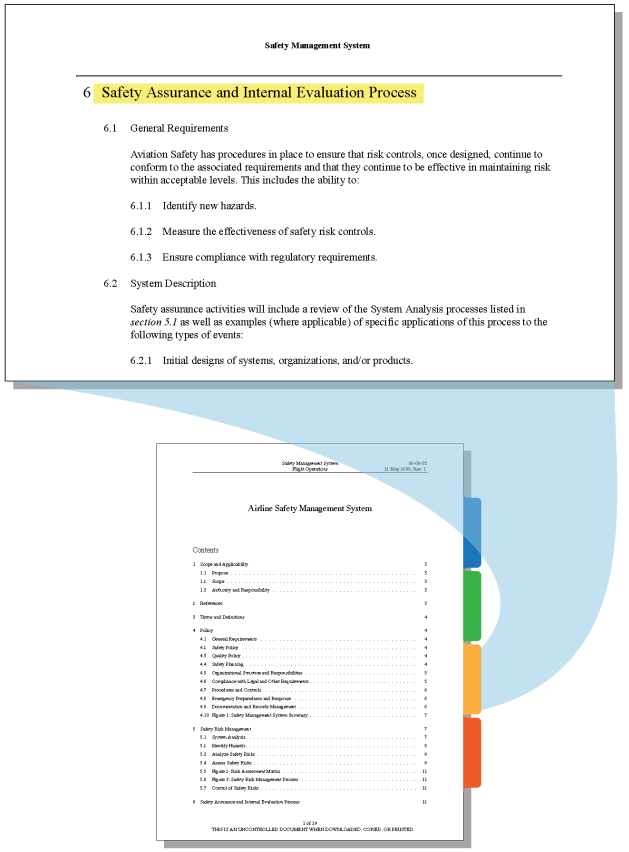
Pillar 3: Safety Assurance

Uses management techniques to:

1. Identify new hazards.
2. Self-reporting techniques.
3. Voluntary and self reporting.
4. Investigations.
5. Measure effectiveness of safety risk controls.
6. Ensure compliance with regulatory requirements.

Quality management includes:

1. Continuous monitoring of the system.
2. First party, second party, and third party audits.
3. Management reviews of the program.
4. Scheduled self audits, internal audits.
5. External audits by oversight organization (e.g., SAI 8).



Safety Management System

6 Safety Assurance and Internal Evaluation Process

6.1 General Requirements

Aviation Safety has procedures in place to ensure that risk controls, once designed, continue to conform to the associated requirements and that they continue to be effective in maintaining risk within acceptable levels. This includes the ability to:

6.1.1 Identify new hazards.

6.1.2 Measure the effectiveness of safety risk controls.

6.1.3 Ensure compliance with regulatory requirements.

6.2 System Description

Safety assurance activities will include a review of the System Analysis processes listed in *section 5.1* as well as examples (where applicable) of specific applications of this process to the following types of events:

6.2.1 Initial designs of systems, organizations, and/or products.

Airline Safety Management System

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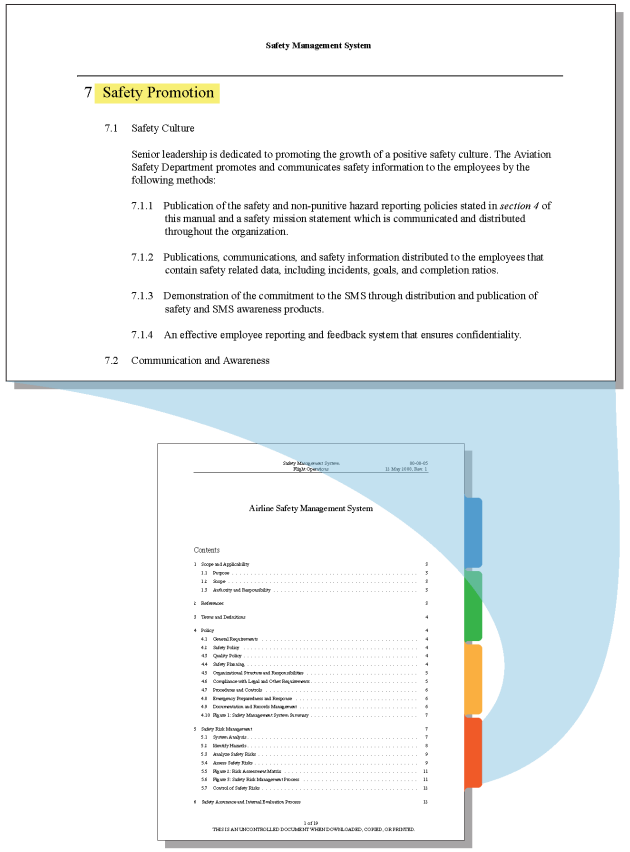
Pillar 4: Safety Promotion and Awareness

Used to foster a positive safety culture.

Provides safety education to and encourages active feedback from employees.

Uses communication tools such as:

1. Aviation Safety Reporter.
2. Newsletters.
3. Bulletin boards.
4. Electronic media.
5. Investigation reports.
6. Posters.
7. Ad hoc reports and presentations.
8. Training and education.



Safety Management System

7 Safety Promotion

7.1 Safety Culture

Senior leadership is dedicated to promoting the growth of a positive safety culture. The Aviation Safety Department promotes and communicates safety information to the employees by the following methods:

7.1.1 Publication of the safety and non-punitive hazard reporting policies stated in *section 4* of this manual and a safety mission statement which is communicated and distributed throughout the organization.

7.1.2 Publications, communications, and safety information distributed to the employees that contain safety related data, including incidents, goals, and completion ratios.

7.1.3 Demonstration of the commitment to the SMS through distribution and publication of safety and SMS awareness products.

7.1.4 An effective employee reporting and feedback system that ensures confidentiality.

7.2 Communication and Awareness

Airline Safety Management System

Contents

Lessons Learned

Improvements.

1. Training and Documentation (manuals).
2. Formalized training process.
3. Risk assessment module.
4. Local FAA participation.
5. Top down approach.
6. Verification of action items.
7. Communication and awareness.
8. Integration and system assessment.

Overview

Uses business-like processes:

1. Metrics and **goals are established** and continuously monitored.
2. Procedures and **processes are established to manage risk** and are **continuously improved**.
3. Levels of **authority and accountability are assigned**.

Benefits:

1. Includes the collection, analysis, and **dissemination of information**.
2. Raises **safety awareness** throughout the organization.
3. Focuses on **managing operational risks**—flight, ground, and maintenance.

Questions

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