Joint Session

Top-Down Safety Focus: Fatigue Risk Management Systems (FRMS)

SMS: Improving Tomorrow…Today!

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12:50 - 13:10

June 17, 2008

Presented at the FAA Fatigue Management Symposium: Partnerships for Solutions; Vienna, VA: June 17-19, 2008

Captain Michael D. New, Ph.D.
Biography

Michael New began his aviation career in the US Air Force as a fighter pilot (F-15), instructor, and evaluator. During his tour in the Air Force, he served as the Chief of Mobility, Chief of Training, and the Chief of Standardization and Evaluation for various units. He holds a Ph.D. from the Georgia Institute of Technology in Human Factors Engineering and has served as a consultant for the US Navy, NASA, and Lockheed-Martin. As a member of the National Safety Committee for the Air Line Pilots' Association and the Human Performance Committee for the International Federation of Air Line Pilots' Associations, Mike conducted research and aircraft accident investigations.

Prior to his present position, Mike served as General Manager of the Research and Development Group within Delta Air Lines. In this role, he managed the Continuing Education, Advanced Qualification, and Curriculum Development functions for Flight Operations. Additionally, he served as an instructor/evaluator and conducted several internal studies for Delta.

Currently, Mike is a B-737-800 Captain and the Director of Aviation Safety for Delta Air Lines. As the flight safety leader for the third largest airline, he has implemented one of the first cross-divisional Safety Management Systems at a US carrier and is responsible for all accident/incident investigation, data collection/analysis, and aviation-related research. In addition to his duties at Delta, he serves on the Safety Council (ATA), the Automation Working Group for the Commercial Aviation Safety Team (FAA), and the Icarus Committee of the Flight Safety Foundation.

Safety Management System (SMS): Improving Tomorrow… Today!

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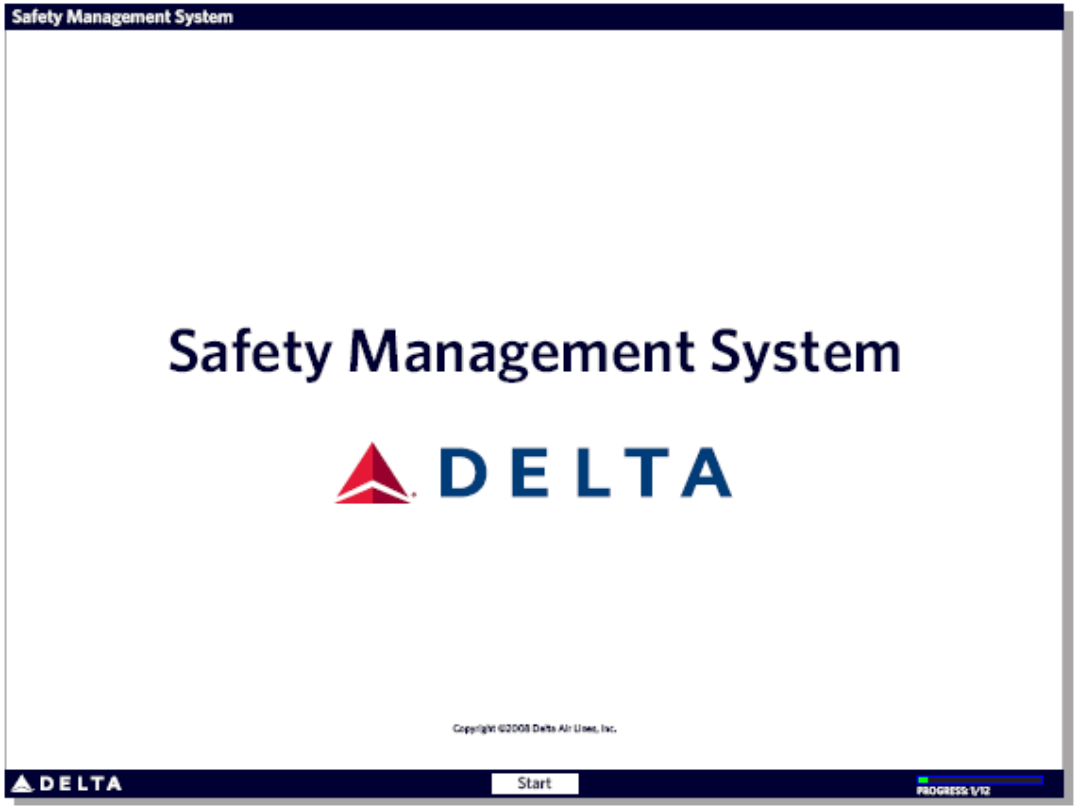
Goals

- Answer the following questions:
  - What is SMS?
  - What materials are available to learn more about SMS?
  - What are the basic components of SMS?
- Share lessons learned from recent implementation experiences.
- Set the stage for the Fatigue Risk Management System (FRMS) discussion.

SMS: Constantly Evolving and Improving

- This presentation is based on:
  - Current organizational culture, practices, and technology.
  - Incorporation of best practices (of which we are aware).
  - Lessons learned during FAA “pilot program.”
- Lessons Learned:
  - Keep it simple.
  - Limit SMS to operational divisions (at least initially).
  - Formalize the processes (develop an SMS manual).
  - Keep a formal log of safety actions taken.

Employee SMS Familiarization Module



What is SMS?

"A safety management system (SMS) is an organized approach to managing safety, including the necessary organizational structures, accountabilities, policies, and procedures."

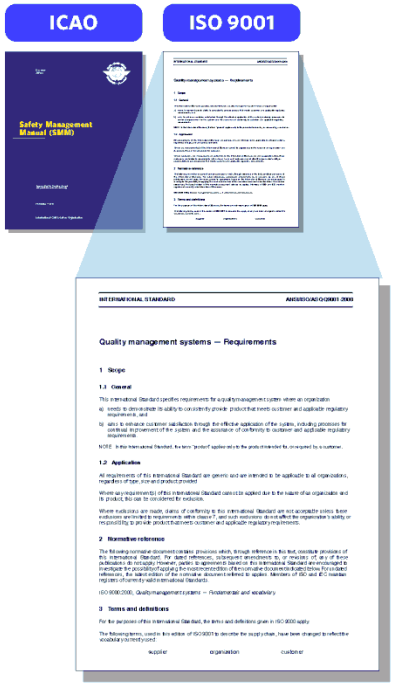
- ICAO Safety Management Manual, 2006

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

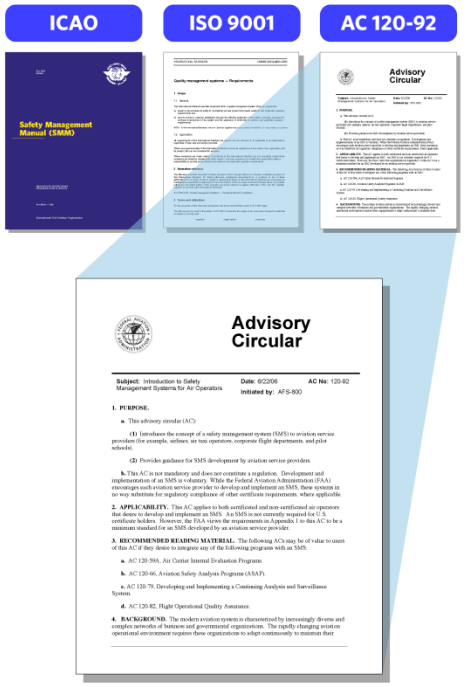
SMS Guidance: ISO 9001:2000

- 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:
  - Introduce SMS concepts to aviation service providers.
  - Provide guidance for SMS development.
- Content (Main Document):
  - SMS principles.
  - Organizational functions.
  - Reasons for and implementation of the “SMS Standard.”



SMS Guidance: AC 120-92 (Appendix 1)

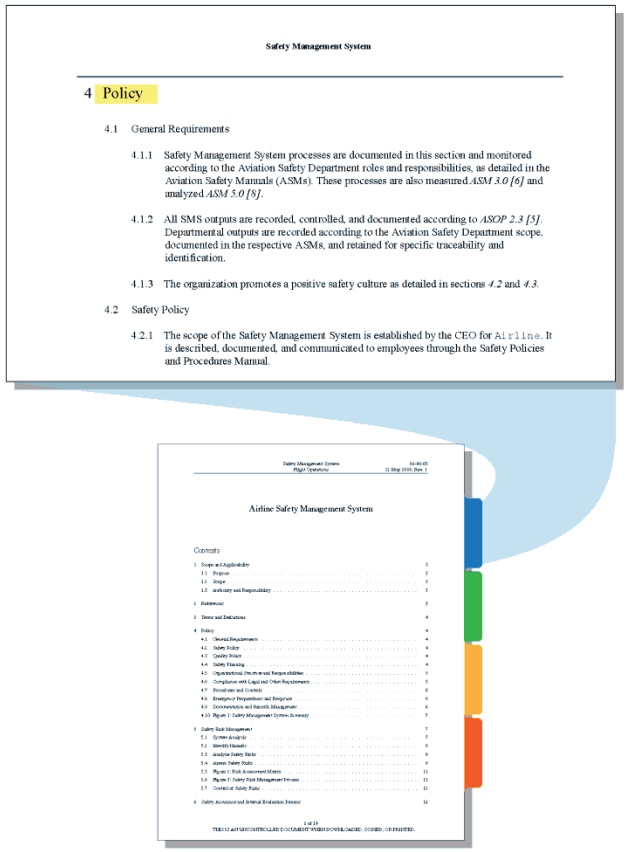
- Purpose:
  - Introduce SMS concepts to aviation service providers.
  - Provide guidance for SMS development.
- Content (Main Document):
  - SMS principles.
  - Organizational functions.
  - Reasons for and implementation of the “SMS Standard.”
- Content (Appendix 1):
  - Establishes minimum standards for US aviation service providers.

SMS Guidance: Company SMS Manual

- Not currently required by FAA.
- Follows structure of AC 120-92 (Appendix 1)
- Purpose: (Four Pillars)
  - Communicates **policies**.
  - Provides processes for **risk management**.
  - Provides processes for **safety assurance**.
  - Describes tools used to **promote safety** within the organization.

Pillar 1: Safety Policy

- Written by top management.
- Demonstrates commitment to:
  - Implement SMS.
  - Manage safety risks.
  - Implement non-punitive hazard reporting system.
  - Establish clear standards for behavior.
  - 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 3.0 [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

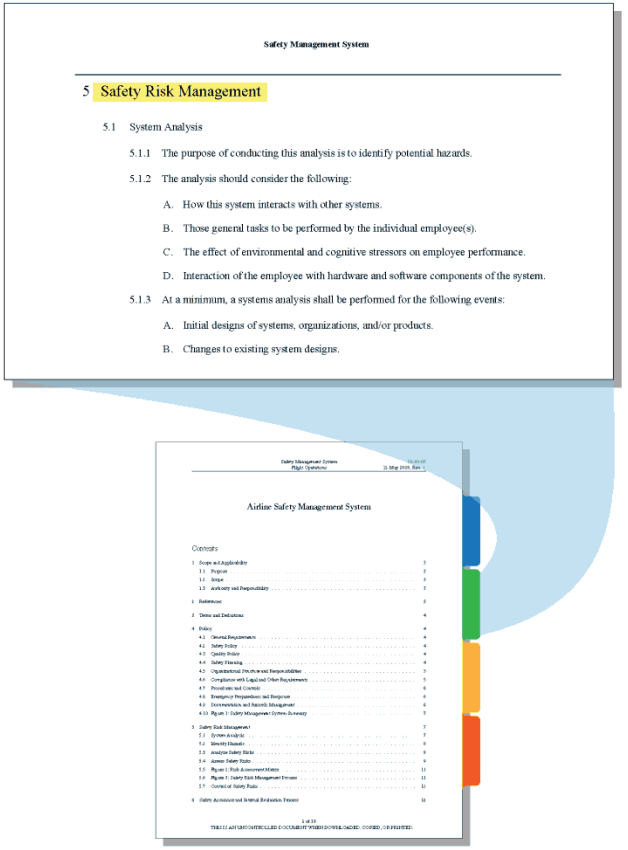
4.2.1 The scope of the Safety Management System is established by the CEO for Airline. It is described, documented, and communicated to employees through the Safety Policies and Procedures Manual.

Airline Safety Management System

Contents

Pillar 2: Safety Risk Management

- "Focuses efforts on those hazards posing the greatest risk." (ICAO SMM, 2006)
- Process consists of:
  - Identifying hazards.
  - Assessing risk.
  - Prioritizing hazards.
  - Developing safety action.
  - Controlling safety risks and monitoring effects of safety action.

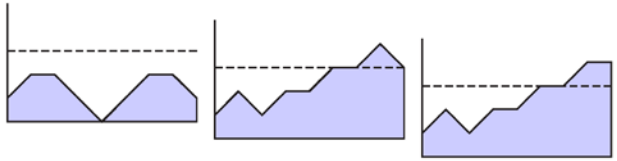


Risk Management: Identifying Hazards

- Includes hazards "identified for the entire scope of the system..." (AC 120-92, 2006)
- Reactive:
  - Formal investigations.
  - Industry sources.
- Proactive:
  - Data analysis.
  - Task analyses.
- Predictive:
  - Input from subject matter experts.
  - Confidential safety reports.

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

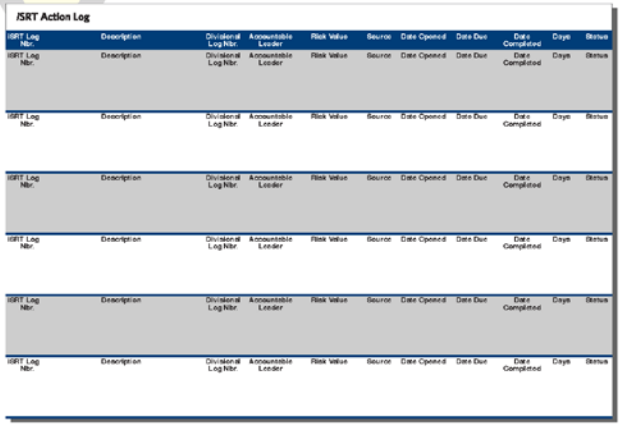
SEVERITY LEVELS						LIKELIHOOD LEVELS				
RATING	PHYSICAL INJURY	DAMAGE TO THE ENVIRONMENT	DAMAGE TO ASSETS	POTENTIAL INCREASED COST OR REVENUE LOSS	DAMAGE TO CORPORATE REPUTATION	A UNKNOWN BUT POSSIBLE IN THE AVIATION INDUSTRY	B KNOWN IN THE AVIATION INDUSTRY	C OCCURRED IN THE COMPANY	D REPORTED >1X/YR WITHIN THE COMPANY	E REPORTED >1X/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:
  - **Unacceptable:** Stop the operation and address the risk.
  - **Acceptable with Mitigation:** The operation may continue under defined conditions.
  - **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.

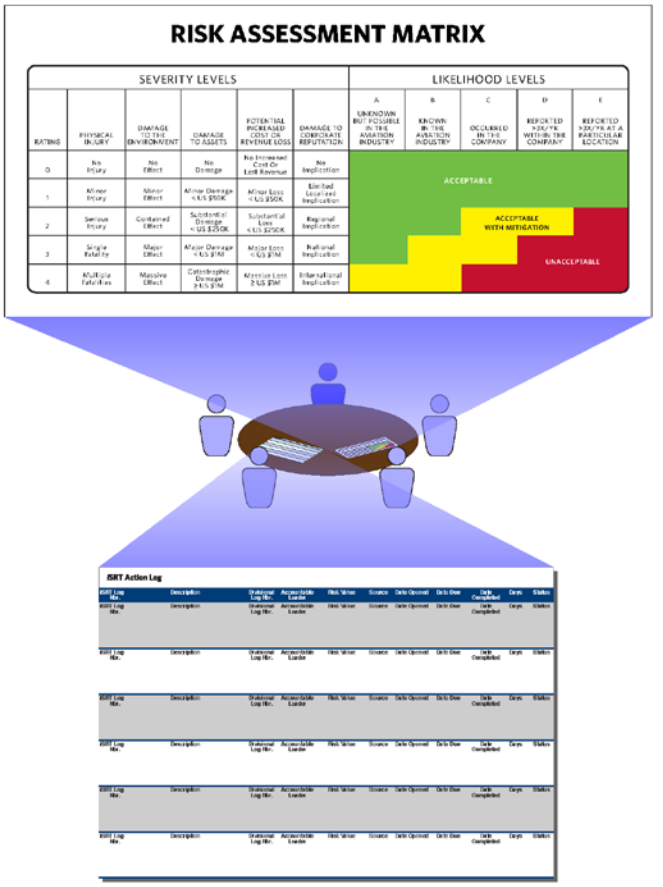
Risk Management: Controlling Safety Risks

- Document hazards and safety action to:
  - Evaluate efficacy of solutions.
  - Facilitate periodic/mandatory review process.
  - Archive for aggregate analysis.
  - Provide reference for next generation of managers.



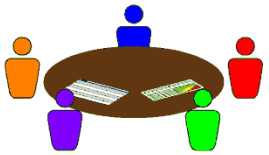
Risk Management: Developing Safety Action

- Group tasked by operational leader to:
  - Identify hazards.
  - Conduct risk assessment.
  - Prioritize issues.
  - Develop safety action.
  - Assign accountability.
  - Review performance of previous action.
- Membership includes department leaders, subject matter experts, representatives from oversight organization, and employee representatives.



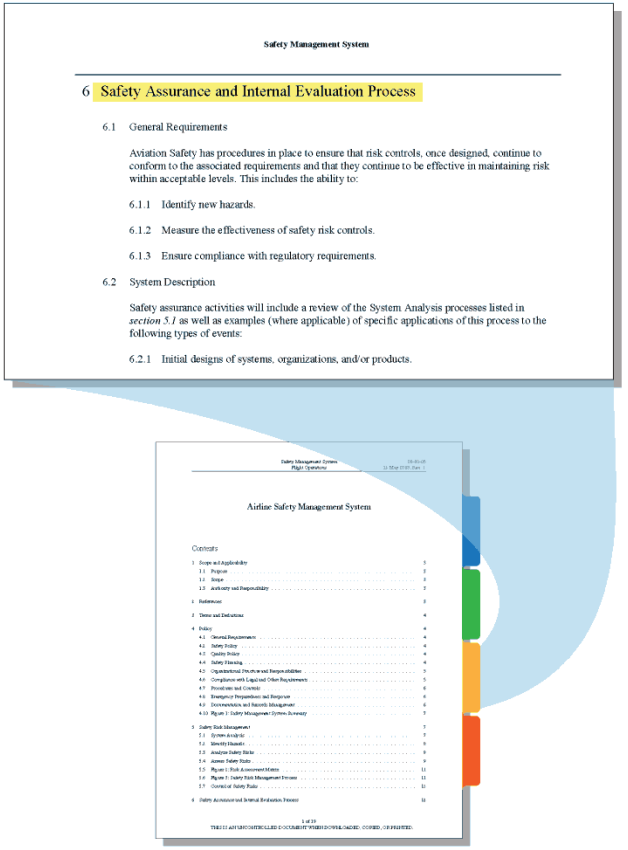
Risk Management: Integrating Safety Action

- "Safety Action Groups" exist in all operational units.
  - Cargo.
  - Dispatch.
  - Flight Ops.
  - Ground Ops.
  - In-Flight Service.
  - Technical Ops.
- Divisional leaders belong to the "Integrated Safety Action Group." Purpose is to:
  - Share safety information.
  - Communicate cross-divisional concerns.
  - Assign safety action to appropriate division.



Pillar 3: Safety Assurance

- Uses quality management techniques to:
  - Identify new hazards.
  - Measure effectiveness of safety risk controls.
  - Ensure compliance with regulatory requirements.
- Quality management includes:
  - Continuous monitoring of the system.
  - Management reviews of the program.
  - Scheduled, internal audits.
  - 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:

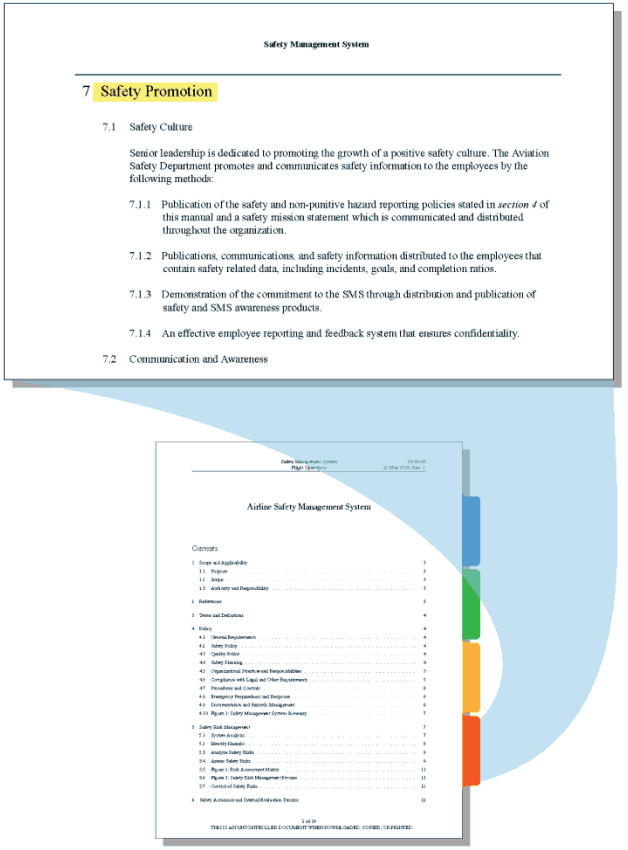
6.2.1 Initial designs of systems, organizations, and/or products.

Airline Safety Management System

Contents

Pillar 4: Safety Promotion

- Used to foster a positive safety culture.
- Provides safety education to and encourages active feedback from employees.
- Uses communication tools such as:
  - Newsletters.
  - Bulletin boards.
  - Electronic media.
  - Investigation reports.
  - Ad hoc reports and presentations.



Summary of SMS

- Uses business-like processes:
  - Metrics and **goals are established** and continuously monitored.
  - Procedures and **processes are established to manage risk** and are **continuously improved**.
  - Levels of **authority and accountability are assigned**.
- Benefits:
  - Includes the collection, analysis, and **dissemination of information**.
  - Raises **safety awareness** throughout the organization.
  - Focuses on **managing operational risks—**flight, ground, and maintenance.

Be Safe

Get involved and share your experiences…

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