Safety Management System Program Manual

Austin-Bergstrom International Airport
Austin, Texas

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1.0 INTRODUCTION TO SAFETY MANAGEMENT SYSTEMS (SMS)

1.1 Introduction

This manual describes the application of Safety Management Systems (SMS) at the Austin Bergstrom International Airport (ABIA). It is a resource intended for the City of Austin Department of Aviation (DoA) executives, managers, safety officials, and all employees. This manual further establishes a systems approach to safety management which benefits both the safety and business aspects of the Airport. It describes the essential components of SMS and also incorporates the International Civil Aviation Organization (ICAO) and anticipated Federal Aviation Administration (FAA) policy for airport SMS programs. Furthermore, it includes valuable lessons learned from a Gap Analysis in SMS implementation efforts at ABIA.

1.2.1. FAA Pilot Program

The FAA solicited several air carrier serviced airports to participate in a pilot program, in an effort to help develop a safety program from the ground up. Several airports were selected across the United States to be recipients of a grant to participate in the Safety Management System Pilot Program development. The SMS grant program was established in an effort to develop a nationwide standard and requisite regulation. Austin Bergstrom International Airport, located in Austin, Texas, was chosen to participate in the initial grant funding.

1.2.2. Certification of Airports

The FAA is strongly considering the inclusion of Safety Management Systems into the Part 139 Certification of Airports. This process will require a Notice of Proposed Rule Making (NPRM) to incorporate it into law. This process may take as long as 2 to 3 years to become law and implemented by the Federal Aviation Administration (FAA). Airports are being encouraged by the FAA and ICAO, to look at their safety programs and consider implementing a SMS program that is tailored to their airport before the FAA adopts regulations mandating the implementation of SMS programs.

1.3 Purpose

Historically, aviation safety has been built upon the reactive analysis of past accidents and the introduction of corrective actions to prevent the recurrence of those events. With today's extremely low accident rate, it is increasingly difficult to make further improvements to the level of safety by using this approach. Therefore, a proactive approach to managing safety has been developed that concentrates on the control of processes rather than solely relying on inspection and remedial actions on end products. This innovation in aviation system safety is called a Safety Management System, an expression indicating that safety efforts are most effective when made a fully integrated part of the business operation.

It is now generally accepted that most aviation accidents result from human error. It would be easy to conclude that these errors indicate carelessness or incompetence on the job, but that would not be accurate. Investigations are finding that the human is

only the last link in a chain that leads to an accident. These accidents will not be prevented by merely changing people; increased safety can only occur when the underlying causal factors are addressed. Enhancing overall safety in the most efficient manner requires the adoption of a systems approach to safety management. Every segment and level of an organization must become part of a safety culture that promotes and practices risk reduction.

Safety management is based on the premise that there will always be safety hazards and human errors. SMS establishes processes to improve communication about these risks and take action to minimize them. This approach will subsequently improve an organization's overall level of safety. The application of a systematic, proactive, and well-defined safety program (as is inherent in a SMS) allows an organization producing a product or service to strike a realistic and efficient balance between safety and production. The forecasted growth in air transportation over the next 20 years, will require new measures and a greater effort from all aviation producers - including airport operators - in order to achieve a continuing improvement in the level of aviation safety. The use of SMS at ABIA can contribute to this effort by increasing the likelihood that airport employees will detect and correct safety problems before those problems result in an aircraft accident or incident.

1.4 Structure

A typical SMS Program and Manual are structured into 4 basic components. These components are as follows;

- Safety Policy and Objectives,
- Safety Risk Management,
- Safety Assurance, and
- Safety Promotion

These categories will be discussed in more detail, later within this Manual.

2.0 GUIDANCE

2.1 ICAO International

In November 2005, the International Civil Aviation Organization (ICAO) amended Annex 14, Volume I (Airport Design and Operations) to require member States to have certificated international airports establish an SMS. The FAA supports harmonization of international standards, and has worked to make U.S. aviation safety regulations consistent with ICAO standards and recommended practices. The agency intends to implement the use of SMS at U.S. airports to meet the intent of the ICAO standard in a way that complements existing airport safety regulations in 14 CFR Part 139.

2.2 Federal Aviation Administration

The FAA is beginning to implement SMS into their various lines of businesses.

2.2.1 Flight Standards

Flight Standards is assisting airlines and operators in developing SMS programs. They have developed an Advisory Circular (AC) 120-92, Introduction to Safety Management Systems for Air Operators.

2.2.2. Air Traffic

Air Traffic has begun starting to train their employees on Safety Risk Management (SRM) processes. They have developed order 1100.161, Air Traffic Oversight, as well as training their employees on Safety Risk Assessments, Analysis and Mitigation.

2.2.3. Airport Operators

In 2007, the FAA Airports published Advisory Circular, AC 150/5200-37, Introduction to Safety Management Systems (SMS) for Airport Operators. This introduction provided the basic overview of SMS SRM principles. No formal implementation guidance was provided. The FAA later initiated grants to several certificated airports to develop SMS programs under an Airports Improvement Program Grant.

2.3 ABIA SMS Program Manual

This ABIA SMS Program Manual provides the framework from which ABIA will begin to build their program. The program may require some additional outside resources to assist ABIA in maturing the program over the next several years.

This SMS Program Manual describes what a Safety Management System (SMS) is and how a systems approach to safety management will benefit both the safety and business aspects of the Department of Aviation. The implementation of SMS represents a change in the safety culture of ABIA. In this regard, airport directors and their staffs will find this document particularly useful since the successful implementation of SMS is dependent on the commitment of the highest levels of management.

3. 0 SAFETY POLICY & OBJECTIVES

3.1 System Safety and SMS

System safety is the application of engineering and management principles, criteria, and techniques to achieve an acceptable level of safety throughout all phases of a system.

Achieving this definition of system safety is the primary objective of SMS. A well-structured SMS provides a systematic, explicit, and comprehensive process for managing risks. This process includes goal setting, planning, documentation, and regular evaluation of performance to ensure that goals are being met.

3.2 Safety Policy and Objectives

The Aviation Department Safety Policy defines the fundamental approach to managing safety that is to be adopted within the organization. The Safety Policy further defines the organization's commitment to safety and overall safety vision, and empowers the organization to fulfill the values and commitments of top management.

3.2.1 Policy Statement

> ***"The City of Austin Aviation Department is committed to implementing a Safety Management System and maintaining a safe, healthy and sustainable working environment for our people, our customers, our partners and contractors, and those we are employed to serve. Employees of the City of Austin Department of Aviation are responsible for promoting a safe environment at Austin-Bergstrom International Airport."***

This safety policy is a key part of the Department of Aviation's overall aviation strategy and provides the framework for management to put in place the organization and arrangements for carrying it out. The Department of Aviation will actively encourage the adoption of this policy by all companies and State and Federal agencies operating on airport property.

The City of Austin Department of Aviation is committed to:

- Implement and maintain an appropriate Safety Management System with a structure to manage, supervise and safely accomplish all aspects of aviation activities which fall within the Department of Aviation's area of responsibility;
- Achieve the highest levels of aviation safety performance;
- Seek to achieve no harm to people and minimal impact on the environment through our business operations;

- Systematically manage aviation safety matters through periodic and rigorous audits and reviews of the safety implications of all our aviation activities;
- Consult with staff and encourage active participation at all levels within our businesses;
- Learn and benefit from our experiences and the experiences of others;
- Promote a culture in which all Department of Aviation employees share these commitments; and
- Increase safety awareness among our business partners and encourage their participation in the program.

To achieve these commitments, the City of Austin Department of Aviation will develop, implement and maintain effective aviation safety management systems and processes that will:

- Identify, access, and manage hazards, impacts, and risks from aviation activities;
- Meet or exceed local, state and federal legislative and regulatory requirements regarding airport operations;
- Train and deploy competent people and allocate responsibilities and tasks commensurate with individual skills;
- Set, achieve and report against objectives and targets to demonstrate continual performance improvement;
- Identify areas for improvement through comprehensive incident reporting and investigation; and
- Maintain a culture that encourages the free and honest reporting of safety issues.

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3.2.2 Safety Objectives

The long term success of SMS is based on the assignment of responsibilities by Department of Aviation top executives. In addition to understanding the principles of safety management, decision-makers will use SMS assessments and analysis to the SMS lifecycle. Department of Aviation supervisors must understand when safety risk management is necessary, and when to elevate decisions and the supporting information to a higher level.

Key elements of accountability within the organization:

- The organization's safety policy addresses responsibility and accountability, including written guidance regarding the safety authorities and responsibilities of all key personnel assigned to the airport.

- Identification of staff that is responsible for administration of the overall SMS. Responsible staff report to the highest level of Department of Aviation management to assure appropriate consideration of all reports, recommendations, and issues.

- Personnel who are responsible for SMS are employed by the Department of Aviation and are provided with the necessary resources to fulfill their duties.

- The responsibilities associated with SMS are clearly defined within job descriptions of Department of Aviation staff along with identified lines of communication within the organization.

- The Department of Aviation has established a safety committee. The safety committee acts as a source of expertise to the Department of Aviation and is co-chaired by the organizations top management and the predominant airline.

3.2.3 Safety Responsibilities

Safety management responsibility and accountability are intertwined. Each Department of Aviation employee acknowledges the importance of safety and takes a leadership role in the continual development of the principles of SMS in their duties and assignments. Although individuals must be accountable for their own actions, top management is accountable for the overall performance of the Department of Aviation employees that report to them.

Since accountability is a two-way street, Department of Aviation directors, managers and supervisors are also accountable for ensuring that their subordinates have the resources, training, experience, etc. which is needed for the safe completion of their assigned duties.

The following describes key management responsibilities for SMS:

Department of Aviation Executive Director (Executive Director):

Subject to the direction and control of the Austin City Council and City Manager, the Executive Director has overall responsibility for the safety of passengers and Department of Aviation employees. The Executive Director also has an overall safety consultation, facilitation and monitoring role for the airport's tenants, concessionaires, airlines, contractors, suppliers, and service providers.

The Executive Director's areas of responsibility include the following:

- Ensure that the safety policy and management system is produced, kept up to date and meets Department of Aviation policies and procedures.
- Take a leadership role in the airport's safety program and ensuring that safety never becomes subordinate to financial matters.
- Develop an annual business plan (i.e. including the capital program) that is sufficiently resourced to achieve compliance with the airport safety policy and management system.
- Appoint safety conscious managers, monitor their performance and ensure that safety is given a high priority within their training and development plans.
- Consider safety issues when making changes in the airport's organization structure and business processes.
- Clearly define accountabilities and responsibilities for all staff for the delivery of safety performance.
- Set and enforce policies, standards and procedures that contribute to the success of the airport's safety policy and management systems.

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Director, Airport Operations and Maintenance:

The Director is accountable for defining, deploying and monitoring SMS strategy and compliance processes to enable the Department of Aviation to have safety focused strategic plans and compliance management. The Director has prime responsibility for supporting the Executive Director to comply with their duties.

The Director's areas of responsibility include the following:

- Provide a leadership role in Department of Aviation safety program.
- Ensure that safety does not become subordinate to financial matters.
- Champion safety at the Department of Aviation meetings.
- Support all departments and functions to monitor safety performance across lines of responsibility.
- Ensure safety improvement objectives are set and implemented.

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- Ensure the Operations and Maintenance division policies, standards, procedures and practices contribute to the success of Department of Aviation Safety Policy and Safety Management System.
- Appoint safety conscious direct reports, monitor their performance and ensure safety is given the highest priority within their training and development plans.
- Ensure Planning and Engineering coordinate with Operational divisions to incorporate safety during maintenance and construction projects.
- Consider safety when making or recommending changes in the airport organizational structure and business process.
- Ensure proper liaison takes place between the activities of Airport police officers and TSA in so far as their shared risk activities fall under the jurisdiction of the Executive Director.
- Ensure there is coordination with those who have operational functional responsibilities which might affect safety.
- Enforce compliance with all safety related legislation applicable to the management of the airport and facilities.

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SMS Coordinator

The SMS Coordinator is accountable to the Director - Airport Operations and Maintenance for defining, deploying and monitoring the Operations department's strategy and compliance process to enable the department to have safety focused plans and compliance management. The SMS Coordinator is also responsible for maintaining a safe operating environment at the Airport.

The SMS Coordinator's areas of responsibility include the following:

- Manage staff and resources to ensure compliance with and maintenance of airside safety standards and recommended practices in accordance with the requirements of the Federal Aviation Administration, International Civil Aviation Organization, Title 14 CFR Part 139, the ABIA Airport Certification Manual and Airside Directives.
- Set a compelling purpose and vision for the Operations Division.
- Lead the Airport's Safety Management System including emergency planning and co-ordinate, supervise and control resources during emergency incidents, aircraft recovery operations, adverse weather conditions, equipment service issues and unscheduled movements.

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- Use best efforts to ensure safety does not become subordinate to financial matters.
- Set demanding objectives for safety improvement and provide support to achieve them.
- Use best efforts to ensure policies, standards, procedures and practices are aligned at all times.
- Recruit, motivate and monitor safety conscious direct reports, identifying suitable development plans.
- Notify top management of all operational matters that may influence or impact their areas of control.
- Maintain and develop constructive relationships with all stakeholders in the safe and efficient operation of the airfield.
- Use best efforts to ensure Operations business plans are sufficiently resourced to achieve compliance with the safety management system.
- Use best efforts to ensure "best practice" operational standards and procedures are identified, documented and implemented.
- Use best efforts to ensure the safe movement of aircraft by coordinating with the Airport Traffic Control Tower, meteorological office, airlines, airport fire/rescue and police, especially when affected by adverse weather conditions, equipment, incidents, emergencies or other disruptions.
- Regulate aircraft ground engine running, night movement, airfield/ramp construction, airfield obstruction safeguarding and airfield congestion in accordance with statutory regulations and Department of Aviation policy.

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3.2.4 Department of Aviation SMS Organizational Line of Communications

The fundamental success of SMS relies upon unobstructed lines of communications throughout the organization. This communication, whether it be horizontal or vertical, reflects the desire of top management to support safety at every level.

The Department of Aviation is organized in a manner intended to be resilient to hazardous situations and its ability to reduce risks. Lines of succession have been established across the organization to ensure responsible safety management. The

organizational flow chart, shown in Figure 3.1 below, is intended to provide for the orderly approach to documentation and information management.

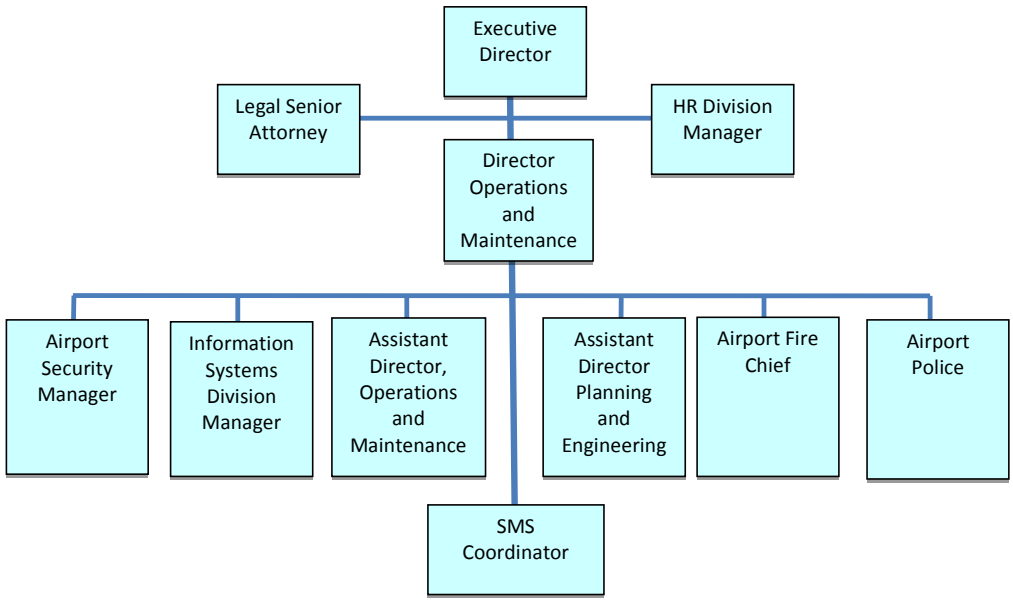

Figure 3.1

Austin Bergstrom International Airport – Aviation Department

Lines of Succession for Safety Management Systems (SMS)

4.0 GAP ANALYSIS

4.1 Overview

The purpose of the Gap Analysis is to document existing gaps or deficiencies in the airport's current procedures, policies, documentation, actions and operations, as outlined in the Airport Certification Manual (ACM), as compared to the safety elements of Safety Management System programs.

SMS principles contain twenty-one basic safety elements, which are utilized in the evaluation, development and management of a SMS Manual and Program.

4.2 Airport Certification Manual (ACM)

Airports with certificated air carrier service must be certified under the Federal Aviation Administration (FAA) guidance under, 14 CFR Part 139, Certification of Airports. Airports establish, under the approval of the FAA, a certification plan that is tailored for their airport, which is in compliance with Part 139. This plan is known as the Airport Certification Manual (ACM). 14 CFR Part 139 historically established the standards and documented processes by which airport operators manage and monitor the safety of their airport.

While the elements in 14 CFR Part 139 address critical safety elements of an airport, they typically do not address the means, processes and analysis for optimal system safety management, as a SMS program does.

4.3 SMS GAP Analysis

The Gap Analysis performed for the Department of Aviation compared current status relative to the twenty-one elements of the SMS Manual and Program in the FAA SMS Pilot Study Participants Guide. The analysis was accomplished through various interviews, review of current documentation, published guidance & best practices, observation of operations, and surveys and then comparing them to both the ACM and 14 CFR Part 139 to the twenty-one elements.

The GAP Analysis Report identified which of the twenty-one elements matched the FAA's SMS guidance materials and which of those twenty-one elements did not. The Report then recommended changes that would create continuity with the elements of SMS. Three classifications were created in the GAP Analysis that identified the degree to which existing procedures or processes met SMS elements.

The three classifications are defined as follows:

- "Existing" – Procedure or process currently in use.
- "In Progress" – Procedure or process is either in development or in the process of being implemented.
- "GAP" – No existing policy or procedure was found to be in place.

Additional guidance on the twenty-one SMS safety elements are provided in Section 12 Appendix 5, The Twenty-One Elements of SMS.

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5.0 HUMAN FACTORS (HF)

Human Factors is the area of study that seeks to maximize the relationship between people and systems in order to improve performance, safety, and reliability. Systems include equipment, procedures, or organizations or teams. The integration of Human Factor awareness into the SMS processes will create a solid foundation for successful and continuous safety improvement.

Human Factor systems involve the interaction between people, equipment, and organizations.

People: The quality of airport operations is dependent upon the numbers of personnel available for operations (manpower), the aptitude, skill, experience, and training of those employees (personnel quality), and a keen awareness of human information processing issues that have significant affects on safety (attention, memory, fatigue, visual and audio perception, team communication, etc).

Equipment: The design of equipment, and/or procedures on how to use equipment, may also have significant impact on system safety. Awareness of Human Factors involved in the equipment used by an organization, especially new equipment, is critical in identifying issues might result in a safety incident.

Organizations: Organizations are also systems. ABIA is composed of different departments, divisions, offices, crews, and tenant organizations that all work and interact together. Each develops and operates under many policies and procedures, some shared, and some individual for each particular group. Human Factors plays a role when procedures from one group are unknown or unclear to the others, interact unexpectedly with other procedures, and can have detrimental affects on overall safe operations.

SMS and Human Factors are inextricably linked. All employees should be vigilant in the detection of system "design vulnerabilities", (people, equipment, or organizational). Department of Aviation personnel must continuously monitor for system parameters at "critical mass", i.e. fatigue, physical requirements, stressors, numbers and quality of personnel or equipment, and organizational issues (values, norms, climate, etc.). Each of these factors can degrade safety climates slowly, but surely, if they are not identified and action taken in a timely manner.

Employees will be responsible to monitor and communicate safety issues and concerns. This SMS Manual provides the guidance to establish those methods, processes, principles and practices to achieve an improved recognition of human factors.

Additional information on Human Factors is available in Appendix 2, Human Factors.

6.0 SAFETY RISK MANAGEMENT (SRM)

6.1 Overview

The Department of Aviation's operational activity and processes are currently structured through Title 14 CFR Part 139, Certification of Airports and the associated ABIA Airport Certification Manual (ACM).

Safety Risk Management is both reactive from a historical perspective and proactive from a speculative or anticipatory analysis. By reviewing past occurrences and considering changes in progress, a probability and severity assessment can be utilized to mitigate hazards and potential hazards to an acceptable level.

The SRM process is utilized when changes in a system (i.e. the airports' configuration, operation, procedures, new equipment, expanded or personnel responsibilities, etc.) are either planned or occur. Any changes to an existing system or systems can introduce adverse hazards and ultimately may result in incidents or accidents.

6.2 Understanding SRM

Risk is the assessment of the likelihood of occurrence and the predictable severity of each identified hazard.

SRM provides the process for evaluation of the various risks and the systematic analysis, mitigation and corrective course of action to eliminate the risk(s) or reduce the probability and severity of the risk(s) to an acceptable level. The process can be implemented in:

- Configuration changes at the airport, whether temporary or permanent;
- The design of new systems, procedures, and/or organizations;
- Any proposed changes to an existing operation, procedures, equipment, personnel and/or environment; or
- Hazards identified during operations or safety assurance functions, such as audits or safety reports.

Once these hazards have been identified, they are assessed and analyzed for their potential impact and safety mitigation is developed to minimize their impact to an acceptable level.

The mitigation of the risks, development of revisions, modifications, and contingency arrangements requires conscious management decisions to approve, fund, schedule, and implement one or more risk strategies.

Safety Risk Management, and continuous safety monitoring provides a formalized and proactive approach to systems safety throughout operational, technical, and human factors considerations. Safety reporting programs, including self-inspections, are necessary to identify latent human, equipment, and procedural deficiencies existing before accidents occur. Information gathered from reporting systems should lead to internal feedback and trend monitoring programs. Reporting systems allow the measuring and assessing of hazards and methods to proactively counteract the risk before incidents or accidents occur.

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6.3 Safety Risk Management Process

The following describes the Safety Risk Management Process.

6.3.1.Notice of Potential Safety Risk

When changes are proposed or occur, the SMS Coordinator shall determine what level of the SRM Process will be required to fully assess the change and develop a safety risk determination or the appropriate level of mitigation to reasonably ensure that the resultant safety is at an acceptable level.

These potential risks may either be identified through reporting systems, proposed changes that have been forwarded for evaluation, or changes which have occurred.

6.3.2. Initial Safety Assessment

The SMS Coordinator will perform an initial investigation of the reported safety issue. In this investigation, the SMS Coordinator will gain understanding of the issue and determine if additional assessment and analysis is required.

If no further investigation is required, the SMS Coordinator will prepare a simplified **Safety Risk Management Decision Report** (SRMDR) to document the reported issue and the associated determination. An example of the simplified SRMDR, is contained in Appendix 6, Simplified SRMDR Example.

If further investigation is required The SMS Coordinator, if appropriate, will convene a Safety Risk Panel (SRP) for the assessment, associated safety risk determination and Department of Aviation approval. This determination will require an expanded **Safety Risk Management Decision Report** (SRMDR). The SRMDR is for determinations that pose an increase in risk to the system and describe the required mitigation for an acceptable level of safety or rejection of the proposed change or process. An example of the expanded SRMDR, is contained in Appendix 7, Expanded SRMDR Example.

6.3.3. Safety Risk Panel

The SMS Coordinator, if appropriate, will convene a Safety Risk Panel (SRP) for the assessment, associated determination and approval through senior ABIA management, in accordance with the ABIA SMS Safety Policy.

The SRP will consist of ABIA subject matter experts, either directly or indirectly involved with the change and as required, other stakeholders (external to ABIA employees) for their expertise and counsel, as appropriate. The involvement of these resources will help ensure that all aspects and consideration have been explored, debated, assessed, analyzed, and mitigated.

A SRP will be sized for the specific safety issue presented and may consist of from 3 to 12 members. The SMS Coordinator will determine the level of participation required.

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The SRP will utilize the ABIA SRM Assessment processes to ascertain a safety risk determination.

6.4 Safety Risk Management Assessments

The Safety Risk Management Assessment process consists of five functional phases:

- Describe the current system and the proposed change;
- Identify all potential hazards;
- Analyze their risks;
- Assessment of each risk; and
- Mitigation and treatment of the risks to an acceptable level.

These phases are the heart of the ABIA SRM Process and define the methodologies and strategies to successfully prepare for a historical eventuality or the unseen realities of new events. A comprehensive breakdown of each of the five phases of SRM are described below, showing the systematic process, including the intent, scope, identification, evaluation levels, mitigation strategies, and the final treatment of the risk and process itself.

6.4.1. Describe the current system and the proposed change.

- Describe the current system, the airport's configuration, operation, equipment, personnel support or activity;
- Describe the proposed change to the system;

- Define the project (i.e. rehabilitation, construction, etc.), activity (maintenance or operation department), equipment (i.e. new or first time to the operator), or process (i.e. inspection, new access route to an area on the airport, training, etc.);

- Define the use, intended function, configurations and/or task descriptions;

- Define the scope, objectives, and utilization interactions;

A descriptive and thorough explanation of procedures, projects, systems and organizations will assist all personnel in procedural understanding leading to proper training**,** eliminating predetermined incorrect assumptions, procedures or actions. A hazard may exist within a procedure, or set of procedures, that can be mitigated by a simple one or two word change to that procedure. A project, regardless of size, may have hazards inherent to the planning and developing stages before implementation ever begins. The system may involve analysis and understanding of hardware considerations such as, equipment, machinery, electronic equipment, furnishings or physical areas such as locations, both inside and outside, terminal or Air Operations Area spaces as well and human factors involvement.

An organization, whether a small shop or the entire airport may be susceptible to hazards due to incomplete understanding or personnel training, improper planning, inattention to rules and regulations, and ineffective management. The description and definition of the operational context of a hazard under consideration must be as accurate as possible**,** as the identification phase of the process begins. A full description of the physical area and/or activity area is of utmost importance to understanding how procedures and processes function within the physical environment.

6.4.2. Hazard Identification

The Safety Risk Panel (SRP) will begin identifying all potential hazards. The unfiltered identification (no qualification – all hazards are accepted at this point) of all potential Hazards, is key to the ultimate discovery and prevention of incidents and accidents. The hazards may come from;

- SRP members and stakeholders;
- From reports of hazards, safety concerns, evaluations of system procedures;
- Data collection – paper/electronic documentation;
- Analysis and assessment of tracked and historical data;
- Considerations of lessons learned and previous experiences; and

- Communication of collected data throughout the process.

Of primary importance to the identification of the hazard is the accuracy of perceptions derived in the planning discussions of new projects, systems, procedures, organizational changes and/or safety reports. Hazards may be as obvious as the "smoking gun" or buried in a maze of statistical history. Frequent review of historical database information reinforces the importance of accurately and consistently adding information to established database programs.

6.4.3. Analyze the Risk for each Hazard

The SRP will quantify and filter (i.e. could this really happen) and group (similar actions or issues) the Hazards. During this process, some hazards that were initially identified may be dropped by the SRP. The SRP will;

- Ask the open-ended questions – What if…?, How can…?, Why did…?;
- Determine what are the trigger mechanisms and various outcomes;
- Identify the consequences of the hazards;
- Identify existing controls to see where a breakdown may occur; and
- Examine Human Factors considerations that may lead to a breakdown;

Existing controls for the project, procedure, system or organization should be identified and reviewed. Asking the open ended questions like "Why did…?" and "What if…?" will assist in finding the cause for events that may happen. Embedded within these open-ended questions are various "trigger mechanisms", precipitating events, or certainties of various outcomes. Through the analysis of each risk, the severity and likelihood of the risk can then be determined.

6.4.4. Assess the Hazard

Hazards will be analyzed to:

- Assess the severity and likelihood of occurrence by use of the Predictive Risk Matrix;
- Prioritize the risk and results from Risk Matrix;
- Select hazards requiring detailed risk mitigation;
- Ascertain the management level for decision-making authority; and

Predictive Risk Matrix		LIKELIHOOD			
		Improbable	Remote	Probable	Frequent
SEVERITY	Catastrophic				
	Major				
	Minor				
	Minimal				

Figure 6.1, Predictive Risk Matrix

HIGH RISK
MODERATE HIGH RISK
MEDIUM RISK
LOW RISK

Figure 6.2, Predictive Risk Matrix Legend

The SRP will utilize the Predictive Risk Matrix, as shown in Figure 6.1, Predictive Risk Matrix, to quantify the likelihood of the risk occurring and the corresponding severity of that occurrence.

Each risk identified for assessment will be mapped on the Predictive Risk Matrix for their initial likelihood and severity in 4 color-coded risk levels, as shown in Figure 6.2, Predictive Risk Matrix Legend. Those risk levels are as follows;

- **High Risk** level occurrences are unacceptable and should be promptly mitigated to an acceptable level of safety.
- **Moderate-High** level of occurrences, are generally unacceptable, but with the implementation of appropriate controls, the occurrence could become an acceptable risk.
- **Medium** level of occurrences, are generally acceptable, providing the appropriate safety controls have been established.
- **Low** level occurrences, pose little or no risk and have adequate levels of control established.

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The **Likelihood** of each hazard is determined using the guidance in the Likelihood Table, as shown in Figure 6.3. The SRP will utilize this table to ensure consistency, when applying assessments for the list of each identified hazard.

LIKELIHOOD LEVELS	
Frequent	Probability happening from a daily to weekly basis
Probable	Probability happening from a weekly to monthly basis
Remote	Probability happening on an annual basis
Improbable	Probability assumed unlikely to occur

Figure 6.3, Likelihood Table

The **Severity** of each hazard is determined using the guidance in the Severity Table, as shown in Figure 6.4. The SRP will utilize this table, to ensure consistency when applying assessments for the list of each identified hazard.

SEVERITY LEVELS	
Catastrophic	Loss of aircraft, loss of structures, fatalities
Major	Damage to aircraft, structures, serious injuries
Minor	Slight damage, functional impairment, slight injuries
Minimal	Miniscule operating/personnel costs and damages

Figure 6.4, Severity Table

Once the initial mapping of each hazard and its' associated likelihood and severity has been completed, the SRP will then determine the priorities of each risk and what mitigation could be either developed or implemented to minimize the risks to an acceptable level. Some risks will require detailed risk mitigation and other may have a more simplistic solution.

6.4.5. Mitigation, Treatment and Monitoring of Risks

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The mitigation, treatment and monitoring are the final steps of the SRM Process. Once acceptable levels of safety have been reached, the proposed change will be acceptable.

- Identify mitigation options – Select best response and risk treatment plans;
- Hazard reduction or elimination;
  - Design and/or modify the hazard for minimization or elimination;
  - Reduce exposure and severity – physical guards or barriers;
  - Warnings, advisories, and/or signals;
  - Procedural and/or operational changes; and
  - Training for hazard avoidance.
- Document risk options and treatment;
  - Approval dependent on the program, risk and mitigation process;
  - Approval of the Safety Risk Management Decision Report certifies that:
    - It was developed properly;
    - Hazards were systematically identified; and
    - Risks were appropriately estimated and mitigated.
- Monitor for effectiveness;
  - Track change(s) to the system, procedure, equipment, personnel and/or environment through data capture, monitoring, reporting and debriefs, and
  - Reapply the SRM process, as required, on the mitigated risks;

An example airport project is contained in Appendix 8, SRM Example Project, which provides a step-by-step development of Hazard identification, risk assessment utilizing the Predictive Risk Matrix and the mitigation of unacceptable risks.

6.5 Safety Risk Reporting

Safety reporting forms are an essential tool for tracking and collecting critical information for analysis and mitigation of hazards. Consistency in collecting critical data collection is best performed through the use of a well designed reporting form which details specific information critical for proper analysis. Collected data can then be integrated into airport electronic records for long term trend analysis. To be effective, the Department of Aviation (DoA) will:

- Develop safety reporting policies and safety reporting forms.

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- Safety Reports and filing instructions will be distributed to all DoA personnel both in printed copy and electronically;
- Safety Reports will contain contact information of the individual reporting the safety issue, the date and time of the occurrence, and a detailed description of the event including metrological conditions, and extenuating circumstances;
- Personal information will be redacted from the report by the SMS Coordinator before being distributed to the Safety Risk Panel for analysis. Anonymous Safety Reports will be accepted, but discouraged; and
- Electronic safety reporting programs will not require a log-in or user ID.

6.6 Safety Risk Communications

The SRM Life Cycle is completed by communicating safety issues and risk resolutions with all personnel. Sharing of SRM information educates personnel to develop a keen awareness of hazards and unjustifiable risks which then creates a stronger safety culture throughout the organization.

Communicating feedback to staff and personnel can be accomplished through:

- Safety recognition and/or awards programs;
- Staff meetings;
- Bulletin boards;
- Newsletters;
- Computer safety briefings at sign-in; and
- E-mails to personnel.

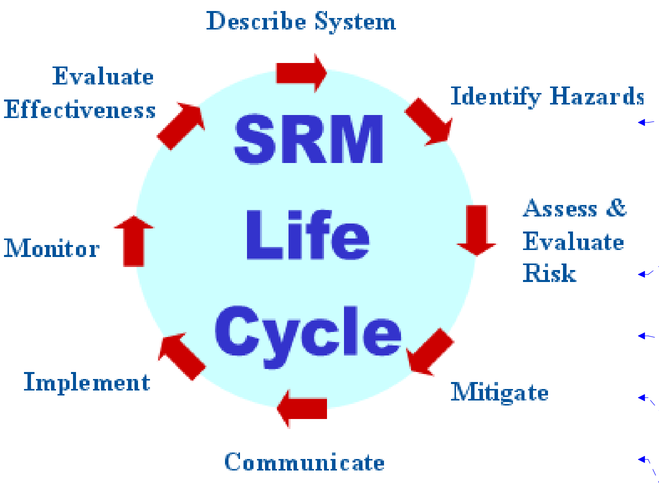

Figure 6.5, SRM Lifecycle Chart

The SRM Life Cycle is a continuous event. All previous activities and determinations, under the SMS/SRM process, are continually being re-evaluated for their effectiveness.

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6.7 Management Responsibility

Supervisors and above will use their best efforts to ensure that the proper mitigation options and treatments will be documented through the SRM process. Approval of the SRMDR certifies that the SRM process was properly followed, and that all hazards were systematically identified and mitigated.

6.7.1. <u>Safety Risk Determinations</u>

The SMS Coordinator will perform investigations of proposed changes or reported safety issues. In this investigation, the SMS Coordinator will gain understanding of the proposal or issue and determine if additional assessment and analysis is required.

If further investigation is required, the SMS Coordinator will convene a Safety Risk Panel (SRP) to make a final determination. This determination will be in the form of a **Safety Risk Management Decision Report** (SRMDR). The SRMDR is for determinations that pose an unjustifiable risk to the system. The SRMDR will describe the required mitigation for an acceptable level of safety or rejection of the proposed change or process. The SRMDR will be processed by the SMS Coordinator, and approved by the Director of Airport Operations and Maintenance. The SMS Coordinator will facilitate the implementation of the SRMDR.

The SRMDR will address, at a minimum, the following issues:

- The current system state, configuration, or process?
- The proposed change and how will it affect the current system?
- Who is impacted by the change, reconfiguration, or process?
- What analysis was accomplished to identify the risk?
- What hazards were identified?
- How the hazards were mitigated, and
- How will the risk be monitored?

6.7.2. <u>Safety Risk Management Decision Report (SRMDR)</u>

The SRMDR will have two distinct signature lines – one for approval of the decision and the other for the acceptance of the mitigated risk.

- **Approval** – SMS Coordinator will sign as the approving official for the documents. This certifies the documentation was developed properly, hazards

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systematically identified, and the risk appropriately estimated and mitigated; and

- **Acceptance of Risk** – Distinct from approval. The Director of Airport Operations and Maintenance, or their designee, will sign all SRMDR documents for the acceptance of mitigated risk.

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The signed SRMDR will be retained in accordance with local, state, and federal document retention policies and regulations.

7.0 SAFETY ASSURANCE

7.1 Performance Indicators

Identification and tracking of performance indicators is critical to any program or system, and even more so with a safety system such as SMS. With SMS however, the intent is to not be anchored in the past, but rather to look ahead and identify and resolve issues before they result in accidents/incidents.

7.1.1 Performance Indicators

In the initial stages of implementing SMS, the selected performance indicators and the data to support them must be those that focus on the degree of compliance with regulatory requirements and the successful implementation and existence of the new system. As the system matures, the performance indicators and the data to support them need to evolve into areas that more fully evaluate system effectiveness - indicators that can identify areas of weakness so that efforts can be properly focused.

Initial performance indicators will be more global in nature, and then as the system becomes more mature, they will become ever increasingly based on workforce selected issues. In the most mature stage of implementation, performance indicators will be much more diverse with individual work centers developing their own set of performance indicators and identifying the data necessary to support them. At any stage in system development though, performance indicators and the data needed to support them can constitute a smattering of indicators across the entire development spectrum. Simply put, SMS data requirements must be established in support of selected performance indicators and revised as the indicators change with system development.

In the area of regulatory compliance, the Airport currently collects an abundance of data concerning the airfield through the Airport Security and Operations Compliance System (ASOCS) and the Computerized Maintenance Management System (CMMS) databases. That data can adequately support performance indicators centered on regulatory compliance. Data to support performance indicators that concern SMS implementation are less readily available and in most cases will have to be developed.

The following performance indicators will be used initially as a minimum to measure implementation of the ABIA SMS:

- Management's visible participation in safety;
- Employees' understanding of the SMS;
- Employees' evaluation of management's commitment to SMS;
- Voluntary Safety/Lessons Learned Reporting;

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- Employee Safety Surveys;
- Audit Findings; and
- SMS Training

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The data to support the first three will come primarily from employee surveys, and data for SMS training will be available in the Training Registration and Administration IntraNet (TRAIN) database. New record keeping or analysis systems will have to be developed and implemented for the others.

Appendix 4 contains additional examples of potential performance measures.

7.1.2 Trend Analysis

Trend Analysis is an integral part of any SMS performance indicator program and an extremely valuable tool for the timely identification of embryonic hazards allowing timely analysis and mitigation before these hazards result in accidents/incidents. It is, however, essential that trend analyses be based on properly identified and tracked performance indicators both “lagging or trailing” and “leading,” and it must be understood that these indicators will have to be modified or changed over time to continue to produce realistic snapshots of an organization’s safety program effectiveness.

Trailing or lagging indicators recount history – past events. They can include such things as accident/incident numbers, runway incursions, bird strikes, etc. Trailing indicators are the most common indicators used by airports in tracking the success or failure of their safety programs, but they do so in hindsight. They do little in the way of providing proactive, look ahead forecasting of potential safety problems and program performance. That is not to say that they cannot be of some assistance in identifying trends.

Future trends can sometimes be identified by using the performance of trailing indicators if done so over longer periods of time and projecting that trend forward. For instance, a trailing indicator could numerically remain well within the acceptable guideline or performance standard for each month over a period of a couple of years giving a sense that the system is in good shape and nothing needs to be done. But showing that same data in a two-year trend analysis could indicate a trend that shows performance, though still acceptable, has actually been trending downward with the ever increasing potential of an unacceptable accident/incident occurring in the not too distant future if that trend is not reversed. In this way lagging indicators can be used as a forecasting tool, but they are not as effective as a good set of leading indicators especially when evaluating overall safety program performance.

Leading indicators look at things that do not necessarily affect system performance as it presently exists. Instead, they provide an evaluation of conditions and activities that precede and affect the occurrence of accidents or incidents in the months or years to come. Such things include changes in the operational and safety environments, training and management involvement in safety. The following are good examples of leading indicators for analyzing an organization's safety program:

- The degree of commitment to safety and health;
- How highly both management and workers value a safe workplace;
- The level of awareness that workers and management have of job related risks;
- Whether inspection and preventative maintenance programs are followed;
- The level or quantity of training provided;
- Total hours of training provided; and
- The degree of activity of Safety Committees and Panels

All of these can be leading indicators that show trends toward a continuation of acceptable or improving safety levels or issues that need to be evaluated and potentially mitigated. For instance, there may be a situation where all mandatory training is being accomplished satisfying one of the trailing indicator performance standards or benchmarks, but the number of hours of additional safety training has been declining over the last couple of years. This may portend a lessening of safety and an increased potential for accidents or incidents that will not show up by solely analyzing trailing indicators until actual accidents/incidents occur. However by identifying this adverse trend through the tracking of a leading indicator such as "Total Training Hours," a thorough evaluation can be conducted thorough the Safety Risk Management (SRM) review process and appropriate mitigation or changes to previous mitigation implemented.

Trend analyses should normally be performed with "Quantitative" data. This means survey questions should be multiple choice, true or false, rank order or constant sum. Survey questions that have textual input (Qualitative) should normally be avoided when the data is intended for use in a trend analysis since that introduces subjectivity into the process.

> NOTE: Sometimes textual input can point to an area(s) that would benefit from further, in-depth investigation.

The keys in any trend analysis are to select the most appropriate indicators, both trailing and leading, with which to evaluate a system and have enough data to produce valid analyses.

7.2 Safety Data Development & Management

7.2.1 Existing Databases

The Aviation Department utilizes several non-integrated database programs and database tools, as shown in Figure 7.1, ABIA Data management Systems. Those affecting operations on the airfield are:

- TRAIN (Training, Registration and Administration Intra Net);
- TMA CMMS (TMA Computerized Maintenance Management System);
- ASOCS (Airport Security and Operations Compliance System);
- RMS (Records Management System);
- VERSADEX Computer Aided Dispatch (CAD);
- Microsoft Excel;
- SQL (Structured Query Language).

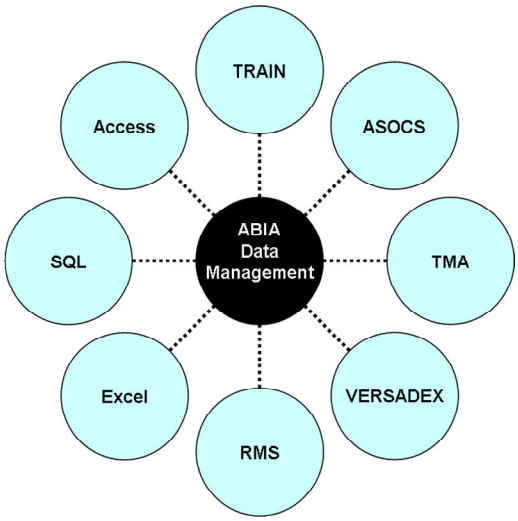

Figure 7.1, ABIA Data Management

In the cases of TRAIN and ASOCS, these programs have only limited statistical functions, but reports from these programs can be imported into Excel for further processing and SQL can be used for more complex processing if necessary. Microsoft Access is also available for use at the Airport.

TRAIN is a program that was developed within the City of Austin Information Technology Department about 12 years ago to fill a need the Department had to track training of their personnel. Since that time, use of the program has expanded to every department in the City including the Department of Aviation. There are abundant choices of reports available within the program, and additional reports can be developed to meet specific needs as has been done for other city departments in the past.

This program will continue to be used for scheduling and documenting training except in those cases where other proprietary systems must be used such as for the Non-Movement Area Training which is a proprietary system.

TMA CMMS is a computerized maintenance work order system that collects a vast amount of data on maintenance activities throughout the airport. An abundance of standard reports are available from this system and the system also has the capability to generate “third party” or ad hoc reports.

This system can effectively provide needed data in support of numerous potential SMS performance indicators.

ASOCS is used by Airfield Operations as the official record of CFR Part 139 activities and also by Operations Security personnel. The two users of this system each have dedicated servers so there is no integration between them. This system has a good capability to generate user defined reports to satisfy a multitude of needs in support of SMS and to be an effective source of data to support numerous potential SMS performance indicators.

RMS is used by Fire and EMS for their official records. It contains a vast amount of data on fire and EMS events that occur on the Airport, but there is no segregation between airside and landside events as there is only one "address" for the entire airport. Additionally, the Federal Health Insurance Portability and Accountability Act (HIPAA) rules limit availability of medical information for incident analysis beyond those investigations conducted by the Fire Department and EMS themselves to whether an individual was "injured, treated and/or transported." This provides only minimally useful information for any incident analysis or "lessons learned" program.
The system is operated and controlled by the City of Austin Fire Department and any possibility of gaining approval for someone outside–that Department to access the system directly is extremely doubtful. However, it may be possible that reports from this database can be made available to an SMS Coordinator.

VERSADEX is used for police functions. It contains a vast amount of data on police events that occur on the Airport, but like RMS, there is no segregation between airside and landside events as there is only one address for the entire airport. As with RMS, HIPAA rules severely limit medical information available for incident analysis outside of a police investigation and use in any "lessons learned" program. When a review of the daily police "blotter" reveals an incident that may be of interest to an airport department, the basic information from that incident is shared with the appropriate airport department(s), but no monthly reports concerning incidents/accidents on the Airport are produced.

The system is operated and controlled by the City of Austin Police Department, and like the Fire Department's RMS, it is extremely doubtful that approval could be gained for anyone outside the Department to have direct access.

A significant amount of data is warehoused in several non-integrated database systems that have the potential to adequately support many of the data needs of SMS once the performance indicators and the data needed to support them are determined. Their full potential will be utilized before other systems are considered, especially in the initial stages of SMS Development.

7.2.2 Available Databases

There are several aviation specific statistical databases or business intelligence tools on the market, but none have been identified as being used in any airport safety environment as yet. Rather, they are generally focused on airline and other aircraft

operator applications. It is, however, anticipated that the industry will respond with a number of offerings specifically for airport use once the FAA establishes a requirement for Safety Management Systems nationwide.

The programs currently available and which are envisioned to be the ones that would be modified to more fully satisfy the needs of airport operators are very capable programs that can access most major database resources. But, history indicates that they require experienced personnel to properly and efficiently utilize them. Considerable staff time is also required to set up and run the analyses. Therefore, the Department of Aviation cannot presently justify either the programs or the personnel to operate them.

7.2.3 Safety Data Development and Management Implementation

The various databases available in the Department of Aviation are adequate to support initial SMS requirements, and should be utilized to their full capabilities before new systems are considered. Slight changes in Performance Indicators themselves may allow existing databases to adequately support SMS as well when that would not otherwise be possible. To accomplish this, the SMS Coordinator as the individual responsible for safety data development and management for SMS shall:

- Identify what data is needed to support individual performance and trend indicators,
- Determine which databases contain the needed data,
- Identify what existing reports can be used to extract the data or develop new reports that may be required,
- Adjust performance measures, if feasible, to allow use of existing data and reports,
- Develop new reporting requirements when needed data is not already available, identify the database to be used for warehousing the data and develop reports to extract the data.

7.4 System Safety Audits

The goal of the SMS audit program is not to focus on actual physical conditions. Rather, it is to focus, at least initially, on evaluating the SMS management practices that are in place and determine if the system is being implemented at a level consistent with industry best practices.

7.4.1 Audit Program

The Department of Aviation will develop an SMS Audit program that utilizes a checklist based on the Twenty-One elements of SMS contained in the Safety Management System Pilot study Participant's guide that was published by the FAA's Office of Airport Safety and Standards (dated April 6, 2007). These Twenty-One elements are listed in detail, in Appendix 5, The Twenty-One Elements of SMS. These audits will be performed no less frequently than annually with the first one occurring within twelve months following publication of the SMS Manual.

The majority of these audits will be conducted with internal resources, principally the SMS Safety Coordinator. In the event a more disinterested resource is desired, use of the Department of Aviation's internal auditor or some other City resource will be considered before utilizing an audit resource external to the Department and the City of Austin.

7.4.2 Audit program implementation

To implement the SMS Audit Program that will identify deficiencies, identify corrective actions and monitor those actions to completion, the SMS Coordinator as the individual responsible for administration of the SMS Audit Program and evaluation of audit findings shall:

- Develop an Audit Checklist based on the Twenty-One Elements of SMS;
- Develop a tracking system to monitor correction of audit findings;
- Establish appropriate performance indicators to gage the effectiveness of the audit program and identify data necessary to support them.

7.5 Corrective Action

A corrective action is a change implemented to address a weakness identified in a system, normally a management system. Effective management of corrective actions provides a vehicle for effective management actions to improve safety and overall performance.

7.5.1 Corrective Action Program

Corrective actions can come from a multitude of sources and can get quite numerous. Those that come from sources such as a Safety Risk Management (SRM) Process, SMS audit or self-inspection, after action reviews (incident, accident, project, etc.) will need to be monitored through utilization of a tracking system. Routine corrective actions such as those resulting from discrepancies identified during Part 139 Airfield Inspections will be specifically tracked by SMS if the item is open more than 30 days

The fundamental rules for any corrective action are:

- Clearly state the corrective action required
- Identify the responsible party or office
- Establish an aggressive but attainable target date for completion
- Monitor progress toward meeting that date

A simple tracking system will be developed utilizing Microsoft Excel or a similar program to monitor progress toward closing corrective actions. Whatever the choice, the chosen system must allow for an adequate level of analysis and performance tracking.

The establishment and tracking of appropriate performance indicators to evaluate the Department of Aviation's performance in meeting target dates for Corrective Actions is essential to a successful program.

7.5.2 Corrective Action Program Implementation

To implement a SMS Corrective Action Program that will track corrective actions to completion, provide monthly progress reports and measure performance, the SMS Coordinator as the individual responsible for administration of the SMS Corrective Action Program shall:

- Develop a Corrective Actions tracking system;
- Establish appropriate performance indicators to measure effectiveness of the Corrective Action Program;
- Include SMS Corrective Actions will be included as a standard agenda item for all meetings of safety committees involving airfield stakeholders.

8.0 NON-PUNITIVE REPORTING SYSTEM

In 1992 the FAA developed the Aviation Safety Action Program (ASAP) found in Advisory Circular (AC) 120.66b, for pilots and aircraft maintenance personnel at select air carriers. The program has been a remarkable success, and has exceeded the goal of a confidential safety reporting system. Non-punitive reporting is an integral segment of the Safety Management System (SMS) and has been implemented in the FAA Air Traffic Organization (ATO). A non-punitive reporting system is a fundamental component of SMS.

The benefits of a non-punitive reporting system are:

- Provides strong incentives to report safety concerns;
- Establishes direct-line communications of safety information to managers;
- Reveals a more accurate view of airport operations safety issues.
- Reporting is confidential without fear of reprisal; and
- Builds mutual trust between management and employees;

To create an open culture with safety excellence in the forefront, organizations must avoid an overly punitive reaction to events and errors. The employee must be encouraged to report errors without fear of recrimination. This will lead to learning opportunities and embracing changes for promotion of the overall safety at ABIA. A strong safety culture is one that reinforces accountability across all levels of the organization. It is a system of accountability that does NOT focus on the human error or the unintended consequences but rather focuses on the quality of our decision making process.

8.1 Non-Punitive Reporting Process

Department of Aviation employees are expected to report any event or observation they feel represents a potential hazard.

All Safety Reports shall be submitted to the SMS Coordinator for processing as described in Section 6.4, Safety Risk Reporting.)

The specific components of our non-punitive reporting systems may vary, but by implementing general guidelines the beginning, a successful program will be in place.

8.2 Policy Letter

The Department of Aviation will establish a policy that identifies the elements of the non-punitive reporting program. It should include the means and method for reporting

potential or real safety issues; time limits for reporting; and under what circumstances the non-punitive reporting program would not apply.

8.3 Reporting Time Frame

The time frame for reporting a hazardous situation should be as soon as possible but should not to exceed 24 hours from the time the submitter becomes aware of a hazard.

8.4 Types of Reports

The report of an unsafe or hazardous situation may be made orally or in writing. If the hazard represents an imminent risk or a severe safety concern, immediate notification to the proper authorities is expected.

8.5 Tracking

The SMS Coordinator will track non-punitive reports in accordance with established policies until the risk has been mitigated or accepted.

8.6 Non Qualifying Reports

Reports that involve criminal activity, substance abuse, intentional disregard for rules and regulations or falsification will be referred to the appropriate supervisor for further handling.

9.0 SAFETY PROMOTION

9.1 Culture

The main goal of safety promotion is to create a "safety culture" that allows SMS to succeed. Culture is management's representation of what the organization believes and practices. Safety is a collective commitment that, with the proper implementation, places the responsibility for safety in the hands of every employee. The result is an environment that encourages the identification, reporting, and correction of safety issues at every level.

The safety culture of the Department of Aviation is defined as a product of individual and group values, attitudes, perceptions, competencies, and patterns of behavior. Culture is relatively stable, enduring, and resistant to change. Indicators of a positive safety culture include:

- Organizational Commitment;
- Management Involvement;
- Employee Empowerment;
- Reward Systems;
- Reporting Systems;
- Level of Assessment;
- Assessment Procedures and Implementation; and
- Validating Measurement Tools.

Organizations that wish to create a Safety Culture ensures organizational values and beliefs are shared by all.

- Values include integrity and honesty, initiative, innovation, responsibility, openness in sharing information, and commitment to constant improvement and continuous learning;
- Members' sense of self is woven into the organization's values;
- Members feel "a part" of something important, good, and larger than self; and
- The system builds organizational commitment and motivation.

9.2 Training & Education

9.2.1 SMS Training and Development

The success of any program is measured by the success of its training and educational expertise. All City of Austin Aviation Department employees will be provided with a clear understanding of SMS policies and procedures to perform their duties safely.

Training is the cornerstone of the Department of Aviation safety and accident prevention program. All division managers are responsible for developing personnel training programs that ensure adherence to the policies and procedures within their areas of responsibility and that are properly aligned for the skills and competencies necessary for each person to perform their duties in an effective and safe manner. Division Supervisors and above are responsible for continued development of training programs that address changes to the organizations policies, goals, and objectives.

Training programs include the process by which an assessment of potential hazards related to an employee's job descriptions might be revealed. The commitment to train all employees, regardless of their professional discipline, is an indication of the Department of Aviation's dedication to implement Safety Management System. Division Managers will review its safety and training, periodically, to identify problem areas, determine specific safety objectives and re-develop coordinated, focused training programs.

9.2.2 SMS Coordinator

The SMS Coordinator will work with each Division Manager to identify SMS-specific training needs and, to the extend practical, the delivery of training sessions. To achieve that objective, training programs will be developed by:

- Identifying the jobs and the tasks associated with each job, and determining the related knowledge and skills required to safely perform those tasks;
- Defining the training objectives and the methods by which training will be delivered, and designing test items and testing methods to establish whether training objectives have been met; and
- Establishing the sequence in which the training topics will be presented, development of lesson plans, development and assembly of training manuals, gathering all required training materials, and assigning instructors.

9.2.3 SMS Training Evaluation

The effectiveness of training programs will be evaluated through:

- Post-training evaluation questionnaires; and

- Surveys of the effectiveness of training programs with randomly selected participants.

The SMS Coordinator will assist managers with this training evaluation process, and will maintain a central database of this effort for future consultations.

9.2.4 SMS Training Records

To insure responsible safety management, formal documentation is required to provide the authoritative basis for the SMS. Personnel training records must be updated within two weeks of the training being completed and is the oversight responsibility of the SMS Coordinator. Training records will be retained in accordance with Department of Aviation policies. Each division manager is responsible for sending safety related training records to the SMS Coordinator by the first of each month.

9.2.5 SMS Indoctrination Training Programs

All new Department of Aviation employees will complete SMS Indoctrination Training, as may be directed by the SMS Coordinator, during their probationary period. This indoctrination training includes safety management program policies and procedures as well as individual responsibilities and accountabilities related to SMS. This training will include, but not be limited to:

- SMS policies and procedures;
- Safety Risk Management (SRM) risk assessment and hazard recognition;
- Safety Report filing procedures; and
- Non-punitive safety reporting policy and guidelines.

SMS Recurrent Training will be provided to each employee on an annual basis. Recurrent training materials will include “lessons learned” from previous SRM studies and SRMDR filings.

SMS recurrent training will emphasize on the job awareness of job-specific safety hazards. It will cover at a minimum the following:

- Changes to policies, procedures, rules, and regulations;
- On the job hazards;
- Equipment and environmental safety procedures;
- Safety Reporting Protocols;
- Roles of key safety personnel;
- SMS communications and sharing of information; and
- Changes to Emergency Preparedness Plans.

Training programs will be updated when unforeseen or unexpected circumstances dictate, such as the results of an SRM process due to changes of equipment, procedures, physical property, and/or personnel.

9.3 Organizational Development

Organizational Development is a systematic process to optimize individual and organizational performance, is essential for SMS success. It consists of two major components:

- Leader Development; and
- Strategic Planning.

9.3.1 Leader Development

Leader Development is the continuous and deliberate process of developing leadership skills, knowledge, and behaviors. Quality leaders do not happen by accident. Leadership is an observable set of skills and abilities that can be learned and fine tuned over a time. Skilled leaders:

- Model the Way **-** They are admired, respected and trusted because they**:**
    - Share sacrifices and risks;
    - Set the moral and ethical standard; and
    - Establish caring relationships with those they work with.
- Inspire a Shared Vision
    - Clearly articulate the vision;
    - Demonstrate commitment to the vision; and
    - Inspire and show enthusiasm and optimism.
- Challenge the Process
    - Stimulate & encourage innovation;
    - Allow subordinates to question assumptions; and
    - Mistakes are part of the learning process.

- Encourage & Enable others to Act
    - Personalized interaction;
    - Provide new learning experiences; and
    - Leadership by "Walking around".

9.3.2. Strategic Planning

Strategic Planning involves purposeful long term planning and attention to:

- Identification of Mission, Vision, Values, and Key Functions;
- Aligning of Internal Processes with Key Functions;
- Developing metrics to proactively rate performance of Key Functions and Internal Processes; and
- Incorporation of Leader Development as a critical component for planning.

Leader Development and Strategic Planning are integral to a viable and robust SMS. Management must show true commitment to:

- Safety as #1 priority;
- Implementation of SMS;
- Continuous safety Improvement;
- Culture of openness and initiative; and
- Providing necessary resources.

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These actions must be factored into leader development and strategic planning of the organization in order to ensure leaders create and commit to the values of a quality safety culture.

9.4 SMS Management Awareness

The Department of Aviation will develop safety management awareness and understanding throughout the entire organization communicating through:

- Safety seminars;
- Safety newsletters, notices and bulletins;
- Communicating safety lessons-learned;

- Bulletin boards and electronic reporting through email and a SMS website; and
- Safety campaigns on specific SMS issues identified and emphasized.

Supervisors will further educate themselves through specific a SMS training program that includes:

- Risk management;
- Accident/Incident investigation;
- Audits; and
- Performance measurement.

9.5 Communications

The Department of Aviation management encourages a free and open exchange of safety information across all levels of employees and between all departments. Keeping staff informed about current safety issues through relevant training, safety literature, participation in safety courses and seminars, etc. improves the safety health of the organization. Departmental managers, in cooperation with the SMS Coordinator, are to encourage interdepartmental discussions on common safety issues, whether in the planning of activities or in response to safety reports or concerns.

Employees are encouraged to bring up safety issues with their supervisor. The discouragement of safety reporting and communication, whether tacit or explicit, will not be tolerated. The SMS Coordinator will develop and coordinate an internal communication strategy aimed at promoting safety and the safe conduct of all Department of Aviation activities. In addition to written communications, it is important for employees to witness evidence of the commitment of top management to safety.

All supervisors shall actively and demonstratively support the internal safety communication strategy. The safety communication strategy should include, for example:

- Safety bulletin boards;
- Safety newsletters;
- Safety posters;
- Safety awards, recognitions; and
- Safety events.

9.6 Safety Incentive Programs and Events

The Department of Aviation shall establish various incentive programs designed to recognize an employee's special effort to improve or enhance the organizations safety culture. The SMS Coordinator will oversee the development of programs that support the promotion of safety. The nature of these programs shall be defined and communicated to the ABIA community as they become available.

Safety incentive events such as safety stand-downs, safety fairs, and safety campaigns will be aimed at promoting safety and encouraging employee participation. The SMS Coordinator will endeavor to arrange these kinds of activities on a quarterly basis, and will seek the cooperation and participation of external stake-holders.

9.7 Lessons Learned

"Lessons Learned" is knowledge acquired from innovation or an adverse experience. This knowledge provides the foundation for employees within an organization to improve a process or activity to work safer, more efficiently, and with a higher quality product.

Deleted: human error

9.7.1 Lessons Learned Program

A Lessons Learned Program is an important component of ABIA's Safety Management System (SMS). It allows for continuous system improvement and feedback, and like other aspects of SMS, there must be a means of measuring results. Lessons Learned do not come solely from such things as after accident/incident reviews, after project reviews or some management related activity as is often the perception although they are prime sources. Instead, there are a multitude of sources both inside and outside an organization that can provide valuable knowledge to improve the safety environment.

Individuals within an organization are good sources of lessons learned, especially when it comes to offering innovation or better ways to accomplish a task. Therefore, it is essential in any Lessons Learned Program to provide a means for individuals to make submissions in the same way as they are afforded the opportunity to report hazards or potential hazards they may observe or otherwise become aware of. No matter what the source of the Lesson Learned, it must be significant, valid, and relevant to the organization.
The Lesson Learned process itself is relatively simple. It calls for:

- Identifying Lesson Learned validity and applicability to the organization;
- Determining target group(s) for distribution;
- Determining appropriate distribution method(s);
- Making timely distribution;

- Accepting feedback; and
- Measuring results.

Dissemination is one of the most important elements of any Lessons Learned Program. It is essential that target groups be properly identified along as well as the most efficient method for dissemination of information. While distribution by email may be the preferred method to get Lessons Learned to management levels of the organization, it will not work well for non-management employees who do not have convenient access to computers. In the latter case, posting the information on a bulletin board in their work center, including a pre-shift/post-shift briefing or safety meeting may be the most appropriate method.

When disseminating Lessons Learned, it is beneficial to keep the form of that document relatively standard so that the information is easily assimilated by the target audience time after time. The document (paper or electronic) will state:

- The purpose of distributing the Lesson Learned (intended for use in future safety meetings, provide immediate information to employees to prevent reoccurrence, inform employees of innovations allowing them to work safer;
- The source of the Lesson Learned (accident/incident review, submitted Lesson Learned, etc.);
- What Happened (a short, simple summary of the accident/incident, submitted Lesson Learned, etc.);
- What went right (stating positive things provides reinforcement for actions);
- What was learned (where did things go wrong);
- Recommended Corrective Actions or How to Prevent Reoccurrence (recommendations to prevent reoccurrence to include target dates for any necessary actions and the responsible individual or office for each); and
- Consideration should also be given to adding a section on Best Work Practices (a list of incident related best practices that will reinforce positive work habits) and providing contacts where the reader can get help or more information (Supervisor, SMS Coordinator, Safety Office, etc.). Note: When it comes to Recommended Corrective Action or How to Prevent Reoccurrence, a restating or paraphrasing an existing policy, process, procedure, etc. is inadequate and does not qualify as a legitimate Lesson Learned.

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The Department of Aviation currently operates a Lessons Learned Program through use of accident or incident reviews at Safety Committee Meetings and posting of accident/incident reports on Safety Bulletin Boards that contain the essential elements of a Lessons Learned Program (root cause, contributing factors and recommendations). The inclusion of Airfield SMS related Lessons Learned on these

bulletin boards in appropriate work centers will be an effective and economical means of getting SMS Lessons Learned to those who need this information, but do not have convenient access to a computer. In a similar manner, the addition of SMS Lessons Learned to the agendas of the airfield related Safety Committee Meetings will provide an efficient means of disseminating this information to committee members and generating committee discussion/feedback. Relevant Lessons Learned will be given in appropriate employee training courses. In this way, a Lesson Learned becomes a longer term tool to improve safety.

Efficiently soliciting Lessons Learned or feedback on published Lessons Learned from airfield stakeholders will be established. Safety Reporting forms, which are normally readily available to airport employees and many non-employees alike, will provide a simple, readily available means for an individual to report a lesson learned input or provide feedback on a publicized Lesson Learned. It is essential that Lessons Learned Program performance indicators be identified and monitored. Those indicators for ABIA are:

- Number of Lessons Learned provided compared to the number disseminated;
- Number of Lessons Learned implementing actions completed within original target date compared to total implemented actions;
- Number of repeat incidents previously discussed in Lessons Learned compared to the total number of incidents;
- Number of repeat incidents previously discussed in Lessons Learned compared to the total number of Lessons Learned distributed; and
- Total number of Lessons Learned generated by management compared to the total generated.

For a Lessons Learned Program to be successful, the following points must be kept in mind. Lessons Learned:

- Must be kept simple;
- Need management support at all levels;
- Need to involve every affected person (organizations and individuals);
- Distribution must be tailored in terms of target audience(s) and method(s);
- Needs a process to receive feedback;
- Performance needs to be measured; and
- May not produce 100% success .

9.7.2 Lessons Learned Program Implementation

The Department of Aviation will implement a Lessons Learned Program that provides a simple process to identify knowledge that would be of benefit to an organization and/or the individuals within it, disseminate that knowledge to the appropriate groups, accept feedback and measure program effectiveness. To implement our Lessons Learned Program, the following will be accomplished:

- The SMS Coordinator will be the responsible individual to review, evaluate, and disseminate Lessons Learned and measure program effectiveness through the establishment and tracking of appropriate performance indicators;
- Make Lessons Learned a fundamental element of any after-project/after incident review activity;
- Include appropriate Lessons Learned in appropriate employee training courses;
- Expand the Airport Safety Office Hazard Reporting Form to include Lessons Learned reporting;
- Allow SMS Lessons Learned information to be included on the Safety Office Bulletin Boards in appropriate work centers;
- Include SMS Lessons Learned as a standard agenda item for all meetings of safety committees involving airfield stakeholders; and
- Establish and track appropriate performance indicators to measure effectiveness of the Lessons Learned Program.

9.8 Safety Promotion and Training Checklist Summary

- Management recognizes that all levels of the organization require training in safety management and that the needs vary across the organization;
- Job descriptions reflect competency requirements;
- All personnel receive safety indoctrination training and participate in specific ongoing training for safety management;
- The organization has an effective program for the timely promotion of safety issues;
- Additional safety awareness training is provided when the operating environment changes (seasonal changes and changes in operational conditions, regulatory requirements, etc.; and

- Employees understand that safety management has nothing to do with attributing blame.

9.9 Safety Committees

Safety Committees are vitally important to the organization by allowing discussion, input, and disagreements on safety performance and promotion to be voiced from various departments, tenants, airlines, and other interested parties. Membership should consist of representatives from both Department of Aviation staff and Airport tenants to provide a forum to discuss safety issues, policies, and procedures, both current and proposed. Specific committees, such as Ramp Safety, Emergency Response, Construction Safety, Wildlife Management, and Runway Safety can be developed with periodic interaction between each committee.

10.0 SMS PROGRAM IMPLEMENTATION

The implementation of a Safety Management System into an organization will not be accomplished overnight. A well thought-out implementation plan will help ensure the programs' success, while not over burdening the organization's human and financial resources.

10.1 ABIA Implementation Approach

The implementation of the Department of Aviation SMS Program will be a phased approach, starting with the Operations and Maintenance Divisions. These two organizations will implement SMS into their organizations first. As SMS knowledge, skills and abilities are mastered, additional SMS features and organizations will be added.

The Department of Aviation plans to expand SMS to other departments and Airport stakeholders as the program matures. This expansion may require additional resources and financial planning on the part of management to experience the full benefit of an improved safety culture.

10.2 SMS Staffing Requirements

All start-up programs, such as implementing SMS, require a amount of an organizations time. The assistance of the SMS consultant has provided Department of Aviation a running start in the programs development and implementation. To ensure the programs success, the Department of Aviation will be required to devote the required resources to accomplish the SMS Coordinators' role in the organization.

10.2.1. SMS Coordinator

The SMS Coordinator has a very significant role in the success of the SMS program. This person's responsibilities are detailed in Section 3.2.3 of this manual.

10.3 Financial Implementation of the ABIA SMS Program

The Department of Aviation's goal is to implement the SMS Program with existing staffing and resources. Eventually, SMS staffing support and resources are expected to grow as the program matures. Ultimately, the ABIA community should have a SMS specialist, who's responsibility is to sustain a continued improvement in the safety culture by reducing the risk of accidents and incidents. Staffing a SMS professional (DoA or contract employee) is expected to cost $85,000.00 annually.

Additionally, the implementation and integration of software applications and hardware to measure performance metric criteria will also benefit the goal of long term success. Technology support for implementing SMS will require software applications, software

development for databases, hardware and integration support. These technology support elements are planned to be a one-time expense, but should not exceed a capital investment of over $150,000.00. Software programs and support may also be a phased-in approach as performance measures and trend analysis activities become more defined.

10.4 Implementation Guidelines

The following list of implementation activities have been developed for the ABIA SMS Program implementation. These activities will provide a scheduled detailed sequential approach toward building the Safety Culture, employee Knowledge Base, and Confidence with implementing SMS.

Those activities are as follows;

CY-2008 Third Quarter

1. Develop an organizational chart identifying positions and safety responsibilities of all key personnel.
2. Develop draft safety policy statement and describe how it is communicated to Department of Aviation employees.
3. Identify, describe, and recommend airport safety goals.
4. Perform Gap Analysis using *"The Five Phases of SRM"* as discussed in FAA Circular 150/5200-37, Introduction to Safety Management Systems for Airport Operators.
5. Provide guidance on use of SRM and develop trend analysis models.
6. Identify, document, and further develop self-inspection findings, reviews, analysis, corrective actions, and preventative actions taken.
7. Prepare recommendations for developing the databases, models, and analytical tools to be used for risk management.
8. Document process to identify training requirements for systems safety.
9. Identify or develop plan to validate training effectiveness and the process to gain training feedback, including useable metrics.
10. Identify or develop defined processes to communicate safety policies and objective throughout the organization.
11. Identify, develop, and describe employee non-punitive reporting systems.
12. Develop process for documenting and storing results of SRM.
13. Describe how existing quality and risk management activities will be integrated into the SMS.
14. Develop plan to integrate apron safety management into the SMS.
15. Develop plan for training and education, safety communication, competency, and continuous improvement processes.

CY-2008 Fourth Quarter

1. Develop plan for employee SMS orientation and training with outline of proposed curriculum and resources.
2. Describe how top management will follow-up on SRM to ensure risk mitigation strategies are appropriate.
3. Identify, document, and further develop detailed self-auditing processes and their findings.
4. Identify or develop process to review lessons learned from within the organization.
5. Develop plan to integrate the tailored SMS program into the overall operation of the airport.
6. Develop Draft Final Plan and schedule for implementation along with anticipated costs.
7. Develop Final Plan and schedule for implementation along with anticipated costs.

CY-2009 First Quarter

1. Incorporate Department of Aviation Safety Policy Statement into Aviation Department Mission documents
2. Communicate to all Airport tenants the Safety Policy and objectives, and commitment to SMS and improving the safety culture of the organization. Communicating feedback to staff and personnel can be accomplished through:

    - Safety recognition and/or awards programs
    - Staff meetings
    - Bulletin boards
    - Newsletters
    - Computer briefings at sign-in
    - E-mails to personnel

3. Appoint the ABIA *Safety Coordinator* as the primary point of contact for all matters related to the implementation of SMS, maintenance of the SMS Handbook, and SMS training
4. Establish an ABIA *Safety Committee* to provide peer reviews of safety reports, hazard analysis, and safety communications
5. Distribute copies of SMS Hand Book to DoA supervisors and tenant management
6. Accomplish SMS and SRM training to all DoA employees from the Top down.

CY-2009 Second Quarter – Implement SRM

1. Publish the Department of Aviation Directive that formally establishes the systematic business processes for the identification of hazards and the analysis, assessment, and mitigation of safety risks.
    - Describe the system, procedure, and/or organization
    - Hazard identification
    - Analyze the risk
    - Assess the risk
    - Mitigate the risk
2. Establish Safety Performance Indicators to act as a benchmark for analysis of future improvements in safety culture.
3. Conduct internal audits of hazard assessments, risk analysis, and safety performance indicators.
    - Ensure planned remedial actions of a risk have been implemented
    - Monitor the effectiveness of the mitigation
    - Consider the future relevance of the mitigation
    - Establish an audit/assessment checklist with planned reviews
4. Create a high level Monthly Safety Report for the Department of Aviation.

CY-2009 Third Quarter – Recurrent Training

1. Education through re-training of objectives and procedures
2. updated training materials to ensure employees know and comply with new safety requirements associated with their job and within the organization
    - Safety Risk Management Decisions
    - Human Factors
    - Team Building
    - Reaffirm understanding of SMS and its relevance to employees, to their positions and to the culture of the organization

CY-2009 Third Quarter – Performance Indicators

1. Review performance indicators and the data to support them to ensure they are evolving into areas that more fully evaluate system effectiveness
    - Indicators that better identify areas of weakness so that efforts can be properly focused.
    - Indicators that are more Global in nature.
    - Indicators that have matured, becoming increasingly relevant to workforce selected issues.
2. Initiate a bi-annual Employee Safety Survey to compare the results of the first survey accomplished in August of 2008. Measure any perceived safety culture changes and re-set targets as needed.

3. Synthesize the following leading indicators for analyzing Aviation safety program
   - The degree of commitment to health and safety
   - How highly both management and workers value a safe workplace
   - The level of awareness that workers and management have of job related risks
   - Whether inspection and preventative maintenance programs are followed
   - The level/quantity of training provided
   - Total hours of training provided
   - The degree of activity of Safety Committees

CY-2009 Fourth Quarter – Safety Non-Punitive Reporting System

- Issue a Department of Aviation policy for a Non-punitive safety reporting system applicable to all Department of Aviation employees
- Identify the elements of the volunteer safety reporting program
- Describe methods for filing safety reports;
  - Recipients of the report – who within the organization gets the report and what is done with the information
  - Time limits for reporting - reporting a hazardous situation as soon as possible but not to exceed 24 hours from the time the submitter becomes aware of a hazard
  - Under what circumstances the non-punitive reporting program would not apply – intentional acts, negligence, criminal behavior
  - Types of Reports - orally or in writing,
  - Safety Committee Review – perform SRM, implement corrective actions if applicable
  - Disseminate all factors to those who have a need to know.
  - Tracking progress of the corrective actions until the hazard has been eliminated to the fullest extent possible
  - Non qualifying reports that appear to involve criminal activity, substance abuse, intentional disregard for rules and regulations or falsification will be referred to the appropriate office for further handling.

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11.0 APPENDICES

The following is a list of included Appendices;

APPENDIX 1 - Definitions

APPENDIX 2 – Human Factors

APPENDIX 3 - Forms

APPENDIX 4 - Examples of Performance Indicators

APPENDIX 5 – The 21 Elements of SMS

APPENDIX 6 – Simplified SRMDR Example Report

APPENDIX 7 – Expanded SRMDR Example Report

APPENDIX 8 – SRM Example Project

APPENDIX 1 - Definitions

Acceptable level of risk – risk determined by management that has been reduced to a level that can be accepted by the organization after considering all safety and legal obligations.

Accident – An unplanned event or series of events that results in death, injury or damage to, or loss of, equipment or property.

Apron (Ramp) – an area on an airport prepared for the purpose of providing aircraft with parking space for the embarkation and disembarkation of passengers, the loading or unloading of mail or cargo, aircraft servicing, or undergoing maintenance.

Audit – Objective assessments to evaluate conformity with policy, standards and contractual requirements. Internal audits are conducted within the department or organization and external audits can be conducted by regulatory offices or contractually through an outside vendor.

Best Practice – Method or procedure recognized by industry as being operationally effective in achieving stated objectives.

Corrective Action – . A change implemented to address a weakness identified in a system, normally a management system.

Gap Analysis – Identification of existing safety components, compared to SMS program requirements. Gap analysis provides an operator an initial SMS development plan and roadmap for compliance.

Hazard – Any existing or potential condition that can lead to injury, illness or death to people; damage to or loss of a system, equipment or property; or damage to the environment. A hazard is a condition that is a prerequisite to an accident or incident.

Incident – An event that has the potential to lead to an accident.

Indicators, leading & trailing or lagging – leading indicators are predictors of future safety performance based on selected criteria. Trailing or lagging indicators are after-the-fact measures of safety performance.

Lessons Learned - Knowledge acquired from an innovation or an adverse experience that causes a worker or an organization to improve a process or activity to work safer, more efficiently or with higher quality.

Likelihood – The estimated probability or frequency, in quantitative or qualitative terms, of a hazard's effect.

Oversight – A function that ensures the effective promulgation and implementation of safety standards, requirements, regulations and associated procedures.

Quality Assurance – planned and systematic actions necessary to provide adequate confidence that a product or service will satisfy given requirements for safety and quality.

Records – Evidence of results achieved and activities performed. In this context, they are distinct from documentation as what is written is permanent and does not change over time.

Risk – the consequence of accepting a hazard.

Risk Assessment – process for evaluating the level of risk and comparing whether the analyzed risk level and the acceptable risk level is tolerable.

Safety – The condition to which environment, health, occupational and aviation risks are managed to acceptable levels.

Safety Assessment – A systematic and comprehensive evaluation of an implemented system to see if all safety requirements are met

Safety Assurance – SMS process management functions that systematically provide confidence that organizational products/services meet or exceed safety requirements.

Safety Culture – The product of individual and group values, attitudes, competencies and patterns of behavior that determine the commitment to, and the style and proficiency of, the organization's management of safety. Organizations with a positive safety culture are characterized by communications founded on mutual trust, by shared perceptions of the importance of safety, and by confidence in the efficacy of preventive measures.

Safety Management System (SMS) – The formal, top-down business-like approach to managing safety risk. It includes systematic procedures, practices, and policies for the management of safety (including safety risk management, safety policy, safety assurance, and safety promotion).

Safety Objective – Safety goals or desired outcomes, which are measurable.

Safety Policy – Defines the fundamental approach to managing safety that is to be adopted within an organization. Safety policy further defines the organization’s commitment to safety and overall safety vision.

Safety Promotion – A combination of safety culture, training, and data sharing activities that support the implementation and operation of an SMS in an organization

Safety Risk – The composite of predicted severity and likelihood of the occurrence defines the potential effect of a hazard.

Safety Risk Control – Any action that mitigates the safety risk of a hazard. Safety Risk Controls necessary to mitigate an unacceptable risk should be mandatory, written in requirements language, measurable, and monitored to ensure effectiveness.

Safety Risk Panel (SRP) – The SRP will consist of Aviation Department subject matter experts, either directly or indirectly involved with the change and as required, and representatives of airlines, concessionaires, or other ABIA tenants (external to Aviation Department employees) for their expertise and counsel, as appropriate. The involvement of these resources will help ensure that all aspects and consideration have been explored, debated, assessed, analyzed, and mitigated. A SRP will be sized for the specific safety issue presented and may consist of from 3 to 25 members. The SMS Coordinator will determine the level of participation required.

Safety Risk Management (SRM) – A formal process within the SMS composed of describing the system, identifying the hazards, assessing the risk, analyzing the risk, and controlling the risk. The SRM process is embedded in the operational system; is not a separate/distinct process.

Safety Risk Management Decision Report (SRMDR) -

Self-Assessment Plan – A formal, management-approved document that describes an airport operator's self-assessment activities and how often they occur, provides a schedule for completing the assessments, and identifies the reports to be generated.

Serious Injury – an injury which is sustained by a person in an accident and which: (1) requires hospitalization; (2) results in a fracture of any bone; (3) involves lacerations which cause severe hemorrhage, nerve, muscle or tendon damage; (4) involves injury to any internal organ; (5) involves second or third degree burns on more than 5% of the body; (6) involves harmful exposure to radiation.

Severity – The consequence or impact of a hazard in terms of degree of loss or harm.

SMS Output – The result or product of an SMS process; in this context, it is the result of a process, which is intended to meet a requirement described in this Manual (e.g. results of safety risk analyses, safety audits, safety investigations, and trend analysis of safety performance indicators).

System(s) – An integrated set of elements that are combined in an operational or support environment to accomplish a defined objective. These elements include people, hardware, software, firmware, information, procedures, facilities, services and environment.

System State – The state of a system (or particular environment) and refers to that environment/system's condition at a particular moment in time or under certain conditions.

Top Management – The person or group of people that directs and controls an organization. Sometimes it is also referred to as senior management

Trigger Mechanisms - Environmental component that causes or enhances the probability of a hazard to occur. Trigger mechanisms include (but are not limited to):

- **Personnel Quality issues**: aptitude, skill, experience, or training,
- **Manpower** issues: The number of people available to operate and maintain systems and procedures;
- **Weather conditions** (rain, snow, ice, wind, etc),
- **Fatigue**,
- **Distractions**,
- **Stress**,
- **Equipment** failures or use issues

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APPENDIX 2 – Human Factors

Human Factors (HF) is the area of study that seeks to maximize the relationship between people and systems in order to improve performance, safety, and reliability. Systems include equipment, procedures, or organizations or teams. Purposely integrating HF into SMS creates a bedrock foundation for successful and continuous safety improvement. HF integration into SMS involves the overlap and interaction of three factors:

- People
- Equipment
- Organizations

PEOPLE: By taking advantage of what we know about how people process information and interact with each other we can better design the systems that we use in the workplace. Different aspects of human information processing include:

- Perception (seeing, hearing, etc)
- Attention and mental workloads (fatigue can play a crucial role)
- Memory (fatigue plays a role here too)
- Problem-solving and decision-making
- Communication:
  - Between individuals
  - Within and across groups
- Social interaction factors (sharing info or reluctance to share info)

For example, read the following sentence in Figure 5.1 and count the number of letter F's seen:

"FINISHED FILES ARE THE RESULT OF YEARS OF SCIENTIFIC STUDY COMBINED WITH THE EXPERIENCE OF YEARS."

Figure 5.1, Perceptual Example No. 1

Many hundreds of people who read this sentence for the first time miss several of the "F's". The F's are all there, right in front of their eyes, but they just don't see them. For those who have seen this sentence before, it's harder to "trick" the brain, they usually spot all the F's right away. There are several theories as to why this happens which involve how the brain processes visual (and other sensory) information. The simple fact of the matter is that sometimes you just can't see what's right in front of you. (There are six F's in the above sentence.)

The implication for HF within SMS is to ensure that people within the organization always try to view operations and procedures from another vantage point. After the fact, it is quite easy to see that a dangerous procedure or situation was allowed to exist, but oftentimes, beforehand, it was not that noticeable. The saying goes something like this, "You can't see the forest, for the trees."

Sometimes perceptual processes cause us to "see" something that's not there. Figure 5.2 provides a simple example of a perceptual process. When looking at the graphic depicted in Figure 5.2 a defined, very bright white triangle may appear to float above the page. Is there really a white triangle floating above the page? Of course not, but….it does ***seem*** to be there.

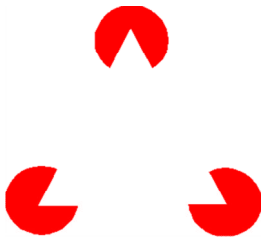

Figure 5.2,What Do You See?

As illustrated by these two perceptual examples….

"Sometimes we don't see what's there, and other times, we see something that isn't there!!!"

Personnel need to be on the lookout for the "F's we can't see" and the issues we think are perfectly fine, but just an illusion. HF concepts that deal with how people process both sensory, attention, and interpersonal communication information can be subtle and hard to pinpoint, however, awareness and vigilance is key in identifying these factors that can contribute to safety degradation.

Two other *People* issues in SMS must also be addressed. They include:

- Manpower: The number of people available to operate and maintain systems and procedures
- Personnel Quality: Aptitude, skill, experience, training, and other characteristics necessary to optimize safety and performance

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These "People" issues have significant affects on the SMS. Skilled, high quality personnel, trained properly, in the right numbers, are key to high system safety.

Equipment: The design of equipment or procedures on how to use equipment, may also have significant impact system safety. An equipment system may be as simple as a radio or as complex as an Air Traffic Control Tower. Awareness of the HF issues involved in the equipment used by an organization, especially new equipment, is critical in identifying issues that may be degrading safety before these issues actually result in a safety incident.

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For example, perhaps an older model vehicle used in operations has a history of popping out of gear when in "park". New vehicles cannot be purchased until the next fiscal year. It is known that as long as the emergency brake is employed, the vehicle is safely parked. Awareness of this safety issue can influence daily briefings, safety updates, training, and preventive maintenance inspections by users and mechanics. A general "awareness" across department "systems" helps guarantee, employees will be vigilant when parking this vehicle or maintaining it.

Organizations: Organizations are also systems. Different departments, divisions, offices, crews, and tenant organizations all work and interact together. Each develops and operates under many policies and procedures, some shared, and some individual for each particular group.

HF plays a role when procedures from one group are unknown or unclear to the others, and can have detrimental affects on overall safe operations. The more procedures and policy knowledge is shared and understood across and within groups, the greater the awareness and vigilance for procedural factors that might have serious safety implications.

In conclusion, SMS and Human Factors are inextricably linked. It is important to be vigilant in the detection of system "design" vulnerabilities, whether that system is a piece of equipment, a procedure, or crew or staff working together. Personnel must continuously monitor for system parameters at "critical mass", i.e. fatigue, physical requirements, stressors, numbers and quality of personnel or equipment, and organizational issues (values, norms, climate, etc.). All of these factors can degrade safety climates slowly, but surely, if they are not identified and action taken in a timely manner.

Employees at every level need to monitor and communicate safety issues and concerns. They must be on constant look out for: ***"The alignment of nature and circumstances that create pathways in which accidents may occur."***

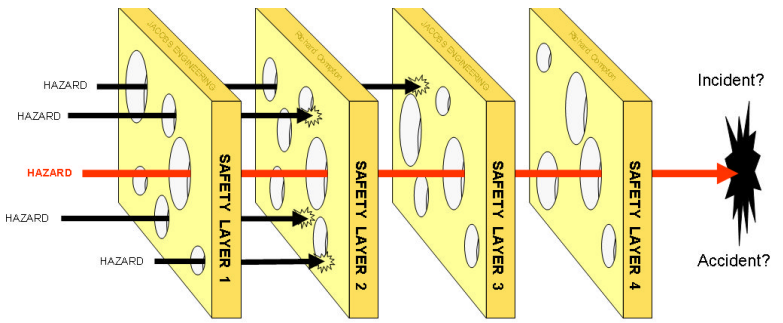

Figure 5.3, Swiss Cheese Multilayered Safety Model
Adapted from James Reason, the Reason Model

If one considers a working environment as a piece of Swiss cheese and the holes in the cheese line up, we allow circumstances to domino into a safety incident. The objective then is to keep the holes of the Swiss cheese out of order. It is important not to allow easy pathways to develop, where one factor after another is allowed to exist and set up the environment for a safety incident.

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APPENDIX 3 - Forms

The following Forms are included in this SMS Manual;

- SAFETY RISK MANAGEMENT SMS COORDINATOR DOCUMENTATION
- SAFETY REPORTING FORM
- LESSON LEARNED REPORTING FORM

SAFETY RISK MANAGEMENT SMS COORDINATOR DOCUMENTATION

Date Report Received: _____/_____/_____

Description of System – Procedure – Equipment – Personnel_____
_____

Hazard/Risk identified as reported_____
_____

Hazard/Risk Assessed/Analyzed_____
_____

Level of Risk Assessed as:_____

Additional Risks associated with hazard? – Y/N___ List as separate documents

By Manager(s) / Titles: _____, _____,

Change(s) Required? – Y/N ____ If No, Manager Approval_____

Change(s)/Action(s) Options_____

Mitigation Decision and Implementation Plan_____
_____
_____

Manager Approval _____Title/Management Level_____

Start Date Est._____ Completion Date Est._____

Entered in SRM Database?_____

Communications - Y/N - SMS Coordinator Responsibility

FAA_____ COA_____ ABIA Divisions _____ Stakeholders_____

ATO_____ Staff_____ Event Reporter_____ Employees_____

SAFETY REPORTING FORM

This form should be used to report any hazard or safety concern that has caused or could cause an accident or incident. Send to the ABIA SMS Coordinator as soon as possible after the hazard has been recognized, identified, and/or observed. Obviously, if the hazard is an emergency or severe safety concern, contact Operations and/or Director of Operations and Maintenance office immediately and/or ABIA emergency numbers – Include List - 911

EVENT DESCRIPTION
(To be completed by person reporting the event)

DATE:___/____/____ TIME: _____AM/PM

LOCATION:_____

_____

DESCRIPTION: _____

_____

_____

_____

_____

WEATHER CONDITIONS:_____

(SMS Coordinator: Tear here and discard securely before processing)

Your Name_____ Division or Work_____

Group _____

Contact number _____ E-mail address_____

Confidentiality Statement
Providing your name can help the ABIA Safety process by allowing yourself to be contacted for additional details regarding the safety concern. Your name will be known ONLY to the SMS Coordinator under the policy agreed to by the ABIA Executive Director and will NOT be released without your permission. You may also submit this reporting form anonymously by filling out the top section of the form with only the details of the event.

LESSON LEARNED REPORTING FORM
(Sample)

A Lesson Learned is knowledge acquired from an innovation or an adverse experience that causes a worker or an organization to improve a process or activity to work safer, more efficiently or with higher quality.

This form should be used by anyone desiring to report an innovation or adverse experience that others can learn from or to comment on a previously published Lesson Learned.

LESSON LEARNED DESCRIPTION
(To be completed by person reporting the event)

DATE:___/____/____ **TIME OF EVENT: _____AM/PM**

LOCATION:_____

WHAT HAPPENED or INNOVATION:_____
_____
_____

WHAT WENT RIGHT or ADVANTAGES:_____
_____
_____

WHAT WAS LEARNED:
_____
_____

RECOMMENDATION or COMMENTS:_____
_____
(use back of form if more space is needed)

.....

(SMS Coordinator: Tear here and discard securely before processing)

Your Name_____ **Division or Work** _____

Group _____

Phone number _____ **E-mail address**_____

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Confidentiality Statement
Providing your name can help by allowing you to be contacted for additional details regarding the Lesson Learned. Your name will be known ONLY to the SMS Coordinator under the policy agreed to by the ABIA Executive Director and will NOT be released without your permission. You may also submit this reporting form anonymously by filling out the top section only.

APPENDIX 4 - Examples of Performance Indicators

The following list of Performance Indicators, are candidates for tracking and measuring the overall ABIA SMS Program. Please refer to Section 9.1 for additional guidance.

Management's visible participation in safety

- Employees' perceptions of the effectiveness of safety visits to work centers by senior managers from employee surveys
- Employees' perceptions of management commitment to safety from employee surveys

Senior Manager Safety Visits

- Number completed vs. number scheduled
- Employees' perception of their effectiveness from employee surveys

Employees' understanding of SMS

- Percent of correct answers on random follow-up survey 30 days following training and possibly periodically thereafter

Employees' evaluation of management's commitment to SMS

- Effectiveness of safety committees from employee surveys (are they more than a coffee break)

Voluntary Safety Hazard Reporting

- Number of submissions
- Number of issues acted upon/closed by initial suspense
- Average time to close

Voluntary Lessons Learned Reporting

- Number of submissions

Safety Audits

- Number completed
- Number completed vs. number scheduled

Safety Surveys

- Number completed
- Number completed vs. number scheduled

Safety Survey/Audits Findings

- Number closed by initial suspense
- Average time to close

SMS Training

- Number and/or percentage of personnel trained
- Percent of correct answers on Random follow-up survey 30 days following training

Ad Hoc Training (training resulting from SRM decison reports, etc.)

- Percentage of required individuals trained within 30 days of establishing requirement.
- Percent of correct answers on random follow-up survey 30 days following training

Weekly Employee Safety Meetings

- Number conducted
- Number conducted vs. number scheduled
- Effectiveness of safety meetings from employee surveys (are they more than a coffee break)

Corrective Actions

- Number of Part 139 discrepancies open beyond 30 days. (It is no longer considered to be “routine” if a discrepancy is open beyond 30 days.)
- Percent of corrective actions that were closed on or before the target date.
- Number of corrective actions that are still open beyond original target date.
- Average number of days beyond original target date it took to close corrective actions.

Lessons Learned

- Number of Lessons Learned provided compared to the number disseminated.
- Number of Lessons Learned implementing actions completed within original target date compared to total implemented actions.
- Number of repeat incidents previously discussed in Lessons Learned compared to the total number of incidents.
- Number of repeat incidents previously discussed in Lessons Learned compared to the total number of Lessons Learned distributed.
- Total number of Lessons Learned generated by management compared to the total generated.

Appendix 5 - The Twenty-One Elements of SMS

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The 21 Elements of a Safety Management System (SMS) are as follows:

1. A written safety policy statement and description of how it is communicated to airport employees.
2. Identification and description of the airport safety goals.
3. A plan for employee SMS indoctrination and training. SMS indoctrination training should provide an outline of proposed curriculum and resources.
4. Documented process to identify training requirements for systems safety.
5. A plan to validate training effectiveness and the process to gain training feedback, including useable metrics.
6. A defined process to communicate safety policies and objectives throughout the organization. Include examples of how information will be communicated and any processes for follow-up.
7. A plan and description of employee non-punitive reporting systems, existing and planned.
8. An organizational chart identifying the names and safety responsibilities of all key personnel, such as the following:
    - Top Management
    - Safety Manager
    - Managers and Supervisors
    - Established Safety Committees and Chairpersons
9. Description of the safety risk management process, including application of "The Five Phases of SRM (safety risk management)," as discussed in AC 150/5200-37, *Introduction to Safety Management Systems for Airport Operators.*
10. Guidance on the use of SRM and trend analysis.
11. Defined process for documenting the results of SRM Decision Reports (SRMDR), including a description of how documents will be stored, i.e., electronic or paper.
12. Description of how top management will follow up on SRMDR to ensure safety mitigation strategies are appropriate.

13. A description of the airport quality management and/or risk management program (if applicable) and its integration into the airport SMS.

14. Description of a plan to integrate apron safety management into the airport SMS. (The FAA's review of the plan will be limited to measures for preventing accidents or incidents involving aircraft.) The plan could include the following:

    - A description of current apron safety management practices, such as reporting requirements to the National Transportation Safety Board (NTSB), Flight Standards, or the Occupational Safety Health Administration (OSHA).

    - An explanation of how current apron safety management practices meet the intent of SMS. This could include the safety plans and practices of tenants and operators at the airport, which should complement the airport SMS.

15. A detailed method to document self-auditing processes and their findings. Self-auditing may be part of the airport self-inspection process. If it is, explain how the self-inspection process addresses systems safety, i.e. if the self-inspection program identifies a hazard on the airport it should determine the risk and document the process for follow-up.

16. A detailed method to document self-inspection reviews, analysis, and findings.

17. A description or plan to integrate the tailored SMS program plan into the overall operation of the airport.

18. Documented plan for training and education, safety communication, competency, and continuous improvement processes.

19. Procedures to promote safety awareness and participation in non-punitive reporting systems.

20. Process to document and review lessons learned from within the organization.

21. Schedule for implementation and anticipated associated costs.

Appendix 6 – Simplified SRMDR Report

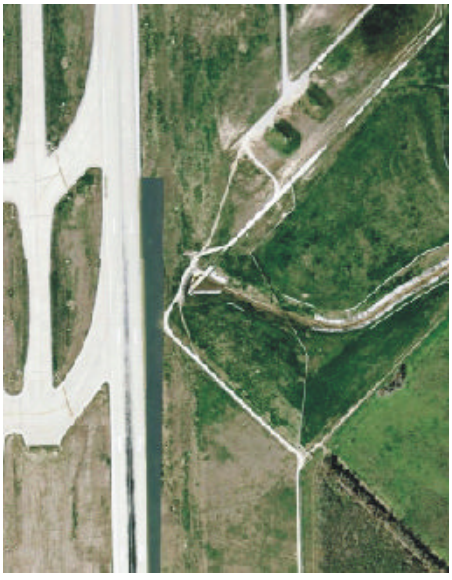
Under Development

Appendix 7 – Expanded SRMDR Report

Under Development

Appendix 8 – SRM Example Project

Under Development



12.0 LIST OF FIGURES