

S M S

AFETY
ANAGEMENT
YSTEM

TOOLKIT

International
Helicopter
Safety Team

www.ihst.org

A Publication of the
U.S. JOINT HELICOPTER SAFETY IMPLEMENTATION TEAM

September 2009





International Helicopter Safety Team

Safety Management System Toolkit

2nd Edition, 2009

Produced by the US Joint Helicopter Safety Team (USJHSIT)

All information in this publication has been provided in good faith. Every effort has been made to ensure the accuracy of the information contained in this publication. Neither the IHST, nor any of its members or contributors, past, present or future, warrants its accuracy, will, regardless of its or their negligence, assume liability for any foreseeable use made thereof, which liability is hereby excluded.

ACKNOWLEDGEMENTS

I wish to thank the dedicated safety professionals of the Joint Helicopter Safety Implementation Team and the Safety Management Systems Industry Working Group that produced this toolkit.

Donald Arendt
*PhD, Federal Aviation Administration
SMS Program Manager, JHSIT SMS IWG*

Fred Brisbois
Sikorsky Aircraft Director of Safety, JHSIT Co-Chair

Sue Brisbois
Education Resources, L.L.C.

Gordon Dupont
President/CEO System Safety Services, SMS IWG

Richard Komarniski
Grey Owl Aviation Consultants, Inc., JHSIT SMS IWG

J. Heffernan
HAI Director of Safety, JHSIT SMS IWG

Eric Luggier
Air Methods, JHSIT SMS IWG

Denise Uhlin
*Bristow Director of Safety,
Western Hemisphere Quality and Safety
JHSIT SMS IWG*

Lisa A. Wright
Publisher, Wright Publishing Group, Inc.

Keith D. Johnson
*Airborne Law Enforcement Association,
Safety Program Manager
JHSIT SMS IWG Chairperson*

FORWARD

The 2005 International Helicopter Safety Symposium marked the beginning of an international effort to reduce the accident rate by at least 80% by 2016. The International Helicopter Safety Team (IHST) was formed to lead efforts toward reaching this objective.

The IHST Executive Committee formed the Joint Helicopter Safety Analysis Team (JHSAT) to analyze the accidents and provide recommendations to reduce the accident rate, and the Joint Helicopter Safety Implementation Team (JHSIT) to develop strategies and action plans to reduce accidents.

IHST includes associations such as Helicopter Association International (HAI), the Airborne Law Enforcement Association, the European Helicopter Association (EHA), European Helicopter Operators Committee (EHOC), Cooperative Development of Operations Safety and Continuing Airworthiness Project (COSCAP) of the International Civil Aviation Organization (ICAO), Helicopter Association of Australasia, Centro de Investigação e Prevenção de Acidentes (CENIPA) in Brazil, American Helicopter Society (AHS) International, Association of Air Medical Services (AAMS), International Association of Oil and Gas Producers (OGP), Tour Operators Program of Safety (TOPS) the military, aircraft and engine manufacturers, the insurance industry, helicopter industry customer base, and line personnel.

The JHSAT's initial report provided recommendations directed at specific missions. The JHSAT's foremost recommendation was the need to implement a Safety Management System (SMS) for use by the helicopter industry.

The JHSIT prepared this toolkit to help organizations understand the fundamentals of an safety management system. It serves as a guide to implement and manage an SMS, tailored to all size organizations.

EXECUTIVE SUMMARY

Based on the findings of the U.S. Joint Helicopter Safety Analysis Team (USJHSAT) report issued in 2007, safety management problems were one of the broadest categories requiring intervention. This toolkit addresses the issues uncovered in the report and provides a Safety Management System (SMS) that proactively promotes safety through a continuous improvement program. This SMS includes attitudes toward assessing and managing risk and managing safety as a proactive organization behavior that employs safety-driven decision-making through risk assessment and promotes a positive and systemic safety culture.

This SMS document is an advanced, integrated method of implementing standards identified by the International Civil Aviation Organization (ICAO) and the FAA Flight Standards Service (AFS-900). The toolkit provides assistance for organizations to achieve improved safety performance using a "performance based approach." It encourages organizations to choose the solution that best suits their needs and performance objectives. The toolkit helps the organization determine their level of compliance and to develop an action plan that includes the necessary components.

The introduction addresses the case for a Safety Management System (SMS) and describes what an SMS is.

Comments are welcome and should be sent to the IHST Secretariat, c/o the American Helicopter Society, 217 N. Washington Street, Alexandria, VA 22314-2538 or email: rflater@vtol.org. Please note the page(s) and/or paragraph(s) that pertain to your suggestion and include your contact information.

Chapter 1

Identifies policies, procedures, and human responsibilities that organizations use to express and achieve their desired level of safety. Policies characterize the nature and performance of an organization, and procedures define how to execute policies. The section on human responsibilities identifies the duties, responsibilities, authority, goals and objectives that impact an SMS.

Chapter 2

Identifies the theories and philosophy behind creating an SMS program that emphasizes the use of 12 core elements in designing an effective SMS plan. These elements include the objectives and expectations which are core to a robust and functional SMS.

Chapter 3

Organized, systematic guidelines are provided that can be followed over time to implement an SMS. A checklist for the 12 elements will help to guide organizations in SMS preparation.

Chapter 4

Contains a variety of resources to assist in designing an SMS manual for organizations wishing to establish a Safety Management System. It includes a definition of terms, checklists and a CD containing examples of forms used in implementing and managing an SMS.

TABLE OF CONTENTS

Introduction1

Why is SMS Needed?
How Does an SMS Differ From
Traditional Approaches?
SMS Business Tools for Managers
Definition of SMS
The Four Pillars of SMS

Chapter 1: Organization & Human Requirements9

Controls, Interfaces, Process Measures
& Safety Goals
Safety Objectives
Safety Planning
Safety Management Plan

Chapter 2: Safety Management System Elements15

Safety Policy
Safety Policy Table
Management Commitment & Accountabilities
Safety Policy Table
Management Commitment & Accountabilities Table
Key Safety Personnel Table
Emergency Preparedness & Response
Emergency Preparedness & Response Table
Documentation & Records
Documentation & Records Table
Risk Management
Safety Assurance
Safety Risk Management Table
System & Task Analysis Table
Hazard Identification
Hazard Analysis
Safety Risk Analysis Table
Risk Assessment

Assess Safety Risk Table
Safety Assurance
Continuous Monitoring Table
Audits
Internal Audits by Operational Department Table
Internal Evaluation
Internal Evaluation Table
Safety Program Assessment
Record of Assessment
Occurrence Investigation
Investigation Design Table
Employee Reporting & Feedback
Just Culture Process
Employee Reporting & Feedback Table
Management of Change
Management of Change Table
Continual Improvement Table
Safety Promotion Table
Personnel Expectations Competence Table
Safety Culture
Communication & Awareness Table

Chapter 3: Guidelines For Implementing An SMS73

SMS Implementation Process
Implementing an SMS
SMS Implementation Checklist
SMS Development Chart

Chapter 4: Sample SMS Manual ...81

Terms & Acronyms101

References105

INTRODUCTION

The implementation of safety management system represents a fundamental shift in the way the organization does business. Safety management systems require organizations to adopt and actively manage the elements detailed in this document and to incorporate them into their everyday business or organization practices. In effect, safety becomes an integral part of the everyday operations of the organization and is no longer considered an adjunct function belonging to the safety office.

The word system means “to bring together or combine”. This is not a new term. The philosopher Aristotle first identified systems. SMS involves transfer of some of the responsibilities for aviation safety issues from the regulator to the individual organization. A role shift, in which the regulator oversees the effectiveness of the safety management system and withdraws from a day-to-day involvement in the organizations it regulates. The day-to-day issues are discovered, analyzed and corrected internally.

From the organization’s perspective, the success of the system hinges on the development of a safety culture that promotes open reporting through non-punitive disciplinary policies and continual improvement through proactive safety assessments and quality assurance.

In aviation, the accident rate has reached a plateau, and new methods are needed to drive the

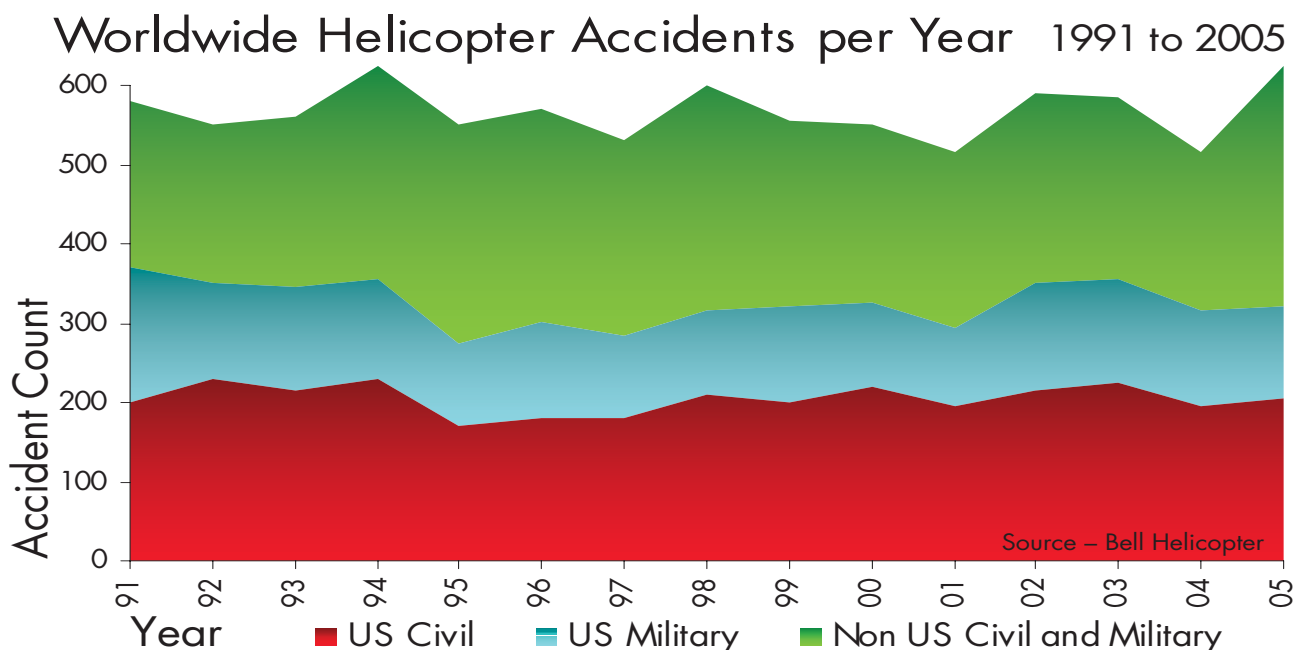
accident rate down. SMS recognizes that this will only happen when we clearly see safety as part of the system and understand how safety interacts with the other elements of the organization.

The safety management system philosophy requires that responsibility and accountability for safety be retained within the management structure of the organization. Management is ultimately responsible for safety, as they are for other aspects of the enterprise. The responsibility for safety, however, resides with every member of the organization. In safety management, everyone has a role to play.

Regardless of the size and complexity of an organization, senior management will have a significant role in developing and sustaining an organization safety culture. Without the sincere, unconditional commitment of all levels of management, any attempt at an effective safety program will be unsuccessful. Safety management requires the time, financial resources and consideration that only the senior management can provide.

Some examples of management commitment and support may be: discussing safety matters as the first priority during staff meetings, participating in safety committees and reviews, allocating the necessary resources such as time and money to safety matters, and setting a personal example.

However it is manifested, the importance of support from management cannot be underestimated.



SAFETY

WHOSE JOB IS IT?

In 2007, the USJHSAT analyzed 197 reported helicopter accidents for the year 2000 as recorded in the NTSB's U.S.A. database. The USJHSAT found that a major contributing factor in many accidents was the failure to adequately manage known risks. Due to the lack of a systematic process, including leadership and accountability, operators did not adequately prioritize and address the risks that lead to most accidents.

The JHSAT studied 174 accidents for the year 2001. They found that in 146 of the 174 accidents, "Pilot Judgment & Actions" was a factor. The Standard Problem Statement (SPS), pilot judgment and actions, dominated the problems, appearing in over 80% of the accidents analyzed.

The dominance of pilot judgment & actions factors is similar to the conclusions of previous studies. The pilot is the last link in the chain of events leading to an accident—he or she is the only one who can affect the outcome once the sequence of event problems has started. If the pilot's judgment and actions in response to problems, whether pilot-initiated or not, can be improved, there is the potential for more than 80% of the accidents to be mitigated, either prevented entirely, or reduced from fatal to minor injury.

If the pilot had made a preflight risk assessment and sounder decisions about helicopter position relative to hazardous conditions, it is possible that the precipitating event could have resulted in a nearly uneventful precautionary or forced landing rather than an accident.

Precipitating events may be beyond the pilot's control, such as system component failures, or they may be pilot-induced, such as loss of engine power due to lack of fuel. Other pilot-induced precipitating events include the results of poor piloting skills and poor decision-making. Piloting skills include physical stick and rudder actions, visual scans, situational awareness, recognition of environmental factors, and the knowledge and proper control of aircraft performance. Poor decision-making includes the pilot's

making a conscious decision to put the aircraft in a situation/environment that is outside his ability to control, or outside the aircraft's performance limits, thereby eliminating recovery options. These situations include improper airspeed, altitude, weather assessment, aircraft loading and crew fatigue. The risk of a pilot-caused accident is increased further when "pilot situation awareness" and "ground duties" (37% each) are combined with other problems including safety management deficiencies.

The USJHSAT concluded that safety management is not a separate independent concept in an organization. Improved oversight of pilots and operations by management is also highlighted by this analysis. This oversight can be obtained by using some variation of a formal integrated Safety Management System (SMS). Among other things, the SMS requires training for specific missions, the establishment and enforcement of standard operating procedures, provision and training of personnel to use risk assessment tools, but most importantly, change the safety culture and ensure that all personnel put "safety" first. The cost benefit of remaining "accident free" needs to be understood and shared with the organization. Having an accident is not only costly in the short-term, but may have long-term effects if that organization no longer uses an operator's helicopter services.

The SMS Toolkit will help develop a scalable safety management system that will show both a return on investment, and/or cost effectiveness from both financial and safety perspectives. It will help organizations develop an SMS designed to fit the size, nature and complexity of their organization. This is a resource document that provides comprehensive information on each of the 12 SMS elements, including checklists for each element that can assist an organization in developing and implementing an SMS. It provides easy-to-use guidance and proven methods that will assist in developing a systematic approach to managing hazards or risks that cause accidents.

All information in this toolkit is consistent with the information and guidance contained in other documents including:

- ICAO Doc 9859 Safety Management Manual
- FAA SMS Framework, SMS Assurance Guide and SMS Implementation Guide, as revised (these documents will be the nucleus of the pending revision to AC 120-92 and the FAA SMS Guidebook).
- FAA SMS Framework & Assurance Guide – Rev. 2
- Transport Canada Safety Management Manual TP 13739

This toolkit complies with the functional requirements of ICAO and the FAA. Organizations that adopt the processes in this manual will benefit from the identification of hazards, reduced exposure to risk and costs associated with incidents and accidents and better retention of personnel. The safety processes in this document must be economically viable and operationally appropriate to the individual operating environment and mission.

This toolkit is applicable to organizations of all sizes. In small organizations, people will perform multiple functions. The process and the management of the SMS will be less formal and more simplified. The checklists for each element will provide benchmarks, some applicable and others not, depending on the size of the organization. It is for the operator to determine the scope and complexity of what works for their individual organization.

Small organizations should consider implementing one element at a time beginning with developing a policy. This could mean having a meeting of all

employees to discuss policies. Once the policy chapter has been completed, move on to the next element.

In order to maximize the effectiveness of an SMS, it is necessary for our industry to communicate using common terms. There is a glossary of terms located at the end of this toolkit to assist organizations with this process.

Why is SMS Needed?

SMS facilitates the proactive identification of hazards, promotes the development of an improved safety culture, modifies the attitudes and behavior of personnel in order to prevent damage to aircraft or equipment, as well as makes for a safer work place. SMS helps organizations avoid wasting financial and human resources in addition to wasting management's time from being focused

on minor or irrelevant issues. SMS allows employees to create ownership of the organization process and procedures to prevent errors. SMS lets managers identify hazards, assess risk and build a case to justify controls that will reduce risk to acceptable levels.

SMS is a proven process

for managing risk that ties all elements of the organization together laterally and vertically, and ensures appropriate allocation of resources to safety issues.

An SMS provides an organization with the capacity to anticipate and address safety issues before they lead to an incident or accident. An SMS also provides management with the ability to deal effectively with accidents and near misses so that valuable lessons are applied to improve safety and efficiency. The SMS approach reduces loss and improves productivity.

THE IHST OBJECTIVE

Reduce the worldwide helicopter accident rate by 80% over the next ten years. (2016)
Improve the safety image of all helicopters worldwide.



SMS Purpose & Methods

- The purpose of a safety management system is to provide a **systematic** way to **control risk** and to provide **assurance** that those risk controls are effective.
- The SMS will give certificate holders a formal means of meeting **statutory safety requirements** (title 49) and the FAA a means of evaluating **management capability**.

Safety Management Systems – Flight Standards



Federal Aviation Administration

Courtesy of Don Arendt, PhD, FAA SMS Program Manager

How does an SMS differ from traditional approaches?

Implementing an SMS does not involve the regulator imposing an additional layer of oversight on the aviation industry. The traditional flight safety approach depended on a flight safety officer or a department in a large organization, independent from operations management, but reporting to the chief executive of the organization. The Safety Officer had no authority to make changes that would enhance safety. The safety officer depended on his/her ability to persuade management to act. An SMS holds managers accountable for safety related performance.

Establishing safety as a core value:

Everyone in the organization must buy-in to making safety a core value, with top management as the guiding light. A positive safety culture is invaluable in encouraging the kind of behavior that will enhance safety. Positively re-enforcing safety-conscious actions sends the message that management cares about safety.

The best way to establish safety as a core value is to make safety an integral part of the management plan and by holding managers accountable.

SMS business tools for managers:

It is important to view an SMS as an operations tool for management. The risk management processes within the SMS includes the need to determine the cost of implementing versus not implementing control measures.

Example:

A two-aircraft, four-pilot organization experiences their third \$5,000 hot-start incident in two years

caused by the poor starting technique combined with weak aircraft batteries. The top manager determines, through discussions with the chief pilot, that a one-time training expense of \$2,000 will prevent a recurrence.

The cost of implementing the solution is \$8,000 (\$2,000 X 4 pilots = \$8,000). The cost of not implementing is \$15,000 (\$5,000 X 3 hot starts = \$15,000).

However, training may not be the only answer. In the same scenario, if the training costs \$20,000, it would be more cost effective to install equipment that prevents hot starts if it can be done for \$12,000.

Simple models that help managers arrive at the most appropriate answer are provided in this SMS Toolkit. These models can ensure even the smallest operator can achieve their safety goals without using a complex SMS.

There are tools available to perform more detailed and complex financial analysis that are easily used by aviation management professionals. One tool is the Return On Health, Safety and Environmental Investments (ROHSEI) software tool developed by ORC. Fifteen member companies of the ORC (ORC Occupational Safety and Health Group — ALCOA, AlliedSignal, ARCO, Bayer, Bristol-Myers Squibb, Colgate-Palmolive, Dow, Duke Power, Eli Lilly, IBM, Johnson & Johnson, Monsanto, M&M Mars, Rhone-Poulenc Rorer, Schering-Plough — formed a task force to work with ORC and Arthur Andersen to tailor traditional financial investment analysis approaches and apply them to achieve a better understanding of the business impacts of health, safety and environmental investments. To accomplish these objectives, the project had to go beyond measures of failure to formulate a set of analytical tools to provide cost/benefit information for making effective cost/risk decisions. Additional information is available on ORC's website at: www.orc-ap.com.

Members of the JHSIT were provided a copy of ROHSEI to help determine the financial benefits of implementing JHSAT's recommendations. The JHSAT 2000 report yielded 57 fleet-wide recommendations to prevent accidents. Just as accidents are normally caused by multiple factors, there are multiple opportunities to prevent them. Of the 57 fleet wide recommendations, 24 dealt with implementation of an SMS.

Since the JHSAT recommendations were data driven, it can be inferred that implementing all of the recommendations has the potential to prevent 100% of the accidents. Since 42% of the recommendations pertained to SMS, it can be further inferred that having an effective SMS has the potential to prevent 42% of the accidents. The assumed U.S. helicopter accident rate in 2000 was 9.32 accidents per 100,000 flight hours. SMS has the potential to reduce this accident rate to 5.406 per 100,000 flight hours preventing 3.91 accidents per 100,000 flight hours. For an operator who fly's 1,000 hours per year, this equates to a potential to prevent 3.91×0.01 accidents per year or 0.039 accidents annually.

Assuming it takes 80 man hours to implement an SMS and two hours per week per aircraft to maintain it, for an operator of two aircraft valued at \$10,000,000 each, a financial case can be made to evaluate the Return On Investment (ROI) for implementing an SMS. Using ORC's ROHSEI program for this example, implementation of an SMS yields a 189% Return On Investment with an 8,894% Internal Rate of Return. The Discounted Payback Period is 0.1 years and the Net Present Value was calculated at \$2,890,970. Making significant changes to the assumptions for implemen-

tation costs, e.g. doubling the investment costs, and reducing the value of the aircraft by 50% still yields a compelling business case for implementing SMS.

Parallel Approaches in Business and SMS

The Business Approach		The Safety Approach
Mission		Mission
Vision		Vision
Corporate Goals		Safety Goals
Policies		Policies
Requirements		Requirements
Business Processes		SRM Processes
Identify Non-Compliance		Identify Hazards/Non-Compliance
Implement Solutions		Implement Hazard Controls
Measure Performance	"SMS is the safety approach to business"	Measure Performance
Lessons Learned		Lessons Learned/Improve Process
Repeat the Process		Repeat the Process

EXAMPLE	#1	#2
Hours per Week to Implement	80	160
Hours per Week to Maintain	4	8
Aircraft Replacement Cost	\$10,000,000	\$5,000,000
Return On Investment	189%	172%
Discounted Payback Period	0.1 Years	0.1 Years
Internal Rate Of Return	8894%	2186%
Net Present Value	\$2,890,970	\$1,399,940



Definition of an SMS

SMS is defined as a coordinated, comprehensive set of processes designed to direct and control resources to optimally manage safety. SMS takes unrelated processes and builds them into one coherent structure to achieve a higher level of safety performance, making safety management an integral part of overall risk management. SMS is based on leadership and accountability. It requires proactive hazard identification, risk management, information control, auditing and training. It also includes incident and accident investigation and analysis.

SMS: What it is and is not...

What it isn't:

- **Not a substitute for compliance**
- **Not a substitute for oversight**
- **Not a replacement for system safety**
- **Not a requirement for a new department**

What it is:

- **Compliance is integral to safety management**
- **An effective interface for safety management**
- **SMS completes the system safety circle**
- **SMS is a set of decision making processes for senior and line management**

Safety Management Systems – Flight Standards



Federal Aviation Administration

Courtesy of Don Arendt, PhD, FAA SMS Program Manager

The Four Pillars of SMS:

The ICAO Document 9859 and FAA Advisory Circular 120-92 states that SMS is structured upon four basic components of safety management:

- Safety Policy
- Safety Risk Management
- Safety Assurance
- Safety Promotion

Safety Policy

Every type of management system must define policies, procedures and organizational structures to accomplish its goals. An SMS must have policies and procedures in place that explicitly describe responsibility, authority, accountability and expectations. Most importantly, safety must be a core value.

Safety Risk Management

A formal system of hazard identification and management is fundamental in controlling an acceptable level of risk. A well-designed risk management system describes operational processes across department and organizational boundaries, identifies key hazards and measures them, methodically assesses risk, and implements controls to mitigate risk.

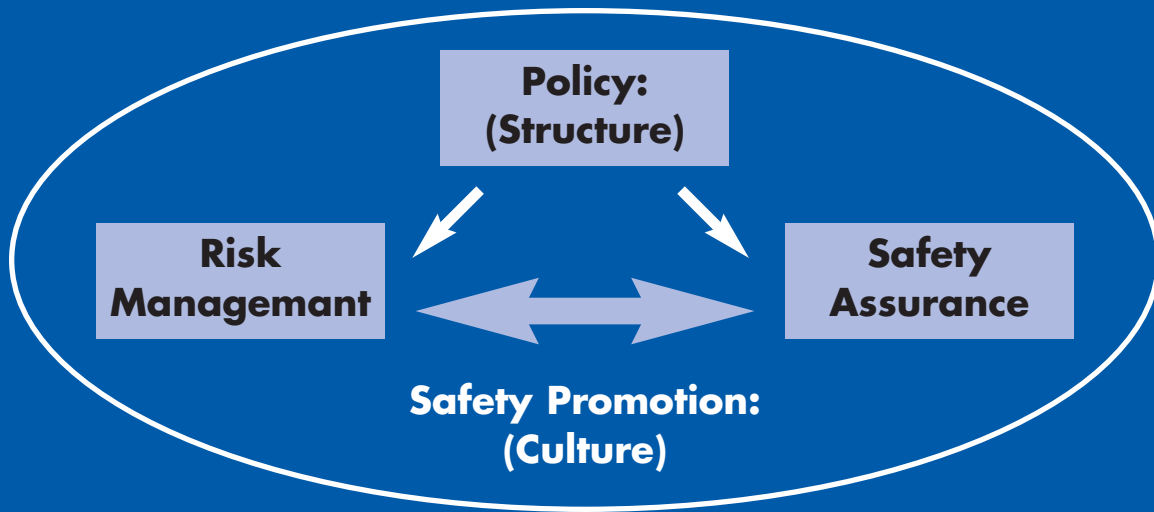
Safety Assurance

Policies, process measures, assessments and controls are in place. The organization must incorporate regular data collection, analysis, assessment and management review to assure safety goals are being achieved. Solid change management processes must be in place to assure the system is able to adapt.

Safety Promotion

The organization must continually promote, train and communicate safety as a core value with practices that support a sound safety culture.

SMS Components ("Four Pillars")



Safety Management Systems – Flight Standards



Federal Aviation Administration

Courtesy of Don Arendt, PhD, FAA SMS Program Manager

A functioning SMS is comprised of the four pillars (or components) and 12 elements:

Safety Policy

1. Safety Policy
2. Management commitment & safety accountability
3. Key safety personnel
4. Emergency preparedness & response
5. SMS documentation & records

Safety Risk Management

6. Hazard identification and analysis (includes system description and task analysis)
7. Risk assessment and control (includes safety risk analysis, assessment and control/mitigation)

Safety Assurance

8. Safety performance monitoring and measurement (includes monitoring, internal and external audits, evaluations, investigations, employee reporting & feedback system, analysis of data, system assessment, preventive/corrective action and management review)
9. Management of change
10. Continual improvement

Safety Promotion

11. Competencies and training (includes personnel expectations and training)
12. Communication and awareness

CHAPTER 1:

ORGANIZATION & HUMAN REQUIREMENTS

In an SMS, policies and procedures are the ways organizations express and achieve their desired level of safety. Policies characterize the nature and performance of an organization and procedures define how to execute them. People execute policies and procedures set by the organization, its governing bodies and management. Responsibilities, duties and authorities define the roles of individuals within the organization.

Responsibility & Authority

Responsibility and authority are fundamental to management of safety. Responsibility and authority should be defined and documented for each of these areas. As discussed, this is especially important with respect to interfaced processes that cut across organizational lines.

Responsibility involves the requirement to actually perform certain work. The person(s) responsible must be trained and competent. There is a way for the responsible person to take appropriate action when performance or conduct requires, such as counseling, training, re-qualification, discipline or removal of the person to whom authority has been delegated.

Authority is the power vested in an individual. To be effective, the assigned responsibility must include commensurate authority. Authority does not have to be absolute, but it does have to be effective. Training includes limitations of authority.

Authority must be documented in employees' personnel records as well as the policy manual. This allows others to recognize their authority and to establish the transfer of authority from the responsible person to the employee.

Policy

Policy is information which establishes a basic requirement for how the organization functions. It consists of statements that are clear, understandable and are generally short and to the point. Participants can identify what the organization's policies are, so they can base their expectations on them. Policies and guidelines help the development of procedures.

For example, an organization may establish a fuel management policy to avoid low-fuel emergencies. The policy might state day VFR flights must have adequate fuel reserves to allow the safe completion of the flight with a minimum of 30 minutes fuel on board at landing.

Procedures

Procedures define the actual methods the organization uses to apply their policies. A procedure is a step-by-step guide to implementing a policy. In the fuel management example given, the procedure may include various methods of positively determining the quantity of fuel on board, the estimated duration of flight, and the projection of fuel consumption as part of the preflight procedures. The organization specifies procedures for these items in the context of their unique operational environment, organizational structure and management objectives.

Controls

Organizational process controls are typically defined in terms of special procedures, supervisory and management practices and processes. Many controls are inherent features of the SMS framework. Such practices as continuous monitoring, internal audits, internal evaluations and management reviews are all part of the safety assurance component. They are identified as controls within the design expectations. Additionally, other practices such as documentation, process review and data tracking are identified within specific elements and processes.

Interfaces

This aspect includes examining such things as lines of authority between departments, lines of communication between employees, consistency of procedures and clearly delineating lines of responsibility between organizations, work units and employees. Interfaces are the “Inputs” and “Outputs” of a process.

Process Measures

A basic principle of safety management is fundamental processes are measured so that management can be data-driven. Outputs of each process should, therefore, be identified for assurance. For example, these outputs should be the subject of continuous monitoring, internal audits and internal evaluation.

Duty

Duty is something a person ought to do. It is a moral, ethical obligation to act. For example, all employees have the duty to report unsafe conditions. To be effective, a single method of reporting should be established to ensure information is effectively managed. Every person’s duties are identified, and the methods they use to execute those duties are described.

Duties apply to persons at every level of an organization. Some may have long-term safety impact such as the duty of mechanics to accurately maintain aircraft records. Some duties are immediate, such as a medical technician’s duty to waive off a landing due to an unsafe condition on a landing pad. Some duties are described at a higher level, i.e., management’s duty to maintain a safe workplace. And, that duty is tied to their responsibilities and authority.

LEADERSHIP

*“The hardest thing to do
and the right thing to do
are often the same thing.”*

Organizations train personnel in their duties and authority. The duties and authorities are spelled out in a short position description. The oversight may simply occur through day-to-day contact and could include on-site training. The goal is to build an SMS that has well balanced duties, responsibilities and authorities.

Safety Goals

Goal setting is vital to an organization’s performance. All organizations have their own ways of setting and expressing a vision. The vision is supported by goals and objectives. The most common weakness in setting goals is identifying outcomes, which usually means counting accidents. But safe organizations can have accidents, while less safe organizations can be lucky and avoid accidents. Although the ultimate goal is no accidents, there are more precise and useful ways of measuring safety, especially in a safety system, than counting accidents.

In some organizations, the goals are not stated very explicitly. Other organizations set goals formally and document the process. Regardless of how management goals are set, few organizations are good at developing safety goals.

It is a never-ending struggle to identify and eliminate or control hazards. We will never run out of things to do to make the system safer. Sound management requires we identify goals, decide how to achieve them, and hold ourselves accountable for achieving them. Risk management procedures can help managers decide where the greatest risks are and help to set priorities. Sound safety goal setting concentrates on identifying systemic weaknesses as accident precursors; either eliminating or mitigating them.

In the past, safety goal setting was accomplished by recording the number of accidents and incidents over a specific period of time. Once that was determined, the goal was to reduce the number of accidents and incidents over the same relative period of time. Most organizations are good at setting financial goals, but may not be as adept at setting safety goals. There are methods of setting safety goals other than focusing on the outcome. Though the ultimate goal is zero accidents, there are more effective methods of measuring safety performance in a safe system.

The primary goal of a safety management system is to have managers and employees hold each other accountable to safety. Everyone has to walk the talk, from the accountable executive to the new hire, for the system to be successful. Organizational influences such as management practices, policy and procedures, hiring practices and fiscal practice can all affect the decision process of the individual.

Safety Objectives

Safety objectives define what the organization wishes to achieve. Safety policy defines the organization's commitment to achieving desired results. It should be publicized and widely distributed. A similar type of pronouncement should be made by the organization. A typical statement outlining the objectives of a safety management program could read:

"The safety management program aims to continually improve the safety of the organization's flight operations by identifying, eliminating or mitigating any deficiencies in conditions, policies and procedures, and by ensuring staff consider, at all times, the safety implications of their own actions, and those of their colleagues."

It is important to ensure the stated objectives are achievable and clearly define the limits within which the organization will operate. They should be unambiguous, well documented, readily accessible and should be reviewed on a regular basis.



The following is a list of activities that demonstrate top management's active commitment to SMS. These include:

- Putting safety matters on the agenda of company meetings, from the management level down.
- Active involvement in safety activities and reviews at both local and remote sites.
- Allocating the necessary resources, such as time and money to safety matters.
- Setting personal examples in day-to-day work.
- Receiving and acting on safety reports submitted by employees.
- Promoting safety topics in organization publications.

The ideal safety culture embodies a spirit of openness and should also demonstrate support for staff and the systems of work. Senior management should be accessible and dedicated to making the changes necessary to enhance safety. They should be available to discuss emerging trends and safety issues identified through the system. A positive safety culture reinforces the entire safety achievement of the organization, and it is critical to its success.

SAFETY PLANNING

“Safety management is the process of integrating safety principles into the framework of sound business management.”

–adapted from Grimaldi and Simonds

The following exercise is intended to help you develop your “roadmap” to a successful safety program.

Vision:

A vision is what you want to achieve and how to establish your safety program goals. For instance, what do you want to accomplish as safety goals by the end of 2010, 2011 and 2012? These goals should be realistic and achievable, but should also “stretch” the organization’s capabilities toward improvement. The process is to identify where you are now, and where you want to be in safety in a specific time. This is the guide to developing a roadmap of “how to get there.”

Now, write a “Vision Statement” describing what your safety program should achieve:

A. Next year:

B. In 2 years:

C. In 5 years:

Goals:

To put your vision in motion, you need to develop an action plan. To develop such a plan, you need to determine your priorities, create goals and set objectives. This is also your “strategy” for making your vision a reality.

A goal is a step in carrying out a strategy. While goals can be set for individuals, in safety management, they are more often set for an organization. Goals can be general and non-specific, as in – “foster public trust and confidence in ‘XYZ’ organization.” It is better if they are realistic and measurable, i.e. – “Reduce damage and injury incidents in flight and ground operations by 50% in the next year.”

List three goals for your safety program:

1.

2.

3.

Objectives:

As your plan develops, you get more and more specific. The next step is to define objectives for divisions and individuals for them to work toward meeting the safety goals. For example, to meet the goal of reducing damage and injury incidents by 50%, one objective could be: Flight Operations and Aircraft Maintenance — develop and implement a plan to eliminate ground damage to aircraft.

List three objectives you want to establish to accomplish your first goal:

1.

2.

3.

Action Steps:

Action steps are the tasks individuals carry out to meet defined objectives. Action steps often have specific dates and times assigned for completion. Some examples of actions steps for the “ground damage to aircraft objective” might be:

- Review data on previous incidents and identify trends
- Survey the current procedures for weaknesses.
- Develop recommendations for improving procedures, including additions to training plans.
- Establish a timeline for implementation with all actions complete within 120 days.

Select one of the objectives you wrote. Now, develop action steps that might be taken to support your objective:

1.

2.

3.

4.

5.

6.

7.

SAFETY MANAGEMENT PLAN

DESCRIPTION OF SMS COMPONENTS:

① Definition of Fundamental Approach to Safety

- a) Philosophical Approach - Vision, Mission, Values
- b) Safety Policy - SMS policy statement
- c) Business and Department Goals - set/reviewed annually

② Clearly Defined Roles and Responsibilities

- a) Openly documented and briefed

③ Top Leadership Involvement

- a) Safety is an agenda item, resource allocation, openness, involved in daily activities, promoting awareness

Safety Management Plan

An SMS Management Plan clearly defines safety objectives, how the organization intends to execute and measure the effectiveness of the SMS, and how the SMS will support the organization's business plan and objectives. The plan should:

- Express management's commitment to safety and clearly state the policies, objectives and requirements of the SMS.
- Define the structure of the SMS.
- Identify the responsibilities and authority of key individuals, such as the safety officer, for managing the SMS.
- Determine the role of the safety officer in light of the 12 elements.
- Define each element of the SMS.
- Convey the expectations and objectives of the SMS to all employees.
- Explain how to identify and maintain compliance with current safety regulatory requirements.

CHAPTER 2:

SAFETY MANAGEMENT SYSTEM ELEMENTS

This chapter identifies the requirements associated with each of the fundamental SMS elements. Successful safety management systems are tailored to fit the size, nature and complexity of an organization. Although the details and level of documentation of an SMS may vary, respecting fundamental elements will assist in ensuring the SMS is effective for any organization.

A safety management system is a systematic, explicit and comprehensive process for the management of safety risks that integrates operations and technical systems along with financial and human resource management for all activities related to any aviation operator or an approved maintenance organization's certificate.

Safety management is woven into the fabric of an organization. It becomes part of the culture – the way people do their jobs. The organizational structures and activities that make up a safety management system are found throughout an organization. Every employee contributes to the safety health of the organization. In some organizations, safety management activity will be more visible than in others, but the system must be integrated into “the way things are done.” This will be achieved by the implementation and continuing support of a safety program based on a coherent policy and procedures.

Safety Policy

It is recommended the safety policy include a description of each element of the system. This would resemble the description of other systems as detailed

in a maintenance control manual, maintenance policy manual or an organization's operations manual.

The safety policy should state that safety has the highest priority. It is the accountable manager's way of establishing the importance of safety as it relates to the overall scope of operations. Leadership sets the tone.

Senior management commitment will not lead to positive action unless commitment is expressed as direction. Management must develop and communicate safety policies that delegates specific responsibilities and holds people accountable for meeting safety performance goals.

Safety Intentions

An organization's safety policy should clearly state the organization's intentions, management principles and aspirations for continuous improvements in safety. This can be achieved through documented policies describing what organizational processes and structures it will use to achieve the safety management system. This should also contain a statement outlining the organization's objectives and the outcomes it hopes to achieve through its safety management system.

SAFETY POLICY

- ▲ **Brainstorm your organization's values and write them down.**
- ▲ **The opening paragraph of your safety policy should reflect where safety fits into your values.**
- ▲ **Dream - what would you like the SMS to do for your organization?**
- ▲ **Set those as the SMS objectives in your policy.**
- ▲ **Outline high level responsibilities for all employees of your organization.**

The policy must be clear, concise and emphasize top-level support – including commitment to:

- Implementing an SMS
- Continuous improvement in the level of safety
- Managing safety risks
- Complying with applicable regulatory requirements
- A commitment to encouragement, not reprisal, of employees that report safety issues
- Establish standards for acceptable behavior
- Provide management guidance for setting and reviewing safety objectives
- Be documented
- Be communicated to all employees and parties
- Review periodically to ensure it remains relevant and appropriate to the organization
- Identify responsibility of management and employees with respect to safety performance
- A means to integrate safety management with other critical management systems within the organization

- A safety component to all job descriptions that clearly defines the responsibility and accountability for each individual within the organization.

When the policies are defined, procedures must be developed to facilitate policy implementation. Safety principles provide safety values that guide the organization. They include:

SAFETY PRINCIPALS

- **Operate in the safest manner possible.**
- **Never take unnecessary risks.**
- **Safety does not mean risk free.**
- **Identify and manage risk.**
- **Familiarity and prolonged exposure without a mishap leads to a loss of appreciation of risk.**

Performance Objective: An organization will develop and implement an integrated, comprehensive SMS for its entire organization and will incorporate a procedure to identify and maintain compliance with current safety-related, regulatory, and other requirements.

SAFETY POLICY: GENERAL EXPECTATIONS TABLE

The following table is extracted from the FAA SMS Program Office Assurance Guide.

Management Accountability

Does the organization identify who is responsible for the quality of the organizational management processes (name, position, organization)? *SMS Framework: 1.2 B) 3) Old – SMS Standard None (R/A)*

Procedure: Scope - Air Operators

Does the organization's SMS include the complete scope and life cycle of the organization's systems, including -

Flight operations? *SMS Framework: 1.0 B) 1) a) (1) Old – SMS Standard 4.1 A) 1 (P)*

Operational control (Dispatch/flight following)? *SMS Framework: 1.0 B) 1) a) (2) Old – SMS Standard 4.1 A) 2 (P)*

Maintenance and inspection? *SMS Framework: 1.0 B) 1) a) (3) Old – SMS Standard 4.1 A) 3 (P)*

Cabin safety? *SMS Framework: 1.0 B) 1) a) (4) Old – SMS Standard 4.1 A) 4 (P)*

Ground handling and servicing? *SMS Framework: 1.0 B) 1) a) (5) Old – SMS Standard 4.1 A) 5 (P)*

Cargo handling? *SMS Framework: 1.0 B) 1) a) (6) Old – SMS Standard 4.1 A) 6 (P)*

Training? *SMS Framework: 1.0 B) 1) a) (7) Old – SMS Standard 4.1 A) 7 (P)*

Procedure: Scope - Separate Aviation Maintenance Service Organizations

Does the organization's SMS include the complete scope and life cycle of the organization's systems, including -

Parts/materials? *SMS Framework: 1.0 B) 1) b) (1) Old – None (P)*

Resource management? *SMS Framework: 1.0 B) 1) b) (2) Old – None (P)*

Technical data? *SMS Framework: 1.0 B) 1) b) (3) Old – None (P)*

Maintenance and inspection? *SMS Framework: 1.0 B) 1) b) (4) Old – None (P)*

Quality control? *SMS Framework: 1.0 B) 1) b) (5) Old – None (P)*

Records management? *SMS Framework: 1.0 B) 1) b) (6) Old – None (P)*

Contract maintenance? *SMS Framework: 1.0 B) 1) b) (7) Old – None (P)*

Training? *SMS Framework: 1.0 B) 1) b) (8) Old – None (P)*

Procedure: Management

Does the organization require the SMS processes to be -

Documented? *SMS Framework: 1.0 B) 2) a) Old – SMS Standard 4.1 B) 1 (P)*

Monitored? *SMS Framework: 1.0 B) 2) b) Old – SMS Standard 4.0 B) 2 (P)*

Measured? *SMS Framework: 1.0 B) 2) c) Old – SMS Standard 4.1 B) 3 (P)*

Analyzed? *SMS Framework: 1.0 B) 2) d) Old – SMS Standard 4.1 B) 4 (P)*

Procedure: Promotion of Positive Safety Culture

Does the organization promote a positive safety culture?
SMS Framework: 1.0 B) 4) a) Old – SMS Standard 4.1.D (P)

SAFETY POLICY: GENERAL EXPECTATIONS TABLE cont.

Procedure: Quality Policy

Does top management ensure that the organization's quality policy, if present, is consistent with (or not in conflict with) its SMS? *SMS Framework: 1.0 B) 4) b) Old – SMS Standard 4.3 (P)*

Procedure: Safety Management Planning

Does the organization establish and maintain measurable criteria that accomplish the objectives of its safety policy? *SMS Framework: 1.0 B) 4) e) Old – SMS Standard 4.7 A (PM)*

Does the organization establish and maintain a safety management plan to describe methods for achieving the safety objectives laid down in its safety policy? *SMS Framework: 1.0 B) 4) g) Old – SMS Standard 4.7 B (PM)*

Procedure: Regulatory Compliance

Does the organization identify current FAA policy, legal, regulatory and statutory requirements applicable to the SMS? *SMS Framework: 1.0 B) 4) d) Old – SMS Standard 4.6.B (P)*

Does the organization ensure the SMS complies with legal and regulatory requirements? *SMS Framework: 1.0 B) 4) c) Old – SMS Standard 4.6.A (P)*

Outputs and Measures

Does the organization ensure all SMS outputs are -

Recorded? *SMS Framework: 1.0 B) 3) a) Old – SMS Standard 4.1.C)1 (I/P)*

Monitored? *SMS Framework: 1.0 B) 3) b) Old – SMS Standard 4.1.C)2 (I/P)*

Measured? *SMS Framework: 1.0 B) 3) c) Old – SMS Standard 4.1.C)3 (I/P)*

Analyzed? *SMS Framework: 1.0 B) 3) d) Old – SMS Standard 4.1.C)4 (I/P)*

Does the organization periodically measure performance objectives and design expectations of the general policy? *See note at 3.1.3 & SMS Framework 1.0 B) 2) (c) and 3) (c); 3.1.3 B) 1) Old – SMS Standard 4.1 B) 3 & C) 3; 6.3.2 A & 6.3.3 (PM/I)*

Bottom Line Assessment

Has the organization developed and implemented an integrated, comprehensive SMS for its entire organization and incorporated a procedure to identify and maintain compliance with current safety-related, regulatory, and other requirements?

Management Commitment & Safety Accountabilities

One person must have the responsibility to oversee SMS development, implementation and operation. This person must be the "champion" for the SMS program. However, this person does not bear the principal responsibility for safety management. The managers of the "line" operational functions, from middle management to front-line managers and supervisors, manage the operations in which risk is incurred. These managers and supervisors are the "owners" of the SMS.*

For each process, the element that defines responsibilities for definition, and documentation of aviation safety responsibilities, applies to all components, elements and processes.

* Safety Management Systems in Aviation, Stolzer, Halford & Goglia

Documentation of Roles & Responsibilities:

The following guidelines highlight some of the key areas that should be documented:

- The safety responsibilities for each position and task.
- The competencies required for each position.
- The line of responsibility for ensuring all staff are competent and trained for their duties and for ensuring that training takes place.
- The responsibilities of the manager responsible for externally supplied services. All unapproved contracting companies should meet the organization's own SMS standards or an equivalent to them.

Performance Objective: Management will define the organization's safety policy and convey its expectations and objectives to its employees.

SAFETY POLICY TABLE

The following table is extracted from the FAA SMS Program Office Assurance Guide.

Management Accountability

Does top management define the organization's safety policy? *SMS Framework 1.1 B) 1) Old – SMS Standard 4.2 A) (P/R/A)*

Procedure

Does the organization's safety policy include the following -

A commitment to implement SMS? *SMS Framework 1.1 B) 2) a) Old – SMS Standard 4.2 B) 1 (P)*

A commitment to continually improving the level of safety? *SMS Framework 1.1 B) 2) b) Old – SMS Standard 4.2 B) 2 (P)*

A commitment to managing safety risk? *SMS Framework 1.1 B) 2) c) Old – SMS Standard 4.2 B) 3 (P)*

A commitment to comply with all applicable regulatory requirements? *SMS Framework 1.1 B) 2) d) Old – SMS Standard 4.2 B) 4 (P)*

A commitment to encourage employees to report safety issues without reprisal, as per SMS Framework Process 3.1.6? *SMS Framework 1.1 B) 2) e) Old – SMS Standard 4.2 B) 5 (P)*

Clear standards for acceptable behavior? *SMS Framework 1.1 B) 2) f) Old – SMS Standard 4.2 B) 6 (P)*

Is the safety policy documented? *SMS Framework 1.1 B) 2) j) Old – SMS Standard 4.2 B) 9 (P)*

Outputs and Measures

Does the Safety Policy provide guidance to management on setting safety objectives? *SMS Framework 1.1 B) 2) g) Old – SMS Standard 4.2 B) 7 (I)*

Does the Safety Policy provide guidance to management on reviewing safety objectives? *SMS Framework 1.1 B) 2) h) Old – SMS Standard 4.2 B) 8 (I)*

Does the organization ensure the safety policy is communicated, with visible management endorsement, to all employees and responsible parties? *SMS Framework 1.1 B) 2) j) Old – SMS Standard 4.2 B) 10 (I)*

Does the organization identify and communicate management and individuals' safety performance responsibilities? *SMS Framework 1.1 B) 2) l) Old – SMS Standard 4.2 B) 12 (I/R)*

Does the organization have methods to periodically measure performance objectives and design expectations of the safety policy? *See note at 3.1.3 & SMS Framework 1.0 B) 2) c) and 3) c); 3.1.3 B) 1) Old – SMS Standard 4.1 B) & C); 6.3.2 A) and 6.3.3 (PM/I)*

Bottom Line Assessment

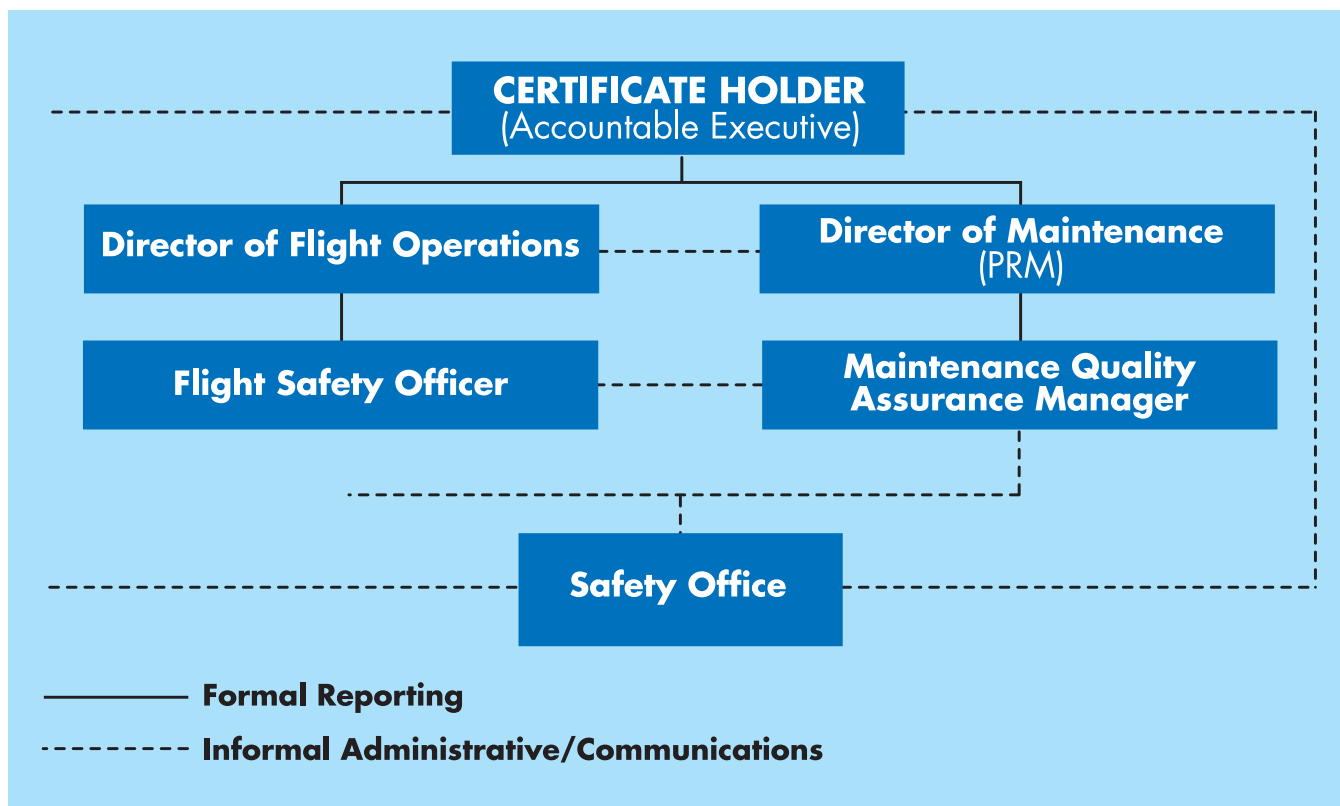
Has top management defined the safety policy and conveyed the expectations and objectives of that policy to its employees?

The illustration on page 20 shows one possible organizational scenario. In many organizations, the safety office is considered to be a stand-alone entity. In a small organization, there probably is no safety office. The functions specific to the SMS are concentrated within this element, and are not distributed throughout the organization. Safety management is a function comparable to any other function in the operation. In the same way that

financial considerations are integrated into the organization, so should safety management considerations. In SMS, safety is considered to be everyone's responsibility and is not unique to the safety office.

Individual Roles & Responsibilities:

The effective management of safety requires a clear delineation of all lines of authority within the



organization. There should be a clear understanding of the accountability, responsibility and authority of all individuals involved in the system. Management should document and distribute the organization operations policy by promoting a common understanding of everyone's role in the safety management system.

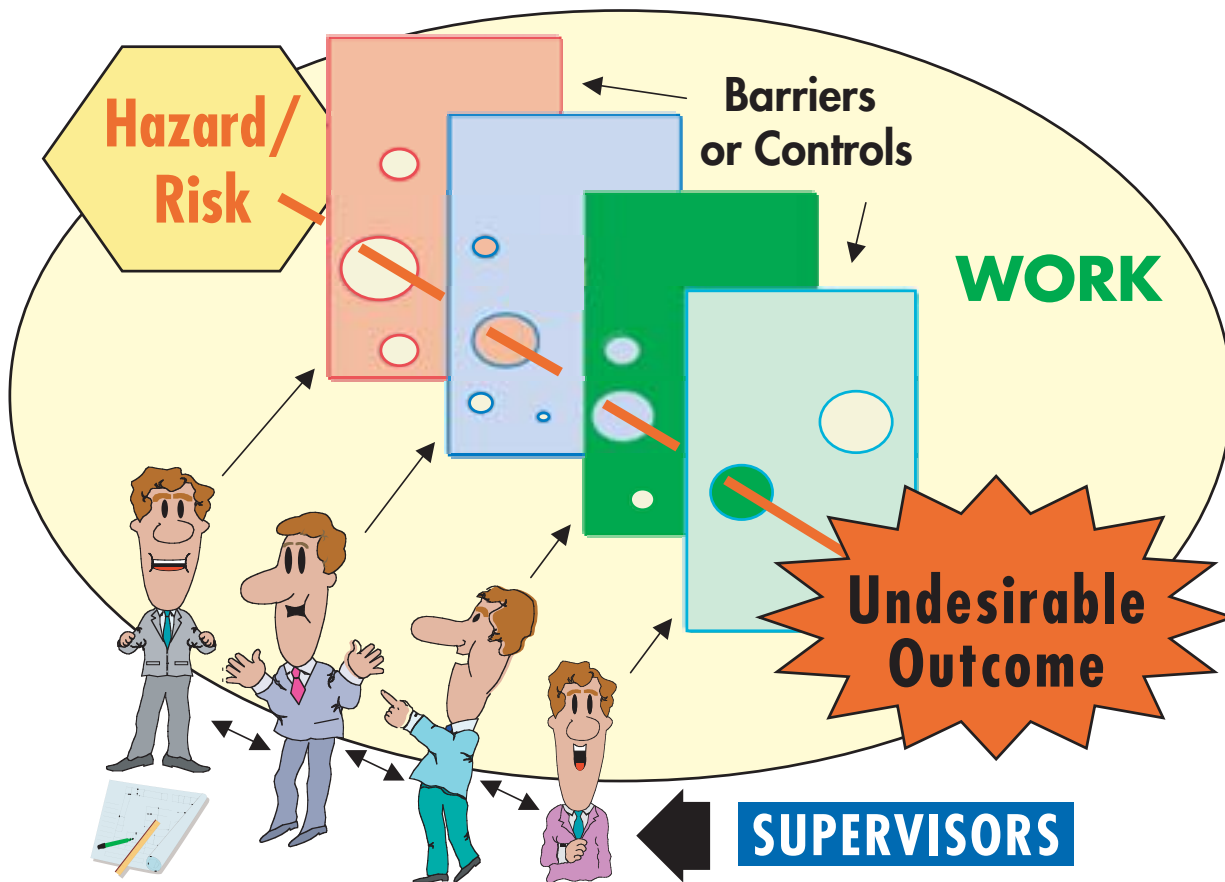
Management's responsibility and accountability for the SMS should be identified. Well-defined lines of authority should be clearly established. These requirements include:

- The accountable manager is responsible for establishing and maintaining the safety management system.
- The functional area of direct responsibility, (i.e., maintenance or flight operations), is responsible for the safety program.
- Everyone is responsible for safety in the organization. This includes operations and maintenance personnel as well as individuals in other non-technical areas.
- The person responsible for the affected functional area, the manager of operations or maintenance is accountable for determining and implementing appropriate comprehensive corrective actions.

The reasons for establishing clearly defined lines of authority is three-fold:

- The manager is the person with direct line responsibility for the affected area and is directly involved in the decision-making process. In most cases, he/she has the knowledge and expertise to recommend effective actions and has the authority to assign the appropriate resources where required.
- The manager must assume responsibility for safety within his/her own area of responsibility. In this way, he/she is involved in the "safety process" and is accountable for issues that arise in his/her functional area.
- A quality assurance function is provided because occurrence investigations and corrective actions are separate activities and responsibilities. This eliminates the potential conflict of interest because the person who identifies the problem is not the person who determines what corrective action to take. This does not preclude the safety committee from discussing safety findings and making recommendations. However, the final say on any remedial action resides with the responsible manager, depending on the size of the organization.

MANAGEMENT & SUPERVISION



Courtesy of Patrick Hudson, PhD, Leiden University - CHC 2009 Safety Summit

Performance Objective: The organization will define, document and communicate the safety roles, responsibilities and authorities throughout its organization.

MANAGEMENT COMMITMENT & SAFETY ACCOUNTABILITIES TABLE

The following tables are extracted from the FAA SMS Program Office Assurance Guide.

Management Accountability

Does the organization ensure top management has the ultimate responsibility for the SMS?

SMS Framework 1.2 B) 1) Old – SMS Standard 4.5.A (R/A)

Does the organization's top management provide the resources needed to implement and maintain the SMS?

SMS Framework 1.2 B) 2) Old – SMS Standard 4.5.B (P/R/A)

Does the organization define levels of management that can make safety risk acceptance decisions?

SMS Framework 1.2 B) 4) Old – SMS Standard 5 D) 2) (P/R/A)

Procedure/Output/Measure

Does the organization ensure that aviation safety-related positions, responsibilities, and authorities are -

Defined? SMS Framework 1.2 B) 3) a) Old – SMS Standard 4.5 D) 1 (P)

Documented? SMS Framework 1.2 B) 3) b) Old – SMS Standard 4.5 D) 2 (P)

Communicated throughout the organization? SMS Framework 1.2 B) 3) c) Old – SMS Standard 4.5 D) 3 (P)

Does the organization periodically measure performance objectives and design expectations of the management commitment and safety accountability element? See note at 3.1.3 & SMS Framework 1.0 B) 2) c) and 3) c)

3.1.3 B) 1) Old – SMS Standard 4.1 B) & C) 6.3.2 A) and 6.3.3 (PM/I)

Key Safety Personnel

Top management has the ultimate responsibility for the SMS and should provide the resources essential to implement and maintain the SMS. Top management should appoint a member of management, such as the Safety Manager, who, irrespective of other responsibilities, has responsibilities and authority including:

- Ensuring the processes needed for the SMS are established, implemented and maintained.

- Reporting to top management on the performance of the SMS and the need for improvement.
- Ensuring the promotion of awareness of safety requirements throughout the organization.
- Ensuring that aviation safety-related positions, responsibilities, and authorities are defined, documented and communicated throughout the organization.

Performance Objective: The organization will appoint a management representative to manage, monitor and coordinate the SMS processes throughout its organization.

KEY SAFETY PERSONNEL TABLE

The following table is extracted from the FAA SMS Program Office Assurance Guide.

Management Responsibility/Procedure

Did top management appoint a member of management who, irrespective of other responsibilities, will be responsible and authorized to -

Ensure that SMS processes are established, implemented, and maintained?
SMS Framework 1.3 B) 1) a) Old - SMS Standard 4.5 C) 1 (P)

Report to top management on the performance of the SMS and what needs to be improved?
SMS Framework 1.3 B) 1) b) Old - SMS Standard 4.5 C) 2 (I/P)

Ensure the organization communicates its safety requirements throughout the organization?
SMS Framework 1.3 B) 1) c) Old - SMS Standard 4.5 C) 3 (I/P)

Outputs and Measures

Does the organization ensure that Key Safety Personnel positions, responsibilities, and authorities are communicated throughout the organization? *SMS Framework 1.2 B) 3) c) Old - SMS Standard 4.5 D) 3 (P) — (I/R/A)*

Does the organization periodically measure performance objectives and design expectations of the key safety personnel element? *See note at 3.1.3 & SMS Framework 1.0 B) 2) c) and 3) c) 3.1.3 B) 1) Old - SMS Standard 4.1 B) & C) 6.3.2 A) and 6.3.3 (PM/I)*

Bottom Line Assessment

Has the organization appointed a management representative to manage, monitor and coordinate the SMS processes throughout its organization?

Emergency Preparedness and Response

An emergency is an event that is by its very nature high risk for those victims at the immediate scene, but also for first responders and those assisting those responders. An ERP exists to control the organizational response to the emergency in such a way as to minimize the risk for all facets of the operation. An ERP is a control mechanism.

Emergency Response Plan (ERP)

An ERP outlines in writing what is done when an emergency occurs, what to do after an accident happens and who is responsible for each action. The better prepared an organization is for an emergency, the better the chances that injuries to personnel and damage to equipment, property or the environment can be minimized.

The plan should be readily available at the work stations of those that may be the first to be notified or required to respond and should be:

- Relevant and useful to people on duty.
- Exercised periodically to ensure the adequacy of the plan and the readiness of the people who must make it work.
- Updated when contact information changes.
- Briefed to all personnel along with their responsibilities.

The ICAO Emergency Response Plan includes checklists that define actions and responsibilities for the following:

- | | |
|----------------------------|---------------------------------|
| ■ Accident Site | ■ Organization |
| ■ Crisis Management Center | ■ Notifications |
| ■ Family assistance | ■ New Media |
| ■ Formal Investigations | ■ Post-critical Incident Stress |
| ■ Governing Policies | ■ Post Occurrence Review |
| ■ Initial Response | |

Additional considerations should include telephone numbers for:

- EMS, fire, rescue, FAA, NTSB, law enforcement, media, aircraft manufacturer, medical examiner.
- Aircraft removal procedures
- Emergency response training

Technology (i.e. cockpit data, voice and video recorders) can provide immediate information that may rule out causal factors such as contaminated fuel that could be a fleet-wide threat, and must always be considered in any loss of power accident.

Note that Chapter 11 of the ICAO Safety Management Manual is dedicated to emergency response planning. The ICAO manual states that the purpose of an ERP is to ensure there is:

- Orderly and efficient transition from normal to emergency operations.
- Delegation of emergency authority.
- Assignment of emergency responsibilities.
- Authorization of key personnel for actions contained within the plan.
- Coordination of efforts to cope with the emergency.
- Safe continuation of operations or return to normal operations as soon as possible.

One person should be assigned the responsibility of maintaining an accident log of activities including:

- Initial notification
- Calls made
- Calls received
- Recording of events
- Press briefing and releases
- Collection of records
- Names & times of dispatch of personnel to the scene
- Handling of personal effects of accident victims
- Securing of maintenance log books (who & time)
- Handling of remains
- Movement and collection of evidence

The purpose of requiring the ERP be a part of the SMS is to ensure that the organization has thought through each of the above items and has established a plan of operation prior to the need to use the plan. This purpose is entirely driven by the same underlying motivation energizing the SMS in the first place – the control of risk.

Organizational Meeting

The key to the plan's success is the ability of management to respond in a logical, coordinated manner. The first step in assuring a timely and appropriate response is to assemble a team of key organization personnel, each of whom will have specific, pre-assigned responsibilities when an accident occurs.

The Accident Response Team (ART) should be composed of a primary and an alternate representative from each of the following departments or persons with these responsibilities:

- | | |
|---------------------------------|----------------------------|
| ■ Accident Response Team Leader | |
| ■ Chief Pilot | ■ Public Relations |
| ■ Dispatcher | ■ Safety Officer |
| ■ Human Resources | ■ Senior Management |
| ■ Legal | ■ Supervisor of Operations |
| ■ Maintenance Supervisor | |

Activating the Plan: The FAA or the NTSB could be the first notification that there has been an accident. The initial communication should trigger a series of phone calls among the members of the ART.

Rehearsal: The best test of how well your plan will work and where it may need refinement is to create a hypothetical accident and rehearse your Accident Response Plan.

Additionally, a flight crew member's sequence of action should include:

Mayday: Declare an emergency. It is important to acknowledge the seriousness of the emergency situation. Declaring a mayday as early as possible will allow more time for emergency services to properly respond. Mayday should be transmitted to Air Traffic Control, organization's base of operations and other aircraft in the vicinity via a common frequency.

Abandon Aircraft: Evacuate the aircraft in accordance with the procedures described in the Aircraft Flight Manual or your organization's Operations Manual.

Notify Authorities: Inform local police, fire and rescue at the accident site of any passenger or crew injuries and arrange for treatment.

Isolate: With police assistance, isolate and secure the accident scene in order to preserve the integrity of the scene.

First Aid: Render emergency first aid to injured persons. Arrange for medical treatment by a physician for all passengers and crew whether they appear injured or not.

Eyewitnesses: Observe anyone in the area at the time of the accident that may be an eyewitness. Attempt to obtain names, addresses and phone numbers.

Silence: Do not speak to anyone at the scene other than responding emergency medical treatment personnel. The crew should have the opportunity to fully recover from shock and review the details of the event in a thoughtful manner, and seek counsel from your organization's legal representative or management. The pilot must cooperate in producing aircraft documents, pilot's license and medical certificate (14 CFR 61.3 (h), and blood alcohol tests (14 CFR 91.17(c and d)).

Team Leader: Contact your Team Leader and advise him/her of the situation. Let the Team Leader coordinate your organization's response.

Performance Objective: The organization will develop and implement procedures that it will follow in the event of an accident or incident to mitigate the effects of these events.

EMERGENCY PREPAREDNESS AND RESPONSE TABLE

The following table is extracted from the FAA SMS Program Office Assurance Guide.

Management Responsibility
Does the organization identify who is responsible for the quality of the emergency preparedness and response process and associated documentation? <i>SMS Framework 1.2 B) 3) Old – None (R/A)</i>
Procedure
Does the organization, across all operational departments (1.0 B) 1) a) of the organization, establish procedures to -
Identify hazards which have potential for accidents and incidents? <i>SMS Framework 1.4 B) 1) Old – SMS Standard 4.8 1) (P)</i>
Coordinate and plan the organization's response to accidents and incidents? <i>SMS Framework 1.4 B) 2) Old – SMS Standard 4.8 2) (P)</i>
Execute periodic exercises of the organization's emergency response procedures? <i>SMS Framework 1.4 B) 3) Old – SMS Standard 4.8 3) (P)</i>
Outputs and Measures
Does the organization identify interfaces between the emergency response functions of different operational elements of the company? <i>SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A) 6) (I)</i>
Does the organization periodically measure performance objectives and design expectations of the emergency preparedness and response system? <i>See note at 3.1.3 & SMS Framework 1.0 B) 2) c) and 3) c) 3.1.3 B) 1) Old – SMS Standard 4.1 B) & C) 6.3.2 A) and 6.3.3 (PM/I)</i>

Bottom Line Assessment

Has the organization developed and implemented procedures that it will follow in the event of an accident or incident to mitigate the effects of these events?

Documentation & Records

The expectation of this process is the organization will have clearly defined and documented safety policies, objectives, and procedures in paper or electronic format.

Procedures that document the organizational processes are required by an SMS and should answer the questions; Who, What, When, Where, and How. The organization should develop and implement a procedure to control all SMS documents. This procedure should include requirements for approval prior to use, periodic review, and revision. The procedure also should include

requirements to make relevant documents available at points of use. The organization should ensure obsolete documents are not used.

SMS documentation should be maintained in an orderly manner, readily identifiable, retrievable, legible, and include the date of revision. The organization should determine how long records should be retained.

Records should be established and maintained to provide evidence of conformity to requirements and of the effective operation of the SMS. A record is proof that the organization has met requirements stated in documented policies, objectives, procedures, and other related documents.

Performance Objective: The organization will have documented safety policies, objectives, procedures, a document/record management process and a management plan that meet safety expectations and objectives.

SMS DOCUMENTATION AND RECORDS TABLE

The following table is extracted from the FAA SMS Program Office Assurance Guide.

Management Responsibility	
Does the organization clearly identify who is responsible for the quality of the documentation and records management process?	<i>SMS Framework 1.2 B) 3) Old – None (R/A)</i>
Procedure: Document Contents	
Does the organization establish and maintain, in paper or electronic format, the following -	
Safety policies?	<i>SMS Framework: 1.5 B) 1) a) Old - SMS Standard 4.9.A.1 (P)</i>
Safety objectives?	<i>SMS Framework: 1.5 B) 1) b) Old - SMS Standard 4.9.A.2 (P)</i>
SMS expectations?	<i>SMS Framework: 1.5 B) 1) c) Old - SMS Standard 4.9.A.3 (P)</i>
Safety-related procedures and processes?	<i>SMS Framework: 1.5 B) 1) d) Old - SMS Standard 4.9.A.4 (P)</i>
Responsibilities and authorities for safety-related procedures and processes?	<i>SMS Framework: 1.5 B) 1) e) Old - SMS Standard 4.9.A.5 (P)</i>
Interactions and interfaces between safety-related procedures and policies?	<i>SMS Framework: 1.5 B) 1) f) Old - SMS Standard 4.9.A.6 (P)</i>
SMS outputs?	<i>SMS Framework: 1.5 B) 1) g) Old - SMS Standard 4.9.A.7 (P)</i>
Procedure: Document Quality	
Does the organization require all documentation be -	
Legible?	<i>SMS Framework: 1.5 B) 3) a) 1) Old - SMS Standard 4.9.B.1.a (P)</i>
Dated (with the dates of revisions)?	<i>SMS Framework: 1.5 B) 3) a) 2) Old - SMS Standard 4.9.B.1.b (P)</i>
Readily identifiable?	<i>SMS Framework: 1.5 B) 3) a) 3) Old - SMS Standard 4.9.B.1.c (P)</i>
Maintained in an orderly manner?	<i>SMS Framework: 1.5 B) 3) a) 4) Old - SMS Standard 4.9.B.1.d (P)</i>
Retained for a specified period as determined by the organization?	<i>Note: Under the Voluntary Implementation and the SMS Pilot Program, the SMS records system does not require FAA approval. SMS Framework: 1.5 B) 3) a) 5) Old - SMS Standard 4.9.B.1.e (P)</i>

SMS DOCUMENTATION AND RECORDS TABLE cont.

Procedure: Document Management

Does the organization control all documents to ensure -	
They are locatable?	SMS Framework: 1.5 B) 3) b) (1) Old - SMS Standard 4.9.B.2.a (P)
They are periodically reviewed?	SMS Framework: 1.5 B) 3) b) (2) (a) Old - SMS Standard 4.9.B.2.b 1 (P)
They are revised as needed?	SMS Framework: 1.5 B) 3) b) (2) (b) Old - SMS Standard 4.9.B.2.b 2 (P)
Authorized personnel approve them for adequacy?	SMS Framework: 1.5 B) 3) b) (2) (c)
Old - SMS Standard 4.9.B.2.b 3 (P)	
All current versions are available at all locations where essential SMS operations are performed?	SMS Framework: 1.5 B) 3) c) Old - SMS Standard 4.9.B.2.c (P/C)
Obsolete documents are either removed as soon as possible, or that they are not used accidentally?	SMS Framework: 1.5 B) 3) d) Old - SMS Standard 4.9.B.2.d (P/C)

Outputs and Measures

Has the organization established and maintained a safety management plan to meet the safety objectives described in its safety policy?	SMS Framework: 1.0 B) 4) g) Old - SMS Standard 4.4 (I/P)
Does the organization ensure SMS records are -	
Identified?	SMS Framework 1.5 B) 4) a) (1) Old - SMS Standard 4.9.C.1.a and 4.9.C.2.b (P)
Maintained?	SMS Framework 1.5 B) 4) a) (2) Old - SMS Standard 4.9.C.1.b (P)
Disposed of?	SMS Framework 1.5 B) 4) a) (3) Old - SMS Standard 4.9.C.1.c (P)
Legible?	SMS Framework 1.5 B) 4) b) (1) Old - SMS Standard 4.9.C.2.a (P)
Easy to identify?	SMS Framework 1.5 B) 4) b) (2) Old - SMS Standard 4.9.C.2.b (P)
Traceable to the activity involved?	SMS Framework 1.5 B) 4) b) (3) Old - SMS Standard 4.9.C.2.c (P)
Easy to find?	SMS Framework 1.5 B) 4) c) (1) Old - SMS Standard 4.9.C.3.a (P)
Protected against damage?	SMS Framework 1.5 B) 4) c) (2) (A) Old - SMS Standard 4.9.C.3.b 1 (P)
Protected against deterioration?	SMS Framework 1.5 B) 4) c) (2) (b) Old - SMS Standard 4.9.C.3.b.2 (P)
Protected against loss?	SMS Framework 1.5 B) 4) c) (2) (c) Old - SMS Standard 4.9.C.3.b.3 (P)
Retained for a documented period of time?	SMS Framework 1.5 B) 4) d) Old - SMS Standard 4.9.C.3.4 (P)
Does the organization periodically measure performance objectives and design expectations of the document and records system?	See note at 3.1.3 & SMS Framework 1.0 B) 2) c) and 3) c); 3.1.3 B) 1) Old – SMS Standard 4.1 B) & C); 6.3.2 A) and 6.3.3 (PM/I)

Bottom Line Assessment

Has the organization clearly defined and documented (in paper or electronic format) safety policies, objectives, procedures, and a document/record maintenance process and established, implemented, and maintained a safety management plan that meets the safety expectations and objectives?

RISK MANAGEMENT STRATEGIES

Reactive

(Past)

Responds to events that have already happened.

Proactive

(Present)

Actively seeks the identification of hazardous conditions through the analysis of the organization's processes.

Predictive

(Future)

Analyzes system processes and environment to identify potential future problems.

Safety Management Systems – Flight Standards



Federal Aviation Administration

Courtesy of Don Arendt, PhD, FAA SMS Program Manager

Safety Risk Management

Understanding the hazards and inherent risks associated with everyday activities allows the organization to minimize unsafe acts and respond proactively, by improving the processes, conditions and other systemic issues that lead to unsafe acts. These systemic/organizational elements include - training, budgeting, procedures, planning, marketing and other organizational factors known to play a role in many systems-based accidents. In this way, safety management becomes a core function and is not just an adjunct management task. It is a vital step in the transition from a reactive culture, one in which the organization reacts to an event, or to a proactive culture, in which the organization actively seeks to address systemic safety issues before they result in an active failure.

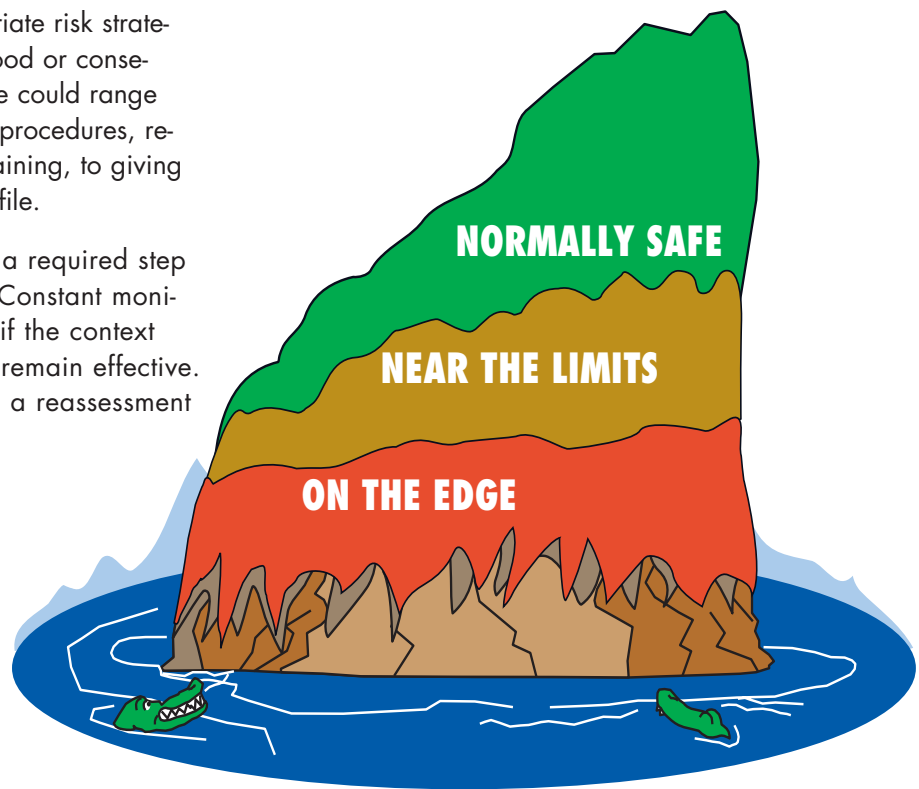
The fundamental purpose of a risk management system is the early identification of potential problems. The risk management system enhances the manner in which management safety decisions are made. The risk management process identifies the 6 steps outlined below:

- 1. Establish the Context.** This is the most significant step of the risk process. It defines the scope and definition of the task or activity to be undertaken, the acceptable level of risk is defined, and the level of risk management planning needed is determined.
- 2. Identify the Risk.** Identification of what could go wrong and how it can happen is examined, hazards are also identified and reviewed, and the source of risk or the potential causal factors are also identified.
- 3. Analyze the Risk.** Determine the likelihood and consequence of risk in order to calculate and quantify the level of risk. A good tool for this process is the reporting system or information gathering techniques. Determining the frequency and consequence of past occurrences can help to establish a baseline for your risk matrix. Each organization will have to determine their definition of severity according to its individual risk aversion.
- 4. Evaluate the Risks.** Determine whether the risk is acceptable or whether the risk requires prioritization and treatment. Risks are ranked as part of the risk analysis and evaluation step.



5. Treat the Risks. Adopt appropriate risk strategies in order to reduce the likelihood or consequence of the identified risk. These could range from establishing new policy and procedures, reworking a task, or a change in training, to giving up a particular mission or job profile.

6. Monitor and Review. This is a required step at all stages of the risk process. Constant monitoring is necessary to determine if the context has changed and the treatments remain effective. In the event the context changes, a reassessment is required.



Courtesy of Patrick Hudson, PhD, Leiden University - CHC 2009 Safety Summit

Interfaces in Safety Risk Management (SRM) and Safety Assurance (SA)

Safety Risk Management (SRM) and Safety Assurance (SA) are the key functional processes of the SMS. They are also highly interactive. The flowchart on page 29 may be useful to help visualize these interactions. The interface element concerns the input-output relationships between the activities in the processes. This is especially important where interfaces between processes involve interactions between different departments, contractors, etc. Assessments of these relationships should place special attention to flow of authority, responsibility and communication, as well as procedures and documentation.

System description (analysis) – The first step in SRM is system description and task analysis. The analysis need only to be as extensive as needed to understand the processes in enough detail to develop procedures, design appropriate training curricula, to identify hazards, and to measure performance.

Hazard identification – Look at the process and ask, what could go wrong under or during hazardous conditions?

Risk analysis – Based on the analysis in the hazard identification step, determine the injury and damage potential of the events related to the hazards in terms of likelihood of occurrence of the events and severity of resulting consequences.

Risk assessment – Risk assessment is a decision step based on combined severity and likelihood. Is the risk acceptable? The process may be complete when severity and likelihood are low and well controlled.

Risk control – This often entails new processes or equipment. Look at the system with the proposed control in place to see if the level of risk is now acceptable. Stay in the design loop until it is determined that the proposed operation or change cannot be mitigated to an acceptable level of risk.

It's essential to recognize the need to update any related system documentation to reflect the risk control.

SAFETY ASSURANCE (SA)

System operation – Monitoring and management of these risk controls is of the most important steps in safety assurance.

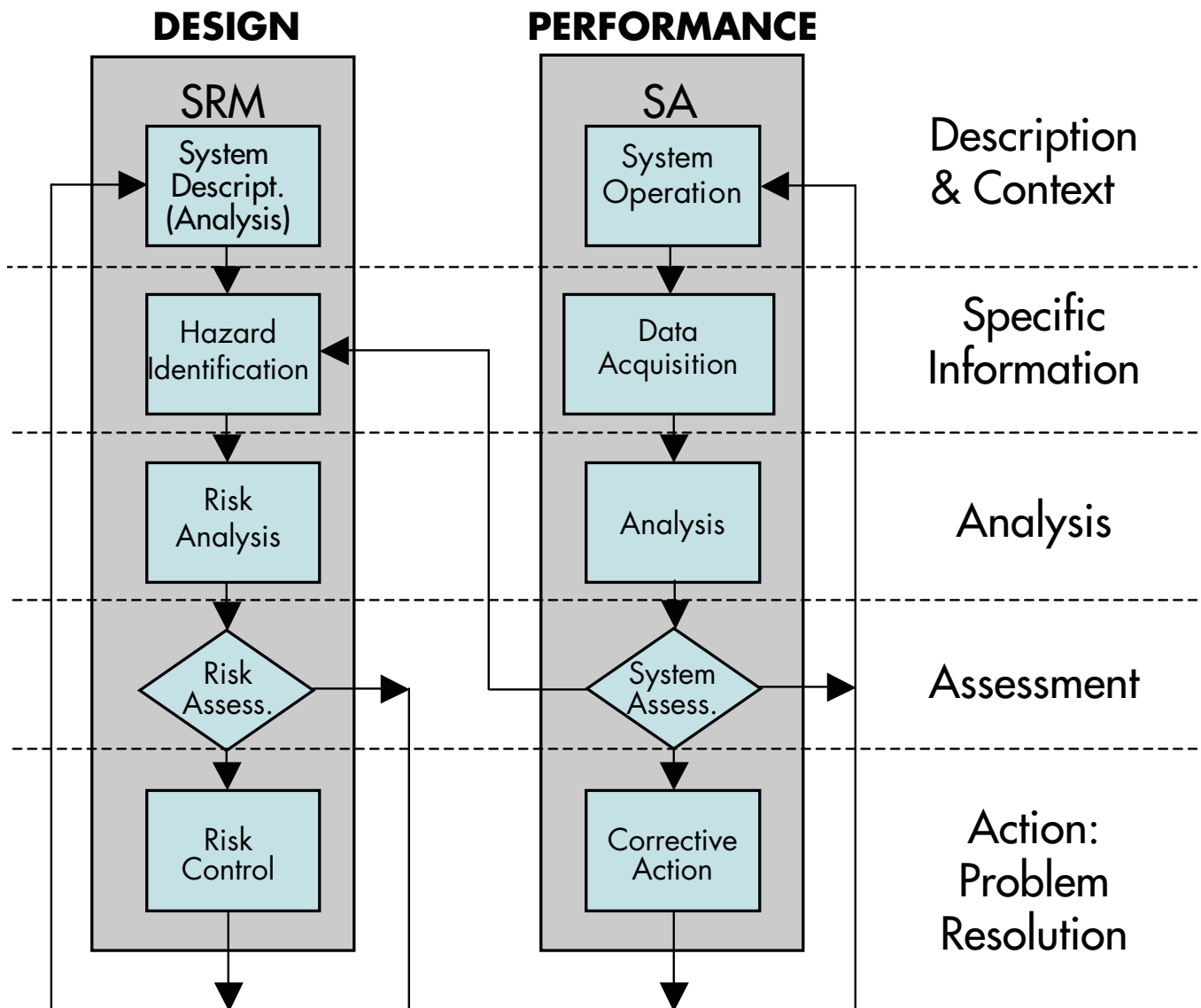
Data acquisition – Collect a variety of data to test the controls. These data range from continuous monitoring (e.g. dispatch procedures), to periodic auditing and employee reporting systems fill in the gaps. It also includes investigations to learn from our failures.

Analysis – As in SRM, data needs to be analyzed in terms of performance objectives and to determine root causes of any shortfalls. Analysis needs to include anticipating new conditions and their possible results.

System assessment – Decisions are made following the assessment process, followed by continually checking and analyzing to ensure the system is working effectively.

Corrective action – The system may need to be corrected if results are not as intended. This may not require the same level of detail we used in initial design. Many times, the corrective action is straightforward.

When new or uncontrolled hazards have been identified, return to the SRM process and re-design the system aspects (e.g. new procedures, training, etc.) or develop new controls.



Performance Objective: The organization will develop processes to understand the critical characteristics of its systems and operational environment and apply this knowledge to identify hazards, analyze and assess risk and design risk controls.

SAFETY RISK MANAGEMENT: GENERAL EXPECTATIONS TABLE

The following table is extracted from the FAA SMS Program Office Assurance Guide.

Input	
Does the organization identify inputs (interfaces) for the Safety Risk Management Component obtained from the critical expectations of its systems and operational environment? <i>SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A) 6) (I)</i>	
Management Responsibility	
Does the organization clearly identify who is responsible for the quality of the Safety Risk Management process? <i>SMS Framework 1.2 B) 3) Old – None (R/A)</i>	
Procedure	
Does the organization's SMS, at a minimum, includes the following processes -	
System and task analysis?	<i>SMS Framework 2.0 B) 1) a). Old - SMS Standard 5.A.1 (P)</i>
Hazard Identification?	<i>SMS Framework 2.0 B) 1) b). Old - SMS Standard 5.A.2 (P)</i>
Safety Risk Analysis?	<i>SMS Framework 2.0 B) 1) c). Old - SMS Standard 5.A.3 (P)</i>
Safety Risk Assessment?	<i>SMS Framework 2.0 B) 1) d). Old - SMS Standard 5.A.4 (P)</i>
Safety Risk Control and Mitigation?	<i>SMS Framework 2.0 B) 1) e). Old - SMS Standard 5.A.5 (P)</i>
Does the organization's SMS processes apply to -	
Initial designs of systems, organizations, and/or products? <i>SMS Framework 2.0 B) 2) a). Old - SMS Standard 5.B.1 (P)</i>	
The development of operational procedures? <i>SMS Framework 2.0 B) 2) b). Old - SMS Standard 5.B.2 (P)</i>	
Hazards that are identified in the safety assurance functions (described in Component 3.0, B)? <i>SMS Framework 2.0 B) 2) c). Old - SMS Standard 5.B.3 (P)</i>	
Planned changes to operational processes? <i>SMS Framework 2.0 B) 2) d). Old - SMS Standard 5.B.4 (P)</i>	
Does the organization establish feedback loops between assurance functions described in the SMS Framework, Process 3.1.1 B) to evaluate the effectiveness of safety risk controls? <i>SMS Framework 2.0 B) 3) Old - SMS Standard 5.C (P)</i>	
Does the organization define acceptable and unacceptable levels of safety risk (for example, does the organization have a safety risk matrix)? <i>SMS Framework 2.0 B) 4) a). Old - SMS Standard 5.D (P)</i>	
Does the organization's safety risk acceptance process include descriptions of the following -	
Severity levels?	<i>SMS Framework 2.0 B) 4) b) 1) Old - SMS Standard 5.D.1.a (P)</i>
Likelihood levels?	<i>SMS Framework 2.0 B) 4) b) 2) Old - SMS Standard 5.D.1.b (P)</i>
Level of management that can make safety risk acceptance decisions? <i>SMS Framework 2.0 B) 4) c) Old – SMS Standard 5.D.2. And 5.4.B (P/R/A)</i>	
Does the organization define acceptable risk for hazards that will exist in the short-term while safety risk control/mitigation plans are developed and carried out? <i>SMS Framework 2.0 B) 4) d) Old - SMS Standard 5.D.3 (P)</i>	

SAFETY RISK MANAGEMENT: GENERAL EXPECTATIONS TABLE cont.

Outputs and Measures

Does the organization describe the interfaces between the Safety Risk Management Component and the Safety Assurance Component (3.0)? *SMS Framework 1.5 B) 1) f) Old - SMS Standard 4.9 A (6) (I)*

Does the organization periodically measure performance objectives and design expectations of the safety risk management component? *See note at 3.1.3 & SMS Framework 1.0 B) 2) c) and 3) c) 3.1.3 B) 1) Old - SMS Standard 4.1 B) & C) 6.3.2 A) and 6.3.3 (PM/I)*

Controls

Does the organization ensure procedures are followed for safety-related operations and activities? *SMS Framework: 1.0 B) 4) f) Old - SMS Standard 4.7 B (C)*

Does management periodically review supervisory and operational controls to ensure the effectiveness of safety risk management? *SMS Framework 1.1 B) 2) k), 3.1.3 B) 1) and 3.1.10 A) & B) Old - SMS Standard 6.3.3 A) and 6.7 (C)*

Bottom Line Assessment

Has the organization developed processes to understand the critical characteristics of its systems and operational environment and applied this knowledge to the identification of hazards, risk analysis and risk assessment, and the design of risk controls?

Hazard Identification & Analysis: System and Task Analysis

Performance Objectives: The organization will analyze its systems, operations and operational environment to gain an understanding of critical design and performance factors, processes and activities to identify hazards.

SYSTEM AND TASK ANALYSIS TABLE

The following table is extracted from the FAA SMS Program Office Assurance Guide.

Input

Does the organization identify inputs (interfaces) for the System and Task Analysis process obtained from SMS Framework 2.0 B) 2)? *SMS Framework 2.0 B) 2) Old - None (I)*

Management Responsibility

Does the organization clearly identify who is responsible for the quality of the system and task analysis process? *SMS Framework 1.2 B) 3) Old - None (R/A)*

Procedure

Does the organization develop system and task descriptions to the level of detail necessary to -

Identify hazards? *SMS Framework 2.1.1 B) 1) a) Old - 5.1.A (P)*

Develop operational procedures? *SMS Framework 2.1.1 B) 1) b) Old - None (P)*

Develop and implement risk controls? *SMS Framework 2.1.1 B) 1) c) Old - None (P)*

Outputs and Measures

Does the organization identify interfaces between the system and task analysis function and the hazard identification function? *SMS Framework 1.5 B) 1) f) Old - SMS Standard 4.9 A (6) (I)*

Does the organization periodically measure performance objectives and design expectations of the system and task analysis process? *See note at 3.1.3 & SMS Framework 1.0 B) 2) (c) and 3) (c) 3.1.3 B) 1) Old - SMS Standard 4.1 B) 3 & C) 3 6.3.2 A & 6.3.3 (PM/I)*

SYSTEM AND TASK ANALYSIS TABLE cont.

Controls

Does the organization ensure procedures are followed for safety-related operations and activities?
SMS Framework: 1.0 B) 4) f) Old – SMS Standard 4.7 B (C)

Does management periodically review supervisory and operational controls to ensure the effectiveness of the system and task analysis process? *SMS Framework 1.1 B) 2) k), 3.1.3 B) 1) and 3.1.10 A) & B) Old – SMS Standard 6.3.3 A) and 6.7 (C)*

Bottom Line Assessment

Has the organization analyzed its systems, operations and operational environment to gain an understanding of critical design and performance factors, processes, and activities to identify hazards?

Hazard Identification

The SMS identifies hazards and develops processes to identify and manage risks. Key elements of hazard identification and risk management programs are:

- Proactive identification of existing and potential hazards. This includes those hazards associated with organizational change when the organization is undergoing rapid growth, introducing new services, new equipment or new personnel.
- A process to prioritize risk management
- A method to track identified hazards

Hazard identification is the act of identifying any condition with the potential of causing injury to personnel, damage to equipment or structures, loss of material, or reduction of the ability to perform a prescribed function. This includes any condition contributing to the release of an un-airworthy aircraft or to the operation of aircraft in an unsafe manner.

This can be achieved through internal reporting mechanisms, such as flight data monitoring programs, or through an assessment of the processes used to perform a specific function or operation. This involves an on-going assessment of the functions and systems, changes to them, and the development of a safety case to proactively manage safety. Safety assessments are a core process in the safety management structure, and provide a vital function in evaluating and maintaining the system's safety health.

Any safety concern an employee has should be reported. Some examples include:

- High workload
- Rushing critical tasks

- Missing checklist items
- Parts issues
- Inadequate tool control
- Feeling fatigued
- Unsafe ground movement
- Improper equipment or tools
- Poorly developed or outdated procedures





When an issue requires action, it must be given to the person with the appropriate level of authority. This maintains accountability in the system. The credibility of the system is only maintained when the outcome of the concern is fed back to the reporter.

The identification of a hazard provides an opportunity to learn how to prevent accidents and incidents it might cause. Procedures need to be in place for internal reporting of hazards. Timely collection of information allows the organization to react to the information.

A hazard reporting form should be simple, convenient and available to all employees. Hazard reporting programs include:

- Feedback to the reporting person
- A process for analyzing data, safety reports and related information
- Ongoing monitoring to confirm the effectiveness of corrective action
- Ongoing monitoring to identify hazardous trends
- A non-punitive discipline policy for individuals who report hazards
- Provisions for anonymous reporting of hazards

REPORTING SYSTEMS

-  **Keep it simple and accessible.**
-  **Re-active and pro-active processes can overlap.**
-  **Ensure people submitting reports get feedback.**
-  **Find a simple way to file and track reports.**

Not all safety information will come through established safety reporting systems. Other methods of collecting information and data can include:

- Maintenance interruption reports
- Crew/mission briefing forms
- Flight and maintenance logs
- Employee interviews
- Surveys

EXPECTATIONS FOR HAZARD IDENTIFICATION

- There are communication processes in place within the organization permitting the safety management system to function effectively.
- Communication processes are commensurate with the size and scope of the organization. (Written documents, meetings, electronic, etc.)
- SMS information is established and maintained in a suitable medium to provide direction in related documents.
- There is a process for the dissemination of safety information throughout the organization.
- There is a means of monitoring the effectiveness of the process for disseminating safety information within the organization.
- Organization-wide, uncomplicated, reciprocal communications related to safety and quality issues are plainly evident.
- All areas, including out-stations and outsource functions, are included in the communication network of the organization.
- There is an established means of inter-departmental communication to spread information on SMS related matters.
- There exists a formal means of communicating with SMS experts so advice is readily available to all personnel. The documentation should indicate where these experts can be located.
- All personnel know their primary contact for safety related matters.
- There is a process for communication strategy including electronic communication, frequent meetings, SMS award systems, employee recognition system, SMS bulletins, etc.
- There is a process for sharing safety related information with outside sources impacted by this information.

Performance Objective: The organization will identify and document the hazards in its operations that are likely to cause death, serious physical harm, or damage to equipment or property in sufficient detail to determine associated level of risk and risk acceptability.

HAZARD IDENTIFICATION TABLE

The following table is extracted from the FAA SMS Program Office Assurance Guide.

Input

Does the organization identify inputs (interfaces) for the Hazard Identification process obtained from the System and Task Analysis process (2.1.1), to include a new hazard identified from the Safety Assurance process (3.0), failures of risk controls due to design deficiencies (3.1.8 (B)(3)), and/or from any other source? *SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A (6) (I)*

Management Responsibility

Does the organization clearly identify who is responsible for the quality of the hazard identification process? *SMS Framework 1.2 B) 3) Old – SMS Standard None (R/A)*

Procedure

Does the organization identify hazards for the entire scope of each system, as defined in the system description? Note: While it is recognized that identification of every conceivable hazard is impractical, operators are expected to exercise due diligence in identifying and controlling significant and reasonably foreseeable hazards related to their operations. *SMS Framework 2.1.2 B) 1) a) Old - SMS Standard 5.2.A.1, 4.1 (P)*

Does the organization document the identified hazards? *SMS Framework 2.1.2 B) 1) b) Old - SMS Standard 5.2.A.2 (P)*

Does the organization have a means of tracking this hazard information? *SMS Framework 2.1.2 B) 2) a) Old - SMS Standard 5.2.B.1 (P)*

Does the organization manage this hazard information through the entire safety risk management process? *SMS Framework 2.1.2 B) 2) b) Old - SMS Standard 5.2.B.2 (P)*

Outputs and Measures

Does the organization describe the interfaces between the hazard identification process and the analysis of safety risk process (2.2.1)? *SMS Framework 1.5 B) 1) f) Old - SMS Standard 4.9 A (6) (I)*

Does the organization periodically measure performance objectives and design expectations of the hazard identification process? *See note at 3.1.3 & SMS Framework 1.0 B) 2) (c) and 3) (c) 3.1.3 B) 1) Old – SMS Standard 4.1 B) 3 & C) 3 6.3.2 A & 6.3.3 (PM/I)*

Controls

Does the organization have a control or controls in place to assure that new hazards are identified, documented, tracked, and managed? *SMS Framework 1.0 B) 4) f), 2.1.2 B) 1) and 2) Old - SMS Standard 5.2 (C)*

Does the organization ensure procedures are followed for safety-related operations and activities? *SMS Framework: 1.0 B) 4) f) and 2.1.2 B) Old – SMS Standard 4.7 B (PM)*

Does management periodically review supervisory and operational controls to ensure the effectiveness of the hazard identification process? *SMS Framework 1.1 B) 2) k), 3.1.3 B) 1) and 3.1.10 A) & B) Old – SMS Standard 6.3.3 A) and 6.7 (C)*

Bottom Line Assessment

Has the organization identified and document the hazards in its operations that are likely to cause death, serious physical harm, or damage to equipment or property in sufficient detail to determine associated level of risk and risk acceptability?

Hazard Analysis

Hazard identification is a wasted unless safety information is extracted from the data collected. The first step in developing safety information is hazard analysis. Hazard analysis is a three-step process:

First Step: Identify the generic hazard (also known as top level hazard). Generic hazard, is a term intended to provide focus and perspective on a safety issue, while also helping to simplify the tracking and classification of many individual hazards flowing from the generic hazard.

Second Step: Divide the generic hazard into specific hazards or components of the generic hazard. Each specific hazard will likely have a different and unique set of causal factors, thus making each specific hazard unique.

Third Step: Link specific hazards to potentially specific consequences, i.e. specific events or outcomes. The following example illustrates the notions of generic hazard, specific hazard and consequences:

An international airport handles 100,000 movements per year launches a construction project to extend and re-pave one of two crossing runways.

The following three-step hazard analysis process would apply:

First Step: State the generic hazard.

— Airport construction

Second Step: Identify specific hazards or components of the generic hazard.

— Construction equipment

— Closed taxiways

Third Step: Link specific hazards to specific consequence(s).

— Aircraft colliding with construction equipment

— Aircraft landing or taking off on a closed runway

This runway construction example can be used to extend the discussion about hazard analysis, that is: efficient and safe operations require a constant balance between production goals and safety goals. In the case of the runway construction example, there is clearly an efficiency goal: maintaining regular airport operations during a runway construction project. There is an equally clear safety goal: maintaining existing margins of safety of airport operations during the runway construction project. In conducting the hazard analysis, two basic premises of safety management must be at the forefront of the analysis:

- A-** Hazards are potential vulnerabilities inherent in technical systems. They are a necessary part of the system as a result of the capabilities they provide the system to deliver services. Workplaces contain hazards which may not be cost-effective even when operations must continue.
- B-** Hazard identification is a wasted effort if restricted to the aftermath of rare occurrences where there is serious injury or significant damage.

Risk Assessment & Control

(includes safety risk analysis, assessment & control/litigation)

Analyze Safety Risk

Based on the analysis in the hazard identification step, determine the injury and damage potential of the events related to the hazards in terms of likelihood of occurrence of the events and severity of resulting consequences. The following table is extracted from the FAA SMS Program Office Assurance Guide.

Performance Objective: The organization should determine and analyze the factors related to the severity and likelihood of potential events associated with identified hazards and will identify factors associated with unacceptable levels of severity or likelihood.

SAFETY RISK ANALYSIS TABLE

The following table is extracted from the FAA SMS Program Office Assurance Guide.

Input
Does the organization identify inputs (interfaces) for the Safety Risk Analysis process obtained from the hazard identification process (2.1.2 B))? <i>SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A (6) (I)</i>
Management Responsibility
Does the organization clearly identify who is responsible for the quality of the hazard identification process? <i>SMS Framework 1.2 B) 3) Old – SMS Standard None (R/A)</i>
Procedure
Does the organization's safety risk analysis functions include -
Analysis of existing safety risk controls? <i>SMS Framework 2.2.1 B) 1) a) Old - SMS Standard 5.3.1 (P)</i>
Triggering mechanisms? <i>SMS Framework 2.2.1 B) 1) b) Old - SMS Standard 5.3.2 (P)</i>
Safety risk of a reasonably likely outcome from the existence of a hazard? <i>SMS Framework 2.2.1 B) 1) c) Old - SMS Standard 5.3.3 (P)</i>
Does the organization's levels of safety risk include descriptions of the following -
Likelihood levels? <i>SMS Framework 2.2.1 B) 1) c) (1) Old - SMS Standard 5.D.1.b</i>
Severity levels? <i>SMS Framework 2.2.1 B) 1) c) (2) Old - SMS Standard 5.D.1.a</i>
Outputs and Measures
Does the organization identify interfaces between the risk analysis functions and the risk assessment function (2.2.2)? <i>SMS Framework 1.5 B) 1) f) Old - SMS Standard 4.9 A (6) (I)</i>
Does the organization periodically measure performance objectives and design expectations of the analysis of safety risk process? <i>See note at 3.1.3 & SMS Framework 1.0 B) 2) (c) and 3) (c) 3.1.3 B) 1) Old – SMS Standard 4.1 B) 3 & C) 3 6.3.2 A & 6.3.3 (PM/I)</i>
Controls
Does the organization have a control or controls in place to analyze the safety risk of the reasonably likely outcomes from the existence of a hazard? <i>SMS Framework 1.0 B) 4) f) and 2.2.1 B) 1) c) Old - SMS Standard 5.3.3 (C)</i>
Does the organization ensure procedures are followed for safety-related operations and activities? <i>SMS Framework: 1.0 B) 4) f) Old – 4.7 B) (C)</i>
Does management periodically review supervisory and operational controls to ensure the effectiveness of the analysis of safety risk process? <i>SMS Framework 1.1 B) 2) k), 3.1.3 B) 1) and 3.1.10 A) & B) Old – SMS Standard 6.3.3 A) and 6.7 (C)</i>

Bottom Line Assessment

Has the organization determined and analyzed the factors related to the severity and likelihood of potential events associated with identified hazards and identified factors associated with unacceptable levels of severity or likelihood?

LIKELIHOOD

		FREQUENT	PROBABLE	OCCASIONAL	REMOTE	IMPROBABLE
SEVERITY	I-CATASTROPHIC	1	2	4	8	12
	II-CRITICAL	3	5	6	10	15
	III-MARGINAL	7	9	11	14	17
	IV - NEGLIGIBLE	13	16	18	19	20

Risk Assessment

Risk assessment is a decision step, based on combined severity and likelihood. Ask, is the risk acceptable? The risk assessment may be concluded when potential severity is low or if the likelihood is low or well controlled.

To use the risk assessment matrix effectively it is important that everyone has the same understanding of the terminology used for probability and severity. For this reason, definitions for each level of these components should be provided.

Risk Matrix

The risk assessment matrix is a useful tool to identify the level of risk and the levels of management approval required for any Risk Management Plan. There are various forms of this matrix, but they all have a common objective to define the potential consequences and/or severity of the hazard versus the probability or likelihood of the hazard.

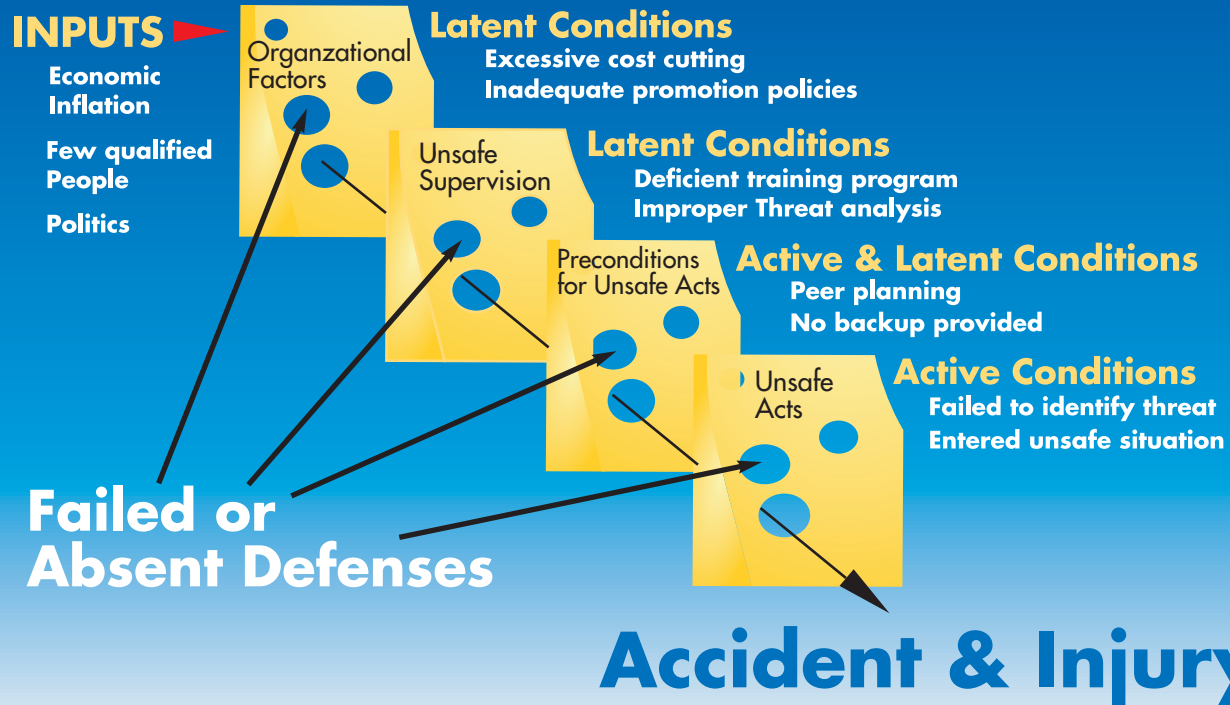
Risk Control

Often risk mitigation will require new processes, new equipment or changes to existing ones. Look at the system with the proposed control in place to see if the level of risk is now acceptable. Stay in this design loop until it is determined that the proposed operation, change, etc. not be mitigated to allow operations within acceptable levels of risk.

RISK MATRIX

- ▶ Has interaction with managers or supervisors, but can exist on it's own.
- ▶ Stresses "links" in an accident chain.
- ▶ Used by military.
- ▶ Enhances situational awareness.

"SWISS CHEESE" MODEL OF HUMAN ERROR



Courtesy of James Reason, 1990

Safety Risk Management Expectations:

- There is a structured process for assessing risk associated with identified hazards expressed in terms of severity, level of exposure and probability of occurrence.
 - There are criteria for evaluating risk and identifying a tolerable level of risk the organization is willing to accept.
 - The organization has risk control strategies.
 - Risk control strategies include corrective/preventive action plans to prevent recurrence of occurrences and deficiencies.
 - The organization has a process for evaluating the effectiveness of the corrective/preventive measures that have been developed.
 - Corrective/preventive actions, including timelines, are documented.
 - There is a risk classification system guiding the organization in developing risk control strategies.
 - The organization uses its risk management results to develop best practice guidelines.
 - The results of the risk management program are built into the organization's methods and procedures.
- The organization must be able to demonstrate the risk management process through records and be able to show periodic review.

Performance Objective: The organization will assess risk associated with each identified hazard and define risk acceptance procedures and levels of management that can make safety risk acceptance decisions.

ASSESS SAFETY RISK TABLE

The following table is extracted from the FAA SMS Program Office Assurance Guide.

Input
Risk Analysis process in terms of estimateDoes the organization identify inputs (interfaces) for the Safety Risk Assessment process obtained from the Safety d severity and likelihood (2.2.1 B))? SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A (6) (I)
Management Responsibility
Does the organization clearly identify who is responsible for the quality of the safety risk assessment process? SMS Framework 1.2 B) 3) Old – SMS Standard None (R/A)
Does the organization define the levels of management that can make safety risk acceptance decisions? SMS Framework 1.2 B) 4) and 2.0 B) 4) c) Old – SMS Standard 5.D.2. and 5.4.B (P/R/A)
Procedure
Does the organization analyze each hazard for its safety risk acceptability using their safety risk acceptance process as described in the SMS Framework Component 2.0, B) 4)? SMS Framework 2.2.2 B) Old – SMS Standard 5.4.A (P)
Outputs and Measures
Does the organization identify interfaces between the risk assessment functions and the risk mitigation functions (2.2.3)? SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A (6) (I)
Does the organization periodically measure performance objectives and design expectations of the safety risk assessment process? See note at 3.1.3 & SMS Framework 1.0 B) 2) (c) and 3) (c) 3.1.3 B) 1) Old – SMS Standard 4.1 B) 3 & C) 3 6.3.2 A & 6.3.3 (PM/I)
Controls
Does the organization ensure procedures are followed for safety-related operations and activities? SMS Framework: 1.0 B) 4) f) Old – SMS Standard 4.7 B (C)
Does management periodically review supervisory and operational controls to ensure the effectiveness of the safety risk assessment process? SMS Framework 1.1 B) 2) k), 3.1.3 B) 1) and 3.1.10 A) & B) Old – SMS Standard 6.3.3 A) and 6.7 (C)

Bottom Line Assessment

Has the organization assessed risk associated with each identified hazard and defined risk acceptance procedures and levels of management that can make safety risk acceptance decisions?

Safety Assurance

Ongoing Monitoring

The ongoing monitoring of all systems and the application of corrective actions are functions of the quality assurance system. Continuous improvement can only occur when the organization displays constant vigilance regarding the effectiveness of its technical operations and its corrective actions. Without ongoing monitoring of

corrective actions, there is no way of telling whether the problem has been corrected and the safety objective met. Similarly, there is no way of measuring if a system is fulfilling its purpose with maximum efficiency.

Evaluation of the safety program includes external assessments by professional or peer organizations. Safety oversight is provided in part by some of the elements of the SMS such as occurrence reporting and investigation. However, safety assurance and oversight programs proactively seek out

potential hazards based on available data as well as the evaluation of the organization's safety program. This can best be accomplished by:

- Conducting internal assessments of operational processes at regularly scheduled intervals
- Utilizing checklists tailored to the organization's operations when conducting safety evaluations
- Assessing the activities of contractors where their services may affect the safety of the operation
- Having assessment of evaluator's processes conducted by an independent source
- Documenting results and corrective actions
- Documenting positive observations
- Categorizing findings to assist in prioritizing corrective actions
- Sharing the results and corrective actions with all personnel
- Utilizing available technology such as Health Usage Monitoring Systems (HUMS) to supplement quality and maintenance programs and Flight Data Monitoring to evaluate aircrew operations
- Facilitating Safety Committee meetings
- Advising the CEO on safety issues
- Causing incidents to be investigated, reviewed, make recommendations and provide feedback to the organization
- Conducting periodic assessment of flight operations
- Providing safety insight to the organization's management

Safety Performance Monitoring & Measurement

The safety performance of the organization is proactively and reactively monitored to ensure that the key safety goals continue to be achieved. Relying on accident rates as a safety performance measure can create a false impression because not having accidents does not necessarily indicate the organization is safe. In reality, there will always be latent conditions within the system that might lead to an accident. Performance measurements must be tailored to the size, nature and complexity of the organization.

The results of all safety performance monitoring is documented and used as feedback to improve the system by the following:

- Address individual areas of concern. The assessment of the improvements made to work procedures might be far more effective than measuring accident rates
- Are specific, measurable, achievable, results oriented and timely (SMART)
- Safety performance measures are linked to the organization's operations performance measures, for example:

Organization Objective: Reduce Costs	Organization Performance Measure: Reduction in Insurance Rates
Safety Objective: Decrease number and severity of hangar incidents.	Safety Performance Measure: Reduction in total number of events: <ul style="list-style-type: none"> ■ Number of damage-only events ■ Number of near-miss accidents ■ Lessons learned from event analyses ■ Number of corrective action plans developed and implemented

Monitoring by audit forms a key element of this activity and should include both a quantitative and qualitative assessment. The results of all safety performance monitoring should be documented and used as feedback to improve the system.

It is widely acknowledged accident rates are not an effective measurement of safety. They are purely reactive and are only effective when the accident rates are high enough. Furthermore, relying on accident rates as a safety performance measure can create a false impression; an assumption that zero accidents indicate the organization is safe. A more effective way to measure safety might be to address the individual areas of concern. For example, an assessment of the improvements made to work procedures might be far more effective than measuring accident rates.

Performance measurements **are a requirement** and must be integrally linked to the organization's objectives. This requires two things: the development and implementation of a coherent set of safety performance measures; and, a clear linkage between

the safety performance measures and the organization's performance measures. This shows a clear relationship between the organization's safety objectives and the achievement of its organizational and performance goals.

Performance Objective: The organization will monitor operational data, including products and services received from contractors, to identify hazards, measure the effectiveness of safety risk controls and assess system performance.

CONTINUOUS MONITORING TABLE

The following table is extracted from the FAA SMS Program Office Assurance Guide.

Input
Does the organization identify inputs (interfaces) for the Continuous Monitoring process obtained from the Risk Assessment process (2.2.2) or Risk Control/Mitigation process (2.2.3)? <i>SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A (6) (I)</i>
Management Responsibility
Does the organization clearly identify who is responsible for the quality of the Continuous Monitoring process? <i>SMS Framework 1.2 B) 3) Old – SMS Standard None (R/A)</i>
Procedure
Does the organization monitor operational data to -
Determine whether it conforms to safety risk controls? <i>SMS Framework 3.1.1 B) 1) a) Old – SMS Standard 6.3.1 A) 1) (P)</i>
Measure the effectiveness of safety risk controls? <i>SMS Framework 3.1.1 B) 1) b) Old – SMS Standard 6.3.1 A) 2) (P)</i>
Assess system performance? <i>SMS Framework 3.1.1 B) 1) c) Old – SMS Standard 6.3.1 A) 3) (P)</i>
Identify hazards? <i>SMS Framework 3.1.1 B) 1) d) Old – SMS Standard 6.3.1 A) 4) (P)</i>
Does the organization monitor products and services from contractors? <i>SMS Framework 3.1.1 B) 2) Old – SMS Standard 6.3.1.B (P)</i>
Outputs and Measures
Does the organization identify interfaces between the continuous monitoring functions and analysis of data process (3.1.7)? <i>SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A (6) (I)</i>
Does the organization periodically measure performance objectives and design expectations of the continuous monitoring process? <i>See note at 3.1.3 & SMS Framework 1.0 B) 2) (c) and 3) (c) 3.1.3 B) 1) Old – SMS Standard 4.1 B) 3 & C) 3 6.3.2 A & 6.3.3 (PM/I)</i>
Controls
Does the organization ensure procedures are followed for safety-related operations and activities? <i>SMS Framework: 1.0 B) 4) f) Old – SMS Standard 4.7 B (C)</i>
Does management periodically review supervisory and operational controls to ensure the effectiveness of the continuous monitoring process? <i>SMS Framework 1.1 B) 2) k), 3.1.3 B) 1) and 3.1.10 A) & B) Old – SMS Standard 6.3.3 A) and 6.7 (C)</i>

Bottom Line Assessment

Has the organization monitored operational data, including products and services received from contractors, to identify hazards, measure the effectiveness of safety risk controls, and assess system performance?

Audits

The use of audit functions to verify compliance and standardization is an integral part of the quality assurance system. An initial audit covering all technical activities should be conducted, followed by a recurring cycle of further internal audits. Detailed records of audit findings, including issues of compliance and non-compliance, corrective actions and follow-up inspections should be kept. The results of the audit should be communicated throughout the organization.

Depending on the size of the organization, these functions may be performed by individuals within the organization or assigned to external agents. Wherever practical, these functions should be undertaken by persons who are not responsible for, and have not been involved in, the certification or performance of the tasks and functions audited. In this way, the quality assurance function system remains neutral and is independent from the operational aspects of the organization.

Audit Checklists

Audit checklists should be employed to identify all of the technical functions controlled by the policy and procedures manuals. These should be sufficiently detailed to ensure all of the technical functions performed by the organization are covered. Accordingly, the extent and complexity of these checklists will vary from organization to organization.

In the case of a quality audit on an organization's safety management system, the checklist should provide a detailed account of the following areas:

- Safety policy
- Safety standards
- Safety culture
- Contractor's safety organization
- Structure of safety accountabilities
- Hazard management arrangements
- Safety assessment, and
- Safety monitoring

(An examples of detailed audit checklists are provided in FAA's Inspection and Audit Manual.)

Performance Objective: The organization will perform regularly scheduled internal audits of its operational processes, including those performed by contractors, to determine the performance and effectiveness of risk controls.

INTERNAL AUDITS BY OPERATIONAL DEPARTMENTS TABLE

The following table is extracted from the FAA SMS Program Office Assurance Guide.

Input
Does the organization identify inputs (interfaces) for the internal audits by operational departments obtained from the risk control/mitigation process (2.2.3)? <i>SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A (6) (I)</i>
Management Responsibility
Does the organization clearly identify who is responsible for the quality of the internal auditing process? <i>SMS Framework 1.2 B) 3) Old – SMS Standard None (R/A)</i>
Procedure:
Does the organization's line management ensure regular audits are conducted of their safety-related departmental functions? <i>SMS Framework 3.1.2 B) 1) Old – SMS Standard 6.3.2.A (P)</i>
Procedure: Auditing of Contractors
Does the organization's line management ensure regular audits are conducted of their safety-related departmental functions which are performed by subcontractors? <i>SMS Framework 3.1.2 B) 1) Old – SMS Standard 6.3.2.A (P)</i>
Procedure: Objectives of Audits
Does the organization conduct regular audits to -
Determine conformity to safety risk controls? <i>SMS Framework 3.1.2 B) 2) a) Old – SMS Standard 6.3.2.B.1 (P)</i>
Assess safety risk controls' performance? <i>SMS Framework 3.1.2 B) 2) b) Old – SMS Standard 6.3.2.B.2 (P)</i>

INTERNAL AUDITS BY OPERATIONAL DEPARTMENTS TABLE cont.

Procedure: Audit Planning

Does the organization's audit program planning takes into account -

Safety criticality of the processes to be audited? *SMS Framework 3.1.2 B) 3) a) Old – SMS Standard 6.3.2.C.1 (P)*

Results of previous audits? *SMS Framework 3.1.2 B) 3) b) Old – SMS Standard 6.3.2.C.2 (P)*

Procedure: Audit Program Management

Does the organization define -

Audits, including -

Criteria? *SMS Framework 3.1.2 B) 4) a) (1) Old – SMS Standard 6.3.2.D.1.a (P)*

Scope? *SMS Framework 3.1.2 B) 4) a) (2) Old – SMS Standard 6.3.2.D.1.b (P)*

Frequency? *SMS Framework 3.1.2 B) 4) a) (3) Old – SMS Standard 6.3.2.D.1.c (P)*

Methods? *SMS Framework 3.1.2 B) 4) a) (4) Old – SMS Standard 6.3.2.D.1.d (P)*

How they will select the auditors? *SMS Framework 3.1.2 B) 4) b) Old – SMS Standard 6.3.2.D.2 (P)*

How they will ensure that auditors do not audit their own work? *SMS Framework 3.1.2 B) 4) c) Old – SMS Standard 6.3.2.D.3 (P)*

Procedure: Documentation

Does the organization define -

Internal audit responsibilities? (P) *SMS Framework 3.1.2 B) 5) a) Old – SMS Standard 6.3.2.D.4.a*

Expectations for -

Planning audits? *SMS Framework 3.1.2 B) 5) b) (1) Old – SMS Standard 6.3.2.D.4.b.1 (P)*

Conducting audits? *SMS Framework 3.1.2 B) 5) b) (2) Old – SMS Standard 6.3.2.D.4.b.2 (P)*

Reporting results? *SMS Framework 3.1.2 B) 5) b) (3) Old – SMS Standard 6.3.2.D.4.b.3 (P)*

Maintaining records? *SMS Framework 3.1.2 B) 5) b) (4) Old – SMS Standard 6.3.2.D.4.b.4 (P)*

Audits of contractors and vendors? *SMS Framework 3.1.2 B) 5) b) (5) Old – SMS Standard 6.3.2.D.5 (P)*

Maintaining records? *SMS Framework 3.1.2 B) 5) b) (4) Old – SMS Standard 6.3.2.D.4.b.4 (P)*

Audits of contractors and vendors? *SMS Framework 3.1.2 B) 5) b) (5) Old – SMS Standard 6.3.2.D.5 (P)*

Outputs and Measures

Does the organization identify interfaces between the internal audits of operational department's processes and the analysis of data process (3.1.7)? *SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A (6) (I)*

Does the organization periodically measure performance objectives and design expectations of the internal audit process? *See note at 3.1.3 & SMS Framework 1.0 B) 2) (c) and 3) (c) 3.1.3 B) 1) Old – SMS Standard 4.1 B) 3 & C) 3 6.3.2 A & 6.3.3 (PM/I)*

Controls

Does the organization ensure procedures are followed for safety-related operations and activities? *SMS Framework: 1.0 B) 4) f) Old – SMS Standard 4.7 B (C)*

Does management periodically review supervisory and operational controls to ensure the effectiveness of the internal audit process? *SMS Framework 1.1 B) 2) k), 3.1.3 B) 1) and 3.1.10 A) & B) Old – SMS Standard 6.3.3 A) and 6.7 (C)*

Bottom Line Assessment

Has the organization performed regularly scheduled internal audits of its operational processes, including those performed by contractors, to determine the performance and effectiveness of risk controls?

Internal Evaluation

Safety Oversight

Safety oversight is fundamental to the safety management process. A principle tenet of safety management policies, principles and procedures, requires an organization to critically review its existing operations, proposed operational changes and additions or replacements for safety significance.

There are two distinctive elements in the safety management system. One is reactive, the other proactive. The reactive process responds to events which have already occurred, while the proactive method actively seeks to identify potential hazards through an analysis of the everyday activities of the organization. The exception to this rule occurs when a potential hazard has been reported through a safety reporting program.

When an occurrence has been reported, or a hazard identified, the procedures for dealing with these issues follow the process illustrated on the top of page 45.

Assurance & Oversight Programs

Good oversight programs evaluate the effectiveness of the organization's SMS. They help management improve safety services.

A quality assurance system defines and establishes an organization's quality policy and objectives. It also allows an organization to document and implement the procedures needed to attain these goals. A properly implemented QAS ensures procedures are carried out consistently, problems can be identified and resolved, and the organization can continuously review and improve its procedures, products and services. It is a mechanism for maintaining and improving the quality of products or services so they consistently meet or exceed the organization's needs and fulfill quality objectives.

In a safety management system, these elements are applied to an understanding of the human and organizational issues can impact safety. In the same way a QAS measures quality and monitors compliance, the same methods are used to measure safety within the organization. In the SMS context this means quality assurance of the safety management system, which in effect, includes the entire operation.

An effective quality assurance system should encompass the following elements:

- Well designed and documented procedures for product and process control

- Inspection and testing methods
- Monitoring of equipment including calibration and measurement
- Internal and external audits
- Monitoring of corrective and preventive action(s)
- The use of appropriate statistical analysis, when required

Quality assurance is based on the principle of the continuous improvement cycle. In much the same way that SMS facilitates continuous improvements in safety, quality assurance ensures process control and regulatory compliance through constant verification and upgrading of the system. These objectives are achieved through the application of similar tools: Internal and independent audits, strict document controls and on-going monitoring of correctives.

To a large extent, controls are built into the design of a Safety Management System. The internal evaluation function of the safety assurance component calls for evaluations "*at planned intervals*" of SMS conformance to objectives and expectations. This is accomplished by evaluating process or operational outputs (FAA SMS Framework, 3.1.3(B) (1)).

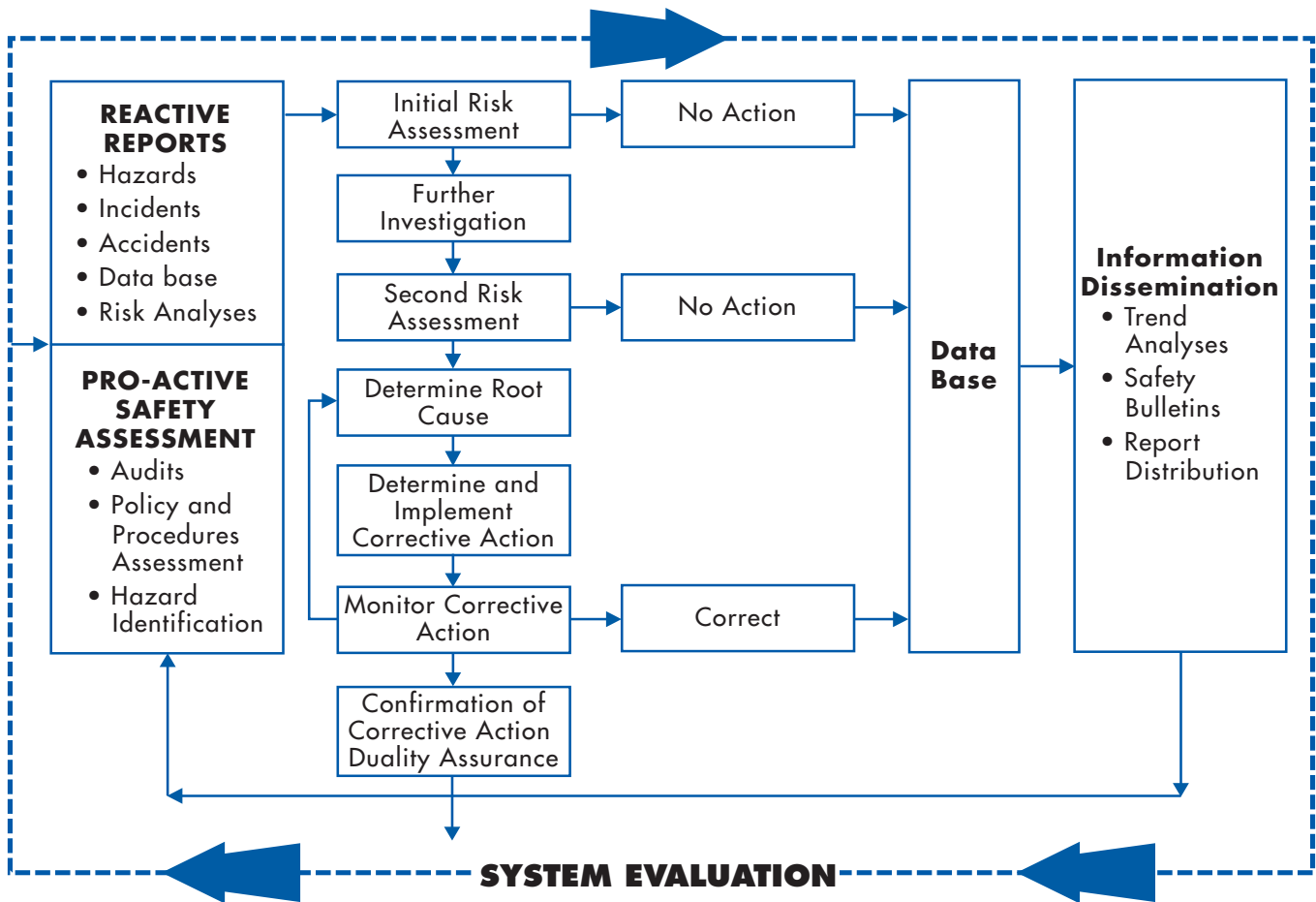
Each of the outputs should also have a method of measurement specified by the organization in accordance with 1.0 (B) (2) "*SMS processes will be...measured...*" Measures need not be quantitative where this is not practical. All that should be expected is some method of providing objective evidence of the attainment of the expectation.

Note that there is a relationship between controls and process measures. That is, the internal evaluation process is the method of controlling the processes, through the associated data collection, analysis, assessment, and corrective action processes. The individual outputs are the content of the measures.

Finally, management reviews are the means of making sure that the appropriate levels of responsibility and authority are brought into the process and that management can be accountable in a proactive way, rather than an after-the-fact attribution.

The safety assessment questionnaire on page 47 is a complete set of outputs, as a minimum expectation, for the content of internal evaluations of each process area and is extracted from the FAA SMS Program Office Assurance Guide.

SMS SYSTEM EVALUATION



Performance Objective: The organization will conduct internal evaluations of the SMS and operational processes at planned intervals to determine that the SMS conforms to its objectives and expectations.

INTERNAL EVALUATION TABLE

The following table is extracted from the FAA SMS Program Office Assurance Guide.

Input

Does the organization identify inputs (interfaces) for the Internal Evaluation process obtained from the Risk Assessment process (2.2.2) or Risk Control/Mitigation process (2.2.3)? *SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A (6) (I)*

Management Responsibility

Does the organization clearly identify who is responsible for the quality of the internal evaluation process? *SMS Framework 1.2 B) 3) Old – SMS Standard None (R/A)*

Procedure

Does the organization ensure internal evaluations of operational processes and the SMS are conducted at planned intervals, to determine that the SMS conforms to objectives and expectations? *SMS Framework 3.1.3 B) 1) Old – SMS Standard 6.3.3.A (P)*

Does the organization's planning of the internal evaluation program take into account -

Safety criticality of the processes being evaluated? *SMS Framework 3.1.3 B) 2) a) Old – SMS Standard 6.3.3.B.1 (P)*

Results of previous evaluations? *SMS Framework 3.1.3 B) 2) b) Old – SMS Standard 6.3.3.B.2 (P)*

INTERNAL EVALUATION TABLE cont.

Procedure: Program Contents

Does the organization define -

Evaluations, including -

Criteria? *SMS Framework 3.1.3 B) 3) a) 1) Old – SMS Standard 6.3.3.C.1.a (P)*

Scope? *SMS Framework 3.1.3 B) 3) a) 2) Old – SMS Standard 6.3.3.C.1.b (P)*

Frequency? *SMS Framework 3.1.3 B) 3) a) 3) Old – SMS Standard 6.3.3.C.1.c (P)*

Methods? *SMS Framework 3.1.3 B) 3) a) 4) Old – SMS Standard 6.3.3.C.1.d (P)*

Processes used to select the evaluators? *SMS Framework 3.1.3 B) 3) b) Old – SMS Standard 6.3.3.C.2 (P)*

Procedure: Documentation

Does the organization define —

Evaluation responsibilities? *SMS Framework 3.1.3 B) 3) c) 1) Old – SMS Standard 6.3.3.C.4.a (P)*

Requirements for -

Planning evaluations? *SMS Framework 3.1.3 B) 3) c) 2) (a) Old – SMS Standard 6.3.3.C.4.b.1 (P)*

Conducting evaluations? *SMS Framework 3.1.3 B) 3) c) 2) (b) Old – SMS Standard 6.3.3.C.4.b.2 (P)*

Reporting results? (P) *SMS Framework 3.1.3 B) 3) c) 2) (c) Old – SMS Standard 6.3.3.C.4.b.3*

Maintaining records? *SMS Framework 3.1.3 B) 3) c) 2) (d) Old – SMS Standard 6.3.3.C.4.b.4 (P)*

Evaluating contractors and vendors? *SMS Framework 3.1.3 B) 3) c) 2) (e) Old – SMS Standard 6.3.3.C.5 (P)*

Procedure: Scope

Does the organization's evaluation program include an evaluation of the internal audit programs conducted by or in behalf of line management of the operational departments described in SMS Framework 1.0 B) 1)?
SMS Framework 3.1.3 B) 4) Old – SMS Standard 6.3.3.E (P)

Procedure: Independence of Evaluators

Does the organization ensure the person or organization performing evaluations of operational processes are independent of the process being evaluated? *SMS Framework 3.1.3 B) 5) Old – SMS Standard 6.3.3.F (P)*

Outputs and Measures

Does the organization identify interfaces between the internal evaluation process and analysis of data process (3.1.7)? *SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A (6) (I)*

Does the organization periodically measure performance objectives and design expectations of the internal evaluation process? *See note at 3.1.3 & SMS Framework 1.0 B) 2) (c) and 3) (c); 3.1.3 B) 1) Old – SMS Standard 4.1 B) 3 & C) 3; 6.3.2 A & 6.3.3 (PM/I)*

Controls

Does the organization ensure procedures are followed for safety-related operations and activities?
SMS Framework: 1.0 B) 4) f) Old – 4.7 B) (C)

Does management periodically review supervisory and operational controls to ensure the effectiveness of the internal evaluation process? *SMS Framework 1.1 B) 2) k), 3.1.3 B) 1) and 3.1.10 A) & B) Old – SMS Standard 6.3.3 A) and 6.7 (C)*

Bottom Line Assessment

Has the organization conducted internal evaluations of the SMS and operational processes at planned intervals to determine that the SMS conforms to its objectives and expectations?

ASSESSING YOUR AVIATION SAFETY PROGRAM

- ❶ If you were briefing senior management on safety risks to your organization, what would you identify as the immediate situation having the greatest potential to result in an incident or accident involving damage or injury?

In the Air?

On the ground?

Other?

- ❷ If you were briefing senior management on safety risks to your organization, what would you identify as areas of concern for the long term?

In the Air?

On the ground?

Other?

- ❸ What do audit reports, accident reports, hazard reports and inspections in your organization identify as areas of concern?

In the Air?

On the ground?

Other?

- ❹ From a staff occupational health and safety viewpoint, what do you predict will be the next report of injury to; or predict who will be the next point of injury?

Maintenance Technicians?

Pilots?

Tactical Flight Officers?

Crew Chief's?

Supervisors?

Ramp agents?

In the workshops?

- ❺ What do you suspect will be the cause of the next report of damage to an aircraft?

- ❻ What is the status of the organization's safety program elements? Be sure to check on the tree categories for each row.

	I Don't Know	Good Shape	Needs Work
MANAGEMENT COMMITMENT			
SAFETY COMMITTEES			
SAFETY COMMUNICATIONS NETWORK			
HAZARD IDENTIFICATION & REPORTING			
AUDITS AND INSPECTIONS			
SAFETY TRAINING			
COMPLIANCE WITH STANDARDS			
SUPPORTING CONTRACTORS INCLUDED			

Do You Work in a Safety Culture?

The following questions have been adapted from Professor James Reason and are intended to help determine if your organization is a true safety oriented culture. The fatal accident rate varies from one every 260,000 flight-hours to 1 in 11,000,000 – depending on one big variable: the safety culture of the organization. Where does your organization fit in? Answer these questions and find out. If you do not know the answer, give it a 0.

I work in ___ **Management**, ___ **Flight Crew**, ___ **Maintenance**, ___ **Support Staff**

Give each question a rating by circling: 0, 5 or 10 according to the following scoring.

0

No, not my organization.

5

Sometimes

10

Yes, this is my organization.

1. MINDFUL OF DANGER: I believe our organization's management is very mindful of the human and organizational factors that can endanger our operations.

0

5

10

2. MISSION STATEMENT: Our organization illustrates its commitment to safety in its mission statement that includes the call to operate safely.

0

5

10

3. SAFETY POLICY: Our organization has a safety policy that is readily visible to all and spells out everyone's responsibilities toward safety.

0

5

10

4. ACCEPTS SETBACKS: I believe our organization's management understands and accepts occasional setbacks and nasty surprises as inevitable. They realize that staff will make errors and trains them to avoid, or detect and recover from them.

0

5

10

5. COMMITTED: I believe our organization's management are genuinely committed to aviation safety and provide adequate resources to serve this end.

0

5

10

6. HF TRAINING: In our organization, all employees, including management are trained in human factors in order to learn how to avoid the error they never intend to make.

0

5

10

7. EVENTS REVIEWED: In our organization, past events are thoroughly reviewed at top level meetings and the lessons learned are implemented as organization wide reforms, not local repairs.

0

5

10

8. IMPROVED DEFENSE: After an incident in our organization, the primary aim of management is to identify the failed system defenses and improve them, rather than to seek to divert responsibility to the incident individuals.

0

5

10

9. DATA: I believe our management recognizes that effective management of safety, just like any other management process, depends critically on the collection, analysis and dissemination of relevant information.

0

5

10

10. HEALTH CHECKS: In our organization, management adopts a proactive stance towards safety. That is, it does some or all of the following:

- a) Takes steps to identify recurrent error traps and remove them,
- b) Strives to eliminate the workplace and organizational factors likely to provoke error,
- c) Brainstorms new scenarios of failure,
- d) Conducts regular "health checks" on the organizational process known to contribute to incidents.

0

5

10

11. STAFF ATTENDS SAFETY MEETINGS: In our organization, staff attends meetings relating to safety from a wide variety of departments and levels.

0

5

10

12. INFORMATION: Our organization provides feedback to all employees when an error is made and ways to avoid repeating the error. It keeps us informed of areas we can improve on as well as our successes.

0 5 10

13. MONEY VS. SAFETY: I believe our organization recognizes that commercial goals and safety issues can come into conflict and have placed measures to recognize and resolve such conflicts in an effective and transparent manner.

0 5 10

14. REPORTING ENCOURAGED: I believe policies in place to encourage everyone to identify safety-related issues (one of the defining characteristics of a pathological culture is that safety messengers are seen as troublemakers and whistleblowers dismissed or discredited).

0 5 10

15. REPORTING TRUST: I and my fellow employees trust our management and have reported human errors over the past 12 months.

0 5 10

16. ADMINISTRATIVE POLICY: Our organization has an administrative policy that makes clear the organization's stance regarding qualified indemnity against sanctions, confidentiality and the organizational separation of the data-collecting department from those involved in disciplinary proceedings.

0 5 10

17. BLAME: I believe my organization disciplinary policy is based on an agreed (i.e. negotiated) distinction between acceptable and unacceptable behavior. It is recognized by all staff that a small proportion of unsafe acts are indeed reckless and warrant sanctions but that the large majority of such acts will not attract punishment. The key determinant of blameworthiness is not so much the act itself, error or violation, as the nature of the behavior in which it was embedded. Did the error involve deliberate unwarranted risk-taking or a course of action likely to produce an avoidable error? If so, then the act would be culpable regardless of whether it was an error or a violation.

0 5 10

18. NON-TECHNICAL SKILLS: I believe our line management encourages their staff to acquire the mental (or non-technical) as well as the technical skills necessary to achieve safe and effective performance. Mental skills include anticipating possible errors and rehearsing the appropriate recoverable recoveries. Such mental preparation at both individual and organizational levels is one of the hallmarks of high-reliability systems and goes beyond routine simulator checks.

0 5 10

19. FEEDBACK: Our organization has in place rapid useful and intelligible feedback channels to communicate the lessons learned from both the reactive and proactive safety information systems. Throughout, the emphasis is upon generalizing these lessons to the system at large.

0 5 10

20. ACKNOWLEDGES ERROR: I believe that our organization has the will and the resources to acknowledge its errors, to apologize for them and to reassure the victims (or their relatives) that the lessons learned from such accidents will help prevent their recurrence. This is part of the Emergency Response Plan

0 5 10

Add up your score: _____

160 to 200 – Should be a great organization to work for. Keep up the vigilance and don't become complacent.

110 to 155 – A good score. There is always room for improvement.

60 to 105 – It's time for management to involve everyone in forming an action plan.

15 to 55 – Not a good position to be in. The company needs to work seriously on a Safety Management System. To do nothing is inviting disaster.

Less than 15 – First day on the job? If not; find a job with another organization. The odds of a fatal accident are just too great.

Perhaps some of the policies, practices and procedures are in place, but you just don't know about them. Take to time to find out about any that you scored a zero on. We all are part of the solution.

Text courtesy of Gordon Dupont, CEO, System Safety Services

RECORD OF ASSESSMENT			
Ref. No.			
Base: Section/Department:		Type of Risk:	
Work Activity:		Injury:	
Team:		Damage to Environment:	
		Damage to Aircraft:	
Assessor Name:		Signature:	
Date of Assessment:		Review Date:	
Employees at risk:			
Others who may be at risk:			
If additional control measures are required, can they be implemented immediately?			Yes No
If no, summarize required action plan below:	Target Date:	Action by:	Completed by:
Date for full implementation of control measures:			
Assessment accepted by: <i>(relevant manager)</i>			
Title:			
Date:			

Investigation

Occurrence, incident & accident:

Occurrences are unplanned safety related events, including accidents and incidents that could impact the safety of guests, passengers and personnel, equipment or the work environment.

Every occurrence, incident or accident is investigated for the purpose of gathering information to help prevent similar occurrences. An initial risk assessment assists in determining the extent of the full investigation. Reports that demonstrate a high potential hazard should be investigated in greater depth than those with low potential. The investigation and analysis results do the following:

- Determine "what" and "why" the event happened, rather than, "who's" to blame
- Ensure the person(s) conducting the investigation is technically qualified and has access to other personnel with expertise that may assist with the investigation
- Identify immediate causal and contributing factors
- Look at organizational factors that may exacerbate the hazard or incident
- Identify both acts of "omission" and "commission"
- Provide a report to the manager with the authority to implement recommendations

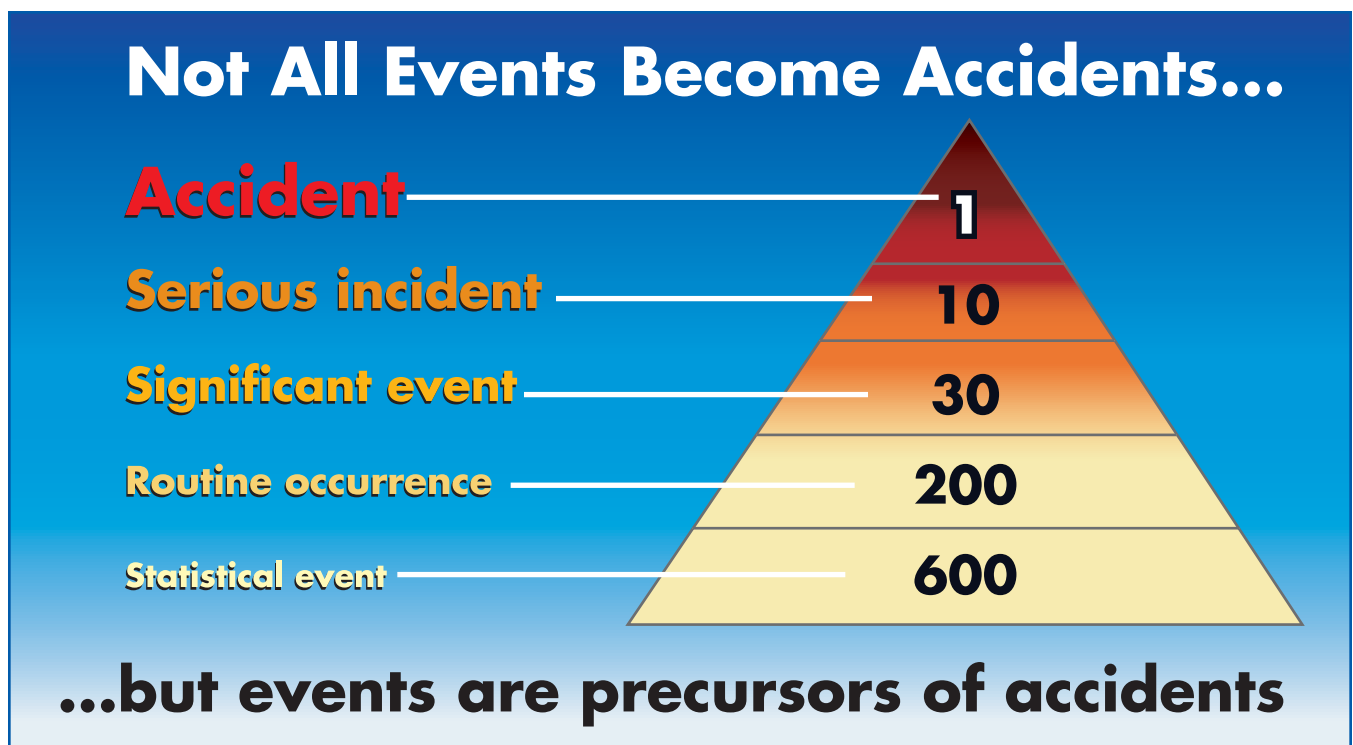
In aviation incidents, injury and damage are generally less significant than in accidents. In principle, more information regarding such occurrences should be available, e.g. live witnesses. Without the threat of substantial damage and injury lawsuits there tends to be a less adversarial atmosphere during the investigation. Thus, there should be a better opportunity to identify why the incident occurred and how the defenses in place prevented them from becoming accidents. In an ideal situation the underlying safety deficiencies could all be identified and preventive measures implemented before an accident occurs. (See the Occurrence & Hazard I.D. Report form on the page 52.)

The 600 Rule

Research into industrial safety in 1969 indicated that for every 600 reported with no injury or damage, there were:

- 30 involving property damage
- 10 involving serious injuries
- 1 fatal injury

The ratio shown in the below figure is indicative of a wasted opportunity if investigative efforts are focused only on those rare occurrences where there is serious injury or significant damage.



OCCURRENCE & HAZARD IDENTIFICATION REPORT

The purpose is to assure that intervention prevents reoccurrence

☐ Occurrence Report

☐ Hazard Identification Report

Date:

Time:

Location:

Employee Name:

Event or unsafe act(s) observed:

Injuries/Illnesses experienced:

Corrective action(s) taken:

Occurrence:

First

Second

Third

Distribution:

Employee

Base Manager

VP Safety

B.S.C.

Comments/recommendations:

Safety Officer's Signature:

Date:

Performance Objective: The organization will establish procedures to collect data and investigate incidents, accidents, and instances of potential regulatory non-compliance to identify potential new hazards or risk control failures.

INVESTIGATION DESIGN EXPECTATIONS

The following table is extracted from the FAA SMS Program Office Assurance Guide.

Input
Does the organization identify inputs (interfaces) for the investigation process obtained from the Risk Control/Mitigation process (2.2.3) and as needed upon occurrence of events? <i>SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A (6) (I)</i>
Management Responsibility
Does the organization clearly identify who is responsible for the quality of the investigation process? <i>SMS Framework 1.2 B) 3) Old – SMS Standard None (R/A)</i>
Procedure
Does the organization ensure it collects data on -
Incidents? <i>SMS Framework 3.1.5 B) 1) a) Old – SMS Standard 6.3.5.A.1 (P)</i>
Accidents? <i>SMS Framework 3.1.5 B) 1) b) Old – SMS Standard 6.3.5.A.2 (P)</i>
Potential regulatory non-compliance? <i>SMS Framework 3.1.5 B) 1) c) Old – SMS Standard None (P)</i>
Does the organization ensure that procedures are established to investigate -
Accidents? <i>SMS Framework 3.1.5 B) 2) a) Old – SMS Standard 6.3.5.B.1 (P)</i>
Incidents? <i>SMS Framework 3.1.5 B) 2) b) Old – SMS Standard 6.3.5.B.2 (P)</i>
Instances of potential regulatory non-compliance? <i>SMS Framework 3.1.5 B) 2) c) Old – SMS Standard 6.3.5.B.3 (P)</i>
Outputs and Measures
Does the organization identify interfaces between the investigation process and analysis of data process (3.1.7)? <i>SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A (6) (I)</i>
Does the organization periodically measure performance objectives and design expectations of the investigation process? <i>See note at 3.1.3 & SMS Framework 1.0 B) 2) (c) and 3) (c) 3.1.3 B) 1) Old – SMS Standard 4.1 B) 3 & C) 3 6.3.2 A & 6.3.3 (PM/I)</i>
Controls
Does the organization ensure procedures are followed for safety-related operations and activities? <i>SMS Framework: 1.0 B) 4) f) Old – 4.7 B) (C)</i>
Does management periodically review supervisory and operational controls to ensure the effectiveness of the investigation process? <i>SMS Framework 1.1 B) 2) k), 3.1.3 B) 1) and 3.1.10 A) & B) Old – SMS Standard 6.3.3 A) and 6.7) and 6.7 (C)</i>

Bottom Line Assessment

Has the organization established procedures to collect data and investigate incidents, accidents, and instances of potential regulatory non-compliance that occur to identify potential new hazards or risk control failures?

Employee Reporting & Feedback System

Systems for Reporting Hazards, Events & Safety Concerns

Employees must have a means of reporting all events and emerging hazards to an appropriate supervisor or manager. The manager should then forward the report for processing. The reporting system should be simple, confidential, convenient to use and complimented with a non-punitive disciplinary policy. These elements, accompanied by efficient follow-up acknowledging to the submitter their report has been received and will be acted upon, will encourage the development of a reporting culture.

Information Dissemination

Feedback is one aspect of a safety reporting system. Employees should be notified when a safety report is received or when a potential safety threat is discovered. Information dissemination can also be achieved through the publication of a newsletter or through the organization's website. The organization should inform all employees where safety-related information is located so that the entire organization becomes aware of safety issues and understands the organization is actively seeking to address these issues. Critical safety changes should be acknowledged and understood by the employee of the corrective action.

Corrective Action Plan

When a safety event has been investigated or a hazard identified, a safety report outlining the occurrence should be given to the appropriate supervisor or manager to determine what, if any, corrective action should be taken. The supervisor or manager should develop a corrective action plan (CAP), a plan submitted in response to findings, outlining how the organization proposes to correct the deficiencies documented in the findings. Depending on the findings, the CAP might include short-term and long-term corrective actions.

Management Involvement

A safety reporting system is one of the primary methods of providing management with information on changing conditions within the organization. Safety reporting and the correction of potential hazards need to involve all employees and is fundamental to a safety management system. Reporting of safety concerns is only part of the process. Safety reports need to be collected, analyzed, reviewed and acted upon. Employee trust the system will consider their concerns in a non-punitive environment is critical to the success of the reporting system.

The key to accomplishing this is to have a reporting system that meets the needs of the employees who will be using it. Employee input into the development of the system is vital. A safety reporting system is worthless if no one uses it. Every

HAZARD ID & REPORTING

If you see something... say something!



If you think it's wrong... **QUESTION IT.**
If you know it's wrong... **STOP IT!**
Either way... **REPORT IT.**

U.S. Department of Interior
Safety Seminar - 2008

employee is essential to make the process effective. A non-punitive disciplinary policy demonstrates management's commitment to achieving the organization's safety goals.

When producing an occurrence or hazard report, every effort should be made to ensure the form is easy to understand and user friendly. The organization should strive to make all reporting forms compatible for each area of the operation. This will facilitate data sharing, trend analysis and will also make the occurrence or hazard investigation process easier.

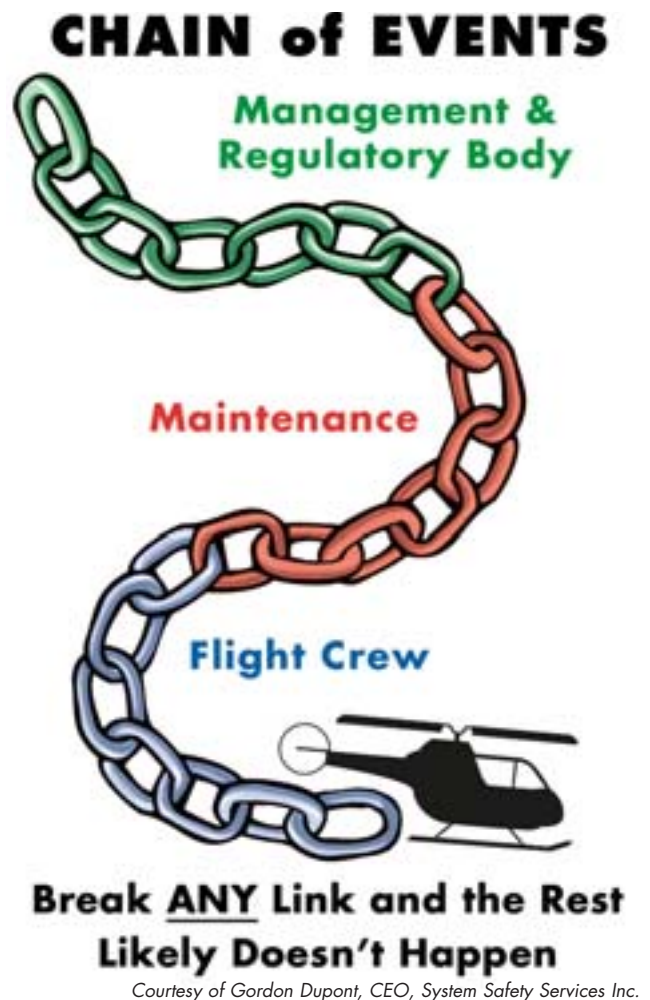
Depending on the size of the organization, the most expedient data collection method might be to utilize existing paperwork, such as flight and maintenance reports. The use of hand written reports or the information derived from verbal reports is equally acceptable. However, verbal accounts should always be followed-up with a written report.

An organization's safety reporting system should encompass the following fundamental elements:

- Systems for reporting hazards, events or safety concerns
- Systems for analyzing data, safety reports and other safety-related information
- Methods for the collection, storage and distribution of data
- Corrective action and risk reduction strategies
- On-going monitoring
- Confirmation of the effectiveness of corrective action

Not just flight operations:

Maintenance errors are known to be a significant cause of aviation accidents. If maintenance had not formed one of the links in a chain of events, an accident might not have occurred. These links are often simple errors that, when combined with other factors, might result in catastrophe. For example, low air pressure in just one tire can result in major damage or destruction of an aircraft, serious injury or death to hundreds of people and the failure of an airline.



One of the problems is maintenance personnel are sometimes not the best communicators. They live with and work around known hazards until an accident occurs.

In order for a Safety Management System to work, maintenance must report hazards with a potential to cause an accident, because the "little things have the potential to become big things (accidents)." In order to reduce human error to "As Low As Reasonably Practical" (or ALARP), everyone must do their part to report the little things that have the potential to become big things. This can be accomplished by:

- Report things pertaining to facilities, equipment or procedures that interfere with doing the job safely.
- Reporting human errors or near misses that would enable safety nets to be developed to prevent a future occurrence.

Maintenance technicians have the duty and responsibility to report anything having the potential to become a hazard so that a risk analysis can be made.

Non-compliance rarely results in an accident or incident, however:

It always results in a greater risk for the operation!

Just Culture Process

Management must promote a non-punitive working environment. This is referred to as a "Just Culture." A non-punitive environment is fundamental to having a good reporting culture. Employees must know and agree on what is acceptable and what is unacceptable behavior. Management must not tolerate negligence or deliberative violations. A just culture recognizes in certain circumstances, there may be a need for punitive action and attempts to define the line between acceptable and unacceptable actions or activities.

Non-Punitive Disciplinary Policy

It is recognized that humans will make errors and systems must be developed that are error tolerant and behaviors changed to lessen the chance of errors occurring.

It is not the goal of policy to seek out the guilty party in order to administer retribution for the error. The goal is not to punish, but to ensure it does not happen again.

The organization should strive to develop a non-punitive disciplinary policy as part of its safety management system. Employees are more likely to report events and cooperate in an investigation when some level of immunity from disciplinary action is offered. When considering the application of a non-punitive disciplinary policy, the organization should consider whether the event involved willful intent on the part of the individual involved.

THE LETHAL COCKTAIL: The Main Predictors

Expectation: Expectation that rules will have to be bent to get the work done.

Powerfulness: The feeling that one has the ability and experience to do the job without slavishly following the procedures.

Opportunities: Seeing opportunities that present themselves for short cuts or to do things "better."

Planning: Inadequate work planning and advance preparation, leading to working 'on the fly' and solving problems as they arise.

Courtesy of Patrick Hudson, PhD, Leiden University - CHC 2009 Safety Summit

AN ORGANIZATION'S REPUTATION

- **How one pilot performs affects each and every pilot in that organization.**
- **Accidents hurt an organizations reputation and have an effect on acceptability to customers.**

Reporting the Errors That Almost Occurred

The reporting of near errors or near misses will be treated as "free lessons." There will be a "learning outcome" that occurs without the expense of an accident.

This is to be encouraged and is the duty of every employee. These "free lessons" will enable us to develop "safety nets" or corrective actions to help ensure that the "near miss" never becomes an accident.

A typical disciplinary policy might include the following statements:

- Safe flight/maintenance operations are the organization's most important commitment. To ensure that commitment, it is imperative to have an uninhibited reporting of all incidents and occurrences that compromise safety.
- Each employee accepts the responsibility to communicate any information affecting the integrity of flight safety. Employees must be assured that this communication will not result in reprisal, thus allowing a timely, uninhibited flow of information.
- All employees are advised that the organization will not initiate disciplinary actions against an employee who discloses a safety related occurrence. This policy cannot apply to criminal or international infractions.

- The organization has developed Safety Reports for employees to use for reporting safety information. They are designed to protect the identity of the employee who provides information. These forms should be readily available in the work area.
- All employees should be urged to use this program to help the organization continue its leadership in providing customers and employees with the highest level of safety. (See the Occurrence & Hazard I.D. Report form on the page 52.)

A non-punitive approach to discipline does not preclude the use of a general progressive approach to discipline in cases where an employee is involved in similar, recurrent events. This might involve the following steps:

- **First offense:** Verbal warning
- **Second offense:** Formal written warning
- **Third offense:** Final written warning (may include suspension)
- **Fourth offense:** Termination.

DEFINING “At Risk Behavior”

“At risk behavior” is behavior in which an individual is willing to assume “unnecessary risks” while performing a particular task in his or her everyday life.

Written warnings should remain active for one year, after which a letter of recognition for positive change will be written and attached to the formal written warning in the personnel file by the individual’s direct supervisor.

An organization should document and define the roles and responsibilities of all personnel in the safety management system. Furthermore, a statement should be made attesting that everyone has a responsibility for safety. This includes a commitment on the part of top management to be accountable for safety within the organization. The dedication and involvement of top management towards safety and safety practices should be clearly visible. It is important that senior management is seen to provide a strong and active leadership role in the safety management system. This includes a commitment to provide the resources necessary to attain the strategic safety objectives established by the organization.

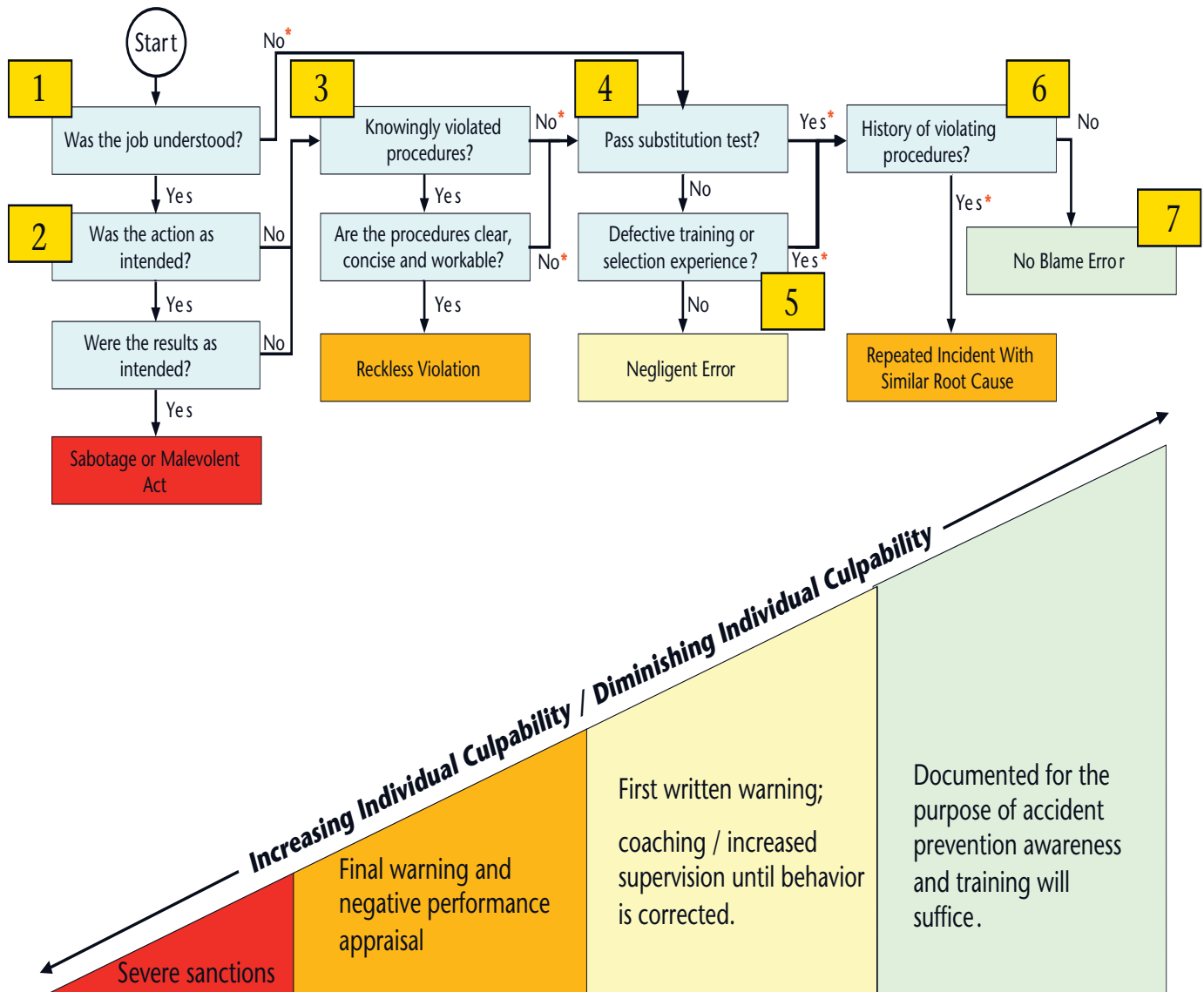
The traditional disciplinary process often falls short in increasing awareness to all personnel. When an incident occurs, whether or not injury or damage occurs, develop and distribute a safety alert notice to increase awareness among all personnel regarding what happened, why and what will be done to prevent it from happening again – even if it is just “following the rules.” It is a way to educate others on the importance of following the rules and the potential consequences of not following the rules.

These activities that demonstrate management’s active commitment to SMS:

- Putting safety matters on the agenda of organization meetings, from the management level downwards.
- Being actively involved in safety activities and reviews at both local and remote sites.
- Allocating the necessary resources, such as time and money to safety matters.
- Setting personal examples in day-to-day work and holding others accountable.
- Receiving and acting on safety reports submitted by employees.
- Promoting safety topics in organization publications.

The ideal safety culture embodies a spirit of openness and should also demonstrate support for staff and the systems of work. Senior management should be accessible and dedicated to making the changes necessary to enhance safety. They should be available to discuss emerging trends and safety issues identified through the system. A positive safety culture reinforces the entire safety achievement of the organization and is critical to its success.

THE “JUST CULTURE” PROCESS



* Indicates a “System” induced error. Manager/supervisor must evaluate what part of the system failed and what corrective and preventative action is required. Corrective and preventative action shall be documented for management review.

Courtesy of Canadian Helicopter Corporation Safety Manual 2007

Performance Objective: The organization will establish and maintain a confidential employee safety reporting and feedback system. Data obtained from this system will be monitored to identify emerging hazards and to assess performance of risk controls in the operational systems.

EMPLOYEE REPORTING AND FEEDBACK SYSTEM TABLE

The following table is extracted from the FAA SMS Program Office Assurance Guide.

Input
Does the organization identify inputs (interfaces) for the employee reporting and feedback system as obtained from employees? <i>SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A (6) (I)</i>
Management Responsibility
Does the organization clearly identify who is responsible for the quality of the employee reporting and feedback process? <i>SMS Framework 1.2 B) 3) Old – SMS Standard None (R/A)</i>
Procedure
Has the organization established and maintained a confidential employee safety reporting and feedback system as in Component 4.0 B) 1) e)? <i>SMS Framework 3.1.6 B) 1) Old – SMS Standard 6.3.6.A (P)</i>
Does the organization ensure employees are encouraged to use the safety reporting and feedback system without fear of punishment and to encourage submission of solutions /safety improvements where possible? <i>SMS Framework 3.1.6 B) 2) Old – SMS Standard 6.3.6.B (P)</i>
Does the organization ensure data from the safety reporting and feedback system is monitored to identify emerging hazards? <i>SMS Framework 3.1.6 B) 3) Old – SMS Standard 6.3.6.C (P)</i>
Does the organization ensure the data collected in the employee reporting and feedback system is included in the analyses conducted under SMS Framework 3.1.7? <i>SMS Framework 3.1.6 B) 4) Old – SMS Standard 6.3.6.D. (P)</i>
Outputs and Measures
Does the organization identify interfaces between the Employee Reporting and Feedback process and Analysis of Data process (3.1.7)? <i>SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A (6) (I)</i>
Does the organization periodically measure performance objectives and design expectations of the employee reporting and feedback process? <i>See note at 3.1.3 & SMS Framework 1.0 B) 2) (c) and 3) (c); 3.1.3 B) 1) Old – SMS Standard 4.1 B) 3 & C) 3; 6.3.2 A & 6.3.3 (PM/I)</i>
Controls
Does the organization ensure procedures are followed for safety-related operations and activities? <i>SMS Framework: 1.0 B) 4) f) Old – 4.7B) (C)</i>
Does management periodically review supervisory and operational controls to ensure the effectiveness of the employee reporting and feedback process? <i>SMS Framework 1.1 B) 2) k), 3.1.3 B) 1) and 3.1.10 A) & B) Old – SMS Standard 6.3.3 A) and 6.7 (C)</i>

Bottom Line Assessment

Has the organization established and maintained a confidential employee safety reporting and feedback system? Is the data obtained from this system monitored to identify emerging hazards and to assess performance of risk controls in the operational systems?

Management of Change

Change is the catalyst for performing the hazard identification and risk management process. Some examples of change include but are not limited to:

- Organizational structure
- Acquisition of equipment
- Fleet make-up
- Mission content or type
- Personnel management
- Regulations
- Competition
- Customer base
- Security
- Financial status

Routines and habits are a part of “the way things have always been done.” This can be counterproductive in actually affecting change. People get used to doing things a certain way. Change is often viewed negatively because it is something different and not part of the normal routine.

When change becomes necessary it is vital to involve affected personnel in the process in order to gain buy-in and acceptance, as well as ownership in the management of change process. All involved in the process must be aware of “what” needs to change and “why.” It is important to engage and motivate staff as well in order to create an atmosphere of understanding what change can bring about in order to move through the entire process of change.

All organizations, regardless of size, are involved in continual change. The traditional model used in dealing with change is based on a specific desired outcome through solving very specific and limited tasks/jobs. People evolve into a process of management of change focused on continuous improvement in the process. (The way they do things every day.)

Unless properly managed, changes in organizational structure, personnel, documentation, processes or procedures, can result in the inadvertent introduction of hazards resulting in increased risk. Good organizations continually seek to find ways to improve processes, recognizing that changes need to be properly and effectively managed. The organization can

minimize the likelihood of introducing risk associated with change by:

- Analyzing changes in operational procedures or processes to identify required changes in training, documentation or equipment
- Analyzing changes in location of equipment or operating conditions for potential hazards
- Ensuring all maintenance and operations manuals are kept up-to-date with the most current changes
- Having a process to ensure all personnel are aware and understand changes in requirements, procedures and applicable maintenance and operations manuals
- Define the level of management to approve a change

Change Process

Since the transformational process is by its very nature difficult, there has to be a strong motivation to stick with the effort. This motivation must exist throughout the team, or the person in a small organization, assigned to achieve the goal of the project. A sense of urgency must exist at the beginning of the process at the top of the organization. In a small organization the champion may be a one-person band. The SMS champion must convince top management, to the greatest extent possible, what the organization must do and who must do it. The champion should remind leaders that the ICAO has mandated SMS in its member states, and each of those states is in the process of accomplishing the mandate. No matter what their initial level of support for SMS, people understand the wisdom of quick adoption of programs they will eventually have to do anyway.

In a small organization, the champion may be the only member of the implementation team. In larger organizations, it is important the champion be empowered to select members of the SMS implementation team from across all departments. The members of the implementation team do not have to be top-level managers. In fact there is much to be said for team members to not have to be part of management. While team members should not be the executive VP's, they should have a high degree of respect within the organization, because they are going to be leading their coworkers into a new way of doing business.

It is wise when making initial changes to go for the short-term wins. Short-term wins create confidence in the process and help motivate others to join in the change effort in this and other areas as change moves forward.

The choice for the first area of implementation is important, and has a meaningful impact on safety. But even more important is that it be achievable. It is valuable to consider the entire operation and choose an area that represents a significant portion of the organization's risk exposure i.e. flight operations. The team is going for a big win, so be aware going after too big a program can be risky.

MOC Phases

The Management of Change (MOC) process has four basic phases: screening, review, approval and implementation. Both the effect of change and the effect of implementing change are considered. The systematic approach to managing and monitoring organizational change is part of the risk management process.

Safety issues associated with change are identified and standards associated with change are maintained during the change process. Procedures for managing change include:

- Risk assessment
- Identify the goals, objectives and nature of the proposed change
- Identify operational procedures
- Analyze changes in location, equipment or operating conditions
- Post current changes in maintenance and operator manuals
- All personnel are made aware of and understand changes
- Identify the level of management with authority to approve changes
- Review, evaluate and record the potential safety hazards from the change or its implementation
- Approval of the agreed change and the implementation procedure(s)

There are methods for managing the introduction of new technology. All personnel should be consulted when changes to the work environment,

process or practices could have health or safety implications. Changes to resource levels and competencies associated with risks are assessed as part of the change control procedure.

Regardless of the magnitude of change there must always be consideration for safety, the associated risks and the management of change principles. Change can only be successful if personnel are engaged, involved and participate in the process management. Management of change provides a structured framework for managing all aspects of the change. How change is introduced dramatically impacts the implementation and the effectiveness of the outcome.

Procedures are established and maintained to manage change with a specific focus on safety and risk. Throughout the process it is important all personnel involved have an accurate understanding of "what" must be changed and "why" it must be changed. It is imperative that management personnel provide direction, guidance and in-depth communication.

The structure and responsibilities associated with change are defined prior to introducing any change. It is important to recognize the complexity of change prior to, during and subsequent to the change itself. Anticipate unintended consequences and the necessity to redirect the process if change fails. Change can fail for many reasons, some of which are as follows:

- Lack of top down support
- Loss of control
- Insufficient resources
- Commitment changes
- Poor communication of the process
- Lack of clarity and consistency
- Lack of understanding
- Insufficient risk analysis
- Timelines too aggressive

The systematic approach to managing and monitoring organizational change is part of the risk management process. Safety issues associated with change are identified and standards associated with change are maintained throughout the management of change process.

Once the need for change has been identified, a structured process is followed in order for change to be appropriately managed. Procedures for managing change include:

- Change Recognition occurs based on differing elements
 - Planned – introduction new product (aircraft-technology)
 - Unplanned – response to outside influences such as regulatory or market factors
- Description
 - Occurs in order to create a vision of the change
 - Enables affected personnel to be aware and to become involved in later stages
- Classification
 - To determine the magnitude of the proposed change
 - Identify route to be followed for change
- Identify Objectives and Constraints
 - Details the objectives of the change
 - Identifies both internal and external constraints impacting change
 - Evaluate the necessity for redefining organization standards to fit the change
- Initial Design
 - Develop potential plans for implementation of the change
 - Generation and evaluation of options and differing paths to bring about the change
- Detail Design
 - Initial processes produce a detailed procedure for the change
 - Detailed process will justify review and support approval for implementation
- Implementation
 - According to detailed change plan
 - Plan defines the monitoring and processes to be implemented
- Feedback and Follow-up
 - Widely communicate the change process to personnel
 - Periodic review of management of change for effectiveness

Performance Objective: The organization's management will assess risk for changes within the organization that may affect established processes and services by new system designs, changes to existing system designs, new operations/procedures or modified operations/procedures.

MANAGEMENT OF CHANGE TABLE

The following table is extracted from the FAA SMS Program Office Assurance Guide.

Input
Does the organization identify inputs (interfaces) for the management of change process obtained from proposed changes to systems, processes, procedures, or organizational structures? <i>SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A 6) (I)</i>
Management Responsibility
Does the organization clearly identify who is responsible for the quality of the management of change process? <i>SMS Framework 1.2 B) 3) Old – SMS Standard None (R/A)</i>
Procedure
Does the organization ensure it does not implement any of the following until the level of safety risk of each identified hazard is determined to be acceptable for -
New system designs? <i>SMS Framework 3.2 B) 1) a) Old - SMS Standard 5.E.1 (P)</i>
Changes to existing system designs? <i>SMS Framework 3.2 B) 1) b) Old - SMS Standard 5.E.2 (P)</i>
New operations or procedures? <i>SMS Framework 3.2 B) 1) c) Old - SMS Standard 5.E.3 (P)</i>
Modifications to existing operations or procedures? <i>SMS Framework 3.2 B) 1) d) Old - SMS Standard 5.E.4 (P)</i>
Does the organization allow it's personnel to take interim immediate action to mitigate an existing safety risk? <i>SMS Framework 3.2 B) 2) Old - SMS Standard 5.F (P)</i>
Outputs and Measures
Does the organization ensure that management of change procedures are interfaced with the SRM process (2.1.1)? <i>SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A (6) (I)</i>
Does the organization periodically measure performance objectives and design expectations of the management of change process? <i>See note at 3.1.3 & SMS Framework 1.0 B) 2) (c) and 3) (c); 3.1.3 B) 1) Old – SMS Standard 4.1 B) 3 & C) 3; 6.3.2 A & 6.3.3 (PM/I)</i>
Controls
Does the organization have a control or controls in place to ensure that it does not implement new system designs, changes to existing systems, new operations or procedures, or changes to operations or procedures until the level of safety risk of each identified hazard is determined to be acceptable? <i>SMS Framework 1.0 B) 4) f) and 3.2 B) 1) Old – SMS Standard 6.3.3 A) and 6.7 (C)</i>
Does the organization ensure procedures are followed for safety-related operations and activities? <i>SMS Framework: 1.0 B) 4) f) Old – 4.7 B (C)</i>
Does management periodically review supervisory and operational controls to ensure the effectiveness of the management of change process? <i>SMS Framework 1.1 B) 2) k), 3.1.3 B) 1) and 3.1.10 A) & B) Old – SMS Standard 6.3.3 A) and 6.7 (C)</i>

Bottom Line Assessment

Has the organization's management assessed risk for changes within the organization that may affect established processes and services by new system designs, changes to existing system designs, new operations/procedures or modified operations/procedures?

Continual Improvement

Much has been said throughout this document about continual improvement. It is a foundational element of a robust SMS and needs to be addressed on a daily basis.

Performance Objective

The organization will promote continual improvement of its SMS through recurring application of Safety Risk Management (Component 2.0), Safety Assurance (Component 3.0), and by using safety lessons learned and communicating them to all personnel.

CONTINUAL IMPROVEMENT TABLE

The following table is extracted from the FAA SMS Program Office Assurance Guide.

Input
Does the organization identify inputs (interfaces) for the Continual Improvement processes that are obtained through continuous application of Safety Risk Management (Component 2.0), Safety Assurance (Component 3.0) and the outputs of the SMS, including safety lessons learned? <i>SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A 6) (I)</i>
Management Responsibility
Does the organization clearly identify who is responsible for the quality of the continual improvement process? <i>SMS Framework 1.2 B) 3) Old – SMS Standard None (R/A)</i>
Procedure
Does the organization continuously improve the effectiveness of the SMS and of safety risk controls through the use of the safety and quality policies, objectives, audit and evaluation results, analysis of data, corrective and preventive actions, and management reviews? <i>SMS Framework 3.3 B) 1) Old - SMS Standard 6.8(P)</i>
Does the organization develop safety lessons learned and - ? <i>SMS Framework 3.3 B) 2) Old - SMS Standard 7.5.A (P)</i>
Use safety lessons learned to promote continuous improvement of safety? <i>SMS Framework 3.3 B) 2) a) Old - SMS Standard 7.5.B (P)</i>
Ensure that safety lessons learned are communicated to all personnel? <i>SMS Framework 3.3 B) 2) b) & 4.2 Old - SMS Standard 7.5.C (P)</i>
Outputs & Measures
Does the organization ensure that trend analysis of safety and quality policies, objectives, audit and evaluation results, analysis of data, and corrective and preventive actions are interfaced with management reviews (3.1.10)? <i>SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A (6) (I)</i>
Does the organization periodically measure performance objectives and design expectations of the continual improvement process? <i>See note at 3.1.3 & SMS Framework 1.0 B) 2) (c) and 3) (c); 3.1.3 B) 1) Old – SMS Standard 4.1 B) 3 & C) 3; 6.3.2 A & 6.3.3 (PM/I)</i>
Controls
Does the organization ensure procedures are followed for safety-related operations and activities? <i>SMS Framework: 1.0 B) 4) f) Old – 4.7 B (C)</i>
Does management periodically review supervisory and operational controls to ensure the effectiveness of the continual improvement process? <i>SMS Framework 1.1 B) 2) k), 3.1.3 B) 1) and 3.1.10 A) & B) Old – SMS Standard 6.3.3 A) and 6.7 (C)</i>

Bottom Line Assessment

Has the organization promoted continual improvement of its SMS through recurring application of Safety Risk Management (Component 2.0), Safety Assurance (Component 3.0), and by using safety lessons learned and communicating them to all personnel?

Performance Objective:

Top management will promote the growth of a positive safety culture and communicate it throughout the organization.

SAFETY PROMOTION: GENERAL EXPECTATIONS TABLE

The following table is extracted from the FAA SMS Program Office Assurance Guide.

Input
Does the organization identify interfaces between the top management and organizational personnel? <i>SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A 6) (I)</i>
Management Responsibility
Does the organization clearly identify who is responsible for the quality of the continual improvement process? <i>SMS Framework 1.2 B) 3) Old – SMS Standard None (R/A)</i>
Procedure/Output/Measure
Does top management promote the growth of a positive safety culture through -
Publication of top management’s stated commitment to safety to all employees? <i>SMS Framework 4.0 B) 1) a) Old - SMS Standard 7.1 1)</i>
Visible demonstration of their commitment to the SMS? <i>SMS Framework 4.0 B) 1) b) Old - SMS Standard 7.1 2)</i>
Communication of the safety responsibilities for the organization’s personnel? <i>SMS Framework 4.0 B) 1) c) Old - SMS Standard 7.1 3)</i>
Clear and regular communication of safety policy, goals, expectations, standards, and performance to all employees of the organization? <i>SMS Framework 4.0 B) 1) d) Old - SMS Standard 7.1 4)</i>
An effective employee reporting and feedback system that provides confidentiality as is necessary? <i>SMS Framework 4.0 B) 1) e) Old - SMS Standard 7.1 5)</i>
Use of a safety information system that provides an accessible efficient means to retrieve information? <i>SMS Framework 4.0 B) 1) f) Old - SMS Standard 7.1 6)</i>
Allocation of resources essential to implement and maintain the SMS? <i>SMS Framework 4.0 B) 1) g) Old - SMS Standard 7.1 7)</i>
Does the organization periodically measure performance objectives and design expectations of the safety promotion component? <i>See note at 3.1.3 & SMS Framework 1.0 B) 2) (c) and 3) (c); 3.1.3 B) 1) Old – SMS Standard 4.1 B) 3 & C) 3; 6.3.2 A & 6.3.3 (PM/I)</i>
Controls
Does the organization ensure procedures are followed for safety-related operations and activities? <i>SMS Framework: 1.0 B) 4) f) Old – 4.7 B (C)</i>
Does management periodically review supervisory and operational controls to ensure the effectiveness of the safety promotion component? <i>SMS Framework 1.1 B) 2) k), 3.1.3 B) 1) and 3.1.10 A) & B) Old – SMS Standard 6.3.3 A) and 6.7 (C)</i>

Bottom Line Assessment

Has top management promoted the growth of a positive safety culture and communicate it throughout the organization.

Competencies and Training & Safety Management Training Requirements

For employees to comply with all safety requirements they need the appropriate information, skills and training. To effectively accomplish this, the organization should document the training requirements for each area of work within the organization.

The type of training to be offered is already mandated via regulation for certain positions in the organization. This includes initial, recurrent and update training requirements, and where required, training specific to the operation of the safety management system. These regulations will provide a good starting point to identify what training is required.

It is recommended that a training file be developed for each employee, including management, to assist in identifying and tracking employee training requirements and documenting training performance.

All personnel should be given introductory and recurrent SMS training. When establishing training requirements for the organization, you should:

- Include a safety orientation for all new personnel, stressing the organization's commitment to safety and everyone's role in the SMS.
- Introduction and review of safety policies.

Ensure employees receive SMS training, in the following:

- The organization's commitment to safety
- The organization's Safety Policy
- The employee's role in the SMS
- The process for reporting occurrences
- All applicable emergency procedures

Minimum Safety Training Requirements		
Type of Safety Training	Affected Personnel	Validity
Introduction SMS training	All employees	N/A
First Aid	One attendant per location	2 years
WHMIS	Engineers, stores	2 years
Job Specific Safety Training	Affected Personnel	N/A

Optional Safety Training Requirements	
Fire Fighting (basics)	All personnel
Periodic SMS Refresher Training	All employees

Performance Objective: The organization will document competency requirements for those positions identified in SMS Framework Element 1.2 B) 3) and 1.3 and ensure those requirements are met.

PERSONNEL EXPECTATIONS COMPETENCE TABLE

The following table is extracted from the FAA SMS Program Office Assurance Guide.

Input
Does the organization identify interfaces between the personnel expectations functions and key safety personnel, SMS Framework Element 1.2 B) 3) & 1.3? <i>SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A 6) (I)</i>
Management Responsibility
Does the organization clearly identify who is responsible for the quality of the personnel requirements process? <i>SMS Framework 1.2 B) 3) Old – SMS Standard None (R/A)</i>
Procedure
Does the organization identify the competency requirements for safety-related positions identified in SMS Framework Element 1.2 B) 3) & Element 1.3? <i>SMS Framework 4.1.1 B) 1) Old – SMS Standard 7.3.A (P)</i>
Outputs & Measures
Does the organization ensure that the personnel in the safety-related positions identified in SMS Framework Element 1.2 B) 3) & Element 1.3, meet the documented competency requirements of Process 4.1.1 B) 1)? <i>SMS Framework 4.1.1 B) 2) Old – SMS Standard 7.3.B (P)</i>
Does the organization periodically measure performance objectives and design expectations of the personnel qualification and training process? <i>See note at 3.1.3 & SMS Framework 1.0 B) 2) (c) and 3) (c); 3.1.3 B) 1) Old – SMS Standard 4.1 B) 3 & C) 3; 6.3.2 A & 6.3.3 (PM/I)</i>
Controls
Does the organization ensure procedures are followed for safety-related operations and activities? <i>SMS Framework: 1.0 B) 4) f) Old – 4.7 B (C)</i>
Does management periodically review supervisory and operational controls to ensure the effectiveness of the personnel qualification and training process? <i>SMS Framework 1.1 B) 2) k), 3.1.3 B) 1) and 3.1.10 A) & B) Old – SMS Standard 6.3.3 A) and 6.7 (C)</i>

Bottom Line Assessment

Has the organization documented competency requirements for those positions identified in SMS Framework Element 1.2 B) 3) and 1.3 and ensured those requirements were met?

Communication, Awareness & Safety Promotion

Core is defined as “the central or most important part of something.” Value is defined as “the worth, importance, or usefulness of something to someone.”

One individual cannot accomplish Safety Goals in an organization. Safety is everyone’s responsibility. A positive safety culture can influence correct behavior. One of the most effective methods to establish safety as a core value is to make safety an integral part of the organization’s management plan. Just as the financial aspects of organizational management requires the ability to set goals and assign accountability, so to does the management of a safety system. Such goals need to be appropriate, practical and achievable. They also need to be measurable, dynamic, and fit to the size of the organization.

For example, a smaller organization may be expanding into a new line of business or operation. Some of the issues they may need to consider would include staffing, employee skill level, hiring, equipment, impact on existing organization and how all of these issues would impact safety. A larger organization would need to consider the same issues. Only the scope would be different.

The success or failure for meeting safety goals should be treated like any other goals within the organization. Requiring safety be a part of every management decision underlines the importance of safety and ensures safety is a normal part of conducting everyday operations.

Safety is recognized as a “core value.” Procedures, practices, training and the allocation of resources clearly demonstrate management’s commitment to safety. The perception the operation is most important, no matter the risk, undermines best safety practice. Effective methods for management to promote safety include:

- Prepare, publish, and disseminate a statement of management’s commitment to the SMS
- Demonstrate commitment to SMS by example
- Communicate the outputs of the SMS to all employees
- Provide training commensurate with people’s level of responsibility
- Define competency requirements for individuals in key positions

- Document, review and update training requirements
- Share “lessons learned” that promote improvement of the SMS
- Have a safety feedback system with appropriate levels of confidentiality that promote participation by all personnel in the identification of hazards
- Implement a “Just Culture” process that ensures fairness and open reporting in dealing with human error

The development of a positive safety culture is predicated on the involvement of all facets of the organization. The objective of this requirement therefore, is to involve all parties in the safety management system, thereby fostering an organization-wide commitment to safety management.

Safety Culture

Culture influences the values, beliefs and behaviors that we share with other members of our various social groups. Culture serves to bind us together as members of groups and to provide clues as to how we behave in both normal and unusual situations. Some people see culture as the “collective programming of the mind.” Culture is the complex, social dynamic that sets the rules of the game, or the framework for all our interpersonal interactions. It is the sum total of the way people work. Culture provides a context in which things happen. For safety management, understanding the culture is an important determinant of human performance and its limitations. The ultimate responsibility for safety rests with the management of the organization.

Safety Culture is affected by such factors as:

- Management’s actions and priorities
- Policy and procedure
- Supervisory practices
- Safety planning and goals
- Actions in response to unsafe behaviors
- Employee training and motivation
- Employee involvement or buy-in

Organizational Culture

Organizational culture recognizes and identifies the behavior and values of particular organizations. Generally, personnel in the aviation industry enjoy a

sense of belonging. They are influenced in their day-to-day behavior by the values of their organization. Does the organization recognize merit, promote individual initiative, encourage risk taking, tolerate breeches of SOP's, promote two-way communications, etc.? The organization is a major determinant of employee behavior.

Positive Safety Culture

A positive safety culture is generated from the "top down." It relies on a high degree of trust and respect between workers and management. Workers must believe that they will be supported in any decisions made in the interests of safety. They must also understand that intentional breaches of safety that jeopardize operations will not be tolerated. A positive safety culture is essential for the effective operation of an SMS. However, the culture of an organization is also shaped by the existence of a formal SMS. An organization should therefore not wait until it has achieved an ideal safety culture before introducing an SMS. The culture will develop as exposure and experience with safety management increases.

Indications of Positive Safety Culture

- Senior management places strong emphasis on safety as part of the strategy of controlling risks and minimizing losses.
- Decision-makers and operational personnel hold realistic views of the short and long-term hazards involved in the organization's activities.
- Management fosters a climate in which there is a positive attitude toward criticisms, comments and feedback from lower levels of the organization on safety matters.
- Management does not use their influence to force their views on subordinates.
- Management implements measures to minimize the consequences of identified safety deficiencies.

Safety must not only be recognized but also promoted by the senior management team as the organization's primary core value. Procedures, practices, training and the allocation of resources clearly demonstrate management's commitment to safety. The key elements of promoting safety within any organization are:

- Safety Culture – Support the expansion of a positive safety culture throughout the organization by:
 - Widely distributing and visibly posting organizational safety policy and mission statements signed by senior management
 - Clearly communicating safety responsibilities for all personnel
 - Visibly demonstrating commitment to safety through everyday actions
 - Implementing a "Just Culture" process that ensures fairness and open reporting in dealing with human error
- Safety Education
 - Widely communicated status on safety performance related to goals and targets
 - Communication of all identified safety hazards
 - Overview of recent accidents and incidents
 - Communication of lessons learned that promote improvement in SMS
- Safety Training
 - Initial "new employee" safety training
 - Recurrent safety training for all employees
 - Document, review and update training requirements
 - Define competency requirements for individuals in key positions
 - Introduce and review safety policies
 - Review of safety reporting processes
- Safety Communication
 - Communicate the realized benefits of SMS to all employees
 - Implement a safety feedback system with appropriate levels of confidentiality that promote participation by all personnel in the identification of hazards
 - Communicate safety information with employees through:
 - Safety newsletters
 - Bulletin board postings
 - Safety investigation reports
 - Internet website

SAFETY CULTURE INDICATORS

GENERATIVE

Chronic unease.

Safety seen as a profit center.

New ideas are welcomed.

PROACTIVE

Resources are available to fix things before an accident.

Management is open but still obsessed with statistics.

Procedures are "owned" by the workforce.

CALCULATIVE

We cracked it!

Lots and lots of audits.

HSE advisers chasing statistics.

REACTIVE

We are serious, but why don't they do what they're told?

Endless discussions to re-classify accidents.

Safety is high on the agenda after an accident.

PATHOLOGICAL

The lawyers said it was OK.

Of course we have accidents, it's a dangerous business.

Sack the idiot who had the accident.

Courtesy of Patrick Hudson, PhD, Leiden University - CHC 2009 Safety Summit

Performance Objective:

Management will communicate the output of its SMS to its employees, and will provide its oversight organization access to SMS outputs in accordance with established agreements and disclosure programs.

COMMUNICATION & AWARENESS TABLE

The following table is extracted from the FAA SMS Program Office Assurance Guide.

Input
Does the organization identify inputs (interfaces) for the Communication and Awareness process obtained from the outputs of Safety Risk Management (2.0) and Safety Assurance (3.0) including -
Hazard identification (2.1.2)? <i>SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A 6) (I)</i>
Risk severity and likelihood (2.2.1)? <i>SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A 6) (I)</i>
Risk assessments (2.2.2)? <i>SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A 6) (I)</i>
Risk control/mitigation plans (2.2.3)? <i>SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A 6) (I)</i>
Safety lessons learned? <i>SMS Framework 3.3 B) 2) Old - SMS Standard 7.5.A (I)</i>
Results of analysis of data (3.1.7)? <i>SMS Framework 1.5 B) 1) f) Old – SMS Standard 4.9 A 6) (I)</i>
Management Responsibility
Does the organization clearly identify who is responsible for the quality of the communication process? <i>SMS Framework 1.2 B) 3) Old – SMS Standard None (R/A)</i>
Procedure/Output/Measure
Does the organization ensure it communicates outputs of the SMS to its employees? <i>SMS Framework 4.2 B) 1) Old – SMS Standard 7.2.A (P/PM/I)</i>
Does the organization ensure it provides its oversight organization access to the outputs of the SMS in accordance with established agreements and disclosure programs? <i>SMS Framework 4.2 B) 2) Old – SMS Standard 7.2.B (P/PM/I)</i>
Does the organization interoperate with other organization's SMSs to cooperatively manage issues of mutual concern? <i>SMS Framework 4.2 B) 3) Old – SMS Standard None (P/PM/I)</i>
Does the organization periodically measure performance objectives and design expectations of the communication and awareness process? <i>See note at 3.1.3 & SMS Framework 1.0 B) 2) (c) and 3) (c); 3.1.3 B) 1) Old – SMS Standard 4.1 B) 3 & C) 3; 6.3.2 A & 6.3.3 (PM/I)</i>
Control
Does the organization have a control or controls in place to evaluate and update safety-related media for target populations? <i>SMS Framework 1.0 B) 4) f) and 3.1.10 B) 2) and 4.1.2 B) 4) Old – SMS Standard 6.3.3 A) and 6.7 (C)</i>
Does the organization ensure procedures are followed for safety-related operations and activities? <i>SMS Framework: 1.0 B) 4) f) Old – 4.7 B (C)</i>
Does management periodically review supervisory and operational controls to ensure the effectiveness of the communication and awareness process? <i>SMS Framework 1.1 B) 2) k), 3.1.3 B) 1) and 3.1.10 A) & B) Old – SMS Standard 6.3.3 A) and 6.7 (C)</i>

Bottom Line Assessment

Has top management communicated the output of its SMS to employees and provided its oversight organization access to SMS outputs in accordance with established agreements and disclosure programs?

CHAPTER 3:

GUIDELINES TO SMS IMPLEMENTATION

Integrating a cohesive SMS can be done in incremental steps. This allows the organization to become acquainted with the requirements and results before proceeding to the next step.

SMS Implementation Process



Safety Management Systems – Flight Standards



Federal Aviation Administration

Courtesy of Don Arendt, PhD, FAA SMS Program Manager

Developing an SMS

This toolkit is a compilation of best practices and solutions. Various SMS toolkits from throughout the industry were reviewed. Contributions came from small, medium and large helicopter operators as well as airlines, industry groups and government agencies.

The intent of this document is to assist organizations in achieving their desired safety performance objectives while allowing them flexibility to reach that outcome. This is commonly known as a “performance based approach” and encourages organizations to choose the solution best suited to their needs and ensures they meet performance objectives. The toolkit helps the organization determine their level of compliance and develop an action plan to include the necessary components.

What Does It Take to Implement an SMS?

Management initiatives are not always successful, and each time a new idea is introduced, people will ask whether this is a worthwhile initiative. Having a good idea does not guarantee success. Many good ideas have failed in practice because one or more of three critical elements were missing, including commitment, cognizance and competence. These three C’s of leadership will determine whether safety management achieves its goals and leads to a pervasive safety culture.

- 1. Commitment:** In the face of operational and commercial pressures managers need to make safety management tools effective.
- 2. Cognizance:** Leaders need to understand the nature and principles of managing safety.
- 3. Competence:** Safety management policies and procedures must be applied throughout the organization.

Phased Implementation

Initial SMS implementation strategy follows a four phased process similar to that outlined in the ICAO Safety Management Manual (SMM). ICAO, as well as other governments in the process of implementing SMS requirements, favor a phased implementation process. The SMS implementation guidance presented in this document closely parallels the ICAO recommended phased implementation process outlined in ICAO Document 9859, SMM.

The phases are arranged in four levels of implementation maturity, similar to that developed as the Capability Maturity Model (CMM) by the Software Engineering Institute of Carnegie-Mellon University. This technique is employed by the U.K. Health and Safety Executive (HSE – equivalent to U.S. OSHA) as a safety culture maturity model.

Note the FAA's approach to a phased implementation of an SMS is based upon, but slightly different than the ICAO implementation strategy expressed in ICAO Document 9859, Safety Management Manual (SMM), Chapter 10, Appendixes 1 and 2 (Gantt Charts).

In the development and implementation of a Safety Management System (SMS), it is best to separate the overall complexity of the task into smaller, more manageable subcomponents. In this way, confusing complexity may be turned into simpler and more transparent subsets of activities requiring minor increases in workloads and resources. This partial allocation of resources may be more commensurate with the requirements of each activity as well as the resources available to the organization.

The reasons justifying why a phased approach to SMS implementation is recommended can be expressed as: (a) Providing a manageable series of steps to follow in implementing an SMS, including allocation of resources; and (b) Effectively managing the workload associated with SMS implementation.

A third reason, quite distinct from the previous two, but equally important, is avoiding "cosmetic compliance". An organization should set as its objective the realistic implementation of a comprehensive and effective SMS, not the tokens of it. You simply cannot "buy" an SMS system or manual and expect the benefits of a fully implemented SMS.

Feedback from other organizations has shown while full SMS implementation will certainly take longer, the robustness of the resulting SMS will be enhanced and early benefits realized as each implementation phase is completed. In this way, simpler safety management processes are established and

benefits realized before moving on to processes of greater complexity. This is especially true with regard to Safety Risk Management (SRM).

In the reactive phase (Level 2), an organization will build an SRM system around known hazards that are already identified. This allows company resources to be focused on developing risk analysis, assessment and control processes (that frequently resolve old long term issues and hazards) unencumbered by the complexities necessary at the proactive (Level 3) and predictive phases (Level 4). Guidance for a phased implementation of SMS aims at:

- providing a manageable series of steps to follow in implementing an SMS, including allocation of resources.
- effectively managing the workload associated with SMS implementation, preempts a "box checking" exercise, and realization of safety management benefits and return on investment during an SMS implementation project.

Implementation Levels: The figure on page 73 and the SMS Implementation Checklist on page 76 illustrate the recommended levels of SMS development and implementation.

Level Zero:

Orientation & Commitment

Level zero is not so much a level as a status. It indicates that the organization has not started formal SMS development or implementation and includes the time period between an organization's first requests for information on SMS implementation and when they commit to implementing an SMS. Level zero is a time for the organization to gather information, evaluate corporate goals, objectives and determine the viability of committing resources to an SMS implementation effort.

Level One:

Planning and Organization

The objective of level 1 is to:

- Complete preliminary and detailed gap analyses
- Complete a comprehensive implementation plan

Level one begins when an organization's top management commits to providing the resources necessary for full implementation of SMS through out the organization.

Gap Analysis

The first step in developing an SMS is for the organization to analyze its existing programs, systems and activities with respect to the SMS functional expectations found in ICAO or FAA documents.

This analysis is a process and called a “gap analysis,” the gaps being those elements in the guidance documents not already being performed by the organization.

- The gap analysis process should consider and encompass the entire organization (e.g., functions, processes, organizational departments, etc.) to be covered by the SMS.
- The gap analysis should be continuously updated as the organization progresses through the SMS implementation process.

Implementation Plan

When the gap analysis has been performed, an implementation plan is prepared. The implementation plan is simply a “roadmap” describing how the organization intends to close the existing gaps by meeting the objectives and expectations in the guidance documents.

- As depicted in the chart to follow, little activity is expected during level one. The organization must first arrange resources, assign responsibilities, set schedules and define objectives necessary to address all gaps identified.

Level Two: Reactive Process, Risk Management

The objective of level two is:

- To correct known deficiencies in safety management practices and operational processes.
- To plan, organize and prepare the organization for further SMS development.

At this level, the organization develops and implements a basic Safety Risk Management process. Information acquisition, processing and analysis functions are implemented and a tracking system for risk control and corrective actions are established. At this phase, the organization develops an awareness of hazards and responds with appropriate systematic application of preventative or corrective actions. This allows the organization

to react to unwanted events and problems as they occur and develop appropriate remedial action.

For this reason, this level is termed “reactive.” While this is not the final objective of an SMS, it is an important step in the evolution of safety management capabilities.

Level Three: Proactive Processes – Looking Ahead

(A Full-Up, Functioning SMS)

At this level of implementation, the safety risk management (SRM) process should be applied to initial design of systems, processes, organizations, and products as well as development of operational procedures and planned changes to operational processes. The activities involved in the SRM process involve careful analysis of systems and tasks involved; identification of potential hazards in these functions and development of risk controls.

The risk management process developed at level two is used to analyze, document, and track these activities. Because the organization is now using the processes to look ahead, this level is termed “proactive.” At this level, these proactive processes have been implemented but their performance has not yet been proven.

Level Four: Continuous Improvement – Continued Assurance

The final level of SMS maturity is the continuous improvement level. Processes have been in place and their performance and effectiveness have been verified. The complete safety assurance process verifies that the remaining features of the other SRM and SA processes are functioning.

A major objective of a successful SMS is to attain and maintain this continuous improvement status for the life of the organization.

The chart on the next page shows a graphical representation of development flow throughout SMS Implementation. It is extracted from the FAA SMS Program Office Assurance Guide.

Implementation Checklist

Management Plan	Person Responsible	Date Completed
Policies, objectives and requirements of SMS are published and distributed		
Organizational structure and key individuals and responsibilities are defined		
Elements of the SMS are defined		
Expectations and objectives of the SMS are conveyed to employees		
A method to identify and maintain compliance with safety and regulatory requirements		

Document & Data Information Management	Person Responsible	Date Completed
Safety policies, objectives and SMS requirements publicized		
Safety regulations that govern the organization identified		
Pertinent safety and regulatory information provided to all employees		
Documentation describing the systems for each SMS component consolidated.		
Change control system in place for applicable documents		
Personnel are educated on changes in documents		
Obsolete documents are promptly removed		
Periodic review of documents		

Emergency Preparedness & Response	Person Responsible	Date Completed
Plan is readily available at work stations		
Plan is relevant and useful		
Emergency response plan is periodically tested		
Plan is updated when contact details change		
Personnel are briefed on the plan and their responsibilities		
Training in emergency response procedures is provided		
Responsibilities for immediate response personnel are defined		
Responsibilities are defined for secondary response personnel		
Responsibilities for site security and accident investigation are defined		
Emergency response plan procedures for next of kin notification are in place		
Procedures for dealing with claims and insurance are identified		
Aircraft recovery procedures are established		

Hazard Identification & Risk Management	Person Responsible	Date Completed
Procedures exist to proactively identify potential hazards		
Potential hazards are considered when making changes within the organization		
Risk management plans are prioritized and approved by appropriate level of management		
Identified hazards are tracked for closure		

Occurrence & Hazard Reporting	Person Responsible	Date Completed
Employees receive feedback on reported hazards		
Safety data is analyzed		
Corrective actions are monitored for effectiveness		
Hazards are monitored to identify trends		
A non-punitive disciplinary policy is in place for reporting hazards		
Procedures for anonymous submittals of hazards are identified		

Occurrence Investigation & Analysis	Person Responsible	Date Completed
Investigations are conducted to determine root cause		
Person(s) conducting the investigation are technically qualified		
Investigations identify what can be done to prevent future occurrences		
Both the immediate causal factors and the contributory factors are identified		
Investigations include looking at organizational factors		
Acts of "omission" and "commission" are identified		
Investigation reports are provided to manager that has accountability and authority.		

Performance Measurements	Person Responsible	Date Completed
Safety performance monitoring is used as feedback to improve the system		
Safety performance measures address individual areas		
Safety performance objectives are SMART (Specific, Measurable, Achievable, Results Oriented, Timely)		
Safety performance is linked to the organization's business performance measures.		

Safety Management Training Requirements	Person Responsible	Date Completed
Safety orientation plan is identified for all new employees		
Competency requirements are documented		
Training requirements are documented		
Regularly scheduled safety meetings are established		
Key personnel are continuously educated on safety management best practices.		

Safety Promotion	Person Responsible	Date Completed
Senior management's commitment to the SMS is published and distributed		
Senior management visibly demonstrates their commitment to SMS		
Outputs of the SMS is communicated to all employees		
Initial and recurrent training is provided to all personnel		
Competency requirements are defined for those individuals in key positions		
Training requirements are documented and periodically reviewed		
Lessons learned are shared to promote improvement of the safety program		
Employee safety feedback system is established		
A "Just Culture" process is in place		

SMS Development Chart

Components, elements and processes should be completed by the indicated level of Implementation.		Implementation Level		
SMS Framework Expectation	1	2	3	
Component 1.0 Safety Policy and Objectives		X		
Element 1.1 Safety Policy	X			
Element 1.2 Mgmt Commitment and Safety Accountabilities	(*1)	X		
Element 1.3 Key Safety Personnel	X			
Element 1.4 Emergency Preparedness and Response		X		
Element 1.5 SMS Documentation and Records		X		
Component 2.0 Safety Risk Management (SRM)		(*3)	X	
Element 2.1 Hazard Identification and Analysis		X		
Process 2.1.1 System and Task Analysis			X	
Process 2.1.2 Identify Hazards		X		
Element 2.2 Risk Assessment and Control		X		
Process 2.2.1 Analyze Safety Risk		X		
Process 2.2.2 Assess Safety Risk		X		
Process 2.2.3 Control/Mitigate Safety Risk		X		
Component 3.0 Safety Assurance			X	
Element 3.1 Safety Performance Monitoring and Measurement		X		
Process 3.1.1 Continuous Monitoring		X		
Process 3.1.2 Internal Audits by Operational Departments		X		
Process 3.1.3 Internal Evaluation		X		
Process 3.1.4 External Auditing of the SMS		X		
Process 3.1.5 Investigation		X		
Process 3.1.6 Employee Reporting and Feedback System.		X		
Process 3.1.7 Analysis of Data.		X		
Process 3.1.8 System Assessment.		X		
Process 3.1.9 Preventive/Corrective Action.		X		
Process 3.1.10 Management Review.		X		
Element 3.2 Management of Change		(*3)	X	
Element 3.3 Continual Improvement		X		
Component 4.0 Safety Promotion			X	
Element 4.1 Competencies and Training			X	
Process 4.1.1 Personnel Expectations (Competence)	(*2)		X	
Process 4.1.2 Training		X		
Element 4.2 Communication and Awareness		X		
(*1) Level 1 - only comply with expectations 1.2 B) 2) & 3)				
(*2) Level 1 - only comply with expectation 4.1.1 B) 1)				
(*3) Level 2 - Implementation of 2.0 B) 2) a), b) & d) and 3.2, will be limited in level 2 by the lack of the system/task analysis process (process 2.1.1)				

CHAPTER 4:

SAMPLE SMS MANUAL



These pages are provided for organizations wishing to develop their own manual for a Safety Management System. Use the SMS Toolkit CD or copy the following pages as needed to build additional manuals.

SAFETY MANAGEMENT SYSTEM FOR

organization name

Approved by: _____

Date: _____

SAFETY MANAGEMENT SYSTEM MANUAL

This Safety Management System (SMS) Manual has been developed to direct all personnel in the safe operations of the organization, and it is the policy that governs the operation of this organization. SMS is a proactive, integrated approach to safety management. SMS is part of an overall management process that the organization has adopted in order to ensure that the goals of the organization can be accomplished.

SMS embraces the principle that the identification and management of risk increases the likelihood of accomplishing the mission. Hazards can be identified and dealt with systematically through the Hazard Reporting Program that facilitates continuous improvement and professionalism. Auditing and monitoring processes ensure that aircraft are operated in such a way as to minimize the risks inherent in flight operations.

Safety Management Plan

Safety management holds the key to this organization's future and affects everything we do. Safety management includes all areas of safety, security, health and environmental management.

This SMS Manual identifies the organization's Safety Management Plan as the tool used to define how the SMS supports the organization's Operations Plan. Management is committed to the SMS and has established leadership for the program and will continue to demonstrate, through everyday actions, the commitment to safety and its priority in the achievements of the organization.

The processes in place in the Safety Management Plan include the active involvement of all managers and supervisors, who, through planning and review, will drive efforts for continuing improvement in safety and safety performance. The key focus is the safe operations of airworthy aircraft.

Safety audits are essential components of the Safety Management Plan. Audits review systems, identify safety issues, prioritize safety issues, involve all personnel and enhance the safety of operations.

Mission Statement

The mission is to provide safe, high quality service to our customers. This includes: *(describe the missions you perform)*.

Safety Policy

All levels of management are accountable for safety performance and are committed to providing safe, healthy, secure work conditions and attitudes

with the objective of having an accident-free workplace. Making safety excellence part of all activities strengthens the organization. The organization's leader is committed to:

- Ongoing pursuit of an accident-free workplace, including no harm to people, no damage to equipment, the environment or property.
- A culture of open reporting of all safety hazards in which management will not initiate disciplinary action against any personnel who, in good faith, discloses a hazard or safety occurrence due to unintentional conduct.
- Regular and ongoing support for safety training and awareness programs.
- Regular audits of safety policies, procedures and practices are conducted.
- Monitoring industry activity to ensure best safety practices are incorporated in to the organization.
- Providing and promoting the necessary resources to support this policy.
- Requiring all employees are responsible for maintaining a safe work environment through adherence to approved policies, procedures and training.
- Requiring all employees to familiarize themselves and comply with safety policies and procedures.

Safety Principles

- Always operate in the safest manner practicable.
- Never take unnecessary risks.
- Familiarity and prolonged exposure without a mishap leads to a loss of appreciation of risk. Safe does not mean risk free.
- Everyone is responsible for the identification and management of risk.
- A culture of open reporting of all safety hazards in which management will not initiate disciplinary action against any personnel, who in good faith, due to unintentional conduct, disclose a hazard or safety incident.

Organization Structure & Safety Responsibilities

The organization's structure is described in the Operations Manual. The organization's top manager is responsible for the following safety accountabilities:

- Conducting all operations in the safest manner practicable.
- Developing long-term safety objectives, including the establishment of safety policies and practices.
- Implementing management systems that will establish and maintain safe work practices.
- Identifying a Chief Safety Officer to provide policies and procedures oversight and safety program rigor. This person is responsible for the following:
 - Maintaining and reporting all safety related data, including the minutes of safety meetings.
 - Providing information on hazard and risk analysis.
 - Defining and establishing a procedure for risk management.
 - Conducting incident and accident investigations.
 - Preparing and presenting audit reports and remedial actions.

The chief pilot is responsible for the following safety accountabilities:

- Ensuring all flight operations personnel understand and comply with applicable regulatory requirements, standards and the organization's safety policies and procedures.
- Identification and development of resources to achieve safe flight operations.
- Observe and control safety systems by monitoring and supervising aircrews.
- Measure aircrew performance compliance with organizational goals, objectives and regulatory requirements.
- Review standards and the practices of organization personnel as they impact flight safety.

The chief of maintenance is responsible for:

- Ensuring all flight maintenance personnel understand applicable regulatory requirements, standards, and organization safety policies and procedures.
- Identification and development of resources to achieve safe maintenance operations.
- Observe and control safety systems by monitoring and supervising maintenance personnel.
- Measure maintenance personnel performance compliance with organizational goals, objectives and regulatory requirements.
- Review standards and the practices of maintenance personnel as they impact flight safety.

Compliance with Standards

All personnel have the duty to comply with approved standards including organization policy and procedures, aircraft manufacturer's operating procedures, and limitations, and government regulations. Research shows that once you start deviating from the rules, you are almost twice as likely to commit an error with serious consequences.

Breaking the rules usually does not result in an accident; however, it always results in greater risk for the operation, and the organization supports the principle of, "NEVER take unnecessary risks."

Intentional non-compliance with standards

Behavior is a function of consequences. Management is committed to identifying deviations from standards and taking immediate corrective action. Corrective action can include counseling, training, discipline, grounding or removal. Corrective action must be consistent and fair.

Organization management makes a clear distinction between honest mistakes and intentional non-compliance with standards. Honest mistakes occur, and they are addressed through counseling and training.

Research has shown that most accidents involve some form of flawed decision-making. This most often involves non-compliance with known standards. Non-compliance rarely results in an accident; however, it always results in greater risk for the operation. Organization policy agrees with the following conclusions:

- Compliance with known procedures produces known outcomes.
- Compliance with standards helps guarantee repeatable results.
- Bad rules produce bad results.
- Complacency affects the safe operation of the aircraft and cannot be tolerated.
- Standards are mechanisms for change.
- The hardest thing to do, and the right thing to do are often the same thing.

Rewarding People

This organization is committed to the principle that people are rewarded for normal, positive performance of their duties that comply with organization standards.

Personnel will not be rewarded for accomplishing the mission by breaking the rules. Reinforced bad behavior breeds continued bad behavior. This is unacceptable.

Safety Promotion

Safety is promoted as a “core value” within the organization. Procedures, practices and allocation of resources and training clearly demonstrate the organization’s commitment to safety. The following methods are used to promote safety:

- Post the Safety Policy in prominent locations around the base of operations.
- Start meetings with a comment or review about safety issues.
- Have a safety bulletin board.
- Have an employee safety feedback process.

Document & Data Information Control

All safety documents are controlled through the technical library. This includes the SMS, operations, maintenance and training manuals. Change control procedures are incorporated into each of these documents.

The Safety Officer is responsible for maintaining and reporting safety related data, including the minutes of safety meetings, information on hazard and risk analysis, risk management, remedial action, incident and accident investigations, and audit reports.

Hazard Identification & Risk Management

The systematic identification and control of all major hazards is foundational. The success of the organization depends on the effectiveness of the Hazard Management Program. Hazards are identified through employee reporting, safety meetings, audits and inspections.

When a major change in operations, equipment or services is anticipated, the management of change process includes hazard identification and risk management processes.

Risk management is the identification and control of risk. It is the responsibility of every member of the organization. The first goal of risk management is to avoid the hazard. The organization establishes sufficient independent and effective barriers, controls and recovery measures to manage the risk posed by hazards to a level as low as practicable. These barriers, controls and recovery measures can be equipment, work processes, standard operating procedures, training or other similar means to prevent the release of hazards and limit their consequences should they be released.

The organization ensures that all individuals responsible for safety critical barriers, controls, and recovery measures are aware of their responsibilities and competent to carry them out. The organization establishes who is doing what to manage key risks and ensure that these people and the things they do are up to the task.

The organization top manager is responsible for accepting or denying operations, and manages risk through the Risk Assessment Matrix. The matrix is a graphic portrayal of risk as the product of probability on one axis (exposure, frequency or likelihood) and potential consequence on the other axis (loss generated from the outcome).

The Risk Assessment Matrix shows an assigned value, and has a broad application for qualitative risk determination as well as graphically presenting risk criteria. The data from the risk assessment(s) is entered into the risk assessment form and is maintained by the safety manager. These risk assessment forms make up the list of hazards for the organization.

Occurrence & Hazard Reporting

All occurrences and hazards identified by an employee will be reported to the safety officer using the HAI web based reporting system called the Event Reporting System, found at www.eventreporting.org. If employees are unable to report through that web site, they may report all occurrences and hazards identified on the Occurrence and Hazard Report below.

Occurrence - Definition

An occurrence is defined as any unplanned safety related event. This would include accidents and incidents that could impact the safety of guests, passengers, organization personnel, equipment, property or the environment.

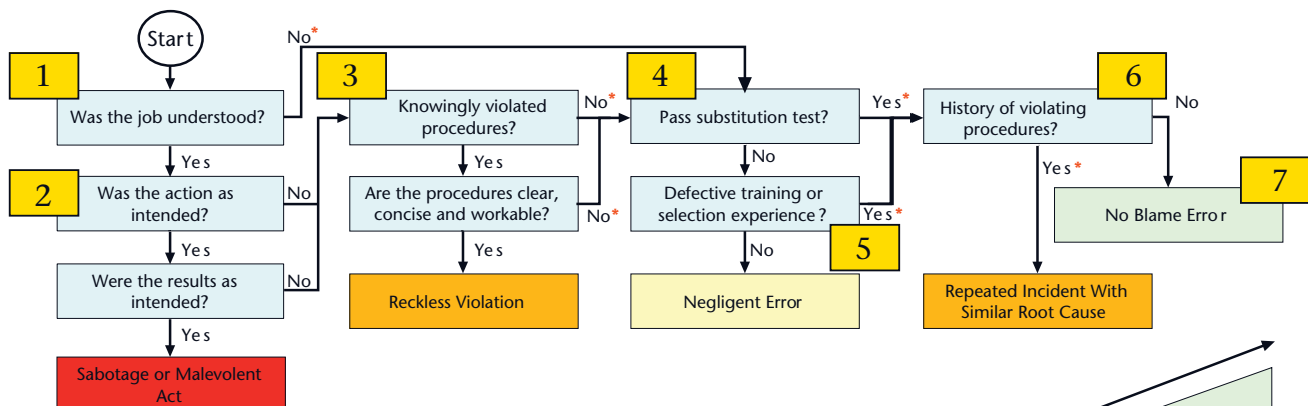
Hazard - Definition

A hazard is defined as something that has the potential to cause harm to a persons, loss of or damage to equipment, property or the environment.

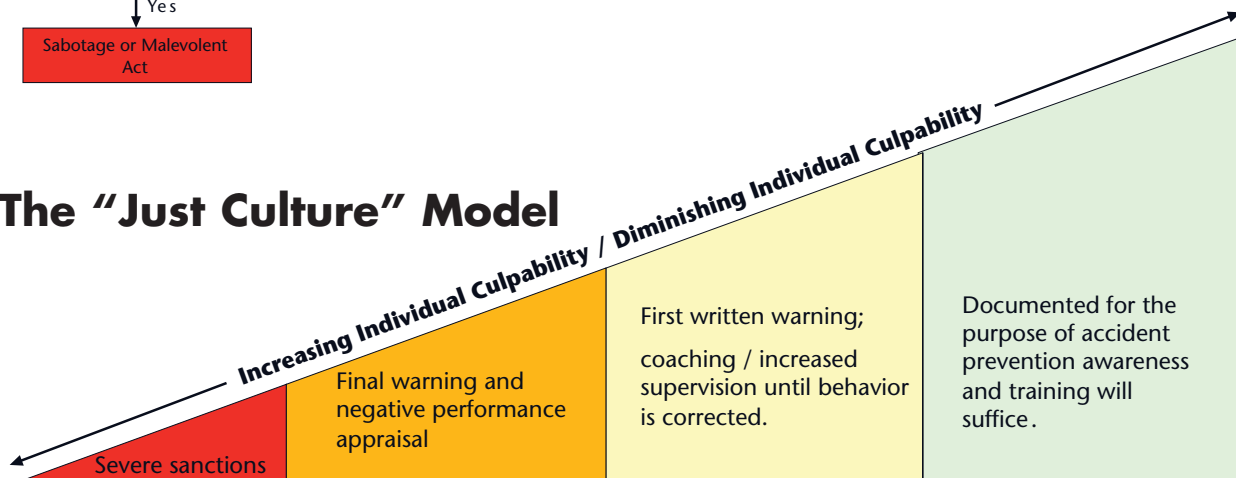
Occurrences

It is the responsibility of the Chief Pilot to ensure all relevant comments and agreed actions from other managers are recorded in the report. Reports are closed when all actions have been taken. Occurrences shall be reviewed in the monthly meeting.

Personnel who report are treated fairly and justly, without punitive action from management except in the case of known reckless disregard for regulations and standards, or repeated substandard performance. The "Just Culture" process shown below is used when deciding if disciplinary action is appropriate.



The "Just Culture" Model



* Indicates a "System" induced error. Manager/supervisor must evaluate what part of the system failed and what corrective and preventative action is required. Corrective and preventative action shall be documented for management review.

Courtesy of Canadian Helicopter Corporation Safety Manual 2007

Occurrence Investigation & Analysis

Significant occurrences are investigated by the officer or his designee, and shall be reviewed by the top manager. The safety officer reviews the database for previous occurrences in order to identify trends.

For human error in maintenance operations, the MEDA checklist should be used. For human error in flight operations, the HFACS checklist should be used. These checklists are posted on the IHST SMS Toolkit webpage, www.IHST.org/SMS toolkit/.

Safety Assurance Oversight Programs

The organization conducts monthly base inspections. Records of base inspections and the resolution of actions are maintained by the safety officer. Issues identified in inspections are included in the agenda of the Safety Meeting. The safety officer is responsible for storing these documents.

The safety officer directs annual audits of the SMS. A sample checklist for audits can be found on the IHST website. Findings and associated corrective actions shall be recorded in the audit.

The safety officer manages and stores audit reports, which include findings and recommended corrective actions. Positive findings are also recorded. Findings and recommended actions are communicated to all personnel.

Employee training files include the Safety and SMS Training Form, located on the next page, to record training, the date that training is next due, and the means of demonstrating competency, verbal or written, as determined by the safety officer and/or chief pilot. Training records are kept in the personal file of all personnel. The chief pilot is responsible for reviewing training files in order to ensure recurrent training is conducted on a timely basis.

Management of Change (MOC)

The Management of Change (MOC) process has four basic phases: screening, review, approval and implementation. Both the effect of change and the effect of implementing change are considered.

The systematic approach to managing and monitoring organizational change is part of the risk management process. Safety issues associated with change are identified and standards associated with change are maintained during the change process. Procedures for managing change include:

- Risk assessment
- Identify the goals, objectives and nature of the proposed change
- Identify operational procedures
- Analyze changes in location, equipment or operating conditions
- Post current changes in maintenance and operator manuals
- All personnel are made aware of and understand changes
- Identify the level of management with authority to approve changes
- Review, evaluate and record the potential safety hazards from the change or its implementation
- Approval of the agreed change and the implementation procedure(s)

There are methods for managing the introduction of new technology. All personnel should be consulted when changes to the work environment, process or practices could have health or safety implications. Changes to resource levels and competencies associated risks are assessed as part of the change control procedure.

Regardless of the magnitude of change, there must always be consideration for safety, the associated risks and the management of change principles. Change can only be successful if personnel involved are engaged, involved and participate in the process management. Management of change provides a structured framework for managing all aspects of the change. How change is introduced dramatically impacts the implementation and the effectiveness of the outcome.

Procedures are established and maintained to manage change with a specific focus on safety and risk. Throughout the process it is important that all personnel involved have an accurate understanding of “what” must be changed and “why” it must be changed. It is imperative that management personnel provide direction, guidance and in-depth communication.

The structure and responsibilities associated with change are defined prior to introducing any change. It is important to recognize the complexity of change prior to, during and subsequent to the change itself. Anticipate unintended consequences and the necessity to redirect the process if change fails.

Change can fail for many reasons some of which are as follows:

- Lack of top down support
- Loss of control
- Insufficient resources
- Commitment changes
- Poor communication of the process
- Lack of clarity and consistency
- Lack of understanding
- Insufficient risk analysis
- Timelines too aggressive

The systematic approach to managing and monitoring organizational change is part of the risk management process. Safety issues associated with change are identified and standards associated with change are maintained throughout the management of change process.

Once the need for change has been identified, a structured process is followed in order for change to be appropriately managed.

Procedures for managing change include:

- Change recognition occurs based on differing elements:
 - Planned – introduction new product (i.e., aircraft or technology)
 - Unplanned – response to outside influences such as regulatory or market factors
- Description
 - Occurs in order to create a vision of the change
 - Enables affected personnel to be aware and to become involved in later stages
- Classification
 - To determine the magnitude of the proposed change
 - Identify route to be followed for change

- Identify Objectives and Constraints
 - Details the objectives of the change
 - Identifies both internal and external constraints that will impact change
 - Evaluate the necessity for redefining company standards to fit the change
- Initial Design
 - Develop potential plans for implementation of the change
 - Generation and evaluation of options and differing paths to bring about the change
- Detail Design
 - Initial processes produce a detailed procedure for the change
 - Detailed process will justify review and support approval for implementation
- Implementation
 - According to detailed change plan
 - Plan defines the monitoring and processes to be implemented
- Feedback and Follow-up
 - Widely communicate the change process to personnel
 - Periodic review of management of change for effectiveness

Emergency Preparedness & Response

The detail of the emergency response plan is contained in the Operations Manual. The safety manager is responsible for assuring that all personnel are trained to handle organization emergencies based on their role in the organization.

Emergency drills are conducted at least annually to ensure employees are competent. Emergency contact numbers are posted and kept current at every organization telephone.

Performance Management

Continuous improvement and exemplary service to our customers is a “core value.” Safety performance is measured by the following performance measures:

- Reduce the number of non-compliances with standard flight operations procedures as measured by observation or flight data monitoring.
- Increase compliance with the safety incident management process (reporting, classification, root cause investigation, and implementation of corrective actions).

The safety manager is responsible for ensuring organization performance is annually reviewed and employees are adequately informed of the results of the review.

Terms & Acronyms

Accident – an unplanned event or series of events that results in death, injury, occupational illness, damage to or loss of equipment or property, or damage to the environment.

Analysis – the process of identifying a question or issue to be addressed, modeling the issue, investigating model results, interpreting the results, and possibly making a recommendation. Analysis typically involves using scientific or mathematical methods for evaluation.

Assessment – the process of measuring or judging the value or level of something.

Attributes – System Attributes, or the inherent characteristics of a system, are present in any well defined organization and apply to an effective SMS. While the six system attributes were first applied with Air Transportation Oversight System (ATOS) fielding, there are conceptual differences when applied to SMS, as discussed below:

Authority & Responsibility

Authority – who can direct, control, or change the process, as well as who can make key decisions such as risk acceptance. This attribute also includes the concept of empowerment.

Controls – controls are elements of the system, including hardware, software, special procedures or procedural steps, and supervisory practices designed to keep processes on track to achieve their intended results. Organizational process controls are typically defined in terms of special procedures, supervisory and management practices, and processes. Many controls are inherent features of the SMS Framework. Practices such as continuous monitoring, internal audits, internal evaluations, and management reviews (all parts of the safety assurance component) are identified as controls within the design expectations. Additionally, other practices such as documentation, process reviews, and data tracking are identified as controls within specific elements and processes.

Interfaces – this aspect includes examining such things as lines of authority between departments, lines of communication between employees, consistency of procedures, and clearly delineating lines of responsibility between organizations, work units, and employees. Interfaces are the “Inputs” and “Outputs” of a process.

Interfaces in Safety Risk Management & Safety Assurance

– Safety Risk Management (SRM) and Safety Assurance (SA) are the key processes of the SMS. They are also highly interactive, especially in the input-output relationships between the activities in the processes. This is especially important where interfaces between processes involve interactions between different departments, contractors, etc. Assessments of these relationships should pay special attention to flow of authority, responsibility and communication, as well as procedures and documentation.

Procedures – ISO-9001-2000 defines “procedure” as “a specified way to carry out an activity or a process” – procedures translate the “what” in goals and objectives into “how” in practical activities (things people do). Procedures are simply documented activities to accomplish processes, e.g. a way to perform a process. The organization should specify their own procedures for accomplishing processes in the context of their unique operational environment, organizational structure, and management objectives.

Process Measures – are ways to provide feedback to responsible parties that required actions are taking place, required outputs are being produced, and expected outcomes are being achieved. A basic principle of safety assurance is that fundamental processes be measured so that management decisions can be data-driven. The general expectations for Component 1, Policy, specify that SMS outputs be measured and analyzed. These measurements and analysis are accomplished

in Component 3, Safety Assurance. Outputs of each process should, therefore, be identified during Component 3 activities. For example, these outputs should be the subjects of continuous monitoring, internal audits, and internal evaluation.

Responsibility – who is accountable for management and overall quality of the process (planning, organizing, directing, controlling) and its ultimate accomplishment.

Audit – scheduled, formal reviews and verifications that evaluate whether an organization has complied with policy, standards, and/or contract requirements. An audit starts with the management and operations of the organization and then moves to the organization's activities and products/services.

Internal audit – an audit conducted by, or on behalf of, the organization being audited, e.g., the flight-training department audits the flight-training department.

External audit – an audit conducted by an entity outside of the organization being audited, e.g., the flight operations division audits the flight training department.

Aviation system – the functional operation or production system used by an organization to produce an aviation product or service (see System and Functional below).

Complete – nothing has been omitted and what is stated is essential and appropriate to the level of detail.

Conformity – fulfilling or complying with a requirement [ref. ISO 9001-2000]; this includes but is not limited to complying with Federal regulations. It also includes complying with company requirements, requirements of operator developed risk controls, or operator policies and procedures.

Continuous monitoring – uninterrupted (constant) watchfulness (checks, audits, etc) over a system.

Corrective action – action to eliminate (remove) or mitigate (lessen) the cause or reduce the effects of a detected nonconformity or other undesirable (unwanted) situation.

Correct – accurate without ambiguity or error in its attributes.

Documentation – information or meaningful data and its supporting medium (e.g., paper, electronic, etc.). In this context, documentation is different from records because documentation is the written description of policies, processes, procedures, objectives, requirements, authorities, responsibilities, or work instructions; where as Records are the evidence of results achieved or activities performed.

Evaluation – an independent review of company policies, procedures, and systems [ref. AC 120-59A]. If accomplished by the company, the evaluation should be done by a person or organization other than the one performing the function being evaluated. The evaluation process builds on the concepts of auditing and inspection. An evaluation is an anticipatory process designed to identify and correct potential problems before they happen. An evaluation is synonymous with the term "systems audit."

Functional - The term "function" refers to "what" is expected to be incorporated into each process (e.g., human tasks, software, hardware, procedures, etc.) rather than "how" the function is accomplished by the system. This makes for a more performance-based system and allows for a broad range of techniques to be used to accomplish the performance objectives. This, in turn, maximizes scalability while preserving standardization of results across the aviation organization communities.

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

Incident – a near-miss episode with minor consequences that could have resulted in greater loss. An unplanned event that could have resulted in an accident or did result in minor damage. An incident indicates that a hazard or hazardous condition exists, though it may not identify what that hazard or hazardous condition is.

Lessons learned – knowledge or understanding gained by experience, which may be positive, such as a successful test or mission, or negative, such as a mishap or failure. Lessons learned should be developed from information obtained from inside and outside of the organization and/or industry.

Likelihood – the estimated probability or frequency, in quantitative or qualitative terms, of an occurrence related to the hazard.

Line management – the management structure that operates (controls, supervises, etc) the operational activities and processes of the aviation system.

Nonconformity – non-fulfillment of a requirement (ref. ISO 9001-2000). This could include but is not limited to, noncompliance with Federal regulations, company requirements, requirements of operator-developed risk controls or operator-specified policies and procedures.

Objective – the desired state or performance target of a process. Usually it is the final state of a process and contains the results and outputs used to obtain the desired state or performance target.

Operational life cycle – time period from implementation of a product/service until it is no longer in use.

Organization – indicates both certificated and non-certificated aviation organizations, aviation service providers, air carriers, airlines, maintenance repair organizations, air taxi operators, corporate flight departments, repair stations, and pilot schools.

Outputs – the product or end result of an SMS process, which is able to be recorded, monitored, measured, and analyzed. Outputs are the minimum expectation for the product of each process area and the input for the next process area in succession. Each of the outputs of a process should have a method of measurement specified by the organization. Measures need not be quantitative where this is not practical; however, some method of providing objective evidence of the attainment of the expected output is necessary.

Oversight – a function performed by a regulator (such as the FAA) that ensures that an aviation organization complies with and uses safety-related standards, requirements, regulations, and associated procedures. Safety oversight also ensures that the acceptable level of safety risk is not exceeded in the air transportation system.

Preventive action – preemptive action to eliminate or mitigate the potential cause or reduce the future effects of an identified or anticipated nonconformity or other undesirable situation.

Procedure – a specified way to carry out an activity or a process.

Process – a set of interrelated or interacting activities that transform inputs into outputs.

Process measures – refer to definition for Process Measures under the Attributes definition, above.

Product/service – anything that is offered or can be purchased that might satisfy a want or need in the air transportation system.

Records – evidence of results achieved or activities performed.

Residual safety risk – the safety risk that exists after all controls have been implemented or exhausted and verified. Only verified controls can be used for assessing residual safety risk.

Risk – the composite of predicted severity (how bad) and likelihood (how probable) of the potential effect of a hazard in its worst credible (reasonable or believable) system state. The terms risk and safety risk are interchangeable.

Risk control – steps taken to eliminate (remove) hazards or to mitigate (lessen) their effects by reducing the severity and/or likelihood of risk associated with those hazards.

Safety assurance – a formal management process within the SMS that systematically provides confidence that an organization's products/services meet or exceed safety requirements. A Safety Assurance flow diagram (Error! Reference source not found., found in section Error! Reference source not found.) includes the Framework element/process numbers and other notes to help the reader visualize the Framework in terms of a process flow (with interfaces), and understand the component/element/process expectations.

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 (as described in this document it includes safety risk management, safety policy, safety assurance, and safety promotion).

Product/service provider Safety Management System (SMS-P) – the SMS owned and operated by a product/service provider.

Oversight Safety Management System (SMS-O) – the SMS owned and operated by an oversight entity.

Safety objective – a goal or desirable outcome related to safety. Generally based on the organization's safety policy, and specified for relevant functions and levels in the organization. Safety objectives are typically measurable.

Safety planning – part of safety management focused on setting safety objectives and specifying needed operational processes and related resources to fulfill these objectives.

Safety risk – the composite of predicted severity (how bad) and likelihood (how probable) of the potential effect of a hazard in its worst credible (reasonable or believable) system state. The terms safety risk and risk are interchangeable.

Safety risk control – a characteristic of a system that reduces or mitigates (lessens) the potential undesirable effects of a hazard. Controls may include process design, equipment modification, work procedures, training or protective devices. Safety risk controls must be written in requirements language, measurable, and monitored to ensure effectiveness.

Safety Risk Management (SRM) – a formal process within the SMS that describes the system, identifies the hazards, assesses the risk, analyzes the risk, and controls the risk. The SRM process is embedded in the processes used to provide the product/service; it is not a distinct, separate process.

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

Separate Aviation Maintenance Organizations – are independent maintenance organizations such as, but not limited to, certificated repair stations, non-certificated repair facilities and separate maintenance organizations. This does not include an air operator's maintenance organization and is not intended to duplicate 1.0 B) 1) a) 3) of an air operator's organization.

Severity – the degree of loss or harm resulting from a hazard.

Substitute risk – a risk unintentionally created as a consequence of safety risk control(s).

System – an integrated set of constituent 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 other support facets.

System Attributes – refer to definition for Attributes

REFERENCES

FAA AC 120-92, Introduction to Safety Management Systems for Air Operators

FAA AC 120-92A, Proposed Changes, SMS Framework for Aviation Providers

FAA Framework & Assurance Guide – Revision 2

ICAO Document 9859,
Safety Management Manual

ICAO SMS Framework Document

Transport Canada Safety Management System Manual TP 13739

FAA SMS Guidebook

FAA SMS Overview,
Donald Arendt, PhD, FAA SMS Program Office

FAA, Aviation Safety Management Systems Requirements, VS8000.367

“Rule Breaking,”
Patrick Hudson, PhD, Leiden University, United Kingdom, CHC Safety Summit 2009

“Rule Breaking,”
Roger Baker, HAI Safety Committee, HELI-EXPO

“Developing an Advanced Safety Culture,”
Patrick Hudson, CHC Safety Summit 2009

“Developing Hearts & Minds – The Tools,”
Patrick Hudson, CHC Safety Summit 2009

FAA Voluntary Implementation of SMS, Draft AC XXX, 11-26-07

“Crew Rest and Fatigue,”
Dudley Crosson PhD

IHST USJHSAT Year 2000 & 2001 Reports

Integrated SMS, HESS Handbook
Canadian Helicopter Corporation

“Building Safety on the Three Cultures of Aviation,”
Robert Helmreich PhD

USAIG Corporate Aircraft Accident Response Plan

Ray Wall SMS Presentation,
Air Logistics, Director of Quality and Assurance,

Board of Directors SMS Briefing Document,
Bristow Group

“Safety Management Systems in Aviation,”
Stolzer, Halford & Goglia

“SMS Tool,”
Ed Stockhausen, Air Methods Inc.

NOTES:

