Understanding Safety Management in Aviation (Part 2)

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In Part 1 of *Understanding Safety Management in Aviation*, we examined the definition of safety and how to manage it. We focused on traditional safety programs and why they have reached their limit as an effective safety tool. We also discussed why a Safety Management System (SMS) is the preferable means of managing safety and illustrated the first two steps (a safety management plan and documentation) involved in creating a SMS.

Now in Part 2 of our series, we will bring all the elements together by focusing on the last four steps in creating an effective, practical SMS. The remaining elements are:

- Safety Oversight;
- Safety Training;
- Quality Assurance, and;
- Emergency Response.

Before we begin our discussion on safety oversight, let's briefly revisit how we identify our organization from a systems-based perspective. In part one of our series we described how we identify our operation (systems, sub-systems, and working level processes or elements). See two system examples below.

- System: Flight Operations
  - ⇒ Sub-System: Air Carrier Programs and Procedures
    - ⇒ Element: Deicing Procedures
    - ⇒ Element: Airman Duties / Flight Deck Procedures
    - ⇒ Element: Operational Control
    - ⇒ Element: Aircraft Performance and Operating Limitations

- System: Ground Operations
  - ⇒ Sub-System: Ground Support Programs and Procedures
    - ⇒ Element: Deicing Procedures
    - ⇒ Element: Line Personnel Procedures
    - ⇒ Element: Fueling Operations
    - ⇒ Element: Aircraft Handling Operations

Each working level process or element represents a data collection / data distribution point. Considering each element, we can begin true safety management by analyzing the data generated in each. Safety oversight represents the first step in the safety management process.

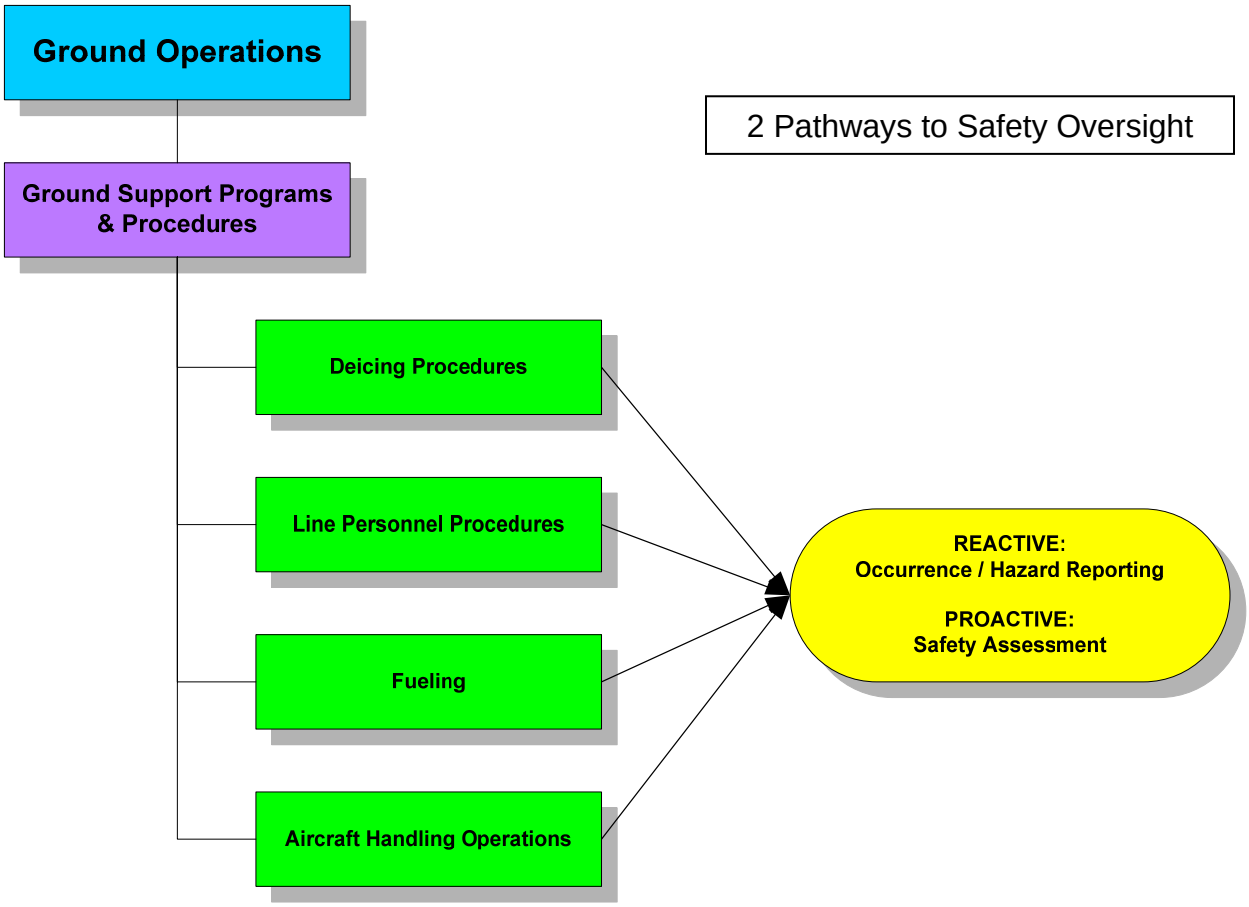
Safety Oversight

Safety oversight represents the door-way into the safety management process. Safety oversight establishes two pathways, based on method of discovery, through which to begin the safety management process. The two pathways are "reactive" and "proactive". Most likely, the reactive pathway of safety management is what many of us are most familiar with. Something happens, usually bad, certainly unwanted, and we react to it. Typical activities involved in reactive safety management include; investigating an incident or accident, collecting data, soliciting and reviewing safety reports with the ultimate goal of changing the way business is conducted to avoid future occurrences.

"Proactive" safety oversight takes a much more assertive role in safety management by collecting and analyzing data to perform an investigation before an incident or accident occurs. Basic proactive safety oversight involves going out into our system and preemptively identifying hazards and risks, by performing safety audits and reviewing non-punitive safety reports. Because we operate in a "data rich"

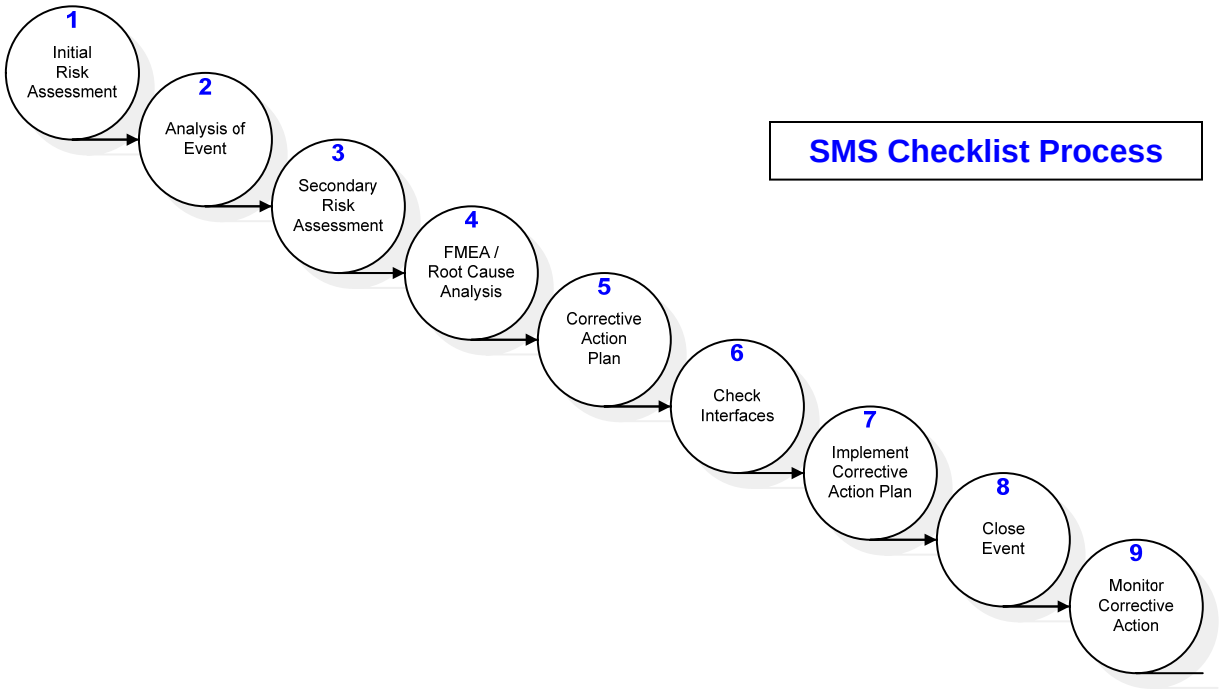
environment, you can even take advantage of more sophisticated analytical techniques such as data mining tools.

Let's take a look at our system safety operating structure to see, first hand, how safety oversight impacts the safety management process.



Remember, each element is the data collection / data distribution point for all safety management activities. Considering safety oversight, within each working level process we can easily see how both "reactive" and "proactive" safety management begins. Simply put, if something has already occurred (i.e. incident or accident) we can react to the event and apply our safety management process, see the SMS Checklist Process below. On the other hand, we can choose to proactively take a look at a particular system applying forward looking safety assessments, otherwise known as our internal evaluation program to actively try to identify hazards and risks before something bad happens. Either way, it is at the element or working level process that we can enter our system, which allows for effective, data-driven safety management.

What do we investigate in our operation? Answer: Everything. The difference is how far we take the investigation and analysis process. The answer is predicated on an initial risk assessment. If we find that based on an initial risk assessment the risk classification of what we are looking at is considered "low-risk," then the analysis should stop and the occurrence be tracked in a safety database for negative trends. On the other hand, if our risk assessment reveals a risk classification of medium or higher risk, then further investigation and analysis is required. Below is a diagram of the safety management process or steps.



Safety Training

Safety training is an interesting topic. So much has been written on the importance of safety training for all employees, yet it seems that a fundamental question remains. What exactly are we supposed to teach people about safety? The most practical answer to this question is simply: teach people whatever they need to know to effectively perform their jobs along with their specific role(s) in the company's SMS. To illustrate, effective, practical safety training should include, but is not limited to, the following subject areas:

1. Safety – What is it?
2. Hazard and Risk – What is it, and what am I supposed to do when I discover it?
3. Safety Reporting – What, when, where, and how to report?
4. Threats and errors as they pertain to my work area and work activities.
5. Recognizing hazardous attitudes and what to do about them.
6. Company and industry "Lessons Learned."
7. Expected work behaviors and expected participation in the "Company Safety Culture."
8. On-The-Job safety tools.

Safety training really is about educating and informing personnel as to what the company expects them to do while performing their daily duties and responsibilities. Many, if not all of us, are very highly trained in the technical aspects of our jobs. However, most of us have not received a commensurate level of training related to safety, social skills, leadership, teamwork, risk management, etc. Company specific education in these areas will allow personnel to better understand their expected role(s) in safety management and expected working behaviors thereby lowering risk, improving safety, and achieving higher work efficiency.

How often should employees be trained in safety?

All employees should receive specific company safety training as a new hire during initial or basic indoctrination. Initial or basic indoctrination should be designed to establish a sound framework of the employees' role(s) and responsibility(ies) in the SMS as well as to present and reinforce company specific, expected working behaviors. Other training footprints should include:

- **Recurrent Training** – Annual or as required.
- **Special Training** – Scheduled as necessary to accommodate new equipment, services, procedures, operating philosophies, management, major company changes, etc.

Quality Assurance

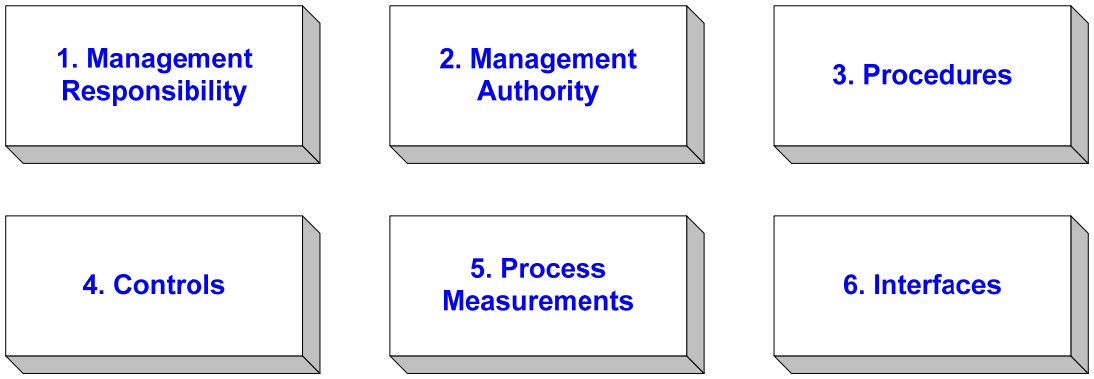
What is quality?

Although we use the term "quality" in many different contexts, all quality products, programs, and services have certain characteristics in common. As such, two important characteristics come to mind when discussing quality. The first characteristic is "conformance to requirements". In other words, the product, program, or service meets all predetermined specifications established by the manufacturer, organization, regulator, and customers. The second characteristic is "fitness for use" which means that the product, program, or service does what it is expected to do, or better yet, exceeds expectations.

How does quality work in a SMS?

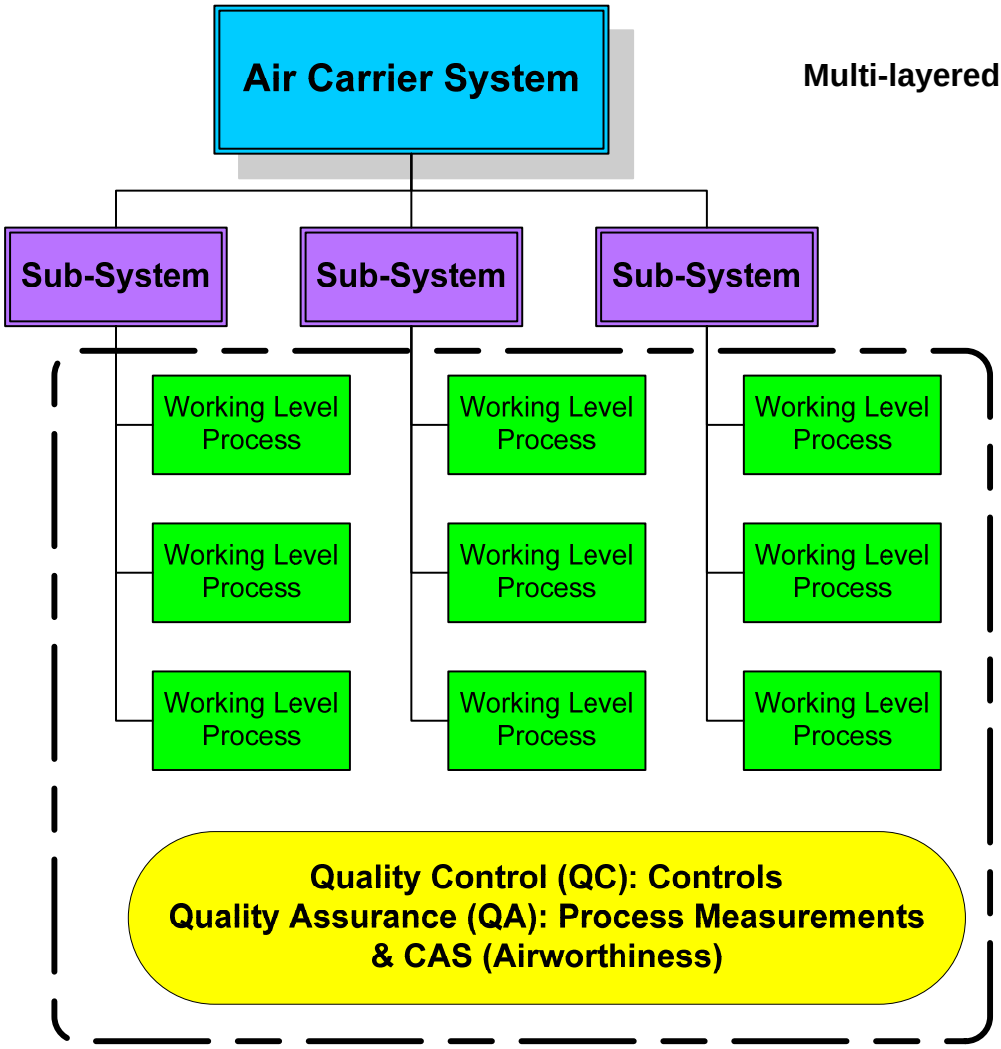
There has been much debate over what quality really is and how, or even where, it fits in a SMS. Perhaps the best way to answer this question is to take a step back and look at a snapshot of our organization to gain an understanding of how all the operational pieces work together.

To begin, if we refer back to the first article in this series, we can look at our organization's system safety structure (i.e. systems, sub-systems, and working level processes). Once we've mapped out our organizational framework in this context, we can observe each working level process from a system safety point of view. In other words, system safety contains six attributes that are designed to analyze, assess, measure, and control hazards and risks.



System Safety Attributes

If we consider the system safety attributes as applied to each working level process, we begin to see that quality control and quality assurance has taken the form of a multi-layered design in our overall operational structure.



First, we have clearly defined procedures that answer questions such as who, what, when, where, and how. Then we have controls to certain high-risk procedures. The control attribute serves as the first quality control check in our operational system. Think of it as an assembly line that utilizes quality control inspectors positioned at strategic locations along the assembly line ensuring that whatever is being assembled meets predetermined quality control standards or specifications.

Moving on from the control attribute, we come to the process measurement attribute. Process measurement is really a fancy term used to describe our internal evaluation program or internal audit program. The process measurement attribute serves as the quality assurance portion of our multi-layered design to quality in our organizational structure. It is important to note that so far in our discussion on quality, from an FAA standpoint, we are describing only the voluntary portion of organizational quality programs.

The last layer in our multi-layered organizational design for quality is evidenced in our CAS (Continued Airworthiness Surveillance) system, for those who have incorporated one. The CAS system, from an FAA point of view, serves as the regulatory portion of our organizational quality design.

QMS vs. SMS

A Quality Management System (QMS) can be defined as a set of policies, processes, and procedures required for planning and execution (i.e. production / development / service) in the core business area of an organization. QMS integrates the various internal processes within the organization and intends to provide a process approach for project execution, which could be product design, program implementation, or service delivery. QMS enables an organization to identify, measure, control, and improve the various core business processes that will ultimately lead to improved business performance through enhanced quality.

The moral of the QMS story is a good one but is distinctly different from a SMS. Quality, and its associated management system, focuses on the characteristics, typically expressed in terms of value, of its products, programs, or services, whereas safety is the minimization and management of operational risk. Both systems serve valuable purposes and if combined, can promulgate into a formidable safety and quality management system or SQMS. The latter being more reminiscent of an organization that has mature safety and quality programs.

Emergency Response

No discussion of SMS would be complete without covering emergency response. While emergency response is a program that hopefully is never utilized under real circumstances, it is a necessary working element of a complete and functional SMS.

A few important assumptions about emergency response:

The first four hours following an incident or accident, especially those involving serious injury or loss of life, are the most critical hours for an organization. History is riddled with examples of how companies imploded during a major crisis. Leadership and the timely, accurate communication, and management of essential information and business processes are critical during this stressful time.

WARNING: Every organization (U.S. operator) must be familiar with NTSB rules to be followed during a reportable incident or accident. Serious consequences can come to an organization that does not understand or comply with NTSB rules. For more information please consult http://www.ntsb.gov/.

Accurate, timely communication channels and information is CRITICAL. The time to discover that communication channels (i.e. important phone numbers) have changed or are not available is not when the emergency response program is being used for real. Specific emergency response procedures and clear, accurate communication channels should be available to all personnel, all the way up to the board of directors. Additionally, an isolated but operationally convenient location should be dedicated as an emergency response center that serves as the “company command center” during a crisis.

Regular emergency response drills are essential for everyone so they know what to do, when to do it, and how it is to be done! People need to know what to do, when to do it, and how it is to be done. A full emergency response program simulation should be conducted at least every two years. Tabletop reviews should be conducted annually and communication information / channels should be validated every business quarter.

Remember, you still have a business to run. Business continuity should always be planned for even in the event of a crisis. Many businesses suffer unnecessarily during a crisis because people are so focused on the crisis that they forget that there is still a business to be managed.

As with any organizational process, always assign a person to be responsible for the emergency response process and someone who has the authority to modify the emergency response process (this may or may not be the same person).

Typical emergency response program elements include:

■ Emergency Response Policy & Procedures	■ Accident / Incident investigation
■ Emergency Response activation, mobilization and agencies notification	■ Response team
■ Personnel welfare	■ Preservation of evidence
■ Casualty and next of kin coordination (Family Response)	■ Media relations plan
■ Wreckage removal	■ Insurance claim procedures
■ Emergency response training	■ Business continuity plan

Conclusion

This two part series, *Understanding Safety Management in Aviation*, is intended to serve as a practical, efficient explanation of what safety management is and how it is applied in aviation. Many useful reference sources exist in our industry, all with the goal of improving safety while simultaneously reducing operational risk. The most important message of this two part series is that a SMS, similar to any other management system, should be systematic and practical in design, comprehensive enough to adequately encompass all organizational functions, yet simple enough for ease of use. If we end up with a SMS that does not provide clear operating instructions or only covers part of an organization, such as flight operations, then as an organization we risk overlooking critical safety management activities.

A comprehensive, data-driven SMS will enhance our organization's operating efficiency and safety performance. Simply put, ***safety*** is good business!

SMS Article #2 - References

- AC 120-59 Air Carrier Internal Evaluation Programs
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