Safety ... the *Proactive Way*

Safety Management Systems (SMS)
Two Wise Men...

“If you keep doing what you’re doing… you’re going to keep getting what you got!”

Yogi Berra

Insanity: doing the same thing over and over again and expecting different results.

Albert Einstein, (attributed)
An Industry Answer?

Aviation Safety to Fire Operations Safety

Launching a *common* idea and a *new* approach:

**SMS**
“SMS”

A systematic and continuous Management process based on proactive identification of Hazards, and analyses of their Risk.
SMS requires knowledge of Human Error Mechanisms

Human Error accounts for 60-80% of all Aviation Accidents. SMS is about managing the manageable, so it requires knowledge of how, what, and why human errors occur.
SMS IS BUILT AROUND FOUR PILLARS

Four Pillars of Safety Management Systems

- Policy
- Risk Management
- Assurance
- Promotion
SAFETY CULTURE

- Policy
  - Doctrine
  - Practices
  - Principles
- Assurance
  - Reporting
  - Investigations
  - Audits
- Risk Management
  - Proactive
  - Prevention
- Promotion
  - Learning
  - Communication
  - Training
  - Reporting
SMS Features

- **Systematic** – Safety management activities are in accordance with a pre-determined plan, and applied in a consistent manner throughout the organization.

- **Proactive** – An approach that emphasizes hazard identification and risk control and mitigation, before events that affect safety occur.

- **Explicit** – All safety management activities are documented and visible.
Organizational Failure Model
Professor James Reason, University of Manchester

Organizational factors
Unsafe supervision
Preconditions for unsafe acts
Unsafe acts
Those errors and violations having an immediate adverse effect
Latent Conditions...

...may lie dormant for a long time, and only become evident when they combine with a triggering mechanism to breach the system’s defenses.
The Path to Latent Conditions

- Latent conditions can be created by:
- Corporate climate and values
- How corporate decisions are made
- Corporate priorities
- Who influences the decision-making chain
- How the decision-making process is recorded and performance tracked
- Not measuring results against expectations
Problems and Solution

- Current safety approaches can’t keep up with complexity growth

- We need a new approach for our safety management and oversight problems
Develops a “Just culture” or “Safety Culture” to:

- Capture the operational knowledge and experience of the employees
- Involve the employees in the safety achievement process
• **Person Model**
  - Name
  - Blame
  - Shame
  - Retrain
  - Write Another Procedure
  - **Fire the Perpetrator**

• **System Model**
  Remedial attention focused on the task and the work place
  - Organization
  - Supervision
  - Managing the manageable

• **We Ask Who?**

• **We Ask Why?**

• James Reason & Alan Hobbs (2003)
Aspects of a Positive Safety Culture

• **Positive Culture**
  • Positive culture

• **Informed culture**
  • People are knowledgeable about the human, technical, organizational and environmental factors that determine the safety of the system as a whole.

• **Flexible culture**
  • People can adapt organizational processes when facing high temporary operations or certain kinds of danger, shifting from the conventional hierarchical mode to a flatter mode.

• **Learning culture**
  • People have the willingness and the competence to draw conclusions from safety information systems and the will to implement major reforms.

• **Reporting Culture**
  • People are prepared to report their errors and experiences

• **Just culture**
  • People are encouraged (even rewarded) for providing essential safety-related information. However, there is a clear line that differentiates between acceptable and unacceptable behaviour.

• **HRO**

• **James Reason (1997)**
A just culture has a documented disciplinary policy

- Define clear lines between the acceptable and the unacceptable

Blame culture promotes hiding

Just culture promotes partnership

A roadmap to a just culture
### Three possible organizational cultures

<table>
<thead>
<tr>
<th></th>
<th>Pathological</th>
<th>Bureaucratic</th>
<th>Generative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information</td>
<td>Hidden</td>
<td>Ignored</td>
<td>Sought</td>
</tr>
<tr>
<td>Messengers</td>
<td>Shouted</td>
<td>Tolerated</td>
<td>Trained</td>
</tr>
<tr>
<td>Responsibilities</td>
<td>Shirked</td>
<td>Boxed</td>
<td>Shared</td>
</tr>
<tr>
<td>Reports</td>
<td>Discouraged</td>
<td>Allowed</td>
<td>Rewarded</td>
</tr>
<tr>
<td>Failures</td>
<td>Covered up</td>
<td>Merciful</td>
<td>Scrutinized</td>
</tr>
<tr>
<td>New ideas</td>
<td>Crushed</td>
<td>Problematic</td>
<td>Welcomed</td>
</tr>
<tr>
<td>Resulting Organization</td>
<td>Conflicted</td>
<td>“Red tape” Organization</td>
<td>Highly Reliable Organization</td>
</tr>
<tr>
<td>Organization</td>
<td></td>
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</table>
What do Interagency Aviation Managers want?

- A Safe and Efficient safety system
- Effective and Strong providers
The Iceberg of Ignorance

4% Problems known to top management

9% Problems known to middle/“line” Management

74% Problems known to supervisors

100% Problems known to rank and file MX personnel

The FS and DOI aviation programs are making progress with strategic risk assessments and doctrinal revisions in policy.

We are seeing significant support in the ranks as a result of recent field inspections, the use of gap analysis tools in maintenance circles, and the interest at all levels in operational risk management.
SMS...emphasizes Risk Management

...It integrates safety with Line Management
## Heavy Airtanker Program System - Human Factors

<table>
<thead>
<tr>
<th>Sub-systems</th>
<th>Hazards</th>
<th>Pre Mitigation</th>
<th>Mitigation</th>
<th>Post mitigation</th>
<th>Additional Local Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilot Proficiency and Training</td>
<td>Lack of fire mission training and Lack of proficiency flight time.</td>
<td>Probable</td>
<td>Vendors have instituted training programs such as CRM, risk management, and flight safety with the intent to standardize cockpit procedures. Increase the scope and complexity of the NAFA program, develop the McClellan training center for fire environment.</td>
<td>Occasional</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aircraft performance planning for successful outcome in a high rate of descent, level off, and climb out profile.</td>
<td>Probable</td>
<td>Address airtanker pilot training and proficiency to reduce frequency of accidents occurring from CPT.</td>
<td>Occasional</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High number of target fixation and tactical maneuvering errors.</td>
<td>Probable</td>
<td>Address human factors including target fixation, situational awareness, task overload, performance/tactical planning errors.</td>
<td>Occasional</td>
<td></td>
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## Heavy Airtanker Program System - Policy, Procedure, and Doctrine

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<tr>
<td>Management Oversight</td>
<td>No requirement to implement a system safety program that is common between the contractor and the agency.</td>
<td>Probable</td>
<td>Establish a requirement to initiate a safety management system between the contractor and the agency. Require the contractor to designate a safety officer.</td>
<td>Remote</td>
<td></td>
</tr>
<tr>
<td>Agency Culture</td>
<td>&quot;Can do&quot; philosophy has developed aviation programs with minimal budgets and staffing.</td>
<td>Probable</td>
<td>The Blue Ribbon Panel stated “significant funding will provide adequate knowledge of aircraft conditions, training and maintenance, that will serve to improve the safety record.&quot;</td>
<td>Remote</td>
<td></td>
</tr>
<tr>
<td>Quality Assurance and Inspections</td>
<td>A culture of acceptable loss has evolved in the agency regarding airtanker losses.</td>
<td>Probable</td>
<td>Establish a higher expectation beyond minimum requirements for safety with a lower tolerance for accidents. This will encourage a cultural change away from one of acceptable loss.</td>
<td>Remote</td>
<td></td>
</tr>
<tr>
<td>Public Perception</td>
<td>Influence on the agency</td>
<td>Probable</td>
<td>Develop a QA program for improved oversight of the contracted fleet ranging from improved checklists, workforce efficiency, adequate staffing of trained inspectors, and standardized procedures.</td>
<td>Remote</td>
<td></td>
</tr>
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Note: The table continues, but the above entries are sufficient to illustrate the format and content of the document.
A SMS Organization... Adopts Risk Management Practices to:

- Adapt to change
- Manage resource application
- Understand the pitfalls of the operating environment
Follows a *phased approach*

The processes underlying the four pillars are modularized

“Growth” or “increasing maturity” is emphasized for the system as a whole and its internal processes
“Growing” SMS
The SMS Maturity Steps

0. Orientation & Commitment
1. Planning & Organization
2. Reactive Processes
3. Proactive/Predictive Processes
4. Continuous Improvement
SMS is the toolbox for...

- Policy & Management Practices
- Safety Assurance processes
- Safety promotion practices
- Risk Management process