Objective

❖ At the end of this module, participants will be able to explain the need for, the strategies and the key features of safety management.

Outline

❖ The safety stereotype
❖ The management dilemma
❖ Need for safety management
❖ Strategies for safety management
❖ The imperative of change
❖ Safety management – Eight building blocks
❖ Four responsibilities for managing safety
❖ Questions and answers
❖ Points to remember
❖ Exercise Nº 03/01 – The Anyfield Airport accident (See Handout Nº 2)
The safety stereotype

In this airline, safety is first

Is it?

In this ATC unit, safety is first

Really?

In this airport, safety is first

What is the fundamental objective of a business organization?

To achieve its production objectives
**Safety management – Rationale**

- In order to achieve its production objectives, the management of any aviation organization requires the management of many business processes.
- Managing safety is one such business process.
- Safety management is a core business function just as financial management, HR management, etc.
- This brings about a potential dilemma for management.

**The management dilemma**

| Management levels |
|-------------------|----------------|
| Protection        | Production     |

<table>
<thead>
<tr>
<th>Resources</th>
</tr>
</thead>
</table>

| Management levels |
|-------------------|----------------|
| Protection        | Production     |

<table>
<thead>
<tr>
<th>Resources</th>
</tr>
</thead>
</table>
Safety space

Financial management
Bankruptcy

Protection
Production
Catastrophe

Safety space

Why SM? – The first ultra-safe industrial system

- Fragile system (1920’s - 1970’s)
  - Individual risk management & intensive training
  - Accident investigation
- Safe system (1970’s – mid 1990’s)
  - Technology and regulations
  - Incident investigation
- Ultra-safe system (mid 1990’s onwards)
  - Business management approach to safety (SMS)
  - Routine collection and analysis of operational data

Why SM? An imperfect system

Safety management – The response to the dilemma

- Safety issues are a by-product of activities related to production/services delivery.
- An analysis of an organization’s resources and goals allows for a balanced and realistic allocation of resources between protection and production goals, which supports the needs of the organization.
- The product/service provided by any aviation organization must be delivered safely (i.e. protecting users and stakeholders).
The essential is invisible to the eyes

<table>
<thead>
<tr>
<th>Number of occurrences</th>
<th>Accidents</th>
<th>1 – 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Serious incidents</td>
<td>30 – 100</td>
</tr>
<tr>
<td></td>
<td>Incidents</td>
<td>100 – 1000</td>
</tr>
<tr>
<td></td>
<td>Latent conditions</td>
<td>1000 – 4000</td>
</tr>
</tbody>
</table>

Navigating the drift

Reactive safety management

- Investigation of accidents and serious incidents
  - Based upon the notion of waiting until something breaks to fix it.
  - Most appropriate for:
    - situations involving failures in technology.
    - unusual events.
  - The contribution of reactive approaches to safety management depends on the extent to which the investigation goes beyond the triggering cause(s), and includes contributory factors and findings as to risks.

Proactive safety management

- Mandatory and voluntary reporting systems, safety audits and surveys.
  - Based upon the notion that system failures can be minimized by:
    - identifying safety risks within the system before it fails; and
    - taking the necessary actions to reduce such safety risks.
Predictive safety management

- Confidential reporting systems, flight data analysis, normal operations monitoring.
  - Based upon the notion that safety management is best accomplished by looking for trouble, not waiting for it.
  - Aggressively seek information from a variety of sources which may be indicative of emerging safety risks.

Strategies – Summary

<table>
<thead>
<tr>
<th>Strategies</th>
<th>Reactive method</th>
<th>Proactive method</th>
<th>Predictive method</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reactive</strong></td>
<td>The reactive method responds to the events that already happened, such as incidents and accidents</td>
<td><strong>Proactive</strong></td>
<td>The proactive method looks actively for the identification of safety risks through the analysis of the organization’s activities</td>
</tr>
<tr>
<td><strong>Predictive</strong></td>
<td>The predictive method captures system performance as it happens in real-time normal operations</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Strategies – Levels of intervention and tools

- Baseline performance
- Desirable management levels
- Reactive method
- Proactive method
- Predictive method
- Efficient
- Inefficient
- Highly efficient
- Very efficient
- Highly inefficient
- Insufficient

The imperative of change

- As global aviation activity and complexity continues to grow, traditional methods for managing safety risks to an acceptable level become less effective and inefficient.
- Evolving methods for understanding and managing safety risks are necessary.
The changing of the guard

- **Traditional** – Accident/serious incident investigation
  - Aviation system performs most of the time as per design specifications (base line performance).
  - Compliance based.
  - Outcome oriented.
- **Evolving** – Safety management
  - Aviation system does not perform most of the time as per design specifications (practical drift).
  - Performance based.
  - Process oriented.

Safety management – Eight building blocks

1. **Senior management’s commitment** to the management of safety.
2. **Effective safety reporting.**
3. Continuous monitoring through systems to collect, analyse, and share safety-related data arising from normal operations.

Safety management – Eight building blocks

4. **Investigation** of safety occurrences with the objective of identifying systemic safety deficiencies rather than assigning blame.
5. **Sharing** safety lessons learned and best practices through the active exchange of safety information.
6. **Integration** of safety training for operational personnel.

7. **Effective implementation** of Standard Operating Procedures (SOPs), including the use of checklists and briefings.
8. **Continuous improvement** of the overall level of safety.

The result of implementing the eight building blocks: An organizational culture that fosters safe practices, encourages effective safety communication, and actively manages safety with the same attention to results as financial management.
Responsibilities for managing safety

- These responsibilities fall into four basic areas:
  1. Definition of policies and procedures regarding safety.
  2. Allocation of resources for safety management activities.
  3. Adoption of best industry practices.
  4. Incorporating regulations governing civil aviation safety.

The safety management process at a glance

- Identify hazards
- Collect additional hazard data
- Assess risks
- Prioritize risks
- Develop elimination/mitigation strategies
- Approve control strategies
- Implement control strategies
- Assign responsibilities
- Re-evaluate control strategies
- Collect additional hazard data
- Identify hazards

In summary

- Managing safety requires resources.
- Allocation of resources is a managerial function.
- Management has the authority and the responsibility to manage safety risks in the organization.
- Management thus is accountable for safety outcome.

In summary

- Safety management
  - Includes the entire operation
  - Focus on processes (Clear difference between processes and outcomes)
  - Data-driven (constant monitoring)
  - Strictly documented
  - Gradual improvement as opposed to dramatic change
  - Strategic planning as opposed to piecemeal initiatives
A balanced perspective

…The pilot-in-command must bear responsibility for the decision to land and take-off in Dryden… However, it is equally clear that the air transportation system failed him by allowing him to be placed in a situation where he did not have all the necessary tools that should have supported him in making the proper decision …

Questions and answers

Q: Explain the difference between reactive, proactive and predictive safety strategies.

A:

<table>
<thead>
<tr>
<th>Reactive method</th>
<th>Proactive method</th>
<th>Predictive method</th>
</tr>
</thead>
<tbody>
<tr>
<td>The reactive method responds to the events that already happened, such as incidents and accidents.</td>
<td>The proactive method looks actively for the identification of safety risks through the analysis of the organization’s activities.</td>
<td>The predictive method captures system performance as it happens in real-time normal operations.</td>
</tr>
</tbody>
</table>

Module N° 3 – Introduction to safety management
Questions and answers

Q: Explain the difference between the traditional and the evolving approach to safety management.
A:
- Traditional – Accident/serious incident investigation
  - Aviation system performs most of the time as per design specifications (baseline performance).
  - Compliance based.
  - Outcome oriented.
- Evolving – Safety management
  - Aviation system does not perform most of the time as per design specifications (practical drift).
  - Performance based.
  - Process oriented.

Slide number: 25

Questions and answers

Q: Enumerate at least four building blocks of safety management.
A:
1. Senior management’s commitment to the management of safety.
2. Effective safety reporting.
3. Continuous monitoring through systems to collect, analyse, and share safety-related data arising from normal operations.
4. Investigation of safety occurrences with the objective of identifying systemic safety deficiencies rather than assigning blame.

Slide number: 26

Questions and answers

Q: Enumerate the four basic responsibilities for managing safety.
A:
1. Definition of policies and procedures regarding safety.
2. Allocation of resources for safety management activities.
3. Adoption of best industry practices.
4. Incorporating regulations governing civil aviation safety.

Slide number: 29

Points to remember

1. The dilemma of the two P’s.
2. The safety space
5. The changing of the guard.
6. The eight building blocks and the four basic responsibilities for the management of safety.
The Anyfield Airport accident

- In the early hours of a Monday-morning, a twin-engined jet transport with 5 crew-members and 63 passengers on board while in its take-off run at Anyfield Airport collided with a small twin-engined propeller-driven aircraft, with only a single crew-member that had intruded the departure-runway.
- Both aircraft were severely damaged as a result of the collision.
- Most passengers and all crew members were killed.

The Anytown City Airport accident

- Group activity:
  - A facilitator will be appointed, who will coordinate the discussion.
  - A summary of the discussion will be written on flip charts, and a member of the group will brief on their findings in a plenary session.
- Required task:
  - Read the text related to the accident of the twin-engined jet transport at Anyfield Airport.
  - ...

The Anytown City Airport accident

- ... required task:
  - From the investigation report of the above accident, you should identify:
    1. Organizational processes that influenced the operation and which fell under the responsibility of senior management (i.e. those accountable for the allocation of resources);
    2. Latent conditions in the system safety which became precursors of active failures;
    3. Defences which failed to perform due to weaknesses, inadequacies or plain absence; ...

ICAO Safety Management Systems (SMS) Course
Module N° 3 – Introduction to safety management
The Anytown City Airport accident

- ... required task:

4. **Workplace conditions**, which may have influenced operational personnel actions; and

5. **Active failures**, including errors and violations

- When you have concluded the above, your task is to complete the Table 03/01 – Analysis (Handout N° 2) classifying your findings in accordance with the organizational accident model.

The organizational accident

![Organizational Accident Diagram](image)

- **Organizational processes**
- **Workplace conditions**
- **Active failures**
- **Latent conditions**
- **Defences**

---

*ICAO Safety Management Systems (SMS) Course*

*Module N° 3 – Introduction to safety management*