SMS Workshop Questions

1/ Which documents can be referred to for creating a good Risk Register and Risk Assessment Matrix?

Sofema Aviation Services (SAS) www.sassofia.com considers key aspects related to the development of an EASA-compliant Safety Management System (SMS) Hazard Log & Risk Register

Introduction

It is important to secure top management buy-in and clear communication about SMS benefits. Moreover, to create a safety culture where reporting hazards is encouraged and not penalized.

Train staff on how to identify, report, and evaluate hazards.
Ensure all personnel understand the purpose of the hazard log and risk register.

EASA Documents
- Regulation (EU) No 2018/1139 (Basic Regulation): Provides the foundation for the regulatory framework.*
- Regulation (EU) No 965/2012 (Air OPS): Focuses on operations, particularly Annex III (Part ORO) and Annex IV (Part CAT).*
- Regulation (EU) 1321/2014 (Continuing Airworthiness) – Part 145 & Part CAMO*
- Regulation (EU) 748/2012 (Initial Airworthiness) – Part 21*
- Regulation (EU) 139/2014 (Aerodrome)*
* Plus, Associated AMC & Guidance Material

ICAO Documents:
- Annex 19 - Safety Management: Offers high-level SMS requirements and guidance.
Doc 9859 - Safety Management Manual (SMM): Provides more detailed implementation guidance. (including the development of risk registers and matrices.)

FAA Advisory Circulars (AC 120-92B - Safety Management Systems for Aviation Service Providers):

- Provides a framework for safety management that aligns with international standards.

ISO 31000 is an international standard for risk management, offering principles, guidelines, and best practices to help organizations effectively manage risks.

- ISO 31000 provides a framework that organizations can use to support the development of a risk management structure integrated with oversight and strategic planning.

ECAST Guidance on Hazards Identification -
https://www.easa.europa.eu/en/document-library/general-publications/ecast-guidance-hazards-identification

- Including specific steps for hazard identification, risk assessment, and control measures. The guidelines ensure compliance and promote best practices when developing a risk register.
- Hazard Identification: Utilize structured methodologies like process mapping or historical data review.
- Risk Assessment: Implement a matrix scoring system considering severity and probability.
- Mitigation Strategies: Define control measures that align with risk levels.

Historical Safety Data and Industry Reports:
- Accident investigation reports from the European Union Aviation Safety Agency (EASA), International Civil Aviation Organization (ICAO), or national aviation authorities.
- Industry risk reports from organizations like IATA or the Flight Safety Foundation.

Considering Challenges & Best Practices
- Change Management issues especially if safety culture is not well-established.
- Resistance to additional paperwork and perceived bureaucratic requirements.
- Handling large amounts of safety data can be overwhelming.
- Training costs and time are often underestimated.
- Maintaining proactive hazard identification as operations change over time.

Next Steps
Sofema Aviation Services (SAS) www.sassofia.com and Sofema Online (SOL) www.sofemaonline.com provide Safety and Risk Management Training as Classroom, Webinar & Online. For further information please see the websites or email team@sassofia.com

2/ Please share some practical examples of SPIs in CAMO organization.

Considering the Identification of Safety Performance Indicators within an EASA Continuing Airworthiness Management Organisation

Sofema Aviation Services (SAS) www.sassofia.com considers the key safety indicators for effective engagement with SMS Safety Performance Indicators (SPI's) within the CAMO business area.

Safety Performance Indicators (SPIs) are metrics used to measure the effectiveness of safety processes and help identify areas needing improvement within an organization.

In an EASA Continuing Airworthiness Management Organization (CAMO), which bridges the gap between operations and maintenance, identifying and managing SPIs is crucial for ensuring the continued safety and airworthiness of the fleet.

Here are Some Key Points and Practical Examples:

As the CAMO serves as an intermediary between operations and maintenance, it is responsible for planning, managing, and ensuring that all maintenance activities are aligned with regulatory requirements and the airline's operational needs.

- Regulatory Compliance: CAMO must ensure compliance with EASA regulations while tailoring safety programs to the unique needs of their fleet and operational context.
- Effective communication between operations and maintenance departments is crucial to provide meaningful data for SPIs and translate findings into actionable safety measures.

Examples of SPIs in CAMO:

Implementing and monitoring these SPIs requires a robust data management system and a safety-oriented organizational culture. CAMO should establish regular review mechanisms, with relevant stakeholders across operations and maintenance, to assess SPI data and ensure continuous improvement.

- **CAMO Compliance Audit Findings**
    - Number of Discrepancies found during Audit – per Audit Cycle

- **Deferred Defects Management**
    - Indicator: Number of deferred defects per aircraft over a specific time period.

- **Maintenance Findings and Recurring Issues**
    - Indicator: Frequency of repetitive technical issues or maintenance findings .

- **Maintenance Schedule Compliance**
    - Percentage of maintenance tasks completed on schedule.

- **Technical Incidents**
  - Indicator: Rate of technical incidents per flight hour or flight cycle.

- **Maintenance Errors**
  - Indicator: Rate of maintenance errors or procedural deviations reported.

- **Airworthiness Directives (AD) Compliance**
  - Timeliness of implementing mandatory ADs.

- **Communication and Coordination Efficiency**
  - Frequency and quality of communication between CAMO and other departments.

- **Component Reliability Analysis**
  - Failure rate of critical components per flight cycle or operational hour.

- **Maintenance Program Efficiency**
  - Percentage of planned vs. unplanned maintenance tasks.

- **Parts Supply Chain Compliance**
  - Frequency of parts delivery delays impacting maintenance schedules.

- **Fleet Availability Rate**
  - Percentage of aircraft available for operation out of the total fleet.

- **Training Compliance**
  - Percentage of CAMO staff who completed required training on time.

- **Occurrence Reporting External & Internal**
  - Effectiveness of the Reporting Systems – Related to the actual reporting rate related to the evidence of exposure due to compliance and safety audit findings.

- **Scheduled Maintenance Workload Balance**
  - Distribution of maintenance tasks across maintenance teams or shifts.

Challenges:

- Accurate data is essential for effective decision-making. Inconsistent data sources, insufficient data management systems, or delayed updates can lead to errors in planning and risk assessments.
  - Implementing integrated digital data management systems that facilitate real-time data sharing and reporting.

- Coordination between CAMO, Operations, and Maintenance - Miscommunication or lack of understanding between CAMO, maintenance, and operations departments can lead to safety issues or inefficiencies.
  - Develop cross-functional training programs and enhance communication channels to foster collaboration.

- Errors due to fatigue, inadequate training, or complacency can compromise safety.
  - Implement a comprehensive training program, including human factors awareness, and ensure adequate rest periods for staff.

3/ How to manage the change in SMS because of revised EASA (145) regulations

Sofema Aviation Services (SAS) www.sassofia.com Considers the primary aspects of SMS Integration within an EASA Part 145 Organisation.

Introduction

Managing the implementation of Safety Management Systems (SMS) due to the revised European Union Aviation Safety Agency (EASA) Part 145 regulations involves thorough strategic planning and effective implementation.
- An Effective SMS will contain the following elements:
- Understanding the Problem "What is wrong" – (hazard identification)
- Developing a Solution "How to Fix the issue" – (remedial action)
- Ensuring effective resolution of the problem "Has the fix worked" – (continuous monitoring)
- The ability to change & Improve "Ensuring both effectiveness and efficiency" – (continuous improvement)

What is involved in an SMS Implementation Plan:

- SMS implementation plans should typically include all of the following elements:
- Safety policy and objectives;
- Detailed System description;
- Full Gap analysis Performed & Documented;
- Understanding of all SMS components;
- Safety roles and responsibilities;
- Hazard reporting policy;
- Means of engaging employees involved in your SMS program;
- Ability to deliver Safety performance measurement and monitoring;
- Provision of Safety training;
- Safety communication; and
- Management review of safety performance and System Feedback.

Additionally to acknowledge the need to ensure sufficient resources related to the following areas: (Essential for a Strong System)

Introduction EASA Organizational Performance Management Systems

Regulation 2021/1963 amends Continuing Airworthiness Regulation (EU) No 1321/2014 as regards safety management systems in maintenance organisations and correcting that Regulation.

- Addition of Clause 145.A.200 – Management System
  - The organisation shall establish, implement and maintain a management system that includes clearly defined accountability and lines of responsibility throughout the organisation, including direct safety accountability of the accountable manager.

  - The identification of aviation safety hazards entailed by the activities of the organisation, their evaluation, and the management of the associated risks, including taking actions to mitigate the risks and verify their effectiveness.
  - A function to monitor the compliance of the organisation with the relevant requirements. Compliance monitoring shall include a feedback system of findings to the accountable manager to ensure the effective implementation of corrective actions as necessary.

Best Practices

- **Gap Analysis** - Perform a comprehensive gap analysis to identify how the existing SMS differs from the new EASA requirements. This provides a foundation for prioritizing changes.
  - Allocate a core team to conduct a gap analysis and review current SMS practices against EASA Part 145 regulations.

- **Change Management Plan** - Develop a robust change management plan that identifies the areas of the SMS impacted and outlines a phased approach to implementation.
  - Develop a change management strategy, SMS adjustments, training modules, and timelines.
  - Develop role-specific training modules that cater to different staff responsibilities.

- **Stakeholder Engagement** - Involve all relevant stakeholders early in the process, including management, safety officers, and operational personnel, to build consensus and reduce resistance.

- **Training Programs** - Create a detailed training program that addresses the new regulatory requirements and how staff roles may evolve.
    - Implement assessments to ensure that staff comprehensively understand the revised SMS procedures.

- **Communication** - Ensure transparent and consistent communication throughout the implementation process, keeping everyone informed of progress and timelines

- **Continuous Monitoring** - Implement an ongoing monitoring and feedback mechanism to evaluate compliance and make adjustments as required Timeline and Manpower
    - Establish a review cycle to regularly evaluate SMS performance and maintain compliance with evolving EASA standards.

Potential Issues of Concern

- In-effective Safety Reporting due in part to a general lack of engagement as well as under-reporting of safety occurrences typically due to multiple factors including lack of either just culture or reporting culture.

- Manpower & process shortfalls in the management of the reporting processes, as well as a lack of effective management and analysis of the gathered SMS data.

- A general lack of an integrated approach, with the need for strong engagement between the role of safety, quality, security and the various business processes throughout the organisation.

- The challenge of external interface and or engagement with both contract & sub-contract service providers.

- Effective balance related to the cost of SMS resources (both human and software / technical) versus the "perceived" return on investment.

- The cost of training for all active service staff with the potential to impact safety throughout the organisation.

- A lack of effective support material available within the continuing airworthiness areas (both EASA Part CAMO & EASA Part 145) providing templates, structure & guidance for establishing safety targets and safety performance.

4/ Aviation Operations, CAMO & Maintenance - How to create and identify a list of Potential Risks?

Risk management remains a critical concern in all facets of aviation, including Operations, CAMO (Continuing Airworthiness Management Organization), and AMO (Aircraft Maintenance Organisation).
Identifying potential risks involves a systematic approach, especially given the high stakes associated with aviation safety.
Considers the importance of managing the risks in a systematic and controlled way using a Risk Register as the Fundamental Tool.

Hazard identification is the foundation of risk management process in an SMS and may be conducted reactively, proactively and even predictably. A Hazard is something with the potential to cause harm, and a risk is the potential outcome of a hazard.

- **What is the difference between a Safety System Hazard Register and a Risk Register?**

    A hazard register is a source of information from which we can consider the risks, whereas a risk register contains information related to the nature of the risk (clearly a risk register serves a higher purpose).

- **The Visibility of Hazards**

    Visible hazards – Are essentially obvious they can be observed, smelt, heard, tasted or felt. They're the most

    Hidden hazards (Sometimes known as latent hazards) are not so easily understood and can relate to either physical hazards such as electricity or non-physical related to poor training, stress etc.

- An Effective Risk Register Process can support the following SMS Analysis

    - o 'Reactive' risk management (incident investigation)
    - o 'Proactive' risk management (Used to identify potential risks)
    - o 'Predictive' risk management (supported by Data to identify area of exposure)

As part of the development of an EASA compliant SMS related to the Safety Management System will benefit from the development and continuous monitoring of a Risk Register.

A risk register is a crucial part of your approach to managing these risks. It's a tool to help you identify, assess, and record your risks and the actions you're taking to eliminate or minimize them.

- For each of the following items perform a risk assessment and ask the questions which help you determine the level of exposure that currently exists in your organisation by asking for each item the following 5 questions:

  o Is this an issue in our organisation?
  o If it is not considered an issue, how can I demonstrate – where is the evidence?
  o How can I measure the effectiveness of the current process?
  o How effective is documentation/training?
  o If there are changes in this element how effectively would the system accommodate the changes?

Techniques to Identify Potential Hazards
- Historical Data Review: Analyze previous incidents, accidents, and near-misses to identify recurring issues.
- Process Mapping: Create process maps of various operations to identify points of potential failure.
- Workforce Surveys: Conduct surveys and interviews with personnel to gather insights on perceived risks.
- Environmental Factors: Consider external influences like weather, geopolitical issues, or regulatory changes.
- Human Factors: Account for human errors, such as fatigue, training gaps, or communication breakdowns.

5/ What SMS is Required in Part CAMO?

Sofema Online (SOL) www.sofemaonline.com considers the key deliverables of an EASA compliance CMO SMS

Introduction

Why it is important to deliver an effective integrated SMS recognizing the importance of the Continuing Airworthiness Management Organisation (CAMO) sitting between maintenance and operations.

Safety management plays a vital role in an EASA Continuing Airworthiness Management Organization (CAMO) to maintain compliance, ensure aircraft safety, and coordinate efficiently between maintenance and operations.

The CAMO is essential in bridging the gap between aircraft operations and maintenance, ensuring the highest levels of safety and compliance. By effectively managing risks, ensuring thorough record-keeping, and fostering communication between departments, a CAMO significantly contributes to the overall safety and efficiency of aviation operations. The integration of maintenance and operations with CAMO as the intermediary minimizes safety risks and potential exposures while ensuring regulatory compliance and streamlined operations.

Consider the following related to the role and importance of CAMO in safety management and how it functions at the center of the aviation ecosystem:

- The CAMO ensures compliance with EASA standards and regulations, including Part-M and Part-CAMO.
- It supervises the maintenance schedule and ensures that all tasks are performed in accordance with the approved maintenance program.
- CAMO is responsible for implementing a Safety Management System that proactively identifies risks.
- The CAMO facilitates hazard identification, risk assessment, and establishes mitigation measures.
- SMS is integrated into the CAMO processes to improve safety performance.

Coordination and Communication:

- CAMO coordinates communication between different stakeholders, such as aircraft operators, maintenance organizations, and regulatory authorities.
- Clear communication ensures all parties understand the aircraft's airworthiness status.

Data Management and Record Keeping:

- CAMO keeps comprehensive records related to the aircraft's airworthiness.
- The CAMO manages maintenance data, inspections, and defect reports, which contribute to trend analysis and risk assessment.

Importance of Integration of Maintenance and Operations:

- By sitting in the middle, CAMO bridges the gap between operations (flight crews, dispatchers) and maintenance (maintenance organizations).

- This integration allows for a better understanding of the aircraft's condition in real-time.

Risk Mitigation:

- Integrated data allows the CAMO to detect emerging risks and issue appropriate guidance to both maintenance and operations.
- The CAMO can proactively address potential problems, reducing the overall operational exposure.

Consider the challenges to successful deployment of an SMS within the CAMO

Deploying a successful Safety Management System (SMS) within an EASA Continuing Airworthiness Management Organization (CAMO) comes with various challenges that need careful consideration to ensure smooth integration and operation.

- Employees might not fully understand the importance of safety culture and may view new procedures as burdensome or unnecessary.
- Staff accustomed to traditional procedures might resist adopting new SMS protocols.
- The cost of implementing comprehensive safety systems can be high, especially for smaller organizations.
- Ensuring data accuracy and completeness is difficult when integrating information from various sources.
- Maintenance and operations might function in silos, reducing effective communication and limiting information sharing.
- Proactively identifying potential risks requires effective data analysis, which can be challenging with incomplete information.
- Introducing new procedures involves training staff, which can be time-consuming and challenging.
- If top management doesn't prioritize safety, it becomes challenging to implement an effective SMS.

SMS Implementation Strategies to Overcome Challenges:

- Provide comprehensive training and emphasize the importance of safety at all levels.
- Regularly involve all stakeholders in planning and review to ensure buy-in. Start with small steps and scale up the SMS gradually to avoid overwhelming the organization.
- Invest in integrated software solutions that facilitate data sharing and analysis.

6/ What are the Best Strategies/Processes to Ensure Safety Assurance?

Considering the Best Strategies/Processes to Ensure Safety Assurance within an EASA Safety Management System SMS)

Introduction – What is SMS – Safety Assurance?

Establishing and maintaining an EASA-compliant Safety Management System (SMS) is essential for aviation safety. The European Union Aviation Safety Agency (EASA) sets rigorous standards to ensure airlines and other aviation organizations maintain high safety levels

- EASA – Safety assurance – all planned and systematic actions necessary to afford adequate confidence that a product, a service, an organisation, or a functional system achieves acceptable or tolerable safety.
- FAA – Safety assurance – Processes within the SMS that function systematically to ensure the performance and effectiveness of safety risk controls and that the organization meets or exceeds its safety objectives through the collection, analysis, and assessment of information.

Safety Assurance Activities Include:

- Organisational arrangements and systematic processes for continuous surveillance and recording of the organisation's safety performance.
- Evaluation of the safety management processes and practices.
- Used as a means to demonstrate that organisational arrangements and processes for safety achievement are properly applied and continue to achieve their intended objectives.

Note: Safety Assurance should be intrusive and enquiring and not simply an administrative "box-ticking" exercise.

According to the ICAO Doc 9859 – Safety assurance includes the following activities:

- Safety performance monitoring and measurement to validate the effectiveness of safety risk management.
- Measuring the outcomes of activities that operational personnel must engage in for the delivery of services by the organisation.

- Management of change – the aviation service provider organisation shall develop and maintain a formal process to identify and manage the changes within the organisation which may affect established processes, procedures, products, and services.
- The management of change should ensure that required safety performance is achieved by reducing or eliminating the safety risks resulting from the changes in the organisation, the provision of services, or the operational environment.
- Continuous improvement of the SMS – the aviation service provider organisation shall develop and maintain a formal process to identify the causes of sub-standard performance of the SMS, determine the implications of sub-standard performance in operations, and eliminate such causes.

SMS Safety Assurance Components include:

- Safety Surveys – Carried out as a matter of routine, to recommend improvements where needed, to provide assurance to managers of the safety of activities within their areas, and to confirm conformance with applicable parts of their safety management systems;
- Safety Monitoring – shall ensure that methods are in place to detect changes in systems or operations which may suggest any element is approaching a point at which acceptable standards of safety can no longer be met, and that corrective action is taken;
- Safety System Records – shall be maintained throughout the SMS operation as a basis for providing safety assurance to all associated with, responsible for, or dependent upon the services provided, and to the safety regulatory authority. Safety records include all documentation produced and maintained throughout the operation of the SMS processes, including the risk assessment and mitigation documentation.

Consider the following challenges and best practices related to Safety Assurance:

- Managing and analyzing vast data to identify trends, risks, and areas needing improvement can be challenging.
- Implementing a safety culture where employees proactively report hazards and incidents may meet resistance due to fear of penalties.
- Ensuring adequate resources (personnel, financial, technological) are available for SMS implementation is often difficult for smaller organizations.
- Proactively identify hazards through comprehensive risk assessments. Employ predictive analytics and historical data to determine potential safety issues.

- Develop clear safety performance indicators and regularly monitor them. Compare performance with targets and identify gaps.
- Establish a non-punitive reporting system to encourage employees to report safety concerns without fear of retribution.
- Foster a culture that encourages continuous improvement. Regularly review the SMS, involve stakeholders, and update policies and procedures as needed.
- Train staff on the importance of safety and encourage open communication regarding safety issues.
- Leadership must prioritize safety and provide the necessary resources for the SMS. This commitment should be communicated to all levels of the organization.
- Integrate the SMS with quality management systems to leverage existing processes and create synergies.
- Ensure that all personnel are trained to understand the SMS and their role in ensuring safety. Conduct regular training and refresher courses.

7/ Considering the Roles and Responsibilities of an EASA Aviation Accountable Manager (AM) in respect of Regulatory Requirements and Obligations

Sofema Online (SOL) www.sofemaonline.com considers the AM roles and responsibilities related to Aircraft Maintenance and CAMO Safety Audit Findings and Root Cause Analysis

Introduction

The European Aviation Safety Agency (EASA) requires an accountable manager in aviation organizations to oversee and ensure compliance with aviation regulations and safety standards.

The roles and responsibilities of an accountable manager are crucial in maintaining safety and regulatory adherence within the organization.

- The accountable manager holds ultimate responsibility for ensuring that the organization complies with all relevant EASA regulations.
- The AM has the authority to allocate resources and implement necessary changes to maintain compliance and enhance safety.
- The accountable manager is responsible for the implementation and effective functioning of the organization's SMS. (this is done typically through delegating responsible persons)

- He / She should ensuring that safety policies are followed and that safety performance is continually monitored and improved.
- Ensuring adequate resources, including staffing, training, and equipment, are available to maintain safety and compliance.
- Prioritizing funding and support for safety-related initiatives and corrective actions.
- Overseeing compliance monitoring programs to ensure that the organization continuously meets regulatory requirements.
- Support and ensure the implementation of corrective actions for any identified non-compliance issues.
- Establishing effective communication channels within the organization to ensure that safety and compliance issues are promptly reported and addressed.
- Ensuring that effective reporting is active both internally and externally to the regulatory authority on compliance status and any significant safety issues.

Involvement in Risk Assessments

- Approving the methodologies and frameworks used for conducting risk assessments within the organization.
- Ensuring that these frameworks are comprehensive and align with EASA standards and best practices.
- Reviewing the outcomes of risk assessments conducted by various departments, including Aircraft Maintenance and CAMO.
- Ensuring that risk assessments are thorough and that significant risks are identified, assessed, and mitigated effectively.
- Making informed decisions on the implementation of risk mitigation strategies based on the findings from risk assessments.
- Allocating necessary resources to address identified risks.

Involvement in CAMO Safety Audit Findings and Root Cause Analysis

- Actively reviewing the findings of safety audits to understand areas of non-compliance or potential safety hazards.
- Ensuring that audit findings are addressed promptly and effectively.
- Overseeing root cause analysis processes to identify the underlying causes of safety issues or non-compliance identified during audits.
- Ensuring that the root cause analysis is thorough and that corrective actions address the fundamental issues, not just the symptoms.

Implementation of Corrective Actions:

- Approving and overseeing the implementation of corrective actions based on audit findings and root cause analysis.
- Monitoring the effectiveness of these actions and making adjustments as necessary to ensure long-term compliance and safety improvement.

8/ Please Clarify Methods of Quantifying Aviation Data for Safety Assessment Purposes

Considering Best Practices related to the Treatment of Aviation Safety Data and how best to Quantify this Data for Safety Assessment Purposes

Sofema Online (SOL) www.sofemaonline.com considers the various processes to best address Aviation Safety Data in an EASA compliant SMS system.

Introduction

Both quantitative and qualitative data play vital roles in the safety assessment process within an aviation SMS compliant with EASA standards.

While quantitative data provides measurable and objective insights, qualitative data offers depth and context. Effective processing of both types of data involves systematic collection, rigorous analysis, and thoughtful integration to enhance overall safety management and performance.

Quantifying aviation data involves systematically collecting, analyzing, and interpreting data to:

- Identify safety risks,
- Measure safety performance, and
- implement improvements.

Differences Between Quantitative and Qualitative Data

Quantitative Data - Numerical data that can be measured and quantified.

- Flight hours, number of incidents, safety performance indicators (SPIs), altitude, speed, frequency of maintenance issues. (Can be statistically analyzed & suitable for identifying trends and making predictions.)

Qualitative Data - Descriptive data that can be observed but typically not measured.

- Incident reports, safety audit findings, employee feedback, interviews, observational notes. (Subjective and interpretative - Rich in detail and context)

- Suitable for understanding underlying reasons, opinions, and motivations.

Data Collection:

- Use standardized forms and instruments for data collection to ensure consistency.
- Ensure data accuracy by cross-verifying with multiple sources.
- Remove or correct any inaccuracies or inconsistencies in the data.
- Combine quantitative data from different sources for a comprehensive analysis.
- Use dashboards and automated tools for real-time data integration and monitoring.

Statistical Analysis:

- Apply appropriate statistical methods based on the data type and research questions.
- Create charts, graphs, and tables to present data clearly. (Use visualization tools to identify trends and patterns.)

Methods of Quantifying Aviation Data

- Conduct thorough and systematic data collection through interviews, focus groups, and observations.
  - Ensure data richness by gathering detailed and comprehensive descriptions.
- Mandatory Reporting (building data sets which can provide trend and group information)
- Voluntary Reporting (building data sets which can provide trend and group information)
- Reactive Indicators: Based on past incidents and accidents.
- Proactive Indicators: Focus on detecting potential exposures hazards before they result in incidents (safety audits)
- Predictive Indicators: Use data analytics to predict future safety performance, e.g., trends in maintenance issues.
- Flight Data Monitoring (FDM)
- Safety Audits and Inspections
- Quantitative Risk Assessment (QRA) - Uses statistical methods to estimate the probability and impact of risks.
- Qualitative Risk Assessment - Expert judgment to assess risk based on experience and knowledge.

Processing Qualitative Data

- Identify recurring themes, patterns, and relationships within the data.
- Compare themes across different data sources to ensure consistency.
- Use multiple data sources or methods to validate findings and enhance reliability.
- Cross-check qualitative findings with quantitative data for comprehensive insights.
- Present qualitative findings in a narrative format, supported by direct quotes and examples.
- Use visual aids such as mind maps or concept maps to illustrate relationships and themes.

Integration of Quantitative and Qualitative Data

- Combine quantitative and qualitative data to provide a fuller understanding of safety issues.
- Use qualitative data to explain the context and reasons behind quantitative trends.
- Cross-validate findings from quantitative and qualitative analyses. (Use findings from one type of data to inform the collection and analysis of the other type.

Data – Issues

- The potential for Data Overload
  - The vast amount of data collected can be overwhelming and difficult to analyze effectively.
  - Human factors can introduce biases, leading to skewed data and inaccurate safety assessments.
- The need to ensure data is regularly updated and maintained.
- Develop standardized forms and procedures for reporting incidents.
- Use consistent metrics for SPIs to ensure comparability over time.

9/ What are the Main Points of KPI's within an Aviation SMS?

Consider the role of Key Performance Indicators (KPI's) in the context of and an EASA Compliant Aviation Safety Management System

Sofema Online (SOL) www.sofemaonline.com considers the Primary Purpose of KPI's within an Aviation SMS?

Introduction

Introduction –Risk Assessment & Management KPI's

KPI's Typically measures how well your operation is doing at achieving its goals, for example reducing downtime or costs. KPIs can be used as a benchmark to understand your organisation's current position as well as to facilitate the development of Key Performance goals.

Key Performance Indicators (KPIs) vary according to the company, its goals, strategies, and action plans. However, there is a set of indicators that is well-regarded and used more often. Consider the following Features:

- The selection of KPIs can relate to many different elements and aspects including financial – efficiency of the process – health and safety (SMS) considerations – defects and pilot reports (PIREPS).

In the context of an EASA-compliant aviation Safety Management System (SMS), Key Performance Indicators (KPIs) are crucial for measuring and monitoring the safety performance of the organization.

- Alignment with Safety Objectives - KPIs should be directly aligned with the organization's safety objectives and goals. This ensures that the indicators provide meaningful insights into how well the organization is achieving its desired safety outcomes.

- Proactive and Reactive Measures - KPIs should encompass both proactive and reactive measures
    - Proactive KPIs focus on identifying potential safety issues before they result in incidents or accidents. Examples include safety audits, risk assessments, and safety training completion rates.
    - Reactive KPIs measure the outcomes of past events to understand trends and areas of concern. Examples include incident rates, accident rates, and findings from safety investigations.

- KPIs should include both quantitative and qualitative data:
    - Quantitative KPIs provide measurable data, such as the number of safety reports filed, the frequency of safety meetings, or the rate of safety training completion.
    - Qualitative KPIs capture more subjective data, such as feedback from safety surveys, employee perceptions of safety culture, and qualitative assessments of safety performance.

- Risk-Based Approach - KPIs should be developed based on a risk-based approach, focusing on areas with the highest potential for significant safety impacts.
- Transparency and Communication
  - Effective KPIs should be communicated transparently within the organization. This involves reporting KPI results to all relevant stakeholders, including management, staff, and regulatory authorities, to foster a shared understanding of safety performance and encourage a culture of safety.

Introduction – Safety Performance Indicator

A safety performance indicator (SPI) is defined in the ICAO Safety Management Manual as a measure (or metric) used to express the level of safety performance achieved in a system.

- Generally expressed in terms of the frequency of occurrences of some event causing harm, e.g., A number of events/year or / 000's of Hrs of operation.
- A set of indicators should also include leading indicators.

Note: These indicators do not require a safety event to take place and are metrics that provide information on the current situation that may affect future performance.

What is the main difference between Safety Performance Indicators (SPI) and Safety Performance Targets (SPT)?

ICAO defines:

- Safety Performance Indicators as "A data-based parameter used for monitoring and assessing safety performance".
- Safety Performance Targets as "The planned or intended objective for safety performance indicator(s) over a given period".

SPI/SPT Development Considerations

- Specific understanding regarding the selection of the relevant safety concern to be treated to ensure both validity & relevance.
- Avoid complexity wherever possible – simple is better and can clearly reflect relevant safety concerns.
- Use clear definitions to avoid ambiguity.
- Phased approach to implementation – achieves the ultimate objective in stages.
- Avoid high workload analysis.
- Ensure a broad coverage is important do not only pursue extremes (to capture systemic exposure that can agglomerate into more significant events.
- Make sure time frames are clear and understood (data capture rate).
- Avoid quantity over quality measure what is important, not easy.

Leading & Lagging SPIs and SPTs

Lagging indicators are reactive in nature that measures an organization's performance like the number and types of incidents that occurred based on the information from past incidents and accidents such as reactionary analysis. Reactionary analysis is analyzing past data to find loopholes in processes and policies.

Leading indicators are proactive and preventive measures that can shed light on the effectiveness of safety and health activities and reveal potential problems in a safety and health program.

Many people are familiar with lagging indicators:

- Incorrect application of the MEL / 1000 Departures
- Missed Airworthiness Directive (AD) / 10,000 FH

Leading SPIs/SPTs – sometimes known as "Process SPIs/SPTs" – measure situations which have the potential to become or contribute to high severity/low probability negative outcomes:

- Leading SPIs support proactive development of the organisation's safety management System – Capability to improve safety exposure.

o SPI – 0.75 events of foreign object damage FOD) to aircraft per 10,000 Maintenance Activities (Ramp Transit & Minor Check).
o SPT: To reduce to 0.5 events of foreign object damage to aircraft per 10 000 Maintenance Activities (Ramp Transit & Minor Check) within 12 months from the introduction.

Implementation of Safety Performance Indicators
Safety performance indicators are important because they measure the proper functioning of the organisations barriers that exist as well as considering also the interfaces between our organisation and customers as well as other related (contracted & subcontracted) organizations.

Once a detailed assessment has been made it is possible to consider which are the most relevant indicators applicable to the organisational objectives.

- How do these indicators relate to each other and do they meet the requirement?

- Is the measurement process of the chosen indicators effective?

Notes

- KPIs are not Safety Performance Indicators (SPI) nor are they directly related to the achievement of safety objectives (although they can be a feature within the overall safety management system).

- Whilst KPIs are closely related to the performance level you want to achieve, don't take them for goals themselves. (This means an indicator is only a metric which we use quantitatively to demonstrate the performance of a given maintenance activity, asset or department.)

- When developing KPIs it is important that they relate to the entire process including the various inputs and outputs so that they are able to genuinely benchmark the performance of the maintenance.

10/ Safety training is a relevant question to all personnel. How should companies guarantee this issue?

How to Ensure Effective Safety Management System (SMS) Training within an EASA Approved Organisation

Introduction

An effective SMS training program is pivotal for the safety and success of an EASA-approved organization. By developing a comprehensive, role-specific curriculum, ensuring content customization, employing competent instructors, and fostering a leadership-driven safety culture, organizations can significantly enhance their safety management capabilities.

Comprehensive Safety Management System Training Programs should be developed that cover all aspects of aviation safety. These programs should be tailored to the specific roles and responsibilities of different personnel training sessions and refresher courses should be adjusted to keep all personnel updated on the latest safety protocols, regulations, and best practices.

- **Develop a Comprehensive Training Program –** Create a Role Specific curriculum that covers all aspects of SMS, including risk management, safety performance monitoring, safety reporting, and safety promotion.

- **Ensure the Content is Customized -** to address the specific needs and operations of your organization. This should include both generic SMS principles and role specific organization procedures.
  - Collect feedback from trainees to identify areas for improvement.
  - Establish metrics to evaluate the effectiveness of the training, such as assessment scores, incident reports, and safety performance indicators.
- **Use Competent Instructors** - Ensure that instructors have the necessary, experience, and understanding of both SMS principles and EASA regulations and Training Techniques.
- **Foster a Leadership Driven Safety Culture -** Ensure that the organization's leadership is visibly committed to safety and supports the SMS training program.
  - Training fosters a safety culture where every member of the organization prioritizes and actively contributes to safety, thus enhancing overall safety awareness and practices.
- **Regulatory Compliance:** EASA regulations mandate comprehensive SMS training for all personnel. Compliance ensures that the organization meets the legal requirements, avoiding penalties and sanctions.
- **Enhanced Safety Performance:** Proper training helps in identifying and mitigating risks effectively, leading to improved safety performance across the organization.

Measuring the Effectiveness of the Training Program

Measuring the effectiveness of the training through assessment scores, safety performance indicators, feedback mechanisms, and continuous improvement processes ensures that the training program remains relevant, effective, and aligned with industry standards.

- **How to Benchmark and Measure** - To ensure the effectiveness of SMS training, it is crucial to establish clear benchmarks and measurement criteria. These can be categorized into qualitative and quantitative metrics:
- **Assessment Scores** - Pre- and Post-Training Assessments: Conduct assessments before and after training sessions to measure knowledge gained.

Next Steps
Sofema Aviation Services (SAS) www.sassofia.com and Sofema Online (SOL) www.sofemaonline.com provide Safety and Risk Management Training as Classroom, webinar or online. Please see the websites or email team@sassofia.com