

Risk Assessment & Risk Management within EASA-Approved Aviation Organisations

Presented by Sofema Aviation Services (SAS)

Introduction

Risk Assessment and Risk Management enable aviation organisations to proactively identify hazards, evaluate risks, and implement effective controls to mitigate or eliminate safety-related issues.

Understanding Risk Assessment

Risk Assessment involves systematically evaluating the likelihood and severity of hazards identified within an organisation's operational activities. It is a structured approach that ensures informed decision-making and guides prioritisation of safety actions.

Key elements include:

- **Hazard Identification:** Determining potential sources of harm or loss, such as equipment failure, human error, procedural shortcomings, or environmental threats.
- **Risk Analysis:** Assessing both the probability (likelihood) of a hazardous event occurring and the severity of its potential outcomes.
- **Risk Evaluation:** Judging the acceptability or tolerability of the identified risks based on clearly defined safety criteria or thresholds.

Proactive Hazard Identification provides an opportunity to anticipate potential threats and mitigate them before they result in safety events or operational disruptions.

- Proactive hazard identification involves systematically exploring potential sources of harm or loss, rather than waiting for incidents or occurrences to signal their presence. It requires organisations to continuously engage in safety-focused activities, leveraging various internal and external data sources.
 - Encourage employees to voluntarily and routinely report hazards, potential safety issues, or operational concerns.
 - Foster a just and open reporting culture by ensuring non-punitive policies, facilitating open communication, and rewarding proactive reporting.
 - Regularly analyse and trend this data to identify emerging patterns and risks.
- Implement systematic safety audits and inspections across all operational areas.
- Regularly review procedures, infrastructure, equipment, and compliance status to identify unsafe conditions, deteriorating standards, or deviations.

- Use checklists and structured methods to ensure thorough and consistent hazard detection.
- Conduct routine safety surveys or questionnaires directed at employees, Particularly frontline operational staff.
- Capture perceptions, concerns, and suggestions directly from personnel involved in day-to-day operations.
- Analyse feedback carefully to highlight hazards that might not be evident through standard observation methods.
- Proactively observe real-time operations to identify hazards associated with procedures, human performance, team interactions, and environmental conditions.
 - LOSA methodologies provide valuable insights into potential operational vulnerabilities and human-factor-related hazards.
- Leverage internal safety data such as Flight Data Monitoring (FDM), Maintenance Data, occurrence reporting, and operational metrics.
- Identify and monitor trends that might indicate latent or emerging hazards, allowing early intervention before hazards become critical.
- Hold regular safety meetings or workshops involving cross-functional teams from various organisational levels.
- Use structured brainstorming sessions or focus groups to proactively discuss potential threats, emerging concerns, or known operational vulnerabilities.
- Regularly review external information sources, such as industry safety bulletins, airworthiness directives, regulatory notices, and reports from similar operations or organisations.
- Apply lessons learned from incidents experienced by other operators, anticipating potential risks in similar operational scenarios.
- Conduct proactive hazard identification during change management procedures. Any new process, equipment, or operational modification should undergo formal hazard identification and risk assessment before implementation.
- Identify and assess potential unintended consequences associated with operational changes.

Managing Subjectivity in Risk Assessment

Risk assessment is widely recognised as one of the most challenging elements due to its inherent subjectivity. Differences in individuals' perceptions, biases, knowledge, and experiences can significantly influence the accuracy and consistency of risk assessments.

Risk assessments involve determining two primary aspects:

- **Probability** – the likelihood of an adverse event occurring.
- **Severity** – the magnitude of potential consequences.

However, these judgements can vary greatly among individuals, influenced by factors such as:

- Personal experience
- Knowledge level
- Cognitive biases (confirmation bias, anchoring, optimism bias)
- Cultural background
- Individual risk tolerance

This variability can lead to inconsistent and potentially inaccurate assessments, undermining safety decisions and prioritisation of risk mitigation actions.

To effectively reduce subjectivity and enhance reliability, aviation organisations should adopt the following best practices:

- Utilise clearly defined risk assessment tools and methodologies, such as:
 - Risk matrices with precise definitions of severity and probability categories.
 - Bow-Tie Analysis to visually represent potential threats, consequences, and mitigations.
 - Fault Tree Analysis (FTA) or Event Tree Analysis (ETA) for more complex scenarios.

Note - Ensuring standardisation reduces ambiguity and improves consistency across assessments.

- Establish and communicate clear definitions for each risk level (acceptable, tolerable, unacceptable).
- Provide focused training programmes to equip assessors with skills and knowledge to accurately evaluate risks.
- Training should include scenario-based practical exercises and calibration workshops to align assessors' interpretations and judgements.
- Employ multi-disciplinary teams for risk assessments rather than relying on individual judgement.
- Facilitate open discussions, enabling assessors to challenge assumptions, share insights, and collectively agree on assessments, thus mitigating individual biases.

- Regularly calibrate assessment teams through periodic training and review of past risk assessments.
- Calibrations help maintain consistency in evaluations, ensuring uniformity in interpreting and applying risk assessment criteria.
- Reference historical data from incident reports, audits, and industry safety databases.
- Benchmark internally and externally to validate assessments against proven historical trends or known risks, reducing subjective interpretations.
- Implement regular feedback loops whereby risk assessment results are reviewed and analysed.
- Identify trends or common discrepancies to refine assessment methods and criteria continually.

Understanding Risk Management

Risk Management extends beyond risk assessment by introducing strategies and controls designed to effectively mitigate identified risks. It involves selecting and implementing appropriate actions, measuring their effectiveness, and continuously monitoring outcomes.

Key elements include:

- **Risk Mitigation Strategies:** Applying actions such as procedural changes, additional training, equipment upgrades, or introducing redundancy to reduce risk to acceptable levels.
- **Implementation of Controls:** Ensuring effective operational oversight, clear allocation of responsibilities, and defined accountability for risk reduction activities.
- **Continuous Monitoring and Review:** Evaluating the effectiveness of implemented risk mitigations, and making adjustments as required.

Challenges Faced by EASA-Approved Organisations

While the theoretical principles of risk assessment and management are clear, practical implementation within aviation environments often reveals several challenges:

Limited Reporting Culture

- **Issue:** Employees may be reluctant to report hazards or near misses due to fear of blame or repercussions.
- **Impact:** Under-reporting reduces the visibility of hazards, leaving management unaware of risks that require mitigation.
- **Solution:** Promote a **just culture** which encourages open reporting without punitive measures, except in cases of intentional non-compliance or gross negligence.

Subjectivity in Risk Assessment

- **Issue:** Risk assessments can become subjective, especially in determining severity and likelihood, leading to inconsistent results.
- **Impact:** Decisions based on subjective assessments can either exaggerate or underestimate risks, leading to inappropriate prioritisation of mitigation actions.
- **Solution:** Establish clear, well-defined risk matrices and guidelines, alongside regular calibration exercises and risk-assessment training for staff to enhance consistency.

Inadequate Data for Analysis

- **Issue:** Lack of sufficient, accurate, or timely data can result in poor risk assessments.
- **Impact:** Decisions made without robust data might fail to address real underlying risks.
- **Solution:** Strengthen reporting mechanisms, ensure data quality through audits, and leverage tools such as Flight Data Monitoring (FDM), occurrence databases, and audit findings to inform assessments.

Resource Constraints

- **Issue:** Organisations may struggle with limited resources (financial, human, or technical) to implement effective mitigations.
- **Impact:** Resource limitations can delay or diminish the effectiveness of mitigation strategies.
- **Solution:** Prioritise risk management activities through risk-based decision-making, ensuring that high-risk areas receive attention first, and progressively manage lower-priority issues.

Best Practices for Effective Risk Assessment & Risk Management

Sofema Aviation Services recommends the following best practices to enhance risk assessment and management processes within EASA-approved aviation organisations:

Promoting an Effective Safety Culture

- Foster a transparent and proactive culture encouraging open communication, safety reporting, and feedback loops throughout the organisation.

Structured Risk Assessment Framework

- Utilise clearly defined risk assessment methodologies (e.g., Bow-tie analysis, risk matrices, fault-tree analysis) to minimise subjectivity and improve standardisation.

Integration of Safety Management with Compliance

- Align SMS and Compliance Monitoring Systems (CMS) to ensure effective identification of regulatory non-conformances and operational hazards, facilitating integrated risk analysis and mitigation.

Risk-Based Decision-Making

- Prioritise risks using objective criteria, ensuring the most significant hazards are addressed effectively within available resources.

Competence and Training

- Invest in comprehensive training for all staff involved in risk assessment and management. Regular refresher training should include scenario-based exercises and case studies relevant to the organisation's operational environment.

Continuous Improvement and Feedback

- Implement regular reviews and feedback loops to ensure risk management effectiveness. Continuous improvement is driven by learning from internal occurrences, industry incidents, and regulatory guidance.

For more information, please email team@sassofia.com or visit our websites:

- Sofema Aviation Services (SAS) www.sassofia.com
- Sofema Online (SOL) www.sofemaonline.com

Next Steps - Sofema Aviation Services is committed to supporting aviation organisations in their journey towards comprehensive risk management excellence, providing professional training and guidance tailored to the unique needs of each organisation.