Considerations Related to the Selection of SMS Control Measures

Sofema Online (SOL) www.sofemaonline.com considers the best practices related to the effective deployment of SMS Mitigation control Measures.

Introduction

After completing an initial hazard analysis, the focus shifts to determining appropriate measures to eliminate, mitigate, or control the identified risks.

- If the risk assessment deems a hazard unacceptable, these control measures must be in place before introducing new procedures or equipment.

Note - However, even if a risk is deemed tolerable, further action to reduce it should be considered if it is reasonably practicable and cost-effective.

- This approach ensures continuous improvement and alignment with best management practices.

Safety Risk Mitigation

Safety risk mitigation involves a thorough examination of each safety risk from multiple perspectives to ensure effective control measures are selected. Key considerations include:

- **Effectiveness:** Assess how well the measure reduces or eliminates the safety risk. This can involve technical, training, and procedural defenses.
    - For example, a technical defense might involve installing advanced warning systems, while a procedural defense might involve revising standard operating procedures (SOPs).
- **Cost/Benefit:** Evaluate the balance between the benefits of the mitigation and its costs. This includes both direct costs (e.g., equipment purchase, training) and indirect costs (e.g., downtime, administrative efforts).
    - A cost-effective measure should provide significant safety benefits relative to its cost.
- Practicality: Consider the feasibility of implementing the mitigation with available technology, financial resources, and administrative capacity.
    - Practicality also involves assessing the time frame for implementation and the availability of necessary skills and expertise.

- Acceptability: Determine the willingness of stakeholders (e.g., employees, management, regulatory bodies) to adopt and support the measures.
    - Stakeholder engagement is crucial for smooth implementation and compliance.

- Enforceability: Ensure that the new operating procedures can be monitored effectively.
  - This may involve developing new monitoring systems or enhancing existing ones to track compliance.

- Durability: Evaluate the long-term sustainability and effectiveness of the measure.
  - This includes considering whether the measure can withstand changes in the operating environment and maintain its efficacy over time.

Residual Safety Risks

Assess the level of risk that remains after implementing the initial mitigation.

- This involves determining if additional control measures are necessary to bring the risk to an acceptable level.
- Unintended Consequences - Identify any new hazards introduced by the mitigation
  - For instance, implementing new technology might reduce one risk but introduce another, such as increased complexity in operations.
- Consider the time required for the implementation of the mitigation.
  - This includes planning, approval, training, and full deployment.
  - Timeliness is essential to ensure risks are controlled promptly.
- Mitigation strategies often result in changes to operating procedures, equipment, or infrastructure. These strategies fall into three categories:
  - **Avoidance:** Canceling or avoiding operations that pose unacceptable risks. This strategy eliminates the risk entirely but may have significant operational impacts.
  - **Reduction:** Reducing the frequency or magnitude of operations to lessen risks. For example, limiting the number of flights in adverse weather conditions or enhancing safety protocols during critical operations.
  - **Segregation:** Isolating the effects of risks or building redundancy to protect against them. This might involve creating separate zones for hazardous operations or incorporating fail-safe mechanisms in equipment.

Human Factors Considerations

Considering human factors is crucial in identifying effective mitigations. Human performance limitations and error-capturing strategies should be integrated into the mitigation plans to ensure they are realistic and effective.

- For example, designing user-friendly interfaces for new technology can reduce the likelihood of human error.

Hierarchy of Control Measures

Control measures should follow a systematic hierarchy, prioritizing the elimination of the hazard or risk.

- If elimination is not practicable, substitution, engineering controls, and administrative controls should be considered in that order.
- This systematic approach ensures that risks are reduced to the lowest reasonably practicable level.

Elimination: Completely removing the hazard or risk from the environment. This is the most effective control measure but is not always possible.

Substitution: Replacing the hazard with a less dangerous one. For example, using a less hazardous material in aircraft maintenance.

Engineering Controls: Designing or modifying equipment to reduce exposure to hazards. This could involve installing guards on machinery or improving ventilation systems.

Administrative Controls: Implementing policies and procedures to manage risks. This includes training programs, safety protocols, and regular safety audits.

Personal Protective Equipment (PPE): Providing PPE to employees as a last resort when other control measures are not sufficient. PPE includes items like helmets, gloves, and safety glasses.

Approval and Authorization

- Control measures often require resources beyond the authority of the individual making the assessment. Therefore, a system of approval and authorization is often necessary:
- **Approval:** The risk assessment and control measures should be approved by the lowest level of management with the authority to implement them.
  - The msing the control measures, and being responsible for the work area and personnel involved.

- Acceptable Risk: The level of residual risk must be confirmed as tolerable. Residual risk scores are categorized as:
  - Green: Accepted by the line manager.
  - Amber: Accepted by the relevant postholder or departmental head.
  - Red: Unacceptable; operations must stop until risks are reduced to an acceptable level.

Implementing Corrective Action

Once appropriate control measures are identified and the risk is accepted, a corrective action plan is recorded

- Each action is owned by the individual responsible for the identified hazard, ensuring accountability.

Safety Data Analysis: Analyzing safety data

- helps highlight high-risk areas and
- guides decision-makers in taking corrective actions,
- implementing risk-based surveillance,
- refining safety policies and objectives,
- setting SPI triggers, and
- conducting further risk assessments.

Note - Safety analysis results should be presented clearly to stakeholders, with actionable recommendations and timelines for implementation.

Approval

The approval process ensures that risk assessments and control measures are vetted and endorsed by competent authorities.

- Approval should be at the lowest level of management commensurate with the authority to implement the procedure. The approving manager must:
    - o Understand and assess the hazards inherent in the activity due to their seniority, background, and experience.
    - o Assess the effectiveness of the proposed control measures.
    - o Be responsible for the work area where the activity takes place.
    - o Directly employ those carrying out or exposed to the hazardous activity.

Acceptable Risk

After approval, it is necessary to confirm that the level of residual risk is tolerable for the company. Authority to confirm acceptable risk on behalf of the company is delegated as follows:

- Green region: Residual risks scores may be accepted by the line manager for the activity under assessment.
- Amber region: Residual risks scores must be accepted by the relevant postholder or departmental head.

- Red region: Residual risks are unacceptable. Operations must stop until sufficient control measures are implemented to reduce the risk to an acceptable level.

Implementing Corrective Action

After identifying appropriate control measures and accepting the risk, the corrective action plan will be recorded.

- Each action will be owned by the individual who identified the hazard, ensuring accountability and tracking of implementation progress.

Safety Data Analysis

Safety data analysis supports decision-making and highlights areas of high safety risk. It assists managers in:

- Taking immediate corrective actions.
- Implementing safety risk-based surveillance.
- Defining or refining safety policies and objectives.
- Defining or refining SPIs and SPTs.
- Setting SPI triggers.
- Promoting safety.
- Conducting further safety risk assessments.

The results of safety data analysis should be communicated clearly to stakeholders and used to inform future actions and decisions. Analysis results may include:

- **Imminent Safety Alerts:** For transmittal to the Competent Authority or organizations regarding safety hazards with potential catastrophic outcomes requiring immediate action.
- **Safety Analysis Reports:** Presenting quantitative and qualitative information, including safety recommendations and descriptions of uncertainty.
- **Safety Conferences:** Sharing safety information and analysis results to promote collaborative initiatives.

Note - Results should be made available to aviation safety stakeholders in an understandable format, targeting organizational decision-makers and external organizations as appropriate.

- Recommendations should be translated into action plans with specific responsibilities and timelines.

Summary

Selecting effective Safety Management System (SMS) control measures is critical for managing and mitigating safety risks in aviation. The process involves a thorough

hazard analysis, assessment of risk acceptability, and the implementation of control measures that are practical, cost-effective, and supported by stakeholders.

Continuous improvement and alignment with best management practices are essential, supported by comprehensive training and resources.

Next Steps

Sofema Aviation Services (www.sassofia.com)and Sofema Online (www.sofemaonline.com) provide Safety Management System classroom, webinar and online training. For details please see the respective website or email team@sassofia.com