Human Error Considerations Within EASA Ground Handling Approved Organisations

Sofema Aviation (SA) Explores the "Dirty Dozen" of human error, including fatigue, stress, and complacency. To Understand why human error alone is not an acceptable terminal root cause.

Introduction

Human factors and operator errors account for over 90% of accidents involving aircraft damage and infrastructure in the aviation industry. To manage these operational risks, the ground handling regulations emphasize analyzing human performance limits and environmental conditions.

GM3 ORGH.MGM.200(b)(2)(ii) General requirements for the management system — Human Factors and Safety Hazards.

The guidance material provides the following details regarding this topic:

- The common causes of these accidents include poor training and supervision, failure to follow standard operational procedures, communication failure, distraction, and work pressure.
- To optimize human performance and manage these risks, tasks and jobs should be designed with ergonomic principles in mind.
- Organizations must take into account typical human performance limitations to ensure that workers are not overloaded and are capable of carrying out their tasks in all operational circumstances.
    - This involves considering the physical design of the workplace, the work environment and equipment, and the mental abilities and risk perception of the person making decisions.
- The regulations recommend that ground handling organizations identify and target root causes related to human factors as part of their safety management system (SMS) and take appropriate mitigating actions.

The "Dirty Dozen" of Human Error The "dirty dozen" is a recognized concept referring to the 12 most common conditions that act as precursors to human error, accidents, or incidents. The framework highlights elements that lead individuals to make mistakes, requiring specific organizational countermeasures. The 12 elements are:

- Lack of communication.
- Distraction.
- Lack of resources.
- Stress.
- Complacency.
- Lack of teamwork.
- Pressure.

- Lack of awareness.
- Lack of knowledge.
- Fatigue.
- Lack of assertiveness.
- Norms, often described as "the way we do things around here".

Managing Fatigue, Stress, and Complacency

Fatigue is explicitly recognized as a significant operational threat that must be addressed during the planning of ground handling tasks and shift organization.

The ground handling management system must establish methods to control and prevent personnel fatigue, aligning with existing requirements such as Directive 2003/88/EC concerning the organization of working time. Organizations must actively evaluate fatigue as a human factor that contributes to operational errors if ignored during activity planning.

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Measurement and Oversight

- Fatigue data collection must be integrated directly into the organization's safety reporting systems.
- The threat of fatigue must be evaluated within the management system's core processes, encompassing safety risk assessment, management, and ongoing monitoring.
- Evaluations should account for environmental inducers, such as noise, extreme temperatures, heavy lifting, or working in uncomfortable positions.
- Assessments must also measure scheduling inducers, including excessive duty hours, rapid shift changes, short turnaround times, personnel shortages, and night work.

Mitigation and Best Practices

- Schedule regular work breaks tailored to the specific type of ground handling activity being performed.
- Guarantee sufficient rest periods between shifts to allow workers to recover from the previous duty period.
- Avoid shift structures that severely disrupt established sleep and work patterns, such as alternating day and night duties.
- Publish shift schedules and any modifications sufficiently in advance to enable personnel to plan for adequate rest.
- Incorporate and provide advance notice for recurrent extended rest periods.
- Conduct a specific risk assessment when urgent operational requirements dictate extended hours or modified shift patterns.

- Apply additional mitigation actions for extended hours, such as implementing extra supervision or mandating additional rest breaks.
- Adapt safety training and distribute promotional materials to raise awareness regarding fatigue management.
- The working environment, including noise, extreme temperatures, and heavy lifting, along with excessive duty hours and shift disruptions, are primary inducers of fatigue.
- Stress, distraction, and work pressure are underlying causes of communication failures and the inability to follow standard operational procedures.
- Organizations must integrate fatigue data into their safety reporting systems and define specific mitigation actions for urgent operational changes that increase working hours.

Why Human Error is Not an Acceptable Terminal Root Cause

- Narrowly attributing an occurrence to human error fails to identify the complex chain of events and contributing factors that led to the non-compliance.
- Stopping an investigation at human error often results in inappropriate or partial causal analyses, leading to ineffective "quick fixes" that only address the immediate effects.
- A proper root cause analysis must explore why a mistake happened, rather than focusing primarily on who caused it or what the direct failure was.
- Ground handling organizations must evaluate broader systemic elements, including organizational structures, processes, personnel training, equipment, facilities, and the operational environment, to develop corrective actions that genuinely prevent recurrence.

Developing Best Practice Mitigations

By analyzing these broader systemic elements using established methods, organizations can avoid ineffective "quick fixes" and implement corrective action plans that address the true systemic drivers of non-compliance.

To develop effective corrective actions that prevent the recurrence of safety events, ground handling organizations must conduct a root cause analysis that investigates:

- The underlying "why"
- Rather than stopping at "who" or "what" caused the non-compliance.

This requires a comprehensive evaluation of systemic and contributing factors across the following domains:

- **Organizational Structures and Processes**
  - Causal factors in this domain often stem from the complexity of the organization and its operational arrangements.
  - Risks may arise from business models involving a heavy reliance on contracted services, commercial pressures, or the demand for short aircraft turnaround times.

- Systemic non-compliance can also originate from deficiencies in core management system components, such as the safety management system (SMS), compliance monitoring processes, and documentation control.
- Furthermore, poorly managed interfaces and complex communication layers between different operational entities contribute to systemic vulnerabilities.

- **Personnel and Training** Investigations must account for human factors and conditions that precipitate human error, such as:
  - Stress, distraction, pressure, and complacency.
  - Specific causal factors include inadequate training, poor supervision, and allowing inexperienced personnel to work unsupervised.
  - The reliance on temporary or seasonal workers can also degrade overall competency levels if these workers are not properly integrated and balanced with experienced full-time employees.

- **Equipment and Facilities** Safety failures can be traced to the physical design of the workplace, ergonomics, and the condition of Ground Support Equipment (GSE).
  - Causal factors frequently involve deficiencies in the GSE maintenance program, the infrequent use of specific equipment resulting in skill fade, or the introduction of new equipment and technologies without adequate prior safety risk assessments.

- **Operational Environment** The physical and environmental context in which work is conducted introduces significant safety variables.
  - Causal factors include working in extreme weather conditions (rain, cold, heat), high noise environments, and congested aerodrome traffic.
  - The structure of the working environment, such as night duties, changing shift patterns, and work intensification, can induce severe fatigue, which directly compromises human performance.

Next Steps

See the following https://sassofia.com/course/easa-compliant-ground-handling-safety-management-root-cause-analysis-for-managers-2-day/; email team@sassofia.com