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Pilot Control Design Influences on Pilot Monitoring Effectiveness of Crew Resource Management in Airbus 320 Landings

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Triggering Mechanisms as Barriers to PM Effectiveness



Disclaimer

- My research, ideas, opinions, and thoughts are my own.
- I am not here as a representative of my employer or any other entity.



Presentation Objectives

- Describe Pilot Monitoring Barriers
 - Flight Deck Automation
 - Pilot Flight Control Design
 - CRM Breakdowns
- Describe Transition State
 - Triggering Mechanisms
 - Known hazards transition to risk



Pilot Monitoring Duties

- FAA AC-12—71B, SOP's and PM Duties for Flight Deck Crewmembers
 - PM Duties
 - Monitors flight path and energy state
 - Supports PF
 - Monitors aircraft state and system status
 - Calls out perceived deviations
 - Prepared to intervene, if necessary



Barriers to PM Effectiveness

- Time Pressure, high workload
- Lack of feedback, lapses in attention span
- Design of SOP
- Pilots' Inadequate Mental Model of Automation Modes
- Training
- Loss of Situational Awareness



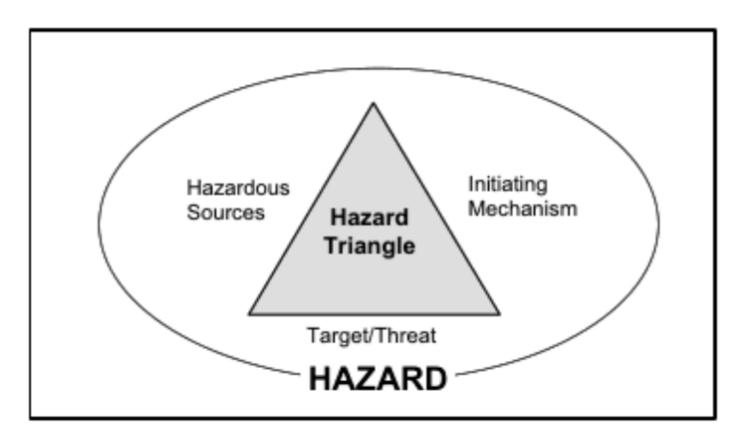
State Transition

- Event(s) that changes hazard to a mishap
 - Hazard components
 - Source-rudimentary element
 - Initiating mechanism-causal factor(s)
 - Transforms hazard (latent failure) into a mishap
 - Initiating mechanism-causal factor(s)
 - Hazard target and threat
 - Target is the vulnerable entity
 - Threat is the level of risk associated with the target (Ericson, 2005).



The Hazard Triangle

Ericson (2005)





Safety Risk Mitigation

- Job and Task Analysis
- Evaluate Hazard Triangle Components
- Past Events and Lessons Learned
- Review Safety Criteria, Regulatory Requirements, and Current Safety Practices
- Ericson, C.A. (2005) *Hazard analysis techniques for system safety.* Hoboken, NJ: John Wiley and Sons.



GAP Analysis

- Actual-Where We are.
- Optimal-Where we want to be.

- ☐ Four Gap Types
 - Performance Gap
 - Perceptual Gap
 - Design Gap
 - Organizational Gap



System Design

- Components of System Safety
 - —Training
 - –Equipment
 - –Procedures



Questions?



