Perspectives on Human Factors in Shifting Operating Environment

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SHIFTING OPERATING ENVIRONMENT
• Storage Tank Incidents Study 1960 – 2003
• Incidents involving Domino Effects 1961 – 2013
• Ten Tank Overfilling Incidents 1972-2009
• Greek Petrochemical Industry Incidents 1997-2003
• Korea Petrochemical Industry Incidents 1997-2007
• Overfilling of a Gasoline Tank caused an accident almost every 5 years from the early ’60s (Buncefield Report 2007)

• 17 Overfilling incidents in Dutch Sites over the period of 1998-2009
Construction
Operator ERROR
Maintenance ERROR
Programming ERROR
Design ERROR

WHY?
**HUMAN FACTOR:** interaction of individuals with each other, with equipment and facilities and with management systems and how such interactions are influenced by a work environment and culture

**HUMAN ERROR:** symptom of Demand capacity mismatch – slips, lapses, mistakes, violations
- Report incidents, investigate, identify root causes, fix, share, learn
- Investigation needs to include views and causes that were not agreed by the incident investigation committee
MANAGING INCIDENTS

- Combats the inherent subjectivity in accident/incident investigation and analysis by ensuring the consistency, objectivity and transparency of the data collection and analysis processes (Reinach 2006)

- But remember: incident investigation by itself does not mean prevention of incidents!
TECHNOLOGY / AUTOMATION

- Overconfidence & Complacency – Insufficient monitoring and checking of automation functions and decisions even when conflicting information is presented

- Out of the Loop Syndrome – Inability of operators to detect automation failures and resume manual control of complex systems
- Automation Complexity – Varies between slips in a low complex environment due to insufficient response time to intentional mistaken actions due to necessary data unavailability despite longer response time availability.
HAZARD AWARENESS

- Increase hazard awareness – at all levels of the organization
- Proactively anticipate personnel changes as practically possible to enable adequate knowledge and skill transfer
CULTURE OPERATIONAL RIGOR LEADERSHIP

- Eliminate the “it has not happened and therefore, it will not happen” mentality: normalization of deviation, shortcuts...

- Create open, transparent and receptive culture (learning organization vs. “blame and punish” culture)
Deeply rooted dedication and commitment at all levels of the organization to identify human and organization factors as cause of incidents - discuss, share, analyze and implement recommendations in the right way every time.
CULTURE OPERATIONAL RIGOR LEADERSHIP

- Receptive to findings pointing towards management commitment, organizational policy, culture, etc.
- Acknowledge possibilities and continually engage workers
- Understand and ask why and what else could be done to prevent the possibilities of
• Clear Expectations define human performance

• Actual performance = f (capability, culture, systems, processes and tools)

• Unclear expectations and poor performance management (measure, monitor, manage) can lead to varying risk perception and higher risk
- Strengthen incident investigation - develop structured framework to identify factors that influence human error
- Educate and increase awareness – learn from previous incidents
- Understand and address prevalent and widespread organizational and human factors
- Manage performance – do not underestimate human factors as cause of incidents
“History repeats itself because no one was listening the first time”

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