Functional Safety Management
Why Human Factors Matter!
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Thank you!
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Introduction

**What is Functional Safety Management?**

ISA 84 5.2.1.2 “A safety management system shall be in place so as to ensure that where safety instrumented systems are used, they have the ability to place and/or maintain the process in a safe state.”

- Easy?

  Write what you plan to do

  Do what you wrote
## Principal-Agent Problem

<table>
<thead>
<tr>
<th>Principle</th>
<th>Agent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citizens</td>
<td>Governments</td>
</tr>
<tr>
<td>Shareholders</td>
<td>Managers</td>
</tr>
<tr>
<td>Residents</td>
<td>Safety Professionals Industry &amp; Government</td>
</tr>
<tr>
<td>Risk</td>
<td>Conflicting incentives</td>
</tr>
</tbody>
</table>

### Agent Conflicting Incentives

- Aversion to change
- Path of least resistance
- Short term pain
- Pride
Agents - Operating Company Executives

The way it should be.

The way it usually is.

Miracle Required

Scott Adams (Dilbert)
Agents

Operating Company PMs

SIS & BPCS Systems Integrators

EPC Contractor

Commissioning Team

Operations Project Staff
“Human nature will instinctively modify what should be done into what can be done especially if this makes the job easier or keeps the job moving in some way” – Loss Prevention Bulletin, October 2000

Excerpt from - What Went Wrong? - Trevor Kletz Book
What is our solution?

1) Functional Safety Plan
2) Lead
3) Disarm
4) Accountability
5) Educate & Motivate
1) Functional Safety Plan

Activities spanning the Entire Lifecycle

- FSA & Audits (Clause 5)
- Verify (Clause 7)
- Plan (Clause 6)
1) Functional Safety Plan – Be Specific

Convert Philosophical Requirements
To project specific Requirements
1) Functional Safety Plan

- Specific
- Easy to understand
- Considers human factors and decision making
- Integrated
- Auditable
- Collaborative
2) Leadership

Every functional safety plan needs an owner/leader

- Motivates teams to work together
- Prevents “Silos Mentality”
- Gets Support from Management
### 3) Disarm - Poison Pills and Antidotes

<table>
<thead>
<tr>
<th>Poison Pill</th>
<th>Antidote Vision Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Veto</td>
<td>“No veto without an effective replacement.”</td>
</tr>
<tr>
<td>“That’s not the way we do it.”</td>
<td>“Improve in existing designs and apply lessons learned”</td>
</tr>
<tr>
<td>KISS</td>
<td>“Design for simplicity of operation over simplicity of design.”</td>
</tr>
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<th>Poison Pill</th>
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<td>“We don’t consider double jeopardy”</td>
<td>“Add layers of protection proportional to risk.”</td>
</tr>
<tr>
<td>&quot;Spurious trips will not be a problem; the instruments we select are reliable.&quot;</td>
<td>&quot;Meet safety, environmental and asset risk targets but also design to maximize operational integrity (minimize spurious trips).&quot;</td>
</tr>
<tr>
<td>&quot;We don't need a review; we will take care of it.&quot;</td>
<td>&quot;Trust but verify.&quot;</td>
</tr>
</tbody>
</table>
4) Accountability

Team

• Successful functional safety: Inter-discipline, inter-organizational collaboration

Multi-Discipline

• Functional safety plan includes a functional safety stakeholder multi-discipline, multi-organization committee which is tasked with making key decisions and reviewing key documents

Accountable

• Functional safety stakeholders must be accountable for following the functional safety plan
5) Motivate, Educate and Incentivize

Educate all team members – Functional Safety Plan

Develop a culture of understanding the reasoning for each step
- Why do PHA and LOPA?
- Why create Safety Requirement Specifications (SRS)?
- Why involve Operations during SRS design?
- Why test field devices?
- Why capture instrument field failure data?
5) Motivate, Educate and Incentivize

Create Process Safety incident reporting mechanism to capture S84 Safety Lifecycle Gaps.

Recognize and Reward team members:
- Efforts to document Gaps
- Efforts to intervene & improve S84 compliance
- Efforts to address Gaps in Systematic way
5) Motivate, Educate and Incentivize

HSE Office Safety Compliance & reporting

- Hold Handrail while using stairs
- Clean spills immediately
- Open Doors slowly, someone can be on other side

Create the same level of awareness and recognition

S84 Compliance & reporting

- Ensure operators are part of SRS design
- Train operators on alarm response that are considered IPLs
- Perform required periodic tests for field instruments
Summary

- Functional safety is art and science – a fusion of technology and leadership.
- Consider – both Tools and Human Factors.
- Create culture of understanding of core values of functional safety.
Where To Get More Information

- ANSI/S84.00.01-2004 - Functional Safety: Safety Instrumented Systems for Process Industry
- Principal-agent problem – Wikipedia
- Presenter Contact Information: nagappan.muthiah@woodgroup.com
Thank You for Attending!

Enjoy the rest of the conference.