Safety First!!

Source: Griffith University Safety Science Innovation Lab
Introduction – Who We Are

Paul Gantt, M.Eng CSP, CET
- President and Founder at Safety Compliance Management
- Degrees in Safety Engineering, Public Administration, and Fire Science
- Over 23 years experience in safety management

Ron Gantt, M.Eng, CSP, CET
- Vice President at Safety Compliance Management
- Degrees in Safety Engineering, OSH and Psychology
- Over 12 years experience in safety management
Session Objectives

- Review the relationship between human error and incident causation
- Identify contextual factors that influence human behavior
- Review case studies involving human performance in incident causation
- List methods for maximizing human performance in your organization
Case Study – Another Ladder Accident

Employee replacing a street sign falls off of a ladder (approximately 12’):

- Immediate Result – Broken ribs and vertebrae
- Direct Cause – Employee likely leaned out while on ladder, causing the ladder center of gravity to shift
- OSHA investigated, no citation issued (“Employee Error”)
- Corrective Action – Name, Blame, Shame, and Retrain
Heinrich Warned Us About This!

**Accident Causes**

- Unsafe Acts: 88%
- Unsafe Conditions: 10%
- "Acts of God": 2%
Perhaps its more complicated?

Source: DOE (2007)
Case Study - Let's Look Deeper

- Company had no effective job hazard analysis or hazard correction programs
- Safety programs/culture was reactive, rather than proactive (safety was an afterthought)
- Employee was called in to work at the last minute
  - On his day off
  - On the day he was leaving for vacation to Las Vegas
  - On his 25th wedding anniversary
Knowing what we know now…

Could we have predicted that an incident was more likely to happen?
Thinking about “human error”

- People make mistakes!
- Those “mistakes” are often not inherently mistakes
  - In another context the same behavior may lead to success
Let’s make some assumptions

- People don’t come to work to get hurt or killed
- People don’t want to be responsible for hurting or killing others
- People don’t come to work to do a bad job
- People don’t want to be involved in incidents

People tend to do things that make sense to them at the time and help them achieve their goals
The million dollar question...

Why did it make sense for them in the moment to do what they did?
The Benefit of Hindsight

After the incident

Unsafe actions

Safe actions

Before the incident

Unsafe actions

????????

Safe actions
Another Case Study – Train Derailment
Another Case Study– Open and Shut Case

• The train engineer admitted he was nodding off. His lawyer said it was a case of “highway hypnosis”

• “Most people are leaning towards human error” – A union official
Another Case Study – Some Questions

• Is it likely that a human being will get bored and distracted in an environment where they are required to passively monitor a system?
  • If yes, does the rail industry not know about it?

• What systems are in place to get an engineer’s attention when a safety critical task is coming up?

• Is there technology available that automatically slows trains if not done so manually when there is a significant change in speeds at a safety critical point (e.g. “autopilot”)?
It’s the people in the system

The people

The system

IT’S BOTH
What is an Error Trap?

• Violates operator expectations
• Requires performance beyond what an employee can deliver
• Induces fatigue
• Provides inadequate facilities or information for the operator
• Is unnecessarily difficult or unpleasant
• Is unnecessarily dangerous
## Error Traps have many sources

<table>
<thead>
<tr>
<th>Task Demands</th>
<th>Individual Capabilities</th>
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<tbody>
<tr>
<td>- Time Pressure</td>
<td>- Task unfamiliarity</td>
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<tr>
<td>- Unclear goals</td>
<td>- Illness or fatigue</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Work Environment</th>
<th>Human Nature</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Distractions</td>
<td>- Tendency to get bored</td>
</tr>
<tr>
<td>- Confusing displays or</td>
<td>- Mental shortcuts/biases</td>
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<tr>
<td>controls</td>
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Case Study #3 – Watch Your Step!

• Mechanical contractor working at biotech facility installing piping systems
• Part of the installation is in an interstitial space above a clean room
• Contractor was instructed not to go
Case Study #3 – More Information

- Site employees routinely went back into the area
- Contractor was informed to pick up the work pace
- Guess what happened…
  - Contractor employees went into space before scaffold planks were put down to get ahead of schedule
  - One employee lost his footing, fell on a sprinkler pipe, it broke and leaked water into the clean room below
  - Result – minor injury, significant damage to property and production

“It is difficult to get a man to understand something when his salary depends on his not understanding it.”

- Upton Sinclair
Understanding Human Performance

The Current View

Safe Act → Success
Unsafe Act → Failure

The Current View
Understanding Human Performance

The New View

Performance Variability

Success

Failure
Maximizing human performance

We have to understand that people will be people!
- Make it easy for employees to do the right thing
- Make it hard for employees to do the wrong thing
- Make it so that when they do the wrong thing it doesn’t lead to catastrophe

*Make the system conform to the people, not the other way around!*
Maximizing human performance

We have to understand that people are the source of safety and success!

• Tap into their innate motivation
• Give employees the benefit of the doubt
• Understand the difference between work as planned and work as performed
• Foster a learning culture for both failure and success
Take Aways

• People make mistakes
• Behavior alone does not lead to error. Context is just as, or more important
• People naturally care about safety and act in ways that make sense to them at the time
• Make it easy for people to do the right thing, hard for them to do the wrong thing
• Remember that your employees are the source of safety and success in your organization
QUESTIONS?

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Slides available at our website: http://www.scm-safety.com