The Influence of Human Performance on Safety

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DISCLAIMER!

This is NOT meant to be an all-inclusive HP Training Session!
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Just enough to whet your appetite!
Southern Company

- Atlanta-based and serving the southeast
- 4.4 million customers and nearly 46,000 megawatts of generating capacity
- **Parent Company for Electric Utilities:**
  - Alabama Power
  - Georgia Power
  - Gulf Power
  - Mississippi Power
  - Southern Power
  - Southern Nuclear
- **Employing over 26,000 people and serving 120,000 square miles**
Engineering & Construction Services

• Basically, E&CS provides a “Project Management” function for Southern Company Operations

• Provides:
  – Design
  – Engineering
  – Project Management Services

• Currently, ~1,500 Employees managing 16 projects across the Southeast

• Managed around ~125 MM contractor work hours in last seven years

• Serves New Generation, Environmental, and Retrofit groups of our business

• Any one day around 4,000- 6,000 craft are on our projects
What Human Performance “is NOT”

- NOT a Performance Management Tool
- NOT an excuse for not holding workers accountable
- NOT a substitute for existing Operational Excellence efforts
- NOT a substitute for existing safety efforts
What is Human Performance?

- Human Performance is an operating philosophy which acknowledges that people make mistakes.

- It identifies causes of human errors and provides specific tools to help eliminate them.

- Human Performance empowers employees, regardless of title or tenure, to contribute equally to the safety and operational excellence of our organization.
What is Human Performance?

Human Performance is the way people think about and perform their work.

- Behaviors + Results = Human Performance
  (How)  (What)

- A strong focus on the reduction of the frequency and lowering of the severity of human error
Benefits of HP: How it helps

1. Provides **tools & techniques** to minimize errors and prevent harm
2. Helps focus our mental approach for doing safe work
   - More **Deliberate** thought and action
   - Better **Awareness** of potential consequences and **Risks**
   - Improved recognition of error-likely situations and error traps
3. Enables us to get it done right, the first time, **safely** doing **quality** work, that produces **reliable & timely** results
To proactively prevent events triggered by human error

What is an Event?

• The undesirable result of an error.

• Any undesirable or unwanted result or outcome involving serious harm to the individual, other assets, and/or an organization.

• An undesirable change in the state of structures, systems, products, services (assets) that involve serious degradation or termination of its ability to perform its required function.
A Critical Step is defined as:

A task action that, if done incorrectly or not at all, would result in an unrecoverable condition affecting safe-quality-reliable job completion.

A step is critical if it has one of the following characteristics:

• Consequence - from incorrect performance:
  * injures personnel  * damages equipment  * harms public

• Irrecoverable - can’t be re-performed, if performed incorrectly
Principles of Human Performance

1. People are fallible and make mistakes, even the best...

2. Individual behavior is influenced by organizational processes and values

3. Error/Mistake-likely situations are predictable and manageable

4. Incidents (Operational and Personal) can be avoided by understanding mistakes and learning from them

5. Leadership response to failure matters (How you react matters!)
The five principles serve as the firm foundation regarding the way employees are trained and coached in their every day work environment. (Active Error Elimination).

The five principles are used to design the organizational structure that employees rely on to manage the business, make the product, and operate safely. (Latent Error Elimination).
Human Performance Principle 1:

People make mistakes, even the best make mistakes.
What is an error?

• An error is an **unintentional** departure from an expected behavioral standard.
  – An intentional departure is a violation.
Human Errors

Two-thirds of all aviation accidents and incidents

92% of car crashes (10mil/Yr) (U.S. Census Bureau)

44,000-98,000 deaths in U.S. Hospitals result from human errors
(Institute of Medicine)
Operational Upset: A condition that adversely affects or may affect the organization, the people, or the mission.

Human Errors

- System Induced Error: 70%
- Individual Error: 30%

Operational Upsets

- 90% Human Error
- 10% Equipment Issues

Origin of Human Error
Human Error

Exercise
How many times does the letter “f” appear in the following sentence?

Finished files are the result of years of scientific study combined with the experience of many years.
“Mistakes arise directly from the way the mind handles information, not through stupidity or carelessness.”

-Edward de Bono PhD
Aocdrcnig to rscheearch at an Elingsh uinervtisy, it deosn't mttaer in waht oredr the ltteers in a wrod are, the olny iprmoetnt tihng is taht the frist and lsat ltteer is at the rghit pclae. The rset can be a toatl mses and you can sitll raed it wouthit porbelm. Tihs is bcuseae we do not raed ervey lteter by it slef but the wrod as a wlohe.
US Highway Fatalities

Vehicle

Highway
Error without consequence is a good thing...

It shows that our systems are error-tolerant and that they are working.
Near Misses & Close Calls are a GIFT!!
MISTAKES are not a choice.

Mistakes

Violations
Human Performance Principle 2:

Individual Behavior is influenced by organizational processes and values.
Workplaces and organizations are easier to manage than the minds of individual workers.

You cannot change the human condition, but you can change the conditions under which people work.

Dr. James Reason
Defenses in Depth

- Redundancy: many layers of protection.
- Diversity: many different varieties of protection.
- Independence: separate/autonomous layers of protection.
Human Performance Principle 3:

Mistake-likely situations are predictable and manageable.
Mistakes are NOT predictable,

But the environment in which mistakes may happen is.
Predictability

What will the next unwanted event be in your organization?

Where will this event take place?
Incidents (Operational and Personal) can be avoided by understanding mistakes and learning from them.
How We See Events

Old View

• Human error is a cause of accidents

• To explain failure, investigations must find failures of systems or parts of systems

• These investigations must find inaccurate assessments and bad decisions

New View

• Human error is a symptom of trouble deeper inside a system

• To explain failure, do not stop at where people went wrong...

• Instead, find out how peoples’ actions and assessments made sense at the time given the circumstances that surrounded them.
Work as Imagined vs. Work in Practice

Management’s Stated Expectations

Hi

Lo

Reliability

Time

Margin for Error

Real Margin for Error

Drift

Actual Threats to Reliability

Perceived Threats to Reliability

“Normal” Practice

“Normal” Practice
Human Performance Principle 5:

Leadership’s response to failure matters.
8 Questions A Manager Should Ask

1. Are the people ok?
2. Is the facility safe and stable?
3. Tell me the **story** of what happened?
4. What could have happened?
5. What factors led up to this event?
6. What worked well? What failed?
7. Where else could this problem happen?
8. What else should I know?
1. Was the learning event done before the discipline?

2. Is the discipline being considered consistent with past practice? Was past practice appropriate?

3. Would discipline normally be issued (based on this behavior) even if there was not an incident?

4. Was the work activity bypassing a normal procedure (without an approved work-around document)?

5. Was the situation complex; requiring adaptation?

6. Was the action a willful, intentional violation?
The purpose of an Investigation should be to "prevent recurrence, not to find people to blame"

Investigations should really be titled...”Learning Events!”
The Key

Event Prevention Happens Through Learning
Successful organizations do 4 things well:

1. Constantly fixate on the next failure.
2. Work hard to reduce operational complication
3. Respond deliberately to actual events.
4. Respond seriously to precursor information.
What can we do about it?

- Behavioral Standards = HU Tools!

<table>
<thead>
<tr>
<th>Individual Tools</th>
<th>Team Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self Checking (STAR)</td>
<td>Pre-Job Brief</td>
</tr>
<tr>
<td>Questioning Attitude</td>
<td>Coaching</td>
</tr>
<tr>
<td>Procedure Usage</td>
<td>Effective Communications</td>
</tr>
<tr>
<td>Place Keeping</td>
<td>Turnover</td>
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<tr>
<td></td>
<td>Post-Job Review</td>
</tr>
<tr>
<td></td>
<td>Peer Checking</td>
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</tbody>
</table>
1. Work Planning
2. Pre/Post Job Briefing
3. One Minute Matters
4. Procedure Use
5. Task Verification
6. Time Out
7. 3 – Part Communication
8. Flagging
Human Performance Tools To Combat Error Traps

- Stop When Uncertain
- Questioning Attitude
- Peer Checking/Self Checking
- Procedure Use and Adherence
- 3-Way Communications
- Pre-Job Briefing and Post-job Review
Do you have any questions?

• What is the Policy?
• What is the Procedure?
• Is there a safe plan to perform this task?
• Is there anything unsafe about this task
• Are you unsure of directions that have been given?
# Questioning Attitude

## Qualify, Validate, Verify (QVV)

<table>
<thead>
<tr>
<th>Qualification of the source of the information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relevant to my task?</td>
</tr>
<tr>
<td>Source reliable and accurate?</td>
</tr>
<tr>
<td>Any reason to suspect the quality of the information?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Validation of the Information Internally</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make sense to me?</td>
</tr>
<tr>
<td>What I expected?</td>
</tr>
<tr>
<td>Fit with past experience and other information</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can I confirm or support the information from an independent, reliable source?</td>
</tr>
</tbody>
</table>
Peer checking engages an equally qualified person as a second verifier of the activity to be performed; thereby reducing the probability of error.
Self-Check using **S-T-A-R**

**S**top -- Pause to focus your attention.

**T**hink -- Understand what is being done and the potential outcomes, so you can decide what to do if the expected results do not occur. And, think about the situation (critical steps and error traps), so you can determine what and how many barriers or defenses you’ll need in place to protect you.

**A**ct -- Carry-out the work activity, as planned.

**R**eview -- Verify that results occur as expected. If unexpected, take action as planned.
Procedure Use and Adherence

- Procedures are utilized to ensure the right actions are performed in the correct sequence
- Following procedures can minimize the potential for making mistakes
Procedure Use and Adherence

- Procedure Adherence: A literal example of complying with the railroad’s safety requirement to tie-down material being transported.
Three-Way Communication

- Get receiver’s attention and deliver the message
- Repeat the paraphrased message
- Confirm message was correctly understood
IMPORTANCE OF 3-WAY COMMUNICATION

This is a real event that occurred

You are the Chief Airplane Washer at the company hangar.

• You:
  - Hook the high pressure hose up to the suds machine.
  - Turn on the machine.
  - Get an important call and have to leave immediately.
  - As you exit, you yell to Don, your assistant,
    “Don, Turn it off!”

• Assistant Don thinks he hears, “Don’t turn it off!”.

• He shrugs, and leaves the area right after you and goes home for the day.
The result of poor communication
Pre-Job Briefing and Post-job Review

- Pre-Job Briefs are tools to identify hazards and corrective measures in the task steps
- Pre-Job Briefs educate and inform the crew in an open forum
- Identifies the Most Error Likely Activity or MELA
- Reviewed at start of shift
- Revised when situations occur that were not predicted in Pre-Job Briefs
- End of shift Post-Job Review for improvements and issues with the shift’s work
What will these tools do for us?

• The tools are not designed to teach people how to do their job, just how to **think** about it!
  – Methodically focuses us on the task at hand.
  – Teaches us how to ask the right questions.
  – Provides guidance on planning work.
  – Demonstrates “thinking compliance” instead of blindly proceeding.
  – Makes it okay to STOP if unsure.
Conclusion

• The use of HU has drastically improved the performance of individuals in the US commercial nuclear industry.

What can it do for us?

Human Error Event Chart from www.nei.org
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