



**Virtual Conference
November 10, 2020**

***“A Systematic
Approach to Safety
Performance”***

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President
Safety Performance LLC**



A Systematic Approach to Safety Performance

Terminal Objective

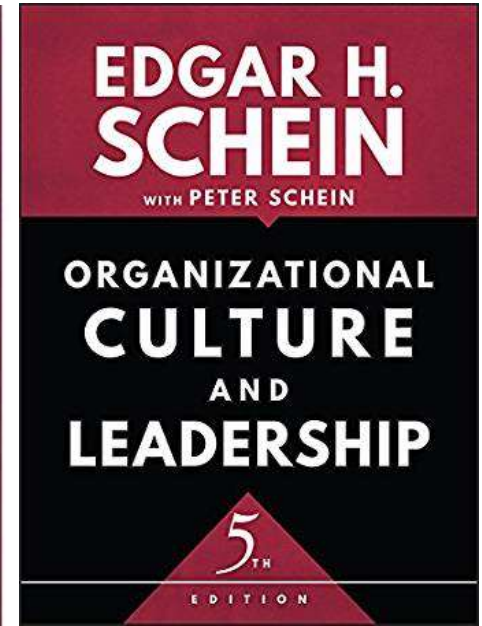
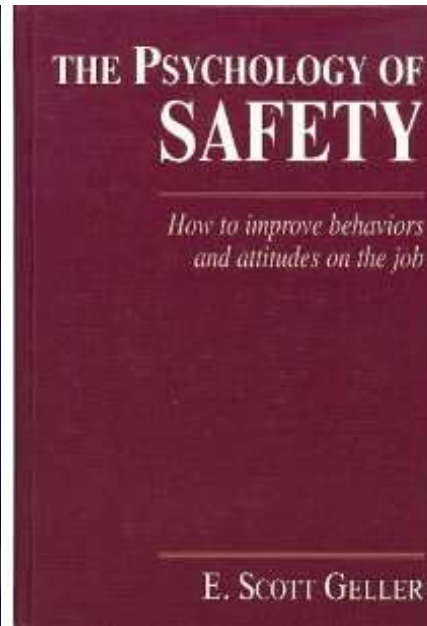
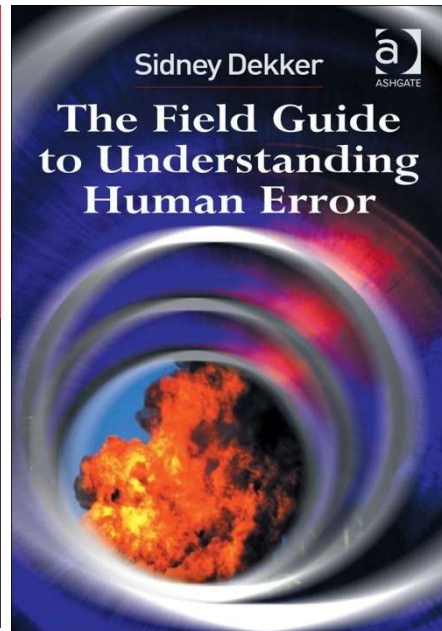
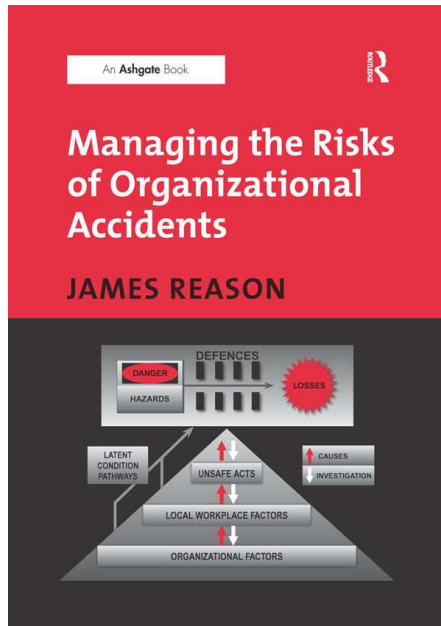
Provide a “new view of safety” with an understanding of basic safety (human and organizational) principles

Enabling Objectives

- 1. Safety (Human & Organizational) Performance Principles**
- 2. Safety Performance Error Traps & Performance Tools**
 - Key Safety Error Traps
 - Errors and Violations
 - Safety Performance Tools
- 3. Hazard Controls “Defenses”**
 - Understand how hazard mitigation controls “Defenses” prevent events and how safety performance tools contribute to reduce errors and exposure to hazards



The Experts



“Why did it make sense for the person to do what they did at the time of the event”
Sydney Dekker

ASSP GM-Z10.100-2019

ANSI/ASSP Z10.0-2019 Occupational Health
and Safety Management Systems



AMERICAN SOCIETY OF
SAFETY PROFESSIONALS

Guidance and Implementation Manual Chapter 2

Understanding the Workplace: The New View of Safety

Figure 1 Revising How We Look at Safety

NEW VIEW OF SAFETY

ACHIEVING EXCELLENCE THROUGH LEARNING HOW WORK IS DONE

Human and Organizational Performance (HOP) Principles

- People will make mistakes
- Error-likely situations are predictable
- All human actions are influenced by the context in which they occur
- Operational upsets can be avoided
- How we respond to failure matters

"Traditional safety focuses on things that go wrong. A great deal can be learned by studying why things go right."

- 1 • Learn from people doing the job
• Speak with workers
• Understand the job and how work gets done
- 2 • Learn from successful job completion
• Investigate successful work to identify gaps
• gaps identify decisions workers make to adjust to gaps

Learning from successful work may expose:

Frustrations
Dependencies
Sensitivities
Good Practices
Recoverability

Human Error Myths

- Human error is a choice
- No events mean no human error problems
- Training will solve human error problems
- Accountability/punishment will address human error problems
- Significance of error should determine the level of discipline
- Experience eliminates human error
- Human error are the root cause of accidents
- Errors are violations

Outcomes of Implementing New View

Better Management of interdependencies with the system
Organizational Resilience
Detect failure before it occurs
Build capacity to be successful in varying conditions
Allow for capacity to exist so if failure occurs the impact is less



True or False?

- 1. No events, no problems?**
- 2. Errors are the same as violations?**
- 3. Accountability is the only solution?**
- 4. Errors cause significant events?**
- 5. Significance determines culpability?**
- 6. Human performance is good common sense?**
- 7. If we train on it, it will come?**
- 8. Experience eliminate incidents?**
- 9. Reward is the same as recognition?**





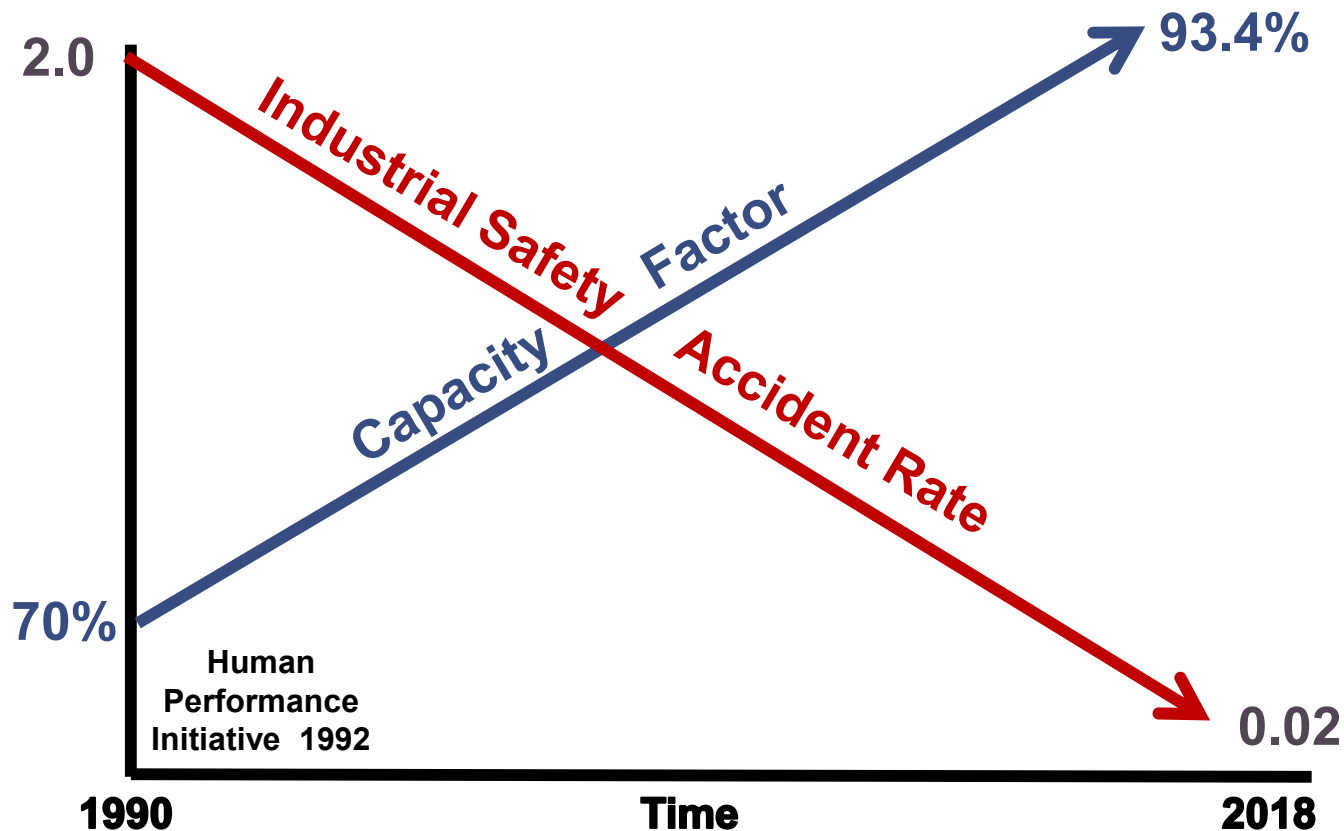
How Were the Principles Derived?



- Airlines
- Defense
- Medical
- Nuclear Industry



Unintended Consequences



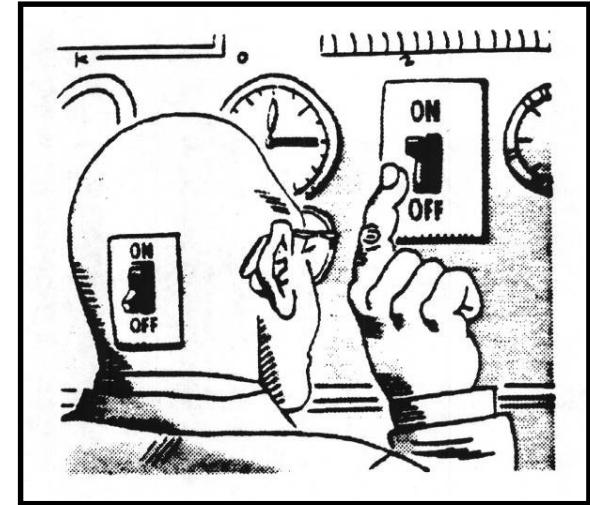
Industrial Safety Accident Rate = Lost Time & Restricted Duty Injuries per 200,000 Hours
Capacity Factor unitless ratio of actual electrical energy output to maximum possible
Source: Institute of Nuclear Power Operation (INPO) Annual Reports

**Safety
Performance** = **Results** + **Behaviors**



Safety Performance Principles

- People make errors
- Organizational values and programs influence behaviors
- Behaviors are influenced by what is encouraged and reinforced
- Most errors are predictable and can be reduced using Safety Performance Tools
- Events can be eliminated with Hazard Mitigation Controls – Defenses



Re + Md → 0 Events



Safety Performance Error Traps



Time Pressure

Time pressure or being hurried can lead to taking short-cuts. Short cuts can quickly lead to injuries, damage to equipment, or harm the environment.



Distractions

Distractions are a concern as people multi-task or use social media to find out what's happening now. Distractions and Interruptions can double the error rate!



Inaccurate Risk Perception

Having done the job safely many times before leads to complacency or overconfidence that can result in an inaccurate risk perception. Just because you've done the job several times before, does not mean that there is less risk.

Low Risk \neq No Risk!

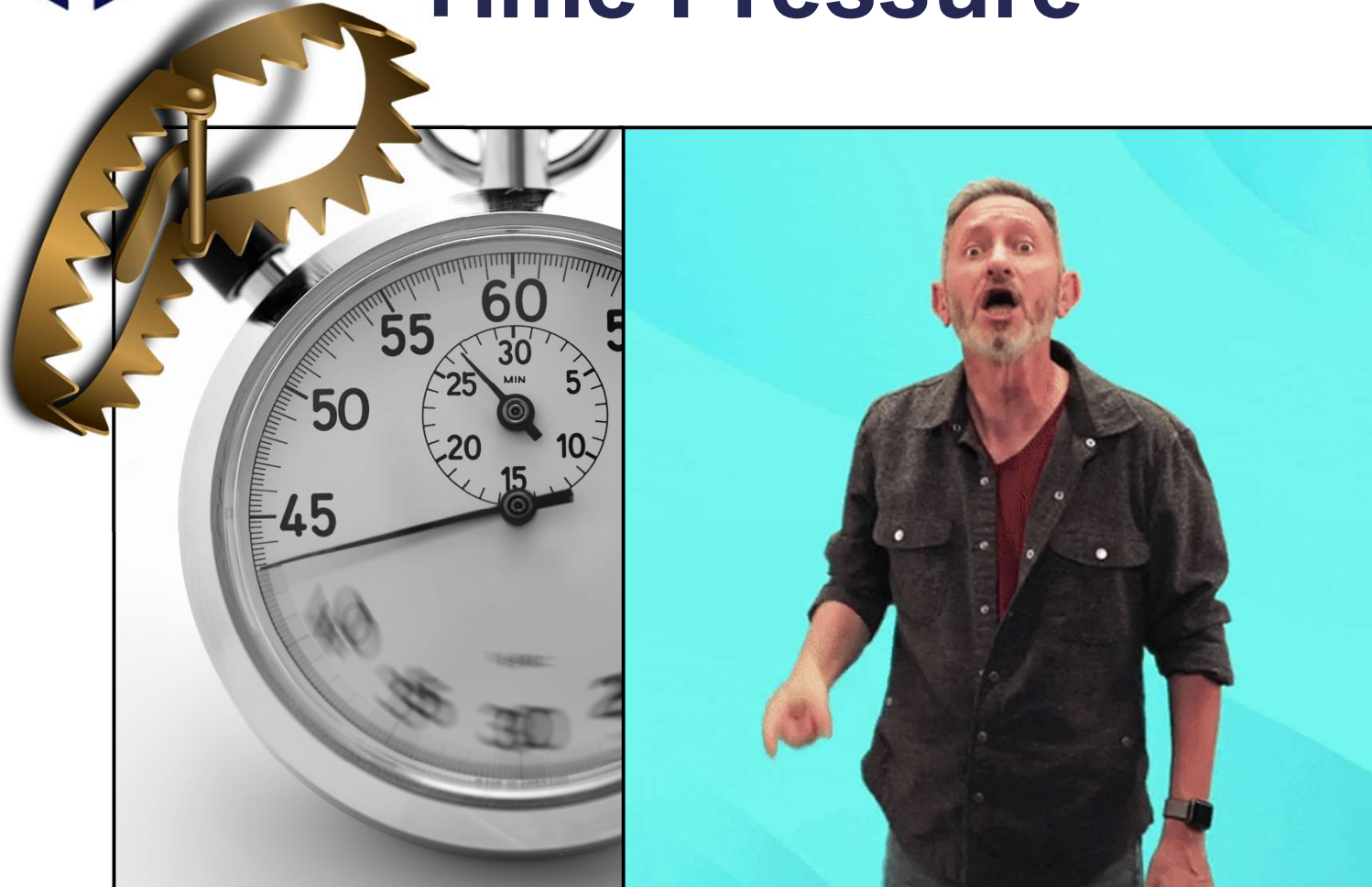


Assumptions

When performing the task for the first-time or make assumptions and choose to not use or refer to programs, processes or procedures, the risk of error can be as high as one in two. Flip a Coin!



Safety Error Trap Time Pressure





Safety Error Trap Distractions





Safety Error Trap Assumptions



11/4/2020

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Safety Error Trap

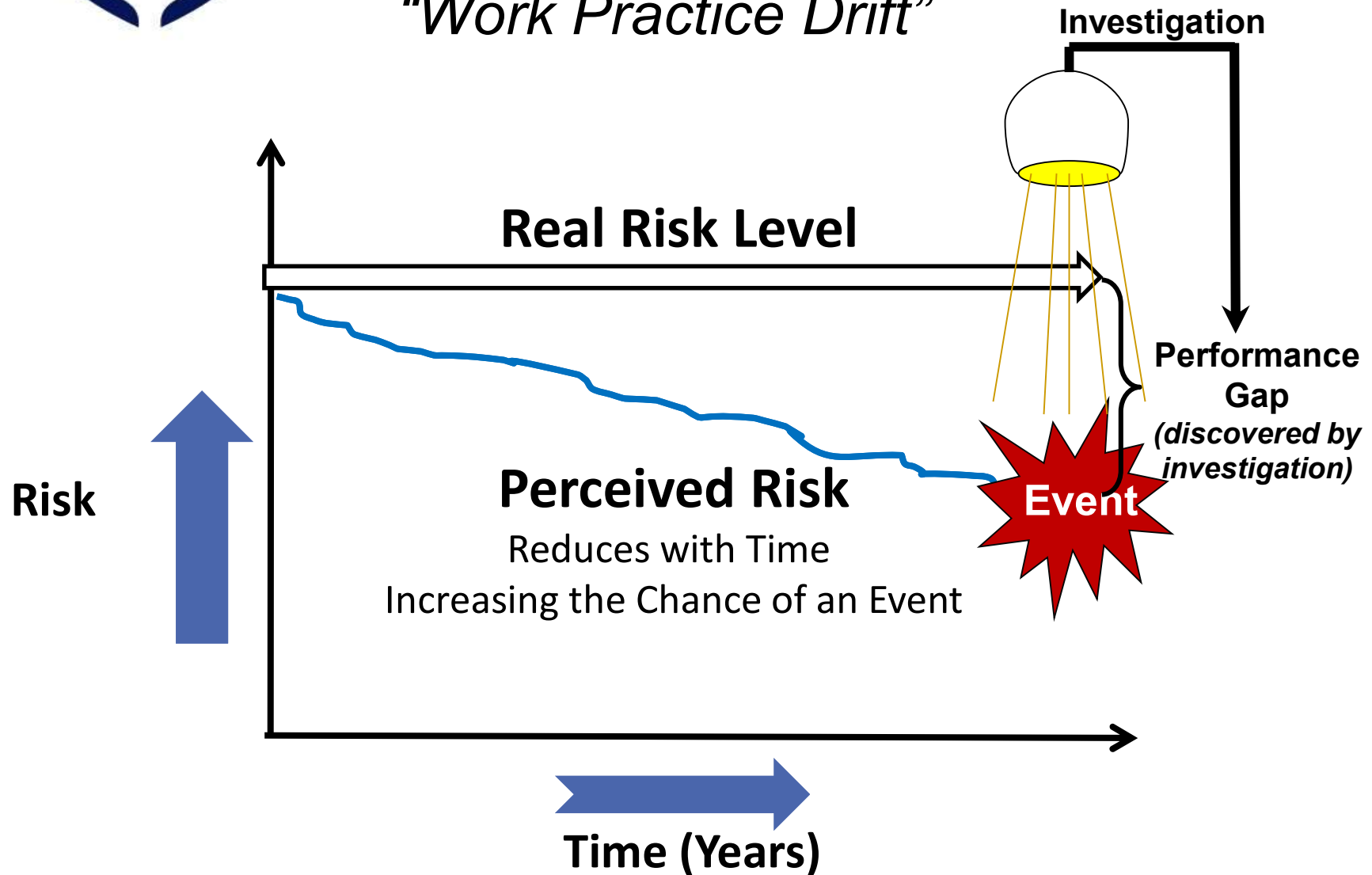
Inaccurate Risk Perception





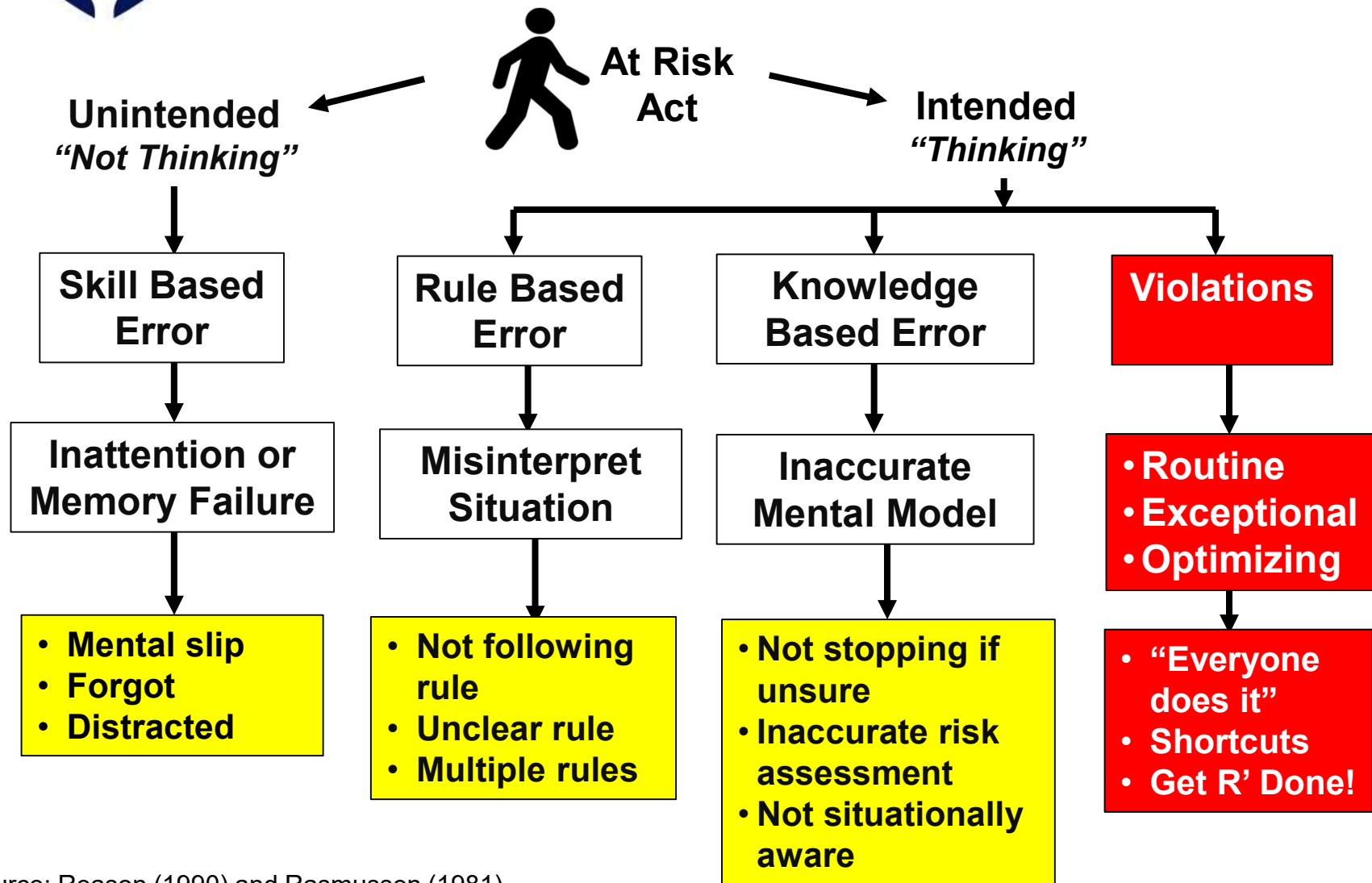
Normalized Deviance

“Work Practice Drift”





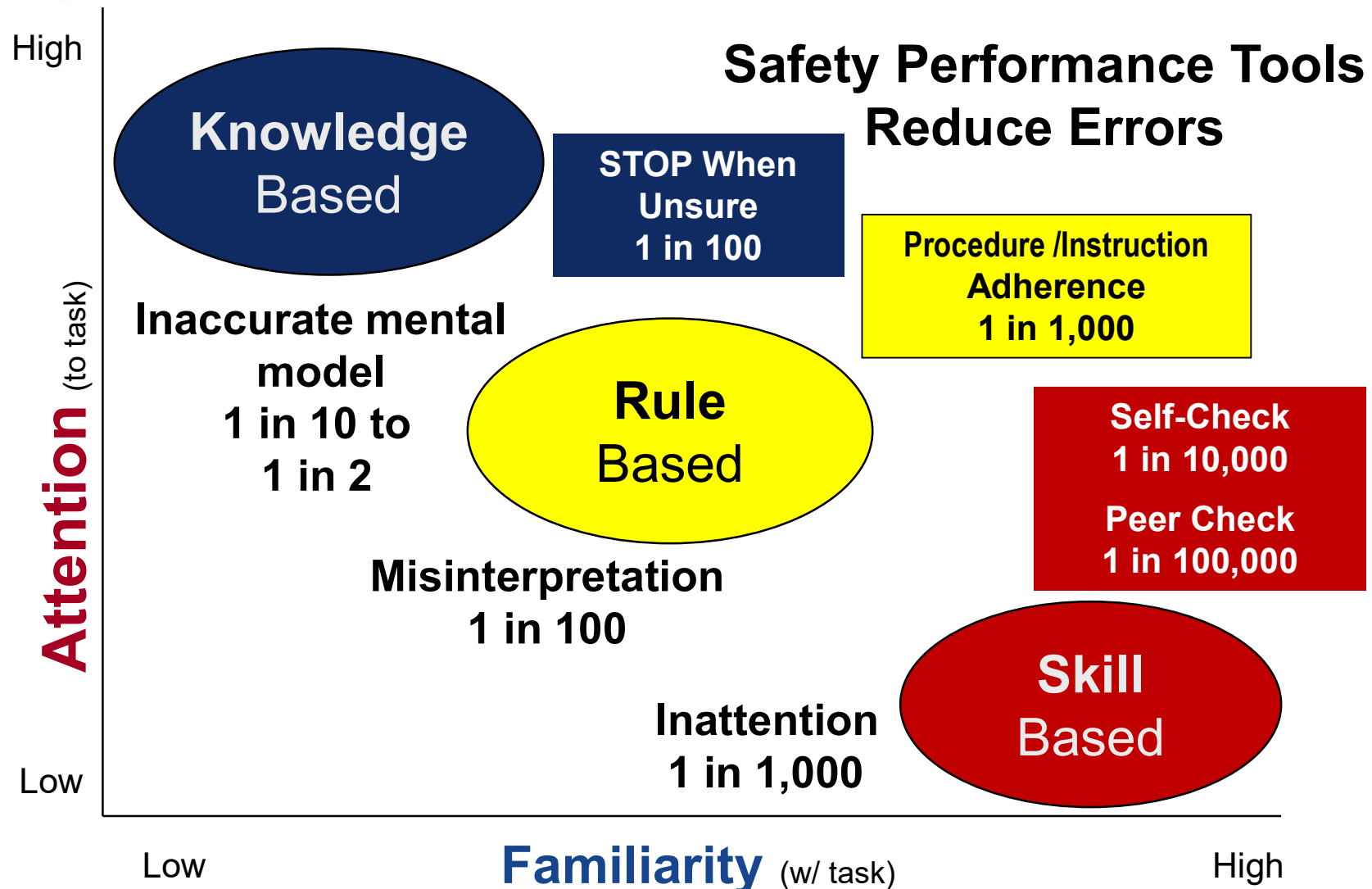
Errors & Violations



Source: Reason (1990) and Rasmussen (1981)



Error Modes & Performance Tools



Reference: Reason, Managing the Risks of Organizational Accidents

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Is 99.99% Acceptable?

If so, we would experience:



22,000 checks
deducted from
wrong accounts
each hour



Two unsafe
plane
landings at
an airport
each day



500 incorrect
surgical
operations
each week



20,000
incorrect
drug
prescriptions
each year

**Errors and Events
Cost Companies Billions of Dollars
Every Year!**



Safety Performance Tools





Pre-job Brief

What

A Pre-Job Brief is an interactive discussion involving all team members to safely perform a task to ensure all potential hazards and risks associated the task are addressed.

Why

- To **identify** hazards and raise To ensure hazard controls are in place
- To discuss lessons learned from similar jobs in the past

How

Conduct it in a reverse manner (worker leads discussion) to assess understanding by participants.



OSHA 1910.269 Job Brief

- Hazards associated with job
- Work procedures involved
- Special Precautions
- Energy source control
- Personal Protective Equipment requirements
- Environmental Hazards and Controls



Post Job Brief



What

A Post-Job Brief is used to gather information and lessons learned from workers after completion of a work activity to improve future performance, promote learning and prevent events.

Why

- To ensure that the work site has been cleaned up
- To ensure that job status is communicated
- To identify what worked well and any opportunities for improvement in the future

When

- When completing work during which lessons were learned
- When completing non-routine, emergent, or high-risk work
- When safety or job execution are challenged, or improvement opportunities exist.

Typical Post Job Brief

- What worked well?
- What can be improved?
- What lessons were learned that need to be captured and passed on to others?

Situational Awareness

FENOC
FirstEnergy Nuclear Operating Company

2 Minute Drill

WHEN STARTING A JOB OR RETURNING TO A JOB SITE...

- Explore:** (look up, down and around)
 - On the Right Train / Component?
 - Are Conditions as we discussed them at the Pre-Job Brief?
 - Any other jobs underway in the area?
 - Any trip-sensitive components present?
 - Any new job site hazards?
 - Any other job site changes?
- Review the Rules:**
 - Procedure / Work Document use
 - Duties, Roles and Responsibilities
 - Stop points / Contingency actions
- Verify Readiness to Proceed:**
 - Conduct SAFER Dialogue if appropriate
 - Are we mentally engaged in the task?
 - Are we all on the same/right step?

X-3467

FirstEnergy
Generation

Safety & Human Performance

2-Minute Drill

Stop ... Look ... Think ... Engage

- Barriers Intact?
- Right Work Location / Component?
- Bump Hazards?
- Safety Hazards & Mitigation?
- What Can Go Wrong & What Are We Doing to Prevent?
- Has Anything Changed from the Brief / Preview?

STOP STOP IF CONDITIONS ARE NOT AS BRIEFED!

NOBP-LP-2601 Rev. 10/ FGPR-SAF-0036

FENOC 2-Minute Drill

STOP, LOOK AND THINK!

- Are we on the correct Unit/Train Component?
- Proper for the task:
 - PPE & FME Controls
 - ALARA Techniques Briefed Appropriately?
 - Clearances verified and signed on?
- Are there any job site hazards?
 - How can we correct/avoid them to prevent injury?
- Does the area contain any of the following:
 - 2-Foot Zone Rule / Bump Hazards
 - Trip-Sensitive Equipment
 - Protected Equipment Postings
 - Other jobs in the Area
- Has our plan changed or does it need to change?
 - If yes, then:
 - STOP!**
 - Place the job in a safe condition
 - Contact supervision
- What are the Critical or Risk Important steps for this task?
 - What could go wrong and what are we doing to prevent it?

NOBP-LP-2603

Two Minute Rule

"Our work is never so urgent, nor our schedule so important, that care cannot be taken to avoid injury."

Take two minutes to evaluate your job site.


A) Look up and down, look all around

B) Ask yourself or each other:

- "What are the hazards?"
- "How can I get hurt?"
- "What is different?"

C) Take action to understand or mitigate any hazards before proceeding

Need help? Contact your supervisor.



2-MINUTE RULE

NGG
Nuclear Generating Group

SAFETY

- What are the hazards in the area?
- What PPE is required for this task/area?
- Are energy sources secured/isolated?

HUMAN PERFORMANCE

- Are we on the correct component?
- How are we maintaining plant status control?
- What is the worst thing that can happen?
- What HU tools will we use for this task?
- Is everything as we expected?

ALARA

- Have I reviewed and signed in on the right RWP?
- How can I minimize my dose?
- Where are the low-dose areas?
- What are the contamination levels in the area?

FirstEnergy | Utilities

2 Minute Drill

Job Site Conditions

- Are we on the correct Circuit or Component?
 - Engaged & on the same / right step
- Proper for the task:
 - PPE, tools and equipment
- Have we positively identified and properly controlled all energy sources?
 - Clearance verified
 - Tested-de-energized
 - Proper grounding
- Are there any job site hazards?
 - How can we correct/ avoid them?
- Does the area contain any of the following:
 - Barricaded areas
 - Trip-Sensitive Equipment
 - Component
 - Other crews working in Bumping Hazards the area
- How can we prevent an injury?
- Has our plan changed or does it need to change?
 - If yes, then:
 - STOP!**
 - Place the job in a safe condition
 - Conduct new job briefing
- What are the critical steps, if any, for this task?
 - Any action that will trigger immediate, irreversible, intolerable harm if that step, or a previous one, is performed improperly

FirstEnergy | Utilities

2 Minute Drill

Potential Hazards

- Permits/Procedure
- Confined Space
- Overhead Loads
- Chemical Use/Storage
- Energy Control
- Electrical
- Line of Fire
- Traffic
- Dog/Bee/Tick Bites
- Pinch Points
- Bending/Lifting
- Heat/Cold Stress
- Housekeeping
- Lighting/Ventilation
- Slips/Trips/Falls
- Sharp/Hot/Wet Surfaces
- Weather

The Risk Challenge

Assess the Risk

- Anticipate errors that could occur at each critical step.
- What could go wrong?
- What is the likelihood?
- What are the possible consequences?
- What is the worst that could happen?
- How do we prevent it from happening (Human Performance Tools, controls and barriers, defenses)?

MAKE SAFETY A WAY OF LIFE

Produced by FirstEnergy Communications COMM2009-02-13-CV

2 minute DRILL @ the Job Site

- What are the hazards in the area?
- How could I get hurt?
- Have I reviewed the applicable JHA?
- Do I have the proper PPE?
- Are proper safety barriers in place?
- Am I on the correct unit / train / component?
- How will I maintain Status Control?
- Do I have the necessary FME tools?
- Are my planned dose reduction techniques appropriate?
- Am I impacting Security? (If yes call x2222)
- What else could go wrong?
- Do I need to or have I changed the plan?

PSEG Nuclear LLC

Two-minute Rule

"Our work is never so urgent, nor our schedule so important, that care cannot be taken to avoid injury."

Take two minutes to evaluate your job site.

A) Look up and down, look all around

- Prevent dropped/falling objects
 - Use lanyards
 - Use netting
 - Use toe boards
- Prevent Foreign Material Exclusion (FME)

B) Ask yourself or each other:

- "What are the hazards?"
- "How can I get hurt?"
- "What is different?"

C) Take action to understand or mitigate any hazards before proceeding

Need help? Contact your supervisor.

NOTHING IS ROUTINE!

McCarl's

Take a Moment for Safety Safety Self-Check

- Did I review and understand the Task Plan for Safety?
- What hazards are in my work area?
- How could I get hurt performing this task?
- Can I do this job safely?
- Do I have the proper PPE?
- Has Zero energy been verified?
- Am I on the correct Unit/Train/Component?
- Has anything changed?
- What else can go wrong?
- Have I done my part to keep others safe?



A SAFETY MINUTE

**WHEN STARTING,
RETURNING OR
INTERRUPTED ...**

- 1. Explore:** (Look up, down & around)
 - **Recognize hazards & controls**
 - **Any potential challenges?**
- 2. Review / Follow Rules**
 - Life Saving Rules / JSA / Job Brief
 - PPE / Safety Equipment
- 3. Perform Final Safety Check**
 - What is the worst that can happen and why won't it?
 - Have all questions been answered?



**STOP if Unsure and
Notify Supervision**

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Attention Focus Self and Peer Check

What

Self-Check focuses attention on the task, to think about the intended action and its expected response before performance, and verify actions taken after performance. STAR (Stop, Think, Act, and Review) is a technique to self check.



What

Peer-Check is a series of actions by two individuals working together at the same time and place, before and during a specific action, to prevent an error by the performer.





Regulations and Rules



Life Saving Rules

CRAFT

- Confined Space
- Rigging and Lifting
- Arc Flash / Electrical
- Fall Protection
- Tagging - Energy Source Control





Follow Rules

What

The rules reflect best practices in the work-place, and many are required by OSHA. Following rules means that individuals understand the rule's intent and purpose and follow them as written.

Why

- To safeguard yourself and coworkers
- To ensure the correct actions are performed in the proper sequence and reduce risk of error.
- Ensures that we stay in “positive control” of the plant; the only thing that happens is what we expect to happen.

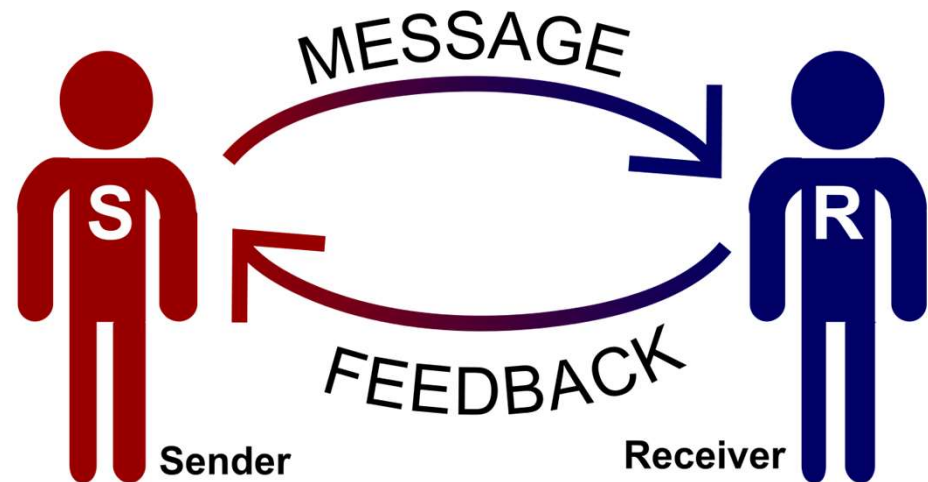




Effective Communication

What

Effective Communication is clear, concise, and free of ambiguity. It is provided in a way that minimizes the chance of being misunderstood. It is usually performed using Three-Part Communications, the phonetic alphabet and the noun names of equipment and components.



Why

- To minimize the potential for making errors.
- To provide for the accurate, complete, concise, clear, and error-free transfer of information.
- To ensure the receiver of the message listens to and understands the message the sender intended to send.

When

Exchanges of information that direct manipulation of equipment or critical steps or safety related tasks require the use of three-part communication.



Stop Work

What

STOP Work involves a brief interruption work to discuss and resolve assumptions, uncertainty, changing conditions, or other potential unsafe conditions.

Why

- To reduce errors and exposure to hazards
- To ensure good decisions are made during work performance
- To challenge preconceptions and assumptions

When

Employees are responsible and authorized to stop work and seek help if an actual or potential unsafe condition is present, but especially when:

- if it is determined during the pre-job brief that a job is unsafe
- Experiencing uncertainty, confusion or doubt
- Encountering unanticipated changes in conditions
- Conflict or inconsistencies exist between plans, rules, procedures, instructions, and actual conditions
- Confusion or concerns are identified
- You or others think or say the following words and phrases: “Probably, I assume, I think, Maybe, Should be, Not sure, We’ve always, I’m 90% certain”





Behaviors are Influenced

- Organizational values, programs, processes and job site conditions
- What is encouraged and reinforced





Safety

No Natural Feedback Mechanism

If people take shortcuts in safety standards, the naturally occurring positive consequence from doing the job with less effort can cause the undesirable behaviors to continue.



Who are Safety Leaders?

Board Members,
CEO, Presidents,
Vice-Presidents,
Directors, Managers

Engineers

Supervisors

Workers

Trainees/apprentices

Anyone in the
organization



Key Skill Set

- Lead by example
- Engage people
- Communicate effectively
- Coach consistently



Let's Talk Safety

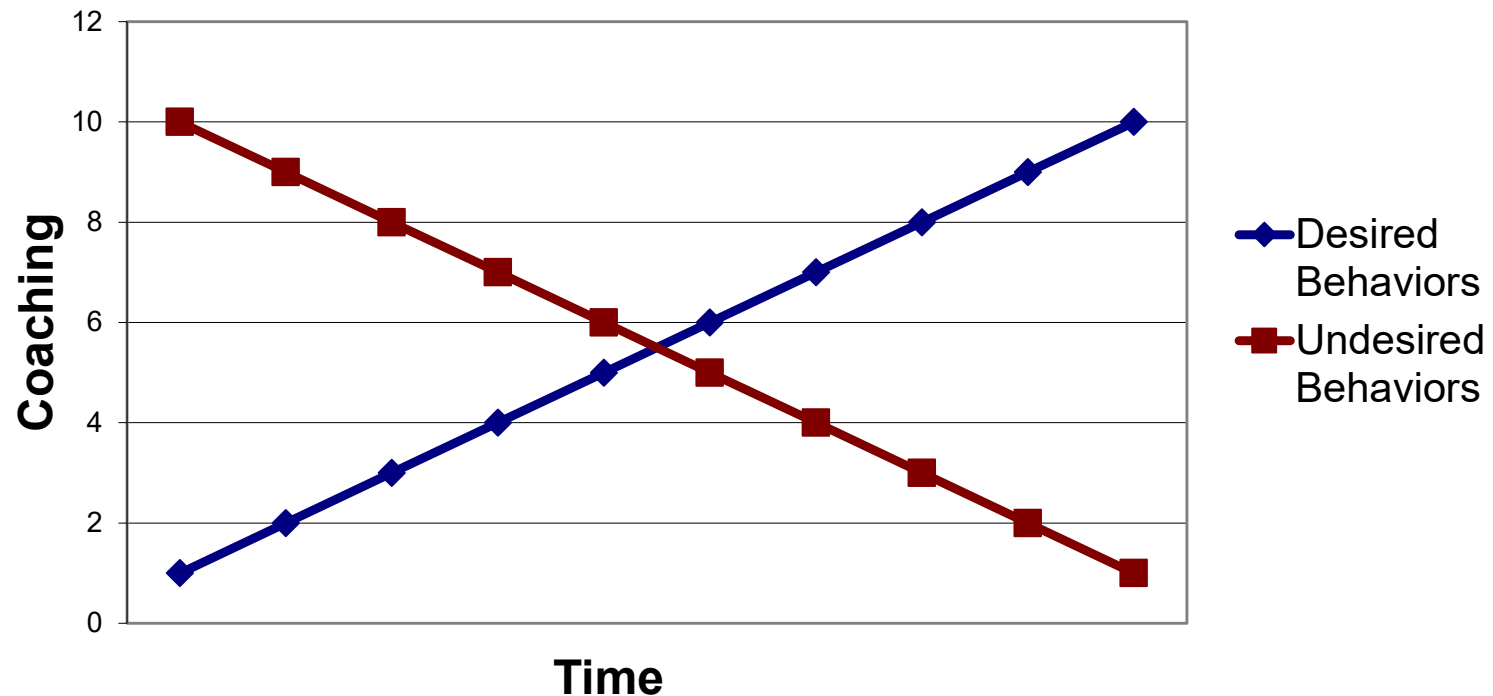
1. See something?
2. Say something ...
ask how job is going
– Listen!
3. Talk about safety:
 - ☐ Safe work practices
(2 or 3)
 - ☐ Improvement opportunities or concerns (if any)
4. Give thanks and summarize



See Something ... Say Something!



The Importance of Coaching



“People achieve high levels of performance based largely on the encouragement and reinforcement received from leaders, peers and subordinates” INPO

What If?
Russ Chiodo
had not
performed a
good pre-job
brief...

S. T. A. R.

**BEAVER VALLEY
MAINTENANCE EXCELLENCE**

MAINTENANCE
Order # 200248689 Unit 2
System 60 Funt. Loc. POLAR CRANE

PRE-JOB (REVERSE BRIEF) ZCRN-201

ANTICIPATE

- ☒ SCOPE: Review & Discuss Procedures, Work Orders & Tech. Specs.
- ☒ PERSONAL PROTECTIVE EQUIPMENT
- ☒ PHYSICAL ACTIVITIES: Lifting, Pushing/Pulling, Eyes on Hands, Eyes on Path, Line of Fire, Rushing
- ☒ CLEARANCE: ☐ Validate Functional Location ☐ Verified Safe ☐ Signed On ☒ Energy Check
- ☒ DUAL UNIT EQUIPMENT IN SAME BUILDING
- ☒ PROTECTED TRAIN: N/A ☐ AFFECTED ☐ OK TO PROCEED
- ☒ OUT OF SERVICE TIME: ☐ OPSA ☐ Tech. Spec. ☐ Maint. Rule N/A
- ☒ EXPECTED PLANT RESPONSE: Alarms / Defeats / Trips / Interlocks
- ☒ IDENTIFY PLANT TRIP SENSITIVE EQUIPMENT and DISCUSS PRECAUTIONS TO BE TAKEN
- ☒ INTERFACES: ☒ QPS ☒ RadPro ☐ Chemistry ☐ Security ☐ QC ☐ Other
- ☒ RAD WORK PRACTICES: RWP# 202-5003 ☐ RP Brief
- ☒ Expected Dose ☐ ALARA Review ☐ Contamination Controls ☐ Waste Minimization
- ☒ CHEMICAL CONTROL: (MSDS) Flammable Storage & Fluid Control
- ☒ HOUSEKEEPING / FME / TRANSIENT MATERIALS
- ☒ DOCUMENTATION CHECKED:
 - ☐ Walkdown Performed / Reviewed ☐ Drawings / VTI Controlled
 - ☐ Risk Review Performed / Level ☐ Calculations / Data Transfer
 - ☐ Work Order Signed On ☐ Fire Watch Log
 - ☐ Procedure Approved for Use ☐ FME Log
- ☒ PERMITS: ☐ Hot Work ☐ Confined Space ☐ SWP ☒ N/A
- ☒ PARTS: ☐ Staged ☐ Proper Quality Class ☒ N/A
- ☒ TOOLS / EQUIP. / M&TE: (If special, note in WIP log)
- ☒ QUAL AREA: POLAR CRANE Qualified? ☒ YES ☐ NO
- ☒ ROLES & RESPONSIBILITIES
- ☒ CONDUCT S.A.F.E.R. DIALOGUE:
 - ☐ Summarize critical steps, job hazards (e.g. asbestos, lead, etc.) & precautions.
 - ☐ Anticipate errors or mistakes for each critical step.
 - ☐ Foresee a probable or worst case consequences if an error was to occur during a critical step.
 - ☐ Evaluate defensive barriers or contingencies to prevent and catch errors and to mitigate consequences for errors at each critical step.
 - ☐ Review previous industry experience & lessons learned relevant to the specific task.
- ☒ HUMAN PERFORMANCE TOOLS: Training, Procedure Adherence (placekeeping), Communications, Questioning Attitude (OOPS), Self & Peer Checking (including First Check, Flagging, Robust Barriers and Verification Practices) Job Briefs

What is the worst that can happen?

- Take care when climbing ladder
- Do NOT PARK over Steam Generators - Go to low dose AREA
- Have enough EXTRA batteries
- Give good turnover brief to Relief
- Do thorough inspection

Russ Chiodo 13470 0161 5-1-08
NAME SAP. No. Section Date
(Rex, 4)



People doing things that can be improved

How work **SHOULD** be done



**Recognize, Interact, Agree on
Cause and Solution**



How work **IS** done



<input checked="" type="checkbox"/>	Tools & Equipment (Use, Condition, Guards, etc.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Procedure Use and Adherence	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Office Safety	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Housekeeping and FME	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Radworker Practices	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Chemical Control	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Event-Free Tools/Techniques Training, Job Briefs, Communications, Procedure Adherence, Self & Peer-Checking (First Check, Flagging/Robust Barriers) Questioning Attitude (Stop if Uncertain) and Verification Practices	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Observation: STOREKEEPER NANCY
PENAR WHILE OFF LOADING
CAUSTIC SODA, NOTICED THAT THE
DRUMS ON 2ND PALLET HAD SHIFTED

Action Taken: SHE STOPPED, CAME AND
GOT ME, WE DISCUSSED THE
DANGER OF POSSIBLE SPILL, WE
GOT SUPERVISOR JEFF REED, WE
DECIDED TO BRACE ON DRUM, CUT THE
BANDING & REPOSITION DRUMS.
ACTIONS WERE COMPLETED SAFELY,
Condition Report Number, if written: _____

Observer (Print) CHARLES OLDEN

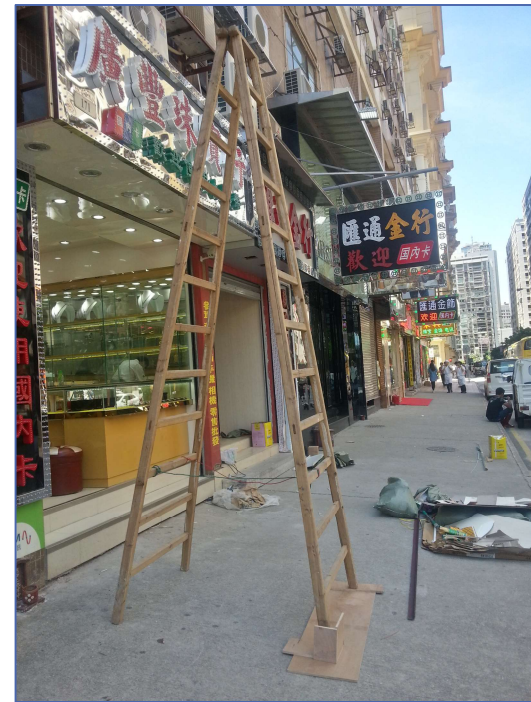
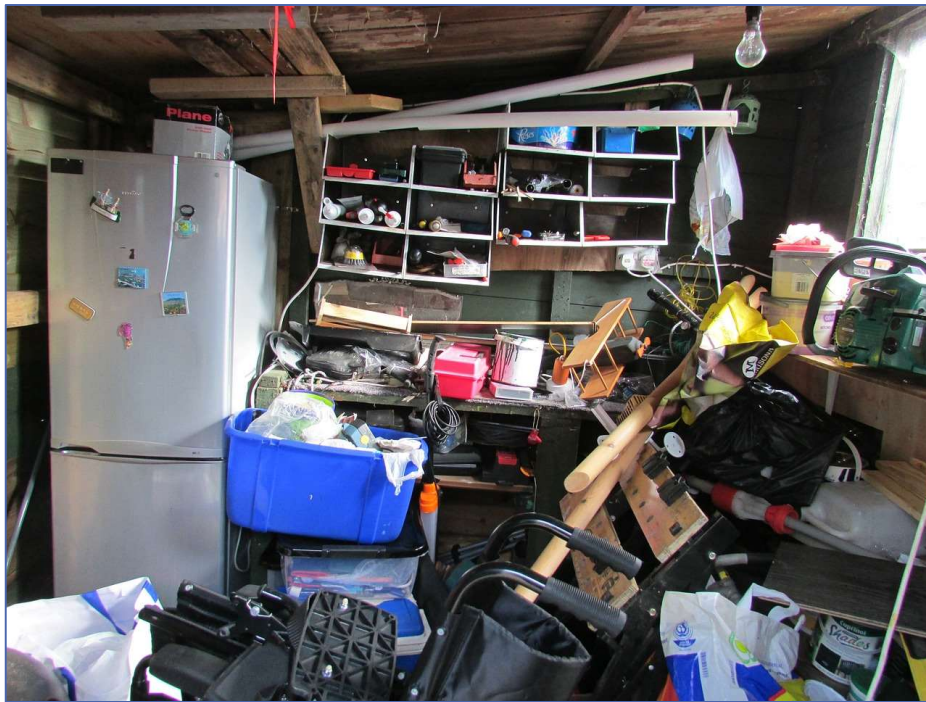
Section/Department SUPPLY CHAIN GDC

Mail Stop BV-GDC **Extension** 7965

What If?
Nancy Penar
did not speak
up and talk
about a
safety
hazard...



Conditions Challenging Personnel or Equipment



Recognize, Agree on Cause and Solution

What If?
**Rob Smith did
not take
action to
Correct an
Unsafe Job Site
Condition?**

(Use, Condition, Guards, etc.)

<input type="checkbox"/> Procedure Use and Adherence	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Office Safety	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Housekeeping and FME	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Radworker Practices	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Chemical Control	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Event-Free Tools/Techniques	<input type="checkbox"/>	<input type="checkbox"/>

Training, Job Briefs, Communications, Procedure Adherence,
Self & Peer-Checking (First Check, Flagging/Robust Barriers)
Questioning Attitude (Stop if Uncertain) and Verification Practices

Observation: OFFICER Rob Smith WAS
OBSERVED SPREADING SALT ON
AN ICEY SPOT HE FOUND
BETWEEN TOWERS.

Action Taken: APPROACHED him AND
INFORMED he WAS DOING A
Good job PREVENTING AN
ACCIDENT.

Condition Report Number, if written: _____

Observer (Print) DUNLEVY

Section/Department SITE PROTECTION



Shawn Williams

Coaching Safety & Radiation Safety Work Practices



Shawn,

Your efforts to improve Safety and Human Performance at Beaver Valley Power Station are greatly appreciated.

As indicated in this KIP Human Performance Observation, the implementation Human Performance Tools [Briefings, Communication Skills, Procedure Use, Self-Checking (STAR), Peer Checking and a Good Questioning Attitude] are vital in improving Safety and Human Performance at our station.

You have set a great example for your peers to emulate in utilizing these skills. We urge you to not only continue exercising these skills, but also to encourage your fellow workers to practice them as well at work and at home.

On behalf of our Plant Safety Committee and Human Performance Leadership Team, thank you for your personal effort and commitment to Keep Improving Performance 24 Hours a Day, 7 Days a Week, 365 Days a Year!

FENOC KIP Human Performance	
Keep Improving Performance	
<input checked="" type="checkbox"/> BEAVER VALLEY	<input type="checkbox"/> DAVIS-BESSE <input type="checkbox"/> PERRY
<input checked="" type="checkbox"/> Introduce Yourself and Discuss The Purpose of Observation	Safe <input checked="" type="checkbox"/> At Risk <input type="checkbox"/>
<input checked="" type="checkbox"/> Protective Equipment (Head Hat, Safety Glasses, Fall Protection, etc.)	<input checked="" type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> Electrical/Mechanical Hazards (Loose Clothing, Lanyards, Exposed Metal, etc.)	<input type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> Physical Activities (Lifting, Pushing/Pulling, Eyes on Hands/Path, Line of Fire, Rushing/Hurrying)	<input type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> Tools & Equipment (Use, Condition, Guards, etc.)	<input type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> Procedure Use and Adherence	<input type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> Office Safety	<input type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> Housekeeping and FME	<input type="checkbox"/> <input type="checkbox"/>
<input checked="" type="checkbox"/> Radworker Practices	<input checked="" type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> Chemical Control	<input type="checkbox"/> <input type="checkbox"/>
<input checked="" type="checkbox"/> Event-Free Tools/Techniques (Training, Job Briefs, Communications, Procedure Adherence, Self & Peer-Checking (First Check, Flagger/Release Barriers), Questioning Attitude (Stop if Uncertain) and Verification Practices)	<input checked="" type="checkbox"/> <input type="checkbox"/>
Observation: <u>Shawn Williams</u> <u>coaching junior RP tech on job coverage - used all proper PPE, good rad worker practices, excellent 3-way comms - GREAT MENTORING</u>	
Action Taken: <u>Congratulated Shawn on excellent mentoring, gave feedback on performance</u>	
Condition Report Number, if written: _____	
Observer (Print) <u>J. Manning</u>	
Section/Department <u>RADPRO</u>	
Mail Stop _____	Extension <u>7507</u>
Date <u>4/24/08</u>	
Put in Collection Box or Send to Human Performance	
Safe and Event-Free Performance	



Three Levels of Culture

1. What can be seen
– visual cues?
2. Behaviors
observed and
reinforced.
3. Safety culture
drivers





Example

Cultural Factors with Average Survey Scores

Survey Questions were assigned a cultural factor.

Average scores for each factor are shown.

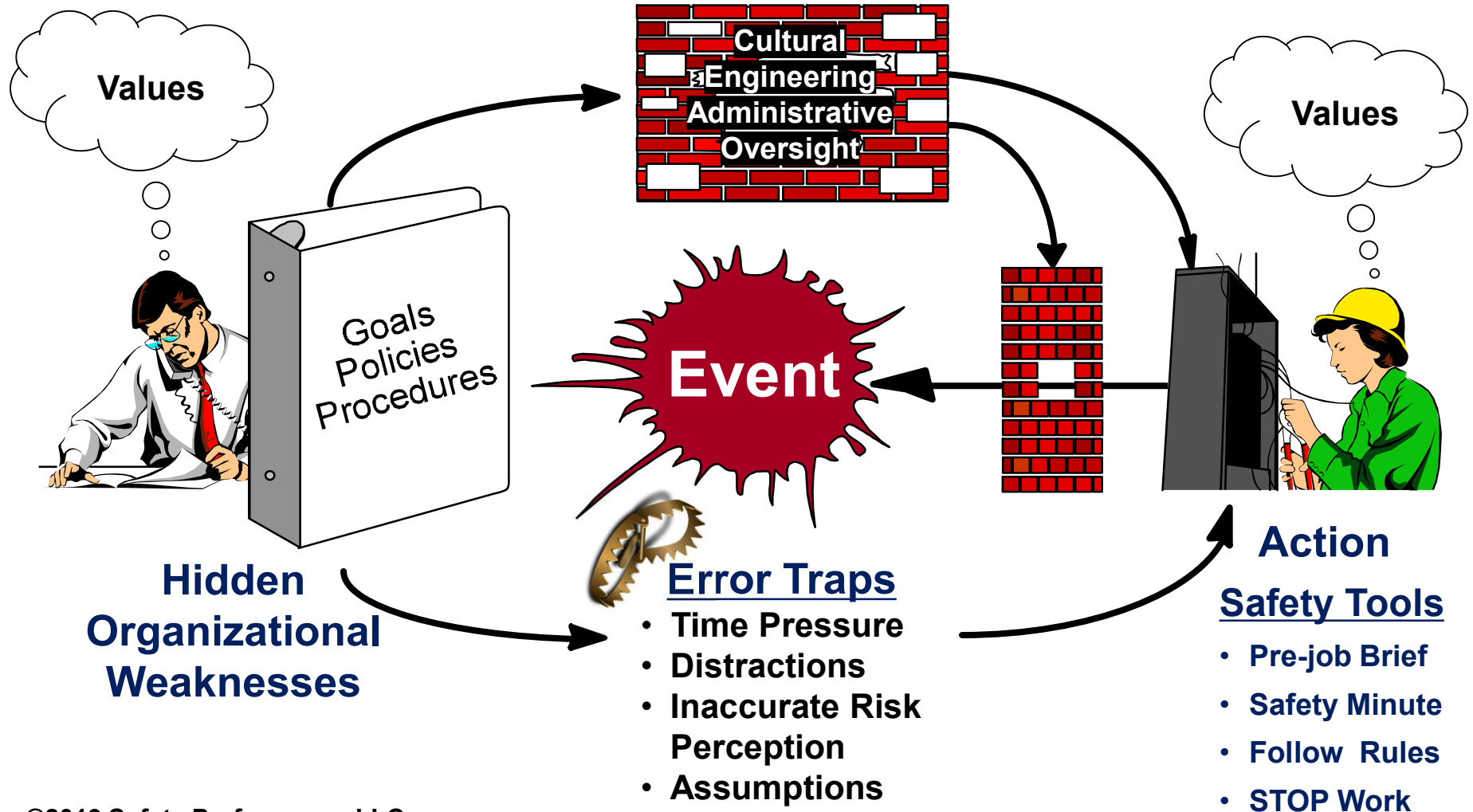
The average of the 5 Cultural Factors that leads to Safety Results is 3.67.





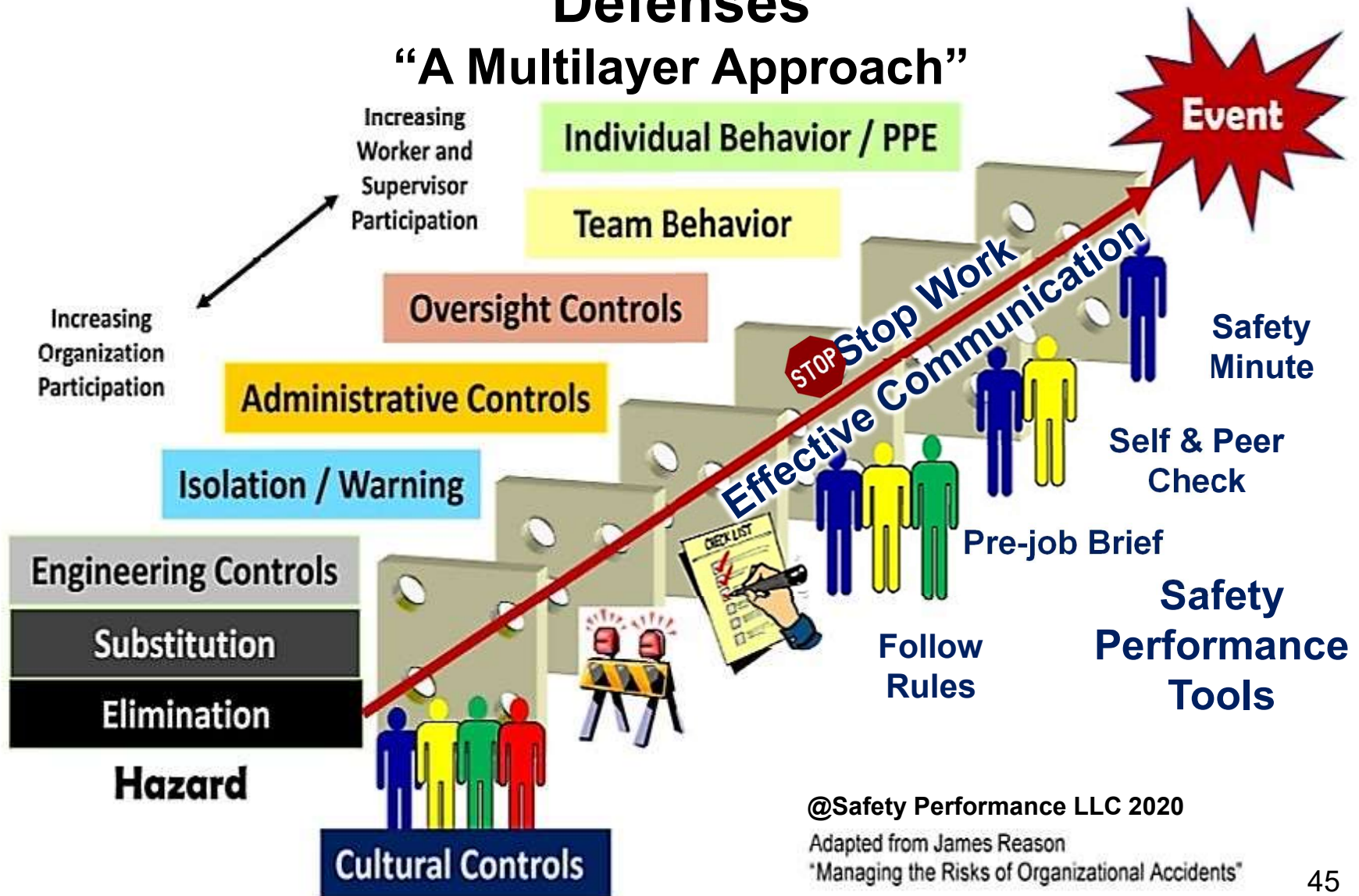
Anatomy of an Event

Weak Risk Controls (Defenses)



Hierarchy of Hazard Controls - Defenses

“A Multilayer Approach”



<div> <div>Hazard Risk Analysis</div> <div> Hazard Mitigation Control “Defenses” </div> <div> Safety Performance Tools </div> </div>	Hazard Control Hierarchy	Examples	Risk Reduction
	<u>Cultural Controls</u>	Personnel in excellent organizations practice safe work practices and safety performance tools rigorously, regardless of their perception of a task's risk and simplicity, how routine it is, and how competent the performer.	Risk Management Process
	<u>Engineering Controls</u>	<ul style="list-style-type: none"> Redesign system or process Physical interlocks Improve rigging & lifting process 	Eliminate or Reduce hazard exposure
	- Elimination	<ul style="list-style-type: none"> Remove hazard (i.e., pinch point) Repair damaged equipment 	Eliminate Risk Exposure to Hazard
	- Substitution	<ul style="list-style-type: none"> Substitute less hazardous chemical Automatic vs. manual tools 	Reduces Hazard Exposure
	<u>Isolation</u>	<ul style="list-style-type: none"> Guards / Stops Presence sensing device Fencing along a walkway 	70%
	<u>Warning</u>	<ul style="list-style-type: none"> Alarms Signs or labels Barriers 	30%
	<u>Administrative Controls</u>	<ul style="list-style-type: none"> Procedures (JHAs, Permits, etc.) Training Work Management 	30%
	<u>Oversight Controls</u>	<ul style="list-style-type: none"> Planning / Risk Management Observations and Coaching 	10%
	<u>Team Behavior</u>	<ul style="list-style-type: none"> Pre-job brief Effective Communications Self and Peer Check 	10%
	<u>Individual Behavior / PPE</u>	<ul style="list-style-type: none"> Personal Protective Equipment Rules / Procedures Use and Adherence Safety Minute STOP Work 	10%



Safety Performance

Traditional

**OSHA
Injury Rates**

**Lost Time /
Restricted Duty**

**Focus on Job Site
Conditions**

**Focus on the
Individual**



Safety Performance

A New View of Safety...

**Improve Incident
Reporting,
Investigations
and Trending**

**Focus on Risk
Reduction &
Exposure Control**

**Focus on
Behaviors and
Coaching**

**Use of Safety
Performance
Tools and
Defenses**

**Leadership
Consistently
Values the
Balance of Safety
& Production**

**Leading
“Proactive” Safety
Performance
Measures**



Example of Obtaining Leadership Commitment to a Safety Strategic Plan

Safety Performance Strategic Plan



Director, Site Operations

Director, Maintenance

Director, Performance Improvement

Director Engineering

Director, Outage & Work Management

Site Vice-President

Safety Performance Strategic Plan

Our Vision

The people at _____ are committed to excellence in Safety & Human Performance. A Strategy has been developed in support of the _____ Strategic Objectives for Safe Event-free Plant Operation. An action plan has been developed to add focus to this initiative, as well as emphasize ownership and accountability. The signatures in this document signify the individual's ownership and accountability to this plan.

Manager, Operations

Superintendent, Unit 1 Operations

Superintendent, Unit 2 Operations

Manager Maintenance

Superintendent, Instrument & Control Maintenance

Superintendent, Electrical Maintenance

Superintendent, Mechanical Maintenance

Superintendent, Planning & Support

Superintendent, Maintenance Services

Superintendent, FIN Team

Superintendent, Nuclear Construction

Manager, Site Projects

Manager, Nuclear Training

Chemistry Manager

Manager, Radiation Protection

Manager, Design Engineering

Manager, Plant & Equipment Engineering

Manager, Technical Services Engineering

Manager, Work Management

Manager, Outage Management

Manager, Site Protection

Manager, Human Resources

Manager, Regulatory Compliance



Develop a Safety Performance Strategic Plan

- 1. Leadership Commitment**
- 2. Current State**
- 3. Desired State**
- 4. Gaps to Excellence / Recommendations**
- 5. Completed and Ongoing Actions**
- 6. Action Plan**

Examples: Pre-job risk assessments, communications, training, Hazard Mitigation Controls (Defenses), observation and coaching, recognition and rewards, audits, assessments, surveys and benchmarking.

- 7. Safety Performance Measures – Traditional and Leading**



Example Safety Performance Strategic Plan

Gaps / Recommendations	Actions Taken	Actions Planned	Proactive Performance Measures
1. Increase focus on learning from incidents	<ul style="list-style-type: none">• Reset the criteria to determine what type and depth of investigation is necessary• Review and enhance the method/tools for investigation• Improve and standardize corrective action process and method of communication to ensure learning is shared and issue is fixed everywhere it is applicable	<ul style="list-style-type: none">• Pilot Culpability Model	1. Potential Significant Injury or Fatality Near Misses and trend analysis



Safety Performance Measures

Traditional “Reactive”

- Compliance driving the Safety program
- Low employee involvement
- Training heavily focused on technical aspects of job
- Focus on a single cause
- Correct the individual failure
- Narrowly apply solutions
- OSHA Recordable injuries
- Lost Time Accidents
- Worker Compensation Cost
- Regulatory violations

Leading “Proactive”

- Leadership “Walk the Talk” Time
- Leaders motivating employees to own safety & go beyond minimal standards
- Recognition for use of Safety Performance Tools
- Focus on hazard exposure and risk
- Employees involved in developing and implementing safety & training programs
- Training includes technical and “soft” skills
- Focus on organizational root cause
- Correcting system / process deficiencies
- Recognize near misses or good catches
- Improvement opportunities
- Safety assessments
- Safety perception surveys



Organizational Behaviors

- **The level of safety performance achieved is influenced by the collective behaviors of all individuals in the organization.**
- **People achieve high levels of safety performance based largely on the encouragement and reinforcement received from leaders, peers, and subordinates.**

Every organization is perfectly aligned to get the results it gets!



AMERICAN SOCIETY OF
SAFETY PROFESSIONALS
November 2019 Journal

HUMAN PERFORMANCE
Peer-Reviewed

A Systematic Approach to SAFETY PERFORMANCE

By John F. Kowalski and John C. Summers

IN TODAY'S BUSINESS WORLD, success necessitates meeting more than the required minimum standards (regulations). Safety performance is about individuals, leaders and the organization working together using safety (human) performance fundamentals and tools to protect personnel, property and the place (environment).

Safety has come a long way since the 1970s. For years, traditional safety focused on separating individual pieces of the process to obtain results. A systemic approach to safety performance is fundamentally different from traditional safety in that it focuses on the safety process.

A high performing organization is grounded on five fundamental safety performance principles:

- 1) People make errors.
- 2) Organizational values and programs influence behaviors.
- 3) Behaviors are influenced by what is encouraged and reinforced.

4) Errors and risk can be reduced through the use of safety performance tools.

5) Events can be eliminated through the use of defenses.

Senge (2006) defines system thinking as "a way of thinking about, and a language for describing and understanding, the forces and interrelationships that shape the behavior of systems."

Systems thinking focuses on how people interact with the others in a system, "a set of elements that interact to produce behavior" (Aronson, 1996). Systems thinking expands its view to take into account increasingly larger numbers of behavior interactions (organization, leader, individual) in a system (the process) that produces desired results.

Each individual plays a key role in working together as part of the organization to achieve the desired safe results. The below KEY TAKEAWAYS

This article provides a systematic thinking approach using human and organizational performance fundamentals and analysis techniques to improve safety performance. The techniques described apply to individuals, leaders and the overall organization.

The authors present a six-part model based on the philosophy that to reduce errors and eliminate events of consequence, adequate human performance tools and defenses must be in place.

The theory aspects are presented, as well as several real-life examples from various industries where applying the correct actions or methods leads to improved, consistent results.

havioral aspects include those by the individual as well as those supported and reinforced by the organization.

In all cases, individuals, leaders and the organization should consistently strive for high safety performance standards. An aspect that plays a key part in what safety behaviors are employed is the culture and subcultures of the organization. Simply stated, culture can be considered as "the way we do things around here."

To establish a proper perspective, consider that, according to Bureau of Labor Statistics (BLS, 2018a; b) data, the rate of fatalities in the U.S. has almost leveled off (with a recent slight increase) while the rate of nonfatal injuries has steadily declined. Why do significant events, including injuries, continue to occur even though lower-level incident rates are declining? Some may answer that lower-level incidents are not being reported. Why could this be occurring? Possible reasons include:

•rewarding the consequence (i.e., low incident rates), which indirectly encourages nonreporting;

•creating a punishment atmosphere when lower-level events are reported;

•not encouraging the reporting of lower-level incidents and near-hits.

Leaders in many organizations tend to reward and recognize job results (production) and frequently overlook or take for granted the prevention behaviors necessary to safely complete the job. Additionally, production results are visible and establish natural feedback, whereas prevention behaviors get no natural feedback. For example, you wear a hard hat and safety glasses and shoes all day in a hot, humid environment. At the end of the workday, nothing happened. So, you might say, "I am really glad I wore this hard hat, safety glasses and shoes; they caused me to sweat more, I probably lost some additional hair, and nothing happened that demonstrated these were needed."

We often associate safety with the OSHA incident rate or days without a lost-time incident. With this premise, the organization could (and sometimes does) conclude that no OSHA recordables means no problems.

In some organizations, after an incident (event) the primary focus is on identifying what the person did or did not do that caused the event. Additionally, the cause is frequently identified as an "unsafe behavior" and opportunities for improvement focus on the individual. Dekker (2014) offers:

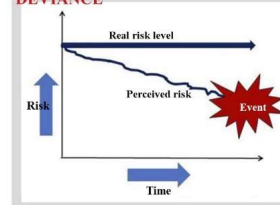
Do you try to understand why it made sense to do what she did? The worker probably did not come to

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FIGURE 1
SAFETY PERFORMANCE
PROCESS



FIGURE 2
NORMALIZED
DEVIANCE



work to do a bad job. If what s/he did made sense to him/her, it probably makes sense to others as well.

That points to systemic conditions to examine.

If an assumption is made that individuals come to work to do their jobs, not to get hurt, then digging a little deeper to identify organizational factors that influence individual behaviors is warranted. In the worst possible scenario, the person performed the correct action, and a hidden (latent) flaw or problem existed, leading to the event. All the individual behavioral change actions in the world will not improve this condition.

Peeling back the layers can lead to more important questions (and answers).

•What about the behaviors of the leaders?

•Does the investigation include review of the work situation that existed when the event or injury occurred?

•Does it include supervisor and manager follow-up to identify how they may have influenced (or did not influence) on-the-job behaviors?

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•Does the investigation include reviewing preparations for job performance, what job previews, hazard analysis, walk downs or prejob briefings occurred before work commenced?

•What previous operating experience, if any, existed before this performance?

•What was the focus of the job brief?

Often, the focus before and during the task is on what it takes to get the job done. High-reliability organizations also focus on what to avoid while achieving success. A site vice president at a nuclear power plant in northwest Ohio has great words to consider when briefing workers: "We have all the time necessary to perform the job correctly the first time, we just don't have any time to waste."

Safety Performance Process

Safety performance combines industrial safety, human performance and organizational performance into one process to protect people, the property (plant) and place (environment). The safety performance process has six key elements starting with organizational behaviors and rotating clockwise toward safe results (Figure 1). Simple-to-use programs, processes and procedures, and hazard risk analysis are vital parts of the safety performance process. However, they alone do not guarantee success. To be effective, the alignment of behaviors of the organization, leaders and individuals is needed. Each aspect of the safety performance process is outlined here.

Organizational Behaviors

Safety starts with the culture of the organization. Safety performance is management-sponsored and leadership-driven by the collective behaviors of the company, from the board of directors to the workers in the field.

After providing human performance training at a power station in western Pennsylvania, training feedback was solicited from trainees, some of whom provided negative feedback. A meeting was held to discuss the subject material. During the meeting, the attendees huddled around one individual, a seasoned worker and an informal leader who the workers respected. Attendees commented that they liked the training, but that their supervisors would not let them use the human performance techniques.

In the days that followed, after being asked several times to help lead the human performance effort, the informal leader finally agreed to help. With his leadership, the program thrived. Workers became involved with the process and made several suggestions to improve it. Workers also started to coach each other and apply safety performance tools more consistently.

A key result was that errors decreased. Every organization has leaders like this informal leader at all levels of the organization. It is critical to identify and engage these leaders to improve safety performance.

While interacting with hundreds of companies and thousands of employees, the authors have often been asked, "How can we reduce errors?" After analyzing hundreds of consequential events, a few common themes usually appeared. First, individuals were not consistently applying appropriate error prevention tools. Second, and more importantly, defenses to protect against errors were either flawed or missing. On further investigation, the authors frequently identified an organizational weakness. If a program was in place to reduce errors and ensure defenses, it was inconsistently applied. Worst case, there was no program, no systematic approach, to protect individuals and the organization.

View paper at website: <https://www.safetyperformance.us/news>

Thank You

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