High Reliability:
Putting Culture to Work

March 2013
Atlanta, Georgia
NERC's "Improving Human Performance on the Grid"

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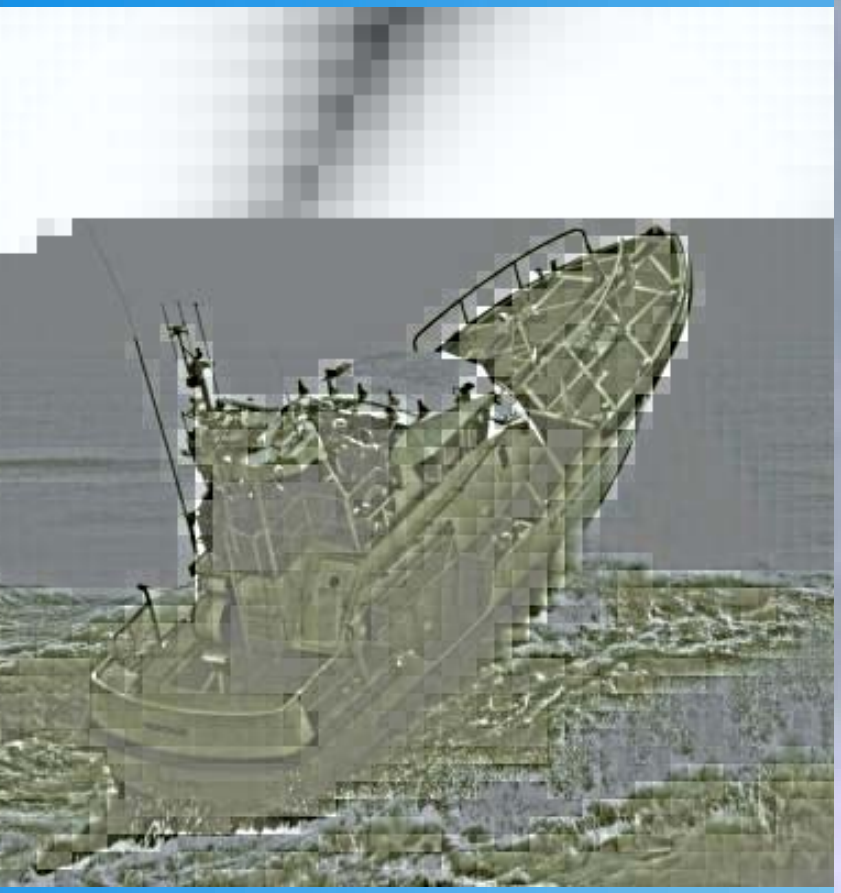


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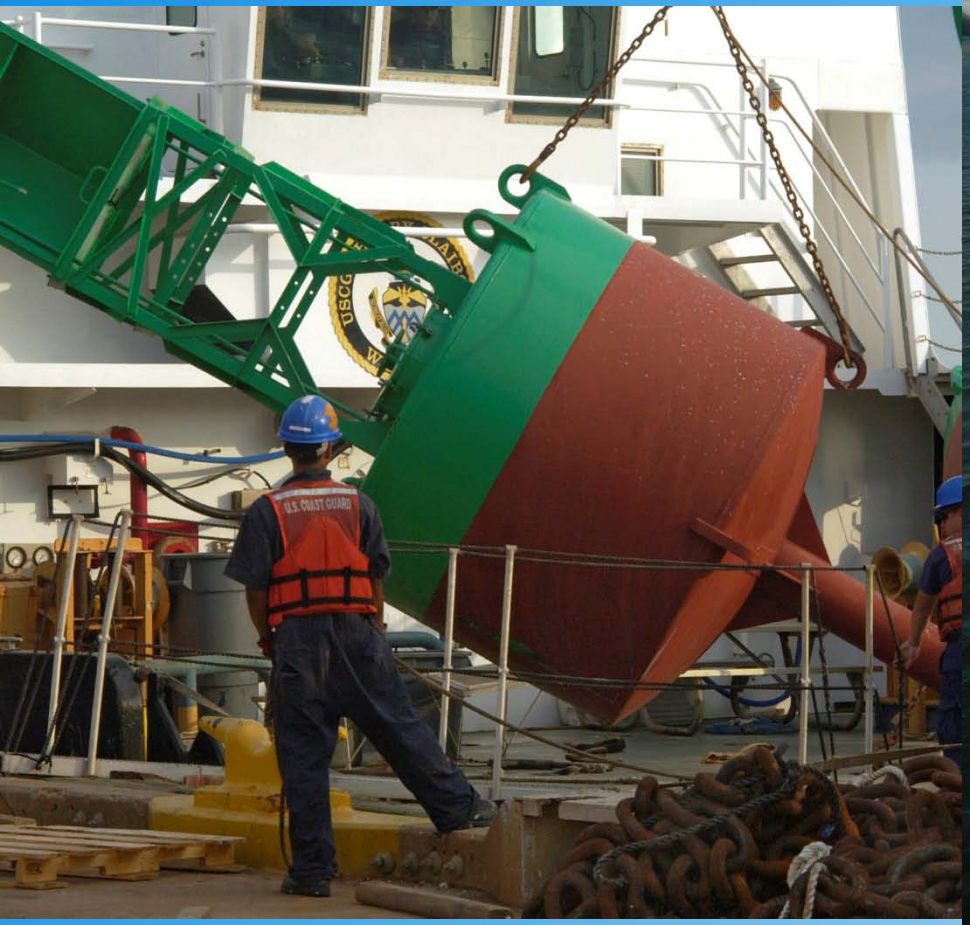
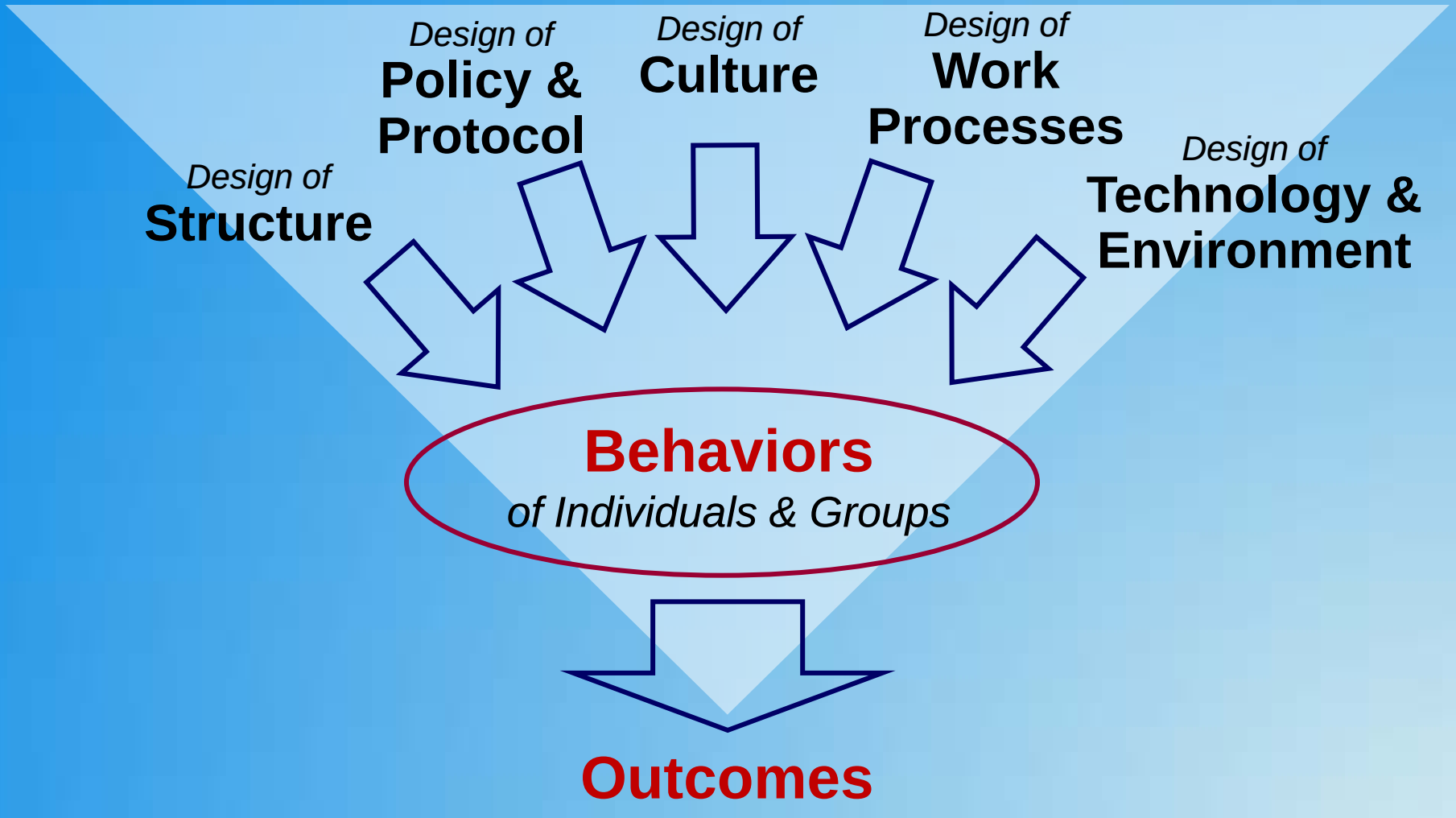

U.S. COAST GUARD

“The Best Damn Rescue in Texas”

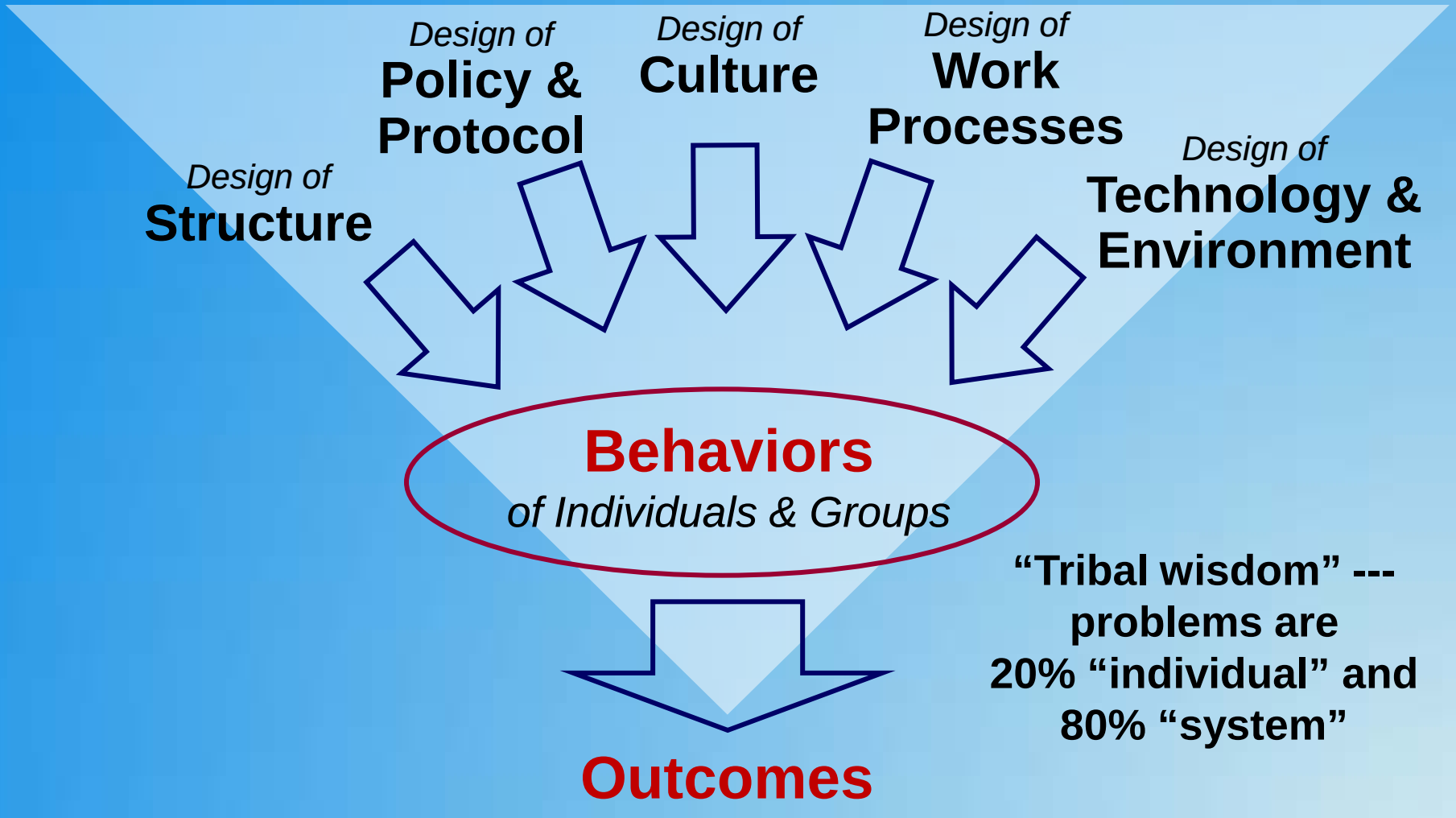
What if we can’t wait 223 years?

Influencing Behaviors “at the Sharp End”



Adapted from R. Cook and D. Woods, “Operating at the Sharp End: The Complexity of Human Error” (1994)

Influencing Behaviors “at the Sharp End”



“Tribal wisdom” --- problems are 20% “individual” and 80% “system”

Adapted from R. Cook and D. Woods, “Operating at the Sharp End: The Complexity of Human Error” (1994)

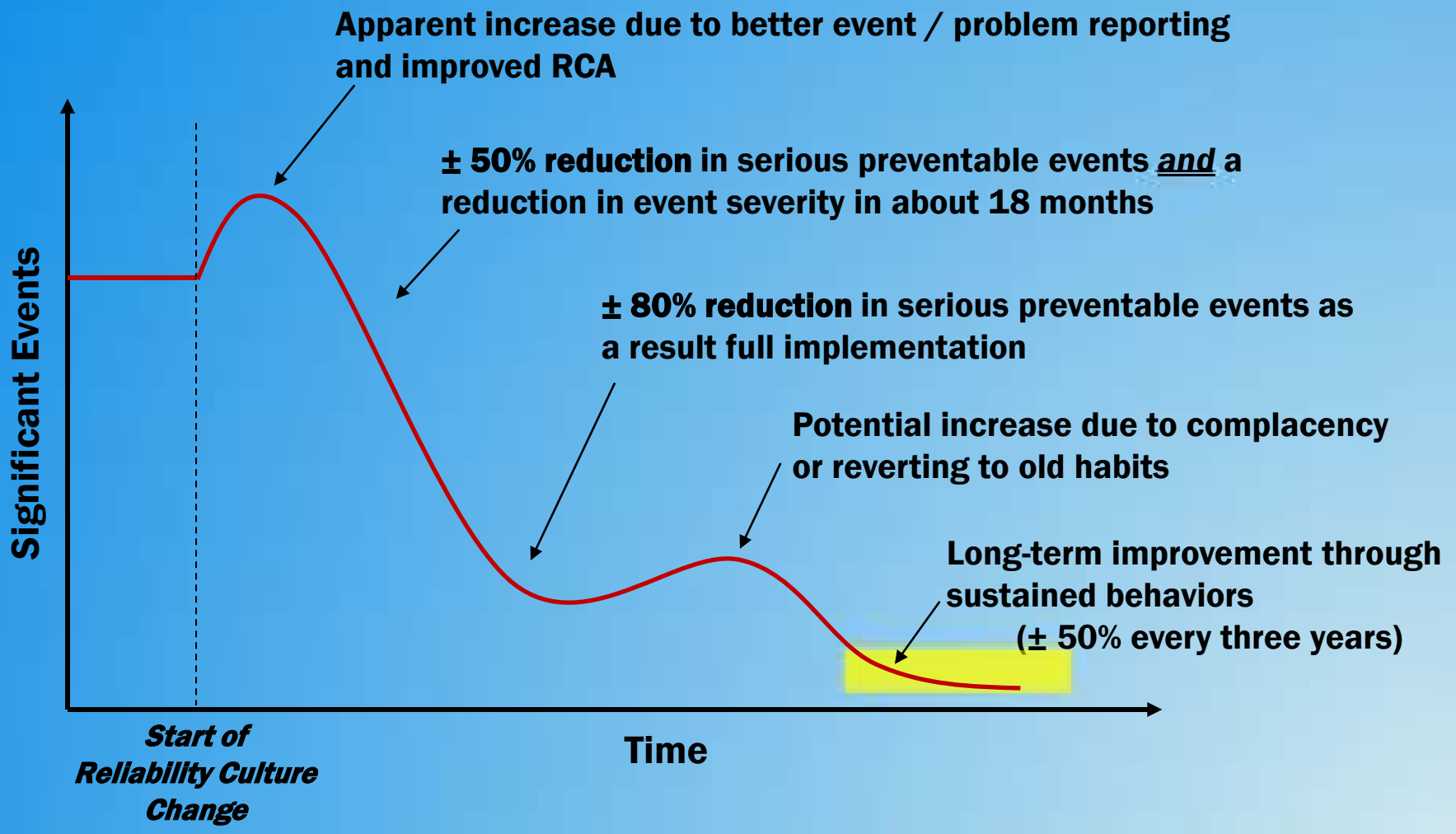
Issues Are Individual *and* System

Performance Factor	Stolovich & Keeps (2004)	Quiram & Marken (2012)*
Environment, Systems, and Resources	26%	29%
Expectations & Feedback	35%	26%
Rewards, Recognition, & Consequences	14%	11%
System Issues	**75%**	**66%**
Capacity & Selection	8%	1%
Skills & Knowledge	11%	33%
Motivation & Preferences	6%	0%
People issues	**25%**	**34%**

***** USCG Performance Technology Center study of 118 performance analyses over 12 years and results compared / averaged via three separate evaluation systems – Tom Gilbert, Joe Harless, and Carl Binder.

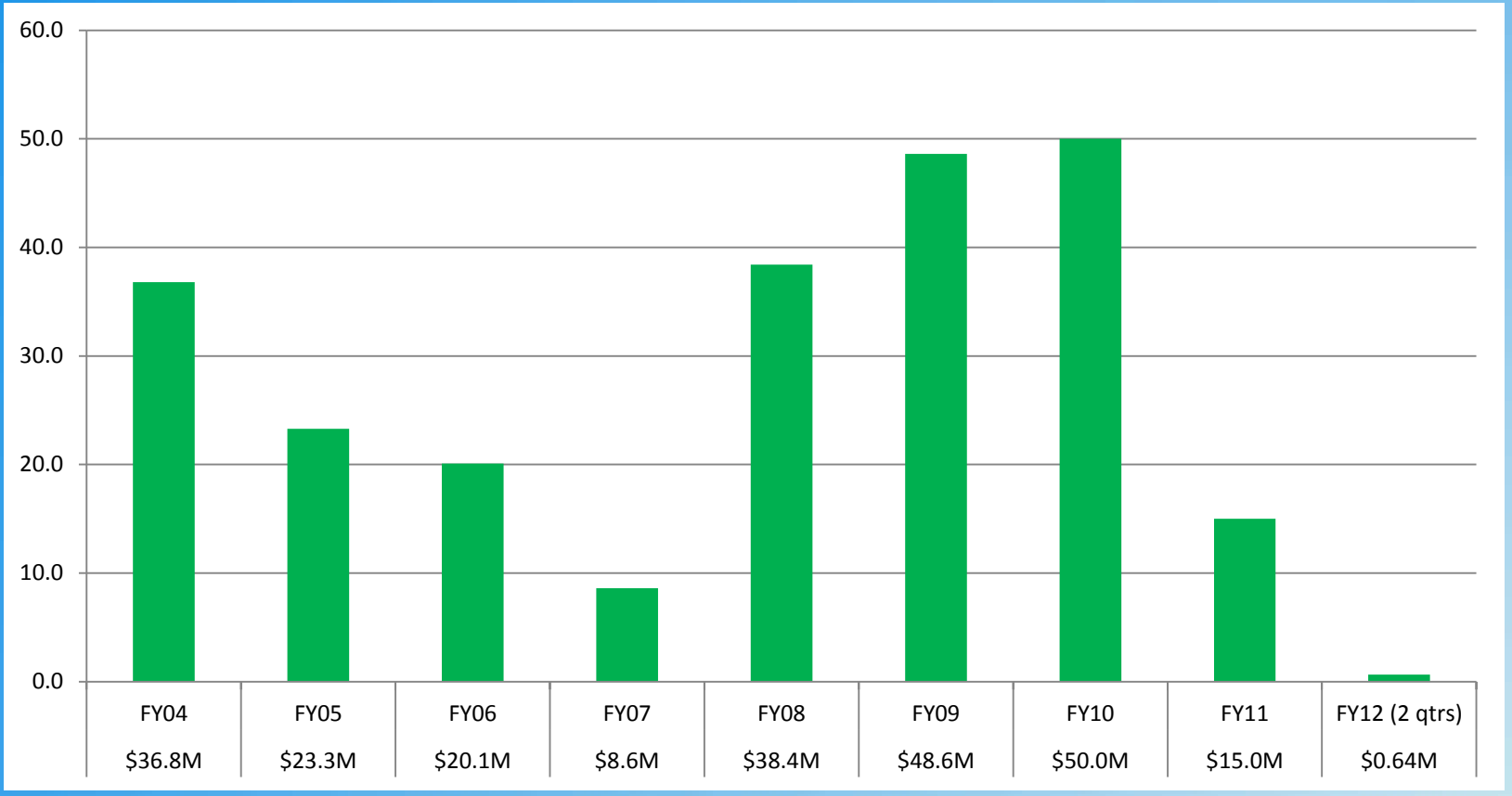
Human Performance Improvement

Achievable Improvement Curve



TVA Human Performance Event Costs

The challenge: Reduce TVA's significant event rate to meet safety, performance, and cost goals



Human Performance Improvement results FY04–FY 12 for the TVA non-nuclear fleet of 123 units (29 hydroelectric, 11 fossil fueled, 83 natural gas). Source: "TVA Focus on Results", J. Patrick O'Neil, NERC HPI Conference 2012, Atlanta, GA.

All-Hands Understanding to Support Reliability

- The nature of human error
- The “anatomy” of an event (in context)
- Precursor events and near misses
- Achievable results (in context)
- The impact of culture on safety
- Skill-, Rule-, and Knowledge-based error
- Error prevention tools and strategies
- Off the job applicability to day-to-day life

More Rules
or
More Tools?

“All-Hands” Behaviors to Support Reliability

Error prevention strategies for use by every person “when indicated”

Behaviors	Tools
Speak Up for Safety	1. Speak Up using ARCC 2. Pre-Task Briefings (esp. complex / infrequent) 3. Post-Task Review 4. Questioning Attitude (Stop and Resolve, Qualify / Validate / Verify) 5. Clarifying Questions
Pay Attention to Detail	1. Self-Checking using STAR 2. Protocol and Checklist Use
Look Out for Each Other	1. Peer Checking 2. Peer Coaching using 5:1 Feedback
Communicate Effectively	1. Three-Way Repeat Back / Read Back 2. Handoffs using SBAR 3. Phonetic Clarification 4. Numeric Clarification

Leader Understanding to Support Reliability

- Reliability science and the nature of human error
- The “anatomy” of an event
- The impact of culture on safety
- Culture embedding mechanisms
- Common barriers to communication
- The “drivers” of accountability
- Basics of RCA, ACA, and CCA

The Science of Human Error

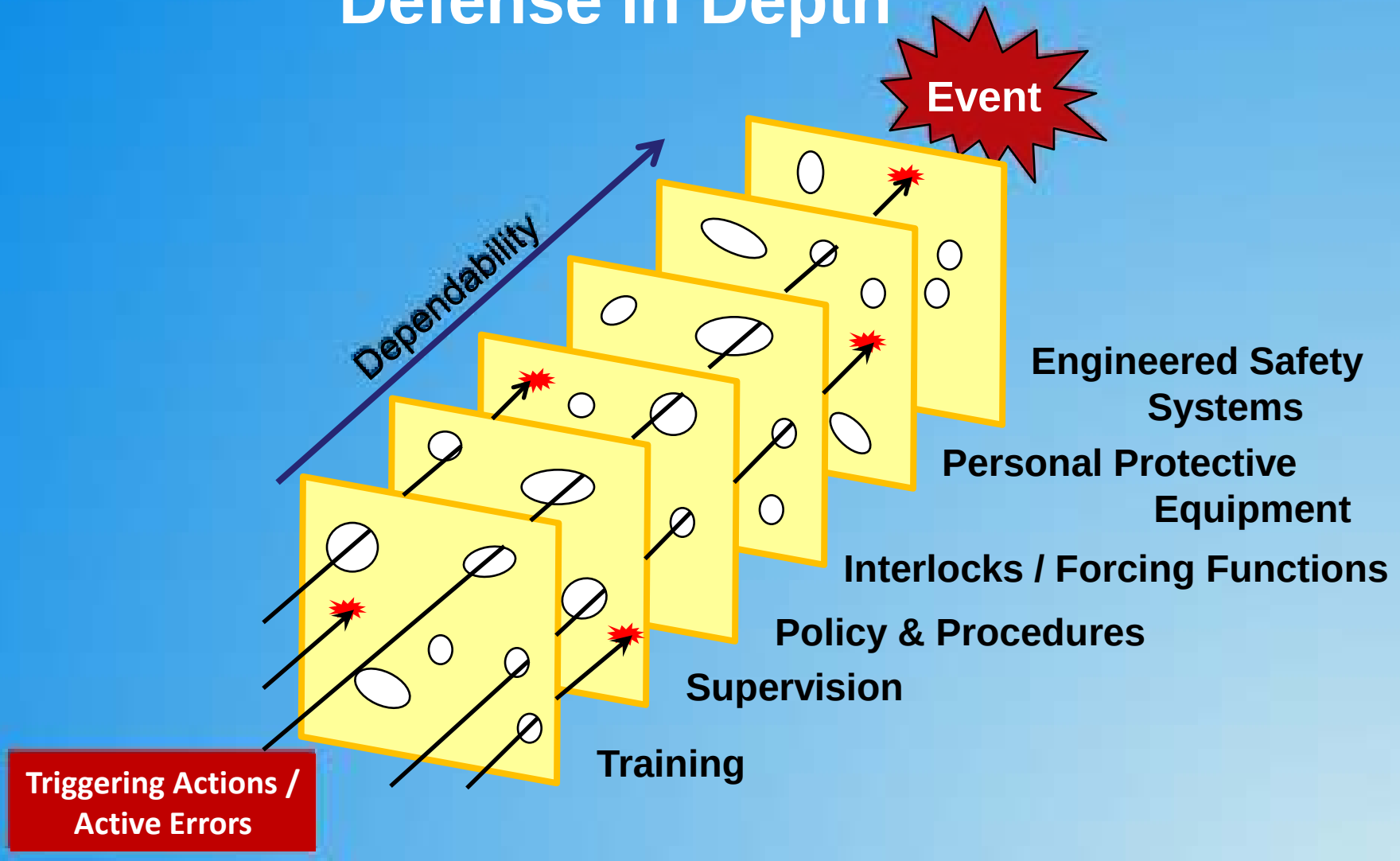
Performance Mode	Error Type	Behavior Themes for Error Prevention	System Themes for Error Prevention
Skill-Based "Autopilot" - Routine acts performed in familiar environments using learned skills. **± 25%** of errors, takes less than a second. **Error rate = 1:1,000**	Slip (execution)	Self-checking	Automation, error proofing
	Lapse (forgetting)	Peer-checking	Checklists, visual cues
	Fumble (motor skills)	Visualization	Automation, error proofing
Rule-Based "Expert problem solving and decision making" - conscious choices based upon education or experience. **± 60%** of errors, takes less than a second. **Error rate = 1:100**	Wrong rule	Questioning attitude	Protocol, checklist
	Misapplication	Questioning attitude	Collegial teamwork
	Non-compliance	Intelligent compliance with expectations	Process/protocol simplification, forcing functions
Knowledge-Based "Figuring it out" -- Conscious choices where no rules exist or are unknown to the user. **± 15%** of errors, takes forever. **Error rate = 3:10 to 6:10**	Decision-making	Stop when unsure	Collegial teamwork
	Problem solving	Stop when unsure	Collegial teamwork

Based on Jens Rasmussen's "S/R/K Model" and James Reason's "Generic Error Modeling System"

Defense in Depth

Adapted from James Reason's "Swiss cheese" model of system failure.

Defense in Depth



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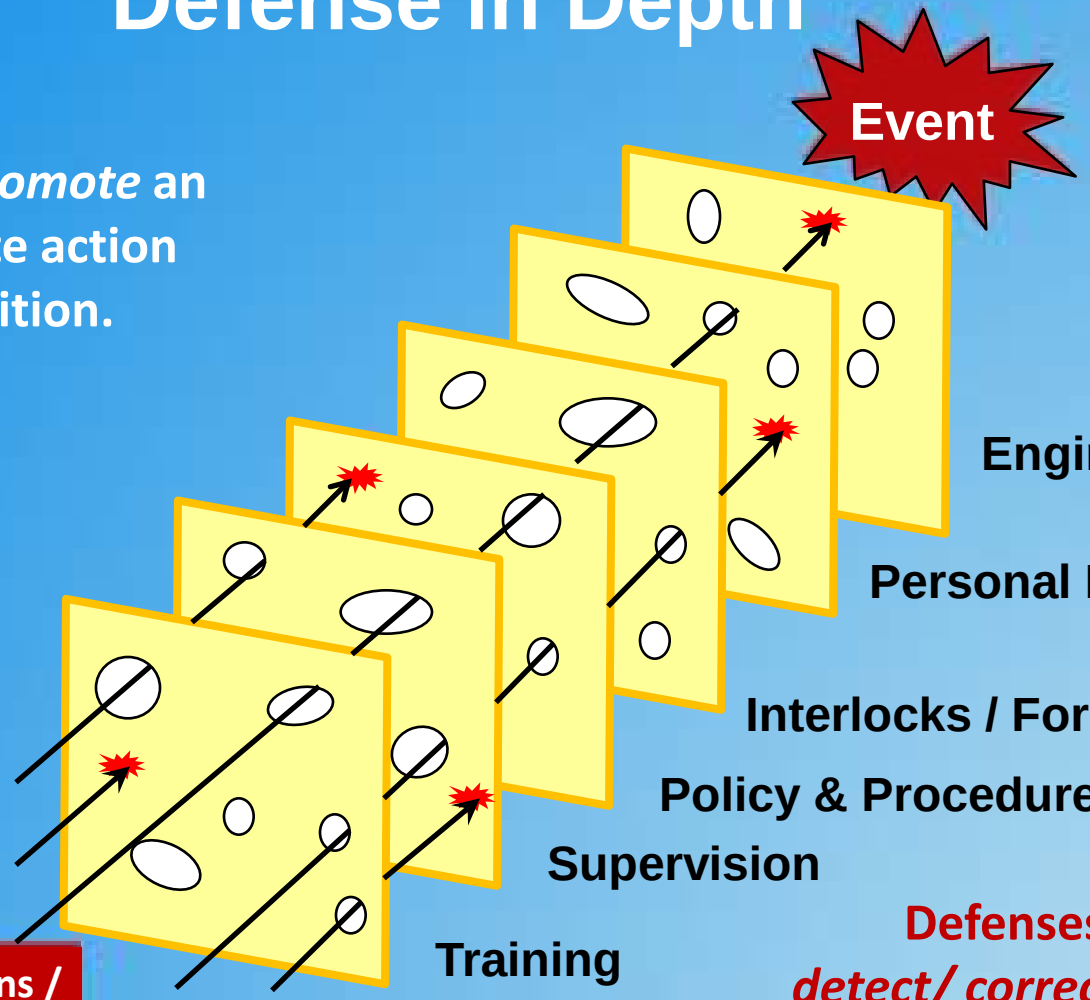
Defense in Depth

Defenses *promote* an appropriate action or condition.

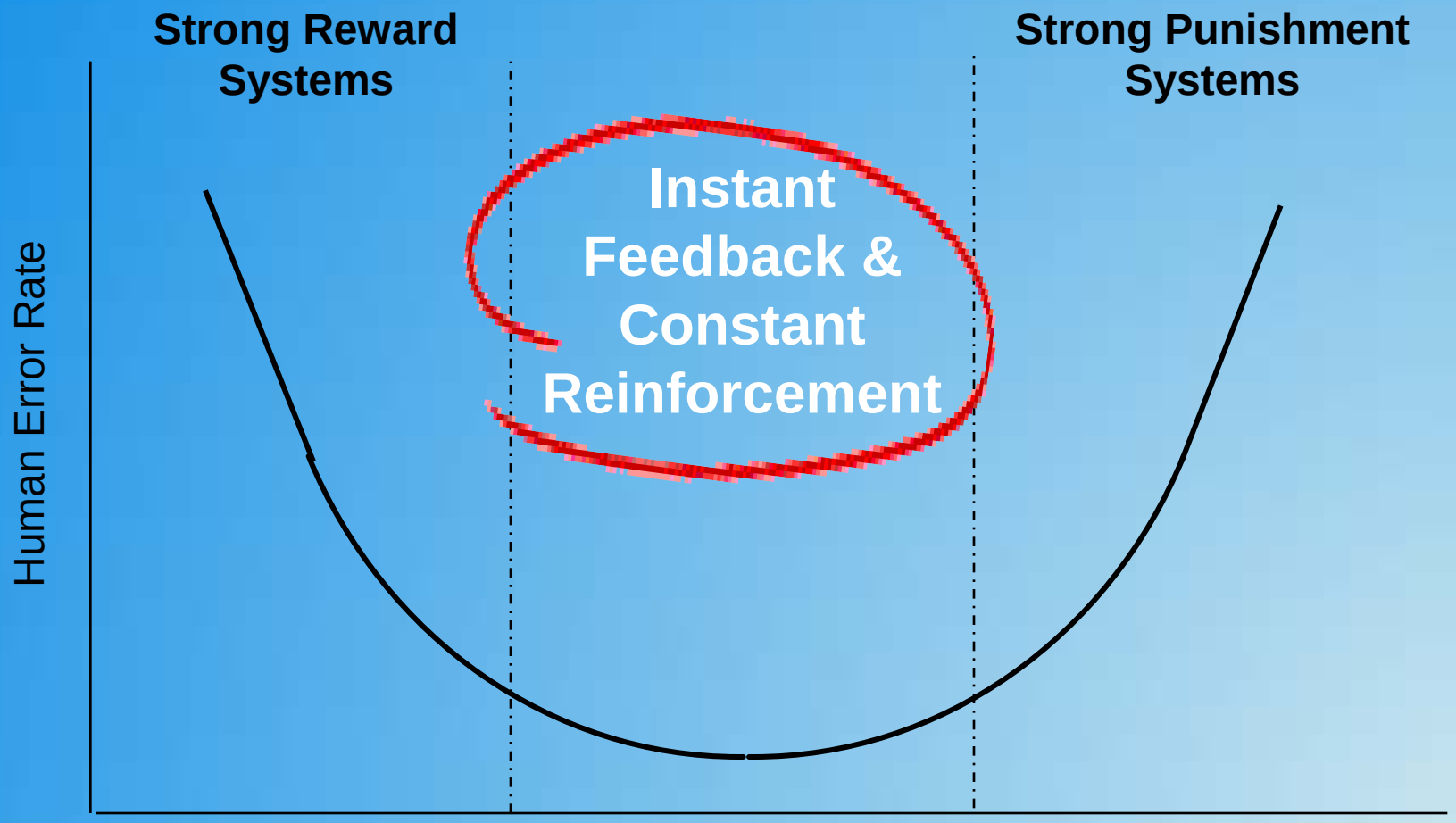


Defenses *prevent / detect/ correct / compensate for* an inappropriate action or condition.

Adapted from James Reason's "Swiss cheese" model of system failure.

“No Interruption Zone”

Accountability System Effectiveness



Culture Embedding Mechanisms

Primary Embedding Mechanisms	Secondary Articulation & Reinforcement Mechanisms
• **What leaders pay attention to, operationalize, measure, and control on a regular basis** • **How leaders react to critical incidents and organizational crises** • Observed criteria by which leaders allocate scarce resources • **Deliberate role modeling, teaching, and coaching** • Observed criteria by which leaders allocate rewards and status • Observed criteria by which leaders recruit, select, promote, retire, and excommunicate organizational members	• Organizational design and structure • Organizational systems and procedures • Organizational rites and rituals • Design of physical space, facades, and buildings • Stories, legends, and myths about people and events • Formal statements of organizational philosophy, values, and creed

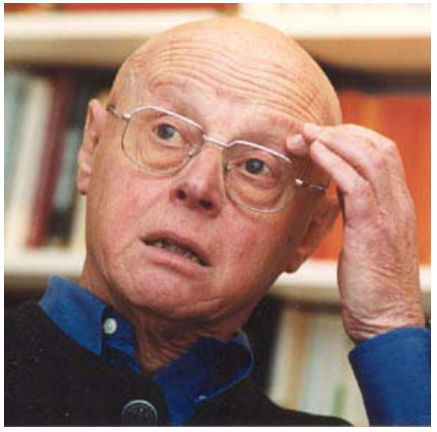
From *Organizational Culture & Leadership*, by Edgar Schein

A Barrier to Communication

Geert Hofstede's Power Distance

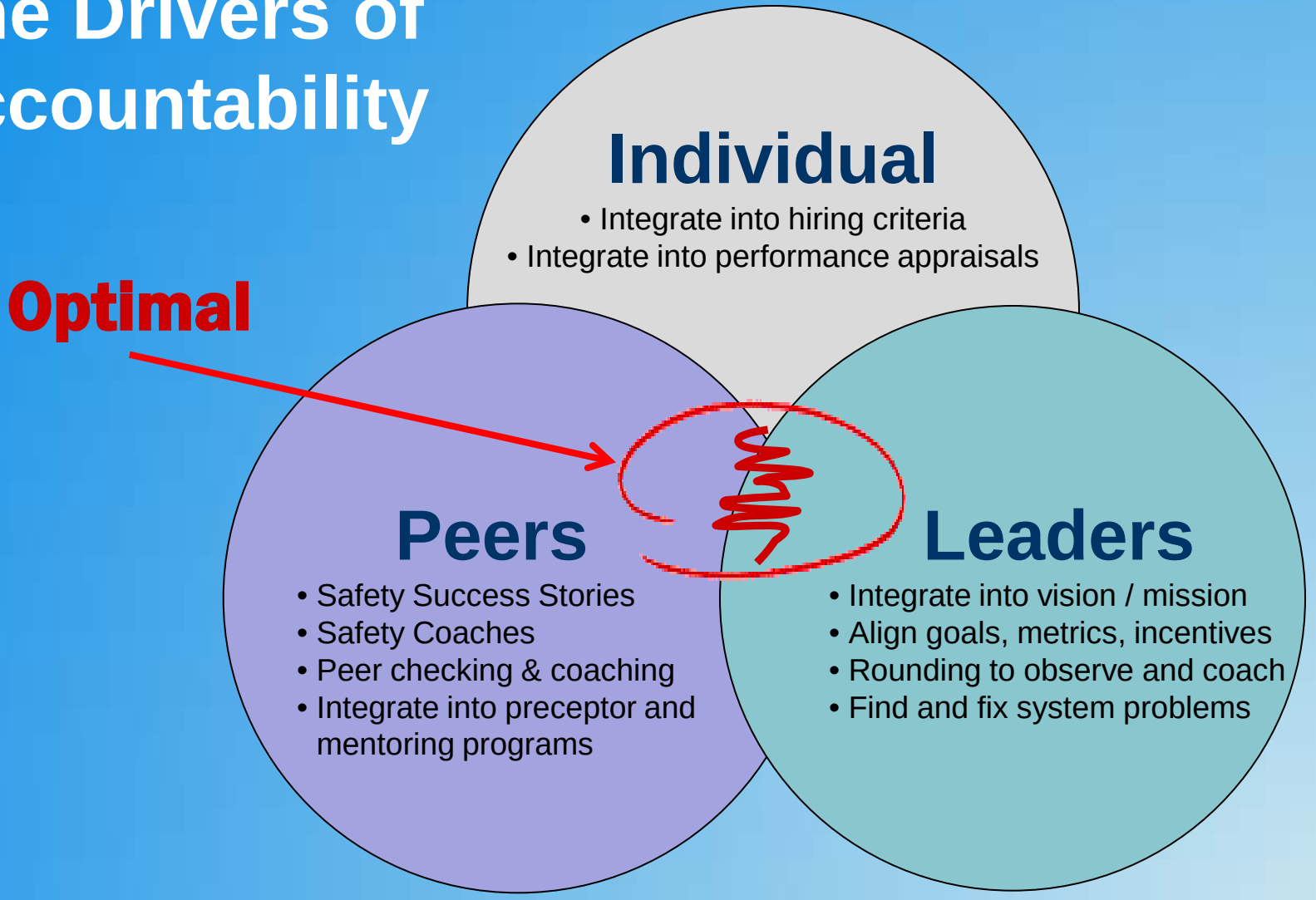
- Extent to which the less powerful expect and accept that power is distributed unequally
- Leads to the *perception* of authority as perceived by the subordinate

"Power distance has its place, but you don't have to weaponize it."



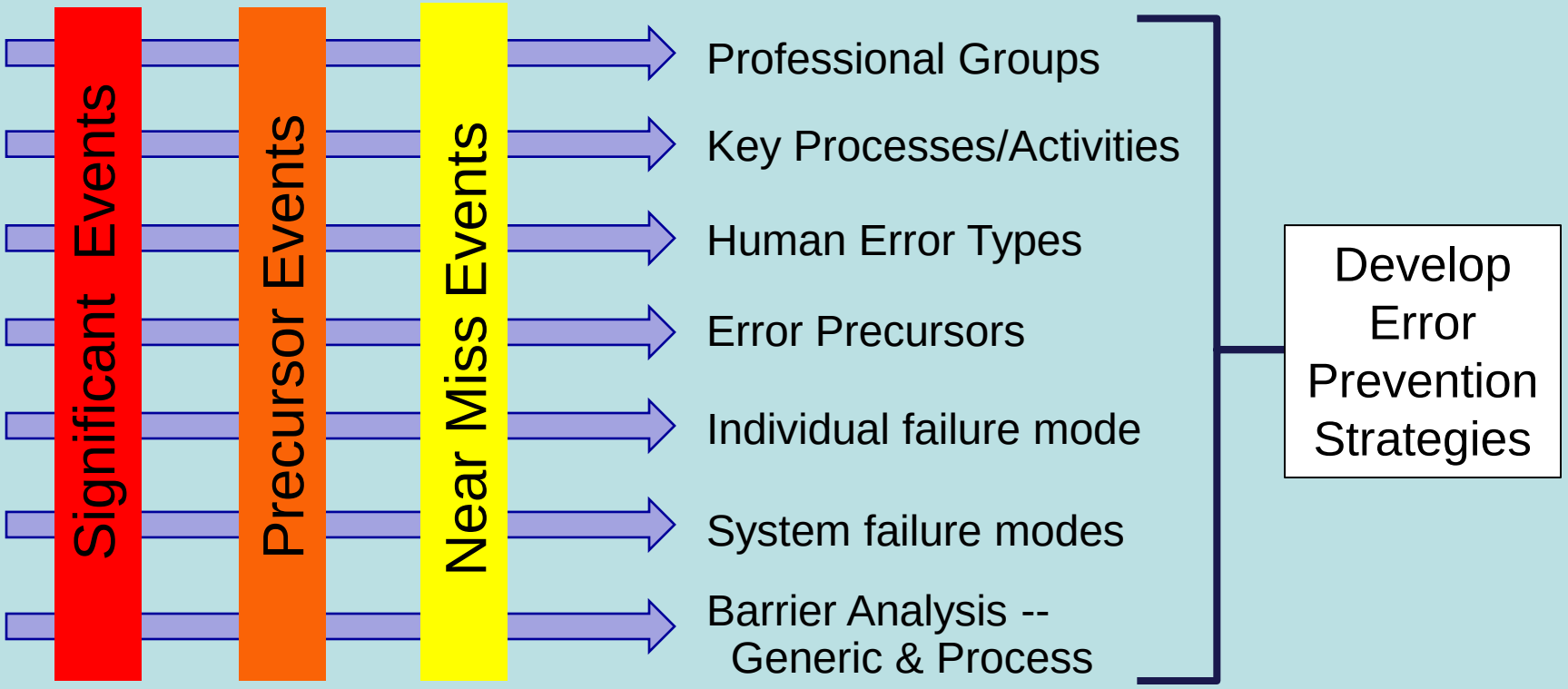
From Geert Hofstede's "Cultural Dimensions" theory

The Drivers of Accountability



Root Cause Analysis / Common Cause Analysis

Identifying “insufficient or inappropriate actions” based upon available data



Shift learning to lesser events and near misses to detect and correct root causes ***before*** they result in significant events.

Root Cause Mentality

- An insatiable desire to understand why things go wrong, why people do what they do, and how things got into their present state
- A reluctance to blame
- A desire to understand

“You don’t really understand the event until you know why the action made sense to the person at the time.”

It *is* what you say . . .

“You made a mistake and I’m here to investigate the event.”

It *is* what you say . . .

“You made a mistake and I’m here to investigate the event.”

vs.

“You experienced an error and I’m here to analyze the event and try to make sure it doesn’t happen to someone else.”

“Inappropriate Actions”

- Was there a deviation from an expected behavior?
- If so, write a brief description of each and every inappropriate action:

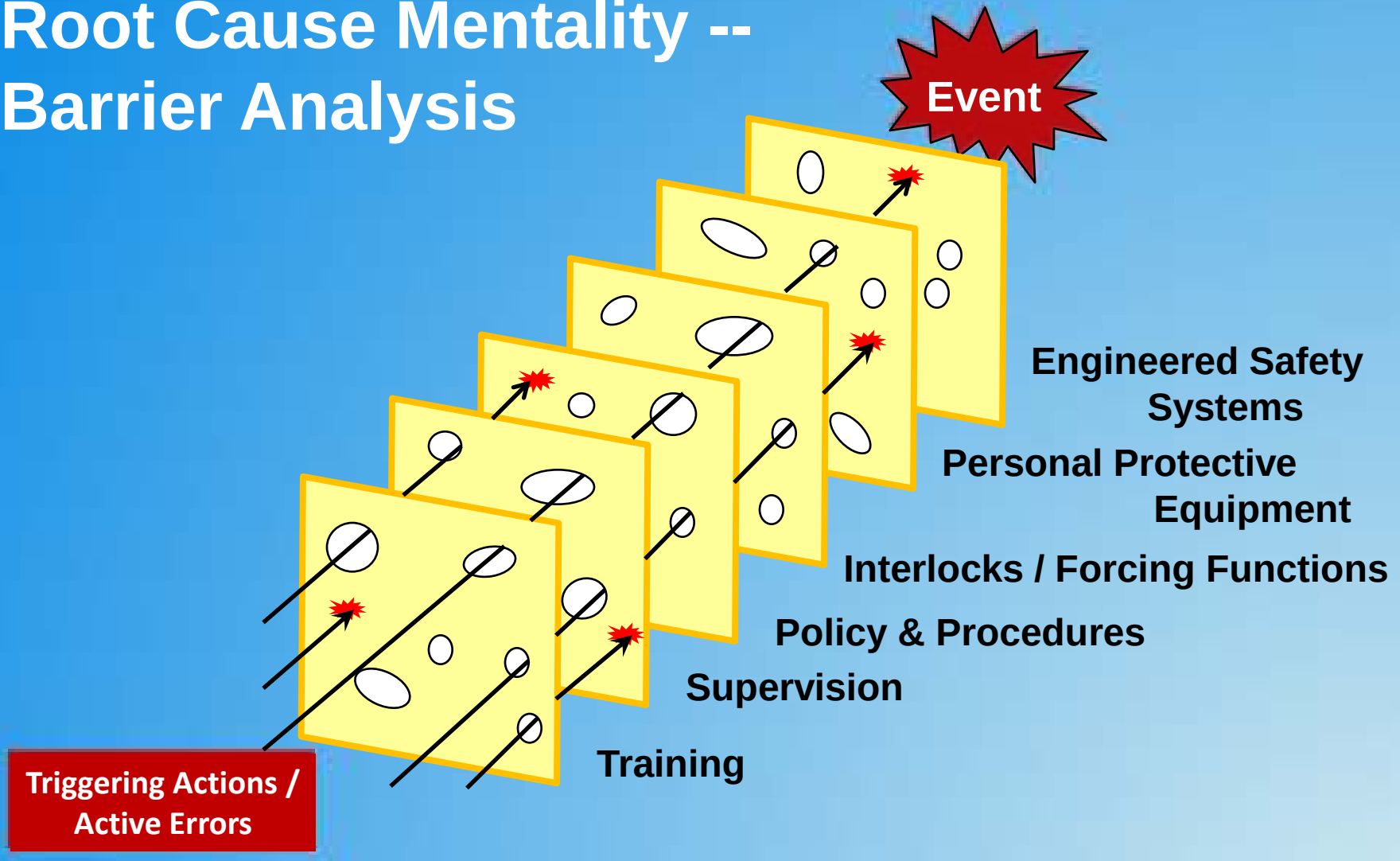
  Professional Group DID / DID NOT . . . .
  BECAUSE . . .
  AND . . . .

- Helps to surface skill / rule / knowledge
- Helps to surface latent system issues
- Walk each inappropriate action through your performance / culpability matrix

Root Cause Mentality -- Process Analysis

Adapted from James Reason's "Swiss cheese" model of system failure.

Root Cause Mentality -- Barrier Analysis



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Leader Behaviors to Support Reliability

ALL of the “All Hands” error prevention strategies, *PLUS . . .*

Behaviors	Tools
Make Reliability and Safety Uncompromisable Core Values	1. Make all decisions with reliability and safety as the primary concerns. 2. Start every meeting with a reliability / safety message 3. Transparency in sharing events (3x3 comms) 4. Encourage and reward reporting of events and eliminate fear of reporting 5. Embed reliability and safety in hiring and performance reviews
Find & Fix System Problems	1. Daily Check-In (Events / Concerns / Needs) 2. Start the Clock for Safety / Reliability 3. Reliability Top 10 / Metrics (detect drift) 4. Enhanced RCA / ACA / CCA
Build Accountability	1. Rounding To Influence (5:1 feedback) 2. Reliability / Safety Coaches 3. Decision Guide - Fair and Just Culture

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Daily Check-In

- High value, low impact
- Every day, ideally 24 / 7 / 365
- Led by a senior leader
- Mandatory attendance, every unit / division / dept
- On your feet, maximum15 minutes
- Focused, report by exception format:

"No events, no concerns, no needs, end of report."

- Improved awareness of the status of front line ops
- More timely recognition and resolution of problems
- Aligns and focuses the leadership team around operational issues

Leaders in the Field

	Walking Rounds	Rounding To Influence	Go and See	Adopt-a-Unit
Sensitivity to Operations Threshold	Low - Moderate *How do your shoes feel?*	Low - Moderate *Shine your shoes*	Moderate *Take a few steps in their shoes*	High *Walk a mile in their shoes*
Time	30 minutes	5 to10 minutes	> 30 minutes	Recurring, in-depth
Theme	General awareness	Specific focus	Blunt end to sharp end translation of expectations	Practical knowledge and experience of unit work
Purpose	• Identify problems that need to be fixed • Build relationships	• Influence a specific behavior expectation • Identify problems impacting a *specific* performance expectation	• *Empathy* for sharp end realities • Identify performance deviations and conditions impacting performance that need remediation	• *Sympathy* for sharp end realities • Identify performance deviations and conditions impacting performance that need remediation
Implementing Detail	Global questions	Targeted questions	Observation of behaviors and environment	Participation in work and work life
Location	Work environment or other	Work environment or other	Work environment	Work environment

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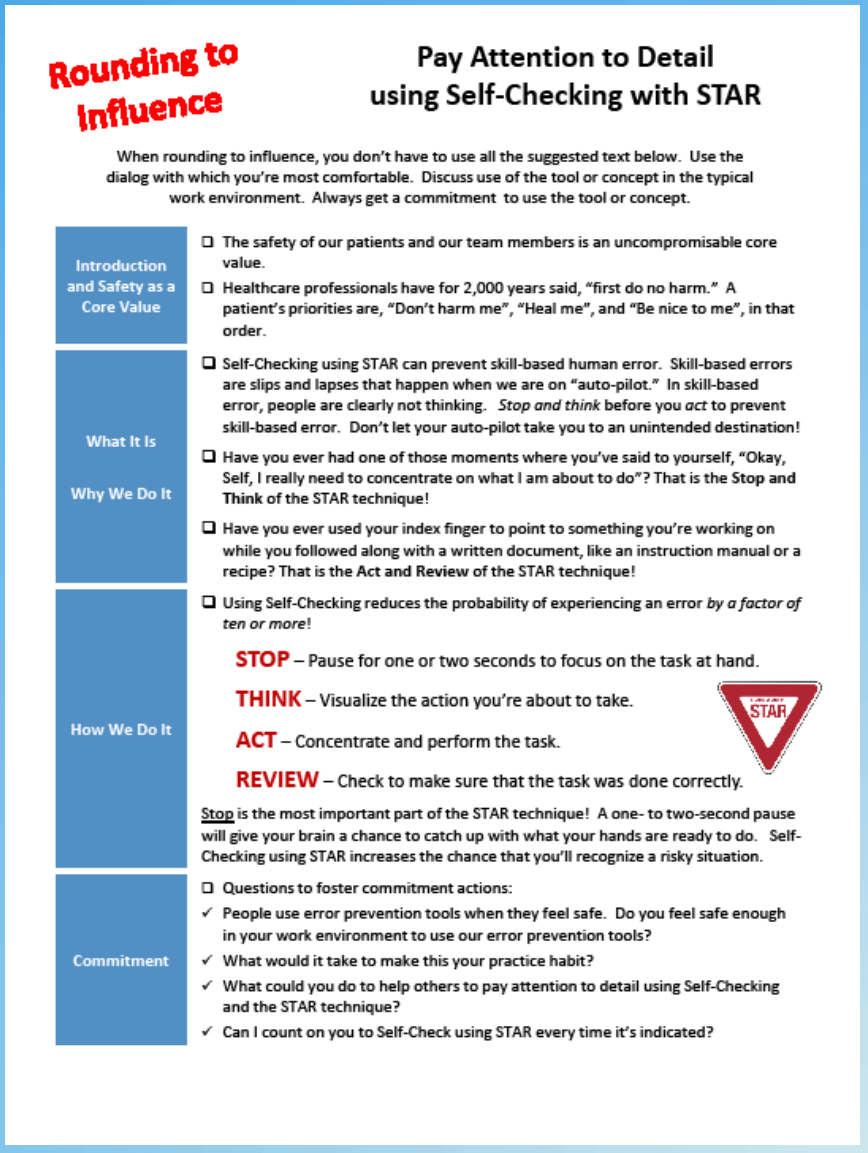
Rounding to Influence

Four steps:

1. Establish reliability/safety as a core value
2. What it is / Why we do it
3. How we do it
4. Get commitment to use the tool or concept when appropriate



Rounding to Influence

Pay Attention to Detail using Self-Checking with STAR

When rounding to influence, you don't have to use all the suggested text below. Use the dialog with which you're most comfortable. Discuss use of the tool or concept in the typical work environment. Always get a commitment to use the tool or concept.

Introduction and Safety as a Core Value

- ❑ The safety of our patients and our team members is an uncompromisable core value.
- ❑ Healthcare professionals have for 2,000 years said, "first do no harm." A patient's priorities are, "Don't harm me", "Heal me", and "Be nice to me", in that order.

What It Is / Why We Do It

- ❑ Self-Checking using STAR can prevent skill-based human error. Skill-based errors are slips and lapses that happen when we are on "auto-pilot." In skill-based error, people are clearly not thinking. *Stop and think* before you *act* to prevent skill-based error. Don't let your auto-pilot take you to an unintended destination!
- ❑ Have you ever had one of those moments where you've said to yourself, "Okay, Self, I really need to concentrate on what I am about to do"? That is the **Stop and Think** of the STAR technique!
- ❑ Have you ever used your index finger to point to something you're working on while you followed along with a written document, like an instruction manual or a recipe? That is the **Act and Review** of the STAR technique!

How We Do It

- ❑ Using Self-Checking reduces the probability of experiencing an error *by a factor of ten or more*!

STOP – Pause for one or two seconds to focus on the task at hand.

THINK – Visualize the action you're about to take.

ACT – Concentrate and perform the task.

REVIEW – Check to make sure that the task was done correctly.

Stop is the most important part of the STAR technique! A one- to two-second pause will give your brain a chance to catch up with what your hands are ready to do. Self-Checking using STAR increases the chance that you'll recognize a risky situation.

Commitment

- ❑ Questions to foster commitment actions:
- ✓ People use error prevention tools when they feel safe. Do you feel safe enough in your work environment to use our error prevention tools?
- ✓ What would it take to make this your practice habit?
- ✓ What could you do to help others to pay attention to detail using Self-Checking and the STAR technique?
- ✓ Can I count on you to Self-Check using STAR every time it's indicated?

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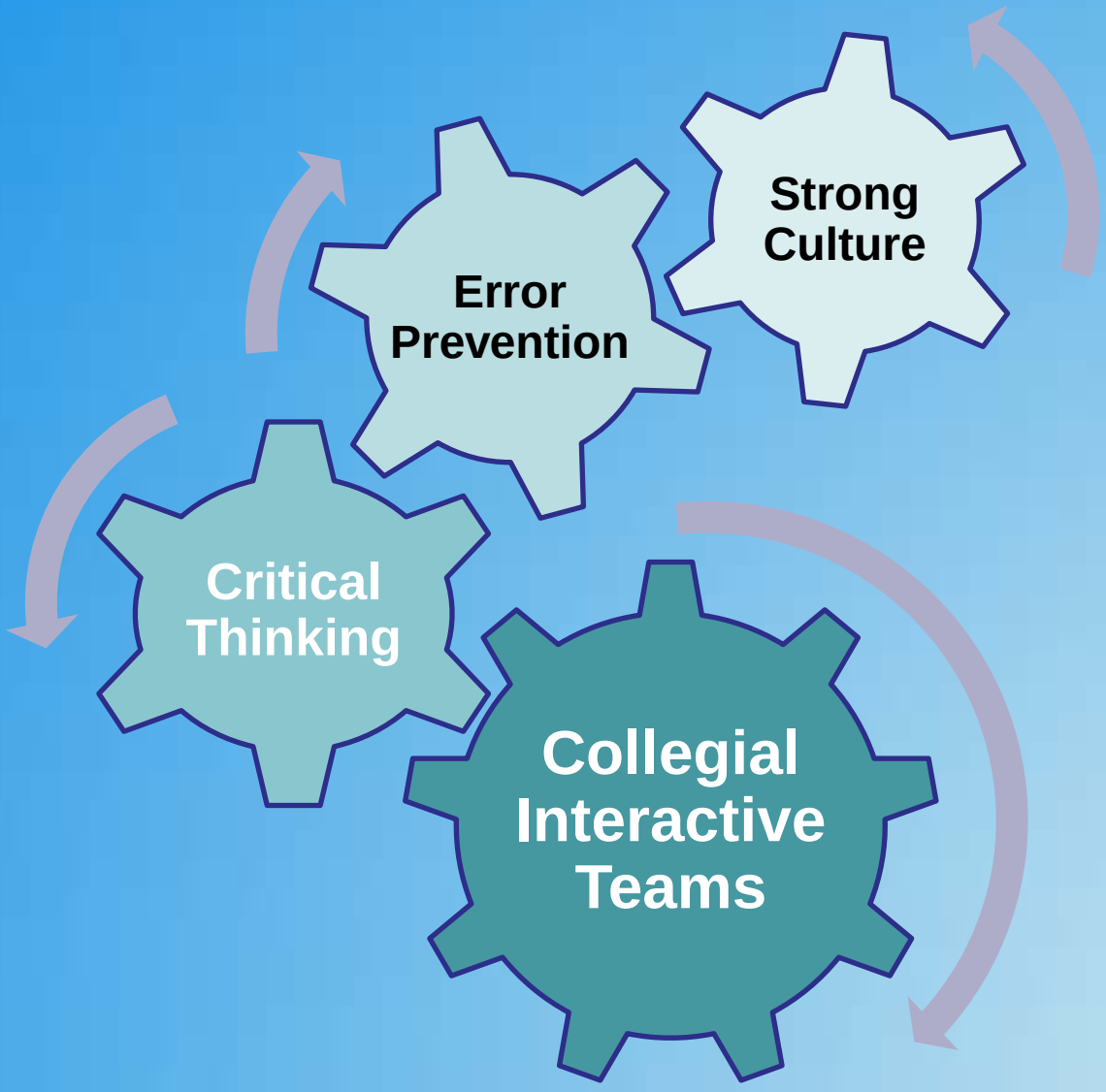
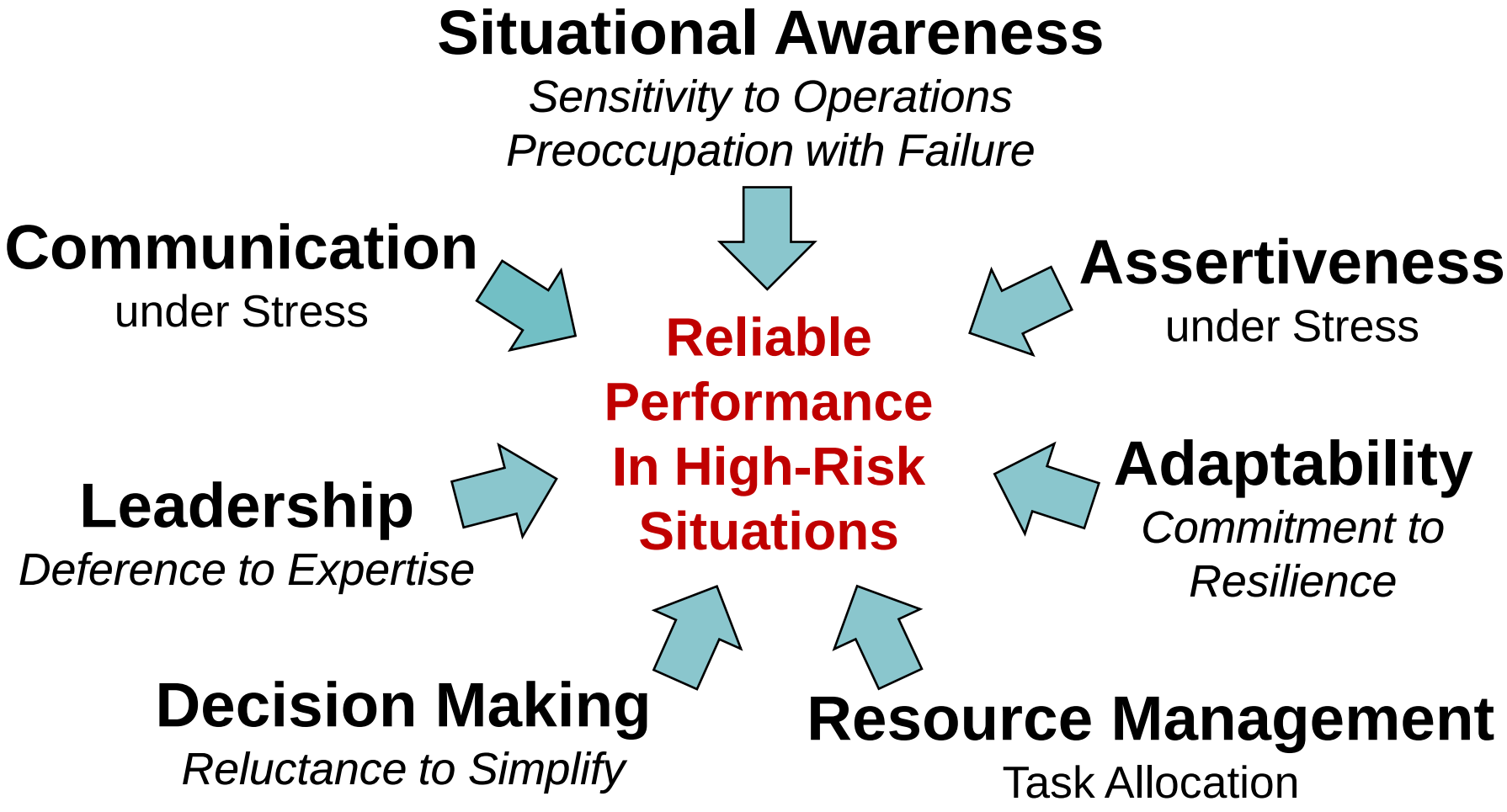
What's Next?


Strong Culture
Error Prevention
Critical Thinking
Collegial Interactive Teams

Leader Understanding –
The elements of Collegial Interactive Teams



Behaviors to Support
Collegial Interactive Teams

Tools supporting CIT promote:

- **Thinking** – preventing misjudgment and decision-making errors
- **Thinking Together** – anticipating and managing the unexpected while preventing group-think
- **Resiliency** – recognizing the team is off the success path and getting back on a path

Most effective in training of natural work teams in simulation.

Simulation – “An activity that mimics reality for education, research, and improving performance”

Behaviors to Support
Collegial Interactive Teams

Lead the Team

- Take the Lead
- Identify objectives
- Assign Roles
- Brief/Execute/Debrief

Maintain Situational Awareness

- Call Outs
- Scan + Big/Little Lens
- Cross Monitor
- Anticipatory Thinking

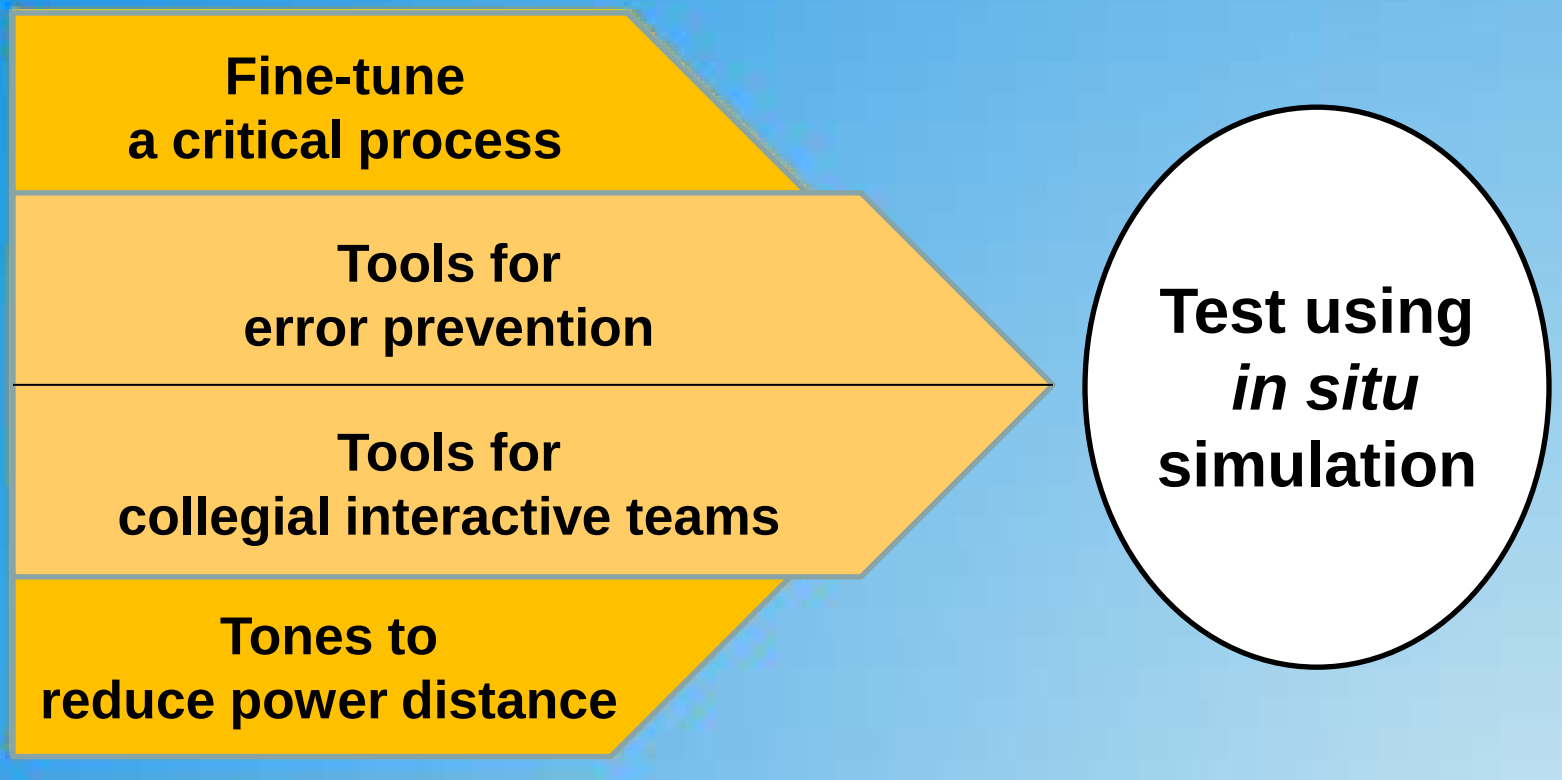
Communicate Clearly

- 3-way Comms
- Numeric Clarification
- Call Outs
- Phonetic Clarification

Think Critically

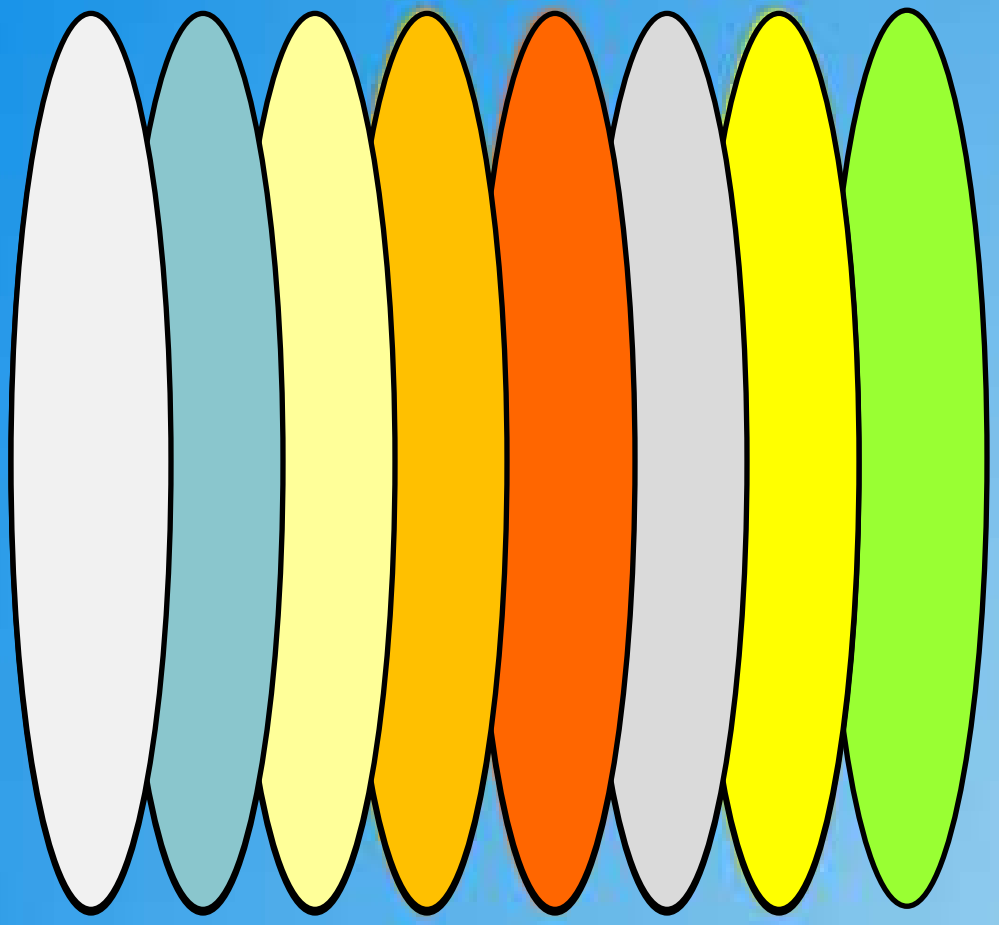
- Questioning Attitude (QVV, Stop &Resolve)
- Decision-Making (STEP)

Making Reliability a Reality -- Exercising Collegial Interactive Teams



***in situ*, Latin for "in position", means to examine the phenomenon exactly in the place where it occurs.**

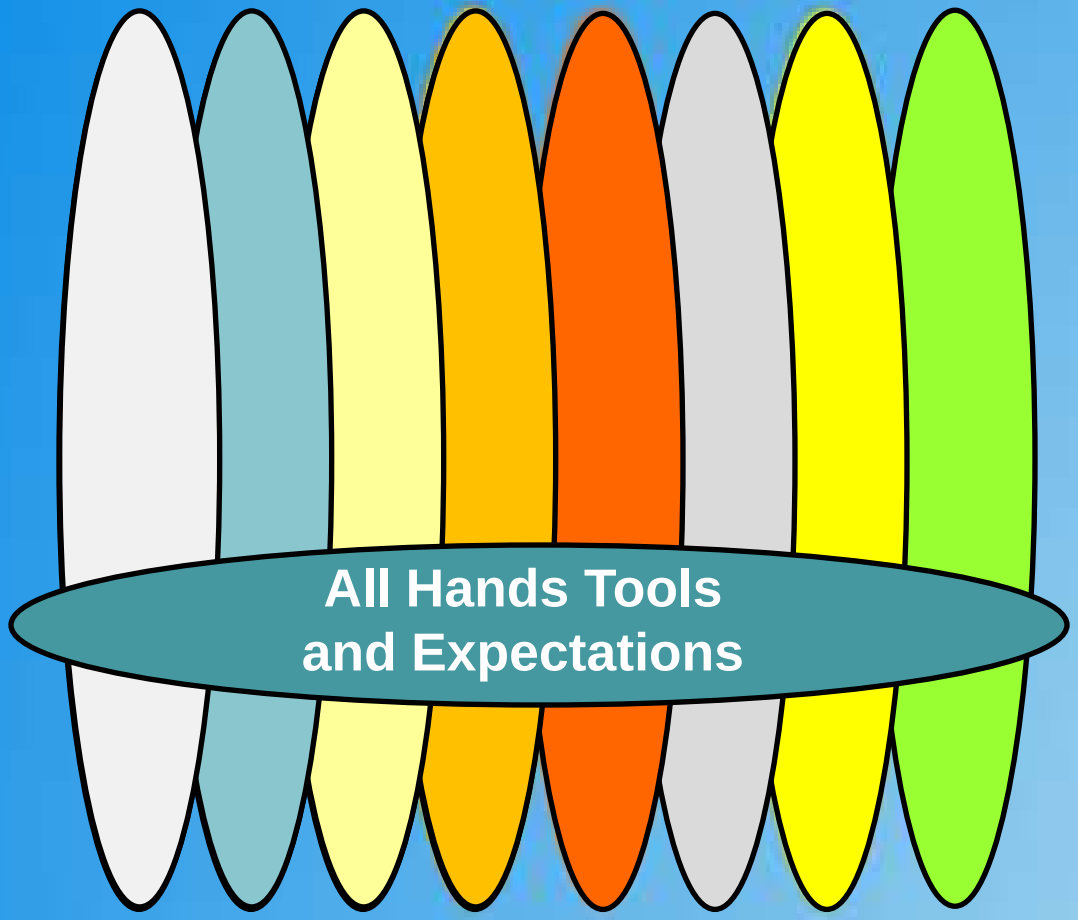
Complimentary Strategies



Competing Priorities

- Competing priority #1
- Competing priority #2
- Competing priority #3
- Competing priority #4
- Competing priority #5
- Ad infinitum . . .

Complimentary Strategies



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Horizontal Interventions

- Behavior expectations for human error prevention
- High Reliability Principles and Accountability Systems

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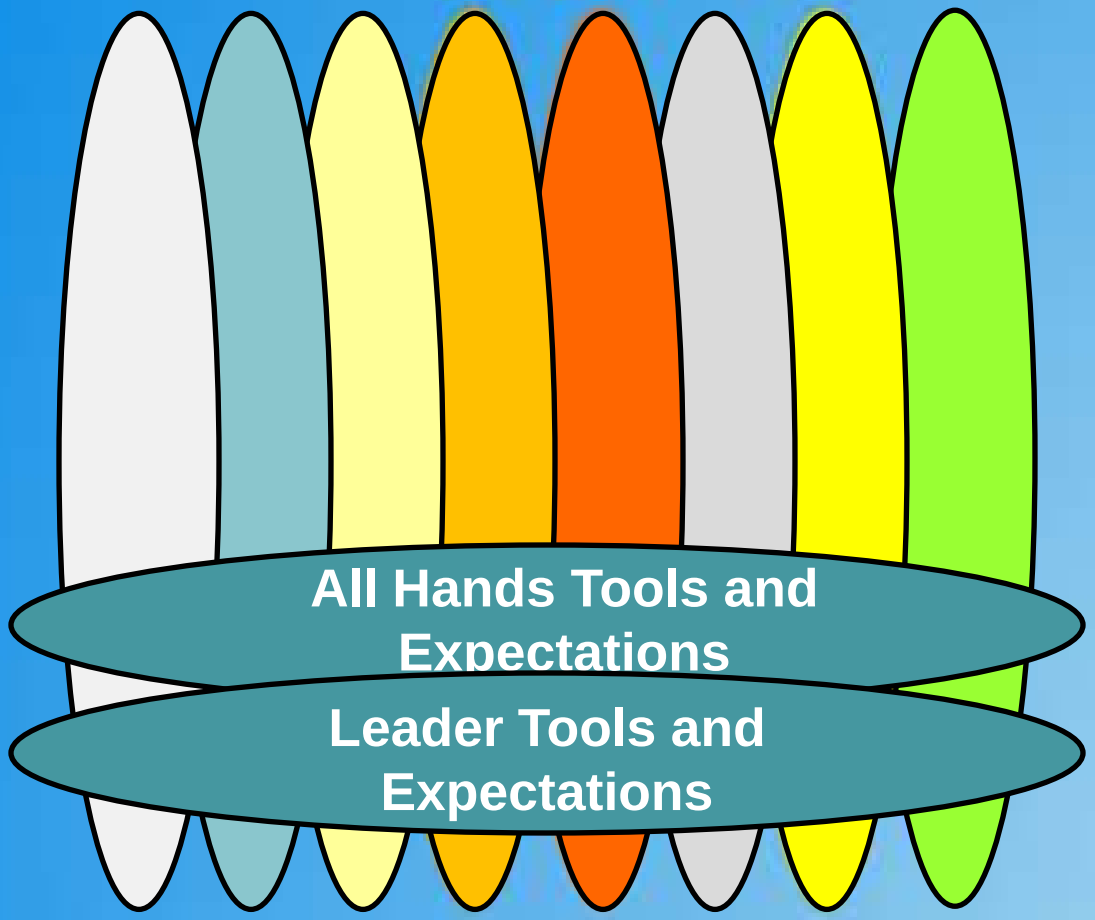

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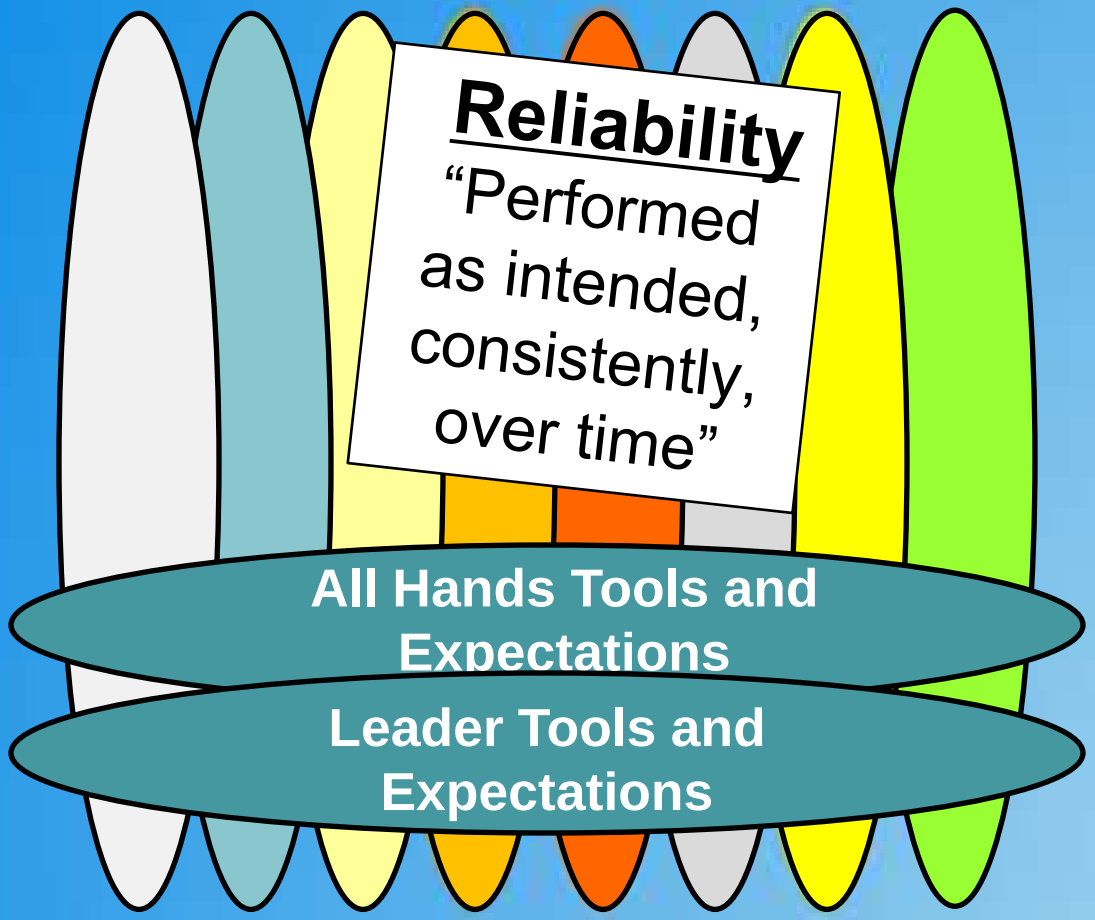

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Consistency of Culture

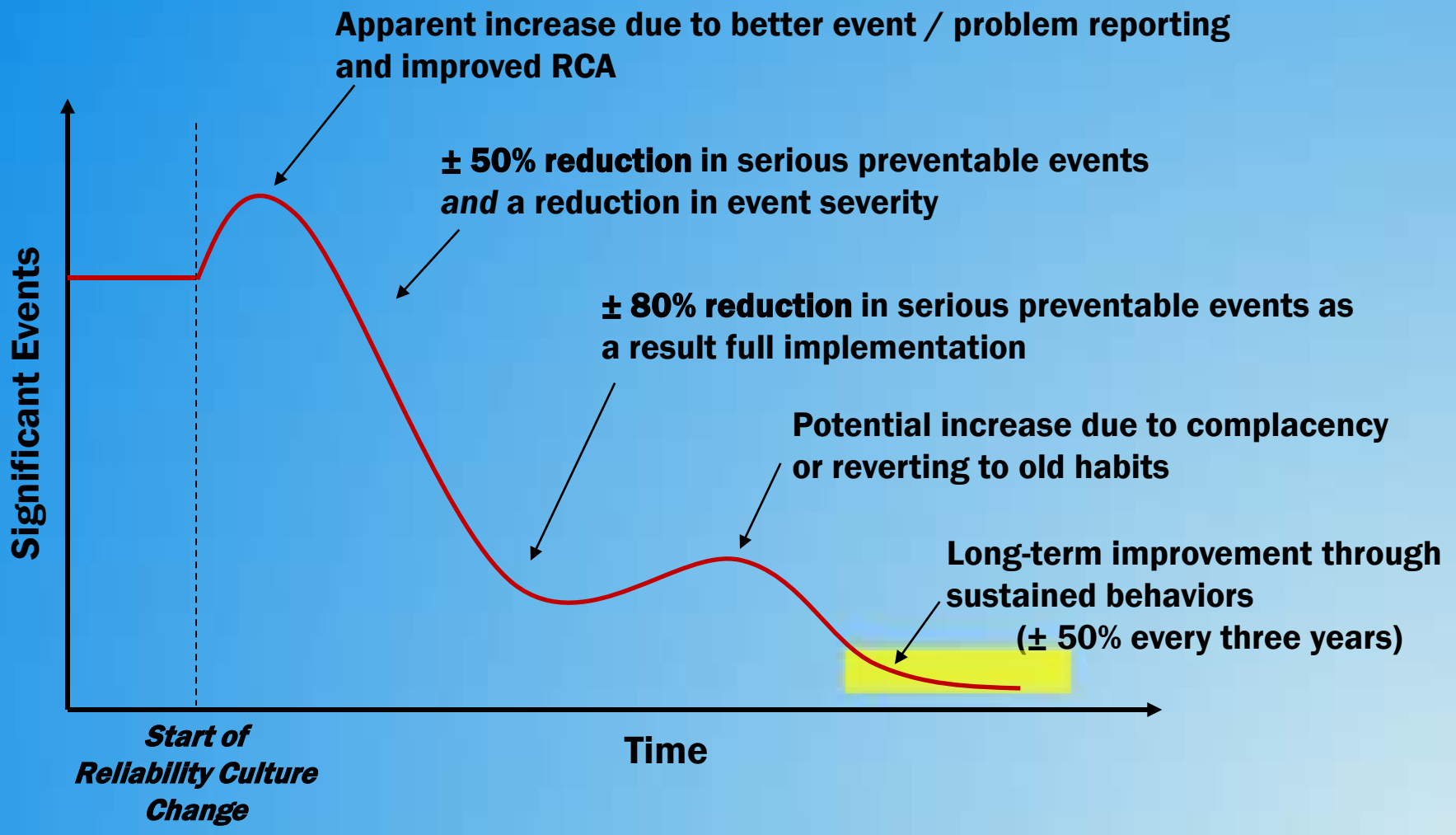
- Safety
- Regulatory Compliance
- Technical Excellence
- Customer Satisfaction
- Employee Satisfaction
- Stakeholder Satisfaction
- Financial Sustainability

Consistency of Culture

Reliability

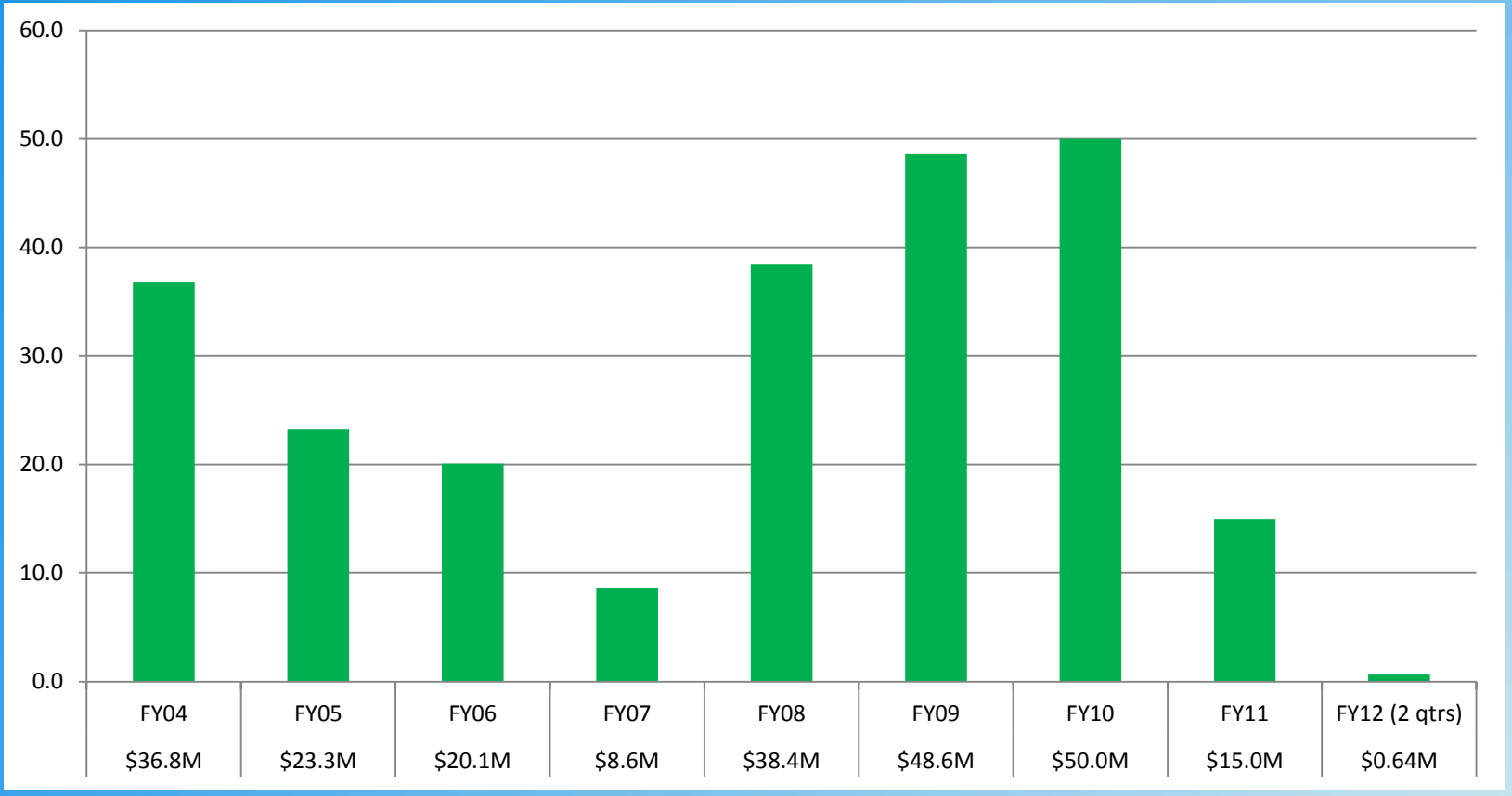
"Performed as intended, consistently, over time"

Achievable Improvement Curve



TVA Human Performance Event Costs

The challenge: Reduce TVA's significant event rate to meet safety, performance, and cost goals



Human Performance Improvement results FY04–FY 12 for the TVA non-nuclear fleet of 123 units (29 hydroelectric, 11 fossil fueled, 83 natural gas). Source: "TVA Focus on Results", J. Patrick O'Neil, NERC HPI Conference 2012, Atlanta, GA.

Potent Quotes

"When you catch problems before they grow bigger, you have more possible solutions." – Dr. Todd Conklin

"High reliability is not a program, it's an operational framework that encompasses all programs – safety, operations, reliability, quality, maintenance, and support." – Dr. Kathleen Sutcliffe

Questions?

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