

***ARE WE TOUCHING  
EVERYONE WHO  
TOUCHES THE GRID?***

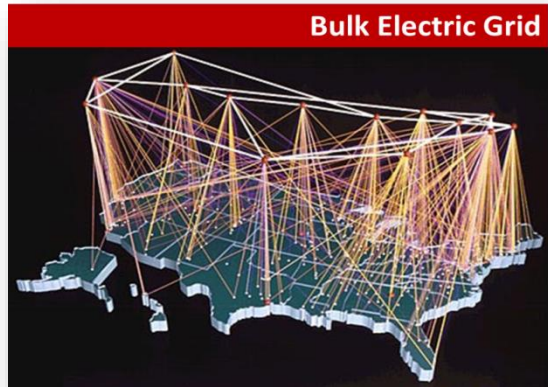
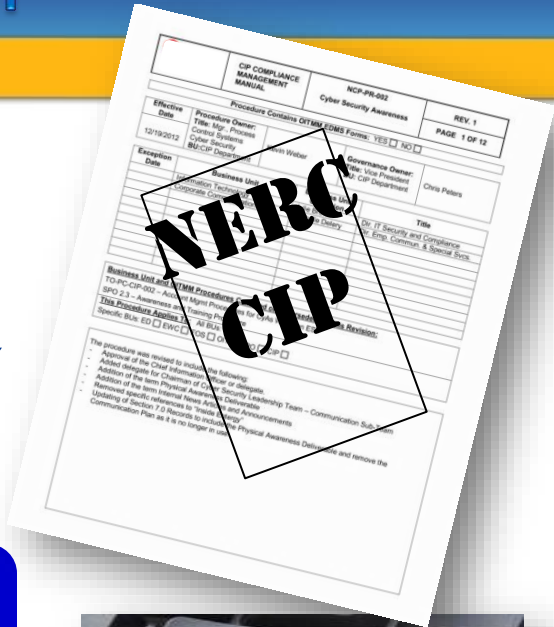
**Tom Harvey, CSP**  
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**REDUCING THE FREQUENCY**  
*and*

**LOWERING THE SEVERITY**  
*of*

**HUMAN ERROR**



# Analysis of Observations

Opportunities to more deeply integrate human performance into the EMS/SCADA/CIP/IT world...

Clear that great gains could be made by strengthening human performance and reducing errors.

While hardware and software failures are often the final manifestations, causes were described as:

"the operator inadvertently...", or "misapplication of rule change", or "operators were not trained to...", or "circumstances negatively affected the ability to make decisions" that point to human interface issues, driven by organizational/systems weaknesses.

Review of the Events Database bears this out as well.

Most attendees had little to no exposure or understanding of human performance, and how it could greatly help their missions.

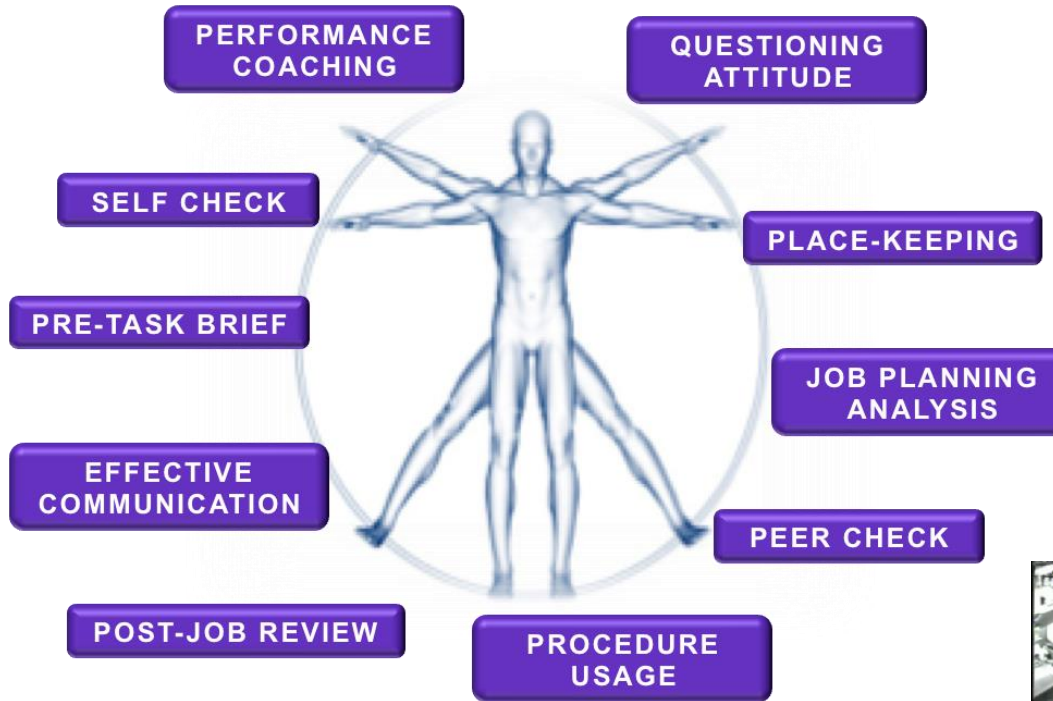
There is a great need within the IT arena for human performance improvement.

There is a strong focus on hardware and software, but...

"Who designs, builds, installs, maintains, and makes changes to hardware and software... ?"

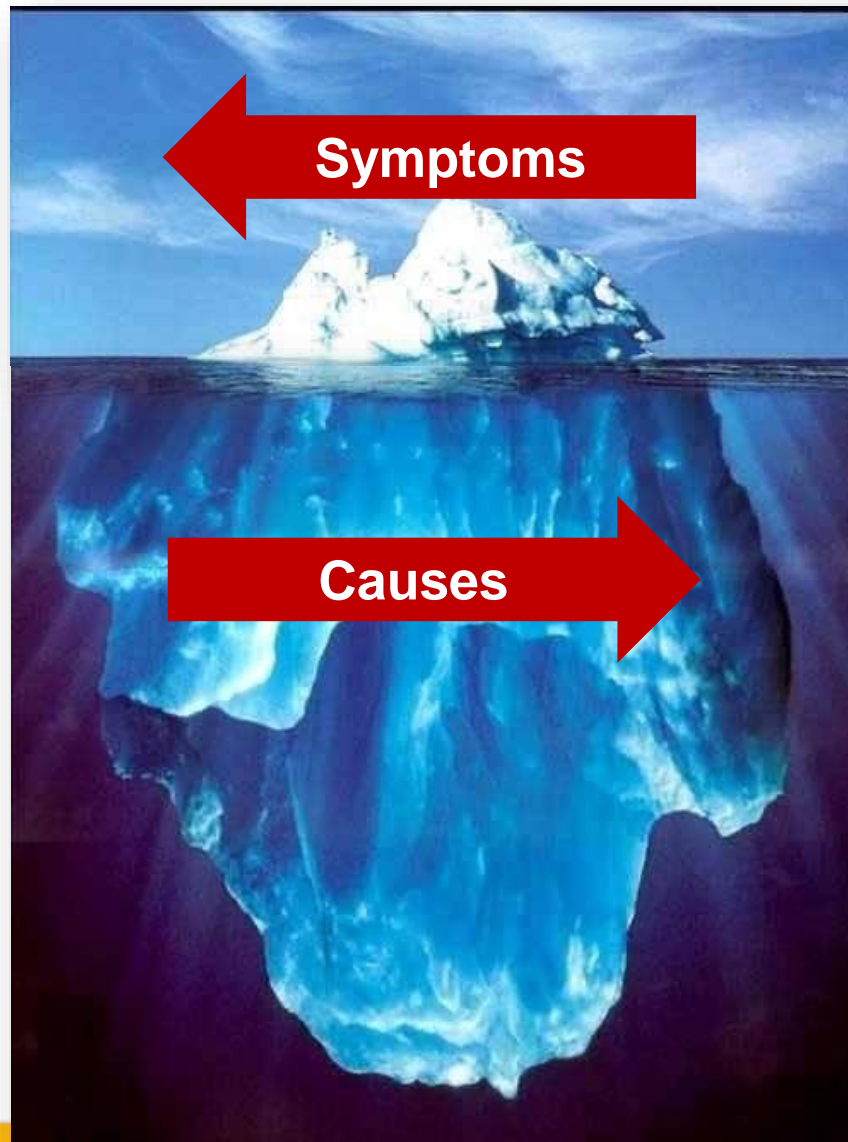


# Humanware



## ***Symptoms are misleading***

- Mistakes
- Violations
- Injuries
- Near-Hits
- High potentials
- Waste
- Inefficiency
- Reliability
- Outage
- Lost income



## ***OP focuses on Causes***

- Situational Traps
- Drift Traps
- Leadership
- Culture
- Job Scoping
- Ineffective use of Tools

# RELIABILITY | ACCOUNTABILITY



## Optimize Performance Error Review (OPER) Form

General	Reviewer:		Date:		
	Person(s) interviewed:				
	Brief description of incident:				
Situational Traps	Which OP <b>Situational Traps</b> were present? (Check all that apply)				
	<input type="checkbox"/> Distractions / Interruptions	<input checked="" type="checkbox"/> Overconfidence	<input type="checkbox"/> Scope Change	<input checked="" type="checkbox"/> Physical Environment	
	<input type="checkbox"/> Time Pressure	<input type="checkbox"/> Vague Guidance	<input type="checkbox"/> Peer Pressure	<input type="checkbox"/> Multiple Tasks	
		<input type="checkbox"/> First Shift/Late Shift	<input type="checkbox"/> Mental Stress		
OP Error Prevention Tools	Which OP <b>Tools</b> were	Used effectively?	Used, but not effectively?	Not used, but were needed?	Not applicable?
	Questioning Attitude	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Self Checking	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Pre-Task Review	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Place Keeping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Procedure Usage	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Peer Check	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Post-Job Review	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Effective Communication	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Turnover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coaching	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
ND Traps & Error Types	Which OP <b>Normalized Drift Traps</b> were identified? (Check all that apply)				
	<input type="checkbox"/> Ineffective Training	<input type="checkbox"/> Conflicting Values			
	<input checked="" type="checkbox"/> Flawed Procedures	<input type="checkbox"/> Faulty Equipment			
	<input type="checkbox"/> Bad Habits	<input checked="" type="checkbox"/> Technology			
	<input type="checkbox"/> Vague Policies	<input type="checkbox"/> Lack of Accountability			
	<input type="checkbox"/> Condoning	<input checked="" type="checkbox"/> Design/Engineering			
	Description of ND Traps:				
CAS	Are ND Traps applicable to other business units?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Error Type:	<input checked="" type="checkbox"/> Skill based <input type="checkbox"/> Rule based <input type="checkbox"/> Knowledge based	
	Have corrective actions been initiated?	<input type="checkbox"/> Yes <input type="checkbox"/> No	NOTES		



## DECISION-MAKING

Perceptions of Risk/  
Risk Taking/Risk Aversion

Task Design/  
Management of Change

Empowerment /  
Autonomy/  
Authority

Workgroup Dynamics –  
Participation/Peer Pressure/  
Conflict Resolution

Organizational Culture –  
Integrity/Ethics/  
Value of Safety

Education/  
Training/  
Aptitude

## FACTORS

Interpersonal Dynamics –  
Heredity/Culture/  
Personality/  
Attitudes/Habits

Communication

Leadership

Accountability/  
Expectations/  
Performance Criteria

Mental and Emotional State/  
Consciousness/  
Situational Awareness



# NORMALIZED DRIFT



When variations in accepted standards, processes, and practices don't result in serious consequences and, over time, become the new norm, allowing risk to increase.



## E X A M P L E S

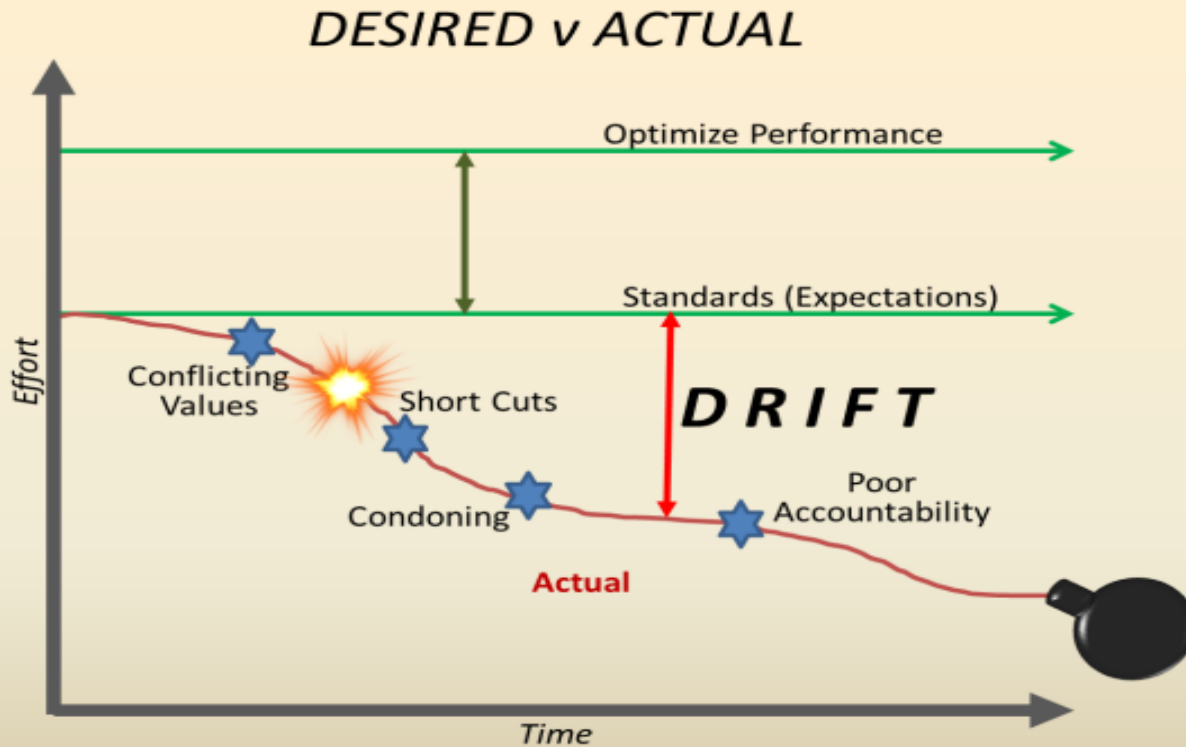
- Individual – Group – Systemic
- “Temporary” becomes long-term
- Short Cuts
- Extend PM to cut costs
- “Learn to live with it”
- Condoning

## D E F I N E D

- Unacceptable risks become acceptable, over time
- Hard to find, easy to ignore
- Growing tolerance for things that are not right
- Under the radar of audits



# NORMALIZED DRIFT



The distinction between “likelihood” and “consequences”

How do you make decisions?

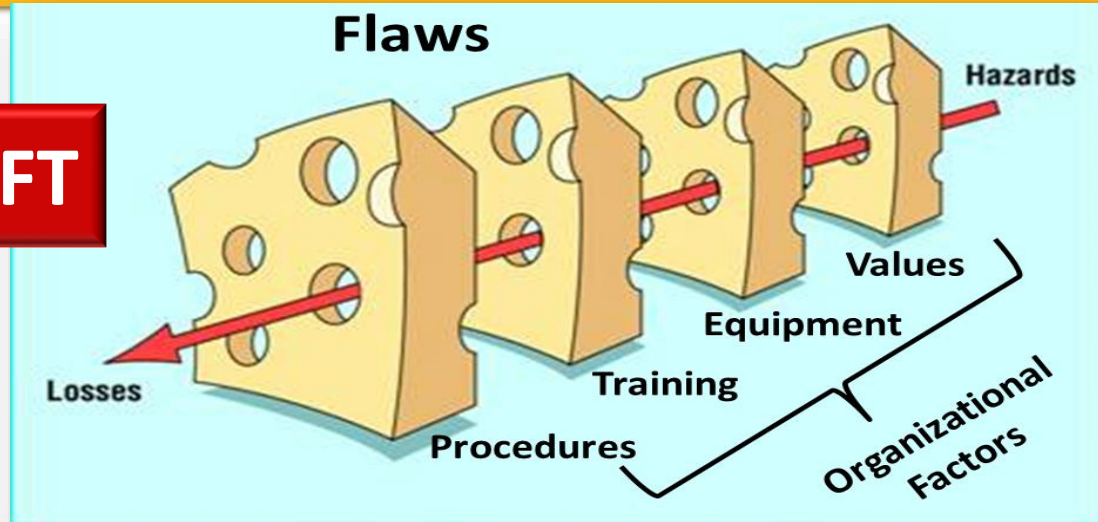
Drift and Risk grow proportionately.

# Acceptable Risks?



## NORMALIZED DRIFT

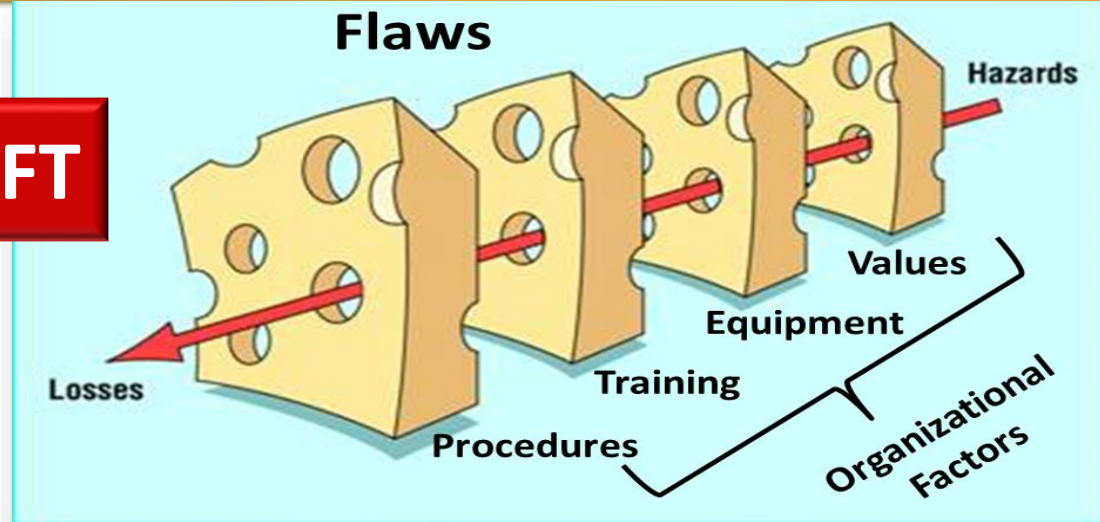
**Traps** in the form of weakness and breakdowns in organizational and personal defenses that become accepted over time, resulting in sub-standard performance, increased risks, and adverse events.



1. **Conflicting Values** – when stated organizational principles and values do not match actual performance
2. **Condoning** – tacit approval of unacceptable deviations
3. **Bad Habits** – short cuts, complacency, wrong perceptions of risk, thrill seeking
4. **Vague Policies** – misunderstood and inconsistently applied
5. **Ineffective Training** – improved job performance not realized

## NORMALIZED DRIFT

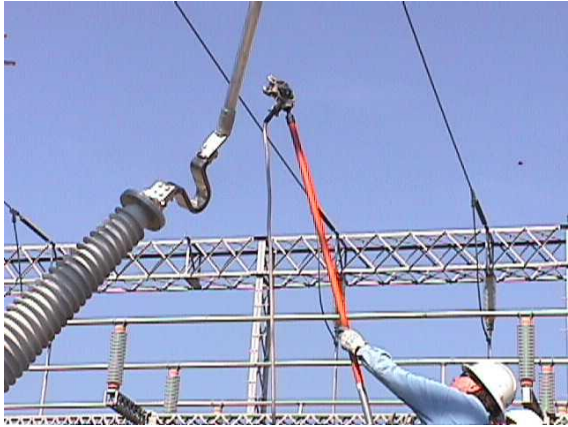
**Traps** in the form of weakness and breakdowns in organizational and personal defenses that become accepted over time, resulting in sub-standard performance, increased risks, and adverse events.



- 6. Flawed Procedures** – needed but missing, incorrect, unclear
- 7. Faulty Equipment** – broken, out of date, inaccurate
- 8. Technology** – failure to take advantage of technology
- 9. Design/Engineering** – inaccurate drawings, component labeling, unapproved modifications
- 10. Lack of Accountability** – Focus is on results rather than how achieved; expectations not clear

Where are you...

***DRIFTING  
to  
DISTASTER?***



## Who Else Have We Missed?

**Contractors**

**Pretenders, Fakers, Make-believers**

**Overconfident & Delusional**

**Those who didn't get it... for whatever reason**



## What Else is *Critical*?

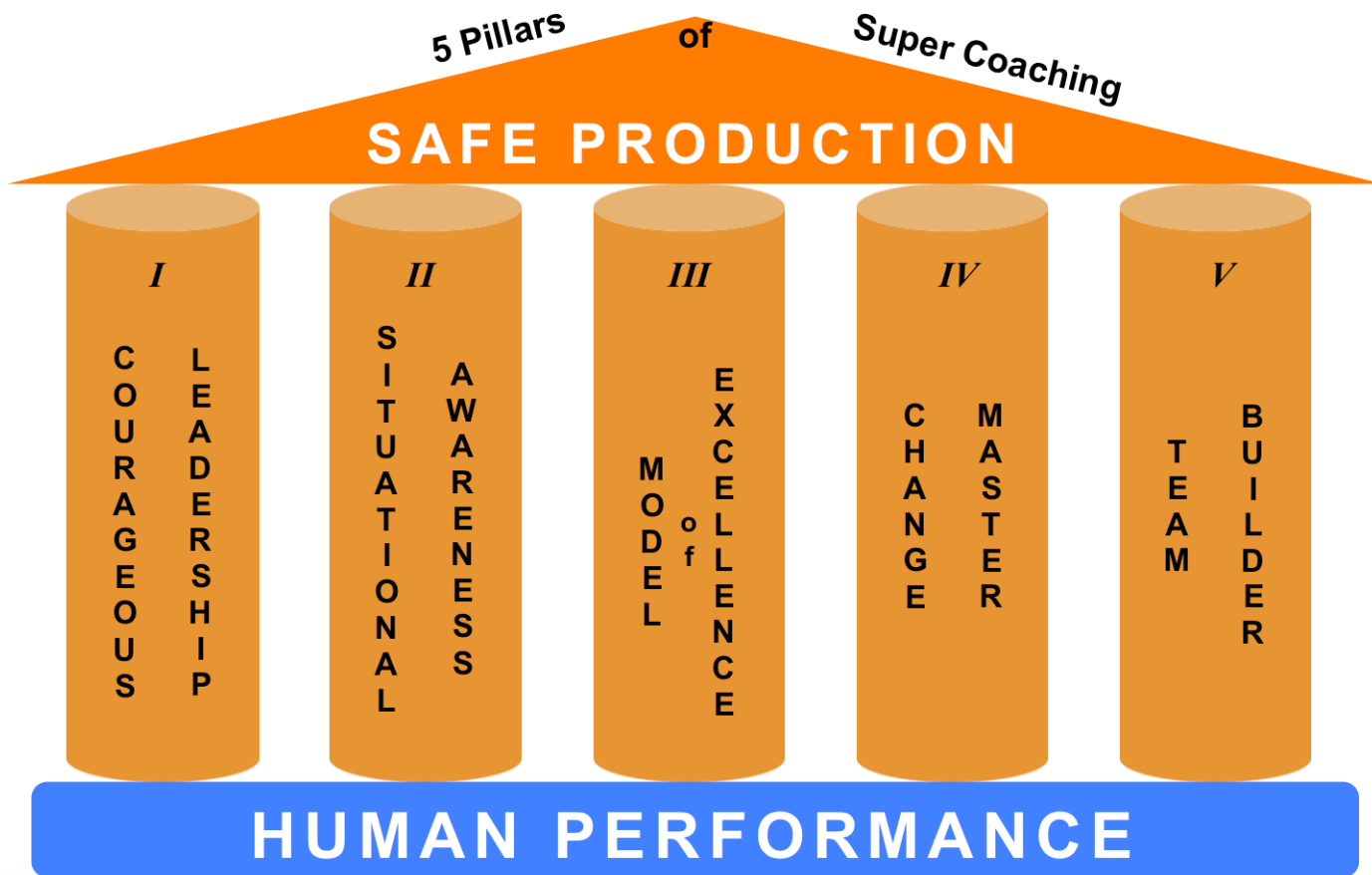
### **Accountability**

- **Weak Links**
- **Bad Apples**
- **Uncontrolled Risks**



# What Else is *Critical*?

## Super Coaching





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