INCIDENT INVESTIGATIONS FROM AN HPI PERSPECTIVE - ONE COMPANY'S JOURNEY

PPSA ANNUAL CONFERENCE, JUNE 2016

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June 2016

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WHAT IF?

- What if paper machines could fly? Who would want to embark on a device with 95% efficiency? Even 99%?
- What if paper machines were nuclear power plants, could we tolerate the level of reliability we currently have?
- What do airplanes and nuclear plants have in common?
- Study of

Human Performance Improvement

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WHAT ARE THE ODDS…

Odds of being injured in the pulp and paper industry
US-OSHA statistics (2014)
1 in 69,000

Odds of being injured in the nuclear industry
US-OSHA statistics (2014)
1 in 670,000

Odds of being killed on a single airline flight
Top 39 airlines (best accident rates)
1 in 19.8 million

Source: OAG Aviation & PlaneCrashInfo.com accident database, 20 years of data (1993 - 2012)

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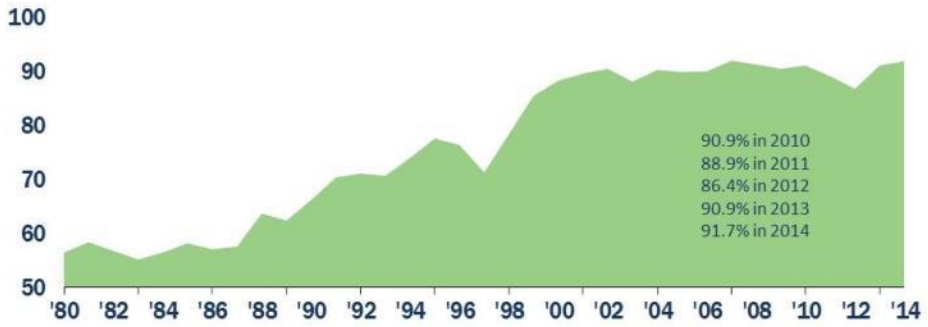
IS PRODUCTIVITY COMPATIBLE WITH SAFETY?

Sustained Reliability and Productivity

U.S. Nuclear Capacity Factor, Percent

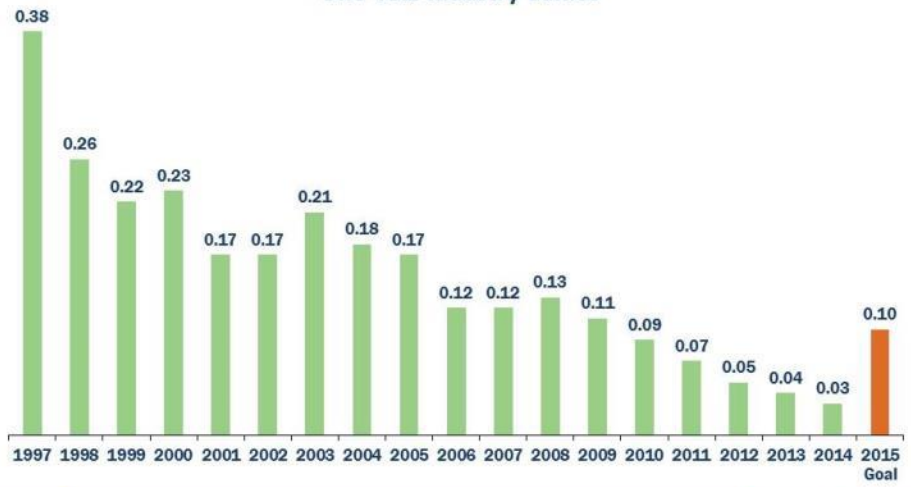


Source: Energy Information Administration
Updated: 5/14

NUCLEAR ENERGY INSTITUTE nuclear. clean air energy.

U.S. Nuclear Industrial Safety Accident Rate

One-Year Industry Values



ISAR = Number of accidents resulting in lost work, restricted work, or fatalities per 200,000 worker hours.
Note: Starting in 2008, data includes supplemental personnel.
Source: World Association of Nuclear Operators
Updated: 5/15

NUCLEAR ENERGY INSTITUTE nuclear. clean air energy.

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CAN THIS BE USED IN OUR INDUSTRY?

- How complicated is this?
- Can we do this in with our limited ressources?

Human Performance Improvement

HPI

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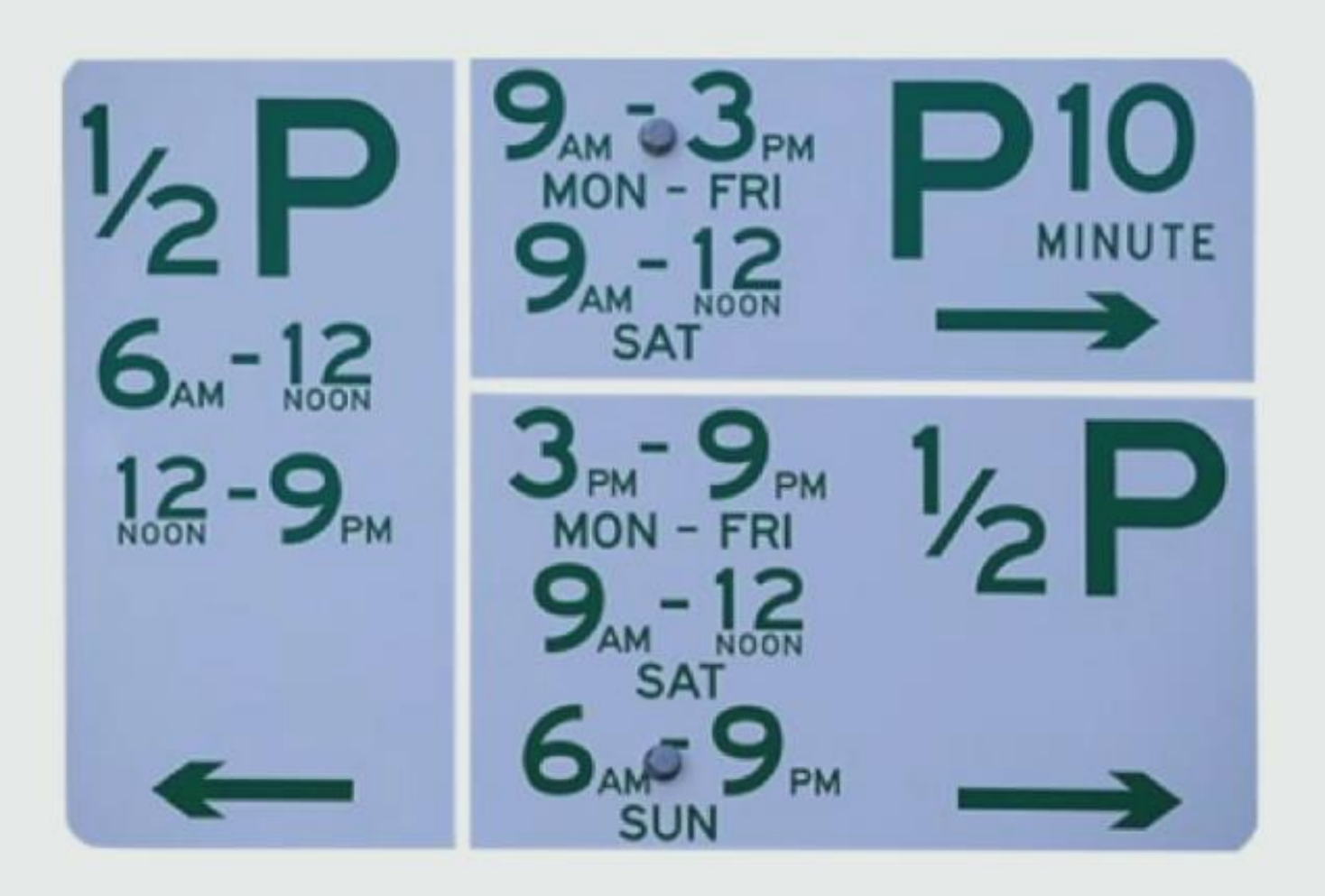
What is HPI and where does it come from?

FRIDAY 8:30AM, CAN I PARK ?



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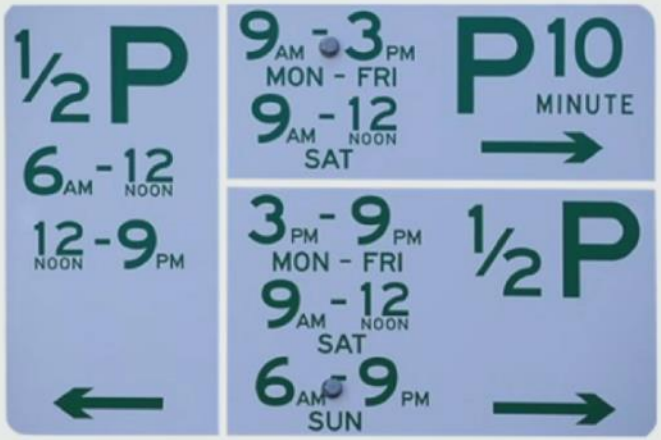
HPI TOOLS & DATA VISUALIZATION ?

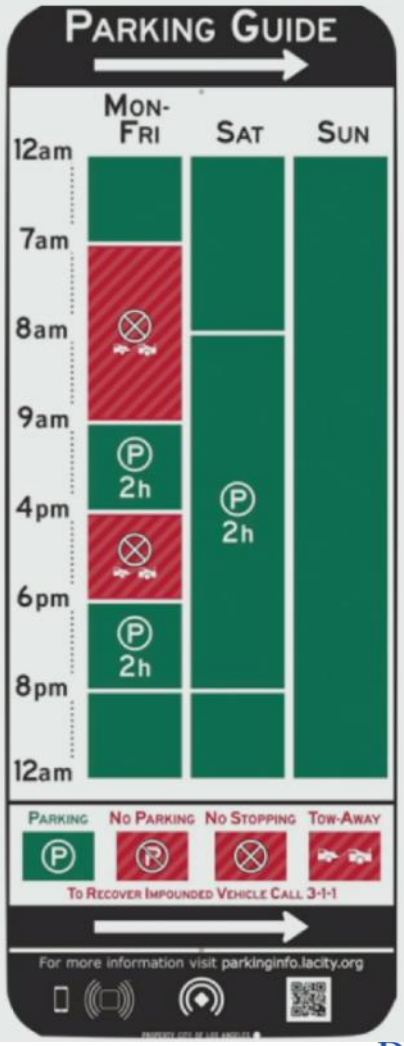
A visualization should be meaningful, should be build with a purpose; to answer a question

It's Friday morning 8:30 can I park here?

It's a simple question but sign on the left side does not answer the question !

it's a data dump and user is expected you to find out.





In the visualization, answer is easy to find: **No I can't park**

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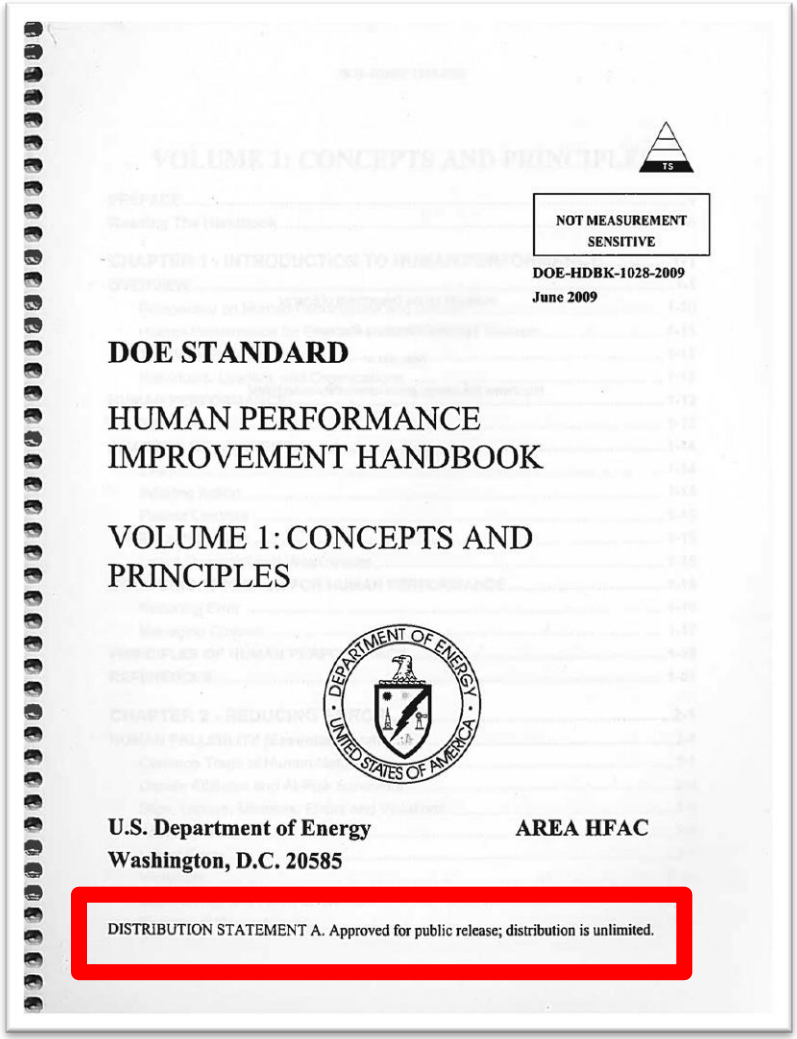
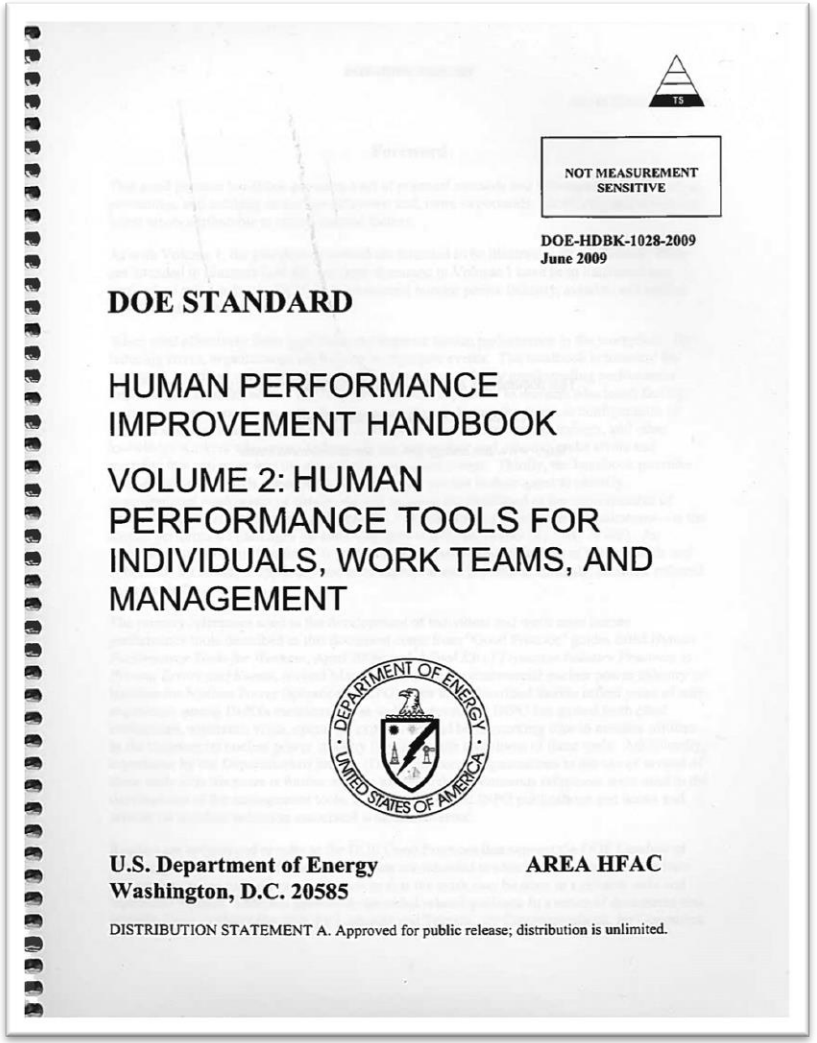
HPI: THE REFERENCE MANUALS





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HPI: 5 KEY FUNDAMENTAL PRINCIPLES

1. People are fallible and even the best make mistakes.
2. Error-likely situations are predictable, manageable, and preventable.
3. Individual behavior is influenced by organizational processes and values.
4. People achieve high levels of performance because of encouragement and reinforcement received from leaders, PEERS, and subordinates.
5. Events can be avoided through an understanding of the reasons mistakes occur and application of the lessons learned from past events (or errors).

FROM DOMINOS TO SWISS CHEESE

Active error

BARRIERS OR CONTROLS TO PREVENT UNWANTED OUTCOMES

Latent error (weakens a barrier)

HPI TOOLBOX TO PREVENT ACTIVE AND LATENT ERRORS

CULTURAL

ENGINEERED

ADMINISTRATIVE

MANAGEMENT / OVERSIGHT

Unwanted Outcome

Re + MB = 0E

Reduce errors | Manage Barriers | Zero Significant Events

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HIGH RELIABILITY ORGANIZATION *EXAMPLES*

Aircraft Carriers

Air Traffic Controller

Airplane Cockpit Crews

Power Grid Dispatch Center

Nuclear Submarine

Nuclear Power Plants

Re + Mb ➡ 0E

HPI

Not limited to Safety

Quality / Reliability / Environment

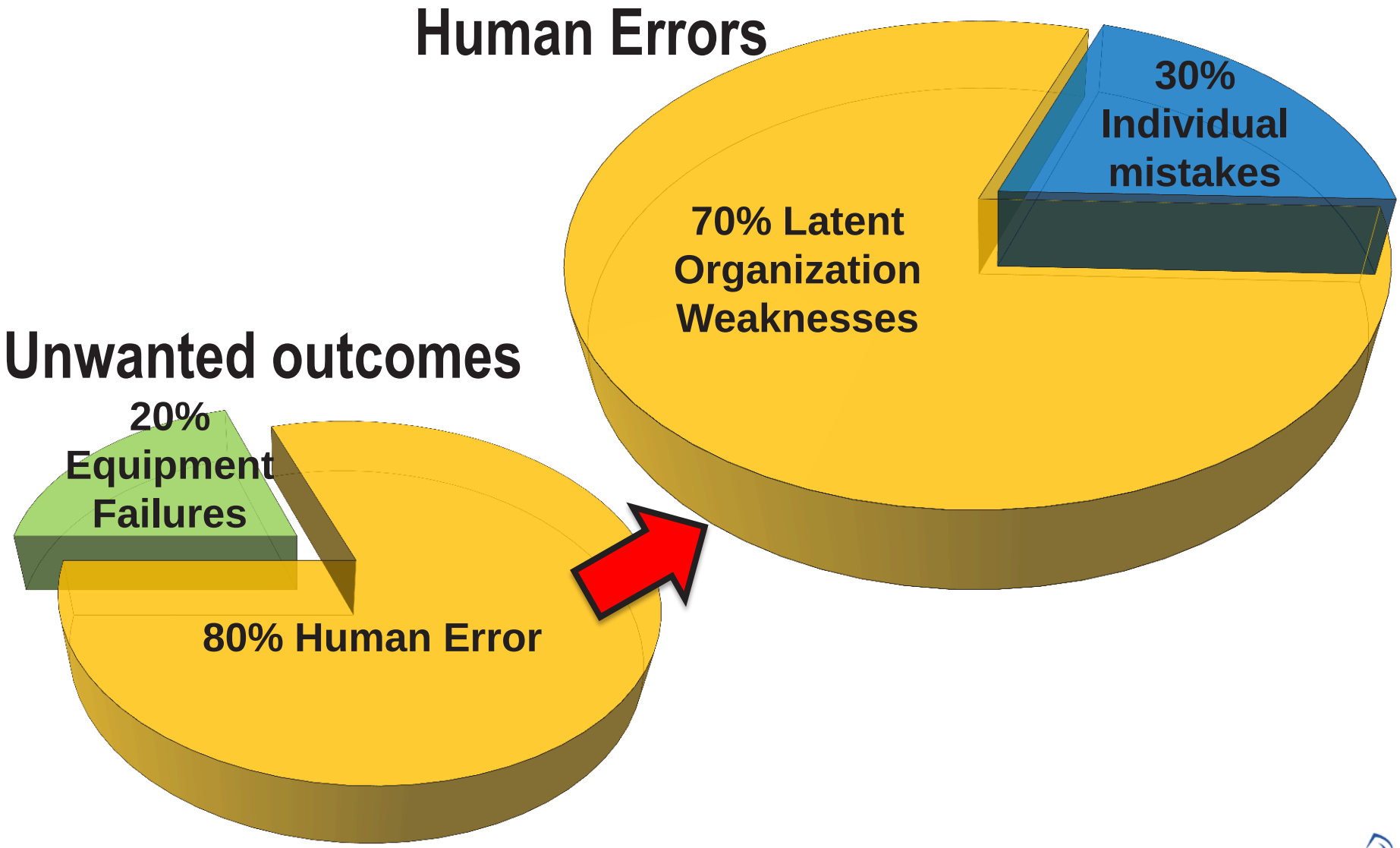
Touches all Value Drivers

HPI

Moves away from relegating Human Error to a fault based system

Blaming people, training, procedures

HUMAN PERFORMANCE AND EVENTS



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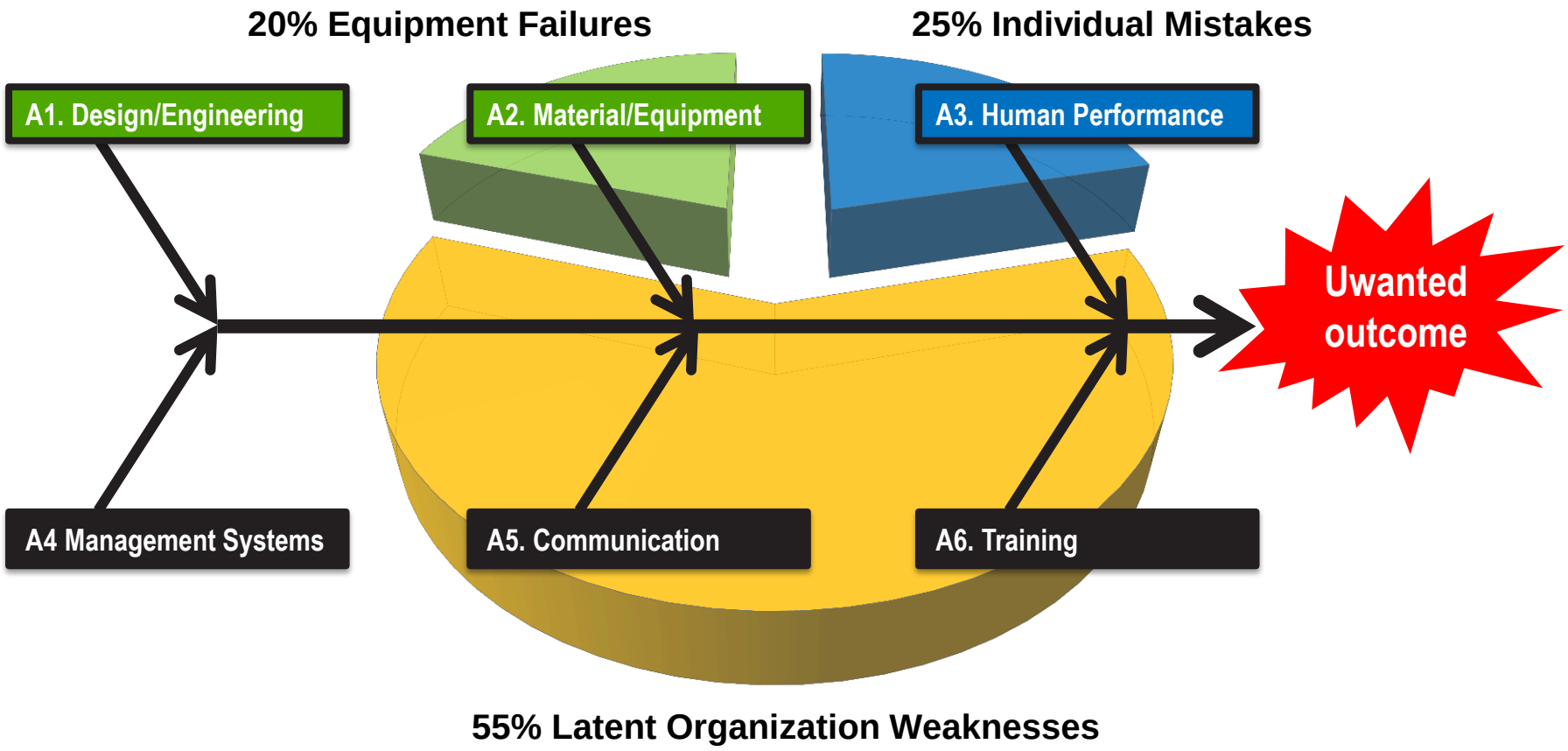
55/25/20% RULE OF HUMAN ERROR



FROM D.O.E. STANDARD

CAUSAL FACTORS

A1 Design / Engineering Problem

B1 DESIGN INPUT LTA
- C01 Design input cannot be met
- C02 Design input obsolete
- C03 Design input not correct
- C04 Necessary design input not available

B2 DESIGN OUTPUT LTA
- C01 Design output scope LTA
- C02 Design output not clear
- C03 Design output not correct
- C04 Inconsistent design output
- C05 Design input not addressed in design output
- C06 Drawing, specification, or data error
- C07 Error in equipment or material selection
- C08 Error not detectable
- C09 Errors not recoverable

B3 DESIGN/ DOCUMENTATION LTA
- C01 Design/ documentation not complete LTA
- C02 Design/ documentation not up-to-date
- C03 Design/ documentation not controlled

B4 DESIGN/ INSTALLATION VERIFICATION LTA
- C01 Independent review of design/documentation LTA
- C02 Testing of design/ installation LTA
- C03 Independent inspection of design / installation LTA
- C04 Acceptance of design / installation LTA

B5 OPERABILITY OF DESIGN/ ENVIRONMENT LTA
- C01 Ergonomics LTA
- C02 Physical environment LTA
- C03 Natural environment LTA

A2 Equipment / Material Problem

B1 CALIBRATION FOR INSTRUMENTS LTA
- C01 Calibration LTA
- C02 Equipment found outside acceptance criteria

B2 PERIODIC / CORRECTIVE MAINTENANCE LTA
- C01 Preventive maintenance for equipment LTA
- C02 Predictive maintenance LTA
- C03 Corrective maintenance LTA
- C04 Equipment history LTA

B3 INSPECTION / TESTING LTA
- C01 Start-up testing LTA
- C02 Inspection / testing LTA
- C03 Post-maintenance / post modification testing LTA

B4 MATERIAL CONTROL LTA
- C01 Material handling LTA
- C02 Material storage LTA
- C03 Material packaging LTA
- C04 Material shipping LTA
- C05 Shelf life exceeded
- C06 Unauthorized material substitution
- C07 Marking / labeling LTA

B5 PROCUREMENT CONTROL LTA
- C01 Control of changes to procurement specifications / purchase order LTA
- C02 Fabricated item did not meet requirements
- C03 Incorrect item received
- C04 Product acceptance requirements LTA

B6 DEFECTIVE, FAILED OR CONTAMINATED
- C01 Defective or failed part
- C02 Defective or failed material
- C03 Defective weld, braze or soldering point
- C04 End of life failure
- C05 Electrical or instrument noise
- C06 Contamination

A3 Human Performance LTA

B1 SKILL BASED ERROR
- C01 Check of work was LTA
- C02 Step was omitted due to mental lapse
- C03 Incorrect performance due to mental lapse
- C04 Infrequently performed steps were performed incorrectly
- C05 Delay in time caused LTA actions
- C06 Wrong action selected based on similarity with other actions
- C07 Omission / repeating of steps due to assumptions for completion

B2 RULE BASED ERROR
- C01 Strong rule incorrectly chosen over other rules
- C02 Signs to stop were ignored and step performed incorrectly
- C03 Too much activity was occurring and error made in problem solving
- C04 Previous success in use of rule reinforced continued use of rule
- C05 Situation incorrectly identified or represented resulting in wrong rule used

B3 KNOWLEDGE BASED ERROR
- C01 Attention was given to wrong issues
- C02 LTA Conclusion based on sequencing of facts
- C03 Individual justified action by focusing on biased evidence
- C04 LTA review based on assumption that process will not change
- C05 Incorrect assumption that a correlation existed between two or more facts
- C06 Individual underestimated the problem by using past event as basis

B4 WORK PRACTICES LTA
- C01 Individual's capability to perform work LTA [Examples include: Sensory/perceptual capabilities LTA, Motor/ physical capabilities LTA, and Attitude/ psychological profile LTA.]
- C02 Deliberate violation

A4 Management Problem

B1 MANAGEMENT METHODS LTA
- C01 Management policy guidance/ expectations not well-defined, understood or enforced
- C02 Job performance standards not adequately defined
- C03 Management direction created insufficient awareness of impact of actions on safety/ reliability
- C04 Management follow-up or monitoring of activities did not identify problems
- C05 Management assessment did not determine causes of previous event or known problem
- C06 Previous industry or in-house experience was not effectively used to prevent recurrence
- C07 Responsibility of personnel not well-defined or personnel not held accountable
- C08 Corrective action responses to a known or repetitive problem was untimely
- C09 Corrective actions for previously identified problem or event was not adequate to prevent recurrence

B2 RESOURCE MANAGEMENT LTA
- C01 Too many administrative duties assigned to immediate supervisor
- C02 Insufficient supervisory resources to provide necessary supervision
- C03 Insufficient manpower to support identified goal/ objective
- C04 Resources not provided to assure adequate training was provided / maintained
- C05 Needed resource changes not approved / funded
- C06 Means not provided for assure procedures/ documents/ records were of adequate quality and up-to-date
- C07 Means not provided for assuring adequate availability of appropriate materials / tools
- C08 Means not provided for assuring adequate equipment quality, reliability, or operability
- C09 Personnel selections did not assure match of worker motivations / job descriptions
- C10 Means / method not provided for assuring adequate quality of contract services

B3 WORK ORGANIZATION & PLANNING LTA
- C01 Insufficient time for worker to prepare task
- C02 Insufficient time allotted for task
- C03 Duties not well-distributed among personnel
- C04 Too few workers assigned to task
- C05 Insufficient number of trained or experienced workers assigned to task
- C06 Planning not coordinated with inputs from walk-downs/ task analysis
- C07 Job scoping did not identify potential task interruptions and/or environmental stress
- C08 Job scoping did not identify special circumstances and/or conditions
- C09 Work planning not coordinated with all departments involved in task
- C10 Problem performing repetitive tasks and/or subtasks
- C11 Inadequate work package preparation

B4 SUPERVISORY METHODS LTA
- C01 Tasks and individual accountability not made clear to worker
- C02 Progress/status of task not adequately tracked
- C03 Appropriate level of in-task supervision not determined prior to task
- C04 Direct supervisory involvement in task interfered with overview role
- C05 Emphasis on schedule exceeded emphasis on methods/doing a good job
- C06 Job performance and self-checking standards not properly communicated
- C07 Too many concurrent tasks assigned to worker
- C08 Frequent job or task "shuffling"
- C09 Assignment did not consider worker's need to use higher-order skills
- C10 Assignment did not consider worker's previous task
- C11 Assignment did not consider worker's ingrained work patterns
- C12 Contact with personnel too infrequent to detect work habit/attitude changes
- C13 Provided feedback on negative performance but not on positive performance

B5 CHANGE MANAGEMENT LTA
- C01 Problem identification did not identify need for change
- C02 Change not implemented in a timely manner
- C03 Inadequate vendor support of change
- C04 Risks/consequences associated with change not adequately reviewed/ assessed
- C05 System interactions not considered
- C06 Personnel/ department interactions not considered
- C07 Effects of change on schedules not adequately addressed
- C08 Change-related training/ retraining not performed or not adequate
- C09 Change-related documents not developed or revised
- C10 Change-related equipment not developed or revised
- C11 Changes not adequately communicated
- C12 Change not identifiable during task

A5 Communication LTA

B1 WRITTEN COMMUNICATIONS METHODS OF PRESENTATION LTA
- C01 Format deficiencies
- C02 Improper referencing or branching
- C03 Checklist LTA
- C04 Deficiencies in user aids (charts, etc.)
- C05 Recent changes not made apparent to user
- C06 Instruction step/ information in wrong sequence
- C07 Unclear/ complex wording or grammar

B2 WRITTEN COMMUNICATION CONTENT LTA
- C01 Limit inaccuracies
- C02 Difficult to implement
- C03 Data/ computations wrong/ incomplete
- C04 Equipment identification LTA
- C05 Ambiguous instructions/ requirements
- C06 Typographical error
- C07 Facts wrong/ requirements not correct
- C08 Incomplete/ situation not covered
- C09 Wrong revision used

B3 WRITTEN COMMUNICATION NOT USED
- C01 Lack of written communication
- C02 Not available or inconvenient to use

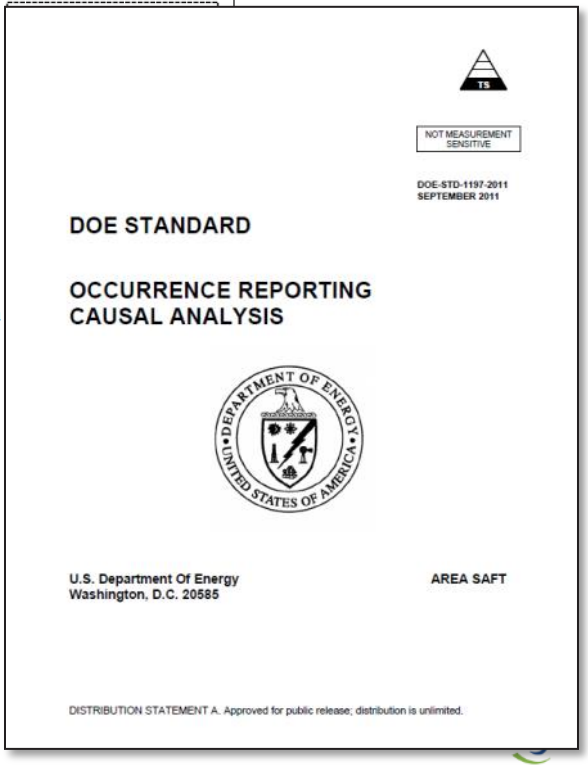
B4 VERBAL COMMUNICATION LTA
- C01 Communication between work groups LTA
- C02 Shift communications LTA
- C03 Correct terminology not used
- C04 Verification/ repeat back not used
- C05 Information sent but not understood
- C06 Suspected problems not communicated to supervision
- C07 No communication method available

A6 Training Deficiency

B1 NO TRAINING PROVIDED
- C01 Decision not to train
- C02 Training requirements not identified
- C03 Work incorrectly considered "skill of the craft"

B2 TRAINING METHODS LTA
- C01 Practice or hands-on experience LTA
- C02 Testing LTA
- C03 Refresher training LTA
- C04 Inadequate presentation

B3 TRAINING MATERIAL LTA
- C01 Training objectives LTA
- C02 Inadequate content
- C03 Training on new work methods LTA
- C04 Performance standards LTA


TS

NOT MEASUREMENT SENSITIVE

DOE-STD-1197-2011
SEPTEMBER 2011

DOE STANDARD

OCCURRENCE REPORTING CAUSAL ANALYSIS

U.S. Department Of Energy
Washington, D.C. 20585

AREA SAFT

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ERROR PRECURSORS

CONDITIONS THAT ARE KNOWN TO INCREASE ERROR RATE

Task Demands *(TD)*	Individual Capabilities *(IC)*
TD1. Time pressure *(in a hurry)*	IC1. Unfamiliarity with task / First time
TD2. High workload *(memory requirements)*	IC2. Lack of knowledge *(mental model)*
TD3. Simultaneous, multiple tasks	IC3. New technique not used before
TD4. Repetitive actions / Monotony	IC4. Imprecise communication habits
TD5. Irreversible actions *	IC5. Lack of proficiency / Inexperience
TD6. Interpretation requirements	IC6. Unsystematic problem-solving skills
TD7. Unclear goals, roles, or responsibilities	IC7. “Can do” attitude for crucial task
TD8. Lack of or unclear standards	IC8. Illness or Fatigue
Work Environment *(WE)*	**Human Nature *(HN)***
WE1. Distractions / Interruptions	HN1. Stress
WE2. Changes / Departure from routine	HN2. Habit patterns
WE3. Confusing procedure / Vague guidance	HN3. Assumptions
WE4. Confusing displays / controls	HN4. Complacency / Overconfidence
WE5. Work-around / OOS instrumentation	HN5. Mind set *(intention)*
WE6. Hidden system response	HN6. Inaccurate risk perception
WE7. Unexpected equipment conditions	HN7. Mental shortcuts *(biases)*
WE8. Lack of alternative indication	HN8. Limited short-term memory

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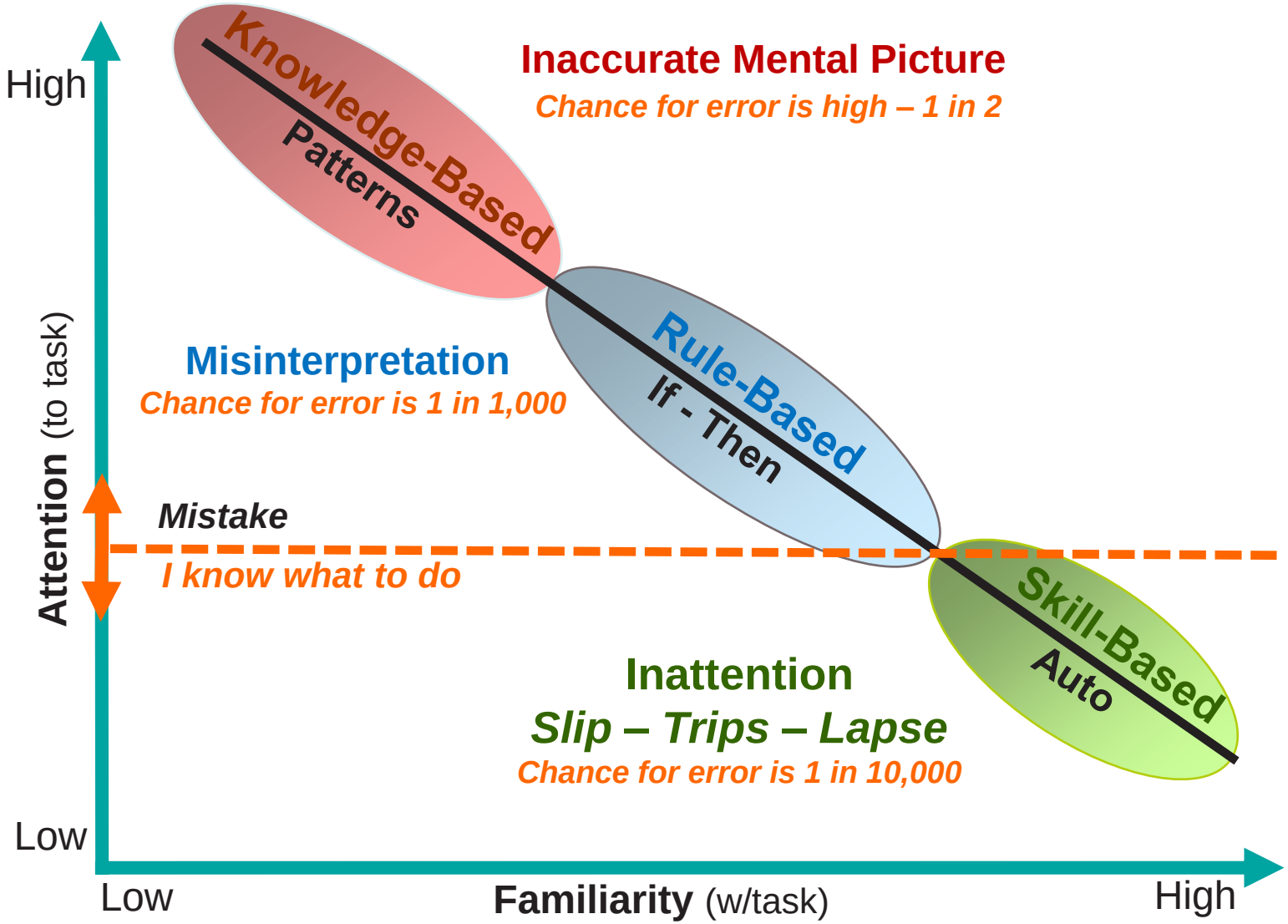
HUMAN PERFORMANCE MODES

IMPACT OF PERFORMANCE MODE ON ERROR RATE



Source: James Reason, *Managing the Risks of Organizational Accidents*, 1998.

3 HPI TOOLS – WHAT'S THE LINK WITH INVESTIGATIONS?

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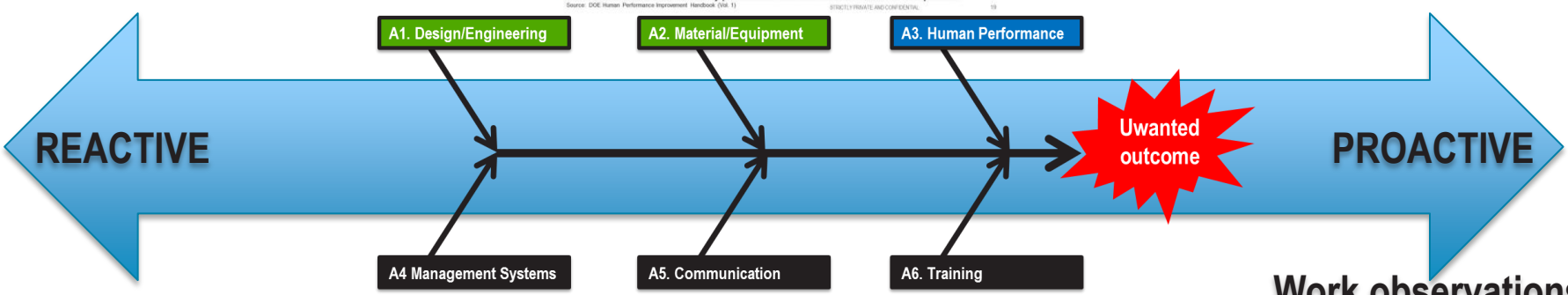
OOS = Out of service

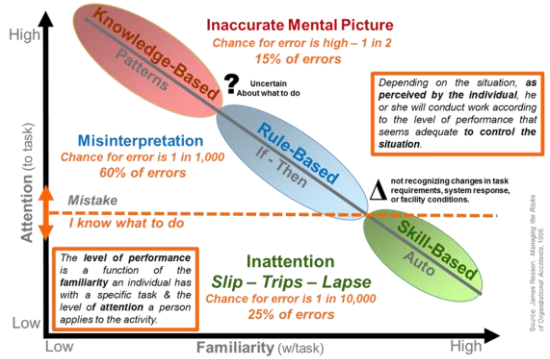
* Irreversible actions are not necessarily precursors to error. It is included because of its importance.

Source: DOE Human Performance Improvement Handbook (Vol. 1)



Investigations

Work observations
Audits



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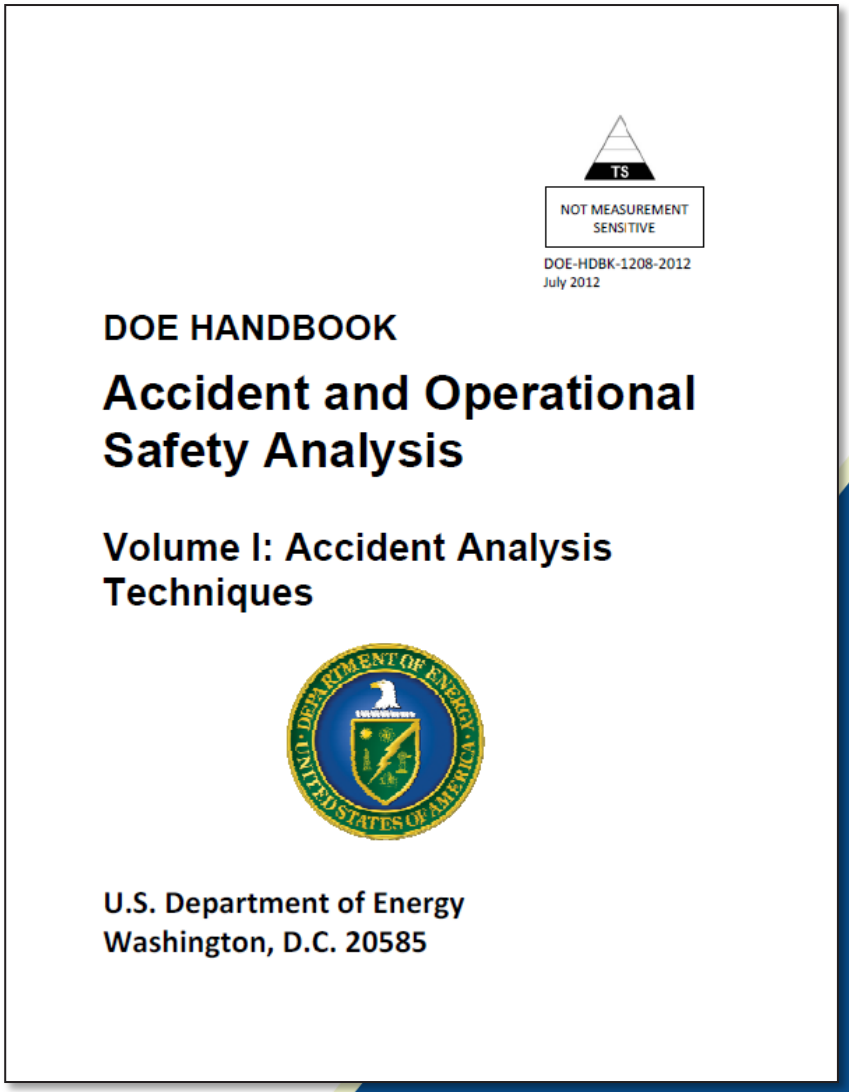

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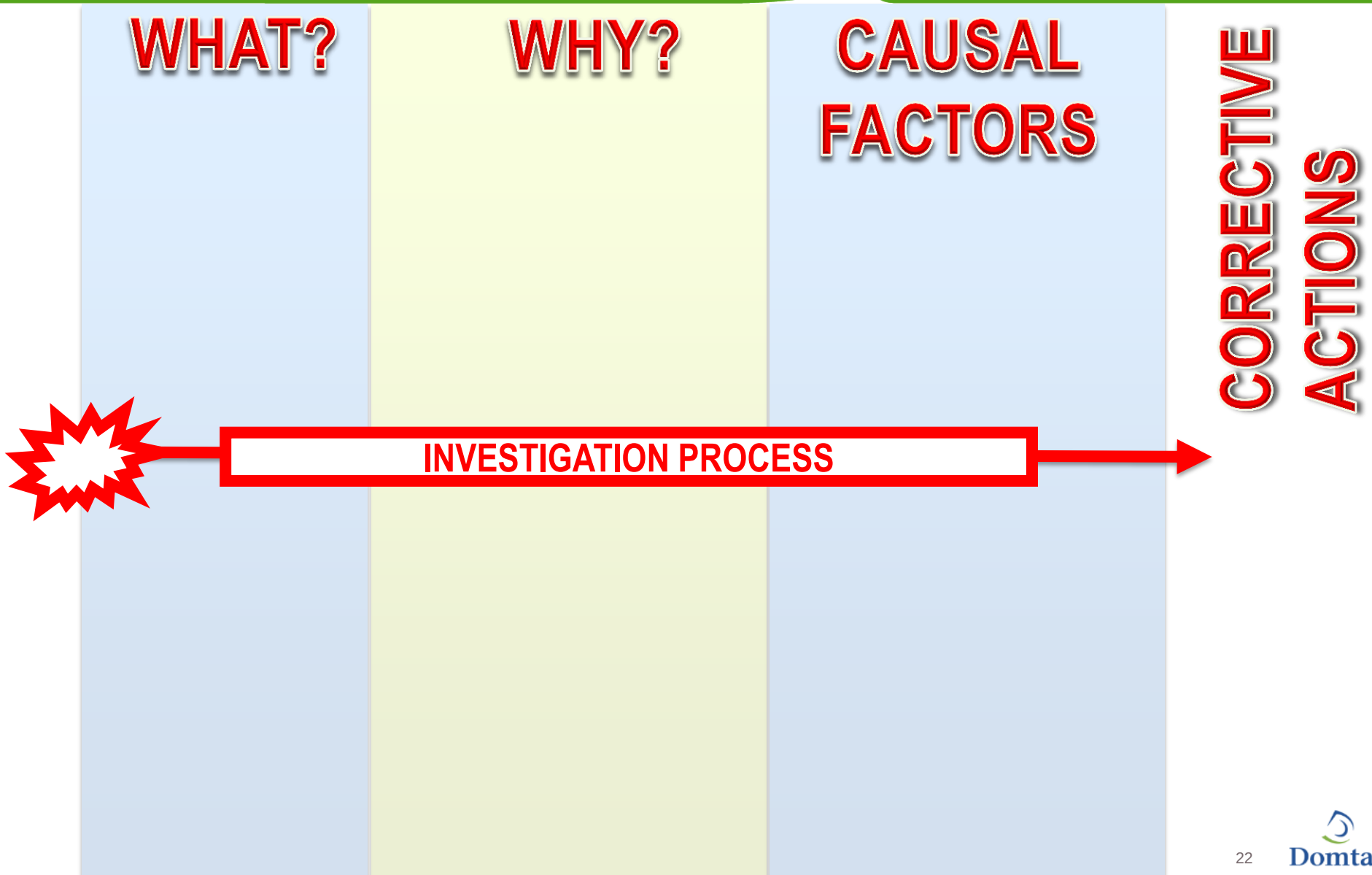
Investigations using HPI

4 STEPS OF AN EVENT INVESTIGATION



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FINDING OUT WHAT HAPPENED

WHAT?

- Collecting evidence
- The 4 P's – material evidence
  - Position
  - Parts
  - Paper
  - Process
- The 5th « P » - people evidence
  - Conducting **interviews**

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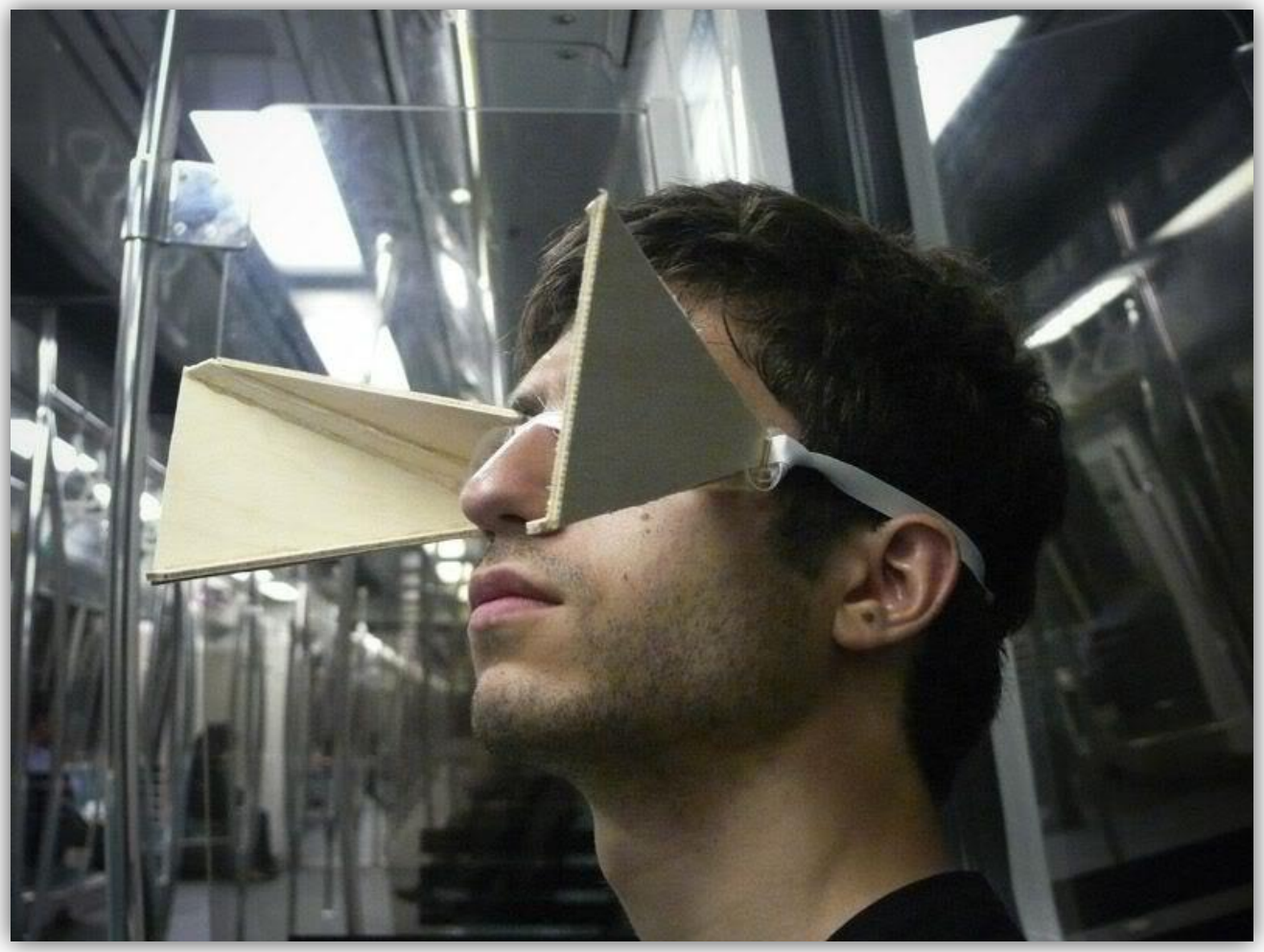
WE WANT TO UNDERSTAND WHAT?



Context !

VIEW INSIDE THE TUNNEL

WHAT?

Context does not justify behavior.
It explains it !

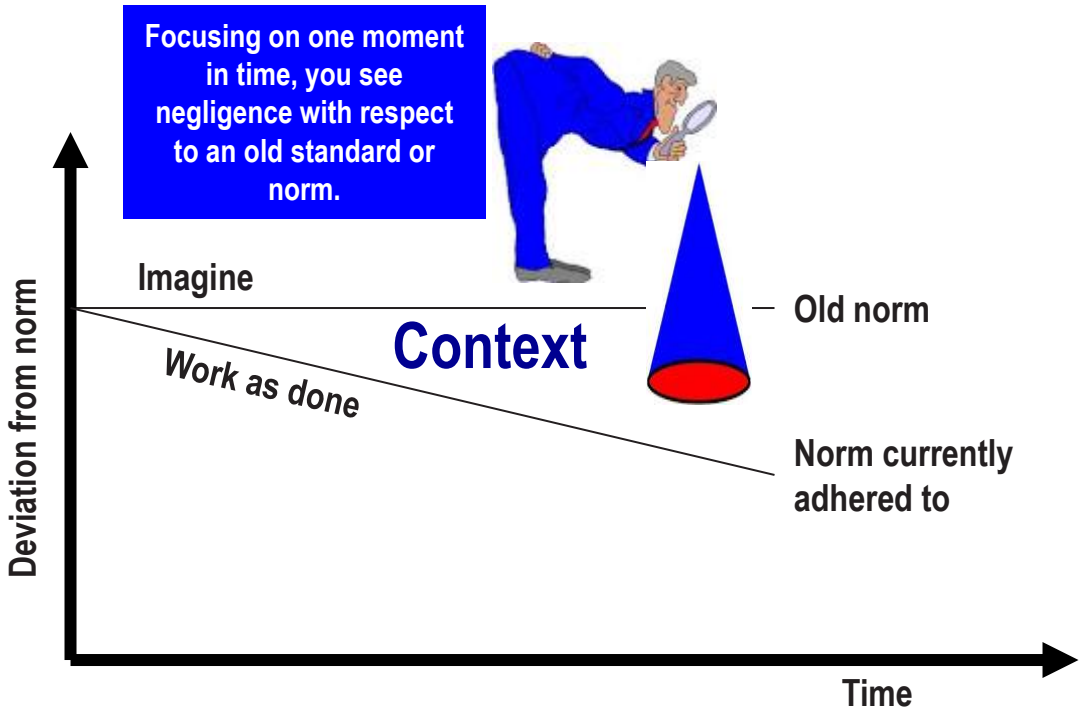
INTERVIEWS:
OPEN *vs* LEADING QUESTIONS

WHAT?

- **Open questions**: encourages a full, meaningful answer
  - Considers the subject's own knowledge and/or feelings.
- **Closed questions**: encourages a short or single-word answer.
  - Tends to restrict people from articulating themselves.

- ***What*** was supposed to happen ?
- ***How*** is the task normally performed ?
- ***What*** was different this time compared to other times, that deviated from “normal” ?
- ***What*** factors existed at the time that influenced your decisions and actions ?
- ***What*** advice do you have for the organization to help minimize the likelihood of a reoccurrence ?
- Do you have other comments ?

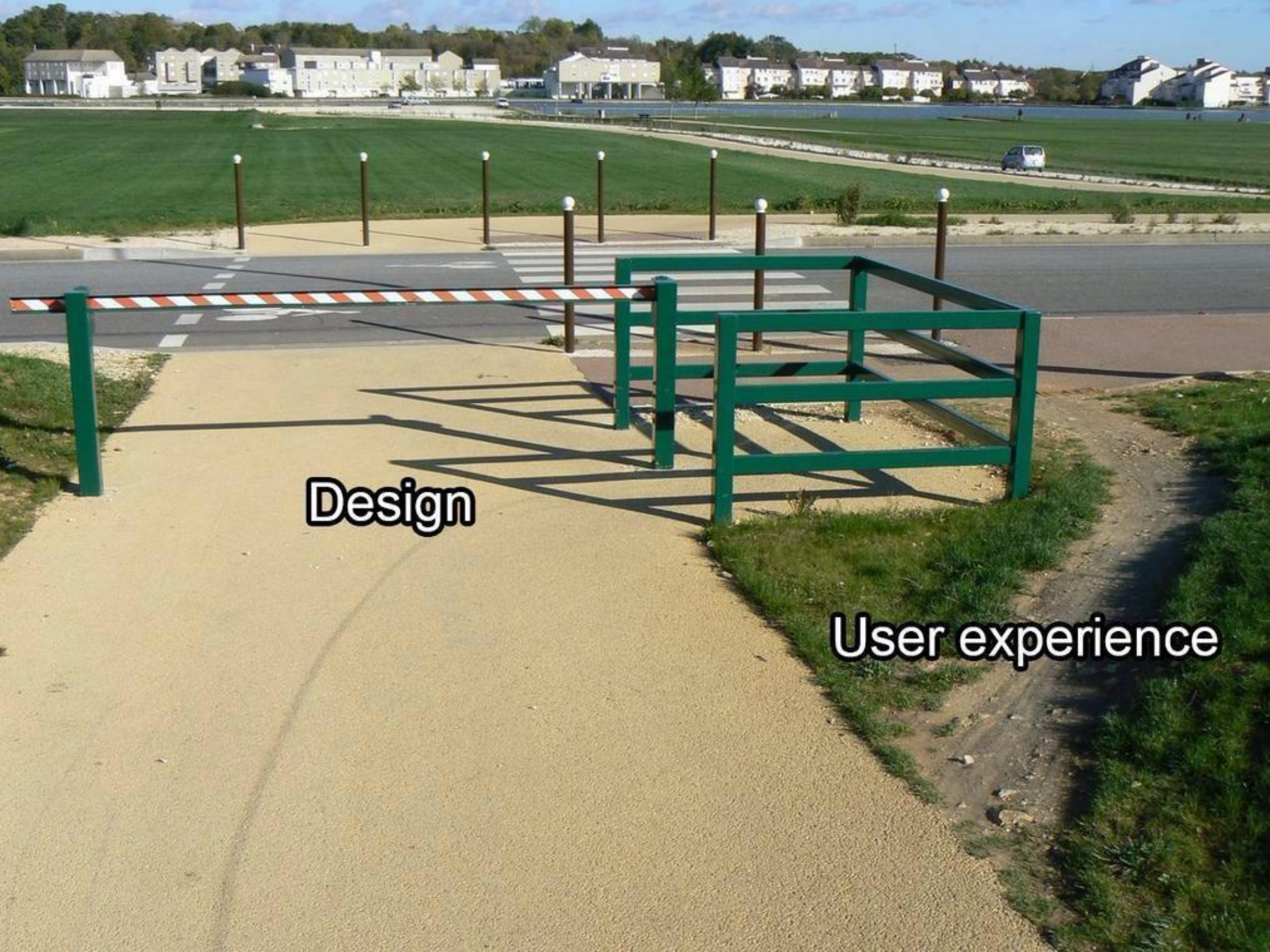
HUMAN ERROR: PATTERNS OF FAILURE WHAT?



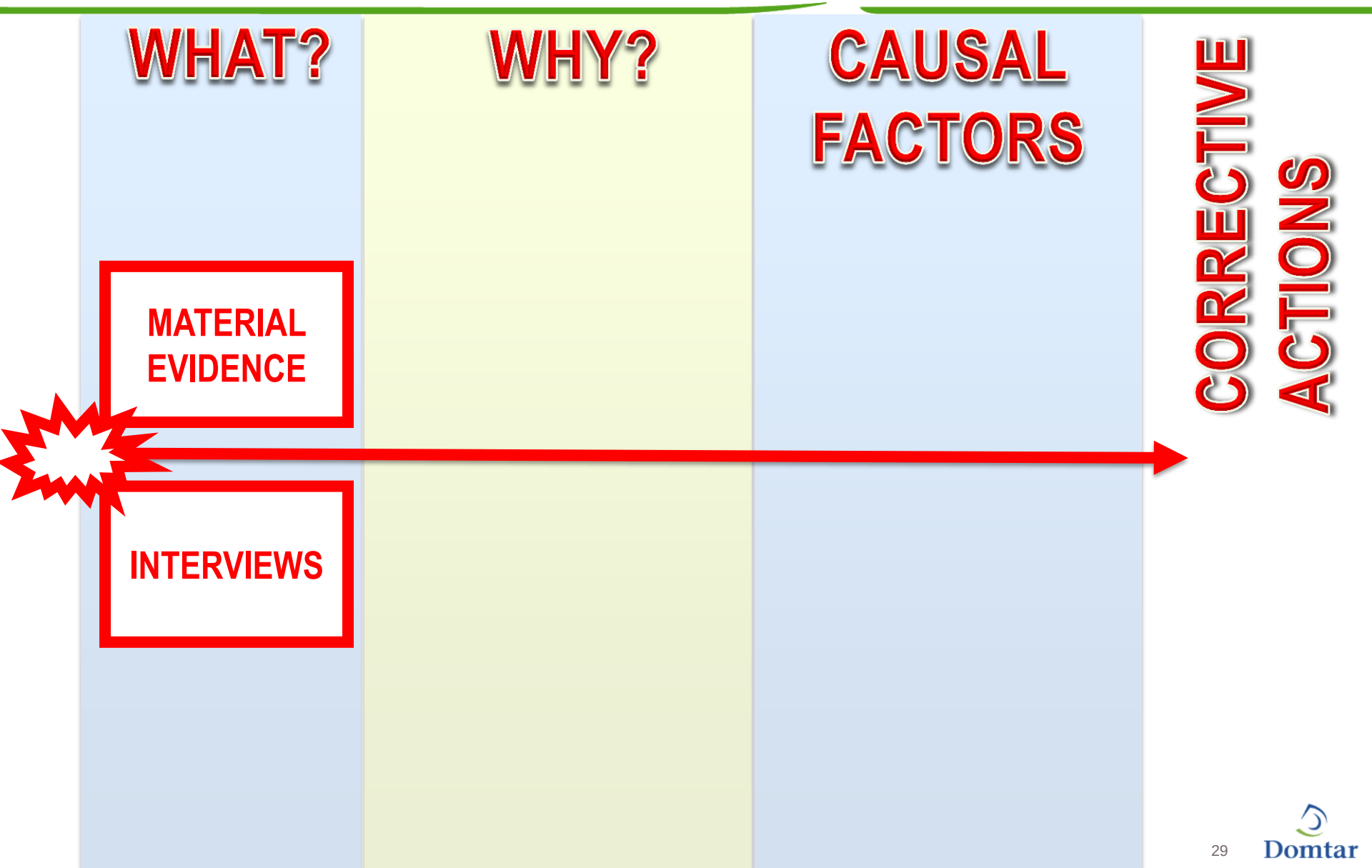
To *drift* is *human*

A behavior may have become the new Norm
across an entire operation or organization

Illustration from: The Field Guide to Human Error Investigations


Design
User experience

INVESTIGATION SEQUENCE



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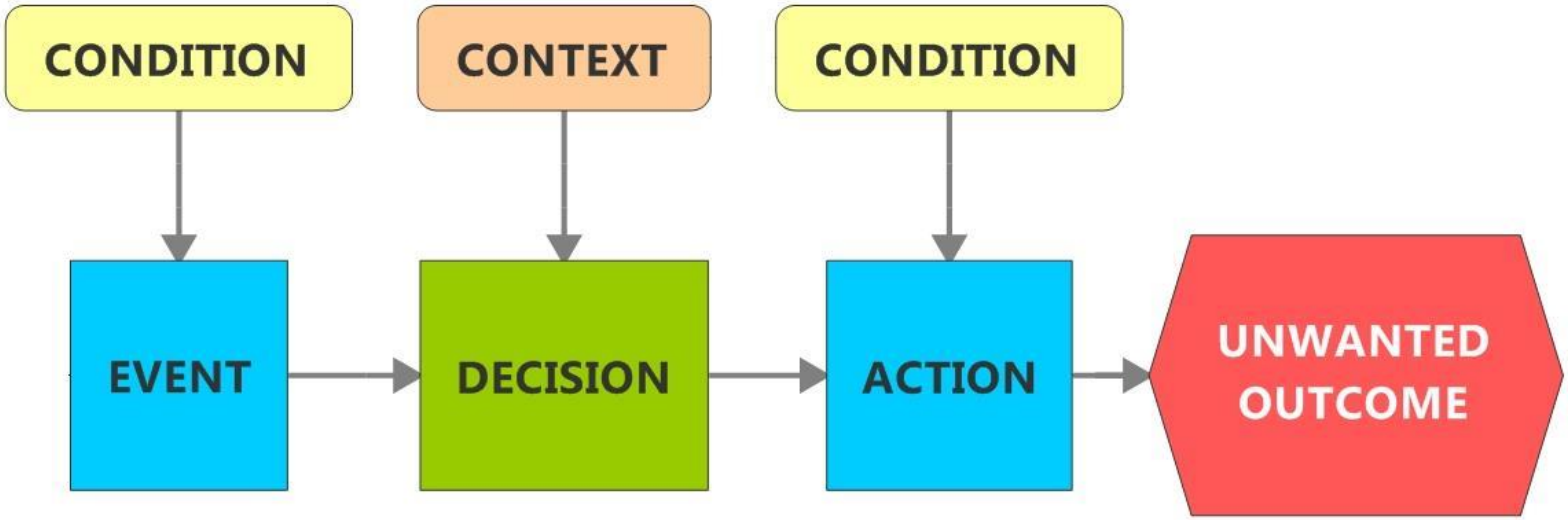
EVENT CAUSAL FACTOR CHARTING
BUILDING THE SEQUENCE OF EVENTS

WHY?



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EVENT CAUSAL FACTOR CHARTING
BUILDING THE SEQUENCE OF EVENTS

WHY?

WORKER INJURED WHEN CHANGING A VALVE

Worker A holds up the valve while worker B undoes the bolts. They lower the valve to the floor	→	Worker B asks worker A if he needs help carrying the valve. Worker A says "no, it's not that bad"	→	Worker A carries the valve to his buggy	→	When setting down the valve on the buggy, Worker A crushed a finger between the valve and the side of the dolly	→	Open fracture at tip of finger
ACTION		DECISION		ACTION		EVENT		UNWANTED OUTCOME

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EVENT CAUSAL FACTOR CHARTING
BUILDING THE SEQUENCE OF EVENTS

WHY?

WORKER INJURED WHEN CHANGING A VALVE

Tight space, no anchor points for rigging

CONDITIONS

Long catwalk from point of work then down a flight of stairs to the basement

A dolly was located just next to the buggy

Worker A holds up the valve while worker B undoes the bolts. They lower the valve to the floor

ACTION

Worker B asks worker A if he needs help carrying the valve. Worker A says "no, it's not that bad"

DECISION

Worker A carries the valve to his buggy

ACTION

When setting down the valve on the buggy, Worker A crushed a finger between the valve and the side of the dolly

EVENT

Open fracture at tip of finger

UNWANTED OUTCOME

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EVENT CAUSAL FACTOR CHARTING
BUILDING THE SEQUENCE OF EVENTS

WHY?

WORKER INJURED WHEN CHANGING A VALVE

CONTEXT

True weight of the valve is 100 lbs. Worker A thought it was in fact 60-70 lbs. Site recommendation is max. 50 lbs.

CONDITIONS

- Tight space, no anchor points for rigging
- Long catwalk from point of work then down a flight of stairs to the basement
- A dolly was located just next to the buggy

ACTION	DECISION	ACTION	EVENT	UNWANTED OUTCOME
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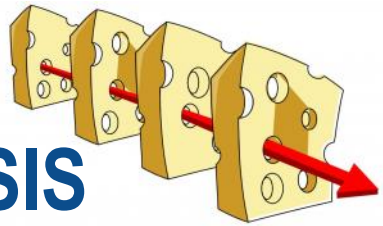
BARRIER ANALYSIS

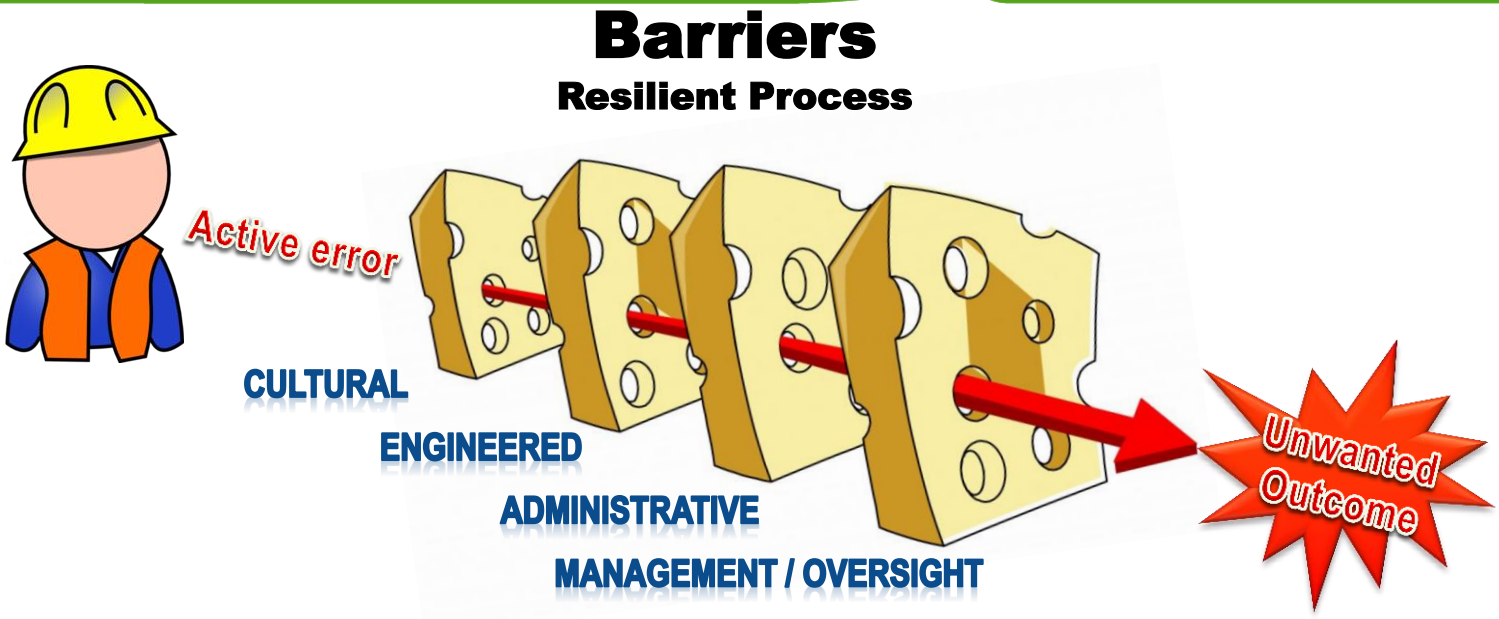


WHY?

- CULTURAL: Agreed-upon rules of the road unique to a location. C
  - Color of the traffic signals. **Green** means go. **Red** is stop. But a **yellow** traffic light mean "prepare to stop".
- ENGINEERED: seat belts, airbags, anti-lock brakes, back up warning systems, rear view mirrors, etc.
  - Can be passive or active (need to be defeated)
- ADMINISTRATIVE: Driver education, insurance, qualification and testing, speed limits and rules of the road.
- OVERSIGHT / MANAGEMENT: Police, speed control radar, cameras at intersections, etc… Other drivers can act as an oversight defense.

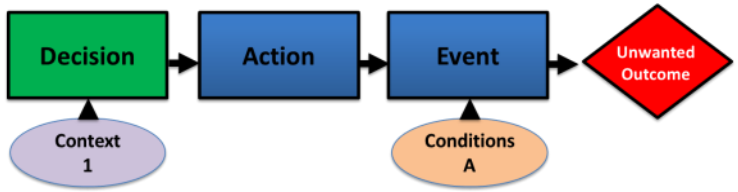
BARRIER ANALYSIS

WHY?



- What were the barriers?
- How did they perform?
- Why did the barriers fail?
- How did the barrier affect the event?
- Context
- Error precursors?

Feed the ECFC
(Event causal factor chart)



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EVENT CAUSAL FACTOR CHARTING
WITH BARRIERS

WHY?

WORKER INJURED WHEN CHANGING A VALVE

True weight of the valve is 100 lbs. Worker A thought it was in fact 60-70 lbs. Site recommendation is max. 50 lbs.

ADMINISTRATIVE BARRIER

Tight space, no anchor points for rigging

ENGINEERED BARRIER (MISSING)

ng catwalk from point of rk then down a flight of stairs to the basement

A dolly was located just next to the buggy

Worker A holds up the valve while worker B undoes the bolts. They lower the valve to the floor

Worker B asks worker A if he needs help carrying the valve. Worker A says "no, it's not that bad"

Worker A carries the valve to his buggy

When setting down the valve on the buggy, Worker A crushed a finger between the valve and the side of the dolly

Open fracture at tip of finger

ACTION | DECISION | ACTION | EVENT | UNWANTED OUTCOME

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ERROR PRECURSOR & PERFORMANCE MODE

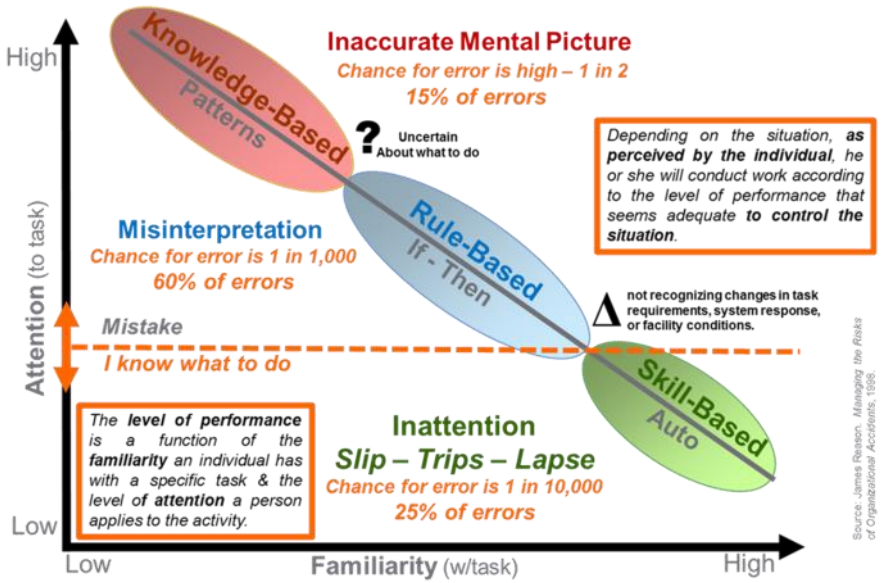
WHY?

Task Demands *(TD)*	Individual Capabilities *(IC)*
TD1. Time pressure *(in a hurry)*	IC1. Unfamiliarity with task / First time
TD2. High workload *(memory requirements)*	IC2. Lack of knowledge *(mental model)*
TD3. Simultaneous, multiple tasks	IC3. New technique not used before
TD4. Repetitive actions / Monotony	IC4. Imprecise communication habits
TD5. Irreversible actions *	IC4. Lack of proficiency / Inexperience
TD6. Interpretation requirements	IC5. Unsystematic problem-solving skills
TD7. Unclear goals, roles, or responsibilities	IC6. "Can do" attitude for crucial task
TD8. Lack of or unclear standards	IC7. Illness or Fatigue
Work Environment *(WE)*	**Human Nature *(HN)***
WE1. Distractions / Interruptions	HN1. Stress
WE2. Changes / Departure from routine	HN2. Habit patterns
WE3. Confusing procedure / Vague guidance	HN3. Assumptions
WE4. Confusing displays / controls	HN4. Complacency / Overconfidence
WE5. Work-around / OOS instrumentation	HN5. Mind set *(intention)*
WE6. Hidden system response	HN6. Inaccurate risk perception
WE7. Unexpected equipment conditions	HN7. Mental shortcuts *(biases)*
WE8. Lack of alternative indication	HN8. Limited short-term memory

OOS = Out of service

* *Irreversible actions are not necessarily precursors to error. It is included because of its importance.*

Source: DOE Human Performance Improvement Handbook (Vol. 1)



Worker A

TD7 – Unclear goals, roles or responsabilities?

IC6 – « Can-do » attitude?

HN3 – Assumptions?

Misinterpretation

Rule-based error

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INVESTIGATION SEQUENCE

WHAT?

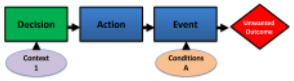
MATERIAL EVIDENCE

INTERVIEWS

WHY?

BARRIER ANALYSIS

ECFC



CAUSAL FACTORS

CORRECTIVE ACTIONS

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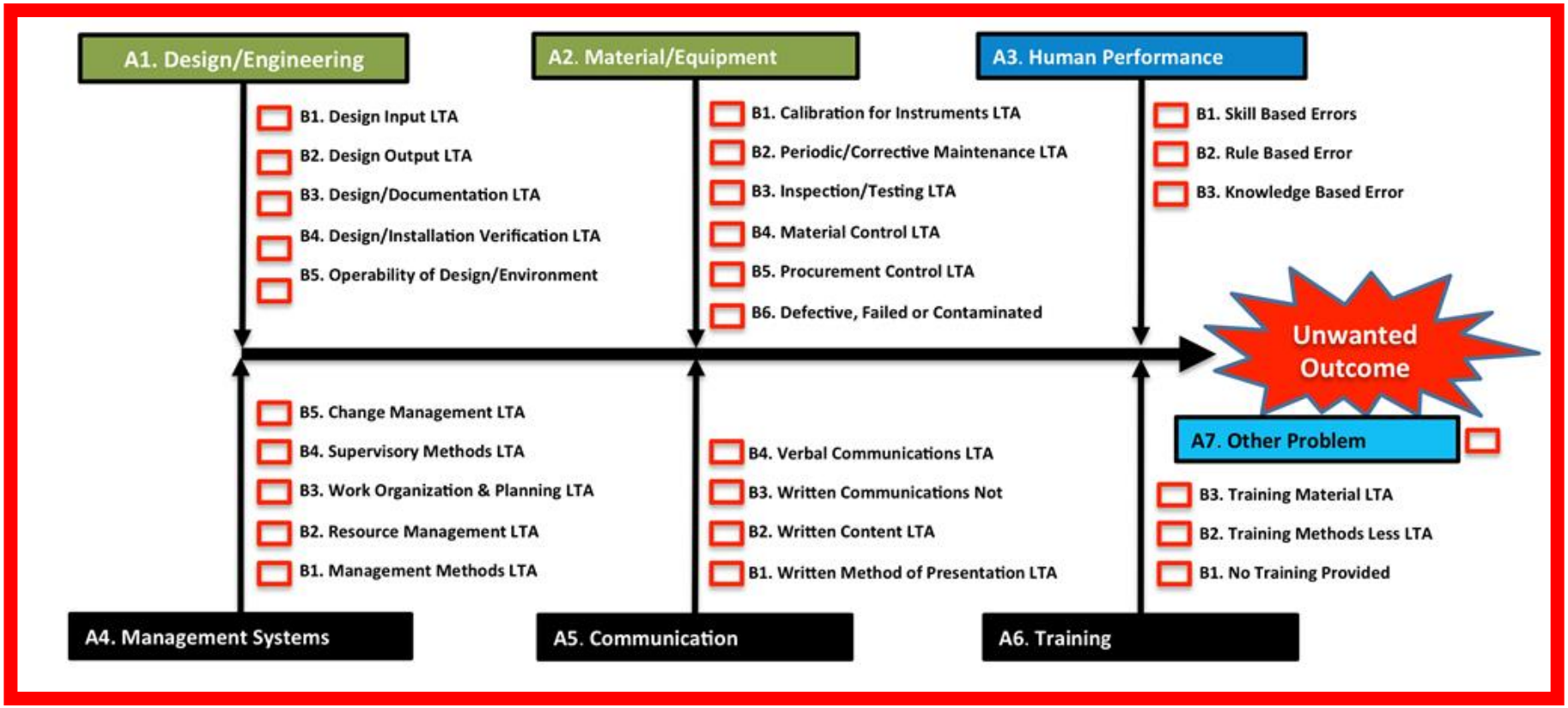
CAUSAL FACTORS

IDENTIFYING CAUSAL FACTORS



- 7 Causal factor families in 3 categories (equipment, human performance, organisation)
- 32 sub-families (B nodes)
- 166 individual causal factors (C nodes)

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PROCESS CAN BE AUTOMATED

CAUSAL FACTORS

Error Precursors

Task Demands (TD)	Individual Capabilities (IC)
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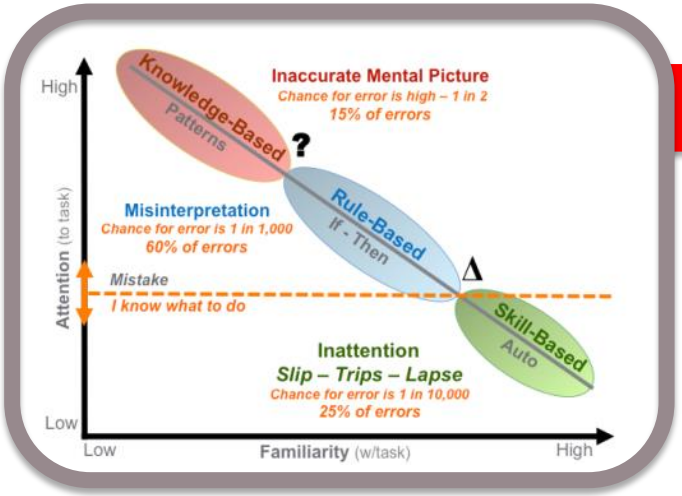
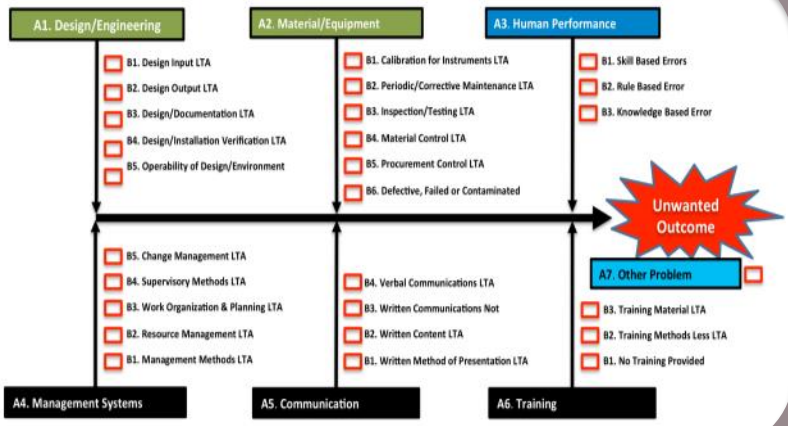
Causal Factors



Causal Factors



	Task Demands (TD)	Description
1	**Time pressure (in a hurry)**	• Urgency or excessive pace required to perform action or task. • Manifested by shortcuts, being in a hurry, and an unwillingness to accept additional work or to help others. • No spare time. **A4.B3.C2, A4.B3.C7**

CAUSAL FACTORS

PROOF IS IN THE PUDDING

- **Choosing a causal factor is not trivial**
- **Support the choice with evidence**
- **In DOE language:**
  - **A3.B2.C01** - Strong rule incorrectly chosen over other rule
  - **A4.B1.C01** - Management policy guidance/expectations not well-defined, understood or enforced
  - **A4.B3.C11** - Inadequate work package preparation

INVESTIGATION SEQUENCE

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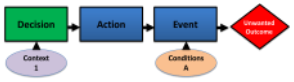
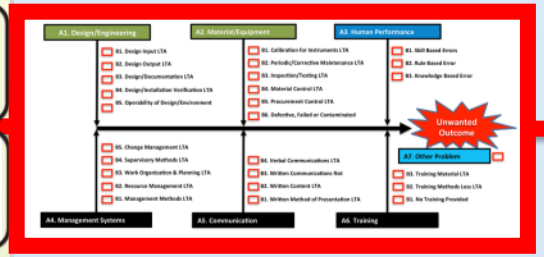


CAUSAL FACTORS



CORRECTIVE ACTIONS

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S.M.A.R.T+ER CORRECTIVE ACTIONS

CORRECTIVE ACTIONS

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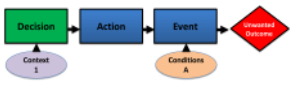

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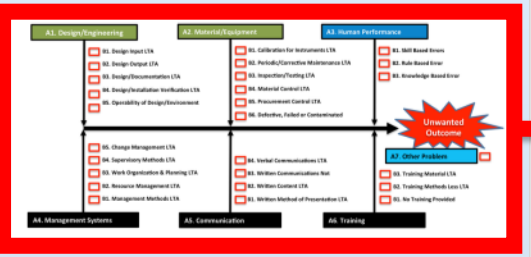

CORRECTIVE ACTIONS

SMART

- SPECIFIC — IS IT DETAILED & UNDERSTANDABLE?
- MEASURABLE — IS IT EASILY EVALUATED?
- ACTION BASED — DOES IT INCLUDE DESIRED END RESULT?
- REALISTIC — IS EXPECTED OUTCOME REASONABLE?
- TIMELY — IS DEADLINE REACHABLE?

+ ER

E.R. EFFECTIVENESS REVIEWS

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SUMMARY

- **Human Performance Improvement**
  - Used by some of the safest industries
  - Human error in the context of an organization
  - Human error is not necessarily the cause, it becomes the symptom
  - Error precursors, performance mode, causal factor tree
- **An HPI investigation**
  - Attempts to see the incident in the eyes of the worker
    - Why did the worker do what he did knowing what he knew
    - Context does not justify the behavior, it explains it
  - Systematic approach to root cause analysis
  - Uproots organizationnal weaknesses

BY HENRY FORD

« The only real mistake is the one from which we learn nothing »

THE FIBER *of* Domtar

AGILE | CARING | INNOVATIVE

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