

Error Management in High Risk Industries through Human Performance Improvement



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Objectives

- Define human performance
- Overview of human fallibility
- Define Human Performance Improvement
- Summary of error management

Human Performance Improvement in High Risk Industries



- Can we:
 - Achieve **zero** human errors?
 - Train people to be **error free**?



What is Human Performance?

- Human Performance is defined as the behaviours carried out by people to accomplish a task.
- ***Performance = Behaviour + Results***
- There are many factors that impact upon people's abilities to execute a task error free.



Humans are Fallible

- *Capable of making an **error***
- ***Susceptible** to errors*
- *We have **limitations***



How are we Fallible?

- Whenever we perform **complex** tasks in a **complex** work environment, **characteristics** of human nature are present.



How are we Fallible?

Fallible

We avoid **mental strain** via assumptions, habits and biases.

We have limited **attention** resources

We have a limited **working memory**

We find it **difficult** to see our own errors

We think '**nothing** bad will happen'

Fatigue and stress



Human Error

- An **error** is an action that unintentionally deviates from an expected behaviour.
- ***“I locked my keys in the car.”***



Errors that we can make

**Slips in
attention
(skill-based)**

**Lapses in
memory (skill-
based)**

**Rule-based
mistakes**

**Knowledge-
based
mistakes**



Human Error Approaches



Traditional Approach: Person-Centred

It's the operators fault – they are in complete control

Error is unpredictable

People need to try harder and pay more attention

People are error prone as opposed to tasks

Current Approach: Systems-Centred

Cannot eliminate human error – let's understand people are fallible

Error is a symptom and largely caused by latent organisational weaknesses (flaws in design, processes, management, leadership, resourcing etc.)

We can predict error (e.g. error likely situations)

Invest our efforts into making the work environment and systems less error prone and more error tolerant

- Which approach do you think industry largely uses?
- Person Centred or Systems Centred?
- Which approach do you think your company largely uses?



Truths About Human Error

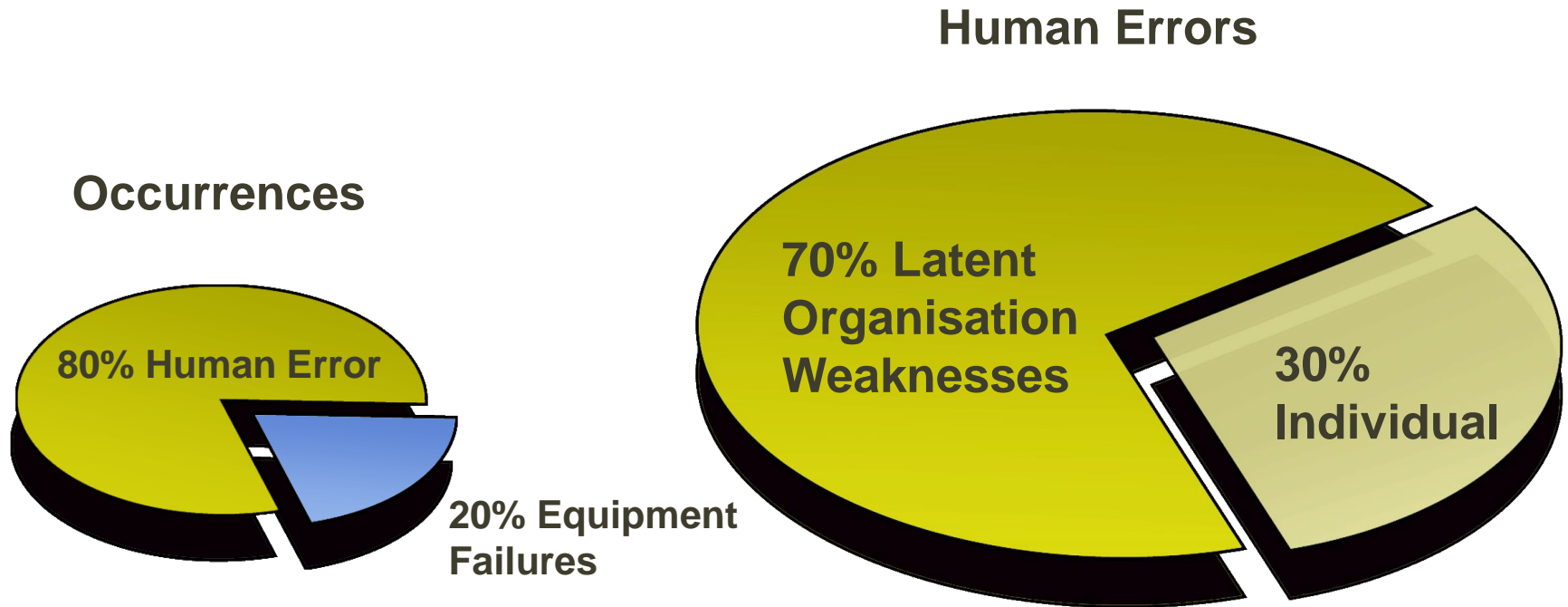


It is present in every industry

It is a key contributor to unwanted events and outcomes

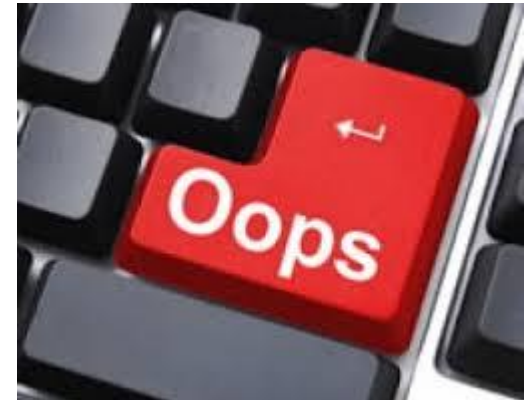
The greatest cause of human error are weaknesses in the organisation

Why Human Performance Improvement?



The Systems Approach

- Systems view of human error.
- Achieving zero errors is unrealistic. No matter how much training we may provide.....



Can we...

- Achieve zero human errors?
- Train people to be error free?



Error Management

Error rates can
never be reduced
to zero

Consequences of
errors can be
eliminated

Event free
performance



Developing skills and
processes that can detect
and contain human
errors at their early
stages to **prevent an
event** from occurring.

"OF COURSE MY DESIGN INCORPORATES HUMANITY.
IT'S FILLED WITH HUMAN ERROR."

- Error Management in High Risk Industries through Human Performance Improvement

**Human
Performance
Improvement
Principles**

**Incident
Investigations**

**Error
Management
Strategies**

Just Culture

Error Traps

**Reporting
Culture**

1. Human Performance Improvement Principles (DOE, 2009)



People are fallible – even the most experienced and best people make errors

Error likely situations are predictable, manageable and preventable

Individual behaviour is influenced by organisational processes and values

People achieve high levels of performance because of the encouragement and reinforcement received from leaders, peers and subordinates

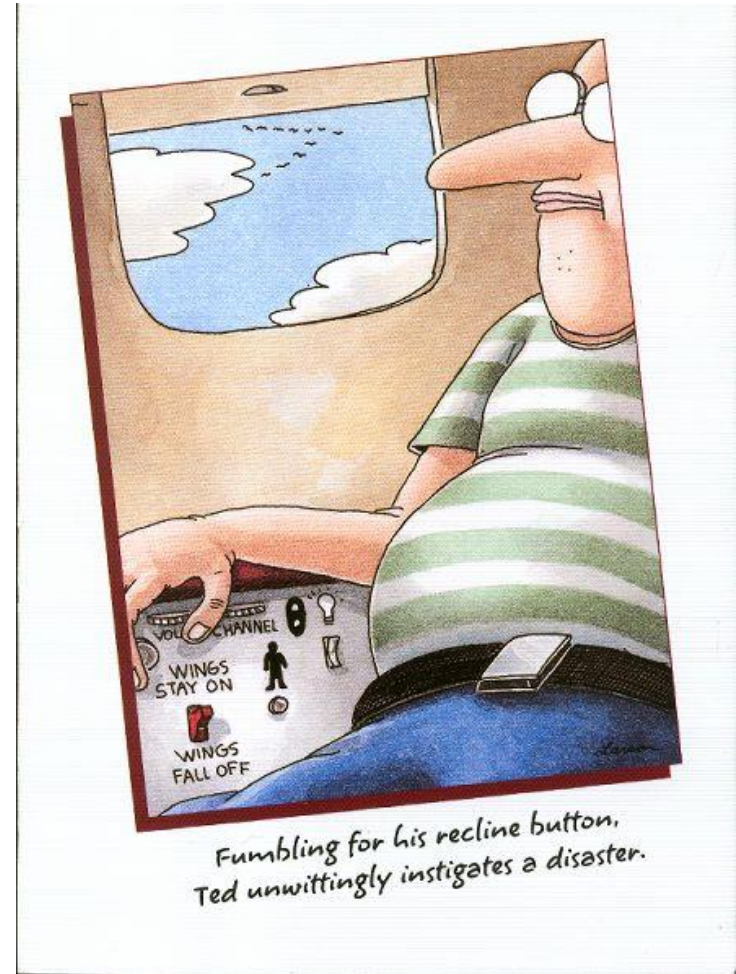
Events can be avoided through an understanding of the reasons mistakes occur and the application of the lessons learned from past events and errors

Absolutely safe environments do not exist

People generally want to do a good job

2. Identify Error Precursors

- Those unfavourable prior conditions at the job site that provoke error.
- Error-likely situations, otherwise known as error-traps.



- **What conditions provoke error in your work place and line of work?**



Error Precursors (DOE, 2009)

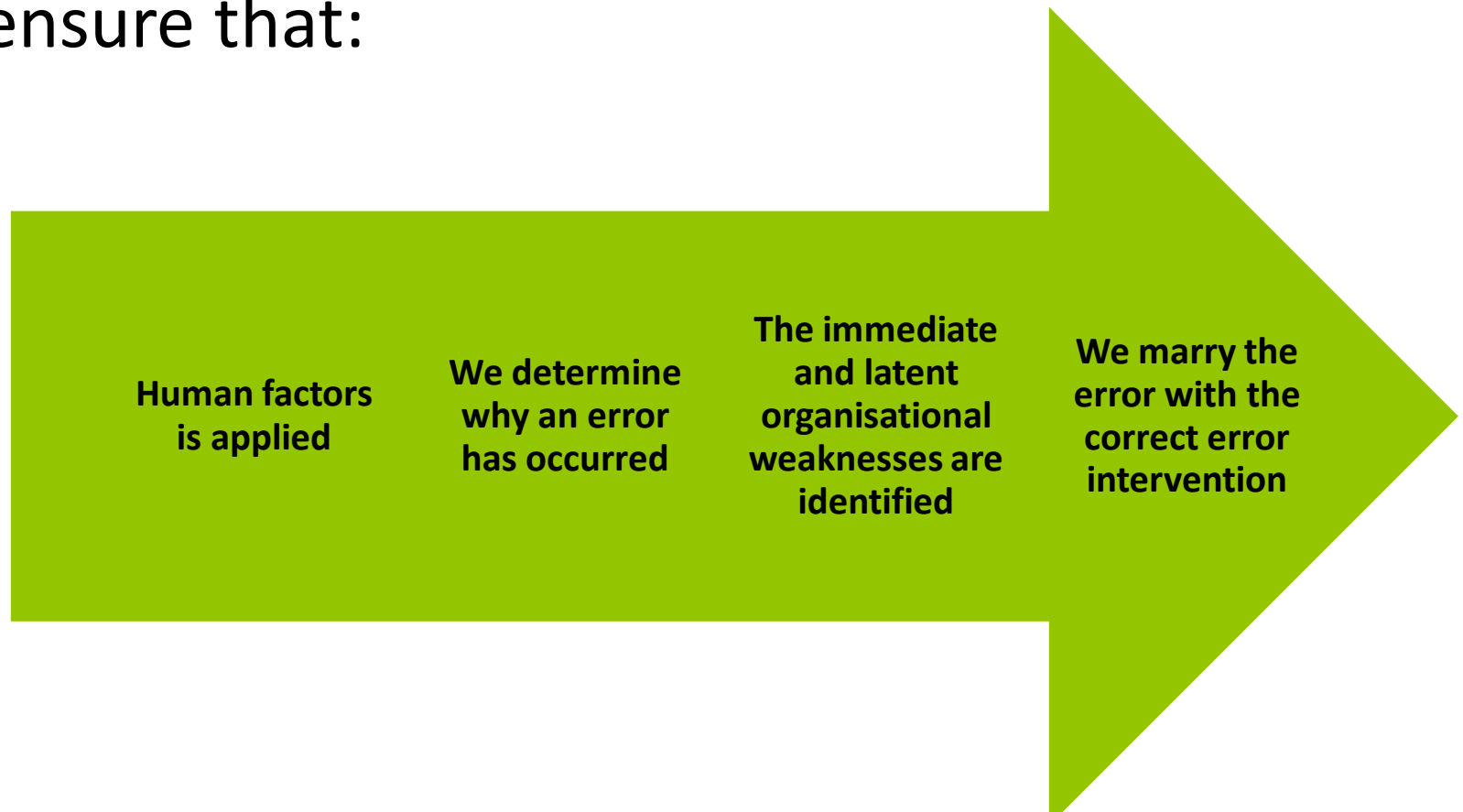


Abbreviated List

Task Demands	Individual Capabilities
• Time pressure (in a hurry)	• Unfamiliarity w/ task / First time
• High Workload (memory requirements)	• Lack of knowledge (mental model)
• Simultaneous, multiple tasks	• New technique not used before
• Repetitive actions, monotonous	• Imprecise communication habits
• Irrecoverable acts	• Lack of proficiency / Inexperience
• Interpretation requirements	• Indistinct problem-solving skills
• Unclear goals, roles, & responsibilities	• “Hazardous” attitude for critical task
• Lack of or unclear standards	• Illness / Fatigue
Work Environment	Human Nature
• Distractions / Interruptions	• Stress (limits attention)
• Changes / Departures from routine	• Habit patterns
• Confusing displays or controls	• Assumptions (inaccurate mental picture)
• Workarounds / OOS instruments	• Complacency / Overconfidence
• Hidden system response	• Mindset (“tuned” to see)
• Unexpected equipment conditions	• Inaccurate risk perception (Pollyanna)
• Lack of alternative indication	• Mental shortcuts (biases)
• Personality conflicts	• Limited short-term memory

3. Review Incident Investigation Approach

- Review incident investigation process, and ensure that:

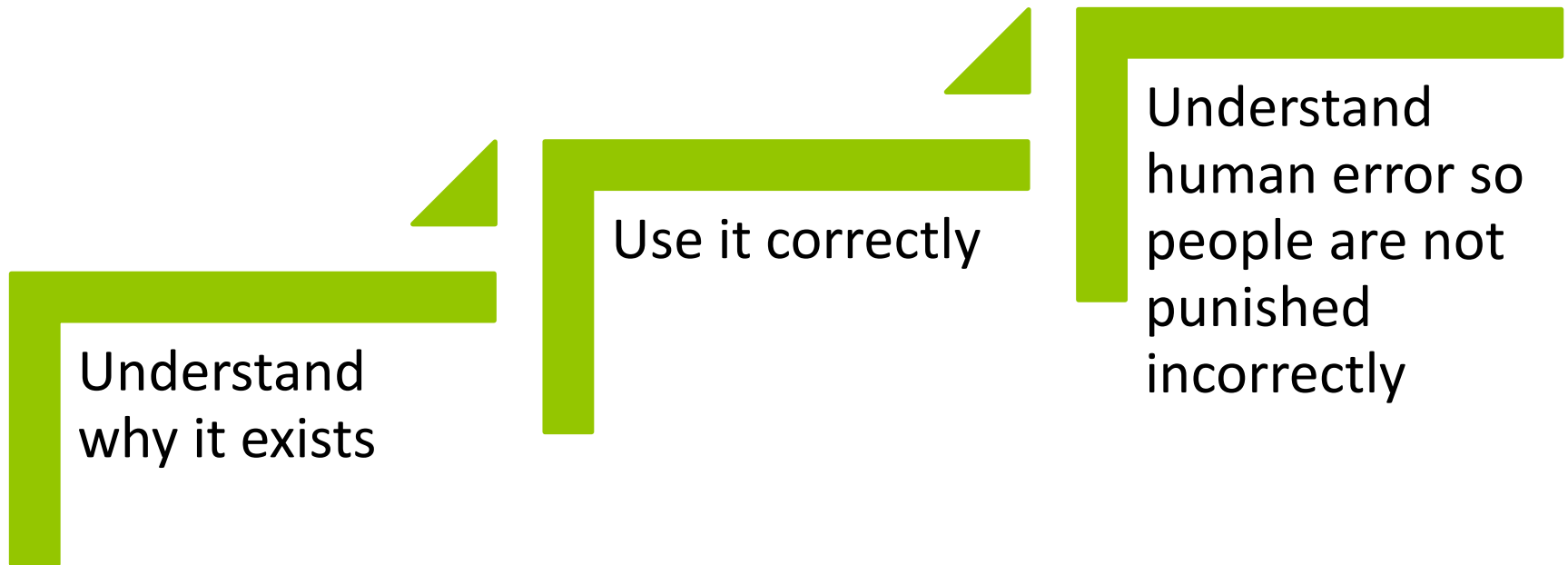


4. Encourage Reporting

- *This isn't just about how comfortable people feel about reporting but also what **they feel is important to report.***
- **Capture** error data to learn and build resilience into our systems.

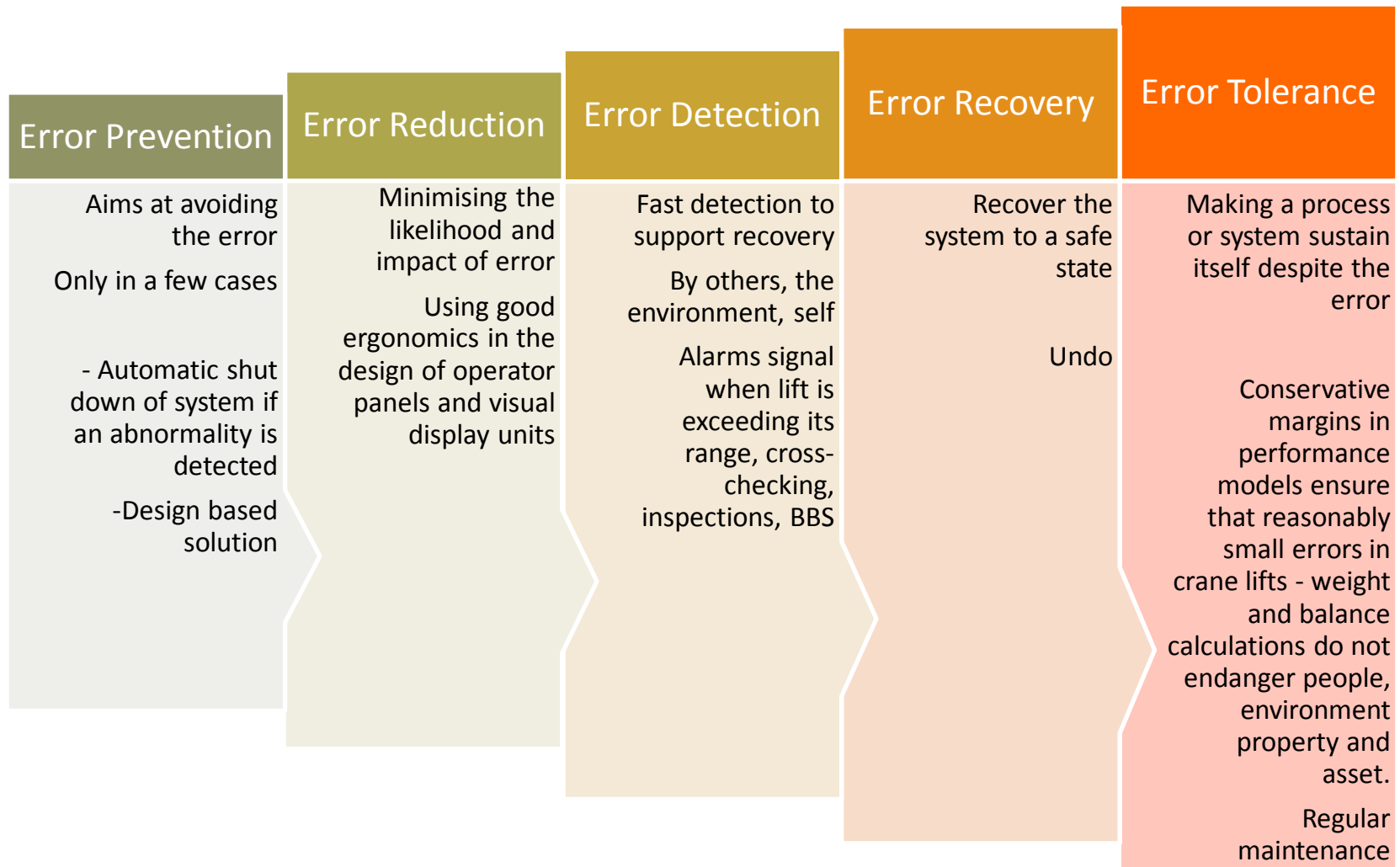


5. Understand Just/Fair Culture



- **Negative reactions to human error leads to more cover ups.**

6. Incorporate Error Management Strategies



- “It is now widely held among human reliability specialists that the most productive strategy for dealing with active errors is to focus upon **controlling** their **consequences** rather than upon striving for their **elimination**.”
(Reason, p. 246)

Humans are fallible

Error is pervasive

**Failure to understand
human error leads to
repeat events/incidents.**

**Adopting human
performance improvement
principles supports event-
free performance.**

Thank you



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References



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- Reason, J (1997). Managing the Risks of Organizational Accidents.