

Human Performance Fundamentals

Human Performance
Fundamentals

BushCo

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Purpose of Course

To proactively prevent “Unwanted Outcomes” triggered by human error.



Human Performance

Part One – Why A Human Performance Approach

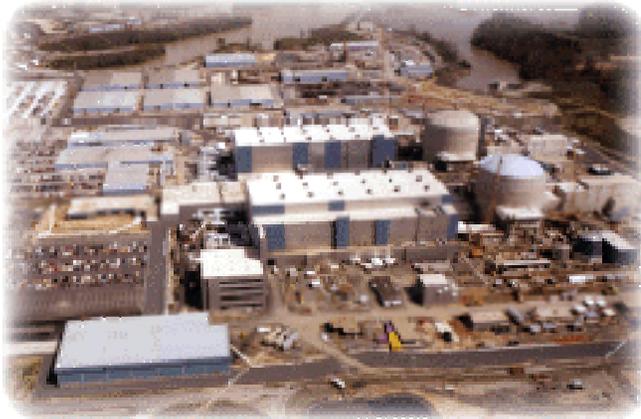
Part Two – Individual

Part Three – Organization

Part Four – Leader

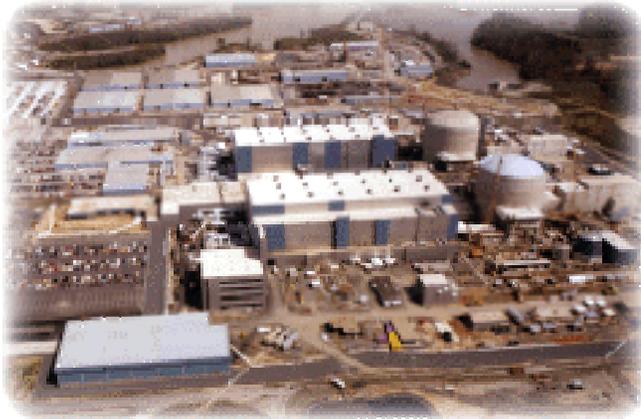
Part Five – Case Studies, Implementation, & Review

Objectives



1. Explain what constitutes an unwanted outcome
2. Describe why the applications of Human Performance are important in reducing the frequency & severity of unwanted outcomes
3. Explain how individual behavior affects the frequency & severity of unwanted outcomes
4. Explain how Organizational Processes and Values affects the frequency & severity of unwanted outcomes

Objectives



5. Explain how leader behavior affects the frequency & severity of unwanted outcomes
6. List the error prevention tools available to help anticipate and prevent error likely situations
7. Given a case study as a guide, explain the attributes of a successful Human Performance Improvement Process
8. Explain what we can do individually and as a company to meet the objectives of this course

Leadership



A Simple Model

**Performance *outcome* Y is a
function of *factors* X .**

$$Y = f(x)$$


Safety—It's a Serious Responsibility

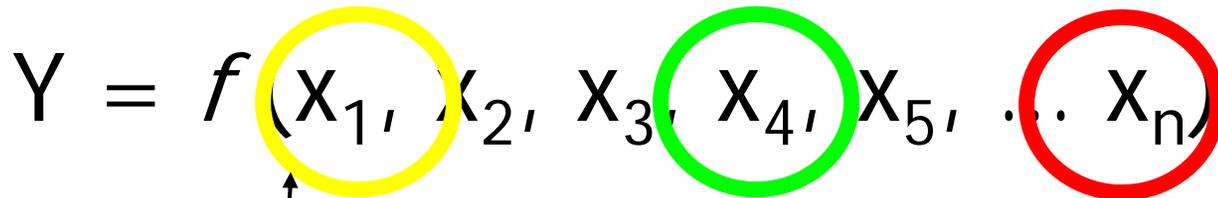


"You weren't listening. I said, 'Don't fall.'"



American Society of Safety Engineers

www.asse.org

$$Y = f(X_1, X_2, X_3, X_4, X_5, \dots, X_n)$$


Little or no effect on y

Positive effect on y

Negative effect on y

The real challenge is to identify those factors that do and don't drive performance.

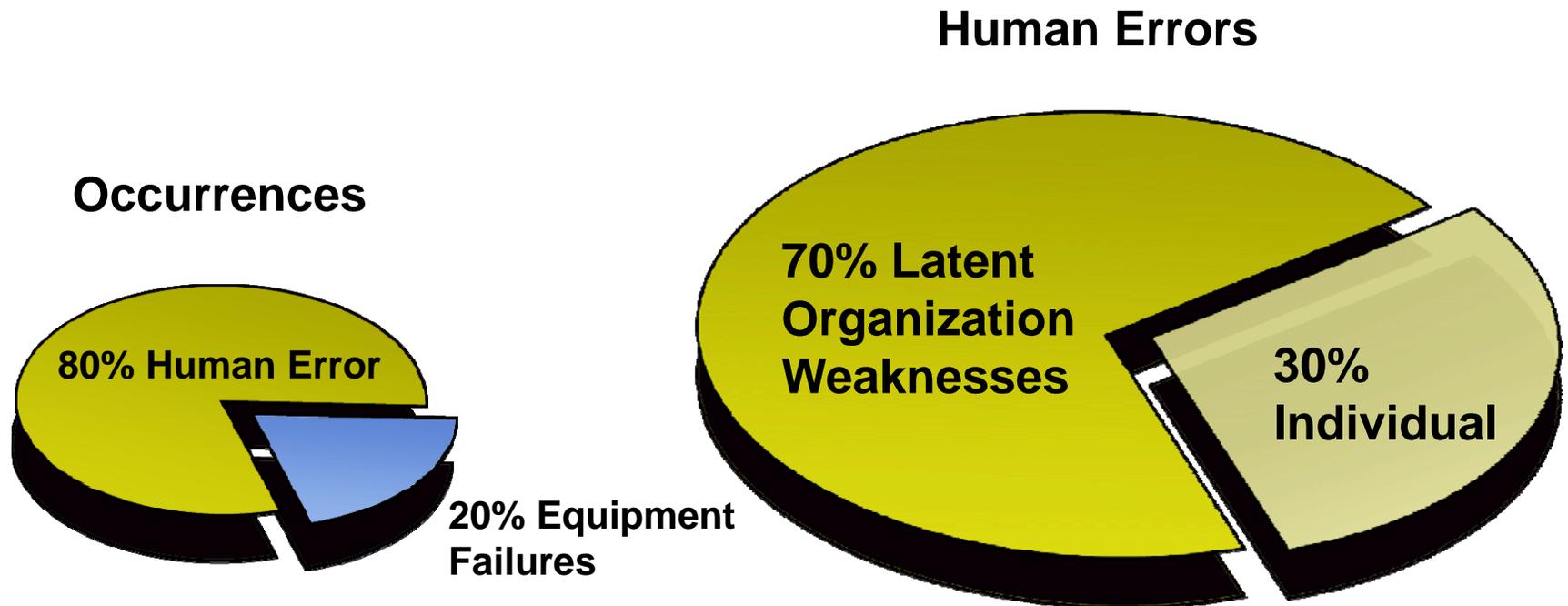
Captain Marty McDonough



The Challenge: Identifying what factors affect people performance

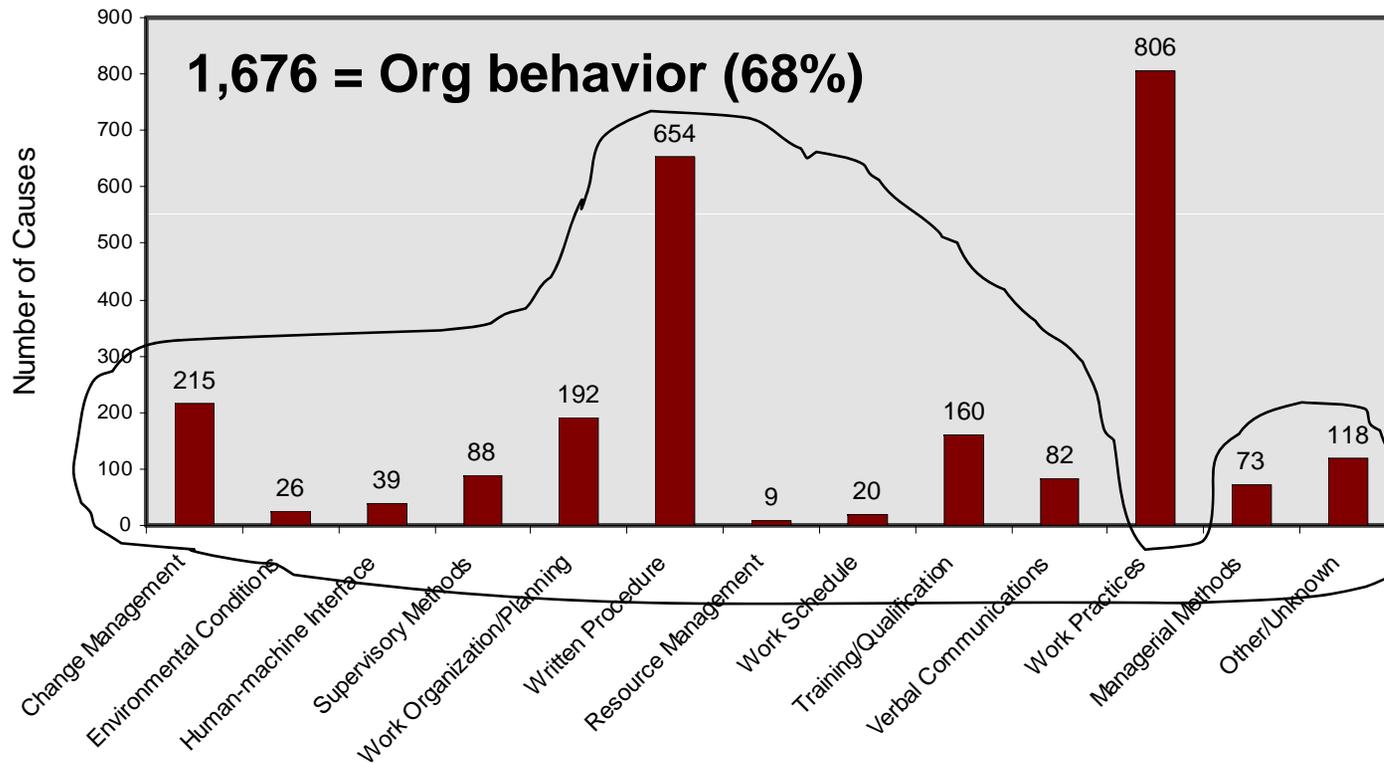


Part I: Why a Human Performance Improvement Approach?



Industry Event Causes *due to human performance*

806 = Individual behavior (32%)



Source: INPO, Event Database, March 2000. For all events during 1998 and 1999.

Facts about Human Error

- It thrives in every industry
- It is a major contributor to events and unwanted outcomes
- It is costly, adverse to safety and hinders productivity
- The greatest cause of human error is weaknesses in the organization, not lack of skill or knowledge
- Error rates can never be reduced to zero
- Consequences of errors can be eliminated



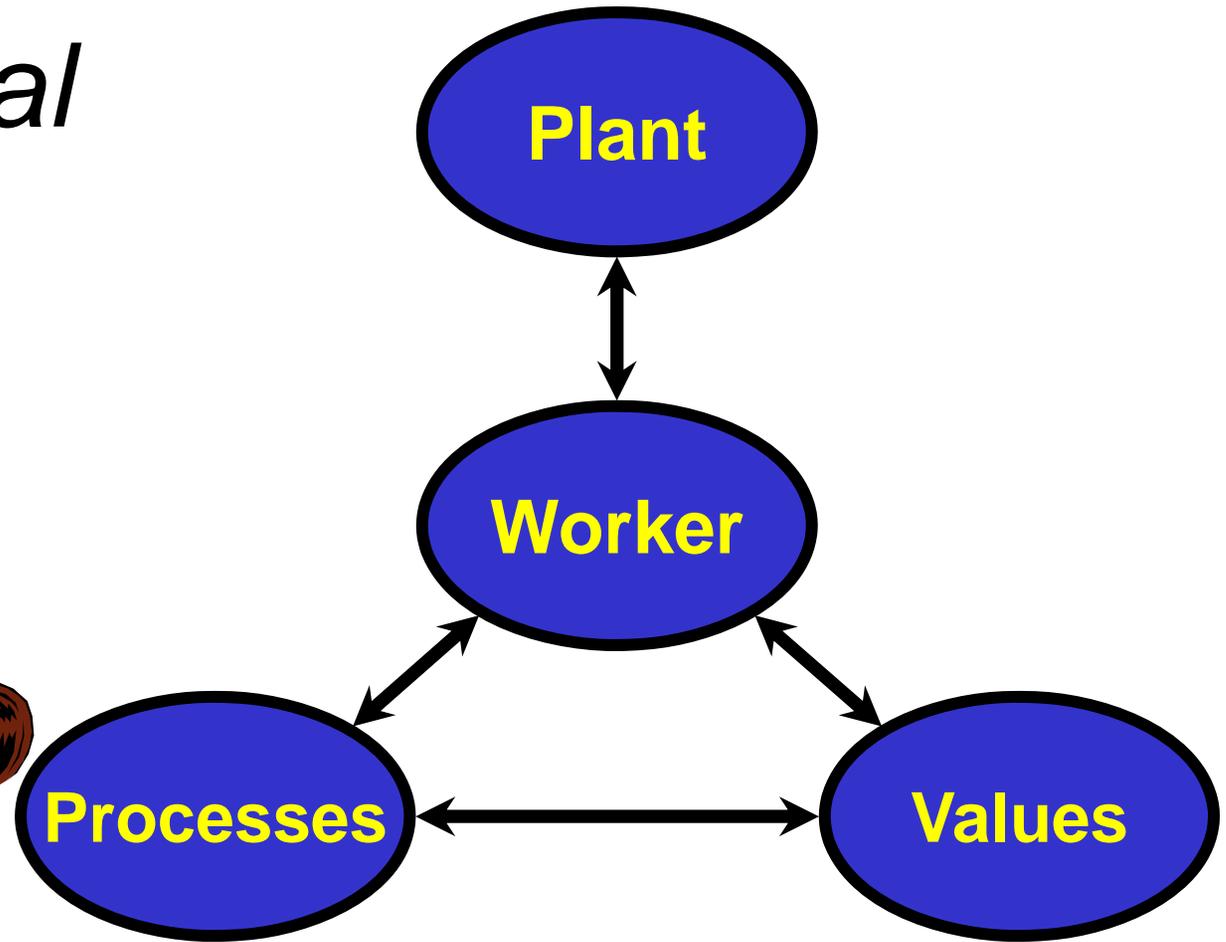
Principles

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 based largely on the encouragement and reinforcement received from leaders, peers, and subordinates.
5. Events can be avoided by understanding the reasons mistakes occur and applying the lessons learned from past events.

MEDICAL ERRORS AND MISTAKES



Individual



Error Precursors

short 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

Limitations of Human Nature

- ❖ Avoidance of mental strain
- ❖ Inaccurate mental models
- ❖ Limited working memory
- ❖ Limited attention resources
- ❖ Pollyanna effect
- ❖ Mind set
- ❖ Difficulty seeing own errors
- ❖ Limited perspective
- ❖ Susceptible to emotion
- ❖ Focus on goal



Hazardous Attitudes

- ❖ **Pride** - “Don’t insult my intelligence.”
- ❖ **Heroic** - “I’ll get it done, hook or by crook.”
- ❖ **Invulnerable** - “That can’t happen to me.”
- ❖ **Fatalistic** - “What’s the use?”
- ❖ **Bald Tire** - “Got 60K miles and haven’t had a flat yet.”
- ❖ **Summit Fever** - “We’re almost done.”
- ❖ **Pollyanna** - “Nothing bad will happen.”

Error Prevention

at the jobsite

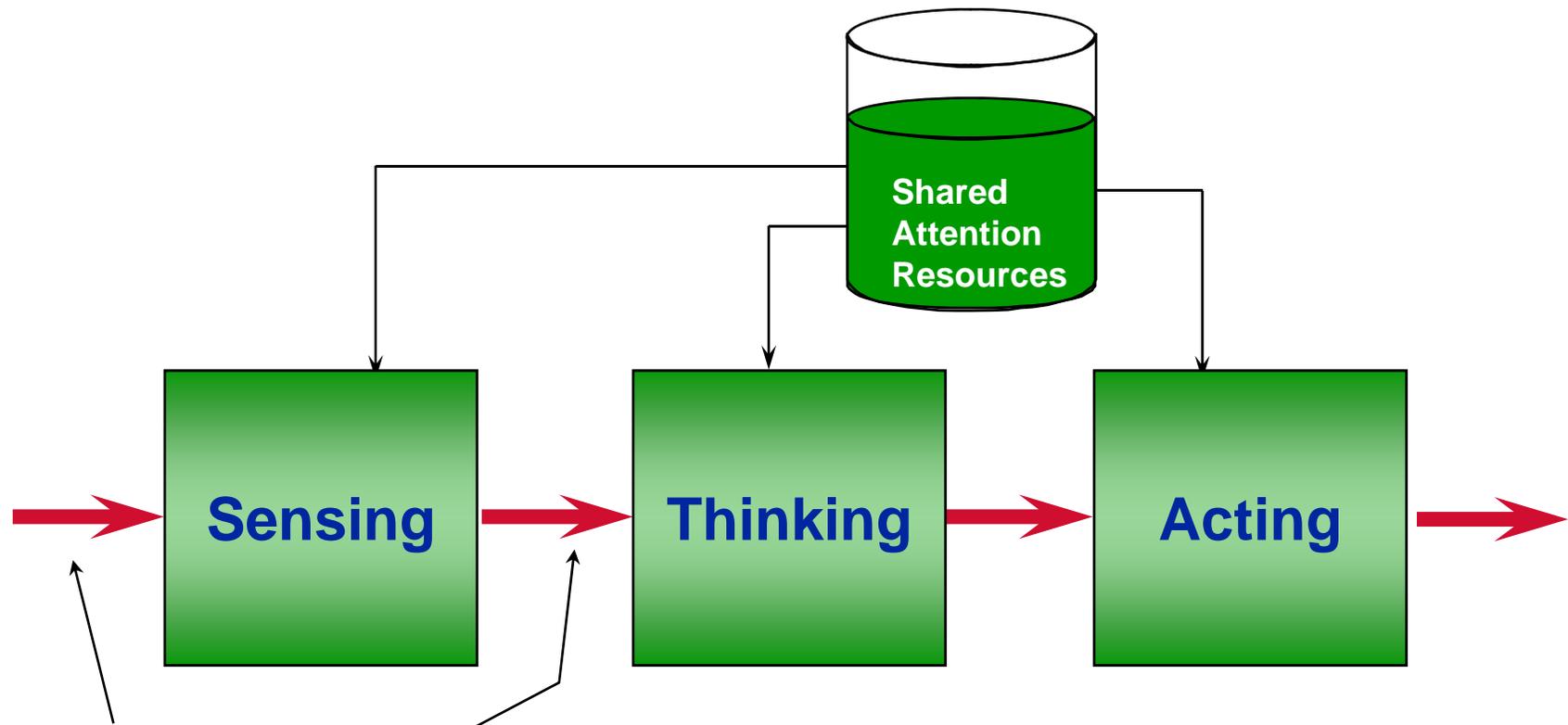
- ❖ Machine
- ❖ Other People
- ❖ Myself



**Finished Files are the Result of
Years of Scientific Study Combined
With the Experience of Many Years.**



Human Information Processing



Information
Flow Path

Source: Wickens, 1992

Organization

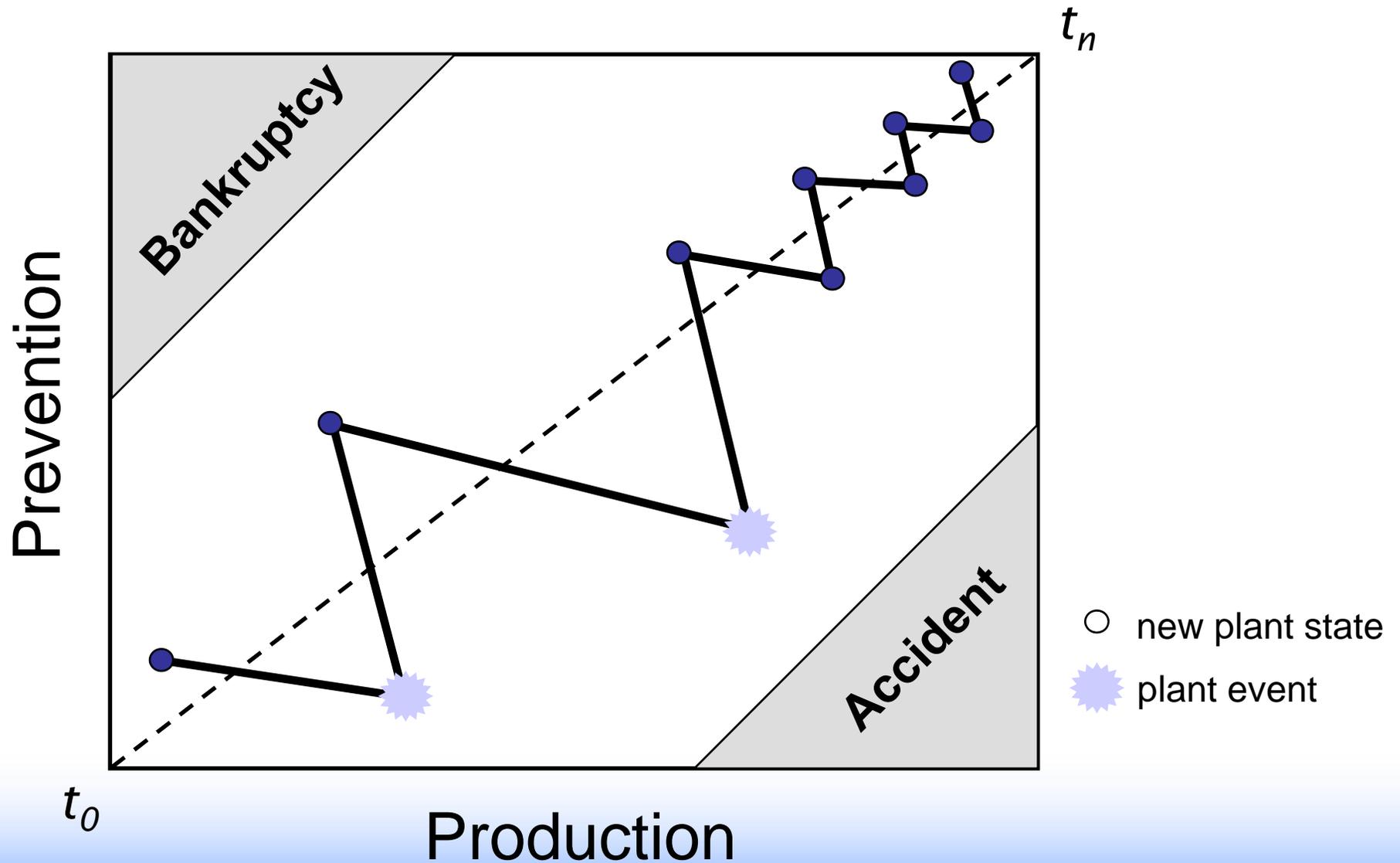


“Events are not so much the result of error-prone workers as they are the outcome of error-prone tasks and error-prone work environments, which are controlled by the Organization.”

James Reason, Managing the Risks of Organizational Accidents



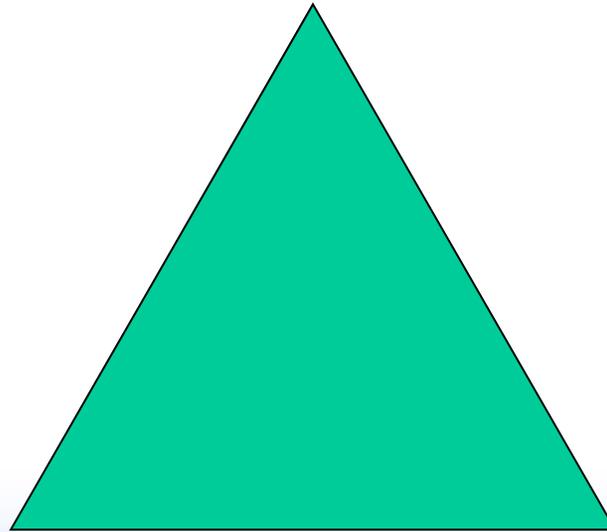
Competing Resources



Source: James Reason. *Managing the Risks of Organizational Accidents*, 1997 (in press).

Human Performance Fundamentals

Victims of our own Success



Human Performance Fundamentals

Defenses

- **Hard -**
 - **Soft -**
- 

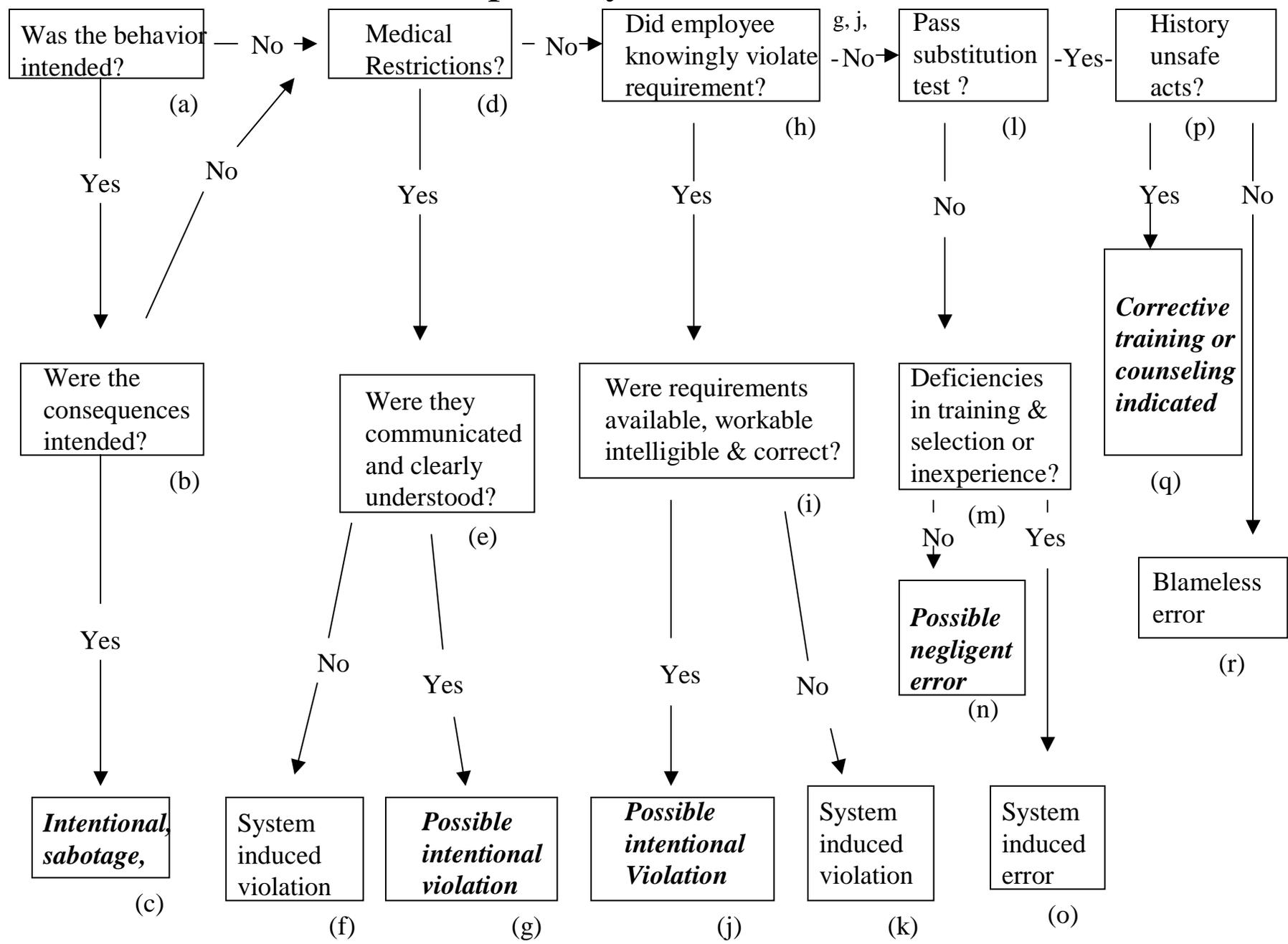
Two Kinds of Error

Active Error ←



→ Latent Error

Culpability Decision Tree

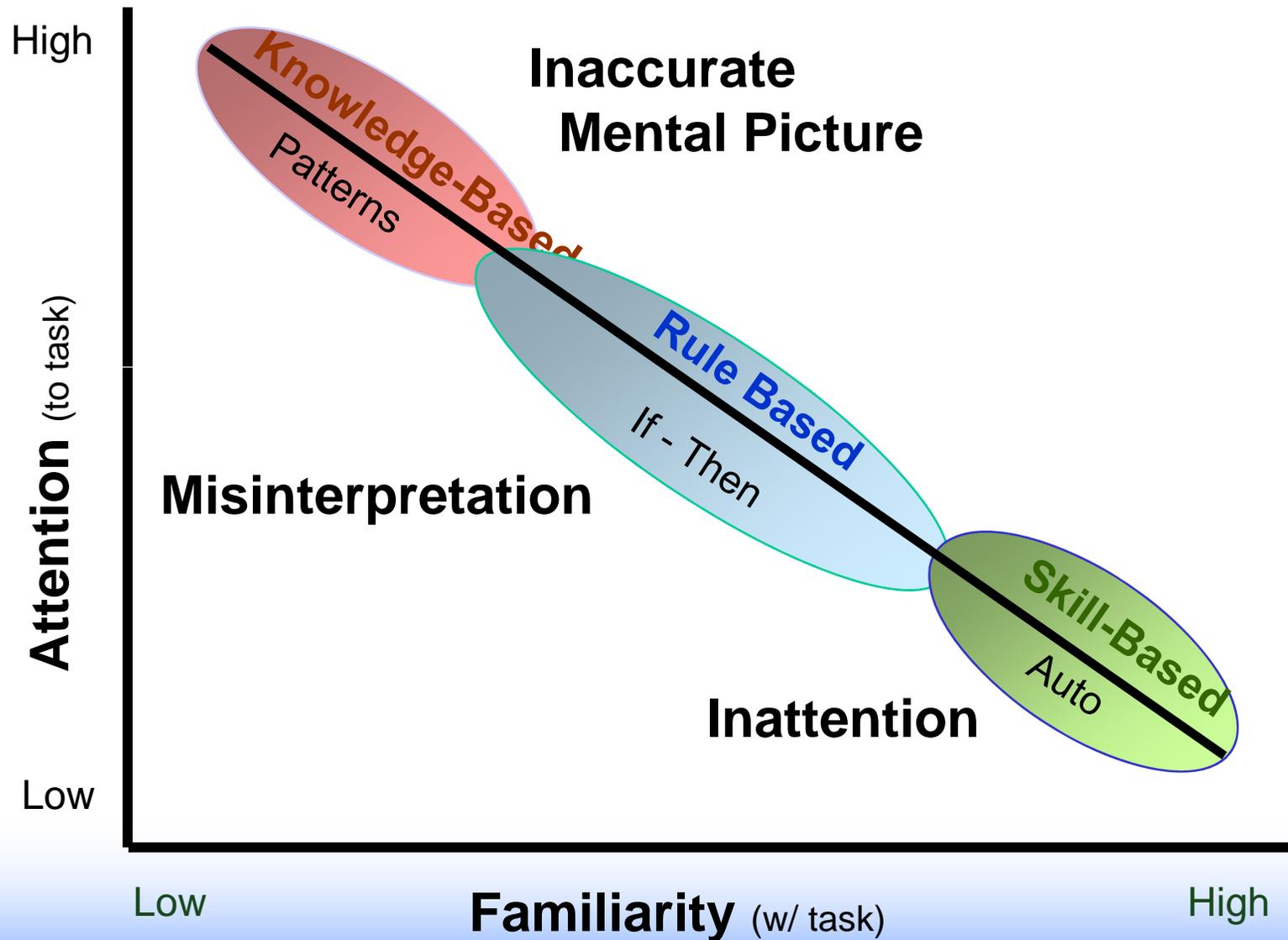


Case Study



**Air Ontario Flight 363 Fokker F28
Dryden, Canada
March 10, 1989**

Performance Modes--Attending Problems



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

Human Performance Fundamentals

**Things aren't always what
they seem!**



The Blame Cycle

Human
Error

More flawed defenses
& error precursors

Individual counseled
and/or disciplined

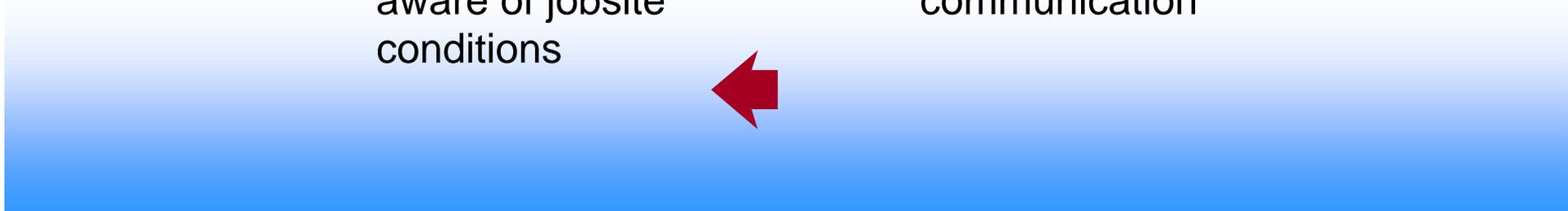
*Blame
Cycle*

Latent organizational
weaknesses persist

Reduced trust

Management less
aware of jobsite
conditions

Less
communication



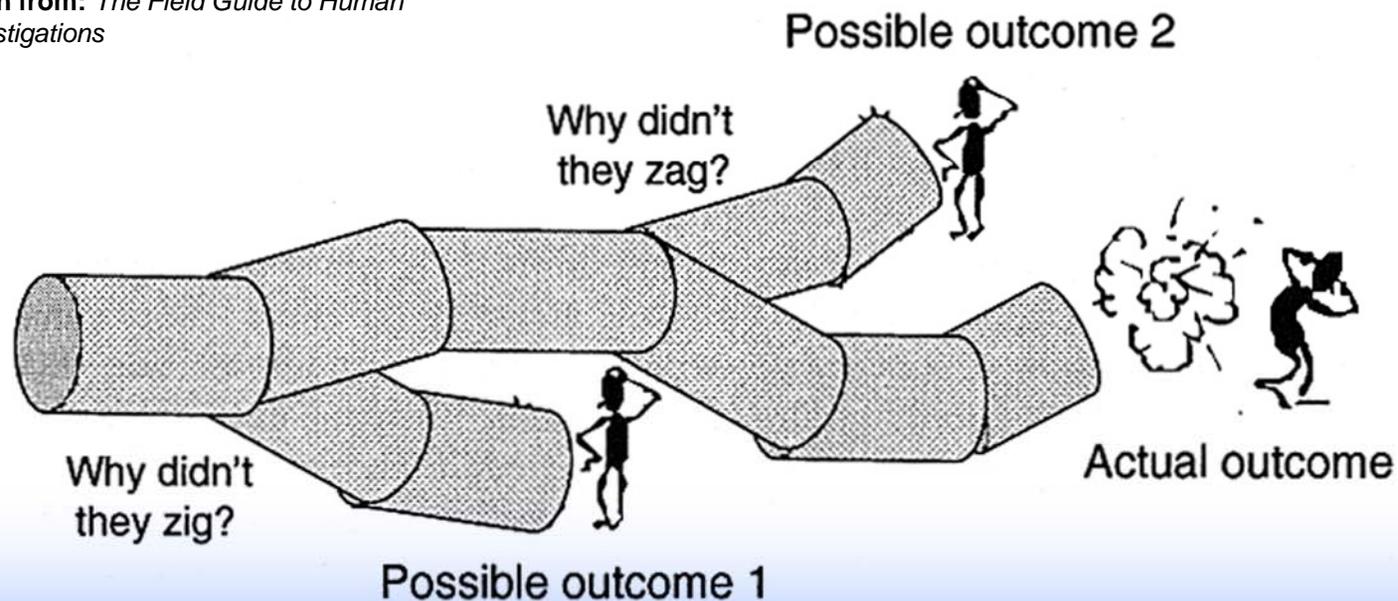
Why is Bad Apple Theory Popular?

- **Cheap and Easy**
 - **Saving Face**
 - **Personal Responsibility and the Illusion of Omnipotence**
 - **Local Rationality Principle**
- 

Counterfactual

Counterfactuals: Going back through a sequence, you wonder why people missed opportunities to direct events away from the eventual outcome. This, however, does not explain failure.

Illustration from: *The Field Guide to Human Error Investigations*



Patterns of Failure

At a particular moment in time, behavior that does not live up to some standard may look like complacency or negligence. But deviance may have become the new norm across an entire operation or organization.

Focusing on one moment in time, you see negligence with respect to an old standard or norm

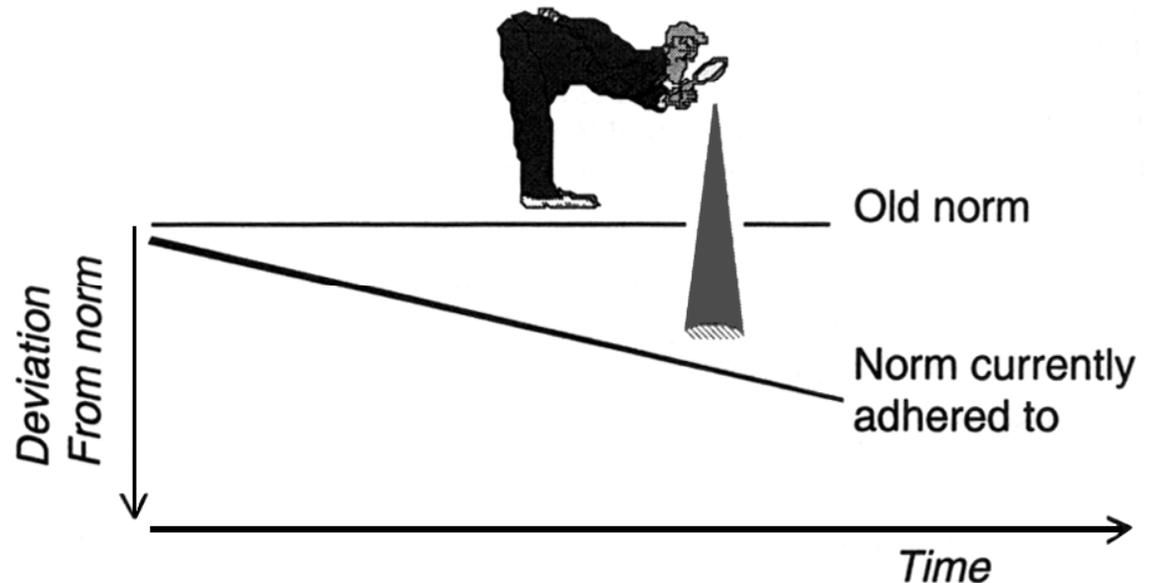


Illustration from: *The Field Guide to Human Error Investigations*

Human Performance Tools

- **Critical Steps**
 - **Enhanced Pre-Job Briefing**
 - **Peer Check**
 - **Self Check**
 - **Independent Verification**
 - **Error Traps**
 - **Just Culture**
 - **Effective Communication**
 - **Questioning Attitude**
 - **Feeling of Uneasiness**
 - **Enhanced Turnover**
 - **3 way communication**
 - **Error Precursors**
 - **Performance/Error Modes**
 - **Devils Advocate**
 - **Place keeping**
 - **Poka Yoke**
 - **SAFE Dialogue**
 - **Discovery Clock**
 - **STAR**
 - **Training**
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