

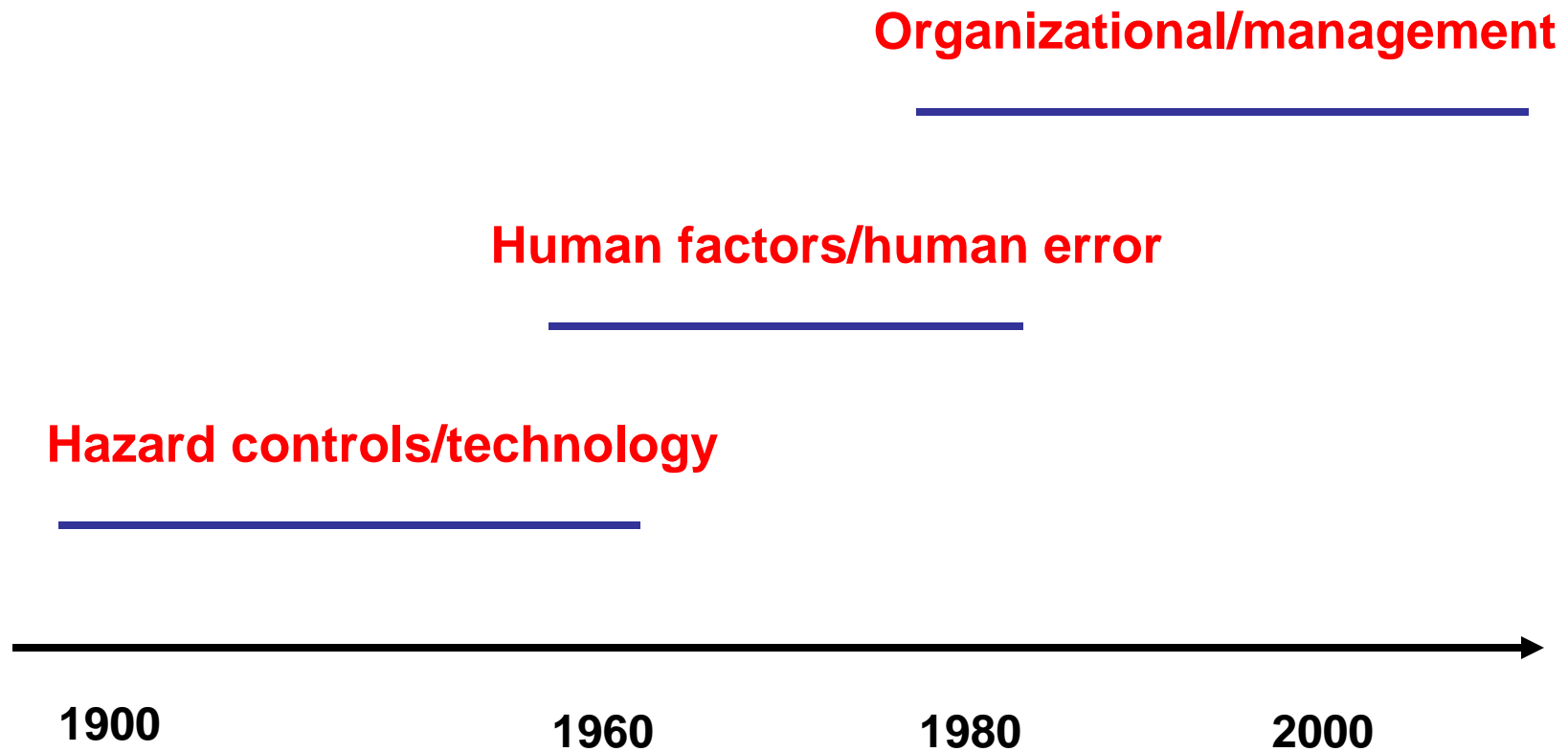
Building and Maintaining a Culture of Safety in a Research Facility

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Epochs of Modern Safety Research and Practice



e.g., Hale & Hovden (1998)

Chernobyl Nuclear Disaster (1986)



Challenger Disaster (1986)



Piper Alpha Explosion (1988)



Shuttle Columbia Explosion (2003)



What have we Learned?

- Active and latent failures
- Push-pull between safety and productivity
- Failure is sometimes designed or engineered into systems (resident pathogens)
- Systems often drift toward failure
- Human error is a consequence not a cause
- In retrospect, human errors are often logical and predictable
- Linear versus non-linear failures
- Managing risk is not simply hazard control and regulatory compliance
- Communication, or lack thereof, often a critical element
- Huge disasters often do not involve huge mistakes
- Safety improvements often compromised by productivity ambitions

Systems Perspective

- Basic/root causes among multiple contributing factors (multi-level/non-linear)
- Importance of monitoring system status and (vulnerabilities, deviations, instabilities, etc.)
- Interactivity of social and technical components of the system
- Need for proactive as well as reactive problem-solving

Core Point: System problems. System solutions

Human Error

Mistakes/violations, such as those due to carelessness, inattentiveness, forgetfulness, preoccupation, or poor judgment, are usually the last and least controllable link in the causal chain.

So what: “Blame and train” is a limited strategy for improving safety

Safety Culture

Working definition - The attitudes, values, norms, and beliefs that a particular group of people share with respect to risk and safety*

“The way we do things around here”

“Behavior-outcome expectations”

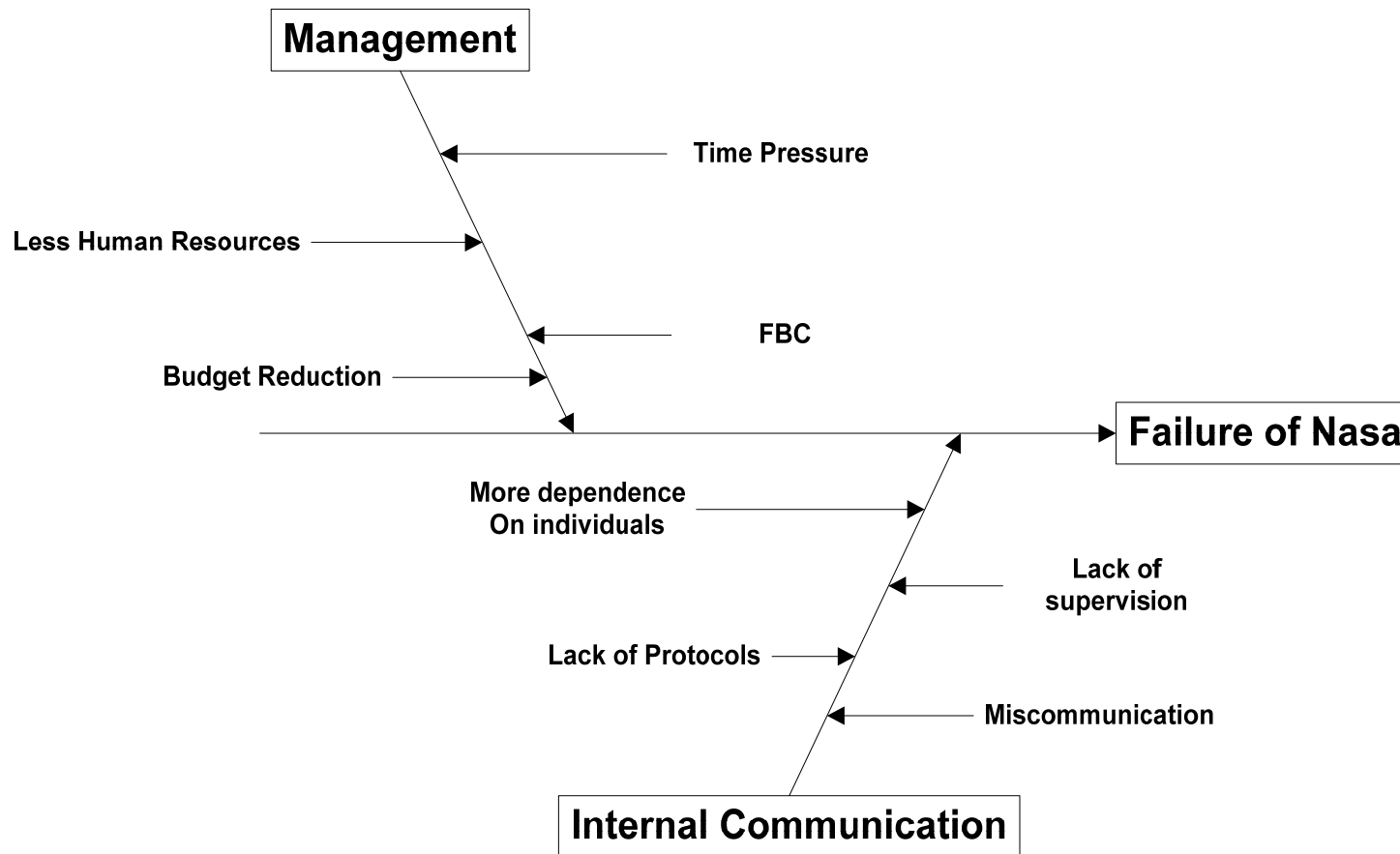
* e.g., Mearns et al. (1998)

Safety Culture

Safety culture is *(pick one of the following)*:

- A unique type of culture
- A sub-type of organizational culture
- An element or facet of organizational culture

And your point is? Safety culture is part of a cultural mix: potential for conflict, etc.

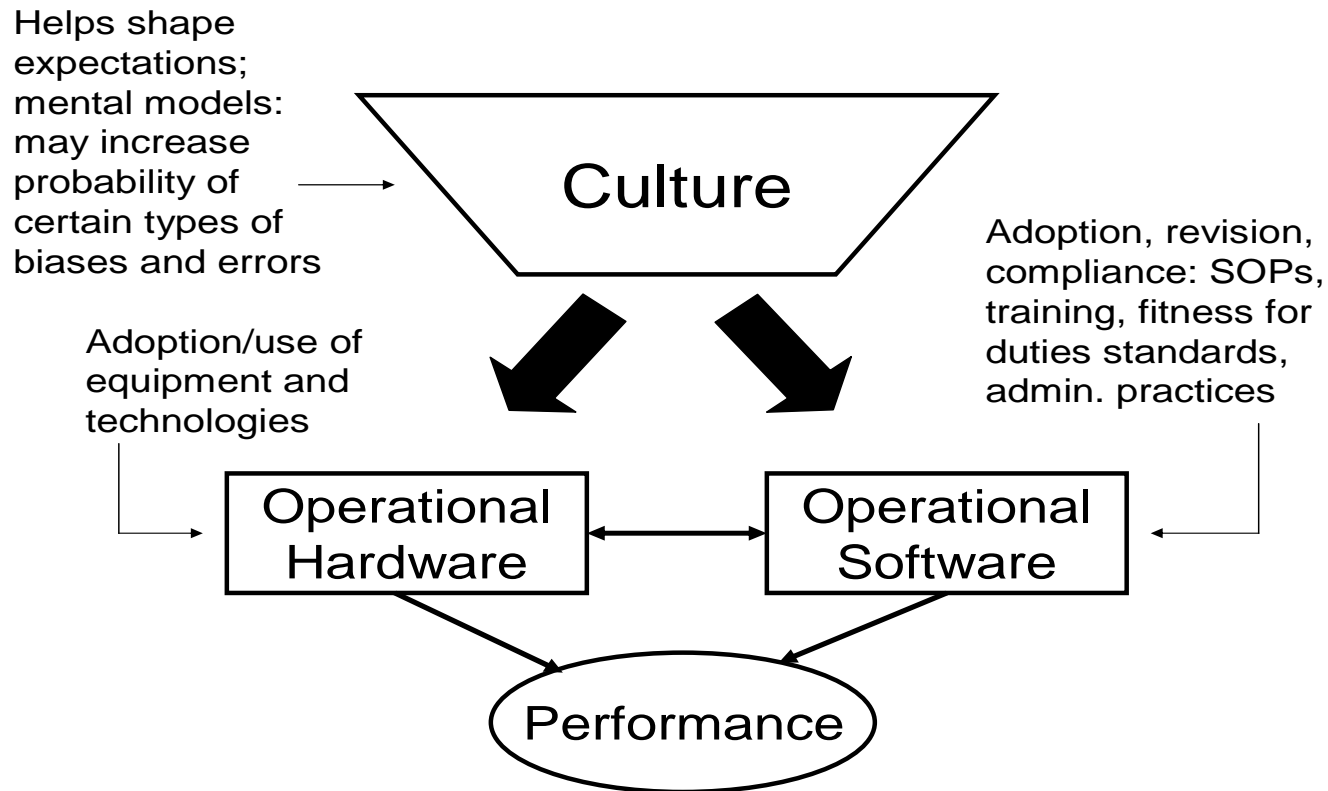


Ishikawa Diagram (Fishbone Diagram)
 Columbia Accident Investigation Board (2003)

Safety Culture

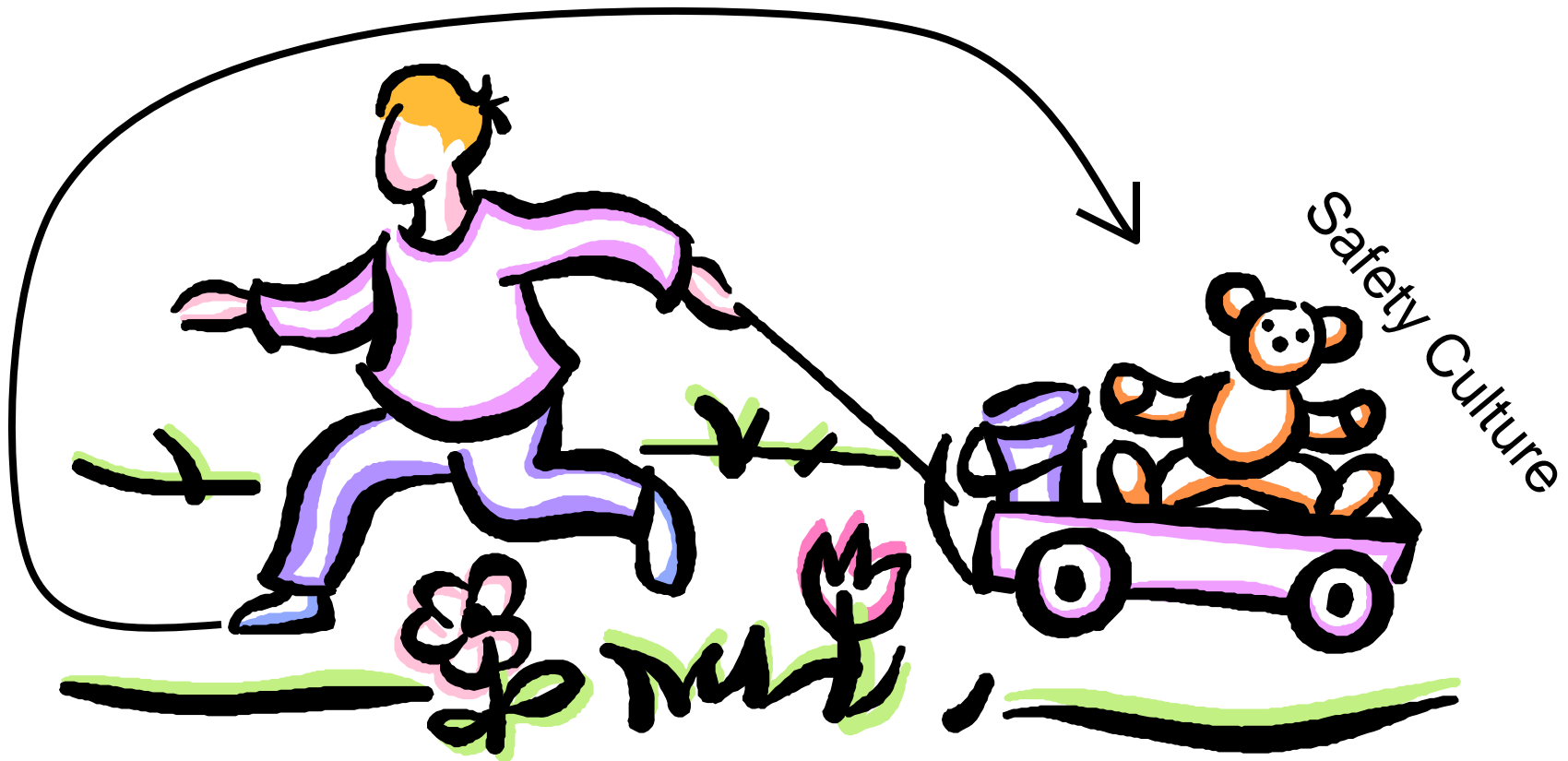
- May be a soft concept but an effective safety culture is built on a solid foundation of analysis and action
- Safety culture is about context and context is importance; it is the operational frame of reference
- It becomes especially important in complex and dynamic work situations and when rules and regulations don't always apply or don't exist

General Model of Safety Culture Influences



DeJoy et al. (2008)

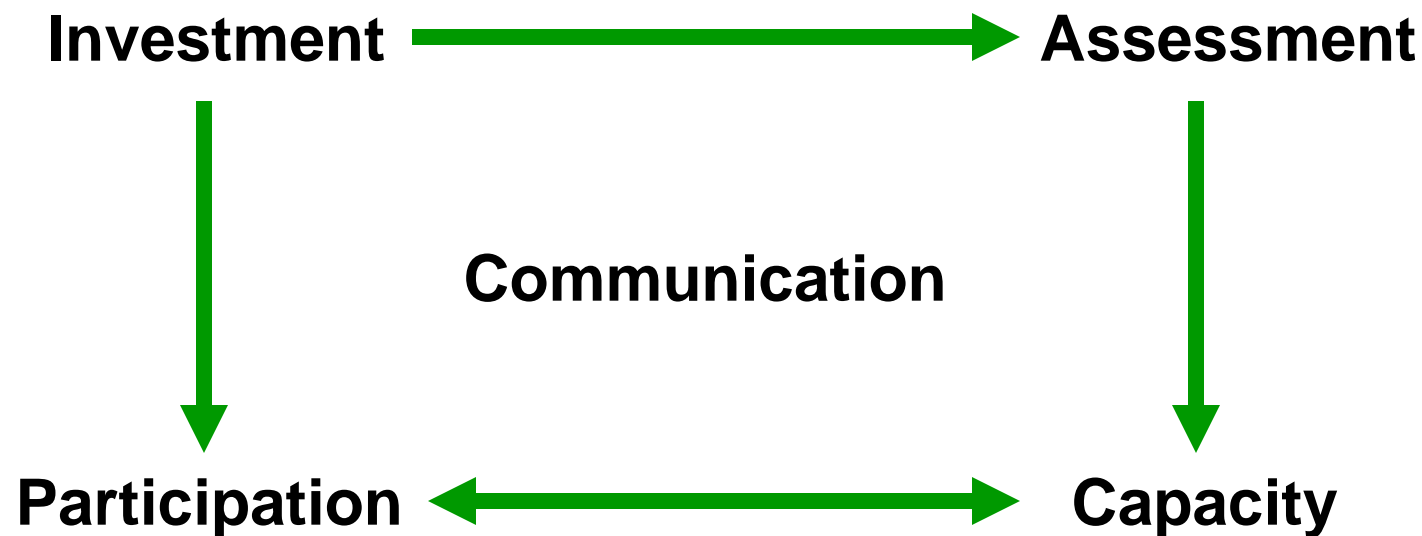
Safety culture is basically historical and cumulative in nature



Building Blocks of Safety Culture

- Investment
- Participation
- Assessment
- Capacity
- Communication

Safety Culture Change (IPACC Framework)



DeJoy (2004)

Key Features – Safety Culture Change

- Investment
 - resources
 - time
 - priorities
- Participation
 - management
 - supervision
 - employees
- Assessment
 - problems
 - context
 - goals
 - Progress
- Capacity
 - facilitation
 - training
 - recognition
- Communication
 - regular
 - reliable
 - complete
 - open

Building and Maintaining a Culture of Safety in an Academic Research Facility:

Suggestions and Observations using IPACC

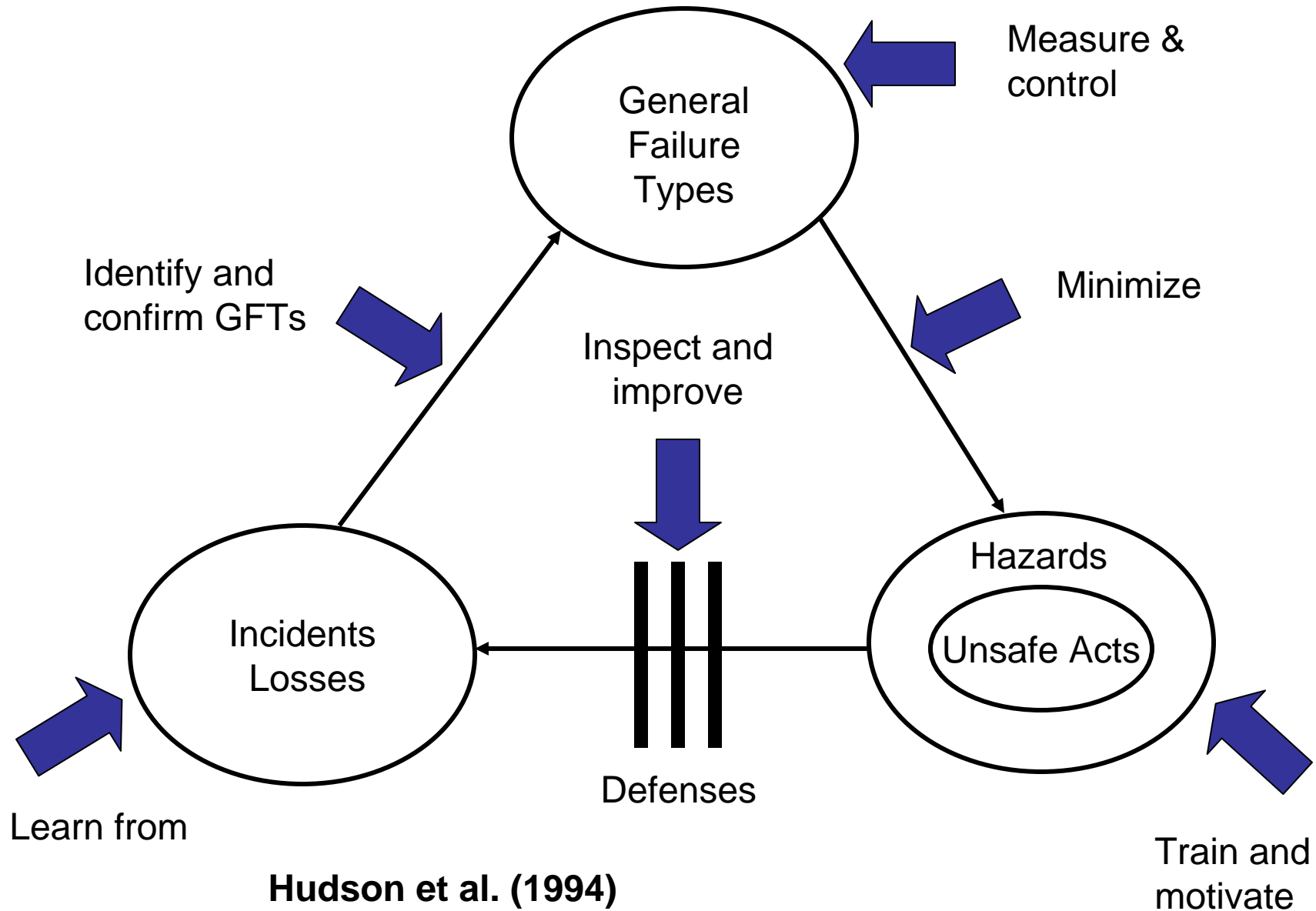
Investment:

- Senior leadership support
- Establish line management accountabilities
- Create high level policies
- Analyze financial disincentives for safety
- Formulate goals

Assessment:

- Analyze context
 - Organizational characteristics
 - Jobs and tasks
 - Physical/technical environment
- Determine current status
 - Hazards
 - Exposures
 - At-risk employees
 - Controls/protocols
- Put tracking/monitoring protocols in place

Tripod-Delta



Hudson et al. (1994)

GFTs

- Design
- Hardware
- Policies and procedures
- Organization
- Goal incompatibility
- Selection and training
- Communications
- Defenses (controls)
- Error-provocative conditions

Coordinated attention to these helps creates a strong, positive safety culture

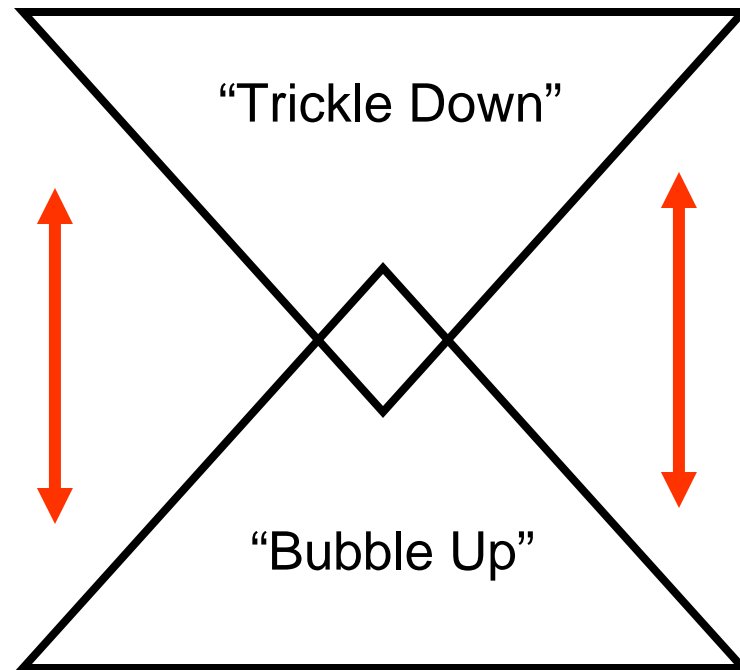
Capacity:

- Capacity usually needs to be built to make full use of investment and assessment results
- Training
 - for frontline workers – not just safe work practices; why and how of participating
 - Managers – about managing safety and communicating
 - Supervisors – about their pivotal role
- Lowering barriers/disincentives for safety

Participation:

- Increasing participation at all levels is generally good for safety performance, especially in complex, dynamic work settings.
- Automatically improves communication
- Fosters organizational citizenship behaviors
- Can produce more effective solutions to safety problems
- Fosters learning (individual & organizational)

Modes of Safety Culture Change



Participation
Communication
Capacity

DeJoy (2005)

Characteristics of HROs (High Reliability Organizations)

- Management commitment to safety
- Safety resources and incentives
- Open and candid communications
- Low frequency of unsafe behavior, even under production pressures
- Priority of safety, even at expense of production/efficiency
- Continuous safety mindfulness
- Openness about errors and problems, errors reported
- Organizational learning

e.g., Rochlin (1999); Singer et al. (2003)

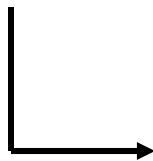
Communication:

- Key feature of positive safety culture
- Transfers knowledge, reduces ambiguity
- Vertical and horizontal communication are both important (e.g., safety chatter-HROs)
- Important to anticipating as well as reacting to problems (important aspect of resilience)
- Social dynamics, trust, fairness, confidentiality are critically important
- Information collected needs to be disseminated and used

Take away point: Communication is The “glue” of safety culture

Part of building a positive safety culture is recalibrating the exchange relationship between the organization and its employees

Organizational
(leadership)
commitment and
involvement



Employee
commitment and
involvement



Some Parting Shots about Safety

- Safety will always be in competition with other priorities
- Safety is a relative concept – a judgment of acceptability
- There are no final victories in the quest for safety
- Working back to basic (aka: root or latent) causes takes “courage”
- Safety isn’t “sexy” - safety is a dynamic non-event
- “We should have paid more attention to that” is not a good answer when something bad happens

e.g., Lowrance (1976); Reason (1997); Weick & Sutcliffe (2001)



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Thanks

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