



THE Ames Laboratory  
*Creating Materials & Energy Solutions*



IOWA STATE  
UNIVERSITY

# Human Performance Improvement (HPI)

## The next greatest safety management theory?

Ames Laboratory  
Safety Coordinator & Representative Meeting  
December 14, 2010

# Safety Management

## What do OSHA & DOE say?

- Required
- Two-way street: management & employees
- Always looking for a better way

**Job Safety and Health**  
**It's the law!**

**OSHA**  
Occupational Safety and Health Administration  
U.S. Department of Labor

**EMPLOYEES:**

- You have the right to notify your employer or OSHA about workplace hazards. You may ask OSHA to keep your name confidential.
- You have the right to request an OSHA inspection if you believe that there are unsafe and unhealthful conditions in your workplace. You or your representative may participate in that inspection.
- You can file a complaint with OSHA within 30 days of retaliation or discrimination by your employer for making safety and health complaints or for exercising your rights under the *OSH Act*.
- You have the right to see OSHA citations issued to your employer. Your employer must post the citations at or near the place of the alleged violations.
- Your employer must correct workplace hazards by the date indicated on the citation and must certify that these hazards have been reduced or eliminated.
- You have the right to copies of your medical records and records of your exposures to toxic and harmful substances or conditions.
- Your employer must post this notice in your workplace.
- You must comply with all occupational safety and health standards issued under the *OSH Act* that apply to your own actions and conduct on the job.

**EMPLOYERS:**

- You must furnish your employees a place of employment free from recognized hazards.
- You must comply with the occupational safety and health standards issued under the *OSH Act*.

This free poster available from OSHA –  
*The Best Resource for Safety and Health*

Free assistance in identifying and correcting hazards or complying with standards is available to employers, without citation or penalty, through OSHA-supported consultation programs in each state.

1-800-321-OSHA  
www.osha.gov

OSHA 3160-11-001

# Avoid stupid, non-value added stuff....



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# Question

What is our  
current safety  
management  
philosophy??



# Our Safety Management Philosophy



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# Question

What are some of the unique characteristics of our work environment?



# Question

Describe our safety “culture”.

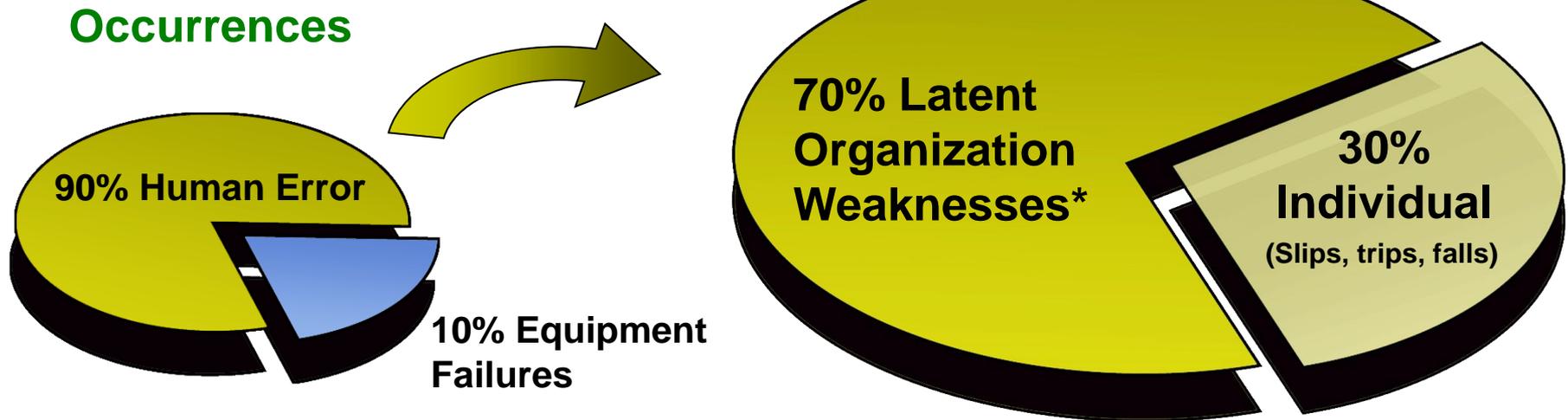


# Director's message to new employees



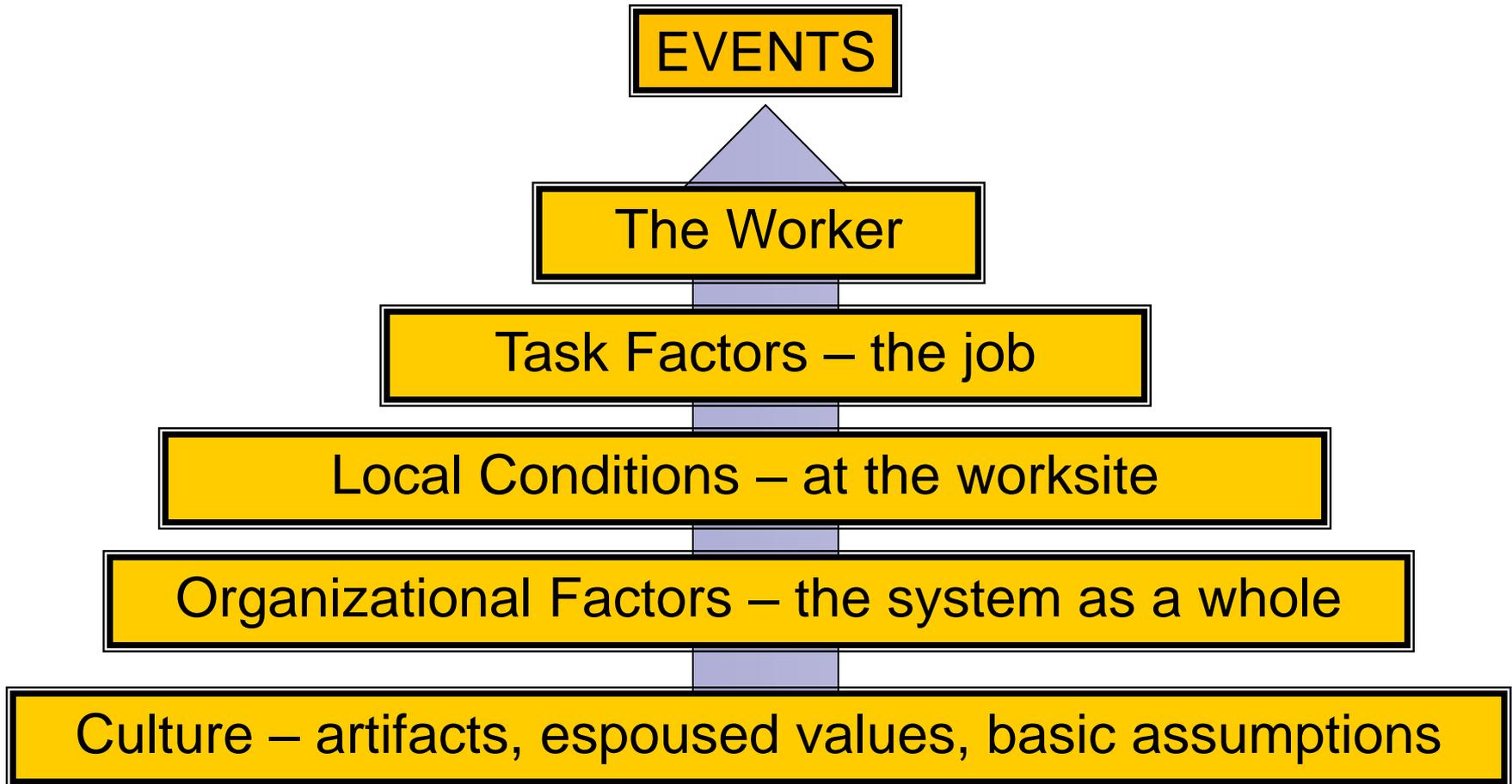
# Human Performance Improvement

## Human Errors



\* Latent Organization Weakness – Hidden deficiencies in management control process or values creating workplace conditions that can provoke an error and/or degrade the integrity of defenses

# Another View



# Human Performance Improvement

## HPI Principle #1:

People are fallible,  
and even  
the best make  
mistakes.



# Human Performance Improvement

Mistakes arise directly from the way the mind handles information, not through stupidity or carelessness.

— Dr. Edward de Bono

Really??!!



# Limitations of Human Nature

- **Stress**
- Avoidance of **mental strain**
- Inaccurate **mental models**
- Limited working **memory**
- Limited **attention** resources
- **Mind set**
- Difficulty **seeing** own errors
- Limited **perspective**
- Susceptible to **emotion**
- Focus on the **goal**
- **Fatigue**



# Hazardous Attitudes

- **Pride:** “Don’t insult my intelligence.”
- **Heroic:** “I’ll get it done, by hook or by crook.”
- **Invulnerable:** “That can’t happen to me.”
- **Fatalistic:** “What’s the use?”
- **Bald Tire:** “Gone 60K miles without a flat yet.”
- **Summit Fever:** “We’re almost done.”
- **Pollyanna:** “Nothing bad will happen.”

# Human Performance Improvement

## HPI Principle #2:

Error-likely situations are predictable, manageable, and preventable.



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# Error Prevention Tools

- Identify critical tasks
- Identify error precursors & error likely situations
- Self-checking
- Peer-checking
- Independent verification
- Pre/Post job briefings
- Procedure use & adherence
- Problem-solving
- Questioning attitude
- Conservative decision making

# Human Performance Improvement

Error without consequence is a good thing — it shows that our systems are error-tolerant and that they are working – Dr. Todd Conklin.



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# Human Performance Improvement

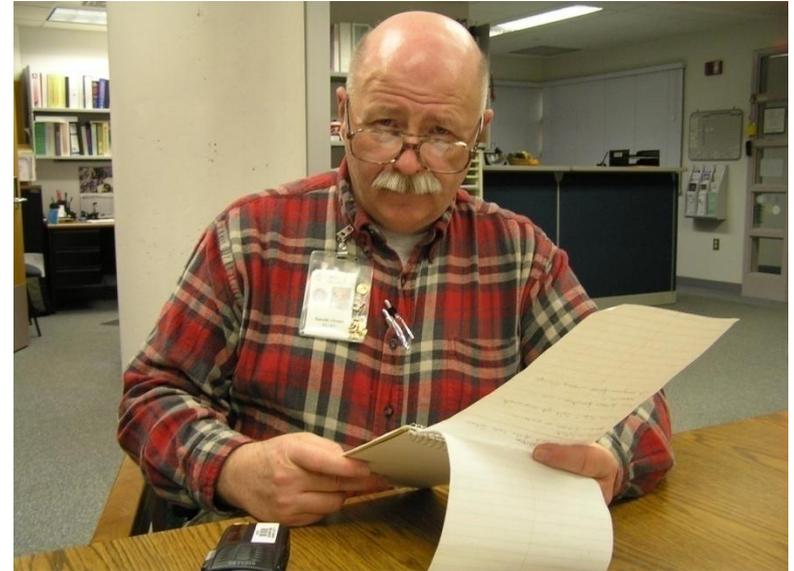
## HPI Principle #3:

Individual behavior is influenced by organizational processes and values.



# Human Performance Improvement

*So, what do we  
do when there  
is an event?*



# Old vs. New Attitude on Error

- OLD: Human error is a cause of accidents
- OLD: To explain failure, investigations must seek failure
- OLD: They must find people's inaccurate assessments, wrong decisions and bad judgments
- NEW: Human error is a symptom of trouble deeper inside a system.
- NEW: To explain failure, do not try to find where people went wrong.
- NEW: Find how people's assessments and actions made sense at the time, given circumstances that surrounded them.

# Human Performance Improvement

## HPI Principle #4:

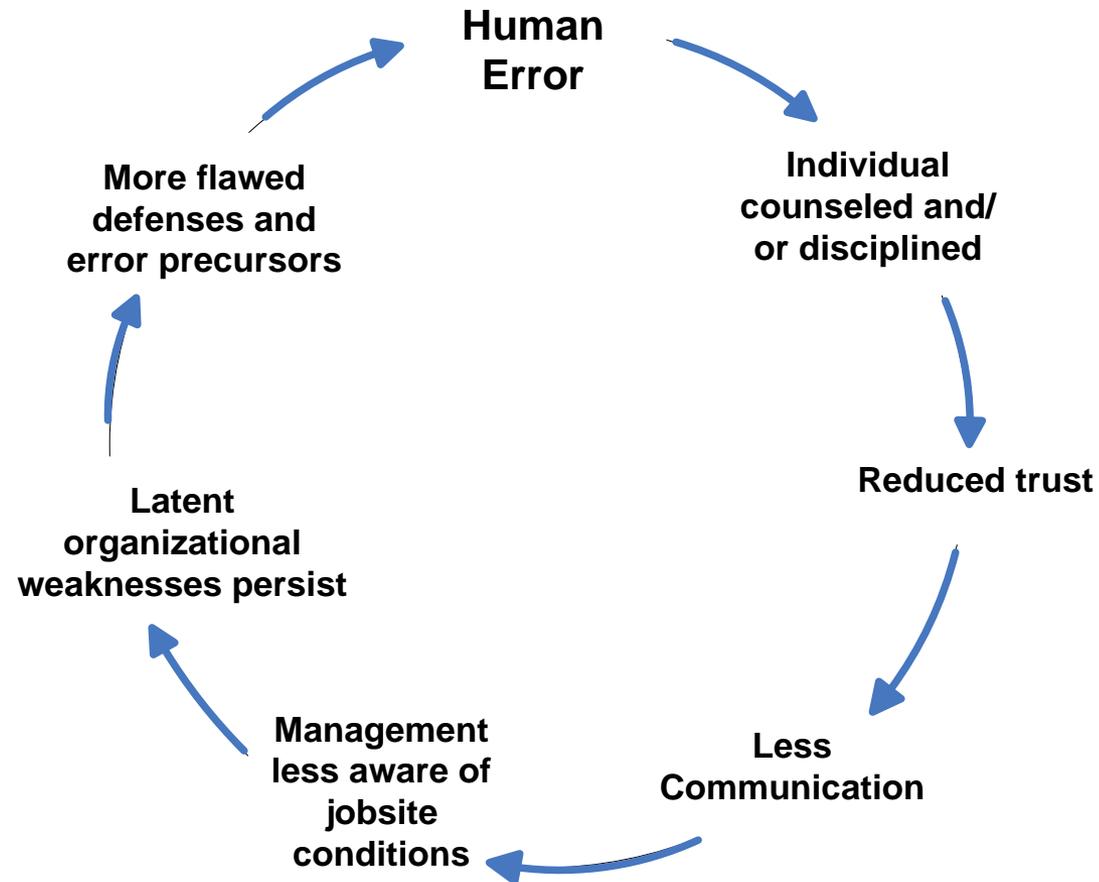
Operational upsets can be avoided by understanding the reasons mistakes occur and applying the lessons learned from past events.



# Human Performance Improvement

- **Encourage Reporting:** Value errors as leading safety data
- **Create a Just Work Environment:** Don't try and punish errors out of the system
- **Flexibility:** Prepare workers to adapt effectively to changing demands
- **Learning:** Create opportunities for observation, reflection and feedback

# Human Performance Improvement



# Human Performance Improvement

## HPI Principle #5:

People achieve high levels of performance based largely on the encouragement and reinforcement received from peers, leaders, and subordinates.



# An Analogy: The Highway



# Case Study #1

- Contractor installing door frames. Company protocol states this is a two-person job. End of day, week and project (deadline looming). Limited personnel so proceeded solo. Door frame fell during installation. Employee reached to catch resulting in hernia.



# Case Study #2

- Facilities Services personnel notice several small burns on wall in laser lab. Observation is reported to ESH&A and investigated. Group members state that burns were the result of installation of laser by factory rep. Factory rep stated that routine installation procedure was followed and beam stops were not part of procedure.

# Case Study #3

- Researcher cleaning glassware. Disconnecting an elbow from a condenser. Connection was stuck and researcher used extra force. The elbow broke and both thumbs were lacerated.



# How to incorporate HPI?

- Independent & Program/Department Walkthroughs
- Readiness Reviews
- Employee Safety & Security Concern Program
- Event Investigation Process
- Training
- Lessons Learned Program

# HPI Champion in DOE

Dr. Todd Conklin, Senior Advisor  
to the Associate Director, Los  
Alamos National Laboratory



# QUESTIONS?



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