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EMERGENCY MANAGEMENT ISSUES SPECIAL INTEREST GROUP

Launching Emergency Management Leadership

Safety Observation Contributions to a National Security Laboratory's Emergency Planning and Preparedness Program

Dina M. Siegel, Michael E. Cournoyer, Joshua Miller, Darril C. Stafford, and Richard A. Norman

Los Alamos National Laboratory

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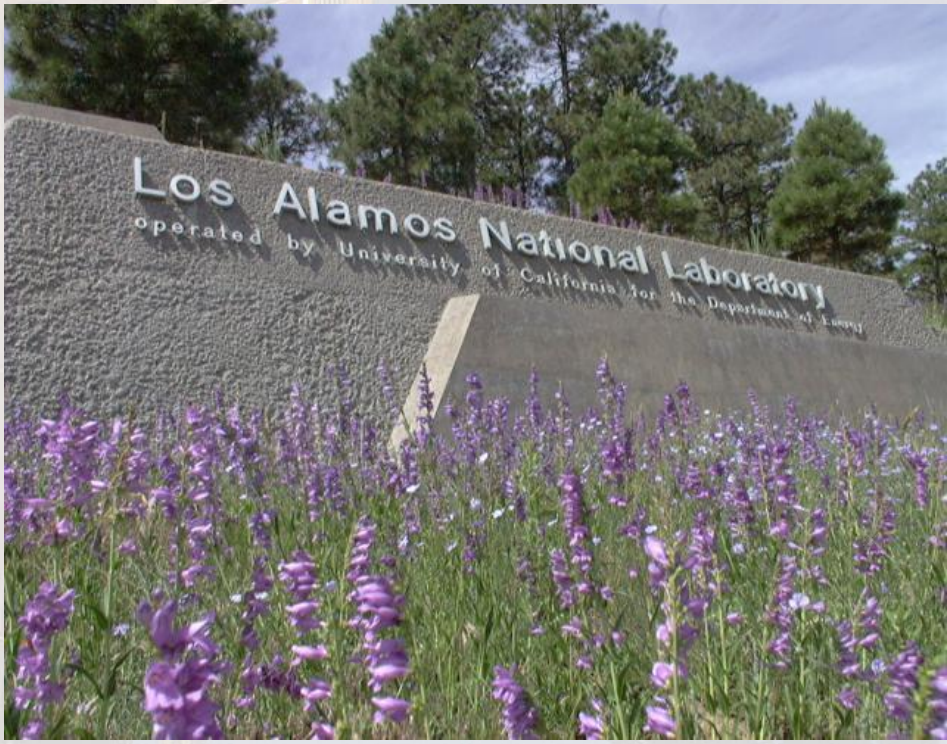
Abstract

- A nuclear research facility's Emergency Planning and Preparedness Program (EPPP) minimizes or mitigates the consequences of an emergency incident. In an effort to reduce the consequences of an emergency incident, a behavior-based safety observation program focusing on the identification and elimination of facility conditions at-risk behaviors has been implemented. This paper focuses on collection of data from facility condition observations, incorporation of this information into an input metric, and the resulting improvements to the EPPP.

Information About LANL

- Solving problems regarding national security account for most activities performed at the Los Alamos National Laboratory (the Lab).
- This involves chemical and metallurgical operations with nuclear materials and other toxic chemicals.



The Lab's EPPP

- Engineered barriers provide the most effective protection from radioactive materials and have been incorporated through architectural and structural design.
- The Lab's Emergency Planning and Preparedness Program (EPPP) augments these passive safety features by minimizing or mitigating the consequences of an emergency incident in order to protect the health and safety of workers, the public, and the environment.
- A key element of the EPPP is to consider measures that lower the risk of emergency operations.

Behavior-Based Safety Observation Program

- The process is based on the simple act of having workers observe other workers and provide feedback to safe and at-risk behaviors.
- Observations typically take 10 to 15 minutes.
- If an observer detects an action by the observee is at-risk, especially if a safety system is being bypassed, the observer may question the observee to verify the intent and desired outcome before the action is taken.

ATOMICS
Allowing Time Observation Measures Increased Commitment to Safety

Behavior-Based Safety Observation Program

- ATOMICS includes five questions for performing observations:
  - I thought you were performing an at-risk behavior because…
  - Do you agree you were at risk?
  - Do you have any control over the situation?
  - Do you have any ideas that could eliminate the risk?
  - Can this be performed safer in the future?

ATOMICS
Allowing Time Observation Measures Increased Commitment to Safety

Safety Observations

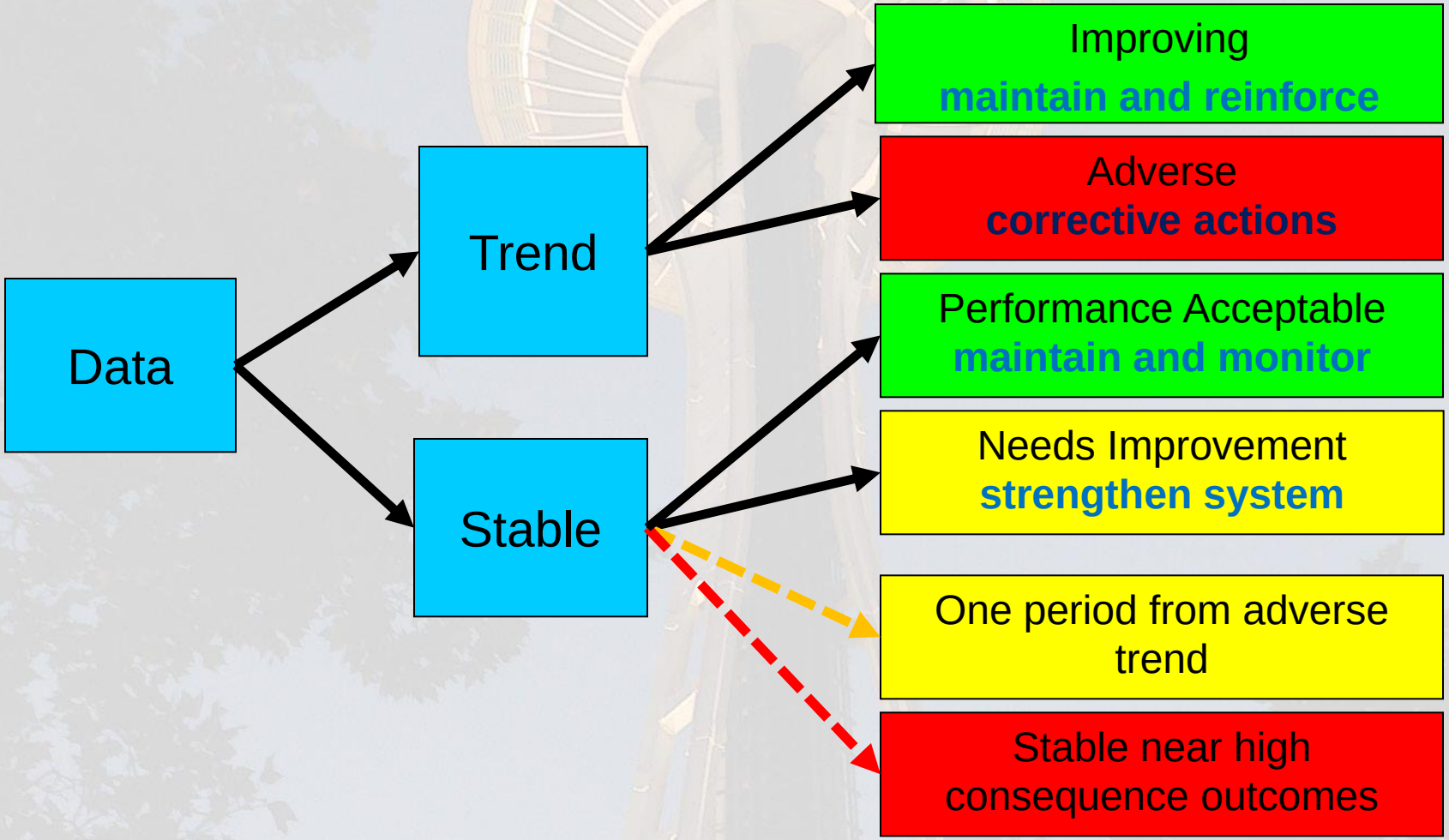
- ATOMICS data from Facility Conditions observation cards has been compiled between March of 2008 and October 2011.

	Facility Conditions Observation
	Walking/Working Surfaces
1.1	Aisles and passageways are kept clear and clean to the extent that the nature of the work allows. Housekeeping in these areas is vital to prevent trip hazards. Permanent aisles and passageways are appropriately marked.
1.2	Floors do not have trip hazards such as power cords, loose carpet or other items on floor.
1.3	Personnel Access such as stairs/ramps/aisles have even or non-slip surfaces free from all trip hazards.
1.4	Stairs with four or more risers have stair rails or handrails on the down side of the stairwell.
1.5	Stair treads reasonably slip resistant and stair nosings have a non-slip finish. Open side walk ways such as loading docks or catwalks have hand and guardrails.

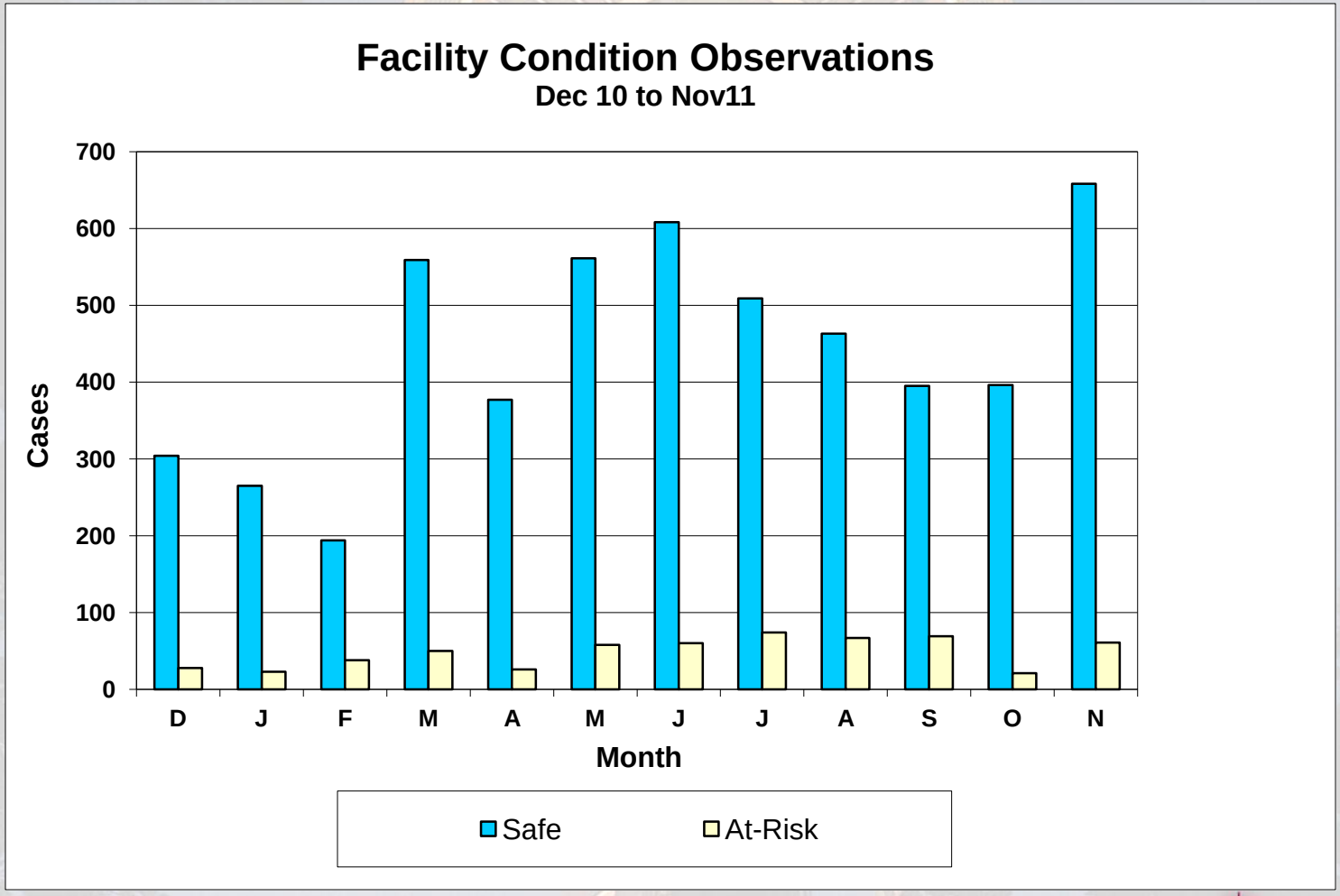
Trends

- One point outside the control limits (**Definitive** trend)
- Two out of three points; two standard deviations above/below average (**Sigma Zone** trend)
- Four out of five points; one standard deviation above/below average (**Sigma Zone** trend)
- Seven points in a row; all above/below average (**Pattern** trend)
- Seven points in a row; all increasing/decreasing (**Pattern** trend)
- Ten out of eleven points in a row; all above/below average (**Pattern** trend)

Methodology



Results



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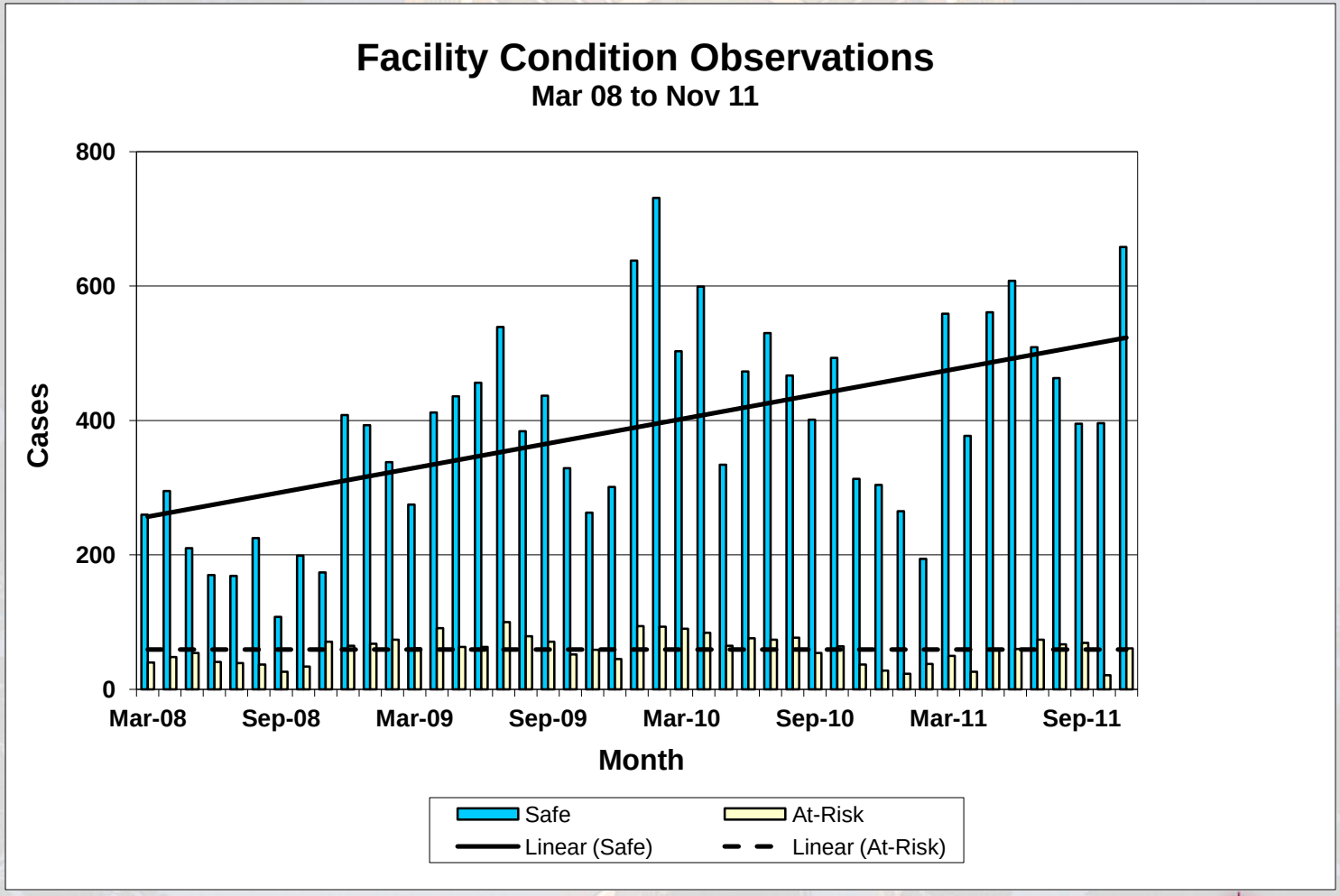
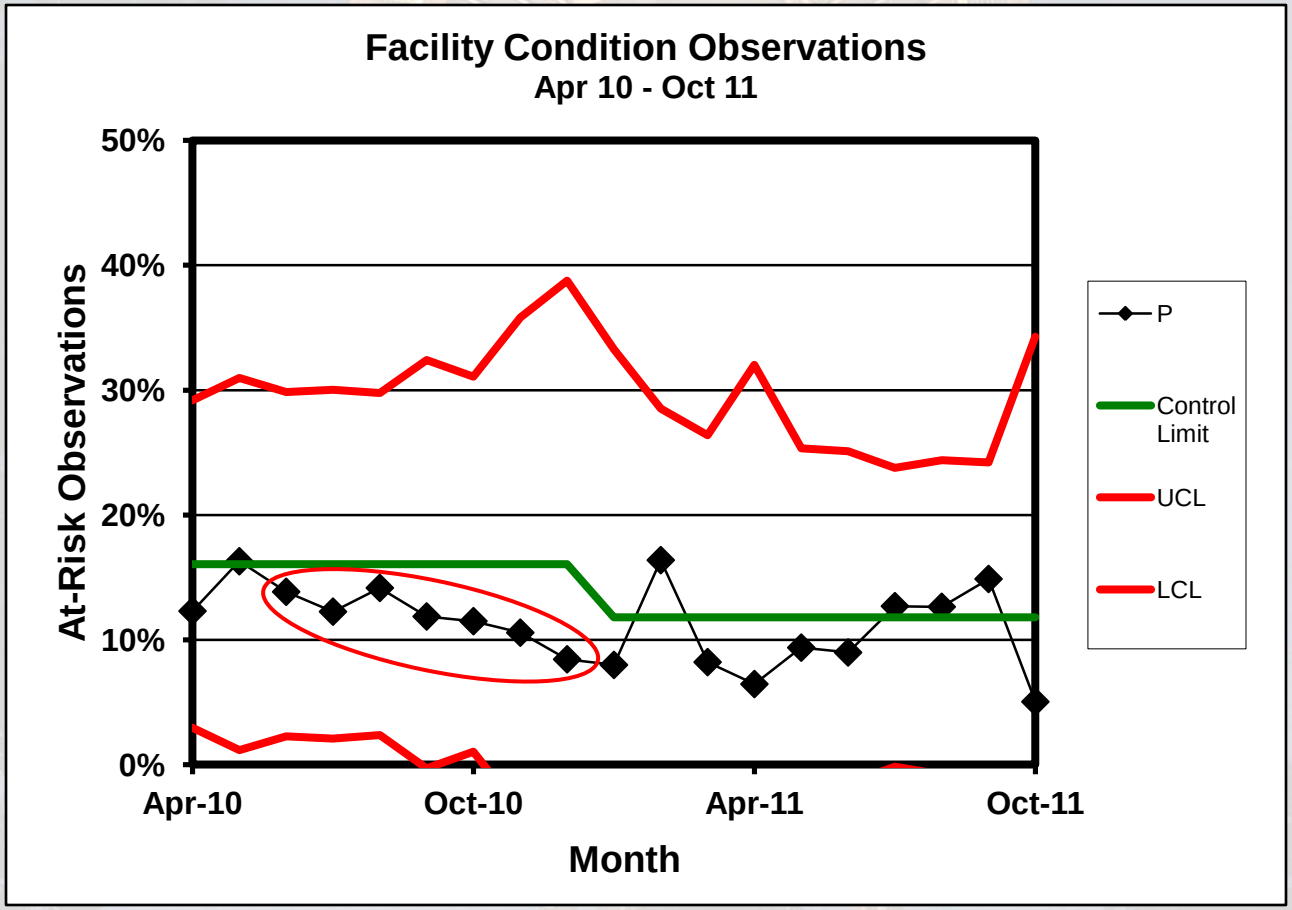
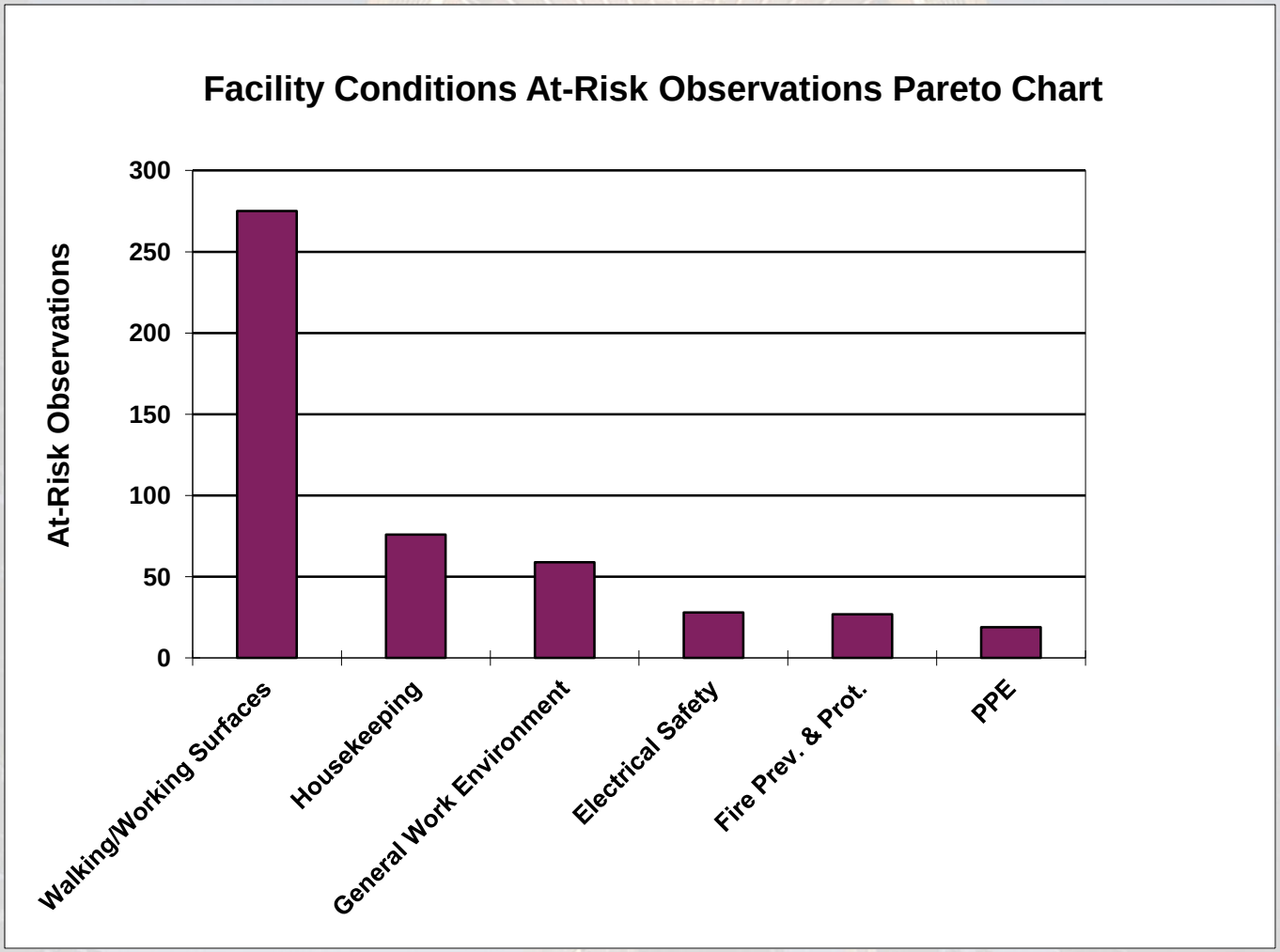
Results


Facility Condition Observations
Mar 08 to Nov 11
800
600
400
200
0
Cases
Mar-08
Sep-08
Mar-09
Sep-09
Mar-10
Sep-10
Mar-11
Sep-11
Month
Safe
At-Risk
Linear (Safe)
Linear (At-Risk)

Results


Facility Condition Observations
Apr 10 - Oct 11
50%
40%
30%
20%
10%
0%
At-Risk Observations
Apr-10
Oct-10
Apr-11
Oct-11
Month
P
Control Limit
UCL
LCL

Results


Facility Conditions At-Risk Observations Pareto Chart
At-Risk Observations
300
250
200
150
100
50
0
Walking/Working Surfaces
Housekeeping
General Work Environment
Electrical Safety
Fire Prev. & Prot.
PPE

Evolution of ATOMICS and Safety Observation Process

From → *To*

Behavior Observation

- Employee owned & managed
- Management supported
- Peer to peer
- Focus was on worker behavior
- Voluntary participation

Job-Site Condition & Behavior Observation

- Joint ownership by management & employees
- Management responsible for process sustainability
- 360º observation
- Injury and event prevention
- Participation/safety results used as input to the performance appraisal process

Effective Safety Management

Characteristics of effective safety performance:

- Measurable.
- Focuses on positive activities.
- Direct impact on outcomes.
- Opportunity for two-way feedback and positive reinforcement.
- Opportunity for goal setting based on performance data.

Focus Shifts

From: crisis reaction

To: process improvement

Safety Standowns

Re-read procedures

Safety Meetings

Retraining

Stop

Think

Act

Review

Focus Shifts

From: tracking accidents

To: preventing accidents

Total Recordable (TRC)

Days Away Restricted Time (DART)

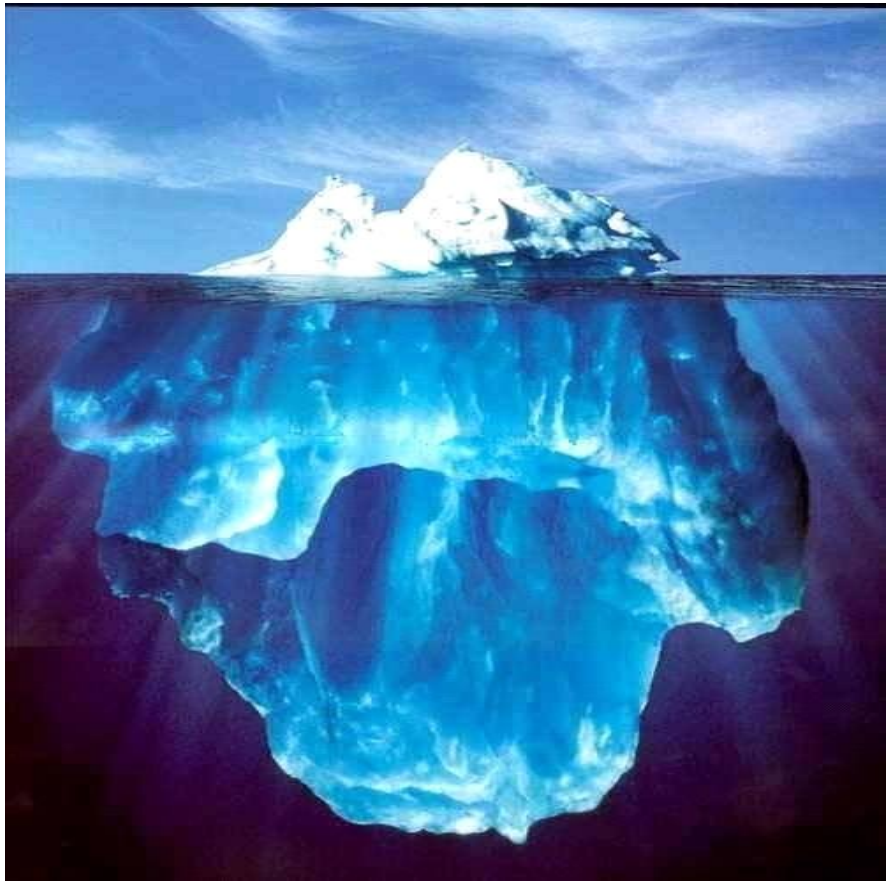
First Aid cases

Fix the problem before it injures the worker.

Identification of error likely situations.

Strengthen defenses.

Observations reduce errors, manage defenses to risks, and reduce injury.



Fatalities
Total Recordable Cases (TRC)
Days Away Restricted Time (DART)
Injuries requiring medical treatment
Injuries requiring first aid
Radiation Protection Observations
Near Hits

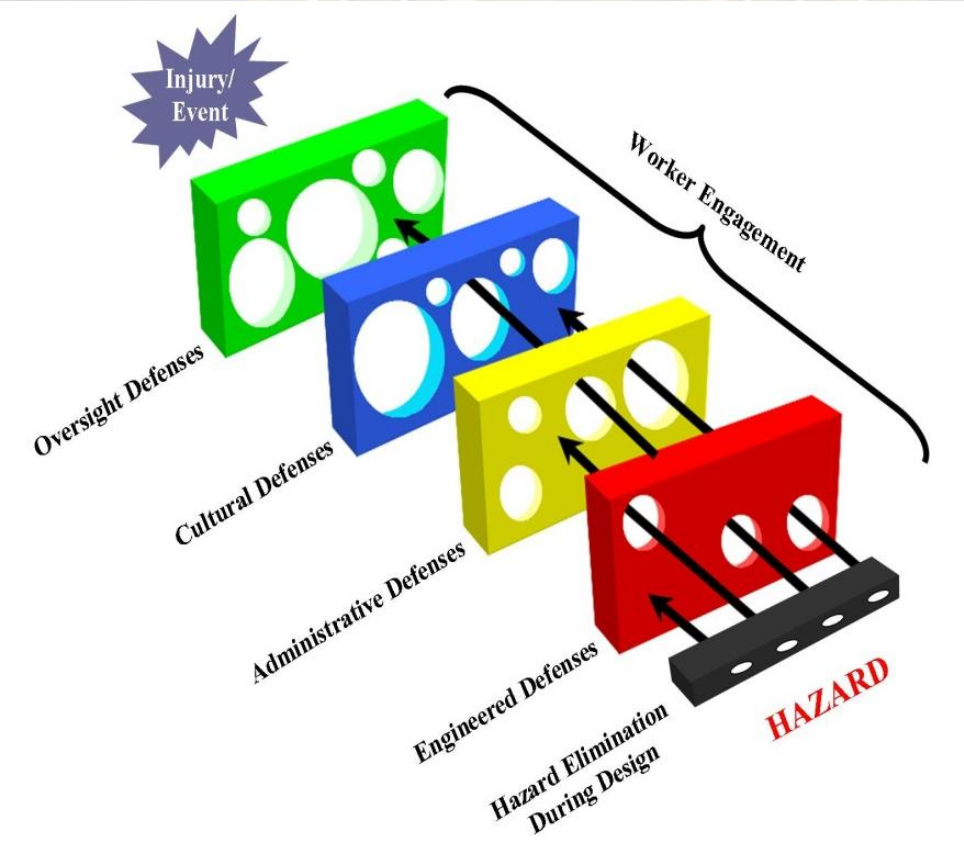
At risk behaviors and conditions

The goal of a safety observation is:

1. Reduce the frequency of events by anticipating, preventing, and catching active errors at the job site.

2. Minimize the severity of events by identifying and eliminating latent weakness.

Why We Trend


Injury/
Event
Worker Engagement
Oversight Defenses
Cultural Defenses
Administrative Defenses
Engineered Defenses
Hazard Elimination
During Design
HAZARD

Summary

- Data generated from a behavior-based safety observation program supports an EPPP by establishing a process that methodically searches for and eliminates the causes of flawed defenses in emergency operations.
- Results presented in this paper are pivotal to the ultimate focus of this program, which is to minimize emergency operational events.
- Employing control charts, trends can be identified in safety observation data.
- This increases technical knowledge and augments operational safety.

Acknowledgements

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