



Prevent Incidents Before They Happen!

Prevention Through Design

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VelocityEHS

HOUSEKEEPING

- Webinar is being recorded – you will receive link to recording
- Ask questions anytime via Q&A feature
- You can also contact us via email at end of deck

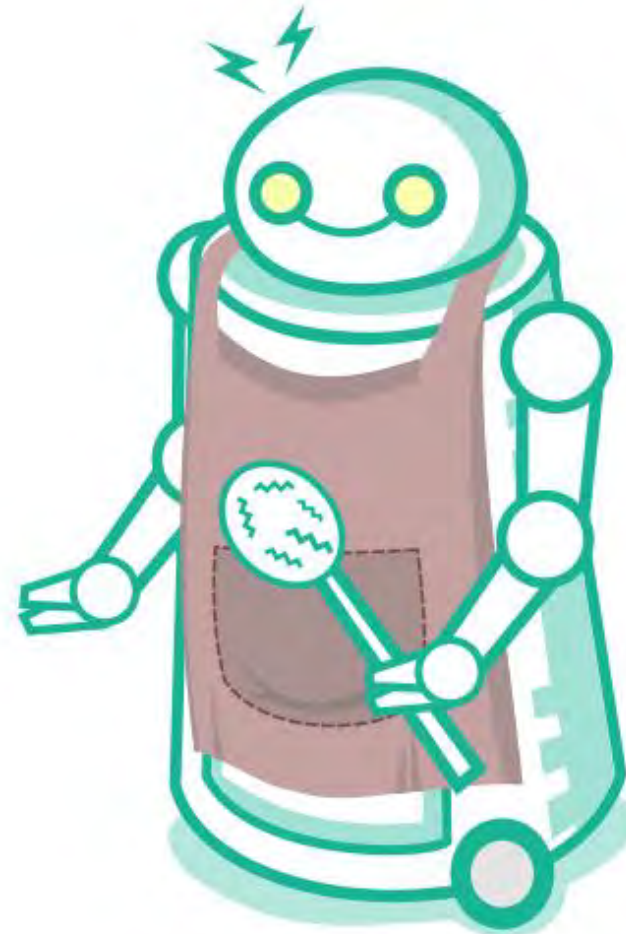


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OBJECTIVES

The background of the slide features a light blue and white color scheme. On the left side, there is a vertical list of three square checkboxes, each containing a blue checkmark. A silver and blue ballpoint pen is positioned diagonally across the bottom right of the image, with its tip pointing towards the top left. The overall aesthetic is clean and professional, suggesting a focus on tasks and objectives.

- How to use the Prevention through Design (PtD) framework to identify and control risks
- Importance of a comprehensive view of risk, including safety culture and leading indicators
- How software can help
- Questions?

INTRODUCTION TO RISK



ISO 45001 DEFINITIONS

Hazard

“Source with a potential to cause injury and ill health”

Risk

“effect of uncertainty”

Opportunity

“circumstance or set of circumstances that can lead to improvement of OHS performance”



Human factors

- Hazard Awareness
- Risk perception
- Risk tolerance
- Fatigue
- Unsafe behaviors (inside & outside the workplace)

Physical/workplace Hazards e.g.

- Dangerous objects/machinery
- Working at height
- Hazardous Chemicals
- Etc...

Operational Factors

- Production targets & other business objectives
- Time & resource constraints
- Workplace safety culture

Risk

```
graph TD; A[Human factors] --> D((Risk)); B[Physical/workplace Hazards] --> D; C[Operational Factors] --> D;
```

TYPES OF RISK CAN INCLUDE:

Safety Risk	Environmental Risk	Compliance Risk	Legal Risk	Financial Risk	Reputational Risk
Ex: Risk of injury, exposure to occupational illness, or death	Ex: Risk of environmental releases to air, water or land	Ex: Risk of safety or environmental violations and fines	Ex: Liability from civil and criminal suits outside of regulatory compliance violations	Ex: Liability from workers' compensation and insurance premiums, asset damages, lost productivity, waste, inefficiency and unnecessary costs, etc.	Ex: Risk to a company's 'brand', or the public goodwill towards them.



RISK AND FREQUENCY

			IMPACT				
			Very Low	Low	Medium	High	Very High
			1	2	3	4	5
PROBABILITY	Very High	5	5	10	15	20	25
	High	4	4	8	12	16	20
	Medium	3	3	6	9	12	15
	Low	2	2	4	6	8	10
	Very Low	1	1	2	3	4	5

RISK PRIORITY MATRIX





Industries categorized by Risk level

Very High Risk	Oil and gas Chemicals Mining and metals
High Risk	Airlines Construction Forestry, pulp and paper Maritime Ports and airports Power utilities
Medium Risk	Aerospace and defense Consumer goods manufacturing Electronic and electrical manufacturing Food and beverage Industrial equipment manufacturing Logistics Pharmaceuticals and life sciences Public transit Vehicle manufacturing Telecoms Water utilities
Low Risk	Banks, insurance and real estate Business services Retail Universities Entertainment venues



STANDARDS AND REGULATIONS



STANDARDS & GUIDELINES ADDRESSING HAZARDS IN DESIGN/REDESIGN

- [ANSI/ASSP Z590.3-2011 \(R2016\)](#) Guidelines for Addressing Occupational Hazards and Risks in Design and Redesign Process
- [ANSI/ASSE Z241.1-2003](#) Control of Hazardous Energy
- [ANSI/AIHA 210-2005](#) Occupational Health & Safety Management Systems
- [ANSI/PMMI B155.1-2006](#) Safety Requirements for Packaging Machinery
- [ANSI/RIA R15.06-1999](#) American National Standard for Industrial Robots





International Organization for Standardization

E.g., ISO 45001 OH & S Management, ISO 14001 Environmental Management,
ISO 31000: Risk Management



PREVENTION THROUGH DESIGN (PtD)



NIOSH/CDC PREVENTION THROUGH DESIGN



Promoting productive workplaces
through safety and health research / **NIOSH**

PREVENTION THROUGH DESIGN



PtD
Prevention through Design

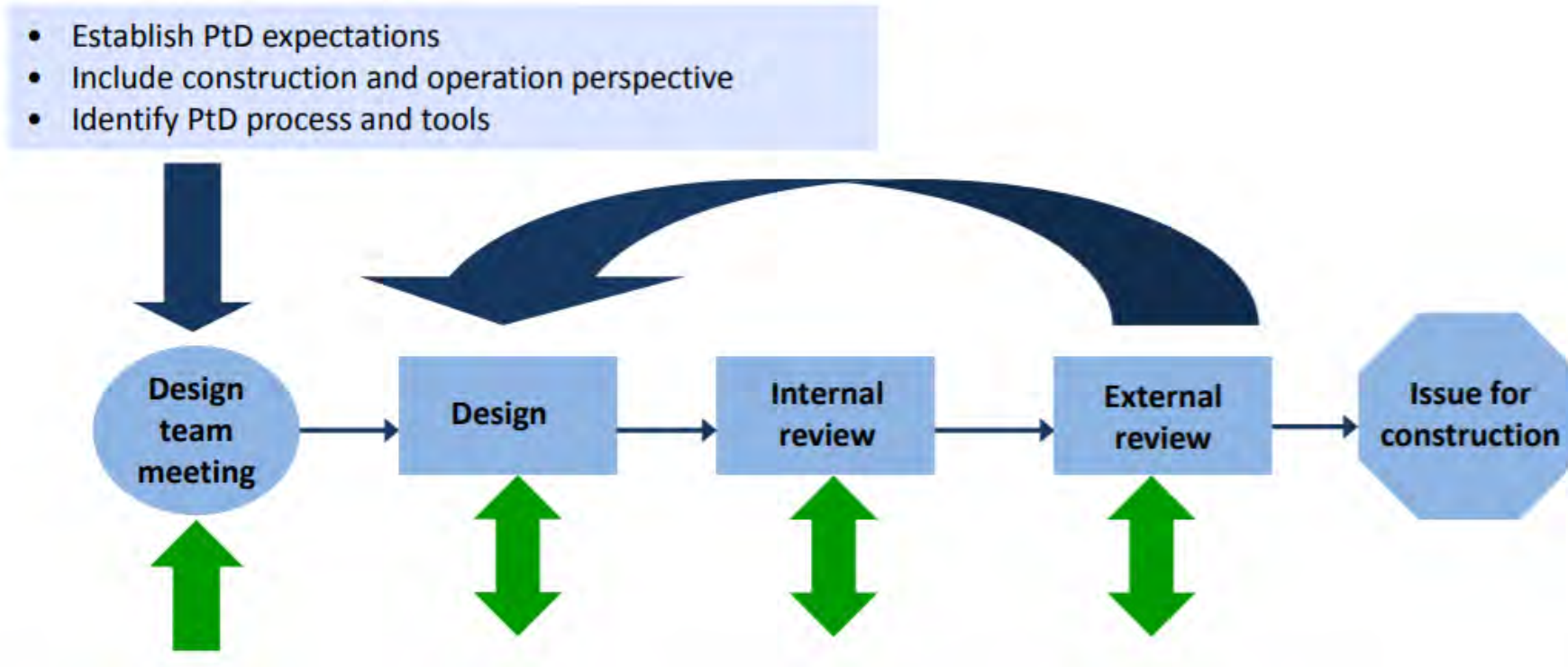
On This Page

- Program Mission
- Defining PtD
- Approach to PtD

<https://www.cdc.gov/niosh/topics/ptd/default.html>



PtD Process



PtD Process

Stage	Activities
Conceptual design	Establish occupational safety and health goals, identify occupational hazards
Preliminary design	Eliminate hazards, if possible; substitute less hazardous agents/processes; establish risk minimization targets for remaining hazards; assess risk; and develop risk control alternatives. Write contract specifications.
Detailed design	Select controls; conduct process hazard reviews
Procurement	Develop equipment specifications and include in procurements; develop “checks and tests” for factory acceptance testing and commissioning
Construction	Ensure construction site safety and contractor safety
Commissioning	Conduct “checks and tests,” including factory acceptance; pre–start up safety reviews; development of standard operating procedures (SOPs); risk/exposure assessment; and management of residual risks
Start up and occupancy	Educate; manage changes; modify SOPs



FIVE PRINCIPLES OF PTD

1. Address health and safety as early as possible in the project
2. Identify and consult all relevant stakeholders
3. Make construction process knowledge available to decision makers
4. Implement the hierarchy of controls in decision making
5. Review and continuously improve



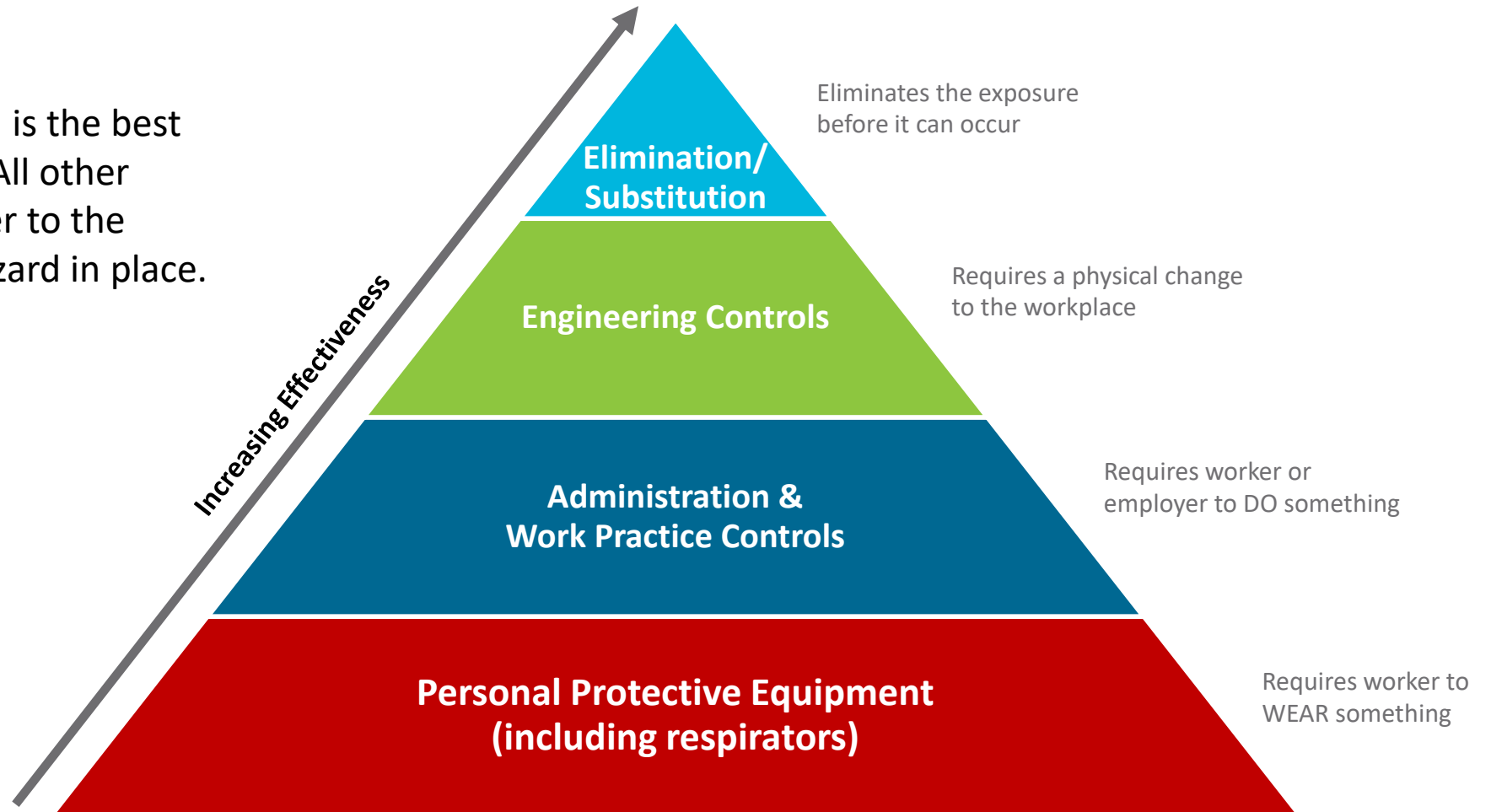
MAKE CONSTRUCTION KNOWLEDGE AVAILABLE

- The construction industry supply chain is highly fragmented and there is often little communication between persons responsible for the initiation, design, production, use and maintenance of facilities (buildings or other structures)
- When expert knowledge about the construction process is fed into “upstream” decision-making, i.e., during the planning and design stages of a project, better decisions are made



THE HIERARCHY OF CONTROLS

Elimination/substitution is the best option, when possible. All other solutions create a barrier to the hazard but leave the hazard in place.



MANY INJURIES RESULT FROM DESIGN PROBLEMS

2000-2002 Australian Study:

- 37% of workplace fatalities are due to design-related issues
- In another 14% of fatalities, design-related issues may have played a role



MANY INJURIES RESULT FROM DESIGN PROBLEMS

Construction Industry Statistics:

- 22% of 226 injuries that occurred from 2000-2002 in Oregon, WA, and CA1
- 42% of 224 fatalities in US between 1990-20031
- 60% of fatal accidents resulted in part from decisions made before site work began
- 63% of all fatalities and injuries could be attributed to design decisions or lack of planning



WHAT HAPPENS WHEN SAFETY IS NOT DISCUSSED DURING DESIGN?

1. Users/Occupants can be hurt.
Example: Kansas City Hyatt
2. Designs are unconstructable.
Example: high school masonry wall collapse
3. Designs are more hazardous to construct than they need to be.
Examples: excavation, superstructure, MEP,
4. Designs are more hazardous to maintain than they need to be.



ON THE OTHER HAND, WHEN WE ADDRESS SAFETY IN PLANNING STAGE...

- Reduced site hazards
- Fewer worker injuries and fatalities
- Reduced workers' compensation costs
- Increased productivity and quality
- Fewer delays due to accidents
- Improved operations/maintenance safety



EXAMPLE: FALLS THROUGH SKYLIGHTS

- A NIOSH survey in seven States in late '80s revealed that approximately 22% (14 of 64) of fatal falls reported to State occupational safety and health officials occurred when workers fell through skylight openings or smoke-vent skylights
- Falls through skylights still happen and are often fatal



EXAMPLE: SOLAR PANELS

Attributes affecting safety:

- 1) Roofing material: newer are less slippery
- 2) Roof slope: less steep roofs are safer
- 3) Roof accessories: separation between vents facilitates worker movement
- 4) Panel layout: clearance between panel edge and roof edge
- 5) Fall protection system – anchors/fall arrest systems
- 6) Lifting methods – workers should not climb ladders holding solar panels
- 7) Electrical systems – rapid shutdown function, training, safety regs



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EXAMPLE: ERGONOMICS



Bad ergonomic design – unnecessary bending



Better ergonomics design – enables better posture, minimal strain



PREFABRICATION

- Inherently safer than “stick-built”
- Work shifted toward more controlled work environments
- Avoid work at heights, confined spaces, etc.
- Less waste
- Time saved
- Less energy
- Less potential for injury
- Fewer greenhouse gas emissions



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CASE STUDY: MODULAR PIPERACKS

- Modules constructed off-site – enabled tank construction to happen without interference from piperack construction
- Working at low level reduced risk of accidents
- 12% more steelwork, but 40% reduction in scaffold costs and 25% reduction in mechanical assembly time
- Cable tray supports were fitted prior to lifting, reducing time working at heights
- Saved an estimated 8 weeks on site



<http://www.dbp.org.uk/cs/DBP00129.pdf>



THREE PHASES OF RISK MANAGEMENT

1. Pre-operational
2. Operational
3. Post-incident



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Pre-Operational

Relationship with suppliers:

1. Establish design specs and objectives
2. In-depth dialogue with suppliers/contractors
3. Ask suppliers for attestations/documentation
4. Visit suppliers/contractors



Operational Phase

- Are “controlled” hazards actually controlled?
- Do operators understand the hazards and controls?
- Are there any previously unidentified hazards?
- How do we address newly identified hazards?



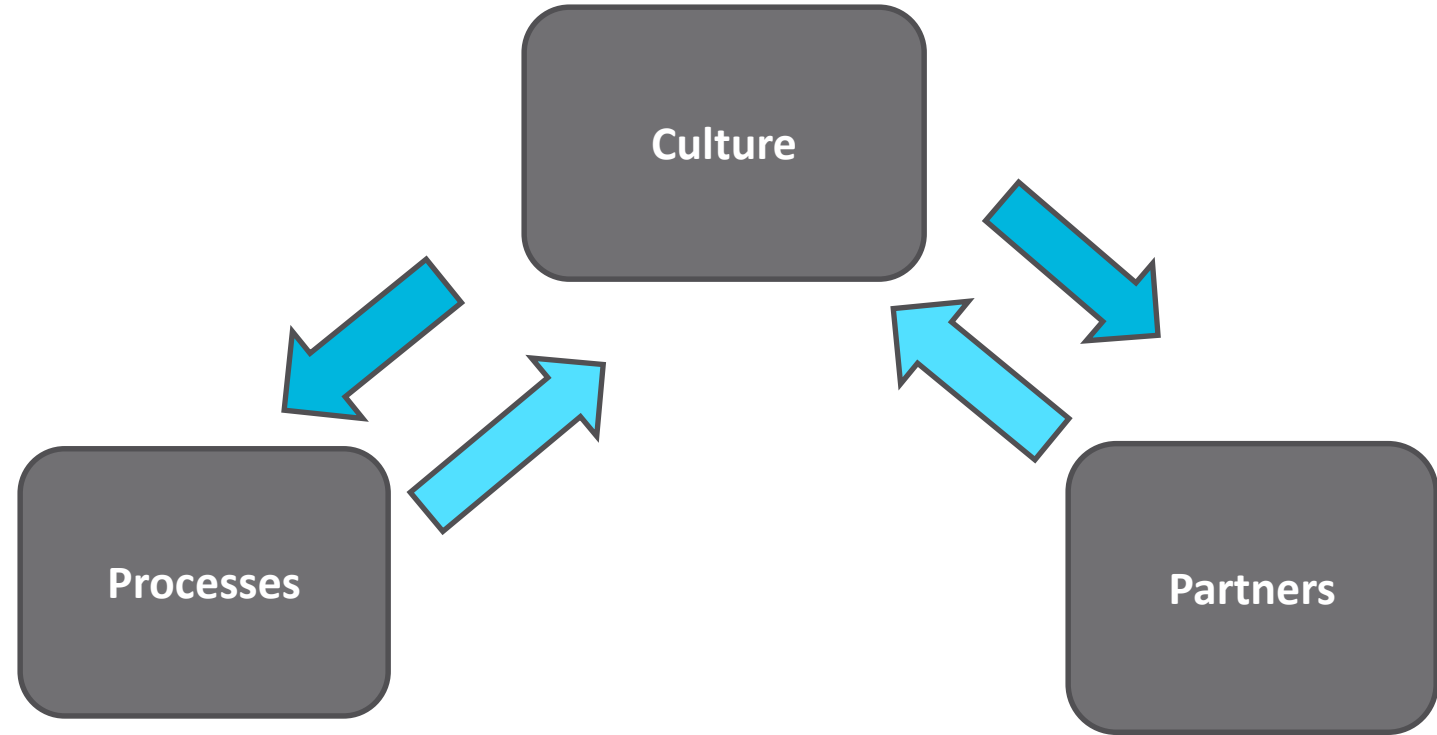
Post-Incident Phase

- Steps to mitigate harm of incident
- Incident investigation – why did incident happen? Did controls not functions properly? Were risks unassessed?
- Development, assignment and management of corrective actions



STEPS TOWARD SUCCESS IN PtD

1. Establish a lifecycle safety culture
2. Establish enabling processes
3. Team with organizations who value lifecycle safety



Our culture affects, and is affected by, our processes and partners



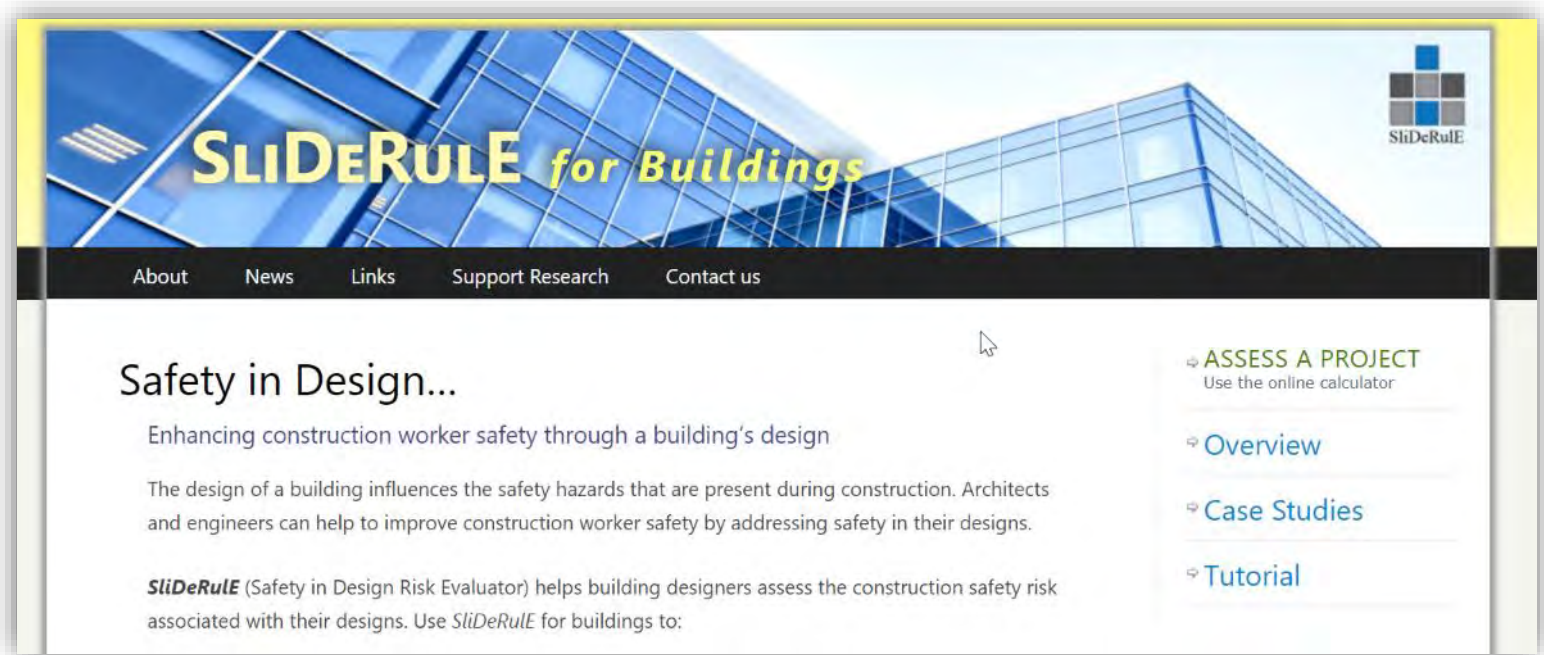
IMPORTANCE OF MANAGEMENT OF CHANGE (MOC)

1. Plan/manage workflows
2. Track authorizations
3. Identify and control risks
4. Maintain an audit trail/documentation
5. Maintain high level of safety and risk control as changes occur



DESIGN TOOLS AND RESOURCES

- [SliDeRule](#) (Safety in Design Risk Evaluator) assists building designers with assessing the construction safety risk associated with their designs
- The Sustainable Construction Safety and Health ([SCSH](#)) [rating system](#) helps evaluate construction worker safety and health on construction projects
- Alan Speegle (The Southern Company) compiled a 1600 item [Prevention through Design list](#), mostly from the process (i.e., industrial) construction sector.



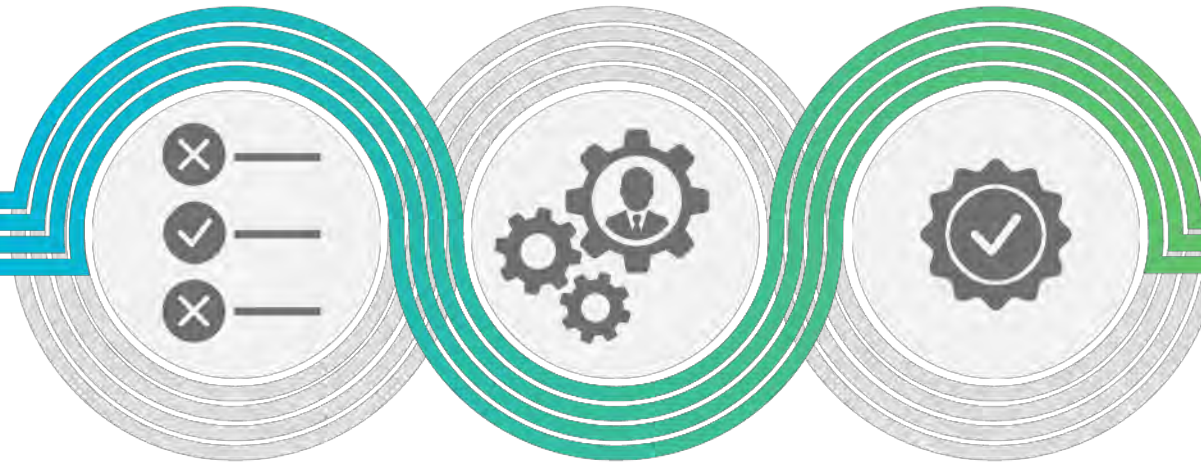
IT STARTS WITH CULTURE

- Secure management commitment to safety and to a life cycle approach
- Instill the right safety values
 - Professional Codes of Ethics (right thing to do)
 - Payoff data (smart thing to do)
- Training



THE LINK BETWEEN SYSTEMS AND CULTURE

There's a dynamic interplay between your systems, your performance and your EHS culture.



**Knowing
What's Right**
Systems

**Ability to
Do it Right**
Performance

**Do it Right
Every Time**
Culture Habits



CHOOSING PARTNERS

- Commitment to safety and to a life cycle approach
- Open to change
- Collaborative culture and experiences
- Participation in planning process
- Accessibility of records (training verifications, written programs)
- Look into contractor management software



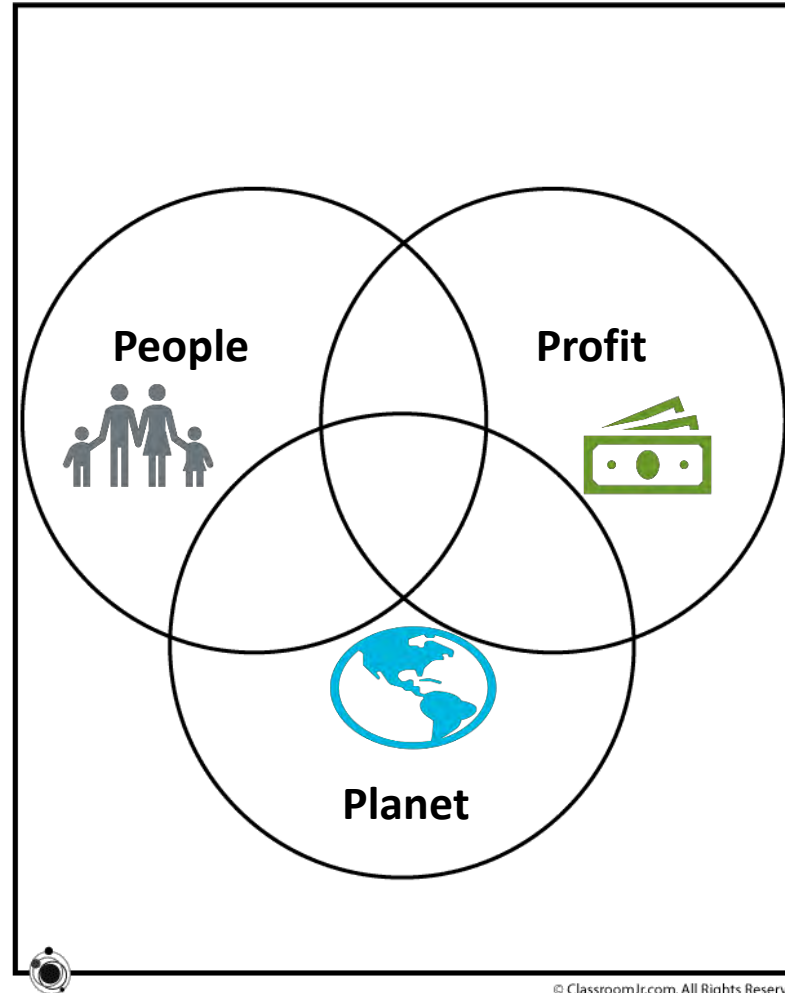
PtD IS GAINING MOMENTUM

- Required in UK, Europe for since 1995
- Required in Australia, S. Africa, Singapore
- OSHA DfCS Workgroup since 2005
- NIOSH PtD Workshops and Funding
- ANSI Standard and Technical Report
- Adoption primarily in the process/industrial construction sector



PtD Is Essential to Sustainability and Corporate Responsibility

PtD helps preserve the safety of those who are not always “at the table” when we’re making our design plans



The “Triple Bottom Line”



Steps in Risk Analysis



ESTABLISH ANALYSIS PARAMETERS

- Determine boundaries
- Consider operating phase (standard operation, maintenance, startup, etc.)
- If applicable, define interface with other systems and tasks
- What can be harmed or damaged – people? Property? Environment?



IDENTIFY HAZARDS

- What aspects of the job produce risks? (Technology, activity, etc.)
 - What characteristics of materials used (e.g., sharp edges, fumes, dusts) create risks?
 - Information to review includes (among other things):
 - System specs
 - SDSs for chemicals involved
 - Relevant codes/standards
 - Information from operators or potential operators
 - Studies from similar systems
 - Potential for unplanned energy releases
 - Possible exposures to hazardous environments (don't forget confined spaces!)
 - Historical data
- Feedback from your whole team



CONSIDER FAILURE MODES

- Consider intentional and foreseeable misuse of facilities, equipment, materials and processes
- What could happen?
What controls are currently in place?
- How well do controls work?
- Do they need to be revised?
Supplemented?



DETERMINE EXPOSURE FREQUENCY & DURATION

- Estimate frequency and duration of exposure
- How often is task performed?
- How long is exposure period?
- How many people are exposed?



ASSESS SEVERITY OF CONSEQUENCES

- number of injuries or illnesses and their severity, and fatalities that might occur;
- value of property or equipment that could be damaged;
- time for which the business may be interrupted and productivity lost;
- extent of environmental damage that could occur.



GO BEYOND STANDARDS AND COMPLIANCE!

Just following standards and regulations won't eliminate all risks.

Example: Lockout Tagout (LOTO)

Systems that meet all OSHA LOTO requirements may still have unacceptable risks, such as placement of LOTO stations in areas too difficult/far away to be easily reachable



Image source: Wtshymanski, [CC BY-SA 4.0](#))



DON'T FORGET PSYCHOSOCIAL RISKS!

- “Psychosocial risks” – anxiety related to perceived risks at work, or to not being included in company safety programs
- Contributing factors: no visibility of safety data, no participation in safety tasks, no addressing of specific employee risks
- Has only gotten worse during COVID



THE FUTURE OF WORK



FUTURE OF WORK

The workforce, workplace, and the nature of work itself are changing more rapidly than ever before.

- New technologies
- Automation and globalization
- Changing employment patterns and relationships
- Recruitment and retention in labor markets
- Changing employment patterns
- Age diversity
- Social justice
- Dissolving barrier between work world and rest of the world

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CDC/NIOSH FUTURE OF WORK INITIATIVE

CDC/NIOSH Future of Work Initiative Priority Topics

Issues that Impact Workplace, Work, and Workforce

Emergency and Disaster Preparedness and Response • Exposures and Hazards • Extreme Weather Conditions • Globalization • Industry 4.0 • OSH 4.0 • Policies • Politics • Resources • Social Disruption

WORKPLACE

ORGANIZATIONAL DESIGN	Autonomy • Burnout and Stress Prevention • Healthy Leadership • Job Flexibility • Leave Systems • Scheduling • Social and Corporate Responsibility • Workplace Built Environment • Workspace • Work-Life Fit
TECHNOLOGICAL JOB DISPLACEMENT	Automation • Digitalization • Job Quantity and Quality • Occupational Polarization • Productivity Enhancement and Quality Improvement through Automated Manufacturing • Stable, New, and Redundant Work
WORK ARRANGEMENTS	Alternative • App-Based • Contingent • Contractual • Direct Hire • Distributed • Free-Lancer • Job Sharing • Non-Standard • On-Call • On-Demand • Part-Time • Platform • Precarious • Seasonal • Single vs. Multi-Employers • Temporary

WORK

ARTIFICIAL INTELLIGENCE	Deep Learning • Machine Learning • Neural Networks
ROBOTICS	Autonomous, Collaborative, Industrial, Managerial, Service, and Social Robots • Autonomous Vehicles • Human-Machine Interaction • Unmanned Aerial Systems • Wearable Exoskeletons and Exosuits
TECHNOLOGIES	Additive and Smart Manufacturing, and 3D Printing • Advanced, Cloud, and Quantum Computing • Bio-Manufacturing • Bio-Technology • Clean and Green Technologies • Digitalization • Information and Communication Technologies • Internet-of-Things • Nanotechnology and Advanced Materials • Sensors • Sensor Surveillance • Smart Personal Protective Equipment

WORKFORCE

DEMOGRAPHICS	Diversity and Inclusivity • Multi-Generational • Productive Aging • Vulnerable
ECONOMIC SECURITY	Adequate Wages • Equitable and Commensurate Compensation and Benefits • Minimum Guaranteed Hours
SKILLS	Continual Education, Learning, and Training • Re-Skilling and Up-Skilling

<https://www.cdc.gov/niosh/topics/future-of-work/issues.html>



TOTAL WORKER HEALTH

Promoting productive workplaces
through safety and health research / **NIOSH**[®]



NIOSH *Total Worker Health*[®] Program

How can a holistic approach to worker well-being assist in improving the safety and health of workers?

Total Worker Health[®] is defined as policies, programs, and practices that integrate protection from work-related safety and health hazards with promotion of injury and illness-prevention efforts to advance worker well-being. The *Total Worker Health* (TWH) approach seeks to improve the well-being of the U.S. workforce by protecting their safety and enhancing their health and productivity. Using TWH strategies benefits workers, employers, and the community.

<https://www.cdc.gov/NIOSH/twh/>




ISSUES RELEVANT TO TOTAL WORKER HEALTH

TOTAL WORKER HEALTH
Advancing Worker Health, Safety, and Well-Being

Issues Relevant to Advancing Worker Well-Being Using Total Worker Health® Approaches

- Prevention and Control of Hazards and Exposures**
 - Biological Agents
 - Chemicals
 - Ergonomic Factors
 - Physical Agents
 - Psychosocial Factors
 - Risk Assessment and Management
- Built Environment Supports**
 - Accessible and Affordable Health Enhancing Options
 - Clean and Equipped Breakrooms, Restrooms, and Lactation Facilities
 - Healthy Workspace Design and Environment
 - Inclusive and Universal Design
 - Safe and Secure Facilities
- Community Supports**
 - Access to Safe Green Spaces and Pathways
 - Healthy Community Design
 - Safe and Clean Environment (Air and Water Quality, Noise Levels, Tobacco-Free)
 - Safe, Healthy, and Affordable Housing Options
 - Transportation and Commuting Assistance
- Compensation and Benefits**
 - Adequate Wages and Prevention of Wage Theft
 - Affordable, Comprehensive, and Confidential Healthcare Services
 - Chronic Disease Prevention and Management Programs
 - Continual Learning, Training, and (Re-)Skilling Opportunities
 - Disability Insurance (Short- and Long-Term)
 - Employee Assistance and Substance Use Disorder Programs
 - Equitable Pay, Performance Appraisals, and Promotions
 - Minimum Guaranteed Hours
 - Paid Time Off (Sick, Vacation, Caregiving, Parental)
 - Prevention of Healthcare Cost Shifting to Workers
 - Retirement Planning and Benefits
 - Work-Life Programs
 - Workers' Compensation Benefits
- Healthy Leadership**
 - Collaborative and Participatory Environment
 - Corporate Social Responsibility
 - Responsible Business Decision-Making
 - Supportive Managers, Supervisors, and Executives
 - Training
 - Worker Recognition, Appreciation, and Respect
- Organization of Work**
 - Adequate Breaks
 - Comprehensive Resources
 - Fatigue, Burnout, Loneliness, and Stress Prevention
 - Job Quality and Quantity
 - Meaningful and Engaging Work
 - Safe Staffing
 - Work Intensification Prevention
 - Work-Life Fit
- Policies**
 - Elimination of Bullying, Violence, Harassment, and Discrimination
 - Equal Employment Opportunity
 - Family and Medical Leave
 - Human and Natural Resource Sustainability
 - Information Privacy
 - Judicious Monitoring of Workers and Biomonitoring Practices
 - Optimizing Function and Return-to-Work
 - Prevention of Stressful Job Monitoring Practices
 - Reasonable Accommodations
 - Transparent Reporting Practices
 - Whistleblower Protection
 - Worker Well-Being Centered
 - Workplace Supported Recovery Programs
- Technology**
 - Artificial Intelligence
 - Robotics
 - Sensors
- Work Arrangements**
 - Contracting and Subcontracting
 - Free-Lance
 - Global and Multinational
 - Multi-Employer
 - Non-Standard
 - Organizational Restructuring, Downsizing, and Mergers
 - Precarious and Contingent
 - Small- and Medium-Sized Employers
 - Temporary
 - Unemployment and Underemployment
 - Virtual
- Workforce Demographics**
 - Diversity and Inclusivity
 - Multigenerational
 - Productive Aging across Lifecourse
 - Vulnerable Workers
 - Workers with Disabilities

 Updated January 2020

Total Worker Health® is a registered trademark of the US Department of Health and Human Services

https://www.cdc.gov/niosh/twh/priority.html#anchor_1578410183952



ELEMENTS OF TOTAL WORKER HEALTH APPROACH

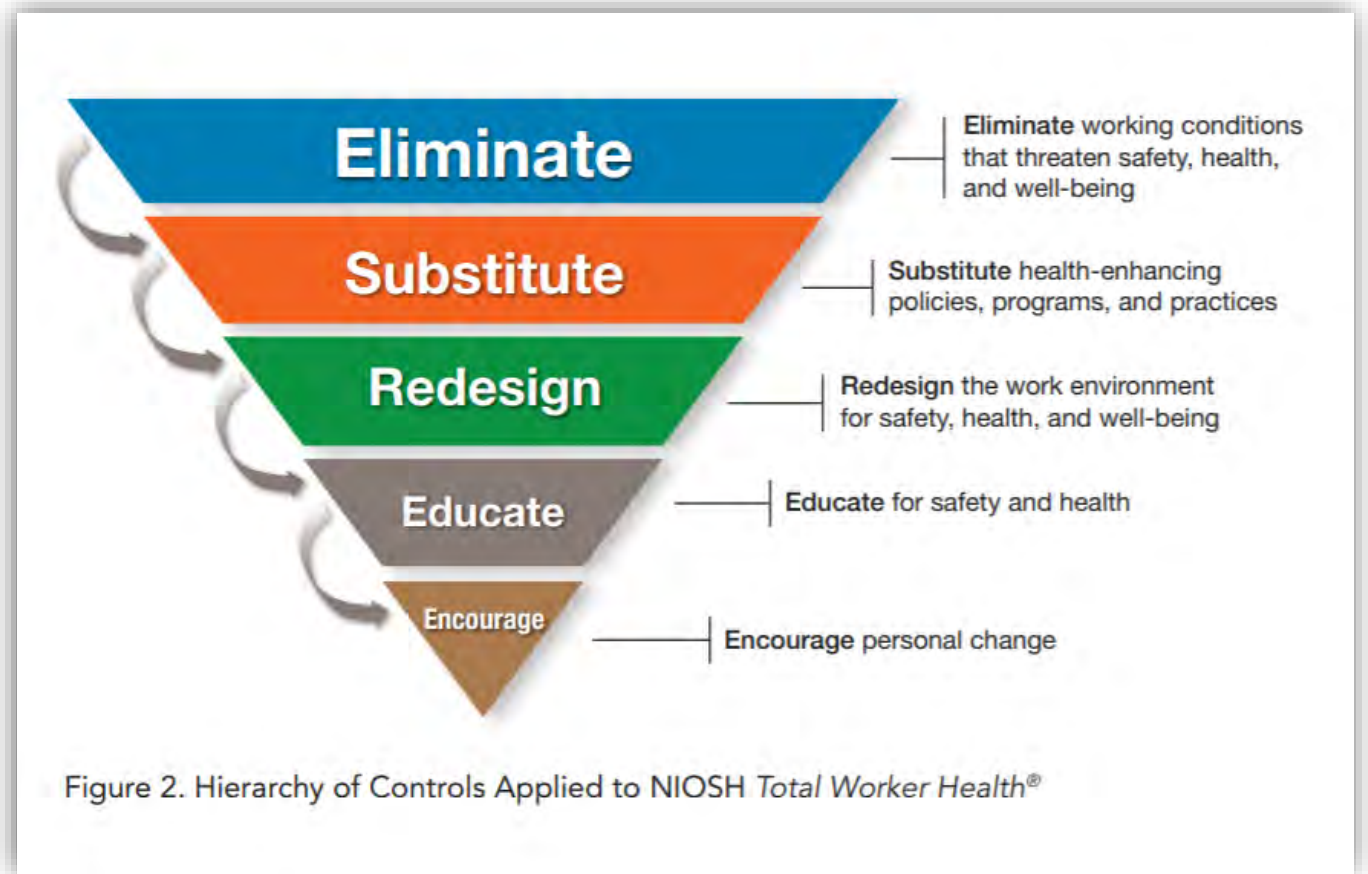
Defining Element of TWH 1: Demonstrate leadership commitment to worker safety and health at all levels of the organization.

Defining Element of TWH 2: Design work to eliminate or reduce safety and health hazards and promote worker well-being.

Defining Element of TWH 3: Promote and support worker engagement throughout program design and implementation.

Defining Element of TWH 4: Ensure confidentiality and privacy of workers.

Defining Element of TWH 5: Integrate relevant systems to advance worker well-being.



THE LINK BETWEEN CULTURE AND PREVENTION



NINE MEASURABLE COMPONENTS OF CULTURE

1. Procedural justice: Fairness and transparency of supervisor's decision-making process.
2. Leader-member exchange: Level of mutual trust and respect between employee and supervisor. Employees treated with dignity.
3. Management credibility: Management actions consistent with words.
4. Perceived organizational support: Employees perceive that the organization values them.



NINE MEASURABLE COMPONENTS OF CULTURE

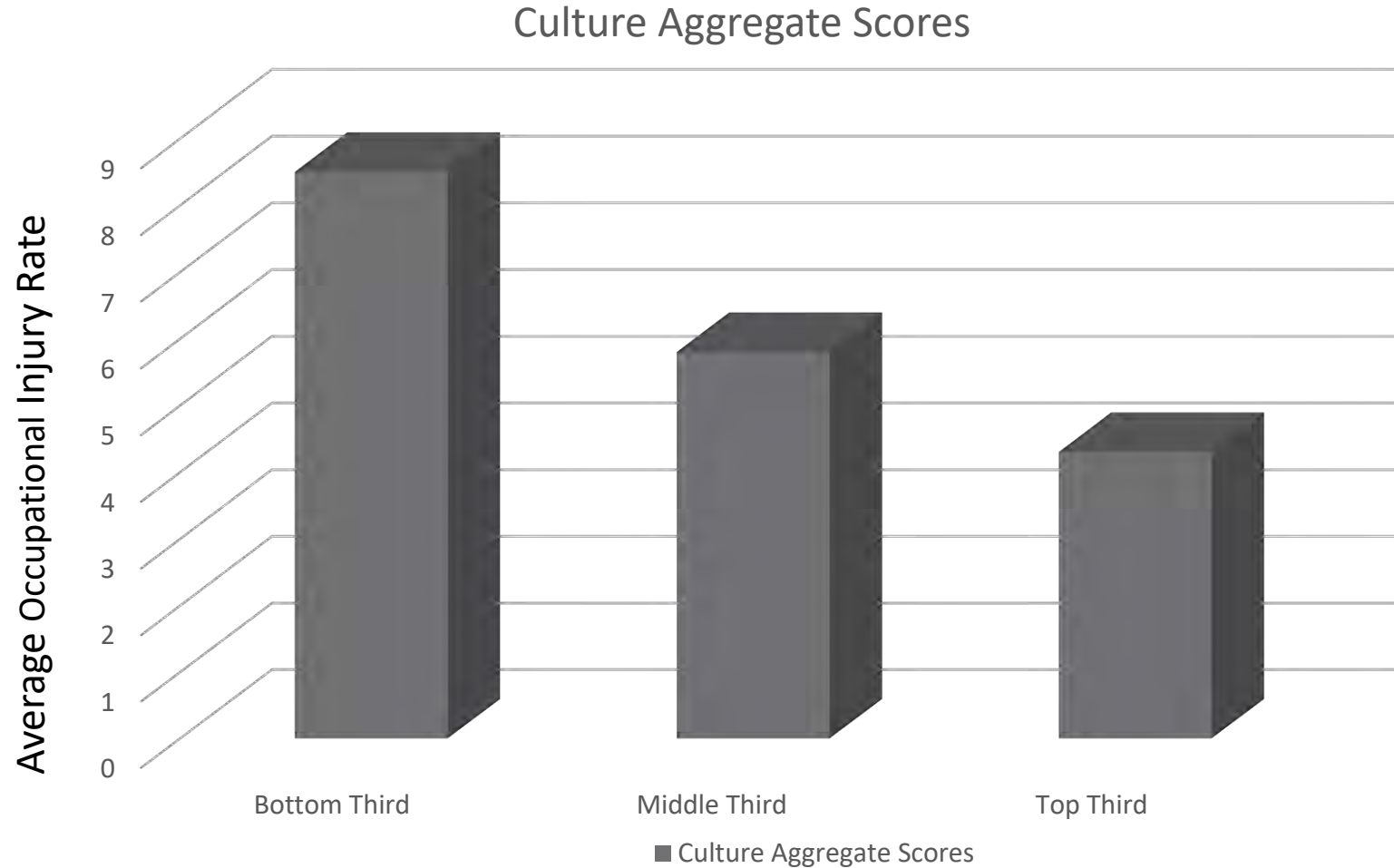
5. Work group relations: Level of mutual trust and respect among coworkers.
6. Teamwork: Ability of the work group to effectively get things done.
7. Organizational value for safety: Extent to which employees perceive that the organization is serious about safety performance.
8. Upward communication: Extent to which safety concerns, suggestions and ideas flow upward through the organization.
9. Approaching others: Extent to which workers are comfortable speaking to one another



Teamwork by [Nick Youngson](#) [CC BY-SA 3.0](#) [Pix4free.org](#)



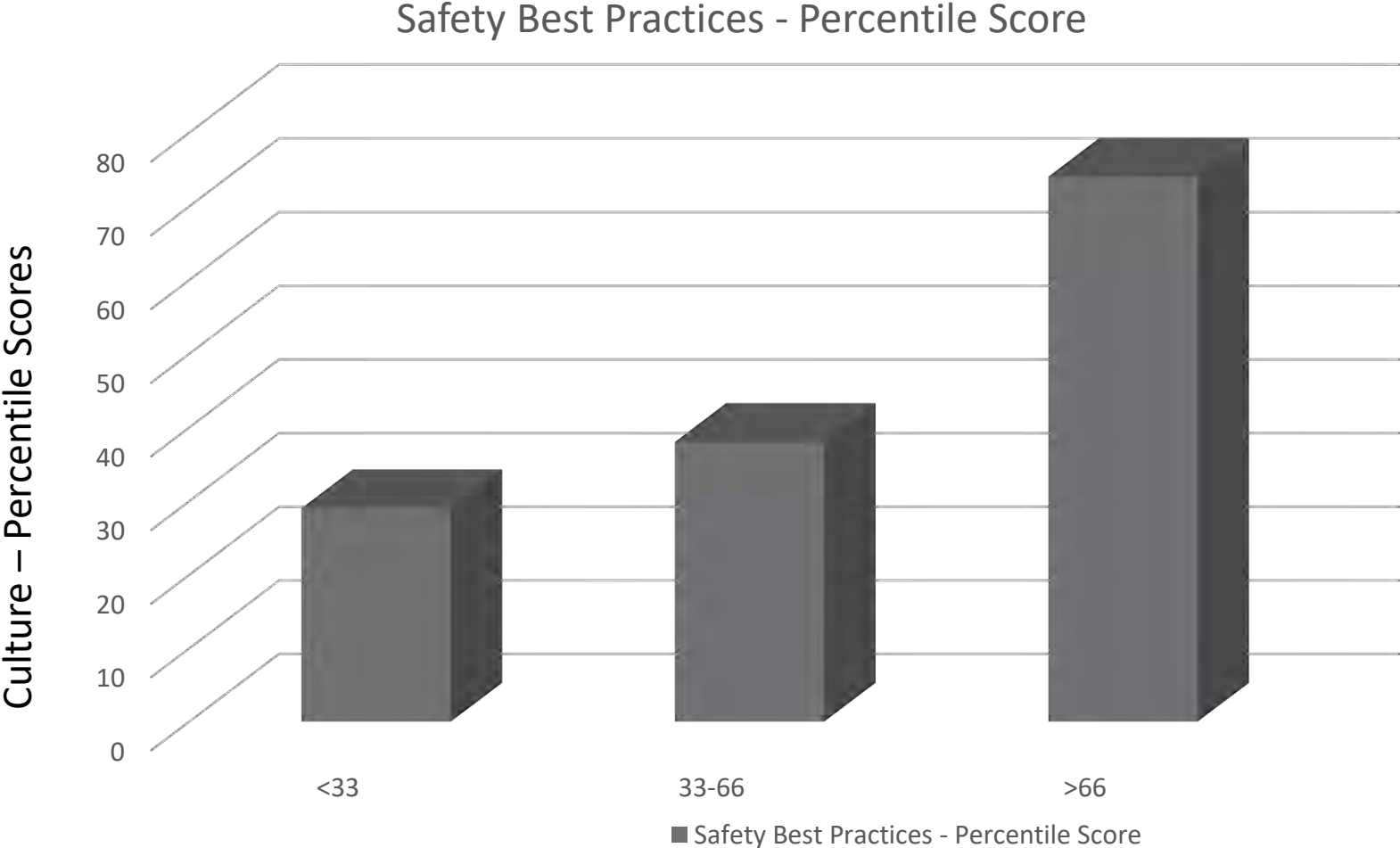
CULTURE MATTERS



Relationship between culture aggregate scores and occupational injury rate, adapted from "Preventing Injuries and Fatalities," ASSP, 2010



LEADERSHIP MATTERS



Relationship between culture aggregate scores and occupational injury rate, adapted from “Preventing Injuries and Fatalities,” ASSP, 2010



CULTURAL SELF-ASSESSMENT

Questions to ask ourselves:

- What metrics do we track, and what do we do with them?
- How do we assess whether we're building strong safety leadership at all levels?
- Are we influenced by attribution bias? E.g. mistaking cause & effect, blaming “unsafe” attitudes
- Do we go on “fault-finding” expeditions, or do we look for positive contributions to safety too?



FUNDAMENTAL ATTRIBUTION ERROR

Why do other people mess things up? Because of the way they are – i.e., internal factors. (E.g., “lazy,” “not too bright”)

But what about when I mess things up? That’s because of external forces, of course!



FAULT-FINDING EXPEDITIONS

- Confirmation bias – we find what we are looking for, but miss chances to find anything else
- Not reflective of reality – creates anxiety, reduces buy-in and hurts morale
- Observing the variety of behaviors across individuals and time that not only give a more accurate picture, but can better help us see risks and opportunities.



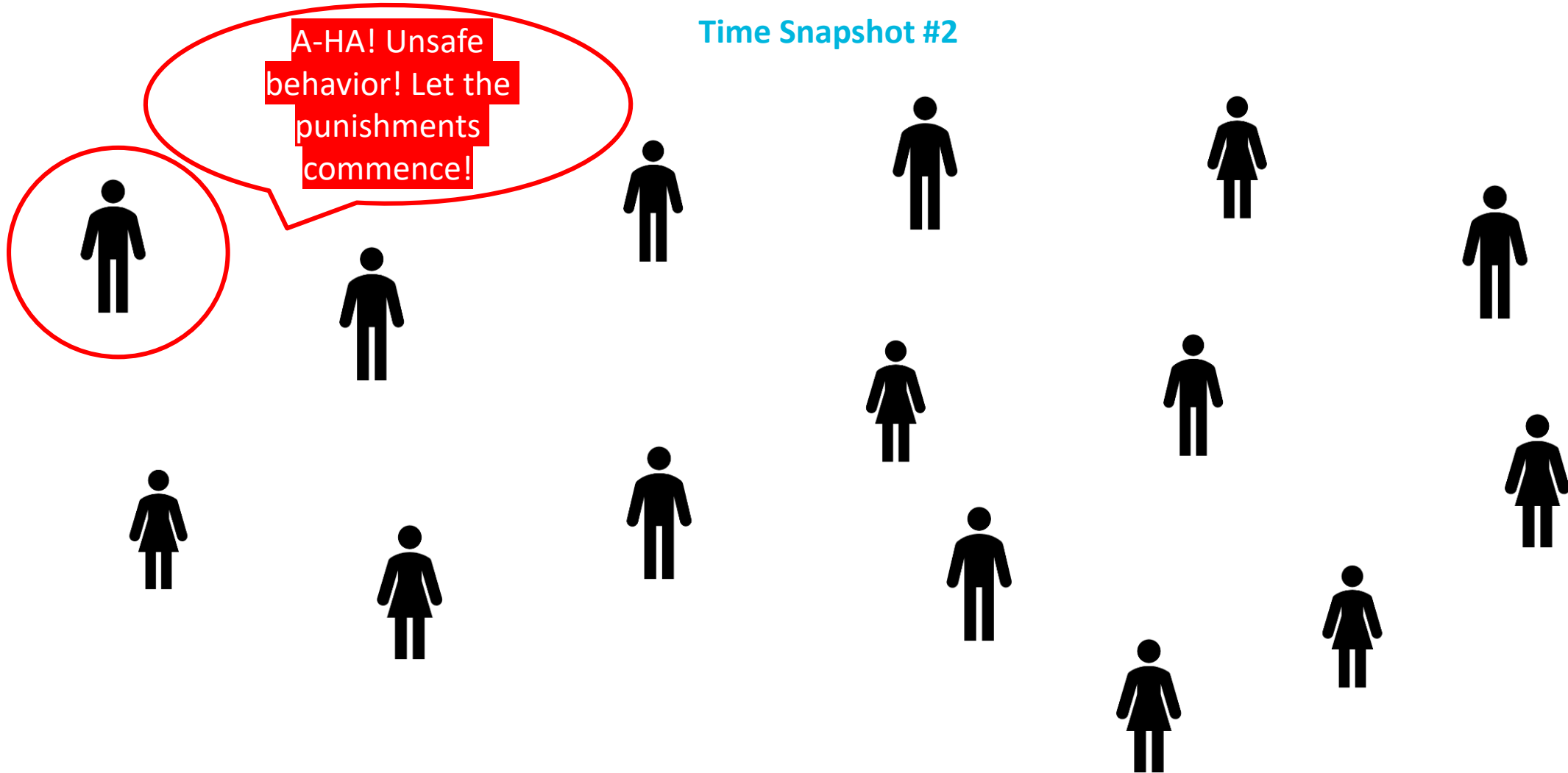
IGNORING VARIANCE

Time Snapshot #1



IGNORING VARIANCE

Time Snapshot #2



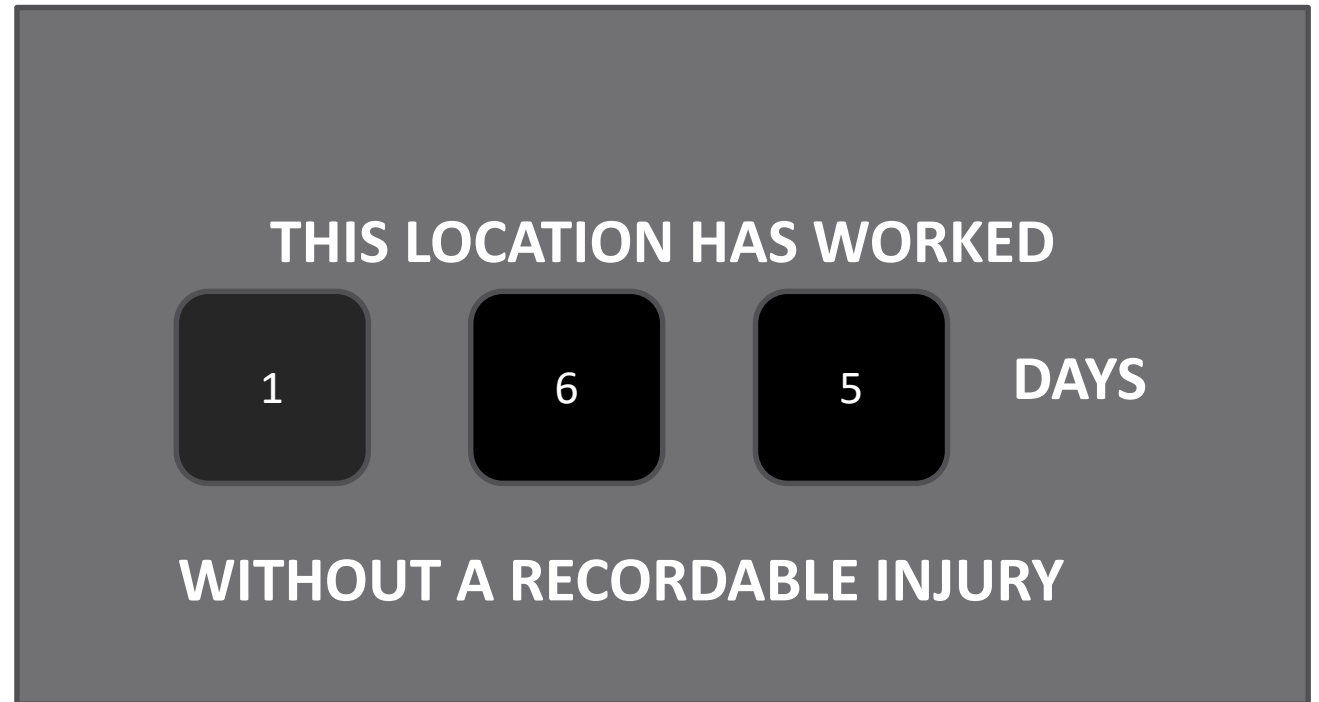
DANGERS OF IGNORING VARIANCE

- Single data-point management – inaccurate view of risk
- Inability to see positive behaviors
- Tendency to disproportionately praise/blame workers who are mostly safe
- Or, to praise employees for a single moment in time
- Not accurately recognizing and reinforcing workplace behaviors



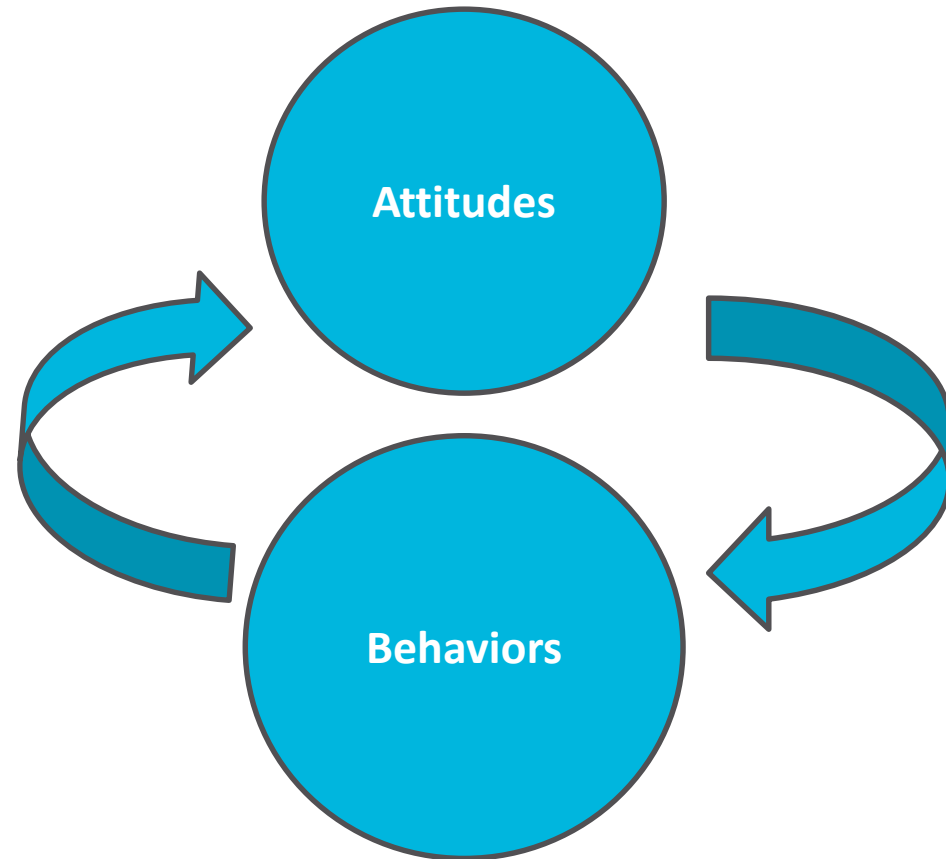
PROBLEM WITH TOO MUCH FOCUS ON INJURY RATE

- Implies that serious or recordable injuries are all that matter
- Implies that “absence of incidents = absence of risk”
- Discourages injury reporting
- Prioritizes tracking failure rather than success – perspective issue again
- Focus on past events, where behaviors have already occurred



ATTITUDE ATTRIBUTION

- Attributing behavior to attitudes is just another kind of labeling
- Attitudes \neq behaviors. Behaviors are much more concrete, more real
- We assume that attitudes cause behaviors, but it's actually a two-way street, and behaviors just as often cause attitudes!



BEHAVIORS CAN CREATE ATTITUDES

Examples:

- Hormones controlling feelings of power are activated after just a few minutes of good posture
- Cognitive dissonance: People who find they're acting in conflict with their attitudes often change the attitudes, not the behavior



Photo courtesy of U.S. Airforce



A TAKE-HOME

The focus should be on changing behaviors, and if we improve the behaviors, the attitudes will follow.

We can best accomplish that by making it easy for employees to model safe behaviors.



TIPS FOR LEADING METRICS



OSHA'S LEADING INDICATOR GUIDANCE



Management Leadership

Using **Leading Indicators**
to Improve Safety and Health Outcomes

Worker Participation

https://www.osha.gov/sites/default/files/OSHA_Leading_Indicators.pdf



OSHA'S RECOMMENDED STEPS

From OSHA Guidance Doc:

- Choose your leading indicators
- Set goals
- Start using Lis
- Periodically Reassess
- Measure and Share Progress

ACTION ITEMS COMPLETED SINCE LAST INSPECTION

Action Item	Due Date	Status
Repair electrical hazard at main entrance	March 15	Completed by due date
Install new fire protection equipment in work spaces	March 15	Not completed by due date
Provide training on updated emergency procedures	April 15	Completed by due date
Conduct a root cause analysis of recent fire incident	May 15	Not completed by due date

Example from OSHA LI guidance:

https://www.osha.gov/sites/default/files/OSHA_Leading_Indicators.pdf



KEY AREAS LEADING INDICATORS SHOULD ADDRESS

- Management leadership
- Worker participation
- Hazard identification & assessment
- Hazard prevention & control
- Education & training
- Program evaluation & improvement
- Communication and coordination of safety program



LEADING INDICATORS NEED TO BE TIED TO SAFETY MANAGEMENT GOALS

- They should be directly relevant to a key aspect of safety performance
- They should have blessing and buy-in from management
- They should be tied to management's view of "success"



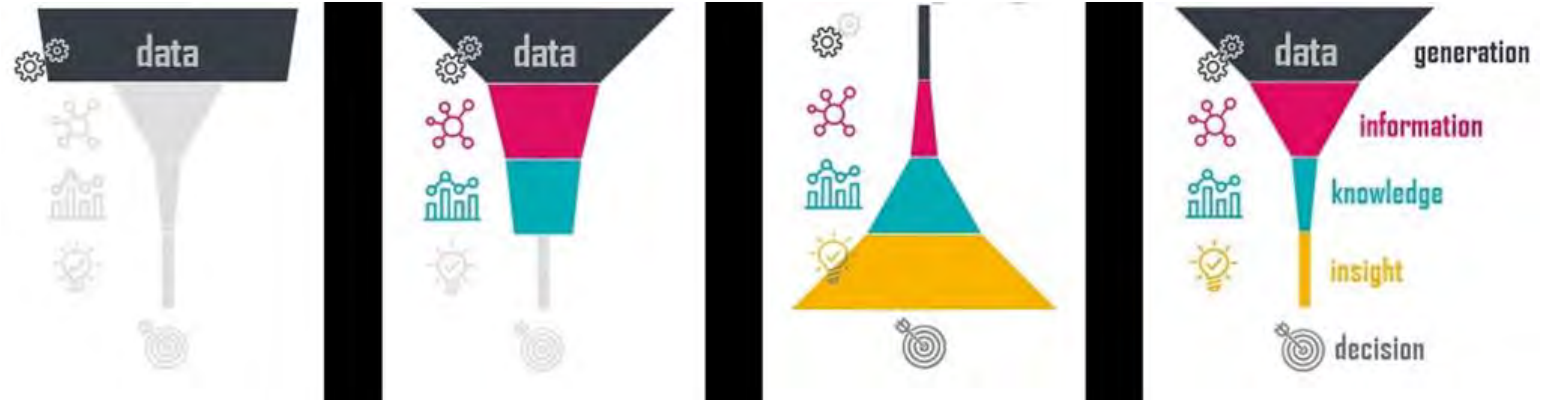
LEADING INDICATORS THAT SUPPORT HAZARD IDENTIFICATION AND ASSESSMENT

- Frequency with which preventive equipment maintenance tasks are initiated and completed on schedule.
- Number of hours passed after an incident before an investigation is started.
- Number of hours passed after an incident before an investigation is completed.
- % of incident investigations that include a root cause investigation.
- % of daily/weekly/monthly inspections completed.
- % of inspections with follow-up action



LEADING INDICATORS THAT SUPPORT HAZARD PREVENTION AND CONTROL

- Length of time interim controls have been in place
- Percentage of recommendations implemented that pertain to PPE hazard controls, administrative controls, engineering controls, substitution, and elimination
- Number of special work permits filled out



EXAMPLE: FLOOR INSPECTIONS

E.g., suppose you learn that there has been an uptick in trips/falls in an assembly department, and our investigations indicate that the primary cause has been cluttering of floors with tools and packaging material.

You can set a LI of frequency of inspections/clearing of floors, with a goal of once/day and tracking method a checklist.

DAILY CLEANUP CHECKLIST

- Rewind air hoses
- Package tools and equipment away from work station floors
- Store unused car parts in storage areas away from floors
- Sweep floors of debris and other objects that can lead to slips or falls



MYTHS ABOUT LEADING INDICATORS

MYTH	REALITY
LIs are predictive	Kind of, but only to a degree
They're superior to lagging indicators, or replace them	They do things lagging indicators can't do, but work closely with them
They represent "new" thinking	The idea of Lis has been around for a very long time
LIs are inherently useful	Not at all – it's quite possible to pick LIs that don't matter much to your understanding of safety



LAGGING AND LEADING METRICS WORK TOGETHER!

Lagging Metrics

Injury Reports • Near Misses
Recurring Events • Days Away (DART)

“The Rear-View Mirror”

(cannot be influenced or changed)

INCIDENT

Leading Metrics

Preventive Maintenance • Mgmt. of Change
Process Hazard Analysis • Training

“The Road Ahead”

Predictive

Modifiable

Preventive

“You don’t know where you’re going until you know where you’ve been.”

Remember: You can and often will learn things from safety incident investigations that cause you to revisit design. Incident investigations and incident rates (a lagging metric) are not separate from PtD.

Source: OSHA

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CONTRACTOR METRICS

- Some contractors at VPP sites track their own metrics, including:
- Types of near misses reported
- Types of first-aid cases
- Incidents of property damage at host site
- Job hazard analyses (JHAs) completed
- Number of audits and corrections

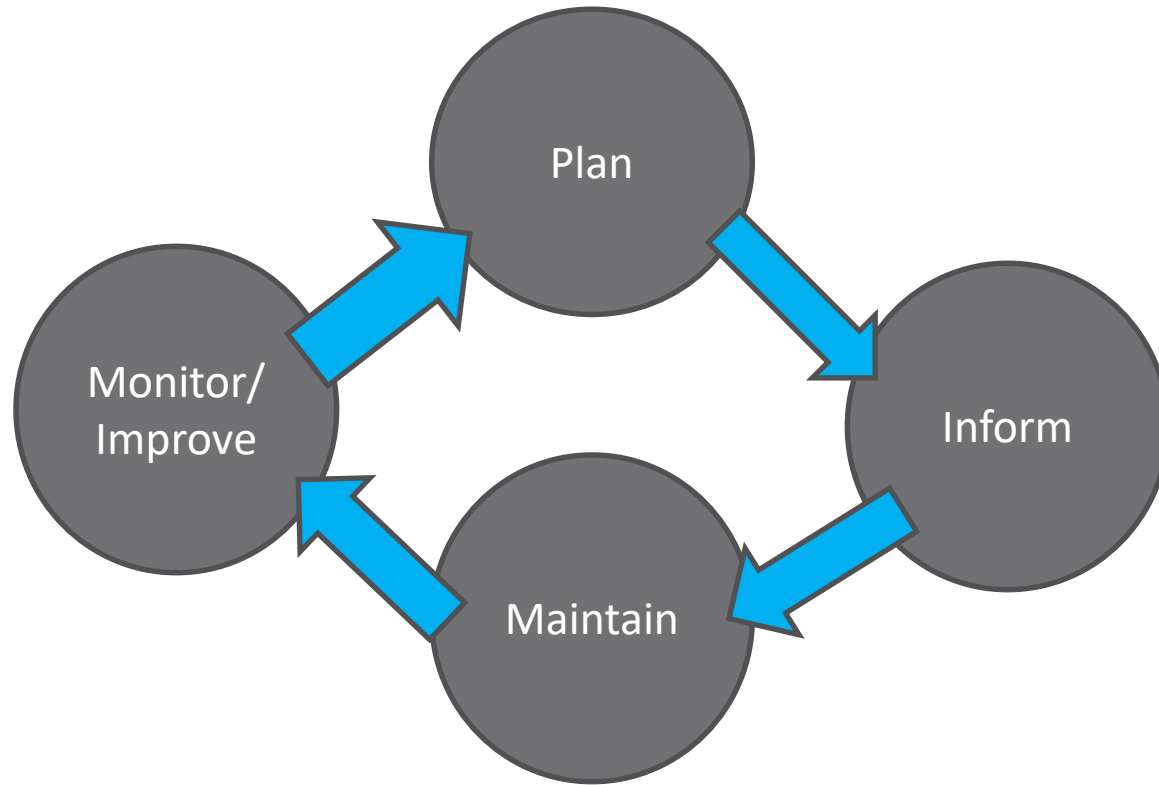
Remember: Your SMS must address contractor safety!



BEST PRACTICES



PLAN ACCORDINGLY



- **Plan:** Meet with stakeholders, and develop plans to address decontamination schedules, chemical safety, social distancing measures, on/off schedules, etc.
- **Inform:** Communicate plans to employees
- **Maintain:** Implement the plans each day
- **Monitor/Improve:** Assess what's working and what's not, and make changes if needed

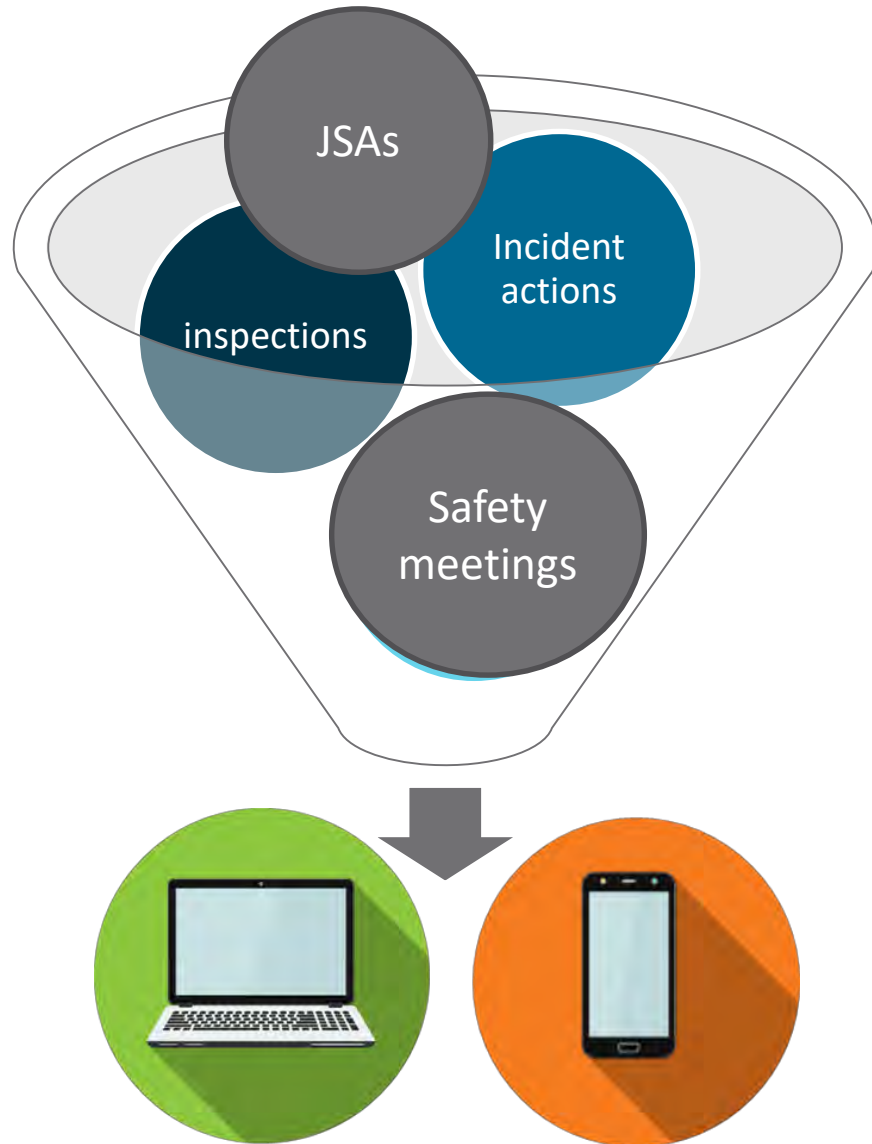


SOME TIPS ON METRICS

- Track at least some leading metrics and some lagging metrics
- Make sure everyone understands how to interpret trends in near misses
- Track issues that are a particular challenge for your company (e.g., overdue action items)
- Tracking metrics alone will not improve performance. Incorporate your tracking into a robust corrective actions program



FUNNEL YOUR CORRECTIVE ACTIONS



Wouldn't it be nice to automatically funnel the actions associated with inspections, JSAs, incidents and safety meetings into one place for tracking and follow-up?



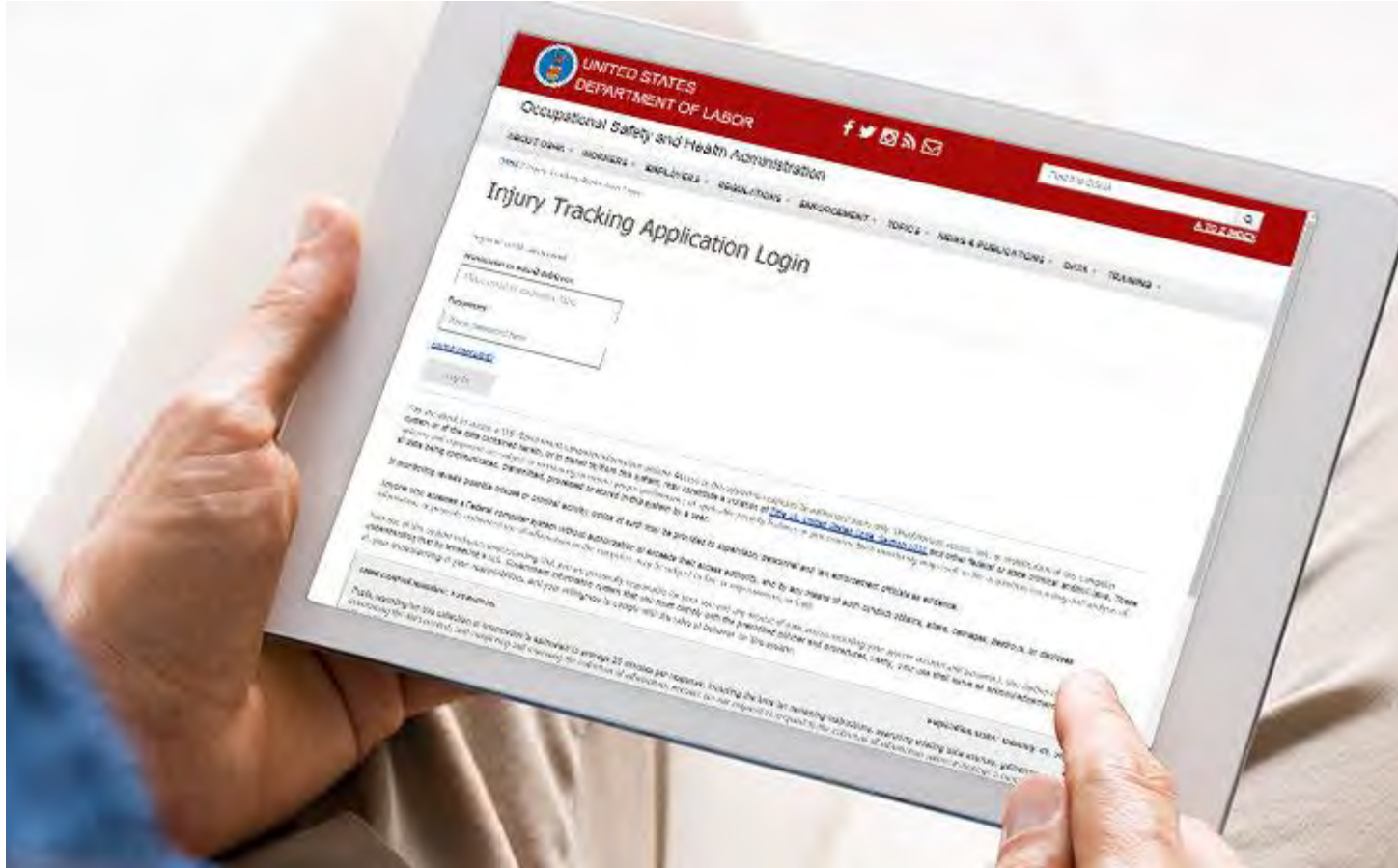
EMPOWER YOUR PEOPLE



You *don't* have to go it alone.
Empower your people to conduct inspections, report incidents/hazards and access SDSs without barriers



IMPROVE DATA ACCESS AND REPORTING



- Access your data from anywhere
- Dashboards organize your most important metrics
- Drive better decision making
- Share progress
- Easily complete required reports like electronic 300A reporting



Easy Question: Which is faster?



Oops – not the right answer. Good luck digging through this to find an SDS during an emergency.



THAT'S RIGHT! Your prize is quick access to SDSs when you most need them.



STAY CONNECTED

- Keep your workers connected
- Stay looped in to training progress
- Show your commitment to your workers



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FLEXIBILITY



Modern EHS software gives us the flexibility to keep our system running no matter what the future may hold.



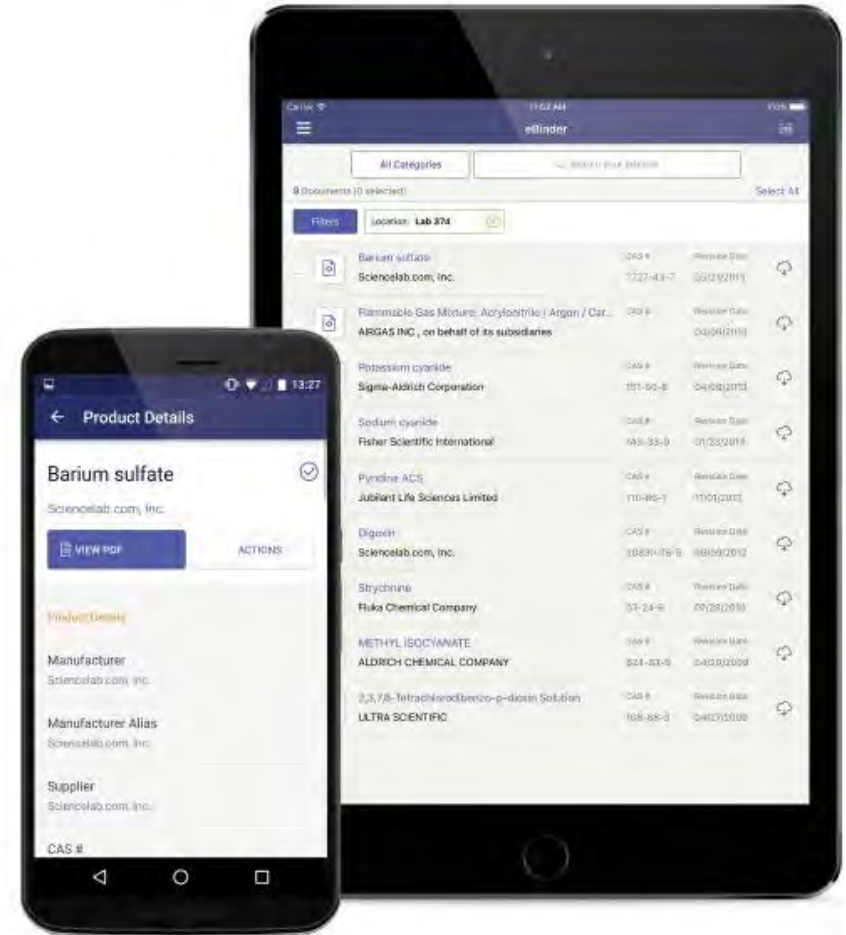
THE “SUCCESS SAFETY CYCLE”

- Responsibility for key tasks is shared with workforce
- Easy to access data and share progress
- Ability to not just keep up, but push on beyond compliance
- Employees at all levels are aware of safety programs, and believe in them

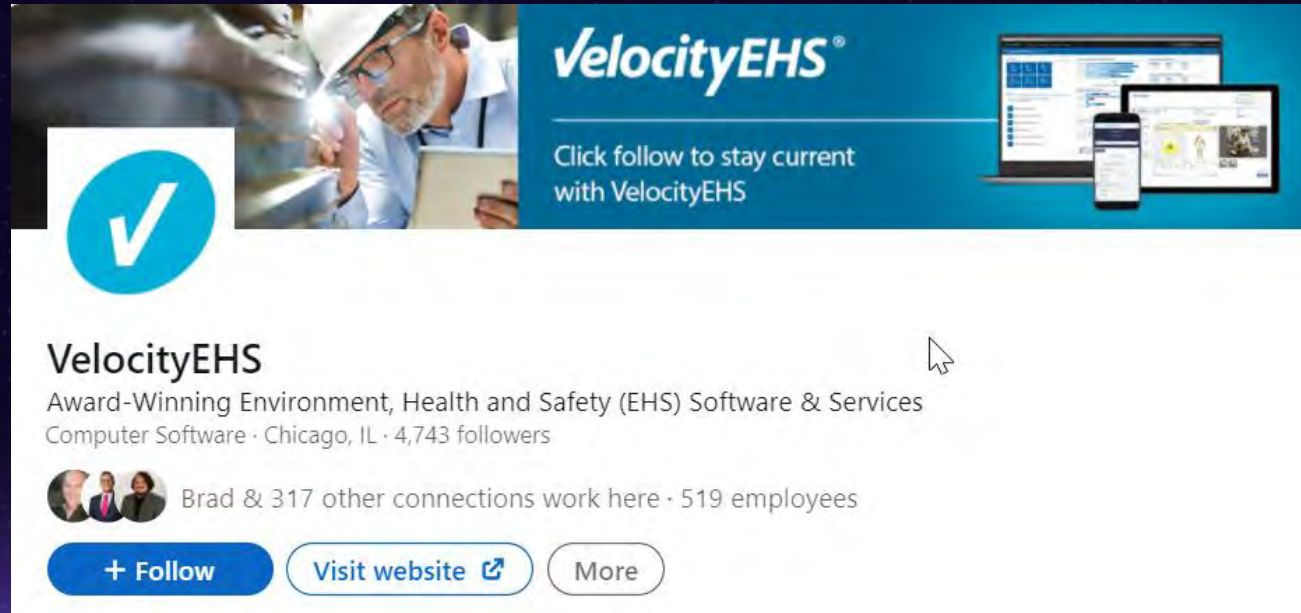


How Technology Can Help

- ✓ Risk management – collaborative, simple identification and control of risks
- ✓ Simple, integrated management of key safety tasks, like corrective actions, incident investigations, safety meetings, risk assessments
- ✓ Management of Change (MOC)
- ✓ SDS management
- ✓ More ability to be proactive
- ✓ Better data visibility, including of leading indicators to drive better decision making



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Questions?

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Thank you!