Preventing Falls through Improved Design

Moderator: Chris Trahan Cain, CIH, Executive Director, *CPWR*

Panelists:

- **G. Scott Earnest, PhD, PE, CSP,** Associate Director for Construction, Office of Construction Safety and Health, *NIOSH*
- **Bill Wright**, Communications Director, *CPWR*
- **Bob Moser, PE, CSP, RA,** Manager of Health & Safety by Design, *Jacobs*
- **Ralph Bierschwale**, Architectural Design Manager and Architecture SME, *Jacobs*
- **TJ Lyons, CSP,** Safety Director, *Gilbane*
- **Jose Herrera,** Safety & Occupational Health Specialist, Directorate of Construction, *OSHA*

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415-655-0003, Access Code 2550 162 8779 #

Prevention through Design and Construction Falls

G Scott Earnest, Ph.D., P.E., C.S.P.
Associate Director
NIOSH
March 2023

CSH The Office of Construction Safety and Health
At the National Institute for Occupational Safety and Health–NIOSH

PtD Prevention through Design

The National Falls Prevention Campaign

Join the
National Safety
Stand-Down
To Prevent Falls in Construction

MAY 1-5, 2023

- NORA Construction Sector Council led
- Campaign leaders: NIOSH, OSHA, and CPWR-The Center for Construction Research and Training
- Evidence Based Campaign
- Evaluation essential to demonstrate success

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NORA

Workers Memorial Day, April 26, 2012

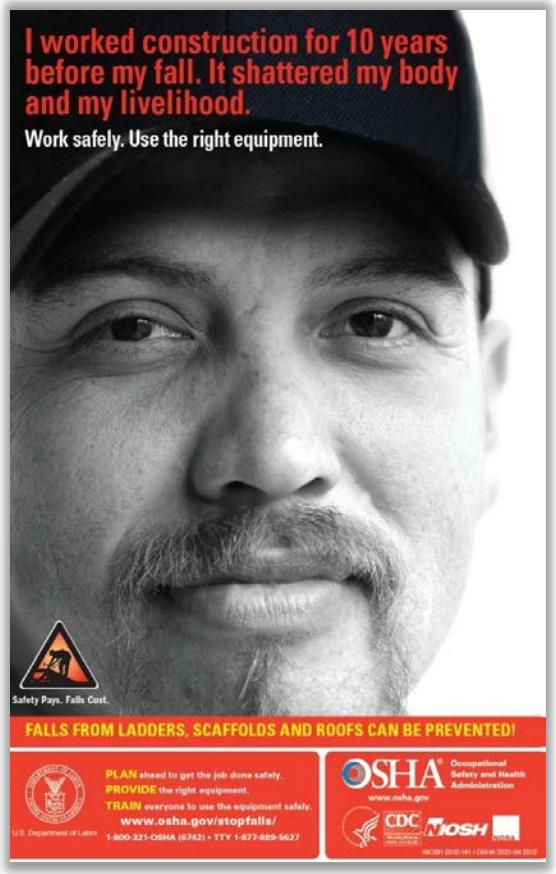
Secretary of Labor, the Honorable Hilda Solis
Remarks at an event in Los Angeles signaling the launch

Implementation

- **Campaign Name:** Safety Pays, Falls Cost
- **Website:** Stopconstructionfalls.com
- **Tagline:** Plan. Provide. Train.
- **Campaign brand:** testimony approach; factual and serious tone
- 60 partners – government, unions, businesses, associations

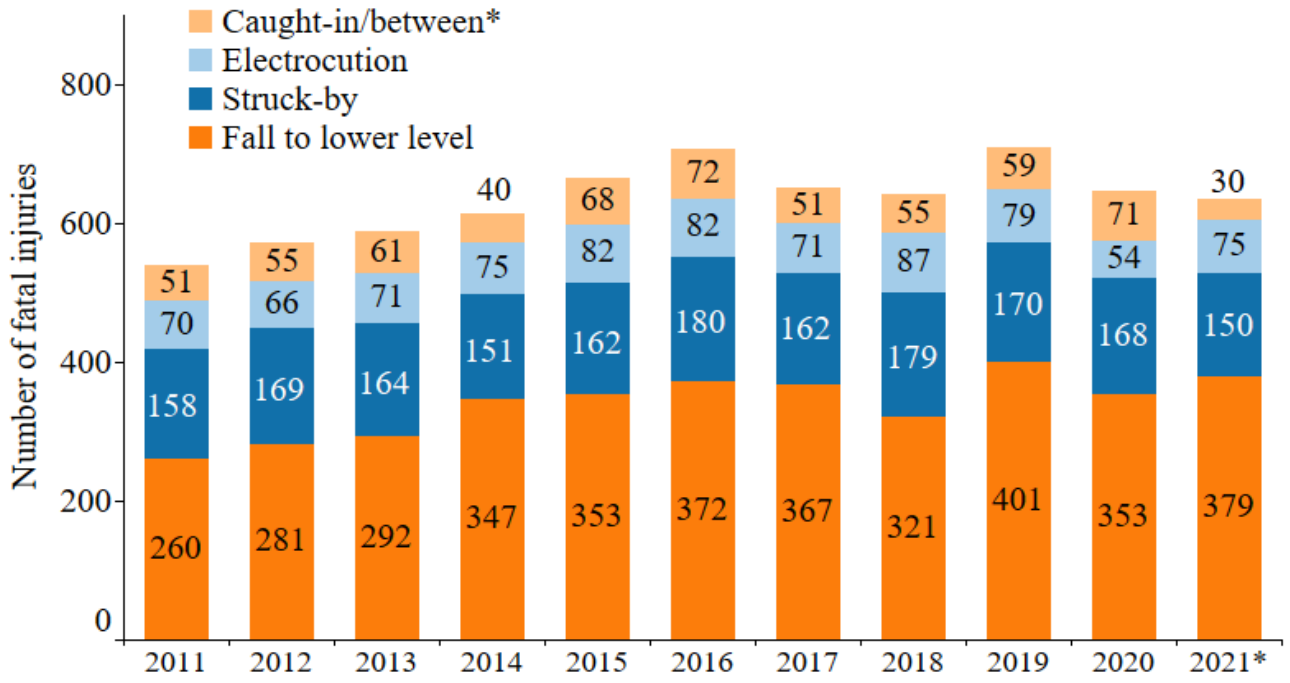
Join the Campaign to Stop Construction Falls!

www.stopconstructionfalls.com



Why Focus on Falls?

Number of fatal injuries in construction by Focus Four injury type



Source: U.S. Bureau of Labor Statistics, 2011-2021 Census of Fatal Occupational Injuries. Calculations by the CPWR Data Center.
*Missing OIICS 64 (caught in/compressed by equipment/objects) in 2021 impacting caught-in/between and total values.

Falls are the **#1** cause of death in construction, despite being preventable!

Top 10 OSHA Violations (2021)

1. **Fall Protection, construction (29 CFR 1926.501)**
2. Respiratory Protection, general industry (29 CFR 1910.134)
3. **Ladders, construction (29 CFR 1926.1053)**
4. Hazard Communication, general industry (29 CFR 1910.1200)
5. **Scaffolding, construction (29 CFR 1926.451)**
6. **Fall Protection Training, construction (29 CFR 1926.503)**
7. Control of Hazardous Energy (lockout/tagout), general industry (29 CFR 1910.147)
8. Eye and Face Protection, construction (29 CFR 1926.102)
9. Powered Industrial Trucks, general industry (29 CFR 1910.178)
10. Machinery and Machine Guarding, general industry (29 CFR 1910.212)

Source: Occupational Safety and Health Administration. (2021). Top 10 Most Frequently Cited Standards for Fiscal Year 2021. https://www.osha.gov/top10citedstandards

Prevention through Design (PtD)

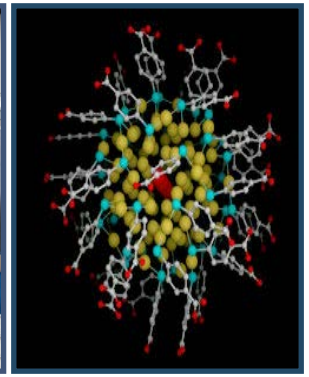
Mission: Design out hazards and minimize risks associated with:

Facilities

Work methods

Processes

Equipment



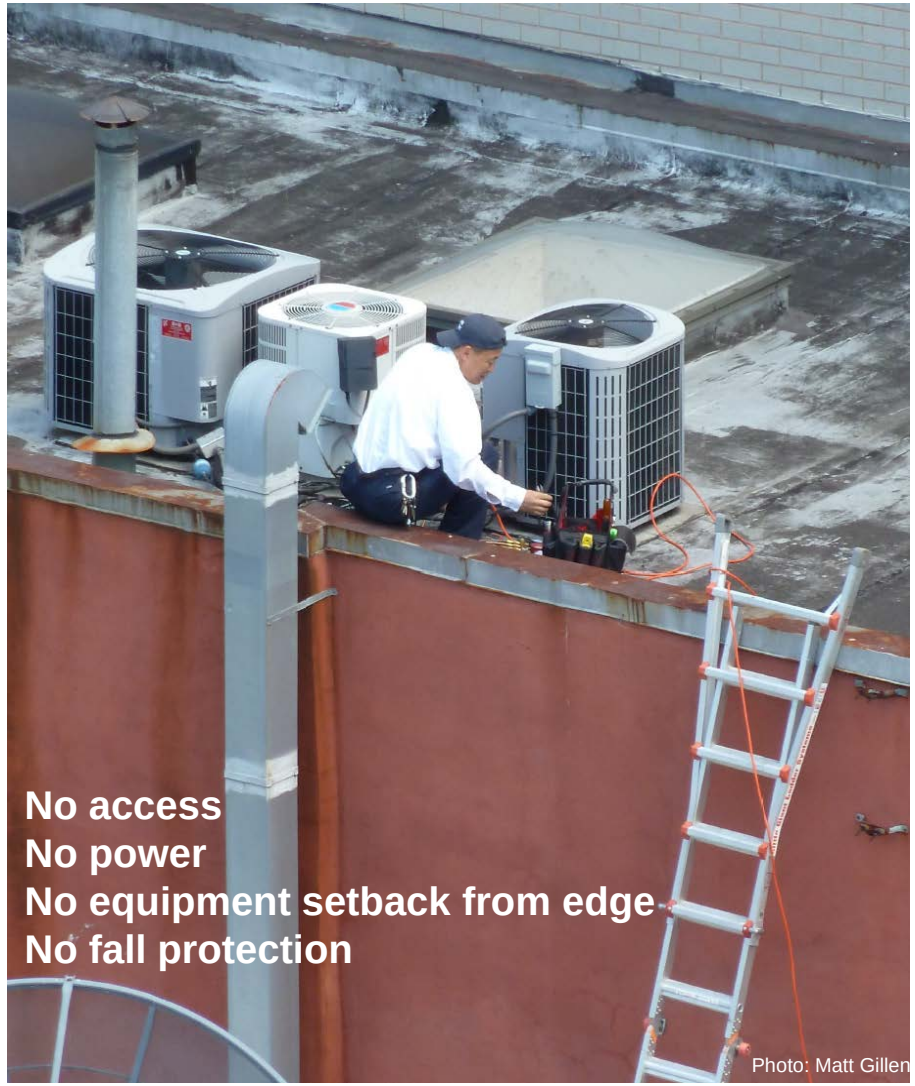
Products & new technologies

Why PtD?

- *"Anticipating* and *DESIGNING OUT* hazards in tools, equipment, processes, materials, structures, and the organization of work is *the most effective way* to *prevent* occupational injuries, illnesses, and fatalities."

- John Howard, M.D.
Director, National Institute for Occupational Safety and Health
Centers for Disease Control and Prevention

Why Prevention thru Design?



Servicing rooftop HVAC equipment

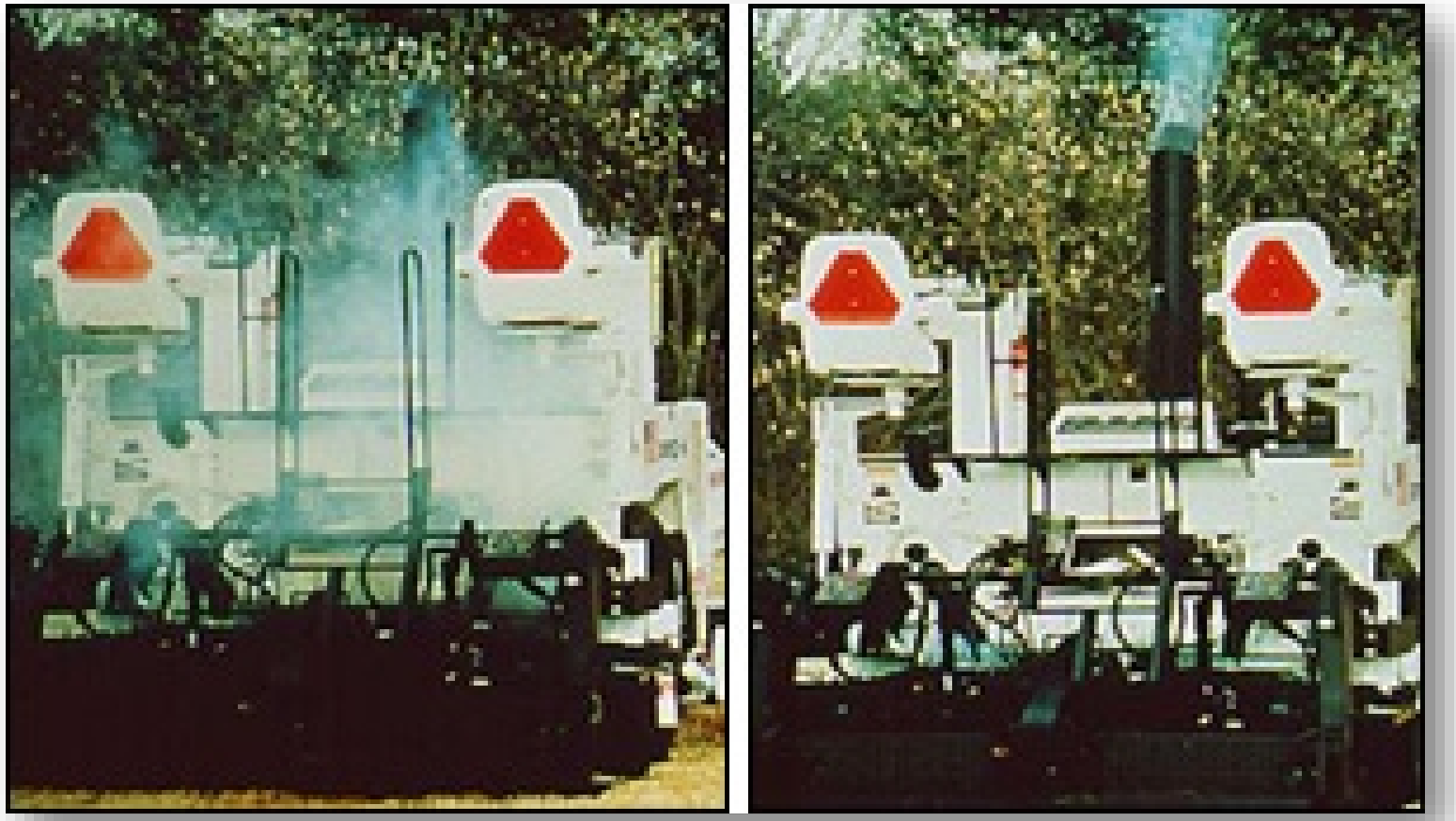
Fall exposures

“Error trap” for workers

Design issues?

HVAC= Heating, Ventilation, and Air Conditioning

PtD Examples: Asphalt Pavers



Before and after photos of asphalt fume emissions from highway-class pavers

Source: Cervarich MB [2008] Prevention through Partnerships. PtD in Motion, Issue 2.

PtD Examples: Silica Controls

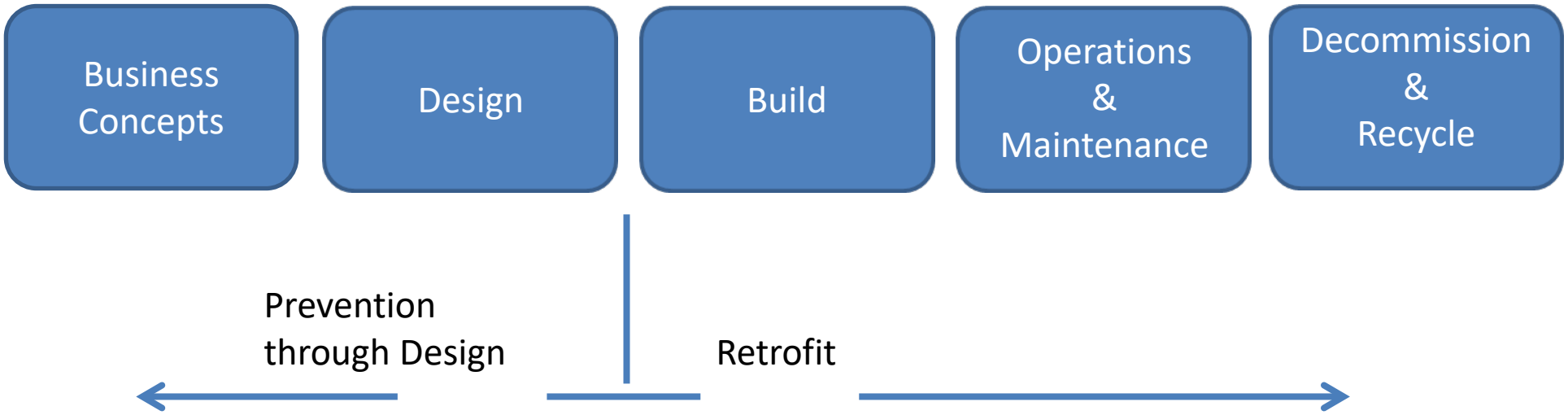
- Table 1 in the construction standard matches 18 tasks with effective dust control methods and, in some cases, respirator requirements.

- Employers that fully and properly implement controls on Table 1:
  - Are assumed to comply with the PEL
  - Not required to conduct exposure assessments for employees engaged in those tasks

Moving Upstream

PtD

Address Hazards Upstream in the process



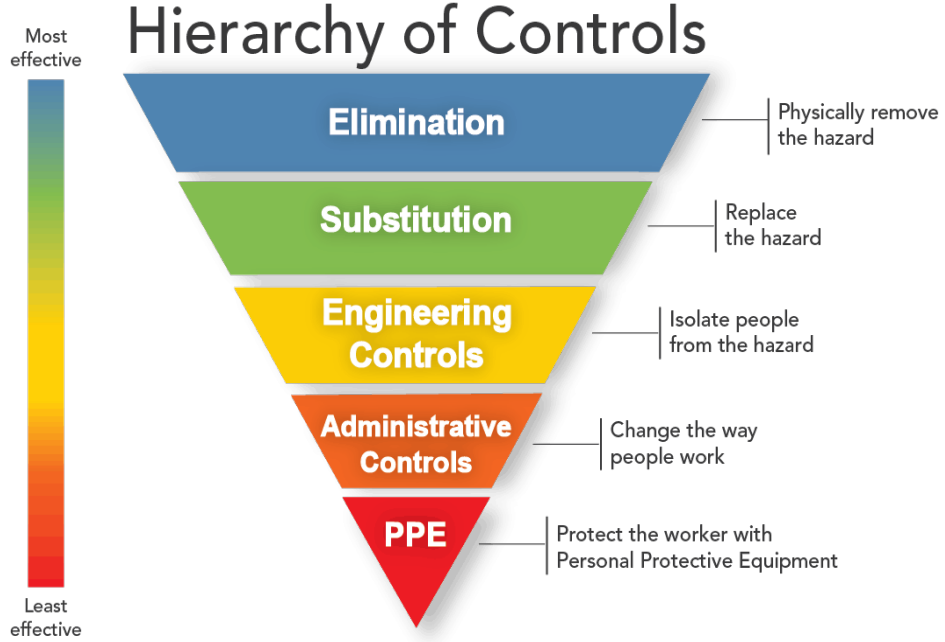
Move worker protection from an afterthought to a forethought in process, product and facility design

PtD is NOT NEW!

- "When you build a new house, ***you shall make a parapet*** for your roof, that you may not bring the ***guilt of blood*** upon your house, if anyone should fall from it.."
- **The Bible, Deuteronomy 22:8**
- Written approx. 1406 BC

- **Prevention through design** is used in many countries and is sometimes called "safety in design", "inherently safe design", "construction design management", or "design for safety"

PtD Motivation



8 deaths described in NIOSH Alert (90-100)…

1 FACE report fatality a 24-year-old male plumber died when he fell through an **unguarded skylight opening** to a concrete floor approximately 22 feet below. The victim and a coworker were installing plumbing fixtures on the roof of a new building.

2 FACE report fatality an 18-year-old male sheet metal helper died after he **fell through a skylight opening** to a concrete floor 33 feet below. The victim was working as a member of a crew engaged in replacing corrugated metal roof sheeting and installing chain-link fencing material on top of 3- by 8-foot fiber glass panels used as skylights.

3 FACE report fatality a 39-year-old male electrician's helper died when he **fell through a domed, smoke-vent skylight** to a concrete floor 16 feet below. Using a 1-inch-diameter rope, the victim and one coworker had lowered an old electric sign to the ground from the side of an unoccupied single-story building.

4 FACE report fatality a 26-year-old male roofer died when he **fell through a domed smoke-vent skylight** to a concrete floor 25 feet below. The victim and two coworkers were installing a spray-on roof covering. The two coworkers were applying sealant, and the victim was applying granular material.

CPWR Webinar

CPWR Research Findings

Prevention Through Design – Knowledge, Use, and Barriers

Bill Wright, Communications Director
bwright@cpwr.com

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Research Approach

Conducted by Dodge

Online survey Nov. 2021
210 architects and 122 engineers

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- 10 Interviews in early 2022
- 1 professor, 1 insurance, 1 association, 3 GCs, 4 SCs

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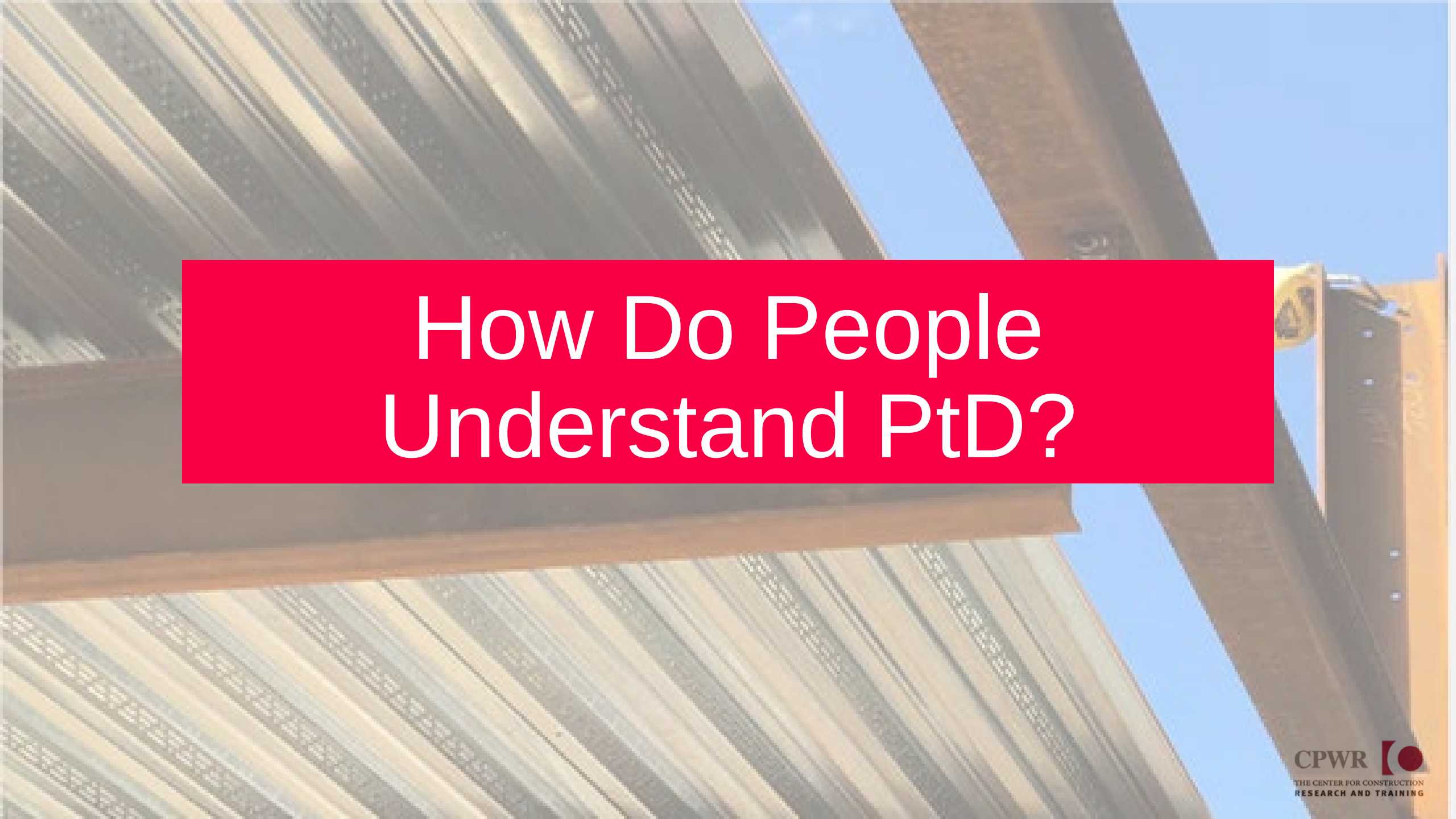
How Do People Understand PtD?
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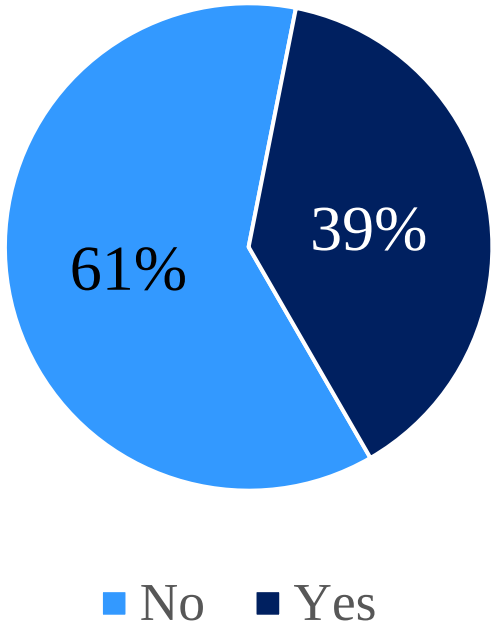
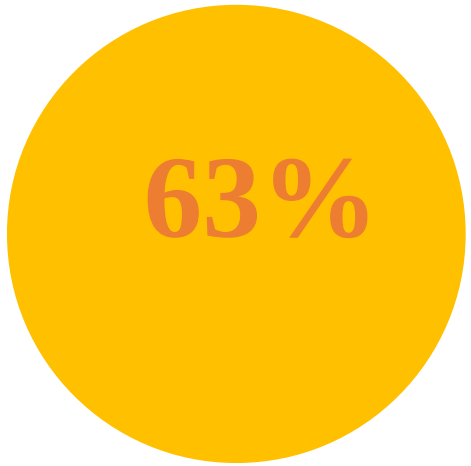
Do People Understand “PtD”?

Awareness Among All Respondents



- Architects

- Engineers



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Interview Comments – Define “PtD”

Information gathered from all affected parties, from manufacturing through installation and maintenance. Input and thought put into the installation and completion of projects.

Trying to manage or change risky environments to reduce the amount of risk.

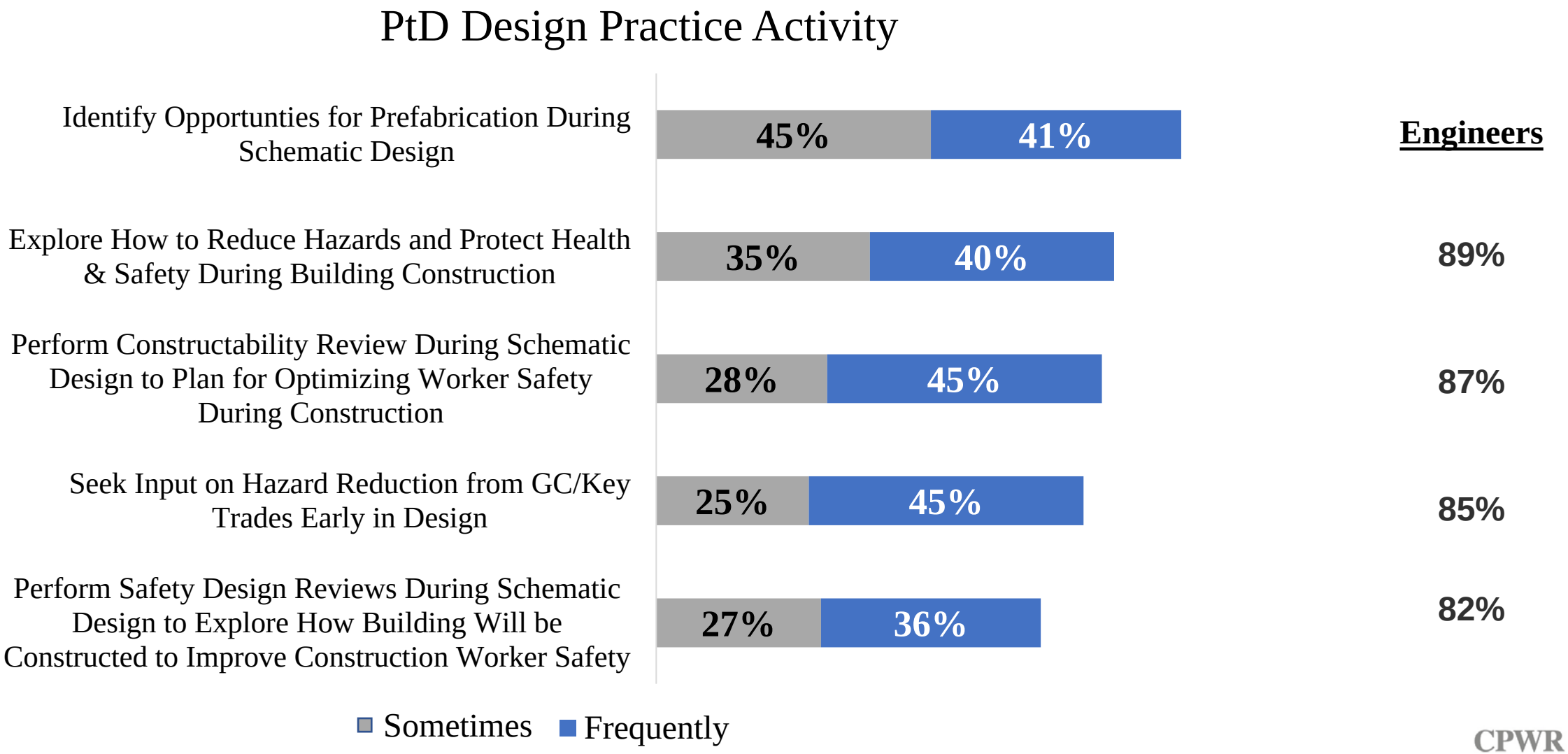
Proactive elimination of hazards through engineering.

A collaborative process between owner, general contractor, design team and subcontractors to ensure they’re making something safely buildable that will be safe for occupants, future occupants, maintenance, etc.

The question is not how to build safely, it’s how to get things done, and doing it safely is part of that.

PtD in Practice

PtD in Practice



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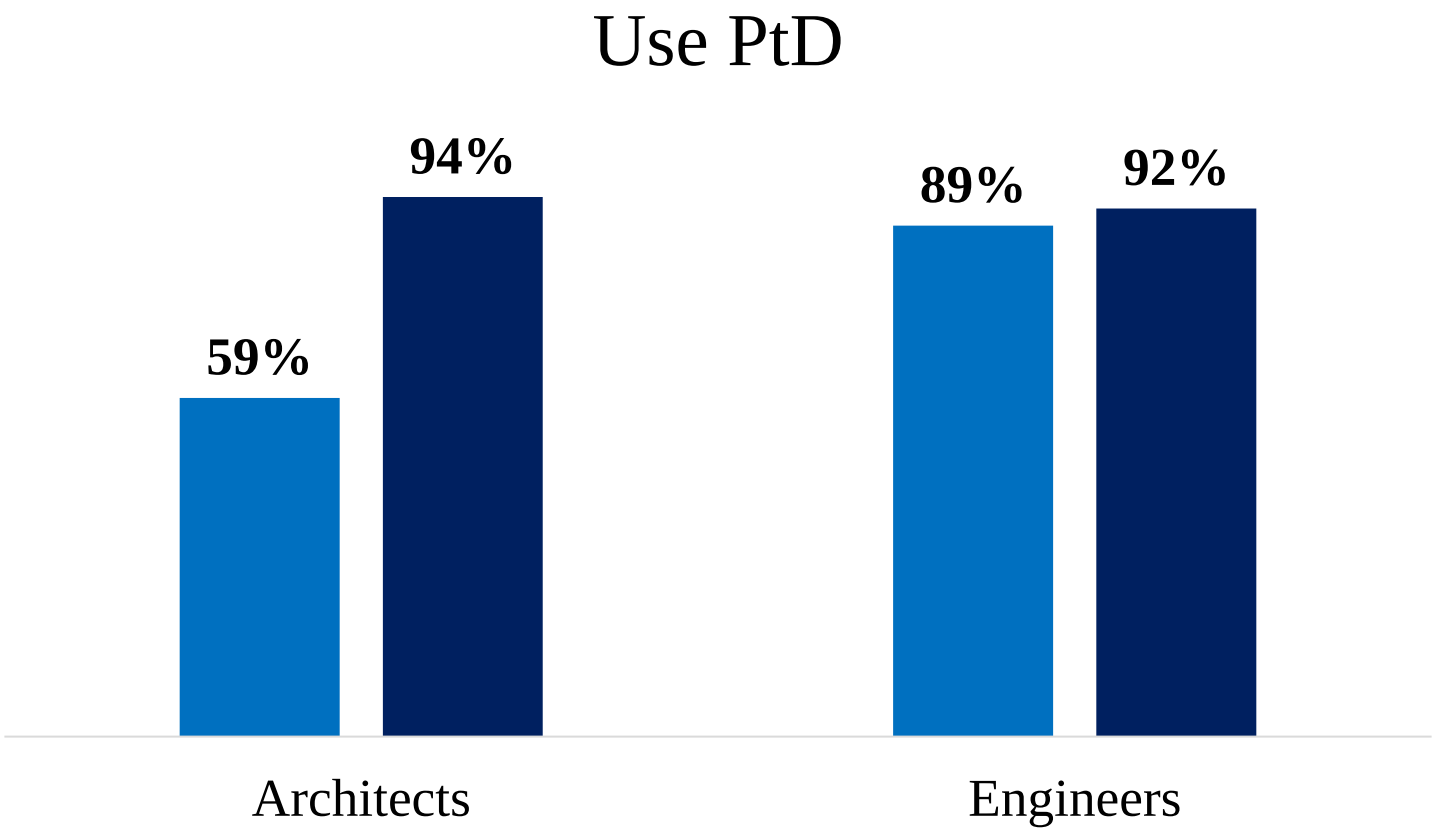
PtD in Practice



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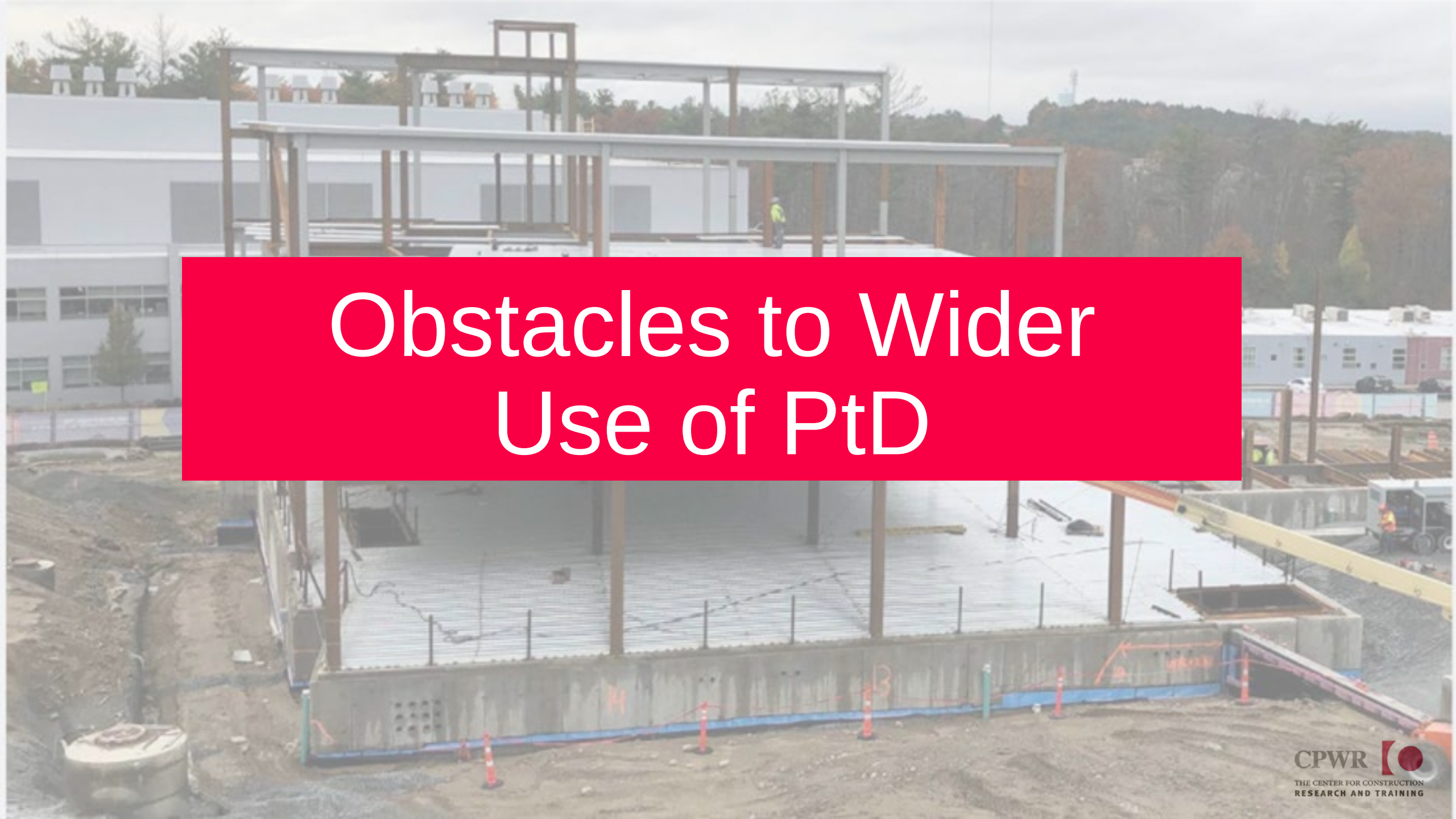

Obstacles to Wider Use of PtD

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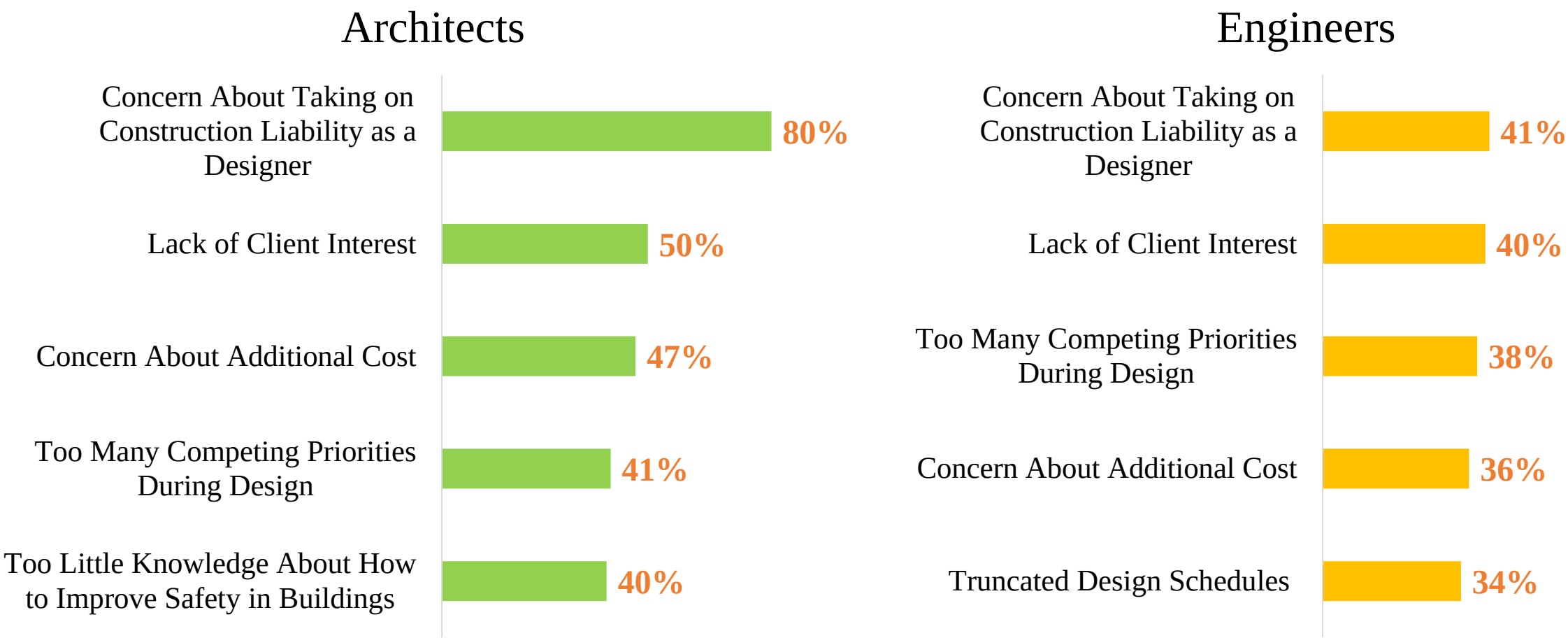
Top Barriers to Practicing PtD



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Interview Comments – Obstacles, Challenges

Lack of concept awareness.

People don’t know what PtD is. Our design manager didn’t know.

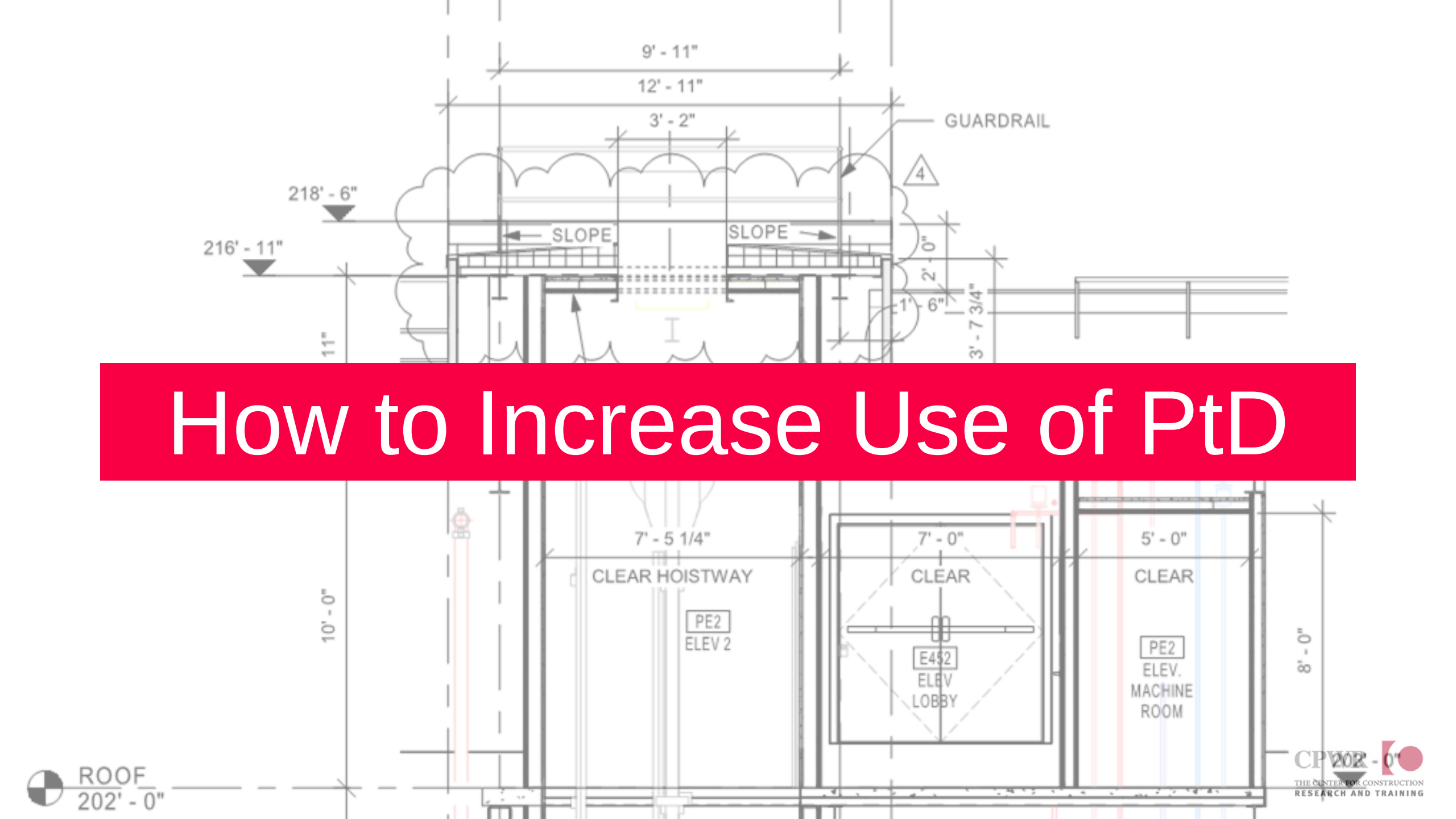
Field and engineer might not understand each other.

Nobody wants to pay for it. Everybody wants people to work safe but no one wants to pay for it.

It’s about the bottom dollar: cost.

Some designers intentionally avoid PtD conversation because some people automatically assume they’ll have a liability and responsibility if something goes wrong post-build.

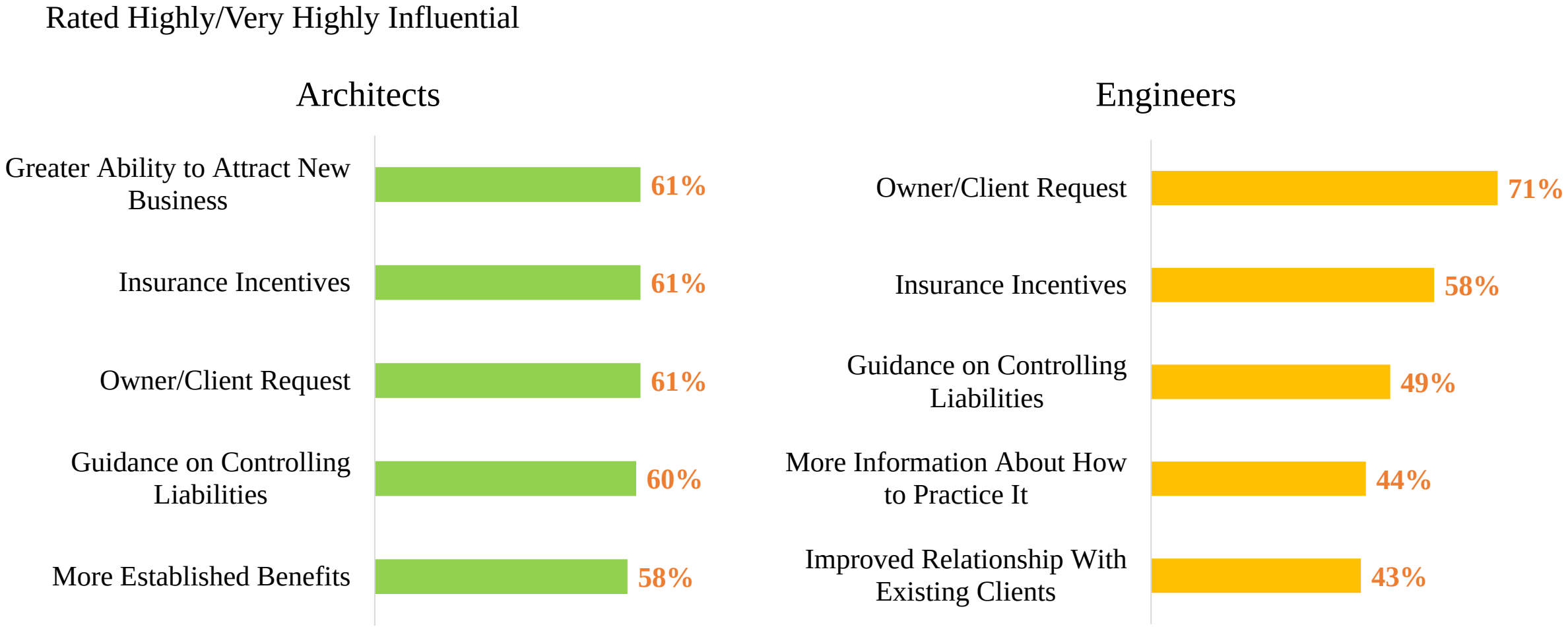
Designers and architects tend to fall back on liability and litigation [when explaining why they don’t use PtD].



How to Increase Use of PtD

Drivers That Would Encourage Wider PtD Use

Rated Highly/Very Highly Influential



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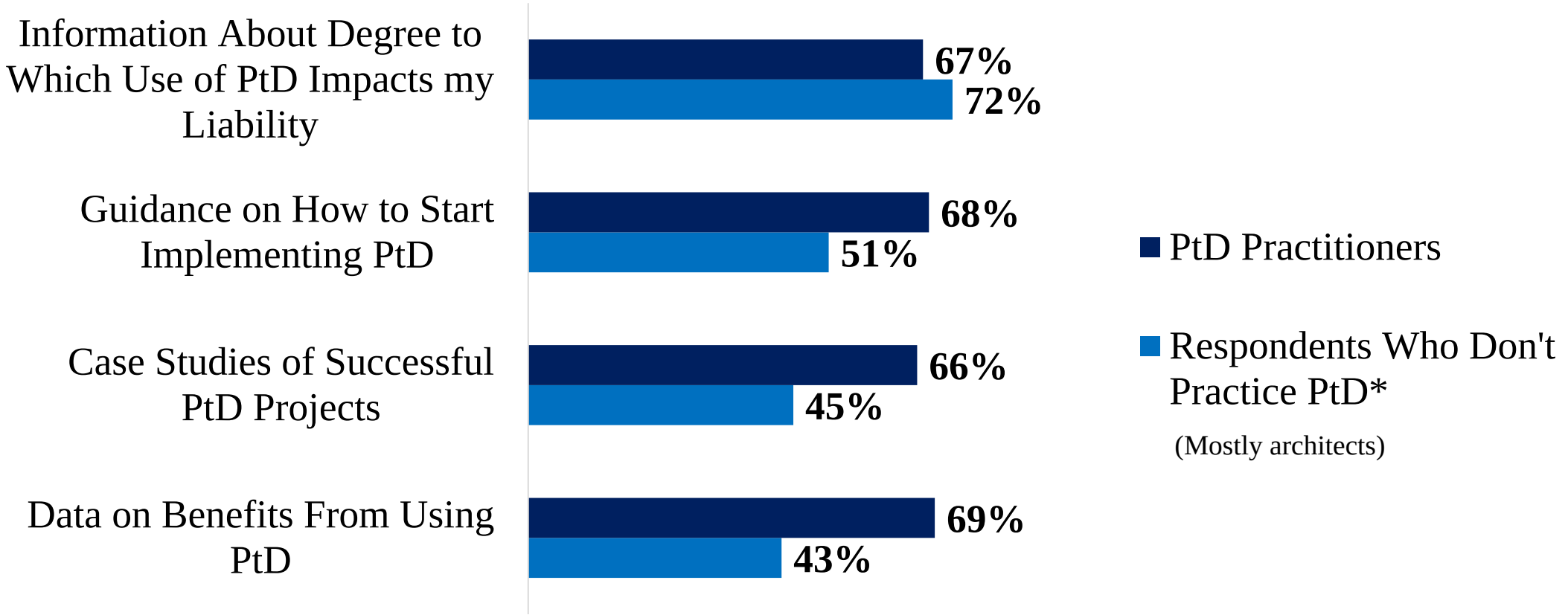
Types of Information That Would Encourage PtD Use



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Jacobs

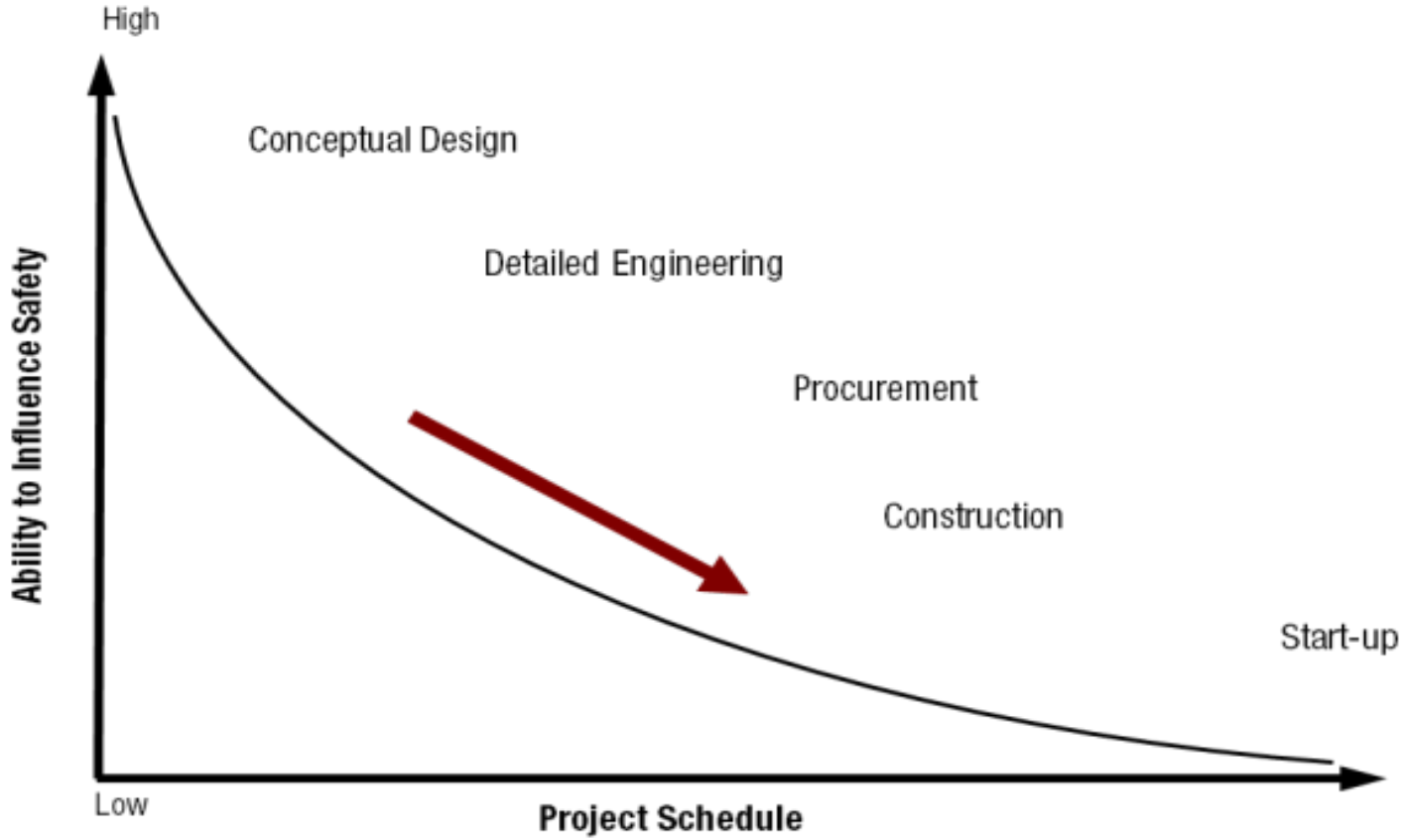
Challenging today.
Reinventing tomorrow.

Safety in Design

What is "Safety & Health in Design"?

- It's more a *"State of Mind"* than just a *"Process"* to follow
- It's about:
  - Applying the Principles of Prevention to the way we design for:
    - Safety and health in construction
    - Safe use, cleaning and maintenance
    - Safe decommissioning
  - Delivering best practice design solutions - every time
  - Giving our designers the opportunity to be creative, innovate and challenge design norms
- Delighting everyone as a result of all of the above
- It is *NOT* about doing the minimum to meet legal compliance

Working Safe

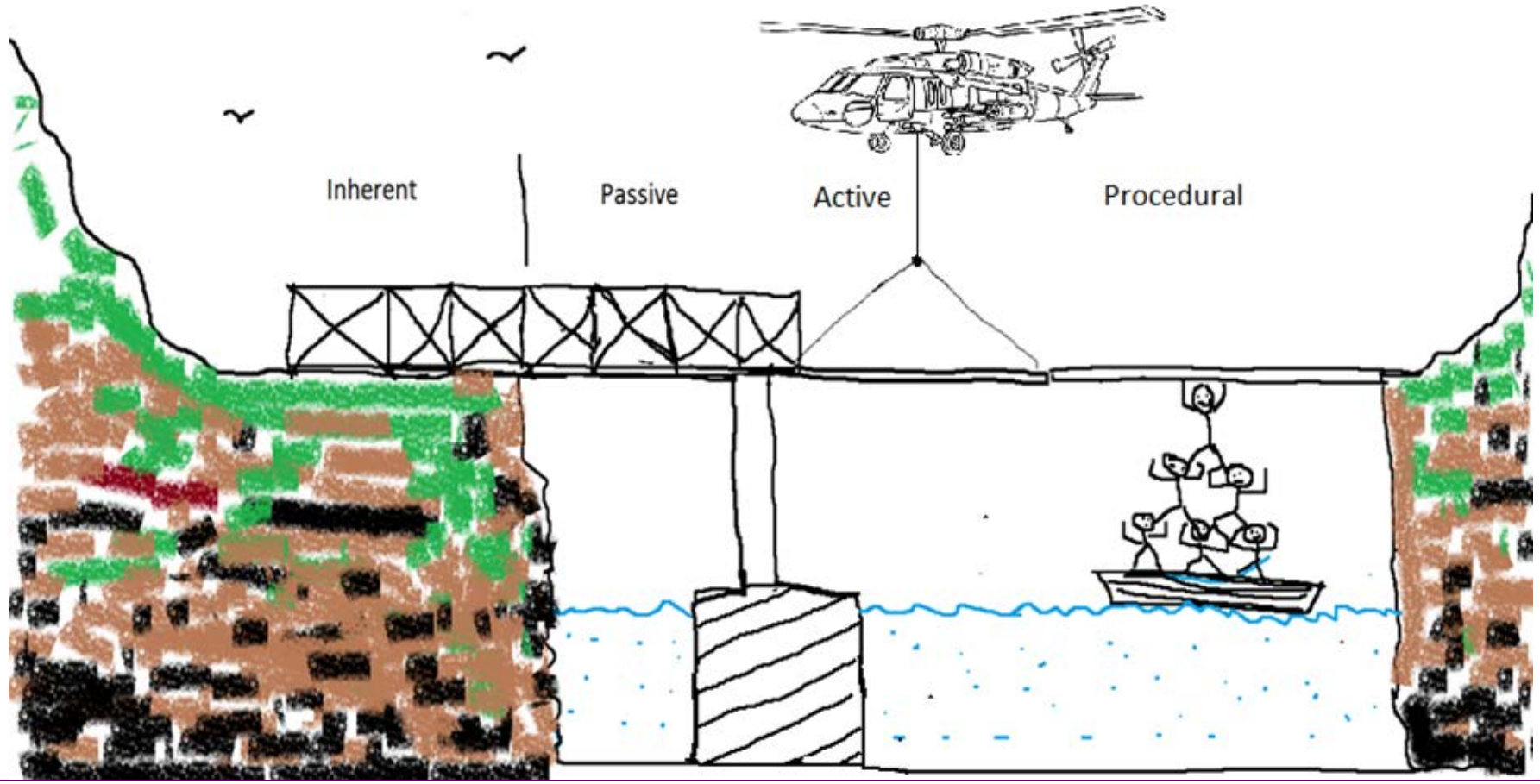


Szymberski 1997

Best Opportunity to Address HSE Early

What is the Concept for Design Safety?

- Layers of Inherent, Passive, Active, or Procedural Controls will Reduce the Risk in a Hierarchy



From PowerPoint: "A Review of Major Accidents and Hazards, and Concepts in Inherently Safer Design" by Jacobs Project Manager, Neil King (2014)

HSE In Design Plan – How do we Implement

- Project Specific – HSE ID Plan
- Conduct a HAZID (Hazard Identification) review early in design when layout is available. Invite the Architect and CM to the review to assure that safe construction practices are considered in early design.
- Conduct systematic constructability reviews early in design. This includes construction documents, technical specifications and bid schedule.
- The objective is to be proactive in design so that construction is not reactive.

TABLE OF CONTENTS

Architectural Safety in Design

- "Design with the End in Mind"…*but also design with Construction in Mind!*
- Make the HAZID part of the Project's normal Design Planning and repeat at Project Milestones
- Visualize Design through *multi-discipline* BIM model
  - *Identify tie-off points*
  - *Ergonomics*
- Exterior Building Elements to Explore
  - *Roofs, Floor Slabs, Cladding, Stair Towers*
- Interior Fit-out Elements for Consideration
  - *Pits/ Slab leave-outs, Curbing*

Roof Design

- Parapets
  - *Preferred over rails and tie-offs*
  - *Design for 42” (everywhere)*
  - *Allow for slopes required for drainage*

- Flat Roof
  - *Preferred for both construction and future maintenance operations*
  - *If possible, bring HVAC gear inside and limit equipment on the roof*

- Curved Roofs
  - *Aesthetically pleasing but problematic*
  - *Provide integrated large scale gutters*

Structural Floor Slabs

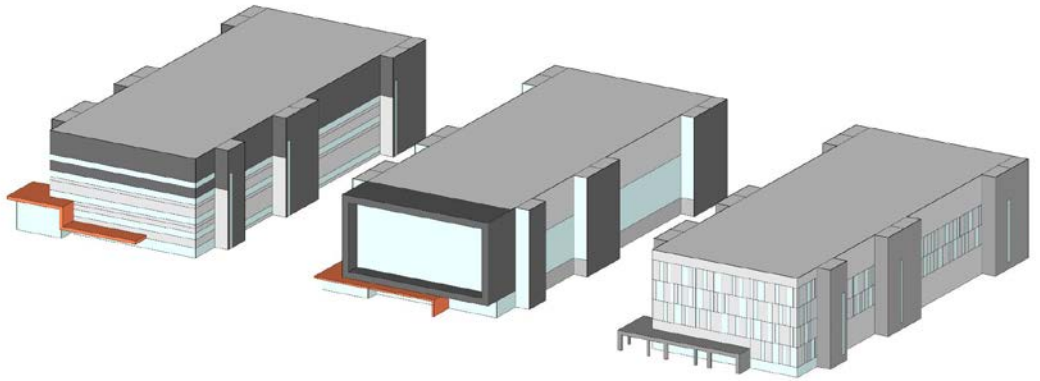
- Elevated Slabs

- Most Common Approach in US Market
  - *Metal Decking*
  - *Rebar, Studs*
  - *Poured Concrete*
  - *Shoring*

- Alternative Approach: Precast Concrete
  - *Appropriate for specific building typologies*
  - *Common usage in European Construction Industry*
  - *Modularized*

Cladding Strategies

- Design Aesthetics
  - *Ideation to consider construction methods*



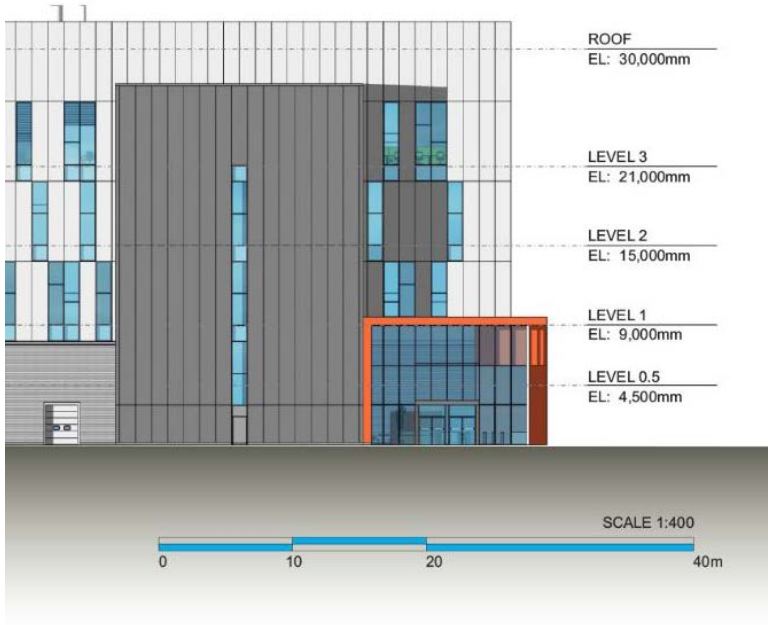
- Traditional Approaches
  - *Insulated Metal Panel (IMP)*
  - *Curtain Wall*
  - *Typically Stick-Built*

- Modularization/ Panelization
  - *Floor to floor*
  - *Limit work at building boundary*
  - *Faster close-in time = safer site*

Stair Towers

- Modular Stair Towers
  - *Off-Site Construction - Safer*
  - *Schedule Stairs to arrive on site early to forego the need for scaffolded assemblies*

- Place Windows in Stair Tower
  - *Once building is enclosed, stairs can be very dark until lighting is installed (temp lighting is less even)*
  - *Being able to see outside may have other safety advantages*



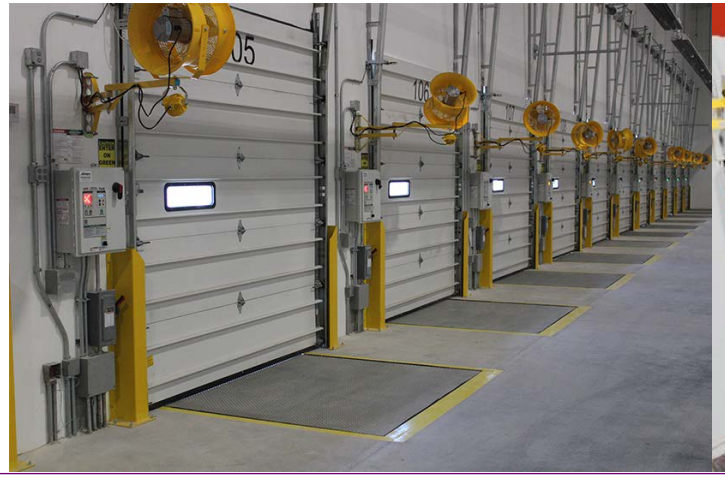
- Combine Safety in Design to entire Envelope

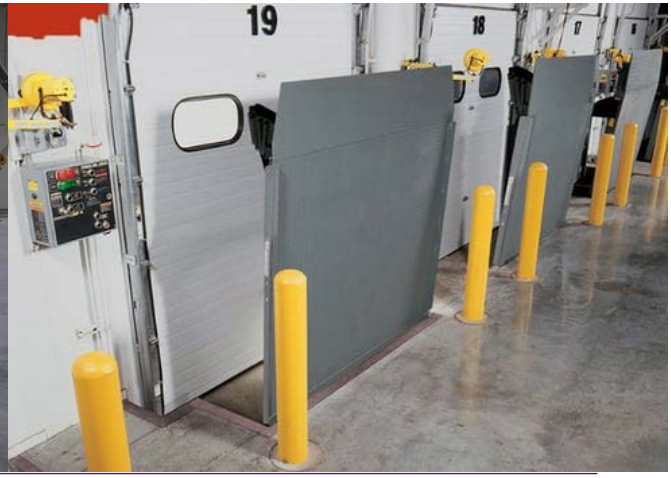
Pits in Concrete Slabs

- Interior Fit-out for Commercial and Industrial Applications

- Pit-Mounted Equipment
  - *Floor Scales*

- Loading Docks
  - *Pit-mounted*
  - *Vertical Storing*





Curbing

- Utility and Process Equipment often need to be elevated onto Housekeeping Pads or Curbs

- Consider using a Built-in Curb, or curbing that is provided by the Equipment Manufacturer

- Concrete Pads are commonly used and are Robust, however they create a tripping hazard during Construction and in Operation

Jacobs

Challenging today.
Reinventing tomorrow.

Thank You

From Protection to Prevention
Best Practices

Photo TJ Lyons

TJ Lyons CSP
Safety Director – NY
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Gilbane
Gilbane Building Company

PtD during Design

Photo courtesy CDC/NIOSH

Design Inset Hole Covers

Photo TJ Lyons

Photo TJ Lyons

Inset Hole Covers

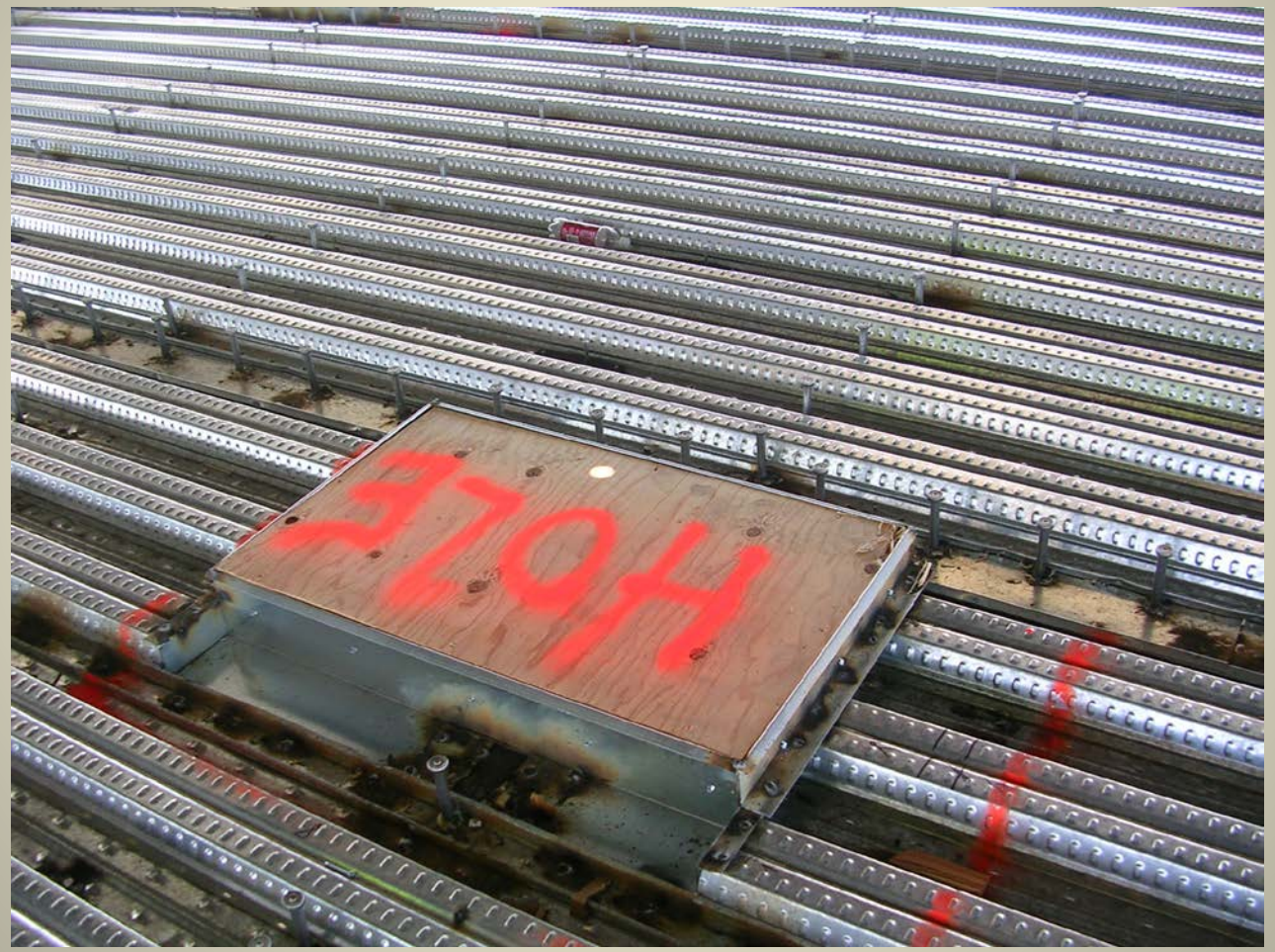

Photo TJ Lyons

PtD when planning

Photo TJ Lyons

PtD = Risk Management to Risk Elimination

Photo TJ Lyons

Photo TJ Lyons

The Barrier
“We have always done this way”

Photo TJ Lyons

Prevention on ANY surface

Photo TJ Lyons

Photo by Skudo

Photo TJ Lyons

Prevention on ANY surface

Photo TJ Lyons

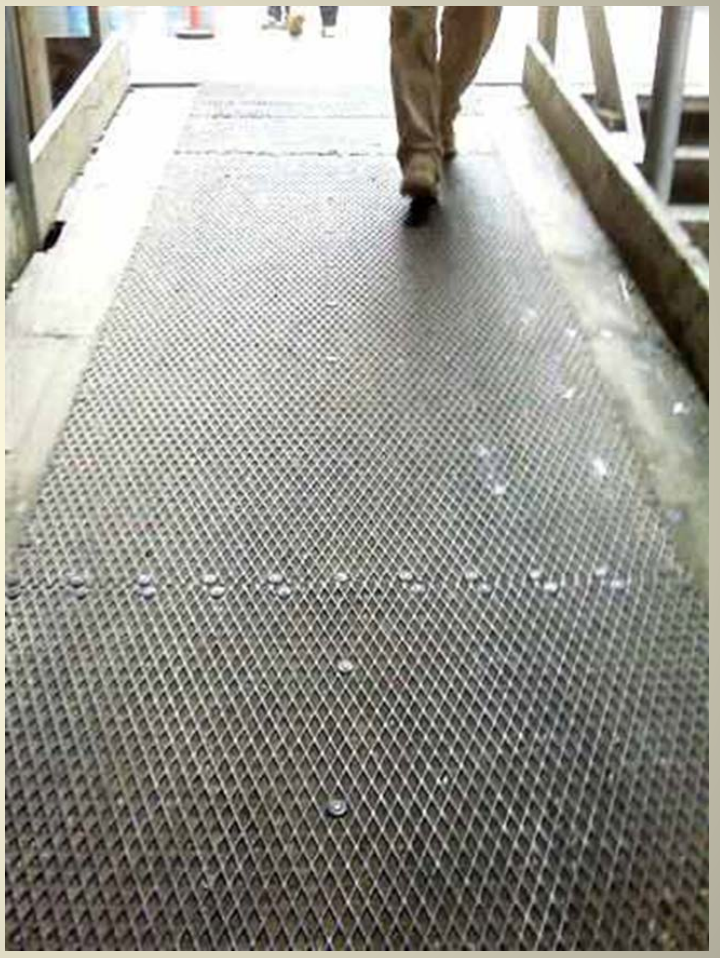

Photo TJ Lyons

Simple Steps…

Photo TJ Lyons

Photo TJ Lyons

Tie Prevention to Efficiency
Not Safety…

Photo TJ Lyons

Photo TJ Lyons

Photo TJ Lyons

Use Contractual Obligations

Courtesy Dave Elrod DPR

“If the conditions does not exist the incident does not occur…”

Photo TJ Lyons

Prevention Through Design Resources

Jose Herrera

Occupational Safety & Health Specialist

OSHA® Occupational Safety and Health Administration

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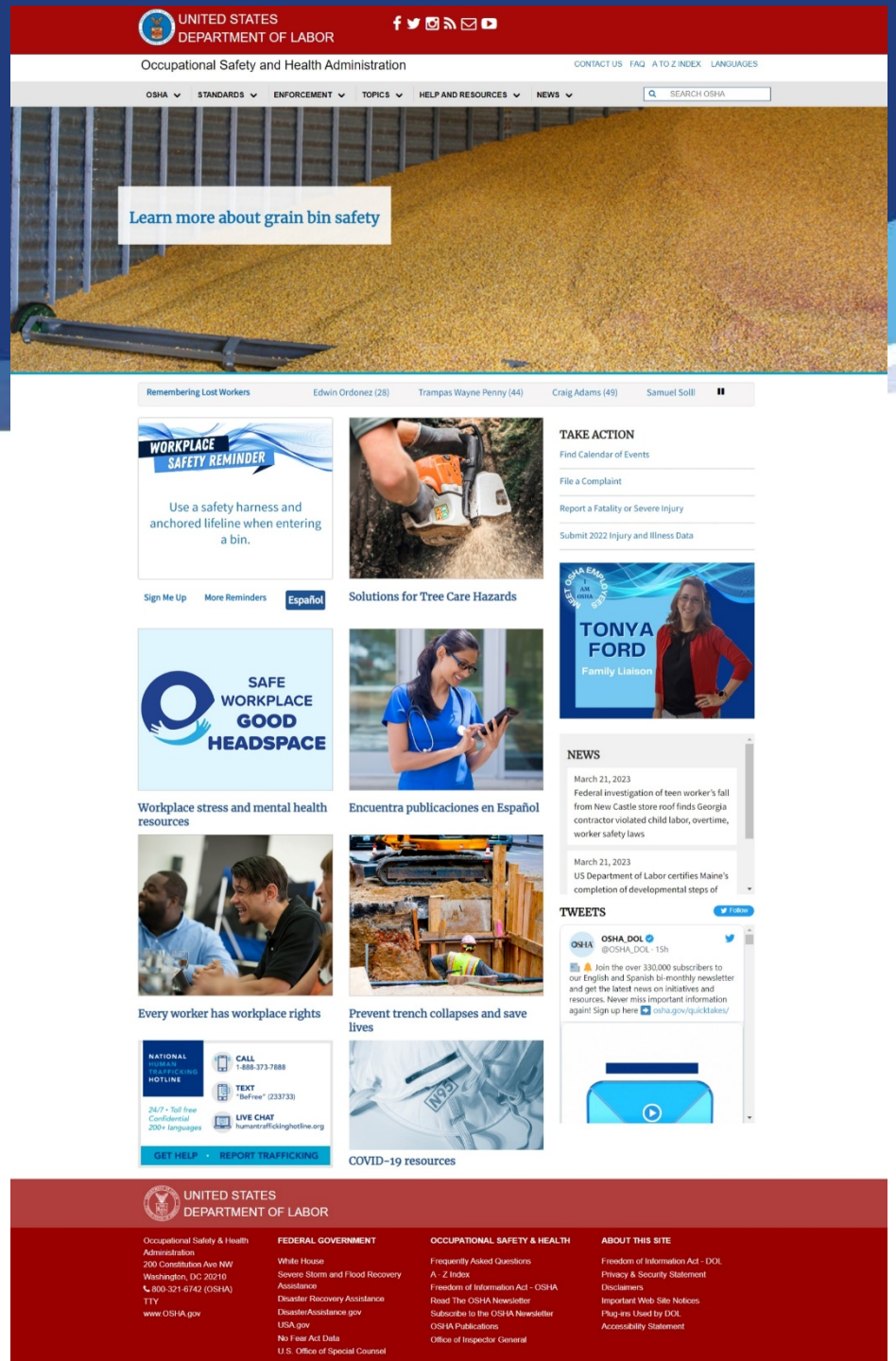

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Topics

Topics

Employer Help
Worker Rights
Heat
Trenching and Excavation
Personal Protective Equipment
Fall Prevention
Hazard Communication
Suicide Prevention

By Sector

Agriculture
Construction
Federal Agencies
Healthcare
Maritime
Oil and Gas
Warehousing

Key Topics

Recordkeeping Requirements and Forms
Safety and Health Programs
Whistleblower Protections

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Directorate of Construction

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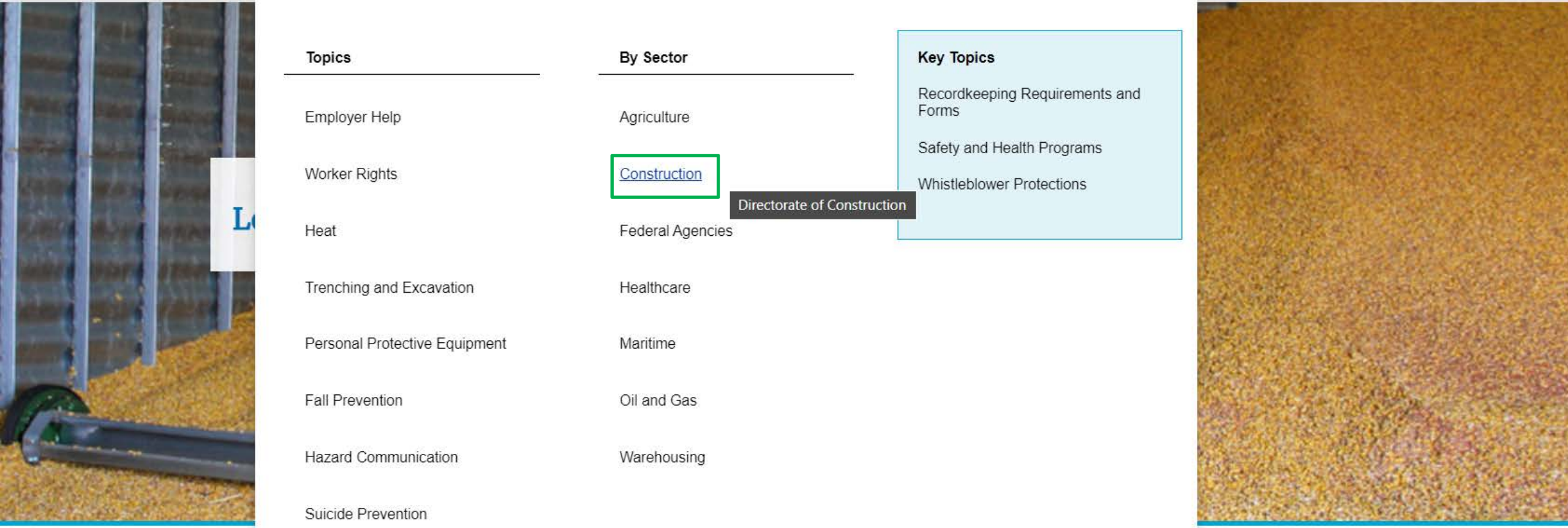

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Construction Industry

Construction is a high hazard industry that comprises a wide range of activities involving construction, alteration, and/or repair. Construction workers engage in many activities that may expose them to serious hazards, such as falling from rooftops, unguarded machinery, being struck by heavy construction equipment, electrocutions, silica dust, and asbestos.

The information, tools, and resources provided in these Construction Industry web pages are designed to assist those in the industry - whether worker or employer - to identify, reduce, and eliminate construction-related hazards.

Regulatory

- 29 CFR 1926 Standard
- Cranes & Derricks
- Confined Spaces
- Trenching and Excavation
- Silica
- OSH Act

Guidance

- Compliance
  - Letters of Interpretation
  - Construction Memos
  - Directives
- Publications

Outreach Efforts

- Infrastructure Safety and Health
- Fall Prevention Campaign
  - National Safety Stand-Down
- Training and Outreach
- Nail Gun Safety

Special Initiatives

- Communication Towers
- Highway Work Zones
- Preventing Backovers
- Suicide Prevention
- Prevention through Design (PtD)

Engineering Investigation Reports

Construction Advisory Committee

What's New

Contact Us

Other Resources

Prevention through Design (PtD)

Construction Workplace Design Solutions. OSHA encourages design professionals to incorporate safety in design to facilitate safe construction, as far as possible. PtD has the potential for reducing injuries and fatalities at construction sites by incorporating features during the design phase that will enhance constructability. PtD will result in fewer delays in construction due to injuries, and savings in workers compensation premiums. Employers should have a system in place where safety and health professionals work with design engineers in "designing out" hazards throughout the design phase of their products.

- Alliance Program Construction Roundtable.
  - Design for Construction Safety
- NIOSH Prevention through Design (PtD)
  - Preventing Falls from Heights through the Design of Embedded Safety Features. Workplace Design Solution.
  - Buy Quiet web resources. A Spanish version is also available. Prevention initiative which encourages companies to design, purchase or rent quieter machinery and tools to reduce worker noise.

OSHA Dictionaries

English to Spanish (Construction Industry terms) - Términos de la Industria de la Construcción (Inglés a Español) (PDF).
Spanish to English - (Diccionario de OSHA - Términos de la Industria de la Construcción (Español a Inglés)) (PDF).

Expert Advisors

Asbestos Regulation
For general industry, construction, and maritime.

Cadmium Biological Monitoring
January 1, 1999, Cadmium Standard.

Lead in Construction
Helps employers understand and comply with OSHA's regulations.

Other Industry eTools and Expert Advisors

OSHA eTools

Construction eTool (en Español)

- Electrical Incidents
- Falls
- Improper Scaffold Construction
- Misuse of Portable Ladders
- Trenching and Excavation
- Unguarded Protruding Steel Rebars
- Vehicles

Ergonomics: Solutions for Electrical Contractors

- Materials Handling: Heavy Lifting
- Installation and Repair: Using Tools
- Prefabrication
- Supplemental Information: Tool Index

Scaffolding eTool

- Supported Scaffold
- Suspended Scaffold

Other Related eTools

- Electric Power Generation, Transmission, and Distribution
- Respiratory Protection
- Steel Erection

Additional Resources

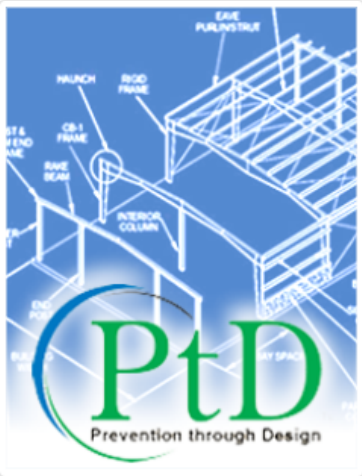
NEW NIOSH Sound Level Meter App. Mobile app for iOS devices that can measure sound levels in the workplace.

Workers' Compensation Costs of Falls in Construction (PPT). Looks at workers' compensation data for injuries resulting from falls from elevations, ladders and scaffolds for construction workers in roofing and carpentry. The data are collected from insured employers in 38 states, a group which comprises approximately 1/3 of total workers' compensation benefits.

OSHA Construction Alliances. Provides a listing of signed alliances specific to construction, each providing information, guidance, and access to training resources that will help protect employees' health and safety.

OSHA® Occupational Safety and Health Administration

Other Resources



Prevention through Design (PtD)

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Continual Updates

- Visit OSHA's website to sign up to receive OSHA information:
  - QuickTakes biweekly newsletter **(287,000+ subscribers)**
  - Tip of the Day **(33,700+ subscribers)**
  - www.osha.gov/contactus
- Follow OSHA on social media
  - Twitter: @OSHA_DOL **(21,500+ followers)**
  - Facebook: Follow the Department of Labor page
  - YouTube: USDepartmentofLabor

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NIOSH PtD Website

Prevention through Design Award

2021 Winner:
Fred Manuele, P.E., CSP

2022 Winner:
Dr. Georgi Popov

The 3rd Annual award ceremony done live at the National Safety Conference in New Orleans in October 2023

Now accepting nominations at: cdc.gov/niosh/topics/ptd/award/default.html

NIOSH Workplace Design Solutions

Preventing Falls through the Design of Roof Parapets

cdc.gov/niosh/docs/2014-108

Supporting Prevention through Design (PtD) Using Business Value Concepts

cdc.gov/niosh/docs/wp-solutions/2015-198

Preventing Falls from Heights through the Design of Embedded Safety Features

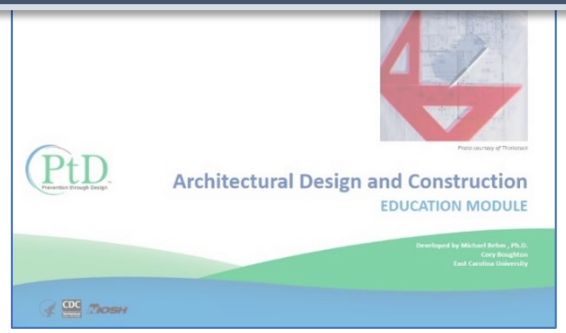
cdc.gov/niosh/docs/wp-solutions/2014-124

Preventing Hazardous Noise and Hearing Loss during Project Design and Operation

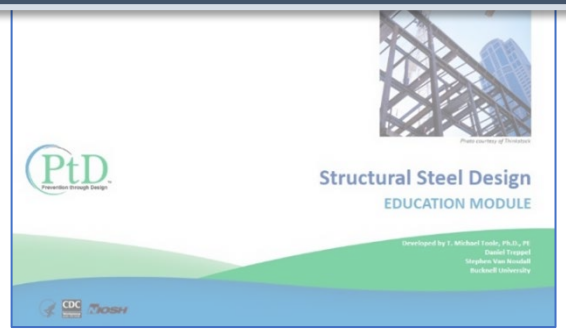
cdc.gov/niosh/docs/2016-101

PtD Resources: NIOSH Education Modules

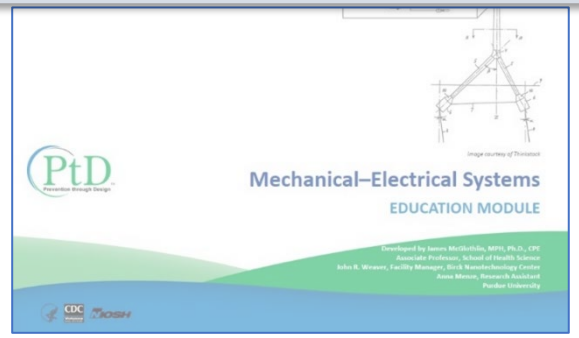
Architectural Design and Construction



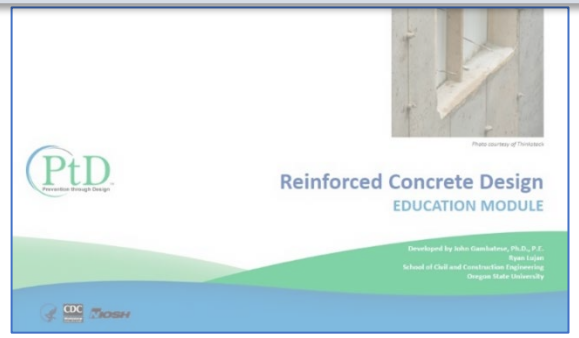
Structural Steel Design



Mechanical-Electrical Systems

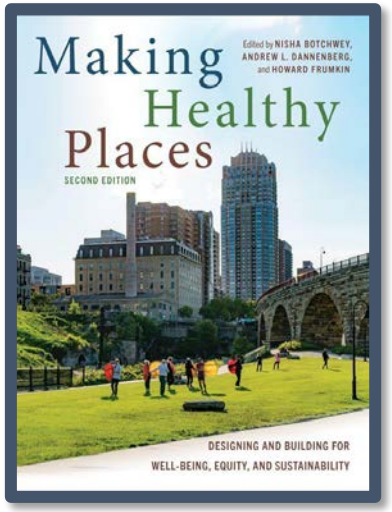


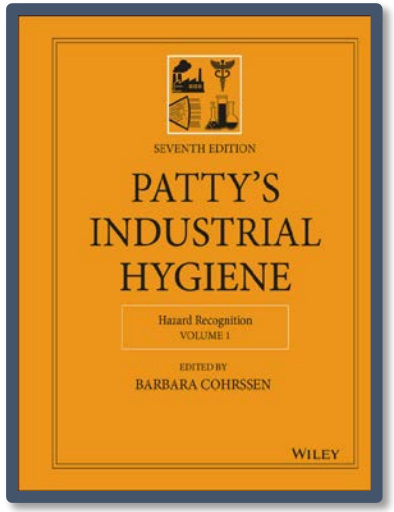
Reinforced Concrete Design

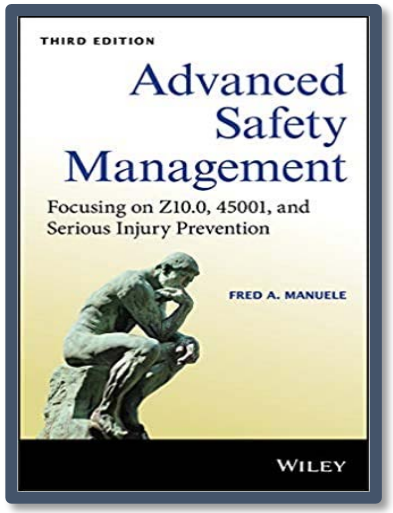


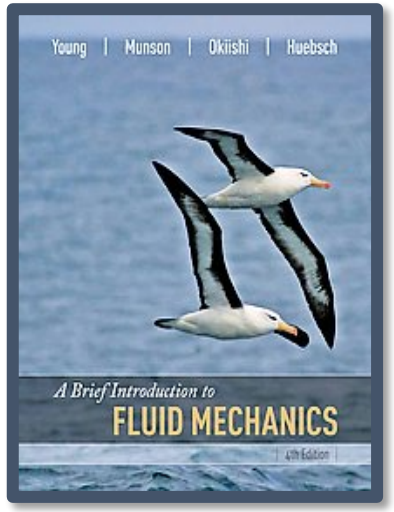
PtD Guidance & Publications: Training Materials
cdc.gov/niosh/topics/ptd/pubs.html

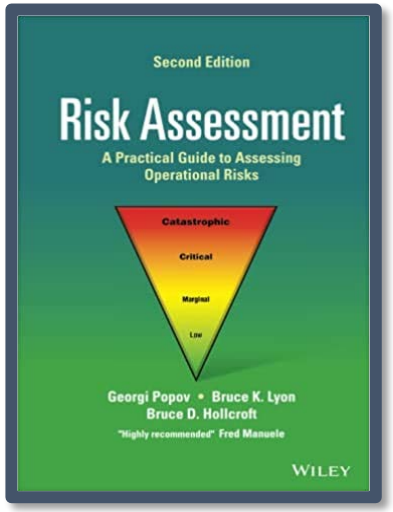
Education: Textbooks & PtD

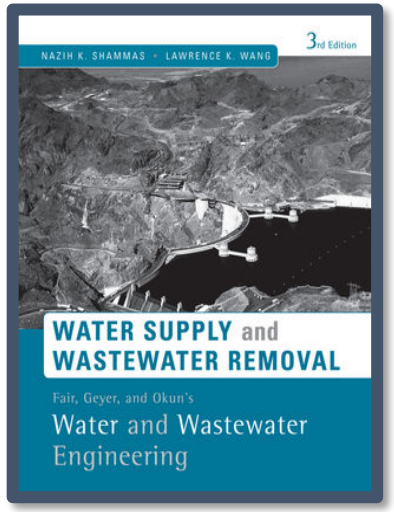


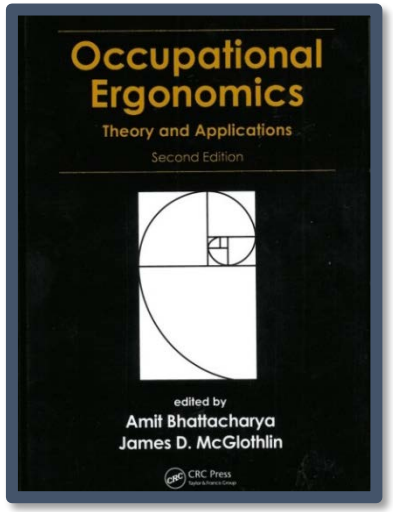


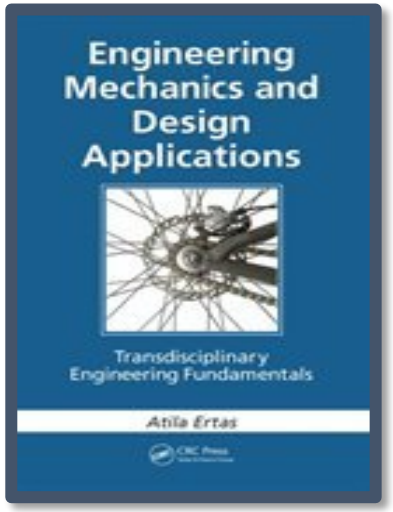




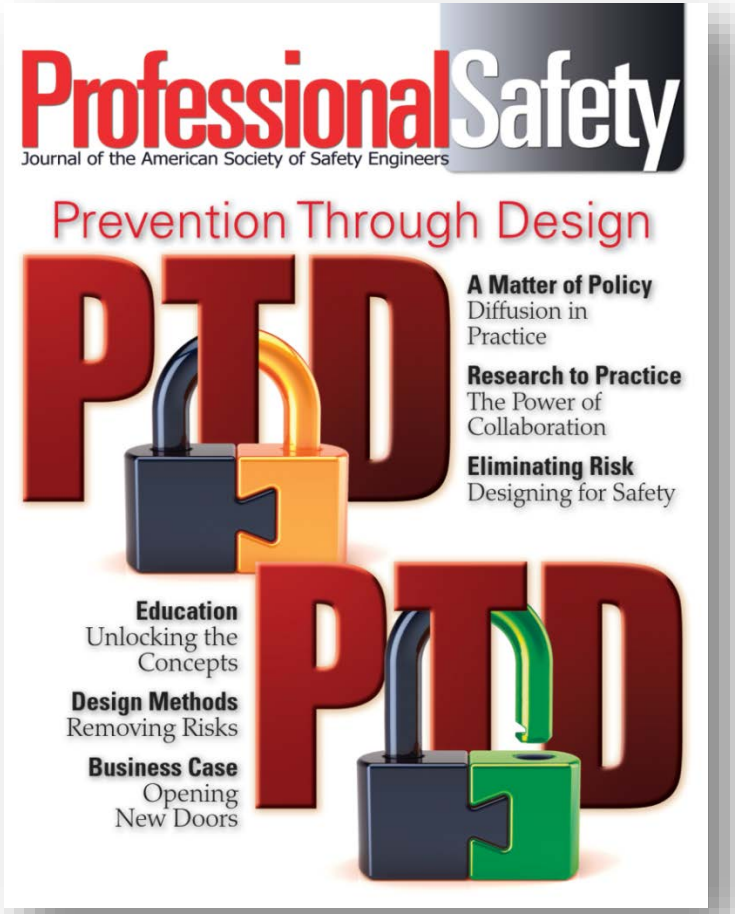








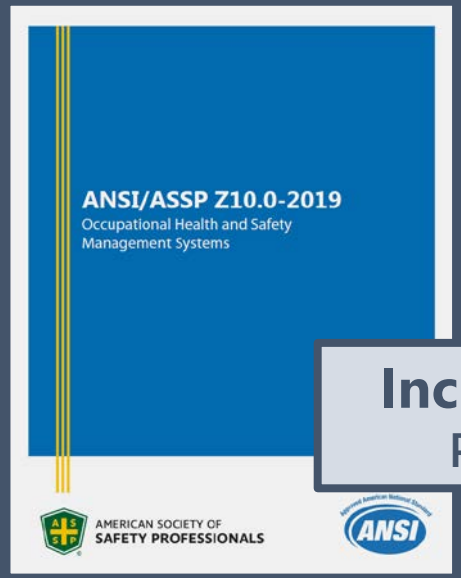
Published articles



Policy: ANSI/ASSO Industry Standards

Z10.0

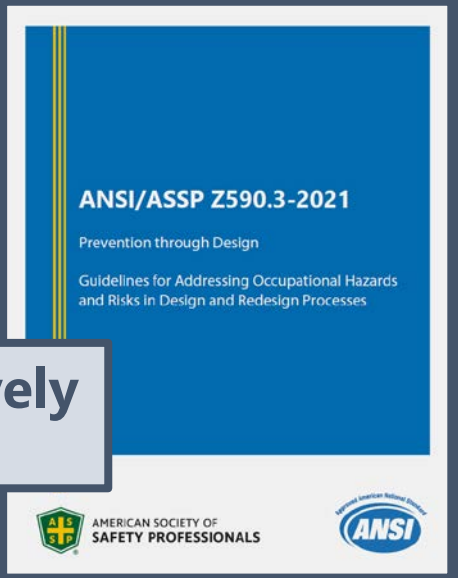
Occupational Health and Safety Management Systems



Includes PtD

z590.3

Prevention through Design



Exclusively PtD

U.S. Green Building Council (USGBC) LEED Pilot credit: *Prevention through Design*

www.usgbc.org/articles/new-leed-pilot-credit-prevention-through-design

The Credit & Worksheet

www.usgbc.org/credits/preventionthroughdesign

Webinars

#1: www.usgbc.org/education/sessions/life-cycle-safety-basics-and-connections-sustainability-6679047

#2: www.usgbc.org/education/sessions/leed-pilot-credit-prevention-through-design-ptd-background-requirements-10947289

Education

A PtD Risk Assessment Course from the ASSP

www.assp.org/education/online-learning

PtD Webinars for Green Building Design from the USGBC

Link: Life Cycle Safety: Basics and Connections to Sustainability

Link: LEED Pilot Credit Prevention through Design (PtD) Background & Requirements

Repository of Articles, Guides, Checklists, Design Tools, and Slide decks

www.designforconstructionsafety.org

Hosted by Dr. T. Michael Toole, Dean of the College of Engineering, University of Toledo

ASU PtD Workshops

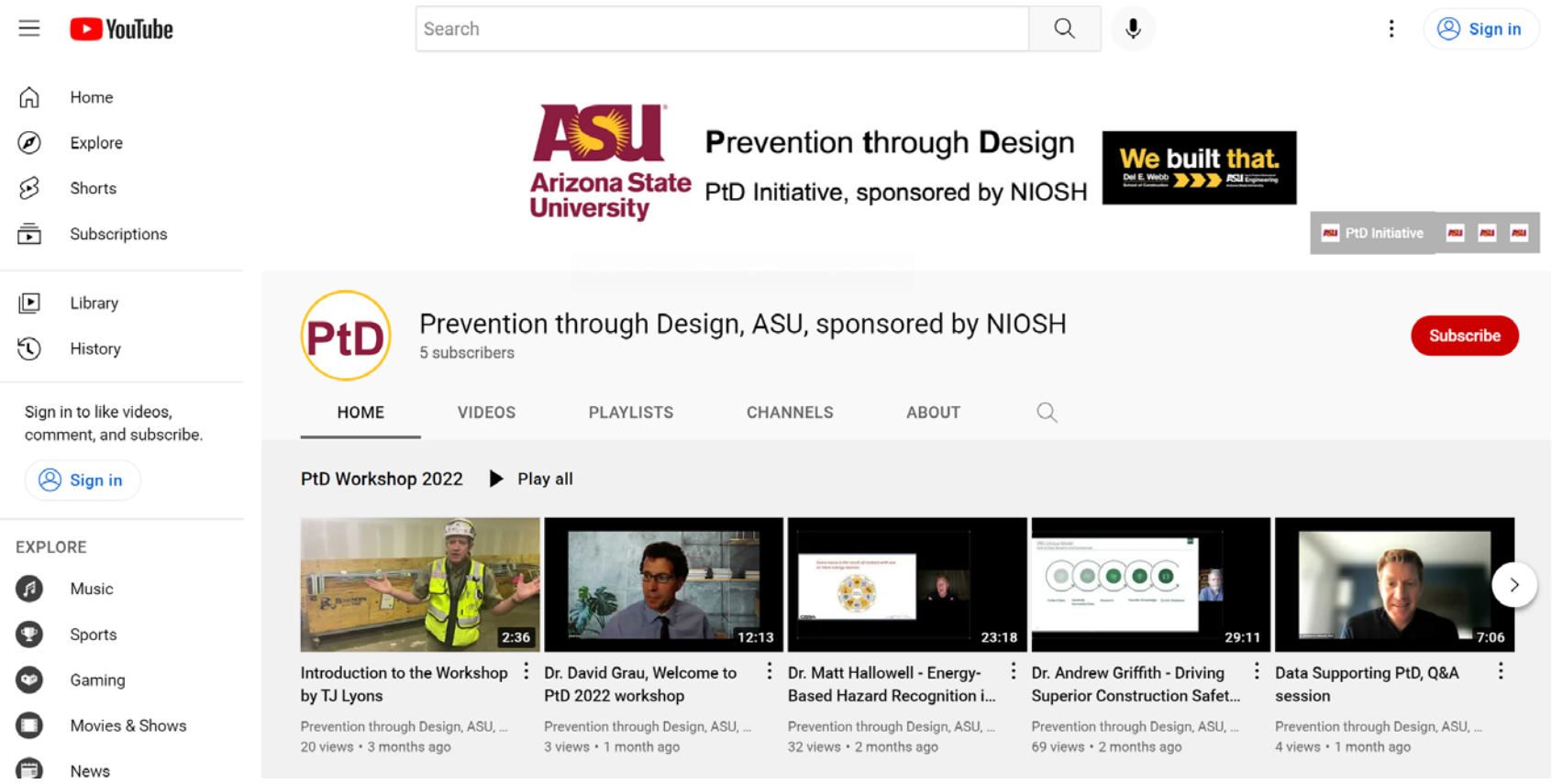
Dr. Edd Gibson and Dr. David Grau of Arizona State have had a PtD emphasis in their Global Safety Center for years.

Workshop participation is close to no-cost. Presentations from 2020, 2021, and soon, 2022, are freely available.

Lessons from U.K. researchers were presented on 5/26/22, which confirmed the 6 to 7 times life saving figures.

https://ptd.engineering.asu.edu/

New PtD YouTube Channel



[Prevention through Design, ASU, sponsored by NIOSH - YouTube]

PREVENTION THROUGH DESIGN (PTD) IN THE PROJECT DELIVERY PROCESS

A PtD Sourcebook for Construction Site Safety

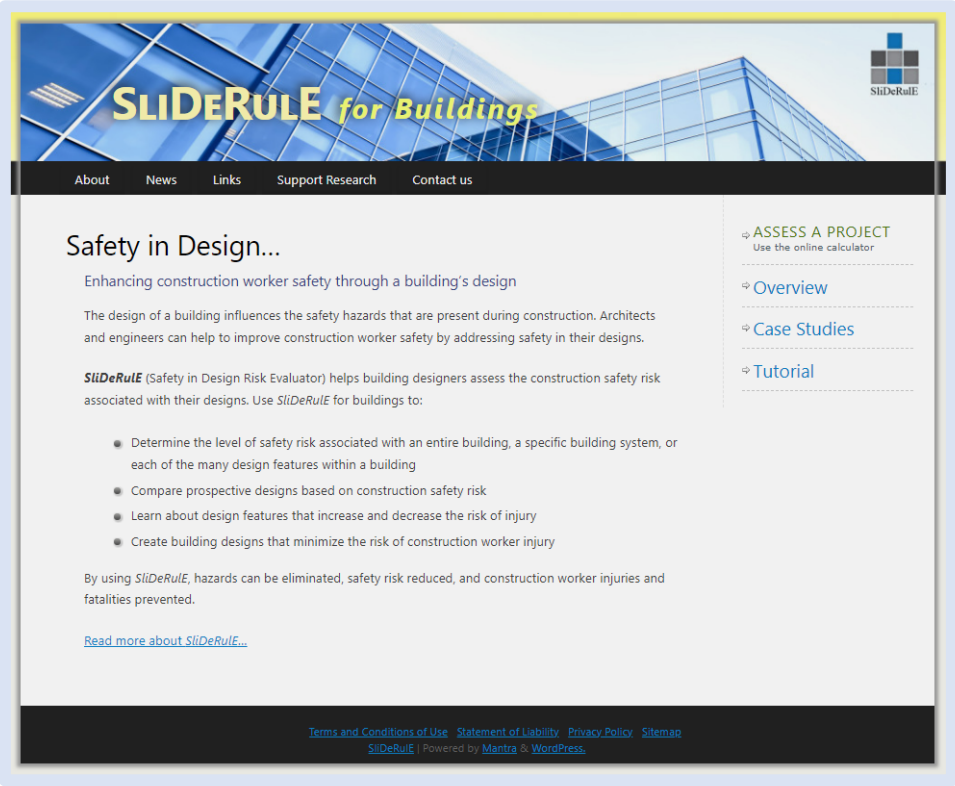
By:
John Gambatese, PhD, PE(CA)
School of Civil and Construction Engineering
Oregon State University

January 2019

Oregon State University

www.designforconstructionsafety.org

PtD Resources: NIOSH Design Comparison Tool



- Sliderule for Buildings www.constructionsliderule.org
- Estimates a Safety Profile for different building options, e.g. steel vs. concrete, etc.

CPWR Planning/ PtD Resources

https://www.cpwr.com/research/prevention-through-design-resources/

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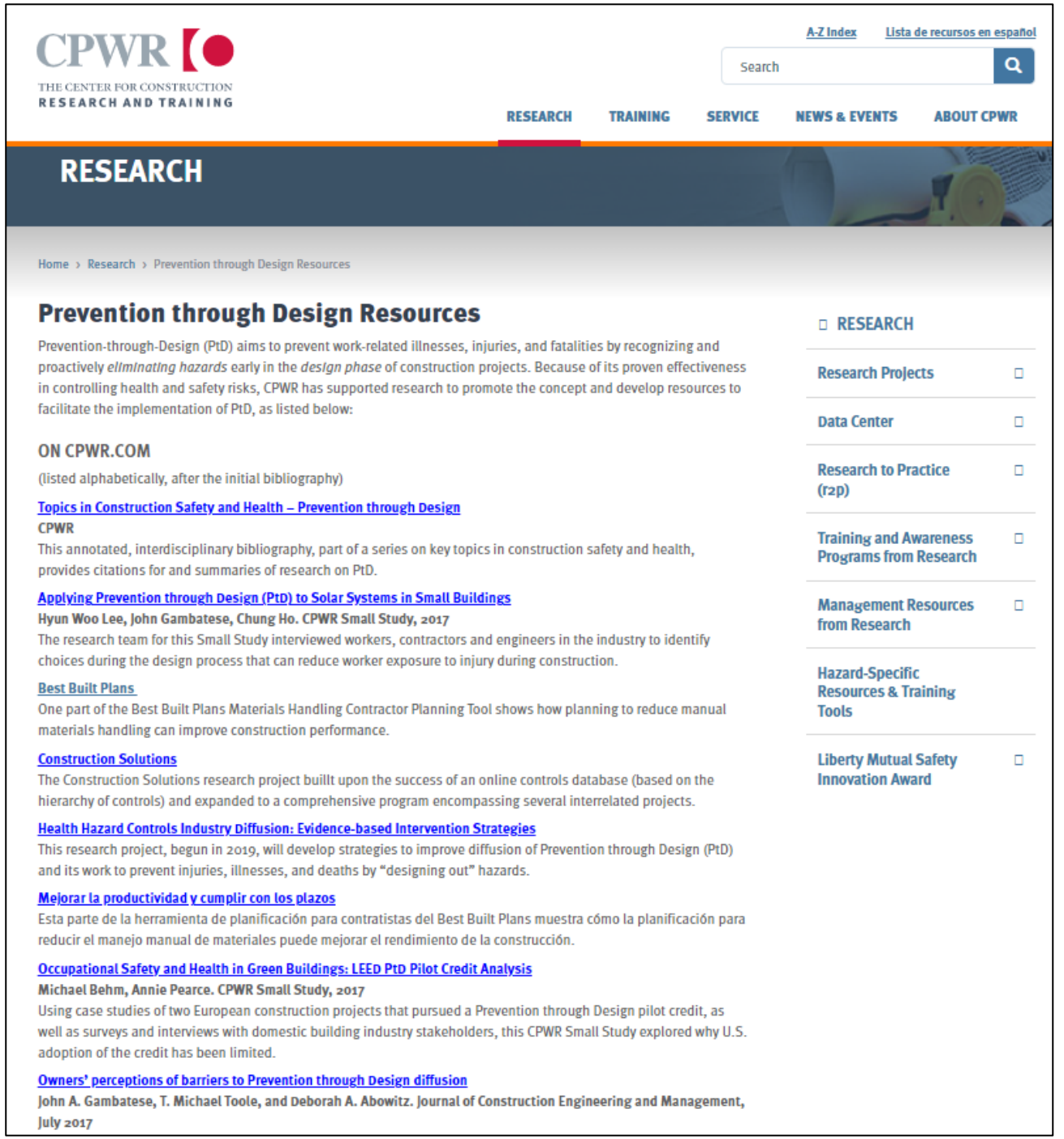

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A-Z Index | Lista de recursos en español

Search

RESEARCH | TRAINING | SERVICE | NEWS & EVENTS | ABOUT CPWR

RESEARCH

Home › Research › Prevention through Design Resources

Prevention through Design Resources

Prevention-through-Design (PtD) aims to prevent work-related illnesses, injuries, and fatalities by recognizing and proactively *eliminating hazards* early in the *design phase* of construction projects. Because of its proven effectiveness in controlling health and safety risks, CPWR has supported research to promote the concept and develop resources to facilitate the implementation of PtD, as listed below:

ON CPWR.COM

(listed alphabetically, after the initial bibliography)

Topics in Construction Safety and Health – Prevention through Design
CPWR
This annotated, interdisciplinary bibliography, part of a series on key topics in construction safety and health, provides citations for and summaries of research on PtD.

Applying Prevention through Design (PtD) to Solar Systems in Small Buildings
Hyun Woo Lee, John Gambatese, Chung Ho. CPWR Small Study, 2017
The research team for this Small Study interviewed workers, contractors and engineers in the industry to identify choices during the design process that can reduce worker exposure to injury during construction.

Best Built Plans
One part of the Best Built Plans Materials Handling Contractor Planning Tool shows how planning to reduce manual materials handling can improve construction performance.

Construction Solutions
The Construction Solutions research project buillt upon the success of an online controls database (based on the hierarchy of controls) and expanded to a comprehensive program encompassing several interrelated projects.

Health Hazard Controls Industry Diffusion: Evidence-based Intervention Strategies
This research project, begun in 2019, will develop strategies to improve diffusion of Prevention through Design (PtD) and its work to prevent injuries, illnesses, and deaths by "designing out" hazards.

Mejorar la productividad y cumplir con los plazos
Esta parte de la herramienta de planificación para contratistas del Best Built Plans muestra cómo la planificación para reducir el manejo manual de materiales puede mejorar el rendimiento de la construcción.

Occupational Safety and Health in Green Buildings: LEED PtD Pilot Credit Analysis
Michael Behm, Annie Pearce. CPWR Small Study, 2017
Using case studies of two European construction projects that pursued a Prevention through Design pilot credit, as well as surveys and interviews with domestic building industry stakeholders, this CPWR Small Study explored why U.S. adoption of the credit has been limited.

Owners' perceptions of barriers to Prevention through Design diffusion
John A. Gambatese, T. Michael Toole, and Deborah A. Abowitz. Journal of Construction Engineering and Management, July 2017

RESEARCH
- Research Projects
- Data Center
- Research to Practice (r2p)
- Training and Awareness Programs from Research
- Management Resources from Research
- Hazard-Specific Resources & Training Tools
- Liberty Mutual Safety Innovation Award

CPWR Planning/PtD Resources: Webinars

- **Applying Prevention through Design (PtD) to Solar Systems in Small Buildings**
  Play Recording
- **Health and Safety Risk Reductions Using Pre-fabricated Concrete Formwork Systems**
  Play Recording
- **Incorporating Informational Technology Into Creating Innovative Construction Products**
  Play Recording
- **Near Miss Information Visualization Tool in BIM for Construction Safety**
  Play Recording

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CPWR Planning/ PtD Resources

NORA Construction Sector Council Falls Work Group **Interim* Fall Prevention Checklist for Architects and Design Engineers**

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Interim* Fall Prevention Checklist for Architects and Design Engineers

**This checklist is currently in the process of being finalized and will be re-released once updated.*

Use this checklist to prevent many common fall exposures during commercial construction and maintenance of buildings. *Prevention through Design (PtD) recognizes that architects and design engineers have the ability to proactively "design out" potential hazards to eliminate or minimize the risk and improve workers' safety and health. Hence, this checklist, during the planning and design phase and beyond, should assist architects and design engineers in order to identify and eliminate some of the potential hazards most commonly found in building construction and maintenance.*

Component	Design Risk	Potential Hazard	PtD Controls	Action by
Roof Openings (skylights, roof hatches, solar tubes, exhaust fans, etc.)	Falling through the roof openings during installation or maintenance.	No or inadequate fall protection systems for fall from elevation (roof openings).	• Permanent guardrails around openings • Skylights to have guardrails, load bearing mesh, or certified glass covers • Group roof openings together to create one larger opening rather than many smaller openings • Safety grab bar for hatch access • Locate roof access away from leading edges • Adequate space around roof hatch to allow personnel movement	☒ Architect ☒ Design Engineer (structural)
Roof Edges (elevated levels/changes in elevations)	Falling off the open edges during construction if they are not adequately guarded.	No or inadequate fall protection systems for fall from elevation (roof edges).	• Design minimum 42" height parapets or railings at all roof edges • Include embedded anchor points: - located to enable the end user to perform regular maintenance tasks safely - Get a fall protection supplier/designer involved in the plan review • Provide safe access directly to all roof levels or from level to level (protected ladder, ships ladder, stairs)	☒ Architect ☒ Design Engineer (structural)
Windows, Balconies, Elevated Patios	Prior to installation of upper story windows, low sill heights add to the chance of falling through the window openings, or fall from	No or inadequate fall protection system for fall from elevation.	• Design windowsills to be 42" minimum above the floor level (i.e., act as guard rails during construction) • Include window washing equipment safety anchorage points in design, and	☒ Architect ☒ Design Engineer

CPWR Planning/ PtD Resources

Written Fall Protection & Rescue Plan

This generic plan, available in English or Spanish, can be printed out and filled in with details from your job site(s).

Small Contractor Fall Prevention Planning Resources

Simple resources for small contractors to plan for fall prevention and protection (also available in Spanish)

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FALL PROTECTION PLAN

CPWR – The Center for Construction Research and Training created this document as part of the National Campaign to Prevent Falls in Construction to provide companies with guidance on how to develop or enhance their site-specific fall protection plans. While OSHA only requires a written fall protection plan for employees engaged in leading edge work, precast concrete erection work, or residential construction work who can demonstrate that it is infeasible or it creates a greater hazard to use conventional fall protection equipment (*See 1926.501(b)(2), (b)(12), and (b)(13)*), CPWR believes that developing and implementing a detailed fall protection plan is essential to protect all workers at risk for a fall. We encourage you to use any and all sections that are applicable to your jobsite(s).

Note: blue text indicates that a word can be found in the glossary at the end of this packet.

For more information about the National Campaign to Prevent Falls in Construction, including how to participate in the annual Safety Stand-Down, visit stopconstructionfalls.com.

Job Name: _____

Jobsite Phone: _____

Job Address: _____

Job Foreman: _____

Qualified Person: _____

1. JOBSITE/BUILDING DETAILS

Use the following page to sketch and note the important details of the jobsite. Be sure to consider:

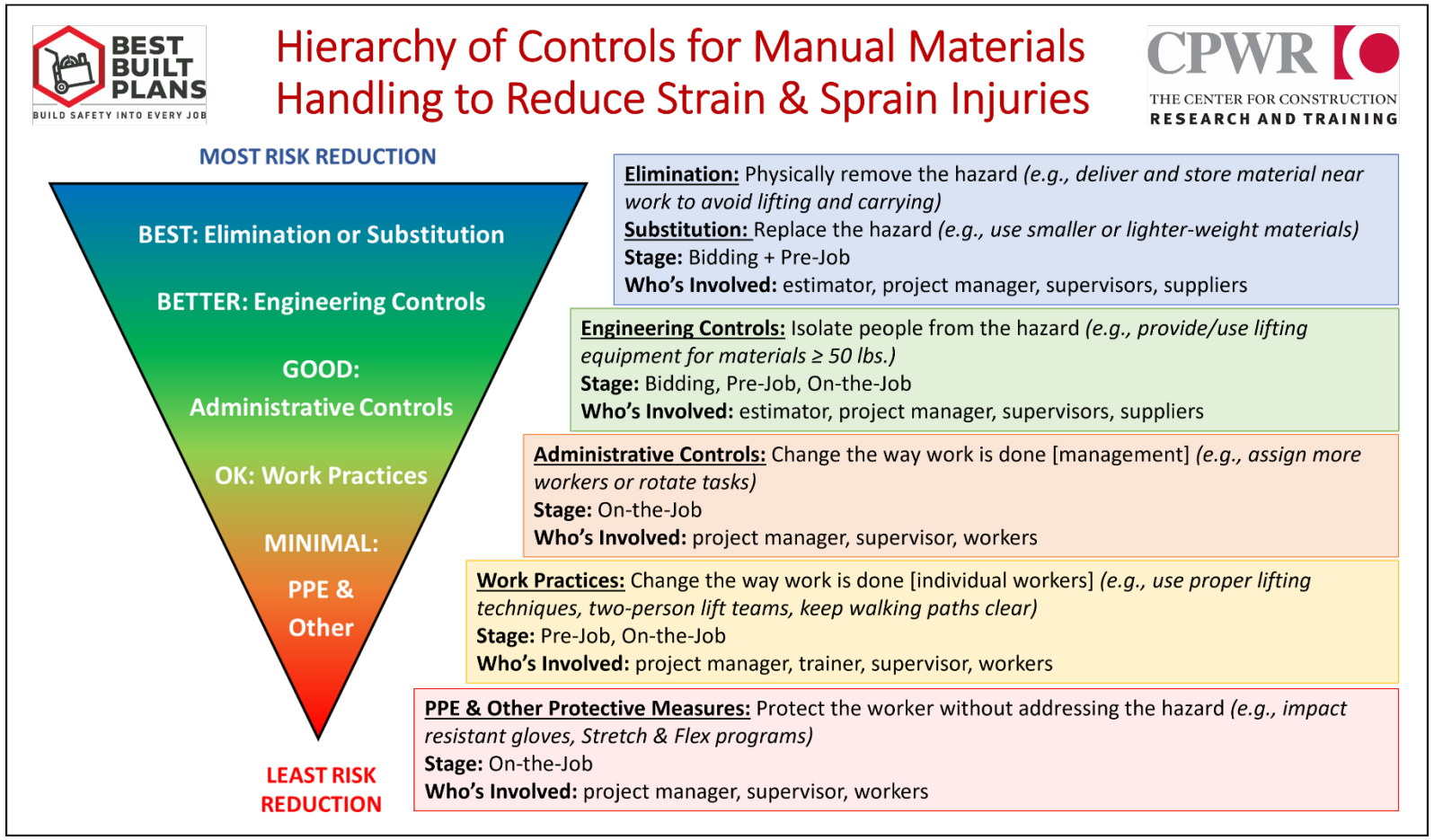
- Type of jobsite or building (e.g. two-story residential home, commercial high-rise, highway work)
- Type of work being done (e.g. framing, roofing, electrical, restoration)
- Prevention through Design measures already in place (e.g. permanent railings or permanent ladders)
- Relevant work surfaces & building materials (e.g. abrasive concrete edges, slippery floors)
- Estimated duration of job (should you consider longer-term solutions such as scaffolding vs. moveable lifts?)

PLAN. PROVIDE. TRAIN. ***Three simple steps to preventing falls.***

CPWR Planning/PtD Resources

Best Built Plans – Manual Materials Handling Planning Tool and Interactive Training Components

Information and planning resources to help a contractor develop a plan to reduce manual materials handling and related injuries and engage all levels of their work force in the process.



1. Bidding
2. Pre-Job
3. On-the-Job
4. Look Back

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THANK YOU!

Questions?

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