

Fall Prevention Through Design

May 5, 2026



Housekeeping



Today's webinar is being hosted by CPWR



It will be recorded and automatically shared via follow-up email.



The recording and slides will also be posted on cpwr.com/webinars.



Attendees are automatically muted! Please submit questions via chat or Q&A.




Spanish audio is available via simultaneous interpretation




Interpretación simultánea

WINDOWS - MAC (Navegador web/*Browser*)

1. En los controles del seminario web, haga clic en **Interpretación** 
2. Haga clic en el idioma que desee escuchar.
3. (Opcional) Para escuchar solo el idioma interpretado, haga clic en **Silenciar audio original**.

Nota: Hay que unirse al audio del seminario web a través de audio o VoIP de la computadora. No podrá escuchar la interpretación de idiomas si utiliza las funciones de audio de teléfono [llamada directa](#) o [recibir llamada](#).

ANDROID - iOS (Aplicación móvil/*Mobile App*)

1. En los controles del seminario web, toque los puntos suspensivos 
2. Toque **Interpretación de idiomas**.
3. Toque el idioma que desee escuchar.
4. (Opcional) Toque el botón de alternancia **Silenciar audio original**.
5. Haga clic en **Finalizado**.

Nota: No podrá escuchar la interpretación de idiomas si utiliza las funciones de audio de teléfono [llamada directa](#) o [recibir llamada](#).

Today's Panelists

Brian Rizzo

*Acting Director, Directorate of
Construction*
Occupational Safety and Health
Administration (OSHA)

Donald Peterson, PhD

Director, Division of Safety Research
National Institute for Occupational
Safety & Health (NIOSH)

Bob Moser, PE, CSP

Senior Director, Safety Engineering
Jacobs

Ian Umstead, MS, CSP, CHST,

Safety Manager
DPR Construction

Chris Trahan Cain, CIH

Executive Director
CPWR—The Center for Construction
Research and Training (CPWR)

www.StopConstructionFalls.com

PLAN. PROVIDE. TRAIN.

Three simple steps to preventing falls.





Learn how we're improving customer service and expanding compliance assistance



[Remembering Lost Workers](#)

[K. Schmitt, 57](#)

[Steven Matthew Jason II, 41](#)

[Benjamin Lionel Bonura, 26](#)

[Derek Marcus Burpo, 51](#)

[Daniel J. \[icon\]](#)



Useful Links

[Learn How to File a Complaint](#)

[Report a Fatality or Severe Injury](#)

[Explore Voluntary Protection Programs](#)

[Schedule a No-Cost Consultation](#)



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

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Fatalities caused by falls from elevation continue to be a leading cause of death for construction employees, accounting for 389 of the 1,034 construction fatalities recorded in 2024 (BLS data). **Those deaths were preventable.** The National Safety Stand-Down raises fall hazard awareness across the country in an effort to stop fall fatalities and injuries.

What is a Safety Stand-Down?

A Safety Stand-Down is a voluntary event for employers to talk directly to employees about safety. Any workplace can hold a stand-down by taking a break to focus on "Fall Hazards" and reinforcing the importance of "Fall Prevention". Employers of companies not exposed to fall hazards, can also use this opportunity to have a conversation with employees about the other job hazards they face, protective methods, and the company's safety policies and goals. It can also be an opportunity for employees to talk to management about fall and other job hazards they see.

Announcements

- The 13th annual National Safety Stand-Down to Prevent Falls in Construction will be held **May 4th-8th, 2026**
- [National Emphasis Program - Falls \(PDF\)](#) - OSHA Instruction - CPL 03-00-025 (May 1, 2023)
- [10 year anniversary, National Safety Stand-Down to Prevent Falls in Construction](#) [\(Video\)](#)
- **Webinar:** [Preventing Falls through Improved Design](#) [\(March 29, 2023\)](#). Prevention through Design (PtD) and how it can be used to improve not only building design, but also work and equipment design.

Web Resources

<https://www.osha.gov/construction>

<https://www.osha.gov/stop-falls>

<https://www.osha.gov/stop-falls-stand-down>

<https://www.cdc.gov/niosh/construction/falls-prevention-campaign/index.html>

<https://stopconstructionfalls.com/home/>

<https://www.cdc.gov/nora/>

<https://www.constructionsafetyweek.com/>



Prevention through Design (PtD)

Donald R. Peterson, PhD, MS, FAIMBE

Director, Division of Safety Research
Acting Associate Director for Construction Safety and Health
biu7@cdc.gov

Images from NIOSH or Microsoft Stock unless otherwise noted



ASK THE EXPERT WEBINAR – Tuesday, May 5, 2026



Number and Rates of Fatalities by Major Industry, 2024

Approximately 12+ million Construction Workers in the U.S.

Number of Fatal Work Injuries



Fatal Work Injury Rate (per 100,000 FTE workers)



Source: US Bureau of Labor Statistics



“**Error Trap**” for workers

- No access
- No power
- No equipment setback from edge
- No fall protection

Why PtD?

Prevention through Design

“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



What is PtD?

Prevention through Design

The NIOSH PtD framework is a process in which Architects, Designers, Owners, and Contractors explicitly consider the safety of construction workers and post-construction maintenance workers during the design phase of the project, and “design out” risks and hazards across all stages of a project’s lifecycle.

Mission of PtD

Prevention through Design

Design out hazards and minimize risks associated with:



Facilities



Work Methods



Processes



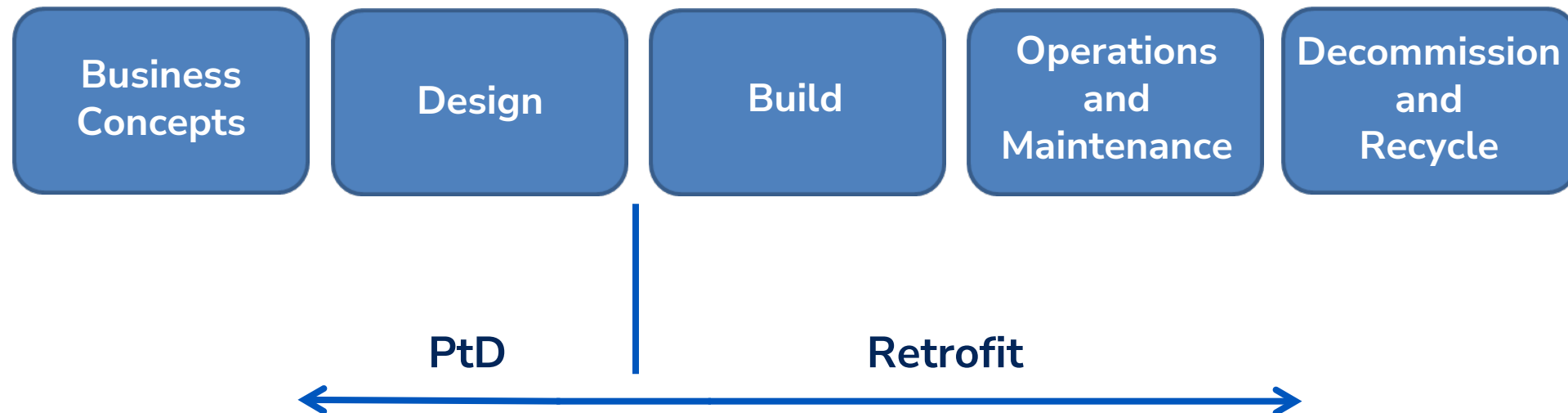
Equipment



**Products and
New Technologies**

Moving Upstream

Address Hazards Upstream in the process



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

Motivation

A Way of Thinking → Avoid the “*Must Trust*”

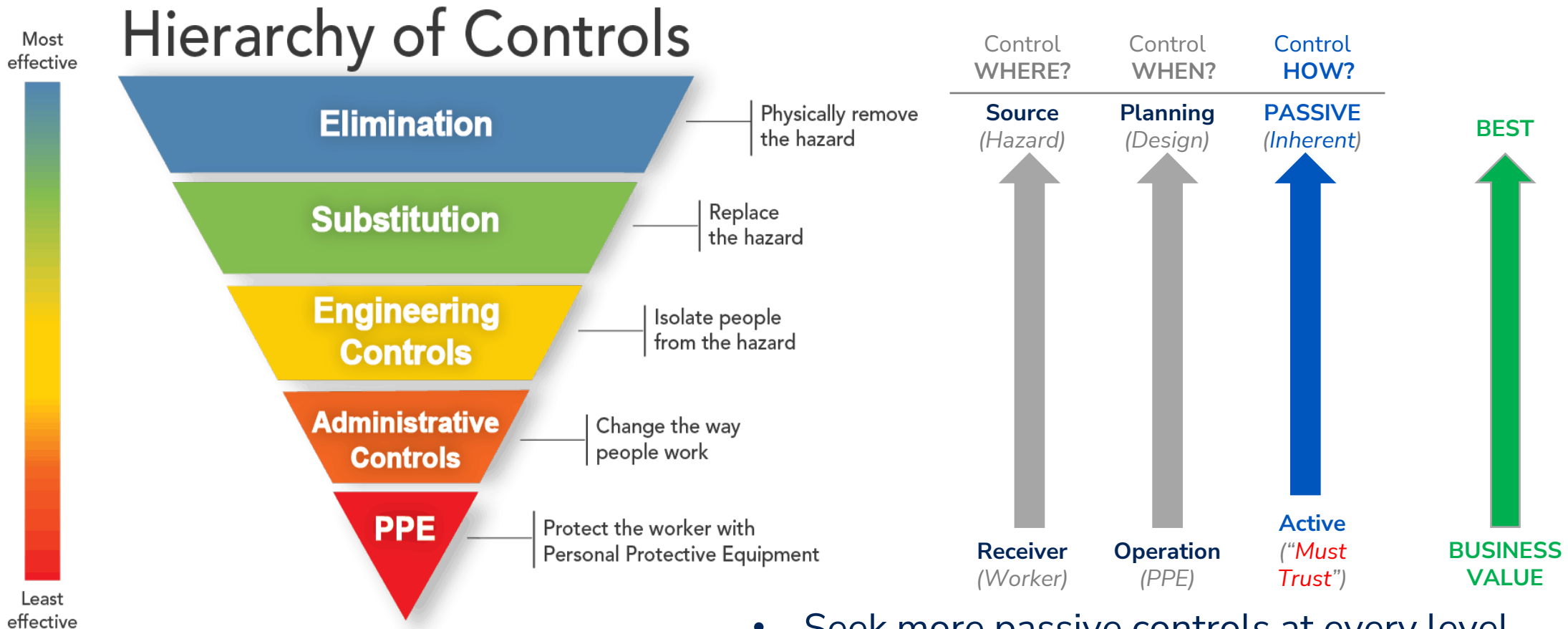


Image from www.cdc.gov/niosh/topics/hierarchy

- Seek more passive controls at every level
 - *Less actions to take means less mistakes to make!*

Return on Investment



construction solutions
ROI CALCULATOR

You have entered as a guest | [Register](#) | [Forgot Password?](#)

Email Password

Enter information below or

	Contact Trip	Sequential
Equipment Name	<input type="text" value="Contact Trip"/>	<input type="text" value="Sequential"/>
Cost to lease or purchase & maintain	\$ <input type="text" value="3,390.00"/> <input type="button" value="Edit"/>	\$ <input type="text" value="3,390.00"/> <input type="button" value="Edit"/>
Cost to train & deploy	<input type="text"/>	<input type="text"/>
Worker productivity	<input type="text"/>	<input type="text"/>
Average injury costs using equipment	<input type="text"/>	<input type="text"/>
Total Cost:	<input type="text"/>	<input type="text"/>
Comparison:	<input type="text"/>	<input type="text"/>
Notes:	<input type="text"/>	<input type="text"/>

OSHA's SAFETY PAYS Program

The Safety Pays Program raises awareness of how occupational injuries and illnesses can impact a company's profitability. The program features multiple tools to help employers estimate costs from workplace injuries. The Safety Pays Tool uses data collected from thousands of workplaces to provide businesses with the opportunity to compare their workplace safety record with their industry peers. The Individual Injury Estimator focuses on how much a specific injury could cost a business. Through these tools and related resources, the Safety Pays Program demonstrates the value of implementing workplace safety and health practices that keep employees safe while lowering costs due to work-related injuries and illnesses.

Safety Pays Tool

Estimate the effect of all injuries and illnesses on your business.

Individual Injury Estimator

Find out how much a specific injury could cost your business.

Resources

Benefits of the OSHA On-Site Consultation Program

Workplace design solutions

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

Supporting Prevention through Design (PtD) Using Business Value Concepts

Prevention through Design

financial or non-financial measures.* [AIHA 2009; Occidental College 2002].

<https://www.osha.gov/safetypays>

<https://cdc.gov/niosh/docs/wp-solutions/2015-198/pdfs/2015-198.pdf>


<https://www.safecalc.org>

Prevention through Design (PtD)

Resources



NIOSH

 NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)
Prevention Through Design

EXPLORE THIS TOPIC ▾

SEARCH

Prevention through Design

For Everyone
JANUARY 18, 2024

KEY POINTS

- Prevention through Design can prevent and reduce occupational injuries, illnesses, and fatalities by designing out or minimizing hazards and risks.
- NIOSH is committed to the successful implementation of Prevention through Design efforts (see NIOSH strategic goals 5 and 6).



Overview

One of the best ways to prevent and control occupational injuries, illnesses, and fatalities is to "design out" or minimize hazards and risks. NIOSH leads a national initiative called

ON THIS PAGE

- Overview
- Defining

<https://www.cdc.gov/niosh/ptd/about/index.html>

CPWR



[A-Z Index](#) [Lista de recursos en español](#)

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- NEWS & EVENTS
- ABOUT CPWR

RESEARCH

Home > Research > Prevention through Design (PtD) Resources

Prevention through Design (PtD) Resources

Prevention through Design is a good practice that involves the early identification of safety and health hazards during the design and planning phases of construction projects. This proactive approach aims to eliminate or reduce hazards before work begins, integrates hazard and risk reduction measures into not only the design of structures, but also work methods, operations, processes, equipment, tools, products, materials, and both new and existing technologies. PtD serves as an upstream primary prevention strategy, mitigating hazards before they lead to injuries or illnesses downstream.

This webpage offers free PtD resources, study findings, and tools for the construction industry created by organizations, industry professionals, safety and health professionals, and researchers. [Contact us](#) for questions, recommendations, or to share other examples of good practices.

[Click on a topic to see a list of linked resources.](#)

← RESEARCH

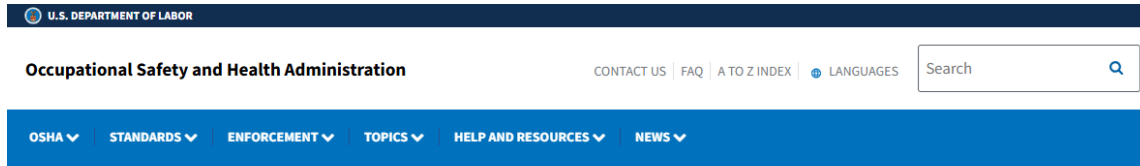
- Research Projects +
- Data Center +
- Research to Practice (r2p) +
- Training and Awareness Programs from Research +
- Management Resources from Research +
- Hazard-Specific Resources & Training

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

Resources

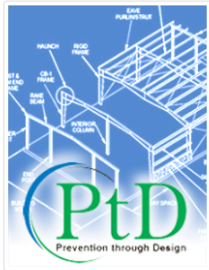


OSHA



Home > Construction Industry > Other Resources

Other Resources



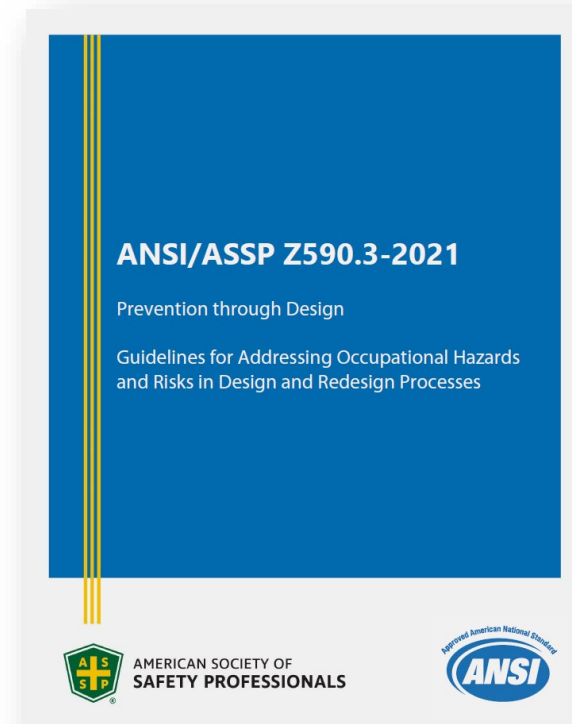
Prevention through Design (PtD)

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.

<https://www.osha.gov/construction/other-resources>

ANSI / ASSP Z590.3 PtD Standard



<https://www.assp.org/standards/standards-topics/prevention-through-design-z590-3>

Key Challenges



- No immediate financial incentive for Architects and Engineers
- Lack of regulatory requirement of Architects and Engineers
- Lack of recognizable duty of Architects and Engineers
- Reluctance to change the standard contracts to enable the adoption of PtD
- Lack of knowledge and training about PtD among Architects, Engineers, and Owners
- Resistance from Architects, Engineers, and Owners to adopt PtD

Preconstruction Activities



How to Improve?

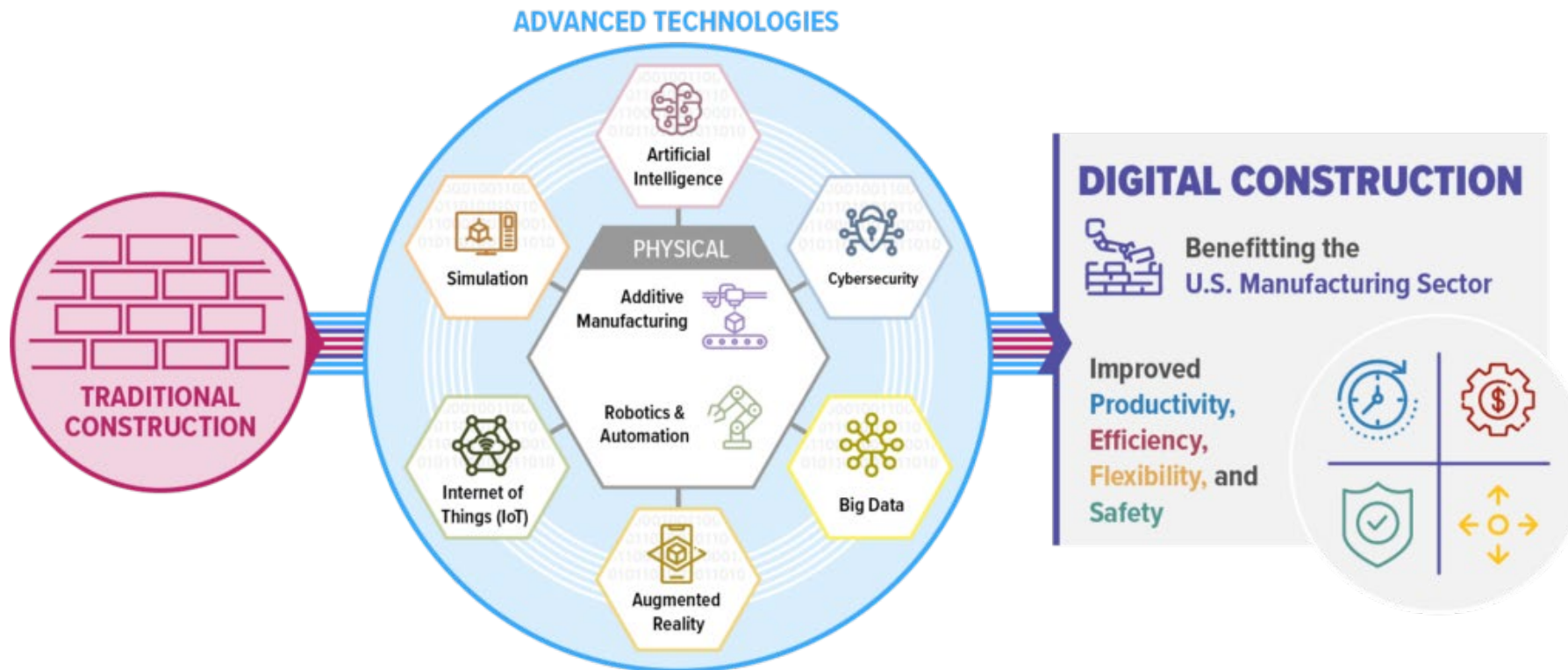


- Understand there are gaps between building code and OSHA
- Educate design teams and architects (CEU credits)
- Add contract language about PtD techniques to be used
- Educate owners on importance of having *contractual* PtD review meetings
- Encourage architects to participate in formal “design-for-safety” reviews with contractors and other stakeholders at regular intervals throughout the design of the project

from AIA Document A201 – *General Conditions of the Contract for Construction*

§ 3.0.20 The Owner places the highest priority on safety, and is committed to the creation and maintenance of a safe environment during and after construction of the Project. The Owner’s goal is zero injuries during construction. In order to advance these safety objectives, the Architect shall participate with the Contractor and other stakeholders in formal “design-for-safety” design reviews and workshops at regular intervals throughout the design of the Project to identify and mitigate occupational safety and health hazards in the planning and design of the Project to make the Project safer to build, use and maintain, which will include a systematic process to whereby the Architect will collaborate with the Contractor and other stakeholders during the “design for safety” process whereby the risks of the proposed design are highlighted, reviewed, addressed and properly documented. Nothing in this paragraph is intended to make the Architect responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, for which the Contractor shall be solely responsible.

Role of PtD in the Digitization of Construction



<https://amcoe.org/event/constructionworkshop/>



PtD Award

Award Nominations Due
June 1, 2026

<https://www.cdc.gov/niosh/ptd/awards/>

The screenshot shows the CDC website page for the Prevention Through Design (PtD) Award. The header includes the CDC logo, the text 'NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH) Prevention Through Design', a search bar, and a button labeled 'EXPLORE THIS TOPIC'. The main heading is 'Prevention through Design (PtD) Award'. Below this, it indicates the award is 'For Everyone' and was last updated on 'MAR. 2, 2026'. A 'KEY POINTS' section states that award nominations are due on June 1, 2026, and are presented in partnership with the American Industrial Hygiene Association, the American Society of Safety Professionals, and the National Safety Council. To the right of this text is the PtD logo, which features a stylized rainbow arch over the letters 'PtD' and the text 'Prevention through Design'. Below the key points are sections for 'Highlights' and 'About the award'. The 'Highlights' section mentions the 2026 award ceremony at the NSC Safety Congress and Expo in Indianapolis, Indiana, and congratulates Bruce Lyon for winning the 2025 PtD award. The 'About the award' section explains that the award recognizes individuals, teams, businesses, and other organizations that have eliminated or reduced hazards through design or re-design efforts. On the right side of the page, there is a 'ON THIS PAGE' table of contents with links to 'Highlights', 'About the award', 'Nomination due date', 'Submitting a nomination', 'Include in the nomination', 'How are PtD Winners Notified?', 'Previous winners', and 'Contacts'. At the bottom right, there is a 'RELATED PAGES' section with links to 'Prevention through Design (PtD)' and 'Our Work'.

Prevention through Design



(pronounced ‘*five in design*’) provides a consistent approach and a common language to the management of HSE risks in the design process, across our global operations, by applying five behaviors which create sustainable design excellence.

- It combines emerging global best practice.
- With guidance from academic research, the United Nations, the World Health Organization and the International Labor Organization,
- Into a practical, behavioral based, HSE in design risk management process.

The five behaviors are below:



Practical Guidance

Enables the identification of both:

- Hazards and Opportunities to improve the design and
- Knowledge gaps that may require SME involvement.

Practical guidance on what Health, Safety and Environment in Design actually means.

Demonstrating to our Clients how Jacobs are Challenging the Accepted.

Health

Occupational diseases:

- Caused by agents arising from work activities: chemical, physical agents, biological agents and infectious or parasitic diseases.
- Target organ systems: respiratory, skin, musculoskeletal, mental and behavioral disorders.
- Occupational cancer.

Mental health and wellbeing:

- Biophilic design.
- Psychosocial factors: stress, or time to do the task/work.
- Crime prevention through environmental design.
- Rethinking built environment for people experiencing hormonal changes: Gender transitioning, IVF, PMT and various stages of the menopause
- Design for people living with dementia.
- Thermal comfort, lighting, indoor air quality, movement/exercise, nourishment
- Suicide prevention.

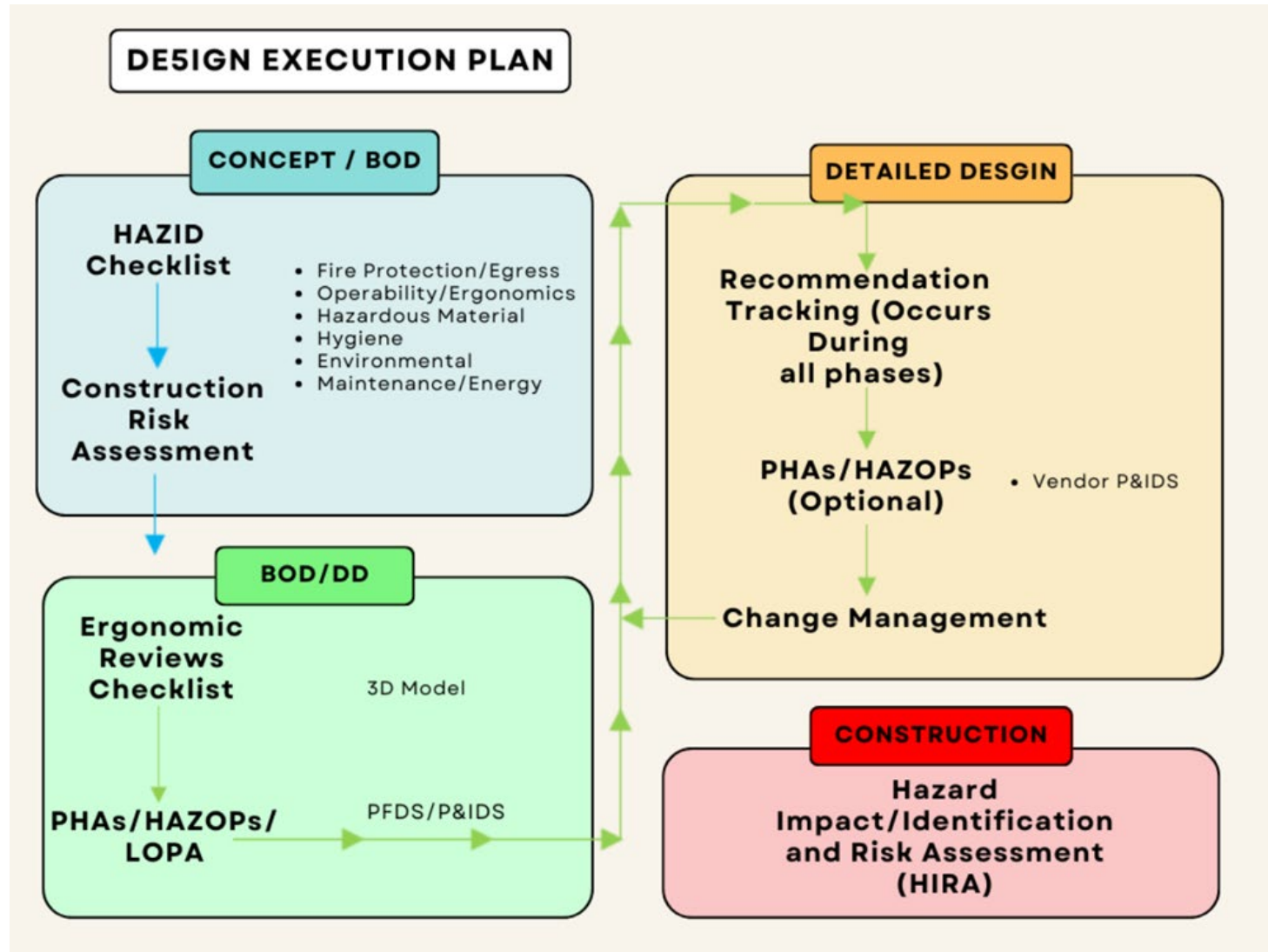
Safety

- Construction sequencing.
- Design for Manufacturer and Assembly (DfMA).
- Modern Methods of Construction (MMC).
- Ground or structure movements.
- Electromagnetic fields.
- Working environment.
- Avoidance of hazardous materials.
- Design for operation, maintenance, demolition and decommissioning.
- Stored Energy.
- Security.
- Safe movement of pedestrians or vehicles.
- Crime prevention.
- Safe access and egress.
- Emergency access and egress.
- Remote/lone working.
- Working at height.
- Weather and underfoot conditions.
- Extreme weather.
- Confined spaces.
- Inclusive design.
- Asset reliability.
- Control and trip systems.
- Design for the end user.

Environment

- Resource management: energy, materials, water.
- Energy efficient design.
- Water conservation.
- In-use asset performance analysis.
- Maximize solar gain or prevailing wind.
- Minimizing waste.
- Contamination: ground, air, water or waste.
- Pollution prevention: light, air, water, ground or noise.
- Biodiversity: flora, fauna, pollinators, invasive species and ecosystem.
- UN Sustainable Development Goals.
- Sustainable design.
- Sustainable procurement.
- Net zero carbon.
- Low operational/embodied carbon.
- Climate change adaptation.
- Resilience against natural or built environment disruptions.
- Operational phase resource management and pollution prevention.
- Demolition phase resource management and waste minimization.

Guidance

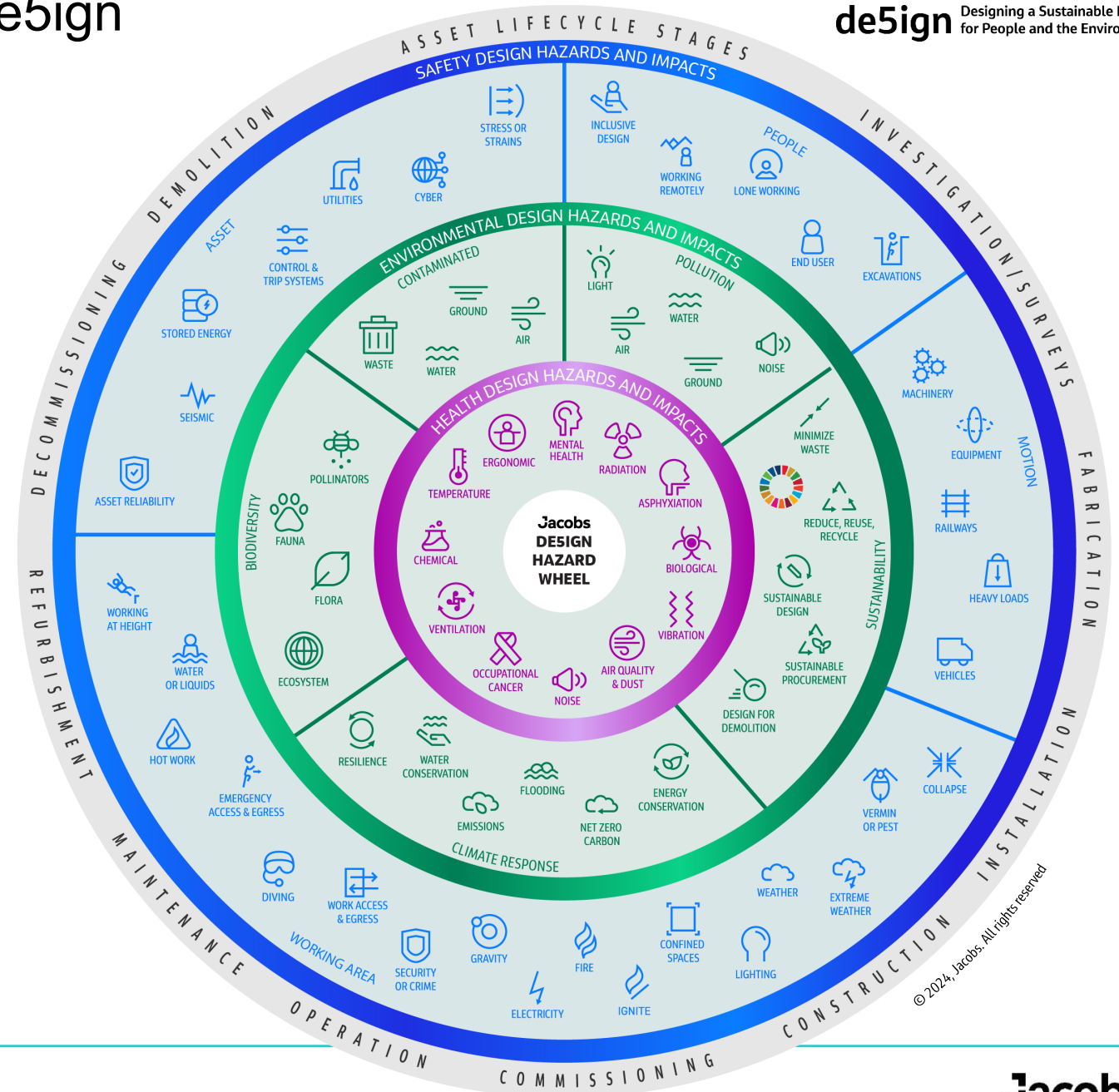


HAZID = Hazard Identification
PHA = Process Hazard Analysis
HAZOP = Hazard and Operability Study
LOPA = Layer of Protection Analysis

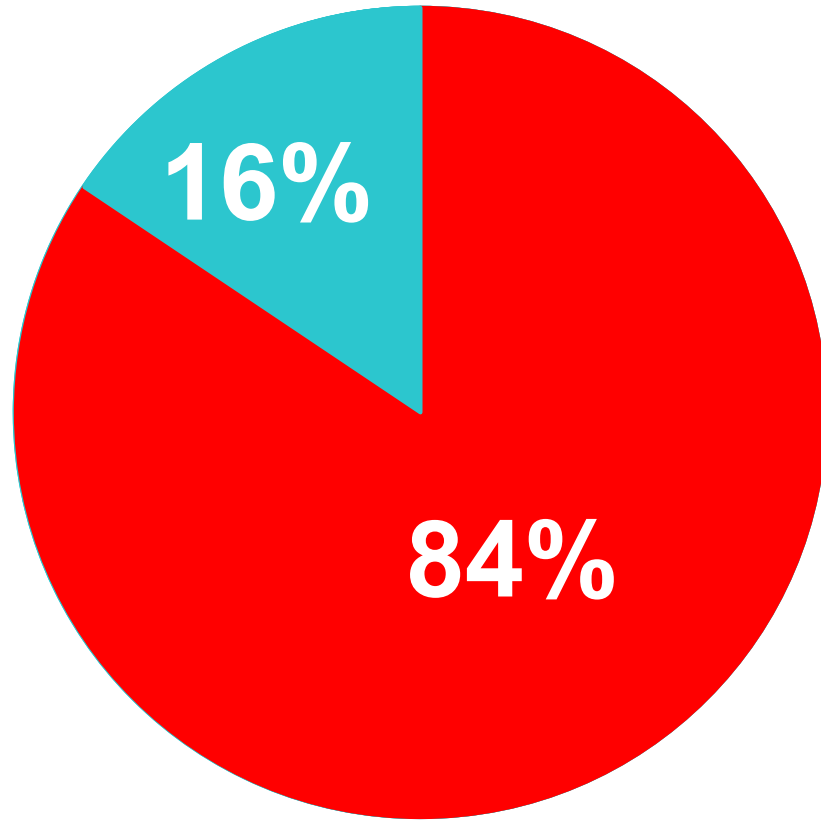
Practical Application of de5ign

De5ign Hazard Wheel

- Collates de5ign ethos into one graphic.
- Technical tool.
- Promotes a wider understanding of the impact of design decision
- Use when reviewing drawings and models and during project team or Client meetings to discuss potential, whole asset lifecycle, HSE in Design hazards.



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- Out of 100% of design hazards in the study.
- Only 75% of design hazards were identifiable by designers.
- Designers could only recognise 38% of those design hazards.
- Hazard recognition skills decrease by 55% for designers with no construction experience.
- Is 16% the volume of design hazards that designers can identify?
- Think about the impact of the **unidentified 84%** of design hazards - on people and the environment.
- Can designers do better than this?

Jacobs

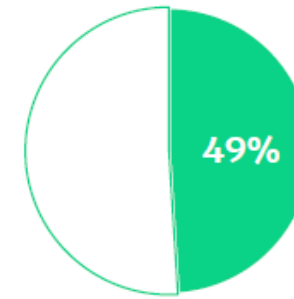
**Challenge
accepted.**

[Matthew R. Hallowell, Daniel Hansen, Measuring and improving designer hazard recognition skill: Critical competency to enable prevention through design, Safety Science, Volume 82, 2016, Pages 254-263.](#)

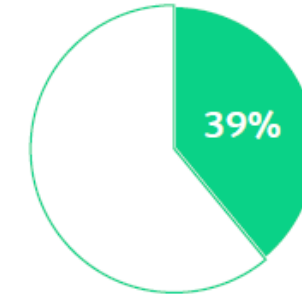
Published Paper

- ICE Virtual Library: Civil Engineering (Proceedings of the ICE).
- Peer review paper on de5ign and its application on the design of HS2's Contract C1 ventilation shafts.
- [June 2023 online publication](#) and November 2023 in print.

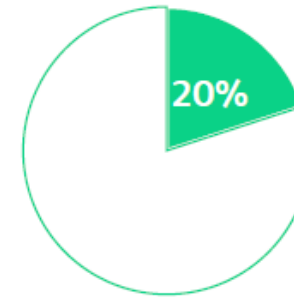
The screenshot shows the ICE Virtual Library website. The header includes the ICE logo and the text 'ICE Virtual Library essential engineering knowledge'. A search bar is present with the placeholder text 'Enter words / phrases / DOI / ISBN / authors / keywords / etc.'. The navigation menu includes 'Home', 'Journals', 'Books', 'Subjects', 'Information', 'News', and 'About'. The main content area displays the paper details for 'A new behavioural approach for the sustainable design of the built environment' by Ray Coleman and Ian Thomas, published online on June 21, 2023. The paper is available as a PDF download.



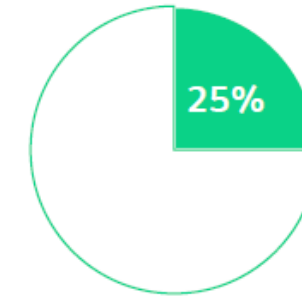
Saving in excavated
spoil volume



Saving in concrete
volume



Saving in construction
cost



Improvement in
construction programme

Modular Safety in Design - Example Project

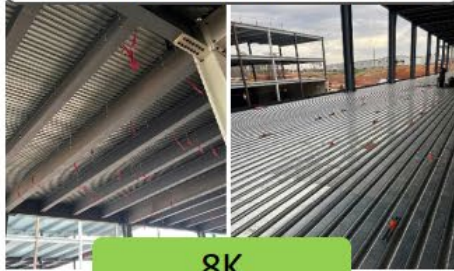


Eliminated over 700,000 hours of Working at Height



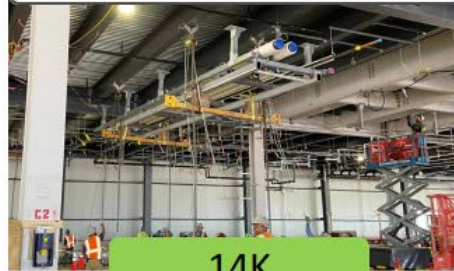
Moved over one million onsite manhours off site.

Clean Room Hanger Embeds



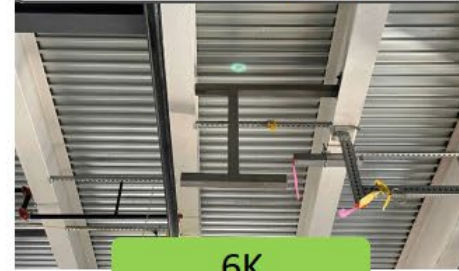
8K

Hilti Pipe Racks & Supports



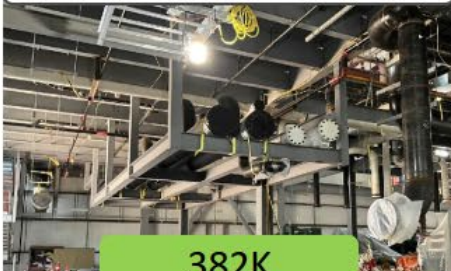
14K

Miscellaneous Pipe Supports



6K

Modular Pipe Racks



382K

Modular Stairs



14K

Pump Skids



10K

Superskids



600K

Steven Callaghan, Jacobs VP Construction

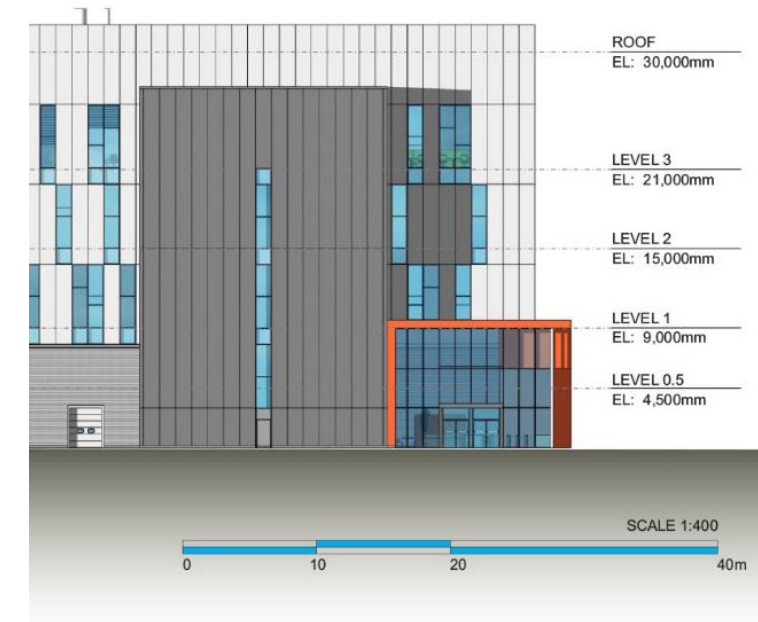
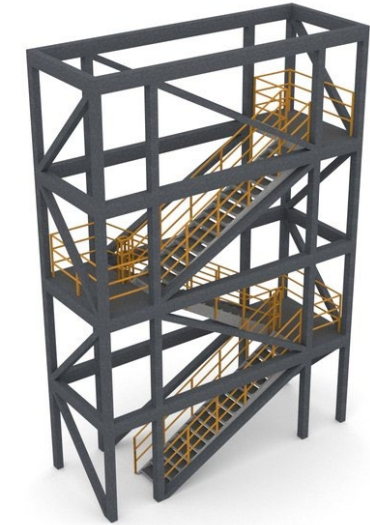
PtD Example Opportunities

- Process
 - *Minimize the amount of hazardous material by reducing it to smaller quantities*
 - *Use hazardous material under less hazardous conditions (such as processing under less severe temperature and pressure conditions)*
- Piping
 - *Use pipe minimum piping diameter and proper Cv in regulators for inert gasses*
 - *Modular pipe racks/supports*
- Electrical
 - *Use min cal. design (energy) for arc flash*
- HVAC
 - *Good ventilation for cryogenic inerts*



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



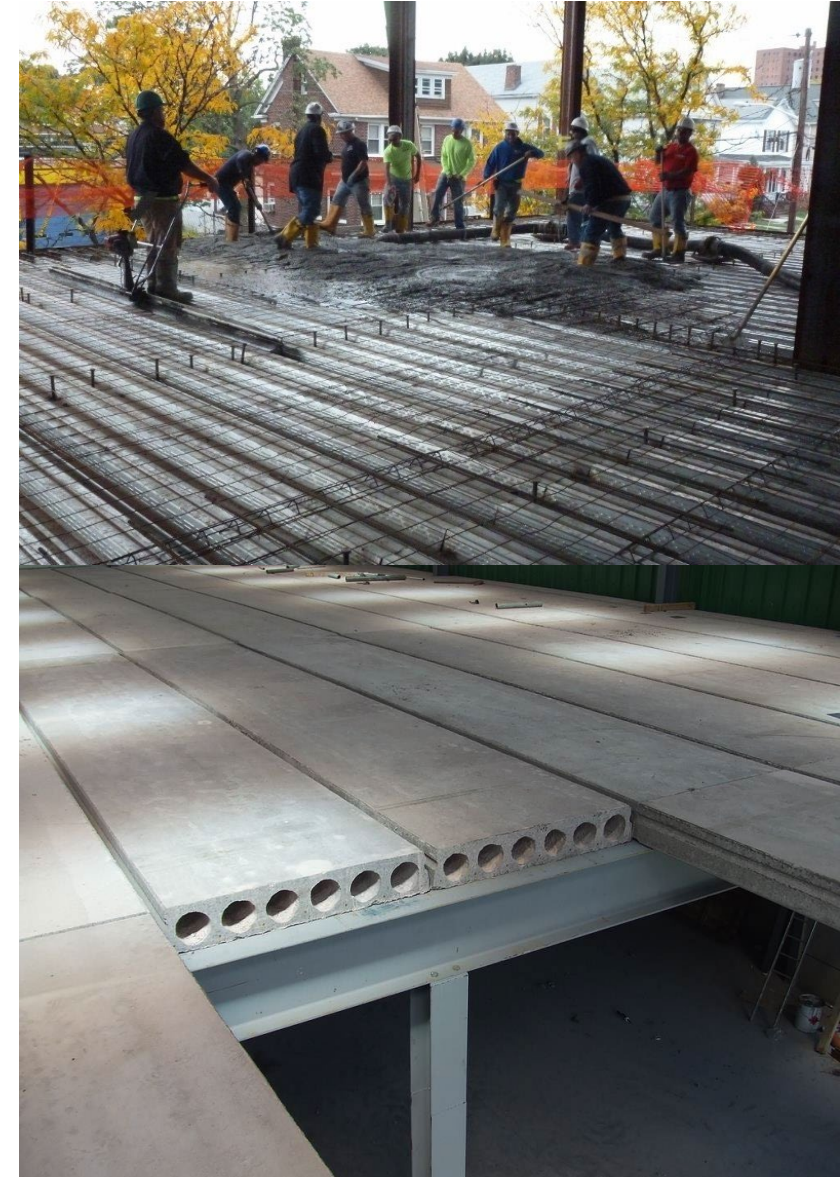
Roof Design

- 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*



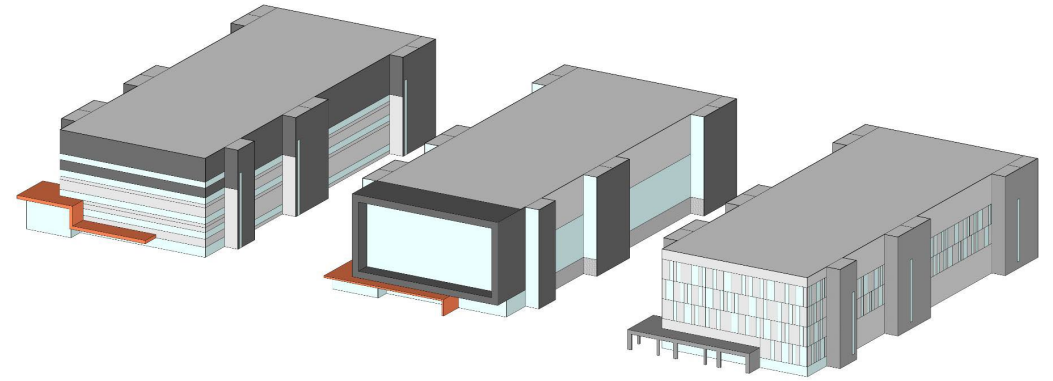
Structural Floor Slabs

- 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*



Thank You

Prevention Through Design

CPWR Webinar

May 05, 2026

Hosted by: Ian Umstead M.S., CSP, CHST

DPR Construction

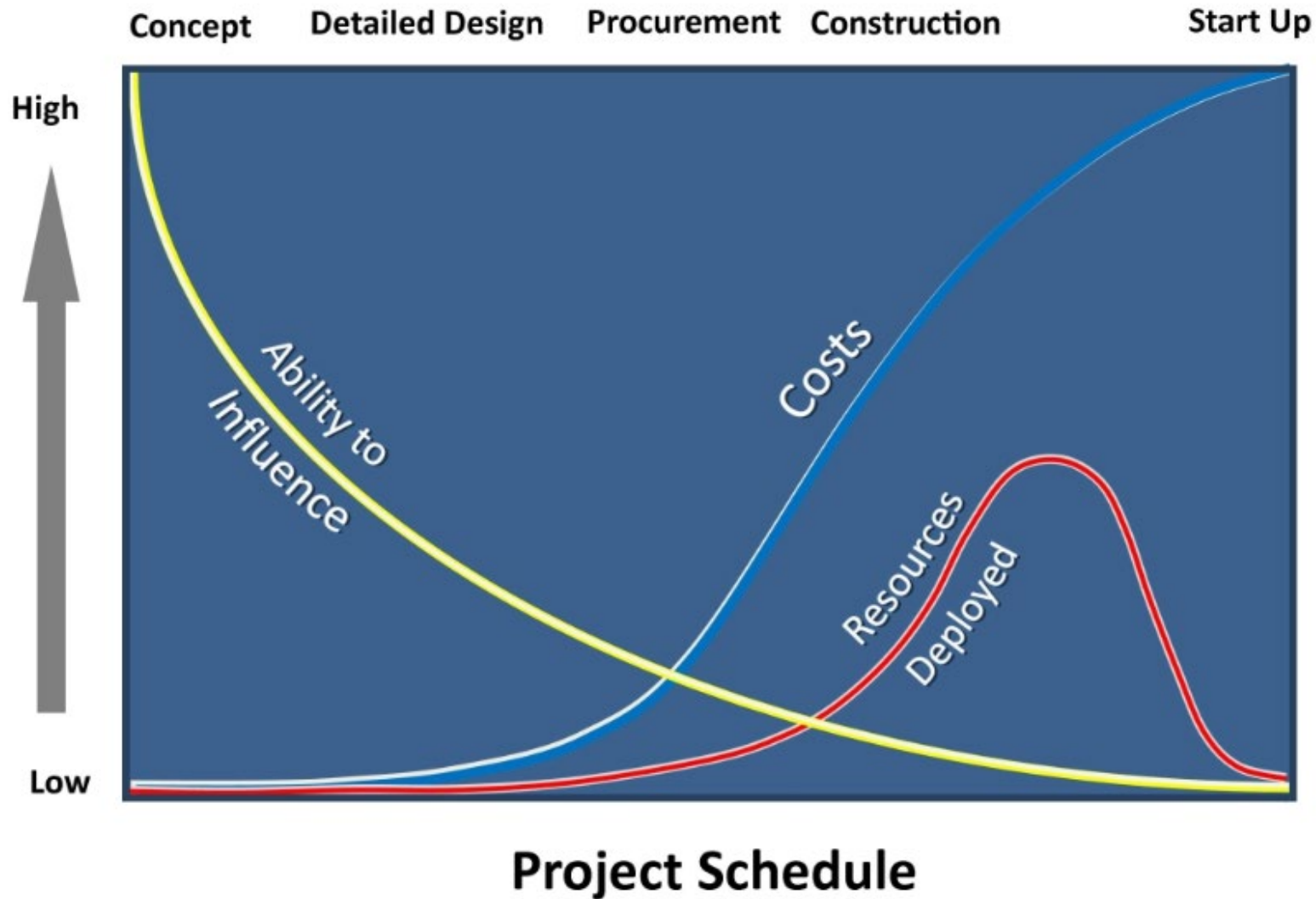




Benefits

- ▶ Identifying Hazards and potential mitigations in design phase before procurement and/or construction starts
- ▶ Potential to alter design in order to provide safer work during and post construction for the constructor and the end user.
- ▶ Input stop points into model or schedule to emphasize safety in certain phases of work
- ▶ Identifying costs and quantities for safety related materials
- ▶ Visual Planning (pre-construction and during construction)
 - Handed a drawing/photo of what the final outcome should look like.
 - Can help plan for fall protection plans, Logistics plans, or other safety related tasks prior to starting work.
- ▶ 4D Modeling (To show safety in the modeling process)

Prevention Through Design Lifecycle



Timeline

Project is Awarded



Owner/Arch./GC/Key Trade partners

Owner/ Arch./ GC/ All trade partners

EHS/VDC/OPS/Pre-con

Owner/ Arch./ GC/ Key Trade Partners

EHS/VDC/OPS/Pre-con

30% Design

Determine Pre-fab applicability
Review Checklists, Preliminary Haz Analysis

60% Design

Design Safety Checklists, Develop
Process Planning, HRA Planning,
Model Safety Review

90% Design

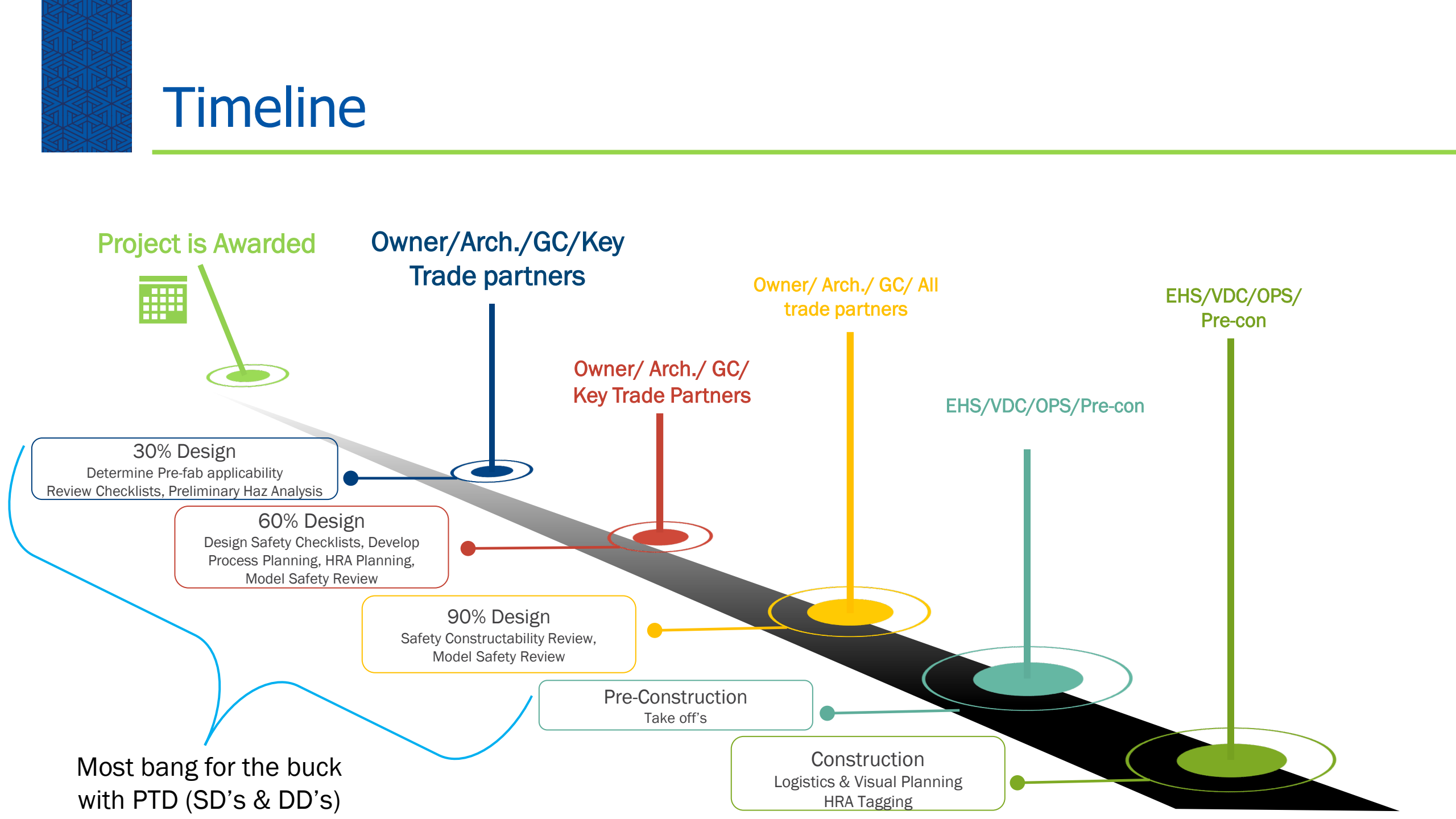
Safety Constructability Review,
Model Safety Review

Pre-Construction
Take off's

Construction

Logistics & Visual Planning
HRA Tagging

Most bang for the buck
with PTD (SD's & DD's)



CPWR & NIOSH Resources

Contractor-developed Templates

Below are a series of PtD template documents developed and provided by a leading contractor committed to PtD. Organizations can customize any or all to embed PtD within their businesses. They include places for an organization to insert its name and/or logo when using these materials.

- [PtD Document Map](#)
An Excel file that quotes from the ASSP Z590.3-2021 PtD Standard and was developed to track what PtD documentation would be required in order to comply with this standard.
- [01 – Sample PtD Company Policy](#)
A template document for businesses to use as a starting point to develop their own internal PtD policy.
- [02 – Sample PtD Company Procedure](#)
A template procedure for businesses to use as a starting point to developing their own internal PtD procedure that can be reviewed against existing company procedures.
- [03 – PtD Flowchart](#)
A draft flowchart that concisely explains the PtD process as shown in 02 – Sample PtD Company Procedure.
- [04 – PtD Execution Plan](#)
A template document for businesses to use to practically plan and execute PtD on an individual project basis.
- [05 – PtD Design Risk Management Guidance Document](#)
A guidance document to help companies adopt PtD Design Risk Management on their projects.
- [06 – Designer Register and Action Decision Log](#)
A template document to enable project teams plan and manage design team and their outputs.

[CPWR Prevention through Design \(PtD\) Resources](#)



[NIOSH Prevention through Design Toolkit for the Construction Industry](#)



PTD Applications

- ▶ Designer Checklists
- ▶ Design Safety Review / HAZOP / HAZID
- ▶ Model Safety Review / Constructability Safety Review
- ▶ PTD Lessons Learned (Design Risk Register)
- ▶ DAC-Safety
- ▶ Logistics Planning
- ▶ Visual Planning
- ▶ HRA Tagging/Planning
- ▶ Safety Material Take Offs

Designer Checklists

- ▶ Checklists to be used by architects/engineers. These would identify certain aspects/components of construction and provide safer design considerations that should be thought about when designing the product.

Design Engineer Codes: CE = Civil, EE = Electrical, ME = Mechanical, SE = Structural, PE = Project

Component	Design Risk	PtD Controls	Architect	Engineer
Framing, Painting, and Trim	Working from ladders presents a risk of injury from falls. By minimizing ladder use, fall risks can be decreased.	• Design interiors that minimize ladder use for finish work such as lower ceilings or eliminating trim around high windows	✓	SE
		• Design roofs with easy access or access from upper interior levels (no ladder required)	✓	SE
		• Locate exterior flatwork adjacent areas that may require work at height to provide stable surfaces	✓	SE
		• Design interior and exterior spaces to accommodate the use of manlifts instead of ladders	✓	SE
		• Schedule exterior flatwork to be completed early to provide stable surfaces for ladder placement	-	PE, SE

Design Safety Review

- ▶ Spreadsheet/checklist to be used as a pump primer during the planning phase to help identify situations where design could or should be considered. A place where thoughts and recommendations can be brainstormed. (Specific to project)

Can be completed in conjunction with SSSP/EHS Risk Assessment Meeting

	A	B	C	D	E
1					
2	Design Safety Review				
3					
4	Checklist	Y/N	NOTES	Implimented By	Complete
5	Pedestrian Control/Considerations				
6	- Signage				
7	- Special Lighting				
8	- Barricades				
9	- Covered Walkways				
10	- Slick Walkways				
11	- Directional Signage				
12	- Temporary Barricades				
13	-Equipment in public right of ways				

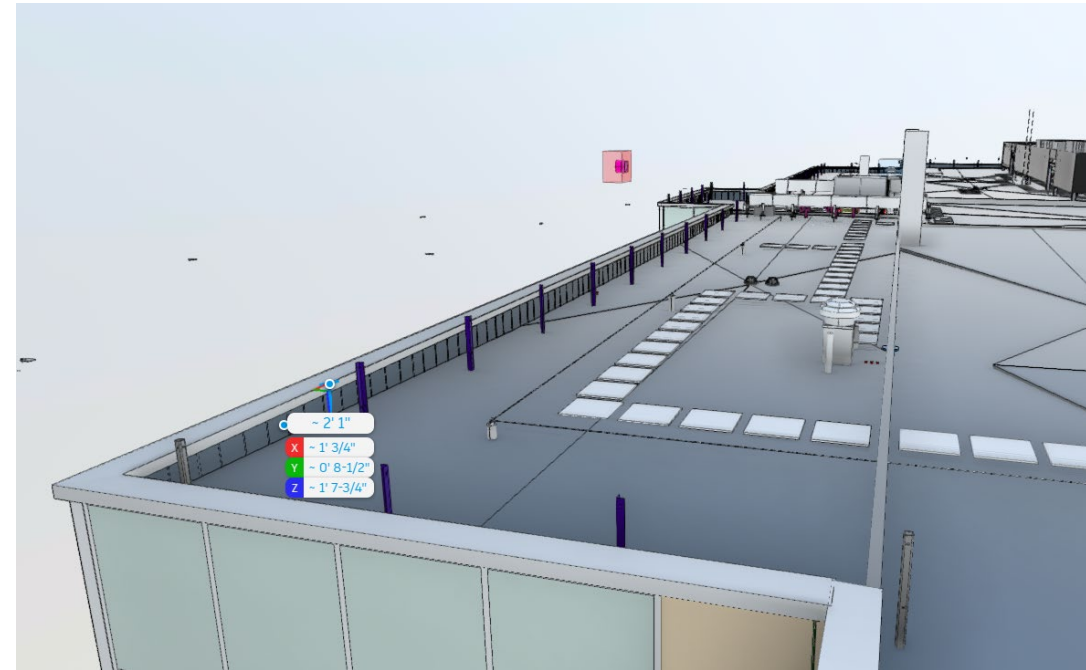
HAZOP / HAZID

- ▶ Hazard Operability Study / Hazard ID is used to Identify areas of safety concern within and around the project. The HAZID will identify and evaluate risk-reducing measures that have already been included in the design to reduce the probability of occurrence and/or the impact of an incident as well as recommend any additional mitigation deemed necessary by the team, along with identifying areas which will require a more in-depth review. This is conducted utilizing 2D and/or conceptual drawings.

ID No.	Risk - HAZID Recommendations	Originator	Date Risk Mitigation Due	Action Owner	Other Owner	Snr Mgmt Escalation	Area / Work Stream	Project Category	Risk Mitigated Date	Current Status
96	Ensure there is adequate space allocated in the design for gas cylinders storage and use, and evaluate safe movement/transfer of the gas cylinders.				Architecture			Safety		
97	Determine the buffer composition and what appropriate PPE and controls are required.				Process			Safety		
98	Determine if bulk acid/caustic tanks will be double walled. If not, ensure necessary containment is provided in the design.				Process			Safety		
99	Evaluate safety shower locations throughout the site, including need for safety showers on platforms.				EHS			Safety		
100	Evaluate need for safety showers for equipment pass-throughs (material air locks between unclassified/CNC and clean space) where wipe-down/sterilizing chemicals are used.				EHS			Safety		
101	Determine the relief venting philosophy for potential releases of API material.				Process			Safety		
102	Provide access for safe removal of pre-filters and HEPA filters on HVAC equipment.				Architecture			Safety		
103	Ensure safe design of the Cold Rooms / Freezer Rooms with appropriate PPE and entrapment protection (alarms, door releases, door defrost, slab heat tracing, etc.).				Architecture			Safety		
104	Perform risk assessment on the Cryo room/system, when the design details are available.				EHS			Safety		
105	Evaluate providing method to restrict roof access via the Lab-Admin elevator.				Architecture			Safety		

Model Safety Review / Constructability Safety Review

- ▶ Once we have drawings/models in hand. Collaborative group efforts to fly the model to “virtually walk the job” to identify potential risks for the constructor and end user. Then develop a plan, mitigation strategy, and design recommendations for the Architect / Engineer / Ops team.



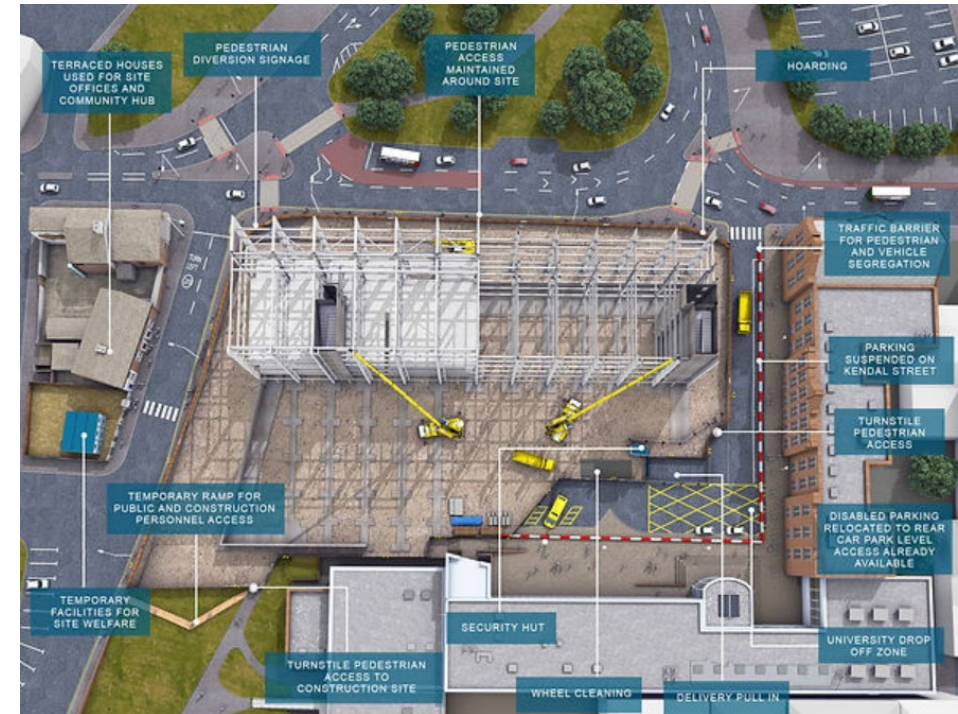
PTD Lessons Learned (Design Risk Register)

- ▶ List of design changes that have been made on previous model safety / constructability safety reviews.
- ▶ Register to be used on future projects for design considerations

	A	B	C	D	E	F	G	H	I
1	PTD Lessons Learned (Design Risk Registrar)								
2	Project	Date	Observation	PTD Consideratons Implmented	Controls implemented	Lessons Learned	HRA	Cost	Related Scope
3	Example A	5/21/2025	Parapet height is at 37" after roof insulation is installed	Raise height of parapet 2" or redcue the insulation thickness			Elevated Work	\$\$\$\$	Roof
4	Example B	6/13/2025	No pre punched hold for 2 line: Structural Steel will require clips for 2 line be welded on post installation.	Pre drill holes/Pre weld clips at fabricator in steel so 2 line can be run through them immediately after installaiton.			Elevated Work	\$\$\$	Structural Steel
5	Example C	7/3/2025	Depth of utilities is 8' Frost line only requires 3'.	Place utilities at 4' in order to not have to excavate as deep.			Ground Disturbance / Temp. Structures	\$	Trenching and Excavation
6	Example D	7/21/2025	No parapet around top roof deck		Install slab grabbers and 2x4's around the paramater of the building. Install permanant roof davits for constructor and end user to use when finishing/working on roof.		Elevated Work	\$	Roof

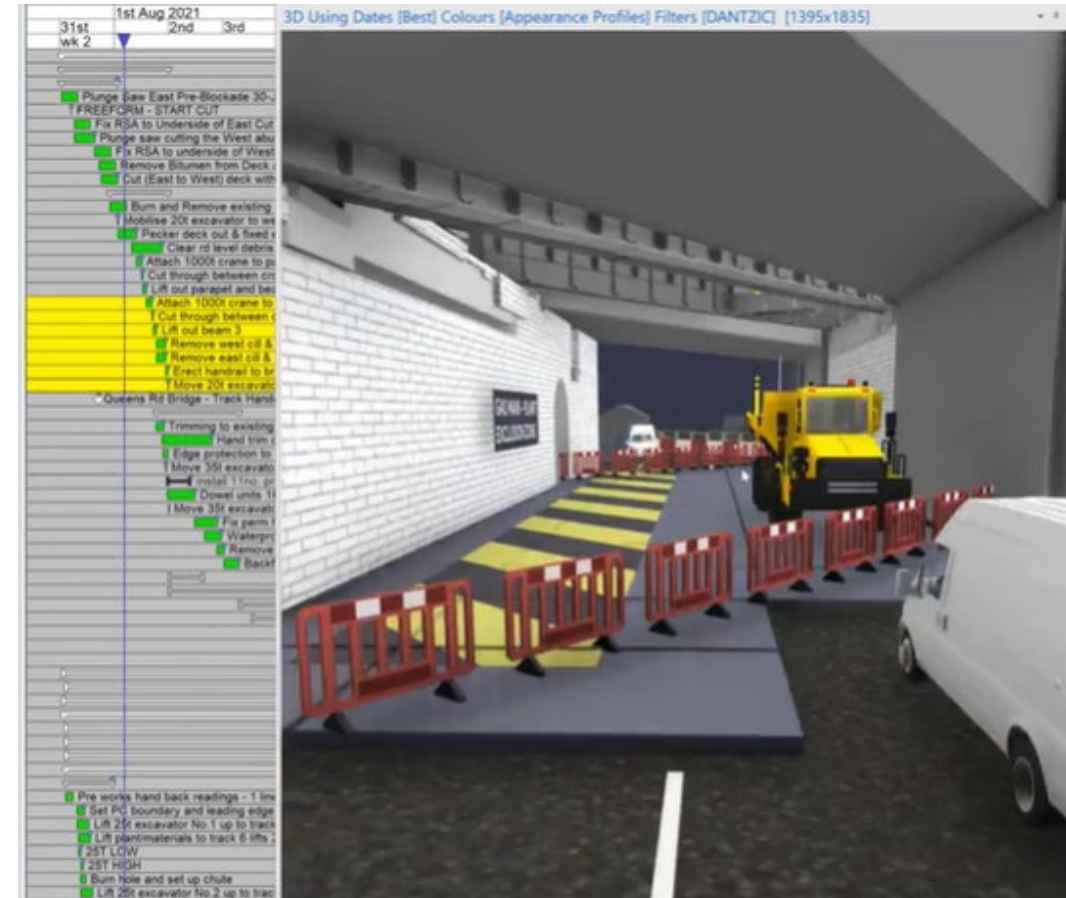
Logistics Planning

- ▶ Use PTD principles for visual logistics planning. This can make it easier for owners and project team members to understand certain phases of work, how to maneuver around the project, and risks applicable site logistics. Allow us to foreshadow risks prior to construction about challenges that we may face over the course of construction.



Visual Planning

- ▶ Utilize 4d modeling to implement or design fall protection plans, erection plans, trench and excavation situations, or other general HRA's. We can model mitigation strategies, perform take offs, identify best practices and/or ideal products/materials to use for a given situation. Aid in earlier procurement and more accurate costs.

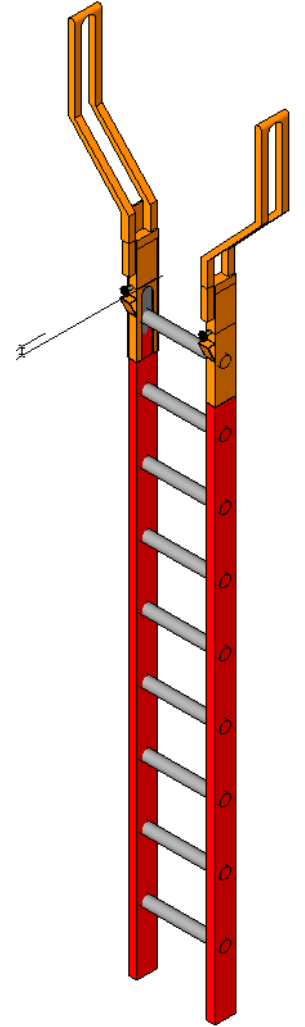
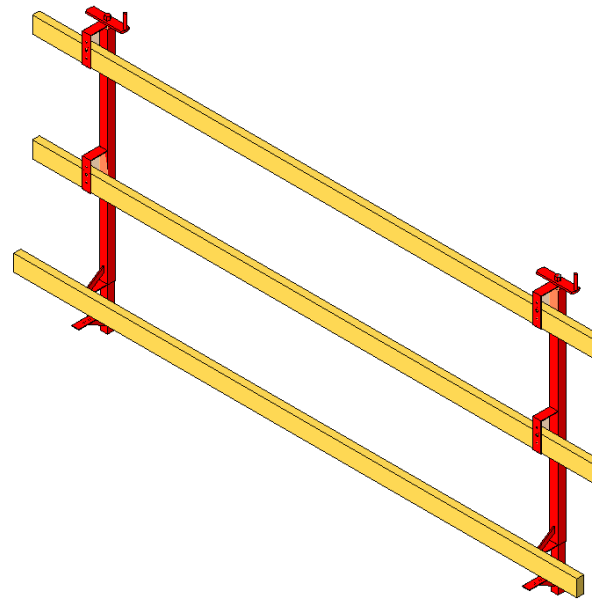
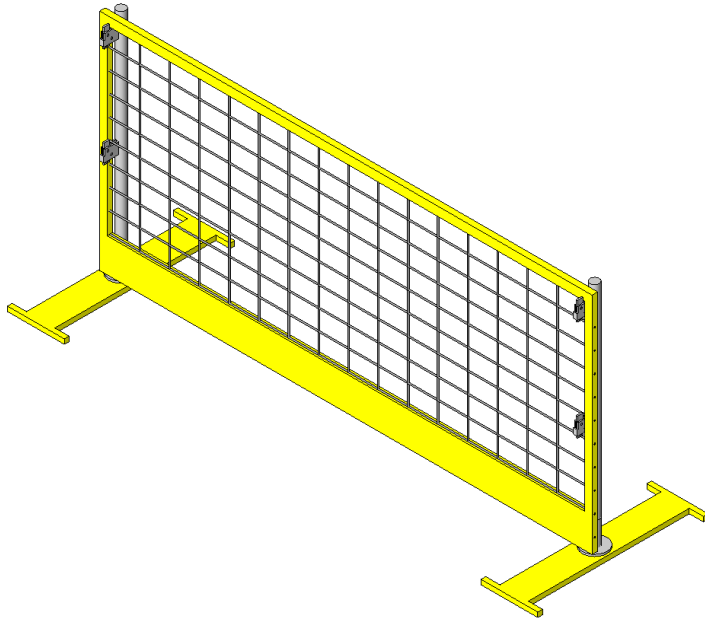
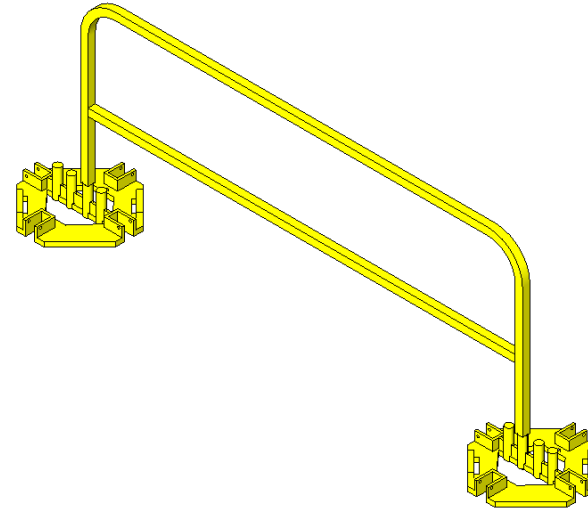
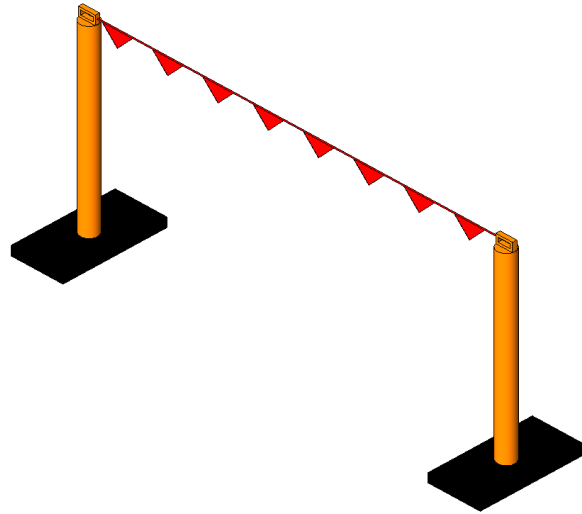
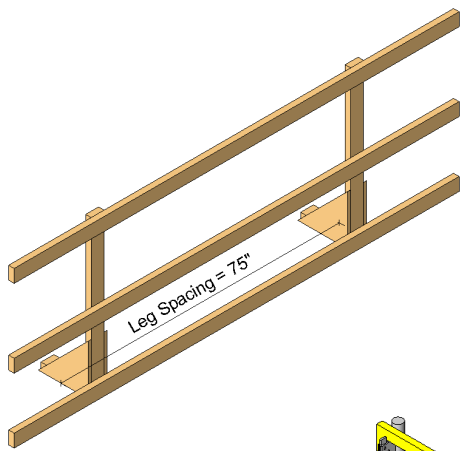


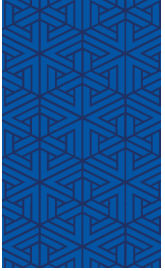


Safety Material Take Offs

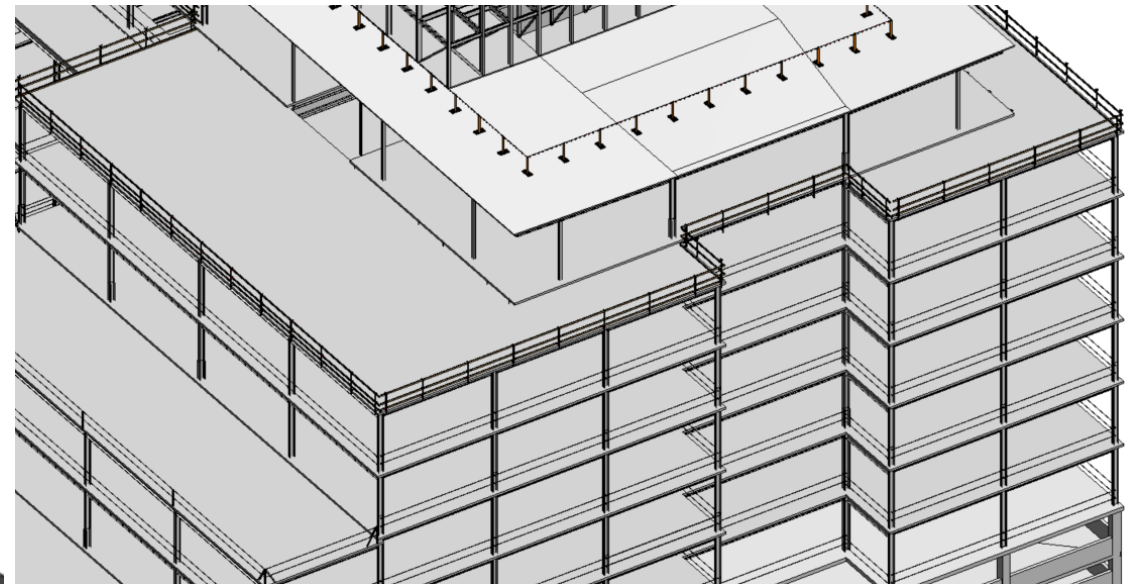
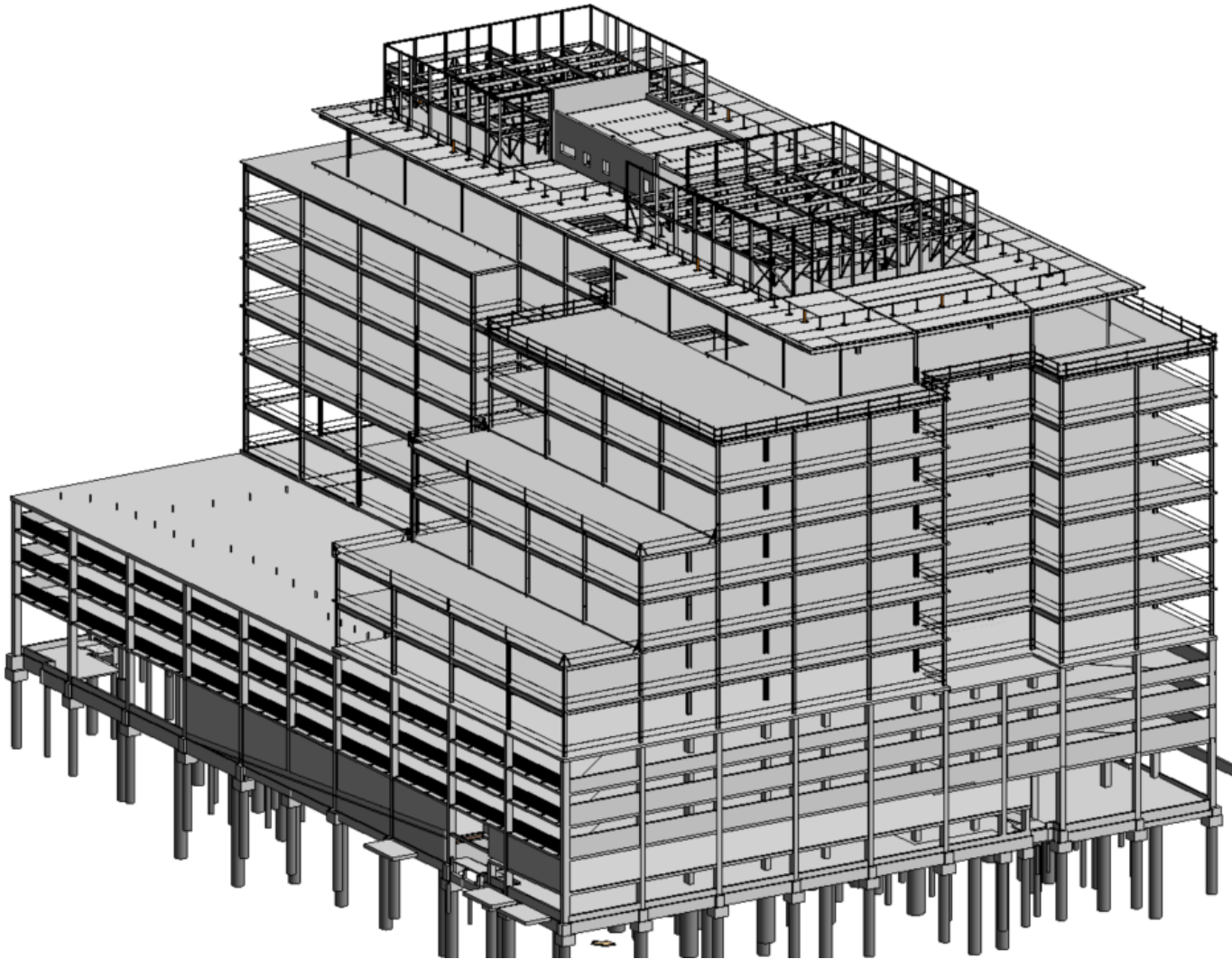
- ▶ More accurate estimates of how much certain safety materials will cost, and at what point of the project those costs may hit the job.
- ▶ Model the protective system in place, for exact quantities.
- ▶ Example:
 - Exterior perimeter: 435'
 - Type of Fall Protection: Slab Grabbers and 2x4's
 - Slab Grabbers: 55 (Unit Cost: \$100.00ea)
 - 2x4's: 1305' (82 - 2x4x16') (Unit Cost: \$10.00)
 - Total cost of fall protection system (Material Only) = \$6320.00

Revit Families (Fall Protection)

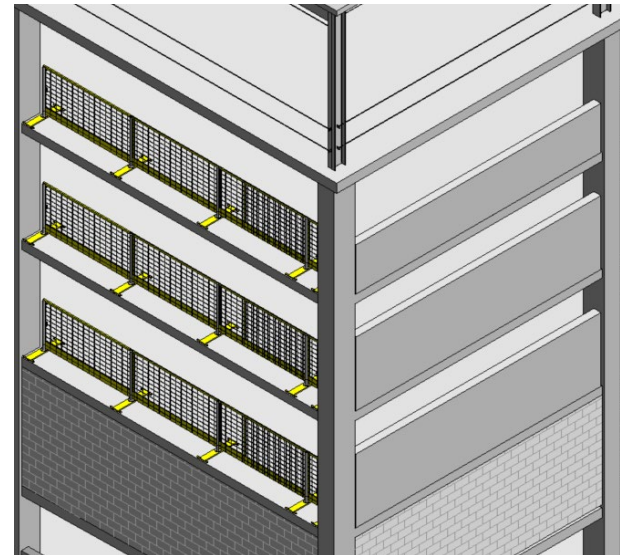
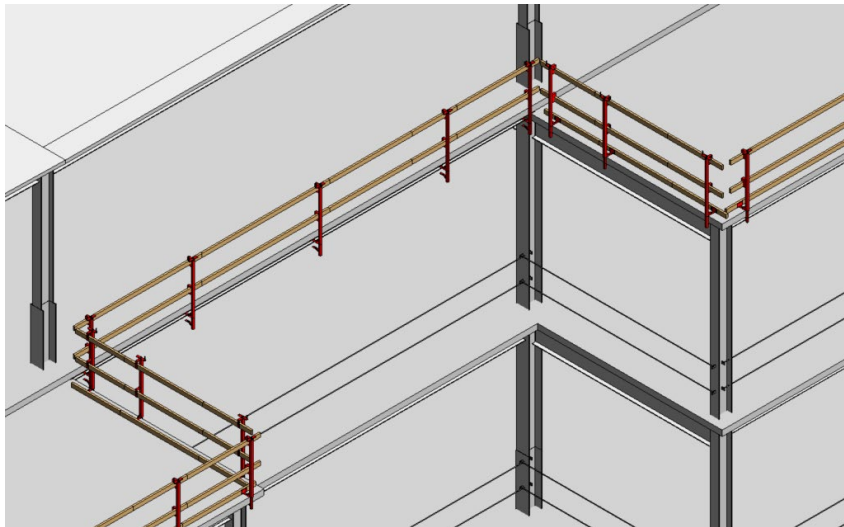
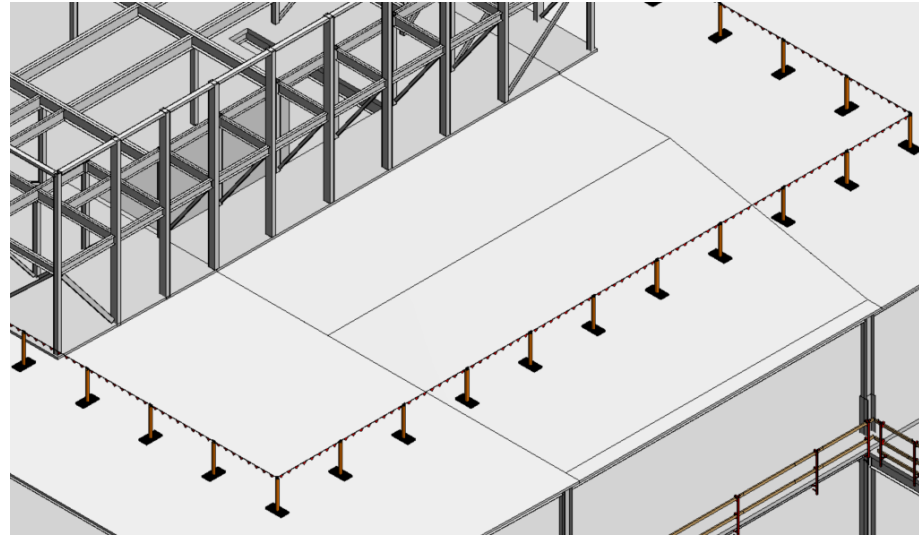
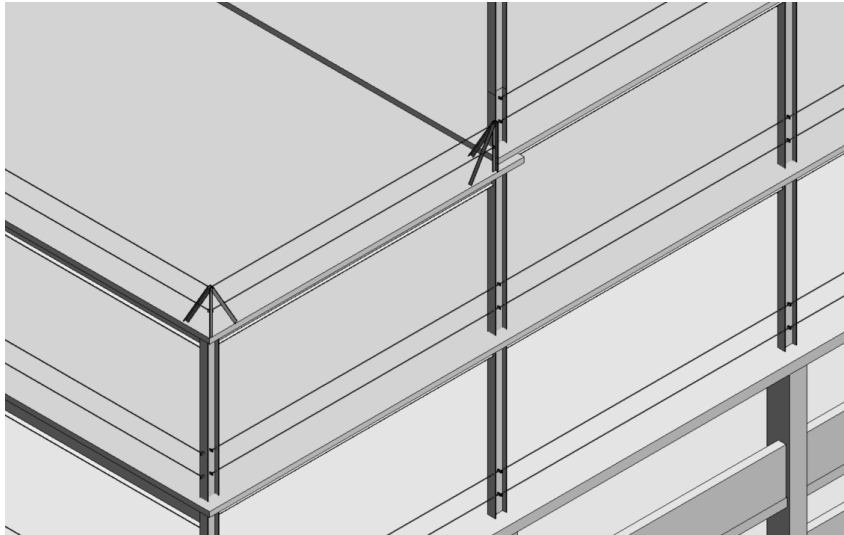




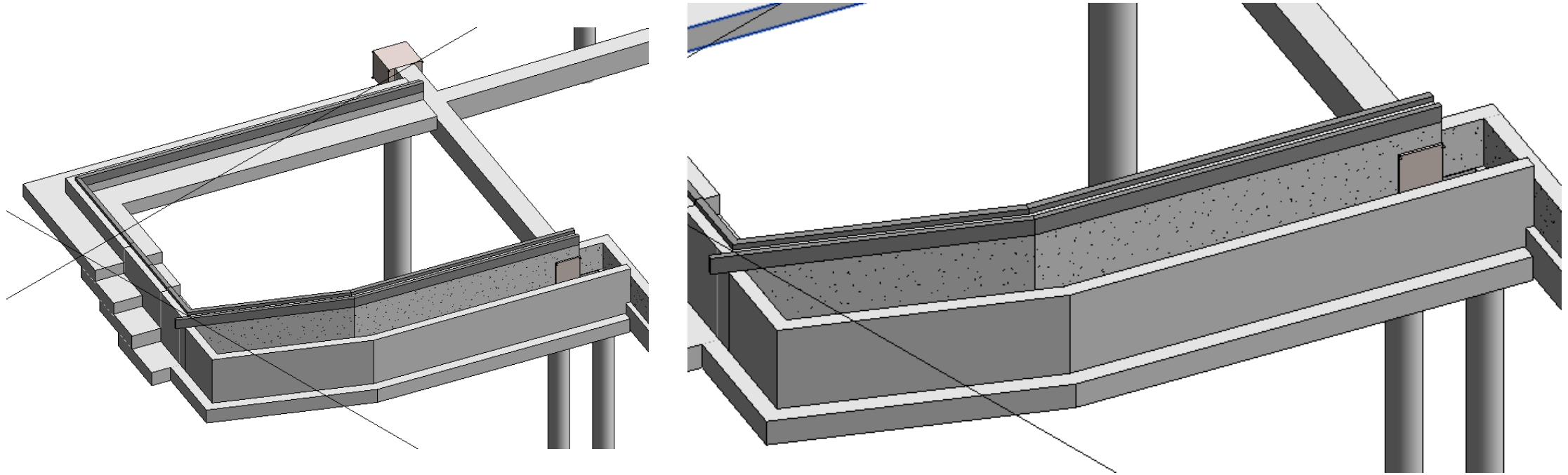
Test Project



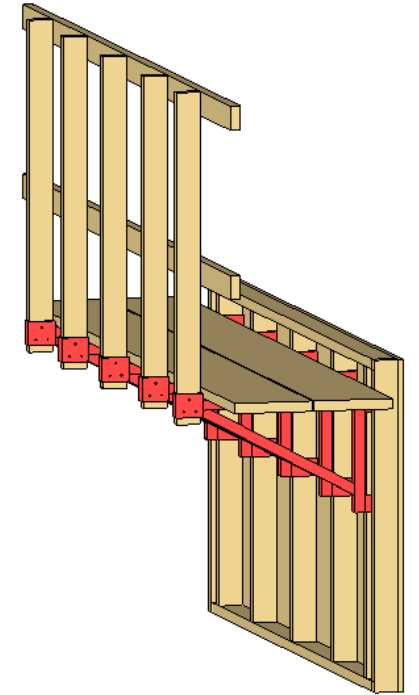
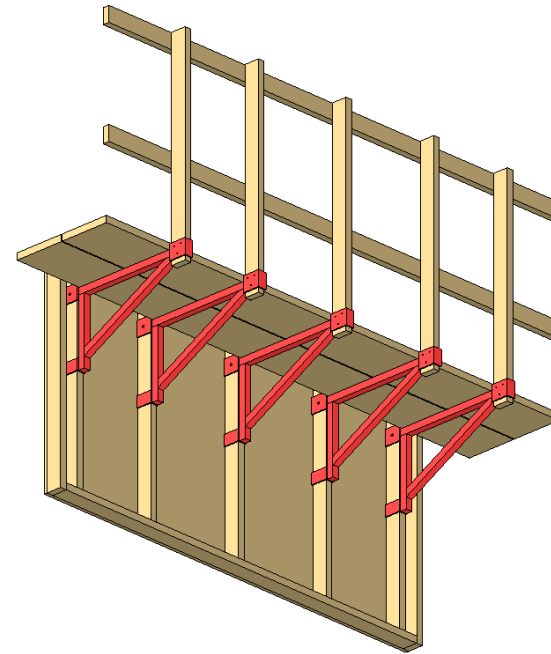
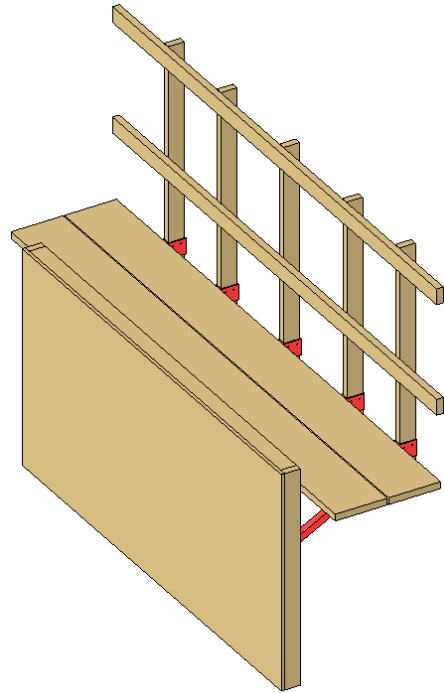
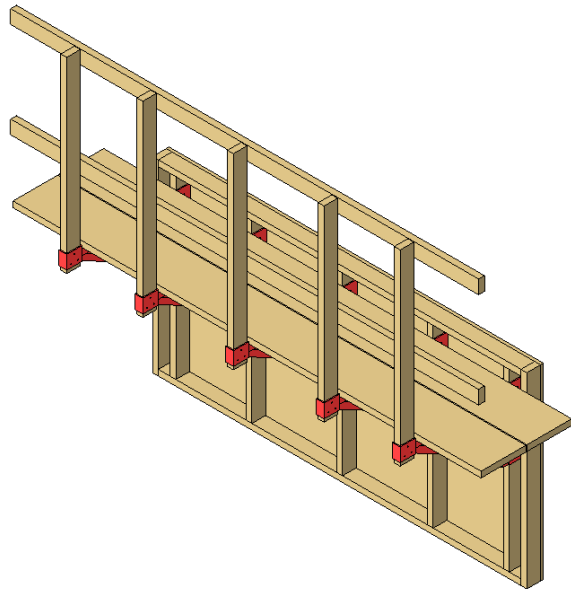
Test Project



Problem Solving/Engineering for Safer Work



Problem Solving/Engineering for Safer Work



Upcoming Webinar: Top Three Things to Know About Working on Roofs

Join roofing safety experts to learn about key training priorities for workers who work on roofs. Panelists will provide an overview of information on falls from and through roofs, describe the recommended breadth of fall prevention training, and then focus on three top training priorities. Attendees will also have the opportunity to ask technical questions about roofing safety and training. English-to-Spanish interpretation will be available.

Panelists:

- Chris Trahan Cain, CIH, Executive Director, CPWR
- Brian A. Rizzo, Acting Director, Directorate of Construction, OSHA
- Donald Peterson, PhD, Director, Division of Safety Research; NIOSH
- Joel Gonzalez, Trust Fund Field Director, Roofers & Waterproofers Research and Education Joint Trust Fund
- Matt Wittenborn, Instructor, Roofers & Waterproofers Research and Education Joint Trust Fund Live

Top Three Things To Know About Working on Roofs

Date: Friday, May 8th

Time: 1pm EST

[Register and submit questions here](#)

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