NIOSH Construction Program Update

Scott Earnest, PhD, PE, CSP
Director, NIOSH Office of Construction Safety and Health
Manager, NORA Construction Sector

Doug Trout, MD
Deputy Director, NIOSH Office of Construction Safety and Health

CDR Elizabeth Garza, MPH, CPH
Public Health Advisor, NIOSH Office of Construction Safety and Health
Coordinator, NORA Construction Sector

NIOSH Office of Construction Safety & Health

May 2023

Leadership Updates

CDC

Dr. Rochelle Walensky, Stepping down effective June 30, 2023

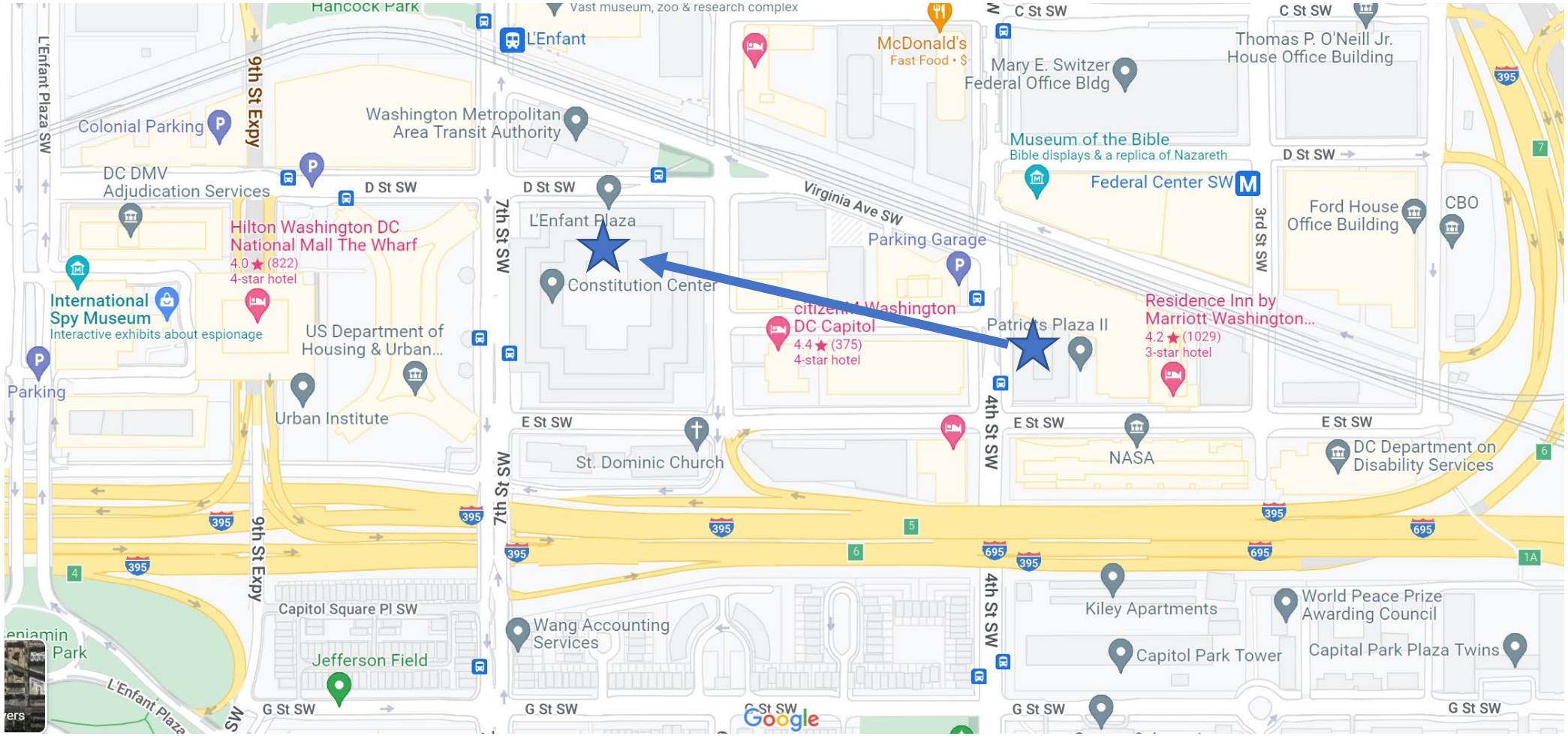
NIOSH OD Retirements

Dr. RJ Matetic, Assoc Director for Manufacturing, retired on Dec 31, 2022.
Frank Hearl, Chief of Staff retired on December 31, 2022
Dr. Jessica Kogel, Assoc Director of Mining, retired on Dec 31, 2022 and passed away in January 2023.

NIOSH Leadership

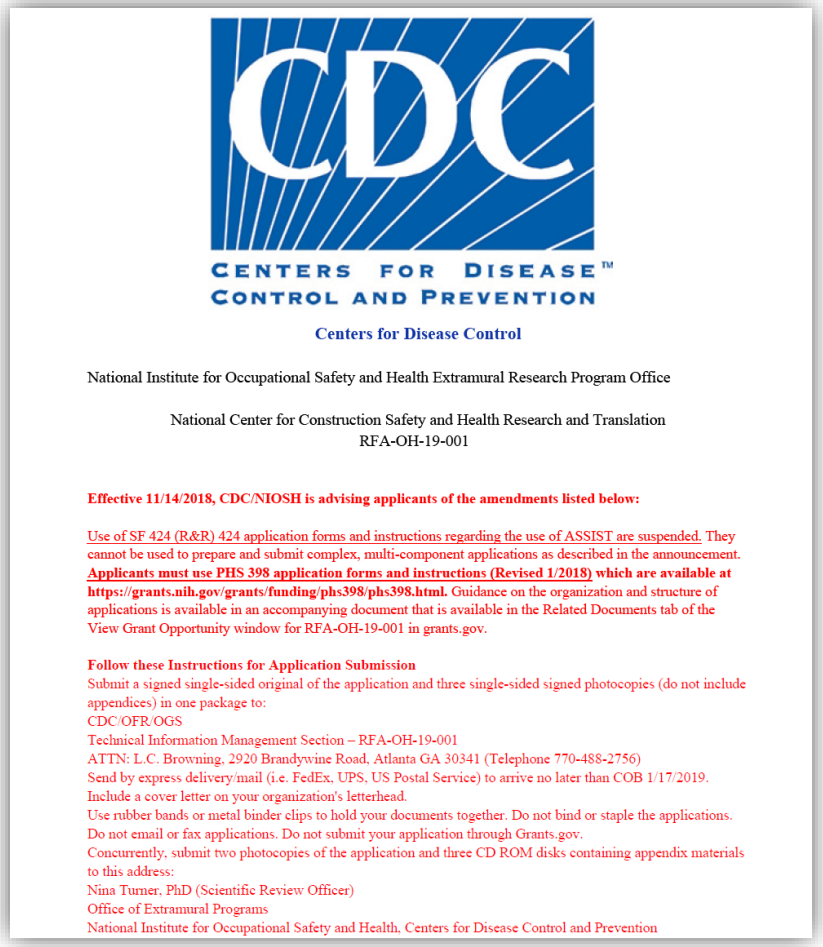
Dr. John Piacentino, Appointed as NIOSH Deputy Director for Program
Maria Strickland, MPH, Appointed as NIOSH Chief of Staff
Dawn Castillo, Appointed as OEP Director
Dr. Jennifer Lincoln, Appointed as Acting Director of DSR

NIOSH HQ moved in April 2023!



National Construction Center Request for Proposals (RFP)

- 5-year cooperative agreement
- Expected budget of approx. $29M
- Expected to be announced in Grants.gov in **August 2023**
- Due Date likely to be **November 2023**



CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Centers for Disease Control

National Institute for Occupational Safety and Health Extramural Research Program Office

National Center for Construction Safety and Health Research and Translation
RFA-OH-19-001

Effective 11/14/2018, CDC/NIOSH is advising applicants of the amendments listed below:

Use of SF 424 (R&R) 424 application forms and instructions regarding the use of ASSIST are suspended. They cannot be used to prepare and submit complex, multi-component applications as described in the announcement. **Applicants must use PHS 398 application forms and instructions (Revised 1/2018) which are available at https://grants.nih.gov/grants/funding/phs398/phs398.html.** Guidance on the organization and structure of applications is available in an accompanying document that is available in the Related Documents tab of the View Grant Opportunity window for RFA-OH-19-001 in grants.gov.

Follow these Instructions for Application Submission
Submit a signed single-sided original of the application and three single-sided signed photocopies (do not include appendices) in one package to:
CDC/OFR/OGS
Technical Information Management Section – RFA-OH-19-001
ATTN: L.C. Browning, 2920 Brandywine Road, Atlanta GA 30341 (Telephone 770-488-2756)
Send by express delivery/mail (i.e. FedEx, UPS, US Postal Service) to arrive no later than COB 1/17/2019.
Include a cover letter on your organization's letterhead.
Use rubber bands or metal binder clips to hold your documents together. Do not bind or staple the applications.
Do not email or fax applications. Do not submit your application through Grants.gov.
Concurrently, submit two photocopies of the application and three CD ROM disks containing appendix materials to this address:
Nina Turner, PhD (Scientific Review Officer)
Office of Extramural Programs
National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention

CDC Moving Forward

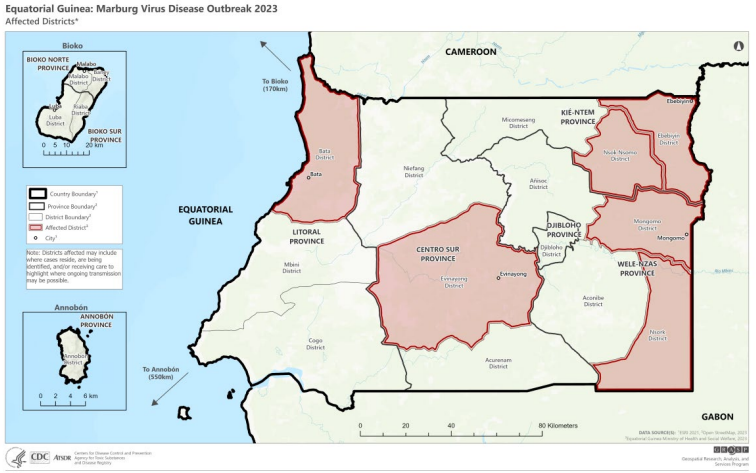
CDCReady RESPONDER

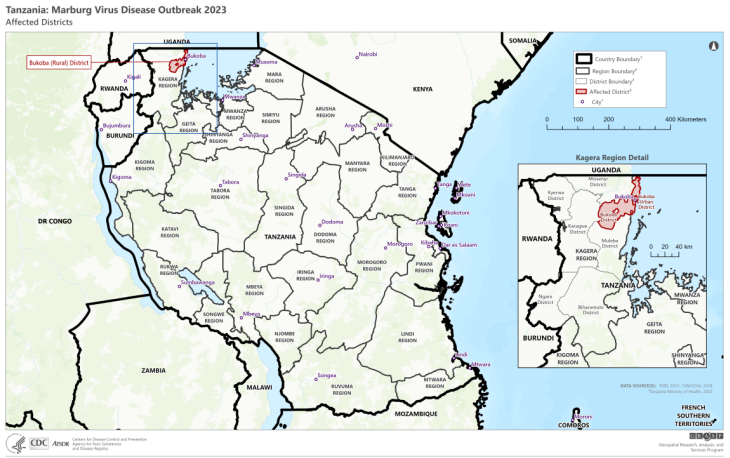
Key Aims of CDCReady Responder

- Build and expand pools of qualified, response-ready, and available responders.
- Expand to include staff not already connected to the response community.
- Train staff to apply their talents to response work.
- Create opportunities for staff to build new skill sets and professional connections.

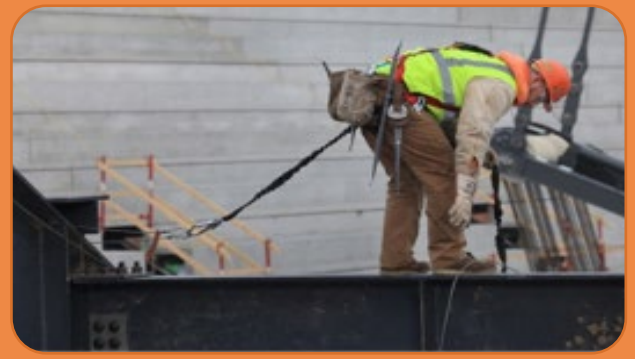
Marburg Outbreak in Equatorial Guinea and Tanzania

- Supporting domestic preparedness activities for a possible travel-related case in the US
- Maintaining a NIOSH on-call list to be on a CDC Emergency Response Team (CERT) that would deploy to the hospital or health department





NORA Construction Sector Work Groups



Preventing Falls

Co-Chairs:

Rich Trewyn

Cheryl Ambrose

Preventing Struck-by

Co-Chairs:

Brad Sant

Alanna Klein

*If interested in joining, reach out to Liz Garza egarza@cdc.gov

NORA

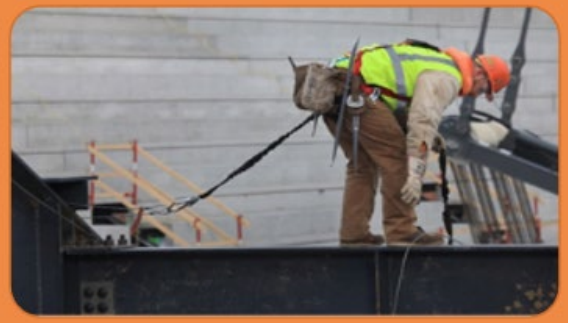
NORA Construction Leadership of two National Safety Stand Downs

http://stopconstructionfalls.com/

STOP. TALK. ACT.

April 17-21, 2023

https://www.cpwr.com/struck-by-hazards



2023

- 10th National Stand-Down to Prevent Falls
- Focus on outreach to most at-risk
  - Small residential contractors, immigrant (Hispanic), roofer

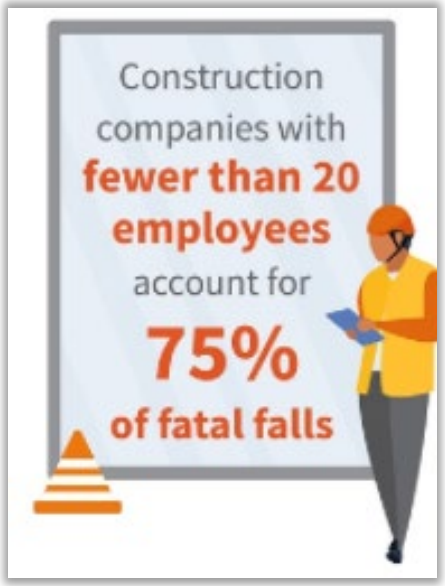
ROOFERS HAVE

10X the rate of fatal falls of all other construction occupations combined

Preventing Falls

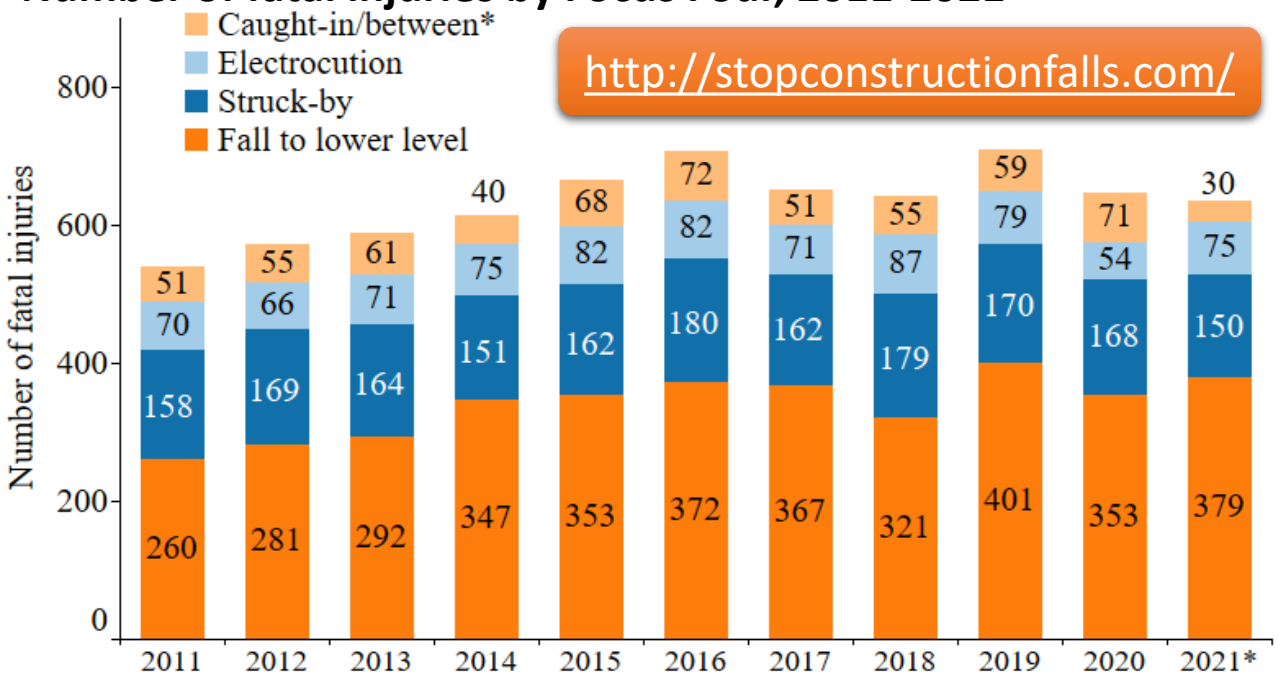
https://www.osha.gov/stop-falls-stand-down

IN 2017, THE RATE OF HISPANIC WORKERS WHO DIED FROM FALLING TO A LOWER LEVEL WAS 50% HIGHER THAN THEIR NON-HISPANIC COUNTERPARTS...



Number of fatal injuries by Focus Four, 2011-2021

http://stopconstructionfalls.com/



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.

March 29, 2023

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,** 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*

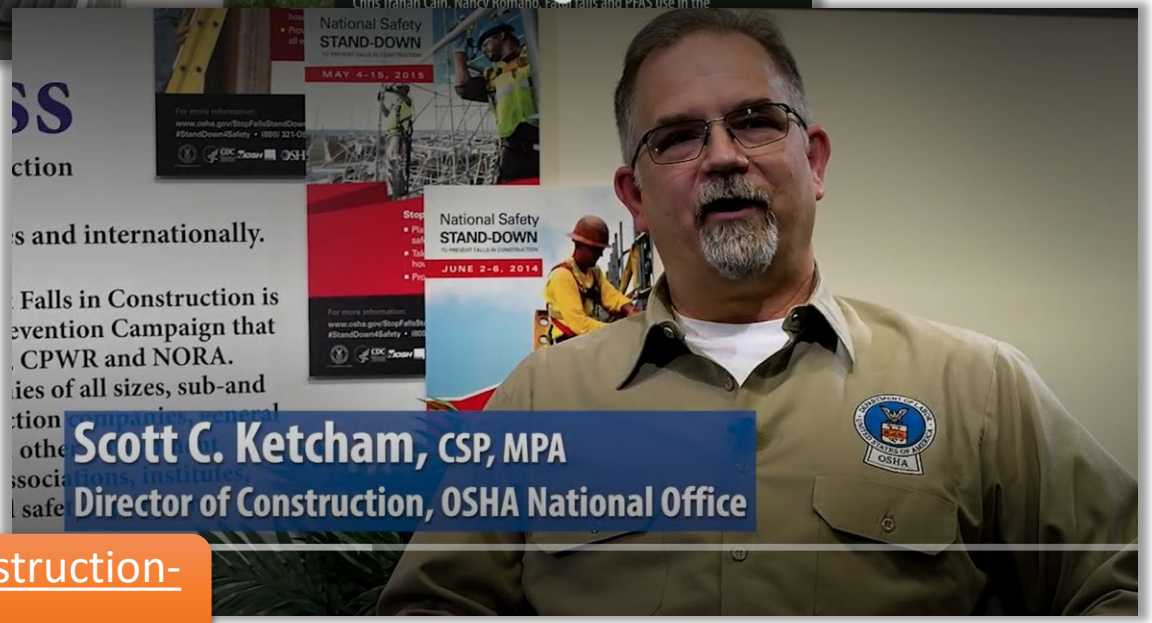
Today's webinar is being recorded and will be posted along with slides at cpwr.com/webinars. For technical difficulties, send a WebEx chat to Jessica Bunting or email jbunting@cpwr.com.

If you cannot hear through your computer speakers, call in using your phone instead at:
415-655-0003, Access Code 2550 162 8779 #

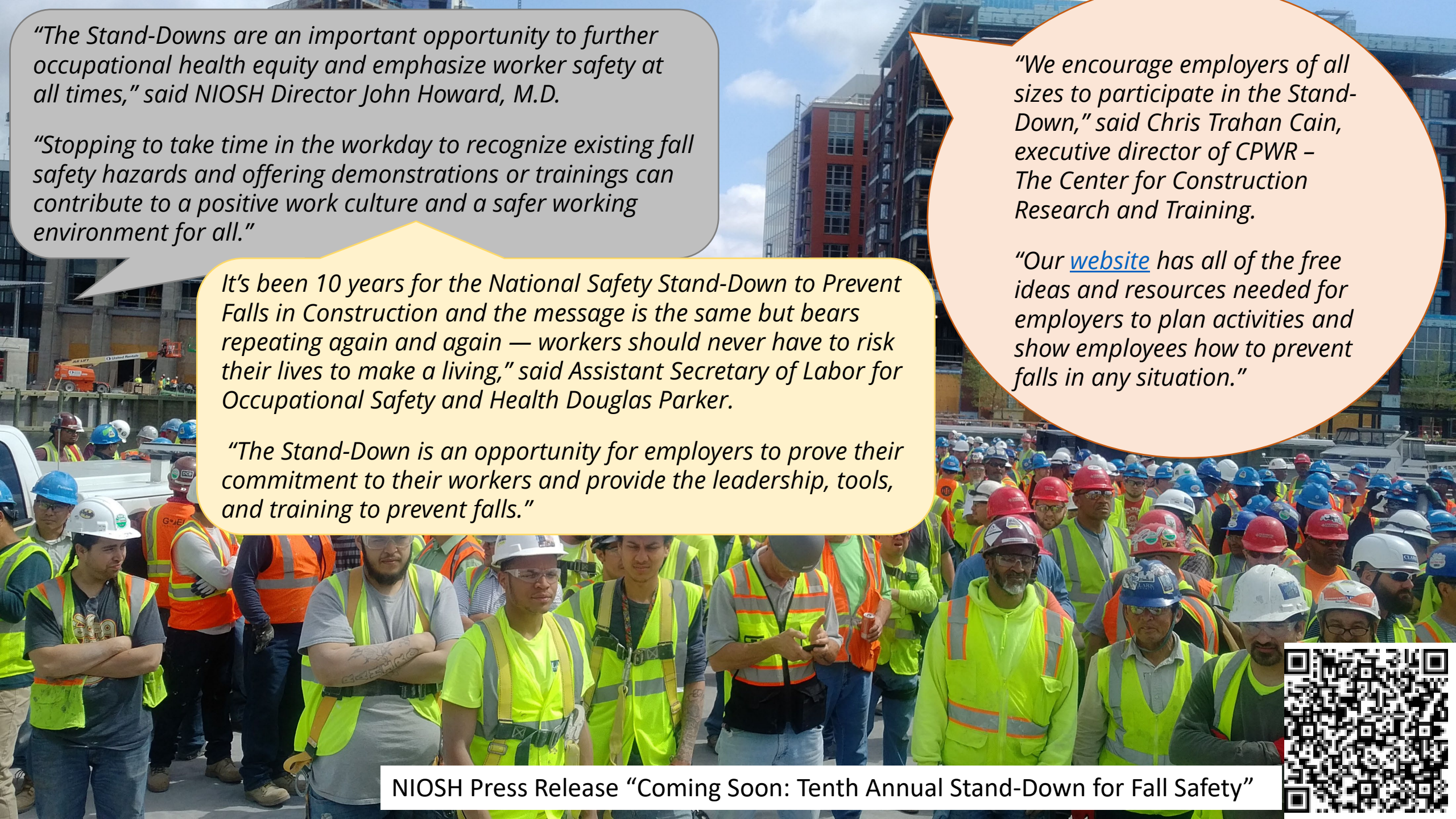
April 26, 2023

NORA 10 yr. Anniversary video, National Stand-Down

Stay tuned, more video testimonials in development based on footage taken in March…



https://stopconstructionfalls.com/wp-content/uploads/2023/05/Construction-Falls-10-Year-Anniversary_HigRes_Compressed.mp4



"The Stand-Downs are an important opportunity to further occupational health equity and emphasize worker safety at all times," said NIOSH Director John Howard, M.D.

"Stopping to take time in the workday to recognize existing fall safety hazards and offering demonstrations or trainings can contribute to a positive work culture and a safer working environment for all."

It's been 10 years for the National Safety Stand-Down to Prevent Falls in Construction and the message is the same but bears repeating again and again — workers should never have to risk their lives to make a living," said Assistant Secretary of Labor for Occupational Safety and Health Douglas Parker.

"The Stand-Down is an opportunity for employers to prove their commitment to their workers and provide the leadership, tools, and training to prevent falls."

"We encourage employers of all sizes to participate in the Stand-Down," said Chris Trahan Cain, executive director of CPWR – The Center for Construction Research and Training.

"Our website has all of the free ideas and resources needed for employers to plan activities and show employees how to prevent falls in any situation."

NIOSH Press Release "Coming Soon: Tenth Annual Stand-Down for Fall Safety"

SPOTLIGHT ON… PLANNING & PPE FIT

2023 STAND DOWN May 1-5

The National Safety Stand-Down to Prevent Falls in Construction is an opportunity to pause work on jobsites to improve fall prevention planning and talk about fall safety with crews, crew leaders, and everyone on your jobsite. The following list of activities provides ideas for employers of all sizes to participate in the Stand-Down.

1. Create or Improve Your Written Fall Protection and Rescue Plan

Do you have a written fall protection and rescue plan? If yes, how can it be improved?

Planning is critical. In a recent survey by CPWR – The Center for Construction Research and Training, respondents who witnessed, experienced, or investigated a past fall incident identified **insufficient or ineffective planning as the number one underlying cause of the fall.**

Use this generic template to create a fall protection and rescue plan. For small employers or those just beginning to plan for falls, click here for a shorter, simpler plan (both templates are available in Spanish). Consult CPWR's Rescue Planning Saves Lives and Planning A Layered Approach to Fall Protection tipsheets for additional information on planning.

2. Attend Virtual or In-Person Stand-Down Events

Check out OSHA's Stand-Down Events Page to find regional or national virtual or in-person events by region.

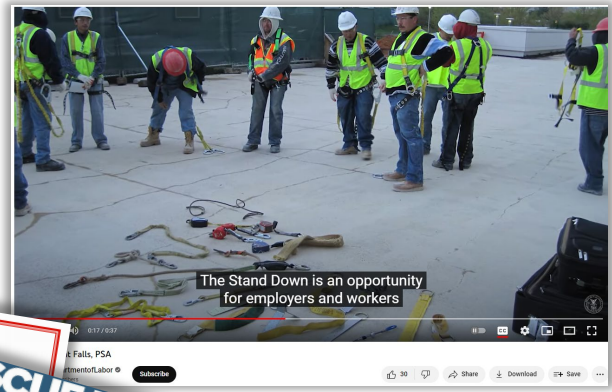
You can also attend webinars on fall prevention or view recordings in the Stop Construction Falls library of fall prevention webinars:

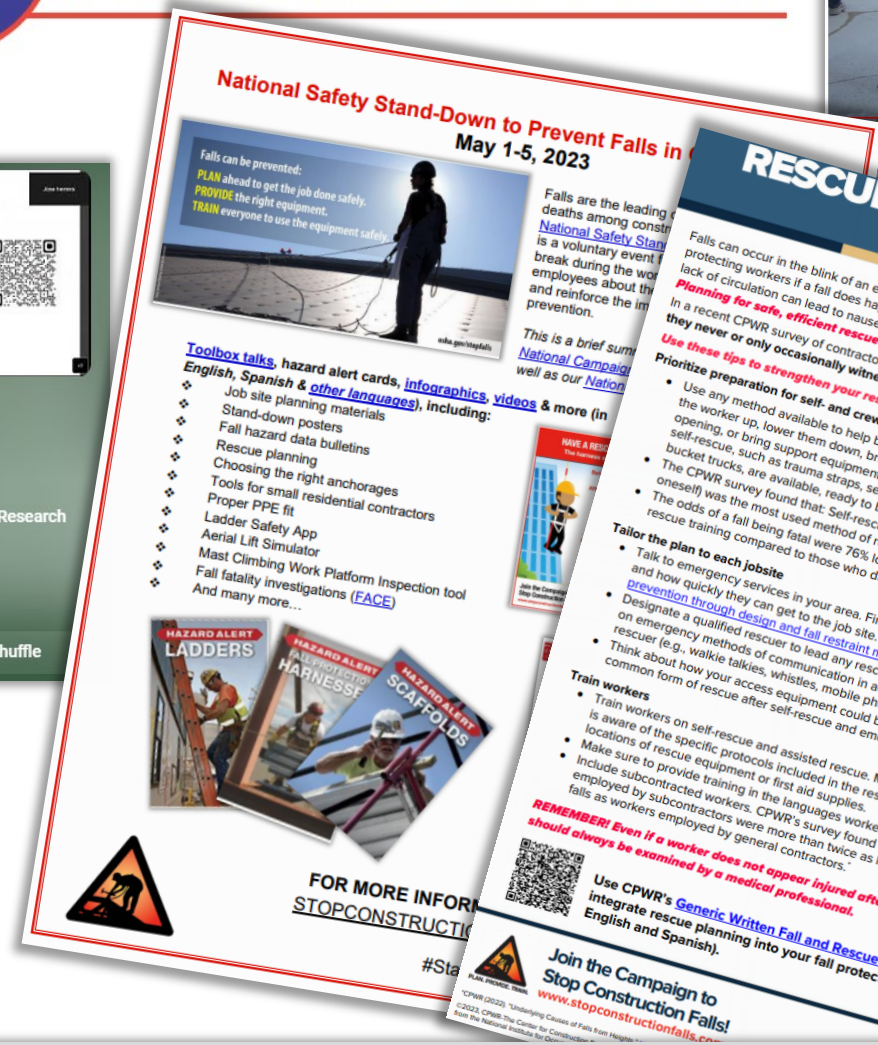
- Check out the Stop Construction Falls - One Stop Stand-Down Shop for links to upcoming webinars for this year's Stand-Down.
- Watch recordings of previous webinars on Stop Construction Fall - Videos and Webinars page.

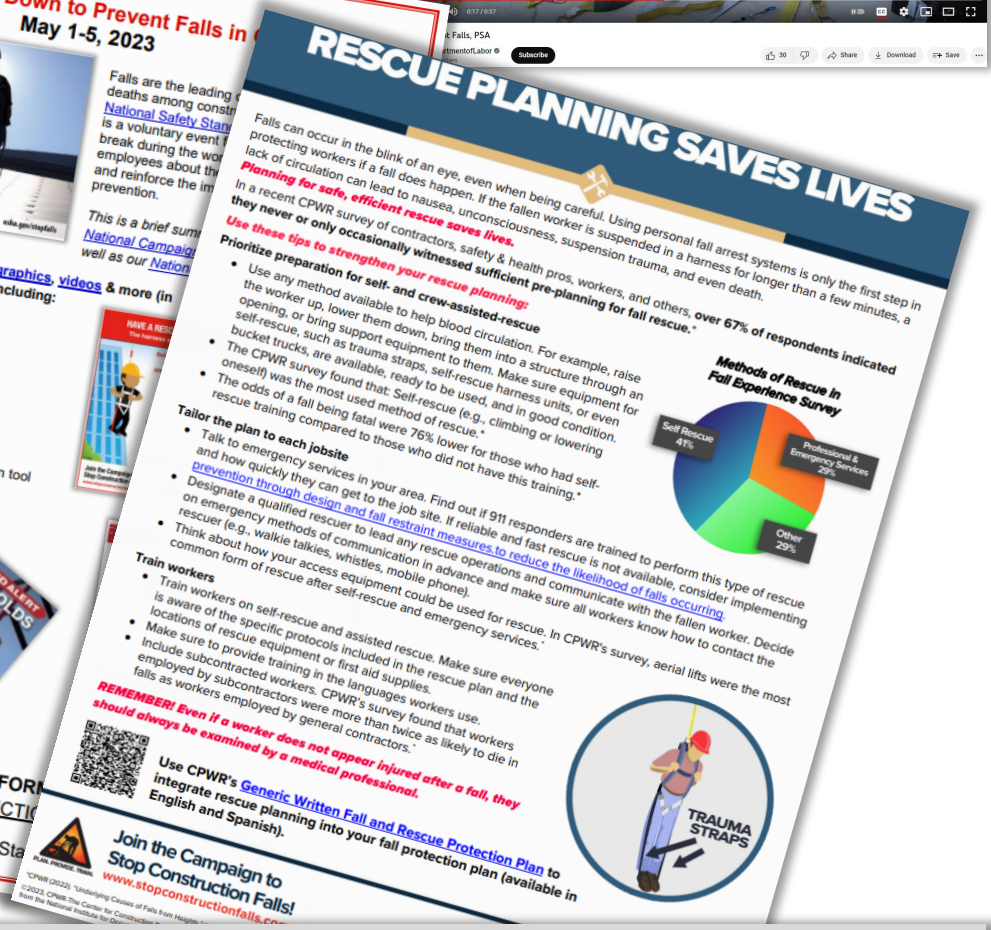
PLAN. PROVIDE. TRAIN. *Three simple steps to preventing falls*

3. Expand Your Resources in Languages Other than English

Use the Stand-Down as an opportunity to assess whether your fall prevention and protection planning, materials, and training are available in the languages used by your crew. If needed, identify or create new resources in the crew's native language(s). You can use Spanish-language resources and resources in languages such as Cambodian, Polish, Portuguese, Russian, and Mandarin from stopconstructionfalls.com to get started.







*Falls to a lower level = **379** of the 1015 construction fatalities in 2021. Falls to a lower level ▲ **13%** from 2011 to 2021*.*

*rate increased from 3.0 to 3.4 per 100,000 (BLS CFOI data)

NIOSH Science Blog: Falls

Standing Down to Prevent Falls in Construction

April 24, 2023 by Mirle Pena, MS; Jessica Bunting, MPH; CDR Elizabeth Garza, MPH, CPH; Douglas Trout, MD, MHS; Asha Brogan, MS; Scott P. Breloff, Ph.D; G. Scott Earnest, Ph.D, PE, CSP

Overview

Construction workers are at risk for injuries from many sources, but falls continue to be the leading cause of death (accounting for 37% [379 out of the 1015 fatalities] of all construction fatalities in 2021). This year marks the 10th annual National Safety Stand-Down to prevent falls in construction, an event to raise awareness that falls among construction workers are preventable. Read further to learn more about the 2023 Stand-Down and how employers, frontline workers, and safety and health professionals can all work to prevent falls in construction.

National Safety Stand-Down to Prevent Falls in Construction

The annual Stand-Down event is part of the National Campaign to Prevent Falls in Construction. It is a one-week, nationwide event organized by the Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Safety and Health (NIOSH), and The Center for Construction Research and Training (CPWR) to raise awareness of slip, trip, and fall hazards and prevent fall injuries and fatalities. Safety Stand-Downs are voluntary events for employers to talk directly to employees about safety. The Falls Stand-Down is an opportunity to distribute educational materials, train workers, and discuss your company's safety policies and goals. Information geared specifically toward small contractors is available.

2023

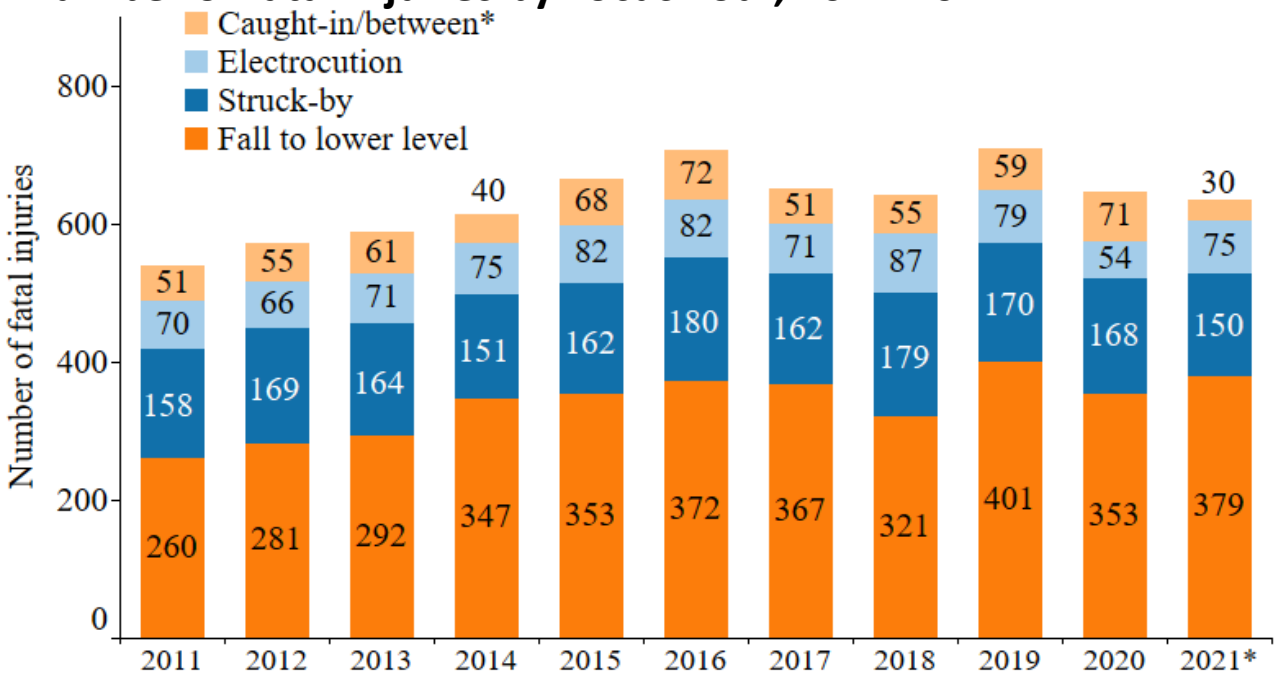
- 4th National Stand-Down to Prevent Struck-by Incidents
  - Focus on roadway workzones, heavy equipment/cranes, dropped objects
  - In coordination with National Work Zone Awareness Week

Preventing Struck-by

**Note: Struck-by WG also covers Caught-in/between (trenches, etc.)*

https://www.cpwr.com/struck-by-hazards

Number of fatal injuries by Focus Four, 2011-2021



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.

https://www.cpwr.com/struck-by-hazards

4th Annual National Stand-Down to Prev Struck-by Incidents

Stand-Down Webpage:
https://cpwr.com/struck-by-hazards

- Toolbox Talks on work zone safety, dropped objects, crane and lift safety, heavy equipment, etc.
- Infographics/Jobsite Signage
- Webinars & Videos
- Research & Data
- PPT slides
- NEW Pilot Planning Program to Prevent Struck-by Incidents

Panelists:

- **Jay W Hocutt CSP, SGE, CWD**, Construction Heavy Equipment Program Manager, *United Cleanup of Oak Ridge (UCOR)*
- **Reese Fortin**, District HSE Manager, *Sundt Construction*
- **Richard Wittlinger**, Safety Director, *JD Eckman*
- **Steve Spaulding**, VP & National Director of Environment, Health and Safety, *Turner Construction Company*

Media Advisory

Print

Updated April 10, 2023

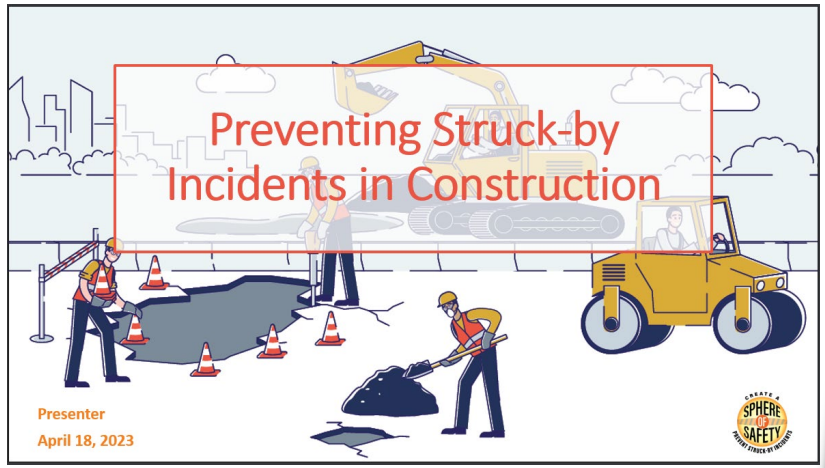
NIOSH UPDATE:

Preventing Struck-by

WHAT

National Stand-Down to Prevent Struck-By Incidents : Companies are encou
provide a safety talk, conduct safety inspections, or discuss common struck-b
workers.

Promoting productive workplaces
through safety and health research



https://www.cpwr.com/struck-by-hazards

NIOSH Science Blog: Struck-by

Struck-By Injuries in the Construction Sector: Common Hazards, Barriers, and Opportunities to Keep Workers Safe

April 4, 2023 by Scott P. Breloff, Ph. D.; CDR Elizabeth Garza, MPH, CPH; Asha Brogan, MS; Jessica Bunting, MPH; Douglas Trout, MD, MHS; Mirle Pena, MS; G. Scott Earnest, Ph. D., PE, CSP

Struck-By Injuries

Struck-by injuries occur from violent contact or impact between an object or piece of equipment and a person. Struck-by injuries can be fatal, and even when a worker is not seriously injured can result in days off work to recover. To help prevent struck-by injuries, companies are encouraged to have a stand-down; a voluntary event for employers to talk directly to employees about safety. This year will be the 4th annual National Stand-Down to Prevent Struck-by Incidents. This event will occur on April 17-21, 2023 with a kick off webinar on April 17 at 2p.m EDT. Understanding the scope of occupational struck-by injuries and prevention solutions is key to understanding the number of incidents that happen each year. Read on to learn more about struck-by injuries in construction and this year's stand-down.

Occupational struck-by incidents caused 150 deaths and 14,000 nonfatal construction sector injuries in 2020 [1]. This totaled $1.4 billion in workers compensation direct costs for non-fatal claims with more than 5 days away from work [2]. Figure 1, from the April 2021 CPWR-The Center for Construction Research and Training Data Bulletin, compares struck-by and other fatalities in the construction industry from 2011 through 2019. During this time, fatalities resulting from being struck by an object or piece of equipment occurred more often (ranging from 76–113 fatalities/year) than fatalities from being struck-by vehicles

May 11, 2023

Good Jobs, Mental Health, and Inequity: Towards a Greater Consideration of Work as a Social Determinant of Health

CDR Elizabeth Garza
Coordinator, Construction Program
National Institute for Occupational Safety and Health
Centers for Disease Control and Prevention

CDR Alice M. Shumate
Director, Center for Maritime Safety and Health Studies
National Institute for Occupational Safety and Health
Centers for Disease Control and Prevention

Social Determinants of Health (SDOH)

- Health inequities are caused by the uneven distribution of SDOH
- Conditions in which people are born, grow, live, ***work*** and age
- Affect a wide range of health, functioning, and quality-of-life outcomes and risks

"Work" added as 6th domain of SDOH

- Community Preventive Services Task Force
  - Employment and Job Characteristics
- CDC Health Equity webpage

Next steps

- Working to reintegrate a biosocial approach to OSH
- Broader adoption of "work" as the 6th domain of the SDOH
- Greater consideration of work in health inequities research

Employment & job characteristics:
Access to stable and fulfilling work with equitable pay. This domain includes wages, work schedules, workload, job security, safety, working conditions and environments, workplace accommodations, access to benefits including paid leave and health insurance, work/life balance, unemployment, and underemployment.

Dump Truck & Quick Coupler Fact Sheets

Preventing Dump Truck-related Injuries and Deaths During Construction

Injuries from dump trucks led to the deaths of 809 construction and extraction workers from 2011 to 2020, an average of 81 deaths per year. Those operating dump trucks or working nearby are at risk of multiple hazards. This fact sheet gives employers ways to recognize and avoid these hazards and prevent dump truck-related injuries and deaths at construction sites.

Employers, contractors, and supervisors should take the lead in using these recommendations to help prevent dump truck-related deaths, injuries, and close calls. Employers have the responsibility to comply with applicable Occupational Safety and Health Administration (OSHA) regulations, including for example 29 CFR 1926 Subpart O (Motor Vehicles, Mechanized Equipment, and Marine Operations) and Subpart G (Signs, Signals, and Barricades), as part of an overall safety and health program. This fact sheet focuses on dump trucks that dump the material out of the rear of the bed, but many of the recommendations may apply to other types of trucks.

A dump truck rollover that occurred while operating on a soft surface.

Prepare and Plan for Safety

- Dvelop a written safety program that addresses the safety hazards to drivers and those who work on the ground near dump trucks (ground workers).
- Inspect the work area for potential hazards before each shift and during the shift as needed to address changing conditions. This should be done by one or more 'competent persons.'
- Provide staging areas to eliminate backing up or at least minimize backing up distances in work zones.
- Create internal traffic control plans (ITCPs) for areas involving dump truck travel. Focus on eliminating or decreasing the need for ground workers near moving vehicles and providing physical barriers where necessary.
- Anticipate ground conditions through pre-planning and provide a stable surface for all dumping operations.
- Prepare and deploy signs and markers to show workers where to walk in high-traffic areas.
- Enforce the applicable elements of consensus standards concerning work zone safety for roadway construction and high-visibility safety apparel.

Consider Using New Technologies

- Many workplaces are using sensors much more frequently for health and safety. Employers should consider installing cameras, electronic signaling devices, or sensors to reduce hazards. These can include:
  - Audible, visual, and/or sensor-based (e.g., radar) devices to warn drivers of workers on foot in the immediate work area
  - Back-up/proximity cameras with a video display for the driver to see their surroundings

Preventing Struck-by Fatalities and Injuries Related to Excavator Quick Coupler Attachments

Summary: Excavator quick coupling devices (quick couplers) can save time on construction job sites by allowing for the rapid change of buckets and other attachments on the end of excavator dipper arms. Improper attachment of the quick coupler, or quick coupler mechanical failure can cause the attachment (which often weighs thousands of pounds) to fall suddenly, potentially causing injury or death to workers. The National Institute for Occupational Safety and Health (NIOSH) recommends that quick coupler failures and subsequent injuries be prevented through proper planning, equipment maintenance, safe work practices, and appropriate training.

Reminder: DO NOT allow construction workers to work within an excavator boom swing radius or directly beneath an elevated excavator bucket or attachment.

Excavator involved in Case Study #1.

Developing Fact Sheet on Quick Coupler Safety

Overview

Struck-by incidents are a leading cause of injury and death among construction workers. Hydraulic excavators and similar equipment are used in construction to move large quantities of earth and for other construction-related tasks.

New FACE reports

WASHINGTON State FACE Program
Fatality Assessment & Control Evaluation

CONSTRUCTION
FATALITY NARRATIVE

FACE

Site Superintendent Run Over by Backing Dump Truck

INCIDENT FACTS

REPORT #: 71-231-2022

REPORT DATE: December 5, 2022

INCIDENT DATE: May 5, 2021

WORKER: 60 years old

INDUSTRY: New Single-Family Housing Construction

OCCUPATION: Construction superintendent

SCENE: Construction site of single-family homes

EVENT TYPE: Pedestrian struck by vehicle

SUMMARY

A 60-year-old construction site superintendent died when a dump truck backing up ran over him. He had 40 years' experience and worked for a new single-family housing construction contractor.

Dump truck that backed over the superintendent.

On the day of the incident, the superintendent was in charge of coordinating and directing subcontractors and scheduling dump trucks to haul away construction debris. Two dump truck drivers employed by a solid waste recycling company were emptying dumpsters and hauling away the debris. While emptying a dumpster, a 5-gallon bucket of paint fell out and spilled on the street. The superintendent came over to organize the cleanup. He assigned one of the subcontractors to get sawdust to absorb the paint and told the drivers he was going to direct vehicles away from it. The drivers then entered their trucks to go pick up the next dumpster located close to the spilled paint. The trucks had to be parked side-by-side as the grapple on one truck needed to pick up the dumpster and empty it into the other. The driver of truck #1 drove out of the alley, turned right, and parked on the side of the street near the superintendent. The driver of truck #2 then turned left onto the street, drove forward, and stopped. He checked his mirrors and got a hand signal from the superintendent to begin backing up. As he was backing up, he lost sight of the superintendent and ran him over. The incident was unwitnessed. It is unknown why the superintendent was in the backing zone, or why the driver could not see him.

Following the incident, investigators found:

- The truck did not have a backup camera, nor was an observer signaling that it was safe to back up.
- The truck's backup alarm was working as it backed up.

OREGON State FACE Program
Fatality Assessment & Control Evaluation

Oregon Institute of Occupational Health Sciences • Oregon Health & Science University
3222 SW Research Dr. L606 • Portland, OR 97239 • 503-494-2281

FACE NIOSH

INCIDENT HIGHLIGHTS

DATE: Mar. 12, 2021

TIME: 8:45 a.m.

VICTIM: 57-year-old white heavy equipment operator; 47-year-old white rancher

INDUSTRY/NAICS CODE: Construction/238910 and Farming/111940

EMPLOYER: Heavy equipment and farming/ranching

SAFETY & TRAINING: The heavy equipment operator was considered experienced, no formal training.

SCENE:

REPORT#: 2021OR01 **REPORT DATE:** April 26, 2023

Heavy Equipment Operator and Rancher Crushed by Excavator—Oregon

SUMMARY

On March 12th, 2021, a 57-year-old heavy equipment operator and 47-year-old rancher were run over by an excavator; they died from their injuries immediately. Another individual was able to stop the excavator without getting injured. At the time of the incident, the heavy equipment operator was standing on the tracks when the pilot control stop bar was accidentally released, allowing the machine to start moving. He fell in between the tracks. When the rancher saw him fall, he ran to the machine to pull him to safety but was also run over by the machine. The operator's lunchbox had been left resting on the travel control levers causing the machine to activate when the pilot control stop bar was accidentally released. READ THE FULL REPORT> (p.4)

CONTRIBUTING FACTORS

Key contributing factors identified in this investigation include:

- Older equipment not retrofitted with new safety features.
- Inadequate training on the equipment and hazards of operation.

CALIFORNIA State FACE Program
Fatality Assessment & Control Evaluation

Occupational Health Branch • California Department of Public Health
850 Marina Bay Pkwy, P-3, Richmond, CA 94804
510-620-5757 • fax 510-620-5743

FACE NIOSH

INCIDENT HIGHLIGHTS

DATE: August 3, 2021

TIME: 9:13 a.m.

VICTIM: 54-year-old Hispanic construction laborer

INDUSTRY/NAICS CODE: Construction Engineering Services/541330

EMPLOYER: General engineering and construction

SAFETY & TRAINING: The employer had a written IIPP, but specific excavator training was not documented

SCENE: Residential street

REPORT#: 21CA004 **REPORT DATE:** January 5, 2022

Construction Laborer Died When Struck by an Excavator Bucket that Detached from a Quick Coupler — California

SUMMARY

On August 3, 2021, a 54-year-old Hispanic construction laborer was struck by an excavator bucket that detached from a quick coupler that was attached to the boom. The crew was installing an underground storm drainage system on a residential street. The victim was in the trench when the excavator operator swung the boom over the trench to continue digging. The bucket detached from the quick coupler and struck the victim below, killing him. READ THE FULL REPORT> (p.3)

CONTRIBUTING FACTORS

- Inadequate training, communication, and situational awareness
- Insufficient inspection and maintenance of quick coupler LEARN MORE> (p.7)

RECOMMENDATIONS

Promoting productive workplaces through safety and health research NIOSH

Pedestrian Worker Safety

Print

If you're an employer, you can promote pedestrian safety for all of your workers by sharing these tips, and you can inform those who drive for work how to avoid striking a pedestrian.

A pedestrian struck-by-vehicle incident occurs when a worker on foot is struck by a vehicle or other mobile equipment in normal operation. These incidents can take place on or off a road open to traffic—when a worker is crossing a city street, working in a construction work zone, or at a parking lot, farm, loading area, or mining site.

From 2014-2020, 2,258 pedestrian workers in the U.S. died in struck-by-vehicle incidents—on average, 323 deaths per year (about 18% of all motor vehicle deaths at work).[1]

Types of Pedestrian Workers

- Some spend much of their workday on foot near vehicle traffic (crossing guards, road construction workers).
- Others are outside their vehicles for shorter periods but may have to work next to high-speed traffic (law enforcemen officers, firefighters, tow truck drivers).
- Some are on foot at off-road worksites working alongside vehicles and equipment (truck drivers, refuse collection workers, agricultural workers, building construction workers).

NORA

Additional Resources

- Motor Vehicle Safety at Work
- Traffic Safety Facts (National Highway Traffic Safety Administration)
- Pedestrian Safety (National Highway Traffic Safety Administration)
- Pedestrian Safety Campaign Materials in Spanish (National Highway Traffic Safety Administration)

Reference

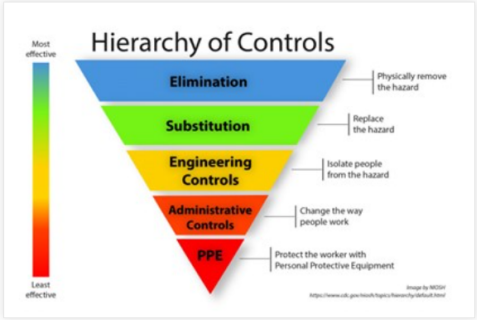
[1]Bureau of Labor Statistics [2022]. Census of Fatal Occupational Injuries, 2014-2020. Create customized tables.

NIOSH Science Blogs: PPE Fit & Psychosocial Hazards

Personal Protective Equipment Fit in the Construction Sector

March 6, 2023 by Mirle Pena, MS; Meghan Kiederer, BA; Patrick G. Dempsey, PhD, CPE; N. Katherine Yoon, PhD; CDR Elizabeth Garza, MPH, CPH; Scott Earnest, PhD, PE, CSP; Douglas Trout, MD, MHS

The construction sector includes a diverse population of workers exposed to many different types of hazards. An important way to prevent occupational illness and injury related to these hazards is by implementing the hierarchy of controls. Personal protective equipment (PPE) is the last control in the hierarchy, but PPE is particularly important when the other controls cannot sufficiently reduce or eliminate hazards.



Construction workers rely on various types of PPE in the course of usual work including fall harnesses, safety shoes, safety glasses, hardhats or helmets, ear plugs or muffs, and respirators. Their PPE must fit properly to provide the expected level of protection and allow them to safely perform their jobs.

Continue reading to learn about NIOSH efforts to improve PPE fit for all workers, including workers in the construction industry.

Equitable PPE Protections

Equitable PPE considers workers' gender, race, age, shape, and size. Workers with different disabilities and job functions, characteristics of occupational settings (e.g., rural), and size of employers (e.g., small versus large employers) are other important factors. In November 2022, NIOSH's National Personal Protective Technology Laboratory (NPPTL) organized the Equitable PPE Protections Workshop to confirm and identify the needs and challenges of diverse PPE user groups and facilitate

Psychosocial Hazards Often Overlooked in Construction Industry

February 15, 2023 by Aurora B. Le, PhD, MPH, CSP, CPH; Doug Trout, MD, MHS; Ann Marie Dale, PhD; Scott Earnest, PhD, PE, CSP

Why Do Psychosocial Factors of Work Matter?

The construction industry has considerable safety and health hazards that result in high rates of injury, illness, and fatality. Common hazards include noise, fall, electrical, and chemical hazards. Approximately 60% of all construction fatalities each year can be attributed to the 'focus four' hazards of falls, struck-by, caught in and between, and electrocutions.[1] Construction occupational safety and health (OSH) has traditionally focused on eliminating, mitigating, and managing those hazards that are common in many construction workplaces.

Other critical threats to construction workers that may be overlooked are psychosocial factors of work. Psychosocial factors are the social, organizational, and managerial features of a job that affect the worker's feelings, attitudes, behaviors, and physiology. Psychosocial factors can result in physical or mental health impacts in the workplace.[2,3] Even though psychosocial factors are often not as easy to observe as physical hazards, and may be more abstract in concept, they are important and should not be dismissed. It is well documented that work affects mental health and vice versa.[4] The combined impacts of physical and mental health have been in the spotlight since the beginning of the COVID-19 pandemic.

Photo © Getty Images

Working conditions such as high demands, low control over work tasks, lack of support from a supervisor or coworkers, and job dissatisfaction are all examples of negative psychosocial factors that can cause adverse health effects. These health effects can include heightened stress[2,3]; poor safety outcomes (e.g., higher injury rates, more frequent incidents)[5–7]; greater risk for cardiovascular disease; and higher susceptibility to musculoskeletal disorders,

NIOSH Science Blogs: Preventing Suicide & Working Hours/Fatigue

Critical Steps Your Workplace Can Take Today to Prevent Suicide

March 15, 2023 by Hope M. Tiesman, PhD; Jodi Frey, PhD, LCSW-C, CEAP; and Sally Spencer-Thomas, PsyD

Employers can play a vital role in suicide prevention. Historically, suicide, mental health, and well-being have been underrepresented in workplace health and safety efforts, but this is changing. In some European countries, there are workplace standards for workplace psychosocial hazards that put workers at risk for suicide. Additionally, in France, employers have been made accountable for toxic workplaces and management practices that contributed to worker suicides.[1] Some of the latest workplace research and best practices for the prevention of suicide are summarized below as a resource for employers and workers.

The Workplace as a Risk Factor for Suicide

The effects of work on suicide are complex. Work can be protective against suicide as a source of personal satisfaction and meaning, interpersonal contacts, and financial security. However, when work is poorly organized or when workplace risks are not managed, work can raise suicide risk in some workers.

Workplace Suicide Risk Factors

There are many different factors that have been shown to adversely affect mental health, and directly or indirectly impact suicidal thoughts, behaviors, and death. Many of these workplace factors interact with non-workplace factors to further increase suicide risk.

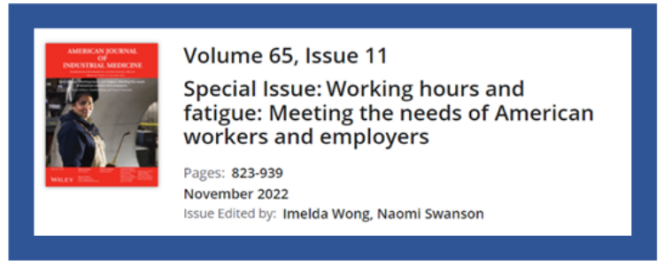
Workplace factors that can contribute to an increased risk of suicide include:

- Low job security, low pay, and job stress [2] [3] 4] [5]
- Access to lethal means [6] [7]–the ability to obtain things like medications and firearms

Working Hours and Fatigue: Meeting the Needs of American Workers and Employers

April 12, 2023 by Grace Vixama, MPH; Imelda Wong, PhD; and Naomi Swanson, PhD

In November 2022, the *American Journal of Industrial Medicine* (AJIM) published a special issue focusing on work-related fatigue. The issue explores factors that may increase work-related fatigue and actions to reduce work-related injuries and illnesses. [1]



This issue is a result of discussions and collaborations from the 2019 NIOSH Working Hours, Sleep and Fatigue Forum and also pulls from reports by the National Institute for Occupational Safety and Health (NIOSH) on long work hours and shift work. The issue's articles give insight into the challenges of managing fatigue across industries and job tasks.

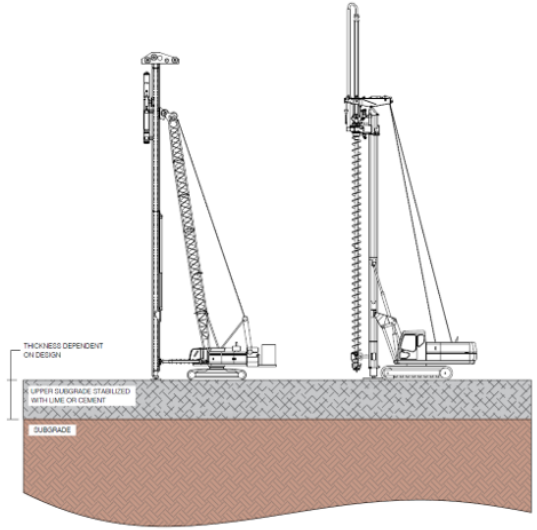
The articles identify knowledge gaps and needs as well as future directions for fatigue research. Similarities were identified across industries to share lessons learned and successful practices to lessen workplace fatigue. Six articles look at approaches in specific sectors including Agriculture, Forestry and Fishing; Healthcare and Social Assistance; Mining; Oil and Gas Extraction; Public Safety; and Transportation and Utilities. The articles identify factors for fatigue risk and effective responses. Two more articles address topics that cut across all industries, focusing on workers with greater risks for workplace injuries and illness and on evaluating the economics of nonstandard work schedules.

NIOSH Science Blog: Foundation Drilling

NIOSH Science Blog: Prevention of Injuries and Fatalities Involving Overturn of Drill Rigs and other Specialty Equipment for Foundation Construction

Introduction

Every year, drill rigs and other heavy, specialty equipment used for deep foundation construction overturn potentially causing injuries and fatalities, as well as damage to the surrounding sites (Figure 1). There are many safety hazards associated with working around this heavy equipment, including the "Focus Four" Hazards: falls, caught-in or -between, struck-by, and electrocution. Five years of BLS, CFOI data show that there were 25 deaths associated with drilling machines, drilling augers and other machinery in source code 3241 from 2017-2021. This science blog will focus on issues related to prevention of overturn of drill rigs and other equipment used for foundation construction.



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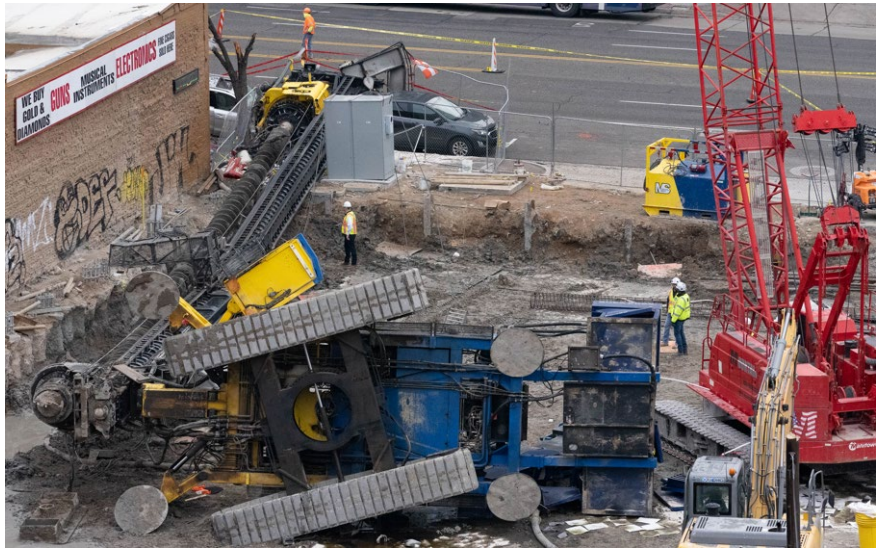

Figure 1. Image of two drill rigs preparing to drill on a safe work platform.

New Journal Articles of Interest

NORA

International Journal of *Environmental Research and Public Health*

MDPI

Review

Four Futures for Occupational Safety and Health

Sarah A. Felknor [1,*], Jessica M. K. Streit [2], Nicole T. Edwards [3] and John Howard [4]

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Abstract: Rapid changes to the nature of work have challenged the capacity of existing occupational safety and health (OSH) systems to ensure safe and productive workplaces. An effective response will require an expanded focus that includes new tools for anticipating and preparing for an uncertain future. Researchers at the U.S. National Institute for Occupational Safety and Health (NIOSH) have adopted the practice of strategic foresight to structure inquiry into how the future will impact OSH. Rooted in futures studies and strategic management, foresight creates well-researched and informed future scenarios that help organizations better prepare for potential challenges and take advantage of new opportunities. This paper summarizes the inaugural NIOSH strategic foresight project, which sought to promote institutional capacity in applied foresight while exploring the future of OSH research and practice activities. With multidisciplinary teams of subject matter experts at NIOSH, we undertook extensive exploration and information synthesis to inform the development of four alternative future scenarios for OSH. We describe the methods we developed to craft these futures and discuss their implications for OSH, including strategic responses that can serve as the basis for an action-oriented roadmap toward a preferred future.

Keywords: strategic foresight; occupational safety and health; scenarios; alternative futures; drivers of change; data security; mental health; partnerships; virtual work

Citation: Felknor, S.A.; Streit, J.M.K.; Edwards, N.T.; Howard, J. Four Futures for Occupational Safety and Health. *Int. J. Environ. Res. Public Health* **2023**, *20*, 4333. https://doi.org/10.3390/ijerph20054333

Academic Editors: Lucian-Ionel Cioca and Paul B. Tchounwou

Received: 2 February 2023
Revised: 16 February 2023
Accepted: 25 February 2023
Published: 28 February 2023

1. Introduction

There is evidence that rapid and multifaceted social, technological, environmental, economic, and political (STEEP) changes have noteworthy and complex effects on the nature of work, the workforce, and the workplace [1–5]. These changes have had a demonstrable impact on the practice of occupational safety and health (OSH), and these trends are expected to continue [6–9]. It has been argued that an expanded focus for OSH will be necessary to proactively prepare for, and respond to, these changes [10]. This includes broadening the range of factors that are recognized as affecting workers and the type of outcomes we consider relevant to OSH [9,10]. The need for expanding paradigms to anticipate and prepare for the changing conditions of OSH has been reported and calls for new strategic approaches to support the transition from OSH 4.0 to OSH 5.0 [11]. Previous work has also substantiated the value of scenarios to identify potential new and exacerbated hazards in the future of work [12].

Safety Science 152 (2022) 105763

Contents lists available at ScienceDirect

Safety Science

journal homepage: www.elsevier.com/locate/safety

Review

Methods to improve the translation of evidence-based interventions: A primer on dissemination and implementation science for occupational safety and health researchers and practitioners

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ARTICLE INFO

Keywords:
Dissemination and implementation science
Translational research
Occupational safety and health
Workplace safety and health
Evidence-based interventions
Research-to-practice

ABSTRACT

Objective: A limited focus on dissemination and implementation (D&I) science has hindered the uptake of evidence-based interventions (EBIs) that reduce workplace morbidity and mortality. D&I science methods can be used in the occupational safety and health (OSH) field to advance the adoption, implementation, and sustainment of EBIs for complex workplaces. These approaches should be responsive to contextual factors, including the needs of partners and beneficiaries (such as employers, employees, and intermediaries).
Methods: By synthesizing seminal literature and texts and leveraging our collective knowledge as D&I science and/or OSH researchers, we developed a D&I science primer for OSH. First, we provide an overview of common D&I terminology and concepts. Second, we describe several key and evolving issues in D&I science: balancing adaptation with intervention fidelity and specifying implementation outcomes and strategies. Next, we review D&I theories, models, and frameworks and offer examples for applying these to OSH research. We also discuss widely used D&I research designs, methods, and measures. Finally, we discuss future directions for D&I science application to OSH and provide resources for further exploration.
Results: We compiled a D&I science primer for OSH appropriate for practitioners and evaluators, especially those newer to the field.
Conclusion: This article fills a gap in the OSH research by providing an overview of D&I science to enhance understanding of key concepts, issues, models, designs, methods and measures for the translation into practice of effective OSH interventions to advance the safety, health and well-being of workers.

PPE Fit related projects

Advancing Equitable PPE Protection for Females Working in Hazardous Environments

Previous research has identified challenges related to equitable PPE use, availability, accessibility, acceptability, and knowledge across several sectors and occupations. These challenges are only increased as the representation of women grows in healthcare, public safety, mining, and construction. NPPTL's project, funded through the NIOSH CORE Health Equity Science and Solutions Pilot program, will further the understanding of the driving factors and barriers to effective use of PPE by female workers. This project includes conducting 7-10 focus groups with 6-12 participants per group. Groups will include multiple occupations, and questions will be designed to identify barriers and driving factors for PPE equity from respondents' perspectives on PPE use, accessibility, availability, acceptability, and knowledge. While this is a pilot effort, the results will be used to develop resources for industry- and job-relevant organizations to increase the equity of PPE protections. This draft framework can then be used to expand the research to other sectors and occupations. Future projects will seek to develop a toolkit to assist organizations and PPE users with assessing the current state of PPE protections to identify solutions to advance occupational safety and health through increasing PPE protections. This project just received formal approval for research to begin. Want to learn more? Reach out to Patrick Dempsey and Katherine Yoon who are leading this effort.

Project Spotlight: Research Efforts to Support PPE Equity

I'm sure many of you participated in NPPTL's Equitable PPE Protections Workshop. During that workshop, NPPTL learned about PPE Equity needs and barriers to equitable PPE protections and reaffirmed our commitment to undertake research that supports the use of PPE by all who need it. In this edition's Project Spotlight, you will learn about three research efforts currently underway in the Research Branch to support equitable PPE for all.

Mobile Facial Scanning App

Current fit testing procedures and research rely on precise manual measurements based on the NIOSH Bivariate Panel and NIOSH Principal Component Analysis (PCA) Panel facial sizing specifications. Fit testing can be time consuming, both during routine operations and emergencies. Fortunately, technology is now capable of capturing 3D facial geometries and creating custom-fitted masks made for users based on their digital facial measurements. As mobile technology is ubiquitous in today's society, the development of cell phone-based and tablet-based applications (apps) that could be used to obtain accurate facial measurements would make the overall fit testing process more efficient. This would also support the introduction of respirators into work environments where fit testing doesn't occur and would support the proper use of respirators by the general public. Accordingly, the Research Branch is pursuing a contract to develop a mobile app for Apple iPhones and Apple iPads to scan users' faces and then provide their facial dimensions and appropriate NIOSH Bivariate and PCA panel sizing. Once we verify this functionality, the app would be expanded to include a prediction of a good-fitting respirator based on the user's panel sizing. The app will also allow users to share their de-identified facial dimensions and demographics with NIOSH to inform the need to develop new headform sizes to accommodate a more diverse group of respirator users. This app will not only support the use and selection of respirators in the workplace but will also help us learn where there may be unique needs for some facial anthropometries. This contract is currently working its way through the procurement process. Want to learn more? Reach out to Mike Bergman who is leading this effort.

Mobile Development and Evaluation of a Train-the-Trainer Program to Support Equitable and Effective Respiratory Protective Device Use

In U.S. workplaces that require the use of respirators, OSHA mandates that these workplaces have written respiratory protection programs with required worksite-specific procedures and elements for required respirator use. As part of these programs, many workplaces employ dedicated staff who are responsible for training workers on the use of respirators and conducting initial and annual fit testing. In many other settings without established respiratory protection programs, these staff do not exist, and thus workers do not receive proper guidance and support for effective respirator use. This project utilizes community resources and trusted community partners to fill the need for education on respirator selection and fit as well as fit testing services for workers without respiratory protection programs and members of the general public. This project will produce a train-the-trainer framework and a series of complementary training modules for public adoption and use. As a result, workers and public wearers of NIOSH Approved® respirators will have greater confidence that their respirators are providing the intended level of respiratory protection and fit. Modules will ensure consistent communication and inform how messages should be designed to promote effective use of respirators for different audiences. A selection framework that is accessible to everyone, including trusted messengers, will positively impact and empower individual user knowledge, attitudes, trust, and effective use of NIOSH Approved® respirators. Currently, we have a contract that is making its way through procurement while we finalize the funding source. Want to learn more? Reach out to Matt Horvatin who is leading this effort.

FY 24-25 CON-related NORA Research projects

FY24 Small Projects Selected for Funding

DLO	Project Officer(s)	IFR Title
DFSE	Stacey Marovich	Integration of Spanish Language Data Coding into NIOCCS
DSR	Marvin Cheng Ci Jyun Liang	Smart Masonry Robot for Struck-by Hazard Prevention
HELD	Marissa Alexander	Investigating Cytokine & Other Biomarkers in Skin Post Exposure to Drilling Fluid
HELD	James Antonini Aliakbar Afshari	Characterization and Toxicity of Aerosols from Thermal Spray Coating Processes
RHD HELD	Stephen Martin Francoise Blachere	DNA-Tagged Particles for Testing Ultraviolet Germicidal Irradiation Systems

FY25 Large Projects Called Forward for Development of Full Proposals

DLO	Project Officer(s)	IFR Title
DFSE	Scott Breloff	Can Exoskeletons Abate Construction Musculoskeletal Injury and Sustain Production?
HELD	Aaron Erdely Patti Erdely	Combustion Source Mixtures: Characteristics and Investigation of Health Effects
HELD	Pius Joseph	A Multi-omics Approach for Early Detection of Silicosis
RHD HELD	Aleksandr Stefaniak Yong Qian	Emissions, Pulmonary and Systemic Toxicity, and Asthma Risk of Resin 3-D Printing

UPDATES FROM DIVISION OF SAFETY RESEARCH – Dr. Chris Pan and colleagues

Mast Climber Studies

- Modeling research involving laboratory studies and follow-up field study tests are continuing
- Current findings will be presented at International Society of Occupational Ergonomics and Safety Conference in October 2023

Exoskeleton Studies

- Continuing work with external partners including Texas Tech University and Oregon State University
- Testing, including human subject testing, continuing

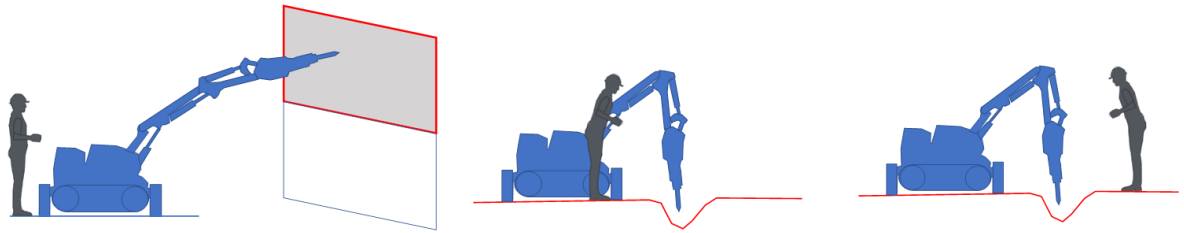
Helmet Studies

- Continuing collaborative work with helmet manufacturers concerning prototype air-bubble cushioning to match with existing helmet models
- Lab test instrumentation improvement ongoing including drop tower upgrade and renovated and customized Randy manikin and data acquisition systems
- Study findings to be presented at the American Society of Biomechanics Conference on August 8-11, 2023

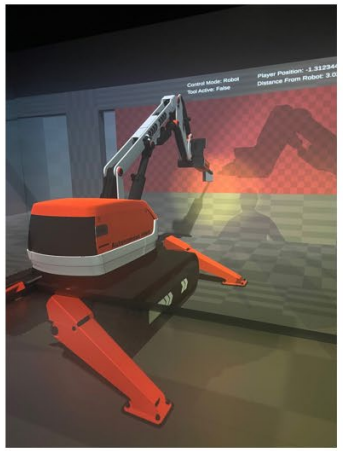
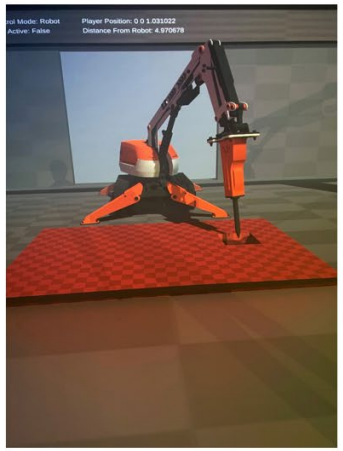
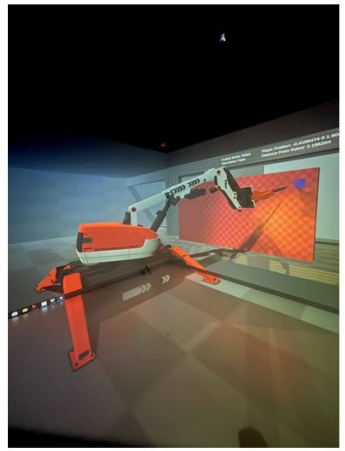
Demolition Robot Project

Project Objectives





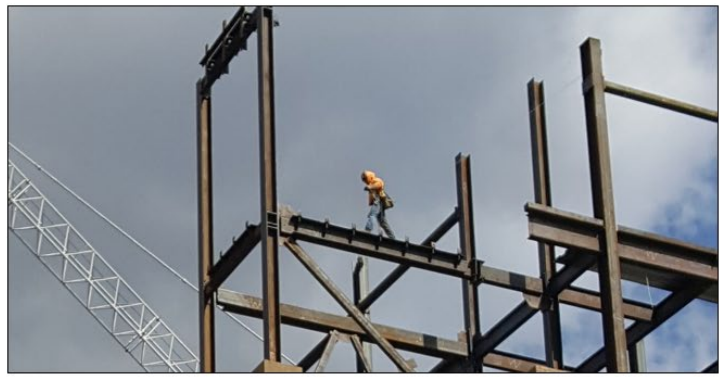
- Conduct an assessment of machine-related, human-related, and environment-related contributing factors of demolition robot hazards.
- Assess the preparedness of demolition robot operators to unexpected robot motions.
- Provide a base of scientific knowledge for risk control and improved operator-demolition-robot interface.

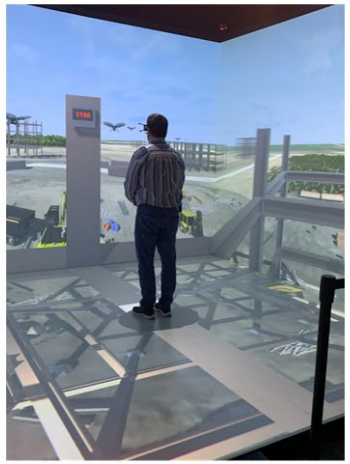




- The contract to develop a virtual environment to collect data in the VR Lab was cleared by ODIT and awarded to Mechdyne.
- Mechdyne is developing the environment for Study 1 and Study 2; we meet weekly to provide input on the latest version of the code.

Drones on construction sites and their effect on workers at heights

Darlene Weaver, Justin Haney, Tony Mckenzie, Doug Ammons





Virtual construction environment

View looking down on forceplate

Virtual gauge with random values

National Institute for Occupational Safety and Health

Review of Medical Surveillance in OS&H – Focus on Construction

Doug Trout, MD, MHS
Deputy Director, NIOSH Office of Construction Safety and Health

April 2023

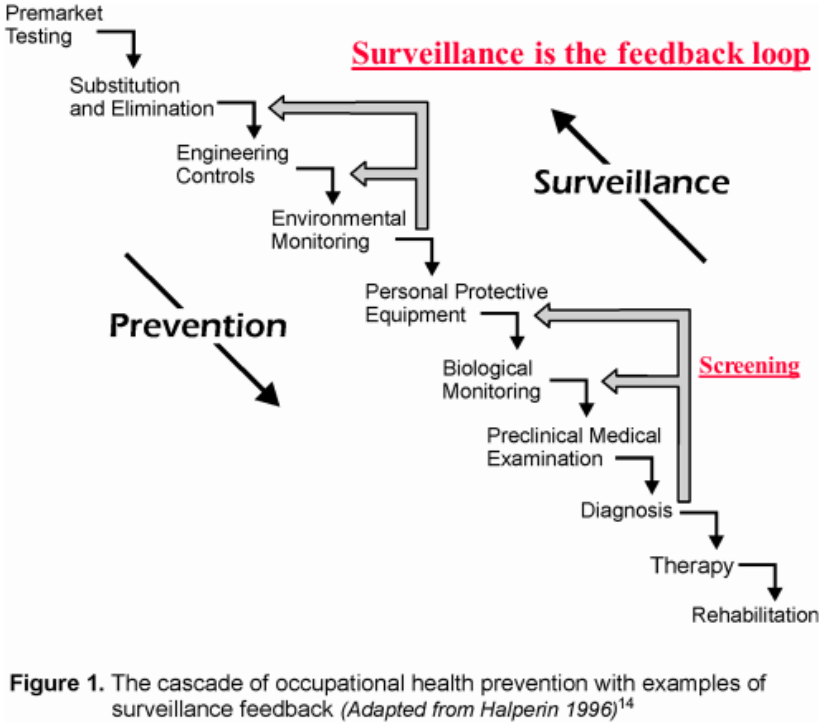


Figure 1. The cascade of occupational health prevention with examples of surveillance feedback *(Adapted from Halperin 1996)*[14]

Building Trades National Medical Screening Program

BTMed – www.btmed.org

A service program run by

CPWR THE CENTER FOR CONSTRUCTION RESEARCH AND TRAINING

The Building Trades National Medical Screening Program is funded through DOE Cooperative Agreement No. DE-FC01-06EH06004

Cobranded Toolbox Talks

Promoting productive workplaces through safety and health research | NIOSH

2022 NIOSH-CPWR Co-branded Construction Toolbox Talks, English Series

Print

The National Institute for Occupational Safety and Health (NIOSH) and CPWR – The Center for Construction Research and Training partnered to develop these co-branded Construction Toolbox Talks, which provide key solutions and best practices for workplace hazards and risks to workers at construction sites.

These free Toolbox Talks allow safety trainers, supervisors, managers, and business owners to lead focused discussions with their workers on hazards they may face on the job.

The Construction Toolbox Talks can also be used to supplement or reinforce other safety and health training.

Each Construction Toolbox Talk includes an explanation of the hazard, a brief, real-life story and discussion questions, and recaps of important safety points. Each Toolbox Talk also has an illustration of the hazard, key solutions, and reminders of important steps to prevent a work-related injury or illness.

The Construction Toolbox Talks are available as web-accessible PDF files and can be downloaded and printed on letter-sized paper (8.5"x11"). Categories are noted below:

Electrical Safety	Environment and Worksite Safety	Heavy Equipment Safety	Exposure Prevention (Chemicals, other)
Fall Prevention	Fire Safety	Material Handling and Ergonomics	Personal Protective Equipment

Heavy Equipment Safety

Aerial Lifts

NIOSH 2022-127

Crane Safety: Stability or Tipping

NIOSH 2022-133

Falling Objects

NIOSH 2022-134

Forklifts

NIOSH 2022-147

Getting On and Off

NIOSH 2022-144

Maintenance

NIOSH 2022-135

[3rd ASTM AM CoE Specialty Workshop - Digitalization of the Construction Industry - AM CoE]

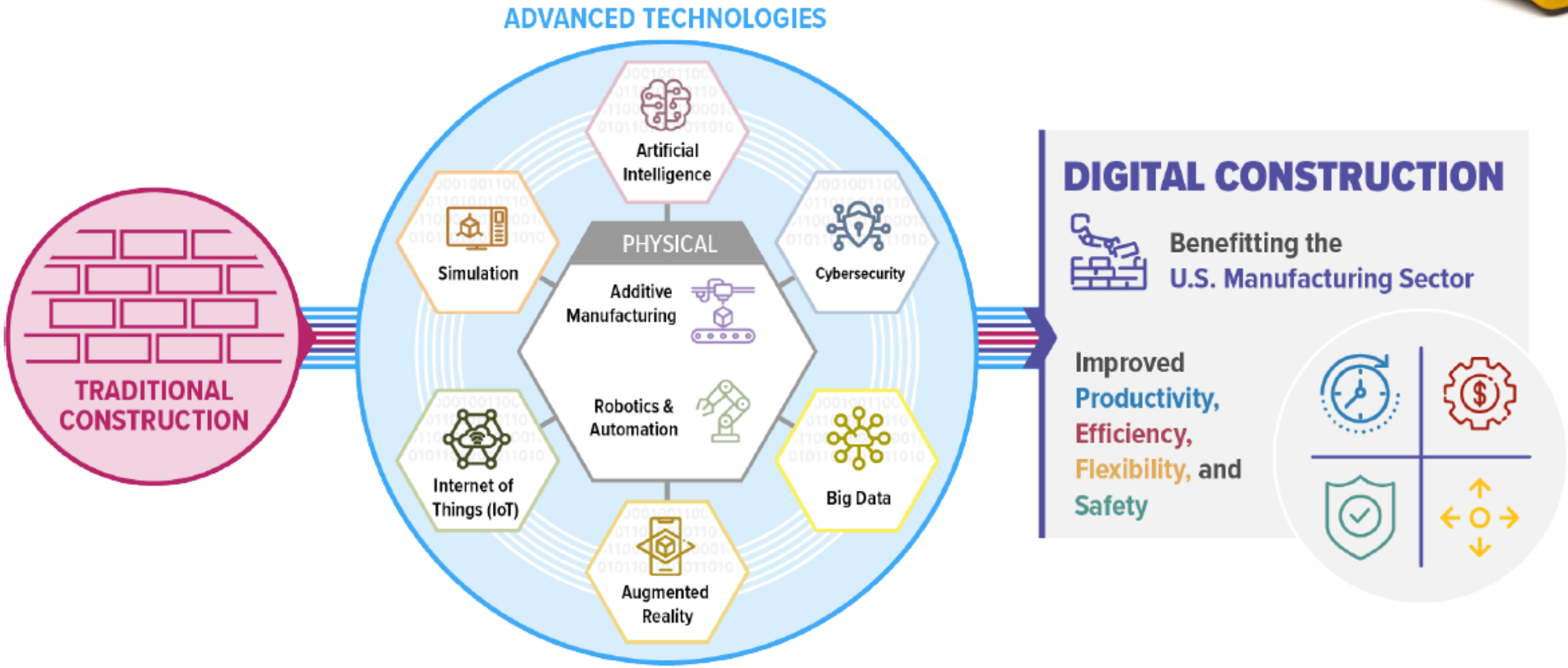


Figure 1. Digital construction and its potential benefits

INNOVATIVE DESIGN

Habitat for Humanity Debuts First Completed Home Constructed Via 3D Printer

PREVENTION THROUGH DESIGN (PtD)

Series of workshops funded by NIOSH in collaboration with Arizona State University

- (2020-2024) 4th Workshop August 10-11, 2022
- Univ of Kansas, Memorial Union, Lawrence, KS
- Goals
  - To drive the implementation of PtD at large industry organizations
  - To advance knowledge in PtD
  - To promote the instruction of PtD in construction management and construction engineering programs at US universities

Prevention through Design | (asu.edu)

Arizona State University

Development of PtD Checklists

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

CPWR
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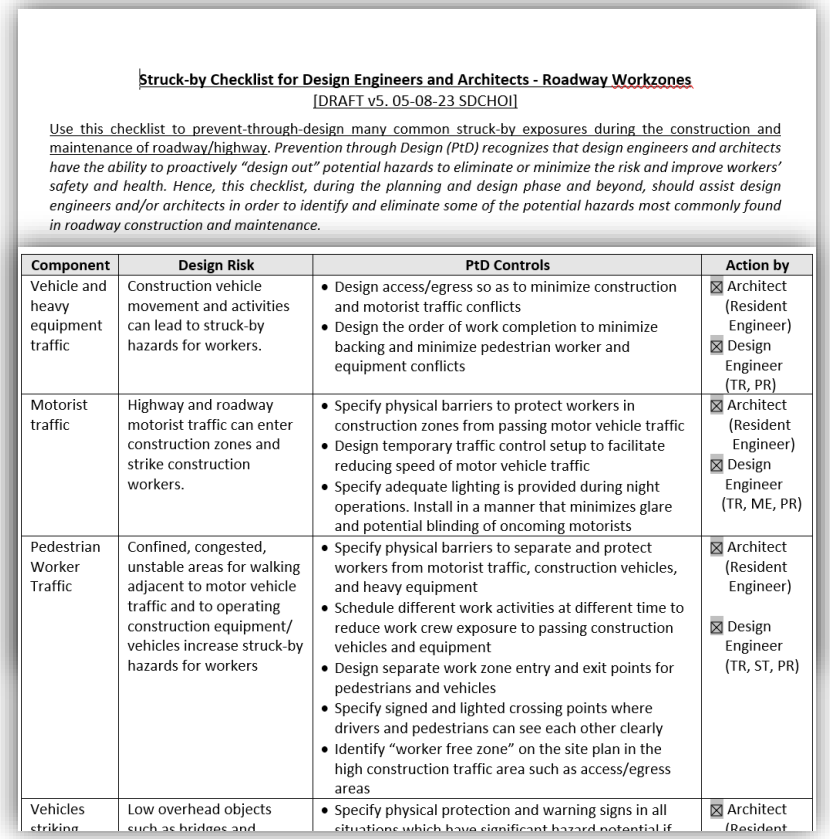
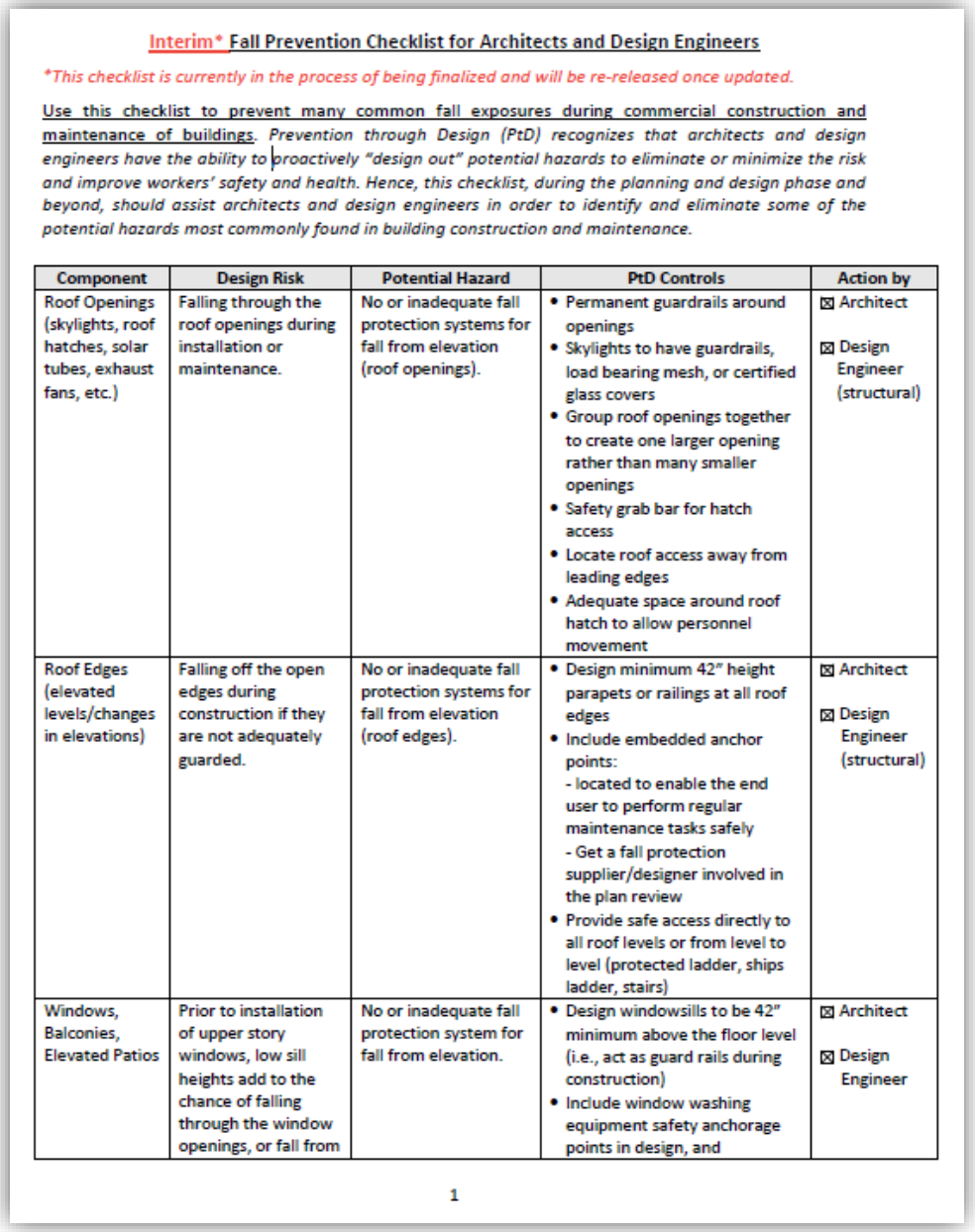
- **Falls**
- **Struck-by Building**
- **Struck-by Workzone**
- **Residential**



Struck-by Checklist for Design Engineers and Architects - Roadway Workzones
[DRAFT v5. 05-08-23 SDCHOI]

Use this checklist to prevent-through-design many common struck-by exposures during the construction and maintenance of roadway/highway. *Prevention through Design (PtD) recognizes that design engineers and architects 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 design engineers and/or architects in order to identify and eliminate some of the potential hazards most commonly found in roadway construction and maintenance.*

Component	Design Risk	PtD Controls	Action by
Vehicle and heavy equipment traffic	Construction vehicle movement and activities can lead to struck-by hazards for workers.	• Design access/egress so as to minimize construction and motorist traffic conflicts • Design the order of work completion to minimize backing and minimize pedestrian worker and equipment conflicts	☒ Architect (Resident Engineer) ☒ Design Engineer (TR, PR)
Motorist traffic	Highway and roadway motorist traffic can enter construction zones and strike construction workers.	• Specify physical barriers to protect workers in construction zones from passing motor vehicle traffic • Design temporary traffic control setup to facilitate reducing speed of motor vehicle traffic • Specify adequate lighting is provided during night operations. Install in a manner that minimizes glare and potential blinding of oncoming motorists	☒ Architect (Resident Engineer) ☒ Design Engineer (TR, ME, PR)
Pedestrian Worker Traffic	Confined, congested, unstable areas for walking adjacent to motor vehicle traffic and to operating construction equipment/ vehicles increase struck-by hazards for workers	• Specify physical barriers to separate and protect workers from motorist traffic, construction vehicles, and heavy equipment • Schedule different work activities at different time to reduce work crew exposure to passing construction vehicles and equipment • Design separate work zone entry and exit points for pedestrians and vehicles • Specify signed and lighted crossing points where drivers and pedestrians can see each other clearly • Identify "worker free zone" on the site plan in the high construction traffic area such as access/egress areas	☒ Architect (Resident Engineer) ☒ Design Engineer (TR, ST, PR)
Vehicles striking	Low overhead objects such as bridges and	• Specify physical protection and warning signs in all situations which have significant hazard potential if	☒ Architect (Resident



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

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Questions?

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