

# Construction Sector Council Struck-by Work Group Report

NORA



STOP. TALK. ACT.

# Activities

- National Stand Down to Prevent Struck-by Incidents
  - Four Sessions
    - Work Zone
    - Lift Zone/Heavy Equipment
    - Dropped Objects
    - English and Spanish
  - April 11-15

**Roadway Construction Is Dangerous**

- According to federal data, in 2020:
  - 857 people died in work zone crashes
  - 170 were "persons on foot" and bicyclists
- On average, about 135 roadway workers are killed on the job annually.
  - The leading cause of death and injury for these workers are struck-by incidents

NATIONAL STAND-DOWN TO PREVENT STRUCK-BY INCIDENTS

SPHERE OF SAFETY

ALTA

**Mobile & Moveable Barrier Options**

Photo Credit: [www.workzonebarriers.com](http://www.workzonebarriers.com) & [www.lindsay.com](http://www.lindsay.com)

**SURVIVING A WORK ZONE STRUCK-BY INCIDENT AND DOING SOMETHING ABOUT IT!!**

FORETRAINING

OBSEY THE ORANGE

SPHERE OF SAFETY

**Prevención de Accidentes**

- Buena planificación
- Compromiso con la seguridad
- Equipo apropiado
- Procedimientos de construcción
- Inspección periódica del lugar de trabajo

Schuffelberger, John E.; Holm, Len. Management of Construction Projects (p. 211). CRC Press. Kindle Edition



## Activities

- 1. Preventing Struck-by Incidents in Roadway Work Zones**
  - 436 live attendees; 220 on-demand views
- 2. Prevención de Incidentes por Atropellos: Zonas de Trabajo, Equipos Pesados e Impacto de Objetos**
  - 41 live attendees; 34 on-demand views
- 3. What's the Risk? Best Practices to Reduce the Likelihood of Struck-by Injuries from Heavy Equipment and Crane Activities**
  - 193 live attendees; 80 on-demand views
- 4. Preventing Struck-by Incidents from Dropped Tools & Other Objects**
  - 183 live attendees; 202 on-demand views



STRUCK-BY WORK GROUP





# Infographics

## HOW HEAVY IS DEADLY?

Month 2022

An object may not be heavy... but if it falls, it could be deadly.

The greater the drop height, the greater the landing force.

Height	1 pound	2 pounds	5 pounds	10+ pounds
300 feet	Serious to Severe	Severe	Severe to Deadly	Deadly
200 feet	Serious to Severe	Severe	Severe to Deadly	Deadly
150 feet	Serious	Severe	Severe	Severe to Deadly
100 feet	Serious	Severe	Severe	Severe to Deadly
50 feet	Serious	Serious to Severe	Severe	Severe to Deadly
20 feet	Serious	Serious	Serious to Severe	Severe
10 feet	Serious	Serious	Serious to Severe	Severe
0 feet	Serious	Serious	Serious	Severe

**FALLING OBJECTS CAN CAUSE**

- Minor injuries like lacerations and cuts
- More serious injuries like broken bones
- Severe injuries like paralysis
- Death, in extreme (or some) cases

**WHAT CAN YOU DO?**

- Tether your tools and equipment
- Keep your work area clear of materials, loose tools and equipment
- Learn about how to prevent falling objects from happening on your job

CPWR THE CENTER FOR CONSTRUCTION RESEARCH AND TRAINING

## PREVENTING STRUCK-BY INCIDENTS

Use flaggers, barricades and signs to control the flow of traffic

Hold a lift plan meeting before any work begins to discuss, for example, items that will be moved, crane set up, and weather conditions

Use tag lines or push sticks to keep loads under control, stay out of the crane's swing radius, never work underneath a suspended load, and DO NOT exceed the crane's lifting capacity

For overhead work, secure tools with tethers and use protective measures such as toeboards or debris/safety nets to prevent, catch, or deflect falling objects

The signal person should use clear signals to communicate with the crane operator

Use barricades to separate workers from vehicles, heavy equipment and falling objects

Properly set up work zones to warn motorists

CPWR THE CENTER FOR CONSTRUCTION RESEARCH AND TRAINING

## STOP THE DROP! PREVENT DROPPED OBJECTS WHEN WORKING AT HEIGHTS

Debris Chute, Safety Nets, Guardrails, Tool Tethers, Debris Nets, Toeboard

**REMEMBER!**

- Secure tools and materials to prevent them from falling on people below.
- Use measures such as toeboards, screens, guardrails, debris nets, catch platforms, or canopies to prevent, catch, or deflect falling objects.
- Barricade hazard areas and post warning signs.
- Always wear a hardhat and routinely inspect it for damage.
- Inspect all tools and equipment before use. Hand tools with loose or cracked handles should not be used.
- Keep materials away from floor openings or leading edges.
- Train workers on the hazards and ways to prevent an incident.

STOP. TALK. ACT.

CPWR THE CENTER FOR CONSTRUCTION RESEARCH AND TRAINING

## STRUCK-BY WORK GROUP



# Toolbox Talks

**CPWR TOOLBOX TALK** **RESEARCH AND TRAINING**

## Preventing Falling Objects

- Use rope pulley systems with brakes for hoisting and lowering.
- Communicate clearly when hoisting and lowering material.
- Provide training which includes hazard recognition and avoidance.
- Develop standard operating procedures for all equipment use.
- Barricade fall zones.
- Follow manufacturer specifications for all equipment use.

**CPWR TOOLBOX TALK** **RESEARCH AND TRAINING**

## Challenges Preventing Falling Objects

- Install protections on the roof to prevent objects from falling.
- Tether tools with proper tool lanyards when performing overhead work.
- Make sure you complete all needed training for the job.
- Inspect your worksite for new dangers each day and when conditions change.
- Wear personal protective equipment.

**CPWR TOOLBOX TALK** **RESEARCH AND TRAINING**

## Solutions for Falling Objects & Dropped Tools

- Tether tools with proper tool lanyards when performing overhead work.
- Keep your worksite clean.
- Make sure your work platform is stable.
- Wear the proper personal protective equipment like gloves, hard hats, and safety glasses.

**CPWR TOOLBOX TALK** **RESEARCH AND TRAINING**

## Prevent Being Caught in/between Equipment and Machinery

- Eliminate need to remove guards for simple maintenance tasks by extending life points.
- Attach guards so workers cannot remove them and, when available, install interlocking guards, which requires a special tool for removal.
- Requirements for Safeguards:
  - Prevent Contact
  - Be Secure
  - Protect from falling objects
  - Create no new hazards
  - Allow for safe lubrication
- Train supervisors, equipment operators, and workers on safe work practices.
- Only qualified personnel should perform maintenance work.
- Safe work practices should include procedures for lockout/tagout of equipment when completing repair work.
  - Ensure any stored energy is released
  - Workers should understand how to stop equipment if a potential danger.
  - Post warning signs to alert workers and bystanders of inspect guards for damage and repair or replace guards before re-energizing and restarting equipment.
- Select appropriate clothing for the task.
  - Avoid loose or baggy clothing. Pants and shirt should fit comfortably; however, pants should not be too long, and sleeves should be tucked in.
  - Do not wear jewelry.
  - Tuck long hair and tuck it into clothing to reduce entanglement risks.
  - If gloves are needed, ensure that they fit appropriately.

©2022 CPWR, The Center for Construction Research and Training. All rights reserved. CPWR is the research and training arm of NABTU. Production of this document was supported by cooperative agreement OH 009102 from the National Institute for Occupational Safety and Health (NIOSH). The contents are solely the responsibility of the authors and do not necessarily represent the official views of NIOSH.

## STRUCK-BY WORK GROUP





# Fact Sheet

## Trench Safety: Before You Dig It, Plan It!

January 2022

**1 cubic yard of dirt weighs the same as a compact car!**

**137 deaths** were caused by excavation and trench cave-ins from 2011 to 2018.



### BEFORE YOU DIG IT, PLAN IT!

- Assign and train a competent person.
- Call 811 to identify and mark underground utility lines.
- Dig a minimum 5 ft away from utility lines.
- Evaluate the soil to determine its stability.
- Plan the job layout to identify safe locations for spoil piles and heavy equipment routes.
- Before the job starts, if the trench will be 5 ft or deeper, set up a protective system. If the trench will be 20 ft or deeper, provide engineering protections.
- Have a traffic control plan and lane closure permits.
- Develop a trench emergency action plan.

### WHEN YOU DIG IT, USE CAUTION!

- Have the competent person inspect the trench, nearby areas, and protective systems each day before the start of work, when conditions change throughout the shift, and after every rainstorm.
- Maintain signs, barriers, and protection around the trench.
- Keep all vehicles and machinery a safe distance from the excavation.
- Ensure ladders and exits are never more than 25 ft away from any worker in the trench.
- Remove workers from the excavation upon any evidence that could cause a cave-in.
- Monitor other types of trench-related hazards that can occur, such as falls from the edge, rigging hazards, or toxic and combustible gases, or oxygen deficient conditions.
- Enforce procedures to ensure that work in an unprotected trench does not occur.

### IF YOU WORK IN A TRENCH:

Check the trench for problems before entering and never enter an unprotected trench. Make sure there is safe entry and exit before entering.

When there is evidence of problems, exit the trench and inform the competent person. Never assume there will be a warning before a cave-in, or that you will have time to get out.



Centers for Disease Control and Prevention  
National Institute for Occupational Safety and Health

**References:**  
[BLS \(2020\). Injuries, illnesses, and fatalities. Safe Work \(State\) \(en\) \(released by Bureau of Economic Analysis\). July 2020. Washington, DC: U.S. Bureau of Labor Statistics. <https://www.bls.gov/news.release/osh072020.pdf>](#)

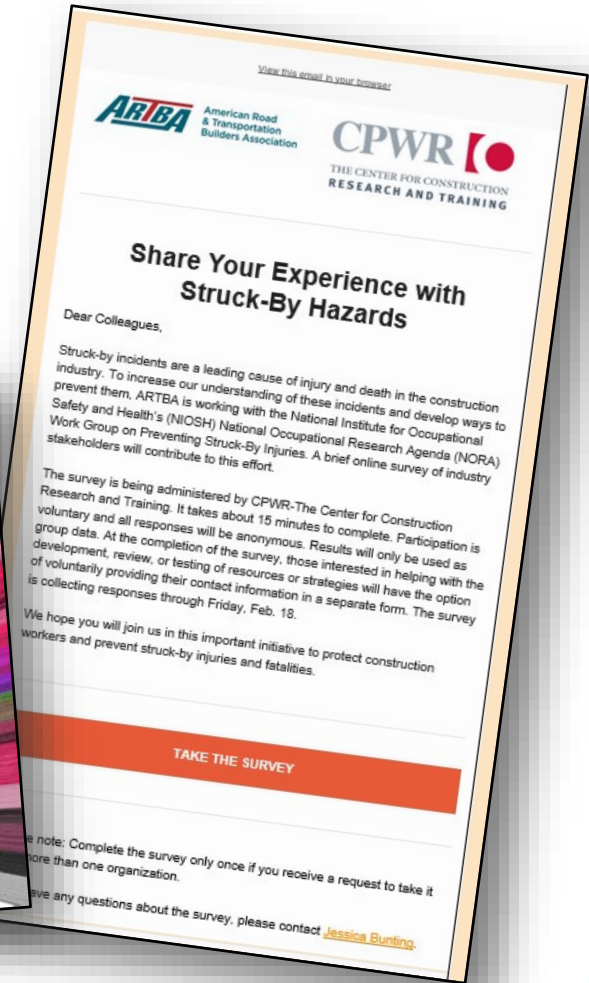
[OSHA \(2015\). Trenching safety and excavation safety. Washington, DC: U.S. Department of Labor. <https://www.osha-slc.gov/sites/default/files/osha-slc-15-129.pdf>](#)

[NIOSH \(2012\). Preventing trench cave-ins from occurring. Cincinnati, OH: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. DHHS \(NIOSH\) Publication No. 2012-210. <https://www.cdc.gov/niosh/publications-and-products/2012-210.pdf>](#)

## STRUCK-BY WORK GROUP



# Behavioral Economics Pilot Study



## STRUCK-BY WORK GROUP



# Behavioral Economics Pilot Study

- Conducted survey on struck-by incidents in February/March:
- 208 respondents:
  - The majority worked for a **general or specialty trade contractor** in the **commercial sector**
  - Most were **safety and health professionals** with **more than 10 years** of experience in the construction industry
- Key findings:
  - Primary causes of struck-by injuries were **working around heavy equipment or vehicles** and **falling/flying objects from heights or on the same level**
  - Measures used most often to protect workers were **training, restricting access to the work area, and using PPE**
  - Top barriers to implementing controls for struck-by hazards were **lack of training, scheduling pressure/emphasis on production, and lack of understanding of how to address the hazard across different jobs and working conditions**





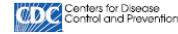
# Behavioral Economics Pilot Study

- Key findings continued:
  - The majority said their company includes strategies to prevent struck-by incidents when planning a project
  - Respondents said that **training is needed on how to identify, prevent, and conduct a job hazard analysis for struck-by hazards**, and **information is needed on what is working on other job sites** to prevent struck-by hazards
  - **Toolbox talks, training programs, and posters** were identified as the most effective ways to raise awareness and ensure safe practices
- Next steps:
  - Develop planning program
  - Recruit contractors of various sizes for pilot testing
  - Gather feedback and update the program accordingly



# NIOSH Science Blog/California FACE Study

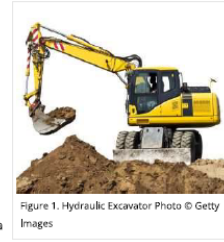
- Preventing Struck-by Fatalities Related to Excavator Quick Couplers, Buckets, and Attachments



## Preventing Struck-by Fatalities Related to Excavator Quick Couplers, Buckets, and Attachments

March 10, 2022 by Laura Styles, Hank Cierpik, Robert Harrison, David Schutt, Scott Earnest, Nancy T. Romano, CDR Elizabeth Garza, Jette Novakmirly, Douglas Trout, and LT Bryan Wimer

The 3rd annual National Stand-Down to Prevent Struck-by Incidents will take place April 11–15, 2022. As part of these efforts, NIOSH and others are highlighting the lethal struck-by risk related to excavator quick couplers. A quick coupler failure can cause the attachment to fall suddenly, causing death, injury, and/or damage to the excavator and attachment.



### Background

Hydraulic excavators (Figure 1 and 2) are used in construction to move large quantities of earth. Many excavators have tracks for movement and are commonly called “trackhoes” or “backhoes.” An excavator quick coupling device (quick coupler) can save a lot of time on the job site, but when an excavator bucket unintentionally detaches from a quick coupler, worker fatalities can – and have – occurred. Quick couplers allow for the rapid change of buckets and other attachments on the end of excavator dipper arms. Depending on the design, they may be used to connect attachments remotely from the cab or may require the operator to complete the connection of the device manually on the ground by inserting a locking pin. Safety mechanisms are built into most modern quick couplers, but they are not fail-proof.



Figure 2. Quick coupler, bucket, and excavator Photo © Getty Images

Struck-by incidents are a leading cause of death among construction workers [1], and since 1992 the leading cause of nonfatal injuries in the construction industry [2]. Excavators are dangerous to work around. The boom and dipper arm move quickly in small spaces such as a trench and carry extremely heavy loads. An excavator bucket can weigh 900 pounds while empty, and significantly more when holding soil or rock, making a failure very dangerous.

Three deaths have been reported since 2019 as a result of a worker being crushed by a bucket that fell from a quick coupler. While quick couplers have their own individual safety specifications, it is important to note that employers must ensure their workers are never working beneath a bucket, attachment, or load, and that workers should never be within the swing radius of an operating excavator. If workers are located outside of this hazard zone, there is much less risk of injury or death if a failure occurs. Furthermore, OSHA prohibits working beneath a load or within the swing radius of an excavator [3-6], and manufacturer and industry guidelines provide strong language recommending against this all-too-common practice [7-11]. If

these guidelines are not followed, injuries and death can occur.

## STRUCK-BY WORK GROUP



# What should we focus on next?



## Thank you!



STRUCK-BY WORK GROUP

