

Fatal and Nonfatal Struck-by Injuries in the Construction Industry, 2011-2019

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OVERVIEW

Struck hazards are a [leading cause of fatal injuries](#) and the [largest contributor](#) to nonfatal injuries in the construction industry. In support of the 2nd annual [National Stand-Down to Prevent Struck-by Incidents](#), this Data Bulletin provides updated data and trends in fatal and nonfatal struck injuries in construction from 2011[†] through 2019. Numbers for fatal injuries were obtained from the online database of the Census of Fatal Occupational Injuries (CFOI), updated and maintained by the U.S. Bureau of Labor Statistics (BLS). Fatalities in all employment (including self-employed and wage-and-salary workers in private and public sectors in construction) were included in the data analyses. Fatality risk was measured by the number of deaths per 100,000 full-time workers (FTEs; assuming a full-time worker works 40 hours per week, 50 weeks per year). The Current Population Survey (CPS), another BLS data collection, was the source of the denominators for fatal injury rate estimates. Nonfatal injury numbers and rates (per 10,000 FTEs) were obtained from the online database of the BLS Survey of Occupational Injuries and Illnesses (SOII), and include only injuries that resulted in days away from work (i.e., severe injuries, or lost workday injuries) among private, wage-and-salary construction workers. Due to data limitations, detailed analyses are only available for selected subgroups.

There are two types of *struck* hazards: “*struck-by*” (i.e., the object strikes the worker, such as trucks and cranes), or “*struck-against*” (i.e., the worker strikes the object, such as striking against a carpet kicker). The majority of struck injuries were from struck-by incidents. When looking at struck-against incidents, few were fatal, hence those fatalities were not reported.

APRIL 26, 2021

STOP
TALK
ACT

NATIONAL STAND-DOWN

TO PREVENT
STRUCK-BY INCIDENTS
IN WORK AND LIFT ZONES



THIS ISSUE

This issue examines fatal and nonfatal struck injuries in construction from 2011 through 2019, identifying trends by subsector and injury cause.

KEY FINDINGS

In 2019, struck-by injuries caused 170 deaths in construction, of which 47% involved transport vehicles.

Chart 1

Between 2011 and 2019, the rate of fatal struck-by injuries in construction from objects/equipment and transport vehicles declined by 15% and 23%, respectively.

Chart 2

Heavy and Civil Engineering Construction (NAICS 237) accounted for more than two-thirds (68%) of construction struck-by deaths from transport vehicles in 2019.

Chart 4

In 2019, there were 20,600 nonfatal struck injuries in construction, comprising one quarter (26%) of the industry's total nonfatal injuries.

Chart 6

Between 2011 and 2019, the rate of nonfatal struck-by and struck-against injuries in construction declined by 20% and 47%, respectively.

Chart 7

NEXT DATA BULLETIN

Impact of COVID-19 on construction workers and businesses

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Numbers in text and charts were calculated by the CPWR Data Center.

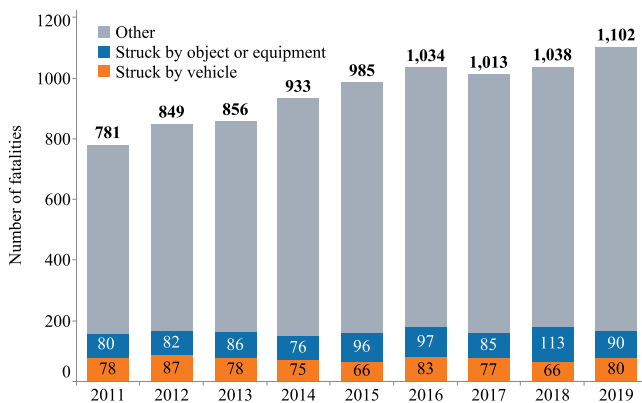
† Since 2011, BLS has started to use version 2.01 of the Occupational Injury and Illness Classification System (OIICS).

More information is available at <https://wwwn.cdc.gov/wisards/oiiics/>

In 2019, 170 construction workers lost their lives from being struck by equipment, objects, or transport vehicles, a 7.6% increase from 158 deaths in 2011 (chart 1). The number of overall construction fatalities rose 41.1% during the same period.

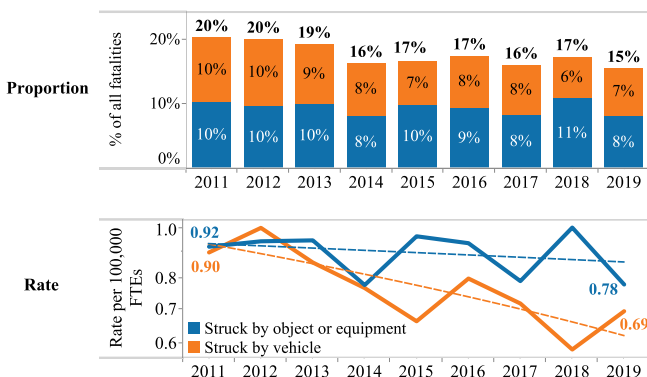
The proportion of total construction deaths from struck-by injuries fell from 20% in 2011 to 15% in 2019 (chart 2). Similarly, the industry's rate of fatal struck-by injuries from both transport vehicles and objects or equipment declined during this period by 23.3% and 15.2%, respectively.

1. Number of fatalities in construction, struck-by and other fatalities, 2011-2019 (All employment)



Source: U.S. Bureau of Labor Statistics, Census of Fatal Occupational Injuries.

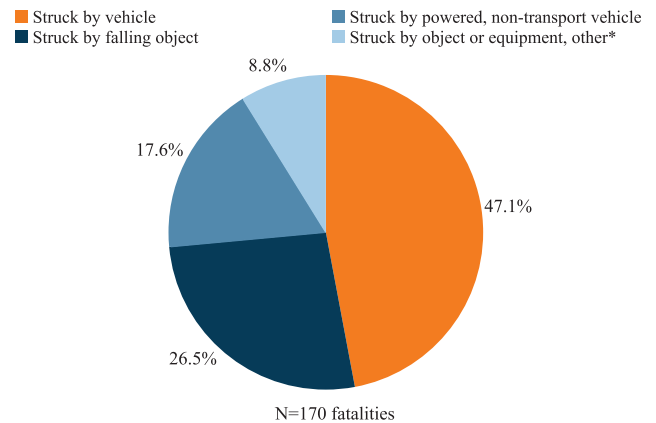
2. Proportion and rate of struck-by fatalities in construction, 2011-2019 (All employment)



Source: U.S. Bureau of Labor Statistics, (1) Census of Fatal Occupational Injuries; (2) Current Population Survey.

In 2019, nearly half (47.1%) of struck-by fatalities in construction involved transport vehicles, such as trucks (chart 3). Objects or equipment were responsible for the remaining struck-by deaths, in particular falling objects or equipment (26.5%) and powered, non-transport vehicles such as forklifts (17.6%).

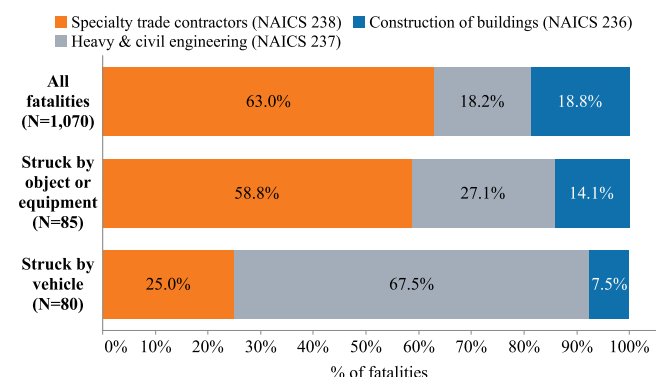
3. Struck-by fatalities in construction, by major cause, 2019 (All employment)



Source: U.S. Bureau of Labor Statistics, Census of Fatal Occupational Injuries.
*Includes struck by rolling, discharged, handheld, swinging, or slipping objects or equipment, and unspecified or unclassifiable causes.

Though Heavy and Civil Engineering Construction (NAICS 237) comprised 18.2% of all construction fatalities in 2019, it accounted for more than two in three (67.5%) struck-by fatalities from transport vehicles and one in four (27.1%) struck-by fatalities from objects or equipment that year (chart 4). The large number of fatalities in this subsector [likely results from road construction site deaths](#) in Highway, Street, and Bridge Construction (NAICS 2373).

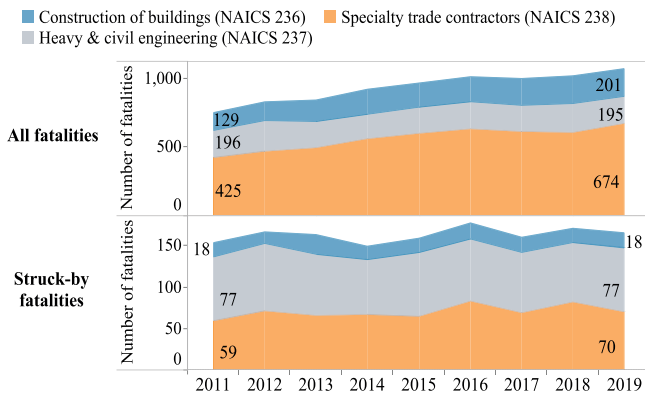
4. Proportion of fatalities by major construction subsector*, struck-by versus all fatalities, 2019 (All employment)



Source: U.S. Bureau of Labor Statistics, Census of Fatal Occupational Injuries.
*Cases missing subsector information are excluded.

While the number of fatal struck-by injuries in Heavy and Civil Engineering construction remained stable from 2011 to 2019, it rose by 18.6% among Specialty Trade Contractors (NAICS 238; chart 5).

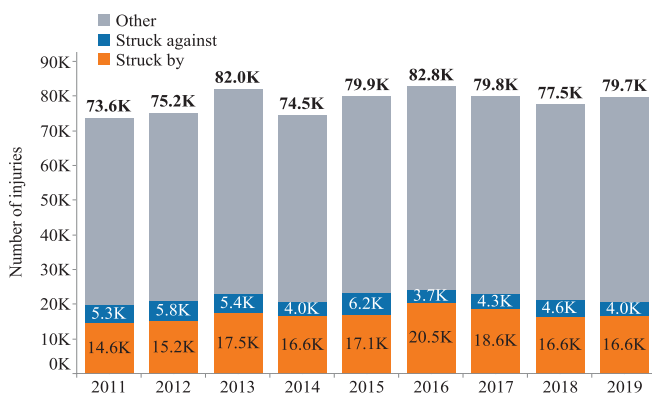
5. Number of fatalities by major construction subsector*, struck-by versus all fatalities, 2011-2019 (All employment)



Source: U.S. Bureau of Labor Statistics, Census of Fatal Occupational Injuries
*Cases missing subsector information are excluded.

In 2019, 20,600 nonfatal struck injuries occurred among wage-and-salary workers in private construction, one-quarter (25.8%) of the industry's total nonfatal reported injuries (chart 6). Four in five (80.6%) of these injuries resulted from being struck by objects, equipment, or transport vehicles (i.e., struck-by), while the remaining 19.4% were due to being struck against objects or equipment (i.e., struck-against). From 2011 to 2019, the number of nonfatal struck-by and struck-against injuries reached the highest point in 2016 (20,500 injuries) and 2015 (6,200 injuries), respectively. While the number of nonfatal struck-by injuries grew 13.7% between 2011 and 2019, the number of struck-against injuries dropped 24.5% during these years.

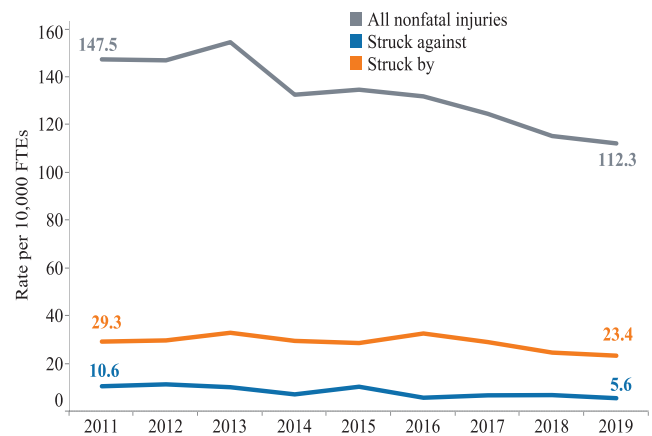
6. Number of nonfatal injuries in construction, struck and other injuries, 2011-2019 (Private wage-and-salary workers)



Source: U.S. Bureau of Labor Statistics, Survey of Occupational Injuries and Illnesses

Between 2011 and 2019, the rate of nonfatal struck-by and struck-against injuries declined by 20.1% and 47.2%, respectively (chart 7). In comparison, the overall nonfatal injury rate in construction fell 23.9%.

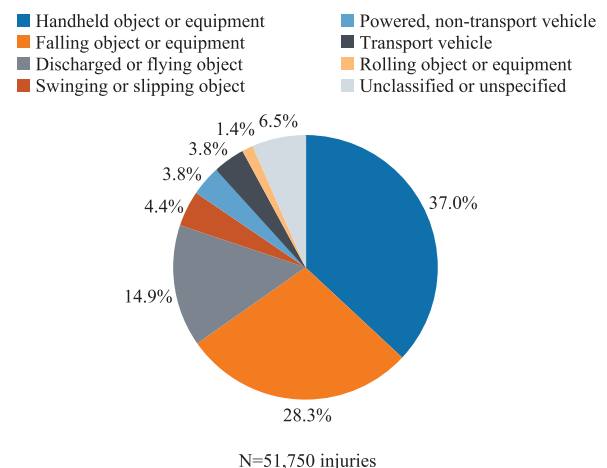
7. Rate of nonfatal injuries in construction, struck versus all injuries, 2011-2019 (Private wage-and-salary workers)



Source: U.S. Bureau of Labor Statistics, Survey of Occupational Injuries and Illnesses

Handheld objects or equipment accounted for the greatest proportion (37%) of struck-by injuries in construction from 2017 to 2019 (chart 8), of which three-fourths (76.1%) involved swinging/slipping objects (e.g., hammers) held by the injured worker (supplemental chart S5). The next most frequent types of struck-by injuries involved falling objects or equipment (28.3%) and discharged or flying objects (14.9%; chart 8). Though transport vehicles caused nearly half of fatal struck-by injuries (see chart 3), they caused 3.8% of nonfatal struck-by injuries.

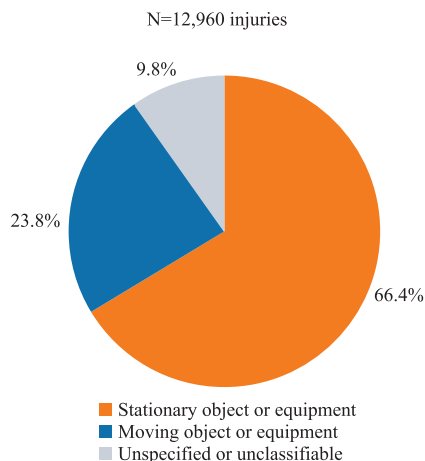
8. Nonfatal struck-by injuries in construction, by type of object or equipment, sum of 2017-2019 (Private wage-and-salary workers)



Source: U.S. Bureau of Labor Statistics, Survey of Occupational Injuries and Illnesses

Of the 13,000 nonfatal struck-against injuries in construction from 2017 to 2019, two in three (66.4%) involved stationary objects or equipment (chart 9), of which 35.9% resulted from a worker stepping on an object (supplemental chart S6).

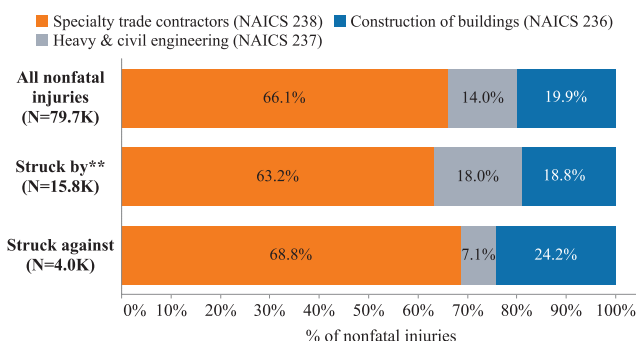
9. Nonfatal struck-against injuries in construction, by major type of object or equipment, sum of 2017-2019 (Private wage-and-salary workers)



Source: U.S. Bureau of Labor Statistics, Survey of Occupational Injuries and Illnesses

Specialty Trade Contractors (NAICS 238) accounted for most nonfatal struck-by (63.2%) and struck-against (68.8%) injuries in 2019 (chart 10). Heavy and Civil Engineering Construction (NAICS 237) comprised 14% of total injuries but 18% of struck-by injuries, while Construction of Buildings (NAICS 236) represented 19.9% of total injuries but 24.2% of struck-against injuries.

10. Proportion of nonfatal injuries by major construction subsector*, struck versus all injuries, 2019 (Private wage-and-salary workers)



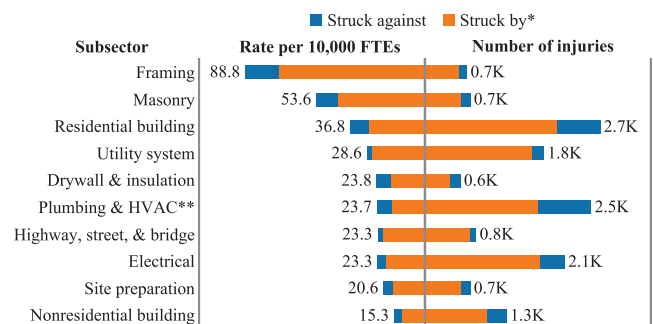
Source: U.S. Bureau of Labor Statistics, Survey of Occupational Injuries and Illnesses

*Cases missing subsector information are excluded.

**Includes "struck by object or equipment" injuries (OIIICS 62), and excludes "struck by vehicle" injuries (OIIICS 24).

In 2019, the nonfatal struck injury rate was particularly high (>35 injuries per 10,000 FTEs) in Framing Contractors (NAICS 23813), Masonry Contractors (NAICS 23814), and Residential Building Construction (NAICS 23610; chart 11). Residential Building Construction accounted for a large number of nonfatal struck injuries (N=2,700) that year.

11. Number and rate of nonfatal struck injuries, selected detailed construction subsectors, 2019 (Private wage-and-salary workers)



Source: U.S. Bureau of Labor Statistics, Survey of Occupational Injuries and Illnesses

*Includes "struck by object or equipment" injuries (OIIICS 62), and excludes

"struck by vehicle" injuries (OIIICS 24).

**HVAC: heating, ventilation, and air conditioning

Struck hazards continue to be a leading cause of fatal and nonfatal injuries among construction workers, even after recent reductions in their rates. Being struck by vehicles remains a common life-threatening hazard in the industry, particularly in Heavy and Civil Engineering Construction. In addition, thousands of construction workers are disabled or lose workdays due to being struck by handheld, falling, discharged, or flying objects or equipment.

Struck injuries and fatalities are preventable. CPWR has summarized strategies and solutions to address struck hazards through a variety of platforms, including the [Construction Solutions](#) website. [OSHA](#) and [NIOSH](#) have also devoted resources to such hazards.

The NORA Construction Sector Council will be holding [two webinars](#) as part of the National Stand-Down to Prevent Struck-by Incidents on April 26th, 2021. More information about the stand-down event is available on the [Struck-by Hazards page](#) on the CPWR website.

ACCESS THE CHARTS & MORE

View the [charts](#) (including supplemental charts) in PowerPoint and the [data](#) underlying the charts in Excel. Downloading will start when you click on each link.

DEFINITIONS

All employment – Self-employed and wage-and-salary workers in private and public sectors in construction

Private wage-and-salary – Workers who receive wages, salaries, commissions, tips, or pay from a private employer

Events/Exposures (i.e., Injury Causes):

Struck injury (OIICS 62*, 63* or 24*) – Injury in which a person is struck (1) by vehicles, objects, or equipment, or (2) against objects or equipment.

1. Struck-by injury (OIICS 62* or 24*)

A. Struck by object or equipment (OIICS 62*)

- a. **Struck by powered, non-transport vehicle (OIICS 621*)** – Injury in which a person is struck by a non-transport vehicle or mobile equipment, such as a forklift.
- b. **Struck by rolling object or equipment (OIICS 622*)** – Injury in which a person is struck or run over by a rolling object or piece of equipment (e.g., hand truck).
- c. **Struck by falling object or equipment (OIICS 623*)** – Injury resulting from being struck by a falling source, including:
 - i. **Struck by object or equipment dropped by injured worker (OIICS 6231)**
 - ii. **Struck by object or equipment dropped by other person (OIICS 6232)**
 - iii. **Struck by object falling from vehicle or machinery, other than a vehicle part (OIICS 6233)**
- d. **Struck by discharged or flying object (OIICS 624*)** – Injury caused by an object that is thrown, hurled, or propelled across space.
 - i. **Struck by dislodged flying object, particle (OIICS 6241)** – Injury in which a piece of material separates from a tool, machine, or other object (e.g., a drill bit breaking off).
 - ii. **Struck by discharged object or substance (OIICS 6242)** – Injury in which an object is ejected under power by a tool or equipment designed for that purpose, excluding weapons (e.g., nail discharged from nail gun).
 - iii. **Struck by thrown object – unintentional injury (OIICS 6243)**
- e. **Injured by handheld object or equipment (OIICS 625*)** – Injury resulting from being struck by objects or equipment in the injured worker's hands, including:

- i. **Injured by object breaking in hand (OIICS 6251)** – Example: Worker is splintered by handheld tool.

- ii. **Injured by slipping or swinging object held by injured worker (OIICS 6252)** – Example: Worker aims hammer incorrectly and strikes their own hand.

- iii. **Injured by slipping or swinging object held by other person (OIICS 6253)**

- f. **Struck by swinging or slipping object (OIICS 626*)** – Example: Worker is hit by swinging door or gate.

B. Struck by vehicle (OIICS 24*) – Injury in which a pedestrian is struck by a transport vehicle, regardless of location.

- a. **Pedestrian struck by vehicle in work zone (OIICS 241*)** – Injury in which a pedestrian is struck by a vehicle in the vicinity of road construction, maintenance, utility work or within an area marked by signs, barricades or other devices (e.g., struck while directing traffic or pavement marking).
- b. **Pedestrian struck by vehicle in roadway (OIICS 242*)**
- c. **Pedestrian struck vehicle in non-roadway area (OIICS 244*)** – Injury in which a pedestrian is struck by a vehicle in industrial, commercial, residential, and farm premises; parking lots; or logging roads.
- d. **Struck by vehicle, other (OIICS 240, 243, 249)** – Injury in which a pedestrian is struck by a vehicle on the side of the road or is struck by a vehicle with an unspecified or unclassifiable detailed event or exposure.

2. Struck-against injury (i.e., struck against objects or equipment; OIICS 63*) – Injury in which a worker strikes an object.

A. Struck against moving object or equipment (OIICS 631*)

- a. **Struck against moving part of machinery or equipment (OIICS 6311)** – Example: Worker is struck against running saw.
- b. **Struck against object or equipment while moving it (OIICS 6312)**

B. Struck against stationary object or equipment (OIICS 632*)

- a. **Stepped on object (OIICS 6321)** – Example: Worker is cut or punctured after stepping on nail.
- b. **Struck against stationary objects or equipment while rising (OIICS 6322)**

Unspecified/unclassifiable (various OIICS codes) – Term used to describe injury causes categorized by OIICS as either “unspecified” or “not elsewhere classified” (n.e.c.).

Detailed categories and definitions are available at <https://wwwn.cdc.gov/wisards/oiiics/Trees/MultiTree.aspx?TreeType=Event>

DATA SOURCES

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U.S. Bureau of Labor Statistics, Survey of Occupational Injuries and Illnesses, 2011-2019.

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Besides cpwr.com, visit CPWR's other online resources to help reduce construction safety and health hazards:

- Choose Hand Safety
<https://choosehandsafety.org/>
- Construction Safety and Health Network
<https://safeconstructionnetwork.org/>
- Construction Solutions
<https://www.cpwrconstructionsolutions.org/>
- Construction Solutions ROI Calculator
<https://www.safecalc.org/>
- COVID-19 Construction Clearinghouse
<https://covid.elcosh.org/index.php>
- COVID-19 Exposure Control Planning Tool
<https://www.covidcpwr.org>
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- Exposure Control Database
<https://ecd.cpwrconstructionsolutions.org/>
- Safety Climate Assessment Tool (S-CAT)
<https://cpwr.com/safetyclimate>
- Safety Climate Assessment Tool for Small Contractors (S-CAT^{SC})
<https://www.cpwr.com/scat-sc>
- Stop Construction Falls
<https://stopconstructionfalls.com/>
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CPWR is the research and training arm of NABTU. Production of this document was supported by cooperative agreement OH 009762 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.

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