CPWR THE CENTER FOR CONSTRUCTION RESEARCH AND TRAINING

Data Bulletin

WWW.CPWR.COM

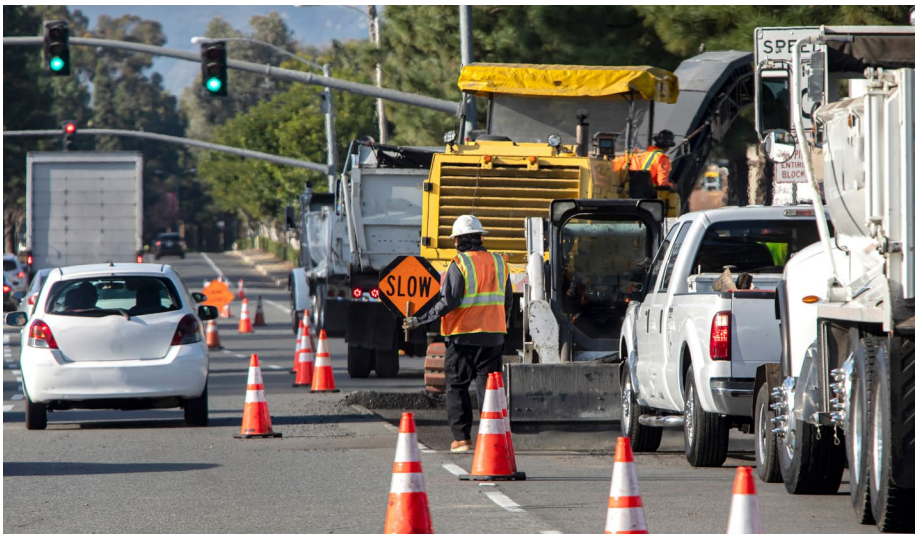
SEPTEMBER 2022

Fatal and Nonfatal Transportation Injuries in the Construction Industry, 2011-2020

William Harris, MS, Amber Brooke Trueblood, DrPH, Raina D. Brooks, MPH, Samantha Brown, MPH[1]

OVERVIEW

Transportation injuries[2] are a leading cause of injuries in the construction industry, accounting for 25% of fatal injuries among all construction workers and 4% of *nonfatal injuries* among private *wage-and-salary* workers in 2020. They also comprise a large portion of fatal (48%) and nonfatal (20%) struck-by injuries in construction. As a result, a thorough understanding of these injuries is needed to guide safety and health interventions, especially as the Infrastructure Investment and Jobs Act invests $110 billion in roadwork and other transportation projects. This Data Bulletin provides information on fatal and nonfatal transportation injuries in construction, as well as information on crashes and fatalities occurring in *construction work zones*. Fatal injuries for all employment were obtained from the U.S. Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI), which is a complete count of reported fatal injuries. Numbers for nonfatal injuries resulting in *days away from work (DAFW)* for private, wage-and-salary construction workers are from the BLS Survey of Occupational Injuries and Illnesses (SOII), which is based on employer logs. Employment figures used for rate calculations per 100,000 *full-time equivalent workers (FTEs)* were estimated using the BLS Current Population Survey (CPS).[3] BLS injury data are complemented by data for crashes and fatalities within construction work zones on public trafficways. This data is obtained from the National Highway Traffic Safety Administration (NHTSA) Fatality Analysis Reporting System (FARS), which is a census of motor vehicle crashes resulting in at least one fatality. Information is based on police reports and other state records. BLS and NHTSA data both examine transportation injuries but are not comparable due to different purposes of collection and definitions utilized.



[1]Correspondence to:datacenter@cpwr.com.
[2]Terms that are italicized at their first mention are defined at the end of the Data Bulletin.
[3]The CPS is conducted by the U.S. Census Bureau for BLS.
Unless otherwise noted, numbers in text and charts were calculated by the CPWR Data Center.

THIS ISSUE

This issue examines fatal and nonfatal transportation injuries in the construction industry, as well as crashes and fatalities occurring in construction work zones.

KEY FINDINGS

There were 2,600 construction workers fatally injured and 35,000 private wage-and-salary construction workers nonfatally injured in transportation incidents from 2011 to 2020.
Charts 1, 5

From 2011 to 2020, a majority of fatal (45%) and nonfatal (63%) transportation injuries were among Specialty Trade Contractors (NAICS 238).
Charts 2, 6

Roadway collisions with other vehicles were the top detailed event for nonfatal injuries (48%) and the second top event for fatal injuries (29%) during the observed time period.
Charts 3, 7

From 2011 to 2020, pedestrian vehicular incidents were the top detailed event for fatal injuries (30%) and the second leading event for nonfatal injuries (17%).
Charts 3, 7

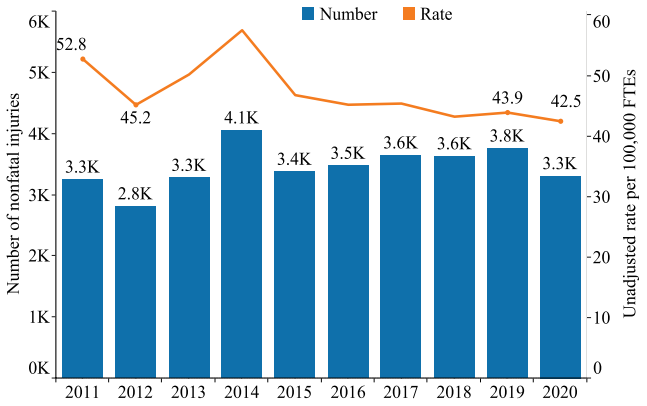
Construction work zone crashes increased 18% from 2011 to 2020.
Chart 10

NEXT DATA BULLETIN

Apprenticeships in Construction

From 2011 to 2020, 35 thousand (K) construction workers experienced a nonfatal *transportation injury* (chart 1). The number of annual injuries remained fairly consistent (approximately 3.3K) from 2011 to 2020, while the rate (per 100,000 FTEs) decreased 19.5% (52.8 to 42.5) from 2011 to 2020. This decline is consistent with trends for all nonfatal injuries in construction. There was a 13.2% decrease in nonfatal transportation injuries (3.8K to 3.3K) and a 3.2% decrease in the rate (43.9 to 42.5) from 2019 to 2020 (the first year of the pandemic).

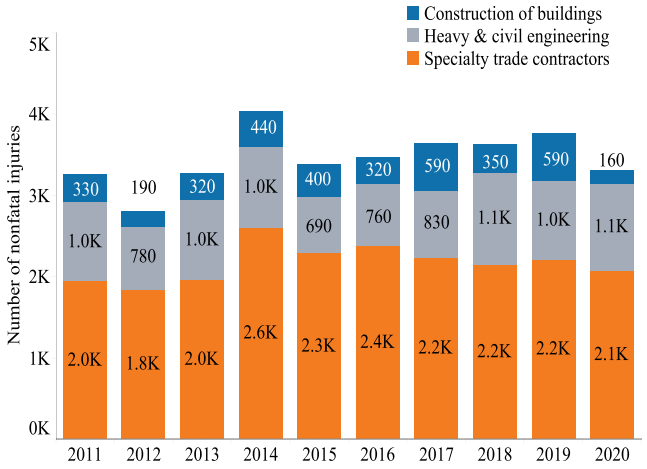
1. Number and rate of nonfatal transportation injuries in construction, 2011-2020 (Private wage-and-salary workers)



Source: *U.S. Bureau of Labor Statistics, 2011-2020 Survey of Occupational Injuries and Illnesses and 2011-2020 Current Population Survey.*

When examined by *major subsector*, 62.7% of nonfatal transportation injuries from 2011 to 2020 occurred among workers in Specialty Trade Contractors (NAICS 238; chart 2), 26.6% were in Heavy and Civil Engineering (NAICS 237) and 10.7% were in Construction of Buildings (NAICS 236).

2. Nonfatal transportation injuries, by major subsector, 2011-2020 (Private wage-and-salary workers)*

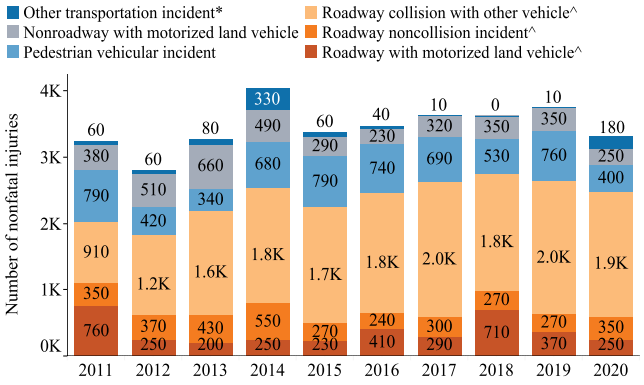


Source: *U.S. Bureau of Labor Statistics, 2011-2020 Survey of Occupational Injuries and Illnesses.*

** Totals may not match chart 1 due to available subsector data.*

Next, the detailed *event or exposure* (e.g., the manner in which the injury was caused) for nonfatal transportation injuries were examined. *Roadway collisions with another vehicle* were the most common cause of nonfatal transportation injuries, accounting for 47.7% (n=16.7K) of these injuries from 2011 to 2020 (chart 3). The second most common cause was *pedestrian vehicular incidents* (17.4%; n=6.1K). During the first year of the pandemic, roadway collisions with another vehicle decreased by 5.0% (2K to 1.9K), while pedestrian vehicular incidents fell by 47.4% (760 to 400).

3. Nonfatal transportation incidents in construction by detailed event or exposure, 2011-2020 (Private wage-and-salary workers)



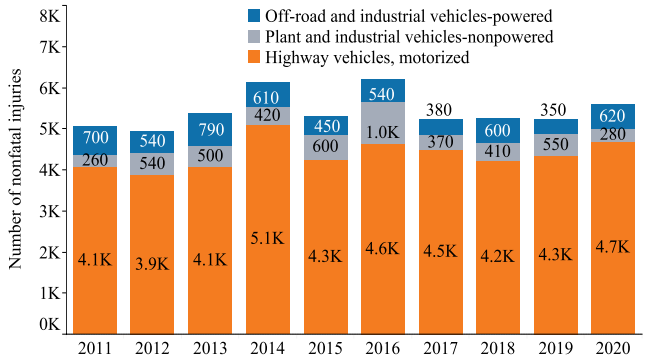
Source: *U.S. Bureau of Labor Statistics, 2011-2020 Survey of Occupational Injuries and Illnesses.*

** Includes OIICS 21 Aircraft incident (n=0), 22 Rail vehicle incident (n=0), 25 Water vehicle incident (n=210).*

^ These are three-digit codes under Roadway incidents involving motorized land vehicles. All other codes shown are two-digit.

Selected detailed categories under primary *vehicle* source (e.g., factor responsible for injury) were then examined for all nonfatal injuries. *Highway vehicles (motorized)* accounted for a majority (77.3%; n=43.8K) of vehicle-related nonfatal injuries among construction workers from 2011-2020 (N=56.7K; chart 4). *Off-road and industrial powered vehicles* were the second most common source during this period (n=5.6K).

4. Selected vehicle sources for all nonfatal injuries in construction, 2011-2020* (Private wage-and-salary workers)

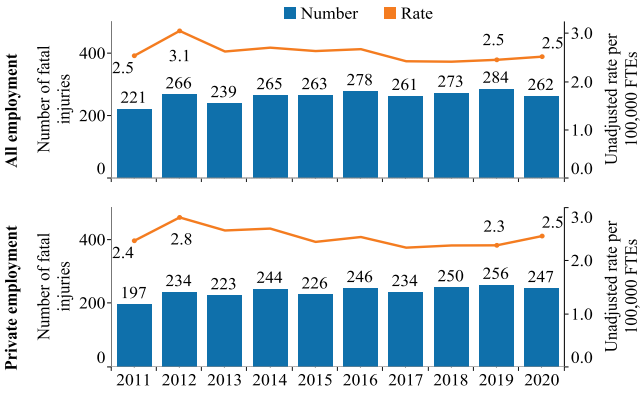


Source: *U.S. Bureau of Labor Statistics, 2011-2020 Survey of Occupational Injuries and Illnesses.*

** Source at two-digit OIICS, excluding OIICS 81 Aircraft (n=0), 82 Rail vehicles (n=30), and 83 Water vehicles (n=220).*

Fatal transportation injuries were then examined. From 2011 to 2020, 2.6K construction workers lost their lives due a transportation injury, with a majority of these occurring in private industry (90.2%; chart 5). While the overall rate stayed the same in 2011 and 2020, the overall number of fatalities increased 18.6% (221 to 262). The increase in the number of fatal injuries is consistent with trends for all fatal injuries in construction. During the first year of the pandemic, there was a 7.7% decrease in fatalities (284 to 262); however, the rate stayed the same at 2.5 per 100,000 FTEs.

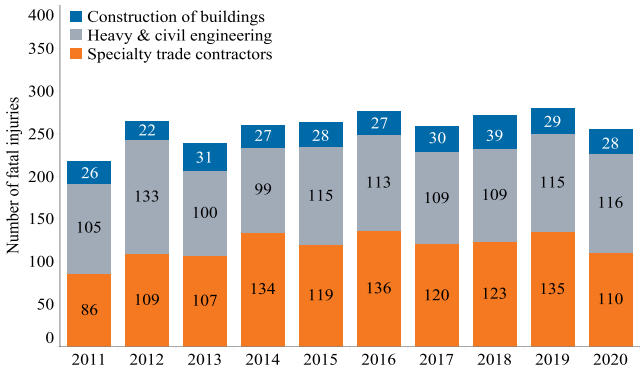
5. Number and rate of fatal transportation injuries in construction, 2011-2020



Source: *U.S. Bureau of Labor Statistics, 2011-2020 Census of Fatal Occupational Injuries and 2011-2020 Current Population Survey.*

When examined by subsector, a majority of fatal transportation injuries occurred in Specialty Trade Contractors (45.1%; NAICS 238) and Heavy and Civil Engineering (42.6%; NAICS 237; chart 6). Construction of Buildings (NAICS 237) accounted for 11% of injuries from 2011 to 2020.

6. Fatal transportation injuries, by major subsector, 2011-2020*

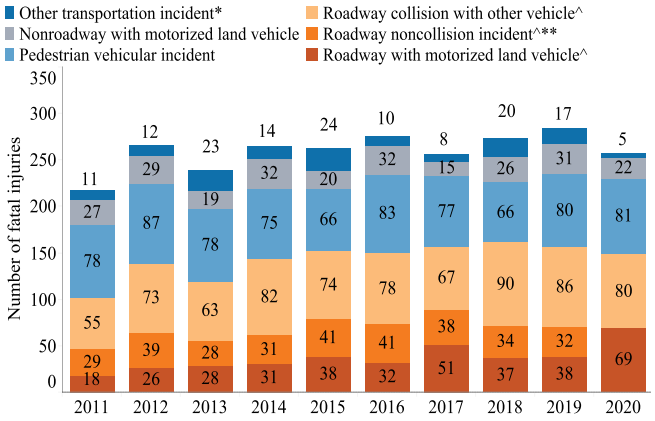


Source: *U.S. Bureau of Labor Statistics, 2011-2020 Census of Fatal Occupational Injuries.*

** Totals may not match chart 5 due to available subsector data.*

The detailed event or exposures were then examined for fatal transportation injuries (chart 7). From 2011 to 2020, most fatalities resulted from roadway incidents involving a motorized land vehicle (54.7%; n=1.4K). Of these, 52.3% (n=748) were due to a roadway collision with another vehicle, which means these collisions caused 28.6% of all fatal transportation injuries. Pedestrian vehicular incidents were the second leading cause (29.5%; n=771) of fatal transportation injuries behind roadway incidents involving a motorized land vehicle. During the first year of the pandemic, roadway collisions with another vehicle dropped by 7% (86 to 80), while pedestrian vehicular incidents increased by 1.3% (80 to 81).

7. Fatal transportation incidents in construction by detailed event or exposure, 2011-2020



Source: *U.S. Bureau of Labor Statistics, 2011-2020 Census of Fatal Occupational Injuries.*

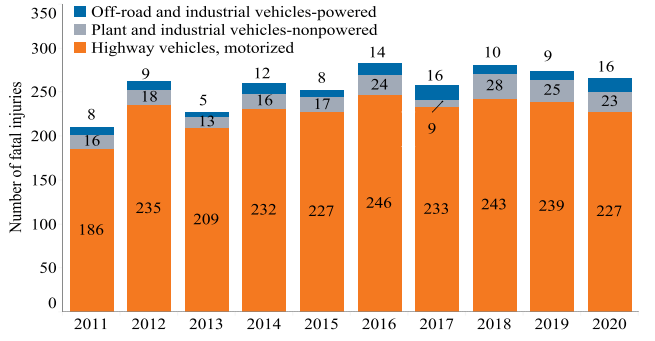
** Includes OIICS 21 Aicraft incident (n=34), 22 Rail vehicle incident (n=86), 25 Water vehicle incident (n=71).*

^ These are three-digit codes under Roadway incidents involving motorized land vehicles. All other codes shown are two-digit.

***Not available in 2020*

Vehicle primary sources were then examined for fatal injuries in construction (chart 8). From 2011 to 2020, most fatal injuries with a vehicle listed as a primary source (n=2.6K) involved a motorized highway vehicle (n=2.3K; 88.5%).

8. Selected vehicle sources for all fatal injuries in construction, 2011-2020*

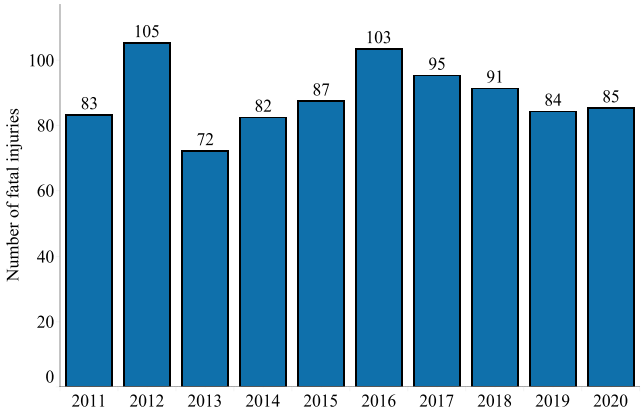


Source: *U.S. Bureau of Labor Statistics, 2011-2020 Census of Fatal Occupational Injuries.*

** Source at two-digit OIICS, excluding OIICS 81 Aircraft (n=34), 82 Rail vehicles (n=3), and 83 Water vehicles (n=46).*

Next, fatal injuries occurring in road construction zones were examined (chart 9). From 2011 to 2020, there were 887 fatal injuries that occurred during road construction. Of these, a majority (81.4%) occurred in Heavy and Civil Engineering (NAICS 237; data not shown).

9. Fatal injuries with road construction as reported location, 2011-2020*

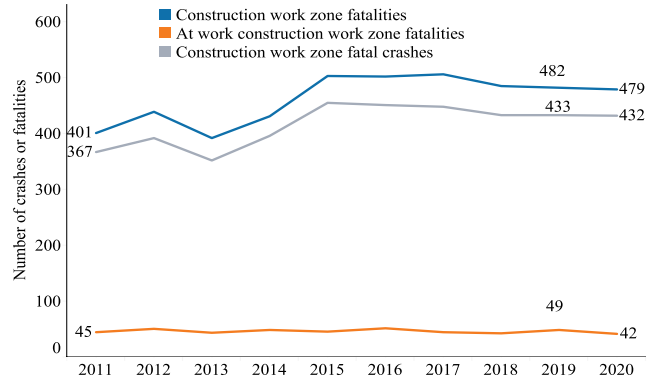


Source: *U.S. Bureau of Labor Statistics, 2011-2020 Census of Fatal Occupational Injuries.*

** This chart is for all injuries in construction, it is not specific to transportation incidents.*

Crashes and fatalities occurring in construction work zones[4] on public trafficways were then examined. From 2011 to 2020, fatal crashes rose 17.7% (367 to 432; chart 10) and fatalities increased 19.5% during the same period (401 to 479). The number of *at work* fatalities occurring in a construction work zone (an estimate of construction worker fatalities) remained consistent over the 10-year period.

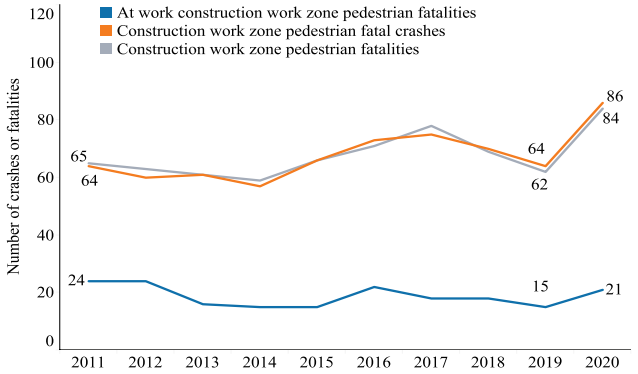
10. Fatal crashes and fatalities in construction work zones, 2011-2020



Source: *National Highway Traffic Safety Administration. 2011-2020 Fatality Analysis Reporting System (FARS).*

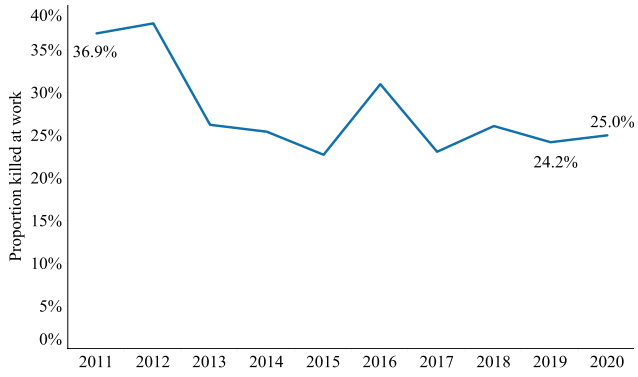
Pedestrian fatalities for all individuals in construction work zone crashes remained consistent in the early 2010s before beginning to rise in 2015 (n=66; chart 11). They then fell slowly, with a small peak in 2017 (n=78), before spiking again in 2020 (n=86). Pedestrian fatalities for those at work saw small fluctuations in the same period, with an average of 19 fatalities annually. In 2011, pedestrian at work fatalities accounted for 36.9% of total pedestrian fatalities, declining to 22.7% by 2015 (chart 12). After spiking to 31% in 2016, the share of fatalities dropped back down to the mid-twenties and remained consistent through 2020.

11. Fatal crashes involving pedestrians in construction work zones, 2011-2020



Source: *National Highway Traffic Safety Administration. 2011-2020 Fatality Analysis Reporting System (FARS).*

12. Proportion of pedestrians killed in fatal crashes in construction work zones while at work, 2011-2020



Source: *National Highway Traffic Safety Administration. 2011-2020 Fatality Analysis Reporting System (FARS).*

Transportation injuries continue to represent a significant risk to the health and safety of construction workers, causing hundreds of fatal and thousands of nonfatal injuries annually. The two most common causes of these transportation injuries were roadway incidents involving a motorized vehicle and pedestrian vehicular incidents. To protect construction workers, it is imperative that we understand transportation injury trends and underlying causes.

The Infrastructure Investment and Jobs Act provides funding for improved roadway and bridge infrastructure, which will create many new jobs and may ultimately increase the risk of transportation injuries, especially with new employers. To help keep workers safe on these and other infrastructure projects, CPWR has published a Safety Briefing and created a website section that provides easy access to research, free planning and training resources, and information about solutions relevant to the main categories of infrastructure projects: transportation; climate, energy and the environment; and broadband.

CPWR has numerous resources dedicated to preventing struck-by injuries, including many focused on work zone safety, and is a primary organizing partner in the annual National Stand Down to Prevent Struck-by Incidents. The National Work Zone Safety Information Clearinghouse also provides information to improve safety in roadway work zones for workers and drivers, and OSHA and NIOSH have resources to help contractors, supervisors, workers, researchers and others reduce occupational injuries.

ACCESS THE CHARTS & MORE

View the charts in PowerPoint and the data underlying the charts in Excel. Downloading will start when you click on each link. These files can also be found under this Data Bulletin at: cpwr.com/data-reports. In addition, see our latest Interactive Data Dashboard on Transportation Injuries in Construction.

DEFINITIONS

At Work *– A crash or fatality was classified in the NHTSA FARS data as "at work" if the crash involved a fatal injury at work or the person related factor indicated a construction/maintenance/utility worker was involved.*

Construction Work Zone *– Area of the road in which road repair work (e.g., long-term stationary construction like building a bridge or adding lanes) is being conducted. A full definition can be found in the FARS CRSS Coding and Validation Manual.*

Days Away from Work *– Nonfatal injury cases resulting in at least one day away from work beyond the day of injury or illness onset. A full definition with an example can be found in the Survey of Occupational Injuries and Illnesses Handbook of Methods.*

Event or Exposure *– The manner in which the injury or illness was produced or inflicted, such as a fall, heat-related illness, etc. For example, a worker who was struck by a pickup truck may have a reported event or exposure of "Pedestrian vehicular incident" with their reported primary source being "Vehicles: Highway vehicles, motorized." Full definitions for categories can be found in the Occupational Injury and Illness Classification Manual. Events mentioned in this Data Bulletin are:*

- ***Transportation Injury*** *– Injuries involving transportation vehicles, animals used for transportation purposes, and powered industrial vehicles or powered mobile industrial equipment in which at least one vehicle was in operation and the injury was due to a traffic incident regardless of the location.*
  - ***Nonroadway with motorized land vehicle*** *– Injuries occurring completely off a public roadway, such as those in a field, factory, or parking lot.*
  - ***Roadway with motorized land vehicle*** *– Injuries occurring on a roadway involving a motorized vehicle.*
  - ***Pedestrian vehicular incident*** *– Pedestrian and other nonoccupants of vehicles who are struck by vehicles or other mobile equipment.*
  - ***Roadway collision with other vehicle*** *– Injury resulting from a collision between more than one vehicle.*
  - ***Roadway noncollision incident*** *– Injury in which the vehicle involved in the injury did not make contact with another vehicle or object.*

Full-time equivalent worker (FTEs) *– Determined by the hours worked per employee on a full-time basis, defined as working 2,000 hours (40 hours x 50 weeks) per year.*

Major subsector *– 3-digit NAICS codes within construction, including Construction of Buildings (NAICS 236), Heavy and Civil Engineering (NAICS 237), and Specialty Trade Contractors (NAICS 238).*

Nonfatal injury *– Nonfatal injuries include injuries or illnesses that resulted in days away from work (DAFW).*

Pedestrian *– As defined by NHTSA, all individuals not on a personal conveyance (e.g., a non-transport device used for personal mobility assistance or recreation).*

Primary source *– The objects, substances, equipment, and other factors that were responsible for the injury or illness incurred by the worker. For example, a worker who was struck by a pickup truck may have a reported event or exposure of "Pedestrian vehicular incident" with their reported primary source being "Vehicles: Highway vehicles, motorized." Full definitions can be found in the Occupational Injury and Illness Classification Manual. Source codes mentioned in this Data Bulletin are:*

- ***Vehicles*** *– The object, substances, equipment, and other factors responsible for the injury incurred by the worker were a vehicle.*
  - ***Highway vehicles motorized*** *– Vehicles operated on public roadways.*
  - ***Off-road and industrial vehicles powered*** *– Off-road vehicles primarily used in nonroadway areas.*
  - ***Plant and industrial vehicles-nonpowered*** *– Nonpowered vehicles used for transportation of payloads, such as nonpowered hand trucks.*

Wage-and-salary *– Workers who receive wages, salaries, commissions, tips, or pay from their employer.*

DATA SOURCES

National Highway Traffic Safety Administration, 2011-2020 Fatality Analysis Reporting System. https://www.nhtsa.gov/research-data/fatality-analysis-reporting-system-fars

Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren and Michael Westberry. Integrated Public Use Microdata Series, 2015-2022 Current Population Survey: Version 9.0 [dataset]. Minneapolis, MN: IPUMS, 2021. https://doi.org/10.18128/D030.V9.0

U.S. Bureau of Labor Statistics (BLS), 2011-2020 Census of Fatal Occupational Injuries (CFOI). https://www.bls.gov/iif/

U.S. Bureau of Labor Statistics (BLS), 2011-2020 Survey of Occupational Injuries and Illnesses (SOII). https://www.bls.gov/iif/

REFERENCES

CPWR-The Center for Construction Research and Training. [2022]. Build Safe Build Strong Keeping Infrastructure Workers Safe as America Rebuilds. https://www.cpwr.com/wp-content/uploads/CPWR_Infrastructure_Safety_Briefing.pdf

CPWR-The Center for Construction Research and Training. [2022]. Fatal and Nonfatal Injuries in the Construction Industry. https://www.cpwr.com/wp-content/uploads/DataBulletin-May2022.pdf

CPWR-The Center for Construction Research and Training. [2022]. Infrastructure Resources: Keeping Construction Workers Safe as America Rebuilds. https://www.cpwr.com/research/research-to-practice-r2p/infrastructure-resources-keeping-construction-workers-safe-as-america-rebuilds/

CPWR-The Center for Construction Research and Training. [2022]. Struck-by Hazards. https://www.cpwr.com/research/research-to-practice-r2p/r2p-library/other-resources-for-stakeholders/struck-by-hazards/

Infrastructure Investment and Jobs Act, H.R.3684, 117th Cong. [2021]. https://www.congress.gov/bill/117thcongress/house-bill/3684/text

National Highway Traffic Safety Administration. [2022]. 2020 FARS/CRSS coding and validation manual (Report No. DOT HS 813 251). https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813251

National Institute for Occupational Safety and Health. [2020]. Directory of Construction Resources. https://www.cdc.gov/niosh/construction/default.html

Occupational Safety and Health Administration. [n.d.]. Construction Industry. https://www.osha.gov/construction

Office of Disease Prevention and Health Promotion. [n.d.]. Fatality Analaysis Reporting System. https://www.healthypeople.gov/2020/data-source/fatality-analysis-reporting-system

Texas A&M Transportation Institute. [2022]. National Work Zone Safety Information Clearinghouse. https://workzonesafety.org

The White House. [2021]. Fact Sheet: The Bipartisan Infrastructure Act. https://www.whitehouse.gov/briefing-room/statements-releases/2021/11/06/fact-sheet-the-bipartisan-infrastructure-deal/

U.S. Bureau of Labor Statistics. [2020]. Census of Fatal Occupational Injuries Handbook of Methods. https://www.bls.gov/opub/hom/cfoi/pdf/cfoi.pdf

U.S. Bureau of Labor Statistics. [2022]. IIF Databases. https://www.bls.gov/iif/data.htm

U.S. Bureau of Labor Statistics. [2012]. Occupational Injury and Illness Classification Manual. https://www.bls.gov/iif/oshoiics.htm

U.S. Bureau of Labor Statistics. [2020]. Survey of Occupational Injuries and Illnesses Handbook of Methods. https://www.bls.gov/opub/hom/soii/pdf/soii.pdf

ABOUT THE CPWR DATA CENTER

The CPWR Data Center is part of CPWR–The Center for Construction Research and Training. CPWR is a 501(c)(3) nonprofit research and training institution created by NABTU, and serves as its research arm. CPWR has focused on construction safety and health research since 1990. The Data Bulletin, a series of publications analyzing construction-related data, is part of our ongoing surveillance project funded by the National Institute for Occupational Safety and Health (NIOSH).

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
- Electronic Library of Construction Occupational Safety and Health
  https://www.elcosh.org/index.php
- Exposure Control Database
  https://ecd.cpwrconstructionsolutions.org/
- Safety Climate - Safety Management Information System (SC-SMIS)
  www.scsmis.com
- Stop Construction Falls
  https://stopconstructionfalls.com/
- Work Safely with Silica
  https://www.silica-safe.org/

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.

CPWR
THE CENTER FOR CONSTRUCTION RESEARCH AND TRAINING
8484 Georgia Avenue
Suite 1000
Silver Spring, MD 20910
www.cpwr.com