

Fatal and Nonfatal Focus Four Injuries in Construction

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OVERVIEW

Construction is one of the most dangerous industries in the United States, with [1,034 fatal](#) occupational injuries among all construction workers and [74,520 nonfatal injuries](#) among private *wage-and-salary* construction workers in 2020. A majority of fatal occupational injuries and a large proportion of nonfatal injuries result from *Construction Focus Four hazards*, which include *falls to a lower level*, *struck-by*, *electrocutions*, and *caught-in/between* injuries. [This classification](#) was created in 1994 in response to the impact the top four safety hazards have on construction workers.

This Data Bulletin provides information on fatal and nonfatal Focus Four occupational injuries in construction, including by *injury type* and *detailed event/exposure*. (In this Data Bulletin, occupational injuries will be referenced as injuries.) Data for fatal injuries from 2011 to 2021 were obtained from the U.S. Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI), a [complete count](#) of fatal injuries and their circumstances. Data for caught/compressed by equipment/objects, which is one of the categories of caught-in/between injuries, were unavailable in 2021 due to the [BLS modernized disclosure](#) policy, which impacts all data from 2019 forward, but missing data varies by year and categories examined. For this Data Bulletin only caught in/compressed by equipment/objects in 2021 was impacted. Estimates of nonfatal injuries for private, wage-and-salary construction workers from 2011 to 2020 were obtained from the BLS Survey of Occupational Injuries and Illnesses (SOII), which are based on employer logs. Nonfatal injuries included are those that resulted in *days away from work (DAFW)*. Due to changes in [SOII publication frequency](#) to biennially, injury data for 2021 are unavailable at this time, and as a result, charts using SOII data are limited to 2011-2020. *Full-time equivalent workers (FTEs)* were estimated using the BLS Current Population Survey (CPS), a monthly population survey, downloaded through IPUMS. CPWR calculated fatal injury rates per 100,000 FTEs, while nonfatal rates were calculated per 10,000 FTEs.



THIS ISSUE

This issue examines fatal and nonfatal Focus Four injuries in construction by injury type and detailed event/exposure.

KEY FINDINGS

From 2011 to 2021, 65% (n=6.9 thousand (K)) of fatal injuries were a result of a Focus Four hazard.

Chart 1

From 2011 to 2021 there were increases in the number (46%) and rate (13%) of fatal falls to a lower level.

Charts 3 and S1

From 2011 to 2020, Focus Four injuries accounted for 40% (n=315.2K) of all nonfatal injuries.

Chart 7

Nonfatal struck-by injuries and their rate declined 2011 to 2020 (4% and 24%, respectively).

Charts 9 and S2

Other falls to a lower level (OICS 433) were the most common type of falls to a lower level, accounting for 81% of fatal and 93% of nonfatal fall injuries in 2020.

Charts 4 and 10

Transport vehicles were the most common cause of fatal struck-by injuries (48%), whereas other struck-by injuries were the most common for nonfatal struck-by injuries (56%) in 2020.

Charts 5 and 11

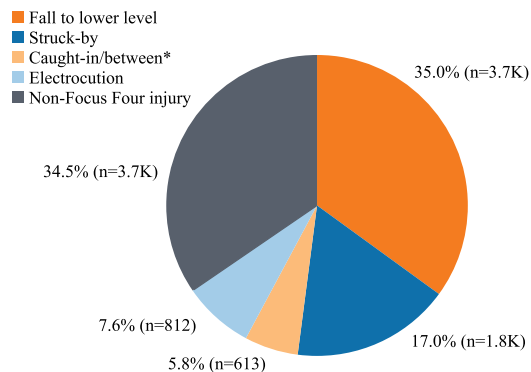
NEXT DATA BULLETIN

Women in Construction: Employment and Business Owner Trends

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From 2011 to 2021, approximately 10.7 thousand (K) construction workers died from an on-the-job injury (chart 1). Of these, 65.5% (n=6.9K) resulted from a Focus Four injury. Falls to a lower level accounted for more than half (53.5%; n=3.7K) of fatal Focus Four injuries, but also 35.0% (n=3.7K) of total fatal injuries in construction during the time period.

1. Fatal injuries in construction, sum of 2011-2021

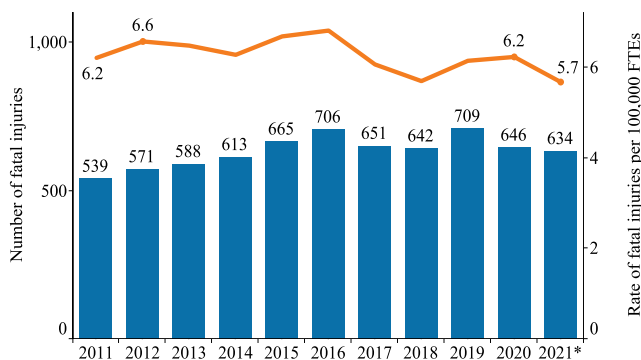


Source: U.S. Bureau of Labor Statistics, 2011-2021 Census of Fatal Occupational Injuries.

*Missing OIICS 64 (caught in/compressed by equipment/objects) in 2021 impacting caught-in/between and total values.

There were 633 fatal Focus Four injuries on average annually from 2011 to 2021, with an average fatal injury rate of 6.3 per 100,000 FTEs (chart 2). In addition to peaks in 2016 and 2017, there was a 1.9% decrease in Fatal Focus Four injuries from 2020 to 2021 (646 to 634). From 2011 to 2021, the rate of Fatal Focus Four injuries decreased 8.1% (6.2 to 5.7 injuries per 100,000 FTEs), with 2021 having the lowest rate since 2018. Focus Four fatal injury trends are similar to those for all [fatal injuries in construction](#).

2. Number and rate of fatal Focus Four injuries by year, 2011-2021

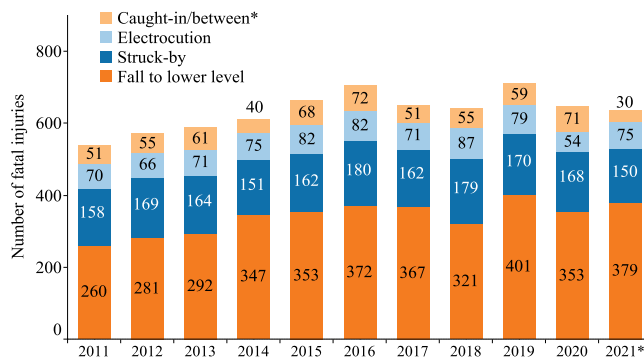


Source: U.S. Bureau of Labor Statistics, 2011-2021 Census of Fatal Occupational Injuries and 2011-2021 IPUMS Current Population Survey.

*Missing OIICS 64 (caught in/compressed by equipment/objects) in 2021 impacting caught-in/between and total values.

Next, fatal Focus Four injuries in construction were examined by injury type (chart 3, rates shown in S1 in chart file). From 2011 to 2021, falls to a lower level accounted for a majority of fatal Focus Four injuries annually (annual average=339). There were increases in the number (+45.8%; 260 to 379) and rate (+13.3%; 3.0 to 3.4 per 100,000) of falls from 2011 to 2021. Struck-by injuries accounted for an average of 165 injuries annually; the number (-5.1%; 158 to 150) and rate (-27.8%; 1.8 to 1.3) of these injuries declined during the period. Electrocutations had an annual average of 74 fatal injuries. Notably, there were declines in the number (-31.6%; 79 to 54) and rate (-28.6%; 0.7 to 0.5) of electrocutations from 2019 to 2020. The next year (2020 to 2021), there was an increase in the number (+38.9%; 54 to 75) and rate (+40%; 0.5 to 0.7) of electrocutations. Caught-in/between accounted for an average of 58 fatal injuries annually from 2011 to 2020 (caught-in/between injury data unavailable in 2021).

3. Number of fatal injuries by Focus Four injury type, 2011-2021

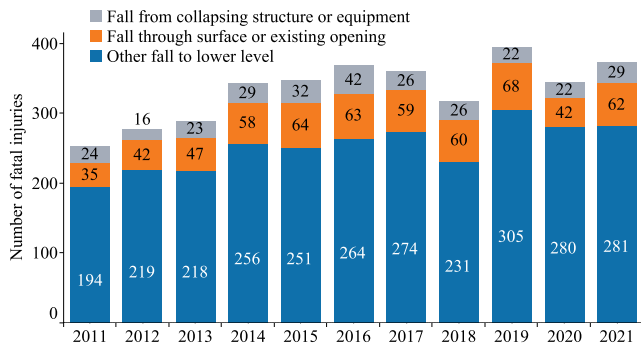


Source: U.S. Bureau of Labor Statistics, 2011-2021 Census of Fatal Occupational Injuries.

*Missing OIICS 64 (caught in/compressed by equipment/objects) in 2021 impacting caught-in/between and total values.

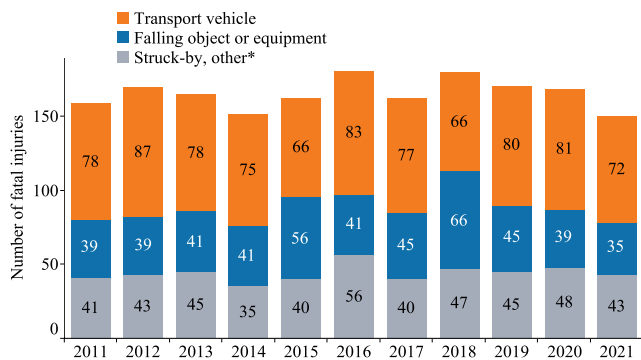
Fatal Focus Four injuries were then examined by detailed event/exposure categories (charts 4-6). Falls to a lower level increased 7.4% from 2020 to 2021 (353 to 379), driven by falls through a surface or existing opening, which accounted for 47.6% of the increase (chart 4). Falls from a collapsing structure or equipment accounted for 31.8% of the increase. There was a 10.7% decrease in fatal struck-by injuries from 2020 to 2021 (168 to 150), in addition to declines in all three detailed event/exposure categories (chart 5). The only caught-in/between category with data available in 2021 was collapsing structure, equipment, or material injuries which decreased 30.2% (43 to 30) (chart 6). On average from 2011 to 2020, caught/compressed by equipment/objects accounted for 30.9% of caught-in/between injuries. Detailed event/exposure information for electrocutations for private construction workers were then examined, with direct exposure to electricity accounting for a majority of these injuries (67.6%) in 2021, a finding supported by [prior research](#) (data not shown).

4. Number of fatal falls to a lower level* by detailed event/ exposure category, 2011-2021



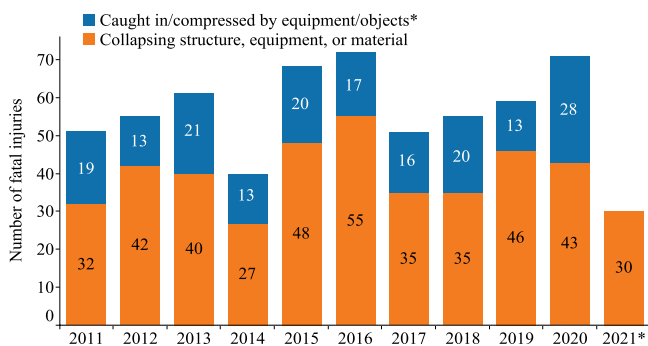
Source: U.S. Bureau of Labor Statistics, 2011-2021 Census of Fatal Occupational Injuries.
 *OIICS 430 (Falls to lower level, unspecified) not included; thus, totals will not match falls to a lower level shown in chart 3.

5. Number of fatal struck-by injuries by detailed event/ exposure category, 2011-2021



Source: U.S. Bureau of Labor Statistics, 2011-2021 Census of Fatal Occupational Injuries.
 *The remaining OIICS 62 (struck by object or equipment) injuries after subtracting OIICS 623 (struck by falling object or equipment) injuries.

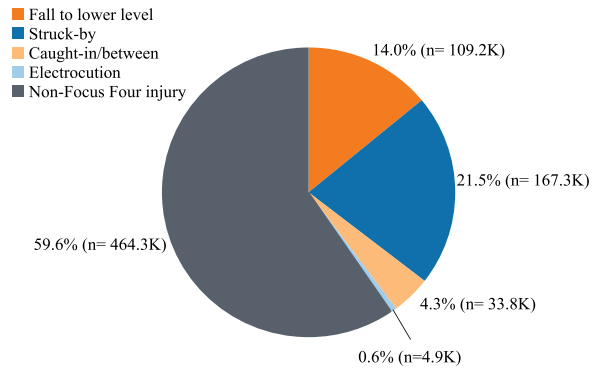
6. Number of fatal caught-in/between injuries by detailed event/exposure category, 2011-2021



Source: U.S. Bureau of Labor Statistics, 2011-2021 Census of Fatal Occupational Injuries.
 *Missing OIICS 64 (caught in/compressed by equipment/objects) in 2021 impacting caught-in/between and total values.

Nonfatal Focus Four injuries in construction were then analyzed. From 2011 to 2020, 779.5K construction workers suffered nonfatal injuries (chart 7), and Focus Four injuries accounted for 40.4% (n=315.2K) of that number. Struck-by injuries were 53.1% of the Focus Four injuries (n=167.3K) and 21.5% of all nonfatal injuries during the period.

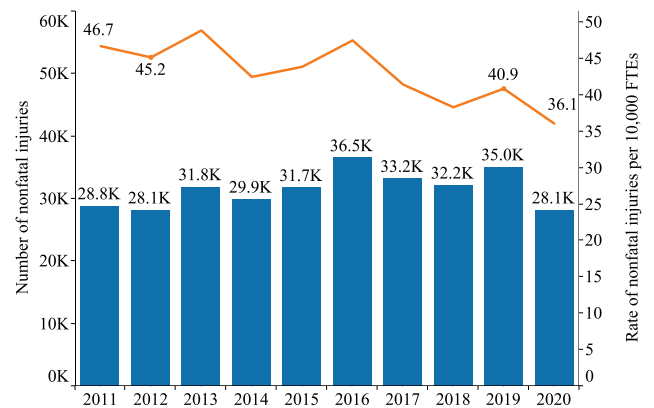
7. Nonfatal injuries in construction, sum of 2011-2020* (Private Wage-and-Salary)



Source: U.S. Bureau of Labor Statistics, 2011-2020 Survey of Occupational Injuries and Illnesses.
 *Due to changes in SOII data publication, estimates for 2021 are unavailable for all related charts.

The number of nonfatal Focus Four injuries changed little from 2011 to 2020, with an annual average of 31.5K injuries, and small increases in 2016 and 2019 (chart 8). The rate of nonfatal Focus Four injuries decreased 22.7% from 2011 to 2020 (46.7 to 36.1 per 10,000 FTEs) (chart 8). Similar to the trends in the number of nonfatal injuries, the rate of nonfatal injuries also increased in 2016 and 2019. The trends for nonfatal Focus Four injuries were similar to those for all [nonfatal injuries](#).

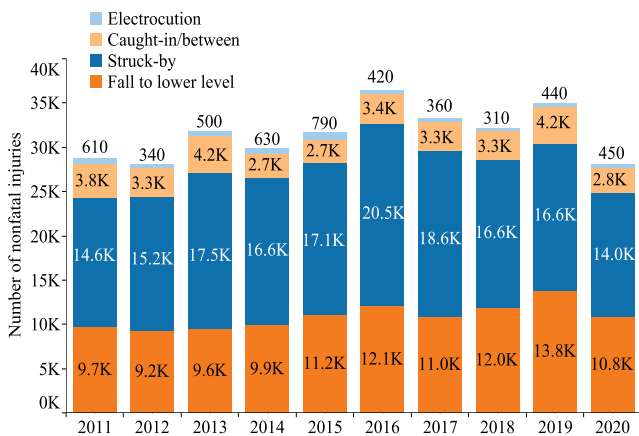
8. Number and rate of nonfatal Focus Four injuries by year, 2011-2020 (Private Wage-and-Salary)



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

Nonfatal Focus Four injuries by injury type were then examined (chart 9, rates shown in S2 in chart file). From 2011 to 2020, nonfatal struck-by injuries accounted for a majority of nonfatal Focus Four injuries annually (annual average=16.7K). The number (-4.1%; 14.6K to 14.0K) and rate (-24.1%; 23.7 to 18.0 per 10,000) of struck-by injuries decreased from 2011 to 2020. Falls to a lower level accounted for an average of 10.9K injuries annually; the number (+11.3%; 9.7K to 10.8K) of falls increased while the rate decreased (-12%; 15.8 to 13.9) from 2011 to 2020. Caught-in/between accounted for an annual average of 3.4K injuries; the number (-26.3%; 3.8K to 2.8K) and rate (-41.9%; 6.2 to 3.6) of these injuries decreased during the period. Electrocutions accounted for an annual average of 485 nonfatal injuries; the number (-26.2%; 610 to 450) and rate (-40%; 1.0 to 0.6) of electrocutions declined from 2011 to 2020.

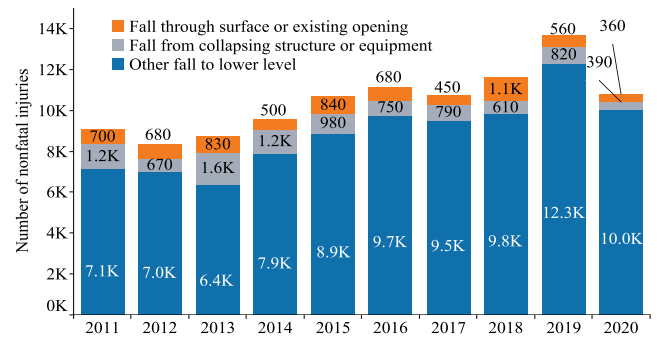
9. Number of nonfatal injuries by Focus Four 2011-2020 (Private Wage-and-Salary)



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

Nonfatal Focus Four injuries were then examined by detailed event/exposure categories (charts 10-12). Characterizing trends in the most recently available years of data, from 2019 to 2020, falls to a lower level declined 21.7% (13.8K to 10.8K). This was primarily driven by a decrease in *other falls to a lower level*, which accounted for 76.7% of the decline (n=2.3K; chart 10). Struck-by injuries decreased 15.7% from 2019 to 2020 (16.6K to 14.0K), with other struck-by injuries accounting for 80.7% of the decline (n=2.1K; chart 11). For nonfatal caught-in/between injuries, the predominant cause of injuries was caught-in/compressed by equipment/objects, representing 95.3% of this type of injury from 2011 to 2020 (chart 12). From 2019 to 2020, caught-in/compressed by equipment/objects injuries declined by 34.1% from 2019 to 2020 (4.1K to 2.7K). However, injuries due to being caught in collapsing structure, equipment, or materials doubled (80 to 160) during the same period. The decrease in nonfatal Focus Four injuries from 2019 to 2020, the first year of the pandemic, was the primary driver of the decrease in all nonfatal injuries for the same time period.

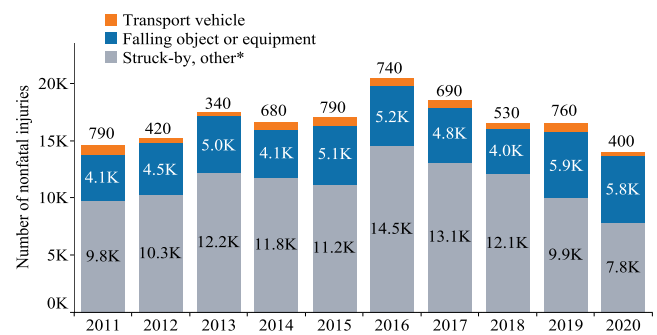
10. Number of nonfatal falls to a lower level by detailed event/exposure category, 2011-2020 (Private Wage-and-Salary)



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

*OIIICS 430 (Falls to lower level, unspecified) not included; thus, totals will not match falls to a lower level shown in chart 9.

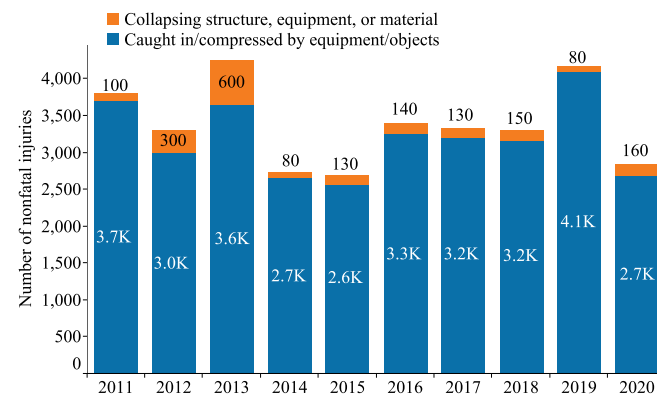
11. Number of nonfatal struck-by injuries by detailed event/exposure category, 2011-2020 (Private Wage-and-Salary)



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

*The remaining OIIICS 62 (struck by object or equipment) injuries after subtracting OIIICS 623 (struck by falling object or equipment) injuries.

12. Number of nonfatal caught-in/between injuries by detailed event/exposure category, 2011-2020 (Private Wage-and-Salary)



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

Construction continues to be one of the most hazardous industries in the United States, and Focus Four injuries represented 65% of fatal injuries from 2011 to 2021 and 40% of nonfatal injuries from 2011 to 2020. This Data Bulletin highlights trends in Focus Four injuries while also investigating injury type, revealing the magnitude of these injuries in the construction industry, and providing a greater understanding of each injury type. A majority of fatal Focus Four injuries resulted from falls to a lower level (35%, n=3.7K); whereas a majority of nonfatal Focus Four injuries resulted from struck-by injuries (22%; n=167.3K). While the Focus Four injury rates for both fatal and nonfatal injuries have decreased since 2011, the overall rates and numbers of injuries show that construction workers continue to face significant risks.

Injuries resulting from a Focus Four hazard are preventable. Effective planning, both during the pre-construction phase and before each task, can improve worker safety and health. Proper planning proactively identifies potential hazards associated with each step of work and the controls needed to mitigate them. CPWR has a number of [free planning resources](#) for contractors, including several addressing fall prevention and a soon-to-be-published planning program for struck-by hazards. A new [Pre-Task Planning \(PTP\) Assessment Checklist](#) can help contractors assess and improve upon their PTP process.

CPWR also has a variety of resources to help contractors provide the correct equipment and controls, in addition to training resources for supervisors and workers, including many dedicated to [addressing the Focus Four Hazards](#). In addition, [OSHA](#) and [NIOSH](#) also provide hazard specific resources for the construction industry, and as part of their Construction Outreach Program, OSHA also provides [Focus Four Training](#) to help workers better understand the hazards they will encounter at the workplace.

There are two annual Safety Stand-Down events coming up to increase awareness of two of the Focus Four injuries: the [4th annual National Stand-Down to Prevent Struck-By Incidents](#) April 17-21, 2023 and the [10th annual National Safety Stand-Down to Prevent Falls](#) May 1-5, 2023. The campaigns provide resources and guidance for construction industry employers to pause work to connect with workers, review company policies, conduct training, inspect equipment, watch a CPWR webinar, or engage in other activities during these weeks. Free resources and activity ideas can be found on the Stand-Down pages linked above, with more material being added as the events approach.

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 the Data Bulletin at: <https://www.cpwr.com/research/data-center/data-reports/>. See updates to our [Focus Four](#) and [Fatal and Nonfatal Injuries](#) dashboards.

DEFINITIONS

Construction Focus Four hazards – Top four construction hazards *as defined in 1994*, including caught-in/between, electrocutions, falls, and struck-by injuries.

Days away from work (DAFW) – 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](#).

Detailed event/exposure – The 2- and 3-digit OIICS event/exposure codes which make up the broader Focus Four categories. Full definitions for categories can be found in the [Occupational Injury and Illness Manual](#).

Full-time equivalent workers (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.

Injury Type- The specific Focus Four hazard, including – The specific condition that caused the death based on the International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) diagnosis Code. Two classifications are examined in the Data Bulletin:

- **Caught-in/between (OIICS 64 and 65)** – Injury in which a person or part of a person's body is caught in or compressed by equipment or objects or is caught in or crushed by collapsing materials.
- **Electrocutions (OIICS 51)** – Injury due to contact with electricity, including direct contact (e.g., touching a live wire) and indirect contact (e.g., contact with pipe touching power line).
- **Falls to a lower level (OIICS 43)** – Injury caused by impact between a falling person and lower surface (e.g., fall from a roof to a ground level; fall from a ground level into an opening or body of water; fall from a collapsing structure).
 - **Other fall to a lower level (OIICS 433)** – This covers all falls not occurring due to collapsing structure/equipment or falls through an existing opening. This category includes falls off of ladders, roofs, and other elevated positions, but does not include injuries due to falls curtailed by personal arrest systems.
- **Struck-by (OIICS 24 and 62)** – Injury in which a person is struck by a vehicle, object, or equipment.
- **Wage-and-salary** – Workers who receive wages, salaries, commissions, tips, or pay from their employer.

DATA SOURCES

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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/>
- Nano Safety Data Sheet Improvement Tool
<https://nanosds.elcosh.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/>

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