

## Fatal and Nonfatal Falls in the U.S Construction Industry, 2011-2022

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### OVERVIEW

Among the [wide range of hazards](#) construction workers face, the most dangerous are falls. Almost half of all work-related fatal *falls, slips, and trips* in 2021 occurred among construction workers (46.2%). Since 2013, workers in the industry have suffered over [300 fatal and 20,000 nonfatal fall-related injuries annually](#). *Falls to a lower level*, a [Focus Four Hazard](#), accounted for [almost all fatal \(95.1%\) and half of nonfatal \(50.2%\) falls, slips, and trips](#) in 2020.

This Data Bulletin examines fatal and nonfatal falls in construction by *major and detailed subsector* and *primary source*. It also looks at fatal falls from 2011 to 2022 by fall height, time of day, state, whether the decedent was a *contracted worker*, and *establishment size*. Falls were defined in various ways based on data availability, including a) falls to a lower level, b) *all falls* (which includes falls to a lower level and *falls on the same level*) and c) falls, slips, and trips (which includes falls to a lower level, falls to the same level, and slips and trips without a fall). Fatal injury estimates were generally obtained from the U.S. Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI) public tool. Exceptions are contracted worker, establishment size, and time of day (Charts 7 to 9), which were produced with restricted access to BLS CFOI data.<sup>2</sup> Estimates for nonfatal injuries resulting in *days away from work (DAFW)* among private, wage-and-salary workers were from the BLS Survey of Occupational Injuries and Illnesses (SOII) public tool, based on employer logs. Because SOII data changed from annual to biennial estimates in 2021, nonfatal data are shown for two-year periods. *Full-time equivalent workers (FTEs)* were obtained using the BLS Current Population Survey (CPS), a monthly population survey, downloaded through IPUMS. Fatal injury rates were calculated per 100,000 FTEs, while nonfatal rates were calculated per 10,000 FTEs.

### THIS ISSUE

This issue examines fatal and nonfatal falls in the construction industry by major and detailed subsector, and primary source, as well as by height of fall, time of day of fall, contracted worker status, and establishment size for fatal injuries.

### KEY FINDINGS

**From 2011 to 2022, the number of fatal falls to a lower level increased 52.7%, while the rate increased 13.3%. The number of nonfatal falls to a lower level increased 2.1% over the same period, while their rate decreased 25.5%.**

Charts 1 and 10

**In 2022, Roofing Contractors (NAICS 23816) had the highest number of fatal falls, slips, and trips (n=100) among detailed subsectors examined.**

Chart 3

**From 2021 to 2022, the number of fatal injuries where roofs were involved (primary source) rose 14.6%.**

Chart 6

**From 2011 to 2022, 70% of fatal fall injuries occurred among those working for small establishments (10 or fewer employees).**

Chart 7

**Most fatal falls occurred from 10 a.m. to 12:59 p.m., with an average of 38.3 fatal falls per hour in 2022.**

Chart 9

### NEXT DATA BULLETIN

Trends of Trenching Injuries in Construction, 2011-2022

**National Safety Stand-Down  
to Prevent Falls in Construction**

**May 6-10, 2024**





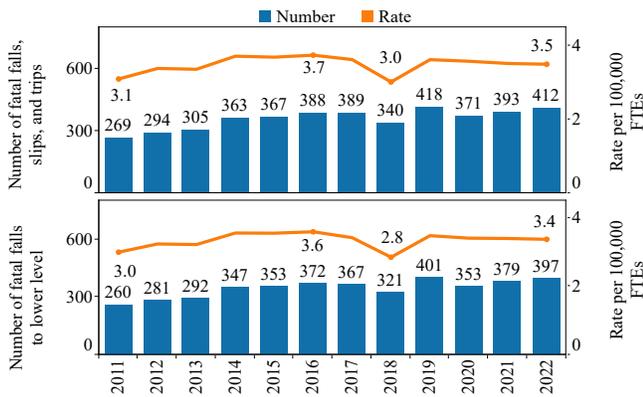
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<sup>2</sup> Charts 7-9 were produced using restricted access data. The views expressed here are those of the authors and do not reflect the views of the BLS.

In 2022, there were 412 fatal falls, slips, and trips in construction, with the majority resulting from falls to a lower level (96.4%, n=397; chart 1). From 2011 to 2022, the number of these types of fatal falls increased 53% (53.2% and 52.7%, respectively), while rates increased 13% (12.9% and 13.3%, respectively). From 2021 to 2022, the number of fatal falls, slips, and trips increased 4.8% (393 to 412) while fatal falls to a lower level increased 4.7% (379 to 397). The rates for fatal falls, slips, and trips and falls to a lower level both decreased slightly from 2021 to 2022 (3.52 to 3.50 and 3.39 to 3.37 per 100,000 FTEs, respectively).

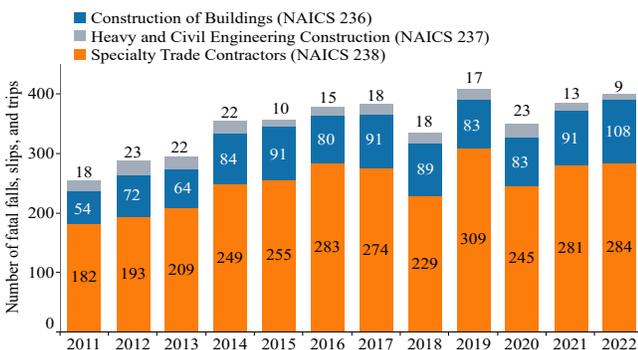
**1. Number and rate of fatal falls, slips, and trips and falls to lower level, 2011-2022**



Source: U.S. Bureau of Labor Statistics, 2011-2022 Census of Fatal Occupational Injuries and 2011-2022 IPUMS Current Population Survey.

In 2022, Specialty Trade Contractors (NAICS 238) accounted for 68.9% (n=284) of the 412 fatal falls, slips, and trips, while Construction of Buildings (NAICS 236) accounted for 26.2% (n=108) and Heavy and Civil Engineering (NAICS 237) accounted for 2.2% (n=9; chart 2). From 2011 to 2022, fatal falls, slips, and trips doubled in Construction of Buildings (54 to 108) and rose 56.0% in Specialty Trade Contractors (182 to 284). There was a 50.0% decrease in fatal falls, slips, and trips in Heavy and Civil Engineering during the same period (18 to 9).

**2. Number of fatal falls, slips, and trips by major subsector, 2011-2022\***

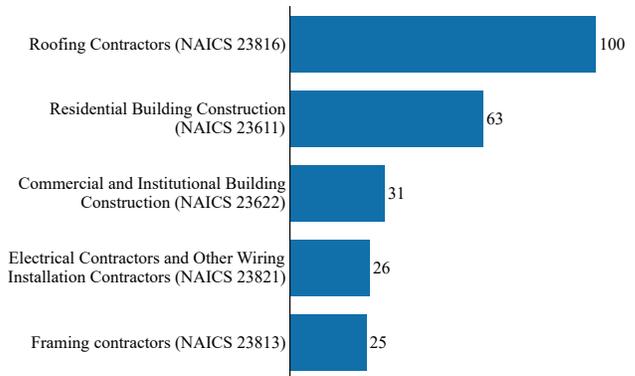


Source: U.S. Bureau of Labor Statistics, 2011-2022 Census of Fatal Occupational Injuries.

\*Totals do not match chart 1 due to missing subsector data.

Among the detailed subsectors examined, Roofing Contractors (NAICS 23816) had the highest number of fatal falls, slips, and trips in 2022 (n=100; chart 3). Numbers were also high among Residential Building Construction (NAICS 23611; n=63) and Commercial and Institutional Building Construction (NAICS 23622; n=31).

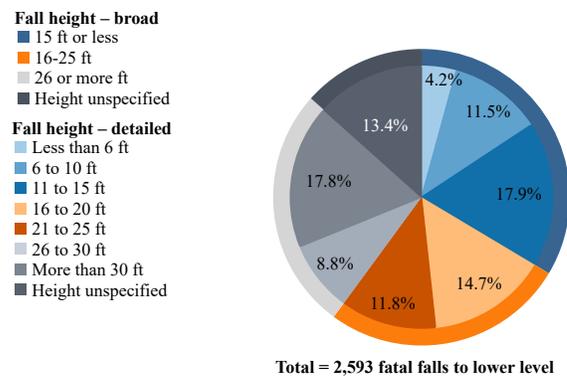
**3. Detailed subsectors with the highest number of fatal falls, slips, and trips, 2022**



Source: U.S. Bureau of Labor Statistics, 2022 Census of Fatal Occupational Injuries.

Next, fatal falls to a lower level from 2011 to 2018 were evaluated by fall height (chart 4). A third of these incidents occurred from heights of 15 feet or less (33.6%), while falls from 16 to 25 feet and 26 feet or higher each accounted for 26.5% of these injuries. Examining detailed height categories, falls from 11 to 15 feet (17.9%), more than 30 feet (17.8%), and 16 to 20 feet (14.7%) accounted for the three largest proportions of fatal falls to a lower level. This is consistent with prior findings in that a majority (83.4%) of fatal falls in construction occurred from heights greater than 10 feet.

**4. Fatal falls to lower level by fall height among construction workers, sum of years 2011-2018\***

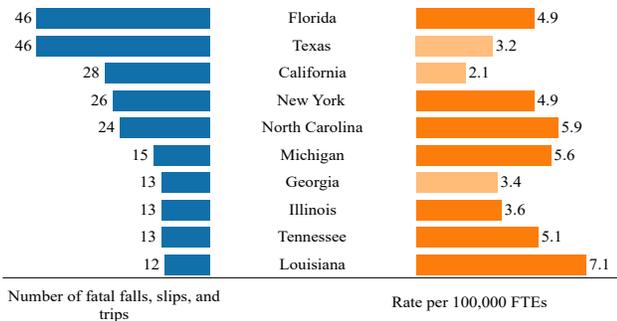


Source: U.S. Bureau of Labor Statistics, 2011-2018 Census of Fatal Occupational Injuries.

\*Due to data availability, years are limited to 2011-2018.

The U.S. states with the most fatal falls, slips, and trips were analyzed (chart 5). In 2022, Florida (n=46), Texas (n=46), and California (n=28) had the highest number of these injuries, while numerous states had rates (per 100,000 FTEs) higher than the national average (3.5), such as Louisiana (7.1), North Carolina (5.9), and Michigan (5.6).

**5. Number and rate\* of fatal falls, slips, and trips in construction by state, 2022**

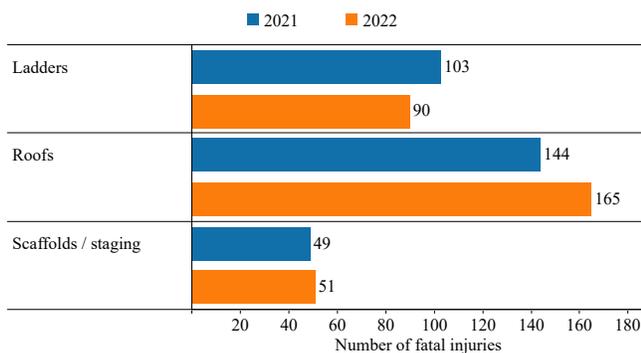


Source: U.S. Bureau of Labor Statistics, 2022 Census of Fatal Occupational Injuries and 2022 IPUMS Current Population Survey.

\*Rates which were higher than the national average (3.5 per 100,000 FTEs) in 2022 use a darker shade of orange.

All fatal injuries (not just falls) in construction were then examined by primary sources (e.g., factor responsible for injury) common to falls, slips, and trips (chart 6). From 2021 to 2022, the number of injuries involving roofs increased 14.6% (144 to 165), while injuries due to scaffolds and staging rose 4.1% (49 to 51). In contrast, injuries due to ladders decreased 12.6% from 2021 to 2022 (103 to 90).

**6. Injury sources\* common to fatal falls, slips and trips, 2021 versus 2022**

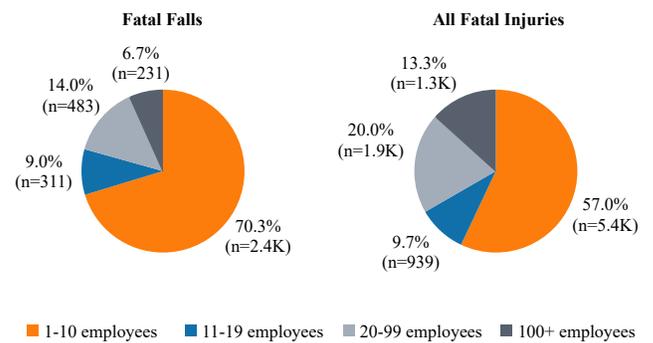


Source: U.S. Bureau of Labor Statistics, 2021-2022 Census of Fatal Occupational Injuries and 2021-2022 IPUMS Current Population Survey.

\*All injuries shown. Sources shown commonly result in falls, slips, and trips (>=50% of primary source injuries).

All fatal injuries in construction, including all fatal falls (whether to a lower level or on the same level) were analyzed by establishment size (chart 7). From 2011 to 2022, just over 7 in 10 (70.3%, n=2.4 thousand [K]) fatal fall injuries occurred in small establishments (1-10 employees), while 6.7% (n=231) occurred in large establishments (100+ employees). In comparison, small establishments accounted for 57.0% (n=5.4K) of all fatal injuries and large establishments 13.3% (n=1.3K). For context, small establishments made up 81.3% of construction establishments in 2020 but only 22.0% of employees.

**7. Fatal falls and all fatal injuries\* in construction by establishment size, sum of 2011-2022**

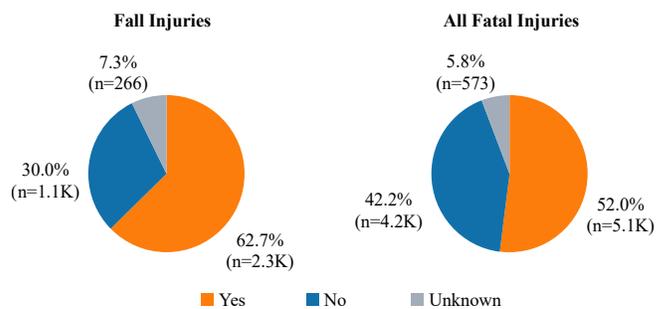


Source: U.S. Bureau of Labor Statistics, 2011-2022 Census of Fatal Occupational Injuries Restricted Use Data.

\*Chart only shows injuries with reported data.

Next, all fatal falls and fatal injuries for contracted workers were examined (chart 8). A contracted worker is defined as someone employed by one firm but working under the direction of another firm that exercises overall responsibility for operations at the site of the fatal injury. Almost two thirds (62.7%; n=2.3K) of fatal falls from 2011 to 2022 occurred among contracted workers. When looking at all injuries, contracted workers accounted for 52.0% (n=5.1K) of all fatal injuries in construction.

**8. Proportion of fatal fall and all fatal injuries\* among contracted workers^, sum of 2011-2022**



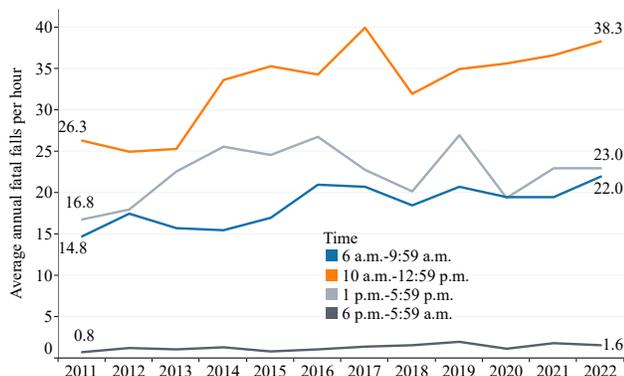
Source: U.S. Bureau of Labor Statistics, 2011-2022 Census of Fatal Occupational Injuries Restricted Use Data.

\*Chart only shows injuries with reported data.

^Indicates if a worker was employed by a firm working under another firm that has overall responsibility for the operations at the work site.

Fatal falls were also examined by the time of day (chart 9). The chart shows the average number of annual fatal falls during each part of the day from 2011 to 2022. Across all years, the period with the largest number of fatal falls per hour was 10 a.m. to 12:59 p.m., with 38.3 fatal falls on average for each hour in 2022 during that period. This is consistent with a [prior study](#) that found half of construction worker fatalities occurred from 10 a.m. to 3 p.m.

**9. Average number of fatal falls\* per hour by time of incident, 2011-2022**

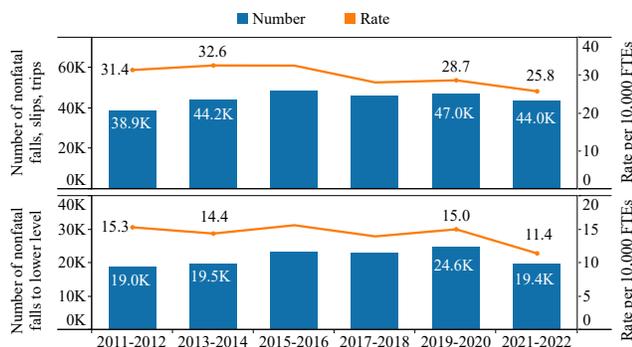


Source: U.S. Bureau of Labor Statistics, 2011-2022 Census of Fatal Occupational Injuries Restricted Use Data.

\*Chart only shows injuries with reported data.

An examination of nonfatal falls (chart 10) found that, compared to 2011-2012, the number of falls, slips, and trips in 2021-2022 increased 13.1% (38.9K to 44.0K), while the rate per 10,000 FTEs decreased 17.8% (31.4 to 25.8). The number of falls to a lower level between the two periods increased 2.1% (2011-2012:19.0K and 2021-2022:19.4K), while the rate decreased 25.5% (2011-2012:15.3 and 2021-2022:11.4). In the two most recent periods, the number of nonfatal falls, slips, and trips decreased 6.4% (2019-2020: 47.0K and 2021-2022: 44.0K), while the rate per 10,000 FTEs decreased 10.1% (28.7 to 25.8). Between the two time periods, falls to a lower level decreased 21.1% (2019-2020: 24.6K and 2021-2022:19.4K), while the rate decreased 24.0% (2019-2020:15.0 to 2021-2022:11.4).

**10. Number and rate of nonfatal falls, slips, trips and falls to lower level, 2011-2022\***

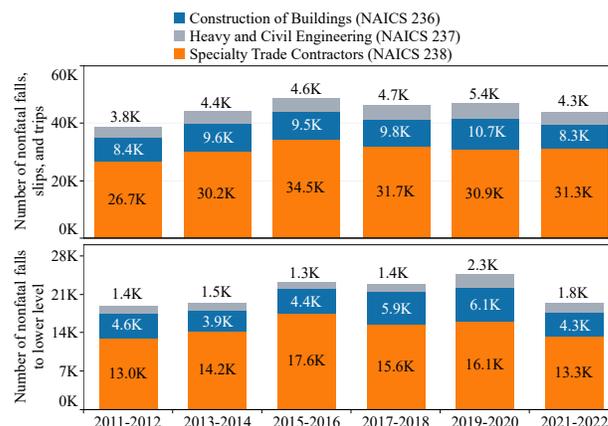


Source: U.S. Bureau of Labor Statistics, 2011-2022 Survey of Occupational Injuries and Illnesses and 2011-2022 IPUMS Current Population Survey.

\*Sum is shown for each two-year period to produce comparable statistics following BLS data change to biennial estimates for 2021-2022.

Specialty Trade Contractors accounted for approximately 70% of nonfatal falls to a lower level (69.8%; chart 11) from 2011 to 2022. The number of nonfatal falls to a lower level decreased 29.5% in Construction of Buildings (6.1K to 4.3K), 21.7% in Heavy and Civil Engineering (2.3K to 1.8K), and 17.4% in Specialty Trade Contractors (16.1K to 13.3K) from 2019-2020 to 2021-2022. Falls, slips, and trips also decreased for Construction of Buildings and Heavy and Civil Engineering, but increased 1.3% for Specialty Trade Contractors (30.9K to 31.3K).

**11. Number of nonfatal falls, slips, trips and falls to lower level by major subsector, 2011-2022\***

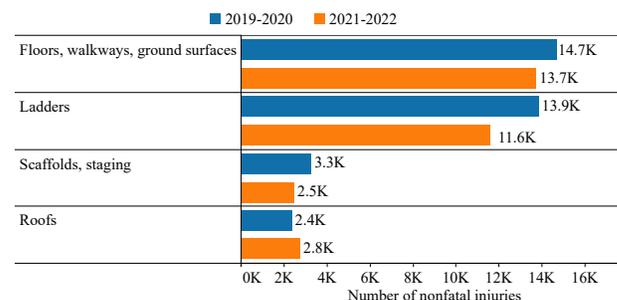


Source: U.S. Bureau of Labor Statistics, 2011-2022 Survey of Occupational Injuries and Illnesses.

\*Sum is shown for each two-year period to produce comparable statistics following BLS data change to biennial estimates for 2021-2022.

Injury sources common to nonfatal falls, slips, and trips were analyzed, comparing 2019-2020 to 2021-2022 (chart 12). Injuries where roofs were the primary source increased 16.7% (2.4K to 2.8K), with decreases for injuries in which ladders (-16.5%, 13.9K to 11.6K), scaffolds/staging (-24.2%, 3.3K to 2.5K), and floors, walkways, and ground surfaces (-6.8%, 14.7K to 13.7K) were the primary source.

**12. Injury sources\* common to falls, slips and trips, 2019-2020 versus 2021-2022^**



Source: U.S. Bureau of Labor Statistics, 2019-2022 Survey of Occupational Injuries and Illnesses.

\*All injuries shown. Sources shown commonly result in falls, slips, and trips (>=50% of primary source injuries).

^Sum is shown for 2019-2020 to produce comparable statistics following BLS data change to biennial estimates for 2021-2022.

Falls are a significant hazard to construction workers. A sustained increase in fatal falls since 2020 has brought their numbers to pre-pandemic levels. During 2021-2022, however, the number of nonfatal falls decreased. There have also been changes in the frequency of sources common to falls, with ladders accounting for fewer fatal and nonfatal injuries while the number associated with roofs has risen.

The burden of falls is not shared equally among construction workers. There were several states with higher rates of fatal falls than the national average in 2022, and roofers continue to account for a large number of fatal falls. Small establishments and contracted workers also accounted for a majority of fatal falls from 2011 to 2022. These findings highlight the need for new, innovative approaches to reaching small employers and workers who may be vulnerable due to poor working arrangements and lack of access to safety resources.

The most important thing to remember in the face of such high fatal injury rates is that falls are preventable. [The National Campaign to Prevent Falls in Construction](#) and [annual Safety Stand-Down](#) event target fall safety in construction, encouraging employers to: PLAN ahead to prevent falls on the job, PROVIDE the right tools and equipment for the job, and TRAIN employees on fall prevention equipment, work practices, and rescue. The PLAN piece is especially important since many decisions, such as access equipment (e.g., ladders, scaffolding, motorized lifts), work organization/methods, and personal protective equipment (PPE) selection and purchase, are made before the job begins. [CPWR's Survey on Underlying Causes of Falls from Heights](#) identified insufficient or ineffective planning as the primary cause of falls from heights. A lack of preparation can lead to a reliance on PPE as the only protective measure, but the survey also found that when employers didn't do any planning, the odds of workers using their PPE were 71% lower. Learn more about planning for fall prevention, fall protection, and fall rescue by accessing these [free templates and checklists](#).

NIOSH and OSHA have also developed materials to address falls and Spanish-language resources from CPWR, NIOSH, OSHA and others can be found on [this page](#).

## 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 our updated [Construction Focus Four](#) and [Falls, Slips and Trips in Construction](#) dashboards.

## DEFINITIONS

- **Contracted worker** – indicates if a worker was employed by a firm working under another firm that has overall responsibility for the operations at the work site. A more detailed definition can be found in this [2011 report from CFOI](#).
- **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 subsector** – 5-digit NAICS codes within construction.
- **Establishment size** – the number of employees working for employer.
- **Falls** – defined using the Occupational Injury and Illness Classification Manual using variety of definitions based on data availability, including:
  - a) **Falls to a lower level (OIHCS code 43)** – includes falls where the injury was produced by impact of the person and another surface of lower elevation.
  - b) **All falls** – includes falls to a lower level and falls on same level.
    - **Falls to a lower level (OIHCS code 43)**
    - **Falls on same level (OIHCS code 42)** – includes falls where the injury was produced by the impact of the person and another surface without elevation.
  - c) **Falls, slips, and trips (OIHCS code 4)** – includes falls on the same level, falls and jumps to lower levels, falls, and jumps that were curtailed by a personal arrest device, and slips and trips without a fall.
- **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.
- **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).
- **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 climbing up a ladder when they slipped and fell would have a reported primary source of, “Ladders.” Full definitions of primary source categories can be found in the [Occupational Injury and Illness Classification Manual](#).
  - **Sources common to falls, slips, and trips** – primary sources for which more than 50% of all injuries were due to falls, slips, and trips.

- **Rates** – calculated by dividing the count of injuries by the number of full-time equivalents for the time period then multiplying by 100,000 for fatal and 10,000 for nonfatal injuries. When multiple years are reported the injuries and populations were summed first.

## DATA SOURCES

Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, and Michael Westberry. Integrated Public Use Microdata Series, 2011-2021 Current Population Survey: Version 9.0 [dataset]. Minneapolis, MN: IPUMS, 2022. <https://doi.org/10.18128/D030.V9.0>.

U.S. Bureau of Labor Statistics (BLS), 2011-2022 Census of Fatal Occupational Injuries (CFOI) Public and Restricted Use Data. <https://www.bls.gov/iif/>.

U.S. Bureau of Labor Statistics (BLS), 2011-2022 Survey of Occupational Injuries and Illnesses (SOII). <https://www.bls.gov/iif/>.

## REFERENCES

Bartlet, G., Greenberg, R., & Bunting, J. [2022]. Highlighted Findings from a CPWR Survey on Underlying Causes of Falls from Heights. [https://www.cpwr.com/wp-content/uploads/RR-falls\\_experience\\_survey.pdf](https://www.cpwr.com/wp-content/uploads/RR-falls_experience_survey.pdf).

CPWR - The Center for Construction Research and Training. [2023]. Falls, Slips, and Trips in Construction [dashboard]. <https://www.cpwr.com/research/data-center/data-dashboards/falls-slips-and-trips-in-construction/>.

CPWR - The Center for Construction Research and Training. [2023]. Fatal and Nonfatal Focus Four Injuries in Construction. <https://www.cpwr.com/wp-content/uploads/DataBulletin-March2023.pdf>.

CPWR - The Center for Construction Research and Training. [n.d.]. Hazard-Specific Resources & Training Tools. <https://www.cpwr.com/research/research-to-practice-r2p/r2p-library/other-resources-for-stakeholders/hazard-specific-resources/>.

CPWR - The Center for Construction Research and Training. [n.d.]. Lista de recursos en español. <https://www.cpwr.com/spanish-language-resources/>.

CPWR - The Center for Construction Research and Training. [n.d.]. Stop Construction Falls. <https://stopconstructionfalls.com/>.

Kleiner, B. M., & Zhao, D. [2017]. Preventing Fatalities in the Construction Industry. The Associated General Contractors of America. [https://www.agc.org/sites/default/files/Files/Safety%20%26%20Health/AGC-VT%20Fatality%20Report%20%5BFinal%5D\\_0.pdf](https://www.agc.org/sites/default/files/Files/Safety%20%26%20Health/AGC-VT%20Fatality%20Report%20%5BFinal%5D_0.pdf).

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>.

U.S. Bureau of Labor Statistics. [2023]. Construction Deaths Due to Falls, Slips, and Trips Increased 5.9 Percent in 2021. <https://www.bls.gov/opub/ted/2023/construction-deaths-due-to-falls-slips-and-trips-increased-5-9-percent-in-2021.htm>.

U.S. Bureau of Labor Statistics. [2017]. Fatal Occupational Injuries to Contracted Workers. <https://www.bls.gov/iif/factsheets/archive/fatal-occupational-injuries-contractors-2011-2015.htm>.

U.S. Bureau of Labor Statistics. [2012]. Occupational Injury and Illness Classification Manual. <https://www.cdc.gov/Wisards/oics/Doc/OIICS%20Manual%202012%20v201.pdf>.

U.S. Bureau of Labor Statistics. [2023]. Survey of Occupational Injuries and Illnesses Handbook of Methods. <https://www.bls.gov/opub/hom/soii/pdf/soii.pdf>.

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- Construction Safety and Health Network  
<https://safeconstructionnetwork.org/>
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- 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.covidecpwr.org>
- Electronic Library of Construction Occupational Safety and Health  
<https://www.elcosh.org/index.php>
- eLCOSH Nano  
<https://nano.elcosh.org/>
- 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](http://www.scsmis.com)
- Stop Construction Falls  
<https://stopconstructionfalls.com/>
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