

## Injuries from falls to lower levels, 2013

*Falls to a lower level accounted for nearly 5 percent of all worker injuries and illnesses requiring days away from work in 2013 and for 13 percent of all fatal work-related injuries. This article compares the numbers of such falls with data from 2011, looks at three industries with a high incidence of falls, distinguishes between fatal and nonfatal falls, and briefly discusses the occupations and demographics of workers who fall to lower levels.*

Falls to lower levels in 2013 were a major hazard to workers. Workers in private industry, state government, and local government suffered 57,020 injuries resulting in days away from work because of falls to lower levels, and 595 workers across private industry and all levels of government lost their lives because of such falls. Falls to lower levels accounted for nearly 5 percent of all injuries and illnesses that required days away from work and for 13 percent of all fatal work-related injuries. The falls resulting in nonfatal injuries required that workers take a median 20 days away from their job, more than twice as long as the 8 days for all nonfatal injuries and illnesses.

In contrast, falls on the same level accounted for more injuries with days away from work, but fewer fatal injuries. In 2013, there were 185,230 cases with one or more days away from work due to falls on the same level. Falls on the same level resulted in 110 fatal injuries.

The number of nonfatal falls to a lower level has been mostly unchanged in private industry since 2011 (see table 1), while the number of fatal falls to a lower level for private industry has increased slightly, from 522 in 2011 to 569 in 2013. Most of this change was in the private construction industry, whose fatal falls increased from 255 to 291, or 14.1 percent, from 2011 to 2013. During this period, total hours worked in the private construction industry increased by 5.8 percent.



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**Table 1. Falls to a lower level, wage and salary workers, 2011 to 2013**

Year	Nonfatal injuries		Fatal injuries		
	Private industry	State and local government	Private industry	State and local government	Federal government
2011	47,920	10,150	522	25	5
2012	47,200	9,690	548	17	4
2013	47,120	9,900	569	18	8

Note: The scope of workers included in the Survey of Occupational Injuries and Illnesses differs from that included in the Census of Fatal Occupational Injuries. The Survey of Occupational Injuries and Illnesses excludes self-employed workers, federal government workers, and workers on farms with fewer than 11 employees; the Census of Fatal Occupational Injuries includes such workers.

Source: U.S. Bureau of Labor Statistics.

The Bureau of Labor Statistics (BLS) collects data on occupational injuries and illnesses and on fatal occupational injuries; however, the program is a purely statistical one and has no regulatory functions. The Occupational Safety and Health Administration (OSHA) is responsible for ensuring workplace safety. To support this mandate, OSHA creates safety standards and is responsible for enforcing those standards. In the construction industry, fall protection is required when workers are at heights 6 feet or more above a lower level.<sup>1</sup>

In some circumstances, such as proximity to dangerous equipment, protection is required at heights less than 6 feet. Some examples of fall protection are guardrails, safety nets, and fall arrest or harness systems.

Data on nonfatal occupational injuries and illnesses come from the Survey of Occupational Injuries and Illnesses (SOII).<sup>2</sup> Fatal injury data come from the Census of Fatal Occupational Injuries (CFOI).<sup>3</sup>

## New data collected on height of fall

Data collected by the SOII and CFOI have been coded, beginning with survey year 2011, on the basis of the Occupational Injury and Illness Classification System (OIICS), version 2.01. This classification system is a comprehensive revision of the coding system used from 1992 to 2010. The new system encompasses a break in series, so data from 2011 to 2013 are not directly comparable to data from 1992 to 2010.<sup>4</sup>

In the OIICS system, the event or exposure (such as fall to a lower level) describes the manner in which the injury or illness was produced or inflicted by the source of injury or illness. Beginning with 2011 data and OIICS 2.01, falls to a lower level were subcategorized as follows:

- Fall to lower level, unspecified
- Fall from collapsing structure or equipment
- Fall through surface or existing opening
- Other fall to lower level

Each of those categories was further divided by the height of the fall, if known or reported, in 5-foot increments (for example, 6 to 10 feet) up to 30 feet. All falls to a lower level from greater than 30 feet were recorded as “more than 30 feet.” The object or structure the worker fell from (roof, ladder, etc.) was captured not by the event code but by the source code. For falls to a lower level, the source was the equipment or part of the structure (structural

element) from or through which the worker fell. In some cases, a secondary source was recorded; this was the object or substance, if any, that contributed to the worker's fall. In the example of a worker falling from a ladder, the secondary source could be the floor or ground. In 84.8 percent of the nonfatal falls to a lower level in 2013, the secondary source was not specified.

As the height of the fall increases, fatal injuries represent a higher proportion of the total of fatal injuries and days-away-from-work injuries. While this result is hardly surprising, data collected from the SOII and CFOI allow rough comparisons of the risks workers face in situations where falls are a hazard.

The comparison is not perfect, as only falls that result in a fatal injury or an injury with one or more days away from work are considered. BLS has limited data on falls that result in injuries with job transfer or restriction (from a pilot study focusing on a small number of industries<sup>5</sup>) and no data on falls that result in injuries without lost work time or with no recordable injury. In addition, the scope of the CFOI and SOII is not the same: the SOII excludes self-employed workers, as well as workers on small farms with 10 or fewer employees.

It is also difficult to compare event or exposure codes because some cells contain data that are not publishable for the SOII, the CFOI, or both. Falls to a lower level are classified as fall to lower level, unspecified; fall from collapsing structure or equipment; fall through surface; and other fall to lower level. Falls to lower level, unspecified, are cases of falls where not enough information is available to code at a more detailed level. Other falls to lower level, the majority of falls to lower level, include falls other than from a collapsing structure or equipment or through a surface. Some examples are falls from a ladder, roof, scaffold, stairs, or trees. This article focuses on other falls to lower level (code 433) because 76.7 percent of the injuries and 78.2 percent of the fatal injuries are within in that group. For both the SOII and the CFOI, the article focuses on falls in the private sector, and, for the CFOI, it excludes self-employed workers. This approach brings the scope of workers covered by the CFOI and SOII closer but still not equal, as the SOII excludes workers on small farms. The agriculture industry, however, represents a small portion of the fatal-falls-to-lower-level total. Of the 322 falls coded as "other fall to lower level" among wage and salary workers, only 1.2 percent were in the animal production or crop production industries.

Within the subset of "other falls to lower level" among wage and salary workers in private industry, the height of the fall is specified in most (87.3 percent) of the fatal injury cases. For injuries with days away from work, the height is specified in about half (49.4 percent) of the cases. The CFOI collects information from multiple sources, including death certificates, workers' compensation reports, and other reports provided by state administrative agencies. On average, the CFOI collects four documents from different sources for each fatal injury, while the SOII relies only on the information provided by the survey respondent to code cases. The additional information may explain why fatal fall injuries are more often coded at a higher level of detail.

In this subset of injuries due to falls, there were 280.0 days-away-from-work injuries for every fatal injury when the fall was from less than 6 feet. (See table 2.) When the fall height was between 26 and 30 feet, there were 3.5 days-away-from-work injuries for each fatal injury. For falls from heights greater than 30 feet, there were 50 fatal injuries while the number of days-away-from-work injuries did not meet publication criteria.

**Table 2. Fatal occupational injuries and nonfatal occupational injuries involving falls to a lower level, private wage and salary workers, 2013**

Event	Injuries requiring days away from work	Median days away from work	Fatal injuries	Ratio of days-away-from-work injuries to fatal injuries
Falls to lower level	47,120	21	423	111.4
Other falls to lower level <sup>(1)</sup>	36,130	20	322	112.2
Other falls to lower level less than 6 feet	14,280	17	51	280.0
Other falls to lower level 6 to 10 feet	2,310	60	31	74.5
Other falls to lower level 11 to 15 feet	520	60	59	8.8
Other falls to lower level 16 to 20 feet	540	180	39	13.8
Other falls to lower level 21 to 25 feet	130	100	34	3.8
Other falls to lower level 26 to 30 feet	60	17	17	3.5
Other falls to lower level more than 30 feet	—	—	50	—

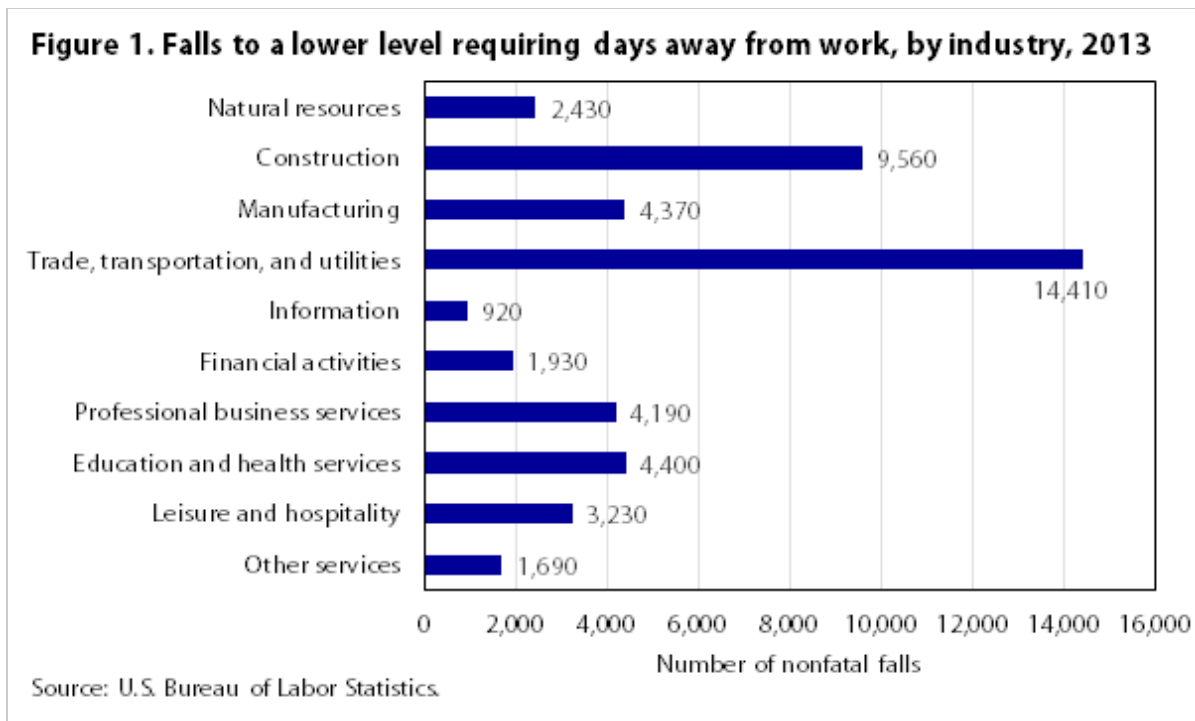
Notes:

<sup>(1)</sup> This category includes all falls to a lower level other than falls from a collapsing structure or equipment and falls through a surface or existing opening.

Source: U.S. Bureau of Labor Statistics.

## Nonfatal injuries by industry

The SOII collects data annually from a random sample of employers. For cases with days away from work, more detail is available, including worker demographics, temporal characteristics, and descriptions of the cases and how they occurred. This article describes injuries requiring days away from work because of falls to a lower level. The term “fall injuries” could also include injuries that require job transfer or restriction and injuries that are recordable but do not involve lost work time, as well as injuries resulting from a fall on the same level. The article focuses only on injuries resulting from falls to a lower level and requiring days away from work, and will refer to these as “fall injuries” in the interest of brevity.



Most of the fall injuries occurred in private industry (82.6 percent). The construction industry accounted for 20.3 percent of these injuries. Other industry sectors with large shares of fall injuries were retail trade (12.3 percent), transportation and warehousing (10.4 percent), manufacturing (9.3 percent), and health care and social assistance (8.3 percent). Figure 1 shows the number of falls to a lower level that required days away from work, by industry, for 2013.

Some of these industry sectors have high numbers of fall injuries because of their size. Manufacturing (3.7 cases per 10,000 full-time workers) and health care and social assistance (2.9) had lower rates of falls to a lower level than the private industry average (5.1). Retail trade (5.1) had approximately the same rate as all private industry. Both construction (18.0) and transportation and warehousing (12.1) had higher rates than the private industry average, in addition to having large numbers of cases.

Agriculture, forestry, fishing, and hunting, while accounting only for 4.2 percent of the fall injuries, had a rate of 20.3 cases per 10,000 full-time workers. This rate was substantially higher than the private industry average. Within the agriculture industry, fruit and tree nut farming stands out, with 530 cases and a rate of 36.9 per 10,000 full-time workers.

In the fruit and tree nut farming industry, among workers injured by falls to a lower level and requiring days away from work,

- 45.3 percent had less than 3 months of service with their employer;
- 77.4 percent were men and 20.8 percent were women;
- 75.5 percent were Hispanic or Latino, and in another 20.8 percent of the cases race or ethnic origin was not reported;
- 81.1 percent fell from ladders; and

- 41.5 percent of the injuries were sprains, strains, or tears.

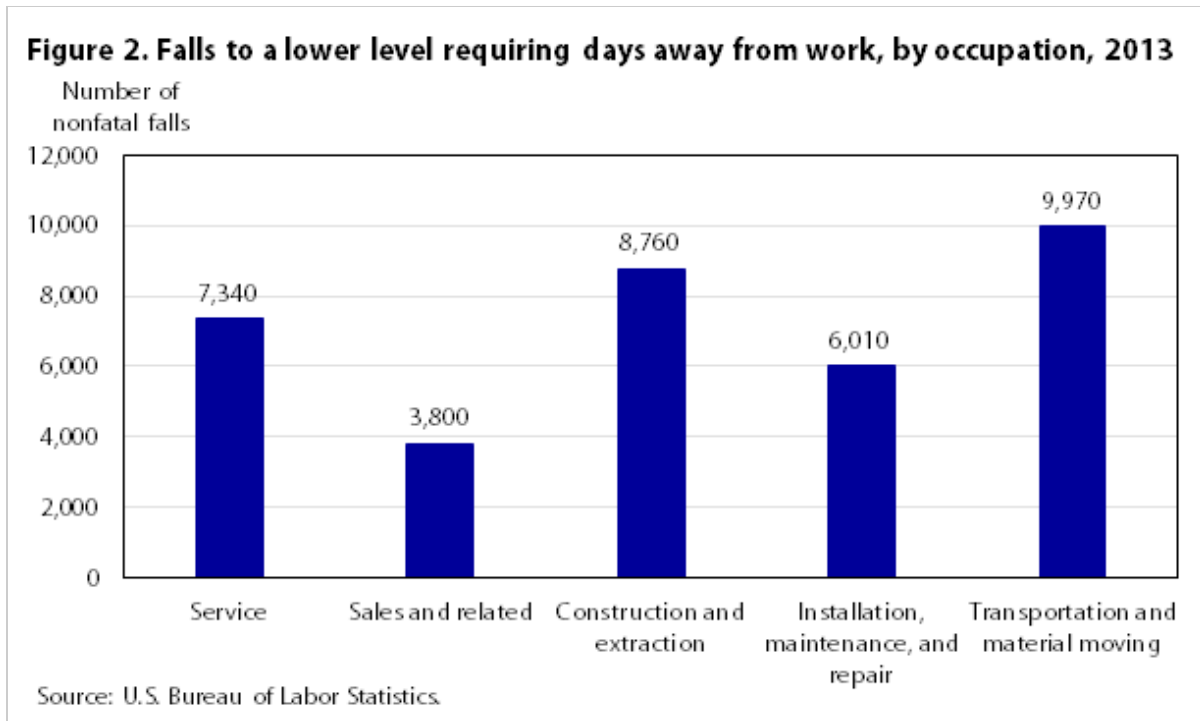
Roofing contractors (NAICS code 23816) have had fall injury rates well above the national average for each of the last 3 years—39.2 in 2013, 50.7 in 2012, and 81.1 in 2011. Key findings for the workers in this industry for days-away-from-work fall injuries are that

- 100 percent were men;
- 51.9 percent were White and 28.8 percent were Hispanic or Latino;
- 48.1 percent of the cases required 31 or more days away from work;
- the median number of days away from work was 26;
- 55.8 percent fell from roofs and 19.2 percent fell from ladders; and
- 51.9 percent of the injuries were fractures.

Another industry with high fall injury rates over the last 3 years is truck transportation (NAICS 484). Workers in this industry had 19.9 fall injuries per 10,000 full-time workers in 2013. Among truck transportation workers,

- 95.5 percent were men;
- 36.6 percent were ages 55 to 64, and 39.7 percent had more than 5 years of service with their employer;
- injuries required a median 30 days away from work;
- in 97.6 percent of the cases, the fall height was either unspecified or less than 6 feet;
- in 53.4 percent of the cases, the source of injury was “trucks—motorized freight hauling and utility”; in 29.5 percent, the source was “floors—walkways—ground surfaces”; and
- in 27.1 percent of the cases, “soreness, pain, hurt—nonspecified” was the nature of the injury. Other frequent natures of injury were sprains, strains, and tears (25.0 percent) and fractures (19.5 percent).

## **Nonfatal injuries by worker and case characteristics**



The majority of the workers who missed days of work because of fall injuries were men, while 27.2 percent were women. In 21.2 percent of the cases, the worker’s occupation group was transportation and material moving occupations, and in another 18.6 percent, the workers were employed in construction and extraction occupations. (See figure 2.) In 42.9 percent of the cases, the worker was White. Hispanics represented 18.5 percent of the cases, higher than their share of all private industry injuries and illnesses with days away from work (13.6 percent). In 31.2 percent of the cases, race or ethnic origin was not reported.

Among all private industry fall injuries, in 26.4 percent of the cases the injuries were sprains, strains, and tears, 24.6 percent were fractures, and in 18.7 percent of the cases the nature of the injury was soreness or pain. Approximately three-quarters (76.7 percent) of the falls to a lower level were categorized as event code 433, “other fall to lower level”; 10.2 percent were “fall from collapsing structure or equipment”; and 9.4 percent were “fall to lower level, unspecified.” Within “other fall to lower level,” when the height of the fall was unspecified or less than 6 feet, there were more sprains, strains, and tears than fractures. From a fall height of 6 to 10 feet and fall height of 11 to 15 feet, there were approximately 5 times as many fractures as sprains, strains, and tears. There are relatively few nonfatal injuries from falls over 15 feet. Much of the data for these categories are not publishable.

In 13.1 percent of the fall-injury cases, the part of body affected was the back. Another 10.1 percent were knee injuries, and 9.4 percent affected the ankle. Floors, walkways, and ground surfaces were the sources of injury in 35.4 percent of the cases, while ladders were the source in 32.5 percent of the cases.

## Fatal occupational injuries

The CFOI compiles yearly counts of all fatal work-related injuries in the United States. The scope of the CFOI includes wage and salary workers in private industry, self-employed workers, and government workers at the federal, state, and local levels. The CFOI publishes counts of fatal work injuries at the national level; for each state; for the District of Columbia, Guam, Puerto Rico, and the Virgin Islands; and for many metropolitan statistical areas.

Each year, the CFOI publishes a preliminary count of work-related fatal injuries and, later, a revised and final total. Data for 2013 used in this article are revised and final.

In 2013, 595 workers died as a result of falls to a lower level. The vast majority (95.6 percent) were employed in private industry. Self-employed workers accounted for 26.4 percent of the total, a percentage that was higher than their percentage of all fatal work injuries (20.7 percent). The overwhelming majority (98.2 percent) were men. More than half of these workers were non-Hispanic White (63.7 percent), while 27.4 percent were Hispanic. Among all workers who succumbed to a fatal occupational injury, 17.8 percent were Hispanic.

As with the nonfatal fall injuries, the source of injury was often a roof (22.0 percent) or a ladder (21.5 percent). A vehicle was the source of injury in 11.8 percent of the cases, with trucks accounting for 8.1 percent; and scaffolding or staging was the source of another 11.1 percent. Intracranial injuries accounted for 41.0 percent of the fatal fall injuries.

Almost half (48.9 percent, or 291 cases) of the fatal fall injuries occurred in the private construction industry. (See table 3 and figure 3.) Of these cases, 66 occurred in the roofing contractor industry, and another 40 occurred in the residential building construction industry.

**Table 3. Fatal falls to a lower level in the construction industry, 2013**

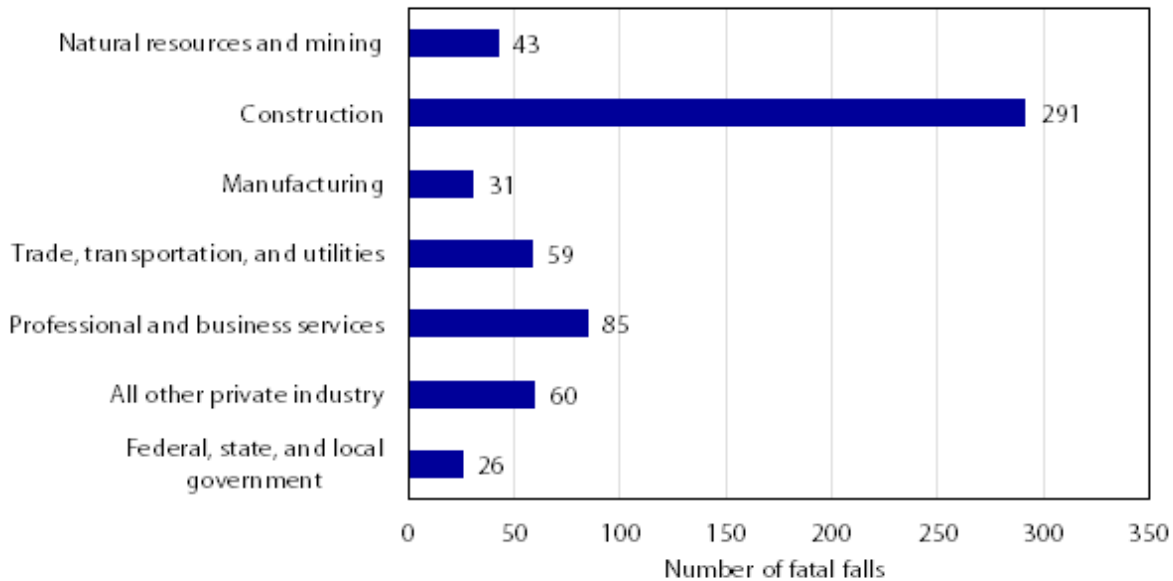
Industry	NAICS code	Fatal falls to a lower level
Construction	23	291
Residential building construction	23611	40
Commercial and institutional building construction	23622	13
Framing contractors	23813	18
Roofing contractors	23816	66
Electrical contractors and other wiring installation contractors	23821	10
Plumbing, heating, and air-conditioning contractors	23822	16
Painting and wall covering contractors	23832	26
Drywall and insulation contractors	23831	12
All other construction industries	—	90

Note: Data are for workers in private industry, government workers, and the self-employed.

Source: U.S. Bureau of Labor Statistics.

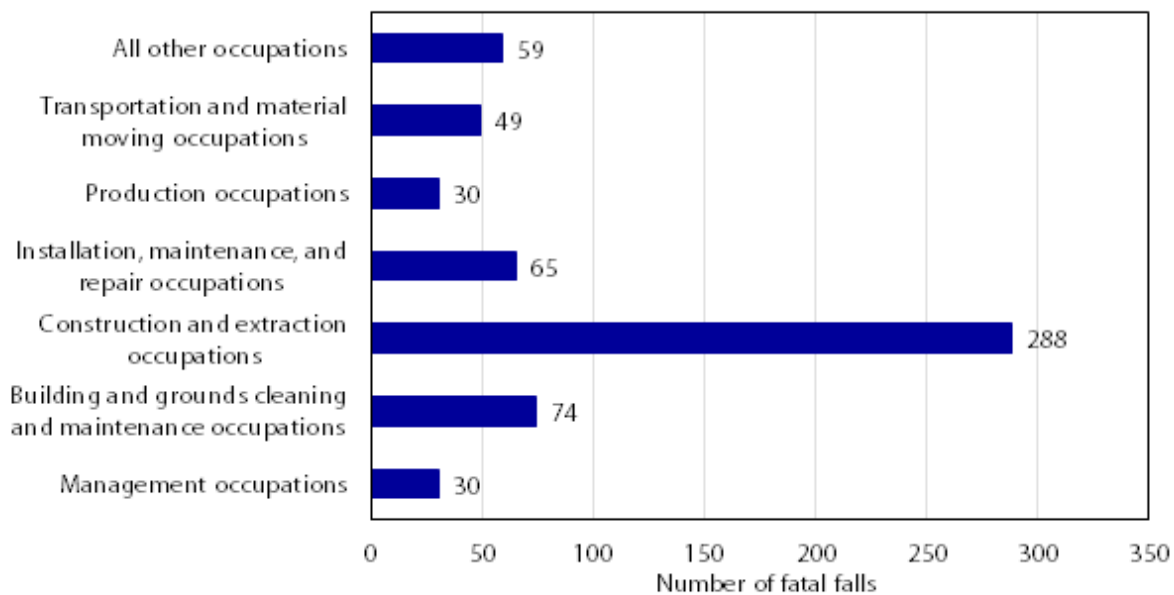


**Figure 3. Fatal falls to a lower level, by industry, 2013**



Source: U.S. Bureau of Labor Statistics.

**Figure 4. Fatal falls to a lower level, by occupation, 2013**



Source: U.S. Bureau of Labor Statistics.

In all industries, of the six occupations with the most fatal fall injuries, five were construction and extraction occupations. Nearly half (48.4 percent) of the fatal fall injuries were to workers in this occupation group. (See figure 4.) The occupations with the most fatal fall injuries were roofers (10.8 percent), construction laborers (10.6 percent), carpenters (7.2 percent), and first-line supervisors of construction trades and extraction workers (5.7 percent). Tree trimmers and pruners (4.7 percent) had the most cases among occupations outside of construction.

For fatal falls from a collapsing structure or equipment, 44.4 percent were from heights of 30 feet or more. For fatal falls through a surface or an existing opening, the most common height of the fall was 11 to 15 feet (19.1 percent). Other falls to a lower level accounted for 79.7 percent of all fatal falls to a lower level. Within the fatal falls coded as other falls to a lower level, 15.6 percent were from 11 to 15 feet and 14.1 percent were from more than 30 feet. Falls can be deadly even from shorter distances, as 13.9 percent of the fatal other falls to a lower level were from less than 6 feet.

## Conclusion

Falls to a lower level continue to be a major hazard to workers. These falls are the source of 13.0 percent of all fatal occupational injuries; in the construction industry, falls to a lower level account for 34.1 percent of fatal injuries. Falls to a lower level represent 5.1 percent of nonfatal occupational injuries and illnesses in private industry, and these are among the most severe nonfatal cases, as shown by the 21 median days away from work in 2013. New data on the height of falls can help to quantify the increased risks of severe injury and death due to falling to a lower level from a height.

### SUGGESTED CITATION

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### NOTES

<sup>1</sup> *Fall protection in construction*, OSHA 3146-05R 2015 (U.S. Department of Labor, Occupational Safety and Health Administration), <https://www.osha.gov/Publications/OSHA3146.pdf>.

<sup>2</sup> Data on nonfatal injuries and illnesses are from the Survey of Occupational Injuries and Illnesses (SOII) program, which collects data from a sample of business establishments in the United States; see "Injuries, illnesses, and fatalities" (U.S. Bureau of Labor Statistics), <https://www.bls.gov/iif/home.htm>.

<sup>3</sup> Data on fatal injuries are from "Census of Fatal Occupational Injuries (CFOI)," (U.S. Bureau of Labor Statistics), <https://www.bls.gov/iif/oshcfoi1.htm>. Fatal injuries in this article are based on revised counts for 2013. For more information on both the CFOI and SOII programs, see "Occupational safety and health statistics," *BLS handbook of methods*, chapter 9 (U.S. Bureau of Labor Statistics), <https://www.bls.gov/opub/hom/pdf/homch9.pdf>. The Injuries, Illnesses, and Fatalities Program uses the Occupational Injury and Illness Classification System (OIICS) to define event or exposure, nature, part of body, and source; see "Injuries, illnesses, and fatalities," *Occupational Injury and Illness Classification manual* (U.S. Bureau of Labor Statistics), <https://www.bls.gov/iif/oshoiics.htm>. Occupation is defined with the use of the Standard Occupational Classification (SOC) system; see Standard Occupational Classification (U.S. Bureau of Labor Statistics), <https://www.bls.gov/soc/home.htm>. Industry is defined in accordance with the North American Industrial Classification System (NAICS); see "North American Industry Classification System (NAICS) at BLS" (U.S. Bureau of Labor Statistics), <https://www.bls.gov/bls/naics.htm>.

<sup>4</sup> From 1992 to 2010, the OIICS divided falls to lower level into several subcategories that describe what the worker fell from—for example, fall from ladder or fall from roof. If, for example, a worker fell 10 feet from a ladder onto the floor, in the 1992–2010 coding system the event would be "fall from ladder" and the primary source would be the ground. The height of the fall was not captured. In the coding system used since 2011, the event would be "other fall to lower level 6 to 10 feet" and the primary source would be the ladder. For the classification system used from 1992 to 2010, see *Occupational Injury and Illness Classification manual* (U.S. Bureau of Labor Statistics, September 2007), [https://www.bls.gov/iif/oiics\\_manual\\_2007.pdf](https://www.bls.gov/iif/oiics_manual_2007.pdf).

[5](#) “Occupational injuries and illnesses: a pilot study of job-transfer or work-restriction cases, 2011–2013,” report 1056 (U.S. Bureau of Labor Statistics, July 2015), <https://www.bls.gov/opub/reports/job-transfer-or-work-restriction/archive/a-pilot-study-of-job-transfer-or-work-restriction-cases-2011-2013.pdf>.

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