

New Data Highlight Severity of Construction Falls

BY MARTIN E. PERSONICK

The hazards of falling are especially prevalent in the construction industry, where working at elevations is common. These hazards explain, in part, why the industry reports disproportionately large numbers of falls resulting in death, and disabling injuries requiring lengthy absences from work.

In 1994, the construction industry accounted for over half of the 577 American workers who fell from heights to their death. Moreover, those who survived construction falls required relatively lengthy absences from work (typically about 3 weeks) to recuperate from their injuries. In contrast, the average recuperation time for all workers was 1 week.

This article presents information on the severity of construction falls, based on data from the BLS Census of Fatal Occupational Injuries and Survey of Occupational Injuries and Illnesses. The two sets of safety and health statistics contain detailed information on how construction injuries occurred. In addition, the survey of injuries and illnesses measures the severity of the fall in terms of median days away from work by type of fall.

Fatal falls

Falls from elevations led all other ways in which construction workers were fatally injured in 1994, surpassing highway incidents—which ranked first in nationwide workplace deaths—and electrocutions, another risk that construction workers face much more often than do workers in other industries.

Falls from elevations made up three-fourths of construction fatalities, compared to a tenth of all fatal work injuries reported by BLS' national census. The table below lists the six leading ways in which construction fatalities occurred and their shares of the 1994 fatality total in construction and in all industries.

Event or exposure	Construction	All industries
Total fatalities	1,027	6,588
Percent	100	100
Fall to lower level	31	9
Electrocution	14	5
Highway incident	13	20
Struck by object	8	9
Worker struck by vehicle	7	6
Caught in collapsing material	6	2
All other events, exposures	22	49

Falls from roofs led all other types, accounting for a third of the 316 construction falls to a lower level in 1994. Next in frequency were falls from scaffolding or other temporary platforms, comprising a fifth of the total, and falls from ladders, making up a seventh.

The following table provides a more detailed look at falls from roofs as well as the origination points of other fatal falls from elevations.¹

Type of fall	Percent of total
Falls to lower level	100
Fall from roof	34
From roof edge	10
Through roof surface	5
Through skylight	3
Through existing opening	3
Other roof falls	11
Fall from scaffold, staging	22
Fall from ladder	15
Fall from building girder, structural steel member	8
Other falls to lower level	22

Fatalities by occupation. Construction laborers were more often fatally injured as the result of falls from elevations than any other occupation in the construction industry, comprising nearly a fifth of the industry total. Next in frequency were carpenters, roofers, and structural metal workers, each with about a tenth of the total. Not surprisingly, falls to a lower level was the leading way in which fatalities occurred

Martin E. Personick is an economist in the Office of Safety, Health, and Working Conditions, Bureau of Labor Statistics, Telephone (202) 606-6170.

for all individual construction trades, accounting for the majority of the 1994 fatality totals for roofers and structural metal workers.

Disabling falls

The construction industry led other major industrial classifications in the rate of injuries and illnesses due to falls, including those from elevations and those on the same level. In 1993, the industry rate for lost work days due to falls was double the national average, at 1 fall-related days-away-from-work injury for every 100 private construction workers. That year, the construction industry reported about 42,000 disabling falls, about a fifth of its 200,000 days-away-from-work cases resulting from all types of events and exposures.

Disabling falls result in much longer absences from work in the construction industry than they do in private industry as a whole. As shown in table 1, the industry's 41,800 disabling falls had a median of 14 days away from work, double the 7-day median for the 370,000 fall cases reported nationwide in 1993.²

Construction workers take longer to return to work after falling than the private industry norm, regardless of the type of fall. Falls from a ladder, for instance, are associated with a 15-day median in construction and a 10-day median in private industry. They also sustain certain types of falls that require relatively lengthy recuperation periods more often than do other private industry workers. Falls from a ladder, for example, made up 20 percent of all disabling construction falls, nearly triple their 7-percent share of disabling falls nationwide.

In general, falls to a lower level result in proportionately more serious injuries, such as broken bones, that require longer recuperation periods than do falls on the same level. In the construction industry, fractures and multiple injuries comprised nearly two-fifths of all disabling conditions associated with falls from elevations, compared with a fourth of those injuries resulting from falls on the same level. (See table 1.) This explains, in part, why the 17-day median for the 23,700 falls to a lower level in the industry far exceeded the 10-day median for the 15,500 falls on the same level. Nationally, the corresponding medians were 10 days to recover from falls to a lower level and 7 days to return to work after falls on the same level.

Risk of injury by occupation. The risk faced by construction workers varies by occupation. In measuring relative

risk, occupational shares of all construction falls (shown in table 1) were compared with occupational shares for total employment in construction (from the Current Population Survey).³ Using this method, construction laborers were at comparatively high risk, because their share of all disabling construction falls (more than a fifth) exceeded their one-eighth share of private wage and salary workers in that industry. Carpenters, by contrast, experienced a sixth of all construction falls, somewhat less than their one-fifth share of the industry's wage and salary workers.

Scope and methods

In terms of worker coverage, the Bureau's Survey of Occupational Injuries and Illnesses (the source of days-away-from-work data) is more limited than the BLS Census of Fatal Occupational Injuries (the source of fatal work injury data). The former series relates to private wage and salary workers only; the latter program also includes the self-employed, paid and unpaid family members, and State, local, and Federal Government workers (both civilian and military). Those differences are reflected in the data on construction falls.

Fatal and disabling event categories discussed throughout this article are described in detail in the 1992 BLS Occupational Injury and Illness Classification Manual.

Falls is one of seven specifically defined divisions within the event or exposure structure. The others include transportation incidents (such as highway mishaps or workers struck by vehicles); contact with objects or equipment (for example, struck by an object or caught in collapsing materials); exposure to harmful substance or environment (such as, contact with electric current or contact with a caustic or noxious substance); assaults and violent acts; bodily reaction and exertion (like overexertion and repetitive motion); and fires and explosions.

The occupation of injured workers is coded from job titles usually indicated on the death certificate or other source documents in the case of fatalities or supplied by the employer in days-away-from-work cases. The 1990 Occupational Classification System, developed by the Census Bureau, was used to determine the appropriate individual occupational category. The system, for example, slots the job title laborer into the occupation construction laborer when construction is reported as the industry of the injured worker. A laborer in agricultural production, however, receives the occupational code farm worker; the same title in most other industries is coded as laborer, except construction.

— Endnotes —

¹ In addition to 316 falls to a lower level, the 1994 BLS fatality census also counted 14 other fatal falls in construction. Most involved falls on the same level that supported the construction worker at the inception of the fall, such as a walkway.

² Median days away from work—the key measure of injury and illness

duration used here—designates the point at which half the total cases for the category studied involved more days and half involved fewer days.

³ Work force data are 1993 annual averages from the Current Population Survey, conducted by the Census Bureau for the Bureau of Labor Statistics.

Table 1. Lost workday injuries and illnesses resulting from falls in the construction industry, selected characteristics, 1993

Characteristic		Characteristic	
Type of fall		Occupation	
All falls:		All falls:	
Number	41,800	Number	41,800
Percent	100	Percent	100
Fall to lower level	57	Construction trade	55
Down stairs	4	Supervisor	5
From floor, dock, ground		Nonsupervisory	50
to lower level	3	Carpenter	16
From ladder	20	Drywall installer	3
From roof	7	Electrician	6
From scaffold	8	Painter	4
From nonmoving vehicle	6	Plumber/pipefitter	4
Fall to same level	37	Roofer	4
Other (including jump)	6	Other trade	13
		Other than trade	45
		Construction helper	4
		Construction laborer	23
		Other	18
Disabling condition		Median days away from work	
Fall to lower level:		All falls	14
Number	23,700	Fall to lower level	17
Percent	100	Down stairs	12
Fracture	28	From floor, dock, ground	
Sprain, strain	29	to lower level	11
Bruise, contusion	11	From ladder	15
Multiple injury	10	From roof	33
Other condition	22	From scaffold	21
Fall to same level:		From nonmoving vehicle	11
Number	15,500	Fall to same level	10
Percent	100		
Fracture	18		
Sprain, strain	35		
Bruise, contusion	16		
Multiple injury	6		
Other condition	25		

TABLE A-4. Fatal occupational injuries by primary and secondary source of injury for all fatalities and by major private industry¹ sector, All United States, 2008 - continued

Primary source and secondary source	Total fatalities (number)	Goods producing				Service providing							
		Total goods producing	Natural resources and mining ²	Construction	Manufacturing	Total service providing	Trade, transportation, and utilities	Information	Financial activities	Professional and business services	Education and health services	Leisure and hospitality	Other services
Saws-powered, except chainsaws.....	4	3	--	3	--	--	--	--	--	--	--	--	--
Welding and heating handtools-powered.....	4	3	--	--	3	--	--	--	--	--	--	--	--
Ladders.....	14	11	--	11	--	3	--	--	--	--	--	--	--
Ladders-movable.....	12	9	--	9	--	3	--	--	--	3	--	--	--
Movable ladders, unspecified.....	3	3	--	3	--	--	--	--	--	--	--	--	--
Extension ladders.....	7	5	--	5	--	--	--	--	--	--	--	--	--
Recreation and athletic equipment.....	5	--	--	--	--	4	--	--	--	--	--	--	--
Recreation and athletic equipment, n.e.c.....	4	--	--	--	--	4	--	--	--	--	--	--	--
Other tools, instruments, and equipment.....	5	--	--	--	--	3	--	--	--	--	--	--	--
Firearms.....	3	--	--	--	--	--	--	--	--	--	--	--	--
Vehicles.....	2,173	710	379	217	114	1,187	777	21	35	140	79	55	75
Vehicle, unspecified.....	3	--	--	--	--	--	--	--	--	--	--	--	--
Air vehicle.....	194	32	20	10	--	122	56	--	3	5	49	7	--
Aircraft-powered fixed wing.....	128	20	8	10	--	88	45	--	--	5	28	7	--
Jet.....	26	7	--	6	--	9	6	--	--	--	--	--	--
Propeller-driven aircraft.....	90	12	7	4	--	70	34	--	--	5	24	4	--
Aircraft-powered fixed wing, n.e.c.....	12	--	--	--	--	9	5	--	--	--	3	--	--
Aircraft-powered rotary wing.....	57	12	12	--	--	29	9	--	--	--	18	--	--
Helicopter.....	57	12	12	--	--	29	9	--	--	--	18	--	--
Aircraft-nonpowered.....	6	--	--	--	--	--	--	--	--	--	--	--	--
Parachute.....	6	--	--	--	--	--	--	--	--	--	--	--	--
Highway vehicle, motorized.....	1,543	366	118	172	76	960	654	19	32	121	28	35	67
Highway vehicle, unspecified.....	12	4	--	--	--	7	5	--	--	--	--	--	--
Automobile.....	253	29	5	13	11	150	65	12	10	19	12	13	19
Bus.....	17	--	--	--	--	11	9	--	--	--	--	--	--
Motorcycle, moped.....	31	4	--	--	--	16	4	--	--	--	3	4	3
Truck.....	1,133	312	108	145	59	717	544	5	20	92	6	13	34
Truck, unspecified.....	40	14	4	8	--	21	15	--	--	5	--	--	--
Delivery truck.....	48	7	--	--	4	36	28	--	--	--	--	--	4
Dump truck.....	101	46	14	29	3	43	27	--	--	12	--	--	--
Pickup truck.....	238	111	36	64	11	97	46	--	8	23	4	5	9
Semitrailer, tractor trailer, trailer truck.....	509	85	34	20	31	417	388	--	5	15	--	--	6
Truck, n.e.c.....	197	49	18	23	8	103	40	4	4	36	--	4	13
Van-passenger or light delivery.....	91	16	--	10	--	57	26	--	--	8	7	3	9
Highway vehicle, motorized, n.e.c.....	5	--	--	--	--	--	--	--	--	--	--	--	--
Highway vehicle, nonmotorized.....	8	3	3	--	--	5	--	--	--	--	--	--	--
Animal or human powered vehicle.....	7	--	--	--	--	5	--	--	--	--	--	--	--
Bicycle.....	3	--	--	--	--	3	--	--	--	--	--	--	--
Offroad vehicle, nonindustrial.....	39	21	19	--	--	14	3	--	--	--	--	7	--
All terrain vehicle (ATV).....	29	21	19	--	--	7	3	--	--	--	--	--	--

See footnotes at end of table.

TABLE F-3. Fatal occupational injuries from falls by type of fall, 2006 — Continued

Characteristics	All falls	Fall from roof	Fall from ladder	Fall from scaffolding, staging	Fall from nonmoving vehicle	Fall to floor, walkway, or other surface
Secondary source⁶ - continued						
Other building materials--solid elements	4	-	-	-	-	-
Fasteners, connectors, ropes, ties	11	-	-	-	-	-
Ropes, ties, chains	10	-	-	-	-	-
Rope, twine, string	6	-	-	-	-	-
Machine, tool, and electrical parts	8	-	-	-	-	-
Electric parts	7	-	-	-	-	-
Electrical wiring	4	-	-	-	-	-
Power lines, transformers, converters	3	-	-	-	-	-
Persons, plants, animals, and minerals	38	-	-	-	3	-
Animals and animal products	5	-	-	-	-	-
Mammals, except humans	5	-	-	-	-	-
Horses	5	-	-	-	-	-
Plants, trees, vegetation--not processed	31	-	-	-	3	-
Trees, logs	30	-	-	-	3	-
Chemicals and chemical products	4	-	-	-	-	-
Tools, instruments, and equipment	132	-	126	-	-	-
Ladders	128	-	126	-	-	-
Ladders--fixed	8	-	8	-	-	-
Ladders--movable	67	-	65	-	-	-
Extension ladders	23	-	23	-	-	-
Step ladders	11	-	10	-	-	-
Containers	14	-	-	-	-	-
Containers-nonpressurized	11	-	-	-	-	-
Boxes, crates, cartons	4	-	-	-	-	-
Tanks, bins, vats	7	-	-	-	-	-
Other	23	8	-	-	-	5
Furniture and fixtures	7	-	-	-	-	-
Furniture	5	-	-	-	-	-
Chairs	4	-	-	-	-	-
Atmospheric and environmental conditions	13	8	-	-	-	-
Weather and atmospheric conditions	12	8	-	-	-	-
High winds, gusts	6	4	-	-	-	-
Ice, sleet, snow	5	4	-	-	-	-
Not reported	81	-	-	-	-	37
Nature⁴						
Traumatic injuries to bones, nerves, spinal cord	64	8	15	4	-	17
Fractures	31	-	7	-	-	14
Traumatic injuries to spinal cord	10	-	3	-	-	-
Multiple traumatic injuries to bones, nerves, spinal cord	22	5	5	-	-	-
Traumatic injuries to muscles, tendons, ligaments, joints	7	-	-	-	-	3
Open wounds	6	-	-	-	-	-
Punctures, except bites	5	-	-	-	-	-
Intracranial injuries	365	79	72	46	40	26
Cerebral hemorrhages	26	-	5	-	3	8
Multiple intracranial injuries	211	55	33	30	16	13
Intracranial injuries, n.e.c.	3	-	-	-	-	-
Multiple traumatic injuries and disorders	315	84	36	31	29	3
Intracranial injuries and injuries to internal organs	93	18	17	8	12	-
Other combinations of traumatic injuries	58	16	9	5	6	-
Other traumatic injuries and disorders	65	11	7	9	6	-
Internal injuries to organs and blood vessels of the trunk	62	11	7	8	6	-

See footnotes at end of table.

TABLE F-3. Fatal occupational injuries from falls by type of fall, 2006

Characteristics	All falls	Fall from roof	Fall from ladder	Fall from scaffolding, staging	Fall from nonmoving vehicle	Fall to floor, walkway, or other surface
Total	827	185	132	91	77	52
State of incident						
Alabama	14	5	-	-	-	-
Arizona	15	5	-	-	-	-
Arkansas	12	3	-	-	-	-
California	98	17	12	11	11	5
Colorado	13	4	-	-	-	-
Connecticut	4	-	-	-	-	-
Florida	65	19	4	9	4	4
Georgia	33	7	4	3	3	-
Idaho	3	-	-	-	-	-
Illinois	32	-	8	-	6	-
Indiana	19	4	-	-	5	3
Iowa	11	-	-	-	-	-
Kansas	12	-	-	-	-	-
Kentucky	13	4	-	-	-	-
Louisiana	12	4	-	3	-	-
Maryland	22	7	4	-	-	3
Massachusetts	16	4	-	4	-	3
Michigan	21	8	7	-	-	-
Minnesota	9	-	-	-	-	-
Mississippi	9	4	-	-	-	-
Missouri	23	-	5	3	3	-
Montana	4	-	-	-	-	-
Nebraska	7	-	-	-	-	-
Nevada	10	4	-	-	-	-
New Jersey	13	3	3	-	-	-
New Mexico	9	-	3	-	-	-
New York (including N.Y.C.)	46	7	10	9	-	3
New York City	34	6	8	8	-	-
North Carolina	25	7	9	3	-	-
North Dakota	5	-	-	-	-	-
Ohio	22	5	-	4	5	-
Oklahoma	8	3	-	-	-	-
Oregon	9	-	-	-	-	-
Pennsylvania	37	10	5	3	4	-
Rhode Island	3	-	-	-	-	-
South Carolina	20	10	-	-	-	-
Tennessee	14	5	-	-	-	-
Texas	60	9	13	6	4	5
Utah	7	-	-	-	-	-
Virginia	18	-	5	-	4	-
Washington	19	5	3	-	-	-
West Virginia	7	3	-	-	-	-
Wisconsin	15	5	3	-	-	-
Employee status						
Wage and salary workers ¹	683	153	84	81	69	51
Self-employed ²	144	32	48	10	8	-
Sex						
Men	788	184	129	91	75	35
Women	39	-	3	-	-	17
Age						
18 to 19 years	13	5	-	-	-	-

See footnotes at end of table.