

Dangerous Jobs

What is the most dangerous occupation in the United States? Is it truckdriver, fisher, or elephant trainer? The public frequently asks this question, as do the news media and safety and health professionals. To answer it, BLS used data from its Census of Fatal Occupational Injuries (CFOI) and Survey of Occupational Injuries and Illnesses (SOII).¹

How to identify dangerous jobs

There are a number of ways to identify hazardous occupations. And depending on the method used, different occupations are identified as most hazardous. One method counts the number of job-related fatalities in a given occupation or other group of workers. This generates a *fatality frequency count* for the employment group, which safety and health professionals often use to indicate the magnitude of the safety and health problem. For example, truckdrivers have the largest number of fatalities and accounted for about 12 percent of all the job-related fatalities in 1995. (See table 1.) But this number is influenced not only by the risk workers face in that occupation, but also by the total number of workers in the occupation.

The second method, *fatality rates*, takes into account the differing total numbers among occupations. It is calculated by dividing the number of job-related fatalities for a group of workers during a given period by the average number of workers during that period.² This rate depicts a worker's risk of incurring a fatal work injury within the employment group and is expressed as the number of fatalities per a standard measure. For example, the fatality rate for truckdrivers is 26.2 deaths per 100,000 workers (table 1). When occupations are ranked by fatality rates, truckdrivers become the ninth most dangerous occupation.

The fatality rates in table 1 relate the total number of job-related deaths in 1995 to the annual average number of workers facing that risk for various groups. These measures are considered experimental because they do not reflect the movement of persons into and out of the labor force, the

length of their work week or work year, or the effect of holding multiple jobs.

Another method of expressing risk is an *index of relative risk*. This measure is calculated for a group of workers as the ratio of the rate for that group to the rate for all workers.³ The index of relative risk compares the fatality risk of a group of workers with all workers. For example, the relative risk for truckdrivers in table 1 is 5.3 which means that they are roughly five times as likely to have a fatal work injury as the average worker.

Analysis of dangerous jobs is not complete, however, unless data on nonfatal job-related injuries and illnesses are examined.

Table 2 shows those occupations with the largest number of nonfatal injuries and illnesses, along with days away from work to recuperate. This table shows that truckdrivers also lead the list for the occupations with the largest number of nonfatal injuries and illnesses. It also shows the chance of incurring an occupational injury or illness which is expressed as the total number of workers in the employment group compared with the number of workers injured in that group. For example, the chance of a truckdriver having a serious injury is 1 in 15, meaning that for every 15 truckdrivers 1 will have a serious injury during the year. But laborers and nursing aides and orderlies have a greater chance of injury or illness than truckdrivers. (See table 2.)

Median days away from work to recuperate is yet another measure that can be used to evaluate dangerous jobs. (Median days is an average such that half of those injured take more than the median days to recuperate while the other half require fewer days.) The median days to recuperate from an injury for the 10 occupations listed are highest for truckdrivers and carpenters, each showing a median of 8 days to recuperate, compared to all workers who had a median of 5 days.

Based on the index of relative risk in the chart, truckdriver is not the most dangerous occupation. This distinction belongs to fishers. Commercial fishers are about four times as likely as truckdrivers to be killed by a fatal work incident (21.3 and 5.3, respectively).

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Using this method of analysis, one could in fact identify even more dangerous occupations like elephant trainers who in some years have had 2 work fatalities. Based on employment figures of about 600 known elephant trainers in the United States, this would produce a fatality rate of 333 per 100,000 workers and a relative risk that is 68 times greater than for the typical worker. Clearly, in this analysis an elephant trainer has the highest risk of a fatal work injury even though the frequency is low or nonexistent in some years. The purpose of this example is to illustrate the importance of viewing frequency counts, fatality rates, and indexes of relative risk to discern dangerous jobs.

The occupations identified by the frequency risk techniques and a chance of injury can be used to target prevention efforts and may reduce both the number and rates of fatalities and injuries for those workers at highest risk.

Characteristic of dangerous jobs

Today, the jobs that have the highest fatality rates and frequency counts are found in outdoor occupations or occupations where workers are not in an office or factory. These include truckdrivers, farmers, construction laborers, and airplane pilots. Most of these workers have one thing in common: they are affected by severe weather conditions, while driving on highways, flying airplanes, performing farm chores, or working on construction sites. Highway crashes are the primary cause of trucker fatalities, falls are the leading cause of death for construction laborers, and tractor rollovers account for 1 of every 3 farm worker fatalities.

Homicide is another serious concern in some job settings. In 1995, homicide accounted for 16 percent of job-related fatalities. Workers most at risk are those who work

late at night, work alone, and handle money. Taxicab drivers are the most susceptible and have a relative risk about 10 times higher than the typical worker. Other occupations that have a high relative risk of homicide include police and guards.

For jobs with high numbers of nonfatal injuries and illnesses, overexertion is the leading event. These injuries result from lifting objects or, in the case of nursing aides and orderlies, patients. Injuries from overexertion accounted for about one third of all the nonfatal injuries in 1994; it took a median of 5 days for those injured to recuperate.

Two occupations appear on both the fatal and nonfatal lists: truckdrivers and construction laborers. But the leading event for fatal and nonfatal incidents for each occupation is different. For truckdrivers, 68 percent of the job-related fatalities are from highway crashes, whereas overexertion is the leading nonfatal event, accounting for 29 percent of the incidents. For construction laborers, the leading fatal events are falls and vehicular-related incidents such as being struck by a backhoe. For nonfatal incidents, the leading event is contact with objects, primarily equipment and tools used on construction sites.

This difference between the leading cause of a fatal and nonfatal injury for truckdrivers is important because it suggests different kinds of prevention efforts. For example, to reduce highway crashes, driver training and proper maintenance of trucks is essential, whereas, to reduce the incidence of overexertion, proper lifting techniques must be taught along with proper use of lifting equipment. For construction laborers, prevention programs for fatal events require awareness of the hazards of falling off buildings, ladders, scaffolding, and other structures while for serious nonfatal injuries, prevention would focus on the proper use of tools.

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¹ Data on fatal work injuries are from the Bureau of Labor Statistics' Census of Fatal Occupational Injuries (CFOI), 1995. This program, which has collected occupational fatality data nationwide since 1992, uses diverse data sources to identify, verify, and profile fatal work injuries. Information about each workplace fatality (occupation and other worker characteristics, equipment being used, and circumstances of the event) is obtained by cross-referencing source documents, such as death certificates, workers' compensation records, and reports to Federal and State agencies. This method assures counts are as complete and accurate as possible.

The Survey of Occupational Injuries and Illnesses (SOII) collects information from a random sample of about 250,000 establishments representing most of private industry. Worker characteristics are collected only for those workers sustaining injuries and illnesses that require days away from work to recuperate.

Because the scope and methodology of CFOI and SOII are slightly different, comparison of the fatal and nonfatal data is problematic.

For more information on either CFOI or SOII, access the World Wide Web at <http://stats.bls.gov/oshhome.htm> or e-mail (cfoistaff@bls.gov).

² There is more than one method to calculate fatality rates that measure the incidence of fatal work injuries for groups of workers. An hours-

based rate measures the risk of fatality per standardized length of exposure; an employment-based rate measures the risk for those employed during a given period of time.

An employment-based fatality rate measures the incidence of a fatal injury for all workers in a group, regardless of exposure time. It does not account for fewer fatalities among part-time workers than for full-time workers because of their reduced hours exposed to the work environment. An hour-based fatality rate accounts for different exposure durations among workers. Hours-based measurements are especially useful in industry and occupational comparisons in which the number of workers at risk can vary among industry or occupational groups for a particular period. Fatality counts from the Census of Fatal Occupational Injuries can be combined with information on employment or hours at work to produce a fatal work injury rate. Because neither hours at work nor number of persons employed are collected in the BLS census, the fatality rates in this report were calculated using the employment estimates from the Current Population Survey (CPS)-a household survey. The CPS annual average employment estimates are based on the number of workers employed during the week of the 12th each month.

³ *Report on the American Workforce*, U.S. Department of Labor, 1994, pp. 95-138.

Table 1. Occupations with largest number of fatalities, rates, relative risk, 1995

Occupation	Fatality count	Employment (in 1,000's)	Fatality rate ¹	Index of relative risk	Leading fatal event (percent)
Total	6,210	126,248	4.9	1.0	
Truckdriver	749	2,861	26.2	5.3	Highway crashes (68)
Farm occupations	579	2,282	25.3	5.1	Vehicular (50)
Construction laborers	309	780	39.5	8.1	Vehicular(28); Falls (27)
Supervisors, proprietors, sales	212	4,480	4.7	1.0	Homicide (63)
Nonconstruction laborers	212	1,337	15.8	3.2	Vehicular (36)
Police, detectives, and supervisors	174	1,051	16.6	3.4	Homicide (47); Highway (28)
Electricians	117	736	15.9	3.2	Electrocutions (59)
Cashiers	116	2,727	4.3	.9	Homicide (92)
Airplane pilots	111	114	97.4	19.9	Airplane crashes (98)
Guards	101	899	11.2	2.3	Homicide (58)
Taxicab drivers	99	213	46.5	9.5	Homicide (70)
Timber cutters	98	97	101.0	20.6	Struck by object (81)
Carpenters	96	1,255	7.6	1.6	Falls (43)
Groundkeepers and gardeners	77	832	9.3	1.9	Vehicular (31)
Welders and cutters	72	604	12.0	2.4	Falls (22); Fires (18)
Roofers	60	205	29.3	5.9	Falls (75)
Fishers	48	45	104.4	21.3	Drowning (81)
Auto mechanics	47	819	5.7	1.1	Highway (21); Homicide (13)
Structural metal workers	38	59	64.4	13.1	Falls (66)
Electric Power Install/rprs	35	126	27.8	5.7	Electrocutions (60)

¹ Excludes fatalities involving workers under 16 years of age because they are not covered by CPS.

Rate = ((Fatal work injuries/Employment) X 100,000 workers). Employment based on 1995 CPS.

Index of Relative Risk = $\frac{\text{Fatality rate for a given group}}{\text{Fatality rate for all workers}}$

Fatality rate for all workers

SOURCE: US Department of Labor, Bureau of Labor Statistics, Census of Fatal Occupational Injuries, 1995.

Table 2. Occupations with largest number of injuries and illnesses with days away from work to recuperate, 1994

Occupation	Total nonfatal cases (in 1,000's)	Employment (in 1,000's)	Median days to recuperate	Chance of injury	Leading nonfatal event (in percent)
All occupations	2,252.6	92,973	5	1:41	
Occupations listed	726.5	14,636	6	1:20	Overexertion (27)
Truckdrivers	163.8	2,438	8	1:15	Overexertion (29)
Nonconstruction laborers	147.3	1,137	5	1:08	Contact with object (35)
Nursing aides and orderlies	101.8	1,359	5	1:13	Overexertion (59)
Janitors and cleaners	60.6	1,407	6	1:23	Overexertion (27)
Construction laborers	55.7	674	6	1:12	Contact with object (39)
Assemblers	53.0	1,167	6	1:22	Contact with object (31)
Carpenters	37.4	869	8	1:23	Contact with object (38)
Stock handlers and baggers	37.2	1,121	5	1:30	Overexertion (37)
Cooks	36.3	1,838	5	1:51	Contact with object (33)
Cashiers	35.6	2,626	6	1:74	Overexertion (27)

Chance of Occupational Injury or Illness = $\frac{\text{Employment}}{\text{Total nonfatal cases}}$

Employment based on 1994 CPS.

SOURCE: US Department of Labor, Bureau of Labor Statistics, Survey of Occupational Injuries and Illnesses, 1994.

Index of relative risk for fatal occupational injuries, 1995

