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**CPWR**

**Work-Related Fatal and Nonfatal Injuries  
among  
U.S. Construction Workers, 1992-2003**

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## **Abbreviations**

BLS	U.S. Bureau of Labor Statistics
CFOI	Census of Fatal Occupational Injuries (BLS)
FTE	Full-time equivalent (2,000 hours worked per year)
NAICS	North American Industry Classification System
NIOSH	National Institute for Occupational Safety and Health, CDC
OSHA	U.S. Occupational Safety and Health Administration
SIC	Standard Industrial Classification
SOII	Survey of Occupational Injuries and Illnesses (BLS)

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The Center to Protect Workers' Rights, CPWR, has been monitoring construction safety and health to provide a basis for more effectively targeting injury- and illness-prevention efforts since 1990. This report summarizes work-related deaths and nonfatal injuries and illnesses among construction workers from 1992 through 2003, the most recent year for which data were available.

In addition to statistics, this report briefly describes recent changes in the data sources used. The authors adjusted fatal and nonfatal injury rates to produce an uninterrupted time series (an adjustment to make the statistics comparable between years) for construction overall. However, given substantial changes between the occupational classification systems used through 2002 and after that year, we could not provide a trend analysis between 1992 and 2003 by occupation. Instead, the trend analysis for selected occupations includes only data for 1992 through 2002, while statistics for 2003 are presented separately. Some construction occupations are not presented individually because the small numbers would not be reliable statistically.

## **Methods**

### **Data on Fatal Injuries**

Numbers of deaths were obtained from the Census of Fatal Occupational Injuries (CFOI) conducted by the U.S. Bureau of Labor Statistics (BLS). CFOI is a federal-state cooperative program that has been implemented in all 50 states and the District of Columbia since 1992 (BLS 2004). Data on deaths resulting from injuries are compiled from death certificates, workers' compensation reports, OSHA reports, medical examiner reports, newspaper articles, and other sources. Both the death and the work-relatedness of the death must be corroborated by at least two data sources or one data source and a follow-up questionnaire. States are allowed to revise the reports within one year to correct errors. Deaths occurring during a commute to or from work are not considered work related, but vehicle-related deaths during the course of work are included. Except where noted, the calculations of death rates in this report include the public and private sectors and self-employed workers. Thus, the numbers presented here may differ from those in some BLS publications, which include only deaths in the private sector.

From 1992 to 2002, CFOI codes for the construction industry used the 1987 Standard Industrial Classification (SIC) categories numbered 1500 to 1799 and included "CCCC" for construction sectors that couldn't be categorized in any SIC (OMB 1987). Occupations were coded under the 1990 Census Occupational Classification System.

Starting in 2003, CFOI coded the construction industry as 23 using the North American Industry Classification System (NAICS), so that detailed construction sectors are coded as NAICS 23600 to 23899 (OMB 2002). Construction trades and extraction occupations are coded under the 2000 Standard Occupational Classification System from 47-0000 to 47-5099 ([www.bls.gov/soc/home.htm](http://www.bls.gov/soc/home.htm)).

## **Data on Nonfatal Injuries and Illnesses**

The Survey of Occupational Injuries and Illnesses (SOII) provided nonfatal injury and illness data. SOII is a federal-state program in which employer reports are collected annually from private-sector establishments and processed by state agencies cooperating with BLS. Unlike CFOI, SOII measures nonfatal injuries and illnesses for private industry only and excludes the self-employed, farms with fewer than 11 employees, private households, federal government agencies, and (for national estimates) employees in state and local government agencies.

SOII has undergone several important changes in recent years. Starting with the 2002 data, revised OSHA requirements for recording occupational injuries and illnesses mean BLS no longer reports injuries separate from illnesses (OSHA 2002). Thus, this report uses the category “days away from work” for injuries and illnesses, which has remained unchanged since 1992. As illnesses have accounted for less than 2% of nonfatal injuries and illnesses in BLS reports on the construction industry in previous years, this report occasionally refers to the broad category as “injuries.”

In addition, starting with the 2003 data, SOII adopted the 2002 NAICS and 2000 Standard Occupational Classification to classify industries and occupations, as did other federal statistical systems. This CPWR report includes 2003 data in the trend analysis for the construction industry as a whole, but reports the 2003 data for individual occupations separately. Because of significant changes in occupational categories, the 2003 numbers may not be directly comparable with the data for previous years (*see annex*).<sup>1</sup>

## **Data on the Workforce**

The number of workers in the construction workforce was taken from the Current Population Survey. This is a monthly survey of households conducted by the Census Bureau for the Bureau of Labor Statistics. Estimates from the survey are based on a scientific sample of about 60,000 households. Each month, an interviewer contacts a designated household to obtain basic demographic information about everyone living at the address, including age, gender, race, and Hispanic or Latino ethnicity. For those aged 16 years or older, the survey collects detailed information on employment, including occupation, industry, and number of hours worked. However, the hours worked by individual workers are self-reported and thus may be under- or overestimated.

Starting with 2003 data, in addition to changes in industrial and occupational classification systems used in the Current Population Survey, BLS replaced (statistical) sample weights based on Census 1990 population controls with Census 2000 population controls (Bowler and others 2003). As a result, for instance, the Hispanic population estimated in the survey increased by 8%.

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<sup>1</sup>Although the 2003 data are included in industry trend analysis in this report, the injury rate for the construction industry using NAICS could be slightly lower than the rate was when it was based on the SIC. For instance, under NAICS some low-risk industries (such as, SIC 8741, management service) are coded for the first time as part of the construction industry.

In order to have an uninterrupted time series for this trend analysis, CPWR adjusted fatal and nonfatal injury rates for 1992 through 2002 to take into account changes in Current Population Survey estimates.<sup>2</sup> As a result, the injury rates presented in this report are slightly lower than some previously published by CPWR and other organizations (*see* NIOSH 2004; Dong and Platner 2004; CPWR 2002; Pollack and Chowdhury 2001).

## **Data on Establishments**

Information on establishments was obtained from County Business Patterns, an annual survey conducted by the Census Bureau. The survey provides information on the number of employees by establishment size for establishments with payrolls (*see* glossary). Construction companies may comprise more than one establishment if they have more than one payroll office. Because the categories of establishment size in County Business Patterns and CFOI differ from each other, this report could not provide death rates for establishments with 10 or fewer employees. And, because County Business Patterns does not indicate hours worked, the distribution of deaths by establishment size was compared to the fraction of construction employment in similar-size establishments, instead of hours worked or full-time equivalent workers used for other calculations in this report (*see* Measuring Risk, below). Also, deaths among the self-employed were excluded from CFOI data to facilitate comparisons with employment figures from the County Business Patterns for the establishment analysis. (County Business Patterns excludes the self-employed.)

## **Measuring Risk**

Risk in construction is measured by rates of fatal and nonfatal injuries (and/or illnesses). Because some construction workers do not work full time in construction, rates are expressed as full-time equivalents or FTEs, defined as 2,000 hours worked per year (50 weeks times 40 hours). This measure facilitates comparisons with workers in other industries. Death rates are measured per 100,000 FTEs. Nonfatal rates are measured per 100 or 10,000 FTEs and, in this report, include only cases with days away from work (*see* glossary).

In addition, for this analysis, where a record was missing a value for a category (for instance, if no ethnic group was recorded), that record was excluded from the related calculation. This approach, however, assumes that the group responding to the question/survey is similar to the group of nonrespondents (Allison 2000).

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<sup>2</sup>For 1992-99 CPS data, the adjustment factor is 0.011660 for the total 16 years and over, and 0.084389 for those of Hispanic or Latino ethnicity; for 2000-2002 CPS data, the factor is 0.004200 for total 16 years and over; and 0.019715 for Hispanic or Latino ethnicity (DiNatale 2003). Compared with previous estimates, from 1992 through 1999, the employment numbers for Hispanics are roughly 8 % higher, death rates 1.5 per 100,000 FTEs lower, and injury rates 30 per 10,000 FTEs lower; for data covering 2000 to 2002, the corresponding numbers are: employment, 2% higher; death rates, 0.5 per 100,000 FTEs lower; and injury rates 5 per 10,000 FTEs lower. For all construction between 1992 and 1999, employment figures are less than 1% higher; death rates 0.2 per 100,000 FTEs lower, and injury rates about 3 to 5 per 10,000 FTEs lower. The changes between 2000 and 2002 are so small for all construction that the numbers were not recalculated for this report.

## Results

### Overall Trends in Construction

The construction sector continues to account for a disproportionate share of work-related deaths in the United States. In 2003, construction workers were 7% of the U.S. workforce, but suffered 21% of the nation's 5,575 reported work-related deaths. Between 1992 and 2003, employment in construction increased by 44% from 7.0 million to 10.1 million workers (chart 1). During the same time, the number of deaths from injuries increased 22%, from 963 to 1,171 (chart 2). Thus, the increasing number of deaths was partly a result of expansion of the construction industry.

The death rates remained relatively constant with a slight decrease from 13.9 per 100,000 in 1992 to 11.7 in 2003, while nonfatal injury and illness rates involving days away from work declined steadily between 1992 and 2003, from 529.5 to 259.4 per 10,000 FTEs respectively, a 51% decrease (chart 3). Risk factors for fatal injuries and nonfatal injuries are not necessarily the same, and several factors could contribute to the decline of reported nonfatal rates over time. One factor might be the apparent underreporting of nonfatal injuries (and illnesses), motivated in part by employers' desire to avoid increases in workers' compensation premiums tied to reported injuries (*see* CPWR 2002, page 33).

The construction death rate was lower than the rates for mining and agriculture but higher than manufacturing in 1992-2003 (chart 4a). Although rates of nonfatal injury and illness with days away from work declined for the four major production industries, rates for construction remained the highest of the four (chart 4b).

***Aging of the workforce.*** In 2003, the average age of construction workers was 39 years, more than one year older than in 1992, with the median age increasing from 36 to 39 during this period. (The median age is the midpoint; half the workers are older than the median and half are younger.) The age structure of work-related deaths reflects the aging of the workforce. Comparing 1992 with 2003, the largest proportion of work-related deaths shifted from the group aged 25 to 34 to ages 35 to 44 (chart 5a). Generally, older construction workers had higher death rates in 1992 and 2003 (chart 5b).

Similarly, the proportion of nonfatal cases in workers aged 25 to 34 dropped from 39.4% in 1992 to 30.3% in 2003; while the proportion for the age group 35 to 44 increased from 23.8% to 28.7% during the same period (chart 6a). Contrary to the pattern for fatal injuries, younger construction workers had higher nonfatal injury and illness rates than older ones in 1992 and 2003 (chart 6b).

***Hispanic workers.*** In the last decade, Hispanic employment in the U.S. construction industry has increased dramatically. The number of Hispanic workers tripled between 1992 and 2003, and the proportion in the construction workforce increased from 9% in 1992 to 21% in 2003 (chart 7). During the same period, the number of work-related deaths among Hispanic construction workers more than doubled, from 108 to 263. Hispanics have had a consistently higher death rate than their non-Hispanic counterparts

over time although the rate of work-related deaths for Hispanics declined in recent years (chart 8a).

By contrast, nonfatal injury and illness rates for Hispanic construction workers were close to or even lower than rates for non-Hispanic construction workers during this period (chart 8b). This result contradicted some published reports. Bollini and Siem (1995) found that Hispanic workers may be at a greater risk for occupational injuries because of limited economic and political resources and poor living and working conditions. A community-based study of non-agricultural Latino/Hispanic workers reported that they have a higher risk of occupational injuries than other workers (Pransky and others 2002).

***Small establishments or contractors.*** The construction industry is composed mainly of small establishments; more than 80% of construction establishments have fewer than 10 employees (U.S. Census Bureau 2004). Small establishments appear to suffer a disproportionate share of work-related deaths from injuries. Establishments having fewer than 20 employees reported 53% of construction deaths from injuries (CFOI) (chart 9a), while employing 39% of the wage-and-salary workforce in construction in 2002 (Census Bureau 2004). In 1992-2003, the numbers for establishments with 10 or fewer employees alone showed 3,819 deaths, 43% of the construction deaths from injuries.<sup>3</sup> (The self-employed are not included in these CFOI figures showing establishment size.) Data limitations prevented calculating death rates for these establishments.

By contrast, however, nonfatal injury rates for small establishments (1-10 employees) were consistently lower than for establishments having 50 to 249 employees (chart 9b). In fact, reported rates for small establishments have been declining continuously since 1994, when BLS first reported injury rates by establishment size.

The BLS results for the smallest establishments continue to be inconsistent with findings in Ontario, Canada, that show a consistent negative correlation between establishment size and injury rate from 1995 through 2001 (McVittie, Banikin, and Brocklebank 1997; McVittie 2003; CPWR 2002, chart 33b;).

Contrary to the overall trends, injury rates for the largest establishments (1,000 or more employees) increased in recent years, while remaining the lowest of construction establishments grouped by numbers of employees.

***Leading causes of deaths from injuries.*** Falls remained the leading cause of deaths in construction (chart 10a). From 1992 to 2003, 4,234 construction workers died of construction falls, accounting for 31% of work-related deaths in the industry. Falls to a lower level caused 4,124 deaths, 97% of the deaths caused by any falls (chart 10b).

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<sup>3</sup> Deaths reported without establishment size information or the self-employed were excluded from this calculation.

***Leading causes of nonfatal injuries.*** Patterns of leading causes for nonfatal injuries differ from those for fatal injuries. In 2003, “contact with objects” was the leading cause, responsible for just over one-third of the 155,420 nonfatal injuries and illnesses with days away from work in construction (chart 11a). More than half of the contact involved being struck by an object. Falls – to a lower level and at the same level – were the second-most-common cause of nonfatal injuries. Nearly one-fifth of nonfatal injuries were caused by overexertion – producing work-related musculoskeletal disorders – with the largest share involving lifting. From 1992 through 2003, the rate of being struck by an object was consistently higher than for the other causes (chart 11b).

***Day and time of fatal injuries in construction.*** From 1992 through 2003, nearly one-fifth of the fatal injuries occurred on Wednesdays (chart 12a). In addition, a slightly higher percentage of deaths was reported before and after lunch time, at 11 am and 2 pm (chart 12b). (Each hour given represents an hour’s time.) More study may be needed to understand what, if anything, these numbers signify.

### **Deaths and Injuries/Illnesses among Selected Construction Occupations in 2003**

In 2003, electrical power installers and ironworkers had the highest rates of deaths from injuries among construction workers, at 68.2 and 67.0 per 100,000 FTEs respectively (chart 13a). Construction laborers, the second largest trade in the industry (after carpenters), had the third-highest death rate at 27.8 per 100,000 FTEs and the largest number of deaths, 277.

As noted, falls cause the most deaths from injuries in construction. The five occupations with the highest rates of fatal falls, in order, were roofers, construction laborers, painters, carpenters, and ironworkers. The death rate from falls among roofers – the highest – was 21.1 per 100,000 FTEs, about 6 times higher than 3.6 per 100,000 FTEs, the average for construction.

The nonfatal injury and illness rate for all construction was 259.4 per 10,000 FTEs in 2003. Construction laborers had the highest rate (455 per 10,000 FTEs) and the largest number (37,660) of injuries and illnesses among all construction occupations (chart 13b). In addition, ironworkers, roofers, and carpenters had higher nonfatal rates than average.

### **Trends among Selected Construction Occupations, 1992 - 2002**

For the 11 years 1992-2002, construction laborers ranked highest in numbers of deaths from injuries (chart 14a). Ironworkers and electrical power installers had the highest average death rates from injuries during this period (chart 14b). Nevertheless, fatal injury rates have declined gradually for these two highest-risk occupations since 1992. Rates of death from injuries declined also among operating engineers, painters, and plumbers, while increasing among roofers and welders/cutters. Below, trends in fatal and nonfatal rates and leading causes of deaths from injuries are reported for selected construction occupations.

- **Bricklayers:** Overall, fatal and nonfatal injury rates for this occupation were lower than for all construction (charts 15a, 15b). Falls to a lower level were the leading cause of deaths for bricklayers (84 deaths, 51% of 165 deaths).
  
- **Carpenters:** Carpenters had lower death rates than for all construction (chart 16a). Falls to a lower level were the leading cause of death for carpenters, 494 deaths (52% of 951), followed by being “struck by” an object, 98 deaths (10%). Nonfatal injury rates were slightly higher for carpenters than for all construction (chart 16b).
  
- **Construction laborers:** The death rate for this occupation was consistently higher than for all construction (chart 17a). Falls to a lower level were the leading cause of this group’s work-related deaths (819 deaths, 26% of 3,167), followed by being struck by a vehicle (496, 16%) and being struck by an object (387, 12%). The nonfatal rate decreased substantially from 1992 to 2002 from 1,329.7 to 491.4 per 10,000 FTE, by 63% (chart 17b). Still, in 2002, construction laborers suffered the highest nonfatal rate among all construction occupations.
  
- **Electrical power installers:** The death rates were consistently much higher than in all construction, but dropped substantially by 67% between 1992 and 2002 (chart 18a). Contact with electric current was the leading cause of deaths at 83 (51% of 163) for the 11 years, followed by falls to a lower level at 55 (34%). The nonfatal rate fluctuated constantly over the years but, like the death rate, was about one-third the rate of 1992 in 2002 (chart 18b).
  
- **Electricians:** The death rate fluctuated over the years but decreased by 11% from 1992 to 2002 (chart 19a). The major cause of death for electricians was contact with electric current, 411 deaths (55% of deaths among electricians), followed by falls to a lower level (128 or 17%). The nonfatal trend for this occupation was close to the trend for all construction, reaching 255 per 10,000 FTEs in 2002 (chart 19b).
  
- **Excavating/loading machine operators:** The death rates varied over the years and were higher than for all construction in most years (chart 20a). Being struck by an object was the leading cause of deaths (20 of 160 deaths). The nonfatal rate was lower than for all construction throughout the time analyzed (chart 20b).
  
- **Grader/dozer/ scraper operators:** The death rates were constantly higher than for construction overall and fluctuated over the years (chart 21a). Highway accidents were the major cause of deaths (23 of 149 deaths, 15%). The nonfatal rates fluctuated but were consistently lower than for all construction (chart 21b).
  
- **Ironworkers:** The death rate for this high-risk occupation declined gradually by 53% over the years (chart 22a). Falls to a lower level caused 335 deaths (72% of 463). The nonfatal injury rate for ironworkers decreased from 1992 to 2002 by 73%, from 1,750 to 473.8 per 10,000 FTEs, although the rate remained higher than for all construction (chart 22b).

● **Operating engineers:** The death rate varied over the years, but dropped by 45% from 1992 to 2002 (chart 23a). Being struck by an object was the leading cause of death for operating engineers, who operate and maintain heavy equipment (69 of 364 deaths, 19%). The nonfatal rates were lower for most of the years compared to all construction (chart 23b).

● **Painters:** Fatal and nonfatal injury rates for this occupation were consistently lower than for all construction. The death rate decreased by 28%, and the nonfatal injury rate dropped 65% from 368 to 128 per 10,000 FTEs between 1992 and 2002 (charts 24a, 24b). Falls to a lower level caused 248 deaths (58% of all painter deaths).

● **Plumbers:** The death rate was consistently low and decreased during this period (chart 25a). Falls to a lower level were the major cause of deaths (60 of 309 deaths, 19%). The nonfatal rates generally were slightly higher than those for all construction, and decreased by 44% from 503 per 10,000 FTEs in 1992 to 284 per 10,000 FTEs in 2002 (chart 25b).

● **Roofers:** Rates of death from injuries were consistently higher than for all construction, and increased from 22.3 to 44.8 per 100,000 FTEs between 1998 and 2002 (chart 26a). Falls to a lower level caused 475 deaths, 73% of the deaths among roofers. Although the nonfatal rate for roofers decreased, it remained higher than for all construction (chart 26b).

● **Truck drivers:** From 1992 to 2002, the rates of death from injuries fluctuated but were consistently higher than for all construction (chart 27a). Half of the deaths (256 of 510) were caused by highway accidents. The nonfatal injury rates decreased by 42% from 533 to 308 per 10,000 FTEs during this time (chart 27b).

● **Welders/cutters:** The death rates were constantly higher than for all construction and increased by 86% from 22 to 41 per 100,000 FTEs in 1992-2002 (chart 28a). Falls to a lower level caused 103 deaths (37% of 281 deaths). The nonfatal injury rates fluctuated over the years with a final rate of 252.0 per 10,000 FTEs in 2002, close to the construction average (chart 28b).

## Discussion and Recommendations

In the past decade, some construction occupations have shown a decrease in work-related deaths from injuries. Meanwhile, reported nonfatal injuries and illnesses in construction have dropped dramatically, as have the nonfatal rates for all industries. However, the data show that the construction industry continues to face serious challenges in safety and health.

The industry's rate of deaths from injuries has declined only slightly since 1992 and there are problems among specific construction trades. Roofers and welders, for instance, suffered an increasing risk of fatal injuries in recent years. Construction laborers continue to have high rates and numbers of fatal and nonfatal injuries (and illnesses). Hispanic workers, an increasing proportion of the construction workforce, have had a markedly higher work-related death rate than their non-Hispanic counterparts over time. Falls, falls

to a lower level in particular, have remained the leading cause of construction deaths, responsible for about one-third of the total.

## **Data Limitations**

The data sets used here have several limitations which could affect the accuracy of this report.

***Underreporting.*** Differing trends for deaths from injuries and for nonfatal injuries and illnesses among small employers in construction might be explained by several factors, particularly accuracy of recordkeeping. SOII estimates the number and frequency of occupational injuries and illnesses based on logs kept by private-sector employers. The accuracy of the logs depends largely on employers' understanding of which cases are work-related and the accuracy of recording and reporting. Oleinick, Gluck, and Guire (1995) investigated possible causes for lower injury rates in small establishments and found no explanation other than underreporting in SOII. Similarly, a study by Morse and others (2004) suggests that the relatively higher rates of occupational illnesses in large businesses generally, which are reported in SOII, likely result from underreporting by smaller businesses.

***Exclusions.*** The Survey of Occupational Injuries and Illnesses excludes self-employed workers and government employees. Leigh, Marcin, and Miller (2004) estimated that BLS missed between 33 and 69% of occupational injuries because of the two excluded categories. This is a problem particularly because one-fourth of construction workers are self-employed.

***Overestimation of hours worked.*** When CPWR compared injury and illness rates at the industry level based on hours worked (obtained from the Current Population Survey) against rates provided by BLS, based on work hours reported by employers as part of SOII, the rates from SOII were slightly higher. This gap suggests that this CPWR report – which used Current Population Survey data – overestimated the hours worked and thus may have underestimated the fatal and nonfatal injury and illness rates by about 10%.

***Misclassification.*** Some construction workers are misclassified in non-construction industries; for instance, workers from temporary-work agencies are classified in “services” under NAICS and SIC.

***Undercounted groups.*** Although CFOI is more accurate and complete than SOII, both data bases could be undercounting occupational injuries (and illnesses, in the case of SOII) in construction. Because the Current Population Survey – used for workforce estimates – is a household survey conducted by telephone, there is likely some undercounting of migrant and mobile workers and those who rent rooms or lack permanent U.S. addresses. For some subgroups this potential undercounting may be of particular concern, such as recent immigrants, Hispanics, and very low-income workers.

***Uncounted illnesses.*** Illnesses that have a long latency, such as cancers and asbestos-related diseases, are known to be undercounted in SOII. The overwhelming majority of reported illness cases are those that are relatively easy to tie to workplace activity – such as, contact dermatitis or carpal tunnel syndrome.

***Other errors.*** Last, three of the four data sets used in this report – the Current Population Survey, SOII, and County Business Patterns – are subject to sampling errors. All four data sets are subject to coding or other errors, which could also affect the data's accuracy.

## **Recommendations**

Given the limitations of the data used for this report, the numbers presented here should be interpreted and used with caution. Nonetheless, we know that almost all occupational injuries and illnesses are preventable through such measures as strengthened safety regulations, safety training, better planning and engineering controls, and cooperation among industry stakeholders. Such efforts should focus on high-risk worker groups identified here; for instance, Hispanic workers, older workers, workers in small construction establishments, and some occupations. Fall prevention should be enhanced, especially for roofers.

Results of this report suggest also a need for further research, such as to verify the apparent underreporting problems in nonfatal injuries and illnesses, and examine the relative risks of fatal and nonfatal injuries; for instance, to characterize fatal and nonfatal falls in construction by occupation and ethnic group.

We need to know more about the risks in order to prevent injuries and illnesses. To improve our ability to monitor safety and health in the industry, it is hoped that the Bureau of Labor Statistics will include the self-employed in its annual survey of occupational injuries and illnesses, and undertake methodological studies to validate the completeness of reporting generally and from small establishments, in particular. We will continue to work with BLS staff and other data users to improve the accuracy of injury and illness data.

## **Glossary**

**Cases involving days away from work** involve at least one full day away from work, with or without job transfer or restriction, as a result of work-related injury or illness.

**Establishment** - According to the Census Bureau, a private-sector economic unit producing goods and services at one permanent physical location, not the same as a construction project or construction site. If a company has more than one fixed place of operation and maintains separate offices, each location is considered a separate establishment and is classified according to its major activity. (In some cases, where there are two or more distinct economic activities at one location, each "primary activity" may be categorized separately as an establishment.) Thus, there are more establishments than

construction companies or proprietors. Establishments are either payroll or nonemployer (without payroll). A nonemployer establishment is a partnership, sole proprietorship, or corporation without employees.

**Hispanic or Latino ethnicity** refers to people who identify themselves as being Spanish, Hispanic, or Latino. Someone who is Hispanic or Latino may be of any race.

**Other recordable cases** are recordable injury or illness cases under OSHA recordkeeping rules that do not involve death, days away from work, or days of restricted work activity or job transfer.

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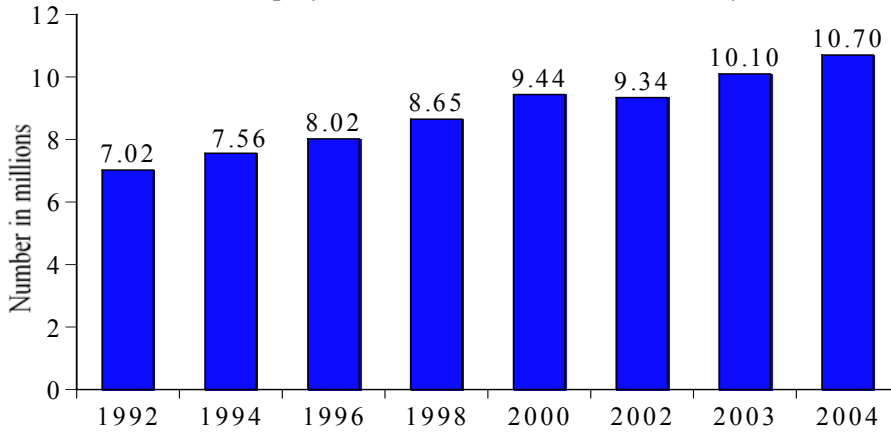
## Annex: Comparison between the 1980 and 2000 occupational classification systems for selected occupations

1980 Standard Occupational Classification System (SOC)			2000 Standard Occupational Classification System (SOC)		
Occupation Code	Occupation Title		Occupation Code	Occupation Title	
553 to 558, 613	553	Supervisors, brickmasons, stonemasons, tile setters	47-1011	First-line supervisors/managers of construction trades and extraction workers	
	554	Supervisors, carpenters and related workers			
	613	Supervisors, extractive occupations			
563 to 564	563	Brickmasons, stonemasons	47-2020	Brickmasons, blockmasons, and stonemasons	
	564	Brickmasons, stonemasons apprentices	47-2021	Brickmasons and blockmasons	
47-2022			Stonemasons		
567 to 569	567	Carpenters	47-2031	Carpenters	
	569	Carpenter apprentices			
573		Drywall installers	47-2080	Drywall installers, ceiling tile installers and tapers	
			47-2081	Drywall and ceiling tile installers	
			47-2082	Tapers	
866		Helpers, construction trades	47-3000	Helpers, construction trades	
			47-3011	47-3012	Helpers-carpenters
			47-3019	47-3013	Helpers-electricians
			47-3019	47-3016	Helpers-roofers

In the 2000 SOC system, apprentices and trainees are classified with the occupations for which they are being trained, whereas in 1980 they were grouped separately according to their occupation. In 2000, helpers and aides are classified separately by occupation, whereas in 1980 helpers of all occupations were classified in one group.

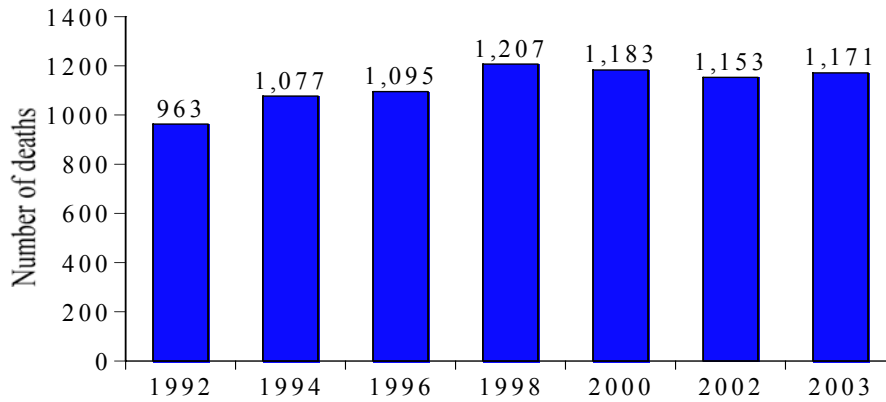
With the 2000 SOC system, first-line managers and supervisors of production, service, and sales workers who spend more than 80 % of their time performing these duties are classified separately in a supervisor category coded 47-1011 because their work is distinct from that of the workers they supervise. Supervisors of professional and technical workers, with a similar background to those they supervise, are classified with the workers they supervise. Similarly, team leaders, lead workers and supervisors of production, sales, and service workers who spend at least 20 % of their time performing work similar to the workers they supervise are classified with the workers they supervise. In the 1980 SOC system, supervisors of all levels were grouped with their corresponding occupations and not separately.

1. Total construction employment in the United States, various years, 1992 - 2003



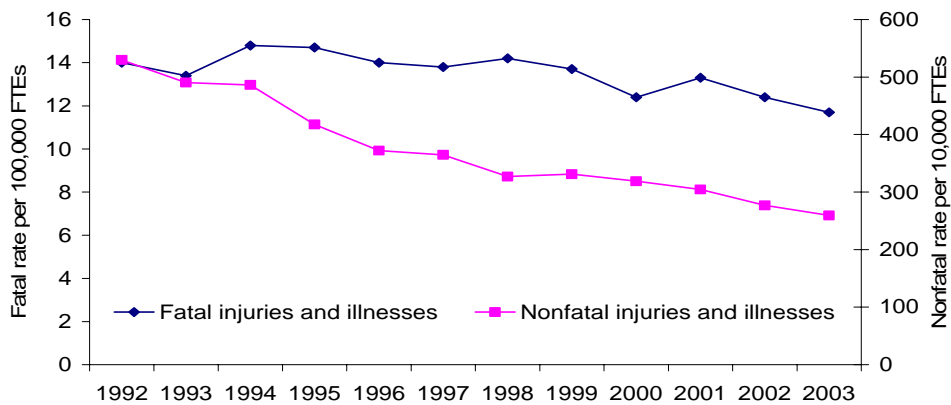
Note: All types of employment. Source: Bureau of Labor Statistics, Current Population Survey.

2. Total number of deaths from injuries in construction, various years, 1992 - 2003



Source: Bureau of Labor Statistics: Census of Fatal Occupational Injuries.

3. Fatal and nonfatal rates of injuries and illnesses in construction, 1992 - 2003



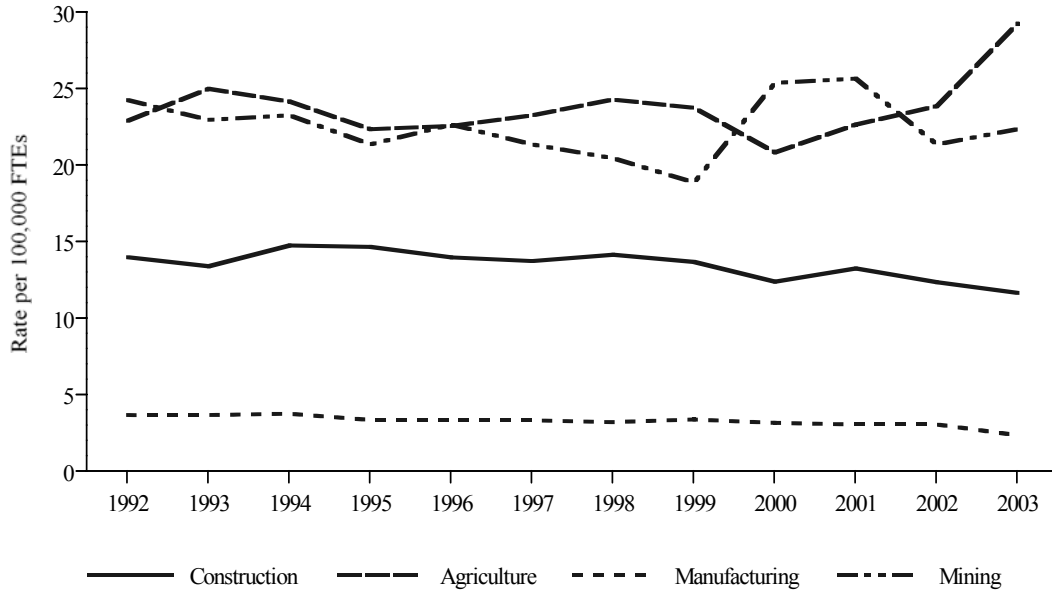
FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Nonfatal data, with days away from work, private sector only, the self-employed excluded

Source: BLS: Census of Fatal Occupational Injuries, Annual Survey of Occupational Injuries and Illnesses, Current Population Survey.

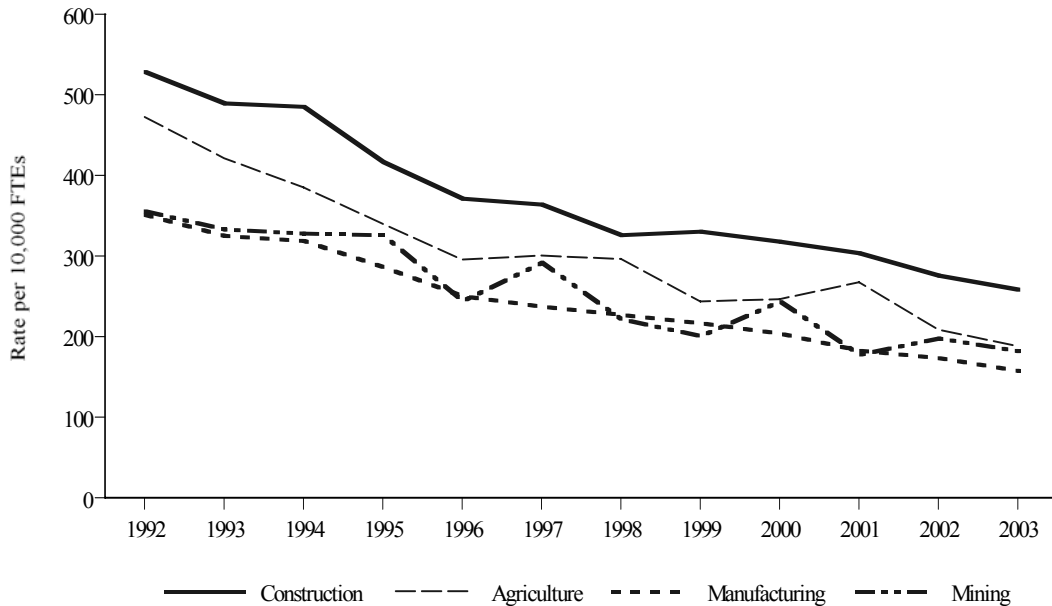
14 Work-Related Fatal and Nonfatal Injuries among U.S. Construction Workers, 1992-2003

4a. Rate of work-related deaths from injuries, by selected industry, 1992-2003



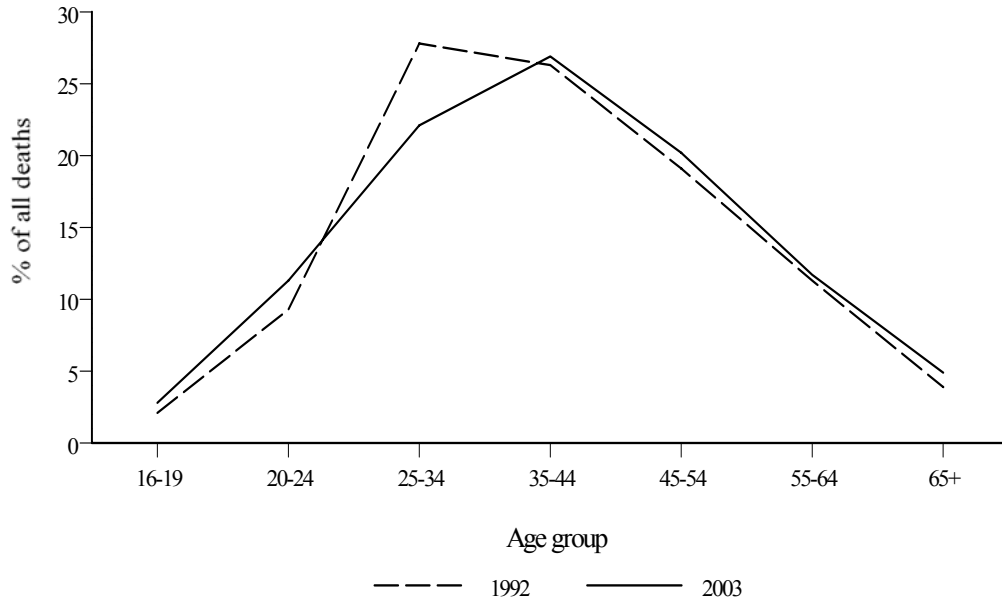
FTE = Full-time equivalent, defined as 2,000 hours worked per year.  
 Source: Bureau of Labor Statistics: Census of Fatal Occupational Injuries, Current Population Survey.

4b. Rate of nonfatal injuries and illnesses with days away from work, by selected industry, 1992-2003



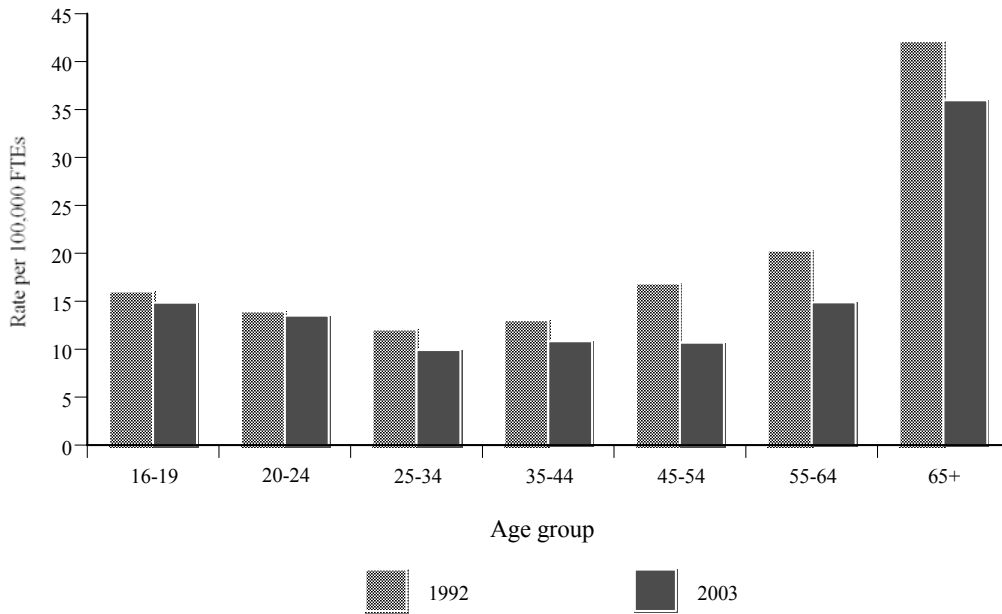
FTE = Full-time equivalent, defined as 2,000 hours worked per year.  
 Note: Data cover private sector only and exclude self-employed workers.  
 Source: Bureau of Labor Statistics: Annual Survey of Occupational Injuries and Illnesses.

5a. Distribution of work-related deaths from injuries in construction, by age group, 1992 vs. 2003



Source: Bureau of Labor Statistics: Census of Fatal Occupational Injuries, Current Population Survey.

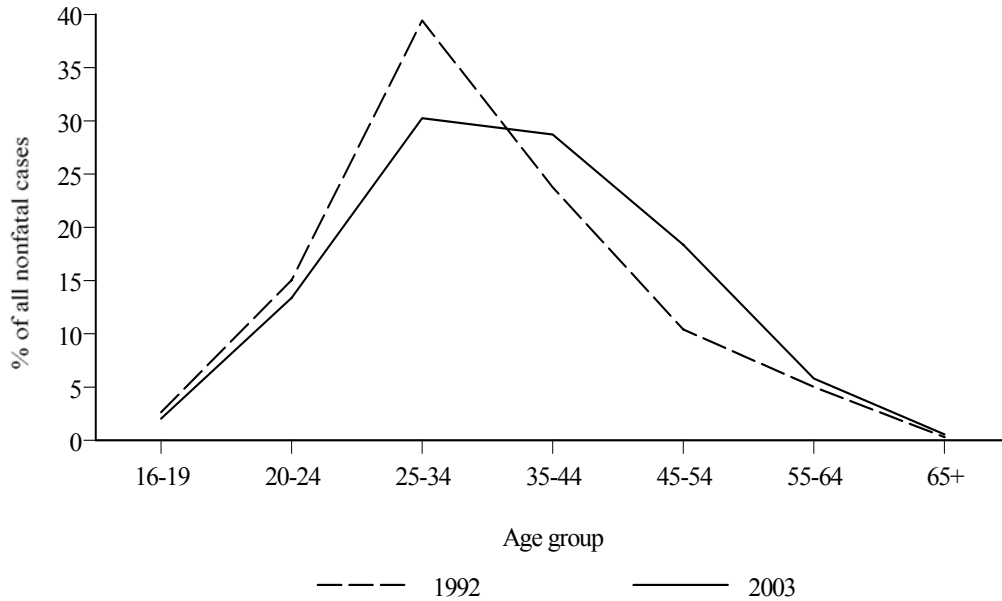
5b. Rate of work-related deaths from injuries in construction, by age group, 1992 vs. 2003



FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Source: Bureau of Labor Statistics: Census of Fatal Occupational Injuries, Current Population Survey.

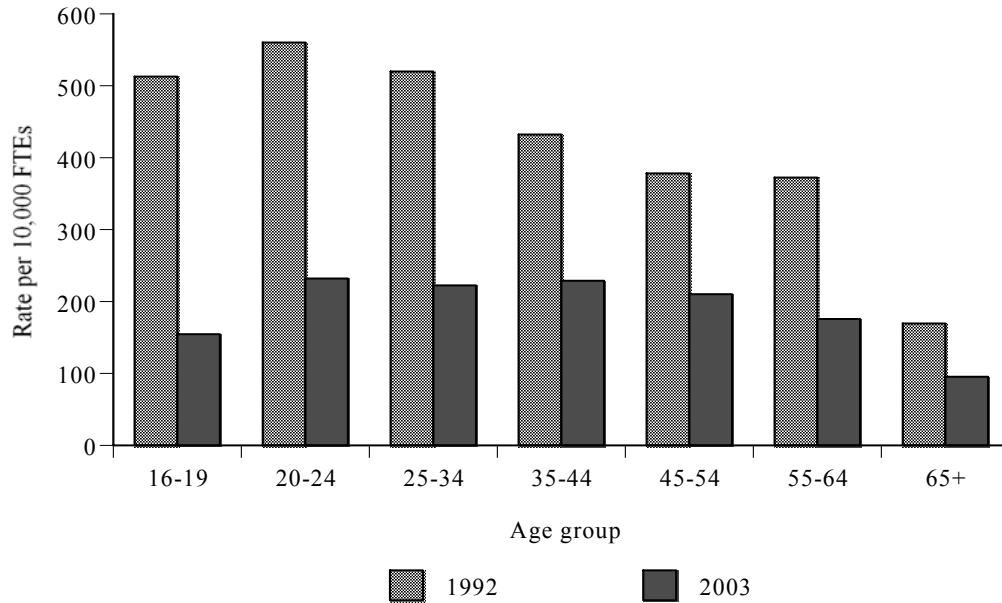
6a. Distribution of nonfatal injuries and illnesses resulting in days away from work in construction, by age group, 1992 vs. 2003



*Note:* Data cover private sector only and exclude self-employed workers.

*Source:* Bureau of Labor Statistics: Annual Survey of Occupational Injuries and Illnesses, Current Population Survey.

6b. Rate of nonfatal injuries and illnesses resulting in days away from work in construction, by age group, 1992 vs. 2003

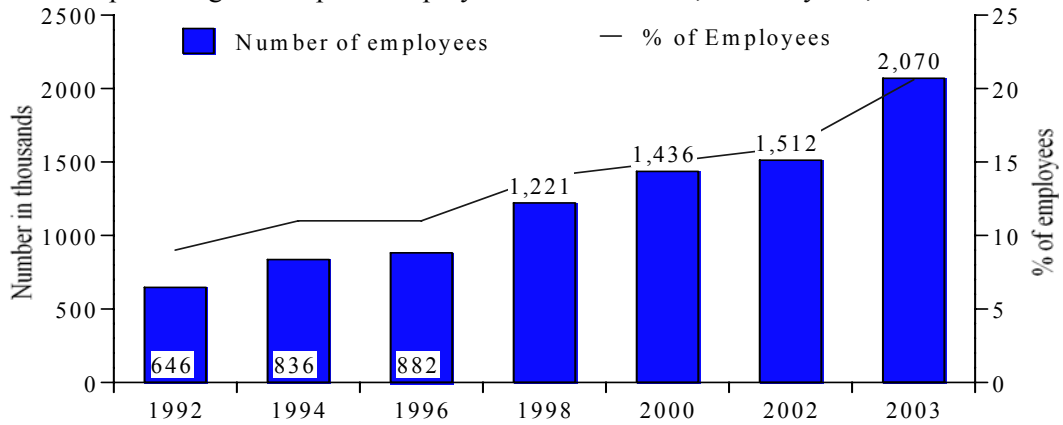


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

*Note:* Data cover private sector only and exclude self-employed workers.

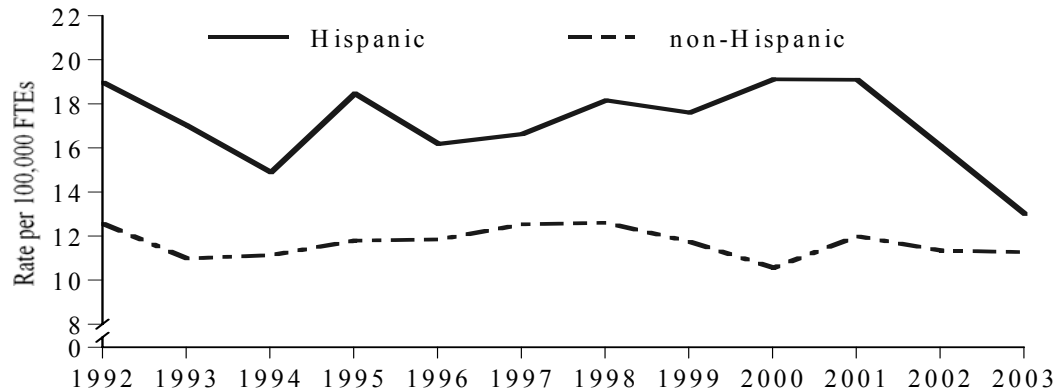
*Source:* Bureau of Labor Statistics: Annual Survey of Occupational Injuries and Illnesses, Current Population Survey.

7. Number and percentage of Hispanic employees in construction, various years, 1992 – 2003



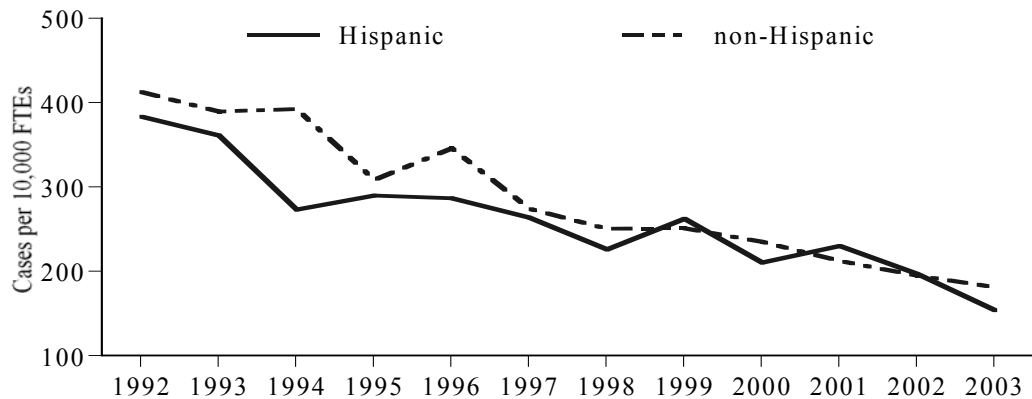
Note: All types of employment. Source: Bureau of Labor Statistics: Current Population Survey.

8a. Rate of work-related deaths from injuries in construction, Hispanic vs. non-Hispanic, 1992-2003



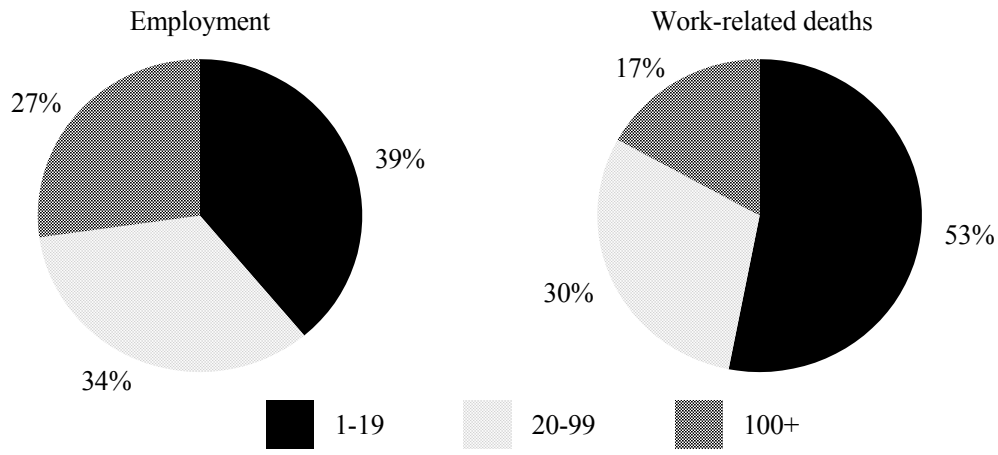
FTE = Full-time equivalent, defined as 2,000 hours worked per year. Source: Bureau of Labor Statistics: Census of Fatal Occupational Injuries, Current Population Survey.

8b. Rate of nonfatal injuries and illnesses resulting in days away from work in construction, Hispanic vs. non-Hispanic, 1992-2003



FTE = Full-time equivalent, defined as 2,000 hours worked per year. Note: Data cover private sector only and exclude self-employed workers. Source: Bureau of Labor Statistics: Annual Survey of Occupational Injuries and Illnesses, Current Population Survey.

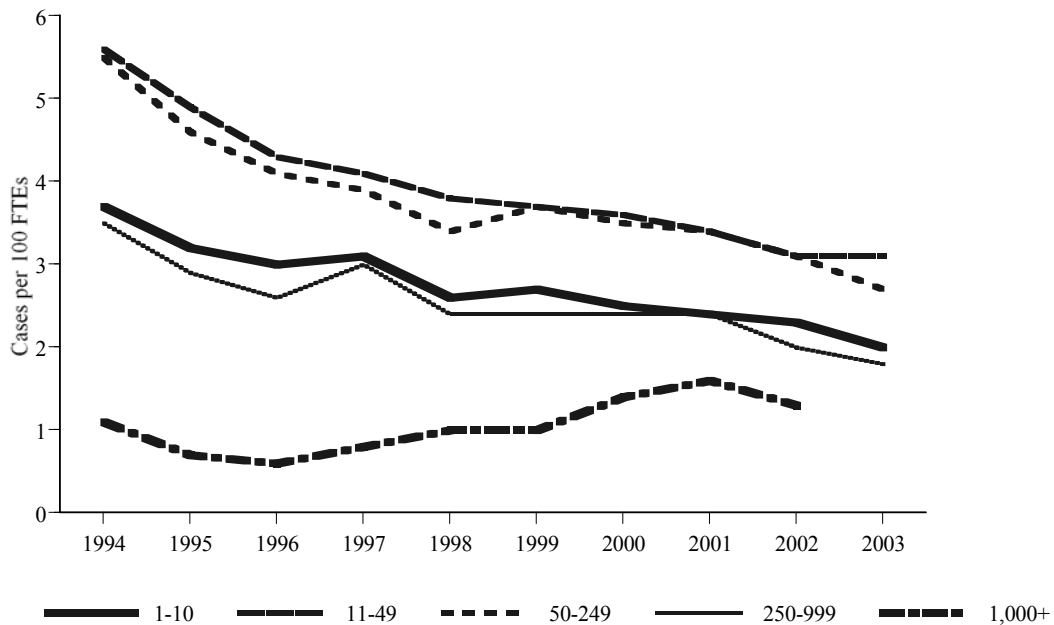
9a. Distribution of construction employment and work-related deaths from injuries, by establishment size, 2002



*Note:* Distribution of employment reported by the County Business Patterns exclude self-employed workers and deaths Reported without establishment size information or self-employed workers were excluded from this calculation. CBP 2002 is the latest data.

*Sources:* Census Bureau: County Business Patterns; Bureau of Labor Statistics: Census of Fatal Occupational Injuries.

9b. Rate of nonfatal occupational injuries and illnesses in construction resulting in days away from work, by establishment size, 1994-2003

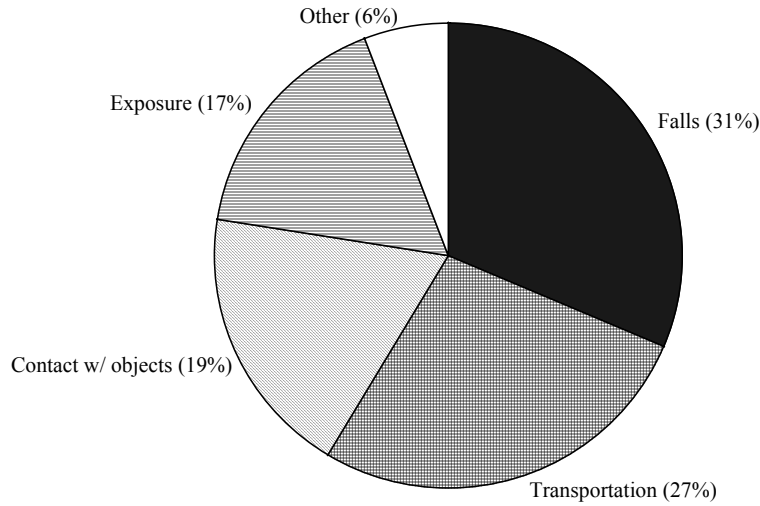


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

*Note:* Data not available for 1,000+ establishment nonfatal rate in 2003, data cover private sector only and exclude self-employed workers. Data by establishment is not available prior to 1994.

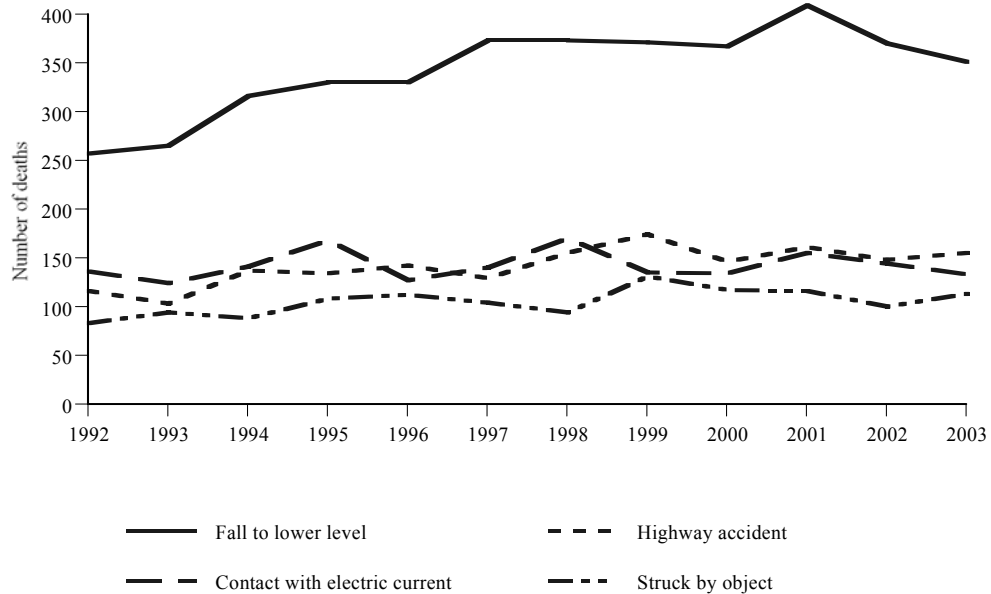
*Source:* Bureau of Labor Statistics: Annual Survey of Occupational Injuries and Illnesses.

10a. Distribution of leading causes of work-related deaths from injuries, construction, 1992 - 2003



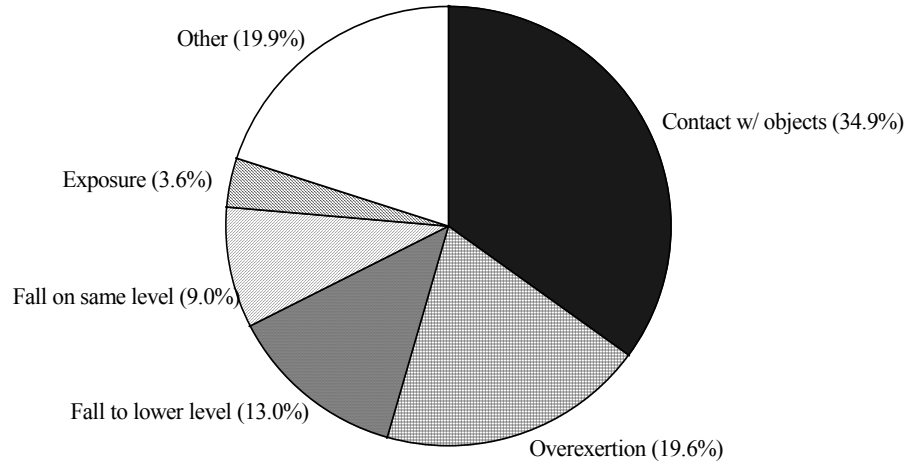
Source: Bureau of Labor Statistics: Census of Fatal Occupational Injuries.

10b. The four events with the most frequent work-related deaths, construction, 1992 – 2003



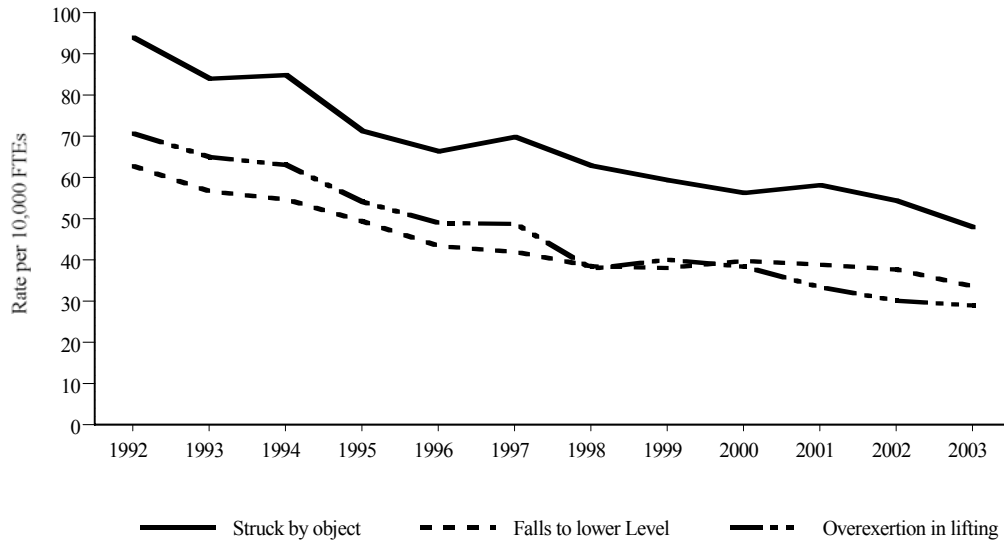
Source: Bureau of Labor Statistics: Census of Fatal Occupational Injuries.

11a. Distribution of leading causes of nonfatal cases with days away from work, construction, 2003



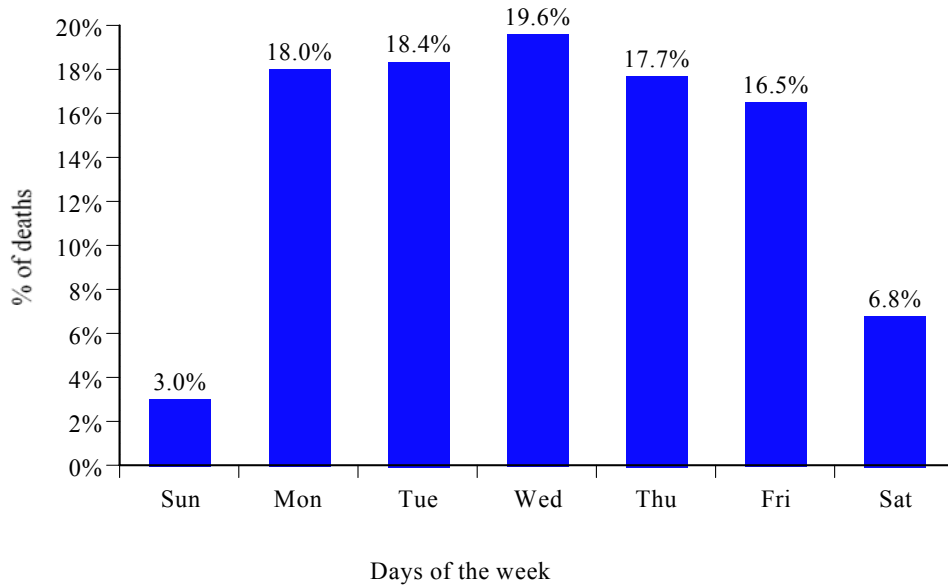
*Note:* Data cover private sector only and exclude self-employed workers.  
*Source:* Bureau of Labor Statistics: Annual Survey of Occupational Injuries and Illnesses.

11b. Rate of leading causes of nonfatal injuries and illnesses resulting in days away from work, construction, 1992 – 2003



FTE = Full-time equivalent, defined as 2,000 hours worked per year  
*Note:* Data cover private sector only and exclude self-employed workers.  
*Source:* Bureau of Labor Statistics: <http://data.bls.gov>.

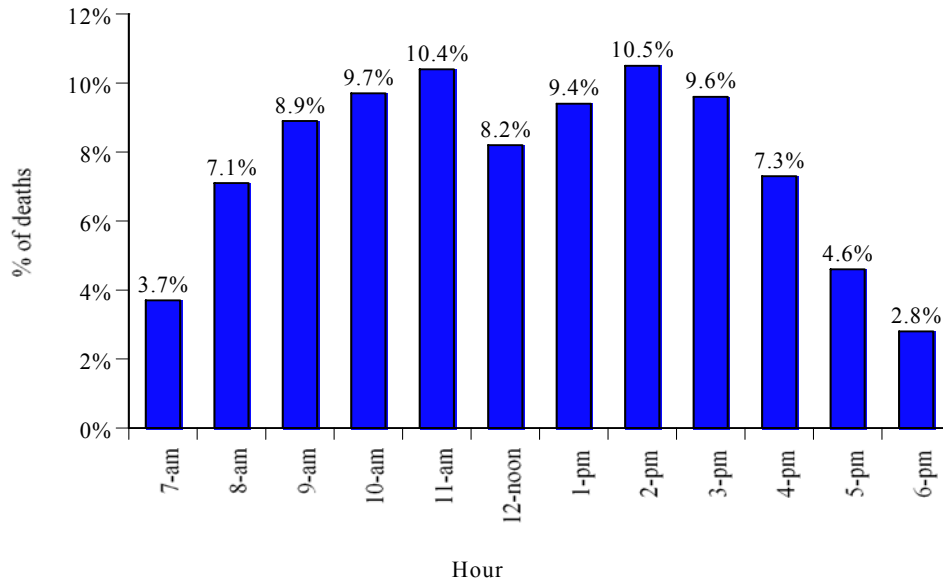
12a. Percentage of work-related deaths from injuries for all construction, by day, 1992-2003 average



*Note:* 13,542 total deaths, 8 deaths with unknown days.

*Source:* Bureau of Labor Statistics: Census of Fatal Occupational Injuries.

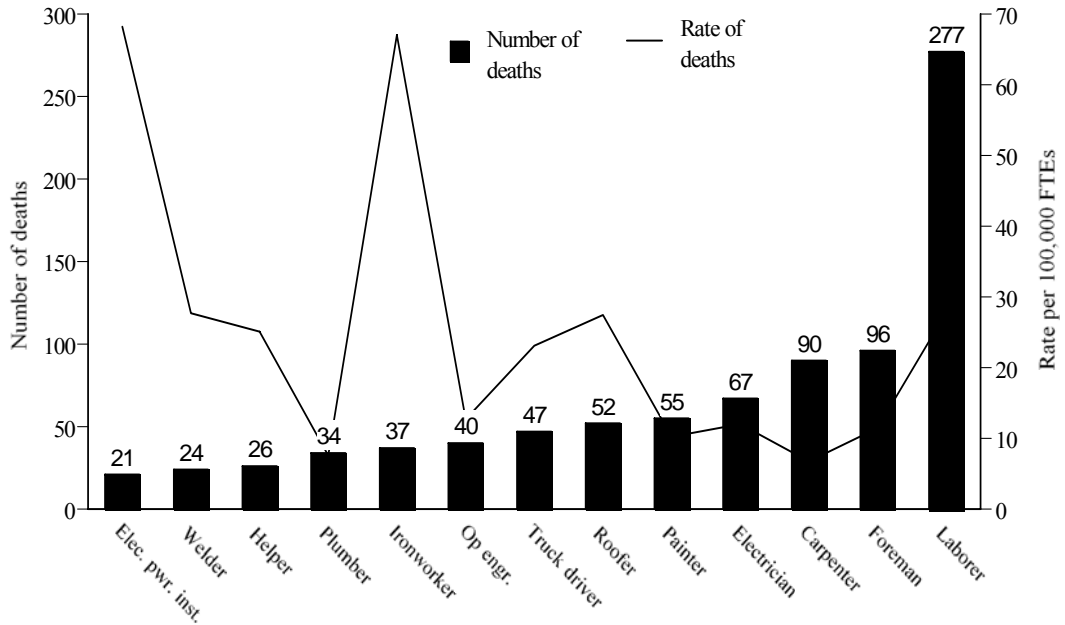
12b. Percentage of work-related deaths from injuries for all construction, by hour, 1992-2003 average



*Note:* 13,542 total deaths, time not reported for approximately 23.8%.

*Source:* Bureau of Labor Statistics: Census of Fatal Occupational Injuries.

13a. Number and rate of work-related deaths from injuries, selected construction occupations, 2003

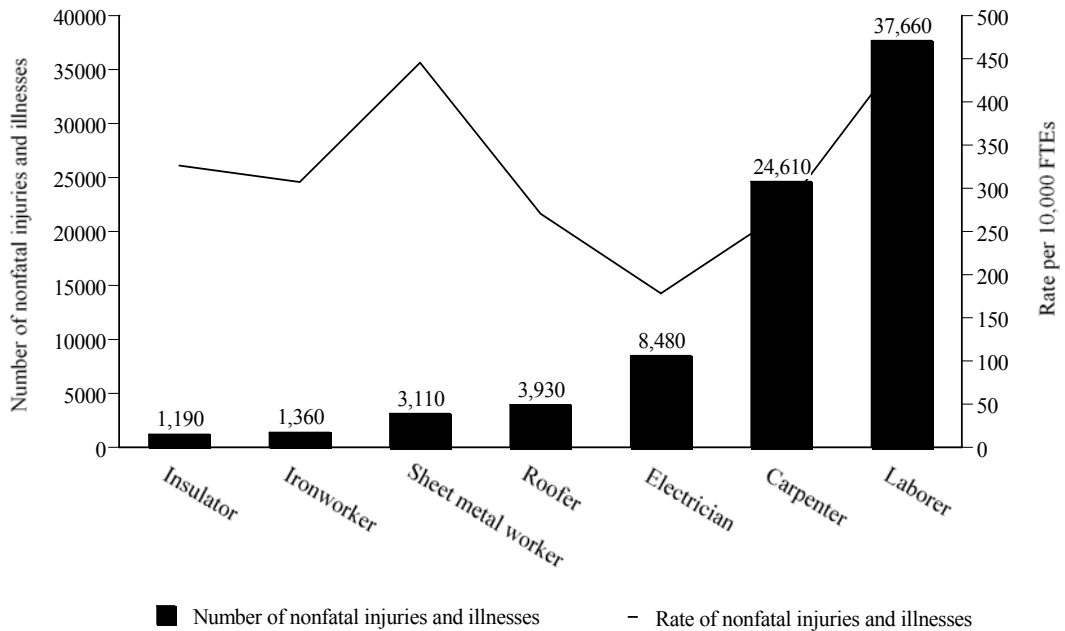


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: The rate of work-related deaths for all construction is 11.74 per 100,000 FTEs, 2003.

Source: Bureau of Labor Statistics: Census of Fatal Occupational Injuries, Current Population Survey.

13b. Number and rate of nonfatal injuries and illnesses involving days away from work, selected construction occupations, 2003

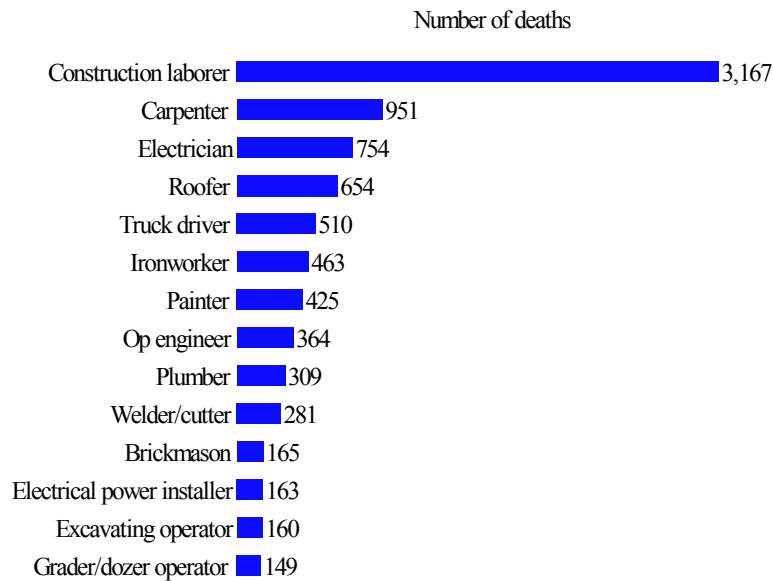


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Data cover private sector only and exclude self-employed workers. The nonfatal injury and illness rate, involving days away from work, for all construction is 218.1 per 10,000 FTEs.

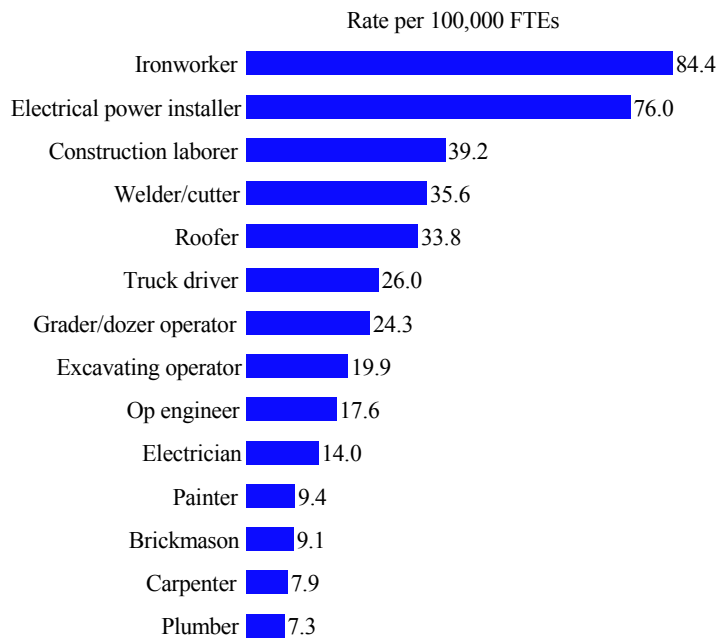
Source: Bureau of Labor Statistics: Annual Survey of Occupational Injuries and illnesses, Current Population Survey.

14a. Number of work-related deaths from injuries, selected construction occupations, 1992 - 2002



Source: Bureau of Labor Statistics: Census of Fatal Occupational Injuries.

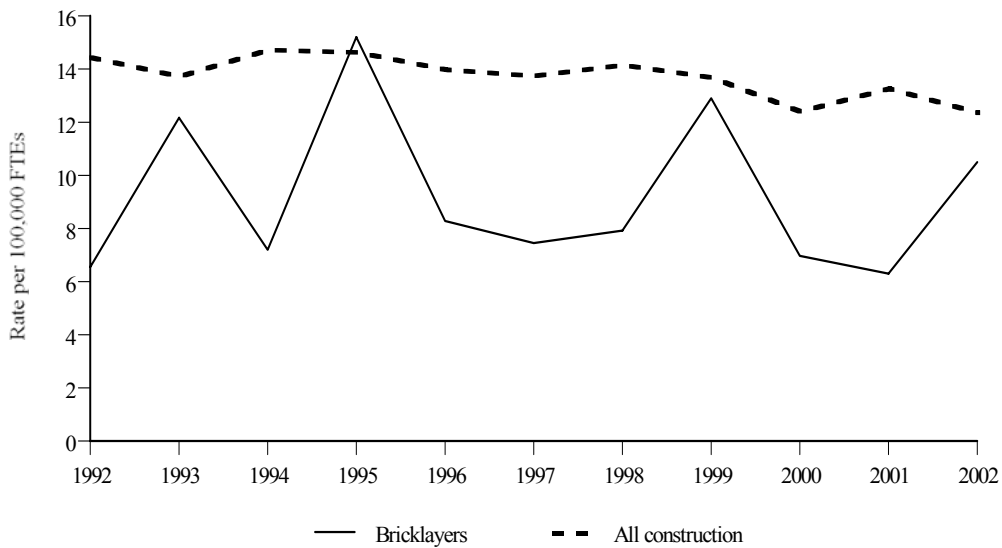
14b. Rate of work-related deaths from injuries, selected construction occupations, 1992 - 2002



FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Source: Bureau of Labor Statistics: Census of Fatal Occupational Injuries, Current Population Survey.

15a. Rate of work-related deaths from injuries, bricklayers and all construction, 1992- 2002

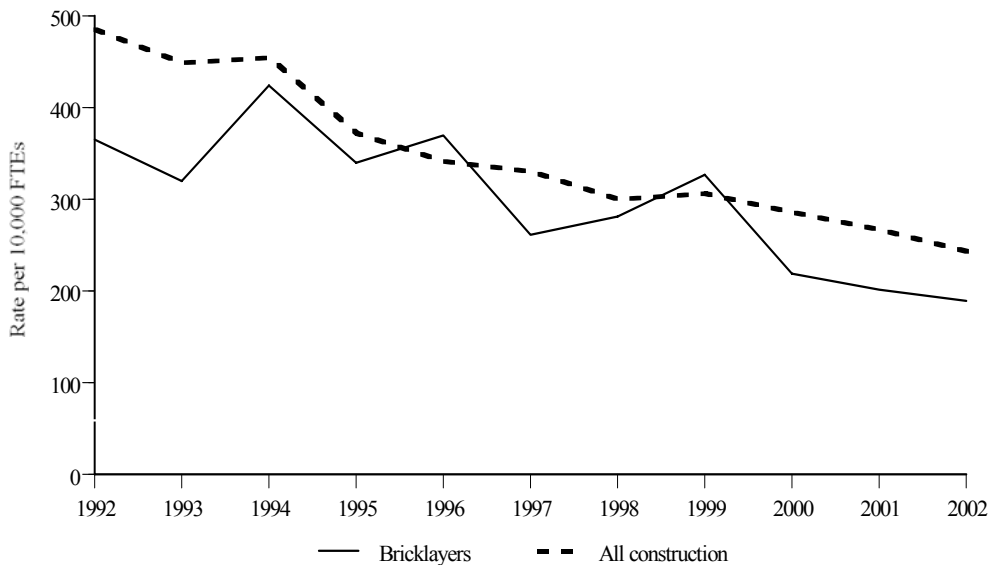


FTE=Full-time equivalent, defined as 2,000 hours worked per year.

Note: Bricklayer data based on a total of 165 deaths.

Source: Bureau of Labor Statistics: Census of Fatal Occupational Injuries , Current Population Survey.

15b. Rate of nonfatal injuries and illnesses resulting in days away from work, bricklayers and all construction, 1992-2002

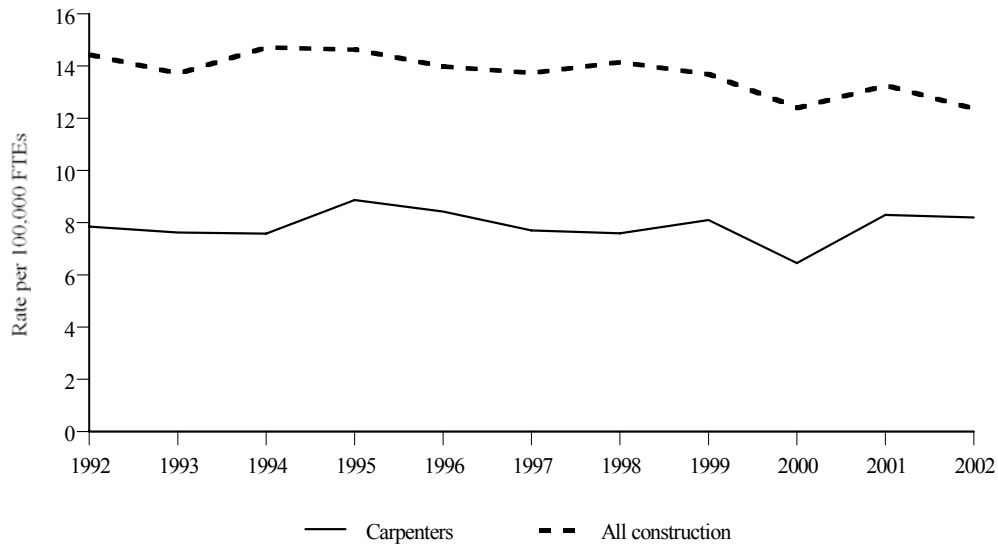


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Data cover private sector only and exclude selfemployed workers.

Source: Bureau of Labor Statistics: Annual Survey of Occupational Injuries and Illnesses, Current Population Survey.

16a. Rate of work-related deaths from injuries, carpenters and all construction, 1992- 2002

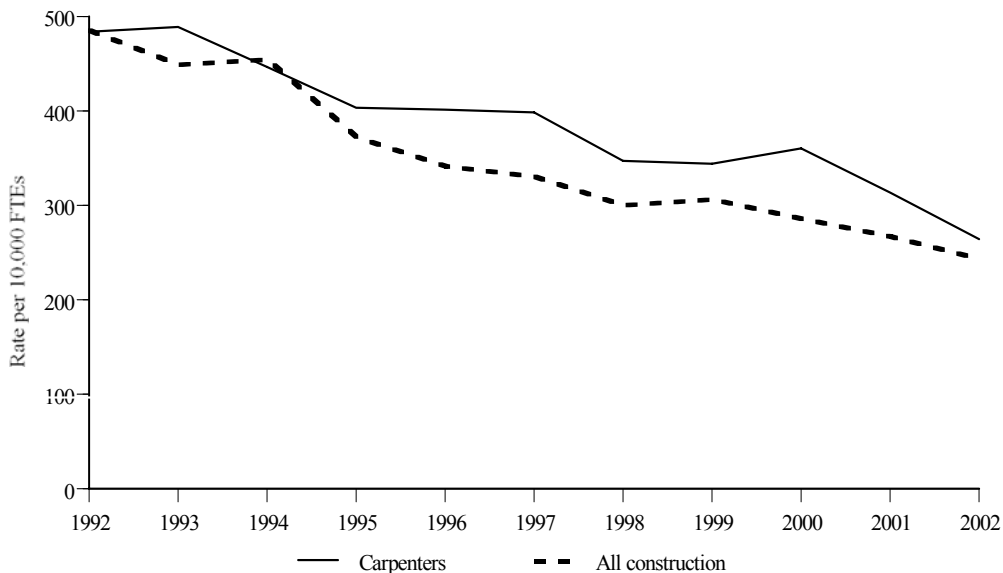


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Carpenter data based on a total of 951 deaths.

Source: Bureau of Labor Statistics: Census of Fatal Occupational Injuries, Current Population Survey.

16b. Rate of nonfatal injuries and illnesses resulting in days away from work, carpenters and all construction, 1992-2002

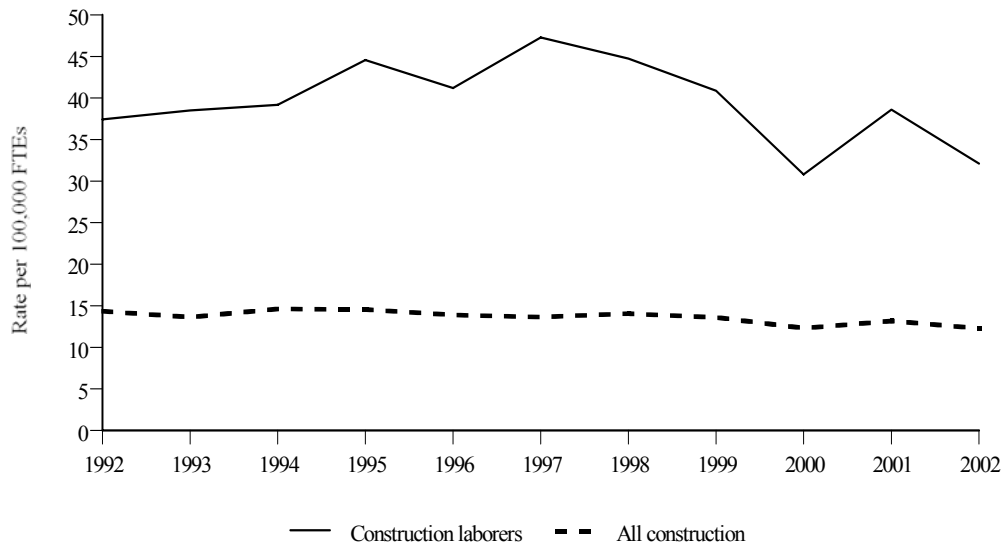


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Data cover private sector only and exclude self-employed workers.

Source: Bureau of Labor Statistics: Annual Survey of Occupational Injuries and Illnesses, Current Population Survey.

17a. Rate of work-related deaths from injuries, construction laborers and all construction, 1992-2002

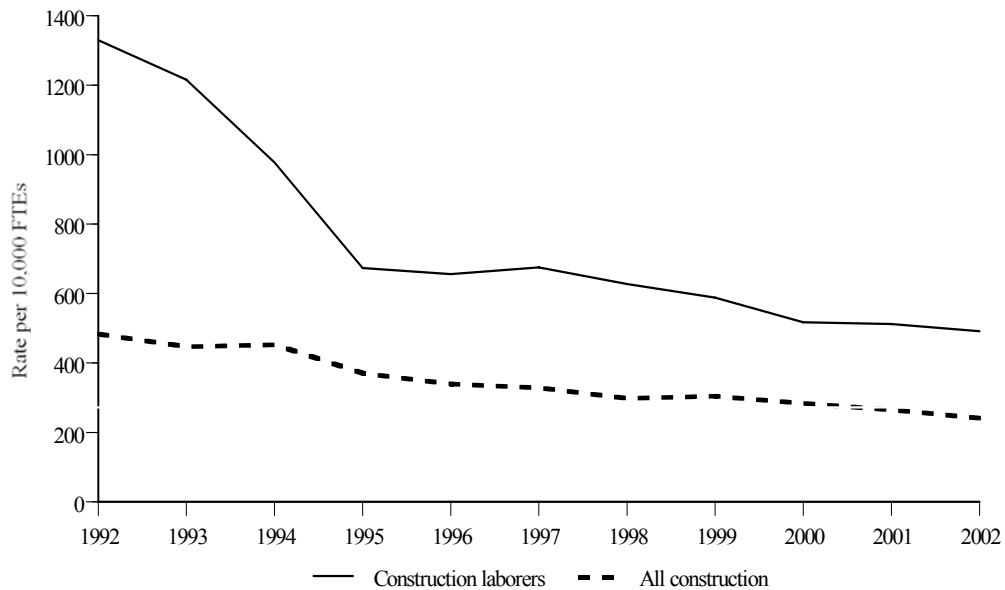


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Construction Laborer data based on a total of 3167 deaths.

Source: Bureau of Labor Statistics: Census of Fatal Occupational Injuries, Current Population Survey.

17b. Rate of nonfatal injuries and illnesses resulting in days away from work, construction laborers and all construction, 1992-2002

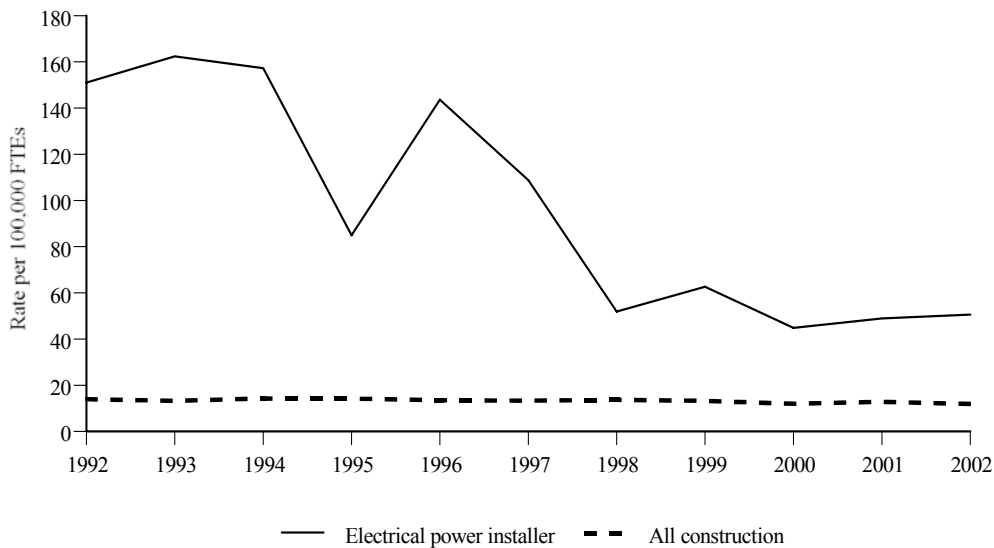


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Data cover private sector only and exclude self-employed workers.

Source: Bureau of Labor Statistics: Annual Survey of Occupational Injuries and Illnesses, Current Population Survey.

18a. Rate of work-related deaths from injuries, electrical power installers and all construction, 1992-2002

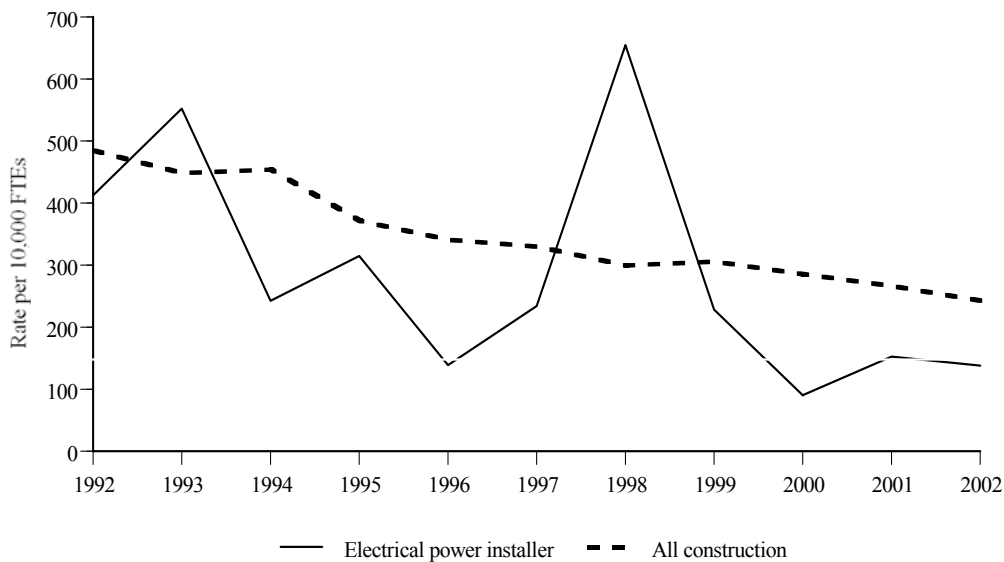


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Electrical power installer data based on a total of 163 deaths.

Source: Bureau of Labor Statistics: Census of Fatal Occupational Injuries, Current Population Survey.

18b. Rate of nonfatal injuries and illnesses resulting in days away from work, electrical power installers and all construction, 1992-2002

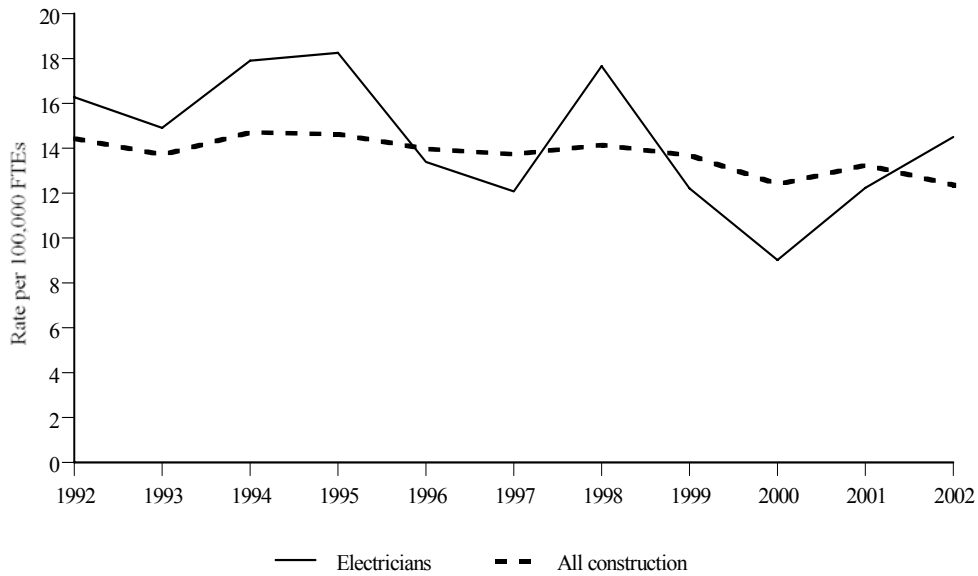


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Data cover private sector only and exclude selfemployed workers.

Source: Bureau of Labor Statistics: Annual Survey of Occupational Injuries and Illness, Current Population Survey.

19a. Rate of work-related deaths from injuries, electricians and all construction, 1992 - 2002

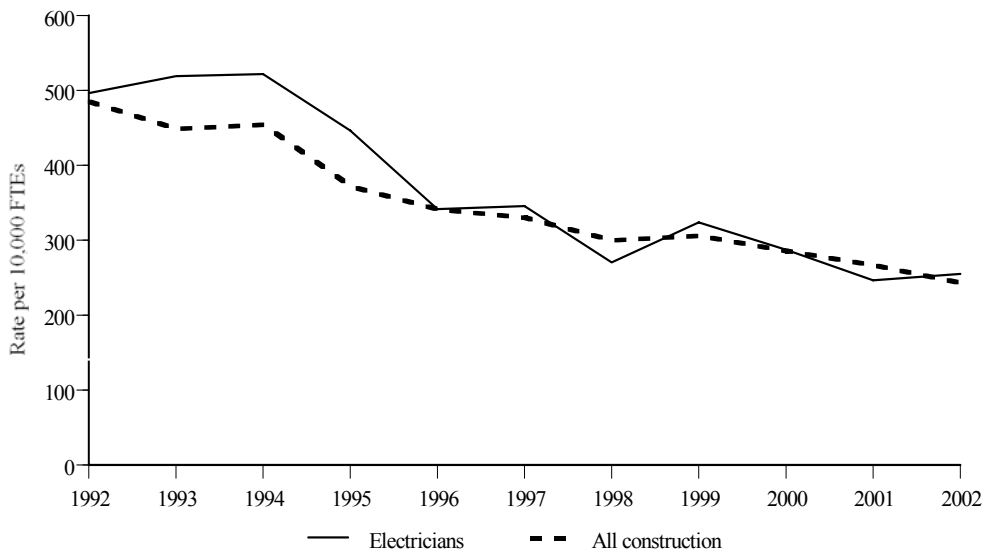


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Electrician data based on a total of 754 deaths.

Source: Bureau of Labor Statistics: Census of Fatal Occupational Injuries, Current Population Survey.

19b. Rate of nonfatal injuries and illnesses resulting in days away from work, electricians and all construction, 1992-2002

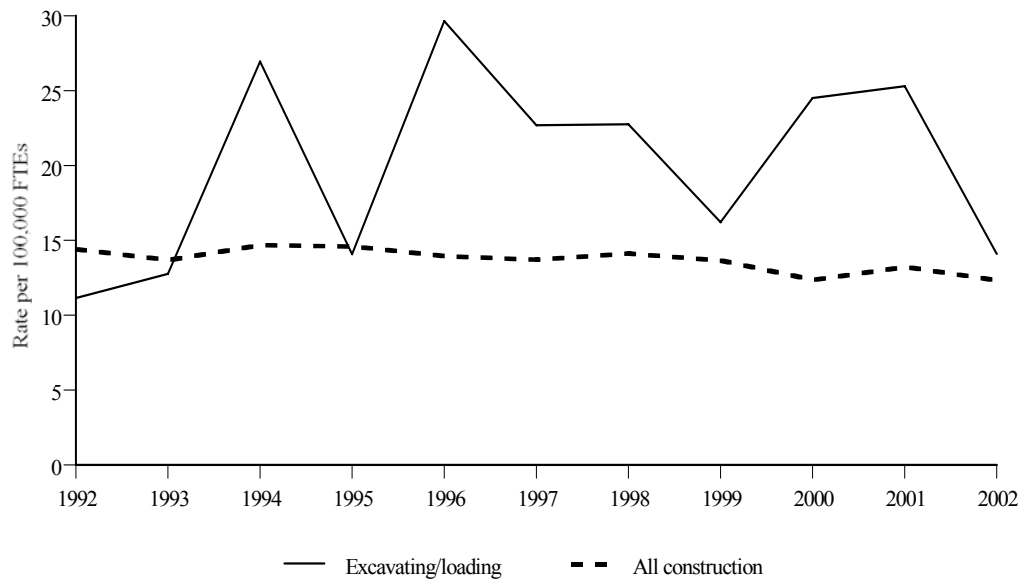


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Data cover private sector only and exclude selfemployed workers.

Source: Bureau of Labor Statistics: Annual Survey of Occupational Injuries and Illnesses, Current Population Survey.

20a. Rate of work-related deaths from injuries, excavating/loading machine operators and all construction, 1992-2002

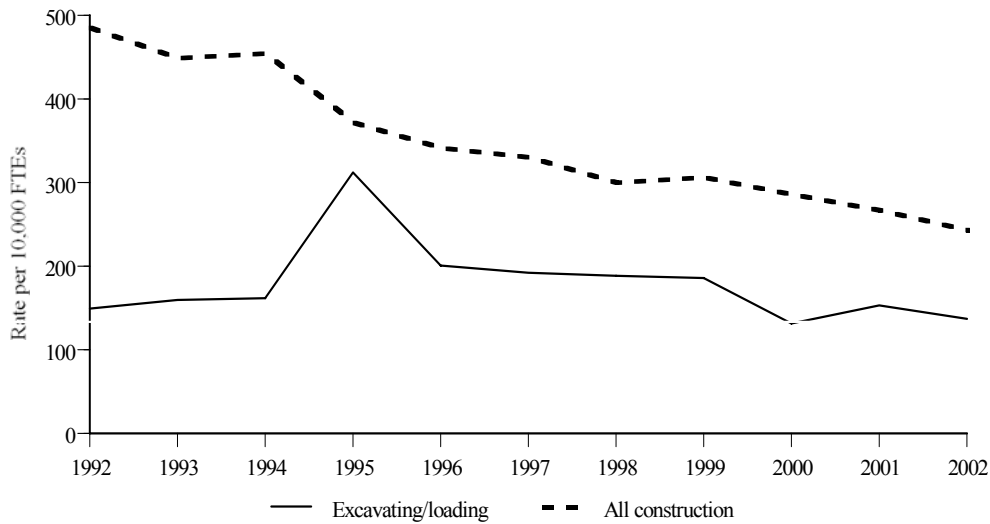


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Excavating / loading machine operator data based on a total of 160 deaths.

Source: Bureau of Labor Statistics: Census of Fatal Occupational Injuries, Current Population Survey.

20b. Rate of nonfatal injuries and illnesses resulting in days away from work, excavating/loading machine operators and all construction, 1992-2002



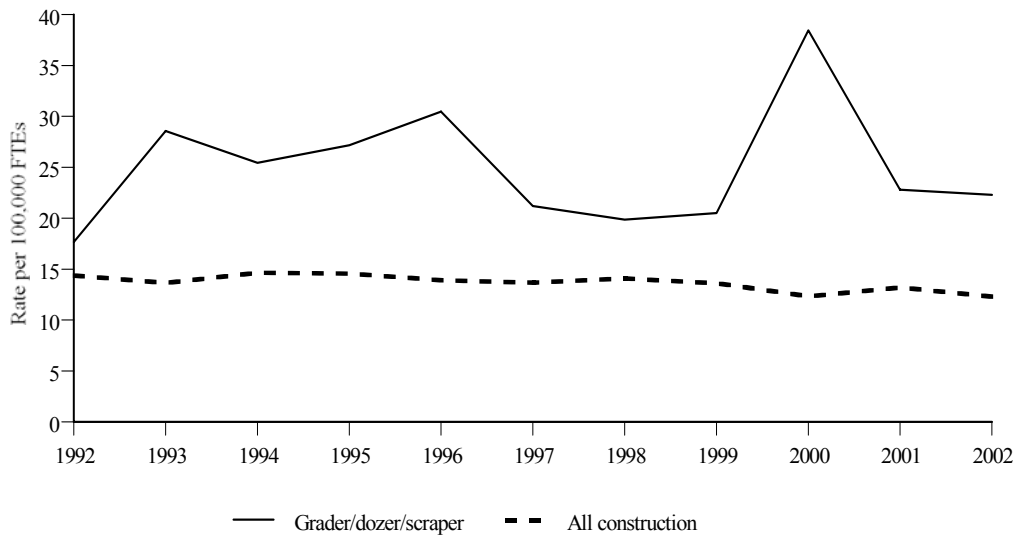
FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Data cover private sector only and exclude selfemployed workers.

Source: Bureau of Labor Statistics: Annual Survey of Occupational Injuries and Illnesses, Current Population Survey.

30 Work-Related Fatal and Nonfatal Injuries among U.S. Construction Workers, 1992-2003

21a. Rate of work-related deaths from injuries, grader / dozer / scraper operators and all construction, 1992-2002

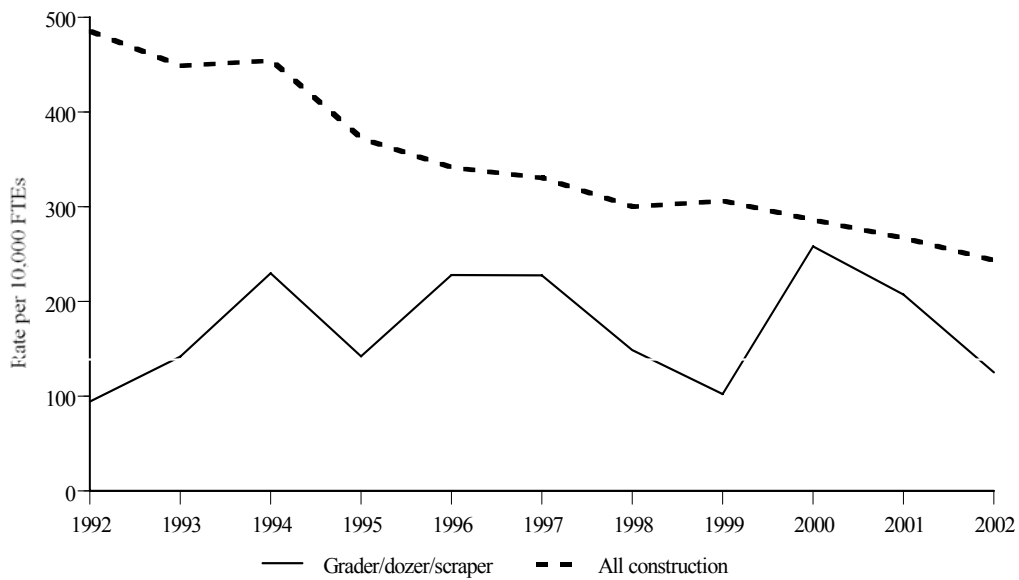


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Grader/dozer/scraper operator data based on a total of 149 deaths.

Source: Bureau of Labor Statistics: Census of Fatal Occupational Injuries, Current Population Survey.

21b. Rate of nonfatal injuries and illnesses resulting in days away from work, grader / dozer / scraper operators and all construction, 1992-2002

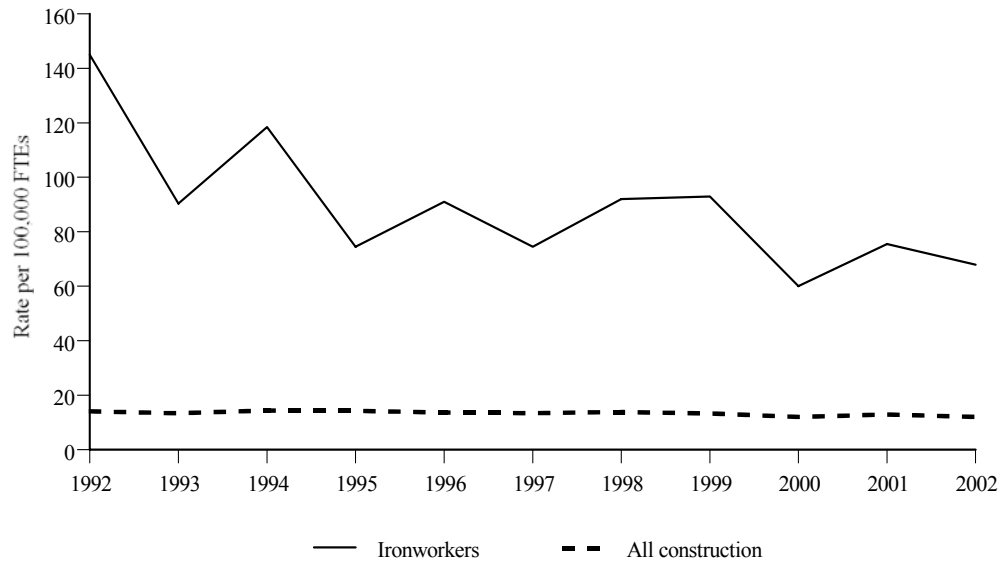


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Data cover private sector only and exclude self-employed workers.

Source: Bureau of Labor Statistics: Annual Survey of Occupational Injuries and Illnesses, Current Population Survey.

22a. Rate of work-related deaths from injuries, ironworkers and all construction, 1992 - 2002

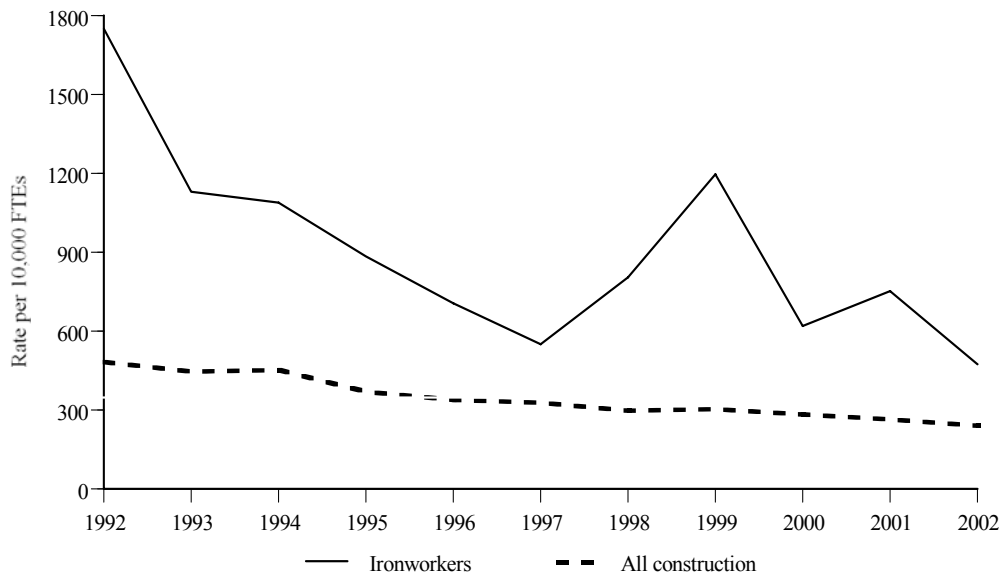


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Ironworker data based on a total of 463 deaths.

Source: Bureau of Labor Statistics: Census of Fatal Occupational Injuries, Current Population Survey.

22b. Rate of nonfatal injuries and illnesses resulting in days away from work, ironworkers and all construction, 1992-2002

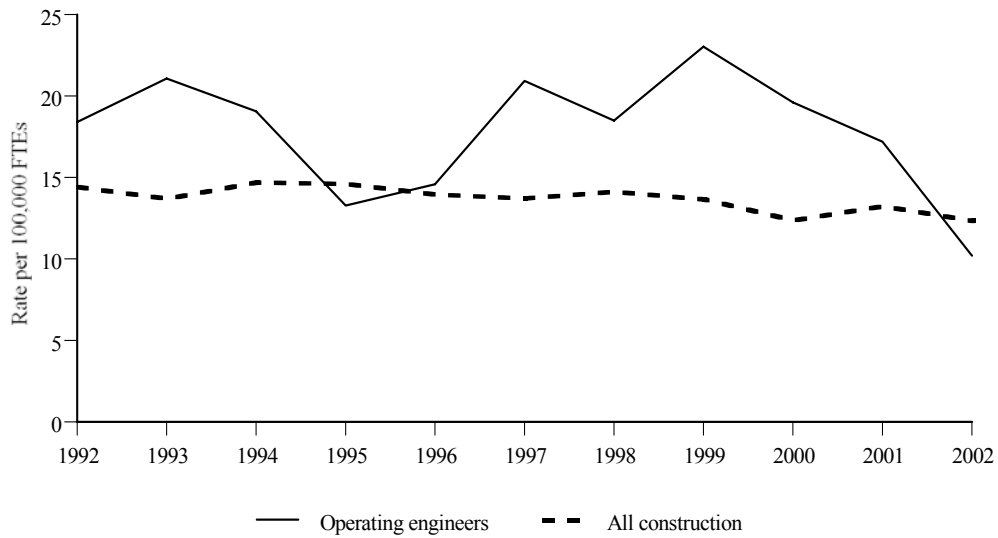


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Data cover private sector only and exclude selfemployed workers.

Source: Bureau of Labor Statistics: Annual Survey of Occupational Injuries and Illnesses, Current Population Survey.

23a. Rate of work-related deaths from injuries, operating engineers and all construction 1992-2002

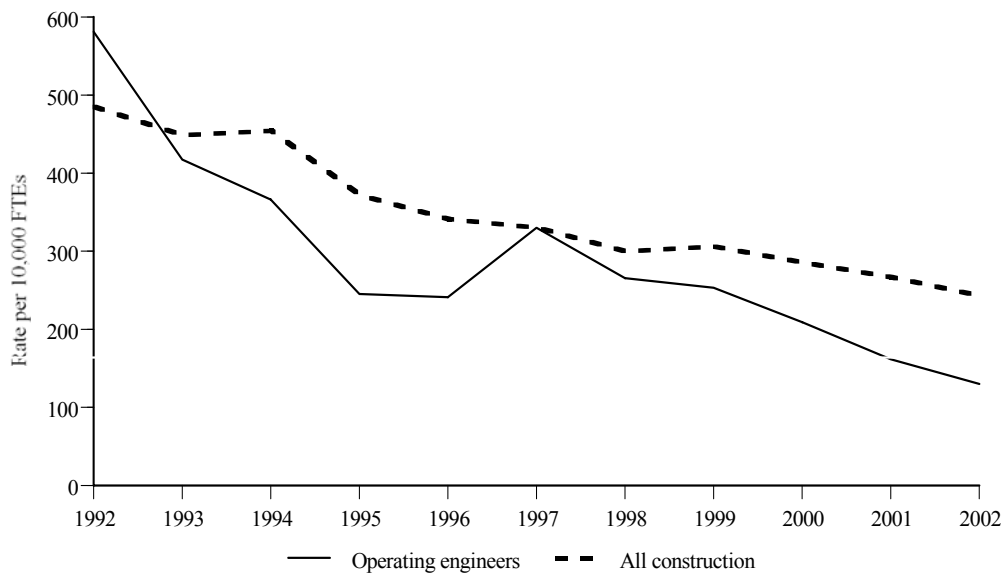


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Operating Engineer data based on a total of 364 deaths.

Source: Bureau of Labor Statistics: Census of Fatal Occupational Injuries, Current Population Survey.

23b. Rate of nonfatal injuries and illnesses resulting in days away from work, operating engineers and all construction, 1992-2002

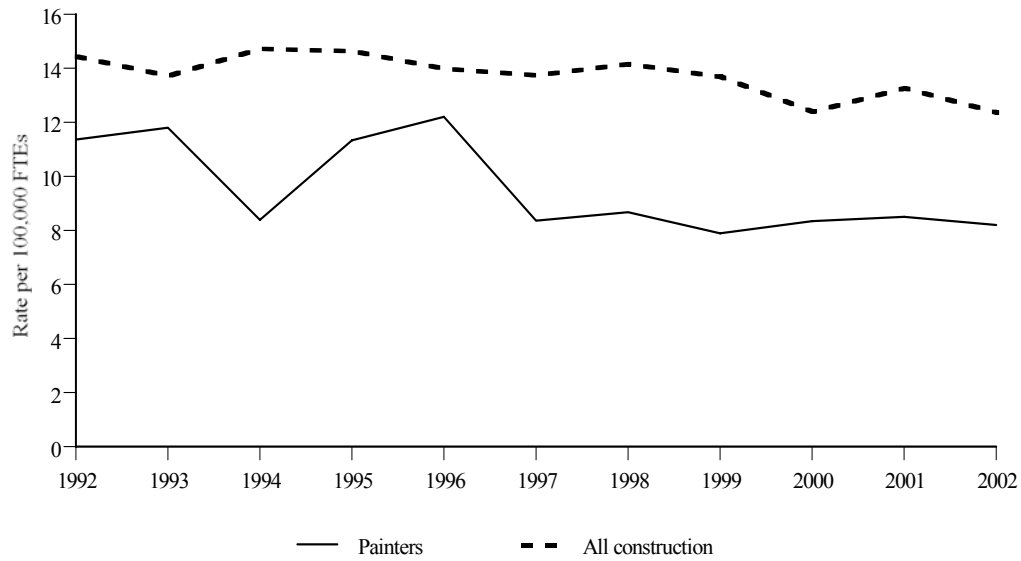


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Data cover private sector only and exclude self-employed workers.

Source: Bureau of Labor Statistics: Annual Survey of Occupational Injuries and Illnesses, Current Population Survey.

24a. Rate of work-related deaths from injuries, painters and all construction, 1992-2002

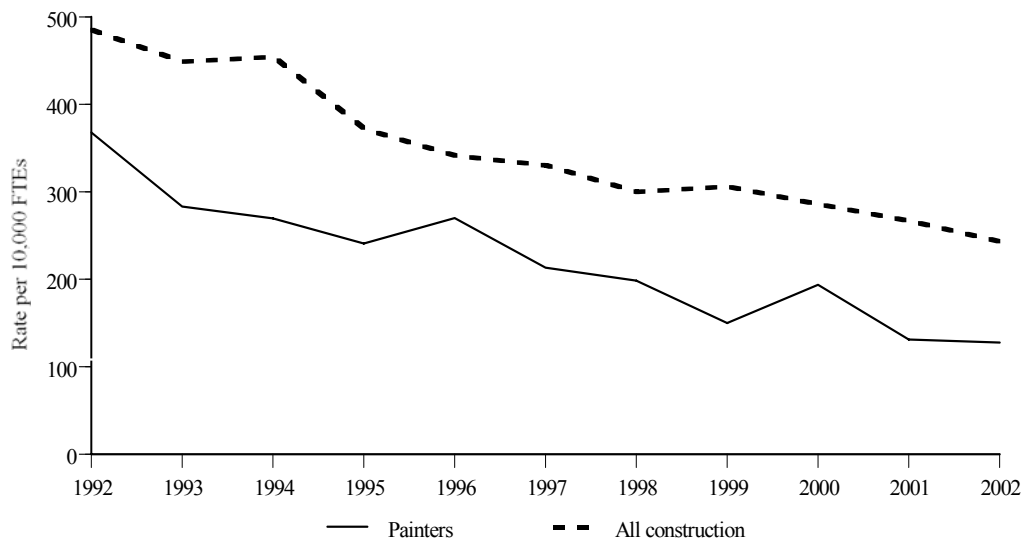


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Painter data based on a total of 425 deaths.

Source: Bureau of Labor Statistics: Census of Fatal Occupational Injuries, Current Population Survey.

24b. Rate of nonfatal injuries and illnesses resulting in days away from work, painters and all construction, 1992-2002

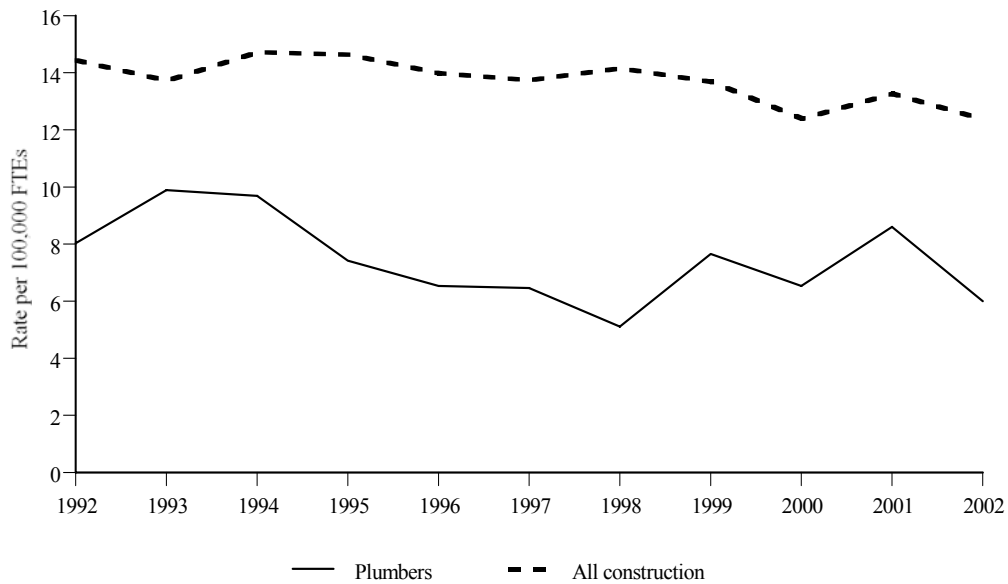


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Data cover private sector only and exclude selfemployed workers.

Source: Bureau of Labor Statistics: Annual Survey of Occupational Injuries and Illnesses, Current Population Survey.

25a. Rate of work-related deaths from injuries, plumbers and all construction, 1992-2002

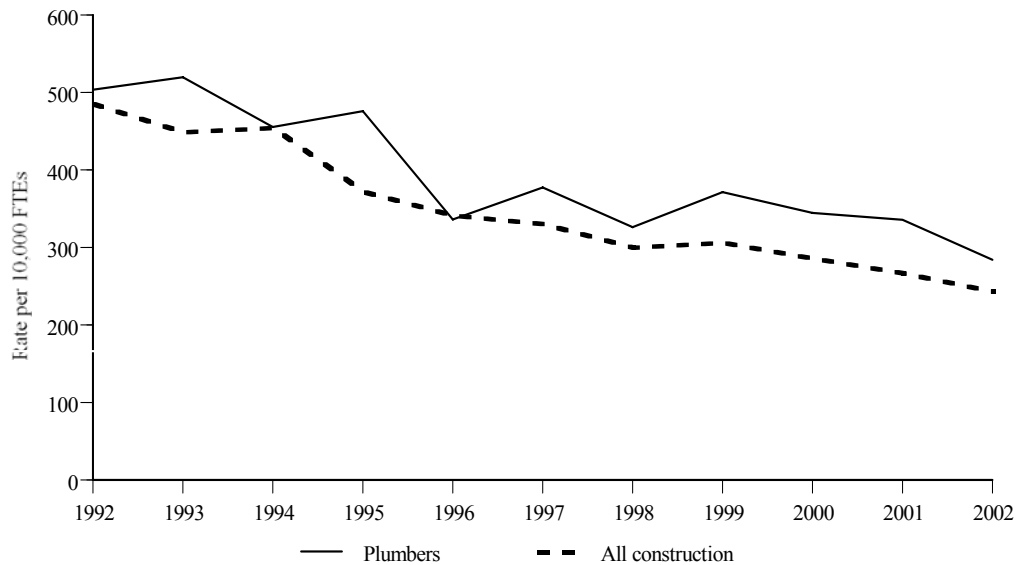


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Plumber data based on a total of 309 deaths.

Source: Bureau of Labor Statistics: Census of Fatal Occupational Injuries, Current Population Survey.

25b. Rate of nonfatal injuries and illnesses resulting in days away from work, plumbers and all construction, 1992-2002

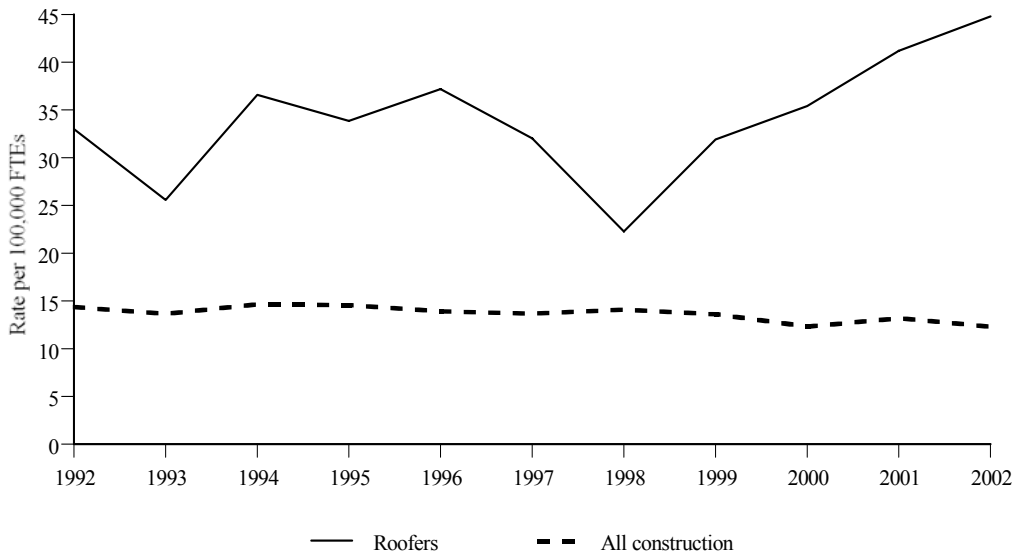


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Data cover private sector only and exclude self-employed workers.

Source: Bureau of Labor Statistics: Annual Survey of Occupational Injuries and Illnesses, Current Population Survey.

26a. Rate of work-related deaths from injuries, roofers and all construction, 1992-2002

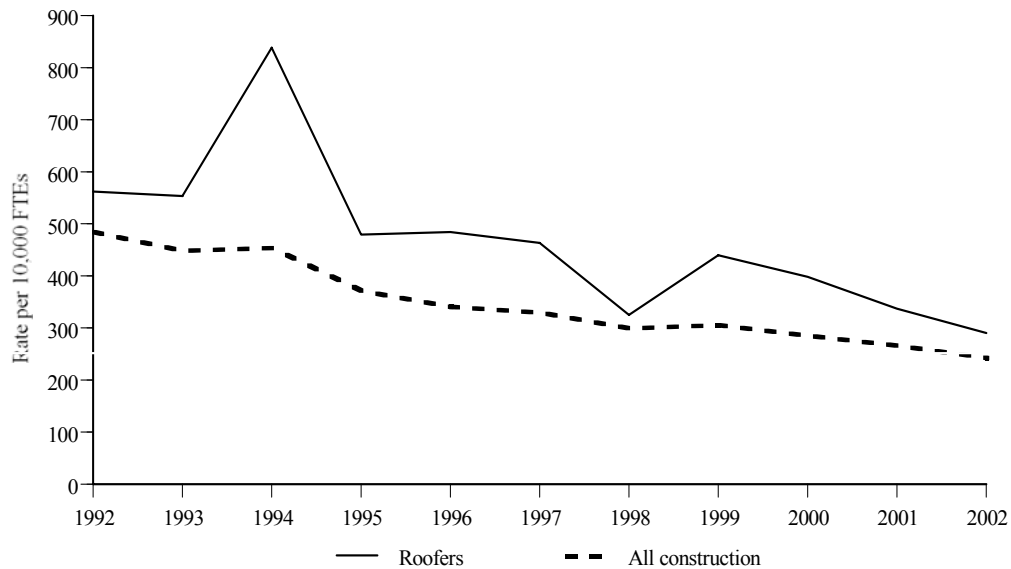


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Roofer data based on a total of 654 deaths.

Source: Bureau of Labor Statistics: Census of Fatal Occupational Injuries, Current Population Survey.

26b. Rate of nonfatal injuries and illnesses resulting in days away from work, roofers and all construction, 1992-2002

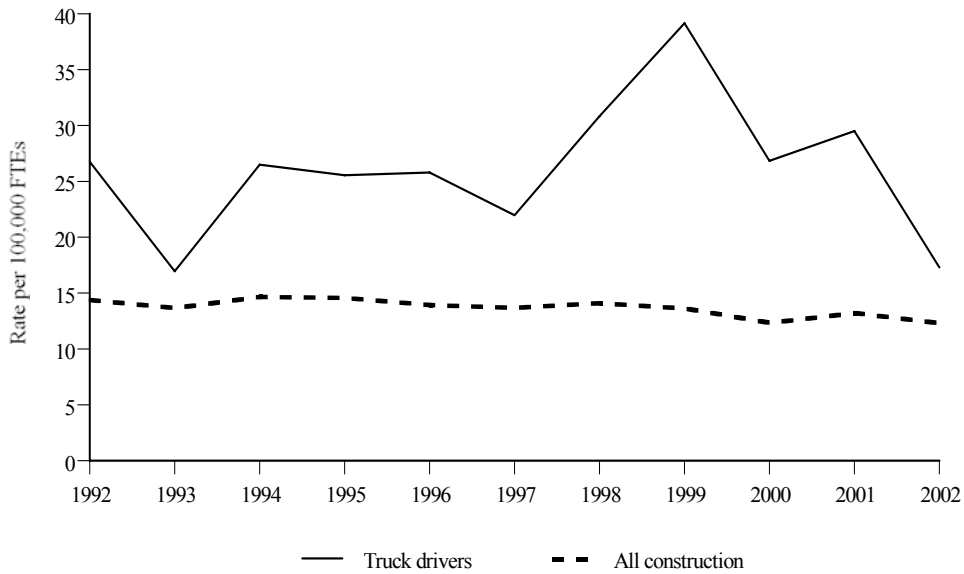


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Data cover private sector only and exclude self-employed workers.

Source: Bureau of Labor Statistics: Annual Survey of Occupational Injuries and Illnesses, Current population Survey.

27a. Rate of work-related deaths from injuries, truck drivers and all construction, 1992-2002

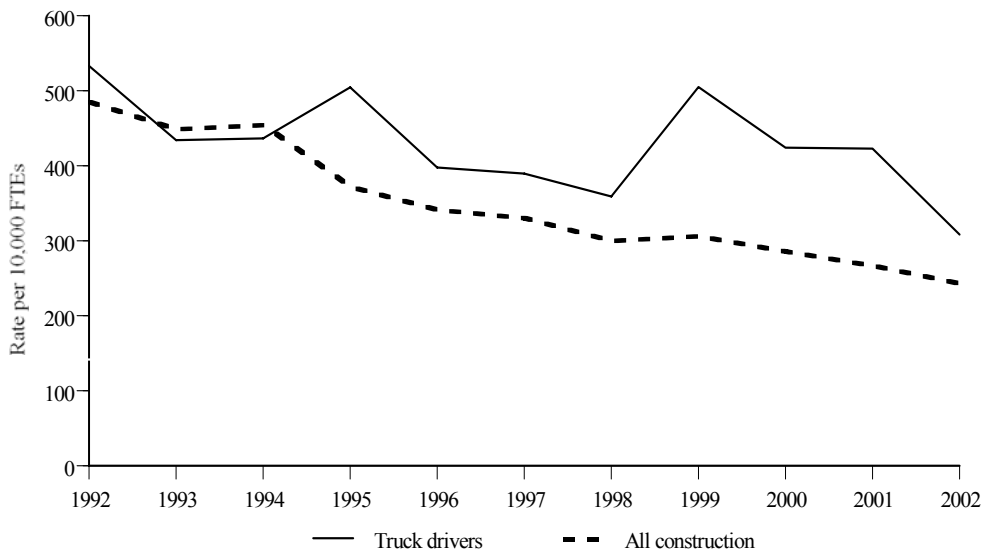


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Truck Driver data based on a total of 510 deaths.

Source: Bureau of Labor Statistics: Census of Fatal Occupational Injuries, Current Population Survey.

27b. Rate of nonfatal injuries and illnesses resulting in days away from work, truck drivers and all construction, 1992-2002

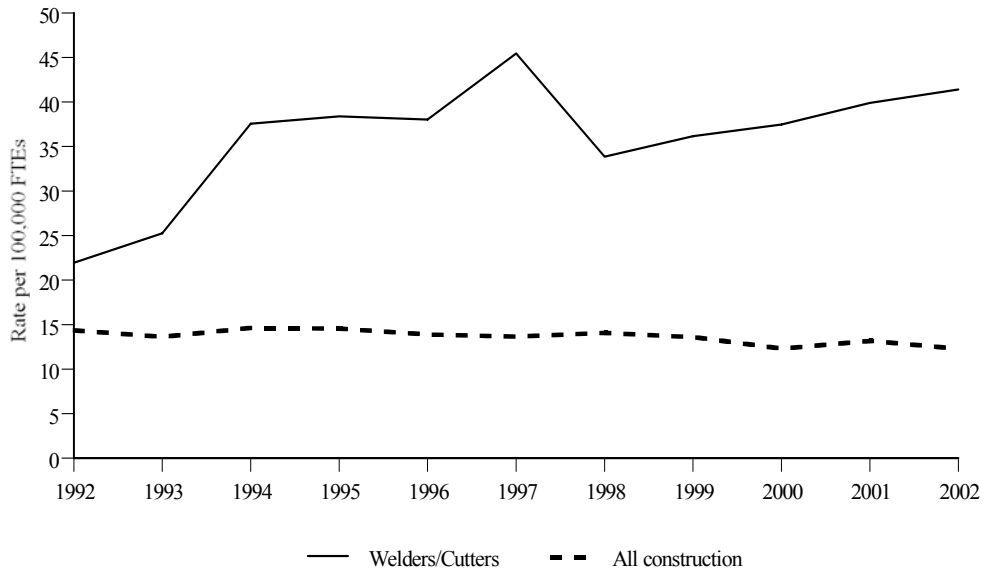


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Data cover private sector only and exclude self-employed workers.

Source: Bureau of Labor Statistics: Annual Survey of Occupational Injuries and Illnesses, Current Population Survey.

28a. Rate of work-related deaths from injuries, welders/cutters and all construction, 1992-2002

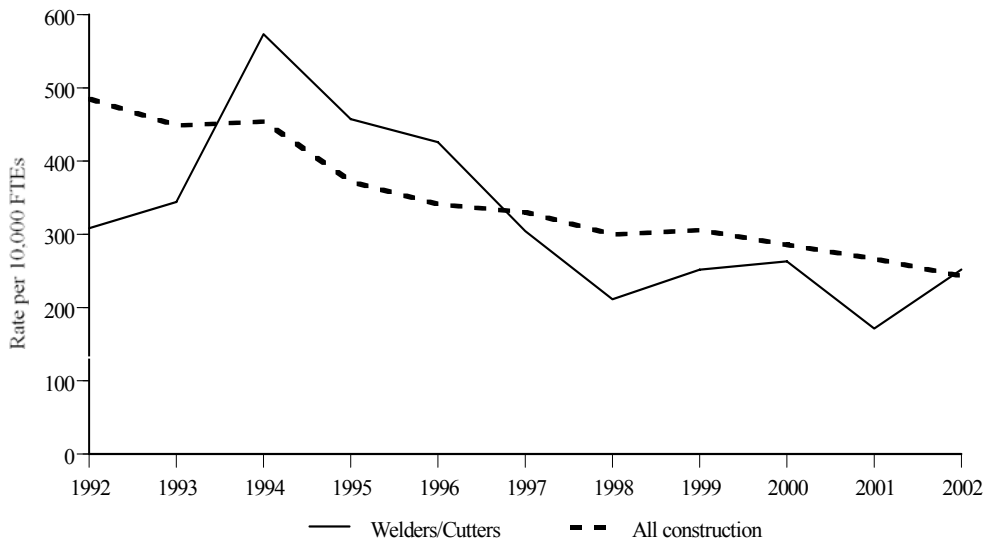


FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Welder and Cutter data based on a total of 281 deaths.

Source: Bureau of Labor Statistics: Census of Fatal Occupational Injuries, Current Population Survey.

28b. Rate of nonfatal injuries and illnesses resulting in days away from work, welders/cutters and all construction, 1992-2002



FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Data cover private sector only and exclude selfemployed workers.

Source: Bureau of Labor Statistics: Annual Survey of Occupational Injuries and Illnesses, Current Population Survey.