

**Trends in Work-Related Death and Injury Rates
among
U.S. Construction Workers, 1992-98**

**Earl S. Pollack, ScD
Risana T. Chowdhury, MS**

The Center to Protect Workers' Rights

April 2001

This research was made possible by the Center to Protect Workers' Rights (CPWR) as part of a research agreement with the National Institute for Occupational Safety and Health, NIOSH (NIOSH grant CCU310982).The research is solely the responsibility of the authors and does not necessarily represent the official views of NIOSH. CPWR — the research and development institute of the Building and Construction Trades Department, AFL-CIO — is uniquely situated to serve workers, contractors, and the scientific community. A major CPWR activity is to improve safety and health in the U.S. construction industry.

Copies of this report are available for \$5 postpaid from Publications, The Center to Protect Workers' Rights, Suite 1000, 8484 Georgia Ave., Silver Spring, MD 20910 (report D1-00) or may be downloaded from www.elcosh.org

© 2001, The Center to Protect Workers' Rights. All rights reserved. For permission to reproduce this document in quantity, contact CPWR at 301-578-8500 or cpwr@cpwr.com.

Abbreviations

BLS	U.S. Bureau of Labor Statistics
OSHA	U.S. Occupational Safety and Health Administration

Contents

Methods, *Page 1*

Results, *2*

Discussion, *2*

References, *4*

End Note, *4*

Charts

Comparisons of rates of work-related injuries and deaths (from injuries), 1992-98 between individual trades and all construction:

1a. and 1b. Bricklayers, *5*

2a. and 2b. Carpenters, *6*

3a. and 3b. Drywall Installers, *7*

4a. and 4b. Electricians, *8*

5a. and 5b. Ironworkers, *9*

6a. and 6b. Laborers, *10*

7a. and 7b. Operating Engineers, *11*

8a. and 8b. Painters, *12*

9a. and 9b. Plumbers, *13*

10a. and 10b. Roofers, *14*

11a. and 11b. Truck Drivers, *15*

12a. and 12b. Welders and Cutters, *16*

13. Distribution of total workforce in terms of full-time work, construction industry, United States, 1992-98 average, *17*

Over the years, the construction industry has had among the highest rates of reported work-related deaths and injuries. Some published reports have indicated that nonfatal occupational injury rates have been decreasing in the 1990s and that the decrease has been greater for construction than for any other industry, except possibly manufacturing (Ruser 1998; Karr 2000). These trends have varied considerably among the construction trades. The Center to Protect Workers' Rights has been analyzing Bureau of Labor Statistics (BLS) data for the seven years 1992-98 in order to understand the reasons for the trends; such information might help efforts reduce workplace injuries and deaths.

Methods

To learn the number of deaths for each occupation in the construction industry, CPWR obtained the public-use data set of the BLS Census of Fatal Occupational Injuries for each year, 1992 through 1998. To compute death rates, denominators were produced using the annual average estimates of hours worked from the BLS Current Population Survey for each construction occupation and converting the estimates into numbers of full-time equivalent workers – defined here as 2,000 hours each.¹

Numbers of injuries involving days away from work were obtained from the BLS Annual Survey of Occupational Injuries and Illnesses for 1992 through 1998. Although the data on nonfatal events include injuries and illnesses, the reported illnesses are such a small proportion of the total – less than 2% – that their inclusion has no noticeable effect on the injury trends. For the injury rate calculations, the denominators were numbers of full-time equivalent workers for each occupation, obtained using the Current Population Survey.

The study begins with 1992, because that year was the first for which the BLS published a complete U.S. Census of Fatal Occupational Injuries and the Annual Survey of Injuries and Illnesses in its current form.

The data sets are not comprehensive or identical. The Annual Survey provides injury data only on the private sector, not on government agency employees. Also excluded from the injury data are self-employed workers, about 25% of the construction workforce. (Excluding the self-employed from the death rate data – in order to make the two sets of data more comparable – would raise the death rates slightly, but would not affect the *trends* for any of the occupations. Similarly, removing government construction workers from the death rate data would not affect the death rate *trends*.)

The seven-year trends are presented on a separate page for each occupation (charts 1a -12b). The upper chart (chart a) shows nonfatal injury and illness rates for one occupation as compared with rates for all construction, while the lower chart (chart b) on each page compares death rates. Charts are not presented for construction occupations in which the numbers are too small to show meaningful trends (see chart 13).

For each occupation, the numbers become too small to be statistically meaningful, in many cases. This is particularly true for the deaths, which (thankfully) occur in smaller numbers than injuries. So, for instance, if the number of deaths for one occupation increased from one to two in a year, the rate might increase 100% but statistically that wouldn't mean much because the numbers are so small. Thus, the charts show trends but the analysis does not focus on specific numbers or variations from year to year.

Results

For construction overall, the trend in nonfatal injury and illness rates with days away from work is downward. The nonfatal injury and illness rates for laborers, ironworkers, and roofers are consistently above the overall construction rates, but the rates for each of the other occupations tend to resemble those for all of construction. (Preliminary BLS data show, for all construction, the downward trend leveled off in 1999.)

The trend in work-related deaths for most occupations tends to be level or slightly increasing, although ironworker death rates have declined from 1992 to 1998. The death rates for ironworkers, laborers, roofers, truck drivers, and welders and cutters are consistently higher than those for all of construction, while those for bricklayers, carpenters, drywall installers, painters, and plumbers are consistently below the overall construction death rate(s).

In the trades with consistently higher death rates than overall construction industry over the entire 1992-1998 period, the major causes of death were found to be:

- For ironworkers, falls to a lower level. On average, 30 deaths annually resulted from these falls, which accounted for almost 73% of ironworker deaths from injuries.

- For laborers, falls to a lower level. On average, about 26% of the 271 laborer deaths suffered annually were from such falls.

- For roofers, also, falls to a lower level. There were, on average, 38 deaths per year from falls, about 72% of the annual number of deaths for this trade.

- Among truck drivers, highway accidents. These accounted for almost 47% of the annual average number of deaths.

- For welders and cutters, falls to a lower level. Seven of the average 23 deaths per year were caused by the falls.

Although the death rates for electricians dipped below those for all construction in 1996 and 1997, electricians had higher rates in the other five years. Also, the number of electrician deaths was substantial, averaging 68 per year. For this trade, the major cause of death was electrocution, accounting for nearly 55% of the deaths.

Discussion

In the cases of electricians, ironworkers, and roofers the data clearly point up a need for interventions – focused on electrocution for the electricians and fall prevention for the two other occupations.

For U.S. industry overall, the rate of deaths from injuries has declined from 1992 to 1998, in contrast to the roughly level rate over those years for the death rate in construction. For instance, BLS News Reports (various years) show a fairly steady decline from 5.2 deaths per 100,000 employed in 1992 to a rate of 4.6 in 1998 for all industry. Similarly, overall occupational injury rates have declined in 1992-98, according to BLS reports, just as they have for construction.

Conway and Svenson (1998) attempted to explain the 1992-96 trend of decreasing occupational injury and ill-

ness rates in the United States. They concluded that the decrease resulted from workers' compensation reforms and an increasing awareness among workers of workplace hazards. The data and conclusions that Conway and Svenson present pertain to all industries combined, however, and thus may not explain trends in the construction industry. Thus, the question remains whether other factors in addition to the different risks may be influencing the reported construction injury and fatality rates.

How the Data Are Collected

Some inaccurate counting of injuries may result from the ways the data are collected. The data on deaths are from a census. The BLS Census of Fatal Occupational Injuries counts only work-related deaths that have been confirmed by at least two sources. Thus, it's likely that the number of work-related deaths from injuries is accurately and consistently obtained. (Some of these deaths may be misclassified by industry, however. A reading of the narrative reports of the deaths suggests that some deaths that have been classified as construction deaths relate to other industries and some of the deaths assigned to other industries appear to be construction deaths. Nonetheless, these apparent errors of misclassification appear to be small.)

By contrast, the data on nonfatal work-related injuries and illnesses in the construction industry are obtained from a sample survey of business "establishments," which consists of a summary of the OSHA logs for injuries that occurred during the year. Using the count from this group of sampled establishments, the BLS estimates the number for all employers. To compound the problem, for these summaries to be accurate, each injury must be reported to the employer and entered in the OSHA log. Yet, a construction worksite may have several employers – a prime contractor and several subcontractors – and, in most cases, the OSHA logs are not maintained on worksites, but at the employers' offices. So it's possible that some injuries are not recorded.

Excluded categories of workers. An additional factor is that injuries to two types of workers may not be being included in OSHA logs. Injuries among self-employed workers are not covered by the Occupational Safety and Health Act of 1970 and are thus not required to be entered in the OSHA log. Also, some agencies that provide temporary workers for construction indicate that they cover their workers for workers' compensation. This would seem to indicate that when one of these workers is injured on the job, his/her injury is reported to the agency rather than to the construction contractor, if the injury is reported. Because temporary agencies are usually not classified in the construction industry, these injuries would not be counted as occurring in construction.

Reports of Possible Underreporting of Injuries

Some studies have suggested that the BLS Annual Survey underestimates the number of work-related injuries in construction. Oleinick, Gluck, and Guire (1995) reported that the BLS Annual Survey data for Michigan considerably underestimated the work-related injury rates for smaller establishments. The authors found no explanation for this other than underreporting in the BLS Annual Survey. Given that almost all construction establishments are small – more than 90% have fewer than 20 employees – this finding suggests the problem can be particularly extensive in construction.

Glazner and others (1998) found that the rates for all injuries that they identified and recorded on the Denver airport construction project were more than twice the BLS rate for all construction, but that the excess was more modest for lost-workday injuries, the most serious ones. The authors attributed the differences to underreporting in the BLS Annual Survey

* * *

All of the situations described above could account for work-related injuries not being recorded on the OSHA logs and thus not being included in the BLS Annual Survey. Moreover, there is no way to know whether any resulting underreporting has been increasing over time.

Given the potential problems mentioned above, the trends shown here should be interpreted with caution.

References

Conway, Hugh,. and Jens Svenson. 1998. Occupational Injury and Illness Rates, 1992-1996: Why They Fell. *Monthly Labor Review*, November, 34-58.

Glazner, Judith E., Joleen Borgerding, Jan T. Lowery, Jessica Bondy, Kathryn L. Mueller, and Kathleen Kreiss. 1998. Construction Injury Rates May Not Exceed National Estimates: Evidence From the Construction of Denver International Airport. *American Journal of Industrial Medicine*, 34: 105-12.

Karr, Al. 2000. They're Falling. Injury and Illness Rates Continue to Drop – But Why? *Safety and Health*, 161(1): 30-35.

Oleinick, Arthur, Jeremy V. Gluck, and Kenneth E. Guire. 1995. Establishment Size and Risk of Occupational Injury. *American Journal of Industrial Medicine*, 28: 1-21.

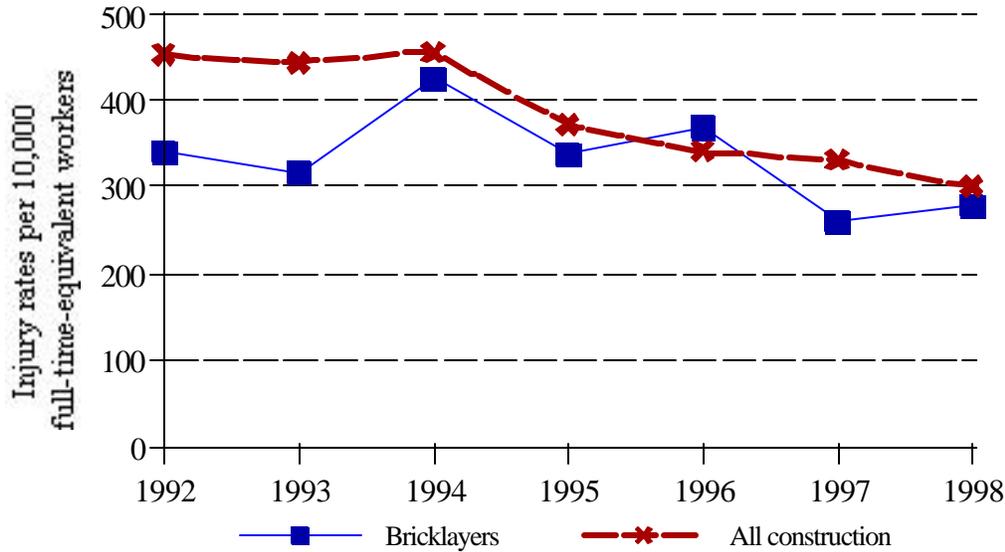
Ruser, John. 1999. The Changing Composition of Lost Workday Injuries. *Monthly Labor Review*, June, 11-17.

End Note

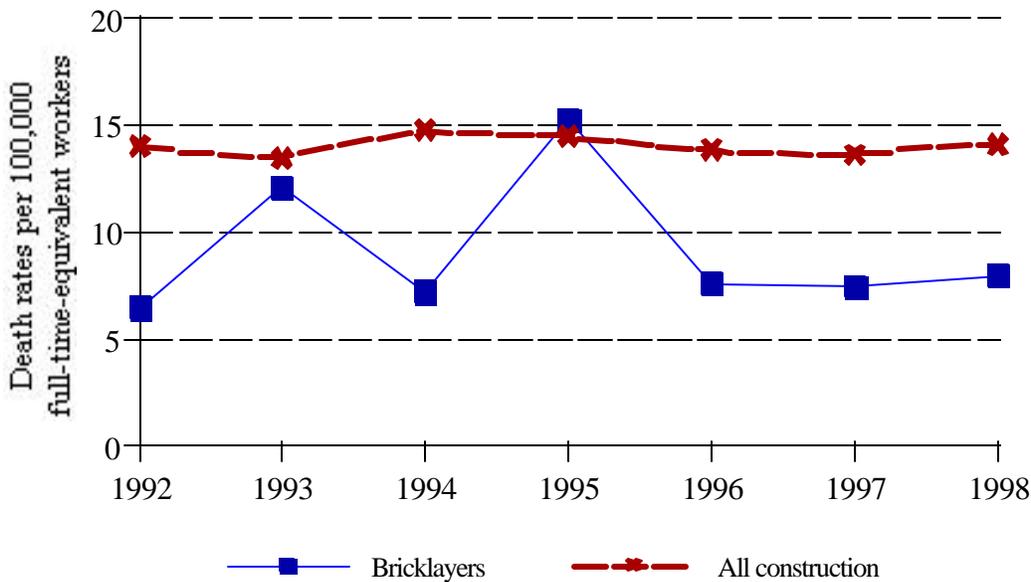
1. The Bureau of Labor Statistics can be reached at <http://stats.bls.gov/oshhome.htm> Data used in this report are not available on that website, however.

Bricklayers

1a. Rate of nonfatal injuries and illnesses resulting in days away from work, bricklayers and all construction, United States, 1992-98



1b. Rate of work-related deaths from injuries, bricklayers and all construction, United States, 1992-98



Note: Chart 1a - Data cover private industry only, and exclude self-employed. Illnesses are about 2% of the total.

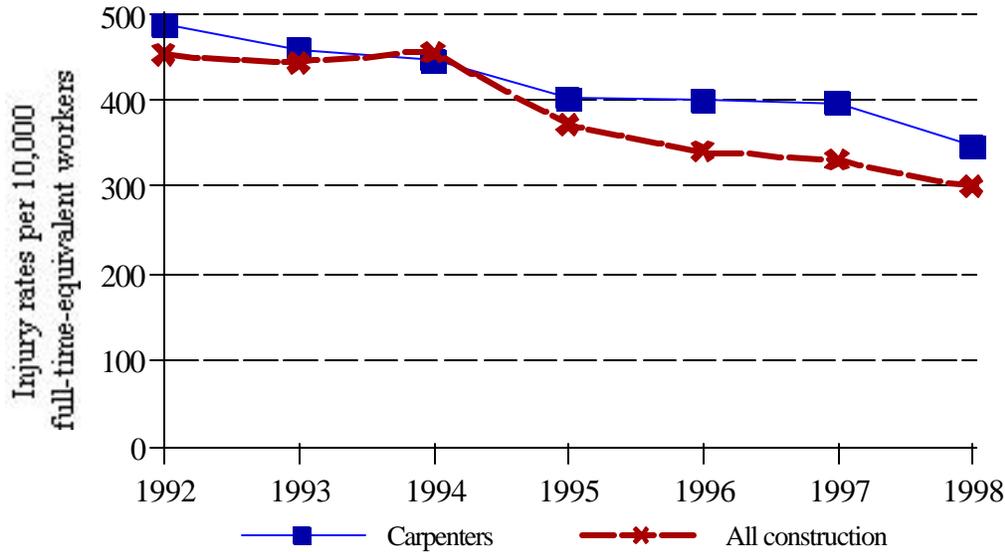
Chart 1b - Bricklayer data based on a total of 95 deaths, an average of 14 per year.

Source: Chart 1a - Annual Survey and Current Population Survey, both Bureau of Labor Statistics.

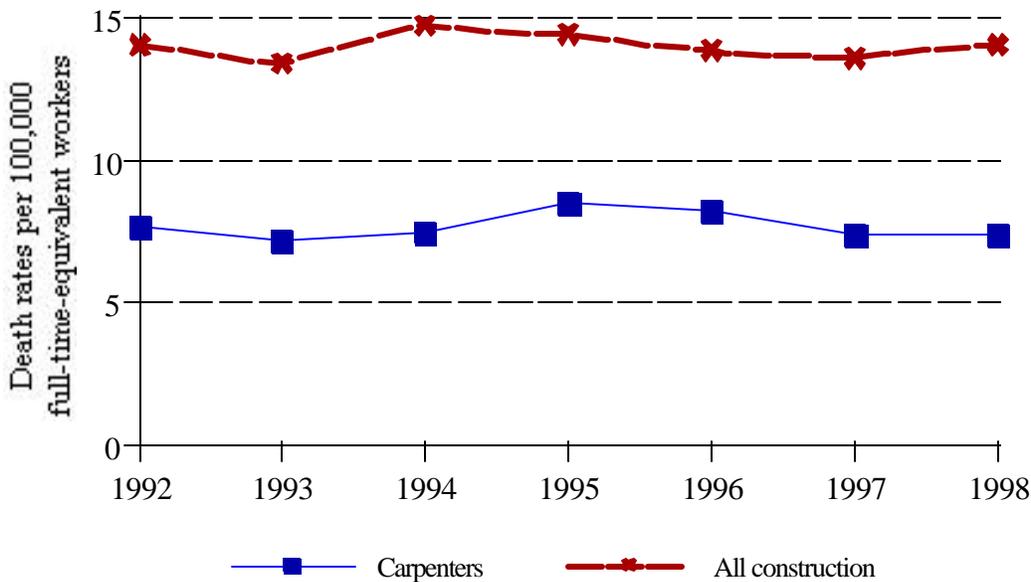
Chart 1b - Calculations based on data from Census of Fatal Occupational Injuries and Current Population Survey, both Bureau of Labor Statistics.

Carpenters

2a. Rate of nonfatal injuries and illnesses resulting in days away from work, carpenters and all construction, United States, 1992-98



2b. Rate of work-related deaths from injuries, carpenters and all construction, United States, 1992-98



Note: Chart 2a - Data cover private industry only, and exclude self-employed. Illnesses are about 2% of the total.

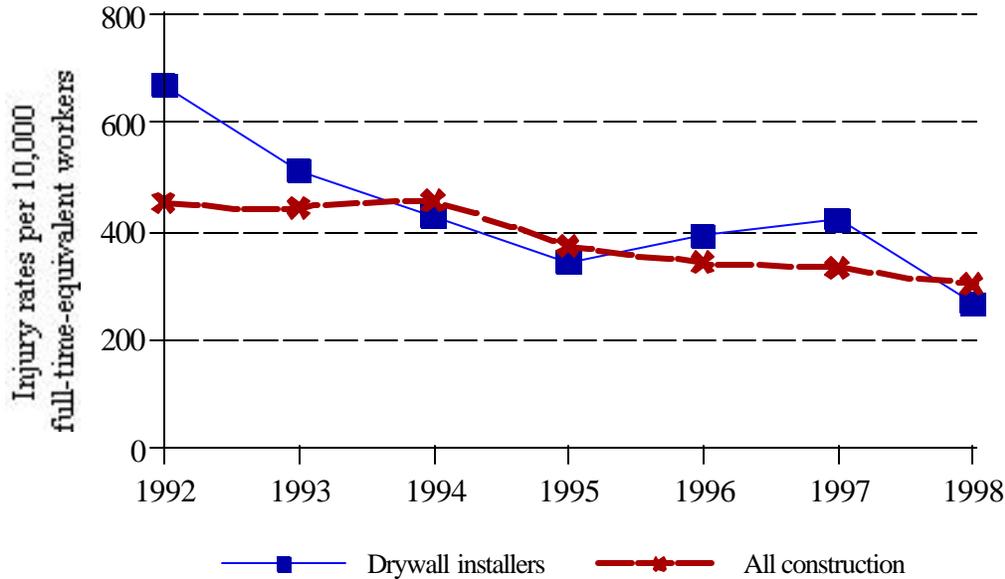
Chart 2b - Carpenter data based on a total of 561 deaths, an average of 80 per year.

Source: Chart 2a - Annual Survey and Current Population Survey, both Bureau of Labor Statistics.

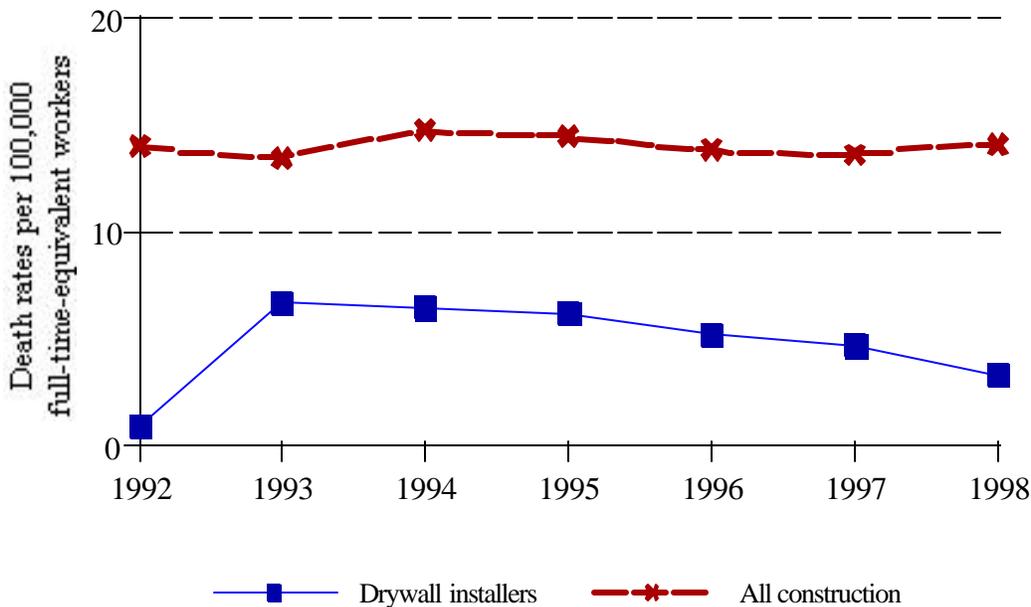
Chart 2b - Calculations based on data from Census of Fatal Occupational Injuries and Current Population Survey, both Bureau

Drywall Installers

3a. Rate of nonfatal injuries and illnesses resulting in days away from work, drywall installers and all construction, United States, 1992-98



3b. Rate of work-related deaths from injuries, drywall installers and all construction, United States, 1992-98



Note: Chart 3a - Data cover private industry only, and exclude self-employed. Illnesses are about 2% of the total.

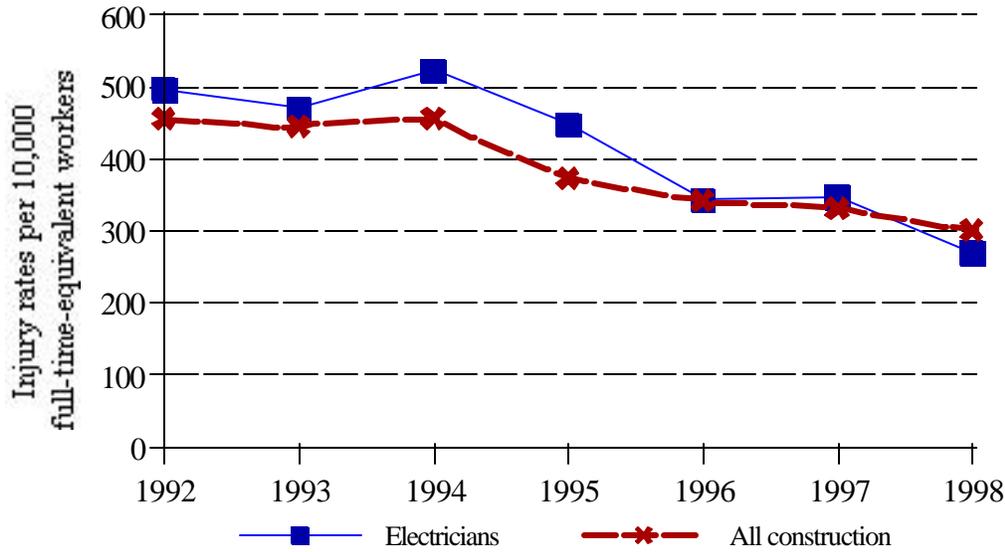
Chart 3b - Drywall installer data based on a total of 47 deaths, an average of 7 per year.

Source: Chart 3a - Annual Survey and Current Population Survey, both Bureau of Labor Statistics.

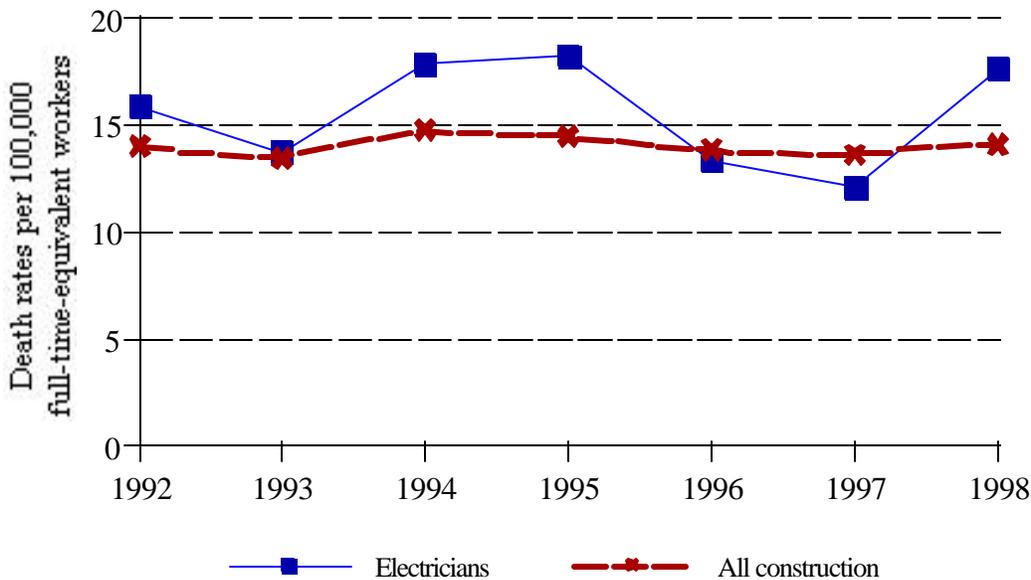
Chart 3b - Calculations based on data from Census of Fatal Occupational Injuries and Current Population Survey, both Bureau of Labor Statistics.

Electricians

4a. Rate of nonfatal injuries and illnesses resulting in days away from work, electricians and all construction, United States, 1992-98



4b. Rate of work-related deaths from injuries, electricians and all construction, United States, 1992-98



Note: Chart 4a - Data cover private industry only, and exclude self-employed. Illnesses are about 2% of the total.

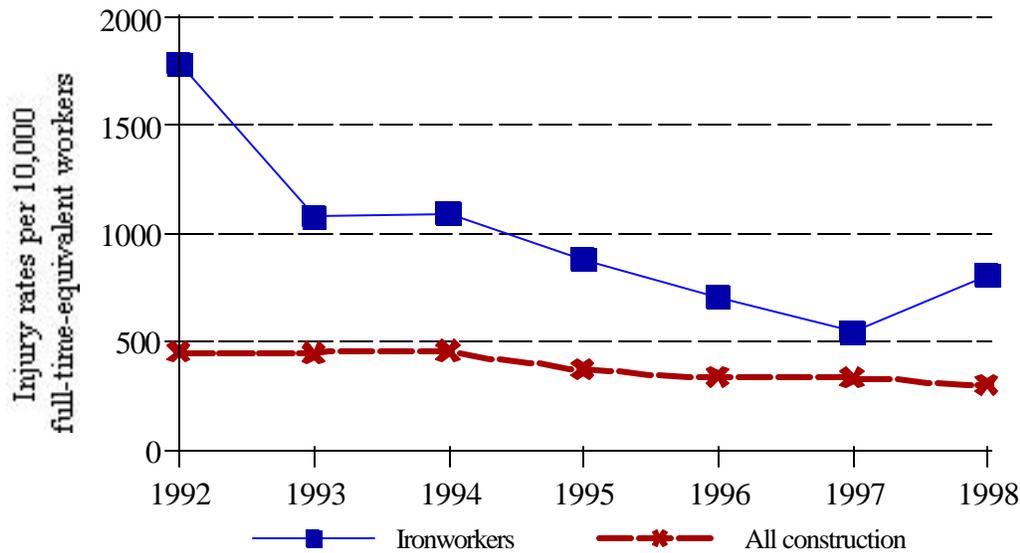
Chart 4b - Based on a total of 473 electrician deaths, an average of 68 per year.

Source: Chart 4a - Annual Survey and Current Population Survey, both Bureau of Labor Statistics.

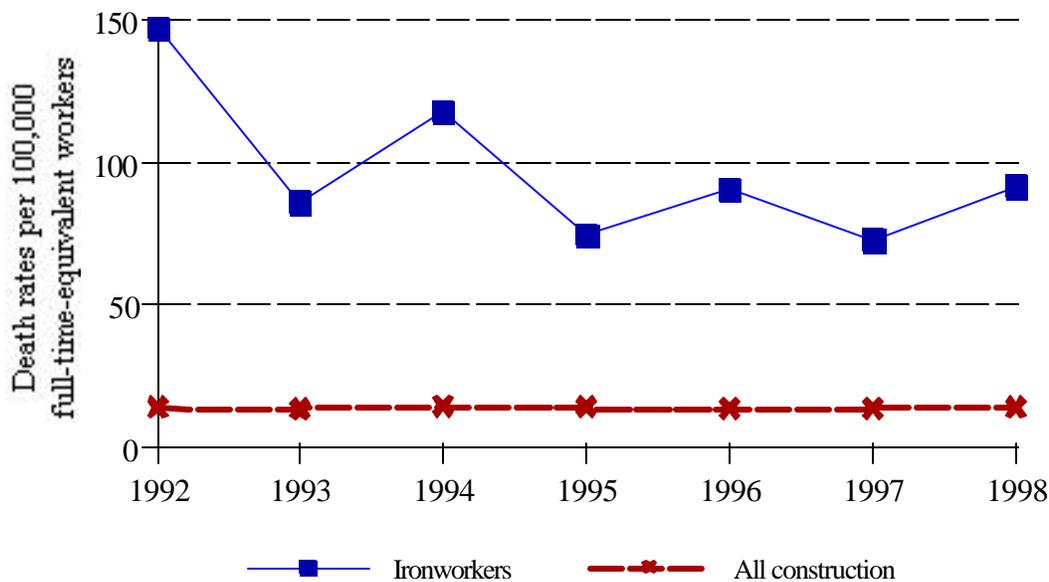
Chart 4b - Calculations based on data from Census of Fatal Occupational Injuries and Current Population Survey, both Bureau

Ironworkers

5a Rate of nonfatal injuries and illnesses resulting in days away from work, ironworkers and all construction, United States, 1992-98



5b. Rate of work-related deaths from injuries, ironworkers and all construction, United States, 1992-98



Note: Chart 5a - Data cover private industry only, and exclude self-employed. Illnesses are about 2% of the total.

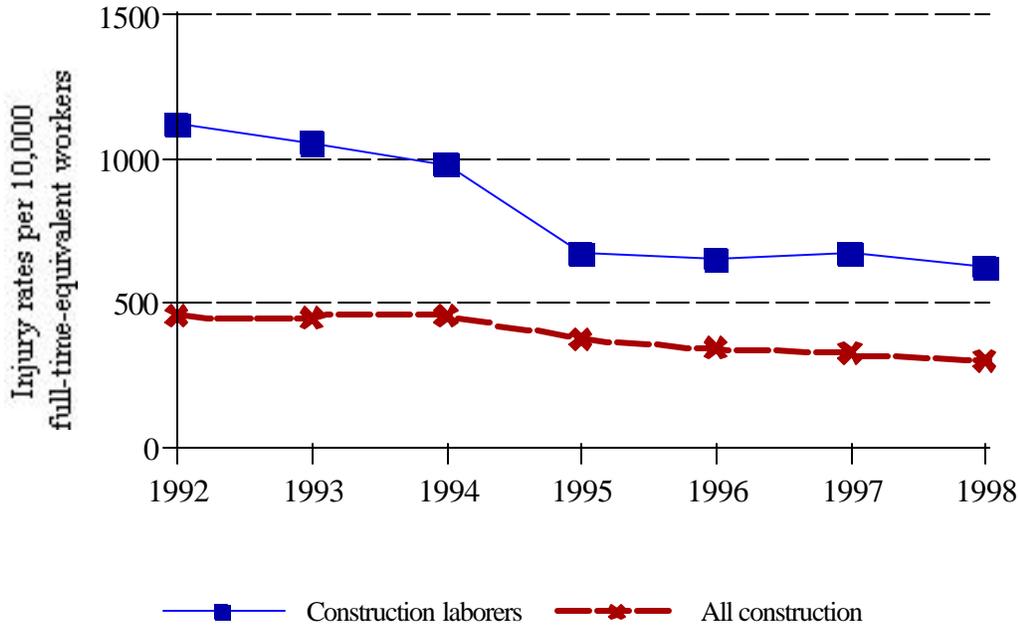
Chart 5b - Ironworker data based on a total of 293 deaths, an average of 42 per year.

Source: Chart 5a - Annual Survey and Current Population Survey, both Bureau of Labor Statistics.

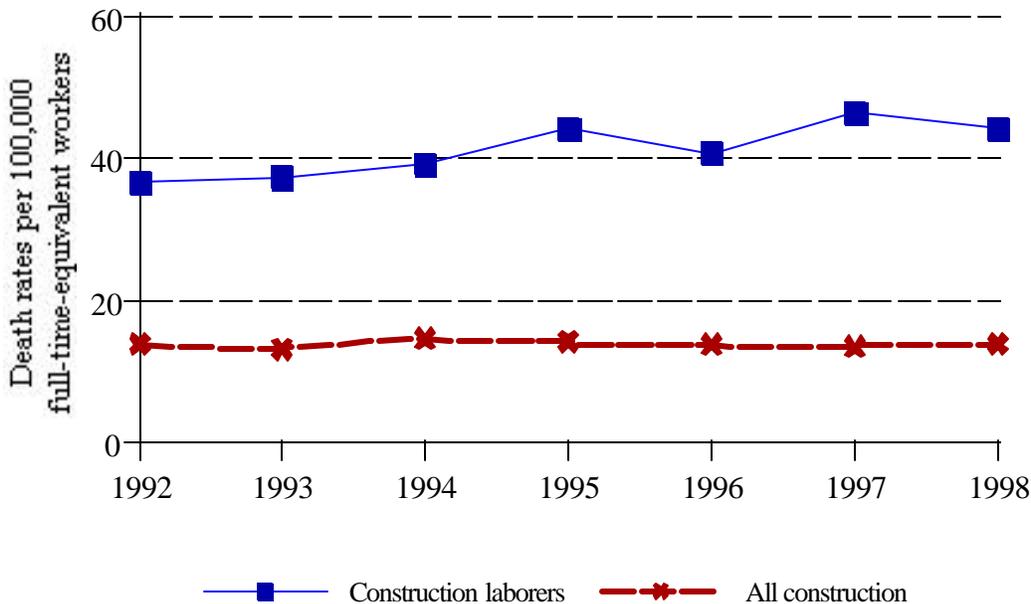
Chart 5b - Calculations based on data from Census of Fatal Occupational Injuries and Current Population Survey, both Bureau of Labor Statistics.

Construction Laborers

6a. Rate of nonfatal injuries and illnesses resulting in days away from work, construction laborers and all construction, United States, 1992-98



6b. Rate of work-related injury deaths, construction laborers and all construction, United States, 1992-98



Note: Chart 6a - Data cover private industry only, and exclude self-employed. Illnesses are about 2% of the total.

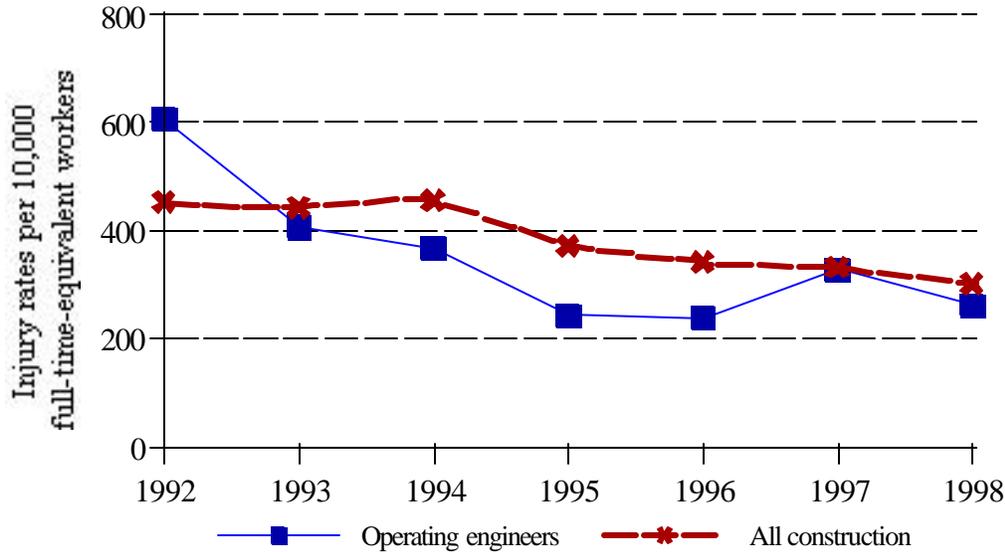
Chart 6 b - Laborer data are based on a total of 1,898 deaths, an average of 271 per year.

Source: Chart 6a - Annual Survey and Current Population Survey, both Bureau of Labor Statistics.

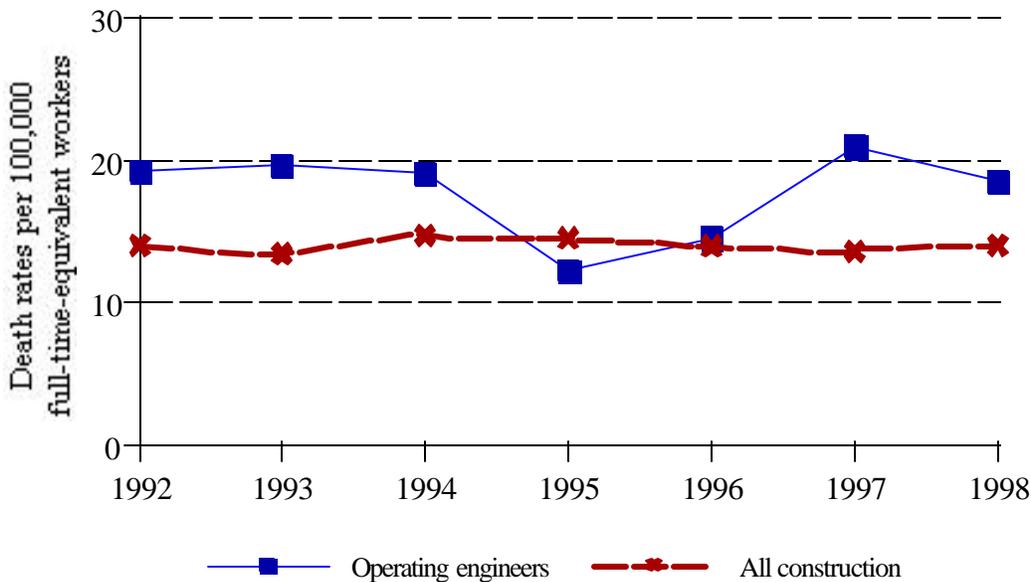
Chart 6b - Calculations based on data from Census of Fatal Occupational Injuries and Current Population Survey, both Bureau

Operating Engineers

7a. Rate of nonfatal injuries and illnesses resulting in days away from work, operating engineers and all construction, United States, 1992-98



7b. Rate of work-related deaths from injuries, operating engineers and all construction, United States, 1992-98



Note: Chart 7a - Data cover private industry only, and exclude self-employed. Illnesses are about 2% of the total.

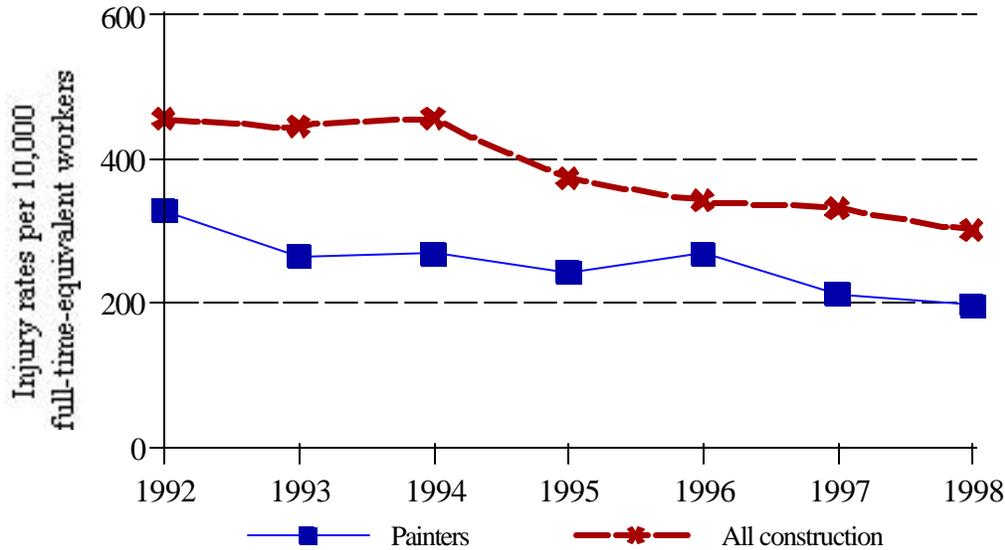
Chart 7b - Operating engineer deaths are based on a total of 213 deaths, an average of 30 per year.

Source: Chart 7a - Annual Survey and Current Population Survey, both Bureau of Labor Statistics.

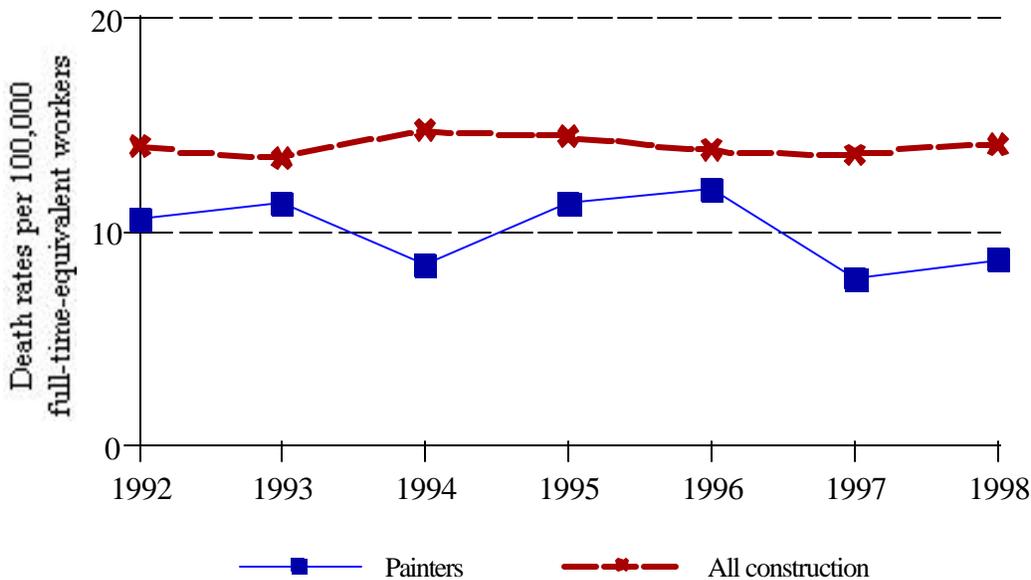
Chart 7b - Calculations based on data from Census of Fatal Occupational Injuries and Current Population Survey, both Bureau of Labor Statistics.

Painters

8a. Rate of nonfatal injuries and illnesses resulting in days away from work, painters and all construction, United States, 1992-98



8b. Rate of work-related deaths from injuries, painters and all construction, United States, 1992-98



Note: Chart 8a - Data cover private industry only, and exclude self-employed. Illnesses are about 2% of the total.

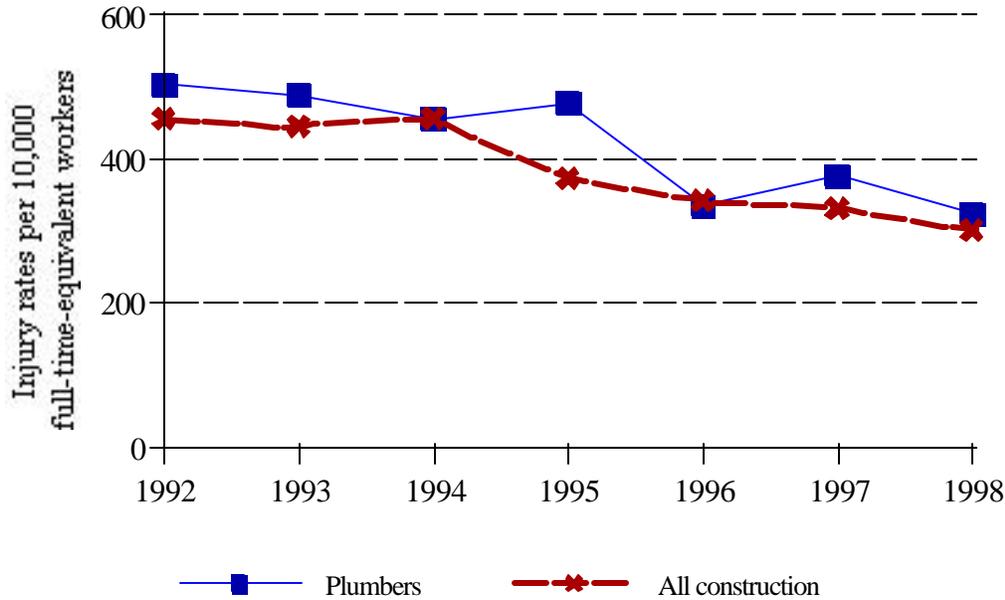
Chart 8b - Painter deaths data are based on a total of 264 deaths, an average of 38 per year.

Source: Chart 8a - Annual Survey and Current Population Survey, both Bureau of Labor Statistics.

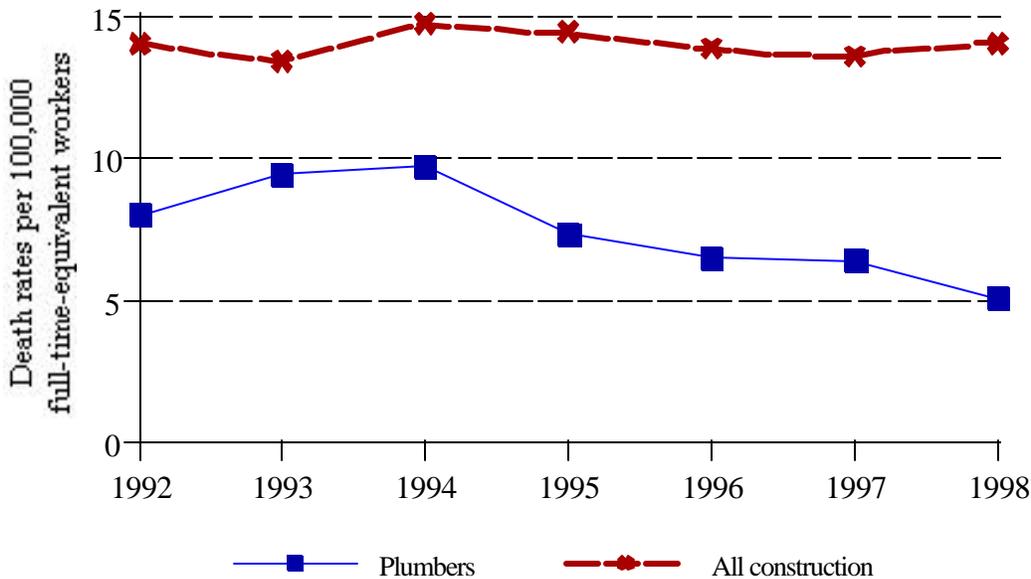
Chart 8b - Calculations based on data from Census of Fatal Occupational Injuries and Current Population Survey, both Bureau

Plumbers

9a. Rate of nonfatal injuries and illnesses resulting in days away from work, plumbers and all construction, United States, 1992-98



9b. Rate of work-related deaths from injuries, plumbers and all construction, United States, 1992-98



Note: Chart 9a - Data cover private industry only, and exclude self-employed. Illnesses are about 2% of the total.

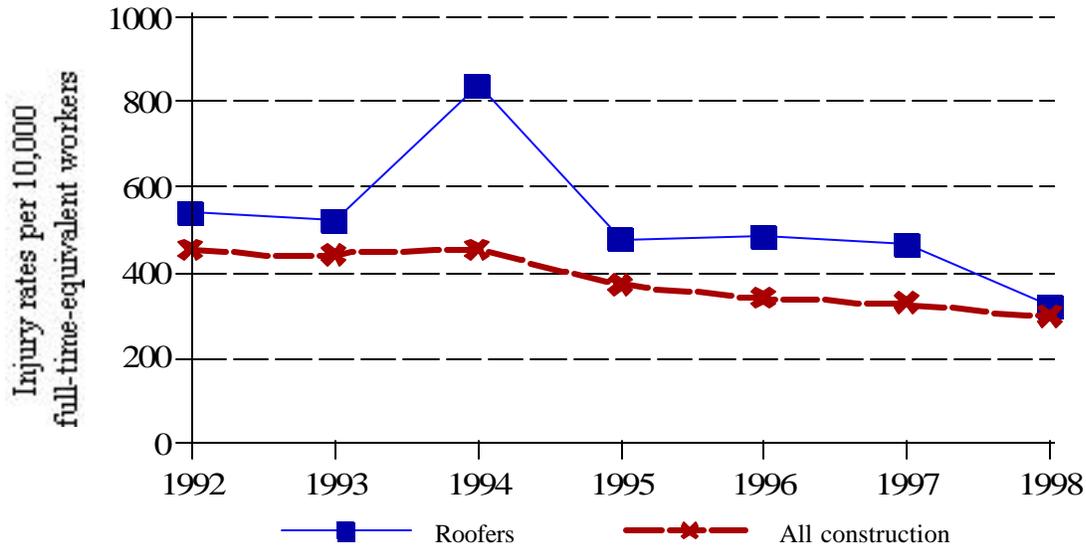
Chart 9b - Plumber deaths data cover a total of 189 deaths, an average of 27 per year.

Source: Chart 9a - Annual Survey and Current Population Survey, both Bureau of Labor Statistics.

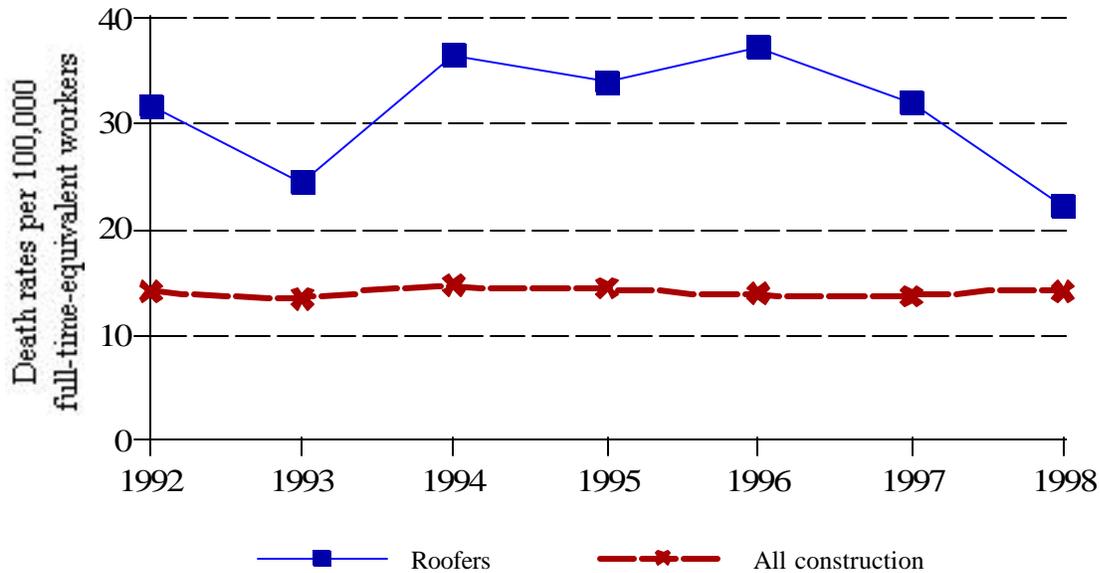
Chart 9b - Calculations based on data from Census of Fatal Occupational Injuries and Current Population Survey, both Bureau of Labor Statistics.

Roofers

10a. Rate of nonfatal injuries and illnesses resulting in days away from work, roofers and all construction, United States, 1992-98



10b. Rate of work-related deaths from injuries, roofers and all construction, United States, 1992-98



Note: Chart 10a - Data cover private industry only, and exclude self-employed. Illnesses are about 2% of the total.

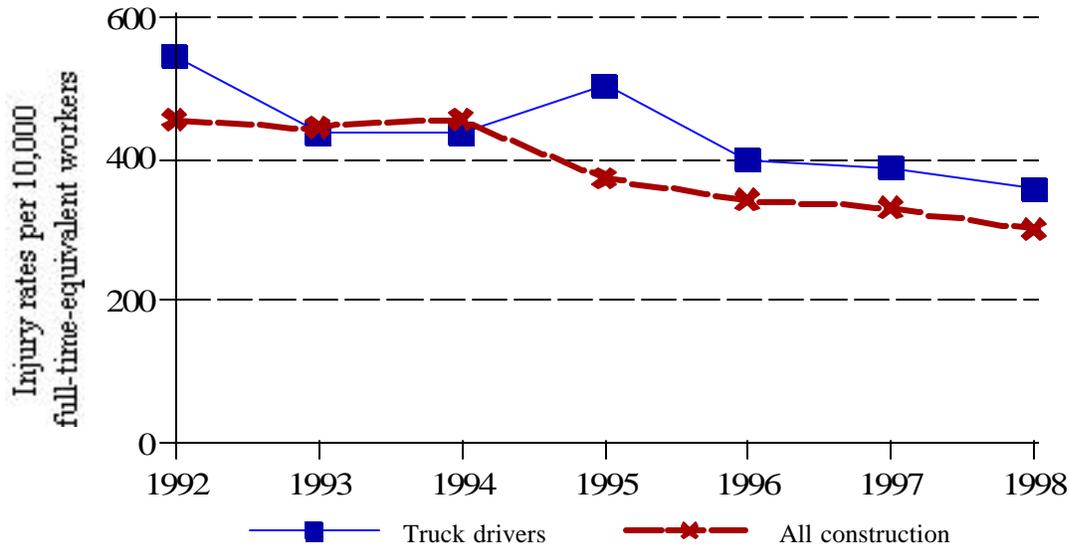
Chart 10b - Roofer deaths data are based on a total of 371 deaths, an average of 53 per year.

Source: Chart 10a - Annual Survey and Current Population Survey, both Bureau of Labor Statistics.

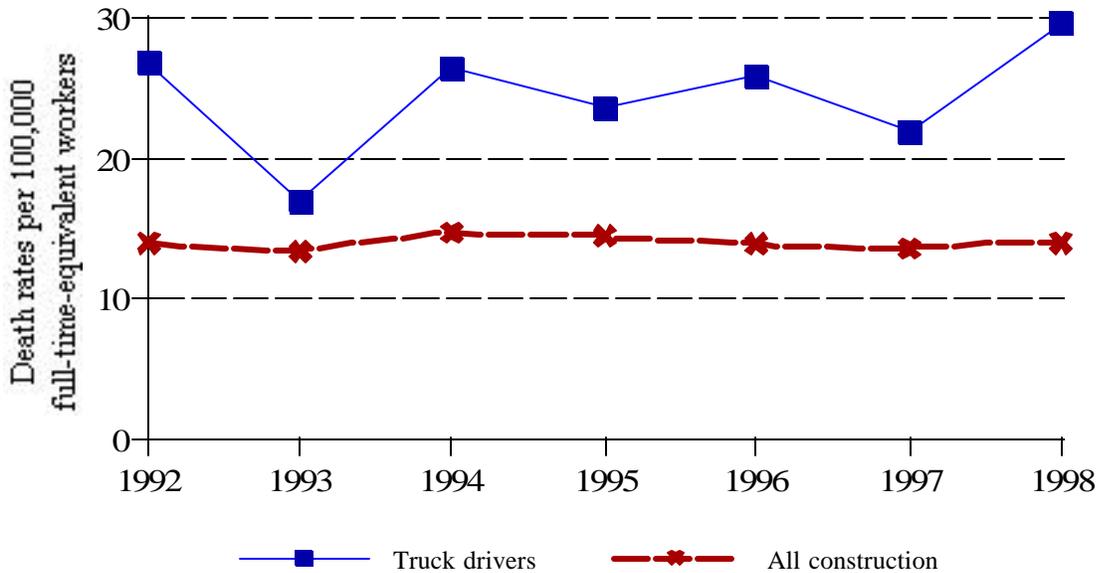
Chart 10b - Calculations based on data from Census of Fatal Occupational Injuries and Current Population Survey, both Bureau of Labor Statistics.

Truck Drivers

11a. Rate of nonfatal injuries and illnesses resulting in days away from work, truck drivers and all construction, United States, 1992-98



11b. Rate of work-related deaths from injuries, truck drivers and all construction, United States, 1992-98



Note: Chart 11a - Data cover private industry only, and exclude self-employed. Illnesses are about 2% of the total.

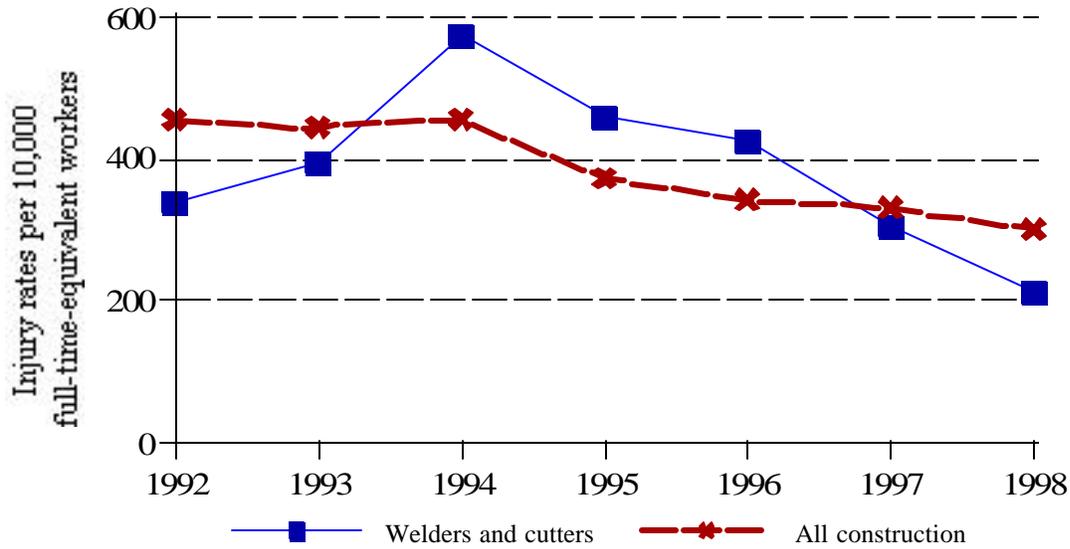
Chart 11b - Truck driver deaths data are based on a total of 302 deaths, an average of 43 per year.

Source: Chart 11a - Annual Survey and Current Population Survey, both Bureau of Labor Statistics.

Chart 11b - Calculations based on data from Census of Fatal Occupational Injuries and Current Population Survey, both Bureau of Labor Statistics.

Welders and Cutters

12a. Rate of nonfatal injuries and illnesses resulting in days away from work, welders and cutters and all construction, United States, 1992-98



12b. Rate of work-related deaths from injuries, welders and cutters and all construction, United States, 1992-98



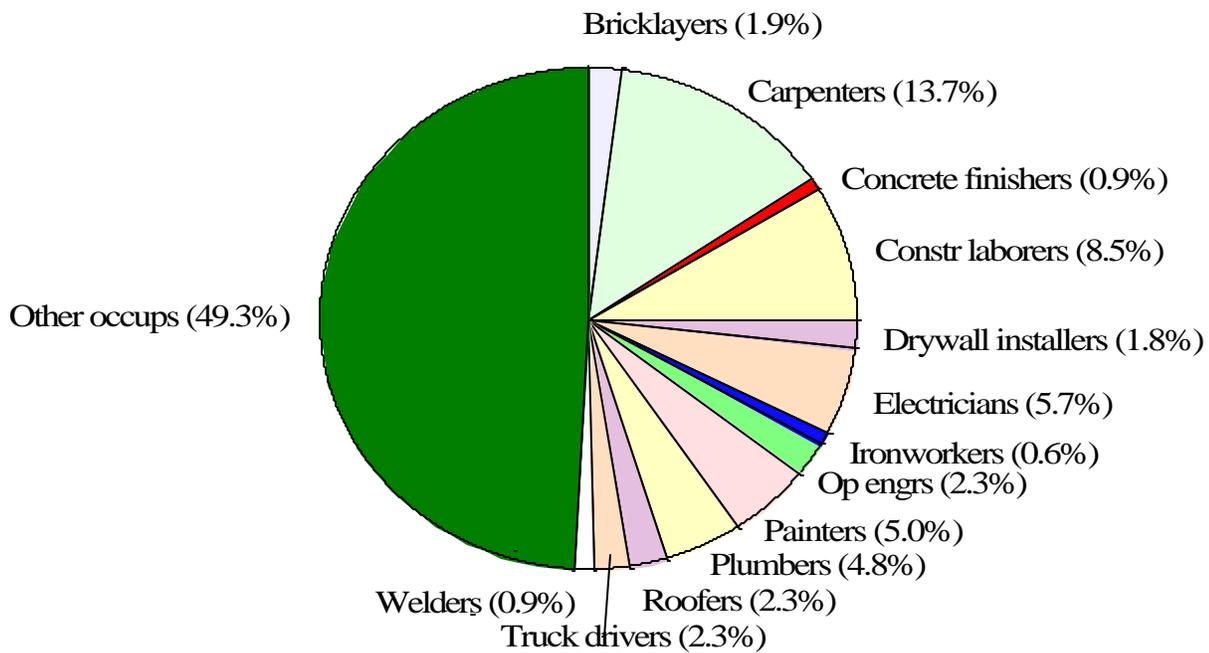
Note: Chart 12a - Data cover private industry only, and exclude self-employed. Illnesses are about 2% of the total.

Chart 12b - Welder and cutter data are based on a total of 164 deaths, an average of 23 per year.

Source: Chart 12a - Annual Survey and Current Population Survey, both Bureau of Labor Statistics.

Chart 12b - Calculations based on data from Census of Fatal Occupational Injuries and Current Population Survey, both Bureau of Labor Statistics.

13. Distribution of workforce in terms of full-time work, construction industry, United States, 1992-98 average



Note: Chart includes apprentices for some trades, where data were available. "Other occupations" include supervisors, clerical workers, sales personnel, and trades that each totaled less than 1% of the industry. Based on a definition of full-time equivalent work as 2,000 hours per year. (Some construction workers work less than 2,000 hours per year in construction.)

Source: Calculations based on data from Current Population Survey, Bureau of Labor Statistics.