

The presentation "Is the Fatal Occupational Injury Experience in the United States Really Improving?" is taken from a presentation given at the NORA (National Occupational Research Agenda) Symposium 2006 held in Washington, DC during April 18-20, 2006. The included version is published on the BLS website with the permission of the author.

# Is the Fatal Occupational Injury Experience in the United States Really Improving?

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The findings and conclusions in this presentation have not been formally disseminated by the National Institute for Occupational Safety and Health and should not be considered to represent any agency determination or policy.



# Introduction

Although there have been many occupational safety and health improvements in the workplace, occupational injury continues to be a prominent public health concern. The occupational safety and health community needs quantitative information to facilitate its efforts in recognizing, evaluating, and controlling hazards in the workplace, as those efforts ultimately lead to the prevention of occupational fatalities.

There are many ways to provide quantitative information to accommodate these needs—counting the number of occurrences provides a measure of magnitude, deriving the rates of occurrence provides a measure of the risk to a specific population, and determining the years of potential life lost provides a gross estimate of lost productivity. Each measure has value and can paint a different picture to guide decision makers in developing preventive strategies. The final measure of economic loss is a combination of the above measures, using the frequency and productivity losses to derive the total cost, while the mean and median provide an average per-person cost of the injury, illness, or fatality. This study examines the societal costs associated with fatal occupational injuries.

In recent years, the number and rate of work-related fatal injuries have been declining. Unfortunately this decline has not been replicated in the reduction of cost to society and the impact on GDP.

The objective of this study is to determine if different impact measures produce a different picture of the U.S. occupational safety experience.



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# Methods

**Theory** – Cost of Illness

**Fatality Counts** – Bureau of Labor Statistics Census of Fatal Occupational Injuries (CFOI), 1992-2002

**Fatality Rates** – Calculated by NIOSH with BLS Current Population Survey data, which may differ from previously published CFOI rates

**Societal Costs** – Direct + Indirect Costs expressed in 2003 dollars

**Direct Costs** – Medical costs; 3-year average cost of fatalities from the National Council on Compensation Insurance

**Indirect Costs** – Discounted present value of loss due to fatal occupational injury

$$PVF = \sum Py,q,s (y+1)[Ys, j(n) + Yhs(n)] (1+g)^{n-y}/(1+r)^{n-y}$$

where:

<b>Py,q,s (y+1)</b>	= probability that a person of age y, race q, and sex s will survive to age y+1
<b>y</b>	= age of the individual at death
<b>q</b>	= race of the individual
<b>s</b>	= sex of the individual
<b>j</b>	= occupation of individual at death
<b>n</b>	= age if the individual had survived
<b>Ys,j(n)</b>	= median annual earnings of an employed person of sex s, occupation j, and age n (includes benefits and life-cycle wage growth adjustment)
<b>Yhs(n)</b>	= mean annual imputed value of home production of a person of sex s and age n
<b>g</b>	= wage growth rate attributable to overall productivity
<b>r</b>	= real discount rate (3%)

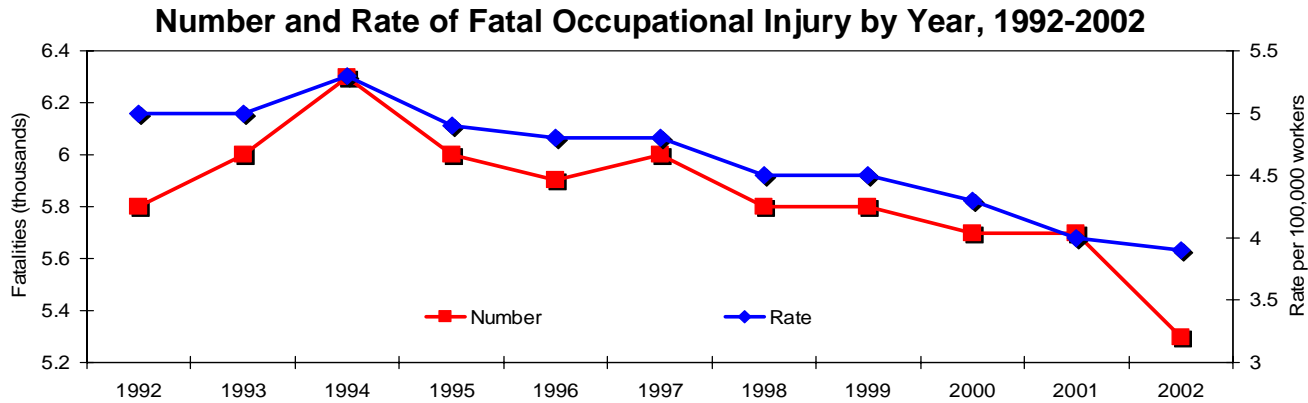


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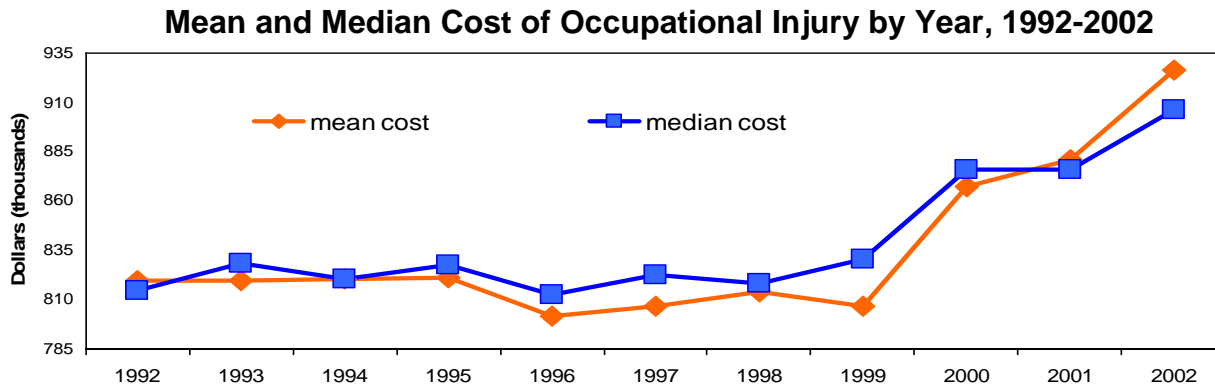
# Results

During 1992 through 2002, fatal occupational injuries declined from 5,833 to 5,316 after having reached the peak of 6,303 in 1994. The rate per 100,000 workers over this time period displayed a similar declining pattern.



Source: Bureau of Labor Statistics Census of Fatal Occupational Injuries

The mean cost of fatal occupational injury increased over this time period from \$819,735 to \$926,113 per fatality-an increase of 13%.



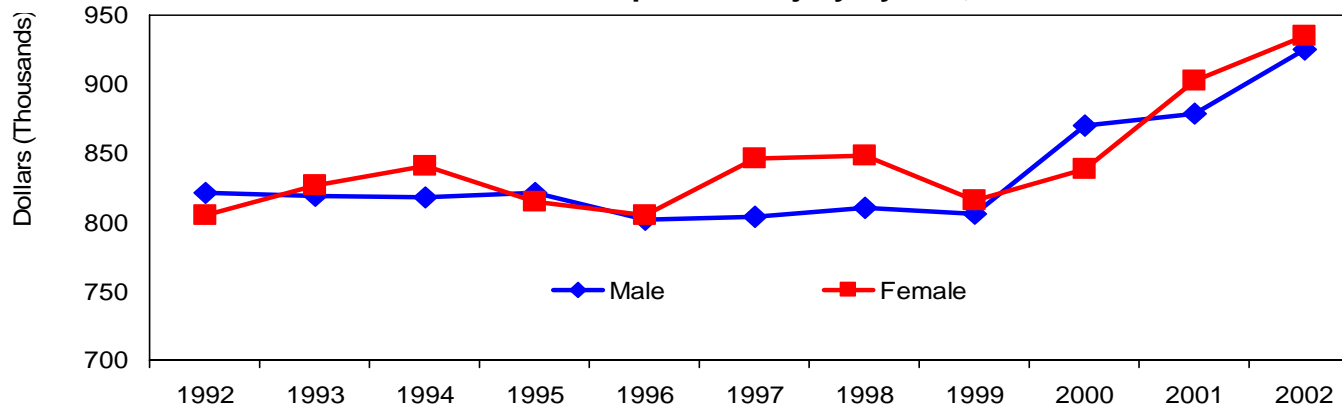
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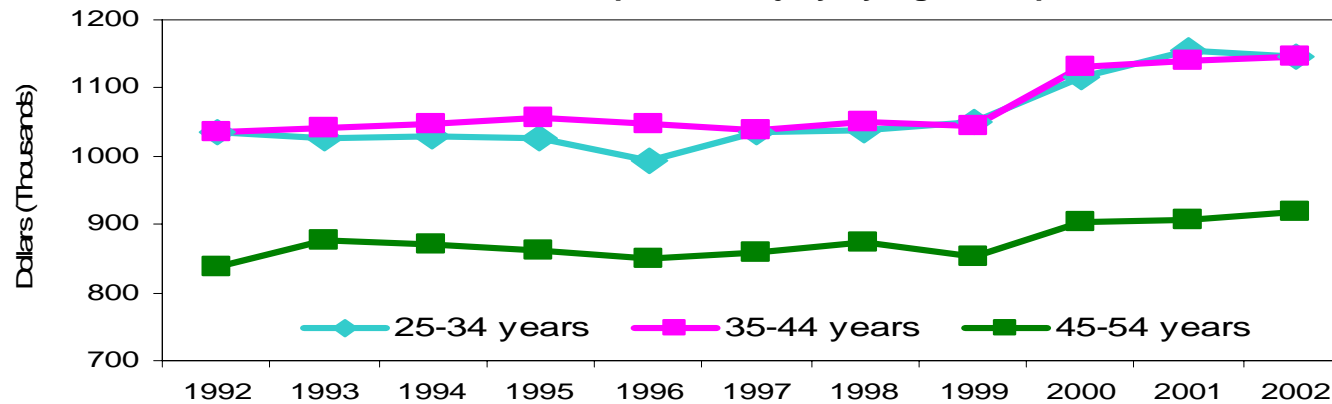
# Results

The impact of these fatalities did not affect subpopulations equally. The following charts demonstrate how these impacts varied by worker and case characteristic.

### Mean Cost of Fatal Occupational Injury by Sex, 1992-2002



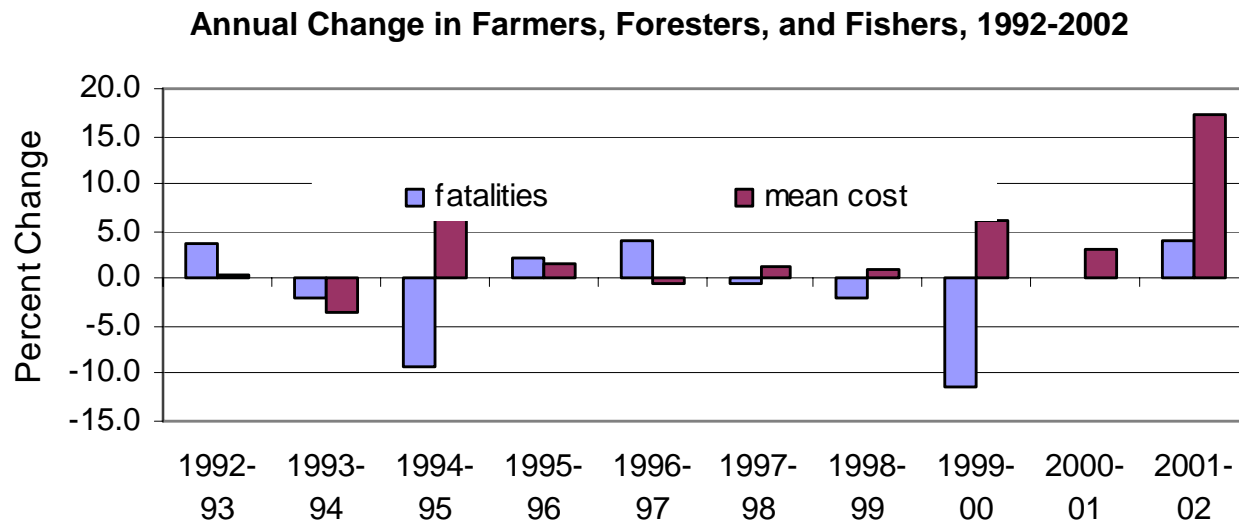
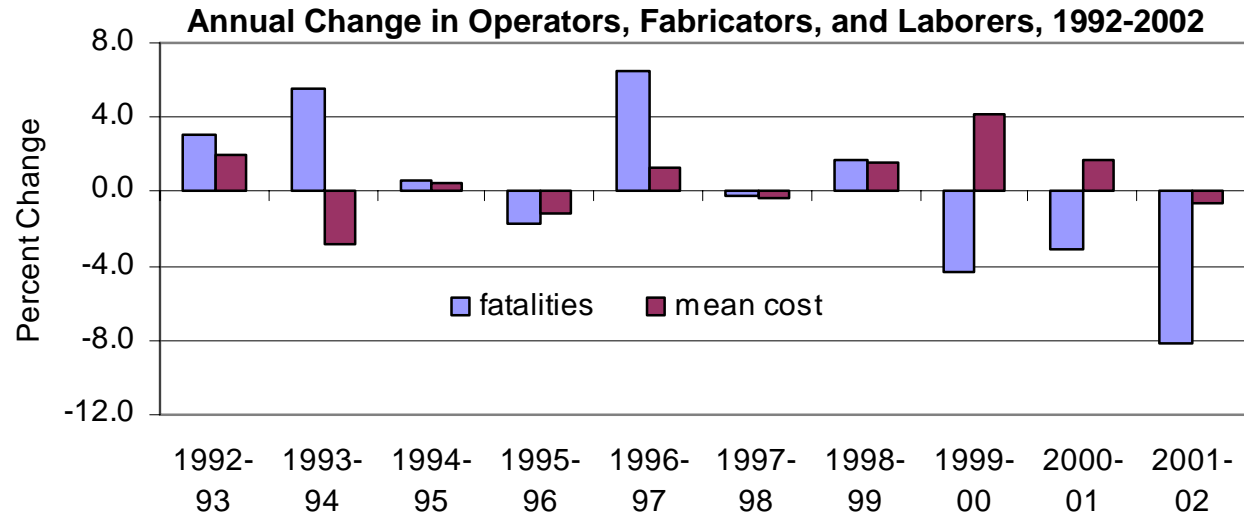
### Mean Cost of Fatal Occupational Injury by Age Group, 1992-2002



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# Results

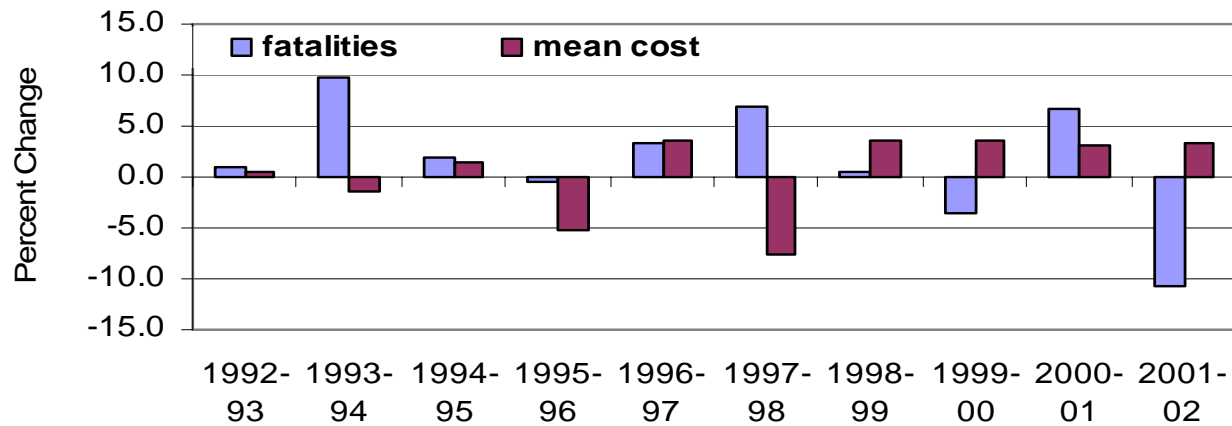


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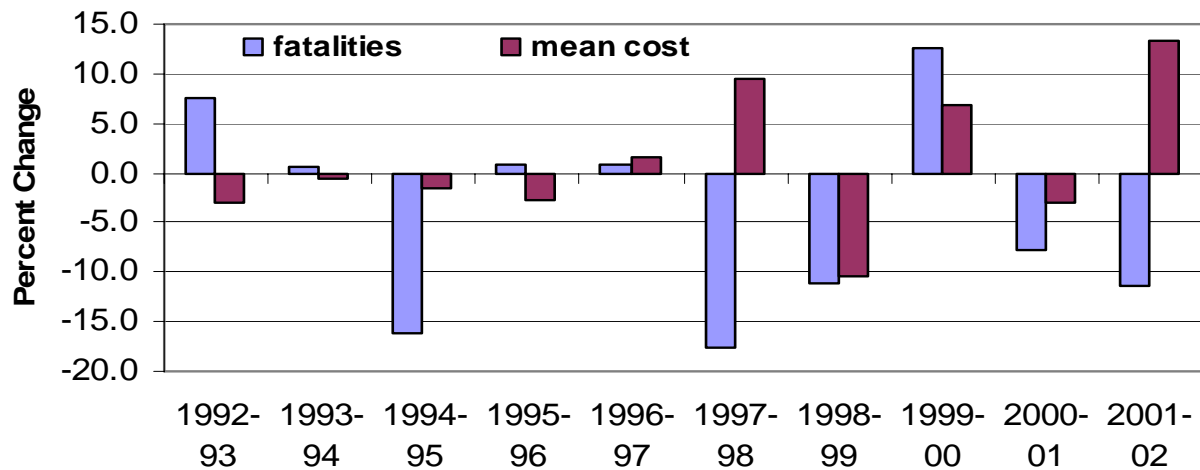


# Results

## Annual Change in Construction, 1992-2002



## Annual Change in Retail Trade, 1992-2002



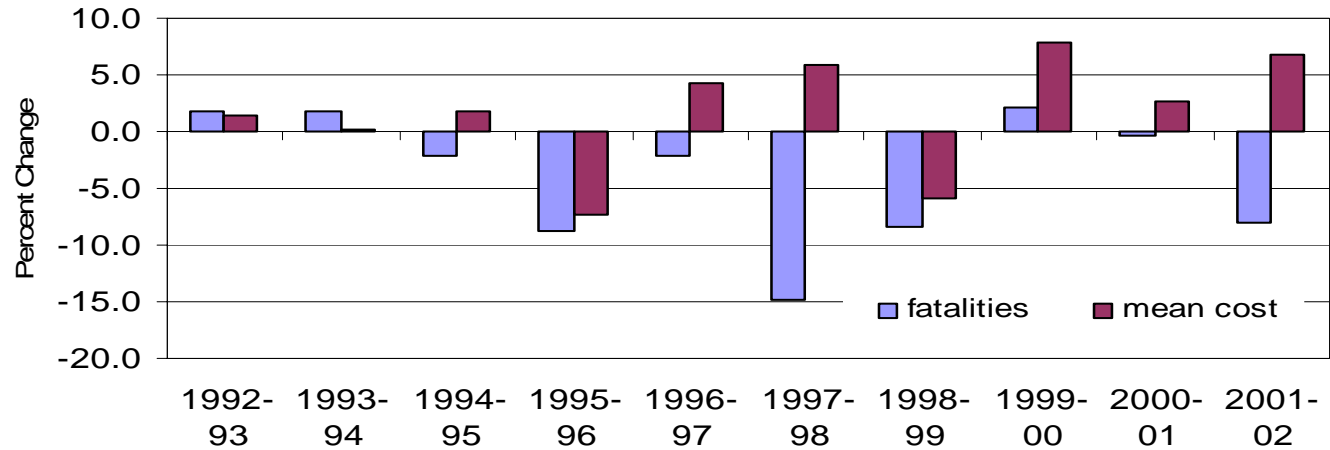
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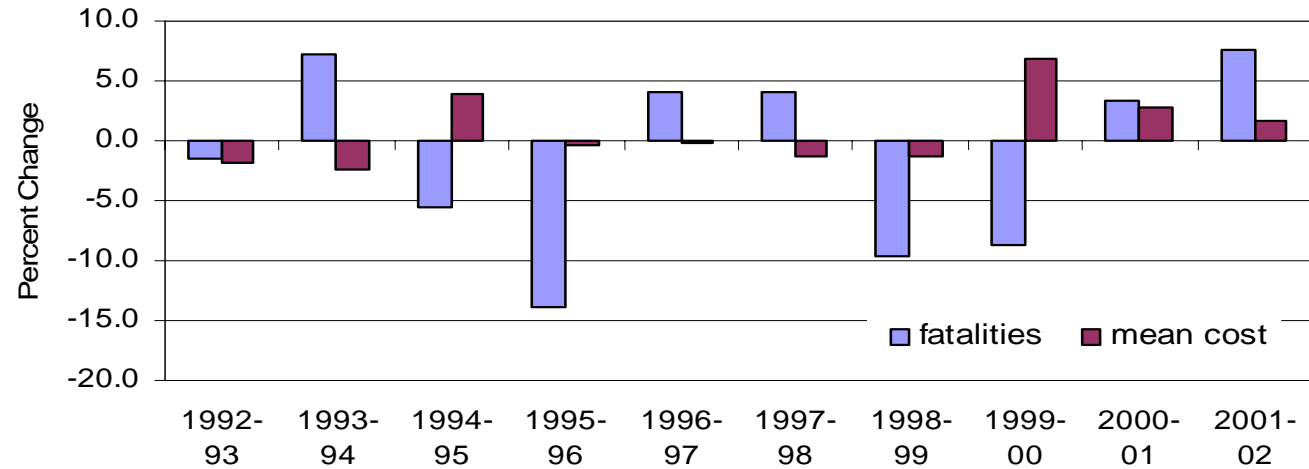


# Results

## Annual Change in Assaults and Violent Acts, 1992-2002



## Annual Change in Exposure to Harmful Substances, 1992-2002



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## Discussion

To fully understand the impact of occupational fatal injuries and the successes of safety promotion and prevention activities, more than one measure should be examined. For the first time, this research provides societal costs of occupational fatal injury over time, allowing for trend analysis of not only magnitude and rate, but the impact on national income and the GDP. Considering the cost or economic impact of an occupational fatality in conjunction with other outcome measures will help focus efforts to improve worker conditions in all industry sectors.

This research demonstrated that while the numbers and rates of fatal occupational injury continued to decline, the mean cost of those losses increased. However, this was not universally true. For example, the number of fatalities in Farmers, Foresters, and Fishers as well as in the Exposure to Harmful Substances or Environments have increased, while the mean cost also increased. Operators, Fabricators, and Laborers showed a decrease in both the number and mean cost of fatalities. Additional analyses are required to determine the underlying conditions that are creating the overall trends as well as the reasons for changes in specific case and worker characteristic experience.



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## Data Sources

**Fatality Data**— Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries. Data exclude military personnel, decedents with unknown age or sex, fatalities occurring in New York City, and fatalities from the September 11, 2001, terrorist attacks.

**Probability of Survival**— National Center for Health Statistics

**Median Annual Earnings**—Wage data from the BLS Current Population Survey (CPS) based on occupation of the decedent and the year of death adjusted by gross domestic product (GDP) deflator to base year of dollar. Life-cycle wage growth was calculated on the basis of the rate of change in wages between age groups.

**Benefits**—U.S. Chambers of Commerce data for the industry in which the decedent was employed and the year of death; GDP deflator adjusted

**Mean Annual Home Production**— Based on data from Expectancy Data derived by the time diary study National Human Activity Pattern Survey sponsored by the U.S. Environmental Protection Agency

**Wage Growth Rate**—Based on BLS Employment Compensation Index

**Age Adjustment**—Algorithm developed by NIOSH.

**Medical Costs**—The 3-year average cost of fatalities from the National Council on Compensation Insurance

**Employment Estimates for Rate Calculations**—BLS CPS



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