



Workplace  
Safety and Health

## Water Transportation (NAICS 483)

Number, Rate, and Costs of Occupational Fatal Injuries in the U.S. Water Transportation Industry by Selected Characteristics, 2003-2006.

Characteristic	Number of fatalities	Fatality rate (per 100,000 workers)	Costs (2006 Dollars)		
			Mean (thousands)	Median (thousands)	Total (millions)
<b>All U.S. Industries</b>	22,197	3.9	\$960	\$944	\$21,316
<b>All Transportation, Warehousing, and Utilities</b>	3,704	12.9	944	974	3,496
<b>All Water Transportation</b>	112	45.2	1,051	1,040	118
<b>Year</b>					
2003	25	36.4	1,075	976	27
2004	44	87.3	1,067	1,030	47
2005	22	35.9	1,070	1,026	24
2006	21	31.0	970	1,046	20
<b>Sex</b>					
Male	--	--	--	--	--
Female	--	--	--	--	--
<b>Age Group</b>					
16-24	12	50.5	1,031	1,003	12
25-34	31	59.4	1,145	1,062	35
35-44	27	42.5	1,279	1,133	35
45-54	30	51.0	1,014	953	30
55-64	7	19.2	641	691	4
65+	5	37.7	88	66	<1
<b>Race</b>					
White	62	30.0	1,059	1,006	66
Black	6	28.8	816	847	5
Other <sup>1</sup>	44	216.4	1,072	1,060	47
<b>Ethnicity<sup>2</sup></b>					
Not Hispanic	89	39.0	1,067	1,037	95
Hispanic	--	--	--	--	--
<b>Selected SOC Occupation Group</b>					
Production	8	149.3	921	959	7
Transportation and Material Moving	95	95.1	1,053	1,046	100



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## Water Transportation (continued) (NAICS 483)

**Number, Rate, and Costs of Occupational Fatal Injuries in the U.S. Water Transportation Industry by Selected Characteristics, 2003-2006.**

Characteristic	Number of fatalities	Fatality rate (per 100,000 workers)	Costs (2006 Dollars)		
			Mean (thousands)	Median (thousands)	Total (millions)
<b>Selected Event or Exposure</b>					
0* Contact with objects and equipment	11	4.4	1,213	1,080	13
3* Exposure to harmful substances or environments	12	4.8	1,224	1,095	15
4* Transportation accidents	85	34.3	1,002	1,029	85
45 Water vehicle accident	70	28.2	1,028	1,030	72
<b>Selected Source of Injury</b>					
8* Vehicles	78	31.4	1,018	1,030	79
88 Water vehicle	64	25.8	1,044	1,049	67

NOTE: Dashes indicate data that do not meet publication criteria.

Asterisks denote a summary level code not assigned to individual cases.

<sup>1</sup>This category includes all other races, such as American Indian and Asian, as well as unknown or missing races.

<sup>2</sup>Numbers are not reported for “unknown”, “not classified” or “not reported” categories.

# Fatal Occupational Injury Cost Model

## Theoretical Basis of Cost Estimation

The cost to society of a workplace fatality was estimated using the cost-of-illness approach, which combines direct and indirect costs to yield an overall cost of an occupational fatal injury. For these calculations, only medical expenses were used to estimate the direct cost associated with the fatality. The indirect cost was derived by calculating the present value of future earnings summed from the year of death until the decedent would have reached age 67, accounting for the probability of survival were it not for the premature death. (For more information, see Biddle, E [2004]. Economic Cost of Fatal Occupational Injuries in the United States, 1980–1997. Contemporary Economic Policy 22(3):370–381 or Biddle, E [2009]. The Cost of Fatal Injuries to Civilian Workers in the US, 1992-2001 and Biddle E and Keane P [2011]. The Economic Burden of Occupational Injuries to Civilian Workers in the United States, 1992-2002. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS.)

## Mathematical Representation of Indirect Costs

$$PVF = \sum_{n=y}^{67} P_{y,q,s}(n) [Y_{s,j}(n) + Y_s^h(n)] * (1+g)^{n-y} / (1+r)^{n-y} \quad \text{where:}$$

PVF	= present discounted value of loss per person due to an individual occupational fatal injury
$P_{y,q,s}(n)$	= probability that a person of age y, race q, and sex s will survive to age n
q	= race of the individual
s	= sex of the individual
n	= age if the individual had survived
$Y_{s,j}(n)$	= median annual compensation of an employed person of sex s, specific occupation j, and age n (includes median annual earnings, benefits, and wage growth adjustments)
j	= specific occupation of individual at death
$Y_s^h(n)$	= mean annual imputed value of household production (h) of a person of sex s and age n
g	= earnings growth rate attributable to overall productivity
y	= age of the individual at death
r	= real discount rate (3%)

## Data Sources

**Fatality data:** Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI). This research was conducted with restricted access to Bureau of Labor Statistics (BLS) data. These data exclude military personnel, decedents with unknown age or sex, and fatalities occurring in New York City. The views expressed here do not necessarily reflect the views of the BLS.

**Probability of survival:** National Center for Health Statistics, Division of Vital Statistics.

**Median annual earnings:** BLS Occupational Employment Statistics Survey. Wage data are based on the occupation of the decedent and the year and State of death adjusted by the Gross Domestic Product (GDP) Deflator to the base year of dollar. The wage growth adjustment, which is the rate of change in wages between age groups, was calculated by NIOSH using BLS Current Population Survey data.

**Benefits:** BLS Employer Cost for Employee Benefits. Benefits data are based on the year of death adjusted by the GDP Deflator.

**Mean annual home production:** Expectancy Data. Data are derived through a time diary study sponsored by the U.S. Environmental Protection Agency and conducted by the University of Maryland.

**Earnings growth rate:** BLS Employment Compensation Index (ECI).

**Medical costs:** National Council on Compensation Insurance. This is a single 4-year average medical cost.

**Employment estimates for rate calculations:** BLS Current Population Survey.

## Fatality Rate Calculations

Fatality rates were calculated by NIOSH and may differ from previously published BLS CFOI rates.

Fatality rates were calculated as deaths per 100,000 workers. Fatality rates for sex, race, age group, and occupation were calculated using employment estimates by the individual characteristic within the specific industry. Employment estimates for the specific industry were used to generate rates for event and source.

## Classification Systems

**Industry:** 2002 National Industry Classification System (NAICS)

**Occupation:** 2000 Standard Occupational Classification System (SOC)

**Event and Source:** 1992 BLS Occupational Injury and Illness Classification System (OIICS)