Work-related Injuries, Illnesses, and Fatalities in Manufacturing and Construction

Total recordable occupational injury and illness incidence rates for 1997 were lower in the construction industry than in manufacturing. However, detailed measures reflecting injury severity and fatality rates suggests that construction may still be more dangerous than manufacturing.

TIMOTHY WEBSTER

Among industry sectors, workers in manufacturing and construction face the highest risk of occupational injuries and illnesses. The Bureau of Labor Statistics (BLS) estimates there were 10.3 injuries and illnesses per 100 workers in manufacturing and 9.5 injuries and illnesses per 100 workers in construction in 1997. (See table 1.) Workers in construction and manufacturing also face a substantial risk of fatality (though not the highest). In 1997, 14.1 out of every 100,000 workers in construction and 3.6 out of every 100,000 workers in manufacturing were fatally injured.[1] (See table 2.)

Injuries and illnesses

During the period 1976-93, total recordable case rates for injuries and illnesses in construction exceeded the total recordable case rates for manufacturing. (See chart.) This history is not surprising given that the work environment in construction is generally more severe than in manufacturing—work is done outside; on roofs, ladders, and scaffolding; with dangerous tools and heavy materials; and with a constant risk of being struck by falling objects. However, this trend was reversed beginning in 1994—total recordable case rates for manufacturing during the period 1994-97 exceeded the total recordable case rates for construction.

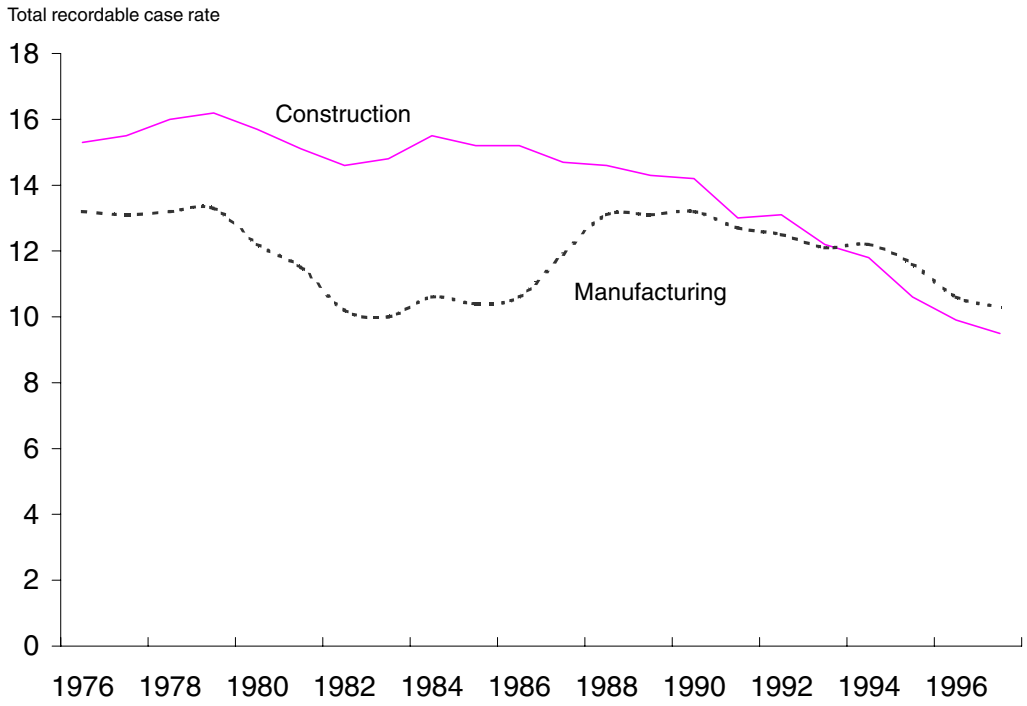
Total recordable case rates for both industries declined during the period 1976-97—38 percent in construction, and 22 percent in manufacturing.[2] The decline in construction's total recordable case rate has been relatively steady since 1983, whereas the rate for manufacturing began to increase in the mid-1980s, until 1991, when it began to decline again. This uneven trend in manufacturing may have been influenced by increased OSHA (Occupational Safety and Health Administration) enforcement of injury and illness recordkeeping in selected manufacturing industries.[3] Trends in the total recordable case rates over the last two decades suggest that both industries have become safer, and that construction has become safer than manufacturing. (See chart and table 1.) However, a closer examination of the data shows construction remains more hazardous than manufacturing in many ways.

Measures of injuries and illnesses

The Survey of Occupational Injuries and Illnesses (SOII) provides measures of injuries and illnesses. *Total recordable cases* are cases where an employee becomes ill or is injured and experiences a loss of consciousness, restriction of work or motion, transfer to another job, or medical treat-

Timothy Webster is an economist in the Office of Safety, Health and Working Conditions, Bureau of Labor Statistics.
Telephone: (202) 691-6169
E-mail: Webster_T@bls.gov

CHART 1. **Total recordable case rates[1] for injuries and illnesses in manufacturing and construction industries, 1976-97**



[1] The incidence rates represent the number of injuries and illnesses per 100 full-time workers and were calculated as (N/EH) x 200,000, where:

N	= number of injuries
EH	= total hours worked by all employees during the calendar year
200,000	= base for 100 equivalent full-time workers (working 40 hours per week, 50 weeks per year)

ment other than first aid. The following four types of cases are subsets of total recordable cases.

Cases involving days away from work. Cases where the injury or illness results in 1 or more days away from work, or a combination of days away from work and restricted work activity.

Cases involving restricted work activity only. Cases where the injury or illness results in restricted work activity but no lost time beyond the day of the incident. In such cases, three situations may occur: The employee may be assigned to another job on a temporary basis; the employee may work at his or her permanent job less than full time; or the employee may work at his or her permanently assigned job full time, but not perform all the duties normally connected with it.

Lost workday cases. The sum of cases involving days away from work and cases involving restricted work activity only.

Cases without lost workdays. Cases where the injury or illness is recordable, but involves neither days away from work nor restricted work activity. In such cases, the injured employee is at work the day following the injury and works at normal capacity.

Trends in case types

An examination of case types helps assess relative workplace safety. For example, two industries, A and B, may each have the same total recordable case rate for any given time period. Industry A's rate is comprised completely of days away from work cases, while industry B's rate is comprised completely of cases without lost workdays. Though a worker is equally likely to sustain a recordable injury or illness in both industries, the severity of the injury or illness is greater in industry A (where all of the injuries or illnesses required days away from work) than in industry B (where none of the cases resulted in lost workdays).

Cases without lost workdays. The rates for cases without lost workdays, the least severe cases, have declined since 1976 for both manufacturing and construction. In 1997, the rate for manufacturing was 5.4 cases per 100 full-time workers, down 36 percent from 1976; the respective rate for the construction industry was 5.0, down 49 percent. Cases without lost workdays accounted for much of the decline in the

TABLE 1. **Incidence rates[1] for nonfatal occupational injuries and illnesses in manufacturing and construction by type of case, 1976-97**

Year	Manufacturing					Construction				
	Total cases	Lost workday cases			Cases without lost workdays	Total cases	Lost workday cases			Cases without lost workdays
		Total	Restricted work activity only	With days away from work			Total	Restricted work activity only	With days away from work	
1976	13.2	4.8	0.4	4.4	8.4	15.3	5.5	0.1	5.4	9.8
1977	13.1	5.1	.4	4.7	8.0	15.5	5.9	.1	5.8	9.6
1978	13.2	5.6	.6	5.0	7.6	16.0	6.4	.1	6.3	9.6
1979	13.3	5.9	.7	5.2	7.4	16.2	6.8	.2	6.6	9.4
1980	12.2	5.4	.6	4.8	6.8	15.7	6.5	.2	6.3	9.2
1981	11.5	5.1	.6	4.5	6.4	15.1	6.3	.2	6.1	8.8
1982	10.2	4.4	.5	3.9	5.8	14.6	6.0	.2	5.8	8.6
1983	10.0	4.3	.5	3.8	5.7	14.8	6.3	.2	6.1	8.5
1984	10.6	4.7	.6	4.1	5.9	15.5	6.9	.3	6.6	8.6
1985	10.4	4.6	.6	4.0	5.8	15.2	6.8	.3	6.5	8.4
1986	10.6	4.7	.7	4.0	5.9	15.2	6.9	.3	6.6	8.3
1987	11.9	5.3	1.1	4.2	6.6	14.7	6.8	.4	6.4	7.9
1988	13.1	5.7	1.2	4.5	7.4	14.6	6.8	.3	6.5	7.8
1989	13.1	5.8	1.4	4.4	7.3	14.3	6.8	.5	6.3	7.5
1990	13.2	5.8	1.6	4.2	7.3	14.2	6.7	.5	6.2	7.5
1991	12.7	5.6	1.7	3.9	7.1	13.0	6.1	.5	5.6	6.9
1992	12.5	5.4	1.9	3.5	7.1	13.1	5.8	.5	5.3	7.3
1993	12.1	5.3	2.0	3.3	6.8	12.2	5.5	.6	4.9	6.7
1994	12.2	5.5	2.3	3.2	6.8	11.8	5.5	.6	4.9	6.3
1995	11.6	5.3	2.4	2.9	6.3	10.6	4.9	.7	4.2	5.7
1996	10.6	4.9	2.4	2.5	5.7	9.9	4.5	.8	3.7	5.4
1997	10.3	4.8	2.4	2.4	5.4	9.5	4.4	.8	3.6	5.0

[1] The incidence rates represent the number of injuries and illnesses per 100 full-time workers and were calculated as: (N/EH) x 200,000, where:

N = number of injuries and illnesses
EH = total hours worked by all employees during the calendar year
200,000 = base for 100 equivalent full-time workers (working 40 hours per week, 50 weeks per year)

NOTE: Because of rounding, sums of individual items may not equal totals.

total recordable case rate for both industries, but the decline was greater in construction.

Cases involving restricted work activity only. Cases involving restricted work activity only are more severe than cases without lost workdays. The 1997 incidence rate for these cases in manufacturing was 2.4 per 100 full-time workers, up 500 percent from 1976. The 1997 rate for comparable cases in construction was 0.8, up 700 percent. The large increase in these cases can be seen in all industry divisions.[4]

Cases involving days away from work. Cases involving days away from work, the most serious cases, involve at least 1 day away from work, though usually more. The 1997 incidence rate for these cases in manufacturing was 2.4 cases per 100 workers, down 46 percent from 1976; the respective rate for construction was higher, 3.6, down 33 percent.

In addition to construction having a higher incidence rate than manufacturing for cases involving days away from work, the median number of days lost in construction was also higher. (See table 2.) Since 1992, median recuperation time for days away from work cases in manufacturing declined from 6 to 5 days. In construction, days lost remained at 7 before increasing to 8 in 1997.

Fatalities

The Bureau of Labor Statistics' Census of Fatal Occupational Injuries (CFOI) provides data on fatal work injuries. CFOI data indicate that construction workers face a greater risk of being fatally injured than workers in manufacturing. In 1997, 14.1 of every 100,000 workers in construction were fatally injured, compared to 3.6 of every 100,000 workers in manufacturing. Since 1992, when BLS first began collecting fatality data under CFOI, the fatality rate in construction has been consistantly higher than in manufacturing,

Summary

Trends in the total recordable case rates during the period 1976-97 suggest that both the manufacturing and construction industries have become safer places to work, and that construction has become safer than manufacturing. However, although both industries provide safer work environments than they did two decades ago, which industry is safer is not easily ascertained; an analysis of a variety of BLS data indicates that construction may still be more dangerous.

- Much of the decline in the rates of total recordable injuries and illnesses in both industries has been in the least serious cases, those without lost workdays. This is especially true in construction.

- Despite declines in the rates of the most serious cases (those involving days away from work) for both manufacturing and construction, the rate for the construction industry remains higher than the rate for the manufacturing industry.

- The median number of days lost for cases involving days away from work is higher in construction than in manufacturing.

- Workers in construction face a greater risk of being fatally injured than workers in manufacturing.

Therefore, although workers in the manufacturing industries face a greater risk of receiving recordable injuries and illnesses, the injuries and illnesses experienced by workers in the construction industries are likely to be more severe, and the risk for a work-related fatality is greater.[5] ■

TABLE 2. **Annual median number of days away from work and fatal injuries per 100,000 workers[1] in the construction and manufacturing industries, 1992-97**

Year	Industry	
	Construction	Manufacturing
Median number of days away from work		
1992	7	6
1993	7	6
1994	7	5
1995	7	5
1996	7	5
1997	8	5
Fatal injuries incidence rate		
1992	14.1	3.8
1993	13.8	3.9
1994	14.8	3.9
1995	14.7	3.5
1996	14.0	3.5
1997	14.1	3.6

[1] The rate represents the number of fatal occupational injuries per 100,000 employed workers and was calculated as: (N/W) x 100,000, where:

N = number of fatal work injuries
W = number of employed workers

NOTE: Employment figures used in these calculations are annual average estimates of private industry wage and salary earners and self-employed civilians, 16 years of age and older, from the Current Population Survey (CPS). Fatally injured workers under the age of 16 were not included in the rate calculations to maintain consistency with CPS estimates.

[1] Data for this article are drawn from two primary sources: The Bureau of Labor Statistics' annual Census of Fatal Occupational Injuries, which covers all occupational injury fatalities in the United States, and the Bureau's annual Survey of Occupational Injuries and Illnesses, which covers nonfatal injuries and illnesses in the private sector. Workplace fatality cases are census counts, and include fatalities occurring to private industry wage and salary workers and self-employed civilians. The number of occupational injury and illness cases is estimated from a survey of private business establishments.

[2] Technically, total injury and illness data for 1976-91 are not comparable with data for 1992 and later. The data for 1976-91 include estimates for fatalities. Beginning in 1992, fatalities were excluded from the estimates developed from the Survey of Occupational Injuries and Illnesses, and collected in a separate program, the Census of Fatal Occupational Injuries. However, the number of fatalities is small relative to the number of injuries and illnesses, so the rates for 1976-91 appear to be the same had fatalities been excluded.

[3] See *Report on the American Workforce* (U.S. Department of Labor, 1994), pp.99-100.

[4] For a detailed discussion of this trend, see John W. Ruser, "The Changing Composition of Lost-workday Injuries," *Monthly Labor Review*, June, 1999, pp.11-17.

[5] This article presents aggregate rates for manufacturing and construction; individual industry rates within manufacturing and construction may be higher or lower than the aggregate rate.