Compendium on Workmen's Compensation

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Chapter 1

Industrial Injuries and Their Consequences

In 1970 about 14,200 workers died from a work-connected injury or disease; another 90,000 were permanently disabled; and more than 2,100,000 were temporarily disabled. Although these deaths and disabilities were only one-fifth of the total accidental injuries from all causes, the numbers are disturbing. Furthermore, another 6 or 7 million persons were injured on the job although they did not miss a day's work. These injured workers and their families suffered bodily injuries and emotional strain as well as substantial economic losses. Their employers and society also suffered sizeable economic losses.

WORK-RELATED INJURIES: TRENDS AND CHARACTERISTICS

The number of disabling work injuries has fluctuated within a fairly narrow range during the past three decades (table 1.1). The peak year in recent history was 1943 when the special demands of World War II (e.g., high employment, inexperienced workers, inadequate training, and constantly changing supervision) moved the number over 2.4 million. The best year was 1958 when the number dropped to about 1.8 million. The number of injuries declined following World War II, rose again during the Korean conflict, continued to decline during the middle fifties, increased gradually from 1958 to 1966, and has remained almost constant since that year. Deaths, permanent disabilities, and temporary disabilities were all higher in 1970 than in 1958.

Because of the inadequacies of accident reporting (see ch. 14) these data on work injuries are subject to a considerable margin of error. The reporting requirements of the Occupational Safety and Health Act of 1970 will provide more accurate data in the future.

Table 1.1.—ESTIMATED NUMBER OF DISABLING WORK INJURIES: 1942–70

Year	Total	Deaths	Permanent disability [1]	Temporary total disability
1942	2, 267, 700	18, 100	102, 600	2, 147, 000
1943	2, 414, 000	18, 400	109, 700	2, 285, 900
1944	2, 230, 400	15, 900	96, 100	2, 118, 400
1945	2, 020, 300	16, 500	89, 900	1, 913, 900
1946	2, 056, 000	16, 500	94, 200	1, 945, 300
1947	2, 059, 000	17, 000	91, 800	1, 950, 200
1948	2, 019, 900	16, 000	88, 500	1, 915, 400
1949	1, 870, 000	15, 000	81, 000	1, 774, 000
1950	1, 952, 000	15, 500	84, 900	1, 851, 600
1951	2, 107, 000	16, 000	91, 000	2, 000, 000
1952	2, 031, 000	15, 000	84, 000	1, 932, 000
1953	2, 000, 000	15, 000	83, 000	1, 902, 000
1954	1, 850, 000	14, 000	75, 000	1, 761, 000
1955	1, 930, 000	14, 200	81, 800	1, 834, 000
1956	1, 950, 000	14, 300	84, 700	1, 851, 000
1957	1, 890, 000	14, 200	80, 800	1, 795, 000
1958	1, 820, 000	13, 300	76, 700	1, 730, 000
1959	1, 960, 000	13, 800	83, 200	1, 863, 000
1960	1, 950, 000	13, 800	82, 200	2, 854, 000
1961	1, 930, 000	13, 500	80, 500	1, 836, 000
1962	1, 990, 000	13, 700	83, 300	1, 893, 000
1963	2, 020, 000	14, 200	84, 800	1, 921, 000
1964	2, 050, 000	14, 200	85, 800	1, 950, 000
1965	2, 104, 000	14, 100	90, 000	2, 000, 000
1966	2, 204, 500	14, 500	90, 000	2, 100, 000
1967	2, 204, 200	14, 200	90, 000	2, 100, 000
1968	2, 204, 300	14, 300	90, 000	2, 100, 000
1969	2, 204, 200	14, 200	90, 000	2, 100, 000
1970	2, 204, 200	14, 200	90, 000	2, 100, 000

[1] Permanent disability includes approximately 1,300 to 1,800 permanent total disabilities.

Sources: Data for 1942–52, as compiled by the U.S. Bureau of Labor Statistics were taken from Herman M. Somers and Anne R. Somers, "Workmen's Compensation" (New York: John Wiley & Sons, Inc.), 1954, p. 2, table 1–A. Estimated work injuries for 1953–64 were compiled by the Bureau of Labor Statistics in collaboration with the National Safety Council. They are based upon available data from various Federal and State agencies and upon industry surveys. Data for 1965–70 are National Safety Council approximations based on data from the National Center for Health Statistics, the U.S. Bureau of Labor Statistics, State Industrial Commissions, and other sources.

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Variation Among Industries

Selected industry data (table 1.2) show how injury frequency rates and severity measures varied in 1970. The injury frequency rate is the number of disabling work injuries per 1 million man-hours worked. Two severity measures are shown: The average number of days lost per injury and a "severity rate" which is the number of days lost per million man-hours worked. Because this "severity rate" is the product of the injury frequency rate and the average number of days lost per injury, it reflects both injury frequency and the severity of those injuries that occur.

Table 1.2.—INJURY RATES BY MAJOR INDUSTRY GROUPS, 1970

	Injury fre- quency rates	Severity rates	Average days charged per injury		
			Per- manent partial	Tem- porary total	All dis- abling injuries
MANUFACTURING					
All manufacturing	15.2	759	427	18	50
Ordnance and accessories	9.8	284	242	14	29
Food and kindred products	28.8	1,156	452	15	40
Tobacco manufactures	11.9	332	268	18	28
Textile mill products	10.4	579	447	21	56
Apparel and other textile products	7.7	207	537	14	27
Lumber and wood products	34.1	2,891	626	20	85
Furniture and fixtures	22.0	909	392	15	41
Paper and allied products	13.9	937	413	22	67
Printing and publishing	11.7	411	354	15	35
Chemicals and allied products	8.5	562	459	18	66
Petroleum and coal products	11.3	1,116	797	21	99
Rubber and plastic products, n.e.c.	18.6	795	473	19	43
Leather and leather products	15.2	534	402	16	35
Stone, clay, and glass products	23.8	1,540	578	20	65
Primary metal industries	16.9	1,128	393	23	67
Fabricated metal products	22.4	1,003	422	16	45
Machinery, except electrical	14.0	583	340	18	42
Electrical equipment and supplies	8.1	333	366	16	41
Transportation equipment	7.9	488	373	21	62
Instruments and related products	7.9	270	291	18	34
Miscellaneous manufacturing industries	15.8	561	373	16	36
NONMANUFACTURING					
All contract, construction work	28.0	2,100	613	17	75
Communication	2.5	235	368	27	93
Local and interurban passenger transit	23.9	1,000	646	16	42
Electric, gas, and sanitary services	6.6	813	671	23	122
Personal services	7.3	276	436	15	35
Miscellaneous business services	6.0	310	474	16	51
Educational services	6.7	385	748	15	57
Fire protection	41.7	4,349	1,275	22	104
Police protection	45.6	2,521	797	12	55
All wholesale and retail trade	11.3	452	545	14	40
MINING					
Coal mining and preparation	41.6	7,792			187
Metal mining and milling	23.7	3,238			137
Nonmetal mining and milling	24.1	2,624			109
Stone quarrying and milling	18.3	2,123			116

Note: Leaders indicate that no data were reported or that data do not meet publication criteria.

Source: "Injury Rates by Industry, 1970," Bureau of Labor Statistics, BLS Report No. 406, pp. 7–17.

Injury frequency rates were highest in the police protection (45.6), fire protection (41.7), and coal mining industries (41.6). The industries with the lowest rates were communication (2.5), electric, gas, and sanitary services (6.6), and miscellaneous business service (6.0), and educational services (6.7). The average number of disabling days per injury exceeded 100 for the low-frequency electric, gas, and sanitary services industry, fire protection, and the four mining groups. For only three industries (tobacco manufactures, textile products, and ordnance and accessories) were the average disabling days per injury under 30. The figure on average days per injury includes schedule charges for death and permanent impairment as well as the number of full calendar days lost to temporary total disability.

Severity rates, reflecting both injury frequency and severity, exceeded 2,000 for eight groups: lumber and wood products, contract construction, fire protection, police protection, and the four mining groups. Coal mining had the highest severity rate (7,792), the highest average disabling days per injury (187), and the third highest injury frequency rate (41.6).

Work injury frequency rates in manufacturing industries increased from 12.0 in 1960 to the 1970 level of 15.2. Every manufacturing industry except lumber and wood products had a higher rate in 1970 than in 1960. A possible explanation is a rise in new hires and more overtime in most of these industry groups coupled with rapid technological change. Fortunately, however, because of a decline in the average number of days per injury, the severity rate for all manufacturing increased only slightly over this 10-year period from 753 to 759.

The experience in most nonmanufacturing and mining industries has been more favorable (table 1.3). Employment increased in many of these industries as it did in manufacturing, but in construction an increase in mechanization apparently eliminated many injuries formerly caused by manual handling.

Because injury and severity rates are not available for all industries, no rates are calculated for all industries combined. It is probable, however, that these overall rates, though still disturbingly high, have declined somewhat over the past dec-

ade. On the other hand, there are also indications that this decline was less relatively than in the preceding two or three decades.

Table 1.3.—COMPARATIVE FREQUENCY AND SEVERITY RATES OF WORK-RELATED INJURIES IN SELECTED INDUSTRIES, 1960-70

	Frequency rate		Severity rate	
	1960	1970	1960	1970
Contract construction	31.5	28.0	2,643	2,100
Communication	1.0	2.5	101	235
Electric, gas, and sanitary services	6.2	6.6	920	813
Wholesale trade	15.3	13.1	818	639
Coal mining and preparation	42.5	41.6	9,170	7,792

Sources of Work Injuries

Industrial injuries occur most frequently in association with (1) handling some object manually or (2) falling. These two classes account for about 43 percent of all compensable work injuries. Other events associated with more than 10 percent of these injuries are: Being struck by a falling or moving object and contact with machinery other than vehicles (table 1.4).

Table 1.4.—PERCENTAGE OF COMPENSABLE WORK INJURIES CLASSIFIED BY ASSOCIATED EVENTS OR OBJECTS

Character of event	All cases	Fatal permanent total	Permanent partial	Temporary total
Handling objects, manual	22.6	13.9	9.6	28.5
Falls	20.4	17.4	18.5	21.2
Struck by falling, moving objects	13.6	9.3	19.3	11.1
Machinery	10.2	3.1	19.2	6.3
Vehicles	7.1	20.7	7.1	6.9
Motor	5.0	18.0	4.3	5.2
Other	2.1	2.7	2.8	1.7
Stepping on, striking against objects	6.9	2.3	5.6	7.6
Hand tools	6.1	1.5	8.1	5.3
Electric heat, explosives	2.5	7.7	2.2	2.6
Elevators, hoists, conveyors	2.2	3.6	3.8	1.5
Other	8.4	20.5	6.6	9.0
Total	100.0	100.0	100.0	100.0

Source: "Accident Facts, 1971 Edition," p. 31, published by the National Safety Council.

Vehicle accidents are the most important factor in fatal or permanent total injuries, followed by falls and manual handling of objects. Accidents involving machinery, falling moving objects, and falls are the three most frequent factors in permanent partial disabilities.

Data are not available on the reason why the person fell, what he did wrong while handling an

object manually, and so on. Some special studies are available that analyze the hazardous or unsafe conditions that gave rise to work injuries in selected industries.[1]

ECONOMIC CONSEQUENCES

When a worker dies, is disabled, or merely requires medical attention because of a work-connected injury or disease, the economic consequences affect the worker, his family, his employer, and society.

The Worker and His Family

The worker and his family may suffer two types of economic losses: (1) a loss of earnings and (2) extra expenses.

Loss of earnings.—If a worker dies because of a work-related injury or sickness, his survivors lose the income he would otherwise have earned less the amount that he would have spent to maintain himself during the remainder of his working career and his retirement years. This loss can be substantial. For example, according to a Bureau of the Census report,[2] in 1968, the average male, aged 30, who had completed 1 to 3 years of high school, had an annual income of about $5,827. The present value of his expected lifetime earnings, assuming an annual discount rate of 4 percent, was about $125,000. In a typical family about 20 percent of this annual income would have been needed to meet the worker's own maintenance expenses. Reducing the lifetime earnings loss by this 20 percent leaves the still substantial loss of about $100,000.

These estimates ignore any expected gains in annual income per worker because of higher productivity and inflation. Assuming an annual increase of 3 percent per year would raise the 1968 net earnings loss to $154,000. For a worker, aged 50, the potential earnings loss would have been less, about $71,000, because he was nearer retirement.

Total and permanent disability causes an even greater earnings loss than death because the worker must be maintained. If the two males, aged 30 and 50, discussed above had been totally and permanently disabled instead of killed, their earnings losses would have been $193,000 and $89,000 respectively.

Permanent partial disability causes some fraction of the permanent total disability loss, depending upon the proportion of annual earnings lost. A worker who is totally disabled for a temporary period loses his income for a specific number of weeks or months. Loss of even a month's earnings is a serious loss for the typical worker. In addition to these earnings losses, the deceased or disabled worker may no longer provide valuable household services that must now be foregone or replaced at some additional expense.

Extra expenses.—In event of death, the earnings loss generally is much greater than the extra expenses associated with death, but these expenses are still substantial. They include funeral and burial expenses, probate costs, lawyer's fees, Federal estate taxes, and State inheritance taxes.

Not all injured workers are disabled but almost all require some form of medical attention. Hospital bills, doctors' and nurses' fees, and other medical expenses follow. For all injuries combined, medical expenses are less than the total earnings loss but for most injured workers their medical expenses exceed their earnings loss.

The Worker's Employer

Part or all of the worker's economic loss may be transferred to the workers's employer under workmen's compensation laws or employers' liability statutes. For example, in New York State the employer of a totally and permanently disabled worker would be responsible for all of his medical expenses and a lifetime weekly income equal to two-thirds of his wage at the time he was disabled subject to a weekly maximum of $80. Most employers are required by law to purchase workmen's compensation insurance to secure their obligations to their employees. Through this insurance, certain premium payments, which include an expense and profit or contingency allowance, replace uncertain benefits to employees. In 1970 workmen's compensation cost employers $4.9 billions or 1.13 percent of covered payrolls.

Less apparent to employers are the other losses, often called indirect losses, associated with industrial accidents. One source [3] lists ten examples of such losses:

(1) Cost of wages paid for working time lost by workers who were not injured.

(2) Net cost to repair, replace, or straighten up material or equipment that was damaged in an accident.

(3) Cost of wages paid for working time lost by injured workers, other than workmen's compensation payments.

(4) Extra cost due to overtime work necessitated by an accident.

(5) Cost of wages paid supervisors while their time is required for activities necessitated by the accident.

(6) Wage cost due to decreased output of injured worker after return to work.

(7) Cost of learning period of new worker.

(8) Uninsured medical cost borne by the company.

(9) Cost of time spent by higher supervision and clerical workers on investigations or in the processing of compensation application forms.

(10) Miscellaneous unusual costs (e.g., loss of profits on contracts canceled, public liability claims, and cost of excess spoilage by new employees).

According to H. W. Heinrich, a pioneer in developing scientific approaches to industrial accident prevention, on the average these indirect costs are about four times the employer's share of their employees' earnings losses and medical expenses. [4]

In a more recent study Simonds and Grimaldi have argued that, although Heinrich should be commended for dramatizing the importance of indirect costs, the ratio of these costs to direct costs (1) varies markedly among employers and over time and (2) on the average may be less than four to one. [5] Instead of a ratio approach, these two authors favor the following formula:

Insurance costs
+A times number of lost-time cases
+B times number of doctors' cases
+C times number of first-aid cases
+D times number of no-injury cases
=Total costs

In the formula, A, B, C, and D represent constants indicating the average uninsured cost for each of these categories of cases.

Society

In addition to the losses described above, society loses the taxes that would have been paid by the injured employees, the products or services they

would have produced, and the costs of commissions and courts administering workmen's compensation and employers' liability. Some injured employees and families become public assistance beneficiaries and are supported by other members of society.

References for Chapter 1

1. See, e.g., Work Injuries and Accident Causes in Hospitals, Bureau of Labor Statistics Report No. 341 (Washington, D.C.: U.S. Department of Labor, Bureau of Labor Statistics, May 1968.)

2. U.S. Bureau of Census, Current Population Reports, Series P-60, No. 74, Annual Mean Income, Lifetime Income, and Educational Attainment of Men in the United States, for Selected Years, 1956 to 1968," U.S. Government Printing Office, Washington, D.C., 1970, p. 34.

3. R.H. Simonds and J. V. Grimaldi, Safety Management, rev. ed. (Homewood, Ill.: Richard D. Irwin, Inc., 1963), pp. 86-91.

4. H. W. Heinrich, Industrial Accident Prevention, 3d ed. (New York: McGraw-Hill Book Co., 1950), p. 50.

5. Simonds and Grimaldi, op. cit., pp. 106-108 and 112.