CHAPTER SIX

Liability for Occupational Accidents and Illnesses

W. Kip Viscusi

Interest in maintaining health and safety in the workplace has surged dramatically since the early 1970s. In 1971 the Occupational Safety and Health Administration was created within the U.S. Department of Labor to control job-related risks. Throughout the 1970s, states boosted the level of workers’ compensation benefits. And the courts have dealt with an increasing number of products liability suits for victims of occupational disease.

In terms of current policy considerations the role of the judicial system is most important, and debate focuses on three classes of concerns. First, how should the liability system be restructured, if at all, to address the new issues that have arisen in mass toxic tort cases? Second, to what extent should laws pertaining to job injuries be overhauled? Finally, given the advent of stiffer job safety regulations and more generous compensation levels for accident victims, should the United States reconsider the role of the liability system? Thus, how have recent policy changes altered the appropriate division of labor among these major institutions?

Policy Objectives and Instruments

Although the specific context may differ from that of other accidents, such as those that are product-related, society’s broad objectives in dealing with job-related injuries and illnesses are the same. First, it is desirable to promote an efficient level of accident prevention. The employer takes actions to make the technology of production, the materials used, and workplace operations safer. Workers affect safety through their behavior on the job and sometimes off (smoking, for example). Ideally, a policy
should encourage awareness of safety practices among all participants in
the workplace. At the same time, the optimal level of job safety will not
provide a risk-free environment. Actions to improve safety are costly to
the firms that must spend money for them and to the workers who must
expend effort or forgo activities such as smoking cigarettes. Some trade-
offs are required.

A second objective is to provide an efficient level of insurance for
workers exposed to the risk of injury or illness. In instances when workers
experience financial losses for which they are not responsible, the optimal
level of insurance that will provide for full replacement of income is the
level that gives them the same marginal utility when they are injured as
when they were not. Such a policy of "making one whole" is not generally
ideal, however. Less than full compensation is desirable if the accident
decreases the marginal utility of income and more if the accident increases
its marginal utility.

To see why this is the case, consider the extreme situation of death. In
an economic manner of speaking, dying alters a worker's utility function
by dropping both the level of utility and the marginal utility of income to
zero; in effect, death replaces the utility function with a bequest function.
It would not be rational to provide for the same level of income after death
that a worker would have chosen when alive, since he or she would not
be alive to enjoy or need it.

Similarly, if there are other types of health impairments that affect the
ability to derive utility from income, the replacement of less than full
welfare loss will be desirable. If one becomes a paraplegic, one would wish
to have insured enough income replacement so that a dollar of income
provides the same marginal utility as it would have if one had remained
healthy. But no reasonable amount of compensation may eliminate the
irreplaceable loss in welfare that a deterioration in health entails. The

1. For a discussion of the effects of changes in utility function see Richard J. Zeckhauser,
"Coverage for Catastrophic Illness," Public Policy, vol. 21 (Spring 1973), pp. 149–73; Michael Spence,
"Consumer Misperceptions, Product Failure and Producer Liability," Review of Economic Studies,
vol. 44 (October 1977), pp. 561–72; Philip J. Cook and Daniel A. Graham, "The Demand for Insurance and Protection: The Case of Irreplaceable Com-
tions is provided in Guido Calabresi, The Cost of Accidents: A Legal and Economic Analysis
(Yale University Press, 1970).
underlying reference point is the level of insurance that accident victims would have selected if they had purchased full coverage at actuarially fair rates before the accident.

It has been generally assumed that an accident leading to disability or otherwise undermining health lowers a person’s marginal utility of income, which implies that less than full compensation is desirable. Recent empirical evidence supports this assumption. As a result, the optimal level of compensation that a worker would choose in a fully efficient market would not restore his or her welfare to its preaccident level.

In addition to accident prevention and efficient compensation, society also wishes to ensure equitable treatment for its members. This takes several forms. First, there may be an altruistic concern with the risks workers face, particularly inordinately large risks. Society may view the situation of one worker facing an annual death risk of 1 in 10 much differently than it views 10,000 workers, each of whom faces a death risk of 1 in 100,000, even though the expected percentage of lives lost is the same in each case.

Second, the manner in which the risk is generated may be of consequence. Society tends to place greater value on assisting individuals who are victims of involuntary risks than on assisting those who incur risks voluntarily.

Third, society is concerned with all classes of accident victims. Victims of job accidents and illnesses presumably are no more deserving of compensation than are victims of product-related accidents or risks whose source cannot be identified.

Finally, society may wish that accident prevention and compensation policies be used to redistribute resources toward those in low-income groups. This objective is controversial because income transfer programs that are more broadly based are better suited to this purpose. Requiring wrongdoers to be responsible for society’s broader desire to ensure equitable income distribution may be inefficient, since it will weaken the effectiveness of litigation to help achieve the other objectives, such as providing efficient incentives for preventing accidents. As a result, the broad-based concern for equitable income distribution is best excluded from a discussion of improving ways to meet society’s objectives except as it may specifically relate to income inequities caused by health and safety risks.

Society’s objectives with respect to job-related health and safety are promoted by various institutional mechanisms—market forces, notably implicit or explicit bargains between workers and employers, occupational safety and health regulations, social insurance programs for job-related illnesses and injuries (workers’ compensation, for example), and the civil liability system. Since no single mechanism need serve all functions, a division of responsibility is possible. The workers’ compensation system, for instance, may be effective in compensating victims of accidents in the workplace but may provide little incentive to improve safety; the civil liability system, however, may very well help to improve safety by holding out the possibility of damages assessed against employers if they do not cooperate. The relative strengths of the different tools should be recognized and exploited.

Thus the civil liability system cannot be viewed in isolation. One must take into account what is accomplished by other mechanisms before suggesting any changes in its function. Indeed, these mechanisms do more than provide the pertinent backdrop against which the system operates. For accidents in the workplace, they are the driving force behind the compensation that injured workers receive and the determination of the level of risk on the job.

The Role of the Market

The most useful starting point for discussing safety risks on the job is to review the effects of the market. Unlike broad environmental hazards that may be borne by an individual who has a remote relationship to the party generating the risk, job hazards arise in an employment relationship. The employer that controls both the work environment and overall work operations hires the worker at some wage rate to perform certain tasks. Implicitly if not explicitly, the worker accepts the job and its associated characteristics, including the risk level and the remuneration associated with it. Thus if risks are known, workers will demand additional compensation for the hazards. This compensation could be provided through a higher base wage rate or, after an injury, through insurance benefits.

With perfect markets, the mix of the various forms of compensation

3. For a broader perspective, see W. Kip Viscusi, Risk by Choice: Regulating Health and Safety in the Workplace (Harvard University Press, 1983); and Viscusi, Employment Hazards.
will be optimal and the risk level will be efficient. Employers will continue investing in safety until the cost incurred just equals the savings achieved in compensation and injuries avoided. Workers will be fully compensated before any accidents for the expected welfare loss to which they are exposed. The additional wage and insurance benefits will equal or exceed the value of their expected loss from injury. Although compensated ex ante, workers will not generally be fully compensated after an injury except when losses are purely financial, in which case risk-averse workers will obtain full insurance for their potential loss in earnings. Because of the wage premium they receive, workers will, however, be better off if no injury occurs, and overall they will not be worse off because of the presence of job risks.

By almost any standard the wage adjustment that workers receive for risk is substantial—an estimated $90 billion in 1985 dollars for the private sector as a whole. Ex ante compensation is substantial on a unit risk basis as well. Table 6-1 summarizes estimates of the implicit values of life and injury reported in various studies of worker earnings. Consider, for example, results from the 1970–71 Survey of Working Conditions. A $3.2 million value of life means that workers receive compensation at the rate of $3.2 million for each expected life lost. Thus a worker facing the average blue-collar death risk of 1 in 10,000 receives extra annual compensation of $3.2 million × 1/10,000, or $320. Similarly, every death at a workplace alters workers’ perceptions of the risk and boosts wage levels employers must pay, thus providing a powerful incentive for firms to operate safely. Estimates of the implicit compensation value of nonfatal job injuries are roughly two orders of magnitude lower than the values of fatalities.

A major criticism of looking to additional compensation for a measure of the implicit values of job risks is that workers may not be fully aware of the risks of a given job when they decide to accept it. Such lack of information is no doubt important, particularly with respect to dimly understood health risks. Nevertheless, employers do provide substantial wage compensation for jobs with increased risks. And survey evidence indicates widespread awareness among workers of many risks they do face.

4. This estimate updates to 1985 prices my estimate of $69 billion in 1980 prices; see chapter 3 of Viscusi, Risk by Choice.

Table 6-1. Summary of Labor Market Studies of Wage Premiums for Job Risks
Thousands of constant 1985 dollars

<table>
<thead>
<tr>
<th>Investigator</th>
<th>Sample</th>
<th>Implicit value of life</th>
<th>Implicit value of nonfatal injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown</td>
<td>National Longitudinal Survey, 1967-73</td>
<td>1,100–1,700</td>
<td>n.a.</td>
</tr>
<tr>
<td>Viscusi</td>
<td>Panel Study of Income Dynamics, 1976</td>
<td>8,000–12,000*</td>
<td>35–39</td>
</tr>
<tr>
<td>Viscusi and Moore</td>
<td>Quality of Employment Survey, 1977</td>
<td>n.a.</td>
<td>37–45</td>
</tr>
<tr>
<td>Viscusi and O’Connor</td>
<td>Survey of Chemical Industry Workers, 1982</td>
<td>n.a.</td>
<td>11–14</td>
</tr>
</tbody>
</table>


n.a. Not available.

* a. Evaluated at the mean risk level for the sample for a model in which the heterogeneity in wage-risk trade-offs was assessed.

When workers accept jobs whose risks are not fully understood, additional market forces come into play. They may often learn about the risk through on-the-job experience, and if the information is sufficiently unfavorable, they can quit. Indeed, as many as one-third of all resignations among manufacturing workers may be due to job risks. Of course, such learning may involve experiencing a disabling on-the-job injury. And there is no assurance that workers will ever be fully informed.

Still, the market plays a central role in determining job safety outcomes.

Decisions by workers and employers dictate the jobs workers take and the risks to which they are exposed. Wage premiums for additional risk and such fringe benefits as sick leave, life insurance, and medical insurance provide the primary compensation they receive. Although their welfare typically will be reduced after experiencing an injury, in many cases workers receive compensation ex ante. Those who are exposed to risk but who are not injured will be paid more than they would have received in a risk-free job. And before an injury takes place, they will find the position attractive, given their perceptions of the risk.

Direct Regulation of Risk

Since workers typically will not be fully informed of all the risks they face, market incentives for improving safety may be inadequate. Even if full information were available and risk levels were efficient, society might wish to promote additional reductions in risk to reflect its altruistic concern with individual health.

Control of risks on the job is the primary function of the Occupational Safety and Health Administration, whose mandate is "to assure so far as possible every working man and woman in the Nation safe and healthful working conditions." Compensating accident victims is excluded from the agency's functions and must be met by market forces, workers' compensation, and the civil liability system.

OSHA's primary regulatory strategy has therefore been to issue health and safety standards, which are then enforced by its inspectors, who have the authority to levy fines on firms that do not comply. The agency began operating by adopting industry consensus standards, such as those of the American National Standards Institute, which pertained largely to safety concerns rather than health risks. OSHA's more recent activities have emphasized setting standards for health risks not covered by the initial standards. Table 6-2 summarizes major OSHA regulations that have been issued or proposed since 1972. The standards have been ranked according to diminishing cost-effectiveness as measured by the cost per life saved.

While most of the standards listed in table 6-2 concern health hazards, the most cost-effective standards concern safety. It is also striking that the cost per life saved for roughly half of these regulations greatly exceeds estimates of the value of life revealed by workers' labor market decisions.
Table 6-2. Cost per Life Saved for OSHA Standards

<table>
<thead>
<tr>
<th>Regulation</th>
<th>Year</th>
<th>Status</th>
<th>Nature of risk</th>
<th>Initial risk (annual)</th>
<th>Lives saved (annual)</th>
<th>Cost per life saveda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil and gas well servicing</td>
<td>1983</td>
<td>P</td>
<td>Safety</td>
<td>$1.1 \times 10^{-3}$</td>
<td>50,000</td>
<td>0.1</td>
</tr>
<tr>
<td>Underground construction</td>
<td>1983</td>
<td>P</td>
<td>Safety</td>
<td>$1.6 \times 10^{-3}$</td>
<td>8,100</td>
<td>0.3</td>
</tr>
<tr>
<td>Servicing wheel rims</td>
<td>1984</td>
<td>F</td>
<td>Safety</td>
<td>$1.4 \times 10^{-5}$</td>
<td>2,300</td>
<td>0.5</td>
</tr>
<tr>
<td>Crane suspended personnel platforms</td>
<td>1984</td>
<td>P</td>
<td>Safety</td>
<td>$1.8 \times 10^{-3}$</td>
<td>5,000</td>
<td>0.9</td>
</tr>
<tr>
<td>Concrete and masonry construction</td>
<td>1985</td>
<td>P</td>
<td>Safety</td>
<td>$1.4 \times 10^{-5}$</td>
<td>6,500</td>
<td>1.4</td>
</tr>
<tr>
<td>Hazard communication</td>
<td>1983</td>
<td>F</td>
<td>Safety</td>
<td>$4.0 \times 10^{-5}$</td>
<td>200,000</td>
<td>1.8</td>
</tr>
<tr>
<td>Grain dust</td>
<td>1984</td>
<td>P</td>
<td>Safety</td>
<td>$2.1 \times 10^{-4}$</td>
<td>4,000</td>
<td>2.8</td>
</tr>
<tr>
<td>Asbestos</td>
<td>1972</td>
<td>F</td>
<td>Health</td>
<td>$3.9 \times 10^{-4}$</td>
<td>396,000</td>
<td>7.4</td>
</tr>
<tr>
<td>Benzene</td>
<td>1985</td>
<td>P</td>
<td>Health</td>
<td>$8.8 \times 10^{-4}$</td>
<td>3,800</td>
<td>17.1</td>
</tr>
<tr>
<td>Ethylene oxide</td>
<td>1984</td>
<td>F</td>
<td>Health</td>
<td>$4.4 \times 10^{-5}$</td>
<td>2,800</td>
<td>25.6</td>
</tr>
<tr>
<td>Acrylonitrile</td>
<td>1978</td>
<td>F</td>
<td>Health</td>
<td>$9.4 \times 10^{-4}$</td>
<td>6,900</td>
<td>37.6</td>
</tr>
<tr>
<td>Coke ovens</td>
<td>1976</td>
<td>F</td>
<td>Health</td>
<td>$1.6 \times 10^{-4}$</td>
<td>31,000</td>
<td>61.8</td>
</tr>
<tr>
<td>Asbestos</td>
<td>1986</td>
<td>F</td>
<td>Health</td>
<td>$6.7 \times 10^{-3}$</td>
<td>74,700</td>
<td>89.3</td>
</tr>
<tr>
<td>Arsenic</td>
<td>1978</td>
<td>F</td>
<td>Health</td>
<td>$1.8 \times 10^{-3}$</td>
<td>11,000</td>
<td>92.5</td>
</tr>
<tr>
<td>Acrylonitrile</td>
<td>1978</td>
<td>R</td>
<td>Health</td>
<td>$9.4 \times 10^{-4}$</td>
<td>0.600</td>
<td>308.0</td>
</tr>
<tr>
<td>EDB</td>
<td>1983</td>
<td>P</td>
<td>Health</td>
<td>$2.5 \times 10^{-4}$</td>
<td>0.002</td>
<td>15,600.0</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>1985</td>
<td>P</td>
<td>Health</td>
<td>$6.8 \times 10^{-7}$</td>
<td>0.010</td>
<td>72,000.0</td>
</tr>
</tbody>
</table>

a. F = final rule; P = proposed rule; R = rejected rule.
b. Millions of 1984 dollars.

Although the exact cutoff for excessively stringent standards may not be clear, all standards following asbestos appear to impose costs that well exceed the benefits generated. The least cost-effective of OSHA's regulations in force is the arsenic standard, which imposes estimated costs of $92.5 million per life saved. More lives could be saved at less cost by redirecting the emphases of OSHA's policies.

The most ambitious of OSHA's regulatory initiatives in the 1980s has been its requirement that manufacturers label their hazardous chemicals and meet other informational requirements. The agency adopted the requirement because it believed that substance-by-substance regulation of the thousands of hazardous chemicals in the workplace was not feasible. From an economic standpoint the labeling strategy is attractive because it addresses directly the market's failure to provide adequate information. Although employers began to comply with this regulation only in 1986, and so it is too early to assess its effectiveness, a field study of the responses
Table 6-3. Worker Responses to Hazard Warnings

<table>
<thead>
<tr>
<th>Item</th>
<th>Asbestos</th>
<th>Chloroacetophenone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual probability of injury before warning</td>
<td>.09</td>
<td>.10</td>
</tr>
<tr>
<td>Annual probability of injury after warning</td>
<td>.26</td>
<td>.18</td>
</tr>
<tr>
<td>Fraction of workers requiring a wage increase</td>
<td>.71</td>
<td>.48</td>
</tr>
<tr>
<td>Risk premium (dollars)</td>
<td>2,995.59</td>
<td>1,915.01</td>
</tr>
<tr>
<td>Probability of quitting before warning</td>
<td>.13</td>
<td>.10</td>
</tr>
<tr>
<td>Probability of quitting after warning</td>
<td>.65</td>
<td>.23</td>
</tr>
</tbody>
</table>


of workers from different plants suggests that the information may be having a dramatic effect. The general nature of the results is reflected in representative statistics in Table 6-3 for two health hazards: asbestos, a well-known carcinogen, and chloroacetophenone, an industrial chemical that causes eye irritation. In each case, workers were shown a label of the type now used by chemical firms with labeling systems. For both hazards the perceived annual risk level, which is scaled in frequency terms comparable to the Bureau of Labor Statistics injury and illness rates, was about one chance in ten before seeing the label. The hazard warning almost tripled the perceived risk in the case of asbestos and doubled it for chloroacetophenone. The fraction of workers who viewed their jobs as high risk (above the national injury risk) also escalated. These increases in risk perceptions were accompanied by a desire for additional wage compensation in many instances (over 70 percent for asbestos), the average premium being $3,000 for working with asbestos and $1,900 for chloroacetophenone. Finally, if the workers did not receive additional pay, they would be more likely to quit their jobs, particularly if they worked with asbestos.

Although the hazard communication standard has substantial promise, OSHA standards generally have not yet had the dramatic effects that policymakers envisioned. The most favorable empirical evidence of the agency's efficacy suggests that from 1973 to 1983 its regulations reduced all work injuries and illnesses by 2.6 percent, injuries and illnesses causing lost days of work by 3.6 percent, and the rate of total lost workdays by 6.1 percent.8 The percentage reduction in injuries is largest for the more severe types, which suggests that OSHA targets more severe hazards disproportionately. Nevertheless, because the agency's rate of inspections and

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the number of penalties assessed have remained low, its regulations have had at best only a moderate effect on workplace health and safety.

OSHA's role can thus be viewed as augmenting that of the market in providing incentives to control risks in the workplace. Unfortunately, its regulations have not fulfilled their initial promise because the standards have often focused on small risks that are expensive to reduce and the enforcement effort has been relatively weak. Many of these shortcomings could be remedied by more effective agency leadership that would recognize there are simply too many hazards to control comprehensively. The issuance of the hazard communication standard was in part an admission of this inadequacy.

Workers' Compensation

Before the twentieth century, workers who suffered accidents on the job and sought compensation could do so only by filing a lawsuit against their employers and could win only by showing that those employers were careless or negligent. Reliance on the traditional remedies of liability litigation posed a variety of difficulties, however, which no doubt led to the creation of the no-fault system of workers' compensation. An average of one in twenty-five workers suffers an accident each year that leads to lost work time. The lawsuits resulting from such injuries could cause a considerable judicial burden, impose sizable legal costs on employers, and create impediments through legal fees and time delays in workers' obtaining compensation. Tort remedies also do not ensure compensation, since employers can invoke several defenses: contributory negligence, assumption of risk, and the fellow servant rule. Finally, judicial remedies put employer and worker in an adversarial relationship. Since most workplace injuries are temporary, after which the worker returns to his job, filing a lawsuit may damage a relationship that both parties would have liked to preserve.

In large part because of such factors, states have established workers' compensation programs. These statutes typically cover all injuries aris-

9. For a discussion of these principles, see W. Page Keeton, ed., Prosser and Keeton on the Law of Torts (St. Paul: West Publishing, 1984), p. 573. Thus the employer could argue that the worker's carelessness contributed to the accident (contributory negligence), that the worker was aware of the risk and incurred it voluntarily (assumption of risk), or that the worker assumed the risk posed by his "fellow servants" upon accepting employment from the "master" (fellow servant rule).
ing out of and in the course of employment, regardless of fault. For the injuries it covers, workers' compensation represents the sole remedy; the worker is generally barred from seeking a recovery from the employer through common law.\textsuperscript{10}

These restrictions do not imply that litigation has no function but only that it has a subsidiary one. In some cases of extreme negligence or intentional misconduct, workers can sue employers. They can also sue third parties who manufactured the products contributing to the injury. Thus a forklift driver injured on the job can sue the manufacturer if, for example, a defect in the forklift led to the accident. On balance, however, workers' compensation programs require employees to sacrifice their right to sue employers for the costs imposed by on-the-job injuries in return for receiving some amount of compensation. To receive compensation, workers must show they suffered an injury arising out of and in the course of employment—and that requirement is not innocuous. For example, causality is much simpler to show for accidents than for illnesses, and as a result, workers' compensation benefits serve primarily as accident compensation. The adverse effects of health hazards, particularly those with long gestations, are often not compensated.

For injuries that are covered, the level of compensation is reasonably generous. The typical state formula provides for replacement of two-thirds of wages, subject to various constraints on minimum benefit levels, maximum benefit levels, and benefit duration.\textsuperscript{11} Since these benefits are not taxable, their value is often comparable with the value of the worker's net earnings before the injury.\textsuperscript{12} The levels of benefits under workers' compensation, however, are somewhat lower than those in products liability awards because workers are paid regardless of fault.\textsuperscript{13}

Employers bear the cost of workers' compensation by paying insurance premiums, whose costs provide a financial incentive to maintain a

\textsuperscript{10} Ibid., pp. 574–75.


\textsuperscript{13} A substantial level of replacement was provided for workers included in the University of Michigan Quality of Employment Survey analyzed in W. Kip Viscusi and Michael J. Moore, "Workers' Compensation: Wage Effects, Benefit Inadequacies, and the Value of Health Losses," \textit{Review of Economics and Statistics}, vol. 69 (May 1987), pp. 249–61. Taking into account the tax status of benefits, the rate of wage replacement for this 1976 sample was 0.835.
safe workplace. Employers that self-insure or those large firms that are strongly merit-rated will be most influenced by these incentives. The provision of such benefits, however, also reduces workers' incentives to avoid accidents, since, after all, they are not footing any part of the premium. Several recent studies suggest that the effect on these incentives may be significant.\textsuperscript{14}

The costs of workers' compensation have increased greatly since the 1970s because benefit levels have become more generous. In 1983, the latest year for which data are available, workers received $22.9 billion in benefits. Table 6-4 shows yearly workers' compensation payments and after-tax premium costs paid by employers. Both payments and premiums have escalated dramatically since the mid-1970s and have led some observers to voice alarm.

The increasing premiums paint an overly simplistic portrait of the program's actual burden, however. Since workers value benefits both for their insurance aspects and their tax-exempt status, they would be

\[\text{Table 6-4. Workers' Compensation Benefits and Related Financial Effects, 1976–83} \]

<table>
<thead>
<tr>
<th>Year</th>
<th>Total premiums</th>
<th>Total payments\textsuperscript{a}</th>
<th>Wage reduction</th>
<th>Net employer savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976</td>
<td>10.9</td>
<td>7.6</td>
<td>29.9</td>
<td>22.3</td>
</tr>
<tr>
<td>1977</td>
<td>14.0</td>
<td>9.8</td>
<td>36.1</td>
<td>26.3</td>
</tr>
<tr>
<td>1978</td>
<td>16.6</td>
<td>11.6</td>
<td>39.4</td>
<td>26.8</td>
</tr>
<tr>
<td>1979</td>
<td>20.0</td>
<td>14.0</td>
<td>43.9</td>
<td>29.9</td>
</tr>
<tr>
<td>1980</td>
<td>22.0</td>
<td>15.4</td>
<td>44.3</td>
<td>28.9</td>
</tr>
<tr>
<td>1981</td>
<td>22.9</td>
<td>15.6</td>
<td>41.8</td>
<td>30.0</td>
</tr>
<tr>
<td>1982</td>
<td>22.5</td>
<td>15.8</td>
<td>37.0</td>
<td>21.2</td>
</tr>
<tr>
<td>1983</td>
<td>22.9</td>
<td>16.0</td>
<td>33.5</td>
<td>17.5</td>
</tr>
</tbody>
</table>

\textsuperscript{a.} Amounts have been adjusted to reflect after-tax costs to the firm.

willing to accept lower wages in return for additional benefits. Indeed, unless benefit levels are excessive, the wage reduction will exceed the actuarial value of benefits because risk-averse workers will value the insurance provided by workers' compensation by more than the expected payout. The estimates for two large samples of workers used to generate the wage reduction statistics in table 6-4 indicate that higher benefits lead to a wage offset more than double the current level of premiums. Thus, far from being a financial burden, workers' compensation actually produces net compensation cost savings for employers.¹⁵

These empirical results can also be used to ascertain the optimal level of benefits.¹⁶ In 1976 benefits were substantially underprovided because the wage reduction workers accepted greatly exceeded the cost of the benefits. But by 1983 levels of compensation had led to benefits close to their optimal level. In terms of efficient insurance, workers' compensation now fulfills its role for those adverse health outcomes covered by the program.

The key remaining inadequacy of workers' compensation is that victims of health hazards often have difficulty obtaining appropriate compensation. Because this problem plagues any compensation program, including civil liability litigation, it is instructive to explore it in detail. The central difficulty is that workers must prove their conditions are job-related. Meeting this test is straightforward when injuries are the result of accidents, but when occupational disease is involved, making an acceptable case for compensation is more difficult. Workers must not only prove they have the disease and that it has adverse health effects but must also prove the link between the disease and the job. Ascertaining such links is often difficult because diseases may have multiple causes, notably those stemming from the workers' own behavior (smoking, say, or alcohol consumption), and because the relative seriousness of different exposure levels may not be well understood. Except for a few "signature" diseases such as asbestosis or mesothelioma, which are caused by exposure to asbestos, the link to the job will be difficult to prove.

¹⁵. One possible offset to these savings is the moral hazard problem that may result if higher benefit levels lead to more accidents.

Even if the underlying medical relationship between substance and injury is clear, the worker's history of exposures may not be known. With diseases that occur after gestation of a decade or more, a variety of factors both on and off the job may have contributed. Since record-keeping over long time periods is often nonexistent, it may not be possible to ascertain, for example, what the worker's history of exposure to toxic chemicals has been. Indeed, until the advent of the OSHA hazard communication regulation, it might not have been possible to discover the nature of workers' present exposures. More fundamentally, it may not be possible to verify workers' plant locations and the nature of their jobs.

Workers' compensation statutes impose strict requirements for establishing the relationship between injury and entitlement to benefits. They typically stipulate that a worker must prove the disease is not one of the "ordinary diseases of life" but is "peculiar to the worker's occupation." Some statutes require a worker to have been exposed to the hazard for a specific length of time before granting eligibility for compensation, even though the disease may be caused by a briefer exposure.17

If these requirements are met, a worker still may not be able to collect because the statute of limitations may have expired. Some statutes require the worker to file for compensation within a particular period after disablement. Such tests do not appear to be overly restrictive except when the worker does not realize the disease is job-related. Although the usual period is one or two years, if only a short time is allowed, the worker may not have sufficient time to identify the cause of the ailment.18 The first incidents of liver cancer caused by exposure to polyvinyl chloride, for example, did not lead to widespread awareness of the job risk because they were very rare and were dismissed as random occurrences. Only after diseases become more widespread and better publicized do people become sufficiently aware of their jobs' role in causing the injury.

Much more restrictive in their effects are requirements that workers be employed at the firm where the disease occurred for a minimum period of time—the average is eight years.19 This is much shorter than

the usual gestation period for cancer. If workers have changed jobs or retired, they may be unable to qualify for benefits.

These difficulties in the structure of workers' compensation are reflected in compensation payments. Employers are six times as likely to contest a disease-related claim as they are an accident-related one, and they win in two-thirds of these cases, usually on the issue of compensability.20 Even cases that do result in a compensation payment often involve a prolonged administrative battle; indeed, 60 percent of all such awards are initially denied.21

The net effect is that few victims of diseases that workers believe to be occupationally related receive compensation. For disabling illness, estimates of workers compensated range from one in thirty to one in twenty.22 Five percent or less of these cases are covered. The successful claim rate is higher when the worker has died; about one-third of these cases receive compensation.

When a clear link between the job and the disease is apparent, the success rates for claims may be much higher. For example, one survey of fatality claims based on exposure to asbestos stated that 61 percent of the claims had been awarded, 25 percent had resulted in an agreement to a modified compensation level, 3 percent had been denied, 6 percent were pending, and 1 percent had been dropped.23 But cases of diseases related to asbestos have received widespread publicity; the success rate of these claims is much higher than for occupational diseases overall. In this sense, asbestos might be viewed as a "best case" for the functioning of workers' compensation.

The low level of benefits received for occupational disease claims often results from the tendency of claimants to negotiate settlements in contested cases. To the extent that there are causes of the disease that are not job-related, this practice may simply reflect the degree of exposure on the job. Public and private compensation combined replace 40 percent of all wages for severely disabled victims of occupational diseases; they replace 60 percent of the wages for all injury classes combined.24

24. Ibid.
These statistics, however, suggest a much higher level of income support for those with occupational diseases than did the workers' compensation statistics cited earlier. The reason for the discrepancy is that workers' compensation is only a minor source of support for the disabled. The main source is social security (53 percent); others include pensions (21 percent), veterans' benefits (17 percent), and private insurance (1 percent).\(^25\) Workers' compensation accounts for the remainder, or only 5 percent of compensation for occupational diseases.

The relatively small contribution of workers' compensation no doubt results from the difficult practical and legal task of establishing a causal link between a job-related exposure and a particular disease. Although existing statistics on self-assessed occupational disease are inherently arbitrary, they do suggest that few such cases are compensated while the worker is ill. More are compensated after death.

Since the major factor limiting compensation is the issue of causality, occupational diseases often get treated much like nonoccupational ailments. Private pension and insurance provide income support, as do social insurance efforts such as social security. From the standpoint of the individual's welfare, the source of the compensation is not of great consequence; it is the level that matters. Social security disability insurance provides income support for workers with long-term disabilities, irrespective of cause. The extent of earnings replacement hinges on a formula linked to the worker's past earnings. These benefits take the form of an annuity payable for life.

In terms of equity, victims of occupational diseases do better than victims of other illnesses but worse than victims of accidents on the job. To the extent that victims of occupational disease can receive workers' compensation benefits whereas victims of nonoccupational injuries and illnesses cannot, they can fare better overall. In accident cases, however, workers' compensation serves an additional function: it encourages employers to provide a safe workplace because premium levels are tied to accident rates. Occupational disease payments provide less incentive since causality is more difficult to ascertain.

Nevertheless, workers' compensation may result in overpayment for victims of occupational disease who collect from more than one source. Since workers' compensation benefits are not automatically deducted from product liability awards, a victim could potentially collect workers' compensation and reap the benefits for a successful product liability

\(^{25}\) Ibid.
lawsuit. To avoid such duplication, proposals have been made to reduce the level of the settlements in civil suits by the amount of workers' compensation benefits received. Variations of this proposal are discussed in chapter 8.

Civil Liability Litigation

Institutional Interactions

Workers' compensation is so dominant a force in compensating for accidents on the job that some observers have questioned whether compensation provided through civil litigation will be of any consequence whatsoever in the long run. Indeed, Keeton and his colleagues have predicted the eventual demise of such litigation:

There is thus a substantial and still important area of labor litigation in which the older law still has significance and vitality. The whole trend is toward cutting it down, making further inroads upon it by bringing as much as possible within the compensation acts; and its ultimate extinction appears only to be a question of time—which, however, may not mean anything immediate.

Although the workers' compensation system is well suited to addressing workplace injuries, illnesses plausibly connected to occupational exposure pose continued problems. Workers not only have difficulty in proving that their diseases were caused on the job, but the benefits they receive if they can establish eligibility may not compensate for the economic and noneconomic (pain and suffering) costs they experience. Accordingly, workers have strong incentives to explore other options for obtaining compensation for severe job-related illnesses and injuries. Chief among these options is a third-party lawsuit against the maker of a product involved in a job accident. Because this option is being increasingly pursued, remedies provided through liability litigation will continue to be important to workers.

Is this desirable? From the standpoint of optimal compensation, accident victims should obtain efficient insurance reimbursement from whatever source might provide it. Thus if they cannot obtain adequate income support and medical reimbursement from workers' compensa-

26. One such initiative was the proposal of Senator Robert Kasten of Wisconsin, the Product Liability Act, S2631, introduced in June 1982.

27. Keeton, Prosser and Keeton on the Law of Torts, p. 575
tion, additional reimbursement through a product liability award is desirable.

Workers may, however, do more than use product liability suits to fill the gaps left by workers' compensation. Although workers' compensation is the employee's exclusive remedy against an employer for injuries covered by the program, such coverage in no way precludes an additional claim against a third party involved in an accident. Recent evidence suggests that efforts to boost levels of workers' compensation have raised benefits for injuries from an inadequate level to roughly their optimal amount.28 Thus from the standpoint of efficient insurance against income losses, a multiple recovery for injury may lead to overcompensation. For diseases, however, compensation may remain insufficient because benefits are subject to caps and duration limits. Such caps may be particularly important in cases of job-related fatalities, since the death benefits under workers' compensation are very limited. In addition, the quality and level of medical care provided through workers' compensation tends to be minimal. Injuries requiring extensive medical expenditures, such as repeated plastic surgery or specialized vocational rehabilitation, are not well handled. Nor is the best possible care generally provided. In situations in which highly specialized and expensive treatment would have a clear benefit, the court can provide for such care, but these determinations can add costs and delays to treatment.

A second objective of litigation is to provide proper incentives for risk reduction. Workers' compensation awards consist exclusively of compensation for loss of income and medical expenses. Product liability awards cover these losses as well as compensation for pain and suffering. Making the employer or producer of workplace equipment responsible for these expenses provides some financial incentive to encourage safety on their part. Nevertheless, in practice, these incentives appear muted.

Table 6-5 summarizes the average levels of compensation provided in court awards and out-of-court settlements in product liability cases concluded in 1977 (updated in 1985 prices). Although the levels of compensation are not negligible, they are below the values workers have assigned for prevention of these health outcomes, particularly fatalities. Product liability awards for fatalities average roughly one-tenth of the

28. See Moore and Viscusi, "Have Increases in Workers' Compensation Benefits Paid for Themselves?"
Table 6-5. Distribution of Liability Awards by Severity of Bodily Injury, 1977

<table>
<thead>
<tr>
<th>Severity of injury</th>
<th>Percentage of parties with payment</th>
<th>Average payment (1985 dollars)</th>
<th>Percentage of total payments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>3.6</td>
<td>219,237</td>
<td>18.8</td>
</tr>
<tr>
<td>Permanent total disability</td>
<td>3.0</td>
<td>421,374</td>
<td>29.9</td>
</tr>
<tr>
<td>Permanent partial disability</td>
<td>2.3</td>
<td>259,443</td>
<td>14.2</td>
</tr>
<tr>
<td>Temporary total disability</td>
<td>23.0</td>
<td>27,316</td>
<td>15.0</td>
</tr>
<tr>
<td>No disability</td>
<td>68.2</td>
<td>13,626</td>
<td>22.2</td>
</tr>
<tr>
<td>Full sample</td>
<td>100.0</td>
<td>41,894</td>
<td>100.0</td>
</tr>
<tr>
<td>Unknown</td>
<td>...</td>
<td>69,836</td>
<td>...</td>
</tr>
</tbody>
</table>


a. The 1977 average payment figures were updated to 1985 values using the CPI.

value of life reflected in the wage-risk trade-offs summarized in table 6-1 and as a result provide too little incentive for safety. Moreover, the safety incentives that are created are dampened by employers' insurance arrangements. Workers' compensation rates for employers who do not self-insure are often governed by industry average risks, so that a firm's specific performance is, at best, only partly reflected in the rates. Similarly, many employers insure against adverse product liability judgments, thus reducing the incentive. The possibility of multiple benefit recoveries encourages safety precautions, but it does so less efficiently than could be achieved through direct OSHA regulation.

A related aspect of workers' compensation and product liability awards is that subrogation and indemnification rules permit the party reimbursing a victim for accident losses to sue a third party to recover his losses. Consider, for example, a worker who is injured while driving a defective forklift and obtains a workers' compensation award. A subrogated fund acquires the employee's right to sue the manufacturer for losses imposed by the defective product. While this legal remedy is feasible, the cost of litigating such a claim reduces its usefulness except when the potential award is very large.

Civil litigation also interacts with government safety regulations. Under current products liability law, the plaintiff can cite a violation of an OSHA safety standard as evidence of failure to adhere to the proper strict liability or negligence standards, thus greatly enhancing the chance of a successful suit. Some observers have suggested that compliance with OSHA and Consumer Product Safety Commission regulations

might be used as a defense in such cases. But compliance may not be sufficient because these regulations are not comprehensive. In some instances there may be no regulation at all addressing a particular hazard; in others the regulation may not be sufficiently specific. For example, OSHA’s hazard communication regulation requires that hazardous chemicals used by manufacturing workers be labeled, but it does not specify the label content or format. A products warnings case would explore intensively the adequacy of the label of a specific product.

Nevertheless, it may be sensible to rely on compliance with government regulations as a defense when the relevant regulation constitutes a highly specific design standard. The OSHA standard for ladders, for example, imposes meticulous design constraints. If these standards limit the manufacturer’s discretion to such an extent that it cannot greatly alter the product’s safety-related attributes, then regulatory compliance takes on added significance.

The chief mechanisms that must establish effective incentives for safety are market forces and government regulation. If these institutions do not establish such incentives, then one cannot rely upon the compensation-oriented institutional approaches to do so.

The joint influence of workers’ compensation and tort liability may be nil if a successful claim cannot be filed. If claimants succeed with respect to other remedies, there will be potential overcompensation of victims, leading to dual recovery and inadequate incentives to work safely. This seemingly paradoxical combination of possible overinsurance and inadequate prevention stems from the fact that health risks involve nontransferable, nonmonetary outcomes. The optimal level of insurance compensation for a fatality may be an amount such as $300,000, depending on the victim’s age and family composition, but the appropriate value of life from the standpoint of prevention may be an order of magnitude larger. This divergence between the values for prevention and compensation highlights the need for relying on more than a single institution to meet multiple objectives.

**Liability Criteria**

Over the past decade third-party lawsuits to obtain compensation for job-related diseases have become increasingly prominent. The asbestos lawsuits and the Agent Orange lawsuits filed by Vietnam veterans are

key examples. Yet many of the limitations of the workers' compensation system also plague products liability litigation, even under the strict liability doctrine increasingly used to resolve such disputes.

To make a successful case under strict liability, one must show that the product was defective, that the defect caused the injury, and that the defendant was responsible.\textsuperscript{31} Defendants can defeat such claims by showing that at least one of these conditions has not been met. It is instructive to explore each of these criteria in turn, particularly with respect to the difficulties posed in disease cases.

\textbf{Proving a Defect.} The principal test for whether a product is defective is whether the activity involving its use is "abnormally dangerous."\textsuperscript{32} The American Law Institute suggests that this standard will be met where the risk is large, severe, and arises from some inappropriate aspect of the activity. Although disease victims are required to exercise "reasonable care," and therefore defendants' liability is not absolute, contributory negligence is not generally a successful defense in cases involving on-the-job exposures.\textsuperscript{33}

\textbf{Proving Causation.} The plaintiff must also demonstrate that the product defect caused the injury. In situations involving diseases such as cancer there are typically multiple causes that cannot be readily distinguished. Indeed, the prominence of asbestos-related lawsuits was certainly due in large part to the clear scientific evidence linking exposure to asbestos with mesothelioma and asbestosis. In many other situations, however, the evidence is far less clear; the long gestation for many diseases makes the process of inferring causal linkages especially difficult.

These lags have additional implications for applying statutes of limitations. The time limits vary, but they typically run from one to six years after the date of injury or exposure in negligence and strict liability lawsuits and from three to twenty years from the date of sale in warranty cases.\textsuperscript{34} In states where the time period begins at the date of exposure to the hazard, these limits undermine many attempts to secure compensation.

Courts and legislatures in more than forty states have responded to this problem by ruling that the statute of limitations does not begin to run until the injury has been discovered. In thirteen of these states, the

\textsuperscript{31} \textit{Injuries and Damages from Hazardous Wastes—Analysis and Improvement of Legal Remedies}, Committee Print, 97 Cong. 2 sess. (GPO, 1982), p. 44.
\textsuperscript{32} American Law Institute, \textit{Restatement (Second) of Torts}, 520.
\textsuperscript{33} Government Research Corp., \textit{Victim Compensation}, p. 45.
\textsuperscript{34} "Note: Compensating Victims." n. 920
time begins after the individual has ascertained or could reasonably have ascertained the causal connection between the job and the illness. 35 Such provisions reduce the formal legal barriers that must be hurdled before a plaintiff can win a case, but they do not eliminate the more general problem of establishing the link between a particular exposure and the disease.

PROVING THE DEFENDANT'S RESPONSIBILITY. Plaintiffs must show that defendants are responsible for the risk. In practice plaintiffs must show that they were exposed in some way to the product of a specific manufacturer that carried the risk. Because of the long time lags involved in many occupational disease cases, plaintiffs may have great difficulty in meeting this test, especially in linking a particular producer with the risk. A worker who used asbestos in manufacturing fireplaces, for example, might not know the identity of the supplier.

Some courts have resolved the identification problem by finding that all producers of a particular substance should be held liable. 36 But this resolution raises still other problems: how should liability be allocated? One practical procedure is to assess liability on the basis of market share. 37

In some cases the costs are borne by insurance companies as well as producers, but this not only increases the number of parties involved, it also complicates the informational requirements, since courts must ascertain which insurer should be held liable and in what amount. In many cases insurance has been sold off to excess carriers or reinsurance companies, introducing additional parties. And the courts' task may be further complicated if such coverage has been written decades ago.

Producers can still avoid liability, however, if they can establish that plaintiffs assumed the risk of injury, that they were aware of the risk and incurred it voluntarily. Much of the impetus for the voluntarily adopted chemical labeling efforts has come from a desire to inform users of the chemical of the risks they face, thus reducing the prospects that producers will be held liable for workers' injuries.

OTHER COMPLICATING FACTORS. Even if the victims must be able to make a case for compensation, they may not be able to collect. The party found responsible may not have sufficient funds to pay all the claims. Or the firm may have closed—indeed, over several decades firms

35. Injuries and Damages from Hazardous Wastes, pp. 43–44.
37. Injuries and Damages from Hazardous Wastes, pp. 61–62.
face a reasonably high probability of closure. But even if the firm remains in business, a surge in the number of lawsuits may threaten its financial viability. Many risks, such as those posed by asbestos or a nuclear power plant catastrophe, will affect a large number of people simultaneously. In the absence of legally mandated caps on awards or unusual insurance protection, resources will be insufficient to meet all valid compensation claims. Claims involving diseases may well be in the billions of dollars—possibly over $38 billion for asbestos alone. Very large levels of payoffs might threaten the viability of the insurance industry and would even have a sizable fiscal impact if the government were the insurer. Opportunities for reorganization under bankruptcy laws enhance the possibility that there will be a limit on the potential liability lower than the total value of legitimate compensation claims.

Despite these shortcomings, products liability provides an important source of compensation for job-related diseases. Almost one-third of all products liability claims are for industrial accidents. But only 11 percent of those who received payment in products liability claims for bodily injury received it for job-related causes. These claims were, however, for much larger amounts than the typical bodily injury award. Roughly 42 percent of total payments were for accidents caused by industrial hazards, and the average payment was $98,000 (in 1976 dollars).

Much of the average award, however, goes toward legal fees, expert witnesses, and court costs. Overall, only 37.5 cents of every product liability insurance premium dollar goes to claimants. In part, this reflects traditional insurance company administration and overhead, which reduces the amount of the total premium that is paid out to resolve claims. The victims' share of the actual award devoted to legal and other expenses is much greater. In one small sample of asbestos settlements, which differs from the aggregative sample for all injuries cited above, 41 percent of all compensation was used to pay legal fees and other litigation expenses. The average performance of the products liability compensation system may be much better. Indeed, the

litigation cost per case should decrease as the legal precedents in these cases become clear-cut and the outcomes more predictable. As a result, legal costs should constitute a decreasing share of total products liability awards.

**Asbestos Claims**

As just noted, firms may not have the resources to pay all valid products liability claims, especially as liability doctrines result in greater awards. The asbestos claims provide the most dramatic and best documented illustration of this problem.

Exposure to asbestos poses several risks. It may lead to asbestosis, which involves scarring of the lungs and pulmonary insufficiency that may be fatal. This is a chronic, noncancerous disease. Asbestos may also lead to lung cancer, which is the cause of death for one-fifth of all asbestos workers. This risk may interact with cigarette smoking, which is believed to increase the incremental asbestos mortality rate (relative to nonsmoking workers not exposed to asbestos) by ten times. Asbestos is also the principal cause of mesothelioma, a cancer that affects the lining of the lung or abdominal wall. Finally, a number of other types of cancer (for example, gastrointestinal cancer) have also been linked to asbestos, but no dose-response relationship has been estimated. As in the case of lung cancer, there are other possible causes of these diseases so that it is often difficult to infer the contributory role of asbestos exposures.43

Even in situations of multiple causality, the extremely potent carcinogenicity of asbestos makes it a strong candidate for causing the disease. A nonsmoking asbestos worker, for example, faces five times the mortality rate from lung cancer as workers who do not smoke and who are not exposed to asbestos, and faces roughly half the risk of a cigarette smoker.44 If, however, a worker smokes cigarettes and is exposed to asbestos, his mortality rate from lung cancer is fifty times that of a nonsmoker who does not work with asbestos. The net effect of such powerful risks is that asbestos may account for up to one-half of all cases of occupational cancer.

These potent hazards in turn have given rise to a rapid increase in


44. Ibid., pp. 332–35.
asbestos-related lawsuits that began in 1973 with the application of
strict liability principles in products liability lawsuits. One leading
asbestos producer, the Manville Corporation, had 16,500 suits pending
against it in 1982, with an estimated potential cost of $660 million.\textsuperscript{45}
Over 100,000 additional suits against Manville are anticipated by 1992.
The settlements in asbestos-related cases averaged $72,000 from 1967
to 1976, of which an average of $28,500 was spent to cover legal fees.\textsuperscript{46}
The total price tag to the industry of the settlements and litigation
expenses up to 1982 has been estimated to be $1 billion. One-third of
this amount has been borne by asbestos producers and two-thirds has
come from insurance firms.\textsuperscript{47}

As significant as these amounts may seem, the primary costs imposed
by asbestos-related diseases will appear in lawsuits that have yet to be
resolved or settled. The best estimate of the financial liability of the
asbestos industry, based on compensation payments made to claimants
thus far, is $38.2 billion.\textsuperscript{48} The range of estimates is $7.6 billion to
$87.1 billion, a disparity caused by the possibly substantial variation in
several key parameters—the incidence of the disease, the average settle-
ment, and the rate of growth in claims.

To put the asbestos costs in perspective, it is instructive to compare
them with the potential resources available for compensating victims.
The combined net worth as of 1982 of the fifty-one insurance companies
involved in asbestos claims was $11.5 billion. The net worth of the
asbestos industry was $15.6 billion, but the pertinent amount will be
less than this figure to the extent that firms create asbestos-related
subsidiaries, as has Manville, giving it protection from some claims
under Chapter 11 of the federal bankruptcy laws.\textsuperscript{49}

In short, the financial resources available to pay asbestos claimants
are not likely to be sufficient to cover the cost. Even the combined net
worth of the asbestos industry and all insurance companies that have
paid asbestos claims will not suffice.

For this and other reasons, alternative approaches involving govern-
ment action have been suggested. These include shifting the burden of
the claims to the federal government, establishing a more modest com-
ensation system, and setting up a pool of funds to pay future claimants.

\textsuperscript{46} Selikoff, \textit{Disability Compensation}, p. 11.
\textsuperscript{47} Kakaliq, \textit{Costs of Asbestos Litigation}, p.v.
\textsuperscript{48} MacAvoy, "Economic Consequences of Asbestos-Related Disease," p. 66.
\textsuperscript{49} Ibid., pp. 77–78.
Toxic Tort Compensation Schemes

The genesis of the recent compensation proposals for victims of occupational disease can be traced to insurance arrangements mandated for hazardous wastes, as well as to the longer-term role of workers' compensation in supporting victims of job accidents. Under the Resource Conservation and Recovery Act, the owner of a landfill or hazardous waste site must maintain insurance coverage for liability up to $6 million, excluding legal fees.\textsuperscript{50} The Comprehensive Environmental Response, Compensation and Liability Act imposes similar requirements on vessels that transport hazardous substances: they must have insurance coverage up to the maximum of either $300 per gross ton of hazardous waste carried or $5 million.\textsuperscript{51} The Superfund Study Group has proposed changes in mechanisms of compensation that would alter the legal structure to make compensation for exposure to hazardous waste more like the workers' compensation system.\textsuperscript{52}

\textit{Occupational Disease Compensation}

The concept of targeting a compensation program on victims of occupational disease is not new. Since its establishment in 1969 the black lung program has provided income support to coal mine workers disabled by the disease.\textsuperscript{53} This program differs from workers' compensation in that the eligibility criteria are generous. A worker was initially presumed to be totally disabled from black lung disease if he had worked in a coal mine for at least ten years and had medical evidence of complicated pneumononconiosis. The program was later expanded to include respiratory and pulmonary impairment (plus fifteen years of coal mining employment). Benefits took the form of an annuity that was not tied to worker wages. The associated costs mushroomed from $1.50 million in 1970 to more than $1 billion by the late 1970s, in large part because of the increased number of claims. This unexpectedly rapid growth should provide a cautionary signal for all those who project costs for any disease compensation program. The estimates should be sufficiently large to include unexpected growth in claims.

In 1977 the financing of the black lung effort from general revenues

\textsuperscript{50} 29 CFR 264.147(b), as revised in 47 Federal Register 16555 (April 16, 1982).
\textsuperscript{52} Injuries and Damages from Hazardous Wastes, pp. 196–271.
was abandoned and a tax on coal production instituted (50 cents a ton for underground mines and 25 cents a ton for surface mines). Because this tax is not explicitly linked either to workplace conditions or to incidence of the disease, it creates no explicit incentives for particular mine operators to operate more safely. However, the tax will reduce coal output.

The basic outlines of the black lung program were found in the most prominent asbestos compensation policy proposed thus far—the Occupational Disease Compensation Act of 1983 (H.R. 3175). Often referred to as the Miller bill for its sponsor, Democratic Congressman George Miller of California, this act would have set up a program resembling workers’ compensation; the benefits would have served as workers’ exclusive remedy for asbestos-related exposures. Potential compensation would have been capped, but workers would have gained greater certainty of receiving compensation. Cases of mesothelioma would have been presumed to be asbestos-related. Lung cancer would have been covered by a similar presumption, provided that it occurred within ten years of the first job exposure. Funding would have been provided by a tax on employers linked primarily to relative market share rather than benefits awarded.

Although cost estimates are not available for this act, they are available for its antecedent, H.R. 5735. Based on an intermediate-risk assumption, total compensation costs for occupational diseases related to asbestos exposure will be $28 billion (using a 2 percent real interest rate). If, however, all non-job-related cases of lung cancer for asbestos workers are compensated, as the act would ensure, the cost would reach $98 billion.

These statistics highlight the major danger of disease compensation programs. The inherent difficulty of distinguishing job-related from other illnesses will boost costs well beyond what can be reasonably afforded—in this case more than tripling the burden.

It is instructive to compare these estimates with likely court-ordered compensation costs estimated by MacAvoy (also based on a 2 percent discount rate). If only lung cancers caused by job-related asbestos

54. Cost discussions are based on the findings in Frederick B. Siskind, “Cost Impact of the 1982 Miller Proposal (H.5735) for Compensating Accident Victims,” Office of the Assistant Secretary for Policy, U.S. Department of Labor (November 1982). The principal change in the more recent version was that, instead of continuing indefinitely, benefits to widows compensated for only five years of income.

55. MacAvoy, “Economic Consequences of Asbestos-Related Disease.”
exposures were compensated, the costs of the compensation bill evaluated at a comparable basis would be $10 billion less than court-ordered compensation. But if, as seems likely, almost all lung cancers among asbestos workers would receive compensation, the cost would triple to an amount well in excess of the estimated costs imposed by prospective products liability lawsuits. As a result, it would not be in the financial self-interest for asbestos producers and affected insurance companies to have such legislation supersede the present mechanisms for settling claims.

In fact, the financial burdens imposed by the proposed asbestos compensation legislation could not be borne by the asbestos industry. Some firms would shut down. Others would reorganize, and their asbestos-producing units would file for bankruptcy. To the extent that compensation burdens would be shifted to other firms in the industry, their financial viability would also be threatened. In short, the asbestos compensation proposal does not appear to be economically viable.

Even if the burden could be borne, the primary mechanism for funding would be an output-related tax. This tax would reduce the output of affected firms, but would provide no incentive for risk reduction for diseases likely to be compensated in the next two decades, since these are the product of past decisions. Diseases that would have to be compensated beyond that point might create incentives for safety to the extent that the funding mechanism is linked to current job conditions.

Because of the difficulty of making any precise linkage of this type, one alternative would be to place a tax on current asbestos exposure levels. Such an externality tax could lead to an efficient level of risk and hence could supplant direct regulatory controls. Any additional costs needed to fund benefits for diseases already caused would be drawn from general revenues.

This approach, however, would address only a small segment of the occupational disease problem—new asbestos-related diseases. It would ignore the chief problem posed today by decades of asbestos exposure: paying for future claims arising from asbestos-related diseases already in gestation.

An Affirmative Policy Proposal

Gaps in information make it difficult to design an effective policy to address the problem of occupational disease. For diseases that have been already caused, no compensatory or regulatory system can alter safety
incentives retroactively. The most that can be done is to provide efficient levels of insurance. There is no compelling rationale for policy involvement beyond existing social insurance efforts, since victims of occupational disease are no more deserving than victims of environmental exposures or risks of undetermined origin. To the extent that workers can prove a job link in a product liability suit or workers’ compensation claim, there is at least some promotion of equity by making the companies involved pay the costs.

For the diseases not yet caused, the emphasis should be on regulatory measures, since these are targeted most directly at the risks. Workers’ compensation and the civil liability system have a role to play in complementing this safety incentive and in providing adequate levels of compensation.\textsuperscript{56}

**Conclusion**

The long-run functioning of the market for potentially hazardous jobs will continue to be governed by multiple institutions. Chief among these is the role of free market forces as worker preferences generate a powerful incentive to provide adequate job safety. The principal mechanisms to bolster market forces are government regulations to promote control of risk and workers’ compensation to address income and medical insurance needs. The responsibilities of these institutions are so extensive that the civil liability system will be much less important with respect to job accidents and illnesses than for any other class of accidents. Indeed, the system’s only current function is for third-party lawsuits.

This secondary function is, however, not inconsequential. For job-related diseases civil liability remedies have become increasingly prominent. The functioning of the legal system with respect to mass toxic torts is not entirely uncontroversial, but many of the problems that have been encountered are inherent to the problem area.