15.
Incentives, Imperatives, and the Decision to Control

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Incentives, Imperatives, and the Decision to Control

OTA has identified a number of incentives and one major imperative for the implementation of control technologies. As used here, an "incentive" is something that encourages an employer to implement a control. Because of the special value placed on health and safety, many people believe that society should, by law and regulation, require employers to take the steps necessary to prevent work-related illnesses and injuries. This belief underlies the basic approach of the Occupational Safety and Health (OSH) Act of 1970, which is an "imperative" for implementing controls.

A great deal that is known about controlling the causes of occupational illness and injury has not been applied in many of the Nation's 4.5 million workplaces. Examining incentives and imperatives can assist in understanding the decisions to implement controls and can outline areas for improvement. Most incentives and imperatives can be used together and, in some cases, they interact and build on each other. In some other cases, however, various historical circumstances have led to compromises that bar the use of some incentives (e.g., workers' compensation laws generally prohibit employees from suing their employers), This chapter presents a description and assessment of these incentives and imperatives.

ASSESSMENT OF EXISTING INCENTIVES

Voluntary Efforts

After being informed of or discovering the existence of job hazards, some employers will take action to reduce, minimize, or eliminate those hazards. They do so either because of altruism toward their workers or out of enlightened self-interest. Strictly speaking, pure altruism implies that the employers take these actions only because of concern for their workers without thought of the ultimate implications for the firm in terms of worker good will, productivity, profits, or future sales. Although this will often be true for the personal motivations of health and safety professionals, most decisions concerning company policy will consider carefully the potential effects on profits.

Photo credit Office of Technology Assessment

Signs are often used to provide information to workers. This one is a gentle reminder about the use of safety shoes

Probably more common than pure altruism are voluntary actions out of enlightened self-interest. These actions are taken because a firm perceives that voluntary efforts, although not necessarily profitable in the short term, will benefit the firm in the long run. This long-term benefit could be an enhanced corporate image or the perception that a given firm is a "good place to work." In addition, voluntary efforts may be undertaken to solve a particular problem before the Government or other groups become involved. (Of course, there may be other benefits to the firm in terms

of reduced workers' compensation costs, reduced capital costs if accidents damage plant and equipment, or a reduced threat of potential liability or an Occupational Safety and Health Administration (OSHA) fine.)

The pressures of the competitive marketplace will, however, substantially limit the ability of individual companies to improve employee health and safety. As described in chapter 14, if a company spends resources on improving workplace conditions and its competitors do not, this company can easily find itself at a disadvantage because its competitors can use the resources thus saved to expand or improve production. Unless the company can save money in some other way, it will have lost money by attempting to do the "right" thing.

There are several ways in which the company may receive a financial return on its health and safety investment—through reduced workers' compensation premiums, for example, or an improved labor relations atmosphere, or reduced vulnerability to fines for violating Government regulations. In this case, the action is not exactly "voluntary, " but results from some other incentive.

Voluntary actions may result in a firm saving on both the direct and indirect costs of occupational accidents. The direct costs include workers' compensation payments for lost wages and medical care, while the indirect costs include loss of productivity, disrupted schedules, equipment and property damage, administrative time for accident investigations, and training of replacements. Estimates of the size of indirect costs range from 4 times to 20 times the direct costs of **ac**cidents (82,380). The National Safety Council has estimated that the average total cost (both direct and indirect) to an employer of a lost-workday accident is about $9,400 (324). Sheridan (436) reports that one large firm has estimated the total direct and indirect cost to be $14,000 for a lost-work-time injury, $100,000 for a fatality, and $200,000 for injuries involving permanent disability.

As noted in chapter 10, it has frequently been said that the most important variable in determining whether a firm will be generally protective of employee health and safety is the commitment of top management. Two studies (441,443) have found that low-accident-rate plants tended to have "greater management commitment and involvement in plant safety matters" (443), although both of these studies involved relatively small numbers of companies. In addition, a number of companies, particularly large ones, have created departments to handle issues of occupational and environmental health and safety, have hired professional staffs with technical expertise concerning health and safety, and have established internal review mechanisms to ensure compliance with health and safety standards. (See 179 for a discussion of some of these arrangements, and box P.)

The important role played by management commitment to the goals of occupational safety and health must be stressed. In the United States, employers are responsible for the organization, design, and management of workplaces. If improvements in employee health and safety are to occur, they will have to involve decisions by management. It is therefore not surprising that management commitment **has** been called the single most important ingredient in effective health and safety programs.

The other incentives and imperatives described in this chapter can be thought of as ways of obtaining the commitment of employers when voluntary efforts are insufficient to correct occupational health and safety hazards. These incentives and imperatives generally reward or penalize companies. It has also been suggested that the compensation of individual line managers should be linked to improvements in product safety, pollution control, and occupational health and safety (139).

In addition, there are a number of voluntary organizations and associations that have been active in the occupational safety and health field. These include professional societies, voluntary standards organizations, trade unions, and employer associations. Companies and their employees may participate in these voluntary organizations and these voluntary organizations are sometimes involved in the development of some of the other incentives and imperatives. This is

Box P.—Example of Voluntary Control Efforts: Du Pont

Effective company-run safety and health organizations require strong impetus and initiative on the part of management. At E. I. du Pont de Nemours and Co., this is reflected in the company's "nine safety principles" (described **inch. 6). The commitment of Du Pont to worker safety dates to the 19th century, when it produced gunpowder.**

> In the early days the company's mills blew up so regularly that they were built with three sturdy stone walls and one flimsy wooden wall, facing Brandywine Creek. When the inevitable explosion came, the wooden wall would blow out. The rest of the mill would remain standing and could be economically restored to service. "Going across the creek" became a company euphemism for being blown to bits (284).

In fact, two du Pont family members were killed in these explosions.

Du Pont requires all levels of management and all employees to be responsible for health and safety on the job. Not only does this attention improve employees' working conditions, but whether dealing with 19th century gunpowder or 20th century petrochemicals, this attention reduces the chances of destroying valuable plant and equipment and incurring expensive downtime. In addition, Du Pont integrates safety with the management of the firm and uses the safety records of managers in making decisions about promotions.

Du Pont established the Corporate Environmental Quality Committee in 1966 to carry out "top management's commitment to environmental quality, including safety and health." It meets weekly and is the overseer of four supporting committees, including an "Occupational Safety and Health Committee."

At the plant level, Du Pont has Central Safety Committees consisting of plant staff managers and assistant managers, the superintendent of safety and health, the environmental control manager, and the plant physician or medical supervisor. This committee directs the plant safety and health program, and meets at least once a month. Plant subcommittees, headed by first-line supervisors, vary in number and function, depending on plant size and needs. Anywhere from 6 **to** 10 **workers serve on subcommittees; there are no requirements, however, for minimum employee representation on the subcommittees. Individual employees are selected by the plant manager to serve on subcommittees, which are considered the focal point for plant involvement in safety policy. Their findings are reported to the Central Safety Committee.**

About 95 percent of all safety hazards are corrected by line organization, and the resolution of individual safety hazards rarely requires involvement of a subcommittee. The minority of complaints that are referred to the committee concern issues that potentially involve plant-wide policy changes.

It has been noted that because of its low injury rate, Du Pont annually saves millions of dollars for workers' compensation compared with what its costs would be if its injury rate equaled the national average for all manufacturers (284). But the chemical industry as a whole, of which Du Pont is a part, generally has had a lower injury rate than that for all manufacturers, although Du Pont's injury rates are better than even the chemical industry average. Little information is available on what it costs Du Pont to achieve this savings in workers' compensation costs.

Finally, while Du Pont is also a widely recognized leader in providing a comprehensive occupational health program for its employees, data on the incidence of occupational *illnesses are* limited (see ch. 2). Thus it is impossible to quantify Du Pont's occupational illness rates and compare them with averages for the chemical industry or for all manufacturers.

especially true for OSHA regulatory proceedings, in which both trade unions and employer associations are often extensively involved.

Voluntary Standards

These voluntary activities may include cooperative efforts to develop voluntary standards, industry standards, or consensus standards. However, comparatively few of these standards are concerned with occupational health and safety.

Some voluntary standards are purely advisory; others, because they specify certain product attributes or dimensions, are ignored by firms only at their peril. For example, some voluntary standards specify the design and dimensions of nuts and bolts. If a firm wishes to manufacture nuts to fit the bolts of other manufacturers, the firm must follow the "voluntary" standard. Another example would be the various standards concerning the electronic components, such as stereo components and computers. The use of voluntary standards in these areas enables consumers to purchase several pieces of equipment from different manufacturers and then hook them together into a smoothly functioning system.

Still other "voluntary" standards have been adopted by Government agencies and now have the force of law. For example, the National Electrical Code, developed under the auspices of a voluntary organization, the National Fire Protection Association, is widely used as the basis for the mandatory building codes of many localities **(203). Similarly, most of the existing** OSHA safety standards, which now have the force of law behind them, began as "voluntary" standards developed under the auspices of the American National Standards Institute (ANSI). (See discussion in ch. 12.)

The standard-writing work of technical organizations, professional organizations, and trade associations is often delegated to subgroups or committees. OTA has not precisely determined what fractions of the participants in these voluntary standard-setting groups represent employers, manufacturers, labor unions, public interest groups, government, and others. It is clear, however, that labor and public interest groups have been and continue to be underrepresented in the deliberations of these committees. Small businesses may also be underrepresented.

There are several reasons for this. First, participation involves the commitment, at the very least, of staff resources. Oftentimes, unions and public interest groups lack sufficient staff resources to participate. Second, standard-setting groups have generally been created and staffed by manufacturers and employers, in part because these groups began the process in order to standardize equipment and designs (the "nuts and bolts" standards). Labor and public interest groups are generally not interested in those issues and do not participate. This historical nonparticipation may have carried over into the safety and health standards activities. Third, the membership of the committees is often unbalanced. For example, the committee that drafted the ANSI standard for abrasive blasting operations consisted of 14 manufacturer and trade association representatives, 6 people from professional organizations, 5 representatives of government agencies, 3 individual members, and 1 person representing a labor organization. Such unbalanced representation not only provokes questions about the degree of protection afforded by voluntary standards, it also makes labor and public interest groups hesitate to participate for fear that their involvement will imply approval of a voluntary standard that they had only minimal influence on.

In addition, voluntary standards are just that, "voluntary," and probably cannot be enforced. Enforcement by a trade association or other organization may violate the antitrust laws. The Supreme Court has ruled that companies can exchange safety-related data and set standards to protect the public's health and safety or to protect themselves from product liability actions. The Court has also cautioned, however, that the standards must not be used as a guise for excluding competitors or for facilitating price fixing. The Federal Trade Commission, which **shares** authority for the enforcement of antitrust laws with the Justice Department, has advised that compliance with such a standard must remain voluntary. There appears to be a limited exception to this general rule-trade associations can require members to abide by a standard that is established to provide the legitimacy of something

(e.g., a breed of cattle) or to establish a network in which the rules or standards are fundamental to its functioning (e.g., the arrangements surrounding the purchase of flowers by telephone) (203).

It is not likely, therefore, that a trade association would try to enforce a health or safety standard by excluding an offending company from membership, organizing a boycott, or taking some other punitive action. It may make efforts to encourage companies to comply, but the possibility of running afoul of the antitrust laws will make it stop short of requiring companies to comply (203). Thus even if a company follows a recommendation concerning worker health and safety made by a trade association or standards organization, the employer has no assurance that competitors will follow suit. (Voluntary standards also play some role in liability actions and the enforcement of the "general duty" clause of the OSH Act (203).)

Moreover, there is concern about the adequacy of voluntary standards, even if they are fully adhered to by employers. Beyond the common lack of labor and public interest representation on the committees that write these consensus standards, some people object to the standards because they often involve a compromise among the various interests, which may reduce the level of protection afforded by these standards. In addition, the employer and manufacturer representatives on these committees are likely to agree to a standard that each of them can already adhere to. They are unlikely to adopt a standard that would require large changes in their current operations, even if some industry leaders have achieved higher levels of protection. Thus these standards are likely to represent the "lowest common denominator" of performance within an industry.

Voluntary standards are an important source of information for employers, workers, government agencies, and others involved in the health and safety field. They represent hours of effort by many practitioners and professionals in this field and can often be useful sources of technical information, especially for defining terms and standardizing certain technical aspects of measurement and control.

Although they can be updated more quickly than OSHA has tended to rewrite its regulations (see ch. 12), unions and public interest groups question whether voluntary standards are sufficiently protective. The existence of these standards might bring the practice of companies to a common level, but, in general, voluntary standards and the voluntary approach will often lead to only limited changes in the health and safety conditions of the workplace.

Provision of Information

The availability of information about occupational hazards and their control is a necessary first step for many improvements in workplace health and safety. It may be provided by private sector organizations, including professional societies, voluntary standards organizations, insurance companies, employers' associations, trade unions, universities, and individual experts. Or it may be provided through the research and dissemination efforts of Federal and State Governments. The availability of information can combine with the other incentives to prompt employer action. For example, a company management committed to improving job safety and health would use available information to analyze job conditions and to make improvements. But without both commitment and information, no actions will be undertaken.

The provision of information through research and dissemination is an important activity unlikely to be met by private parties because information, once disclosed, becomes a "public good. " This means that the developer of the information cannot capture its full economic benefit because that person cannot always charge for the information. Furthermore, as illustrated by the description of a company's use of computer conferencing (ch. 10), a company may elect to hold private its safety and health information or to release it only under its own terms.

State and local "right to know" laws, and the development of an OSHA regulation concerning "hazard communication" (labeling) promise to provide more information to workers and employers. The impetus for three laws has been provided by coalitions of unions, health and safety

professionals, and public interest groups who believe that workers and their doctors have a right to be informed of the identity of substances they work with and the potential hazards of those substances. Economists have also suggested that one way in which the existing market system may have failed is by not providing workers with sufficient information about hazards. In either case, one possibility is to require that information be provided to workers (628).

The new OSHA "hazard communication" regulation requires, among other things, that containers of "hazardous" chemical substances bear a label with information on the name of the substance and the precautions to be taken. Both the laws and the OSHA regulation enhance the dissemination of information to individual workers in expectation that this will lead to improvements in on-the-job health and safety conditions. In addition, labels provide important information to "down-stream" employers who previously had been ignorant about hazards in the materials they purchase.

One important issue in this area concerns manufacturers' desire to limit the information provided in order to preserve trade secrets, such as the chemical composition of a product. A second issue concerns which substances are deemed "hazardous" and who determines this. A third concerns the coverage of the laws and regulations. Do citizens and communities, in addition to workers, have access to this information? And what industries are covered? Fourth, there are questions about the relationship between the new OSHA regulation and the State and local "right to know" laws. In particular, Federal OSHA is arguing that, in general, its "hazard communication" regulation preempts State and local "right to know" laws. All of these issues are being considered in the recent legal challenge to the OSHA regulation. (For a general discussion of these issues, see 44.)

The increased availability of information on workplace hazards may serve as an incentive for companies to introduce controls. However, while the provision of information through both research and dissemination is an important first step, it is not sufficient by itself to guarantee improvements in health and safety. It may not counterbalance other factors that affect employers' decisions about whether or not to implement controls (box Q), which may be more important than a lack of information in explaining why many employers have not invested in health and safety improvements. (In addition, as described in ch. 12, the OSHA consultation program also provides information on hazards and controls to employers.)

Workers' Compensation and Insurance

Employers may take actions to improve job safety in order to reduce the costs of workers' compensation and property insurance. The most important purpose of the workers' compensation system is to provide workers suffering from workplace injuries and illnesses with medical treatment

Box. Q.—The Effect of New Information About Hazards

Using data from the results of OSHA health inspections, Mendeloff (301) analyzed exposure levels over time for:

- **substances for which recommendations for lower exposure levels were made by either the American Conference of Governmental Industrial Hygienists or the National Institute for Occupational Safety and Health and for which no new OSHA standard was issued,**
- **substances for which no new recommendations were made, and**
- **substances for which new OSHA standards were issued.**

The OSHA health inspection data may not be a perfect indicator of employee exposure levels over time, but presumably any biases affected the measurements for all three groups of substances.

Mendeloff's analysis showed no statistically significant trends in exposure levels for groups 1 and 2, and a significant decline for group 3.

and to compensate them for the income lost because of those injuries and illnesses. But the improvement of occupational safety and health is also a goal of workers' compensation. To the extent that employers, through this system, pay for the costs of medical treatment and lost wages, there is a monetary incentive to reduce those costs. Thus, employers may install control technologies in order to save on their workers' compensation premiums. In addition, the insurance companies and the state agencies that provide workers' compensation insurance often provide services to improve health and safety conditions in their client companies.

Similarly, actions to reduce the costs of property insurance may coincidentally benefit worker health and safety. For example, preventing fires and explosions in a factory may result in lower property insurance costs, as well as reducing the number of workers injured.

The history of workers' compensation reveals different motives and goals for the various interested groups (described further in ch. 11). Progressive reformers sought to alleviate the loss of income suffered by accident victims and their families and to encourage prevention. Businesses wanted to stabilize the uncertainties inherent in the liability system, to limit the growth in the size of awards, and to restrict more sweeping social changes. They were also interested in prevention, in part as an additional means to control or reduce costs. The National Association of Manufacturers, for example, was very impressed with the preventive effects of the German compensation system. In their view, the causes of accidents needed to be given equal consideration with the consequences *(274).* Nearly every contemporary observer includes prevention as one of the goals for workers' compensation (30,46,106,131,317, 656,657),

Workers' Compensation and Occupational Injuries

Although many employers and insurance companies believe that workers' compensation is an incentive for prevention of occupational injuries, the precise circumstances under which this is true are fairly complex (see, e.g., *656,657).* Moreover, empirical evidence concerning the effect of this incentive is thin.

There are, of course, difficulties in estimating what injury rates would have been in the absence of workers' compensation. In theory, various statistical techniques can be used to analyze the effects of particular programs, after adjusting for other factors that influence injury rates. One study *(105)* found a decrease occurred in the number of certain occupational fatalities at the same time **that** workers' compensation was created. Several other studies (53,104,106,107), however, have not found a favorable effect on injury rates from workers' compensation.

The economic incentive regarding occupational injuries is diluted to some extent because many employers pay premiums that are based on the average experience for their industry or line of business (so-called manual rates). These rates apply, it was estimated in 1972, to the 85 percent of companies that employ about 15 percent of the work force (317). These firms are so small that year-to-year injury rates vary widely purely by chance. Thus, in order to ensure year-to-year certainty of payout by the insurance carriers, as well as to minimize administrative costs, these *com-*panies are grouped and pay rates determined from the manual.

At the other extreme are firms large enough to predict with a high degree of confidence their accident rates from year to year. Except in States that prohibit it, these firms generally insure themselves. It has been estimated that less than 1 percent of firms self-insure, but that those firms employ 10 to 15 percent of the workers included under the compensation system (317).

Finally, firms in the middle are "merit-rated," generally using either "experience-rating" or "retrospective-rating," which are methods for tying a firm's premiums to its actual loss experience. Under experience-rating, insurers modify the manual or class rate for a firm by its actual accident experience for the most recent three years. Thus, successful efforts to prevent injuries in the current year will lead to premium savings in the following three years. As the firm's size increases, more weight is given to the company's actual experience and less to the employer's class or indus-

try average (409,656). Under retrospective-rating, the employer pays for losses up to specified ceiling limits and the insurer pays for losses above the ceiling. Thus this plan "provides the firm with a combination of insurance and self-insurance" (656,657).

In addition, premium discounts are given to large policyholders and some insurance companies pay dividends to their policyholders (682). These dividends can be either "flat rate" (the same to all policyholders) or "sliding scale" (higher rates paid to employers with better loss records and to larger policyholders). The sliding scale plans, because they tie dividends to the loss experience of firms, may provide safety incentives *(657).*

Although the rates for small companies are generally not directly based on their experience, if such a firm has a particularly bad record it might be placed in an "assigned risk pool," with a correspondingly higher premium. Small firms with very good records, however, generally do not receive a reduction in their premiums (317).

A primary goal of insurance is to spread risks among employers, thus preventing, for a given employer, a very large or catastrophic loss in any one year. The losses to be paid out are made, through insurance arrangements, into predictable and regular annual payments. Moreover, when the pooling of risks places safe employers in the same group with less safe employers and both have the same premium rate, the less safe will not have any incentive to improve performance. Thus, the goal of insurance or loss spreading acts to dilute the incentive provided by workers' compensation.

Although this effect has been often noted, the degree of dilution is unclear because, although most employers do not appear to be experience-rated, most employees work for employers who are. Moreover, as Victor (656) has shown, the size at which a firm becomes eligible for experience rating varies dramatically among industries, largely because of the differences in injury rates among industries. Finally, although most employees work in firms that have some form of experience-rating, it is difficult to determine what portion of all occupational injuries and illnesses occur in these firms.

There have been only a few empirical studies of the effects of experience-rating on injury rates. Russell (409) found that large firms, which are generally experience-rated, had lower injury rates than medium-sized firms. But she also found that small firms had low injury rates as well, even though they, as a group, are not experience-rated. Two other published studies have not been able to isolate any measurable effects for the experience-rating system used in workers' compensation (109,464).

A second limitation on the safety incentive provided by workers' compensation is found in the benefit levels. Employers' incentives are directly related to the degree that the workers' compensation system provides for the full social costs of injuries. Generally speaking, workers' compensation pays the medical expenses associated with the injury but only a portion of the employee's lost wages.

The States generally replace two-thirds of lost wages up to a maximum amount or ceiling. This replacement, however, is usually based on the employee's wages just before the injury and are often not adjusted for potential increases in the employee's earnings over his or her career. In addition, many States have mandatory waiting periods or minimum lengths of time that a disability must last before any payment will be made. Although workers' compensation benefits are not taxable, the system does not replace lost fringe benefits, which have become an increasingly larger portion of employee wage packages in the last decade. Moreover, the ceiling on payments is frequently so low that many workers receive much less than the theoretical two-thirds replacement. It was estimated that during the late 1960s, workers' compensation had a median wage-replacement rate of only *50* percent *(52).* More recently, a group of researchers found earnings-replacement rates of 46 percent, *59* percent, and 75 percent in California, Florida, and Wisconsin (81). But it is not clear to what extent this applies to other States.

Furthermore, as a general rule, workers' compensation replaces only lost earnings. It does not usually compensate for "pain and suffering" or even the loss of physical capabilities that do not

directly result in loss of earnings ***(260).*** "In [workers'] compensation . . . the only injuries compensated for are those which produce disability and thereby presumably affect earning power" (144). One example of this are injuries that are limited to damage to the workers' reproductive system. The States generally do not allow compensation for this because such damage does not reduce the workers' earning power (144,260). In these cases, injured and ill workers are not fully compensated.

However, in nearly all of the States, workers with certain kinds of permanent partial injuries (e.g., loss of a hand or leg) receive compensation payments based on schedules of fixed dollar amounts for the part of the body affected. (For a list of these, see 484.) For the same injury, all workers receive that same payment, even if their wage levels differ. Thus, compensation for permanent partial injuries is often not directly tied to an individual's lost wages, although the payments may ultimately be based on the average wages of all workers.

A third limitation is that some occupational injuries (and most occupational illnesses) are not compensated at all because the worker fails to file a claim, Some of these workers become dependent on other social insurance programs (e.g., Social Security) or pension programs that provide disability benefits. Although this is mainly a problem for occupational diseases (see discussion in **the** next section) it may also be a factor for occupational injuries.

Based on data from the 1972 Survey of Disabled and Non-Disabled Adults, a Department of Labor report (596) concluded that only 43 percent of people severely disabled by work-related injuries received workers' compensation payments. Severe disability was defined as complete inability to work. The work-related disabilities were determined by analysis of survey responses and thus the results of these surveys need to be interpreted cautiously.

An analysis of a similar survey conducted in 1978 found that only 33.1 percent of those whose main disability was due to an on-the-job injury were currently receiving workers' compensation benefits (437). This analysis also found that workers' compensation appeared to provide only 22.5 percent of the income maintenance for those totally disabled by occupational injuries. The remaining three-quarters of their support came from Social Security, employer/union retirement and disability funds, veterans' benefits, private insurance, welfare, and other sources. Workers' compensation should not necessarily be "charged" with replacing all the lost income of injured workers if other factors contributed to the total disability. It is, however, surprising that most of the income support for this group comes from other sources, Employees and other public welfare programs thus may be bearing much of the cost of occupational injuries (437).

These results may occur because the disabled workers did not apply for workers' compensation benefits, because no benefits were ever awarded or because the workers' compensation benefits ran out while the disability remained. Further research is needed to determine the factors that contribute to this apparently inadequate compensation. But from the standpoint of evaluating the incentives of workers' compensation for prevention, the conclusion is the same. To the extent that these costs do not enter the workers' compensation system, employer premiums will not rise, and employers do not face the full financial incentive to reduce the incidence of injuries and illnesses.

Finally, one other factor may influence the safety incentives provided by the workers' compensation system. As is discussed later in this chapter, under certain assumptions it is possible that employers may pay workers additional wages in order to attract them to hazardous jobs. If these additional wages or hazard premiums do exist, the creation of a workers' compensation system may lead only to reductions in the hazard premiums. In effect, compensation would shift from before the accident to after the accident, and from all exposed workers to those who incur injuries.

However, this shift may not result in any change in injury rates (131,151,300). Three recent studies (83,150,151) have found, in fact, that increases in workers' compensation costs and benefits are associated with decreases in employee wages. Two of these studies (150,151) found that increases in workers' compensation costs were,

at **least for nonunion workers, completely offset by decreases in employee wages. This result implies that for these employees, workers' compensation has no net effect on employer safety incentives.**

Workers' Compensation and Occupational Disease

As opposed to the situation regarding workplace injuries, most observers agree that many cases of work-related disease fail to enter the workers' compensation system. It is clear that any economic incentive provided by workers' compensation will be reduced substantially if only a few occupational illnesses are compensated. **However, representatives of the insurance industry claim that only a few occupationally related diseases go uncompensated (285,286).**

There have been several estimates of the number of cases of occupational disease that are compensated. Data collected by the Bureau of Labor Statistics in the Supplementary Data System suggest that only 3 to 3.7 percent of all first reports of workers' compensation concern an occupational disease. Barth and Hunt (46) report that the percentage of all compensation cases that concerned occupational diseases ranged from 0.1 percent to 5.5 percent for the 12 States for which data were available in 1975. Half these States fell in the range between 1 and 2 percent. They also report the results of a large survey conducted by Cooper & Co. of 44,066 workers' compensation cases in the fall of 1975. About 0.8 percent of the cases concerned on-the-job heart attacks and about 2.1 percent were related to other occupational diseases.

Because there are no firm estimates of the total number of occupational disease cases, it cannot be said with certainty that this range of 2 to 4 percent means the compensation level for disease is too low, too high, or just right. However, as mentioned in chapter 2, the number of all work-related **cancer cases** currently reported to worker's compensation agencies is substantially less than the number of cancer cases estimated to be caused by occupational asbestos exposure. In addition, because of the difficulties faced by anyone filing a claim for **occupational disease** compensation (discussed in this section), it is probable that many disease cases go uncompensated.

Barth and Hunt (46) describe a number of scientific, legal, and regulatory barriers that impair the certain and timely compensation of occupational illnesses. They note that the system provides a bifurcated response to disease claims. Those that are readily connected to workplace exposure and that are relatively inexpensive (e.g., acute dermatoses) are compensated much like accidental injuries. Disease claims that involve serious disabilities that are less clearly linked to workplace exposures (e.g., chronic respiratory disease) are marked by extended controversy and long waiting periods between a claim being filed and first payment. Moreover, these cases create a disproportionate amount of administrative costs for the system. They note that "[f]or such claims the system retains many of the undesirable features of the tort system that workers' compensation was supposed to supplant" (46).

For occupational illnesses that manifest themselves only after a latent period of years there may not be a strong economic incentive for prevention. Firms contemplating an investment that will reduce their workers' compensation payments 20 to 30 years from now (or even payments for product liability, as discussed later) can invest the money elsewhere for a better return. That alternative investment may be more profitable than the possible reduction in future compensation costs. Moreover, the firm may not even be in existence in **20 or 30 years, and its managers will almost certainly have changed. Thus a firm may fail to take actions to prevent occupational illness. On the other hand, the threat of having an occupational disease disaster similar to that associated with asbestos may outweigh this financial calculation (286).**

A number of State statutes and interpretations of them impede compensation for occupational diseases. For example, some States have restrictive definitions that make it difficult for disease victims to receive compensation. Most States have abandoned or gone beyond the "schedules" or lists of occupational diseases, which were often unduly restrictive (such as textile producing States that did not list byssinosis on their schedules, or coal mining States that did not compensate coal workers' pneumoconiosis). Many States, however, deny compensation for "ordinary diseases of life"

and will compensate only those that are "peculiar or particular" to some line of work. This rule has been applied even for occupations that face an increased risk of contracting an "ordinary disease of life." Legal strictures concerning time limitations and the requirements for proving causation also create difficulties for compensating people with occupational diseases (46,261).

The Surveys of Disabled and Non-Disabled Adults provide some information concerning the sources of income for people disabled by disease, though, as mentioned earlier, the self-identification of "job-related" diseases means care must be taken in analyzing the results. The 1978 survey showed that of those who attributed their disability to bad working conditions, only 21.8 percent had ever applied for workers' compensation, as opposed to 64.4 percent for on-the-job injuries. This application rate was static between the 1972, 1974, and 1978 surveys (437).

The 1972 survey found that of those who thought their disabling illness was due to workplace conditions, only 3 percent were receiving workers' compensation. The 1974 figure is essentially the same-5 percent (596). By 1978, of those citing "bad working conditions," about 13 percent were receiving workers' compensation benefits, compared with 33 percent for those with job-related injuries (437). Although about 23 percent of total income replacement for job-related injuries comes from workers' compensation, for disabilities due to "bad working conditions," the figure is about 12 percent. Nearly half the income maintenance for this disease-disabled group comes from Social Security Disablity Insurance. These estimates have been criticized for various reasons related to the design of the survey, the size of the survey population, and the use of self-reporting to describe both health conditions **and** the work-relatedness of those conditions (214,285,680).

However, more detailed studies of two well-known occupational hazards, asbestos and cotton dust, support the general conclusion that most of the income support for workers disabled by occupational illnesses does not come from the workers' compensation system (217,431). Because both asbestos and cotton dust have been clearly linked to occupational disease and have received widespread public attention, they represent the "best **cases"** for the compensation of disease by the workers' compensation system.

A study (431) of a group of insulation workers who died from asbestos-related disease found that of those who stopped working because of their terminal illness, two-thirds never filed for disability benefits from workers' compensation before their deaths. Of the claims that were filed, nearly half were still pending at the time of the workers' deaths. When there was a surviving widow, claims for death benefits were filed in fewer than half the cases.

In addition, workers' compensation was the sole or primary source of medical benefits for only about 4 percent of these workers. The workers and their families appear to have relied on union welfare funds, Medicare, other private insurance plans, and their own savings to pay for the medical costs of asbestos-related disease. A tort liability suit was filed in fewer than one-fifth of the cases for which data were available. In only 9 percent of the cases did the worker or spouse file both a claim for workers' compensation and a lawsuit. In over half the cases (57 percent), neither a workers' compensation claim nor a liability suit was filed. The most important factor in explaining the failure to file for workers' compensation appears to be "ignorance, either of the source of the disease or of the legal rights of survivors to compensation."

Johnson and Heler (236) have calculated the expected monetary losses for the families of these workers. They estimated that the gross loss due to disability and death from asbestos-associated disease amounted to over $250,000 per family. Half the widows they studied received no benefits at all. The other half received a variety of benefits. About 28 percent of these benefits came from workers' compensation, while 16 percent came from tort suits and settlements. The remainder came from Social Security, private pensions, and veterans' benefits. Johnson and Heler also calculated the net financial losses for these families. On average, the widows who received benefits had approximately one-third of their losses replaced.

In theory, through the workers' compensation system, employers bear the costs of occupational disease. But for this group of workers, about 85

percent of the gross wage loss was borne by the families of the affected workers. Of the small portion of lost wages that were replaced, less than half were paid for by employers through workers' compensation and by producers through tort suits and settlements.

Hughes (217) has similarly studied income replacement for a group of workers exposed to cotton dust who developed byssinosis, He found that workers' compensation replaced only **6.9 percent of the estimated lost income for this group. Forty percent of lost income was replaced by funds from Social Security, 3.5 percent from Veterans Administration benefits, and 2.6 percent from private pension plans.** The total income replacement amounted to about 53 percent of expected earnings. "Even with Social Security funds in crisis, it is apparent that a massive shift of costs has been made from the employers to the general taxpaying public, due to an almost nonexistent workers' compensation system—a form of public subsidy to disease-producing industries . . . " (217).

Role of Insurers

Beyond the incentives faced by private employers, insurance carriers might have an independent financial incentive to prevent injuries and illnesses. If an insurance company can improve the loss experience of its policyholders, it maybe able reduce the amount that must be paid out in claims.

In practice, however, this incentive is limited, too. Low benefit levels reduce the incentives to insurers just as they reduce the incentives to employers. In addition, if the merit-rating system is working properly, insurers will have little incentive to improve the loss experience of firms that are fully merit-rated. For such companies, the benefits of reduced claims will be received by the employer.

Insurers will receive an independent benefit only if they can cut losses in the time period before the premiums are adjusted by the experience factors. Insurers will also benefit if they can reduce the losses for firms that are not fully merit-rated. However, insurance industry representatives argue that reduced rates are important for attracting and holding customers, and that maintaining customers is a powerful incentive for reducing claims and therefore rates (286).

In fact, many insurers provide loss-control services to their policyholders. The results of one survey imply that private insurers and State workers' compensation funds provided a total of 1.6 million such visits to policyholders in 1974. Private insurers provided 1.5 million of these visits (472,473). More recently it has been estimated that the insurers who are members of the two major trade associations (the Alliance of American Insurers and the American Insurance Association, or AIA) employed about **8,600 loss-control specialists in 1983, while independent firms added about another 1,000, for a total of 9,600. The** 8,600 specialists working for the members of the two associations conducted about 1.5 million visits to policyholders. It is also estimated that about 177,000 samples of suspected toxic substances were analyzed in 1983, while approximately **40,000 policyholders participated in train**ing programs provided by the Alliance and AIA member companies (286).

Some of the expenditures for "loss control" are expenses for inspecting workplaces in order to determine the nature of the operations and to set premiums (30,473), rather than to suggest or mandate preventive actions. Little statistical information is available to determine the percentage of insurer visits that are primarily for collecting information for rate-setting and the percentage of visits that provide safety advice (473).

Aside from this rate-setting activity, insurers have offered loss-control services as one way of competing in an industry that until recently was subject to detailed price and service regulation by State agencies. In general, that regulation did not allow insurers to compete by charging different rates. It is not clear what effect various efforts to "deregulate" this industry will have on the provision of loss-control services (268).

However, although insurers do provide consultative services to their policyholders, they generally do not grant rate decreases to employers who accept such services. It is likely that the advice provided by insurers has a positive effect on safety, but this effect may be limited by fear that the employer, a valued client, will simply change insurance companies rather than make a large expenditure for health and safety controls.

To the extent that occupational diseases do not enter the compensation system, there is no financial incentive to prevent them, either on the part of the employer or the insurer. Compensation for illnesses will also be discounted substantially because of the latent period between exposure and disease manifestation. The insurance industry, however, maintains that it is taking steps to avoid future occupational disease disasters similar to the asbestos situation (286,675).

Changes in Workers' Compensation

In practice, the workers' compensation system only provides a limited economic incentive for prevention, especially for occupational illnesses. Changes have been suggested to improve economic incentives provided by this system. These include increasing the degree of experience-rating in the compensation system (317), instituting employer deductibles or copayments for the first $500 of compensation expenses (449), and changing the Federal income tax deductions allowed for workers' compensation premiums (228). However, because workers' compensation is currently administered by the States, the first two suggestions would involve changes in each of the States or creation of a single Federal system.

Moreover, the effects of the suggested changes are not completely clear. For example, Victor **(656)** suggests that the creation of employer deductibles might increase the incentives faced by some employers while decreasing the incentives faced by other employers. The net effect on injuries is unclear. In addition, increasing the economic incentives of workers' compensation could increase employers' incentives to contest claims, as well as their incentives to prevent illness and injury. Finally, many of the limitations of injury taxes (discussed in ch. 16) **also** apply to these suggested changes in the workers' compensation system.

There has been considerable recent discussion concerning the possibility of creating a Federal system to compensate for occupational exposures to asbestos (517). Prevention should be a consideration in any changes in compensation. A compensation system should be designed to "internalize" the costs of disease. In other words, producers and employers should bear the costs of occupational disease (14). However, the use of Federal funds to supplement an occupational disease fund may dilute this incentive. If Congress takes action concerning occupational disease compensation, this action could include a requirement that companies take concrete steps to prevent future cases of disease.

Tort Liability

The effects of court-enforced tort liability on employer practices concerning health and safety has been highlighted by the large number of lawsuits concerning worker exposure to asbestos (box R). In particular, attention has focused on the well-publicized case of one supplier of asbestos, the Manville Corporation (formerly Johns Manville), which has filed for a corporate reorganization under the bankruptcy laws because of the burden of paying numerous liability suits. Facing the threat of potentially costly lawsuits and large awards for damages, employers and manufacturers may take action to improve workplace health and safety.

As discussed in chapter 11, before the passage of workers' compensation laws in the early part of this century, injured workers could sue their employers for damages. They encountered substantial difficulties in winning these suits, however. Workers' rights to sue their employers were greatly restricted with the creation of the workers' compensation system. For most cases of occupational injury or illness, workers are not allowed to sue their employers for such compensation. Instead, the workers' compensation system, in theory, provides a specified level of benefit that is awarded to pay medical costs and compensate for lost wages.

In general, the law of torts provides the opportunity to sue for monetary compensation when property has been damaged or a person has been injured, but precisely defining the field of tort law is difficult. One noted scholar has written:

> A really satisfactory definition of a tort has yet to be found. . . . Included under the head of torts are a miscellaneous group of civil wrongs, ranging from simple, direct interferences with the per-

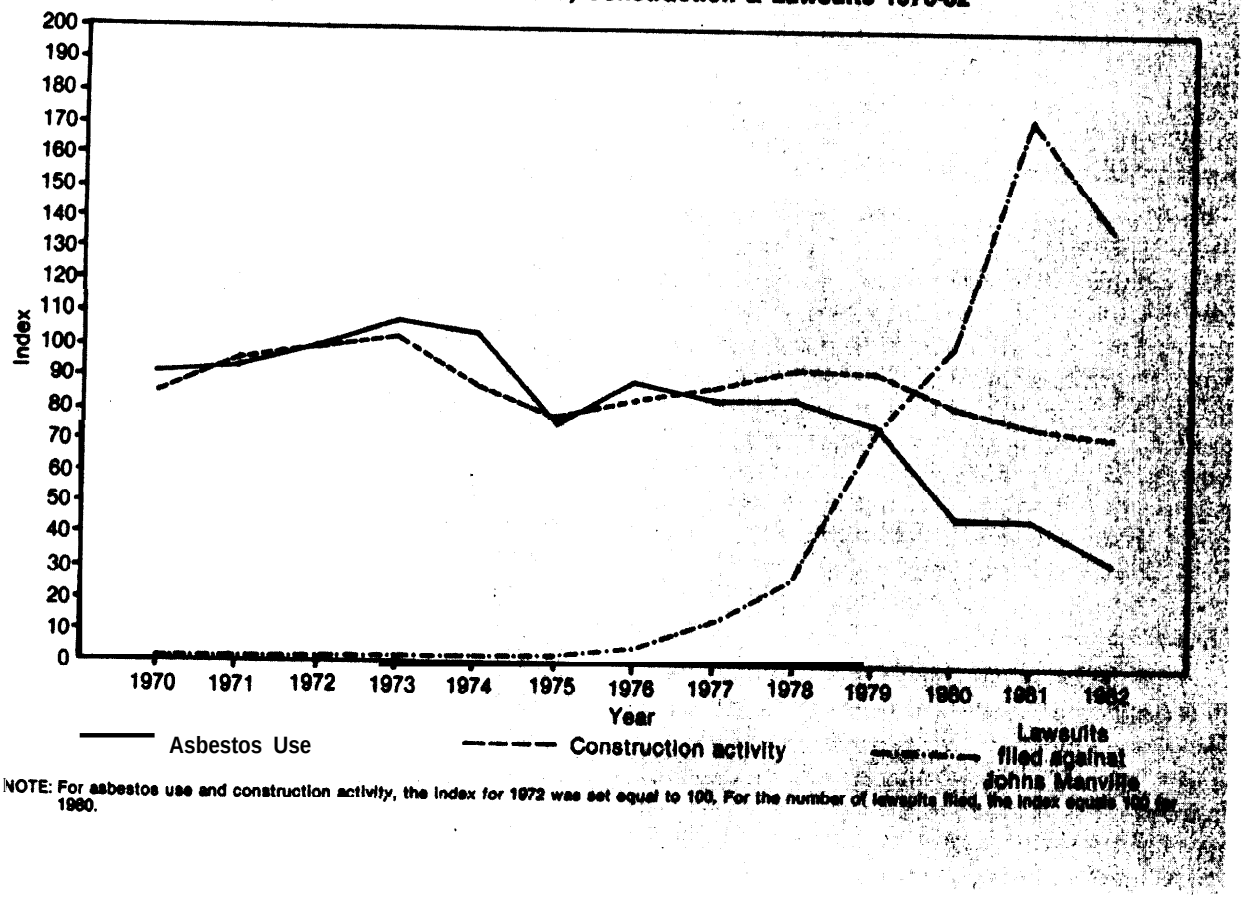
Box R.—The Effect of Tort Liability on Asbestos Consumption

Asbestos consumption in the past generally followed the pattern set by construction activity (see fig. 15-1). This usage pattern was partially a result of the use of asbestos for building insulation. When construction activity increased, asbestos consumption increased; when construction activity decreased, as in the recession of 1974-75, asbestos consumption decreased. The first indication of a divergence from this pattern can be seen after 1977. Overall, asbestos consumption declined 72 percent from 1973 to 1982.

In 1972, OSHA lowered the permissible levels for exposure to asbestos. This took effect in two stages, a limit of five fibers per cubic centimeter (c.c.) was issued in 1972, while a limit of two fibers per c.c. became effective in 1976. In 1975, OSHA proposed to lower this limit to one-half fiber per c.c. During the 1970s, the Environmental Protection Agency and the Consumer Products Safety Commission also issued regulations restricting the uses of asbestos. In November 1983, OSHA issued an emergency temporary standard that set the maximum workplace exposure limit to one-half fiber per cubic centimeter. This emergency standard, however, was struck down by the Fifth Circuit Court of Appeals. OSHA now is developing a new standard and held public hearings on it in the summer of 1984. Analysis of data from OSHA inspections by two different researchers (237,301) indicates that the levels of worker exposure to asbestos have declined from those that existed before the more stringent limit went into effect (see discussion in ch. 13).

But another important factor was the dramatic increase in liability suits filed against asbestos producers. For example, in 1976 there were 160 cases pending that named Johns Manville as one of the

Figure 15-1.—Asbestos Use, Construction & Lawsuits 1970-82



NOTE: For asbestos use and construction activity, the index for 1972 was set equal to 100. For the number of lawsuits filed, the index equals 100 for 1980.

defendents. The number of lawsuits facing the asbestos company increased twelvefold in 1979, to 2,000, and the number of cases has increased nearly exponentially since then (see fig. 15-1) (480). Although it is difficult to describe with certainty the factors that have affected production and consumption, it is widely believed that this increasing trend in the filing of lawsuits and the increasing size of the awards in those suits has been the major factor.

In addition to having to comply with environmental and occupational health regulations, the fear of successful liability actions has provided a strong incentive to producers and manufacturers to find substitutes for asbestos in their products. For example, a combination of polyester fibers and glass fibers is used in pipe insulation in place of asbestos (391). Other materials that have been used in place of asbestos are rockwool (rock fiber), wool astonite, newsprint and other wood pulp fibers, steel fibers, textile fibers, and polypropylene fibers.

> son . . . or with property . . . up through various forms of negligence. . . The law of torts . . . is concerned with the allocation of losses arising out of human activities. . . So far as there is [a general principle] . . . it would seem that liability must be based upon conduct which is socially unreasonable . . . or unreasonable interference with the interests of others . . . (Presser. Quoted in **379).**

Baram (379) notes that controversies involving risks to human health have traditionally involved legal concepts grouped under tort law. Four areas of tort law have been used to resolve controversies that involve such risks: negligence, product liability, nuisance, and strict liability. Of these, negligence, product liability, and strict liability are applicable to issues of workplace health and safety.

Negligence has been defined as "conduct which falls below the standard established by law for the protection of others against unreasonable risk of harm. " To maintain a suit based on negligence, four elements must be shown: the existence of a legal duty or obligation to protect people from harm, a failure to conform to that duty, a proximate causal connection between that failure and a resulting injury, and an actual injury (379). Under the general doctrine of negligence, a person can be held liable for an injury if he or she failed to act in a "reasonable" way to prevent the injury.

Product liability developed out of warranty law. The courts have ruled that manufacturers and sellers implicitly warrant that their products are suitable and safe for all reasonably anticipated uses. Whether or not the seller was legally negligent is irrelevant in this situation because the very fact of the defect indicates a breach of the warranty **(203).**

Under ***strict liability,*** the manufacturer is liable for injuries resulting from a defective product that is unreasonably dangerous, without regard to fault or contractual limitations. Here, the degree of diligence or care in preventing injuries is immaterial (203). Strict liability has traditionally been used for "ultrahazardous" ***or*** "abnormally dangerous" activities (42). In recent years, the courts have adopted in the field of product liability law some of the concepts of strict liability. In fact, product liability suits can be based on negligence, warranty, and strict liability. Liability is now applied in cases where: 1) a product was defectively designed, 2) a product was defectively manufactured, or 3) a product was sold without proper warnings concerning its use and dangers.

The "duty to warn" has been the basis for many of the successful lawsuits concerning asbestos exposures, in which courts have ruled that the manufacturer has an obligation to take reasonable actions to discover the hazards associated with a product and to warn accordingly. This duty may include specialized testing (69):

> The manufacturer is held to the knowledge and skill of an expert. . . [This] means at a minimum he must keep abreast of scientific knowledge, discoveries, and advances and is presumed to know what is imported thereby. But even more importantly, a manufacturer has a duty to test and in-

spect his product. The extent of research and experiment must be commensurate with the dangers involved.

By far the most common use of tort actions in occupational safety and health are suits against a third party—for example, the manufacturer of products purchased by the employer for use in the workplace. Thus, employees injured by a malfunctioning punch press can sue the manufacturer of the press, while employees who used asbestos in their work can sue the manufacturer of the asbestos product. Because the ill or injured worker is not directly employed by this third party, lawsuits concerning work-related illness or injury are not prohibited by workers' compensation laws.

Although many employers are concerned about legal liability, in most cases it does not directly affect them as employers. Rather, it affects the products that they sell to consumers or to other employers. In 1978 it was estimated that while only 11 percent of all product liability awards involved work-related injuries and illnesses, these cases accounted for 44 percent of the total dollars awarded for product liability (228).

This slightly roundabout approach of third-party suits may lead ultimately to improvements in working conditions and in the health and safety of the work force, but a number of factors limit its effectiveness. The first is that it does not apply to employers, even in cases in which the employer may have been in the best position to ensure that the equipment and products were being used in a safe and healthful fashion. In these cases, the manufacturer is still held responsible.

Other limitations on the usefulness of third-party suits are found in the traditional degree of proof demanded by the courts in liability actions. This burden of proof is often very difficult for the worker, especially in cases of occupational disease. The problems employees can encounter include:

- It is difficult to prove (or even recognize) that harm has occurred when a disease, such as cancer, may be caused by many factors, including occupational ones.
- The isolation of the product or products that "caused" the harm is difficult, especially if there are harmful interactions with other products, or when the proof for the causal connection is only through statistical inference.
- The long periods of time that often elapse between exposure and effect make the causal connection and the identification of products and manufacturers much more difficult.
- Even if the manufacturer can be identified, the firm may have gone out of business, be currently unprofitable, or otherwise not able to pay damages.
- In some States, statutes of limitations bar suits for damages beyond a certain length of time (generally 3 to 10 years) after the last exposure to the hazard, even if the disease only manifests itself 20 or 30 years later (203).

As noted earlier, State workers' compensation laws generally bar suits by employees against their employers, although there are several exceptions to this. First, any employer that is not covered by the State workers' compensation law may be sued. Some employment categories that commonly fall in this group are agricultural employees, domestic servants, employees of very small businesses, railroad workers, and employees of charitable organizations **(407).**

Second, courts may grant employees "injunctive and declaratory relief. " In one case, ***Shimp v. New Jersey Bell Telephone Co.,*** an employee obtained a court injunction to require the employer to prohibit smoking in general working areas. The court ruled that such an injunction would not be barred by the workers' compensation law of New Jersey and that the employee, who was allergic to cigarette smoke, had a common-law right to a healthful work environment. It is not clear whether other courts will also adopt this reasoning (407).

Third, in nearly all States workers can sue employers for damages in cases of willful or intentional acts. This includes situations in which the employer actually intended that the employee be injured, as well as cases that involve fraud or deceit. by the employer. For example, if an employer deliberately conceals from a worker information concerning a work-related illness, employees may be successful in collecting damages from the employer. The West Virginia Supreme Court

extended this rule to cases of willful, wanton, or reckless employer misconduct (407), although this was subsequently restricted by a new State law (2,342).

Fourth, in some jurisdictions an employer may be sued by an employee when acting in a "dual capacity." The three main types of dual capacity cases involving workplace health and safety issues are based on the obligations of the employer as land owner, medical practitioner, or seller of products. Thus an employer, for example, who offers an onsite medical service and who negligently treats an employee maybe sued for medical malpractice. Similarly, an employer may also be sued by a worker for injuries or illnesses incurred due to a product manufactured by the employer. It should be noted that only a minority of jurisdictions currently allow such "dual capacity" suits (407).

It has been suggested that employees be allowed to sue their employers. For example, Amchan (2) has proposed that workers and their families be allowed to sue employers if the worker *is* killed or permanently disabled due to the "willful, intentional, or grossly negligent conduct" of the employer. Although such change might enhance employer incentives for prevention, it would also have a number of social, legal, and economic implications that need to be considered carefully.

The future importance of tort liability as an incentive to control workplace hazards is unclear. Although much attention has been given to the circumstances of asbestos exposure, asbestos may not be typical. Currently the prohibition of most employee suits against employers severely weakens the incentive. In addition, the practical problems of proving causation will tend to limit to just a few hazards the lawsuits by workers against suppliers.

Congress is currently considering legislation to change certain aspects of product liability law. As suggested earlier for changes in workers' compensation it is important that the effect of these changes on incentives for prevention be considered carefully,

Labor Market Forces, Collective Bargaining, and Workers' Rights

To some extent, employers are motivated to improve employee health and safety because of pressures from the labor market. Economists since Adam Smith have hypothesized that employers would have to pay more to attract workers to jobs with unsafe conditions or other adverse working conditions. In theory, if there is complete information about workplace hazards and alternative job opportunities, employers may find that they cannot attract enough workers. There are then two basic choices—raise the wages or reduce the hazards. Thus, the possibility exists that this labor market pressure may induce improvements in employee health and safety.

The payment of additional wages for occupational risks can be seen in the existence of "hazardous duty pay" in certain high-risk occupations. But these additional wages may also be built into the general pattern of wages for an industry or occupation. In this situation, they would not be directly observable, but would be included as part of the total **wage.** The additional wages paid for workers exposed ***to*** occupational risks have been termed "hazard premiums" or "compensating wage differentials." In theory, various statistical techniques could be used to separate the factors that determine wages, thus testing whether a "hazard premium" existed and determining its size. In practice, the data are difficult to analyze because of problems in measuring job risks and in adjusting for other factors that influence wages.

To date, the published studies on this question have generally found compensating wages for increased risks of death, but are inconsistent on whether there are also compensating wages for increased risks of nonfatal injuries. In fact, several studies have found, contrary to expectations, that some groups of workers were not receiving compensating wages. In some cases hazardous work was associated with ***lower*** **wages** (138,192). Moreover, even the studies that have found increased wages for hazardous work have not been consistent on the size of these increased wages or

the implied "value of life." (See ch. 14 for a table presenting this wide range of values. For reviews of this literature, see 191 and 448.)

In addition, employers may find that their workers are quitting soon after starting work because of unsafe or unhealthful working conditions (658a). Efforts to reduce such turnover and to improve employee morale may lead to investments in health and safety controls.

Of course, all these labor market pressures are vitally dependent on the existence of alternative job opportunities. In areas and times of high unemployment, this incentive to control hazards will be substantially reduced. Moreover, other labor market imperfections, such as incomplete information about job hazards, the costs of searching for jobs, and unequal bargaining power also limit this incentive.

Collective Bargaining Agreements

Negotiation and collective bargaining can also bean incentive. This requires that unions be committed to the recognition of health and safety concerns and assign high priority to these issues in collective bargaining. Other important union obligations for the success of this strategy include being fully informed about **OSHA regulations, enforcement procedures, and employee rights under the** OSH Act. In addition, the union must establish a system to monitor employer actions, usually through safety stewards or trained local representatives, as well as develop procedures for hazard identification, management negotiation procedures, enforcement of committee findings, and rank-and-file feedback about these findings (253).

Labor unions can exert influence because their representatives can be present for all plant operations, every working day. However, because the collective bargaining process involves a process of negotiation and compromise, unions may make tradeoffs between economic benefits (including greater wages, job security, and fringe benefits) and more attention to occupational hazards.

There are approximately 150,000 separate collective bargaining agreements in the United States, and 82 percent of these contain some reference to health and safety. Apparently, emphasis on these issues at the plant level has increased during the last decade. This may be because of a belief "that control and prevention of job hazards can be improved through the combination of more effective OSHA rules, regulations, and enforcement programs with trade union programs, including more effective collective bargaining contracts and their administration" (185).

The Bureau of National Affairs (BNA) has tabulated the major provisions in over 5,000 collective bargaining agreements and analyzed closely a representative sample of 400 contracts (77). Table 15-1 illustrates the frequency of health and safety provisions in collective bargaining language from 1954 through 1981. Until 1971, according to the BNA, there was only a slight increase in the prevalence of such provisions: for example, from 38 percent of contracts **in 1954 requiring management to "take measures" to protect the workers to 42 percent by 1971. The only type of contract provision that** showed more than a slight increase was that for safety committees.

Passage of the OSH Act in 1970 coincided with an increase in the number of contracts that included health and safety clauses, and the provisions became increasingly specific. The overall frequency of safety and health clauses between 1954 and 1970 had remained between 60 and 65 percent, but by 1975, 82 percent contained such clauses. There was also an increase of 11 percentage points in clauses requiring employer compliance with laws from 1971 to 1975.

The general statement of responsibility in most contracts states that the company must make "reasonable provision for the health and safety of the employees, " which appears to be redundant with the general duty clause of the OSH Act (see ch. 12). Moreover, 29 percent of the contracts in 1981 required the company to comply with present legal standards. These provisions enable local unions to use the grievance process (an internal dispute mechanism negotiated by labor and management for the resolution of employee complaints) to change or influence health and safety conditions, in addition to filing an OSHA complaint.

Table 15-1.—Percentage of Contracts Containing Health and Safety Clauses,[a] 1954-81

		Company obligation				Employee obligation		Other provisions
Years	Clauses	To take measures	To meet legal standards	To provide safety equipment	To provide first-aid equipment	Must wear safety equipment	Must obey safety rules	Safety committees
1954	600/0	380/0	13 "/0	270/o	11 "/0	7%	17"/0	180/0
1961	65	34	11	32	16	7	11	28
1966	62	35	NA	28	12	6	8	29
1971	65	42	15	32	14	7	13	31
1975	82	50	26	36	21	NA	NA	39
1981	82	50	29	42	21	NA	NA	43

[a]Considerable overlap was noted in all categories
NA—Not available
SOURCE (77)

Joint Labor-Management Health and Safety Committees

Joint committees vary in structure, organization, and capacity for intervention. The role of the committee ranges from a limited monitoring of workplace routines to a strong source of pressure on workers, union, management, and OSHA. The proportion of contracts with a clause concerning health and safety committees rose from 18 percent in 1954 to 43 percent in 1981, with most of the increase following passage of the OSH Act (see table 15-1).

The growth in labor-management safety and health committees may represent an attempt on the part of both labor and management to resolve issues at the local level. An important factor in **a** union's ability to improve safety and health is rank-and-file concern about these issues and the relative priorities that union members and their leaders place on health and safety in relation to other negotiable provisions, such as wages, work hours, seniority, and grievance procedures. According to Kochan and his colleagues, the most important determinant of committee effectiveness from the management perspective is the attitude and commitment of the top management. It is also important that there be a balance of strengths between both bargaining groups. Acting as an external pressure, the presence of OSHA may place a weak union in a more equal bargaining position with management (253).

Collective bargaining is commonly associated with opposition in interests and an atmosphere of limited trust, but there may be "integrative" issues over which parties share common goals. It has been suggested that safety is such an "integrative" issue, leading to a capability for cooperative problem solving on safety issues through health and safety committees in the context of an overall bargaining relationship (253).

Collective bargaining often serves as a direct and immediate stimulus for setting up these committees. However, it does "not guarantee that an active and ongoing committee will develop" (253). Indeed, there are numerous instances where the presence of a contract clause requiring safety committees has not resulted in regular meetings or useful recommendations by functioning committees.

There has been only a limited amount of research assessing the impact on worker health and safety of these joint committees. Kochan, Dyer, and Lipsky studied union and management attitudes in ***59*** plants (253). For several reasons, they were unable to obtain data on actual injury and illness experience at these plants. Thus their results are generally based on subjective perceptions of workers and managers from surveys and interviews.

They attempted to describe the conditions under which labor-management committees would have a high level of activity and would continue to function. These conditions occurred **when OSHA** pressure was perceived to be strong, when the local union was perceived to be strong, when there was substantial rank-and-file involvement in health and safety issues, and when management approached these issues in a problem-solving manner. The committees that produced the largest number of recommendations tended to have a high level of input from the local union membership, frequently reported back to those

members, and were in workplaces with a high proportion of young workers. The degree of top management commitment was also a very important variable for determining the success of these committees. In particular, management tended to adopt a problem-solving approach to health and safety issues when they were under pressure from OSHA to comply with particular regulatory requirements **(253).**

Cook and Gautschi (121) used data for 113 manufacturing firms in Maine to study the effectiveness of OSHA and labor-management committees. They found a favorable effect on plant injury rates from OSHA citations. In addition, there was some evidence that union-management safety committees were also effective in reducing injury rates. For the plants with 300 or more employees, this effect was significant **at** the 90 percent confidence level. However, for all the plants with 200 or more employees, the effect was not statistically significant.

California has created a program to encourage the formation of joint committees on construction sites. Under this "Cooperative Self-Inspection Program, " a site will be exempt from routine OSHA inspections if a joint committee is set up to perform regular inspections of the workplace. This program has been implemented on six projects. The California Division of Occupational Safety and Health reports that the injury rates at these worksites are "substantially lower" than both the rates for other California construction projects and the experience of these same companies at other sites not included in the program **(337,347).**

In a study of survey responses from 127 firms in Massachusetts, Boden and colleagues (66) found that the "mere existence" of a joint committee in a workplace had no effect on either the number of OSHA inspections prompted by worker complaints or the relative hazardousness of the firm as measured by serious OSHA citations. The researchers also conducted more detailed interviews with union and management representatives at 13 of the firms with labor-management committees. The data from these interviews suggest that the committees that were perceived as "effective" apparently increased perceived safety (leading to fewer worker complaints to OSHA) and improved employer compliance with OSHA standards (leading to fewer citations) (see also 335 and 341 and box S.)

OSHA and Workers' Rights

The OSH Act itself created a number of opportunities for worker participation concerning occupational safety and health. The act provided that workers could:

- request OSHA inspections,
- participate in the conduct of an OSHA inspection,
- participate in any of the stages of a proceeding before the Occupational Safety and Health Review Commission,
- contest the "reasonableness" of the abatement date set by OSHA,
- participate in standards development and the issuance of variances, and
- request a Health Hazard Evaluation from the National Institute for Occupational Safety and Health.

The right to participate in Occupational Safety and Health Review Commission proceedings and to contest OSHA citations has been the subject of several court cases. The result of these cases, interpreting the language of the OSH Act, is that employees and their unions can participate in these proceedings if the cited employer is contesting a citation. Employees and unions also have an independent right to contest the reasonableness of the prescribed abatement date. However, employees and unions do not have an independent right to contest an agreement between OSHA and the employer concerning the nature of the required controls, the type of citation, or the penalty amount. If OSHA and an employer agree on these issues and the employer withdraws its "contest" before the Review Commission, the employees can object only to the specific abatement dates. (See 307 for excerpts from several of the important cases on this issue.)

In addition, the act created a mechanism in section 11(c) to protect employees from job discrimination for having exercised any of the rights listed above. However, the resources devoted to OSHA's

Box S.—Collective Bargaining Results: Worker Training and Health and Safety Committees

Training Concerning Health, and Safety

Approximately 420,000 of the total 800,000 General Motors (GM) employees are members of the United Automobile Workers (UAW). The UAW-GM contract provides for training of full-time union health and safety representatives for each GM plant with more than 600 employees (37). The full-time union safety representatives, selected first by the locals and finally by the UAW international headquarters, train alongside GM's own safety representatives for 40 hours at the General Motors Institute. Training involves hazard recognition, OSHA complaint procedures, and OSHA regulations. In accord with the UAW-GM contract, the union representative accompanies his or her management counterpart twice monthly on inspections, and also walks with OSHA inspectors on their tours. The union member's role also includes reviews of training and education programs and accident reports, and the person is empowered to shut down a hazardous operation, but only with joint approval by the plant safety officer. In addition, the union safety and health representative is involved in the initial stages of grievance resolution concerning health and safety issues.

Some unions that represent workers who move frequently from worksite to worksite, such as the International Brotherhood of Painters and Allied Trades (IBPAT) and the United Association of Plumbers and Pipefitters, also place high priority on the training and education of their workers and union safety representatives. Part of this attention is directly related to securing desirable contract language concerning health and safety. IBPAT has concluded, for example, that its training program had a "statistically significant impact on collective bargaining, leading to more and better safety and health bargaining language in both local and district."

Labor-Management Committees

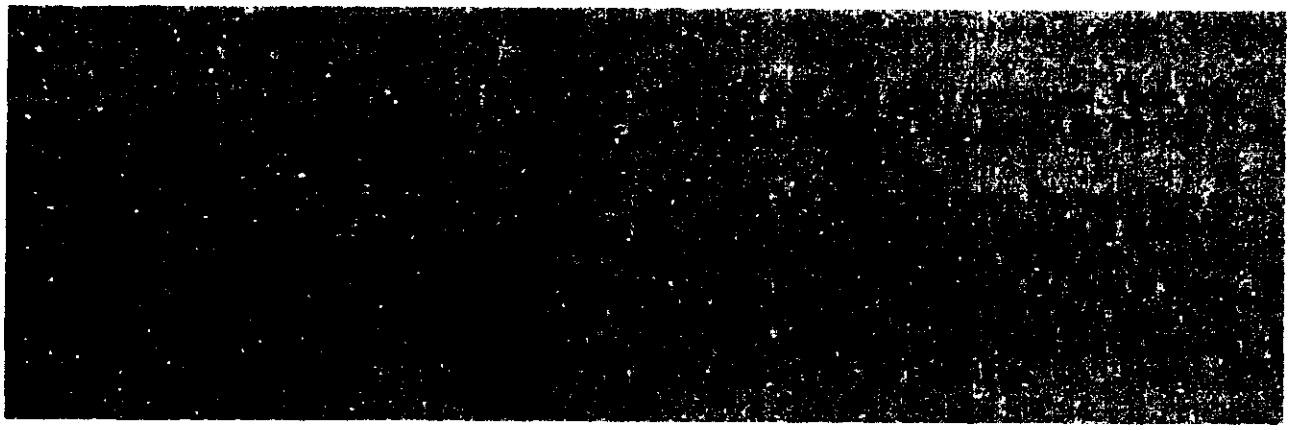
One refinery plant of the Shell Oil Company that has 2,000 workers organized by the Oil, Chemical and Atomic Workers (OCAW) also has contractual provisions for union-management committees. The current contract language was drawn up in 1973. Unlike most OCAW contracts, this one provides no trained hygienist to survey worksites regularly. It does, however, provide for a union-management health and safety committee that:

> **. is to be composed of an equal number of representatives from the hourly and staff [management] groups and is to meet periodically to discuss health and safety matters and make recommendations to management. Where a recommendation made to the company is not accepted, an explanation will be made to the committee. Decisions by the company with respect to health and safety recommendations shall not be subject to the grievance and arbitration procedures of the articles of agreement (emphasis added).**

Union representatives are unhappy with their negotiated position that makes them unable to use the grievance procedure or arbitration.

In discussions with OTA, OCAW representatives cited difficulty in presenting and resolving health hazards as compared to safety problems. Safety hazards, usually readily visible, are quickly identified and consequently more easily eliminated than health hazards, which can involve multiple factors and the effects of which become evident only slowly due to varying latency periods.

Company perceptions, however, differ. Shell has described the joint committee policies as having "dispelled rumors and improved relations" between the adversarial parties, and having "removed the mystery" with regard to company initiative and support of workplace health and safety. Management representatives felt that these issues were best handled in the joint committee setting, and contended that union desires to use the grievance procedure were often motivated by wanting to push other issues into the grievance setting "under the guise of safety."



enforcement of this have been very limited. Moreover, employees do not have a right to pursue a court-ordered remedy independently, but must rely on OSHA to negotiate a settlement or file suit. Thus, one commentator has suggested that the implementation of this provision "has been seriously flawed" (406).

This protection from discrimination covers workers who refuse to engage in imminently hazardous work. An OSHA regulation prevents employers from disciplining employees for such a refusal if there is insufficient time to eliminate the danger of **death or serious injury through any other means. In *Whirlpool Corp. v. Marshall,*** the U.S. Supreme Court unanimously upheld this regulation (307,408). This right is limited to refusing imminent injury hazards and does not extend to most chronic health hazards.

Under **a** provision in the National Labor Relations **Act,** employees who refuse to perform hazardous work **may be** protected from disciplinary action if they are **acting** together and in good faith (408). Recently, however, the National Labor Relations Board ruled that this did not apply to one worker who refused a hazardous assignment because he **was acting** only by himself **(328).**

Of great **importance to effective worker participation** in labor-management activities is the availability of information to workers and their unions about plant-specific hazards. The OSH Act has several provisions requiring that employees be fully informed about health and safety issues. The act provides that OSHA issue regulations requiring that employers inform employees of the protections and obligations provided by the act and the standards that apply to their workplaces (section **8(c)(l)).**

The OSH Act also mandates OSHA to issue regulations requiring employers to maintain records of employee exposures, to provide employees and their representatives with the opportunity to observe employer-conducted exposure monitoring, and to provide access to these records. Employers are also required to notify employees who have been or are being exposed above permissible limits and inform them of "the corrective **action being** taken" (section **8(c)(3)). Finally, the Act requires that standards issued by OSHA "shall prescribe the use of labels or other appropriate forms of warning as are** necessary to insure that employees are apprised of all hazards to which they are exposed, relevant symptoms and appropriate emergency treatment, and proper conditions and precautions of safe use and exposure" (section **6(b)(7)).**

Several OSHA regulations give workers and their unions the right to obtain information from employers. For example, an OSHA regulation issued in 1978 requires that the employer-maintained Log of Injuries and Illnesses be made available to workers upon request, and employers are required to post a summary of the log each year. The OSHA Access to Records regulation and recent rulings by the National Labor Relations Board also assist unions and workers in obtaining information concerning exposures and employer-held medical records. Finally, as discussed earlier in this chapter, various state and local

right-to-know laws and the recent OSHA regulation concerning hazard communication may also aid workers and their unions in learning about hazards. (For further discussion of employee rights, see 307, 333, and 408.)

Possible Changes in Workers' Rights and Collective Bargaining

It has been proposed that workers' rights concerning workplace health and safety be expanded. Several observers have argued, based on the experience of other countries, that health and safety improvements could be made by enhancing workers' rights to full information on job hazards, ***re***quiring worker participation in health and safety decisions, and permitting workers to refuse all work assignments they consider to be hazardous ***(64,242,677).***

In Sweden, for example, since 1974, every establishment with five or more employees must have at least one worker-elected health and safety steward; larger workplaces typically have a steward for each area of the workplace with one worker designated as the chief health and safety steward. The health and safety stewards have the authority to inspect the workplace for hazards, are involved in the design of the workplace, and have the right to examine company records. They also have the authority to order, for health and safety reasons, that a particular plant operation be shut down, even over the objections of management. In cases of a labor and management dispute, the operation remains shut down until a government inspector visits the workplace and resolves the issue.

In addition, all workplaces with 50 or more employees must have a labor-management health and safety committee. The committee discusses plans to improve working conditions, is involved with the design of new facilities and worker training, and supervises the company health and safety staff. Although the workers have a majority on these committees, most decisions are reached by consensus of both labor and management representatives. Finally, a number of different types of training courses have been developed for workers, supervisors, and the worker health and safety stewards. These courses are commonly administered by the Swedish trade unions, both at trade union schools and in worker-organized "study circles" ***(64,242,677).***

As described in chapter 10, employers, unions, universities, and other groups in the United States have developed and administered worker training and education programs. The "right to know" movement in this country (discussed earlier) reveals the desire of many workers, unions, and communities for complete information about workplace hazards and for greater involvement in health and safety issues. In addition to the "right to know, " Mazzocchi has suggested that workers be afforded a "right to act ." This would mean that, in each workplace, a worker would be "deputized" to represent fellow workers in seeking outside assistance to evaluate information obtained under the "right to know" laws and the OSHA "hazard communication" standard (345).

However, direct application in the United States of the experience of other countries will be impaired by differing legal, cultural, economic, and political conditions. In addition, greater employee involvement in health and safety would represent changes in the traditional authority of **management to make decisions concerning all working conditions.**

It has also been suggested that greater use of collective bargaining could improve occupational safety and health. Collective bargaining agreements can detail procedures and investments that are tailored for individual plants and firms, thus decentralizing the process of implementing health and safety controls. The result, it is claimed, can be health and safety improvements that are both "more efficient and more effective" than those produced by the current system of national regulatory standards (37).

There are three significant factors that limit the effectiveness of collective bargaining in improving occupational safety and health. First, only about **20 million workers, or about 20 percent of the U.S. work force of 100 million, belong to la**bor unions. Moreover, the percentage of the labor force belonging to unions has been declining since the 1950s. This may represent the result of social and cultural patterns and the preferences of U.S. workers and managers, but it should also

be noted that U.S. law has not always permitted collective bargaining. Because of this, one labor union representative on the advisory panel for this assessment suggested that changes in labor relations law have health and safety implications.

Second, not all unions have the kinds of expertise in industrial hygiene, injury prevention, or occupational medicine needed to negotiate and enforce agreements on occupational health and safety. A recent survey of 14 U.S. labor unions shows that union spending on worker health and safety ranged from about 20 cents to over $15 per member. These 14 unions employed only two full-time physicians and one part-time one, while the majority of these unions employ few full-time industrial hygienists, public health professionals, or other health and safety staff ***(678).***

Third, by definition safety and health provisions must compete for attention and resources with other bargaining issues. In periods of economic downturn, workers and their unions, concerned about maintaining wage levels and preserving employment security, may push safety and health issues down the list of priorities.

Government Regulation

The final factor that influences employer decisions to control hazards is an imperative: the regulations and standards issued by Government agencies, mainly OSHA. As detailed in chapter 12, OSHA has been empowered to issue mandatory regulations, to conduct inspections, and to propose penalties and require correction when it finds violations of those regulations. OSHA regulations are often the focus of health and safety discussions because they require response and compliance. Nevertheless, they are limited as a factor in health and safety because few regulations have been promulgated and enforcement is spotty. Any changes in this, however, will occur only if Congress and the executive branch act to increase **OSHA resources or change standard-setting and enforcement procedures.**

(As part of this assessment, Mendeloff analyzed some of the factors that affect compliance with several OSHA health standards. See box T.)

In addition to OSHA, other Federal agencies may require employer actions that either directly or coincidentally improve worker health and safety. Using the authority granted by several different statutes, both the Environmental Protection Agency (EPA) and the Consumer Product and Safety Commission (CPSC) regulate products that may also be workplace hazards. For example, EPA regulates the production of pesticides and requires notification before other chemicals are manufactured in order to protect public health and the environment. EPA's regulations, in many cases, also reduce worker exposures.

For some toxic substances, in fact, workers may be the only significantly exposed group. In light of their overlapping authorities, EPA and OSHA have considered joint regulatory proceedings. The most recent public announcement of this has involved possible regulation of methylenedianiline, although it now appears that the agencies have decided that OSHA, not EPA, will take responsibility for regulating workplace exposures (346, 354).

Regulation of the products purchased by businesses may, in some cases, be more cost-effective than requiring installation of industrial hygiene controls. For example, a number of workers exposed to formaldehyde are employed in establishments where the only source of exposure is the emission of formaldehyde from products supplied by other industries. These include apparel manufacturers using cloth treated with formaldehyde-based resins and office workers who are exposed to formaldehyde from particleboard or plywood products in their offices. In these cases, standards concerning formaldehyde emission rates or product content might be both less expensive and easier to enforce than efforts to increase general ventilation in numerous small establishments in dispersed locations ***(206).***

One way to issue standards for these hazardous products used in the workplace would be coordinated regulatory efforts between OSHA and the EPA or the CPSC . This approach holds some promise for reducing the hazards of products purchased by small businesses. However, this approach will have only a limited impact on hazards related to the improper use of products in the workplace. In addition, there are difficulties in regulating products already manufactured and in use.

Box T.—Factors Affecting Worker Exposures

On contract to OTA, Mendeloff analyzed OSHA inspection data from 1973 through 1979 for four substances: lead, trichloroethylene, asbestos, and silica. Mendeloff developed several different measures of employee exposure and attempted to explain observed variations in exposure using other information included in the OSHA data. His analysis was limited because, first, not all inspection results were included in the OSHA computer system. Second, the results of his analysis explain only between 5 and 25 percent of the variation in the dependent variables. Thus, the variables he was able to test do not capture all the factors that determine success in controlling hazards (301).

Mendeloff found that complaint and programed inspections were equally effective in discovering employer noncompliance with OSHA standards. Mendelhoff predicted that the presence of a union at an inspected establishment would contribute to lower exposures and fewer citations. However, this was not supported by the OSHA inspection data. He did find that, other things being equal, exposures tended to be higher at plants in nonmetropolitan (rural) areas compared with those in metropolitan areas. It might be speculated that workers in nonmetropolitan areas have fewer job choices and are thus more willing to tolerate higher exposure levels. Alternatively, it could be that information about hazards and controls reaches rural areas more slowly or is adopted more reluctantly there.

Size of establishment was also examined. The results indicate that both large and small establishments were less likely to have overexposures than medium-sized establishments, paralleling the situation with injuries in which medium-sized establishments appear to have higher rates. However, in many cases the differences between the various establishment sizes were not statistically significant. Moreover, interpretation of the observed differences was hampered by ambiguities in the definitions of the employee exposure variables.

Mendeloff also examined the possibility that employer efforts to control hazards depended on the cost of doing so. Using information from an OSHA report, he calculated the average costs per exposed worker of complying with OSHA's proposed lead standard. The industries with the higher average compliance costs (primary smelting, secondary smelting, battery manufacturing, brass, bronze, and copper foundries) tended to have higher employee exposures. The industries with lower average compliance costs (newspapers, commercial printing, can manufacturing, gray iron foundries), whose costs were one-tenth to one-twentieth those of the higher cost group, had a substantially lower proportion of overexposures. These results support the claim that employees tend to be protected from exposures when protection is cheap and overexposed when it is expensive.

Mendeloff reviewed the results of a number of recent inspections with OSHA inspectors. For firms in violation of OSHA standards, the compliance officers estimated the costs of reaching compliance. In some cases the compliance costs were modest, but for others, the costs were quite large. This group of cases may not be a representative sample, but for most of them, the costs of compliance would be substantially larger than both the average OSHA fine and the maximum OSHA penalty for serious violations ($1,000). Profit-maximizing businesses that take actions based on the "bottom line" will invest in health and safety only to the extent that such investments minimize their costs of doing business. If compliance costs are substantially higher than expected penalties, the profit-maximizing firm will not voluntarily udertake these health and safety investments.

Jones *(237)* examined *OSHA* inspection data for asbestos exposures from 1972 to 1979. She found that an increase in engineering control costs of $l00 per employee was associated with an increase in the average asbestos exposure level of 0.7 fibers per cubic centimeter, while an increase in OSHA penalties of $350 per citation was associated with a decrease in average exposure level of 1 fiber per cubic centimeter. Thus employers appear to be sensitive to costs: as the costs of control go up, employers decide not to implement controls (leading to higher worker exposure levels), while as the expected costs of OSHA penalties go up, compliance improves. However, increased penalties were also associated with employers more frequently deciding to contest the OSHA citations, again consistent with the theory that employer decisions are sensitive to costs. Jones found that an increase in the total penalties of $1,000 was associated with a 27 percent increase in the probability that the employer would contest the results of the inspection.

SUMMARY

OTA has identified a number of incentives or imperatives for the implementation of control technologies. These include: voluntary efforts by employers and voluntary associations, the availability of information, the desire to reduce insurance or workers' compensation losses, fear of tort liability actions, labor market pressures and collective bargaining agreements, and government regulations. One or all of these may influence employers to install and maintain appropriate controls. However, all have significant limitations.

Management commitment has been called the single most important ingredient in effective health and safety programs. After being informed of or discovering the existence of job hazards, some employers will take action to reduce those hazards, although the pressure of competition will substantially limit these voluntary employer activities. In addition, employers and their employees often participate in the development of voluntary standards, which are an important source of information in the health and safety field. But because they are voluntary, these standards will often have only a limited impact on worker health and safety.

Making information about occupational hazards and their control available is a necessary first step for many improvements in workplace health and safety. Providing information through research and dissemination- is an important governmental activity. The increased availability of information on workplace hazards may serve as an incentive for companies to introduce controls, but it is not sufficient by itself to guarantee improvements in worker health and safety.

Employers may take actions to improve job safety in order to reduce the costs of workers' compensation and property insurance. The costs of medical treatment and lost wages paid through the workers' compensation system provide a monetary incentive to reduce those injuries and illnesses. In addition, insurance companies and State agencies that sell workers' compensation insurance usually offer 'loss-control services" to improve health and safety conditions in their client companies. It is likely that workers' compensation is an incentive for prevention of occupational ***injuries,*** although data supporting this conclusion are limited. For occupational ***illnesses,*** the economic incentive provided by workers' compensation is reduced substantially because few **cases of** work-related illnesses enter the workers' compensation system. This appears to be true even for well-studied occupational diseases, such as those associated with asbestos and cotton dust.

By far the most common use of tort actions in occupational safety and health **are** suits against a third party—for example, against the manufacturer of products purchased by the employer for use in the workplace. These suits may **lead** to improvements in working conditions, but a number of factors limit their effectiveness. The first is that suit cannot usually be brought against employers because workers' compensation laws bar employees from suing their employers in cases involving work-related disease and injury. Other limitations involve recognizing and proving causation, and identifying the responsible manufacturers. It is not now clear how important tort liability will be as an incentive, although it has probably encouraged the development of substitutes for asbestos.

To some extent, employers maybe motivated to improve employee health and safety because of pressures from the labor market. However, a slack labor market, with relatively high unemployment, and other market imperfections limit this incentive.

Negotiation and collective bargaining can also bean incentive. Passage of the OSH Act in 1970 coincided with an increase in the number of contracts that included safety and health clauses, and the clauses became increasingly specific. But this is significantly limited because, first, only a small percentage of U.S. workers belong to labor unions. Second, not all unions have the kinds of expertise in industrial hygiene, injury prevention, or occupational medicine needed to negotiate and enforce agreements concerning health and safety. Third, by definition safety and health provisions must compete for attention and resources with other bargaining issues. Many workplaces have

joint labor-management health and safety committees, but the research assessing the effectiveness of committees in improving worker health and safety is limited.

The OSH Act itself created a number of opportunities for worker participation concerning occupational safety and health. For example, State and local "right-to-know" laws and the OSHA "hazard communication" standard will provide workers with more information about hazards. However, there is still controversy about the requirements of these regulations.

The final factor that influences employer decisions to control hazards is an imperative: the regulations and standards issued by government agencies, mainly OSHA. In addition, some of the regulatory actions of other Federal agencies may require employer actions that either directly or coincidentally improve worker health and safety.