INTEGRATING SAFETY AND ENVIRONMENTAL REGULATION OF CONSTRUCTION INDUSTRY

By Charles J. Kibert[1] and Richard J. Coble,[2] Member, ASCE

ABSTRACT: Many construction safety issues are closely connected to environmental problems. The consolidation of safety and environmental regulation at federal and state levels, either partially or totally, would provide the construction industry with a single agency that would provide uniform and accurate guidance, avoid unnecessary duplication of guidance and information, and virtually eliminate conflicts that are currently caused by multiagency oversight. In addition to benefits to the industry, there are also significant cost savings that could be attained by the various levels of government involved in monitoring the construction industry by combining their various safety and environmental regulatory functions. Combining certain Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA) functions would increase efficiency and provide a good model for the contemporary movement to reinvent government. The resulting consistency of regulation would decrease conflicting guidance from agencies that are regulating similar issues and, at the same time, increase the quality of worker safety and environmental protection. In addition to the regulation of hazardous materials by both agencies, there are significant additional opportunities for consolidating operations and regulation of the construction industry.

INTRODUCTION

The construction industry is heavily regulated by a variety of federal, state, and local organizations that have overlapping and confusing jurisdictions. These organizations provide conflicting guidance and information, and cause severe problems and higher costs for the constructor and developer. Examination of the wide variety of controls that are imposed on the construction industry by the government provides some insights as to how simplifications of this system can be made that would benefit both industry and government. A consolidation of closely related regulatory functions would decrease the number of required permits, decrease the cost of construction, decrease the cost of regulation, and decrease litigation resulting from the confusing myriad of regulations and regulatory bodies. One of the potential areas for changing regulatory agency organization is construction safety, in which a number of issues have environmental aspects. The feasibility of consolidating Occupational Safety and Health Administration (OSHA) responsibilities with Environmental Protection Agency (EPA) functions is worthy of consideration in light of the improvements in efficiency that are possible. Informing construction professionals of these closely linked problems would greatly speed the implementation of changes that would benefit both the industry and the government.

EPA/OSHA AUTHORITY

Unlike OSHA, which derives its authority from a single act of Congress, the EPA receives its direction and powers from a number of statutes (Gershonowitz 1991). The 1970 Clean Air Act, the Clean Air Act Amendments of 1990, the Noise Control Act of 1970, the National Environmental Quality Act of 1969, and the Resource Conservation and Recovery Act (RCRA) are examples of laws that provide the EPA with wide-ranging jurisdiction, primarily over environmental matters. By extension, the EPA can be said to have some jurisdiction over health and safety issues, many of which affect the construction site and process.

OSHA is, in effect, a U.S. Department of Labor agency created by the Secretary of Labor. In contrast, the EPA was created by an act of Congress. OSHA is enforcement-oriented. Although the EPA provides enforcement, it is directed more toward providing information and education as agents for change (Moran 1991). Both regulate many of the same issues, in different manners, in regional offices in the same places. OSHA is limited to regulating the workplace, and the EPA's jurisdiction is the land, water, and air. OSHA's workplace jurisdiction covers both employee health and safety matters, and the EPA focuses on public safety.

Philosophically, it is apparent that when environmental issues are being addressed, it is largely

[1]Prof., M.E. Rinker Sr. School of Build. Constr., P.O. Box 115703, Univ. of Florida, Gainesville, FL 32611-5703.

[2]Assoc. Prof., M.E. Rinker Sr. School of Build. Constr., P.O. Box 115703, Univ. of Florida, Gainesville, FL.

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the human impact that is ultimately the issue. Pollution of air, land, and water; destruction of animal habitats and wetlands; and high noise levels are effects that lead to a reduction in the quality of life and threaten the human race. Ultimately, in their broadest context, environmental issues are safety issues. For implementation and cost reasons it is especially important that the construction industry be thoroughly aware of this connection.

HAZARDOUS MATERIALS IN CONSTRUCTION

Hazardous-materials regulation is perhaps the premier example of an issue that touches on both safety and environmental issues. Both the EPA and OSHA are independently spending millions of dollars on regulating this common issue.

OSHA's involvement with regulating hazardous materials on construction sites began in 1970 with its establishment via the Williams-Steiger Occupational Safety and Health Act. Shortly after its formation, OSHA began determining what materials and chemicals were hazardous, and in the process created the so-called OSHA "Z" list. This is a list of substances, along with their individual permissible exposure limits (PELs), that states the maximum airborne exposure to which an employee can be exposed. The PELs were developed from standard 8-h time-weighted averages (TWAs) that defined the toxic effects of these substances.

In 1986, the Hazard Communication Standard (29 CFR 1910.1200) went into effect, requiring employee training and the maintenance of material safety data sheets (MSDS). The 1989 Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) dictated that employers must establish a health and safety program for employees that states how they will protect employees against toxic substances and provide medical surveillance (Covilli 1992). The Process Safety Management Standard for Highly Hazardous Materials (29 CFR 1910.119) is a recently adopted standard in which OSHA directed that, for construction work in process plants, the construction workers are to have the same level of safety as the plant's permanent workforce (Auger 1992). In dealing with OSHA 1910.119, larger companies such as DuPont are integrating contractor personnel into their training programs to insure that both the letter and spirit of the law are being obeyed. In addition to minimizing liability, DuPont and similar process industry firms are well-equipped to conduct the required training, because their business is safety and environment intensive. The provision of detailed bid packages to the contractors is an important vehicle in spelling out the division of responsibilities between the owner and the contractor. A detailed audit checklist is utilized to insure that all responsibilities are covered.

OSHA is responsible for enforcing the Hazard Communication Standard. In fact, four out of the five most frequently issued OSHA citations in a given year are concerned with aspects of this standard (Table 1). It applies to employers in both manufacturing and nonmanufacturing sectors of the economy, and is therefore enforceable on construction sites. The goal of this standard is to ensure that employers and employees have basic knowledge about hazardous materials, are aware of the specific hazardous materials on the construction site being utilized by the various contractors, and know how to minimize the injuries and illnesses associated with largely chemical sources. In general, substances that are ignitable, corrosive, reactive, or toxic are classified as hazardous materials by OSHA (Bauer and Kellar 1992). Common paths of hazardous materials entry into the body are the following:

1. Inhalation of substances such as ammonia and asbestos fibers
2. Skin absorption of solvents (gasoline, mineral spirits, toluene) and pesticides
3. Swallowing of toxic substances
4. Injection of hazardous materials via compressed-air-driven equipment, grease guns, and hydraulic lines, especially during cleaning activities

TABLE 1. Five Most Cited Construction Standards and Their Relative Rankings (1987–1991)

OSHA standards (1)	Description (2)	RELATIVE RANKING TO 1991 Years 1991 (3)	1990 (4)	1989 (5)	1988 (6)	1987 (7)
59(e) (1)	Written hazardous communication program	1	1	1	—[a]	—[a]
59(h)	Employee training–hazardous communication	2	2	2	—[a]	—[a]
59(g) (1)	MSDS for hazardous chemicals	3	3	3	—[a]	—[a]
1903.2(a) (1)	OSHA poster	4	4	4	1	2
59(g) (8)	Accessible copies of MSDS	5	5	12	—[a]	—[a]

[a]Full enforcement of the Hazard Communication Standard began in March 1989.

Each of these entry paths has clear safety implications, but there are also many environmental consequences. The constructor is not only responsible for the safe handling of hazardous substances, but for their safe disposal as well. The environmental consequences of disposal of hazardous materials in an unsafe manner are the pollution of the air, water, and land, and clear safety threats not only to the workers, but also to the population in general.

Asbestos is a hazardous material that contractors must often remove as a portion of a construction renovation contract. The EPA is responsible for insuring that building owners, constructors, and abatement contractors comply with regulations for removal and disposal of asbestos. OSHA is responsible for the protection of the health and safety of workers involved with asbestos (Kibert 1991).

It is clear, then, that the responsibilities of OSHA and the EPA are closely related, and overlap in the area of hazardous materials. OSHA is basically responsible for the protection of the worker from the ingestion of hazardous materials. The EPA has the lead in insuring that hazardous materials do not enter the environment. In fact, as noted above, entry of hazardous materials into the environment is tantamount to exposing the worker and their families to the hazardous materials, either directly through inhalation or contact, or indirectly via the food chain. In the area of hazardous-materials communication, regulatory efficiency could be vastly improved if many OSHA functions were to be absorbed by the EPA. This would simplify the regulatory process and increase the effectiveness of controlling hazardous materials. OSHA enforcement has focused on issues that also have extensive environmental consequences and that would be more appropriately handled by the EPA.

The intertwining of safety and environmental issues occurs repeatedly in the construction industry. It is important that when safety matters are at issue, the construction professional should be aware of the environmental implications. Effective safety programs will need to include the design and implementation of both safety and environmental considerations.

WATER POLLUTION/WETLANDS

The EPA has more interaction and responsibility for certain types of projects than for others, especially wastewater-treatment plants. In the construction of wastewater-treatment plants, the EPA and OSHA have a memorandum of understanding (MOU), in which both agencies agree to improve the enforcement of construction safety requirements. The MOU states that the two agencies will coordinate inspection efforts, exchange information, and jointly provide effective training programs. The EPA agreed to provide OSHA with information on all uncorrected and repeated violations by contractors, to review safety violations by contractors on EPA-funded projects, and to provide a three-day training course for state pollution agencies and inspectors ("EPA" 1991). This is an interesting prototype agreement in that it provides a model for other regulatory teaming agreements in which the regulatory bodies look out for each other's interests. At a deeper level, however, it calls into question the need for duplicating efforts by regulatory agencies.

Although wetlands are a part of the overall broad issue of water quality, there has been no formal unification of EPA and OSHA jurisdictions. The recent change of administration at the federal level will cause renewed attention to be focused on wetlands, with special emphasis on again attempting to define wetlands. Current law allows for the mitigation of wetlands; that is, small wetland areas, if permitted, may be consolidated into fewer, larger wetlands. The mitigation process is largely a construction activity, and it should be expected that OSHA and the EPA will again combine their jurisdictional efforts to provide a more uniform regulatory atmosphere.

JOINT EPA/OSHA OPERATIONS

The EPA and OSHA have expended considerable effort in coordinating their various operations. A general memorandum of understanding (MOU) between EPA and OSHA was written in 1990 with the intention of improving the working relationship between the two organizations. One of the provisions of the MOU is to generate guidelines to improve interface activities, with the overall goal of identifying and minimizing workplace hazards. The agencies agreed to develop an annual workplan that would establish each year's priorities. For example, the OSHA-EPA workplan for 1992 focused on two programs: OSHA's petrochemical special emphasis program (PetroSEP) and the EPA's lead reduction strategy.

A 1986 MOU between the two agencies spelled out their working relationship with respect to the Toxic Substances Control Act (TSCA). The goal of TSCA was to identify and regulate unreasonable risks to health or the environment from chemicals manufactured, processed, or imported into the United States.

The EPA's responsibility is to administer the TSCA law. Congress has required that controls established by TSCA be based on findings that the chemicals involved pose unreasonable risks. OSHA has the responsibility of protecting workers from workplace hazards such as toxic chem-

TABLE 2. Hazard Categories for Common Construction Projects

Substance (1)	Physical Hazards		Health Hazards			Environmental Hazards	
	Flammable/ combustible (2)	Compressed gas (3)	Systemic poison (4)	Irritant/ dust (5)	Corrosive (6)	Storage (7)	Disposal (8)
Alcohol solvents	X	—	X	—	—	X	X
Asbestos	—	—	X	—	—	X	X
Carbon dioxide	X	X	X	—	—	X	—
Carbon monoxide	X	X	X	—	—	X	—
Compressed air	X	—	—	X	—	X	X
Diesel fuel	X	—	X	X	—	X	X
Form oil	—	—	—	X	—	X	X
Kerosene	X	—	X	X	—	X	X
LP gas	X	X	—	—	—	—	—
Mineral spirits	—	—	—	X	—	X	X
Muriatic acid	—	—	—	—	X	X	X
Paint	X	—	X	X	—	X	X
Pesticides	X	—	X	—	—	X	X
Wood dust	—	—	—	X	—	—	—
Wood preservatives	—	—	X	—	—	—	—

icals by setting permissible exposure limits (PELs) for these substances. OSHA must prove that a risk is posed by the chemical in question before a health standard can be promulgated.

OSHA must also show that the regulation of a specific chemical is economically and chronologically feasible for the industry as a whole. It is clear that the EPA and OSHA roles are tightly intertwined, and the TSCA MOU provides for highly integrated activities in this arena.

Another area of joint interest is the enforcement of the Resource Conservation and Recovery Act (RCRA) in which EPA must do the following:

1. Notify OSHA of any hazardous-waste generation, treatment, storage, or disposal facility or site where cleanup is planned or underway.
2. Inform OSHA of hazards to persons working at these facilities, as well as the nature and extent of exposures and methods of protection.
3. Identify incidents of worker injury or harm at hazardous-waste facilities or sites [RCRA section 7001 (f)].

Contractors are becoming increasingly exposed to hazardous-materials issues as environmental and safety law evolves. A 1992 U.S. Court of Appeals decision held that a contractor who had unknowingly moved contaminated soil from one part of a site to another during excavation may be liable for cleanup costs (Black 1993). Other than sounding an ominous note for contractors in general, this incident illustrates the need for improved cooperation between the EPA and OSHA to promulgate rules that clearly spell out contractor obligations.

There are several methods by which the EPA and OSHA could improve their joint operations in a fashion that would benefit construction industry.

1. Shared offices: There is considerable overlap between EPA and OSHA administrative regions, and in many jurisdictions their offices are in the same federal buildings or suite of leased offices. Sharing offices would promote better communication, increase cross-training opportunities, reduce administrative costs, and reduce operating costs by allowing sharing of testing and inspection equipment.
2. State agencies: Encourage states to reorganize state-level environmental and safety offices into joint organizations and decentralize federal operations by allowing the state office to enforce the federal standards. This could be accomplished by expanding the requirements for approved environmental and safety plans.
3. Expand EPA-OSHA joint efforts: Current agreements call for the agencies to cooperate in the areas of lead and asbestos control, wastewater-facility construction, and toxic-substance determination. Considering the wide variety in environmental law, there are numerous other possibilities for combined efforts.
4. Regional "super" offices: The existing collocation of many EPA and OSHA offices could be used to simply combine operations at the regional level. Cross training of inspectors could lead to a reduction in costs or could effectively provide additional inspectors. This concept would still require some special support expertise specific to the needs of each agency.

THE FUTURE: SAFETY/ENVIRONMENTAL PLANS

The ever-increasing commingling of regulatory requirements from OSHA and the EPA makes it worthwhile to consider the creation of an enhanced plan that takes into account both the contractor's environmental and safety requirements. In addition to the environmental requirement to adequately address hazardous materials, the constructor must carefully control site drainage, prevent the migration of silt into streams and other bodies of water, protect trees and other designated vegetation, and minimize noise and air pollution. Table 2 shows how OSHA and EPA regulations overlap on some of the more basic construction materials.

Upcoming regulations will require careful control and recycling of solid waste. The sum total of all these requirements and the interaction of safety and environmental issues makes it necessary to consider the expanded education of the construction professional in environmental issues as well as safety matters. A useful vehicle for accomplishing this fusion would be to create an industry-wide procedure for writing a combined safety environmental plan that would integrate these issues into a single, cohesive plan. This enhanced plan would have the advantage of consolidating issues that are ever more frequently comanaged by the EPA and OSHA, placing them into a single volume suitable for regulatory agency review as well as for workforce training.

CONCLUSION

The relationship between safety and environmental regulation and issues is one that all construction professionals should be made aware of as a part of their continuing education in environmental issues. The rationale as to why certain matters are considered to be safety issues often has its roots in environmental concerns. The most obvious area is hazardous materials and hazard communication. Other issues, such as asbestos removal, polychlorinatd biphenyl (PCB) abatement, and the problems with lead in piping and paints are other dual-concern areas that have both safety and environmental implications. The potential for consolidation of regulatory jurisdiction over these matters is one that construction professionals should be cognizant of in their employee training and strategic planning. Finally, it is their input to the political process that may one day provide for changes in the methods for handling safety and environmental regulation on the construction site.

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