

MOVING GROUND: THE EVOLUTION OF THE ENVIRONMENTAL SAFETY AND HEALTH FIELD AND PROFESSION

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Abstract

A brief historical account of the evolution of the occupational and environmental safety and health (OESH) field is provided, with an emphasis on developments in the United States, Wisconsin and at the University of Wisconsin – Whitewater. As public health and environmental concerns receive increased attention from employers, communities and government the scope of the OESH field is changing and expanding. Opportunities and challenges faced by future safety professionals are reviewed, and University of Wisconsin – Whitewater plans to provide the education needed to meet those demands are outlined.

Introduction

American workplaces have changed significantly in the last few decades as a result of the growing presence of computers and information technology, as well as from the gradual shift from an industrial to a service based economy. Concurrently, our workforce has become much more diverse in terms of age, gender, culture, ethnicity and nationality. Employment relationships are also changing with larger proportions of workers being employed by small and mid-size companies, in less than permanent jobs, working from home or from transient locations, and in general with much looser ties to their employers.

Overtime the United States has experienced gradual improvements in occupational and environmental safety and health (OESH). Still, according to the National Institute for Occupational Safety and Health (2008), “On average, nearly 16 workers in the United States die each day from injuries sustained at work, and 134 die from work-related diseases. Daily, an estimated 11,500 private-sector workers have a nonfatal work-

related injury or illness, and as a result, more than half require a job transfer, work restrictions, or time away from their jobs. Approximately 9,000 workers are treated in emergency departments each day because of occupational injuries, and approximately 200 of these workers are hospitalized. In 2004, workers' compensation costs for employers totaled \$87 billion." This ongoing socioeconomic burden of mostly preventable injuries, illnesses and environmental degradation can be greatly curtailed by the increased presence of well-prepared OESH professionals in organizations across the country.

In this paper we briefly review the development of the OESH field and the needs, opportunities, and challenges that future professionals in this area will have before them. Our changing economy calls for new professionals, and the OESH Department at the University of Wisconsin – Whitewater, with the unwavering support of Chancellor Richard Telfer, is taking steps to provide the education needed by these professionals.

An Historical Perspective

Although human work was early recognized as the source of all economic growth, workplaces have always been plagued with risks for workers. The groundbreaking work of Ramazzini in the 1700's pointed out the connections between work and the development of illnesses and injuries. In contrast to the medical practitioners of his time who focused exclusively on the patients' symptoms, Ramazzini argued for the analysis of work and its environment as well as the workers themselves and their clinical symptoms. His pioneering studies indicated the health hazards of noxious chemicals, dust, metals, and other harmful agents encountered by workers in multiple occupations.

The great intensification of the economic activity brought by the Industrial Revolution also amplified the ill effects of occupational hazards. The advent of the factory made it possible to obtain gains in productivity by increasing labor efficiency. The accelerated pace of the work activities, although generating economic prosperity, was gradually related to occupational safety and health issues, and to environmental decay associated with the hasty urbanization process. Some concern with the incidence of injuries and illnesses related to the industrialization process and its influence on the national economy (i.e., loss of national human resources) led to some early attempts to improve safety in factories in the 1800's.

In 1891, the US Congress passed the first federal statute governing mine safety, marking the beginning of a slow evolution of increasingly comprehensive federal legislation. This was a very limited law and established minimum ventilation requirements for underground coal mines, and prohibited employment of children less than 12 years of age. In 1893, Congress passed the Safety Appliance Act, the first federal statute to require safety equipment in a few workplaces. In 1910, following years of exceedingly high numbers of fatalities and large scale accidents in coal mining, Congress established the Bureau of Mines charged with conducting accident prevention research, although inspection authority was not established until 1941. In 1947,

Congress authorized the formulation of the first code of federal regulations for mine safety.

Additional efforts by the US federal government to ensure workplace safety and health were minimal until the enactment of the Occupational Safety and Health Act of 1970, which was passed to ensure "so far as possible every working man and woman in the nation safe and healthful-working conditions and to preserve our human resources." As a result of this legislation, the Occupational Safety and Health Administration (OSHA) was created to enforce the regulations established by the 1970 act. Significant landmarks in the occupational safety and health field are summarized in Table 1, with an emphasis on US developments.

Table 1: Landmarks in occupational safety and health

Date	Event, Organization or Individual	Action or Outcome
1700	Bernadino Ramazzini	Publishes book " <i>The Diseases of Workers.</i> "
1896	National Fire Protection Association	Established. Develops fire protection and prevention standards.
1908	Alice Hamilton, MD	First US physician to practice industrial medicine.
1911	State of Wisconsin	Enacts first worker's compensation law.
1911	American Society of Safety Engineers	Founded. Largest US safety professional organization.
1913	National Safety Council	Founded. Promotes safety in workplaces, transportation, and homes. Collects and publishes accident data.
1914	United States Public Health Service	Established. Promotes and advances public health and safety.
1916	American College of Occupational and Environmental Medicine	Founded. Promotes workers' health through preventive medicine, clinical care, research, and education.
1918	American National Standards Institute	Founded. Develops voluntary consensus safety standards.
1936	Walsh-Healy Act	Passes by Congress. Protects safety and health of employees of government contractors whose contracts exceed \$10,000.
1938	American Conference of Governmental Industrial Hygienists	Established. Advances worker protection by providing scientific information to OESH professionals.
1939	American Industrial Hygiene Association	Established. Professional organization for professionals engaged in occupational health issues.

Date	Event, Organization or Individual	Action or Outcome
1957	Human Factors and Ergonomics Society	Established. Researches and disseminates knowledge on human attributes for the design of equipment and tasks that fit workers.
1959	Insurance Institute for Highway Safety	Formed. Study ways to reduce highway traffic accidents.
1969	Coal Mine Health and Safety Act	Passed by Congress. Establishes inspections, enforcement, and penalties.
1970	Occupational Safety and Health Act	Passes by Congress. Establishes OSHA and NIOSH.

As the occupational safety and health profession evolved it gradually embraced public and organizational concerns with the impact of the economic activity on the natural environment. This progressive expansion of the safety profession responsibilities towards environmental protection presents significant challenges and opportunities.

The American environmental movement has its roots in the conservation movement first initiated in Western Europe in the 17th and 18th centuries. The movement is also associated with efforts in the 1800's to denounce the large costs of environmental disregard, and the pervasive air and water pollution resulting from the industrialization process, and from the quick urbanization that ensued. In the mid 20th century several large proportion disasters resulting in extensive environmental damages across the world raised public awareness. In the 1960's and 1970's growing research evidence pointed at actual and potential threats to the environment and to the long time survival of humanity. In 1972, under the auspices of the United Nations, representatives of several countries met to discuss the state of the global environment. This first international conference resulted in the creation of governmental organizations across the globe focusing on the environment, and in the establishment of the UN Environmental Program.

In the US the creation of the Environmental Protection Agency has been associated with two separate, but important, events. First was Rachel Carson's book *Silent Spring*. Published in 1962, it documented the relentless misuse and overuse of pesticides and awakened the world to their hazardous attributes. The second was the establishment of the National Environmental Policy Act (NEPA) which was signed into law in 1970. NEPA required the formation of a Council on Environmental Quality (CEQ) to advise the president on environmental matters, and to review Environmental Impact Statements required when federal agencies conducted major construction projects.

On July 9, 1970, President Nixon sent to congress Reorganization Plan Number Three creating the US Environmental Protection Agency (EPA). The EPA was established as an independent agency with the purpose of managing the nation's environment, and was formed from a number of smaller branches of different federal agencies. The

EPA's mission includes: (1) Establish and enforce national environmental protection standards; (2) Conduct environmental research; (3) Provide assistance to others combating environmental pollution; and (4) Assist the CEQ in developing and recommending to the president new policies for environmental protection. Table 2 provides a brief glimpse of the history of the US Environmental Protection Agency.

Table 2: Important dates in the history of the US Environmental Protection Agency

Date	Event or Activity
1970	National Environmental Policy Act signed into law.
1970	First earth Day, April 22.
1970	EPA created.
1970	Clean Air Act signed into law.
1972	Federal Environmental Pesticide Control Act signed.
1974	Safe Drinking Water Act passed by Congress.
1976	Resource Conservation and Recovery Act passed by congress
1976	Toxic Substance Control Act passed by Congress.
1977	Clean Water Act passed by Congress.
1980	Comprehensive Environmental Response Compensation and Liability Act - Superfund Amendment. EPA supervises Three Mile Island nuclear spill clean-up.
1982	Asbestos School Hazard Amendment Act passed by Congress.
1984	Hazardous and Solid Waste Amendments passed by Congress.
1985	EPA responds to Bhopal, India, chemical release disaster.
1986	EPA responds to Chernobyl nuclear power plant meltdown disaster.
1989	EPA responds to Exxon Valdez tanker oil spill in Alaska.
1990	Pollution Prevention Act passed by Congress.
1993	EPA designates cigarette smoke as a human carcinogen.
2001	EPA responds to New York City September 11 terror attack.
2005	EPA issues clean air mercury rule. EPA responds to hurricanes Katrina and Rita.

In Wisconsin

Before workers' compensation laws became effective injured workers needed to rely on public and private charity. As a last resort the injured worker could sue the employer and would have to prove in court fault and/or a safety violation on the part of the employer. At the time the legal environment was very employer biased, with common law allowing companies to use four "ironclad" defenses rules: (1) Contributory-Negligence - the worker was in any degree responsible for his/her own injury; (2) Fellow-Servant - other employee caused the injury; (3) Freedom-from-Negligence - the injury was no fault of the employer; and (4) Assumption-of-Risk - the employee knew

the (potential) risks associated with the job. The situation often resulted in catastrophic losses to individual injured workers, and had the potential to lead to social tensions and to overload the legal system.

Workers' compensation programs were first developed in Europe, with the United States being one of the last industrialized nations to adopt them. Wisconsin is credited with the first effective workers' compensation law enacted in 1911, with earlier attempts by other states being vacated by the courts. Central to Wisconsin's law was the concept of employer's liability for the injuries sustained by workers in the course of their employment. The new law also mandated occupational safety and health standards for workplaces in Wisconsin.

In Whitewater

The initial landmark of the OESH field at the University of Wisconsin – Whitewater occurred in the 1952-1953 academic year when the course Safety Education was offered for the first time by the then Wisconsin State College – Whitewater School of Education. The 1952 course description stated: “The place of safety education in school as related to street and highway safety and driver education, recreational safety, home safety, community safety, rural safety, shop safety and water safety.”

Over the years this course was updated, modified and re-named several times. In the 1970's and 1980's the course was offered under the name Introduction to Safety, and starting in 2000 as SAFETY 201 - Personal and Public Safety. Driver's Education was added to the curriculum in the 1960-1961 academic year, which allowed students to become certified driver's education teachers. In the 1967-1968 academic year a third course was added to the curriculum - Industrial Safety Management. That same year a minor program in safety education was created consisting of five courses.

During the 1969-1970 academic year the new Department of Safety Education was created. The first Bachelor of Science in Education Degree (BSE) with a Major in Safety Education was offered during the 1971-1972 academic year. A Master of Science in Traffic Safety was introduced during the 1976-1977 academic year, and a Master of Science in Safety during the 1980-1981 academic year. In the 1982-1983 academic year the department changed its name to Safety Studies, and in 2000 to its current designation Department of Occupational and Environmental Safety and Health (OESH).

Significant developments took place beginning in 2004 with the creation of new Construction Safety emphasis and certificate programs, followed in 2006 by similar programs in Occupational Ergonomics. These initiatives were established in close cooperation with ad hoc advisory boards, and addressed clear demands for professionals with greater specialization in those areas. Those were followed by the implementation in 2007-2008 of an emphasis and an interdisciplinary minor program in Environmental Management. The Department is currently partnering with the College of Letters and Sciences in the creation of a new Public Health minor.

In 2008, the OESH Department in partnership with the University of Indiana-Bloomington Department of Applied Health Science was selected by the Occupational Safety and Health Administration as a new OSHA Training Institute Education Center. The Center allows the Department and its faculty to reach and support a wide population of working safety professionals through short courses delivered in a variety of locations and in multiple delivery modes. Table 3 provides an overview of significant events in the history of the OESH Department at the University of Wisconsin – Whitewater.

Table 3: Growth and development of the OESH Department at the University of Wisconsin – Whitewater.

Date	Activity or Event
1952-1953	First safety course offered in Safety Education.
1960-1961	Driver Education Safety course offered.
1967-1968	Minor in safety education. Graduate courses offered.
1969-1970	Department of Safety Education created.
1971-1972	Safety Education Major created.
1976-1977	Master Degree in Traffic Safety offered.
1977-1978	Broadfield Safety Major-Occupational offered (BSE).
1980-1981	Master of Science in Safety offered.
2000-2002	Occupational Safety (BS), Minor in Occupational Safety.
2004-2005	Construction Safety emphasis (BS) and certificate (post-baccalaureate).
2006-2007	Occupational Ergonomics emphasis (BS) and certificate (post-baccalaureate).
2008-2009	Environmental Management minor and emphasis are approved and offered for the first time.

The Future of the Profession and the OESH Department at the University of Wisconsin – Whitewater

The evolution of the OESH profession can be roughly characterized as a progression in three stages: compliance, integration, and finally sustainability. The first phase emphasized adherence to newly developed regulations. The second stage saw the integration of OESH into all aspects of the organization, representing a proactive systems approach to managing environmental safety and health responsibilities. Finally, we have reached a time when organizations have realized that their long term survival depends upon meeting the triple bottom line of economic, social and environmental demands. In that context the OESH professional must take a leadership position alongside other senior management in order to achieve sustainability.

To be perceived as business leaders in the 21st century OESH professionals must contribute to the organization, supporting environmental safety and health processes, and be accountable to the triple bottom line. Financial and business principles should be incorporated in the education of OESH professionals. They should be knowledgeable in all aspects of the organization, rely on scientific principles, be current on technological developments, and engage organizational stakeholders for continuous improvement.

The OESH professionals must be problem solvers, with multiple skills and capable of demonstrating results contributing to organizational goals. They must be creative and able to integrate information from multiple sources finding new ways to involve employees and accomplish goals. The OESH professional is responsible for the critical task of educating management about the importance of protecting the health and safety of the workforce, the community and the natural environment.

The OESH Department at the University of Wisconsin – Whitewater is taking steps to meet the needs of the future safety professional with the development of a new on-line masters degree. This promising initiative has received strong support from Chancellor Telfer, and from the OESH advisory board representing different segments of government, business and academia. As part of this initiative the School of Graduate Studies at the University of Wisconsin – Whitewater sponsored the administration of a national survey to assess the educational needs of practicing safety professionals. Approximately 600 respondents from across the country answered the survey, 95% of them being full time OESH professionals. Two-thirds of the respondents indicated that they have considered a graduate degree in OEHS, with a significant proportion of them showing a clear preference for on-line and hybrid instruction. The preliminary survey results confirmed the strong interest in the proposed graduate program. A request for support for the program development and implementation was approved by the University of Wisconsin Board of Regents and was now under consideration for funding by the state government.

The OESH Department is expanding its faculty expertise with the addition of a new member with a background in epidemiology, who will bolster public and environmental health education capability. This new faculty member will increase our ability to deliver on-line classes to our graduate students in the future. Finally, in consonance with its future direction, in 2009 the OESH Department will be moving into new and improved facilities in Hyland Hall.

Conclusion

As described in the preceding paragraphs, the OESH field and profession are being transformed by a changing economy and rapidly growing technology, and their resulting influence on the environment. As organizations become aware of the heightened market and societal expectations regarding the consequences of business activities, the OESH profession is presented with critical opportunities and challenges. The OESH field is now encompassing aspects beyond traditional occupational safety, as public

health and environmental concerns receive increased attention from employers, communities and government. Furthermore, as we transition to a new administration and Congress majority, anticipated to be more attuned to the health concerns of the American workforce and public, the safety profession will be called upon to play an increasingly central role.

In 2000 a report sponsored by the National Research Council highlighted concerns with the shortage of trained safety professionals and educators. The OESH Department at the University of Wisconsin – Whitewater has been preparing safety professionals to meet the challenges of protecting workers, communities, and the natural environment for over three decades. As the University of Wisconsin – Whitewater under the leadership of Chancellor Telfer moves towards a greener and more sustainable campus, the OESH Department efforts gain greater relevance both near and far. Through initiatives such as the proposed on-line masters degree and involvement in sustainability endeavors the Department will continue to be an invaluable resource for Wisconsin.

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