

ATTAINING OCCUPATIONAL HEALTH AND SAFETY THROUGH ... EDUICATION, ENGINEERING AND ENFORCEMENT

Every year, many workers in Maine and elsewhere in the United States are injured or killed on the job, or develop work-related illnesses. While most injured workers may have access to Workers' Compensation benefits,¹ such compensation does not make up for extended and sometimes permanent pain and disability. Clearly it is more sensible for employers and workers to focus on the prevention of occupational accidents, injuries and illnesses than to deal with the consequences after the fact.

Data on occupational injuries, illnesses and deaths are collected by Maine, other states, and the federal government. Based on the most recent data compiled by the Maine Department of Labor's Bureau of Labor Standards (MDOL/BLS), there were **13,843** work related and disabling injuries and illnesses in the state during 2005, resulting in at least one day away from work.² In 2005, there were also **15** people who died in occupationally related fatalities, including 10 employees and 5 people who were self-employed.³ These numbers do not begin to portray the human loss and suffering involved by injured workers and their families, or the life-long impacts of losing a family member to a work-related death.

Maine employers, workers, and unions can work with officials to reduce the harsh consequences of work-related injuries, illnesses and fatalities by developing and implementing occupational health and safety programs containing three important approaches -- Education, Engineering, and Enforcement. This strategy, called a **Three E** approach, involves:

- ◆ **E**ducation on hazard recognition and abatement;
- ◆ Reduction and elimination of unsafe and unhealthy work environments through proper **e**ngineering and ergonomic design; and
- ◆ The full **e**nforcement of existing federal and state laws dealing with occupational health and safety.

EDUCATION

New employees experience a disproportionately high rate of work-related accidents, injuries, and illnesses. All too often, a lack of education, training, and experience on how to perform the job safely are major contributing factors. According to the Maine Department of Labor, workers who have been with their particular employer for less than one year accounted for fully one third of disabling occupational injury or illness "first reports" (FROI's) in 2005.⁴ Workers who had been with their employer for two years or less were almost 46 percent of these injuries and illnesses. In contrast, workers who had been with their employer for 10 to 14 years constituted 5.7 percent of first reports, those with 15-19 years comprised 7.4 percent, and those who had worked for their employer for 20 years or more accounted for only 6.4 percent.⁵ (See Table One).

¹ Only workers who are in employment sectors covered by Workers' Compensation Insurance are eligible.

² Maine Department of Labor (MDOL), Bureau of Labor Standards (BLS), *Characteristics of Work-Related Injuries and Illnesses in Maine, 2005, An Annual Report*; November 2006, by Theodore Bradstreet and Steven Laundrie; p. 4. According to a recent report from the Department of Labor, however, such figures may be an underestimate. (Maine Department of Labor, "Report of the Occupational Safety and Health Data Collection and Injury Prevention Work Group," February, 2008).

http://mainegov-mages.informe.org/labor/workplace_safety/datagroup/2007report.pdf

³ Maine Department of Labor, BLS, *Census of Fatal Occupational Injuries, 2005*, p. 5.

⁴ Maine Department of Labor, BLS, *Characteristics of Work-Related Injuries and Illnesses in Maine, ibid.*, p. 15. Workers with a length of service of two years or fewer with their employers were **45.9** percent of "first reports of occupational injuries and illnesses" (FROI's). The BLS report notes that the length of service with a particular employer "does not necessarily represent the total experience of a worker in the occupation in which the worker was injured."

⁵ *Ibid.* Combined, workers with a length of service of 10 years or more accounted for 19.6 percent of first reports.

**TABLE ONE: First Reports of Disabling Occupational Injury
or Illness by Length of Service, Maine, 2005***

<u>Length of Service</u>	<u>Number of First Reports</u>	<u>Percent of All First Reports</u>
Under 1 Year	4,622	33.4
1-2 Years	1,734	12.5
2-3 Years	1,026	7.4
3-4 Years	1,450	10.5
5-9 Years	1,879	13.6
10-14 Years	792	5.7
15-19 Years	1,027	7.4
20 Years or More	890	6.4
Not reported	423	3.1
TOTAL	13,843	100.0

* SOURCE: Percent calculations based on data from Maine Department of Labor (MDOL), Bureau of Labor Standards (BLS), *Characteristics of Work-Related Injuries and Illnesses in Maine, 2005, An Annual Report*, November 2006, by Theodore Bradstreet and Steven Laundrie, p. 15. "Length of service" refers to the duration of a person's employment with a particular employer at the time of the injury or illness report, NOT the length of time the person has been working in a particular occupation.

The Maine DOL report also contains significant findings regarding the age categories of workers with disabling injuries and illnesses in 2005. The workers with the highest number of reported work-related injuries and illnesses were those in the **45-49** year age category (13.8 percent, with 1,907 reports), and the second highest incidence occurred among the **40-44** age group (13.6 percent, with 1,883 reports). The age group with the third highest number of first reports were workers aged **19-24** (12.6 percent, or 1,748 reports). Also, roughly two-fifths (40.1 percent) of reports were from employees aged 45 years and above. (These data are from the MDOL/BLS report on occupational injuries and illnesses).⁶

However, the significance of these numbers is not entirely clear unless we compare them (with some caveats) to the breakdown of the Maine employed labor force by age. Table Two shows the distribution of first reports of occupational injuries and illnesses for Maine in 2005, by combined age categories, compared to the age distribution of Maine's employment in 2005.⁷

On the one hand, the age percentages of reported injuries and illnesses compared to the age percentages of Maine's employed labor force are roughly similar for the 16-24 year age group, and for the 45-54 year age group. This finding is somewhat puzzling, given the high number of first reports (1,748) among 19-24 year olds.⁸ But there are some differences for the other three other age categories of

⁶ The age distribution data for these first reports (FROI's) are taken from MDOL/BLS, *Characteristics of Work-Related Injuries and Illnesses in Maine, 2005; ibid.*, p. 14. These percentage calculations are based on the number of first reports of disabling occupational injuries and illnesses for each age category, divided by the total number of first reports for 2005.

⁷ The combined age/employment percentages were calculated based on employment and age distribution data from the U.S. Department of Labor, Bureau of Labor Statistics (USDOL/BLS), *Geographic Profile of Employment and Unemployment*, "Employment status of the civilian non-institutional population in states by sex, race, Hispanic or Latino ethnicity, and detailed age (preliminary)," 2005 Annual Averages (for Maine); <http://www.bls.gov/lau/ptable14full2005.pdf> (PDF page 22). The age/employment percentage calculations are based on the number of persons employed for each age category, divided by total employed. Although useful, this comparison has some limitations due to differences in data sources and hence needs to be qualified, for two reasons. First, the population of workers included in the MDOL data on FROI's primarily includes only those workers in "covered" employment (i.e., employees who are covered by Workers' Compensation). Secondly, the USDOL/BLS age distribution/employment data are estimates based on sampling in the U.S. Current Population Survey.

⁸ MDOL/BLS, *Characteristics of Work-Related Injuries and Illnesses in Maine, 2005; ibid.*, p. 14, and USDOL/BLS, *Geographic Profile of Employment and Unemployment, ibid.* The age categories for these employment data are not identical to the age categories used in the First Reports data, so a 19-24 year age comparison was not possible.

workers. Workers who are **25-34** years old appear to be at high risk of work-related disabling injuries or illnesses. While they comprised only **16.7** percent of Maine’s total employed population in 2005, they accounted for **19.5** percent of the first reports of work-related injuries and illnesses. Workers who were 35-44 years old also appear to be at a somewhat higher risk, accounting for 25.7 percent of first reports but constituting only 23.6 percent of the employed Maine labor force. In contrast, the oldest workers, age 55 or above, were underrepresented in the reports for injured or ill workers (at 15.0 percent), compared to their percentage of the total employed labor force (19.5 percent). These differences may be related to more years of occupational experience and length of service with employers.⁹

TABLE TWO: First Reports of Disabling Occupational Injury or Illness by Age Categories, and Age Categories of Employment, Maine, 2005			
Age Category	Number of First Reports*	Percent of All First Reports*	Age Category as Percent of Maine Employment, 2005**
16-24 years old	2,038	14.7	14.4
25-34 years old	2,703	19.5	16.7
35-44 years old	3,553	25.7	23.6
45-54 years old	3,475	25.1	26.0
55 and older	2,070	15.0	19.5

* SOURCE: Frequencies, and percent calculations based on these data, are from Maine Department of Labor (MDOL), Bureau of Labor Standards (BLS), *Characteristics of Work-Related Injuries and Illnesses in Maine, 2005, An Annual Report*, November 2006, by Theodore Bradstreet and Steven Laundrie, p. 14.

** Age percentages calculated based on employment and age distribution data from U.S. Department of Labor, Bureau of Labor Statistics, *Geographic Profile of Employment and Unemployment*, “Employment status of the civilian noninstitutional population in states by sex, race, Hispanic or Latino ethnicity, and detailed age (preliminary),” 2005 Annual Averages (for Maine); <http://www.bls.gov/lau/ptable14full2005.pdf> (PDF page 22). Age/employment percentage calculations based on the number of persons employed for each age category, divided by total employed.

It is clear that while workers with less than one year of service with their employer experience much higher rates of work-related injuries and illnesses in Maine, all groups are potentially at risk. Occupational health and safety education for both workers and supervisors can play a vital role in helping to reduce these injuries and illnesses. Examples of important topics to be covered in this education include: approaches for identifying and abating hazards, legal provisions and standards of all applicable occupational health and safety laws, emergency procedures in the case of accidents, and new developments in occupational health and safety standards relating to specific types of work. Another key educational component is the ongoing training of labor and management on safe work practices and methods, including training (and follow up) on the correct usage of personal protective equipment (PPE), along with the correct operation of equipment on the job.¹⁰

ENGINEERING

In addition to looking at information on industries and occupations (see Table Three), it is also critical to understand the causes and nature of work-related injuries and illnesses, and contributing factors to work accidents, in order to address engineering and design improvements on the job. Here are some highlights concerning these factors.

⁹ *Ibid*. While it would be useful to have breakdowns of these data by gender, this information was not included as part of this 2005 BLS report. It is possible to obtain this information separately, however, so this issue may be addressed in a future report.

¹⁰ U.S. Department of Labor, OSHA, Shipyard Industry, OSHA 2268, 1998 (Revised); p. 8.

1) Causation: The Maine BLS report on work related injuries and illnesses for 2005 examines two characteristics related to causation: a) events or exposures (the manner in which the injury or illness was produced) and b) the source of the injury or illness (“the object, substance, bodily motion, or work environment which directly produced or inflicted the injury or illness”).¹¹

According to the report, the two most common types of occupational **events or exposures** resulting in injuries and illness were overexertion in lifting, occurring in **13.8%** of all first reports (1,916 cases), and falls to floor, walkways, or other surfaces, in **9.8%** of first reports (1,361 cases). In addition, the most common **source** identified in these reports was that of the bodily motion or position of the injured worker. This source was identified in **18.4%** of all 2005 first reports.¹²

2) Kinds of Injuries and Illnesses: The kinds of injuries and illnesses in the first reports for 2005 are described through two characteristics: the nature of the injury or illness, and part of body affected. Clearly “musculoskeletal injuries dominate workplace injuries and illnesses in Maine.”¹³ The most common “nature” of injuries was that of **sprains, strains, and tears**, which was identified in 4,921 cases, accounting for **over one-third** (35.5%) of all FROI’s. The second ranking “nature” of injury or illness, “**non-back soreness, pain or hurt**,” listed in almost 2,000 cases (1,983 reports, or 14.3 percent) was also musculoskeletal.¹⁴ The “part of the body” affected most often was the lumbar region (1,852 reports, or 13.4 percent).¹⁵

3) Occupations and Industries: Table Three lists the top ten occupations of injured workers in Maine, and the top ten industries of injured workers. It is interesting to note that while some of the occupations ranked in the top ten might be expected, such as construction laborers, there are also occupations not commonly associated in the public eye with workplace injuries or illnesses, such as retail salespersons.¹⁶ The list of top 10 industries is also eye-catching, with the surprising second-place listing of elementary and secondary schools, and the third-place listing of nursing care facilities. It is also notable that ship-building and repairing, still one of Maine’s largest industries, is on this list.

The hazards which contribute to many of the injuries among Maine’s workers can often be mitigated by ensuring that workplaces or sites are safe and healthful through proper **engineering** and design, taking into account the demands and characteristics of work in different occupations and industries. For example, proper ergonomic work design can play a vital role in reducing musculoskeletal related disorders or injuries (MSDs), such as carpal tunnel syndrome. (Ergonomics is an applied science that involves the adaptation of work stations, machines, tools, and equipment, to fit the occupational health and safety needs of workers).¹⁷

According to OSHA, the following work practices or conditions can be contributing factors to MSDs: “force, repetition, awkward and static postures, quick motions, compression or contact stress, vibration, or cold temperatures.”¹⁸ MSDs should not and need not occur as a result of an employee’s job. A number of possible actions can be taken to mitigate the hazards that may lead to these injuries. One strategy involves labor and management participation in joint health and safety committees, that can function to identify, reduce, and/or eliminate ergonomic and other hazards.

¹¹ MDOL/BLS, *Characteristics of Work-Related Injuries and Illnesses in Maine, 2005*; *ibid.*, p. 11.

¹² *Ibid.*, p. 10-11.

¹³ *Ibid.*, p. 12.

¹⁴ *Ibid.*

¹⁵ *Ibid.*, p. 13.

¹⁶ *Ibid.*, p. 8.

¹⁷ U.S. Department of Labor, OSHA, Ergonomics: The Study of Work. Washington, D.C.: U.S. Department of Labor, OSHA 3125, 2000 (Revised), p. 1.

¹⁸ *Ibid.*, p. 3.

**TABLE THREE: Top Ten Occupations and Industries of Injured Workers,
in First Reports of Disabling Occupational Injury or Illness, Maine, 2005**

<u>Rank</u>	<u>A. Top Ten Occupations of Injured Workers</u>	<u>Number of Reports</u>	<u>Rank</u>	<u>B. Top Ten Industries of Injured Workers</u>	<u>Number of Reports</u>
1	Laborers and freight, stock and material movers, hand	859	1	General medical & surgical hospitals	641
2	Truck Drivers, heavy and tractor-trailer	688	2	Elementary and secondary schools	622
3	Nursing aides, orderlies and attendants	651	3	Nursing care facilities	598
4	Janitors and cleaners, except maids and housekeeping cleaners	559	4	Ship building and repairing	478
5	Retail salespersons	499	5	Supermarkets and other grocery (except convenience) stores	439
6	Construction laborers	386	6	Full-service restaurants	298
7	Stock clerks and order fillers	354	7	Highway, street and bridge construction	291
8	Carpenters	345	8	Warehouse clubs and supercenters	243
9	Combined food preparation and serving workers, including fast food	274	9	Discount department stores	221
10	Production workers, all others	266	10	New single-family housing construction (except operative builders)	208

*SOURCE: Data are from Maine Department of Labor, Bureau of Labor Standards (BLS), *Characteristics of Work-Related Injuries and Illnesses in Maine, 2005, An Annual Report*, November 2006, by Theodore Bradstreet and Steven Laundrie, pp. 8-9.

Based on this hazard identification and analysis, appropriate engineering actions can be taken involving the design or redesign of work stations, tools, equipment, and machines; employee training and education; and where feasible, the adoption of administrative controls, including job rotation, break time, diversification of job tasks, and the use of personal protective equipment (PPE).¹⁹ However, personal protective equipment should only be used as a last resort. The Congressional intent behind the passage of the Occupational Safety and Health Act of 1970 was to eliminate and control hazards in the workplace and at worksites, and “to stimulate employers and employees to institute new and to perfect existing programs for providing safe and healthful working conditions.”²⁰

ENFORCEMENT

According to data compiled by the U.S. Department of Labor's Bureau of Labor Statistics, Maine was shown to have the highest incidence rate of nonfatal occupational injuries and illnesses of forty-six reporting states and territories of the U.S., in 2006 (in private industry). Table Four provides the incidence rates of occupational injuries and illnesses for the ten states reporting the highest rates.

¹⁹ *Ibid.*, p. 7. Maine law requires most employers to provide employees with at least 30 consecutive minutes of unpaid rest time after every six consecutive hours worked.

²⁰ Occupational Safety and Health Act of 1970. P.L. 91-596, 1970, Amended by P.L. 101-552, 1990, Section (2) (b) (1).

**TABLE FOUR: Top Ten States with Highest Incidence Rates of
Nonfatal Injuries and Illnesses in Private Industry, U.S., 2006**

<u>State</u>	<u>Total Cases</u> (per 100 full time workers)*
Maine	7.0
Montana	6.9
Washington	6.6
Alaska	6.2
Indiana	6.0
Vermont	5.5
Wisconsin	5.5
Nevada	5.5
Illinois	5.4
Oregon	5.3

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics, Table SNR13, "Nonfatal occupational injury and illness incidence rates by State and case types, private industry, 2006; "
<http://www.bls.gov/iif/oshwc/osh/os/ostb1775.pdf>

* The incidence rates "represent the number of injuries and illnesses per 100 full-time workers, and were calculated as: (N/EH) X 200,000, where N = number of injuries & illnesses, EH = total hours worked by all employees during the calendar year, 200,000 = the base for 100 equivalent full-time workers (working 40 hours per week, 50 weeks per year)." (*Ibid.*)

The data in Table Four demonstrate the clear and continued need for strong enforcement of existing occupational health and safety laws on the federal and state levels. The General Duty Clause of the Occupational Safety and Health Act requires all employers covered by this statute to: 1) provide their employees with a place of employment free "from recognized hazards that are causing or likely to cause death or serious physical harm ...;" and 2) "comply with occupational safety and health standards promulgated under this Act."²¹ Public employees in Maine are covered by a similar statute providing these basic protections. The existence of these laws should enable Maine's workers to attain healthful and safe workplaces or sites. Yet, as demonstrated by the previously cited data, Maine has the dubious distinction of being the national leader in the incidence of nonfatal occupational injuries and illnesses in private industry.

CONCLUSIONS

Using the "Three E" approach involving **E**ducation, **E**ngineering, and **E**nforcement, Maine's employers, workers, and unions can, and should, continue working collaboratively, along with appropriate officials, to attain and maintain workplaces or sites that are healthful, safe, and productive.

Prepared as a public service by the Bureau of Labor Education, University of Maine; Spring, 2008
(207) 581-4124 web: <http://dll.umaine.edu/ble/>



A member of the University of Maine System

²¹ *Ibid.*, Section 5.