FATAL INJURIES AT WORK

MASSACHUSETTS FATALITY UPDATE, 2003 – 2004

Occupational Health Surveillance Program Massachusetts Department of Public Health September, 2006

Every year, men and women in a wide variety of jobs and industries throughout Massachusetts die as a result of traumatic injuries at work. These deaths are all the more tragic because they are largely preventable. Information about where and how they occur is essential in order to develop effective prevention programs. In Massachusetts, the Occupational Health Surveillance Program (OHSP) in the Massachusetts Department of Public Health (MDPH) collects information on fatal occupational injuries as part of the national Census of Fatal Occupational Injuries (CFOI), conducted in cooperation with the Bureau of Labor Statistics (BLS), U.S. Department of Labor.

OHSP also conducts in-depth investigations of fatal occupational injuries as part of the national Fatality Assessment and Control Evaluation (FACE) project, sponsored by the National Institute for Occupational Safety and Health (NIOSH). The purpose of the FACE project is to develop a detailed understanding of how fatal injuries occur and to identify effective countermeasures to prevent similar incidents in the future. Excerpts from selected FACE investigations are highlighted in this report.

This update provides an overview of fatal injuries at work that occurred in Massachusetts during 2003 and 2004. These include fatalities traditionally linked to the work environment such as falls, electrocutions, and exposure to toxic chemicals. They also include workplace homicides and suicides as well as motor vehicle-related fatalities that occurred during travel on the job. Deaths resulting from occupational illnesses and heart attacks at work are excluded from this fatality update.

OVERVIEW OF FATAL INJURIES AT WORK IN 2003 - 2004

- In Massachusetts, a total of 150 men and women were fatally injured at work during 2003 and 2004. Ninety-five percent of these workers were men. In 2003, 73 men and five women suffered fatal injuries at work in Massachusetts; in 2004, 69 men and three women died as a result of occupational injuries. The average annual rate of fatal occupational injury for all workers in Massachusetts was 2.3 per 100,000 workers over the two year period 2003-2004.[1]

- The average age at death was 41.6 years. More than one-quarter (27.3%) of victims were younger than 35 years of age. The highest fatal injury rates were among the 35-44 age group and those individuals 65 years and older. The 150 fatalities resulted in a total of 5,000 potential life years lost, an average of 33 potential life years lost per death. Potential life lost is the difference between the victim's age and 75 years.

- One hundred and sixteen (77%) victims were white non-Hispanic. Fifteen victims (10%) were Hispanic, twelve of whom were foreign born. The average, annual rate of fatal injuries among Hispanics was 3.6 deaths per 100,000 workers over the two year period, 2003 – 2004.

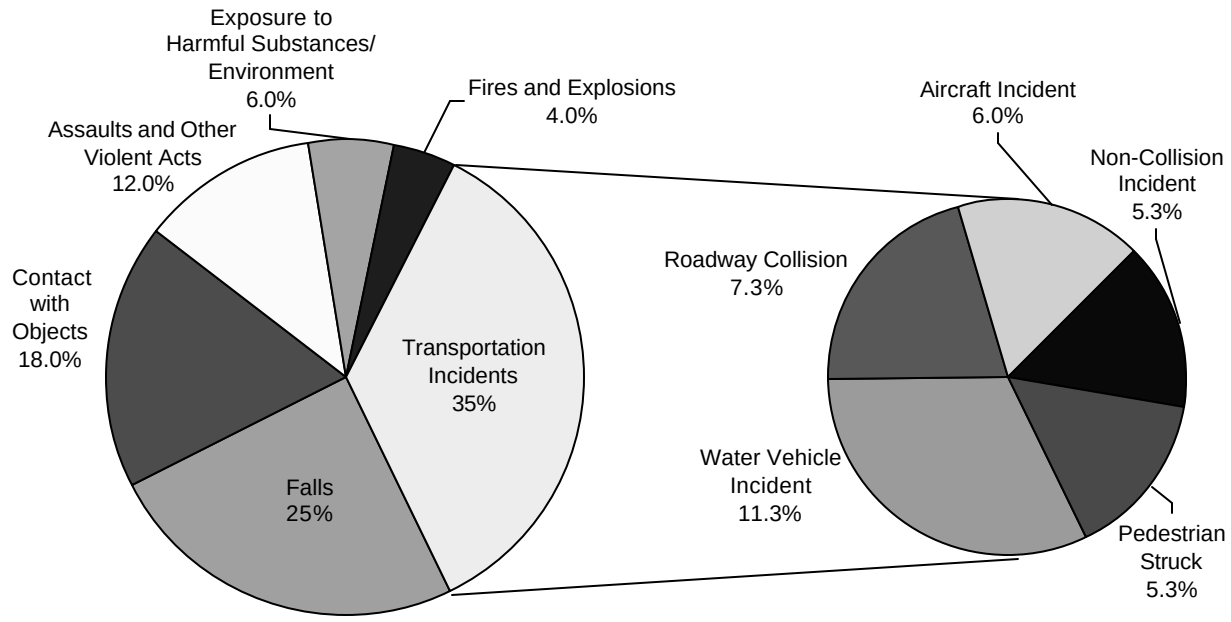
- Thirty-five victims were foreign-born, ten of whom were employed in the construction industry. Foreign-born workers had a higher rate of fatal injuries compared with workers born in the United States (3.4 verses 2.0).

- Of the 150 workers fatally injured, 25 (17%) were self-employed and died at 1.8 times the rate of wage/salary earners.

[1] One hundred and fifty work-related fatality cases identified as of 1/1/06. Rate calculations exclude cases under 16 years of age.

EVENTS RESULTING IN FATAL INJURIES

Figure 1. Fatal Injuries at Work by Event/Exposure
Massachusetts 2003-2004, N = 150



Source: Census of Fatal Occupational Injuries

Transportation-related incidents accounted for 53 (35%) deaths**.** These incidents involved workers in a wide variety of industries including fishing, professional & technical services, warehousing, and transportation. Eleven workers were vehicle occupants who were fatally injured in roadway collisions. An additional eight vehicle occupants died in overturns and other non-collision crashes. Eight victims were pedestrians struck by vehicles in the roadway, the breakdown lane, a parking lot, and other off-road areas. The remaining 26 transportation-related fatalities occurred in non-highway incidents: 17 involving fishing vessels, and nine involving aircraft. Five fishing vessel incidents and two aircraft incidents resulted in more than one fatality per incident.

Falls to a lower level accounted for 89% of all fatal falls, claiming 33 workers' lives and resulting in more fatalities than any other single event during 2003-2004. Half of these fatal falls were from a height of 25 feet or less (Range: 5 to 200 feet)[2] and included 12 falls from a ladder, scaffold, girder, or stairs, nine from a roof, four through an opening in the floor, and three from a stationary vehicle. Sixty-nine percent (23/33) of the fatal falls to a lower level occurred in the construction industry.

Contact with objects or equipment claimed the lives of 27 (18%) workers. Seventeen of the victims were struck by or against objects such as felled trees, un-manned vehicles, structural beams, and other building materials. Ten workers were caught in or compressed by equipment, objects, or collapsing materials. Among these, cranes killed three persons, and production machinery claimed three lives.

Assaults and other violent acts accounted for 18 (12%) of the work-related deaths; nine were workplace homicides and nine were suicides. More than one-half (five) of homicide victims were killed while working in convenience stores or gas stations. Six workers were slain during robbery attempts. Five of the nine homicides involved the use of knives and the remaining four resulted from gunshots. Seven of the nine homicide victims were foreign-born workers.

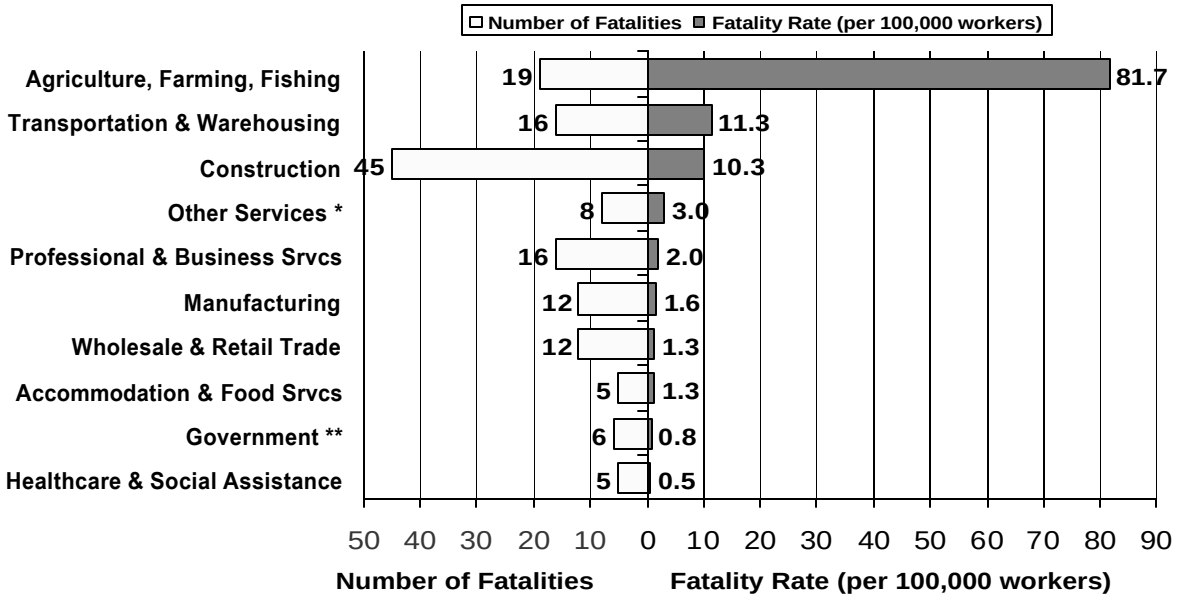
Exposure to harmful substances or environments resulted in the deaths of nine (six percent) workers. Seven of these workers were electrocuted, four of whom came in contact with energized power lines.

An additional six (four percent) workers perished in fires or explosions.

[2] Height information was not available for four fatal falls to a lower level.

FINDINGS BY INDUSTRY

Figure 2. Number and Rate[3] of Fatal Injuries at Work by Industry Division[4]
Massachusetts 2003-2004



Note: Data not presented for four Industry Divisions with fewer than five fatalities.
* Other Services includes automotive as well as other maintenance/repair services.
** The Government category includes fatalities sustained by public sector workers regardless of industry.

Source: Census of Fatal Occupational Injuries

The **Agriculture, Farming, and Fishing** industry had 19 (13%) fatalities and the highest occupational fatality rate (approximately 82 deaths per 100,000 workers) during 2003 and 2004. Seventeen of the 19 victims in this industry sector were commercial fishers. Of the 17 commercial fishers who lost their lives in 2003-2004, five drowned in one incident when their scalloping boat capsized and sank in frigid waters.

The **Transportation and Warehousing** industry had 16 (11%) deaths with the second highest fatality rate of 11.3 deaths per 100,000 workers. Seven workers were fatally injured in transportation incidents involving trucks and another nine victims were involved in five plane crashes.

The **Construction** industry had the highest fatality count with 45 (30%) deaths and the third highest occupational fatality rate (10.3 deaths per 100,000 workers). Twenty-three construction workers died as a result of falling from a height. Six died after contacting electric current, five were struck by or against an object, and four were killed after being caught in or compressed by a machine or other equipment.

The **Professional and Business Services** industry accounted for 16 (11%) deaths with a rate of 2.0 fatalities per 100,000 workers.

The **Trade** industry had 12 (8%) deaths with a rate of 1.3 deaths per 100,000 workers. More than half (56%) of all homicides occurred in the retail trade sector.

The **Manufacturing** industry claimed the lives of 12 workers and six **Government** employees sustained fatal injuries in 2003-2004. Three of the six government workers were employed by local municipalities. An excerpt from FACE Report 03MA041 on the next page describes an incident which resulted in the death of a public sector grounds keeper.

[3] To maintain consistency with denominator data, fatalities among military personnel and workers under 16 years of age were excluded from the numerator in rate calculation.
[4] Industry definitions based on the 2002 North American Industry Classification Structure (NAICS), The Office of Management and Budget.

OSHA COVERAGE, INVESTIGATIONS AND PENALTIES

The Occupational Safety and Health Administration (OSHA) investigated 38% (57/150) of the fatal work-related injuries that occurred in Massachusetts between 2003 and 2004.[5] About half of the remaining fatalities were in sectors that fall outside of OSHA jurisdiction such as commercial fishers, public sector employees, sole proprietors, or the self-employed. The remaining fatalities involved events not routinely addressed by OSHA such as homicides, suicides, airplane/railway incidents, or roadway motor vehicle-related crashes.

OSHA levied fines for violations of health and safety standards against 47 of the 54 employer establishments they investigated.[6] In the period 2003-2004, the agency assessed a total of $823,025 in initial penalties, with the lowest fine assessed at $1,500 and the highest at $70,000.

Public Sector Equipment Operator Killed when Run Over by a Rotary Riding Mower - Massachusetts
Massachusetts FACE Report 03MA041

A public sector equipment operator was fatally injured when he was run over by a sit-down rough rotary mower. The victim, who was mowing a section of a city park, had stopped the mower on an edge of a hill and turned off the engine. After exiting the mower, he noticed that the mower had started to roll down the hill. The victim attempted to stop the rolling mower by stepping in front of it, but became trapped underneath the mower and was dragged approximately 75 feet. The victim had worked for the city parks department for approximately eight years. The employer did not have a designated person in charge of safety and health, nor a written safety and health program. On-the-job training had been provided by the city on the mower involved in the incident.

In order to prevent similar incidents, Massachusetts FACE recommended that employers should:
1) develop, implement, and enforce standard operating procedures (SOPs) for operating and shutting down mowers, including requirements to park mowers on level ground; 2) develop, implement, and enforce a comprehensive written safety program, which includes training on hazard recognition and the avoidance of unsafe work practices and conditions.

In addition, employers of state and municipal workers should provide work environments that, at a minimum, meet all relevant Occupational Safety and Health Administration (OSHA) and American National Standards Institute (ANSI) requirements and standards.

The full report can be found at www.cdc.gov/niosh/face/MAFACE.html

COMMENTS

It is important when reporting summary information about fatal occupational injuries to acknowledge the individuals that these numbers represent. These deaths were tragic incidents that were largely preventable. In addition to the human and emotional losses suffered, these deaths resulted in financial hardships for victims' families as well as societal losses. Surveillance findings guide government, industry, labor, and community organizations in developing and implementing strategies to prevent similar tragedies in the future.

Nationwide, an average of 5,631 workers died annually as a result of traumatic work-related injuries in 2003-3004, and the average annual occupational fatality rate was 4.0 deaths per 100,000 workers.[7] This rate is substantially higher than the average annual rate of 2.3 deaths per 100,000 workers for Massachusetts for the same time period. Massachusetts' lower

[5] OSHA also conducted five initial investigations of occupational deaths that either resulted from heart attacks or were among self-employed individuals in 2003 and 2004.

[6] Three establishments that OSHA fined each had two fatalities in this time period.

[7] U.S. Department of Labor, Bureau of Labor Statistics, Census of Fatal Occupational Injuries, 2003-04.

fatality rate is possibly explained in part by differences in the industrial make-up of the Commonwealth's workforce as compared with that of the nation. Between 2003 and 2004, 43% of Massachusetts' workforce was employed in relatively lower risk, service-oriented jobs in education, business, administration, leisure, hospitality, and healthcare as compared with 36% of the U.S. workforce. Nationally, proportionately more workers were employed in higher risk industry sectors such as heavy manufacturing, agriculture, mining, and utilities management.[8] Massachusetts also has lower rates of fatal motor vehicle crashes and homicides in general. These two types of fatal injuries contributed substantially to the national occupational fatality burden. While the fatality rate is lower in Massachusetts, continued efforts are needed to reduce the human and economic toll of preventable deaths at work in the Commonwealth. Findings in this update highlight several specific issues to be addressed.

The **construction** industry in Massachusetts continues to have both high numbers and high rates of fatal occupational injuries. One-half (51%) of the deaths in this industry were due to falls. OSHA has established standards for fall prevention at construction sites (29 CFR 1926, Subpart M, Fall Protection). Comprehensive work-site fall prevention programs that adhere to these OSHA standards and promote use of engineering controls that safeguard against falls can reduce the risk of fall-related injuries in construction. To spread the fall prevention message, innovative efforts are needed to reach employers and workers in small construction companies, as well as the homeowners who hire them. In Massachusetts, the Fatality Assessment and Control Evaluation (FACE) project is facilitating discussions among a diverse group of stakeholders representing labor, occupational health surveillance/research, risk management, enforcement, and the community for the purpose of sharing strategies for fall prevention in the construction industry and identifying opportunities for collaboration. FACE continues its educational outreach to residential contractors by disseminating fall prevention brochures in multiple languages. These brochures are available on our web site at www.mass.gov/dph/ohsp. Also, the regional OSHA office implements a local emphasis program (LEP) on fall protection, and currently, a residential construction LEP in Southeast Massachusetts is underway. For information about OSHA Region 1 Local Emphasis Programs, contact Robert Hooper at 617-565-9860.

The high occupational fatality rates among **Hispanic and immigrant workers** should be interpreted with caution because they are calculated using small numbers of deaths as well as imprecise and, often, underestimated workforce counts for Massachusetts. However, these rates are consistent with previous findings for Massachusetts and with findings for the nation as a whole. Increasingly, immigrants are making up a greater percentage of the Commonwealth's workforce; however, 23% of all the 2003-04 fatal injuries involved foreign-born workers, which is higher than their representation in the workforce (16-17%).[9] Higher than average fatality rates for foreign-born and Hispanic workers may be explained by their disproportionate representation in higher risk jobs and other factors such as literacy, language, and cultural barriers at work, inexperience, lack of information about occupational hazards, health and safety rights and resources, fear of discrimination and socioeconomic pressure that renders workers hesitant to speak up.[10] [11]

There is growing recognition of the need to identify and address the factors that place immigrant, Hispanic, and other minority workers at high risk. In response to the incident in which two Vietnamese floor finishers were fatally burned and another two sustained serious burn injuries (see excerpt from FACE Report #04MA032 on the next page), Boston-based community organizations solicited input from the FACE project as well as other state, local, and federal agencies to identify hazards associated with hardwood floor finishing. These community organizations have successfully used this information to work with local employers and product manufacturers/distributors in developing strategies to reduce these hazards. The Occupational Health Surveillance Program continues to document the occupational health experience of immigrant workers and to collaborate with community organizations to disseminate educational materials on health and safety in multiple languages. OHSP distributes a guide describing worker rights and benefits under the workers' compensation system in Massachusetts available in English, Portuguese, and Spanish at www.mass.gov/dph/ohsp. In the last few years, the FACE project has highlighted some of the work hazards that put immigrant workers at risk for injury by issuing one page Safety Alerts and FACE Facts that describe fatal incidents, inform workers of their health and safety rights on the job, and propose recommendations to prevent similar events from occurring again. Locally, OSHA regional and area offices have outreached to Hispanic workers and their employers by providing educational activities and consultation services. Information, resources, and publications in Spanish can be found on the OSHA website at http://www.osha.gov/as/opa/spanish/index.html.

[8] U.S. and Massachusetts workforce estimates calculated using Current Population Survey data; U.S Department of Labor, Bureau of Labor Statistics, 2003-2004.
[9] MassINC (The Massachusetts Institute for a New Commonwealth). (2005), The Changing Face of Massachusetts.
[10] Frumkin H. Pransky G. (1999), Special Populations in Occupational Health. Occup Med: State of the Art Reviews, 4(3):479-84.
[11] Azaroff L. Levenstein C. Wegman D. (2002), Occupational Injury and Illness Surveillance: Conceptual Filters Explain Underreporting, Am. J Pub Health, 92(9): 1421-29.

Two Vietnamese Floor Sanders Die When Wood Floor Finish Product Ignites - Massachusetts
Massachusetts FACE Report 04MA032

Two hardwood floor sanders were fatally injured when the three-family house they were working in caught fire. The victims were refinishing the wood floors in the third floor unit and the stairs leading up to this unit. The incident occurred when the flammable lacquer floor sealer they were applying was ignited by a pilot light in a gas stove, causing the house to catch fire. At the time of the incident, the windows were closed and no other means of ventilation were being used. The company did not have a written hazard communication program. The victims received on-the-job training, but it did not address the hazards associated with this incident. Both of the fatally injured workers were Vietnamese immigrants. The company owner was also Vietnamese.

In order to prevent similar incidents, Massachusetts FACE recommended that employers should:
1) use wood floor finishing products that are less flammable (products with flash points greater than 100°F) for indoor applications; 2) ensure that ignition sources, including gas pilot lights, are extinguished prior to beginning work; 3) ensure that work areas are adequately ventilated during indoor application of wood floor finishing products; 4) conduct job hazard analyses and implement and enforce a safety checklist to be completed prior to beginning work; 5) develop, implement, and enforce a written hazard communication program that includes training employees about the chemicals they work with and the associated hazards and controls of these chemicals. Additional recommendations for the wood floor finishing industry, homeowners, policymakers, and other stakeholders can be found in FACE Report #04MA032 at www.cdc.gov/niosh/face/MAFACE.html.

The FACE Program, in conjunction with the Office of the State Fire Marshall, also released a Fire Safety Alert in response to this incident that is available in English as well as Vietnamese. A black and white English version of this alert is located on the next page. See the contact / material request information section below on how to obtain full size color copies of the alert in English and Vietnamese.

CONTACT / MATERIAL REQUEST INFORMATION

For detailed tables of fatal occupational injuries in 2003 and 2004, previous fatality update reports as well as FACE Facts and Safety Alerts, please contact the Massachusetts Department of Public Health, Occupational Health Surveillance Program, 250 Washington Street, 6th Floor, Boston, MA 02108-4619. These reports may also be obtained by calling 1-800-338-5223. Some can be accessed online at www.mass.gov/dph/ohsp, under the 'Educational Materials' or 'Data Reports and Publications' section of 'Fatal Work-related Injuries.'

ACKNOWLEDGEMENTS

This project is a joint effort of several state and federal agencies. For their assistance in providing data and advice, we thank: Marthe Kent, Regional Administrator, OSHA Region I; Robert Hooper, Assistant Regional Administrator, OSHA Region 1 and his staff; Stanley Nyberg, Registrar of Vital Records and Statistics, MA Department of Public Health and his staff; and Anthony Conti, Director, MA Fatal Accident Reporting System (FARS). We also appreciate the contributions of the MA Department of Labor and Workforce Development, the MA Office of the Chief Medical Examiner (CME), the MA Department of Industrial Accidents, the U.S. Coast Guard, the National Transportation Safety Board (NTSB), the Boston Regional Office of the U.S. Bureau of Labor Statistics, the National Institute for Occupational Safety and Health (NIOSH), local and state police departments, health departments, and clerks of cities and towns.

Fire Safety Alert

Occupational Health Surveillance Program- Massachusetts Department of Public Health
Office of the State Fire Marshal Department of Fire Services
March 2006

Wood Floor Sanders Killed When Floor Finishing Product Catches Fire-Massachusetts

Wood floor finishing can expose workers, building occupants, and homeowners to fire hazards. In Massachusetts, three wood floor sanders died within a 10 month period (September 2004 – July 2005) in two separate fires when the flammable lacquer floor sealer they were using caught fire. The sealer used in these incidents was highly flammable (flash point 9°F/-13°C). All three of the fatally injured workers were Vietnamese immigrants.

Incident 1: Two floor sanders died from burns and two were seriously burned while they were refinishing wood floors in a three-family house. The house caught fire while the workers were applying a lacquer sealer that was ignited by a pilot light in a gas stove. At the time of the fire, windows were closed and no other means of ventilation were being used.

Incident 2: One floor sander died from burns and another received minor burns while finishing wood floors that they installed in a single family house. The house caught fire while the workers were applying a lacquer sealer that was ignited by a pilot light on a gas hot water heater. The heater was located in a closet on the same level of the house where the floors were being finished. At the time of the fire, the front door was open, but windows were closed and no other means of ventilation were being used.

What is the flash point of a liquid?

The flash point is the lowest temperature at which a liquid produces enough vapor to catch fire in the presence of a flame or other ignition source. **The lower the flash point, the more flammable the liquid.** A product's flash point can be found on the *Material Safety Data Sheet* (MSDS), or product label or by calling the product manufacturer.

HOW CAN YOU HELP PREVENT FIRE DURING FLOOR FINISHING?

Use less flammable wood floor finishing products (products with flash points greater than 100°F/38°C) for indoor applications.

Extinguish all open flames and other ignition sources before beginning work.

- Extinguish gas appliance pilots (on stoves, hot water heaters, heating units, clothes dryers, and other appliances).
- Turn off and unplug cycling electrical appliances (such as refrigerators, air conditioners, heating units, hot water heaters) and other electrical devices.
- Do not light or smoke cigarettes while you are working.
- Do not turn light switches on or off during the floor finishing process; turn off power to work area, if possible.

Adequately ventilate work areas during wood floor finishing.

- Open windows; keep open during product application until product is dry.
- If electric fans are used for ventilation, they must be classified as ***explosion proof*** and be plugged in outside of the work area.

In addition, employers should:

Provide safety training to employees, as required by law,* about the hazards of the chemicals they work with and safe work practices. Training should be provided in the languages spoken by employees.

*The Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (29 CFR 1910.1200).

Conduct a job hazard analysis before each job. Also require employees to complete a safety checklist before beginning each job.
Before starting floor finishing jobs, employers should get information on manufacturer's safety recommendations for all products being used, ignition sources in the house and how to keep the work area ventilated. This information should be part of the safety checklist given to the work crew before going to the work site. Employers should make sure that the safety checklist has been completed before anyone starts work.

Fatality Assessment Control Evaluation (FACE) Project 617.624.5627

Please report work-related fatalities immediately to the

Toll-Free Occupational Fatality Hotline

1-800-338-5223

or

Fax 617-624-5696

When reporting a fatality, include the following information:

- Your name, organization, address, and phone number
- Victim's name, occupation, and employer
- Brief description of the incident, including date and time

The Occupational Health Surveillance Program would like to thank all agencies and people that contribute to our efforts in preventing work-related deaths by reporting fatalities and providing information during our fatality investigations.

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