



## **Massachusetts FACE • Occupational Fatality Report**

Massachusetts Department of Public Health  
Occupational Health Surveillance Program  
Fatality Assessment and Control Evaluation Project



### **Warehouse Worker Fatally Injured when Struck by Falling Metal Grates – Massachusetts**

**Investigation: # 09-MA-042-01**  
**Release Date: May 20, 2011**

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#### **SUMMARY**

On October 23, 2009 a 49-year-old male warehouse worker (victim) was fatally injured while collecting product for an order. While getting ready to move the pallet jack that he was using to the location of the next item to be picked, he was struck by metal grates that fell from their top shelf storage location. A co-worker who was in an adjacent aisle accessing the top section of a rack heard the crash and then found the victim underneath the metal grates. Co-workers cleared the grates away from the victim, started cardiopulmonary resuscitation, and placed a call for emergency medical services (EMS). Within minutes EMS and the local police and fire departments arrived at the incident location, and the victim was transported to a local hospital where he was pronounced dead. The Massachusetts FACE Program concluded that to prevent similar occurrences in the future, employers should:

- **Ensure that infrequently accessed materials stored within rack systems are secure by using supplemental cables or gates across the front of the rack;**
- **Install guards on the rear of racks in back-to-back setups to reduce the chance of disrupting materials in adjacent racks;**
- **Develop, implement, and enforce a comprehensive written safety and health program that includes topics related to warehouse operations such as safe storage of items, retrieval of stuck items, and safe operation of powered industrial trucks and provide training in languages on these topics that employees can comprehend; and**
- **Ensure that all federal and state required trainings and licenses for forklift operators are valid and up-to-date.**

#### **INTRODUCTION**

On October 23, 2009, the Massachusetts FACE Program was notified by a local police department through the 24-hour Occupational Fatality Hotline that earlier that same day a 49-year-old male warehouse worker had died after being struck by falling metal racks. An investigation was initiated. On November 17, 2009, the Massachusetts FACE Program Director

and an investigator traveled to the company's main office, which was also the incident location, and met with a company representative. The police report, death certificate, and corporate information were reviewed during the course of the investigation. Photographs were taken of the location where the incident occurred.

The company is a manufacturer's representative for both residential and commercial plumbing supplies, pipes and tanks. The company was formed in 1980 and was incorporated in 1983. At the time of the incident, the company had been at the current Massachusetts facility, which they built, for less than six years. The normal work schedule for the company's warehouse workers is Monday through Friday starting around 6:30 a.m. and ending at 3:30 p.m. The victim was one of 13 warehouse workers employed by the company and held the job title of order picker. The victim was a Vietnamese immigrant who had been employed at the company for about nine years. The victim, who was deaf and did not communicate verbally, was hired by the company through a state program that arranges job placements for workers with disabilities. The company employs two other employees through this program who are also deaf.

The company owns multiple powered industrial trucks, and employees who operate the trucks are provided the OSHA required powered industrial truck training and are certified every three years. The victim did not operate powered industrial trucks as part of his job and, therefore, did not need the powered industrial truck certification. A co-worker, the operator of the forklift involved in the incident, had been provided the powered industrial truck training by a previous employer less than three years prior to the incident, but conditions at the current company were different enough that the current employer should have provided powered industrial truck training when the operator was hired.

New employees, including the warehouse workers, are typically hired through a temporary agency. After being on the job for a few months and going through hands-on training, the company then decides if the worker is to be hired full-time. It was unknown if a sign language interpreter was available when the victim was being trained at his time of hire. The company did not have a comprehensive health and safety program, but did have a safety committee. The company also gave employees an allowance to purchase steel toed shoes. There was no union representation at the company.

## **INVESTIGATION**

The company's main location, which is the location where the incident took place, has offices and a large warehouse. The warehouse section of the building is 63,000 square feet with a ceiling height of 35 feet. The company installed all new rack systems prior to moving into the new building. The company also purchased all new powered industrial trucks at this same time. The warehouse was set up with multiple rows of the rack systems. Some of the rows of the rack system had two rack systems against each other back to back with a one foot space, that the company representative called a flue. Other aisles had single rows of racks. The top levels of the racks were approximately 20 feet high. There were approximately seven levels within each rack section, although the number per rack did vary. Each level had either metal rack shelving or a number of cross beams intended to support pallets. Those levels with metal shelving had two grates approximately 46 inches deep and 42 inches wide. These grates could hold boxed or

loose materials or two standard 48 inch by 40 inch pallets side by side with some pallet overhanging the front or back of the shelf (Figure 1).

The company also brought some of their old rack systems with them from the previous building location to the new building for potential future use. Prior to the incident, the company had set up a few of the old rack systems to prepare for the arrival of product from their out of state subsidiary distribution warehouse that was being closed. Not all of the older rack systems were used, and 14 metal grates from the old rack system remained stacked on a pallet with plastic wrapped around them. This pallet had been stored on the top shelf of a new rack since the company moved into the building (Figure 2 - shows two of the older metal grates).

On the day of the incident, the victim was performing one of his normal tasks of picking product for an order. The victim had a manual pallet jack with a pallet on the forks and was picking product when he came across an item on a shelf that he could not reach. The victim then went and got a rolling ladder so he could retrieve the product that was out of reach. The product was placed on the pallet and the victim returned the rolling ladder to its storage location. The victim returned to the aisle where he left the pallet jack so he could move the pallet jack to the next location of product to be picked.

At this same time, a co-worker was operating a reach truck in an adjacent aisle, accessing the top shelf of a rack to remove a pallet that had two stacked acrylic bathtubs stored in boxes on it (Figures 3 and 4). Because this was a back-to-back setup, although located on separate racks and shelves, the pallet with the bathtubs was next to the pallet with the metal grates, with the one foot flue separating the two shelves. The bathtubs were being moved to a different location within the warehouse as part larger effort to reorganize some products in the warehouse.

The co-worker positioned the reach truck's forks inside the pallet with the bathtubs and tried lifting the pallet, but the pallet was caught on something and would not lift off the shelf. The co-worker then attempted to free the pallet by tilting the forks. It appears that either the pallet with the bathtubs, or the bathtub boxes themselves were caught on some of the stored metal grates on the adjacent shelf and when the forks were tilted, this caused 12 of the 14 grates to fall. The company reported that they have a procedure to follow if a pallet or product becomes stuck. This procedure requires the reach truck operator to call a foreman who will get an order picker truck to assess the problem.

As the victim entered the aisle to retrieve his pallet jack so he could continue his task, the 12 metal grates fell from the above shelf on top of him. The co-worker who was operating the reach truck in the adjacent aisle heard the loud crash and went to the next aisle, finding the victim underneath the grates. Immediately co-workers started to move the metal grates from the victim, started cardiopulmonary resuscitation (CPR), and placed a call for emergency medical services (EMS). Representatives from the local police department, fire department and EMS arrived at the scene within minutes. The victim was transported to a local hospital where he was pronounced dead.

## CAUSE OF DEATH

The medical examiner listed the cause of death as blunt trauma with head, neck, torso and extremity injuries.

## RECOMMENDATIONS/DISCUSSION

**Recommendation #1: Employers should ensure that infrequently accessed materials stored within rack systems are secure by using supplemental cables or gates across the front of the rack.**

**Discussion:** The spare rack shelving was stored on the topmost shelf because the workers had not needed it since moving to the new warehouse. While it is efficient for warehouse operators to store infrequently used items in the least accessible space, it is important to ensure that all materials are stored safely and securely.<sup>1</sup> Many rack manufacturers recommend stringing netting, cables, or gates across the front of rack bays to prevent falling materials, whether they fall as the result of fork trucks striking the rack system, shifting over time from vibration, or, in this case, direct impact.<sup>2,3</sup> This restraint method should not be used in lieu of proper product bundling and inventory monitoring, but can further prevent materials from falling.

**Recommendation #2: Employers should installing guards on the rear of racks in back-to-back setups to reduce the chance of disrupting materials in racks.**

**Discussion:** Several rack manufacturers recommend installing guarding on the back side of racks to prevent materials from falling out of the back of the rack, and to reduce the chance of positioning materials too deep within the rack bay.<sup>3</sup> Rigid cross braces, grates, and netting are available for this purpose. These guards can also reduce the risk of disrupting materials in back-to-back setups, which is important when using powered industrial trucks, and especially reach trucks, where the operator remains at the floor level. The use of such guards in back-to-back setups will also ensure that the flue space between the racks is kept free of obstructions, a requirement of fire prevention code for many warehouses.<sup>4</sup> Guards will also help with the proper positioning of items that are deeper than the shelves or overhanging their pallets. The use of such rear guards in this case may have prevented the large tub boxes or pallet from toppling the stack of shelving. In addition, closing off or having a co-worker monitor the isles located on the backside of racks where large items are being accessed will also help ensure workers are not located within an area where they could be struck by unexpected falling objects.

**Recommendation #3: Employers should develop, implement, and enforce a comprehensive safety and health program that includes topics related to warehouse operations such as safe storage and retrieval of item and safe operation of powered industrial trucks and provide training on these topics in languages that employees can comprehend.**

**Discussion:** At a minimum, a comprehensive written safety and health program should include an explanation of the worker's rights to protection in the workplace, safe work practices workers are expected to adhere to, specific safety protection for all tasks performed, ways to identify and avoid hazards, and who they should contact when safety and health issues or questions arise. In this case, topics also to be included are safe storage of items within the rack system, procedures for retrieving stuck materials, and safe powered industrial truck operation in the vicinity of co-workers.

Employers should use their employees' expertise throughout the process of developing the comprehensive safety and health program by seeking employee input. Even after the safety and health program is developed, employers should continue to seek employees' input during the routine updating of the program. The program should be updated when safety concerns arise and when new equipment and new tasks are introduced into the workplace. The employers should provide training on the comprehensive safety and health program topics and the training should be conducted in languages that are comprehensible to the participants. Accommodations such as interpreters, Communication Access Realtime Translation (CART), and/or assistive listening devices should be secured when necessary.

As a reference, a summary of the Occupational Safety and Health Administration's (OSHA) draft proposed safety and health program rule, which discusses the safety and health responsibility of employers, has been included at the end of this report. In addition, the Massachusetts Department of Labor Standards (DLS) offers free consultation services to help small employers improve their safety and health programs, identify hazards, and train employees. DLS can be contacted at 617-969-7177. More information about DLS can be found on their Web site at [www.mass.gov/dos/consult](http://www.mass.gov/dos/consult).

**Recommendation #4: Employers should ensure that all federal and state required trainings and licenses for forklift operators are valid and up-to-date.**

**Discussion:** Employers have to comply with federal and state requirements before allowing employees to operate forklifts.

1) *Federal requirements:* In this case, the employer did have a powered industrial truck training program for training employees in the operation of forklifts, as required by OSHA. At the time of the incident, the forklift operator had been with the company for 14 months and had had experience operating other models of lifts through previous employment. He also had received powered industrial truck training within the past three years, by his previous employer. This training, however, was on a different model forklift and in a setting with different hazards. Therefore, at the time the operator was hired, in accordance with OSHA requirements, the

current employer should have provided powered industrial truck training to the operator on the model of forklifts that he would be operating and on the site specific hazards that he would encounter when operating these forklifts.<sup>5</sup>

2) *Massachusetts requirements*: In Massachusetts, the 1C Hoisting License issued by the Department of Public Safety (DPS) is required to operate forklifts for work. In this case, the operator of the reach truck did not hold this license. In order to obtain a hoisting license, operators must be 18 years of age, complete an application, and successfully pass an examination covering all working parts of the hoisting machinery, safe operating practices, hand signals, and inspection procedures.<sup>6</sup> Information about the hoisting license can be found on the DPS Web site at [www.mass.gov/dps](http://www.mass.gov/dps). In Massachusetts no worker should be operating hoisting equipment, including forklifts, without a valid Hoisting License.

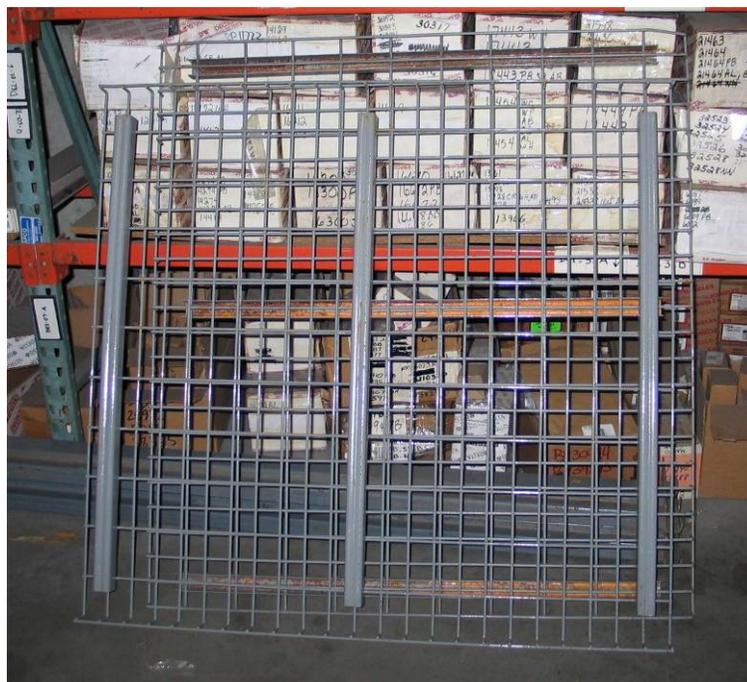
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**Figure 1 – Warehouse rack system**



**Figure 2 – The older metal rack grates**



**Figure 3 – Straddle lift truck involved in the incident**



**Figure 4 – Boxed tubs**



## **FATALITY ASSESSMENT AND CONTROL EVALUATION PROGRAM**

The Massachusetts Department of Public Health, in cooperation with the National Institute for Occupational Safety and Health (NIOSH), conducts investigations on the causes of work-related fatalities. The goal of this program, known as Massachusetts Fatality Assessment and Control Evaluation (Massachusetts FACE) is to prevent future fatal workplace injuries. Massachusetts FACE aims to achieve this goal by identifying and studying the risk factors that contribute to workplace fatalities, by recommending intervention strategies, and by disseminating prevention information to employers and employees.

Massachusetts FACE also collaborates with engineering and work environment faculty at the University of Massachusetts at Lowell to identify technological solutions to the hazards associated with workplace fatalities.

NIOSH funded state-based FACE Programs currently include: California, Iowa, Kentucky, Massachusetts, Michigan, New Jersey, New York, Oregon, and Washington.

Additional information regarding this report is available from:

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### **Evaluate this report**

We would appreciate your feedback on these reports so we may continue to improve the MA FACE project and our investigation reports. A feedback form can be found at: [http://www.mass.gov/Eeohhs2/docs/dph/occupational\\_health/report\\_evaluation.doc](http://www.mass.gov/Eeohhs2/docs/dph/occupational_health/report_evaluation.doc)  
The completed form may be returned by fax to (617) 624-5676, by mail to FACE, 250 Washington Street, 6<sup>th</sup> Floor, Boston, MA 02108, or by email to [ma.face@state.ma.us](mailto:ma.face@state.ma.us).