



Division of Safety Research

1095 Willowdale Road

F A C E

Fatality Assessment and Control Evaluation Program

Morgantown, West Virginia 26505

Phone:

(304)285-5916

FACE Report Number: 2001-06

September 19, 2001

Eighteen-Year-Old Sporting Goods Retail Store Worker Dies in a Fall From a Shelving Unit—Pennsylvania

SUMMARY

An 18-year-old male sporting-goods retail-store worker (the victim) died from a head injury after falling approximately 12 feet from the top of a shelving unit. When the incident happened, the victim was in the process of retrieving a large, heavy box from the top shelf of an H-frame shelving unit. A witness reported that as the victim leaned over and grasped the box by its nylon shipping bands, one of the bands broke and the victim fell backwards off the H-frame to the concrete floor. A registered nurse (RN) who was shopping in the store witnessed the incident, and rendered cardiopulmonary resuscitation (CPR) to the victim. The store's manager called 911 and emergency rescue personnel and police arrived within minutes. The victim was life-flighted to a nearby trauma center where he died later that day from his injuries.



Photo 1. H-Frame Shelving Unit

NIOSH investigators concluded that, to prevent similar incidents, employers should

- ***ensure that only properly trained personnel operate hydraulic lifting equipment***
- ***ensure that all workers utilize fall protection when working on top of H-frame shelving units***
- ***evaluate their store's storage requirements and their materials handling procedures***
- ***implement a spot inspection program to ensure that all employees are complying with safety requirements, and develop and enforce consequences for noncompliance***

INTRODUCTION

Fatality Assessment and Control Evaluation (FACE) Project

The National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR), performs Fatality Assessment and Control Evaluation (FACE) investigations when notified by participating states (North Carolina, Pennsylvania, South Carolina, Tennessee, and Virginia); by the Wage and Hour Division, Department of Labor; or when a request for technical assistance is received from NIOSH-funded state-level FACE programs in Alaska, California, Iowa, Kentucky, Massachusetts, Minnesota, Missouri, Nebraska, New Jersey, Ohio, Oklahoma, Texas, Washington, West Virginia, and Wisconsin. The goal of these evaluations is to prevent fatal work injuries in the future by studying the work environment, the worker, the task the worker was performing, the tools the worker was using, the energy exchange resulting in fatal injury, and the role of management in controlling how these factors interact. The FACE program does not seek to determine fault or place blame on companies or individual workers. For further information visit the FACE website at www.cdc.gov/niosh/face/faceweb.html or call toll free 1-800-35-NIOSH.

On February 18, 2001, an 18-year-old retail store worker (the victim) died as a result of severe head injuries he sustained in a fall off an H-frame shelving unit. On March 2, 2001, the National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR) was notified of the incident by the U.S. Department of Labor, Wage and Hour Division, and initiated an investigation. On March 12, 2001, a DSR occupational safety and health specialist conducted a site visit to the retail store and met with representatives from both the Federal and State Wage and Hour agencies, with store employees, and with representatives from the retail store's corporate office. During that site visit, information was collected regarding the store's safety programs and employee training, work schedules, and operating procedures. Also, employees who were working or witnessed the incident were interviewed, and photographs of the H-frame and work locations were taken.

The sporting goods retail store where this incident occurred is one of a chain of similar stores located throughout the eastern United States. The store has been in business at its current location since 1993. There were approximately 45 employees hired to split two shifts at this store. At the time of the incident, 13 workers and 2 managers were on duty. The majority of the store's employees were young, between the ages of 17 and 25 years old. It is the store's policy not to hire anyone under the age of 16. The victim had worked at the store for over a year during evenings and weekends.

Safety and health training for employees was provided by the corporate office and coordinated by their District Loss Prevention Manager. The store provides training and certification in the proper operation and use of fall protection, operation of the electrically powered high-lift order picker (referred to as the beeper), and materials handling. Employee certification is denoted by different colored name badges. It was a corporate policy that no one under the age of 18 be allowed to operate or be raised in the air by the beeper. This was the sporting goods retailer's first workplace fatality.

INVESTIGATION

The sporting goods retail store where this incident occurred is located in a small strip mall, along with over a dozen other establishments. The store is approximately 100 feet wide and 150 feet long, with the ceiling approximately 20 feet high. The store has an open design and is subdivided into two departments, the soft- and hard-product departments. The soft-product department contains items such as clothing, shoes, and other dress items or accessories. The hard-product



Photo 2. Beeper Used to Access H-Frames

department contains items such as weights, bikes, treadmills, and many other hardware-type items. Workers are assigned to one area depending on their experience and seniority with more experienced workers assigned to the hard-product department; however, employees often help one another in other departments depending on how busy they are in their own departments.

Store products are stored or displayed on a variety of different types of shelving units. Large, bulky or heavy items are stored on shelving units called H-frames. The H-frame is a heavy-gauge steel shelving unit in the shape of an “H”, that is 12 feet high and 8 feet wide and can be butted together in 10-foot lengths to cover varying distances. Each H-frame can consist of multiple shelves depending on the configuration and size of the objects stored. Approximately half of the store is comprised of H-frame units that are arranged to form aisles. In order to remove items from the top shelves of the H-frames, the store utilizes an electrically powered, hand-controlled, vertical lift, referred to at this store as the beeper. The beeper has an attached work platform that is surrounded by a guardrail. One worker positions the beeper and operates the lift, while another worker stands on the platform and is raised to the level necessary to retrieve the item. The corporate office has a written and posted policy that requires the person being raised in the air to wear fall protection. Fall protection consists of a body harness that is tethered to a self-retracting lanyard which is secured to the upper frame of the work platform. The corporate office also requires that both the operator of the beeper, as well as the person being lifted, be trained and certified to use the equipment, including fall protection equipment.



Photo 3. Work Platform Attached to Beeper

On the afternoon of the incident, the victim was assisting a customer and was requested to retrieve a box that contained an exercise bench from the top shelf of an H-frame. The box was 44 inches long by 30 inches wide by 6½ inches in depth and weighed 80.3 pounds. The box was shipped to the store with the contents secured by two ½-inch nylon banding straps on the vertical dimension, and three ½-inch nylon banding straps on the horizontal dimension. The victim asked a 17-year-old coworker to assist him in retrieving the box. The coworker positioned the beeper on the opposite side of the H-frame to where the box was located, and raised the victim up to the top shelf. The victim exited the beeper's platform and walked on the top shelf of the H-frame to retrieve the box. The exercise bench box was on the bottom of a stack of other products, and the victim had to move and relocate several other boxes in order to gain access to the particular box he was attempting to retrieve. As the victim was rearranging boxes, the

coworker was paged to the front of the store. As the coworker was leaving, the victim asked him to request one of the store's managers to come back and assist him in retrieving the box. As the manager and the coworker were walking back to where the victim was working, they both reported that they heard a "snap" and saw the victim fall backwards off the top of the H-frame shelf. The victim fell 12 feet, striking the back of his head on the concrete floor. The manager ran to the front of the store and called 911. A customer in the store, who was a registered nurse, administered CPR to the victim until emergency medical services (EMS) arrived at the site. After assessing the victim's condition, EMS called in a Life-Flight helicopter which transported the victim to a nearby trauma hospital. The victim died later that day of head injuries received from the fall.



Photo 4. *Nylon Banding Straps*

CAUSE OF DEATH

The official cause of death was severe head trauma.

RECOMMENDATIONS

Recommendation #1: Employers should ensure that only properly trained personnel operate hydraulic lifting equipment.

Discussion: In this incident, neither the victim nor the coworker who lifted the victim to the top of the H-frame were trained or certified by the store to operate the equipment. The store provides training and certification in the proper operation and use of fall protection, operation of the beeper, and materials handling. Employee certification is denoted by different colored name badges.

Recommendation #2: Employers should ensure that all workers utilize fall protection when working on top of H-frame shelving units.

Discussion: According to the store representatives, one trained and authorized worker on each shift was designated as the person responsible for retrieving boxes from the top of the H-frames. That person was required to wear the fall protection harness throughout the shift and was to be lifted only by another trained and certified person operating the beeper. Fall protection was provided for working within the confines of the beeper's work platform. A trained and certified worker may have recognized the hazard of working at elevations without fall protection and may have positioned the beeper on the side of the H-frame near the box, enabling the box to be removed while remaining on the platform with fall protection in use. [Note: In this incident, the victim was not wearing fall protection and exited the work platform to climb on top of the H-frame to retrieve a box.] Whenever it is necessary to walk or work on the top shelf of the H-frame away from the beeper to retrieve boxes, additional fall protection should be utilized. One method of fall

protection for working on top of the H-frame would be to provide a horizontal lifeline that has an anchor point in the walls, and the worker tethered to a fall arrest device that slides along the lifeline for mobility. This method is illustrated in the diagram.

Recommendation #3: Employers should evaluate their store's storage requirements and their materials handling procedures.

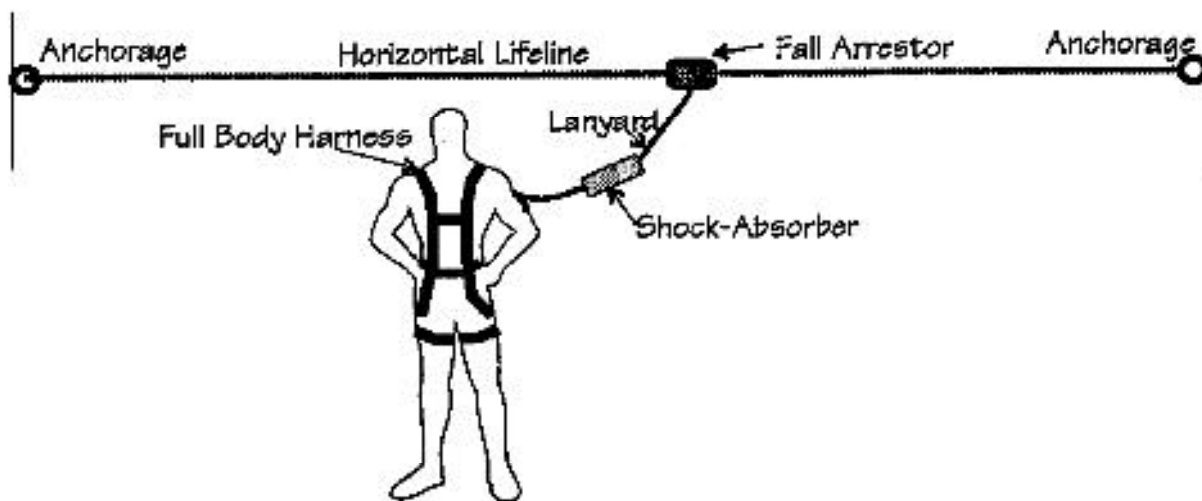


Diagram. *Example of Horizontal Fall Protection*

Discussion: Intermixing different product boxes of various sizes, shapes, and weights in overhead storage should be avoided; and, employees should also be instructed not to attempt to lift boxes by the nylon (or metal) shipping bans. In this incident, the victim fell while attempting to retrieve a large, awkward-sized box weighing 80 pounds when the nylon shipping ban he was lifting the box by broke. To further complicate the retrieval, the box was buried beneath a number of other different-sized boxes.

Placing large and heavy boxes on overhead storage shelves, as well as stacking boxes, should also be evaluated because of the difficulty of retrieving such boxes at heights, as well as of the potential for employee or customer injury if the boxes were to fall from the shelving units. Some of the larger boxes that contained heavy treadmills (as seen in Photo 1) were stored on the top shelves of the H-frames. Retrieval of one of these boxes, given its size and weight, even using the beeper and elevated work platform, would be difficult. It may be safer to store the large or heavy items at ground level, or alternatively in a warehouse until needed.

Recommendation #4: Employers should consider implementing a spot inspection program to

ensure all employees are complying with safety requirements, and develop and enforce consequences for noncompliance.

Discussion: To ensure safety compliance, spot inspections by supervisors and management should be conducted regularly to verify that proper procedures are being followed. Specific deterrent consequences should be established for noncompliance. The policy for all the retail stores operated by this corporation is that only trained and certified personnel are allowed to operate the lifts. In addition, workers under the age of 18 years old are prohibited from operating any of the stores' powered equipment, which includes the beeper. This store uses specially colored employee identification badges to denote training on powered equipment.

INVESTIGATOR INFORMATION

This investigation was conducted by Joseph E. Burkhart, Safety and Occupational Health Specialist, NIOSH Division of Safety Research, Surveillance and Field Investigation Branch, Fatality Assessment and Control Evaluation Team.



Joseph E. Burkhart, Safety and Occupational Health Specialist
Fatality Assessment and Control Evaluation Team
Trauma Investigations Section
Surveillance and Field Investigations Branch
Division of Safety Research

Date: _____

Virgil J. Casini, Team Leader
Fatality Assessment and Control Evaluation Team
Trauma Investigations Section
Surveillance and Field Investigations Branch
Division of Safety Research

Date: _____

Robert Koedam, Chief
Trauma Investigations Section
Surveillance and Field Investigations Branch
Division of Safety Research

Date: _____

Dawn N. Castillo, Chief
Surveillance and Field Investigations Branch
Division of Safety Research

Date: _____

Tim Pizatella, Deputy Director
Division of Safety Research

Date: _____