The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces through safety and health research

Ironworker Dies following a 12-Foot Fall from Metal Decking onto Concrete

FACE 8912

INTRODUCTION

The National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR), performs Fatal Accident Circumstances and Epidemiology (FACE) investigations when a participating state reports an occupational fatality and requests technical assistance. The goal of these evaluations is to prevent fatal work injuries in the future by studying the working 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.

On December 13, 1989, a 20-year-old male ironworker died when he fell 12 feet onto a concrete floor.

CONTACTS/ACTIVITIES

Officials of the state Occupational Safety and Health Program notified DSR of this fatality and requested technical assistance. On January 26, 1989, an industrial hygienist, safety engineer, and occupational health nurse from DSR interviewed a company official, conducted a site evaluation, and photographed the incident site.

OVERVIEW OF EMPLOYER'S SAFETY PROGRAM

The victim had been employed since his arrival in the U.S. as an ironworker by a small construction company that does steel erection and decking. He had only been in the U. S. about 7 months at the time of the incident. Although he spoke and understood English, his principal language was Spanish. The company has been in existence for 20 years. At the time of the incident about 60 people worked for the employer. Employees receive on-the-job training for all tasks by the foreman. The company has written safety rules; however, there is no specific safety officer. The job foreman acts as the company's safety representative. There had not been a safety meeting conducted on this particular jobsite, but one had been held with the same crew on a similar job about 1 month before the Incident. The company requires the workers to furnish their own work shoes. Other safety equipment, such as gloves, hard hats and safety belts, are supplied by the employer.

SYNOPSIS OF EVENTS

The victim was a member of an eight-person crew engaged in steel erection at a two-story building under construction. The structure had a floor area of about 30,000 square feet. The concrete ground floor had been finished earlier so that work could continue through the winter months. At the time of the incident the victim and a co-worker were placing corrugated metal decking on steel beam gridwork to serve as the formwork for a concrete floor. The 20-gauge steel decking sheets were 26-feet-long by 3-feet-wide and weighed about 120 pounds. One edge formed an inverted "U" that was slipped over the vertical edge of an adjacent sheet to secure the decking together. The decking rested on four 6-inch I-beams on 8-foot centers. After a sheet was positioned, it was tack-welded to the structural framework.

A co-worker stated that the victim was trying to handle a sheet of decking alone. The victim was dragging the sheet toward the edge of the installed decking when he lost his balance and fell backward. He landed striking the left side of his head against the concrete floor 12 feet below.

One worker went to aid the victim while another called the county emergency medical service (EMS). The EMS team was at the scene within 15 minutes of the incident. EMS care, including back and neck stabilization and oxygen, was provided at the scene and while the victim was being transported to a nearby hospital. The victim was pronounced dead shortly after arrival.

CAUSE OF DEATH

The medical examiner stated that head injuries sustained in the fall caused death.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Whenever any work is performed from an elevation where the potential for a fall exists, employers should ensure that fall-protection equipment is provided and utilized by their employees.

Discussion: The use of a "traditional" safety belt/lanyard combination as required by 29 CFR 1926.104(d), is sometimes not practical during construction operations, particularly where worker mobility is required. Use of a retracting lifeline equipped with a locking device, and attached to a support line, can provide sufficient mobility in some cases. In this case, the work was being done only 12 feet above a concrete floor. A retracting lifeline, connected to a safety line and preplanned placement of the decking stack might have prevented this fatality. Alternative forms of worker protection, such as safety nets (as specified in 29 CFR 1926.105), or a catch platform, should be considered. Safety nets can effectively prevent injury or death when a worker falls. Also, in this situation, wheel-mounted scaffolding might have been placed under the workers to serve as a catch platform. This portable scaffolding can be moved to a new location as each area is finished. The use of alternative fall protection systems must be carefully considered, regardless of what height is involved.

Recommendation #2: Hazard identification should be done as a part of the initial job planning.

Discussion: The employer should identify all potential hazards. One way is by analyzing the sequential steps in routine operations to identify potential hazards, and attempting to develop procedures or other control measures which effectively eliminate or reduce the hazards. This type of analysis is known as job hazard analysis. Additionally, each specific job involves hazards particular to that job or working environment. Therefore, employers should conduct a jobsite survey, identifying all hazards, and implementing appropriate control measures prior to starting any job. A jobsite survey in this instance would have identified the need for some type of fall protection. Both job hazard analysis and pre-job survey techniques can be effectively used to train workers in hazard identification and appropriate control measures.

Recommendation #3: The employer needs to train employees in the recognition of hazards, and methods to control such hazards, including the use of appropriate safety equipment.

Discussion: According to 29 CFR 1926.21(b)(2), employers are required to instruct each employee in the recognition and avoidance of unsafe conditions, and to control or eliminate any hazards or other exposure to illness or injury. Although the Spanish-speaking victim could speak and understand English, he may not have fully understood the potential hazards involved with this job. In this and similar situations the employer may need to provide additional training to ensure that these employees understand the hazards and how to properly use safety equipment to protect themselves.

Recommendation #4: Designers of buildings such as this multitiered steel-framed structure should provide for fall protection anchorage systems as part of the overall design of the structure.

Discussion: The building design should allow construction and maintenance activities to be done utilizing safety equipment to protect the workers during potentially hazardous activities. This would include incorporating anchor points for lifelines and/or safety nets as part of the building structure. The incorporation and use of anchorage points in the building design could result in the possible prevention of fall-related fatalities by making it easier for workers to use fall protection during the construction phases of a building.

Recommendation #5: The employer should ensure that workers are using proper material-handling techniques.

Discussion: The victim in this incident was trying to drag a 120-pound piece of steel decking into place by himself. While attempting this task he lost his balance and fell. If another worker had been assisting the victim in placing the piece of decking, the victim may not have fallen.

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Last Reviewed: November 18, 2015