The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces through safety and health research

Carpenter Dies in 90-Foot Fall from Top of Parking Garage

FACE 8924

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 October 29, 1988, a 49-year-old male carpenter fell 90 feet to his death from the top of a parking garage which was under construction.

CONTACTS/ACTIVITIES

Officials of the state Occupational Safety and Health Program notified DSR concerning this fatality and requested assistance. On February 14, 1989, two safety specialists and a safety engineer from DSR met with company representatives, and visited and photographed the incident site.

OVERVIEW OF EMPLOYER'S SAFETY PROGRAM

The victim was employed by a construction company that has been in business for 14 years. The company's principal business is the erection of concrete structures. The company employs approximately 800 workers, including 530 carpenters. The employer has a safety officer and written safety rules and procedures. Weekly tool box safety meetings are held at the jobsite, and on-the-job training is provided. Most of the employees are members of local trade unions. The victim had been a carpenter for about 30 years, and had been working for this employer for about 7 months.

SYNOPSIS OF EVENTS

The victim and a co-worker were preparing a form for pouring a prestressed concrete column at the 10th-floor level of a parking garage. The design required that weld plates be embedded in the surface of the finished concrete column. The columns are designed to support precast concrete panels that form the exterior wall of the garage. The panels are secured to the columns by joining the panel weld plates to the column weld plates and then welding them together.

The stressing cable reinforcements, commonly called tendons, had already been installed in the column form and prestressed to their required load. (Prestressing is an operation that places tension in the cable or stretches it by putting it under an applied load of up to 200,000 pounds per square inch of cable cross-sectional area. This causes the cable to become taut much like a guitar string.) In order to get the column weld plates through the maze of reinforcement cables to their proper location, the workers had to use a pry bar to deflect the cables. The weld plate then had to be fitted and secured to the form.

The victim, working from a wooden beam, was tied off to a 1 1/2-inch- diameter rebar in the following manner. The victim secured one end of a 6-foot lanyard to one “D” ring on his safety belt, fed the other end of the lanyard through a second “D” ring on his belt, and then secured it to the first “D” ring. This created a loop with the lanyard. He took an 8-foot lanyard and, at its midpoint, wrapped it several times around the 1 1/2-inch rebar. He took one end of the 8-foot lanyard, passed it through the loop of the 6-foot lanyard and fastened the snap hook to the snap hook at the other end.

The victim asked his co-worker to get him a portable power saw. The co-worker turned and saw the victim fall off the edge of the building. The victim did not cry out when falling. The co-worker said that he saw the lanyard unwrapping from the rebar.

The victim landed facedown in the dirt just outside the building. The co-workers on the scene moved the victim’s head enough so that he could breathe. The emergency squad was called within a few minutes of the incident and arrived within 10 to 15 minutes. The victim had no pulse and was pronounced dead by a deputy medical examiner.

CAUSE OF DEATH

The medical examiner stated the cause of death was multiple internal injuries sustained from the fall.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: The employer should train employees in the proper use of the safety equipment provided for worker protection.

Discussion: According to the employer, the victim was tied off in the manner previously described. Since the co-worker reported seeing the 8-foot lanyard unwrapping from the rebar as the victim fell, it is possible that one snap hook rolled out of the other snap hook. (Rollout occurs when the latch is forced open by a twisting or turning action. This typically occurs when two snap hooks are attached together. A typical snap hook needs only about 2 pounds of force to open the hook or latch.)

From the information obtained from state compliance personnel, there were tie-off points that the employees could have used to make the proper use of the available safety equipment. The employer said that the victim had been hired from a union hall and had received previous training. It is difficult to determine accurately what type and level of training a newly-hired employee received from previous employers. Therefore, each employee should be trained in the use of the specific types of safety equipment provided by the company. The employer should be aware of potential hazards (such as snap-hook “rollout”) and inform employees of the circumstances that could allow this to happen.

Recommendation #2: The employer should evaluate potential tie-off points and determine if the available safety equipment can work as designed. If the equipment will not work as designed, the employer should contact equipment manufacturers to determine what equipment is available that can do the job properly.

Discussion: The employee tied himself off to a 1 1/2-inch rebar. It is possible that the snap hooks on the lanyards would not fit onto the rebar, and the employee had to come up with another method of securing himself to the rebar. By connecting the two hooks together, the employee created a situation where the potential for rollout existed. He apparently was not aware of this problem. The employer should verify that employees are tying off correctly. When incorrect methods are observed, the employer should take steps to correct the situation. Having employees use locking hooks might have prevented this fatality. (Locking hooks require over 200 pounds of force to open under pressure.)

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