



The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces
through safety and health research / **NIOSH**

Cement Finisher Dies After 160-Foot Fall from Scaffold

FACE 8921

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 19, 1988, a 27-year-old male cement finisher was dismantling suspended scaffolding inside a 172-foot-high circular concrete silo when he lost his balance and fell from the scaffolding. His safety lanyard broke and he fell 160 feet to the concrete floor of the silo.

CONTACTS/ACTIVITIES

State officials notified DSR of this fatality and requested technical assistance. On February 13, 1989, a DSR research team conducted a site visit, interviewed company representatives, photographed the site of the incident, and discussed the incident with the OSHA compliance officer and state medical examiner personnel.

OVERVIEW OF THE EMPLOYER'S SAFETY PROGRAM

The victim had been employed for 3 years by a construction company that specializes in slip form construction. The company had 28 workers on site. Concrete forms of different dimensions are erected, set into place and then concrete is pumped into the forms. The company has been in operation since 1928 and employs a corporate safety director. The job superintendent is responsible for safety at the jobsite. Safety meetings are conducted each Monday morning prior to the start of work. Each employee is issued a company safety manual upon hire and training is provided on the job.

SYNOPSIS OF EVENTS

The company had been contracted to construct a holding facility for cement. This included constructing three interconnected concrete silos and installing equipment inside these silos. The silos were 172 feet high and 40 feet in diameter, with 10-inch-thick walls. The project began in October 1988, and by the day of the incident the silos had been

constructed and the interior walls had been finished on two of the silos. On the day of the incident the victim and a co-worker were completing the interior finish of the third silo. The two men were working at a height of 160 feet from a suspended scaffold. The scaffold, which was shaped to fit the curvature of the interior wall of the tank, was erected around half the inside diameter of the tank and was suspended from ropes anchored at the top of the silo. As the men finished the inside surface of one half of the tank, they disassembled the scaffold from each end toward the center where a door would provide access to the outside of the silo. The scaffolding, dropped to the floor piece-by-piece as it was disassembled, was then erected around the other half of the tank. The interior walls of all three silos were finished using these procedures.

At the time of the incident the men had completed the interior finish of the third silo and had begun to disassemble the scaffolding. Each man was using a nylon rope lanyard attached to a chain on a scaffold bracket. The brackets were spaced 6 feet apart. As each man reached a point in the operation where he was ready to drop a bracket to the ground, he hooked his lanyard to the chain on the next bracket.

At some point the victim lost his balance and fell off the end of the scaffolding. The co-worker stated that he saw the victim fall and jerk upwards as the lanyard caught him. As the victim's weight dropped back on the lanyard, it snapped, causing him to fall 160 feet to the concrete floor below. The emergency rescue squad was summoned immediately by the company secretary. Employer representatives stated that it was approximately 30 minutes before the rescue squad arrived at the scene. The victim was pronounced dead at the scene.

When the lanyard was inspected, burn damage was discovered in several places, including the point at which it had snapped. This damage probably occurred during welding or burning operations from a previous job.

CAUSE OF DEATH

Although the medical examiner had not completed his report at the time of this investigation, the cause of death is presumed to have been multiple traumatic injuries.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Fall-arresting devices should be periodically inspected for damage by a qualified person, and faulty equipment should be immediately removed from service. Additionally, employees required to wear fall protection should inspect their own equipment before the start of each job.

Discussion: In this instance, fall-arresting equipment was not individually assigned, but was obtained from a common pool. It was possible that a worker would not use the same piece of equipment on a daily basis. For this reason, fall protection equipment should be periodically inspected by a qualified person to determine if it is in suitable condition to be used by workers. Additionally, employers should train workers in inspection techniques that would allow them to identify faulty equipment. Workers should inspect their equipment before the start of work each day. Faulty equipment should be immediately removed from service to ensure worker safety. A properly trained worker would have identified the faulty lanyard upon inspection. Had the faulty lanyard been removed from service, and an undamaged one used instead, this fatality might have been prevented.

Recommendation #2: Personal protective equipment should be able to withstand the harshest conditions to which it may be subjected on any given job.

Discussion: The nylon lanyard involved in this incident received burn damage, probably while being used in the vicinity of welding or cutting operations. Many materials, including nylon, can be easily damaged in the presence of extreme heat. For this reason, nylon lanyards should not be used where they might be exposed to conditions that could include extreme heat; rather, steel mesh or wire core lanyards would have been more suitable. Personal protective equipment should be evaluated before being used on any job to ensure that it can withstand the harshest conditions to which it may be subjected without sustaining damage that would jeopardize the safety of a worker.

Recommendation #3: OSHA requires that workers working from float or ship scaffolds (scaffolds suspended from overhead supports) be protected by an approved safety lifebelt, lanyard, and lifeline secured above the point of operation to an anchor point or structural member.

Discussion: According to 29 CFR 1926.451 (w)(6), workers working from float or ship scaffolds shall be protected by a safety lifebelt and lanyard hooked to a lifeline which is secured above the point of operation. In this instance, no lifeline was used and the lanyard was hooked directly to the scaffold. Even the required fall protection, however, would not have prevented this incident because a damaged lanyard was used. For this reason, the feasibility of a redundant fall-arresting system should be evaluated. For example, if a lifeline and a lanyard, each anchored at different points on the structure, were both hooked to the safety lifebelt or body harness, two points of suspension would exist. In such a redundant system, if a lanyard broke (as in this instance), the lifeline would still support the worker. If a redundant fall-arresting system had been in effect, this incident might have been prevented.

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