The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces through safety and health research NIOSH

Painter Dies When Scaffold Falls Inside Municipal Water Tank in Indiana

FACE 9012

SUMMARY

A journeyman painter died when the swing scaffold he was using to access the interior of a 68-foot-tall by 32-foot-diameter municipal water tank fell. The painter was working from a single point suspension scaffold near the top of the tank. The painter was wearing a safety belt and lanyard secured to a lifeline. When he finished painting the upper area of the tank the painter disconnected his lanyard from the lifeline and moved to the other end of the scaffold to hand the spray paint gun he was using to his foreman. The foreman had just taken the spray paint gun from the victim when he heard a "pop" and saw the scaffold on which the victim was standing fall to the floor of the tank 65 feet below. Investigation after the incident revealed that the two "U" bolts on the cable which supported the block and tackle from which the scaffold was suspended had loosened enough to allow the cable to slip through them, causing both the scaffold and all of its supporting hardware to fall. The victim was pronounced dead at the local hospital approximately 1 1/2 hours after the incident. NIOSH investigators concluded that, in order to prevent similar incidents in the future, employers must ensure that:

- **appropriate personal protective equipment be worn properly and consistently whenever the potential for a serious fall exists**
- **suspension scaffold rigging be inspected periodically to ensure that all connections are tight and that no damage to the rigging has occurred since its last use.**

INTRODUCTION

On October 22, 1989, officials of the Indiana Occupational Safety and Health Administration notified the Division of Safety Research (DSR) of the death of a 37-year-old male painter who died on October 21, 1989, when the suspension scaffold he was working fell 65 feet inside a municipal water tank. Technical assistance was requested by the Indiana Occupational Safety and Health Administration, and on November 30, 1989, a DSR safety specialist conducted an investigation of this incident. The investigator discussed the case with state officials and emergency services personnel. The investigator reviewed the incident with company officials, and investigated and photographed the incident site.

The employer, a painting contractor with 20 employees, has been in business for 7 years. The company has a designated safety officer and written safety rules and procedures, but no formal training program. The victim was hired as a journeyman painter, and had worked for the company for 1 month at the time of the incident. The victim had previously been employed as a painter by other contractors for approximately 10 years.

INVESTIGATION

The victim was a member of a three-man crew engaged in painting the interior and exterior of two 68-foot-tall by 32-foot-diameter municipal water tanks. The crew had been working on this project for 2 weeks prior to the incident, and had completed all work on one tank and most of the exterior work on the second.

On the day of the incident, the crew arrived at the worksite at approximately 11:30 a.m. The crew consisted of a foreman, the victim, and a groundman. The foreman was going to spray paint the interior of the water tank while the victim was to finish work on the exterior of the tank. The groundman was to work inside the tank handling the spray paint lines used in the operation. The victim, a journeyman painter, asked to paint the interior of the tank. The foreman agreed, and the victim proceeded to paint the interior of the tank while the foreman finished work on the exterior of the tank.

Access to the interior of the tank was provided through a manhole on the side of the tank at ground level, and a second manhole located on top of the tank. This second manhole was reached by climbing a fixed ladder on the exterior of the tank.

The interior sidewalls of the tank were reached via a swing scaffold rigged inside the tank. This scaffold consisted of an aluminum ladder secured to a steel “stirrup” (a steel bar bent into a box shape and installed perpendicular to the ladder) at each end. The ladder was thus subjected to loading while in a horizontal position, rather than in the vertical position for which it was designed. Cables from each stirrup ran to a common tie-off point. A cable from this common tie off point then passed through a block and tackle. By pulling on this cable the entire scaffold could be raised and lowered from the ground level of the interior of the tank (Figure). The block and tackle which supported the scaffold was secured by a single cable which looped around a vertical steel pipe on top of the tank and fastened back to itself by two “U” bolts.

The entire crew entered the tank through the lower manhole. The groundman and the supervisor then raised the scaffold with the victim on it to the top of the tank. The victim was wearing a safety belt and lanyard which was secured to a lifeline, with the lifeline secured to a steel railing on the top of the tank. The victim proceeded to paint the top few feet of the tank’s interior. The foreman climbed the exterior ladder to the manhole on top of the tank to help complete work near the tank’s top. At approximately 1:00 p.m., the victim completed painting at the upper level. He then disconnected his lanyard from his lifeline and moved over to where he could hand the paint spray gun to the foreman so the foreman could finish a small area at the top of the tank. The foreman had just taken the spray gun from the victim when he heard a “pop” and saw the victim and the scaffold on which he was standing, fall to the floor of the tank 65 feet below. The victim and the scaffold struck the floor of the tank, barely missing the groundman. The foreman called to the groundman and told him to go next door and call an ambulance. The foreman then descended the ladder on the exterior of the tank and went in to assist the victim. The Emergency Medical Service (EMS) unit arrived on the scene approximately 5 minutes after the incident, removed the victim from the tank via the lower manhole, and transported him to the local hospital. The victim was pronounced dead at the hospital at 2:29 p.m.

Investigation after the incident revealed that the two “U” bolts on the cable which supported the block and tackle had allowed the cable to slip through them, causing both the scaffold and all of its supporting hardware to fall. This particular rig had been used daily for 2 weeks preceding the incident with no problems.

CAUSE OF DEATH

The cause of death was listed by the coroner as “hemorrhage from severe liver laceration and brain stem hematoma.”

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Appropriate personal protective equipment should be worn at all times whenever the potential for a serious fall exists.

Discussion: In this case the victim was wearing a safety belt and lanyard, however at the moment when the incident occurred he was not hooked up to his lifeline. This failure to use PPE at all times during the job allowed the victim to experience a fatal fall when a scaffold failure occurred.

Recommendation #2: Suspension scaffold rigging should be inspected periodically to ensure that all connections are tight and that no damage to the rigging has occurred since its last use.

Discussion: The scaffold rigging in this case had been used daily for 2 weeks prior to the incident; however, no periodic inspection program was in place. It appears that the “U” bolts holding the scaffold had loosened over time, although this loosening had not been observed by workers at the site.

Recommendation #3: Equipment should only be used for the purpose for which it was designed.

Discussion: The “scaffold platform” in this incident was a simple aluminum ladder. This ladder was designed to support a load in a vertical position but was being utilized to support a load while in a horizontal position. While this did not directly contribute to this incident, the potential for a failure of the ladder while being used in this manner was certainly present.

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