



The National Institute for Occupational Safety and Health (NIOSH)

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# Laborer Struck And Killed By A 700-Pound Concrete Lid – Virginia

FACE 9608

## SUMMARY

A 37-year-old male laborer (the victim) died when a 700-pound concrete lid fell on him as he tried to guide the lid onto a water distribution box. The day preceding the incident, the victim and a co-worker had installed an open-topped water distribution box into the ground at a private residence. A concrete lid was being lowered onto the box when the incident occurred. A flatbed truck equipped with a monorail boom and electric hoist had been backed to the edge of the water distribution box in preparation to off-load the concrete lid. The concrete lid was 5-feet square, 6-inches thick, and weighed approximately 700 pounds. A chain was attached from the electric hoist on the boom through a hole in the middle of the lid, and around a 6-inch square, 35-inch-long wood post (toggle) which was intended to support and stabilize the lid. The truck driver operated the electric-hoist control levers as the victim and his co-worker positioned themselves on opposite sides of the distribution box in preparation to guide the lid into place. As the lid was being lowered, the lid shifted from a horizontal position to a vertical position, allowing the toggle to slip through the opening in the lid. An instant before the toggle slipped through the opening, the victim grabbed the lid to possibly correct its alignment in relation to the top of the distribution box. As the toggle slipped through the opening the lid fell free and dropped toward the ground. The victim, who was grasping the lid, was knocked off balance and fell to the ground a second before the lid fell. The victim landed on his back and the lid fell across the victim's chest, lower trunk, and legs. An emergency response team was called and arrived about 25 minutes later. In the interim, the lid was removed from the conscious victim and he was covered with blankets. After the emergency response team arrived, they provided basic life support and transported the victim to the local hospital where he died 12 days later from the multiple traumatic injuries he received in the incident. NIOSH investigators concluded that, to prevent similar occurrences, employers should:

- ensure that no employee works or travels near a suspended load
- consider the delivery of boxes and lids together as one unit
- ensure rigging is suitable for the load being lifted
- develop, implement and enforce a comprehensive written safety program.

## INTRODUCTION

On November 20, 1995, a 37-year-old male laborer (the victim) died after being struck by a 700-pound concrete lid while he was trying to guide the lid onto a water distribution box. On February 4, 1996, officials of the Occupational Safety and Health Administration of the state of Virginia (VOSHA) notified the Division of Safety Research (DSR) of this fatality, and

requested technical assistance. On February 14, 1996, a DSR safety specialist traveled to the site to conduct an investigation. The incident was discussed with the owner of the company and the VOSHA compliance officer assigned to the case. A video of the incident site and equipment was viewed during the investigation.

The employer was a residential contractor and developer that had been in operation for 21 years. The employer had no written safety program, but informal safety talks were said to have been given at each job site. The company consisted of 4 workers: one foreman, one clerical worker, and two laborers. This was the first fatality experienced by the employer.

## INVESTIGATION

The employer had been contracted to install septic systems and water distribution boxes at a residential subdivision. The employer had worked at the subdivision on an irregular basis for 2 years. This was the second day at this particular job site. Prior to the incident, the victim and a co-worker had excavated a hole and placed an open-topped concrete water distribution box in the hole. The box was located in the driveway of a previously finished private residence, approximately 3 feet from the garage door. Also, drain lines from the distribution box had been installed, and a concrete lid was to be placed on the distribution box the following day.

On the day of the incident, the two workers arrived at the incident site and performed numerous clean-up tasks until the arrival of the concrete lid. A monorail boom truck carrying the concrete lid arrived about 9:30 a.m. After a short discussion between the two workers and the truck driver, the truck was backed into position in preparation to off-load the concrete lid. The lid was 5-feet square, 6-inches thick, and weighed approximately 700 pounds. A 20-inch square hole, which would eventually accommodate a metal drain, was present in the center of the lid. A chain was then attached from the electric hoist on the boom through the hole in the middle of the lid. The chain was wrapped around a 6-inch square, 35-inch long toggle which was intended to support and stabilize the lid. The chain was then pulled back through the hole and secured onto itself (Figure). The truck driver operated the electric hoist control levers, located on the frame of the truck bed, while the victim and his co-worker positioned themselves on opposite sides of the distribution box in preparation to guiding the lid into place on top of the box. As the lid was being lowered from the back of the truck bed, which was 50 inches from the ground, the lid shifted from a horizontal position to a vertical position, allowing the toggle to slip through the hole in the lid. An instant before the toggle slipped through the hole, the victim grabbed the lid, possibly to correct its alignment in relation to the top of the distribution box. As the toggle slipped through the hole, the lid fell free and dropped toward the ground. The victim, who was grasping the lid, was knocked off balance and fell to the ground a second before the lid fell. The victim landed on his back and the lid fell across his chest, lower trunk, and legs. An emergency response team was called, and arrived about 25 minutes later. In the interim, the lid was removed from the conscious victim and he was covered with blankets. After the emergency response team arrived, they provided basic life support and transported the victim to the local hospital, where he died 12 days later from the multiple traumatic injuries he received in the incident.

## CAUSE OF DEATH

The death certificate listed the cause of death as crushing injuries to the chest and torso.

## RECOMMENDATIONS/DISCUSSION

### **Recommendation #1: Employers should ensure that no employee works or travels near a suspended load.**

Discussion: OSHA regulation 29 CFR 1926.651 (e) requires that no employee shall be permitted underneath loads handled by lifting or digging equipment, and that employees stand away from any vehicle being loaded or unloaded, to avoid being struck by any spillage or falling materials. In this case, the victim was in proximity to the 700-pound concrete lid that was being lowered to the ground via an electric hoist. A toggle, supporting the lid, slipped through the hole in the lid, allowing the lid to fall to the ground and ultimately onto the victim. If the victim had been a safe distance away from the load being lowered, as prescribed by OSHA regulations, the incident may have been avoided.

**Recommendation #2: Delivery companies/manufacturers of water distribution boxes should consider the delivery of boxes and lids together as one unit.**

Discussion: The delivery company in this incident was also the manufacturer of the concrete water-distribution box and lid. The lid was delivered as a separate unit; this increased the amount of material handling and associated risk of injury. Note: The company is currently devising a policy/plan to assemble and deliver the two-piece unit together as one unit, thereby eliminating one handling hazard.

**Recommendation #3: Delivery companies should ensure rigging is suitable for the load being lifted, moved, or lowered.**

Discussion: The rigging, a chain passed through a hole in the center of the lid and around the toggle, and back up through the hole and connected onto itself, was inadequate for the load being moved. When the concrete lid shifted from a horizontal to a vertical position, the toggle was pulled through the hole in the center of the lid, which allowed the lid to drop onto the victim. There are a number of ways to connect rigging safely to a load. Securing two shoulder-eye bolts into the lid during the manufacture would allow these bolts to be used as attachment points for chain slings, wire rope, etc.; using metal mesh or nylon web slings is another common way of properly rigging the load. Safety-rigging considerations are paramount in the safe delivery of materials.

**Recommendation #4: Employers should develop, implement and enforce a comprehensive written safety program.**

Discussion: The employer did not have a written safety program. The development, implementation, and enforcement of a comprehensive safety program should reduce and/or eliminate worker exposures to hazardous situations. The safety program should include, but not be limited to, the recognition, control and avoidance of hazards (e.g., maintaining a safe distance away from loads being lifted, moved, or lowered, and proper rigging techniques).

## REFERENCES

Code of Federal Regulations 29 CFR 1926.651 (e). Office of the Federal Register, Washington, D.C. 1993

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