The National Institute for Occupational Safety and Health (NIOSH)

# Maintenance Supervisor Dies After the Personnel Platform He Was Working From Falls to the Ground – Virginia

FACE 9312

## SUMMARY

A 57-year-old male maintenance supervisor (the victim) died from injuries he received after the personnel platform on which he was working fell to the ground. The victim was part of a three-man crew assigned to replace four ¼-inch wire ropes which operated an overhead crane door at the concrete mixing/casting building of a pre-cast concrete manufacturing facility. The victim was working from a personnel platform suspended 22 feet in the air by an industrial crane which was not equipped with an anti-two-block device. Another worker (an untrained crane operator) operated the crane, while the third worker was located inside the building. After replacing the second wire rope, the victim signaled the crane operator to extend the boom toward the area where the third wire rope was to be attached. As the boom extended, the load handling device (hook and block) contacted the boom tip (two-blocking) and caused the wire rope to break. The personnel platform, victim, and load handling device fell to the ground. The crane operator, who witnessed what had occurred, ran to aid the injured, but conscious, victim. He informed the third worker who telephoned 911 for the emergency medical service (EMS). The EMS arrived in less than 5 minutes, administered first aid, and transported the victim 10 miles to the local hospital where he died 11 days later. NIOSH investigators concluded that, to prevent similar occurrences, employers should:

- **install anti-two-blocking devices on crane load (hoist) lines**
- **evaluate the use of alternative methods to perform work at heights**
- **ensure that only competent/trained personnel operate cranes**
- **identify hazards and appropriate safety interventions in the planning phase of maintenance projects.**

In addition, crane manufacturers' should:

- **consider revising equipment manuals and general safety rules to include anti-two-blocking device information.**

## INTRODUCTION

On December 6, 1992, a 57-year-old male maintenance supervisor (the victim) was injured when the personnel platform on which he was working fell to the ground. He died 11 days later, on December 17, 1993, as a result of the injuries he received in the incident. On January 14, 1993, officials of the Virginia Occupational Safety and Health Administration (VAOSHA) notified the Division of Safety Research (DSR) of this fatality, and requested technical assistance. On January 28,

1993, a safety specialist from DSR investigated the incident and reviewed the circumstances with a company representative and the VAOSHA compliance officer assigned to the case. Photographs of the incident site and equipment were taken, and the medical examiner's report was requested.

The employer in this incident was a pre-cast concrete manufac- turer that had been in operation for 32 years and employed approximately 100 workers. The employer had a written safety policy and a general safety program. The company controller was responsible for the administration of the safety program on a collateral-duty basis. The employer provided on-the-job train- ing, and the production supervisor conducted tool-box safety meetings on a weekly basis. Also, the company had a joint labor/management safety committee which met on a monthly basis. The victim worked for the company for 7 years and 8 months as a maintenance supervisor, and had approximately 30 years of exper- ience working as a maintenance supervisor. This was the first fatality the company had experienced.

## INVESTIGATION

On the day of the incident (Sunday December 6, 1992, while the plant was idle for the weekend), a maintenance supervisor (the victim) and two co-workers (mechanics) arrived at the plant to perform a 1-day maintenance job at the concrete mixing/casting building. The job consisted of replacing four ¼-inch wire ropes which controlled the operation of the overhead crane door at the building. The wire ropes were attached to the door approx- imately 22 feet above the ground.

At the time of the incident (approximately 2 p.m.), the victim was working inside a metal personnel platform 5 feet wide by 6 feet long by 36 inches high. The platform was suspended from the load handling device (hook and block) by four wire rope slings. The hook and block was attached to the ½-inch aircraft cable load line. The platform was suspended 22 feet in the air by an industrial crane (hydraulic telescoping-boom crane) above a concrete pad (Figure 1). The crane was not equipped with an anti-two-block device and the person operating the crane was not a trained crane operator. Work had been in progress about 4 hours and two of the four wire ropes had been successfully re- placed. After replacing the second wire rope, the supervisor signaled the crane operator to extend the boom toward the area where the third wire rope was to be attached. As the boom ex- tended, the block contacted the boom tip (two-blocking) and caused the wire rope to break (upper panel of Figure 2). The personnel platform, victim, and load handling device fell to the ground. The crane operator, who witnessed what had occurred, ran to aid the victim. He found the victim injured, but conscious. He informed the third worker who telephoned 911 for the emergency medical service (EMS). The EMS arrived in less than 5 minutes, administered first aid, and transported the victim 10 miles to the local hospital. The victim died in surgery 11 days later on December 17, 1992.

## CAUSE OF DEATH

The medical examiner's report listed the cause of death as pulmonary emboli secondary to lower extremity fracture.

## RECOMMENDATIONS/DISCUSSION

**Recommendation #1: Employers should install anti-two-blocking devices on crane load (hoist) lines**

**Discussion:** Two-blocking is the third most prevalent source of death or crippling injuries involving crane operations, ranking after crane/powerline contact and crane upset (MacCollum, 1992). In addition, there have been thousands of two-blocking incidents that have broken the hoist line, most going unrecorded because no one is injured when the hoist line fails and drops the hook and/or load (MacCollum, 1992). Two-blocking occurs when the load handling device (hook and/or ball or block), contacts the boom tip. This contact can cause the hoist rope to break, allowing the load to fall. Additionally, two-blocking occurs if the block is pulled into the boom sheaves, or if the boom is lowered with the block close to the boom tip. Two-blocking can also occur while walking a crawler crane with a long boom. If the boom is not carrying a load, the load handling device can drift up to the boom tip, and the fly pole action of the long boom is sufficient to break the load line. Although two-blocking occurs on many types of cranes, hydraulic tele- scoping-boom cranes are most prone to this hazard. The power of the hydraulic rams that extend hydraulic booms is often suffi- cient to break the hoist line if the crane two-blocks. An operator can forget to release or pay out the load line when extending the boom. Human factors logic suggests

that when an operator must use two controls, one for the hoist line and one for the hydraulic boom extension, the chance of error is increased (MacCollum, 1992). One way to prevent two-blocking is by using an electrical sensing device, typically known as an anti-two-blocking device (lower panel of Figure 2). It consists of a weighted ring that surrounds the hoist line and is suspend- ed on a chain from a limit switch attached to the boom tip. When the hoist block or ball touches the suspended, weighted ring, the limit switch opens and an alarm warns the operator. It can also be wired to automatically interrupt and stop the hoisting.

**Recommendation #2: Employers should evaluate the use of alter- native methods to perform work at heights.**

**Discussion:** An industrial crane was used to hoist a personnel platform on which the victim was working. Equipment such as scaffolds, personnel hoists, aerial lifts, stairways, elevating work platforms or ladders should be used as the primary means of reaching the worksite in lieu of personnel platforms suspended by crane booms. Current OSHA standards for General Industry (29 CFR 1910), do not require the use of anti-two-blocking devices or systems on cranes. The use of cranes to hoist personnel platforms for worker access to elevated surfaces is not permitted by OSHA for General Industry. However, when general craning operations are being performed, anti-two-blocking devices or systems should be used to help prevent two-blocking incidents.

**Recommendation #3: Employers should ensure that only competent/ trained personnel operate cranes.**

**Discussion:** Although the employer had a written safety policy and a general safety program, the operation of cranes by competent/trained personnel was not addressed. 29 CFR 1910.180 (B)(2) refers to ANSI B30.5-1968 section 5.3.1(a) which states that cranes shall be operated only by qualified personnel, defined as designated persons. A designated person is one who is selected or assigned by the employer or the employer's representative as being competent to perform specific duties. Safety programs should limit the operation of cranes by competent/trained personnel only.

**Recommendation #4: Employers should identify hazards and appropriate safety interventions in the planning phase of maintenance projects.**

**Discussion:** Worker safety requirements should be addressed and incorporated into all maintenance projects during both the planning phase, and throughout the project. The planning phase should contain procedures which specifically address all hazards that may be encountered, and all safety interventions to be implemented to control or eliminate such hazards. These procedures should allow, but not be limited to, lead time for developing safe work practices and procedures, training, qualified personnel selection, and protective equipment needs.

**Recommendation #5: Crane manufacturers' should consider revis- ing equipment manuals and general safety rules to include anti-two-blocking device information.**

**Discussion:** Although crane manufacturers' equipment manuals contain valuable operational safety information, the manuals could be revised to provide additional information on the use of anti-two-blocking devices. Anti-two-blocking devices act as passive controls in the event an operator runs the load into the boom.

## REFERENCES

Office of the Federal Register: Code of Federal Regulations, Labor 29 Part 1910.180 p. 498. July 1, 1989.

MacCollum, D.V. Crane Works. Excuses equal disaster. pp. 5-10. December 1992.

American National Standards Institute: American National Standards for Mobile and Locomotive Cranes, ASME/ANSI B30.5-1989, p. 33. 1968.

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Last Reviewed: November 18, 2015

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