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PUBLIC HEALTH SERVICE/CDC/NIOSH/DSR
FACE 97-14

TO: **Director, National Institute for Occupational Safety and Health**

FROM: **Division of Safety Research, NIOSH**

SUBJECT: **Maintenance Worker Dies After Overhead Crane Collides With Aerial Platform At Construction Equipment Plant - North Carolina**

SUMMARY

A 54-year-old industrial maintenance worker (the victim) was killed when the aerial platform he was working from tipped and fell 19 feet to the floor of a construction-equipment manufacturing plant. The victim had been grinding the end of a shortened runway rail for a floor-operated overhead crane while another overhead crane was operating on an adjacent runway. As the operating crane traveled along its runway, it struck the aerial platform, knocking it off balance and causing it to tip over to the floor. When the platform and victim hit the floor, the victim sustained massive head trauma and internal injuries. Co-workers notified the emergency medical service who responded within 3 minutes, and the victim was transported to a local hospital where he was pronounced dead.

NIOSH investigators concluded that, in order to prevent similar incidents, employers should:

- *ensure that a hazard assessment of work areas is conducted prior to work being performed*
- *ensure that adequate zones of safety, marked by readily discernible warning devices, are established around maintenance areas in production facilities.*

INTRODUCTION

On June 13, 1997, a 54-year-old industrial maintenance worker (the victim) sustained fatal injuries when a floor-operated overhead crane struck the aerial platform from which he was working, causing it to tip and fall to the concrete floor of a manufacturing plant. On June 19, 1997, officials of the North Carolina Occupational Safety and Health Administration (NCOSHA) notified the Division of Safety Research (DSR) of the incident, and requested technical assistance. On July 10, 1997, a DSR safety engineer interviewed the plant's human resources manager, examined the incident site, and met with the safety director for the employer.

The employer was an industrial maintenance contractor, in business since 1964, employing 160 workers at the time of the incident. The employer performed all types of industrial maintenance activities including plant rehabilitation and modification, demolition, and shut-down operations. The business had an ongoing contract with the equipment manufacturer to supply a permanent crew (9 employees including supervisor) which performed continual modification and upkeep of the manufacturer's facility. This was the employer's first fatality. The employer's safety program addressed drug testing, hazard communication, lockout/tagout policies, excavation/trenching safety procedures, personal protective equipment use, first aid, and competent-person certifications. The victim had 1 year and 2 months experience with the company and had previous maintenance experience with other employers.

INVESTIGATION

This plant used floor-operated overhead cranes to move parts and subassemblies among various work stations or bays. When changes in production method or product design were made, corresponding changes in the routing of the crane runways were often necessary. A primary responsibility of the contract maintenance crew was to perform the necessary rerouting of the runways. Beginning at 7 a.m. on the day of the incident, the crew was engaged in this activity in an area of the plant where bodies for off-road haulage trucks were fabricated. One of the bays in this area had been closed to production so that the runway could be rerouted, and the two cranes on this runway had been locked out and tagged. The crew had cut the rails during the morning using a scissors type aerial platform for access. While they were working, the cranes on the runway over the adjacent hauler body tack bay (see figure) remained operational, and several times had passed close to the elevated platform. Just before 11:00 a.m. the victim repositioned the aerial platform 19 feet above the floor and closer to the adjacent runway, presumably to gain better access. He then began to grind the rough-cut end of the rail nearest the hauler body tack bay. As the victim was grinding the end of the rail, a production worker in the hauler body tack bay noticed some machine parts which would interfere with the rerouting operation. He began tramming the crane towards them, intending to move them out of the way. As he trammed the crane with his attention focused on the floor area, the crane's drive mechanism approached and contacted the aerial platform, which began to tip. Both the victim and his supervisor yelled to the worker to stop. He immediately stopped the crane, but the platform had been pushed beyond its limits of stability and continued to tip. The victim fell 19 feet, landing on the concrete floor. Co-workers notified emergency medical personnel who responded within 3 minutes. The victim was airlifted to a nearby hospital where he was pronounced dead.

CAUSE OF DEATH

The cause of death was established as massive head trauma and internal injuries.

RECOMMENDATIONS/DISCUSSIONS

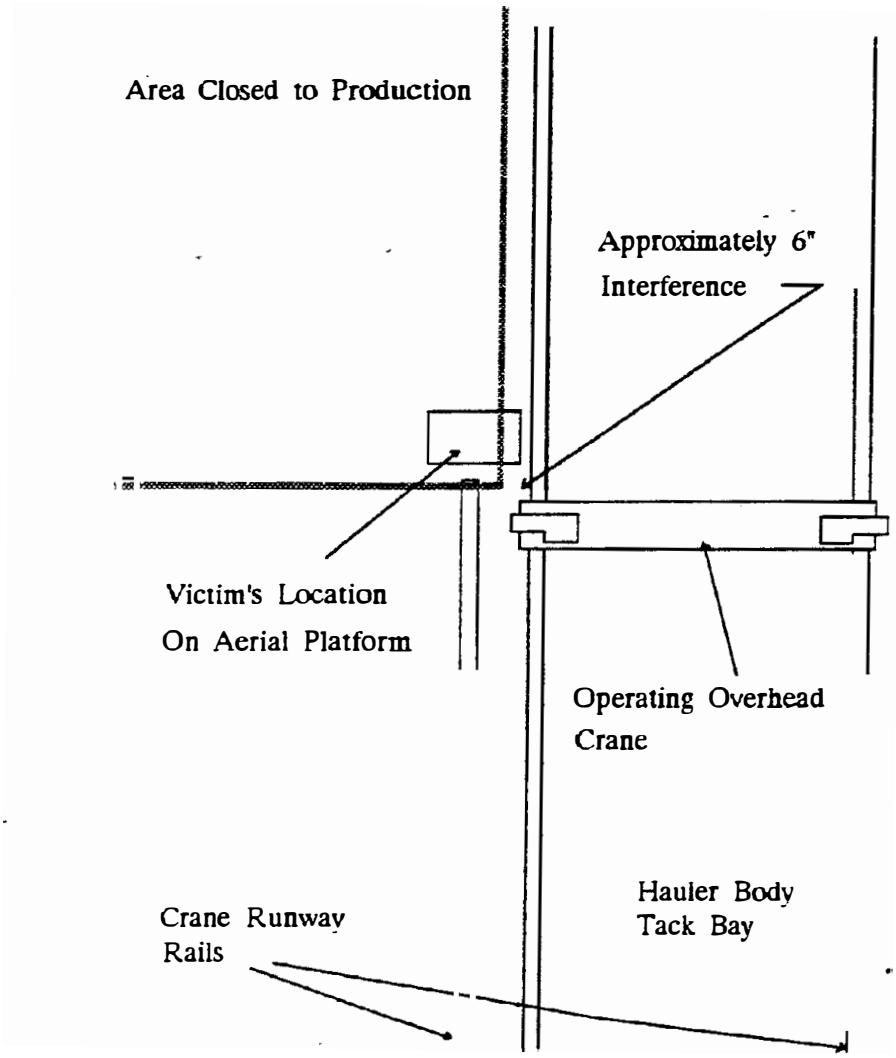
Recommendation #1: Employers should ensure that a hazard assessment of work areas is conducted prior to work being performed.

Discussion: The cranes which operated on the rails being re-routed had been locked out and blocked against motion to protect workers during the modification. However, the crane operating in the adjacent bay remained in use without restriction. During the morning, the aerial platform had been located between 1 and 1½ feet of the operating crane and the crane had passed by several times. Later, the victim repositioned the platform, presumably for better access to the cut rail. In this location the platform was 4 to 6 inches inside the crane's zone of movement because the drive mechanism of the crane extended slightly beyond the rails. This distance would have been difficult to detect visually, especially by an individual at floor level. Had the crane been located near the end of the adjacent cut-off rail when the platform was positioned, the clearance could more accurately have been judged. Better yet, stops could have been fixed to the rail to limit the movement of the crane, or the crane could have been de-energized and tagged out of service.

Recommendation #2: Employers should ensure that adequate zones of safety, marked by readily discernible warning devices, are established around maintenance areas in production facilities.

Discussion: Although the bay in which the modifications were taking place had been designated as non-production and no movement of equipment was taking place, another crane was operational on an adjacent runway. Additionally, no barricades, warning lines, or signs were used. The controls for the crane were suspended from an umbilical which allowed the operator to work the crane while standing at floor level. The crane operated on rails which were about 20 feet off the floor. The operator's attention would normally be focused on the load or load-handling device rather than on the rail above, and the load would be lifted no higher than necessary for movement above floor obstacles. Additionally, since the crane had passed beside the platform without incident during the morning hours, it may not have occurred to any of the workers that the platform had been repositioned within the crane's zone of movement. Where workers are exposed to hazard from movement of overhead cranes, a safe zone of operation should be marked by signal devices such as blinking lights or marker cones placed at floor lever, where they are easily seen.

Figure: FACE 97-14, Overhead View of Crane Runways



Sketch not to scale

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Fatality Assessment and Control Evaluation (FACE) Project

The National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR), performs Fatality Assessment and Control Evaluation (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.

States participating in this study: North Carolina, Pennsylvania, South Carolina, Tennessee, and Virginia.

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