TO: Director, National Institute for Occupational Safety and Health

FROM: California Fatality Assessment and Control Evaluation (FACE) Program

SUBJECT: Crane operator/foreman is impaled and dies when moving crane strikes gate in California

SUMMARY

California FACE Report #98CA015

A 46-year old crane operator/foreman (decedent) died when he struck a partially open gate with a moving crane and the end of the gate came into the cab and impaled him. The decedent was driving the crane back from a job in the darkness of the morning when he struck the end of the partially open gate. The crane was moving at 20 miles per hour and had its headlights on. The crane had been used to change a billboard sign. Access to the billboard was through the gate used to close off a gravel road. The gate had not been secured in the open or closed position. The height of the 20-foot long gate tapered from the hinged end. It was 48 inches high at the hinged end and tapered at the free end to a height of approximately 12 inches. The CA/FACE investigator determined that, in order to prevent future occurrences, employers should ensure as part of their Injury and Illness Prevention Programs that:

- unattended gates should be secured secured in place.
- gates have a reflective panel on the free end to warn approaching vehicles.

INTRODUCTION

On October 15, 1998, at 6:15 a.m., a 46-year old male crane operator was fatally injured when he was impaled by the free end of a partially open gate. The gate had swung partially closed when the moving crane approached it. The decedent ran into the free end. The free end came into the cab of the crane and struck the employee in the chest and abdomen. The CA/FACE investigator learned of this incident on October 16, 1998 from the local legal office of the Division of Occupational Safety and Health, California Department of Industrial Relations (Cal/OSHA). On October 16, 1998, the CA/FACE investigator traveled to the incident site where he inspected and photographed the scene. On October 20, 1998 he traveled to the main office and met with the company branch operations manager and the environmental compliance/safety manager. Also on October 20, 1998, the CA/FACE investigator traveled to the impound yard where he inspected and photographed the truck-mounted crane involved in the

incident.

The employer, an outdoor advertising company, had been in business for approximately 97 years at the time of the incident. The company has 180 employees with 4 working on site at the time of the incident. The decedent had worked for the company for 14 years and had worked at the site of the incident only that morning. However, he had worked at the site intermittently during the course of his employment.

Company safety responsibilities were defined, with the company's branch president, branch operations manager and the environmental compliance/safety manager having overall responsibility. Site foremen have responsibility at the various sites. The company had a written Injury and Illness Prevention Program (IIPP) and a code of safe practices. The decedent was trained in the hazards of the industry and was a licensed crane operator. Tailgate safety meetings were conducted every 10 working days. General safety meetings, which included management, were held once a month.

INVESTIGATION

The site of the incident is a right-of-way road **(exhibit 1)** used jointly by a nursery, poultry ranch, the local power company and the outdoor advertising company involved in this incident. The road is gravel covered dirt and the roadway itself is level. Access to the road is gained from an undeveloped lot that adjoins the street. To drive on the road users must unlock and pass through a gate.

The gate is constructed of 3-inch square stock steel. It is hinged on the north end and is locked on the free end by means of a chain and interlocking pad locks, each pad lock belonging to one of the users. The gate was approximately 20-feet long. An exact measurement was unavailable due to the destruction of the gate **(exhibits 2 & 3)**. The top of the hinged end of the gate stood 49 1/2 inches from the ground, with the gate itself being 48 inches high. The gate tapered down near the free end so it would appear to be a blunt-tipped triangle. Again, due to the destruction of the gate, an exact measurement of the height of the blunt tip of the free end was unavailable, but appeared to be about one foot high **(exhibit 4)**. The free end appeared to stand 49 1/2 inches from the ground with the taper coming up from the bottom of the gate. On the day of the incident the decedent and his crew, three other employees, left the main company yard in the dark at 5:00 a.m.--their normal starting time. The decedent was driving a 58,000 lb. truck mounted crane **(exhibit 5)**. He had one passenger accompanying him. The two other employees followed in a chase vehicle. They arrived at the job site at 5:30 a.m., after passing through the gate which had already been opened by an unknown party. They changed a copy (billboard) sign in about 30 minutes.

At approximately 6:00 a.m. the decedent and his passenger began to drive out of the work site using the gravel road. It was still dark at this time as sunrise did not occur until 6:56 a.m. The Teletrac locator indicated the truck-mounted crane was in the location of the work site at 6:00 a.m. They were traveling at 20 miles per hour, according to their onboard tachograph.

During the time between when the crew passed through the gate on the way to the job site and when they returned, the gate had swung partially closed for an unknown reason. The decedent's truck-mounted crane approached the gate at 20 miles per hour. The portion of the

gate protruding into the roadway was the small, tapered end. The truck-mounted crane's headlight were on.

The left, front fender of the truck-mounted crane struck the small, tapered end of the gate. The end smashed through the fiberglass fender **(exhibit 6)** and struck a portion of the engine-side firewall. It sheared the air line (used for the brakes) and the electrical power to the truck-mounted crane. The end made a turn into the cab of the truck and went under and through the dash **(exhibit 7)**. It continued, impaling the decedent, sitting in the driver's seat, pushing him to the right and into his passenger. It continued through the seat back **(exhibit 8)**, the rear of the cab (sheetmetal) and stopped by putting a large dent in the thick, diamond-plate bulkhead at the front of the truck bed. The bulkhead is located approximately 6 inches behind the cab of the truck.

Since the air line for the brakes was sheared, the truck's brakes locked up. This occurred only after a short air bleed down period. With the truck out of control, the passenger reached over the decedent and tried to apply the air brakes, but they did not work. The truck continued for approximately 75 feet, with a large portion of the gate protruding from the left, front fender, where it went off the road to the right and stopped in a ditch. The passenger could not get his door open, so he crawled out of the window in the passenger door.

At this time the other two crew members arrived in the chase vehicle. The passenger in the truck-mounted crane ran across the street and call 911 from the motel located there.

Paramedics were dispatched at 6:26 a.m. and arrived at 6:32 a.m. They extricated the decedent at 7:08 a.m. and transported him to a local hospital where he arrived without a pulse or spontaneous respirations and was pronounced dead at 8:15 a.m.

CAUSE OF DEATH

The death certificate stated the cause of death to be multiple pelvic fractures.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should ensure as part of their IIPP that unattended gates should be secured in place.

Discussion: In this incident a 20-foot long gate was used to close off an access road when the road was not in use. Prior to the arrival of the employer's crew, the gate had been opened, but not secured against movement. There was a string that was intended to be used for this purpose, but was not used on the morning of the incident. When the employer's crew drove through, they did not check to determine if the gate was secured against movement. Many factors can cause an unsecured gate to swing into the closed or partially closed position including wind and vibration caused by heavy equipment moving nearby. A train track was located approximately 35 feet away and could also be a factor due to vibration. If the gate had been secured in the open position, this incident would not have happened.

Recommendation #2: Employers should ensure as part of their IIPP that gates have a reflective panel on the free end to warn approaching vehicles.

Discussion: There is a possibility the decedent may have seen the gate prior to hitting it,

and either attempted to bump it out of the way or had no time to respond. However, the available evidence suggests he did not even see it. Although the gate had reflectors on both sides of the gate, these were to warn approaching traffic that the gate was closed. There were no reflectors or reflective panel on the free end of the gate. Reflectors or reflective material should be placed on the free (non-hinged) end of gates so if the gate is dislodged from its secured position, by passersby, wind**,** e.g., it can be seen by approaching traffic. If the free end of the gate had reflective material on its free end, this incident may not have happened.

Richard W. Tibben, CSP
FACE Investigator

Robert Harrison, MD, MPH
FACE Project Officer

Laura Styles, MPH
Research Scientist

March 24, 1999

****

FATALITY ASSESSMENT AND CONTROL EVALUATION PROGRAM

The California Department of Health Services, in cooperation with the California Public Health Foundation, and the National Institute for Occupational Safety and Health (NIOSH), conducts investigations on work-related fatalities. The goal of this program, known as the California Fatality Assessment and Control Evaluation (CA/FACE), is to prevent fatal work injuries in the future. CA/FACE aims to achieve this goal by studying the work 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.

NIOSH funded state-based FACE programs include: Alaska, California, Iowa, Kentucky, Maryland, Massachusetts, Maryland, Minnesota, Missouri, Nebraska, New Jersey, Ohio, Oklahoma, Texas, Washington, West Virginia, and Wisconsin.

****

Additional information regarding the CA/FACE program is available from:

California FACE Program
California Department of Health Services
Occupational Health Branch
1515 Clay St. Suite 1901
(510) 622-4370