TO: Director, National Institute for Occupational Safety and Health

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

SUBJECT: Vineyard Equipment Operator Dies after being Crushed by a Forklift in California

SUMMARY
California FACE Report #95CA018

A 42-year-old male equipment operator died after being crushed by a forklift. Just prior to the incident, the victim was helping his co-worker attach a piano (spreader bar) to a gondola full of grapes. When the victim and his co-worker finished attaching the piano, the co-worker signaled the forklift driver to lift the gondola. The forklift driver then stepped on the accelerator in order to generate enough power to lift the gondola off the ground. The accelerator controlled the speed of the engine that supplied power to both lift the forklift arms and move the forklift. The forklift was in forward gear at the time, and consequently moved ahead approximately eight feet, crushing the victim. The forklift driver had not realized that the forklift was in gear at the time. It was the company standard operating procedure (SOP) to put the forklift into neutral or put the emergency brake on prior to lifting a gondola. The victim had been working between two gondolas and could not move out of the way of the oncoming forklift. He was run over by the left front dual wheels on the forklift. The forklift operator immediately turned off the forklift when he realized what had happened. The victim's co-worker ran to his aid and discovered that he was lodged beneath the front left dual tires on the forklift. The forklift driver moved the forklift off the victim while the co-worker ran to a nearby phone and summoned emergency services. The victim was not breathing and his heart had stopped when first checked by paramedics. The CA/FACE investigator concluded that in order to prevent similar future occurrences, employers should:

· provide a formal forklift safety training program for all employees who operate forklifts.

· have a documented standard operating procedure (SOP) for all workers involved in the operation of loading gondolas onto trucks.

In addition, product manufacturers and designers should consider:

· equipping forklifts with interlocks so that lifting cannot take place while a forklift is in gear. Alternatively, forklifts could be equipped with alarms that signal when there is an attempt to change the forks' position while the transmission is in gear.

INTRODUCTION

On October 26, 1995, at approximately 2:58 a.m., a 42-year-old male equipment operator (the victim) died after being run over by a forklift. The CA/FACE investigator was informed of

this incident by a California Division of Occupational Safety and Health (Cal/OSHA) district office on November 2, 1995. An employer interview and site visit were conducted on November 9, 1995. Photographs were taken of the incident site, and copies of the Cal/OSHA report, sheriff-coroner's autopsy report and police report were obtained by the CA/FACE investigator.

The employer in this incident owned a grape vineyard. The land had been used as a vineyard since 1973 and had been owned by the employer since 1968. At the time of the incident the grape harvest was in progress. There were approximately 40 employees working at the vineyard during the harvest, however, only four were at work at the time of the incident. The victim had worked for his employer for approximately three months. He had worked as a truck driver prior to his recent employment at the vineyard. The employer stated that the victim had worked as a truck driver with the vineyard staff for two to three years. During that time he had become familiar with the operations at the vineyard.

There was a full-time safety officer on staff who had worked for the vineyard for approximately 22 years. The company had monthly safety meetings (field safety and health meetings) where various safety issues and topics were discussed. These safety meetings were documented by the employer and the workers signed a roster when they attended. The company also had a written Injury & Illness Prevention Program (IIPP) at the incident site. This plan did not, however, address the operation the victim was involved with at the time of the incident.

The forklift driver in this incident had not received any formal safety training in forklift operations, although the employer had sent some of the other forklift operators to a formal training program off-site. There was, however, safety training which addressed the equipment used during the harvest. This pre-harvest training, although not documented, was given to all employees working during the harvest. It involved a 2-3 hour training session in equipment (tractor and forklift) operations and a 2-3 hour training session in harvest operations.

INVESTIGATION

On the day of the incident, at approximately 1:30 a.m., the victim and two co-workers were loading gondolas full of grapes onto the back of a flatbed truck. According to management officials, work at this hour was not unusual during the harvest. Two gondolas had been loaded onto the truck prior to the time of the incident. A total of ten gondolas were to be loaded onto the truck. There were three types of gondolas used at the vineyard. These included a six ton gondola, a two and a half ton gondola (valley style), and a one ton gondola. The six ton gondola was not being used during the operation on the evening of this incident. The one ton gondola was used in the field where it was loaded with grapes. It was then transported by forklift to a transfer area where it was dumped into the valley style gondola. The valley gondola was then lifted and transported a short distance with a large forklift and placed on the back of the flatbed truck.

Prior to the incident, the victim's job had been to transport the empty valley style gondolas with a forklift from the storage area to the transfer yard. He would transport two gondolas at a time while doing this job. At the time of the incident, the victim had jumped down from his forklift in order to help a co-worker hook a piano (spreader bar) to a valley style gondola. The piano is attached to the gondola (see Exhibit 1) so that the forklift can lift the

gondola off the ground and transport it to the truck. The job of attaching the piano is usually done by one worker, however, it is often faster if two employees each attach one side of the piano to the gondola. In this incident, the victim was helping his co-worker attach the piano to the gondola.

Once the piano was attached to the gondola the victim's co-worker gave a "thumbs up" signal to the forklift driver. This signal indicated to the driver that the piano was attached and that he could now lift the gondola off the ground. The forklift was in forward gear at the time, so when the forklift operator pushed on the accelerator the forklift rapidly moved forward approximately eight feet. The accelerator controlled the speed of the engine that supplied power to both lift the forklift arms and move the forklift. The co-worker who had signaled the forklift operator was able to get out of the way, but the victim was standing between the gondola being lifted and a second gondola (see Exhibit 2) and could not get out of the path of the oncoming forklift. Consequently, he was run over by the forklift's front left dual tires. There was approximately one foot of room on either side of the victim, which was not enough room for him to avoid the oncoming forklift.

The forklift driver was operating a large automatic industrial forklift which had a lifting capacity of 15,000 lbs. The average weight of a gondola with a load of grapes was approximately five to six thousand pounds. There were three potential gear positions available with this automatic forklift. They were forward, neutral and reverse. The forklift was in forward gear at the time of this incident. The forklift driver did not realize that he had left the forklift in forward gear when he began to accelerate to lift the gondola. The employer stated that it was the unwritten company standard operating procedure that forklift operators place the gears in neutral or to set the handbrake prior to lifting anything with the forklift. There was a parking brake on the forklift, however, it was not engaged at the time of the incident. Once the forklift operator realized what had happened he immediately turned off the forklift. The co-worker on the ground had heard the victim scream and ran around the forklift to see what had happened. He discovered the victim beneath the front left dual tires on the forklift. He yelled to the forklift driver to move the forklift forward off of the victim. The forklift driver did as he was instructed and the co-worker ran to call emergency services. When the co-worker returned to the victim he checked for vital signs (pulse and spontaneous respirations) but could not detect either. Cardiopulmonary resuscitation was not initiated by any of the co-workers. The victim had received severe trauma to both his head and neck during the incident. Paramedics arrived at 2:58 a.m. and found that the victim had no pulse or spontaneous respirations.

CAUSE OF DEATH

The sheriff-coroner's autopsy report stated the cause of death to be transection of the cervical cord due to displaced fractures of the cervical spine due to crushing blunt force trauma.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should provide a formal forklift safety training program for all employees who operate forklifts.

Discussion: The forklift operator in this incident had received some basic training in forklift operations during the pre-harvest training. This training was not documented, however, so it is

difficult to assess how complete it was. A formal forklift safety training program could have addressed some of the hazards associated with this incident. This incident may have been prevented if the forklift driver had secured the handbrake prior to the incident, or if he had placed the gears in neutral before attempting to lift the gondola. Under Title 8 of the California Code of Regulations (CCRs) section 3203 (b)(2), there must be documentation of safety and health training required by subsection (a)(7) for each employee, including employee name or other identifier, training dates, type(s) of training, and training providers. This documentation must be maintained for at least three years.

Recommendation #2: Employers should have a standard operating procedure (SOP) for all workers involved in the operation of loading gondolas onto trucks.
Discussion: In this incident, there was no SOP for the operation being conducted by the workers. An SOP could have addressed the hazards involved in this operation. An SOP to avoid such hazards may have included specific guidelines on how far away workers should be before a gondola is lifted off the ground, and the necessary clearance around workers before the forklift operator can lift the gondola. Title 8 of the California Code of Regulations requires there to be written instructions to safely complete the operation that was being performed.

Recommendation #3: Manufacturers should consider equipping forklifts with interlocks so that lifting cannot take place while a forklift is in gear. Alternatively, forklifts could be equipped with alarms that signal when there is an attempt to change the forks' position while the transmission is in gear.
Discussion: In this incident, the forklift allowed the operator to elevate the forks while in gear. The forklift had no alarm to signal that it was in gear when the forks were moved. Consequently, when the operator raced the engine to gain extra power in lifting the load, he didn't notice the forklift was in gear and it began to roll forward. An interlock could prevent this type of maneuver. For those industries where a change in fork position is necessary while the forklift is in gear, an alarm could act as an extra reminder to the operator.

References
Barclays Official Code of Regulations, Vol. 9, Title 8, Industrial Relations. South San Francisco, CA, 1990.

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FATALITY ASSESSMENT AND CONTROL EVALUATION PROGRAM

The California Department of Health Services, in cooperation with the Public Health Institute and the National Institute for Occupational Safety and Health (NIOSH), conducts investigations of 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, Massachusetts, Michigan, Minnesota, Nebraska, New Jersey, New York, Oklahoma, Oregon, Washington, West Virginia, and Wisconsin.

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

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