TO: Director, National Institute for Occupational Safety and Health

FROM: California Fatality Assessment and Control Evaluation Program

SUBJECT: Laborer dies when run over by heavy equipment in California.

SUMMARY
California FACE Report 98CA012

A 19-year old male laborer (decedent) died after being run over by the rear wheels of the front trailer of a tractor/trailer rig at a construction site. The victim was attempting to clean the dirt from the right rear fender of the double trailer rig that was being loaded by an excavator. The decedent walked from the left side and around the back of the tractor trailer rig to perform the cleaning. The decedent was standing in front of the rear wheels when the tractor/trailer driver began to drive off. The excavator operator normally sounds one horn to move and two to stop to inform the truck driver of what movements he should make. The truck driver indicated he heard a horn and begin to drive away. The excavator operator stated that he did not sound the horn. The excavator operator saw the decedent being run over and sounded his horn twice to attempt to get the truck driver to stop. The decedent was not wearing a high visibility garment. The CA/FACE investigator concluded that, in order to prevent future occurrences, employers should:

· ensure employees assigned tractor/trailer cleaning duties do so away from the loading site and with the truck driver's knowledge.

· ensure employees do not stand in front of the direction of travel of any machine capable of movement.

· have traffic move only at the direction of a traffic controller at sites where traffic movement may be dangerous to employees.

In addition, heavy machinery manufacturers should:

· design a machine's warning horn and backup alarm to be extraordinarily distinct.

INTRODUCTION

On August 15, 1998, at 8:30 a.m., a 19-year old male laborer was fatally injured when he was run over by the wheels of the trailer of a tractor/trailer rig. The decedent was attempting to clean dirt off the front trailer's right rear fender, when the tractor driver began to drive away. The CA/FACE investigator learned of this incident on August 18, 1998 from the local legal office of the California Occupational Safety & Health Administration (Cal/OSHA). On August 25, 1998, the CA/FACE investigator traveled to the incident site where he met with the

employer's site foreman, two representatives of the general contractor and a representative of the truck dispatcher. The CA/FACE investigator took photographs of the area where the incident happened.

The employer, a general engineering contractor, had been in business for approximately 8 years at the time of the incident. The company had 40 employees with 4 working on site at the time of the incident. The decedent had worked for the company for 10 months, and had worked at the site of the incident for 3 days.

Company safety responsibilities were defined, with the overall safety responsibility assigned to the company safety officer with site superintendents and site foremen having responsibility at the various sites. The company had a written Injury and Illness Prevention Program (IIPP) which contained all of the required elements and a code of safe practices. The decedent completed and signed off on the employer's safety orientation and training on high visibility garments and safe practices around operating machines. Training documents acquired by the CA/FACE investigator include the subjects of working specifically around tractor/trailers, horns and backup alarms. None of those training documents were signed by the decedent. There were no specific written instructions for the task the decedent was performing. Safety meetings were conducted once a week at the job site and more often if deemed necessary. Safety meetings which included management and employee representative attendance were conducted once a month.

INVESTIGATION

The site of the investigation is on a major university campus. The site was being cleared and prepared for the building of dormitories. Soil movement was being accomplished by an excavator loading the trailers of tractor/trailer rigs (**exhibits 1 & 2**). The tractors pulled two, bottom-dump trailers. The rigs would drive in an easterly direction down a ramp constructed for access to the loading site (**exhibit 3**). An excavator was located on the east side of the loading site.

On the day of the incident, as the tractor/trailer rigs drove in to be loaded, they swung their rigs south and then drove north so the right side of their trailers would be adjacent to the area where the excavator was loading. This area was on the extreme east portion of the site (**exhibit 4).** As they drove into position, the excavator operator would blow his warning horn twice to indicate to drivers that they should stop. The excavator would load the front trailer first, sounding one long blast of his warning horn for the driver to move up. The loading procedure was repeated for the rear trailer. The last single warning horn would indicate to the tractor drive to drive away.

The rig involved in the incident was being loaded while the decedent was located southwest of it. He was acting as the flagman to direct construction traffic in the area. The front trailer had been loaded and the tractor driver had moved his rig forward so the rear trailer could be loaded. On the first scoop of soil, some spilled on the rear fender of the front trailer. The excavator operator called the decedent over to clean dirt off the fender of the trailer. The decedent walked east and then north to the area of the right rear tires of the front trailer. He proceeded to clean the soil off the fender with his hands. Standing in front of the tires, he began

to clean off the dirt. The excavator operator loaded the second scoop of soil into the rear trailer. As the excavator operator pulled his bucket away, he truck driver drove away running over the decedent with the right rear tires of the front trailer. The excavator operator saw what was happening and blew his horn twice to stop the truck driver. The driver stopped, but the decedent had already been run over.

Paramedics were dispatched at 8:58 a.m. and arrived at 9:05 a.m. No treatment or CPR was attempted and he was pronounced dead at 9:07 a.m.

CAUSE OF DEATH

The death certificate stated the cause of death to be multiple blunt force injuries**.**

Recommendation #1: Employers should ensure employees assigned tractor/trailer cleaning duties do so away from the loading site and with the truck driver's knowledge.
Discussion: The cleaning operation assigned to the decedent in this incident was done at the loading site. Although the excavator operator was aware of the presence of the decedent, the truck driver was not. Cleaning operations of tractor/trailer rigs must be done away from the loading site. The activities and, often, the restrictions at loading sites make it dangerous to perform work other than loading. Cleaning and any other work on the tractor/trailer rigs must be done with the full knowledge of the truck driver. Drivers must know, if they are themselves not performing cleaning or other work, that someone else is and that person performing the cleaning or work must be the person to tell them to move. In this way, the driver knows that it is safe to move his rig. Alternatively, communications devices or electronic signaling devices can be used to indicate to the drivers that it is safe to move their vehicle. If the cleaning operation was performed away from the loading site and if there were explicit communications between the driver and the decedent, this incident may not have happened.

Recommendation #2: Employers should ensure employees do not stand in front of the direction of travel of any machine capable of movement.
Discussion: The employee fatally injured in this incident stood in front of the wheels of the trailer he was cleaning. The fender he was cleaning could have been done from the side. Because the tractor/trailer rig could move forward or back up, employees should be trained to anticipate those movements and not place themselves in the paths of travel. Because the decedent was in a path of travel, when the driver moved forward, he could not get out of harm's way.

Recommendation #3: Employers should require all ground employees to wear high visibility garments when they are in hazardous traffic areas.
Discussion: The decedent was found not wearing a high visibility garment. Training documents indicate that he had been trained to wear personal protective equipment, including high visibility garments, while on the job site. High visibility garments are worn so others, especially heavy machinery operators or truck drivers can discern a person's position on the construction site. Machinery operators and truck drivers are normally trained to stop when they lose sight of

someone nearby. They proceed when the person wearing the high visibility garment is spotted in a safe place. Had the decedent been wearing a high visibility garment, he may have been spotted by the truck driver who may not have moved until the decedent was out of the area of danger.

Recommendation #4: Employers should have traffic move only at the direction of a traffic controller at sites where traffic movement may be dangerous to employees.
Discussion: Many construction sites have a traffic controller. Arriving and departing traffic is instructed to heed only the traffic controller's signals when moving at the site. When ground personnel must come close to moving equipment or other traffic, it presents a danger to them. Traffic controllers assure that any traffic movements are safe for pedestrians. In this incident, the decedent was the traffic controller, but he was called away to clean dirt off the fender of the trailer that ran over him. If the decedent had returned to his traffic control position to indicate it was safe to depart and the tractor driver moved only at the direction of the traffic controller, this incident would not have happened.

Recommendation #5: Manufacturers should design a machine's warning horn and backup alarm to be extraordinarily distinct.
Discussion: In this incident the truck driver indicated that he heard a horn and took that as the signal to drive away. The excavator operator stated that he did not sound his horn. During the on-site investigation, it was noted that the excavator had to occasionally back up slightly in order to get a better angle on the soil it was attempting to pickup. This slight movement caused the backup alarm to sound. There exists the possibility that what the truck driver heard was the backup alarm, not the excavator's horn. The CA/FACE investigator determined that, although the backup alarm and horn were distinct, they were not extraordinarily distinct enough to prevent a mistake from being made. The warning horn should be very different from anything else on the site, especially a back up alarm.

References:
Barclays Official California Code of Regulations, Vol. 9, Title 8, Industrial Relations, South San Francisco, 1998

For general information regarding equipment movement on a construction site refer to:
http.www.dir.ca.gov./title8/1590.html, /1592.html, /1597.html, /1599.html

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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 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.

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

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