TO: Director, National Institute for Occupational Safety and Health

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

SUBJECT: A laborer dies in a street work zone after being backed over by a dump truck

SUMMARY
California FACE Report #07CA001

A 64-year-old Hispanic laborer died after being backed over by a dump truck in a street work zone. The victim was assisting equipment operators and truck drivers to maneuver within the work zone when the incident occurred. The driver of the dump truck did not see the victim as he backed his truck, and did not expect the victim to be behind the truck. The dump truck speed was 2-3 miles per hour (mph) and the distance backed was approximately 30 yards when the incident occurred. The back-up alarm was working and the truck had adjustable mirrors on both sides of the cab. The victim was wearing a high visibility vest and hard hat at the time of the incident. The CA/FACE investigator determined that in order to prevent future occurrences, employers, as part of their Injury and Illness Prevention Program (IIPP) should:

- Ensure that workers who are on foot stay out of the work area where heavy equipment is operating, and in clear view of operators.
- Ensure that when visual contact is lost with workers on foot, drivers of trucks and heavy equipment stop and do not resume work until visual contact is re-established.
- Minimize the distance trucks need to back up in order to gain access to the work area.
- Consider using additional safety devices for trucks and heavy equipment to warn workers of a backing vehicle and to warn drivers when someone is in their blind spots.
- Consider educating employees on the concept of teamwork in safety as part of the documented safety meeting program.

INTRODUCTION

On March 13, 2007, at approximately 10:30 a.m., a 64-year-old Hispanic laborer died when he was backed over by a dump truck in a street work zone. The CA/FACE investigator learned of this incident on March 22, 2007, from the legal office of the Division of Occupational Safety and Health (Cal/OSHA). Contact with the victim's

employer was made on March 28, 2007. On May 8, 2007, the CA/FACE investigator traveled to the company that employed the victim and interviewed the company's corporate counsel. Photographs of the incident scene and equipment involved were obtained as well as other pertinent documents.

The employer of the victim was a company that provided contractors and homeowners with concrete, aggregate, and asphalt products. The company had been in business for 50 years and had 950 employees. There were nine employees at the job site. Work on the site had been underway for two days when the incident occurred. The victim had worked for the company for 10 years. The victim was born in Mexico and had been in the United States for 33 years. The victim was a high school graduate and spoke both English and Spanish.

The company had a written IIPP that was printed in English. The program had all the elements required by state regulations. Safety meetings were held on a quarterly basis and were documented. The company had a training program that provided safety training to employees. Most of the training was done on-the-job (OJT). The company employees also received specialized training on the "Manual of Traffic Controls for Construction and Maintenance Work Zones" (see references).

INVESTIGATION

The site of the incident was a street construction work zone that ran in a north/south direction. The work being performed was the removal of the street asphalt using a street grinder. The job site had a valid Traffic Control Permit (TCP) and the street had been coned off in accordance with the filed construction work zone plans. The incident occurred at approximately 10:30 a.m. on a clear day.

The vehicle involved in the incident was a three-axle dump truck. The truck had a trailing axle which was a load-bearing axle added to the rear of the truck to allow increased payloads. The axle was also referred to as a "strong-arm". The local police conducted a basic safety inspection of the truck after the incident and found no violations and the truck to be well maintained and in good condition.

On the day of the incident, the victim was assigned to the work zone as the "dump man". His duties were to coordinate the movement of the dump trucks with the asphalt grinding operation and the paving equipment. This incident occurred in the vicinity of the asphalt grinding operation. The asphalt grinder would pulverize the asphalt on the street to a predetermined depth and then transfer the asphalt to the dump truck via a conveyor belt. After making one pass in a northerly direction, the grinder backed up to make another pass. The dump truck driver waited until the grinder was in position and then proceeded to back up to the asphalt grinder. The dump truck driver put the trailing axle down so that the wheels were approximately six inches from the ground. As he backed toward the asphalt grinder, the driver did not see the victim and did not expect him to be behind the truck. He then felt the truck hit what he thought was a debris pile. He stopped the truck and got out and walked to the back of the truck and found the victim lying under the right rear tires of the truck. The dump truck driver called for help from the other co-workers who were south of him at the asphalt grinder. The paramedics and fire department arrived and treated the victim and then transported him

to a local hospital where he was taken into surgery. Despite the hospital's efforts to treat the victim, he died as a result of his injuries.

CAUSE OF DEATH

The cause of death according to the death certificate was blunt force injuries of torso.

RECOMMENDATIONS / DISCUSSION

Recommendation #1: Ensure that workers who are on foot stay out of the work area where heavy equipment is operating, and in clear view of operators.

Discussion: Construction heavy equipment is inherently dangerous to work around, especially for employees on foot. The victim's job assignment was referred to as the "dump man" for the dump trucks and the asphalt grinder and paving equipment. He was supposed to coordinate the movement of the dump trucks exporting asphalt grindings with the asphalt grinding operation and to coordinate the movement of the dump trucks importing fresh asphalt with the paving equipment. His job duties required him to be in visual contact with the drivers and operators whenever there was movement. In this particular case, the victim wound up behind the dump truck while it was backing and lost visual contact with the driver. No one witnessed the incident. Employers can ensure worker compliance with safe work practices through continued documented programs of specific training, supervision, safe work recognition, and progressive disciplinary measures.

Recommendation #2: Ensure that when visual contact is lost with workers on foot, drivers of trucks and heavy equipment stop and do not resume work until visual contact is re-established.

Discussion: Visual contact with workers on foot in a street construction work zone is necessary to acquaint drivers and operators with all ongoing conditions. Although the technical aspects of operating trucks and heavy equipment can be the primary focus of a driver performing usual duties, the driver must also be proficient enough to constantly be aware of the people working in close proximity. When a driver loses visual contact with workers on foot, they should stop and not proceed until visual contact is re-established.

Recommendation #3: Minimize the distance heavy equipment needs to back up in order to gain access to the work area.

Discussion: The distance the asphalt dump trucks had to back up in this incident was approximately 300 feet of straight unobstructed road before engaging the asphalt grinder. Although the vicinity may have been checked for obstructions prior to backing, conditions are constantly changing in a construction environment. Periodic turnouts closer to the work area should be used to minimize the distance required for backing. In this case, the street intersection at the beginning of the work zone could have been used for that purpose.

Recommendation #4: Consider using additional safety devices for dump trucks to warn workers of a backing vehicle and to warn drivers when someone is in their blind spots.

Discussion: Workers on construction sites often work in close proximity to moving trucks and heavy equipment. Being exposed on a daily basis to the noise and warning devices of backing equipment can desensitize individuals to the presence of such vehicles. Other devices such as a strobe light or different noises should be considered as additions to the standard back-up alarm to warn workers of a backing vehicle. There are also devices available that can detect the presence of persons in the blind spots of vehicles and provide a warning to the driver. These additions should be considered especially when the standard practice has failed. If such a device had been used this incident may have been prevented.

Recommendation #5: Consider educating employees on the concept of teamwork in safety as part of the documented safety meeting program.

Discussion: The employer might consider adding to their safety program the concept of safety as a team effort. When everyone at the scene claimed they did not see the victim go behind the backing truck, this is an indication of lack of teamwork. The social work environment or sense of belonging to a work group is a principle that should be addressed at safety meetings. The concept of teamwork as a safety factor is used in many high hazard situations such as confined spaces, energized high voltage work, and fire fighting. Stressing the concept of teamwork as a safety endeavor motivates workers to want to belong to their work group and minimizes chances of exclusion. When all employees buy into the concept of teamwork, often they create safety standards that are higher than the standards set for individuals. Had the teamwork concept of safety been employed in this incident, a fatality might have been prevented.

References:

California Code of Regulations, Vol. 9, Title 8, Subchapter 4, Construction Safety Orders, Article 10, S Haulage and Earth Moving, Section 1592. Warning Methods, Article 11. Vehicles, Traffic Control, Flaggers, Barricades, and Warning Signs, Section 1597. Jobsite Vehicles., Section 1598. Traffic Control for Public Streets and Highways, Section 1599, Flaggers

Manual on Traffic Controls for Construction and Maintenance Work Zones, September 26, 2006, State of California, Department of Transportation.

Haapaniemi P (1996) "Will High-Tech Systems Help Drivers Avoid Crashes?"

Traffic Safety Vol. 96, No. 5, pp 16-19. National Safety Council, September/October 1996.

Parlay International. Transportation and Traffic Safety, 1989, "Backing Up", 1050.012, 1050.078.

EXHIBITS:

Exhibit 1. The dump truck involved in the incident.

Exhibit 2. The highway work zone where the incident occurred, looking north.

Exhibit 3. The highway work zone looking south.

Hank Cierpich
FACE Investigator

Robert Harrison, MD, MPH
FACE Project Officer

Laura Styles, MPH
Research Scientist

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FATALITY ASSESSMENT AND CONTROL EVALUATION PROGRAM

The California Department of Public Health, 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 the CA/FACE program is to prevent fatal work injuries. 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: California, Iowa, Kentucky, Massachusetts, Michigan, New Jersey, New York, Oregon, and Washington.

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

California FACE Program
California Department of Public Health
Occupational Health Branch
850 Marina Bay Parkway, Building P, Third Floor
Richmond, CA 94804