TO: Director, National Institute for Occupational Safety and Health

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

SUBJECT: A Diesel Mechanic Dies When He is Crushed Between the Tire and the Cab of a Fire Truck.

SUMMARY
California FACE Report #08CA009

A diesel mechanic died when he was crushed between the left front tire and the cab of a fire truck. The victim was attaching gauges and connections from a diagnostic monitor machine to the truck engine when the incident occurred. The CA/FACE investigator determined that, in order to prevent future occurrences:

- Employers should ensure that diesel mechanics always stand clear of lowering cabs.
- Truck manufacturers should design a control box "dead man" switch to use when lowering cabs.

INTRODUCTION

On August 19, 2008, at approximately 9:00 a.m., a 32-year-old diesel mechanic died when he was crushed between the left front tire and the cab of a fire truck. The CA/FACE investigator was notified of this incident on August 21, 2008, by the San Bernardino Office of the Division of Occupational Safety and Health (Cal/OSHA). On October 7, 2008, the CA/FACE investigator inspected the victim's place of employment, interviewed the company safety director and three co-workers, and obtained pictures of the fire truck involved in the incident. A representative from the fire truck manufacturer was interviewed at a later date.

The employer of the victim is a company that sells, rents, and services heavy equipment, power generation, and material handling machinery. The employer has been in business for over 68 years and has approximately 600 employees. The victim had been employed with the company for five years. The victim was born in the United States and had a 12th grade education.

The employer of the victim had a written Injury and Illness Prevention Program (IIPP) and work procedures for specific job tasks, including raising and lowering engine cabs for dynamometer testing. The instructions were not specific for the manufacturer and model of the vehicle. Employee safety meetings were held monthly and were documented. Employee training was conducted in a classroom setting by

representatives from equipment manufacturers, and on-the-job training was provided by certified equipment maintenance supervisors. Employee proficiency after training was measured through written tests and demonstration of skills as observed by their supervisor. The victim in this incident had received specific training on dynamometer testing.

INVESTIGATION

The site of the incident was a test area located within the maintenance and repair section of the power systems' division facility grounds. A large electronic machine (dynamometer) was attached via sensor cables to the diesel engine of trucks to test the operation of various engine components. The cab of the engine compartment was raised to connect the dynamometer sensor cables, and then lowered to run the engine for testing. The mechanic raised and lowered the cab of the truck using a hand-held control box that was tethered to the passenger side of the truck frame. The control box contained a toggle switch with three positions (up, down, and neutral), and a push button.

The cab was raised by activating the toggle switch to an "up" position, and continuously holding down the push button until the cab reached the desired height. The cab was lowered by placing the toggle switch in the "down" position, and stopping as needed by placing the toggle switch in the neutral position. It was not necessary to continuously hold the push button to lower the cab. The usual work practice was for the mechanic to hold the control box on the tether, and walk around the cab while it was being raised or lowered to ensure that the cab movement was not impeded.

On the day of the incident, at approximately 7:30 a.m., the victim was assigned to perform dynamometer testing on a new hook and ladder fire truck. The victim was working alone at the time of the incident. According to evidence from the scene, the victim had most likely finished connecting the dynamometer sensors to the engine and was lowering the cab with the control box. The victim was trapped between the driver's side front tire and the cab. The location of the victim and the control box suggests that he was either attempting to prevent the sensor cables from becoming entangled by the lowering cab, or he was trying to retrieve the control box that might have slipped from his hand as the cab was being lowered. The supervisor of the victim went to the test area at approximately 9:00 a.m., and witnessed the lower portion of the victim protruding from the area between the driver's side front fender and top of the tire. The victim was unresponsive and the supervisor contacted local emergency services by telephone. The supervisor and a co-worker located the control box in the driver's side wheel well, and raised the cab six to eight inches to free the victim. The victim could not be resuscitated and was pronounced dead at the scene by emergency response personnel.

CAUSE OF DEATH

The cause of death according to the death certificate was traumatic asphyxia.

RECOMMENDATIONS / DISCUSSION

Recommendation #1: Employers should ensure that diesel mechanics always stand clear of lowering cabs.

Discussion: The victim was crushed between the fire engine cab and tire. It is not known exactly what the victim was doing at the time of the incident. Evidence suggests the victim might have been trying to prevent the sensor cables from becoming entangled by the lowering cab, or he was trying to retrieve the control box that might have slipped out of his hand as he was lowering the cab prior to performing the dynamometer testing. If sensor cables become entangled while the cab is lowering, the cab should be stopped, and then raised and locked into place before attempting to reroute the cables. If the control box slips or is dropped from the mechanic's hand, the mechanic should stand clear and allow the cab to lower regardless of damage that may occur. In this incident, the fatality may have been prevented had the victim stood clear of the cab while it was lowering.

Recommendation #2: Truck manufacturers should design a control box "dead man" switch to use when lowering cabs.

Discussion: In this incident, the push button in the control box had to be held down continuously as the cab was being raised, but not when being lowered. In this design, the operator does not have control of the downward cab movement because it continues moving downward even if the control box should become separated from the operator. Having a "dead man" switch incorporated into the down position would allow the operator to have continuous control over the cab movement up and down, particularly if the control box should become physically separated from the operator. Had a dead man switch been part of the down position on the control box, this incident might have been prevented.

References:

California Code of Regulations, Title 8, Section 4002. Moving Parts of Machinery or Equipment.

California Code of Regulations, Title 8, Section 4186. Maintenance and Use of Point of Operation Tools and Guards.

EXHIBITS:

Exhibit 1. The control box used to raise and lower the cab.

Exhibit 2. The storage area for the control box showing the spiral cord that attaches to the control box.

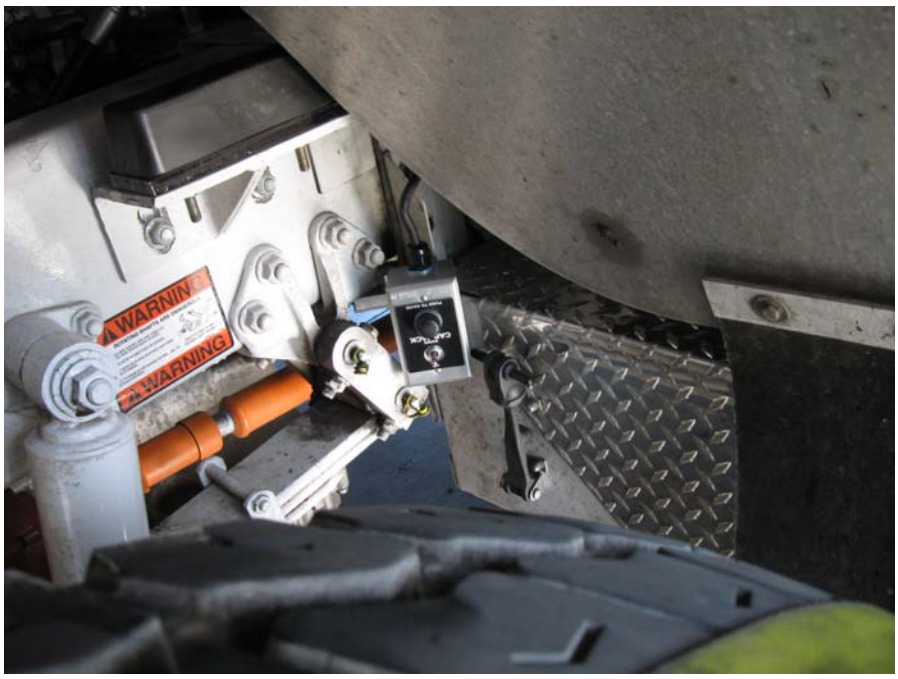

Exhibit 3. The location of the control box - next to the tire wheel well.

Exhibit 4. The tire and fender of the cab where the victim was pinned.

Exhibit #5. The distance between the tire and fender of the cab was approximately 4.5 inches.

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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:

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