

TO: Director, National Institute for Occupational Safety and Health

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

SUBJECT: A plumber died when the trench he was working in collapsed around him

SUMMARY
California FACE Report #05CA002

A 35-year-old male plumber died when the trench he was working in caved-in around him. The victim was in the trench connecting a residential sewer line to a sewer main when the incident occurred. The trench was seven-feet deep and was not shored, benched, or sloped. The area where the trench was located had been dug up before by other utilities. The soil that was removed from the trench was placed next to the edge of the trench. The company had shoring, but it was not available at the job site. The victim was hired two days before the incident occurred and had not yet been to the company's orientation and safety training. 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 employees do not enter trenches deeper than five feet without the benefit of shoring, benching, or sloping.
- Ensure that backhoe operators place the excavated soil from trenches a minimum of 2 feet away from the edge of a trench.
- Ensure employees receive safety training and their achievement of skills is verified through a testing program before they are assigned hazardous work.

INTRODUCTION

On March 21, 2005, at approximately 9:40 am, a 35-year-old plumber died when the trench he was working in collapsed around him. The CA/FACE investigator learned of this incident on April 7, 2005, through a Los Angeles County Coroner's post-mortem report. Contact with the victim's employer was made on April 17, 2005. On June 9, 2005, the CA/FACE investigator traveled to the facility where the victim worked and interviewed the owner of the company. A co-worker, the backhoe operator, was later interviewed by telephone.

The employer of the victim was a plumbing contractor that had been in business for over 17 years and had 70 employees. The victim had been employed with the company for two days when the incident occurred.

The company had a written safety program and an IIPP. The program had procedures that were task-specific for employees to follow including detailed procedures on excavations, trenching, and shoring. Formal safety meetings were held monthly and were documented. Attendance by all employees was mandatory. Tailgate safety meetings were held approximately every 10 working days.

The company's training programs consisted of monthly and tailgate safety meetings and specific specialized training, on an as-needed basis. The training followed a 12-month cycle with a combination of classroom and on-the-job training on mandated subjects pertaining to their industry. New employees might work 12 months before receiving training in a specific area. All training was documented. All newly hired or transferred employees were required to receive a safety orientation on the first day of employment, which included a physical exam and drug screening as well as instructions in applicable areas of safety. The victim was hired and reported directly to the job site on his first day of employment and had not received this training.

INVESTIGATION

The site of the incident was a new housing tract where the utilities were being installed. The victim was a new hire to the company who was recommended to the owner by the backhoe operator. The owner of the company hired him based on the backhoe operator's recommendation although he had never met the victim. According to the backhoe operator, he had worked with the victim before and although he did not know the extent of his background or experience, the victim was able to adequately perform plumbing functions. Their assignment was to install the sewer lines from the houses to the street and connect them to the main sewer line.

On the day of the incident, the victim was working with the backhoe operator as a two man crew. The backhoe operator dug a trench from a house to the sewer connection in the street, placing the excavated soil at the edge of the trench. The trench was approximately seven feet deep and three feet wide at the point where the connection was to be made. According to the company owner, the backhoe operators in his employment usually sloped out the trenches they dug instead of using shoring. The backhoe operator involved in this incident said they had made many connections in the previous two days. This connection was at the end of a cul-de-sac and the connection to the main sewer line in the street was difficult to find. The backhoe operator also stated that most of the trenches he dug varied in depth from three to six feet and that the soil was hard and compacted. He did not slope or shore any of the trench walls he dug in this subdivision.

The area where this particular trench met the main had been dug up before by other utilities, and the soil had not been recompacted to the same density as the surrounding

soil that had not been disturbed. After the backhoe operator dug seven feet down and exposed the main sewer line, he swung his backhoe bucket out of the trench. While he was swinging the backhoe bucket out of the trench, the victim jumped into the trench to finish digging out the sewer line connection with a shovel. While the victim was in the trench, the walls of the trench collapsed around him and completely buried him. The backhoe operator jumped off the backhoe and tried to dig the victim out by hand while yelling for help. Several workers in the area responded and dug with him. The paramedics arrived and pronounced the victim dead while he was still entrapped.

CAUSE OF DEATH

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

RECOMMENDATIONS / DISCUSSION

Recommendation #1: Ensure employees do not enter trenches deeper than five feet without the benefit of shoring, benching or sloping.

Discussion: When the walls of a trench give way, the pressure exerted by the falling soil will vary depending on the type of soil and width of the trench, however, the result will usually be the same; entrapment to anyone caught inside. Sometimes workers are not entrapped but are struck and killed by falling soil. This is why it is important to ensure employees do not enter trenches deeper than five feet without the benefit of shoring, benching, or sloping. The owner of the company stated that most of his backhoe operators used the sloping or benching method when trenches exceeded five feet in depth. Sloping or benching involves positioning the soil from an excavation away from the trench at an angle that would prevent the soil from caving into the trench. The owner also stated that the backhoe operators could request shoring at any time and it would be delivered to them. The shoring was kept at the company's main building and not at job sites. Shoring systems use materials such as timber products or aluminum hydraulic shoring to provide support to the walls of the trench. Trench boxes can also protect workers although they don't support the walls of the trench. If either sloping or shoring had been used in this incident, this fatality may have been prevented. Employers can enhance worker compliance with safe work practices through programs of task specific training, supervision, recognition, and progressive disciplinary measures.

Recommendation #2: Ensure that backhoe operators place the excavated soil from trenches a minimum of two feet away from the edge of a trench.

Discussion: When the backhoe operator dug the trench, he placed the excavated soil on the edge of the trench. The combination of the weight of the excavated soil combined with the soil conditions created by other utilities made an unstable condition which eventually caused a separation from the side of an excavation, burying the victim who was in the trench. One method used to protect employees from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations is

by placing and keeping such materials or equipment at least 2 feet from the edge of excavations.

Recommendation #3: Ensure employees receive safety training, and their achievement of skills is verified through a testing program, before they are assigned hazardous work.

Discussion: Before an employer assigns employees to hazardous work, the employer needs to instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to that work environment. The employer also needs to control or eliminate any hazards or other exposure that could cause injury or illness, and train employees in safe work practices that apply to the work they are asked to perform. Training in recognizing and avoiding hazards should be given to all workers before they start a new task, a new process, or operate new machinery. Workers can then be assessed to ensure they have comprehended and retained that training. The employer in this case had training available that covered all the requirements necessary for employees to work safely, however, the victim did not receive the training prior to starting work. Employers need to have safeguards built into the system to ensure that their training is implemented when required.

References:

California Code of Regulations, Vol. 9, Title 8, Sections 1539 - 1543

<http://www.cdc.gov/niosh/85-110.html>

<http://www.cdc.gov/niosh/face/In-house/full9902.html>

<http://www.cdc.gov/niosh/face/stateface/mn/96mn059.html>

<http://www.cdc.gov/niosh/face/stateface/mn/96mn073.html>

http://www.dir.ca.gov/dosh/dosh_publications/tb_trench.pdf

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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.

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

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