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Coming out of the trenches.... safely

In Holly Springs, NC, a 45 year old construction worker who had planned on moving into a new home with his fiancé the next day was instead buried in 10-feet of dirt when a portion of a wall of the trench he was working in collapsed. Crew members were installing a sewer line for a new development when the wall gave way. It took rescue workers nearly 12 hours to retrieve the worker's body.

In Shelton, CT, a 37 year old worker from Brazil was buried alive and suffocated after a trench wall collapsed on him. The wall of the 11-foot deep, 2 and a-half foot wide trench that was dug to reinforce the foundation of a home gave way when the worker began using a hammer drill. Officials at the scene said vibrations from the drill likely caused the collapse. They also said that the walls of the trench were not shored.

And in Reno, NV, two construction workers, ages 20 and 39, died after the walls of a 12-foot deep trench at a golf course collapsed on them. A third worker was rescued nearly four hours later. The walls of the trench had not been shored. The Nevada Occupational Safety and Health Administration (OSHA) subsequently attempted to fine the company that employed the men, but the firm had already permanently closed its doors. The 39 year old worker left behind three children, ages 12 to 15.

These examples are among the many deaths that occur in the United States each year in trenching and excavation cave-ins. Most workers don't realize how quickly a trenching or excavation cave-in can occur — or how quickly they will be buried with no chance to escape. According to the U.S. Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries, 271 workers were killed in trenching or excavation cave-ins from 2000 through 2006.

A review of multiple national databases by researchers from the National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention (CDC), showed that trenching and excavation hazards in construction resulted in 488 deaths between 1992 and 2000 — an average of 54 fatalities each year. Sixty eight percent of those fatalities occurred in firms with fewer than 50 workers. Approximately 19 percent of the workers who died were Hispanic. The research also showed that 46 percent of the fatalities occurred in small companies with 10 or fewer workers and 68 percent occurred in firms with fewer than 50 workers. Both NIOSH and OSHA have been involved in numerous educational efforts aimed at reducing trenching and excavation fatalities.

Understanding the hazards

Construction workers regularly involved in trenching and excavation work may not fully understand all of the hazards — or may not realize how quickly these hazards can result in traumatic injuries or death. In a publication entitled Excavations, Oregon-OSHA (OR-OSHA) notes that a cave-in can trap a worker within seconds and kill the person within minutes. According to OR-OSHA, two cubic yards of soil weigh about 6,000 pounds. A person who is buried will suffocate in less than three minutes, and if the person does survive, the weight of the soil is likely to cause serious internal injuries.

The first page of Excavations, "How to Dig Your Own Grave," graphically illustrates how deaths in excavations can occur. Arrows point to the following: No protective system, spoils too close, excavator bucket over worker, no hard hat, and no means for entering or exiting.

What to do

There are a number of steps job site superintendents, workers and employers can take to reduce the risk of serious injury or death in trenching and excavation activities. One of the most important is to plan ahead for any unsafe conditions that may be encountered. Also, ensure that a "competent person" with a greater level of training and experience than other workers possess oversee all trenching and excavation activities. The competent person must be designated by the employer, must be in the work area, and is responsible for seeing that appropriate shoring or controls are in place before workers enter the trench, and for promptly acting to correct any problems.

All workers should make sure equipment is in good condition before entering a trench. Make sure pre-project planning has taken place so shoring boxes are available on the site when needed for trench excavations. Ensure that pre-task planning has taken place before entering the trench to make sure the competent person has verified that it is safe to enter and that a shoring or trench box, ladder and other equipment are in place. Also, make sure that all utilities have been marked before digging and that all electricity, gas and water pipes in the trench have been shut off.

Employers should be familiar with the OSHA standards that regulate trenching and excavation activities. For additional information on federal OSHA's construction standards regulating this type of work, visit OSHA's Web site, www.osha.gov, then refer to the following standards: 29 CFR 1926.650, 29 CFR 1926.651 and 29 CFR 1926.652.

Note: The OSHA Construction Standards' General Safety and Health Provisions, 29 CFR 1926.20 (a)(1), prohibit contractors or subcontractors from requiring employees to work in unsanitary, hazardous or dangerous conditions. OSHA is often willing to cite a trenching violation as a "willful" violation because the federal agency assumes that everyone should know that trenches are an obvious danger. (A SINGLE "willful" violation — one that an employer intentionally and knowingly commits — carries a penalty of \$5,000 to \$70,000.)

In some cases, failure to address trenching and excavation hazards may result in more serious consequences and criminal prosecution. In New York City, officials investigating an incident in which a 30 year old day laborer from Ecuador digging a foundation in a trench next to a home suffocated when part of a wall from the home collapsed charged the owner of the construction site with criminal manslaughter. Authorities indicated that criminal charges in construction related incidents linked to owners at other work sites in New York were likely.

NIOSH has these additional tips for employers:

- Develop, implement and enforce a comprehensive safety program for all employees, which includes training in hazard recognition and the avoidance of unsafe conditions.
- Ensure that workers who are part of a multilingual work force comprehend instructions for safe work practices for the tasks to which they are assigned. Note: This is extremely important, especially with the high number of Hispanic/Spanish-speaking workers in the construction industry. In June 2008, the CDC published a report noting that between 1992 and 2006, 11,303 Hispanic workers in the United States died from job related injuries. The death rate for Hispanic workers was consistently higher than the rate for all U.S. workers. Thirty four percent of the Hispanic worker deaths during that time period occurred in the construction industry.
- Use shoring systems or sloping of the walls in all excavations 5 to 24-feet deep in any type of soil, except solid, stable rock.
- Have a qualified engineer determine appropriate shoring, shielding or sloping requirements for all excavations deeper than 24-feet (except those in unfractured rock).
- Become familiar with the provisions of the National Bureau of Standards/NIOSH document entitled Development of Draft Construction Safety Standards for Excavation (which can be accessed at www.cdc.gov/niosh/83-103v1.html) and implement them as safe work practices.

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