Excavation & Trenching



INCIDENT

Carlos Moncayo, a 22-year-immigrant from Ecuador. He died on April 6 when a 13-foot deep trench he was working in collapsed at a New York City construction site. Inspectors repeatedly had warned contractors supervising the site that the trench was an imminent hazard because it was not properly shored up. Lacking support walls, the trench eventually did collapse. Moncayo was buried up to his neck and crushed to death by thousands of pounds of dirt.

On August 5, the Manhattan district attorney indicted two companies and two supervisors for causing Moncoya's death. Harco Construction, Sky Materials, foreman Wilmer Cueva and site superintendent Alfonso Prestia have been charged with manslaughter, negligent homicide and endangerment.

NEED TO KNOW

An excavation is any man-made cut, cavity, trench, or depression in an earth surface formed by earth removal. Trench is a narrow excavation (in relation to its length) made below the surface of the ground.

In general, the depth is greater that the width.

Excavations can be any size: wide, narrow, deep, or shallow.

Dig a hole in the ground and you have made an excavation.

A trench is an excavation, too, if it isn't more than 15 feet (4.5 meters) wide at the bottom. And, if you install forms or other structures in an excavation that reduce its width to less than 15 feet, measured at the bottom, the excavation is also considered a trench.

Most regulations require that if you work in an excavation that is five feet deep (or deeper), your employer must protect you from trench collapse, cave-ins and other trenching and excavation hazards. If a competent person determines there is a potential for an excavation to cave-in, you must be protected regardless of its depth.

BUSINESS / REGULATIONS

In an investigation, OSHA found that the project's general contractor, Harco Construction LLC of New York City, and Moncayo's employer, subcontractor Sky Materials Corp. of Maspeth and Calverton, did not provide cave-in protection for the trench or support or brace a section of undermined and unsupported sidewalk to prevent it from collapsing into the trench.

"Carlos Moncayo was a person, not a statistic. His death was completely avoidable. Had the trench been guarded properly against collapse, he would not have died in the cave-in," said Kay Gee, OSHA's area director in Manhattan.

"Managers from Harco and Sky Materials were aware of these deadly hazards and did not remove employees from the trench, even after warnings from project safety officials. This unconscionable behavior needlessly and shamefully cost a man his life."

OSHA issued each employer two citations for willful violations of workplace safety standards and assessed fines of $140,000 – the maximum fines permitted – for each company.

In addition to the OSHA citations, officials from both companies were indicted for manslaughter, among other charges on Aug. 5 in New York State Supreme Court.

OSHA further opined.

Construction work hazards are well-known, and so are safeguards to prevent death and injuries.

Employers must provide a workplace that allows employees to return home safely at the end of a day.

STATISTICS

In 2003, OSHA conducted on investigation because there were 48 trench fatalities.

Because of these steps with more information of trench hazards and stepped up enforcement the annual trench fatalities declined. But fatalities still occur.

The results of OSHA's investigation are useful in understanding why trench fatalities **still occur today** and how to avoid them.

1. **Main Reason**

1. Trenches collapse because they are not properly protected.
2. Protective systems were properly employed in only 24 percent of the trenches. In the remainder, a protective system was either improperly used (24%), available but not in use (12%) or simply unavailable (64%).

2. **Competent Person**

Further, despite the fact that environmental conditions were a contributing factor in 68 percent of the fatalities, the competent person was not onsite when the fatality occurred 86 percent of the time. Most of the time (65%) the employer had not identified the soil type even though soil type is a factor in trench cave-ins.

3. **Mondays**

Also, a disproportionate number of fatalities (36%) occurred on Mondays, probably because rain or other factors changed conditions over the weekend. Under OSHA regulations, the competent person must inspect trench work in progress before each shift and after any changes in conditions.

4. **Schedule/Deadlines Times**

The OSHA investigations showed that schedule time was more important than safety in 88 percent of the incidents. Seventy-two percent of the fatalities occurred in trenches less than nine feet deep. Only nine percent occurred deeper than 15 feet.

5. **Trades/Fatalities**

The most commonly killed employees were construction laborers (53%), with plumbers and pipe fitters following next at nine percent. Most (58%) were killed while installing pipe.

6. **Nationalities/Fatalities**

Fifty-six percent of these fatalities were Hispanics, and 52 percent were foreign-born. For 44 percent, Spanish was their primary language. At least 30 percent had been working for their employer for less than a year, and most (59%) worked for a subcontractor.

7. **Union vs Nonunion**

Only six percent were union members. Since, nationwide, about 20 percent of construction work is union, the expected rate of union fatalities would be near 20 percent. The lower rate suggests that union jobs are safer, that supervisors and workers on union sites are better trained and that the union offers the kind of protection that workers need to speak up about safety issues on the worksite.

8. **Written safety/health program and safety training**

Just over half the employers had a written safety and health program, but, of these, only 40 percent covered trenching. Sixty-five percent provided no trench safety training. Most employers (71%) had never been inspected by OSHA, but 21 percent had been previously cited by OSHA for trench safety violations.

9. **Type of worksite/Company size**

About three in every four fatalities occurred at residential worksites. Most companies were small; 42 percent had fewer than ten employees. Though, typically, five or less workers were present on the site when the incident occurred, most of the projects (52%) involved contracts worth $100,000 or more.

PREVENTION

The following is a 10 Point Work Plan for Excavation and Trenching for managing and maintaining safe excavation work.

1. **Regulatory Requirements**

All employers must provide a workplace free of recognized hazards that may cause serious injury or death. As a supervisor you must understand and follow regulatory requirements for trenching and excavation work.

2. **Designate Competent Person/Persons**

A competent person is someone designated by the employer, who can identify existing and predictable hazards or working conditions which are hazardous or dangerous, and who is authorized to take prompt corrective measures to eliminate them.

3. **Determine Soil Type**

Excavation work is dangerous, and a hazard assessment must be done before any excavation or trenching work is started. This assessment begins by determining the type of soil. A competent person must determine the soil type using visual and manual tests.

The entire excavation site, including soil adjacent to the site, will be checked for tension cracks, indications of layered geologic structuring on the open side of the excavation, signs of bulging, boiling, or sloughing, as well as signs of surface water seeping from the side of the excavation or from the water table.

Moisture content also affects soil strength. Once opened, the moisture content of the soil begins to change almost immediately. This can affect the strength of the walls. The longer an excavation is left open the greater the risk is for cave-in.

4. **Identify and Remove Sources of Vibration**

Vibrations from nearby equipment, machines, vehicle traffic, and operations such as earth moving, compactions, pile driving, and blasting can all affect the stability of the excavation and contribute to the collapse of excavation and trench walls.

Place barricades to keep unnecessary equipment out of the excavation area

5. **Location of Spoil Piles**

Excavated soil, equipment and other material located next to an excavation puts pressure on the excavation’s walls and can lead to cave-in. It can also lead to equipment or soil falling into the excavation and onto workers.

Keep soil and equipment at least 1 meter (2 feet in the US) away from excavation and trench edges.

6. **Access and Egress**

Whether protected by sloping, boxes, or shoring, trenches must be provided with ladders so that workers can enter and exit safely. Ladders must:

- Be placed within the area protected by the shoring or trench box.
- Be securely tied off at the top.
- Extend above the shoring or box by at least 1 meter (3 feet).
- Be inspected regularly for damage.

7. **Protective Systems**

Designing a protective system requires consideration of many factors, including: soil classification, depth of cut, water content of soil, weather and climate, and other operations in the vicinity.

- Sloping and benching the sides of the excavation;
- Supporting the sides of the excavation; or
- Placing a shield between the side of the excavation and the work area.

8. **Preplanning**

Waiting until after the work starts to correct mistakes in shoring or sloping slows down the operation, adds to the cost of the project, and makes a cave-in or other excavation failure more likely.

Before preparing a bid, you should know as much as possible about the jobsite and materials needed to perform work safely and in compliance with safety standards. Factors to consider:

Traffic

- Proximity and physical condition of nearby structures
- Soil classification
- Surface and ground water
- Location of the water table
- Overhead and underground utilities
- Weather
- Quantity of shoring or protective systems that may be required
- Fall protection needs
- Number of ladders that may be needed
- Other equipment needs

9. **Inspections**

A competent person must inspect excavations, adjacent areas, and protective systems daily for possible cave-ins, indications of failures in protective systems and equipment, hazardous atmospheres, and other hazardous conditions.

Inspections must be done prior to the start of work and as needed throughout the shift and are required after natural events, such as rainstorms, or other hazard-increasing occurrences, such as blasting work.

10. **Training**

Any worker who has a part in any excavation work must be trained on the procedures and responsibilities they have for working safely in excavations and trenches. This includes the competent person, supervisors, equipment operators, and the workers down in the excavations.