

A pipe layer working in a trench for a general contractor in Texas, died when a trench wall gave way and he was fully engulfed in sand/dirt.

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SUMMARY

A 45-year-old, male pipe layer (the victim) died when a trench wall collapsed and he was fully engulfed in sand/dirt. Prior to the event the worker was operating a pipe bursting machine in an area of the trench protected by a trench box. For reasons that are unclear, the victim left the protection of the trench box and walked into an area that was not shored. As the victim stood in the unprotected area, a wall gave way and the sand/dirt engulfed the victim. Fellow workers immediately jumped into the trench and attempted to uncover the victim. Firefighters, upon their arrival entered the trench before adequate shoring was in place. As they attempted to rescue the victim a second wall collapsed. The victim was again covered by sand/dirt and two rescuers were trapped up to their knees. It was only after the second cave-in that rescue personnel decided it was not safe to continue rescue operations until adequate shoring was in place. Adequate shoring was put in place and the victim was then removed.

The TX FACE Investigator concluded that to reduce the likelihood of similar occurrences, employers should:

- * Require a competent person remain at the trench as long as a worker is in a trench.*
- * Develop a system of successively heavier penalties for violation of safe work practices.*
- * Perform a job safety analysis (JSA) to determine what hazards employees may encounter while performing their work.*
- * Develop an emergency action plan for employers and emergency responders that describes the rescue and medical duties to follow and insures that all employees and rescue personnel are knowledgeable of those procedures.*

INTRODUCTION

On March 20, 1998, a 45-year-old, male pipe layer (the victim) died when a trench wall gave way and the sand/dirt fully engulfed and suffocated him. The TX FACE program officer was made aware of the incident through a newspaper clipping on March 26, 1998. On April 8, 1998, the TX FACE program officer visited the employer. The safety director was interviewed. No other employees were available. No photographs or measurements could be taken because the trench had been covered prior to the investigation. EMS, fire department and autopsy reports were obtained.

The employer is a civil contractor specializing in water drainage and sanitation sewer work. The company employs 250 workers, 125 of whom are of the same occupation as the victim. The company has been in business for 43 years. At the time of the incident, there were five employees at the site.

The safety program has a designated safety director. There is a written safety program which addresses some aspects of excavation and trenching safety. Safe work procedures, specific to the various tasks employees must perform, are included in the safety program.

The company's training program includes a basic safety orientation. Safety meetings /refresher training are conducted on a weekly basis. Task-specific training is also conducted. Training is generally provided on the job.

The victim had been working for the company for one and a half years. According to a company official, the victim had more than 20 years of experience with the task being performed. In addition, the victim was also identified as a "competent person." A competent person meets specific criteria described in OSHA standard 1910.650.

INVESTIGATION

The employer was in the process of replacing an existing sewer line. Two excavations were made, one at each end of the sewer line. In this case, one trench was excavated approximately 20 feet long, 18 feet deep and six feet across. An eight by ten-foot long trench box coupled with eight feet wide, 16 feet long, quarter inch steel plates were used to provide protection for the victim. The steel plates were placed vertically along the trench walls and the trench box was placed inside the steel plates. This method provided shoring protection for 16 feet in both length and height.

A four-foot section of the trench was not shored for several reasons. This area was not considered a work area and no workers were expected to be in this area. There was also an existing water line and a gas line that projected out approximately two feet from the opposite end wall. The lines ran perpendicular to the trench. In addition just below the water and gas lines was wood shoring from a previous excavation that had taken place years before.

The method used to replace the sewer line eliminated the need to excavate the entire length of the line. A hydraulic rod pusher with a pipe burster attached was used in this process. The pipe burster attachment pushed/crushed the existing pipe into the soil. A new line was then attached and pulled back through. Once the new line was in place, the pipe burster was detached and the hydraulic rod pusher machine was lifted out of the hole. A backhoe was used to lift the machine out of the trench. The backhoe was positioned over a manhole at the end of the trench where there was no shoring. After the machine was lifted from the trench, the back hoe was left idling in its current position.

For an unknown reason the victim left the protection of the trench box and entered the area that lacked shoring. On previous jobs and also the day before this incident, the victim had been admonished by his supervisor for stepping outside the protection of the trench box. While the

victim was in the improperly shored area a side wall caved in and engulfed him in sand/dirt. The victim was covered over his head for seven to eight minutes according to a fire department report. Moments before the initial cave-in, the competent person left the immediate area and walked down to the other trench opening which was approximately 350 feet away.

Immediately after the cave-in fellow workers jumped into the trench and began to uncover the victim. Fire department personnel were dispatched and arrived two minutes later. Upon their arrival they observed the victim's head and neck were uncovered. Rescuers entered the trench and started to provide oxygen to the victim and shore the trench up with boards. Approximately 40 minutes into the rescue, the end wall without shoring gave way and covered the victim. The cave-in also covered the legs of the rescuers up to their knees resulting in an injury to one rescuer.

Fire department personnel then determined the trench was unsafe to enter. A determination was made that this was no longer a rescue operation but instead a body recovery operation. The employer was then ordered to obtain steel planks to use to shore the trench. This task was completed at 10:30 p.m. The victim was then removed and transported to a trauma center.

CAUSE OF DEATH

The autopsy report indicated the cause of death to be from asphyxia due to upper airway obstruction and external compression of the chest.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should require a competent person to remain at the trench as long as a worker is in a trench.

Discussion: In this case, the employer should have had two competent persons available at the job site due to the fact there were two separate trench openings 350 feet apart. A "competent person" must have specific training in and be knowledgeable about soil analysis, the use of protective systems, and the requirements of OSHA standards 1926.650, 651 and 652. The responsibility of a competent person is to ensure compliance with applicable regulations and to make those inspections necessary to identify situations that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres or other hazardous conditions, and then to insure that corrective measures are taken. Consistent with these goals, the competent person may perform other duties.

Recommendation #2: Employers should develop a system of successively heavier penalties for violation of safe work practices.

Discussion: The victim was known for having a "get the job done" attitude. Prior to this incident the victim had been admonished by his supervisor for stepping outside the protection of the trench box. The victim knew about the dangers because he had been trained as a competent person, therefore, he knew the risks involved. It must be made clear to all employees by supervisors that all safety regulations and instructions are expected to be followed just as

seriously as any other company directive. Safety measures are part of the requirements for performing jobs. Safety should be more cooperative than enforced. However, when employees' actions indicate they are not willing to act in the interest of their own safety, then disciplinary measures should be incorporated.

As a last resort, management should use a system of successively heavier penalties for safety violations. For example, the first clear and deliberate violation may bring an official reprimand; the second, a short layoff; the third dismissal (Grimaldi, Simonds, 1989).

Recommendation #3: Employers should perform a job safety analysis (JSA) to determine what hazards employees may encounter while performing their work.

Discussion: Development of a JSA forces those conducting the analysis to view each operation as part of a system. In so doing, each step in the operation is assessed while consideration is paid to the relationship between steps and the interaction between workers and equipment, materials, the environment, and other workers. Other benefits of a JSA include: identifying hazardous conditions and potential accidents, providing information with which effective control measures can be established, determine level of knowledge and skill as well as the physical requirements that workers need to execute specific tasks, and discovering and eliminating unsafe procedures, techniques, motions, positions and actions.

Recommendation #4: Employers should develop an emergency action plan for employees and emergency responders that describes the rescue and medical duties to follow and insures that all employees and rescue personnel are knowledgeable of those procedures.

Discussion. When the victim's coworkers first recognized that the victim was covered with dirt, their first reaction was to come to the aid of their fellow worker. Their reactions were driven by emotion and put their own lives in danger. Many injuries and deaths to rescuers, coworkers or emergency responders, are the result of forging ahead without stopping and assessing the situation. Following formal procedures in the event of an emergency situation such as this are essential in order to avoid further injury and to make sure that the lives of those performing the rescue are not also endangered.

To the extent feasible and practical, the employer should analyze job-sites for all foreseeable emergencies. A plan based on specific events should be developed. The plan should describe what actions to take, regarding rescue and/or first aid.

In the case of the emergency responders, a plan was in place. The plan states, "It is of utmost importance that no one enters trench until properly shored." These instructions were not followed because the emergency responders were focused on immediately attending to the victim. However, their actions put their own lives in danger because they were exposed to an improperly shored trench which eventually collapsed on them.

The plan should be reviewed to determine if it is still adequate and all emergency responders should become knowledgeable on the procedures.

REFERENCES

1. 29 CFR 1910.650, 661 & 652, Code of Federal Regulations, Washington, D.C.: U.S. Government Printing Office, Office of the Federal Register.
2. Grimaldi, J.V., Simonds, R.H. Safety Management, 5th ed. Homewood, IL: Irwin 1989