

## **Contract Worker Re-installing Sewer Line in Wyoming**

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### **SUMMARY**

A 39 year old male plumber's helper died from injuries incurred when a excavation collapsed while re-installing a sewer line at a construction site for a new home being built. The victim was in an un-shored, vertical-walled excavation, replacing a sewer pipe that had been installed nearly a week prior to the incident. While he was shovelling dirt above the pipe to prevent future breakage, a 2' x 3' concrete caisson/footer fell in the excavation along with the surrounding excavation wall, burying the victim to his knees with dirt, striking him in the abdomen, and pinning him to the remaining wall of the trench. The victim sustained severe internal injuries to the abdomen and pelvic area, and died the following day in the hospital.

Employers may be able to minimize the potential for occurrence of this type of incident through the following precautions:

- **Shore vertical wall excavations to OSHA standards**
- **Establish quality control procedures to minimize reworks**
- **Improve hiring practices for short-time workers**

### **INTRODUCTION**

On a Monday afternoon, May 11, 1992 a plumber's helper and a back hoe operator were replacing a sewer line that had been installed 6 days earlier. A septic tank had been installed the previous day, but was placed too high to allow proper flow from the house to the septic tank. A decision had been made to relay pipe from the house to attain proper flow. An excavation was being dug to expose the sewer line and a standpipe adjacent to the front porch of a new home under construction. The victim was in the hole, shovelling dirt around the existing pipe near the east edge of the hole to protect it from breakage, and the backhoe operator was watching from the northeast corner of the hole. At the southeast corner of the hole, at ground surface, was a concrete footing which was hidden from the workers by a large plywood piece. A wooden porch awning support with a drainpipe downspout attached was resting on, but not attached to, the concrete footing. Another hole had been dug slightly east of the excavation.

While the victim was in the hole, the piece of concrete became dislodged from under the plywood and rolled into the hole, bringing soil from the wall of the excavation, burying the victim up to his knees with dirt and pinning him at the abdomen between the rolling concrete piece and the north wall of the excavation.

The backhoe operator called to nearby sanitation workers to help, and they found that the victim's legs were pinned by the flat part of the concrete piece. Personnel at the scene had released the victim and pulled him to the surface of the hole by the time emergency services arrived. Fire rescue professionals found the victim balanced on a ground surface area between two excavations, with his feet dangling into one of the holes. The victim was in extreme pain, coherent, breathing well, and answering questions. His lower legs were discolored and he complained of severe pelvic and leg pain. Emergency personnel placed the victim on a backboard for transport 10' to a more stable area, where they applied oxygen and arranged for hospital transfer by ambulance.

## INVESTIGATION

Through a reciprocal notification agreement with the OSHA Administrator of the Wyoming Department of Employment, the WY-FACE Project was notified of this incident at 10:30 a.m. on May 14. Communications were initiated with first responders, hospital and law enforcement agencies, the county coroner and representatives of the company where the victim was employed. Photographs were taken, conversations were held with investigators and pertinent reports were requested.

The investigation showed that First responders were on the scene within two minutes of notification (an estimated seven minutes after the incident occurred), that ambulance personnel arrived within 12 minutes of notification, and that the victim was received at the hospital within 35 minutes of original notification (an estimated 40 minutes after the incident occurred). A co-worker had contacted nearby sanitation workers to help free the victim. They used a backhoe to remove the caisson and lift the victim from the hole. Ambulance personnel placed him on a backboard and took him to the hospital. The victim was alert, with normal breathing and heart rate, and complaints of pain in the pelvic and left hip and thigh areas. He was diagnosed as having multiple pelvic fractures and a retroperitoneal hemorrhage, and rapidly developed a pattern consistent with disseminated inter-vascular coagulation. Efforts to resuscitate the employee failed to maintain adequate blood pressure and, despite resuscitative efforts, the patient succumbed approximately 27 hours after the incident occurred.

The victim was a newly hired employee of an out-of-the-home plumbing sub-contractor for a new-home construction project. He had worked for the company for 6 days, and was on his final day of the project. History indicated the victim drank heavily, and that his drinking was known to his employer. The victim demonstrated a persistent cough and presence of severe Laennec's cirrhosis, but pre-transfusion blood samples detected no alcohol in his system at the time of hospital admission.

The task being conducted was to replace a sewer line that had been installed several days earlier. A septic tank installed a day prior was set too high to allow proper flow, and the line from the house to the tank was being replaced to compensate. The victim was working in 6' wide excavation with near vertical walls, near the foundation of new home construction. There was a 2' x 3' concrete caisson/footer buried near the ground surface with the front porch support resting on the caisson. A large piece of plywood on south side of hole covered the caisson. The proposed 8' excavation had been dug nearly to top of the existing sewer line. Another hole had been dug slightly to the east along the underground pipe line.

The victim was inside an un-shored, vertical-wall trench replacing the sewer line. He was working alone in a vertical wall trench. A co-worker was seated on a back-hoe outside the trench. The victim was shovelling dirt around a sewer line to protect it from breaking when digging the remainder of the trench, as instructed by the backhoe operator. The employer later said that the procedure should have been to

break up and dig out the pipe. Vertical walls were not shored. The backhoe operator was within visual and audio range. Two separate holes were dug along sewer line rather than a long trench. Vertical walls provided minimal escape opportunity.

The unfinished job was completed and the excavation filled in by the contractor about an hour after the victim was transported to the hospital, and prior to arrival by law enforcement, OSHA, or WY-FACE investigators. When investigators arrived, the hole had been filled and it was apparent that a septic system had been installed and the ground had been just recently graded. Evidence of the incident is reliant on first responder photographs and witness testimony.

## **CAUSE OF DEATH**

The Medical Examiner listed the cause of death as Multiple fractures from crushed pelvis.

## **RECOMMENDATIONS/DISCUSSION**

This incident could have been prevented through better quality control at the time of initial installation. If the tank had been installed correctly, reinstallation would have been unnecessary. The proximity of the standpipe to the porch support indicated a potential footing in the area. Workers may have been more aware of that possibility.

Worker was known by employer to have no background knowledge of plumbing or excavation, and to have a history of alcohol abuse. Both the worker/victim and the backhoe operator/supervisor were hired on a short-term basis for one project only. Better control could have been provided in hiring people for high-risk jobs. The victim's alcohol abuse may have contributed to the severity of the injuries received, or to his ability to quickly analyze and react to the danger involved. When the caisson fell, the victim reacted by trying to hold it back, rather than by scrambling away from it. More experienced judgment or better ability to assess danger might have provided for a different intuitive reaction.

The victim wore jeans and work boots, but was not wearing other personal protective gear. Such equipment may not have been a factor in regard to the injuries received.

OSHA Standards (29 CFR 1926.651 and .652) cover worker protection in excavations and trenches by requiring that walls & faces of excavations where workers are potentially exposed to danger from moving ground be guarded by a shoring system, safe ground sloping, or equivalent protection such as trench shields or boxes. None of these safeguards were present, although such safeguards might have prevented the incident or its severity.

Companies responsible for installation of sewer lines for new home construction should insure that sewer lines and septic tanks are properly installed before covering them up. In addition to the economic loss, rework often results in attitudinal and behavioral risk beyond the normal risk of the task itself.

Whenever excavations or trenches are used, employers and their workers should be aware of OSHA worker protection requirements for shoring, sloping walls, and trench shields. For the safety of the

workers involved, these regulations should be strictly adhered to, and contract agreements should cover such compliance requirements.

Care should be taken in high-risk jobs subjecting workers to excavation or trenches, on construction sites, and/or in close proximity to earthmoving equipment, to use safe hiring practices. Prior knowledge of alcohol and/or substance abuse and of a lack of experience in trenching operations should have caused the employer to either provide increased supervision or to not use the employee in this particular job.

There is an historical suggestion of underlying liver disease which may have contributed to the seriousness of the injury. The combination of the consumptive effects of a massive retroperitoneal hematoma and the underlying liver disease resulted in a continued bleeding state. Autopsy findings are that the cause of death is a result of a variety of pathophysiologic changes instigated by a massive crush injury to the pelvis and retroperitoneal hemorrhage superimposed on severe underlying Lannec's cirrhosis. While the death followed occupational injuries received, the death may not have resulted from those injuries under different circumstances.

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## **FATAL ACCIDENT CIRCUMSTANCES AND EPIDEMIOLOGY (FACE) PROJECT**

The National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR), performs Fatal Accident Circumstances and Epidemiology (FACE) investigations when a participating state reports an occupational fatality and requests technical assistance. The goal of these evaluations is to prevent fatal work injuries in the future by studying the working 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.

States participating in this study include: Georgia, Indiana, Kentucky, Maryland, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia.

NIOSH Funded/State-based FACE Projects providing surveillance and intervention capabilities to show a measurable reduction in workplace fatalities include: Alaska, California, Colorado, Massachusetts, New Jersey, Minnesota, Missouri, Wisconsin and Wyoming.

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Additional information regarding this report is available from:

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**Please use information listed on the Contact Sheet on the NIOSH FACE web site to contact In-house FACE program personnel regarding In-house FACE reports and to gain assistance when State-FACE program personnel cannot be reached.**