

Colorado FACE Investigation 91C0074

SUBJECT:

Sanitation worker dies when rescuing co-worker from underground sewer vault.

SUMMARY:

A 49-year old employee of a sanitation company died when he was overcome with hydrogen sulfide gas in an underground sewer vault.

Two sanitation workers were assigned to clean the vault that served as a junction box for converging sewer lines. Employee #1 entered the vault to scrape a bar screen located at the far end of the vault. The bottom of the vault was covered with approximately two feet of sewage. Shortly after entering the vault employee #1 fell to the ground unconscious. Employee #2 witnessed his co-worker fall out and entered the vault to assist. He was able to revive employee #1 and drag him to the base of the ladder. Employee #1 was then able to exit the vault unassisted. He then checked on employee #2 and observed that he was unconscious. He obtained assistance from a local company in calling 911 and a deputy sheriff, two ambulances, and the local fire department responded. Rescue workers entered the vault and extracted employee #2 and attempted to revive him. He was transported to a local hospital where he was pronounced dead. The workers did not have any personal protective equipment other than gloves and waders. The vault was not tested prior to entry nor was any ventilation supplied.

The Colorado Department of Health (CDH) investigator concluded that to prevent future similar occurrences, employers should:

- Develop and implement a comprehensive written confined space safety program.
- Provide lifelines and harnesses, and ensure that workers wear them when entering confined spaces.
- Provide air testing equipment and train employees on the proper use and maintenance of the equipment.

- Develop, implement, and enforce a written safety policy and safe work procedures designed to help workers recognize, understand and control hazards.

INVESTIGATIVE AUTHORITY:

The Colorado Department of Health (CDH) performs investigations of occupational fatalities under the authority of the Colorado Revised Statutes and Board of Health Regulations. CDH is required to establish and operate a program to monitor and investigate those conditions which affect public health and are preventable. The goal of the workplace investigation is to prevent work-related injuries in the future by study of the working environment, the worker, the task the worker was performing, the tools the worker was using, and the role of management in controlling how these factors interact.

This report is generated and distributed to fulfill the Department's duty to provide relevant education to the community on methods to prevent severe occupational injuries.

INVESTIGATION:

The investigation of this work-related fatality was prompted by a report from the Occupational Safety and Health Administration (OSHA) Area Office. The CDH investigation included interviews with the company owner and investigating officers. Reports were obtained from the county sheriff and the responding ambulance team and medical records were obtained from the treating hospital.

This company employs three people. The company did not have a safety officer or a written safety program. The company had been in business for seventeen years and the deceased had worked for the company for two years, eighteen months of which he had worked part-time. The company did not have any type of training program and no personal protective equipment was in use by the deceased on the day of the incident.

CAUSE OF DEATH:

The cause of death as determined by autopsy and listed on the death certificate as asphyxia secondary to exclusion of oxygen by hydrogen sulfide.

RECOMMENDATIONS/DISCUSSION:

Recommendation #1:Develop and implement a comprehensive written confined space safety program to address all provisions outlined in NIOSH publications 80-

106, "Working in Confined Spaces," and 87-113, "A Guide to Safety in Confined Spaces."

Discussion: Confined space entry procedures should be specific to each type of confined space; e.g. Valve vaults, wet wells, utility vaults, sewer manholes, etc. Employers should, therefore, develop, implement and enforce a confined space entry program as outlined in the recommended NIOSH publications. At a minimum, the following items should be addressed for each type of confined space:

1. Is entry necessary? Can the assigned task be completed from the outside?
2. Has a confined space safe entry permit been issued by the employer before each confined space is entered?
3. Are confined spaces posted with warning signs, and are confined space entry procedures posted where they will be noticed by employees and others? (e.g. Emergency Medical Personnel)
4. If entry is to be made, has the air quality in the confined space been tested for safety based on the following criteria:
 - Oxygen supply at least 19.5%
 - Flammability range less than 10% of the lower explosive limit (LEL)
 - Absence of toxic air contaminants?
5. Are workers and supervisors being continuously trained in the selection and use of:
 - respiratory protection
 - test equipment, including calibration and maintenance
 - lifelines
 - emergency rescue equipment
 - protective clothing?
6. Have workers been properly trained in working in and around confined spaces?
7. Are confined space entry, safe work practices, and rescue procedures discussed in safety meetings?
8. Is appropriate ventilation equipment available and/or used before and during entry and work?
9. Is the air quality monitored when the ventilation system is operating?
10. Is an outside observer posted and appropriate rescue equipment (safety belt/harness and lifeline) used during every confined space entry?
11. Are employees continuously trained in confined space rescue

procedures?

Recommendation #2: Provide lifelines and harnesses, and ensure that workers wear them when entering confined spaces.

Discussion: In this incident, employee #1 entered the confined space without any means of extraction. Had he been wearing a safety harness and a power winch been at the scene employee #2 (the deceased) could have assisted him when he first lost consciousness without entering the vault. A hoisting device designed for lifting humans will not subject the individual being lifted to crushing hazards. This is especially important if any part of the body becomes caught during an emergency lift (even though in this incident crushing injuries were not apparent).

Recommendation #3: Provide air testing equipment and train employees on the proper use and maintenance of the equipment.

Discussion: In this incident there was no air testing equipment provided. Had the air been tested the hydrogen sulfide/oxygen deficiency would have indicated the need for ventilation prior to entering the confined space.

Recommendation #4: Employers should develop, implement, and enforce a written safety policy and safe work procedures designed to help workers recognize, understand and control hazards.

Discussion: According to 29 CFR 1926.21(b)(2), employers are required to instruct each employee in the recognition and avoidance of unsafe conditions, and to control or eliminate any hazards or other exposure to illness or injury. In this and similar situations the employer may need to provide additional training to ensure that these employees understand the hazards and how to properly use safety equipment to protect themselves.

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