

Construction Worker Dies After Falling 20 Feet Through An Equipment Hatch Into a Sewage Pumping Station Wet Well

DATE: April 4, 1994

SUMMARY

On September 24, 1993 a 20 year-old male construction worker was killed after falling 20 feet into a wet well at the construction site of a sewage pumping station. The incident occurred while the victim and co-workers were removing mud that had collected at the bottom of a newly constructed sewage wet well. The victim was standing at the top of the wet well to guide a 50 gallon drum that was being lowered into an equipment hatch. As he was placing his foot against the drum, the chain holding the drum slipped off its supporting hook, causing the drum and the victim to fall into the wet well. NJDOH FACE investigators concluded that, in order to prevent similar incidents in the future, these safety guidelines should be followed:

- **Employers should ensure that all access and equipment hatches are protected with guard rails.**
- **Employers should ensure that employees have the proper equipment and training to perform a given task.**
- **Employers and employees should develop and implement a comprehensive safety program.**
- **Employers and employees should conduct a daily job hazard analysis of all work areas.**

INTRODUCTION

On September 30, 1993, NJDOH FACE personnel were informed of a fatal work-related fall from a newspaper article. After contacting the company and the incident site owner, FACE investigators conducted a site visit on November 17, 1993 to photograph the site and interview witnesses. Further information on the incident was gathered from the OSHA investigation file, the police and medical examiner's reports, and newspaper articles.

The employer was a general construction contractor who has been in business for 52 years and usually employed 10 to 25 workers. Although the company did not have a written safety program, the owner states that foremen receive OSHA safety training and hold weekly safety meetings. The victim was a 20 year-old male construction worker who had worked for the company for about 4 months.

INVESTIGATION

The incident occurred at the construction site of a new sewage pumping station that was being built to expand the capacity of an old pumping station. The company had been constructing the station for about a year and was nearing completion. The pumping station consisted of two large underground vaults, a wet well that was two levels deep and a dry well that was three levels deep. Entrance to the wet well was through two hatches located in the 13 by 22 foot cement slab that capped the top of the well. One hatch was a large 10 foot by 40 inch entrance hatch leading to a stairway down to the next level. The second was a smaller 40 by 40 inch equipment hatch. Both hatches were made of metal diamond plate that closed flush with the cement. Neither hatch was equipped with guard rails. The dry well was located a few feet from the wet well and had a small structure built on it to protect the pumps and electrical equipment from the elements. When in operation, raw sewage will enter the wet well where it will be screened and collected at the bottom. Pumps located in the dry well will then pump the sewage out of the wet well to a sewage line where gravity will move it to a treatment station.

The incident occurred on a clear Friday morning. With construction of the pumping station nearly completed, the company was cleaning up the site and was in the second day of removing mud that had collected in the bottom of the wet well. A crew of four worked at the task, consisting of an equipment operator and three laborers. The equipment operator ran a backhoe which was used to lower a 50 gallon drum to the intermediate (second) level of the wet well. The drum was suspended by a drum lifting device attached to several linked chains. These chains were joined at a heavy steel ring that fit over a large hook on the backhoe bucket (see diagram). After the water had been pumped from the well, a laborer at the bottom shoveled mud into a five gallon bucket and passed it to a second laborer on the intermediate level. This laborer emptied the mud into the drum. When the drum was full, the equipment operator raised the drum up to where a third laborer (the victim) guided it through the equipment hatch opening. The drum was then emptied and lowered back down into the well.

Using this method, the crew successfully lifted and dumped several drums of mud through the morning. At about 11:25 a.m., the equipment operator swung the empty drum to the hatch to lower it to the bottom. The victim, who was standing by the open hatch, put his right foot on or against the drum and was holding the chain as he guiding the drum down the equipment hatch. The chain then slipped off the backhoe bucket hook, causing the drum, chain, and victim to fall into the equipment hatch opening. The victim fell about 20 feet to the intermediate floor below, landing in a recessed trough. The site engineer, who was working in the nearby dry well, called 911 for help but was not able to reach the police until his third attempt. The police, ambulance, and paramedics arrived to find the victim unconscious with severe head injuries. He was carried out of the wet well and transported to the local hospital with CPR in progress. He was pronounced dead at the hospital at 12:02 p.m.

It was not determined precisely why the steel ring supporting the chains slipped off the backhoe hook. The angle of bucket may have been a factor as it directly affected the angle of the hook, possibly allowing it to slip off. The chains may have also shifted on the ring, causing the ring itself to shift and slip off the hook. The OSHA investigation did not find any fault with the hook, chains, or lifting device.

CAUSE OF DEATH

The county medical examiner attributed the cause of death to cerebral hemorrhages due to craniocerebral blunt trauma due to fall from a height.

RECOMMENDATIONS/DISCUSSIONS

Recommendation #1: Employers should ensure that all access and equipment hatches are protected with guard rails.

Discussion: In this situation, the hatch opening was not protected with a guard rail. Had a rail been in place, the employee could have guided the drum into the opening without placing himself at risk. It should be noted that the use of floor opening covers and guard rails is required under the federal OSHA standard 29 CFR 1926.500(b)(1) thru (9).

Recommendation #2: Employers should ensure that employees have the proper equipment and training preform do a given task.

Discussion: It is not known why the chain holding the drum detached from the backhoe. This not only contributed to this incident but could have also seriously injured a worker standing under the falling drum. It is recommended that employers ensure that the proper equipment is used for a given task and that the equipment is in good condition before using it. Employees should also be trained in using this equipment. In this case, a "mousing" (a device that allows the hook to close like a shackle) would have prevented the ring from slipping off the hook. Redundant systems may also be considered, such as using a second chain to carry the load if the first chain fails.

Recommendation #3: Employers and employees should develop and implement a comprehensive safety program.

Discussion: It is recommended that employers should emphasize worker safety by developing and implementing a comprehensive safety program to reduce or eliminate hazardous situations. This program should include appropriate worker safety training to help reduce or eliminate hazardous situations. Records should be kept of any training conducted.

Recommendation #4: Employers and employees should conduct a daily job hazard analysis of all work areas.

Discussion: Due to the variety of hazards at construction sites, it is recommended that contractors should conduct a job hazard analysis of the work areas with their employees. A job hazard analysis should examine all work areas for fall, electrical, chemical, or other hazards the workers may encounter. After identifying any hazards, the employees should be instructed by the foreman on how to correct or avoid them.

REFERENCES

Code of Federal Regulations 29 CFR 1926, 1991 edition. U.S. Government Printing Office, Office of the Federal Register, Washington DC.

ATTACHMENTS

Job Hazard Analysis. OSHA 3071, US Department of Labor, Occupational Safety and Health Administration, Washington DC. 1988.

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