

Sewage Treatment Plant Worker Dies After Falling 12 Feet Through a Floor Opening

DATE: September 1, 1993

SUMMARY

On May 13, 1993 a 51 year-old male sewage treatment plant worker was critically injured after falling 12 feet through a floor opening where he was using an overhead hoist to move materials to the basement of a plant building. The incident occurred after the victim and a co-worker had completed hoisting a pallet jack from the basement of the building. The victim was returning the hook of the hoist into the building when he backed into the floor opening and fell into the basement. He died of his injuries on May 15, 1993, two days after the incident. NJDOH FACE investigators concluded that, in order to prevent similar incidents in the future, these safety guidelines should be followed:

- **Employers and employees should ensure that the floor gate door openings are always provided with guard rails when the doors are opened. The floor gate doors should also be closed immediately when access is no longer needed.**
- **The employer should consider additional guarding and design modifications for the hoist and loading dock area.**
- **Employers should conduct a job hazard analysis of all work activities with the participation of the workers.**
- **Employers should develop, implement, and enforce a comprehensive safety program with the assistance of a joint labor/management safety committee.**

In addition, to prevent possible electrical incidents;

- **The employer should immediately take all overhead hoists out of service and inspect them for electrical malfunctions.**

INTRODUCTION

On May 15, 1993, the New Jersey Department of Labor (NJDOL) Public Employees Occupational Safety and Health (PEOSH) Program informed NJDOH FACE investigators of a serious work-related fall. On May 17, 1993, the NJDOL PEOSH Program informed us that the victim had died of his injuries. NJ FACE investigators conducted a site visit on May 18, 1993 to examine the incident site and to interview the employer and a witness. Further information was derived from the PEOSH Program and medical examiner reports.

The employer was a municipal sewage treatment plant that has been in existence since 1920 and employed 12 workers in a two shift operation at the time of the incident. The treatment plant became a utility about four years ago and services five neighboring municipalities. The victim was a 51 year-old

maintenance repairman who had been working at the plant for 29 years. He had worked at his current position for 24 years.

INVESTIGATION

The incident occurred in the plant's digester building where sewage is separated into sludge. This building was completely renovated three years ago, a renovation that included installing an overhead hoist at the rear of the building. This hoist was an electrically operated, 440 volt winch which travelled along a horizontal I beam suspended about ten feet above the floor. The hoist moved outdoors through a set of double "dutch" (two section) doors to the rear loading dock of the building. The hoist was operated by a hand-held pendulum controller attached to a retracting cable reel with enough cable to stretch outside the double doors. Inside the building, a set of steel double doors had been installed in the floor to allow materials to be hoisted in and out of the basement. The floor opening measured 6' 4" by 6' 4" and had been installed at the site of a old floor opening that had been covered by a metal grate. The area around the doors was cramped, with only 4' 2" of space between the edge of the floor opening and the doors leading to the loading dock. Portable safety rails were available for the floor opening, but could not be used while the hoist was in operation as the low ceiling prevented loads from being lifted over the rails.

The day of the incident was a clear Thursday morning. As usual, the victim and his co-worker arrived at work at 7 a.m. and worked separately until 9 a.m. when they took their break. Several other employees were also working at other areas of the plant. After their break, the two workers needed a pallet jack to move a pallet of equipment. The jack was stored in the basement of the digester building where it was used to move pallets of materials. While the co-worker went down the stairs to the basement to get the pallet jack, the victim stayed on the first floor to open the floor gates and operate the hoist. The two successfully raised the jack from the basement and moved it outside, where the victim operated the hoist while standing on the raised platform of the loading dock. The co-worker stood below him on the loading dock where he stabilized the jack as it was lowered to the pavement and disconnected the hoist hook.

At about 9:30 a.m., the victim started to move the hoist back into the building. The co-worker saw that that wind was closing the top section of the double doors and warned the victim, who pushed the doors open and continued moving the hoist back inside the building. The co-worker then climbed the steps to the loading dock platform. As he reached the top, he glimpsed the victim falling into the floor opening, striking a light fixture as he fell into the basement. He immediately went to his aid and found him unconscious but breathing. The co-worker went to another building to call for help and was assisted by several other workers, one of whom was an emergency medical technician (EMT). The EMT started first aid while the others helped shuttle first-aid supplies from the first aid cabinet. The police and EMS arrived and transported the victim to a nearby park where he was med-evaced to the regional trauma center, located in the next state. He died at the trauma center on May 15, 1993, two days after the incident. The FACE investigation could not determine the exact reason why the victim fell into the opening. It was noted that the area was cramped for space and it is possible that the victim fell while trying to move the hoist clear of the doors. A worker at the plant stated that he had received an electric shock from a similar hoist at another plant building and thought there might be a connection to this incident. A FACE investigator examined the hoist at the incident site and found a ground fault on the controller and the hoist. The plant electrician checked the equipment with a voltmeter and found an intermittent 100 volt charge on the hoist. No voltage was detected on the controller.

CAUSE OF DEATH

The county medical examiner attributed the cause of death to severe head injuries received in a fall.

RECOMMENDATIONS/DISCUSSIONS

Recommendation #1: Employers and employees should ensure that the floor gate door openings are always provided with guard rails when the doors are opened. The floor gate doors should also be closed immediately when access is no longer needed.

Discussion: In this situation, the victim was apparently unaware how close he was to the floor opening and fell into it while walking the hoist into the building. To prevent this, it is recommended that the portable guard rails should always be used when the floor gate doors are opened. (If this is not practical with the present guard rails, new rails that can be moved easily should be purchased). The floor opening doors should also be closed as soon as access is no longer needed, i.e. as soon as the hoist has been moved clear of the floor opening.

Recommendation #2: The employer should consider additional guarding and design modifications for the hoist and loading dock area.

Discussion: The FACE investigation found a number of factors that may have contributed to the incident. The area around the floor opening was cramped for space, making it difficult to around move when the doors were open. The double "dutch" doors to the outside were allowed to swing freely, which could bump or distract a worker. Also, the pendulum controller stretched directly over the floor opening, which could lead a worker to follow it back into the opening or interfere with the moving hoist. It is recommended that additional guarding and design modifications should be made to correct these problems, such as moving the pendulum controller to the side of the opening. Due to the nature of the environment, it may be necessary to consult a safety specialist to properly design an effective safety system.

Recommendation #3: Employers should conduct a job hazard analysis of all work activities with the participation of the workers.

Discussion: Due to the variety of hazards at sewage treatment plants, it is recommended that employers conduct a job hazard analysis of the work area with the employees. A job hazard analysis (as described in the attached OSHA publication) should examine all work areas for fall, electrical, chemical, or other hazards the workers may encounter. After identifying the hazards, the employees should be instructed on how to correct or avoid them.

Recommendation #4: Employers should develop, implement, and enforce a comprehensive safety program with the assistance of a joint labor/management safety committee.

Discussion: The employer did not have a written safety program or have a joint labor/management safety committee. It is recommended that employers should emphasize worker safety by developing, implementing, and enforcing a comprehensive safety program to reduce or eliminate hazardous situations. This program, as developed with the assistance of a joint labor/management safety committee, should include the recognition and avoidance of hazards identified by the job hazard analysis and include appropriate worker safety training. Records should be kept of any training conducted.

In addition, to prevent possible electrical incidents from the ground faults found in the hoist mechanism;

Recommendation #5: The employer should immediately take all overhead hoists out of service and inspect them for electrical malfunctions.

Discussion: The digester building hoist was found to have a ground fault that intermittently energized the hoist with 100 volts. This was apparently caused by painting the hoist I-beam that also served as the hoist's electrical ground. Although there is no evidence that this was a factor in the incident, all hoists of this type should be immediately taken out of service, inspected, and repaired by a licensed electrician.

REFERENCES

Code of Federal Regulations 29 CFR 1926, 1991 edition. U.S. Government Printing Office, Office of the Federal Register, Washington DC. pg 188

ATTACHMENTS

1. Job Hazard Analysis. OSHA 3071, US Department of Labor, Occupational Safety and Health Administration, Washington DC. 1988.
2. Safety and Health Manual for Sewer and Water Supply Employees. District Council 37 & New York City Department of Environmental Protection, 125 Barclay Street, New York NY.
3. Guide to Effective Joint Labor/Management Safety & Health Committees. NJ Department of Health, Public Employees Occupational Safety and Health Program, Trenton NJ.
4. Information Bulletin: Joint Labor/Management Safety & Health Committees. NJ Department of Health, Public Employees Occupational Safety and Health Program, Trenton NJ.

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