

NJ FACE INVESTIGATION REPORT



Fatality Assessment & Control Evaluation Project

FACE 03-NJ-010

April 6, 2004

Construction Worker Struck and Killed by a Pile Falling From a Crane

On February 4, 2003, a 35-year-old construction worker died when a 2,000-pound steel pile being raised by a crane fell and struck him. The incident occurred at the construction site of a new concrete bridge replacing an old timber bridge that spanned a reservoir in a residential community. The construction required driving piles (wood or steel columns) into the soft mud and earth near the lakeshore to provide a solid base for constructing the bridge. On the day of the incident, the crew was preparing to drive a test pile when a rainstorm interrupted work. It rained only a short time, and the crew returned to work. Following his usual procedure, the operator tested the crane before starting to raise the pile. The crane line lost tension as the pile was lifted, causing a series of events that severed the nylon choker slings holding the pile. The pile fell, striking the victim who was standing nearby to position a compressed air hose. NJ FACE investigators recommend following these safety guidelines to prevent similar incidents:

- **Employees should stand clear of the pile driver as the pile is raised into the leads.**



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INTRODUCTION

On February 5, 2003, a county Medical Examiner notified NJ FACE staff of the death of a worker killed in a work-related incident involving a crane. The next day, a FACE investigator went to the incident site and found no one working at the site. The investigator photographed the site and returned to the office to contact the company. On February 14, 2003, FACE investigators interviewed a company representative and the engineer contracted by the county to oversee the project. Investigators then briefly examined and photographed the incident site. Additional information was obtained from the police report, the medical examiner's report, and the OSHA investigation file.

The victim's employer was a heavy construction contractor that specialized in earthworks and utility projects (SIC 1611). The company has been in business since 1955 and employed 120 field laborers and 40 office workers during peak construction periods. The company has an extensive safety program, including toolbox meetings and an organized safety committee that meets every other month. The victim was a 35-year-old white male employed as a journeyman dock builder with the company. This was his fourth bridge project with the company. He was hired from the local union hall by request due to his experience with the company. Although hired on this job as a laborer, he also had experience as a company foreman on previous jobs. The victim was unmarried and is survived by his nine brothers and sisters.

INVESTIGATION

The incident occurred at the construction site of a bridge in a small suburban community. The county government was replacing an old timber bridge that spanned a reservoir in the area. According to a neighbor, the bridge was being replaced following a fatal motor vehicle accident in which a motorist crashed through the bridge and into the water. The county put the project up for bid, and the victim's company was awarded the project. The old bridge was still in service when work started in November, 2002. The project was planned to be completed in July, 2003.

As part of the construction project, the company was driving piles into the lakebed to provide a support structure for the bridge abutments. A crane-supported pneumatic pile driver was used to



Photo 1
Pile driver leads, hammering mechanism,
and pneumatic air hose

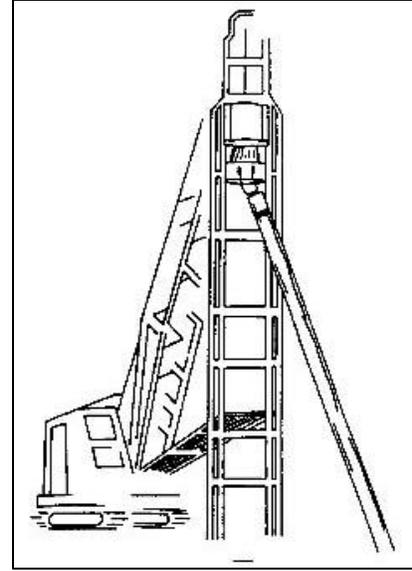


Figure 1
Illustration of pile being
raised into the leads

sink the piles. This device used air pressure to raise and drop an 11,200-pound hammer onto a pile, driving it into the ground much like a carpenter would hammer a nail into wood. The hammering mechanism moved on steel tracks called leads (see Photo 1). The leads, which were longer in length than the piles, were lifted vertically into position with a crane over the area where the pile was to be driven. The bottom of the leads had an anchor that sank into the ground, holding it in place. To raise a pile into the leads, the crane operator first lowered the hammering mechanism close to the ground where a worker would attach chokers (flat nylon straps) to the hammer. The chokers were slung around the top of the pile, which was lying on the ground nearby. As the hammer was raised back up, the pile was lifted with it until it was fully upright in the leads (see Figure 1). The hammering mechanism was started, and the machine repeatedly raised and dropped the hammer on the top of the pile, driving it into the ground. Several different types of piles were used at the site, including steel, sheet metal, and timber piles. To determine how deep to sink the piles, the company first drove smaller test piles before using the main 18-inch-diameter piles. The test piles were 40-foot-long, 12-inch-diameter steel pipe piles that weighed approximately 2,000 pounds.

The incident occurred on Tuesday, February 4, 2003, a winter day with temperatures in the 40's. At 6:30 a.m., a crew of eight workers arrived and started work on driving piles to create the foundation for



Photo 2

**Piles: steel pipe pile in water,
sheet pile to right**

the new bridge abutment, an operation requiring about 60 piles to complete. At this point, the project was about 25 percent completed. The crew worked through the early morning without incident, driving three 18-inch-diameter main piles into the ground. At 10:30 a.m., they were driving a 12-inch test pile when it started to rain. The crew shut down operations and took shelter in the tool shed for 45 minutes until the rain stopped. According to company procedure, it was the responsibility of the crane operator to decide if work was to continue after the rain. The operator had a great deal of experience, having worked with cranes since 1955 and with this crane for the previous four years. He returned to “exercise” the crane, going through a series of dry-runs to

check the crane and test its brakes. He did this by raising and lowering the hammer 10 to 12 times over a ten-minute period before determining that the machine was working correctly. At approximately 11:30 a.m., the crane operator gave the OK and the crew went back to work. The crane operator swung the pile driver over to a 12-inch-diameter steel test pile and lowered the hammer. The victim and a co-worker rigged the pile to the hammer with two new 12-foot-long, 3-inch-wide nylon chokers, each rated for 7,000 pounds. Standing near the shore on a small floating platform, the victim guided the compressed air hose leading to the pile driver hammer as the crane operator raised the hammer and pile up into position. Once the pile was in the leads, the crane operator lifted the whole assembly a few feet off the ground and started to swing it into position. As he was doing this, the crane line that supporting the hammer mechanism slipped and went slack, causing the hammer to fall against the nylon chokers holding the pile. This pinched and severed the straps holding the 2,000-pound steel pile. The pile fell, striking the victim who had turned away from the crane.

The victim was immediately knocked unconscious and fell into the 18-inch-deep water. Co-workers went to his aid as the supervisor called 911 for help. Lifting the victim’s head out of the water, the co-workers prepared to do CPR when they saw that he was breathing. The police arrived in about four

minutes, and the fire department and EMS arrived in about 8 minutes. The victim was transported to a New Jersey Level Two Trauma Center where he was treated for head, chest, and abdominal trauma. Despite treatment, the victim succumbed to his injuries and died at 5:30 p.m. that day.

The cause of the crane line failure was not determined. A company mechanic immediately inspected the crane and found nothing wrong, a finding that was confirmed when the company had the crane examined by a crane inspection service. OSHA investigated the incident and did not issue any citations, noting that the loads were within the crane's 180,000-pound capacity and that the operator had properly exercised the machine after the rainstorm.

RECOMMENDATIONS/DISCUSSIONS

Recommendation #1: Employees should stand clear of the pile driver as the pile is raised into the leads.

Discussion: In this incident, the victim was standing near the pile with his back turned when the pile fell from the leads. To prevent future incidents, NJ FACE recommends that all workers stand clear of the pile driver when piles are raised into position. The distance should be at least the length of the pile. If circumstances require the worker to stay in the perimeter, the worker must remember to watch the pile and leads at all times and have an escape path available.

RECOMMENDED RESOURCES

It is extremely important that employers obtain accurate information on health, safety, and applicable OSHA standards. NJ FACE recommends the following sources of information which should help both employers and employees:

U.S. Department of Labor, Occupational Safety & Health Administration (OSHA)

Federal OSHA will provide information on safety and health standards on request. OSHA has several offices in New Jersey that cover the following counties:

☎ Hunterdon, Middlesex, Somerset, Union, and Warren counties.....(732) 750-3270

☎ Essex, Hudson, Morris, and Sussex counties.....(973) 263-1003

☎ Bergen and Passaic counties.....(201) 288-1700

☎ Atlantic, Burlington, Cape May, Camden, Cumberland, Gloucester,

Mercer, Monmouth, Ocean, and Salem counties.....(856) 757-5181

🌐 Federal OSHA Website: www.osha.gov

U.S. Department of Labor, Mine Safety & Health Administration (MSHA)

Federal MSHA regulates safety and health in metal and non-metal mines. The MSHA website has a great deal of useful safety and health information including detailed reports on fatality investigations.

New Jersey mines are under the jurisdiction of the Wyomissing PA field office.

☎ Telephone: (610) 372-2761

🌐 Website: www.msha.gov

NJ Public Employees Occupational Safety and Health (PEOSH) Program

The PEOSH act covers all NJ state, county, and municipal employees. Two state departments administer the act; the NJ Department of Labor (NJDOL), which investigates safety hazards, and the NJ Department of Health and Senior Services (NJDHSS) which investigates health hazards. PEOSH has information that may also benefit private employers.

NJDOL, Office of Public Employees Safety

☎ Telephone: (609) 633-3896

🌐 Website: www.nj.gov/labor/lse/lspeosh.html

NJDHSS, Public Employees Occupational Safety & Health Program

☎ Telephone: (609) 984-1863

🌐 Website: www.state.nj.us/health/eoh/peoshweb

NJDOL Occupational Safety and Health On-Site Consultation Program

Located in the NJ Department of Labor, this program provides free advice to private businesses on improving safety and health in the workplace and complying with OSHA standards. ☎ Telephone: (609) 984-0785

🌐 Website: www.nj.gov/labor/lse/lsonsite.html

New Jersey State Safety Council

The NJ State Safety Council provides a variety of courses on work-related safety. There is a charge

for the seminars.

☎ Telephone: (908) 272-7712.

🌐 Website: www.njsafety.org

Internet Resources

Other useful internet sites for occupational safety and health information:

www.cdc.gov/niosh - The CDC/NIOSH website.

www.dol.gov/elaws -USDOL Employment Laws Assistance for Workers and Small Businesses.

www.nsc.org - National Safety Council.

www.state.nj.us/health/eoh/survweb/face.htm - NJDHSS FACE reports.

www.cdc.gov/niosh/face/faceweb.html - CDC/NIOSH FACE website.

REFERENCES

Field Manual 5-134, Pile Construction. US Department of Army Publication FM 5-134, April 1985, Washington DC.

DISTRIBUTION LIST

NIOSH

Employer

Incident Site Owner

Labor Union(s)

NJ State Medical Examiner

County Medical Examiner

Local Health Officer

NJDHSS Occupational Health Service Internet Site

NJDHSS Census of Fatal Occupational Injuries (CFOI) Project

Fatality Assessment and Control Evaluation (FACE) Project
Investigation # 03-NJ-010

Staff members of the New Jersey Department of Health and Senior Services, Occupational Health Service, perform FACE investigations when there is a report of a targeted work-related fatal injury. The goal of FACE is to prevent fatal work injuries by studying the work environment, the worker, the task and tools the worker was using, the energy exchange resulting in fatal injury, and the role of management in controlling how these factors interact. FACE gathers information from multiple sources that may include interviews of employers, workers, and other investigators; examination of the fatality site and related equipment; and review of OSHA, police, and medical examiner reports, employer safety procedures, and training plans. The FACE program does not seek to determine fault or place blame on companies or individual workers. Findings are summarized in investigation reports that include recommendations for preventing similar events. All names and other identifiers are removed from FACE reports and other data to protect the confidentiality of those who participate in the program.

NIOSH-funded state-based FACE Programs include: Alaska, California, Iowa, Kentucky, Massachusetts, Michigan, Minnesota, Nebraska, New Jersey, New York, Oklahoma, Oregon, Washington, West Virginia, and Wisconsin. For further information, visit the NJ FACE website at www.state.nj.us/health/eoh/survweb/face.htm or the CDC/NIOSH FACE website at www.cdc.gov/niosh/face/faceweb.html.

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