

# NJ FACE INVESTIGATION REPORT



*Fatality Assessment and Control Evaluation Project*

FACE 98-NJ-047-01

February 26, 1999

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## Worker Suffocated When Engulfed in a Sand Hopper

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### *SUMMARY*

On June 6, 1998, a 56 year-old worker died when he was engulfed by sand in a hopper at a concrete pipe manufacturing company. His job as a “material man” was to direct the flow of sand and gravel from storage bins to hoppers housed in a shed on top of the plant. Since there was only one conveyor that moved sand and gravel from storage bins to the shed, the material man had to enter the shed and manually operate a lever that controlled the flow of sand or gravel into the correct hopper. He entered the 17 foot deep hopper filled with sand, perhaps by falling, was engulfed, and suffocated. FACE investigators concluded that in order to prevent similar incidents, the following safety guidelines should be followed:

- The employer should develop, implement, and enforce a permit-required confined space entry program.
- The employer should conduct a job hazard analysis; policies and training should be implemented based upon the findings of the evaluation.
- The employer should consider establishing a joint labor/management safety and health committee.



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## ***INTRODUCTION***

This work-related fatal injury was reported to the NJDHSS FACE staff on June 8, 1998 by a federal OSHA area safety supervisor. It was initially thought to be a machine-related fatality. A joint site visit was conducted on June 11 with the OSHA compliance officer, who had also inspected the plant two years before the fatal injury. (Another OSHA compliance officer responded to the site on the day of the incident.) FACE staff were present during interviews of the company managers, the corporate health and safety manager, and two co-workers. The site was viewed and photographs were taken. Further information was received from the medical examiner, police report, and OSHA.

The employer was a concrete pipe manufacturing company, located in a rural area, that employed 39 workers. The company had been in business at the present site for more than thirty years. The shop workers were unionized. The company was owned by a larger conglomerate, which employed the health and safety manager. The health and safety manager served three plants and was in charge of safety, health, and environmental issues for each. He visited this plant about once each month.

The plant had been inspected by OSHA in 1996 and was cited for violations of the permit-required confined space standard. At that time, the OSHA compliance officer identified ground-level sand and gravel hoppers as permit-required confined space areas. The company had presented OSHA with a written plan on how they would implement a procedure to deal with permit-required confined space entry and rescue. However, the plan was never implemented.

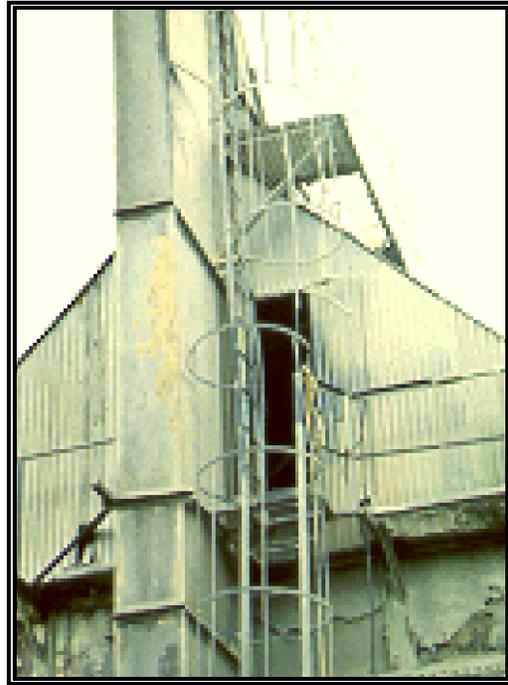
There were two areas of the plant that manufactured concrete pipes. The back section, in which the victim was employed, made pipes of four to five foot diameter and operated six days a week. The front section produced smaller diameter concrete pipes.

Sand and gravel were brought to the company by truck and dumped either in outdoor storage bins or directly into large holding bins covered with steel rebar. One bin held gravel and one held sand. As needed, a front end loader moved the sand from the outdoor storage bins to the holding bins. These fed a step conveyor/elevator that moved the sand and gravel up and above an elevated shed or "change-over" room. The sand or gravel was dumped from the conveyor down into loading hoppers, each about 17 feet deep and measuring eight by ten feet, located in the change-over room. One hopper held sand and two held gravel. The sand hopper had a capacity

of 40 to 50 tons of sand. From the loading hoppers, the material flowed down chutes (two for gravel and one for sand) to the mixing room. Workers there controlled the flow of sand and gravel and weighed them in weigh-up hoppers before the material went on to the mixers. There the sand, gravel, and water were mixed and agitated and the resulting concrete was poured into molds for the pipes. It was usual to drop 3000 pounds of sand followed by 2480 pounds of stone about every 15 minutes. They usually made about 8 to 10 batches per hour and about 100 tons of product per day. During the weekend, they made about 4 batches per hour. The poured concrete pipes were finally moved to a climate-controlled curing room where the concrete hardened.



Back of plant, ladder leading to the door of the change-over room.



Door of change-over room containing the hoppers.

The change-over man, or material man, controlled alternating the movement of sand and gravel to the conveyor from the storage bins in the yard. He controlled the supply of materials based on the level in the outside hoppers. Because one conveyor supplied both sand and gravel to the changeover room, it was necessary for the material man to climb up the ladder to the change-over room and manually activate a lever that controlled the flow of material into the appropriate hopper. During a normal work day it was necessary to do this about eight to ten times.

The worker in the change-over room did not know when the mixer in the weigh-up room would open a chute. The worker releasing sand from the chute at the bottom of the sand hopper had no way of communicating with a worker in the change-over room or of hearing him.

### ***INCIDENT***

On the day of the fatality, a few of the twenty workers started work at 6 a.m.. Others, including the victim, started at 7 a.m.. He was working Saturday for overtime. During the regular work week he drove a forklift truck but on Saturdays he was given his choice of which job to do. Since he was the senior man who had been with the company for 27 years, he had the first choice. He always chose to do the “change-over.” This had been his regular job until five years prior to the fatality.

The victim was last seen around 9:15 a.m., climbing the ladder to the change-over room. Although one worker reported that the loading hoppers were full from the night before, he may have climbed up to the loading hoppers to “change over” from one material to the other. This involved climbing the fixed ladder, walking across an exterior catwalk with no midrail, and entering the “change-over room” that enclosed the hoppers. In order to activate the lever and regulate inflow of sand or gravel, he would have walked on a 2 inch by 10 inch wooden plank and stood on a 6 foot unsecured ladder to reach the handle that controlled the flow of material from the conveyor. The ladder rested on the wooden plank.

Around 10 a.m., a worker in the mixing room was releasing sand from the chute at the bottom of the sand hopper. When only a little sand came out he investigated and saw a man’s shoe in the sand. He initially thought it was an old shoe that had gotten into the load; finding debris in the materials was not unusual. As he tried to remove it, he saw that the shoe was worn by a person and immediately realized who it was. He called for help and he and their foreman quickly climbed up to the change-over room and tried to rescue the victim by going into the sand hopper to dig him out. One other worker assisted them with the digging. They were unable to free the victim but workers in the mixing room pulled the victim out of the chute, which had an opening of only 11 by 18 inches. The victim dropped down into the weigh-up hopper. His co-workers entered the hopper, lifted the victim out, and placed him on the floor. Police and emergency workers had now arrived at the site and they administered CPR (cardio-pulmonary resuscitation). The victim was pronounced dead at the scene.

The company managers contacted the crisis counseling unit at the local hospital and counseling was offered to workers three days after the incident.

Since there were no witnesses, it is not known if the victim fell into the sand in the hopper or how he may have gotten into it. When the police examined the scene, they noted that there was a fine coating of undisturbed sand on the two wooden planks in the change-over room. There were no marks on them that indicated that the planks had been touched or grabbed. The ladder showed no signs of being moved. They found a hammer on top of the ladder. The control lever was positioned so the loading chute would direct the flow of material into the sand hopper. Both hoppers were filled with materials.

### ***CAUSE OF DEATH***

The medical examiner determined that death was caused by suffocation due to being buried in a sand hopper.

## ***RECOMMENDATIONS/DISCUSSIONS***

***Recommendation #1:*** The company should develop, implement, and enforce a permit-required confined space entry program.

Discussion: According to 29 CFR 1910.146, a permit-required confined space is a confined space that has one or more of the following: 1) contains or has a potential to contain a hazardous atmosphere; 2) contains a material that has the potential for engulfing an entrant; 3) has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or 4) contains any other recognized serious safety or health hazard.

The change-over room at this plant was a permit-required confined space because it contained sand and gravel that had the potential for engulfment and had 17 foot bins with sloping walls, tapering to smaller chutes. A ground-level sand and gravel hopper was identified as a permit-required confined space during an OSHA compliance officer's inspection of the plant in 1996. At that time, the compliance officer was unaware of the hoppers in the change-over room. No permit-required confined space entry program was initiated although the company reported to OSHA that they would do so. Permit-required confined spaces were not identified, worker training was not done, the program was not implemented, and provisions were not made for worker rescue.

When the untrained workers entered the sand hopper in their attempt to rescue the victim, they unknowingly endangered their own lives. It is not unusual for rescuers to die in the same confined space as the original victim. Maintenance workers periodically entered the shed to repair holes in the walls between the hoppers. Occasionally, the material men also did repairs to the hoppers.

***Recommendation # 2:*** The employer should conduct a job hazard analysis; policies and training should be implemented based upon the findings of the evaluation.

Discussion: An OSHA plant-wide inspection revealed many safety and health hazards, including confined spaces, electrical hazards, fall and trip hazards, and lack of a lockout/tagout program. Also, a change-over room, similar to the one involved in the fatality, existed in the front of the plant. The company had not recognized the danger that existed there.

A job hazard analysis (JHA) should be done to evaluate the tasks that workers must perform, determine existing or potential hazards, and design procedures on ways to eliminate or avoid the

hazards. Foremen and workers should be included in the evaluation. The labor union that represents the shop workers should also be involved in the job hazard evaluation and should be actively involved in safety and health issues in the plant.

The employer should develop a training program for workers based on the results of the JHA. As the JHA is reviewed and revised, workers should be retrained on the revisions. The employer should also include hazard recognition as part of the employees' training. Since training cannot cover every situation in which a worker may find himself, hazard recognition is a skill that would be applicable to any usual or unusual situation. Periodic re-training and updates on new procedures and equipment will be necessary.

To eliminate the need to enter the change-over room, the company has installed an automated system which allows the material man to direct the flow and storage of materials without entering the elevated shed. A barrier has been erected in the shed to prevent a worker from falling into the hoppers.

***Recommendation # 3:*** The employer should consider establishing a joint labor/management safety and health committee.

Discussion: A committee composed of members from labor (including the union) and management can be beneficial for all concerned. Health and safety issues can be discussed and plans made on how to address them. A joint labor and management committee would foster a heightened awareness of safety and promote a healthy workplace. A safer workplace may be a more productive workplace.

## ***ATTACHMENTS***

Job Hazard Analysis, U.S. Department of Labor, Occupational Safety and Health Administration, 1988, # 3071

## ***REFERENCES***

29 CFR 1910.146, Permit-required Confined Spaces, U.S. Government Printing Office, Washington, D.C.

Guide to Effective Joint Labor/Management Safety and Health Committees, NJ Department of Health, Public Employees Occupational Safety and Health Program, 1996.

Job Hazard Analysis, U.S. Department of Labor, Occupational Safety and Health Administration, 1988, # 3071

## **DISTRIBUTION LIST**

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## **FATALITY ASSESSMENT AND CONTROL EVALUATION (FACE) PROJECT**

Investigation # 98-NJ-047-01

Staff members of the New Jersey Department of Health and Senior Services, Occupational Disease and Injury Services, perform FACE investigations when there is a report of a work-related fatal fall or machine-related incident. The goal of the FACE Program is to prevent future incidents by studying and identifying the risk factors that contribute to workplace fatalities, by recommending intervention strategies, and by disseminating information to employers and employees. All NJ FACE data are reported to NIOSH for trend analysis on a national basis. All identifiers are removed from the FACE reports and other data to protect the confidentiality of those who participate in the program.

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