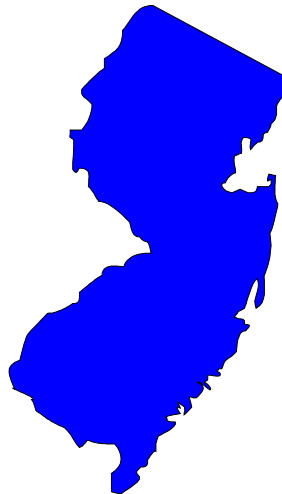


F.A.C.E.

INVESTIGATION REPORT

Fatality Assessment and Control Evaluation Project

FACE #96-NJ-026-01
Recycling Center Laborer Crushed in a
Vertical Upstroke Baling Machine



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FROM: Fatality Assessment and Control Evaluation (FACE) Project
New Jersey Department of Health & Senior Services (NJDHSS)

SUBJECT: FACE Investigation # 96-NJ-026-01
Recycling Center Laborer Crushed in a Vertical Upstroke Baling Machine

DATE: February 21, 1997

SUMMARY

On April 17, 1996, a 72-year-old recycling center laborer was crushed to death after falling into the loading chamber of an industrial baling machine. The incident occurred as the victim and his co-workers were compacting and baling discarded newspapers in a vertical upstroke baling machine. This machine used a 12-foot deep pit in the floor as a loading chamber. The victim, a “broom-man” who usually swept loose material into the baler, was working near the machine when he apparently fell into the loading chamber pit. His co-workers, not knowing that he was in the baler, filled the loading chamber with newspapers and started the machine. NJ FACE investigators concluded that, to prevent similar incidents in the future, these safety guidelines should be followed:

- o Employees should keep a minimum distance of six feet from the baler’s loading chamber floor opening.
- o Employees should be trained to safely operate and maintain the baler.
- o Older baling machines should be retrofitted to comply with the safety requirements of the American National Standards Institute.
- o Employers should develop an effective lockout/tagout program for machine maintenance.
- o Employers should be aware of educational and training resources for health and safety information.

INTRODUCTION

On April 19, 1996, NJ FACE personnel learned about this work-related fatality from a newspaper article. The employer was contacted and agreed to participate in the FACE investigation, which was conducted on April 25, 1996. During the visit, FACE investigators examined the machine and interviewed the employer and victim's co-workers. Additional information on the incident was obtained from the OSHA compliance officer, police report, and medical examiner's report.

The employer was a small, privately owned recycling center that collected and baled newspapers and cardboard. The company had been in business for about 50 years and employed eight workers at the time of the incident. The company did not have a safety program or operating manuals for the baler. There was no training program for operating the baler, with the employer explaining that training was usually not necessary since the company had a very low turnover and most of the employees had been there many years. He also stated that the company plans to end the baling operation in a year and change the business to a brokerage that buys and sells baled material.

The victim was a 72-year-old male laborer who had started working for the company more than 40 years ago. After leaving to work for a steel company, the victim returned to the recycling company in 1971. He worked at the recycling company steadily for the past 25 years, and had worked part-time for the past seven years since turning age 65. The employer stated that the victim was in good health.

INVESTIGATION

Background

The incident occurred in a small paper recycling facility located in a suburban residential neighborhood. Newspapers and cardboard collected by the neighboring townships were trucked to the fenced-in facility and taken to the weigh station, a small building that also held the business office. The company purchased the bulk material, which was dumped into an open yard outside the baler building. A front-end loader moved the materials around the yard and loaded the baler. Completed bales were moved with a forklift to an adjacent loading dock and loaded onto trucks for shipment.

The company purchased the reconditioned vertical upstroke baler (also known as a "pit baler") in 1986. The baler was housed in the center of a 27 by 24 foot single-story building with bay doors on three sides. A 60 inch long by 30 inch wide by twelve-foot deep floor pit served as the baler's

loading chamber. Directly over the loading chamber was a large machine resembling an open arch with large metal doors on each side (see Figures 1 and 2). When closed, the two bale chamber doors completely enclosed the machine and formed the baler's compacting chamber. The machine also contained the motor and chain drive mechanism for the compacting ram, which was positioned at the bottom of the pit at the start of the compacting cycle.

To make a bale, the bale chamber doors were first opened to expose the loading chamber pit. Several sheets of cardboard were placed on top of the compacting ram, which was lowered to the bottom of the loading chamber. A front end loader pushed paper into the loading chamber pit while employees with rakes pushed loose material into the pit. When the chamber was filled, the bale chamber doors were closed and secured, and the compacting ram was started. The slowly rising ram pushed the newspapers up the loading chamber and into the compacting chamber, where they were pressed into a bale. Without lowering the compacting ram, the workers opened the bale chamber doors and manually wrapped baling wire around the compacted newspapers. When the ram was released and lowered, the newspapers expanded against the wires to form the bale. The bale was ejected from the machine by placing a metal bar against the floor and wedging it against the bottom of the bale. As the bale was lowered on the bar, the leverage tilted the bale forward until it fell off the compacting ram and onto the floor in front of the machine. The completed bale weighed from 1,400 pounds (cardboard) to 1,600 pounds (newspaper) and measured approximately five by four by three feet.

The baler was operated by two identical control panels on the front and rear of the machine. Three buttons on each panel controlled the movement of the compacting ram (up, down, and stop). Although still operable, the plastic stop buttons on both panels were broken off and unmarked. There were no other emergency stop buttons on the machine. The workers were responsible for light maintenance, such as greasing the baler's door hinges and chain drive bearings. All other machine maintenance was done by an outside contractor, who had recently replaced a door wheel and brake mechanism. Two heavy steel plates were used to cover floor openings to the front and rear of the baler's loading chamber. The plate in front of the machine was made of smooth steel, and the plate behind the machine was textured diamond plate.

Incident

The day of the incident, a Wednesday, was cloudy and cold. The workers arrived at the site at their usual starting time of 6:30 a.m. There were four workers on the baling operation; a foreman who operated the front-end loader, a forklift operator, and two laborers (including the victim) who swept near the baler and operated the machine. It was a routine morning. The front-end loader pushed the newspapers into the baler building and loaded the compactor chamber. As he did this, the two laborers swept loose newspapers into the loading chamber. The victim worked at the front of the machine and helped in closing the bale chamber doors, operating the baler, and tying wire around the bale. He also placed a large block of wood on the floor in front of the machine before the bale was ejected. The bale would fall on top of the block, creating a space between the bale and the floor. This made it easier for the forklift to scoop under the bale and pick it up.

At 9:00 a.m., the crew took a coffee break. After the break, the victim greased the bale chamber doors before they resumed making bales. No one saw the victim fall into the baler's loading chamber. The victim was last seen near the front of the machine at about 11:00 a.m., throwing the block of wood to the side. The co-workers noticed that he was missing, but this was not unusual since the victim lived next to the facility and often went home to use the bathroom. They went on to make the next bale, but when they opened the bale chamber doors they saw what they thought to be dye or tomato juice in the bale. After seeing body parts, they told their supervisor who notified the police. The victim's body was found in the bottom of the bale.

It is not known how the victim fell into the machine. No one heard any cries or heard him fall. It is possible that he fell while looking down into the machine, or inadvertently walked back into the loading chamber. He may have also slipped on the smooth metal floor plate in front of the machine. There was also a concern that the forklift operating in the small space may have hit or forced the victim into the pit. The victim may have been rendered unconscious or unable to call for help after striking the metal compacting ram twelve feet down the loading chamber.

CAUSE OF DEATH

The county medical examiner determined that death was caused by multiple injuries.

RECOMMENDATIONS/DISCUSSIONS

Recommendation #1: Employees should keep a minimum distance of six feet from the baler's loading chamber floor opening.

Discussion: The victim apparently fell into the loading chamber when he got too close to the floor opening. This baler is unique in that it uses a large floor opening that cannot be practically guarded. FACE recommends that the company set a policy that prohibits employees from approaching within six feet of the floor opening. This area should be marked by painting a line around the opening, which should not be crossed when the chamber is open. Signs should also be posted warning of the fall hazard in the area. The workers can still sweep the area using long handled brooms and can enter the area to place the baling wire while the bale is in the chamber (see recommendation #3). The bale chamber doors should also be closed whenever the machine is left unattended.

Recommendation #2: Employees should be trained to safely operate and maintain the baler.

Discussion: The company did not have the operator's manual or any written procedures for running the baling machine. Also, the baler was not properly maintained, as indicated by the broken stop buttons on the control panels. FACE recommends that the company should contact the baler servicing company to repair the buttons and obtain the operator's manual. Employees should then be trained in the correct procedures for operating and maintaining the machine, as explained in the manual. The company should develop a written program outlining any special procedures (such as lock-out/tag-out) required for the machine. The company should also consider installing an additional emergency stop button on the opposite side of the machine.

Recommendation #3: Older baling machines should be retrofitted to comply with the safety requirements of the American National Standards Institute.

Discussion: This incident involved an older baling machine reconditioned in 1986. This machine was observed to have a number of potential safety hazards, such employee's hands and feet being exposed to a pinch point created when the compacting ram passes below the floor line. Many of these hazards are addressed in the American National Standard Institute (ANSI) publication ANSI

Z245.5-1990 *Baling Equipment Safety Requirements*. ANSI recommends the following safety equipment for vertical upstroke balers:

1. Ram compression stroke interlock, to keep all doors closed during the compression stroke;
2. Ram protective shield, a shield to guard the pinch point between the ram and the floor line;
3. Door locking mechanism, to allow for the slow relief of side pressure as the bale chamber door is opened.

FACE recommends that older balers should be inspected by a qualified service technician and retrofitted to comply with the latest ANSI requirements.

Recommendation #4: Employers should develop an effective lockout/tagout program for machine maintenance.

Discussion: During the interviews, one employee stated that they occasionally have to enter the baler's loading chamber to clean out debris that collects under the compacting ram. This is extremely hazardous since the baler may be inadvertently started while a worker is in it. To prevent this, FACE recommends that the company develop a lockout/tagout program. This program would require shutting off and locking out the main power switch to the baler whenever a worker needs to enter the machine or otherwise come in contact with moving machine parts. Further information on lockout/tagout is included in the OSHA publication, *Control of Hazardous Energy (Lockout/Tagout)*.

It should be noted that lockout/tagout is required under the federal OSHA standard 29 CFR 1910.147(c).

Recommendation #5: Employers should be aware of educational and training resources for health and safety information.

Discussion: It is important that employers obtain current information on OSHA regulations and methods of ensuring safe working conditions. Because obtaining this type of information is often difficult for a small business, the following sources may be helpful:

U.S. Department of Labor, OSHA:

On request, the federal Occupational Safety and Health Administration (OSHA) will provide information on safety standards and requirements. OSHA has several offices in New Jersey that

cover the following areas:

Hunterdon, Union, Middlesex, Warren and Somerset Counties.....(908) 750-3270
Essex, Sussex, Hudson and Morris Counties.....(201) 263-1003
Bergen and Passaic Counties.....(201) 288-1700
Atlantic, Gloucester, Burlington, Mercer, Camden, Monmouth,
Cape May, Ocean, Cumberland and Salem Counties.....(609) 757-5181

NJDOL OSHA Consultative Services: The New Jersey Department of Labor OSHA Consultative Service will provide free consultation to business owners on improving health and safety in the workplace and complying with OSHA standards. Their telephone number is (609) 292-3922.

New Jersey State Safety Council: The NJ Safety Council provides a variety of courses on work-related safety. There is a charge for the seminars. Their address and telephone number is 6 Commerce Drive, Cranford, New Jersey 07016, telephone (908) 272-7712

Other Sources: Trade organizations, equipment manufacturers, and trade unions are good sources of information on suppliers of safety equipment and training.

REFERENCES

ANSI Z245.5-1990 *Baling Equipment Safety Requirements*; American National Standard Institute, New York, NY. (212) 642-4900.

29 CFR 1910.147. Code of Federal Regulations. U.S. Government Printing Office, Office of the Federal Register, Washington, D.C.

Control of Hazardous Energy (lockout/tagout), U.S. Department of Labor, Occupational Safety and Health Administration, 1988. OSHA publication 3120.

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