

# F.A.C.E. INVESTIGATION REPORT

## Fatality Assessment and Control Evaluation Project

FACE #94-NJ-009-01  
Foreman Crushed to Death After  
Being Caught in a Screw Conveyor



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**FROM:** Fatality Assessment and Control Evaluation (FACE) Project  
New Jersey Department of Health (NJDOH)

**SUBJECT:** Face Investigation #94-NJ-009-01  
Foreman Crushed to Death After Being Caught in a Screw Conveyor

**DATE:** September 26, 1994

## **SUMMARY**

On February 4, 1994, a 35 year-old male asphalt shingle recycling plant foreman was killed when he became ensnared in an industrial screw conveyor. The incident occurred when the victim climbed up onto the operating machine in order to clear a jam in the conveyors. The victim was apparently reaching into the machine when his clothing caught on the rotating screw conveyor, pulling him into the machine. NJDOH FACE investigators concluded that, in order to prevent similar incidents in the future, these safety guidelines should be followed:

- o Employers should develop, implement, and enforce an effective mechanical lock-out, tag-out program.
  
- o All machine access panels should be equipped with safety interlocks to prevent the machines from operating with the covers open.
  
- o Employers should develop and implement a comprehensive employee safety program that includes certification in the safe operation of machinery.
  
- o Employers should provide secure and easy access to the industrial machinery.
  
- o Employers should perform periodic safety inspections to ensure that safety interlocks and railings are in place and in good working order.

## **INTRODUCTION**

On April 26, 1994, NJDOH FACE personnel were informed by an area OSHA compliance officer of a work-related fatal incident that the officer was investigating. After contacting the employer, FACE personnel conducted an on-site investigation on May 12, 1994. The site visit included interviewing the employer representative, photographing the scene, and talking with a witness. Additional information was obtained from the OSHA file, police report, and medical examiner's report.

The employer was an asphalt shingle recycling company who had been in business at this location for five years. The company employed a total of 40 workers, 25 of whom worked at this plant. The company had a written safety program and usually had one employee responsible for safety at the plant. The victim was a 35 year-old male shift foreman and machine operator who was responsible for supervising eight production line workers and operating the process machinery. He had worked for the company for about nine months.

## **INVESTIGATION**

The incident occurred inside the main building of an asphalt roof shingle recycling plant. Shingles were trucked to the plant and dumped into a large milling machine where they were reduced in size. After removing paper and other debris, the shingles were conveyed to a second milling machine where they were again reduced in size. The pieces of shingle were conveyed onto a sizing screen before being formed into new products such as asphalt road filler. The machine involved in the incident was called the accumulator (see Figure 1). Freshly milled pieces of shingle were belt conveyed into a hopper which fed a series of screw conveyors. The screw conveyors (which are four rotating screw augurs mounted parallel to each other) controlled the flow of shingles onto a sizing screen. The accumulator was located approximately 20 feet above the plant floor and was accessible by a ladder that led to a catwalk mounted on one side of the machine.

Prior to the incident, the screw augurs had been replaced in the accumulator. An error in measuring the augurs resulted in the screw blades being built about a foot too long. This was corrected by plant personnel who cut off the excess material with a cutting torch, leaving a small

rough protrusion on one of the augurs. The accumulator was also prone to jams caused by compacted shingles, which were unclogged by hand using a metal rod to loosen the material. A safety cover over the accumulator augurs had been removed.

The day of the incident, a Friday, was a cloudy winter day. The employees began at their usual time of 7 a.m. and worked through the early morning without incident. The victim took his station by the plant operator's station, a small control pulpit located near the accumulator and screening machines. At about 10 a.m., the plant employees went on break. Although the machines were usually shut down during breaks and lunch, the victim kept the machine running and remained at his station. Noticing that a jam had formed in the accumulator, the victim left his station and climbed up the side of the machine to the accumulator screw conveyors. After seeing the clog, he shouted down to a co-worker on the floor that he needed some help. As the co-worker prepared to climb the machine, the sleeve of the victim's sweater caught on the protrusion remaining on the screw augur where the excess blades had been cut off. The victim was pulled into the machine and was crushed between the screw augur and machine housing. Unaware that the victim was caught, the co-worker climbed up to help the victim and found him caught in the machine. The co-worker immediately shut the machine off and radioed for help on a hand-held radio. Other plant employees came to his aid and called 911 for help. The police and EMS arrived and pronounced the victim dead at the scene.

Federal OSHA conducted an investigation immediately after the incident and found that the accumulator had not been equipped with safety interlocks which would have prevented it from operating with the cover removed. The company responded quickly to correct the OSHA citations, installing the interlocks and building a new catwalk to access the accumulator. The company also designated a site safety officer who is responsible for safety training and maintaining the company safety programs. Many of these changes were in place or being implemented at the time of the FACE investigation.

### **CAUSE OF DEATH**

The county medical examiner attributed the cause of death to crushing chest injuries and the avulsion of an upper extremity.

## **RECOMMENDATIONS AND DISCUSSION**

Recommendation #1: Employers should develop, implement, and enforce an effective mechanical lock-out, tag-out program.

Discussion: The company did not have an effective lock-out, tag-out program at the time of the incident. Such a program would require employees to shut down and lock out the power supplies to any machines before they are maintained. An effective program would include thorough employee training in lock-out tag-out procedures and strict enforcement of the program. Since the incident the employer has implemented an effective lock-out, tag-out program.

Recommendation #2: All machine access panels should be equipped with safety interlocks to prevent the machine from operating with the cover open.

Discussion: The accumulator was not equipped with safety interlocks to prevent the machine from running with the access doors open. Since the incident, the company has replaced the access cover with a wire mesh cover equipped with a safety interlock. This allows the operator to look at the augurs without removing the cover and shuts down the machine if the cover is opened. Other access panels have been equipped with similar interlocks.

Recommendation #3: Employers should develop and implement a comprehensive employee safety program that includes certification in the safe operation of machinery.

Discussion: The victim apparently lacked the training necessary to safely operate and maintain this machine. It is recommended that a written safety program be developed that includes supervisors and workers to be trained and certified in the safe operation of the machines before being allowed to use or maintain the equipment. Periodic recertification should also be required to ensure the worker is knowledgeable in operating and safety procedures. Training should include standard operating procedures and safety practices unique to each piece of equipment. Since the incident, the employer has initiated a written worker certification program.

Recommendation #4: Employers should provide secure and easy access to the industrial machinery.

Discussion: In this incident the victim climbed directly up the machine to the augurs. This created an very unstable position to work from and a serious fall hazard. The company has since corrected this problem by extending the catwalk around the entire perimeter of the machine, providing a stable work platform for maintaining the augurs. It was noted that the ladder platforms become clogged with shingle debris falling from the conveyors. FACE recommends that the conveyor should be enclosed or otherwise modified to prevent debris from falling off.

Recommendation #5: Employers should perform periodic safety inspections to ensure that safety interlocks and railings are in place and in good working order.

Discussion: Conducting periodic safety inspections of the machines and work stations would ensure that all safety devices are in place and functioning. Performing the inspections with the employees would help to remind them of the purpose of the devices.

## **REFERENCES**

Code of Federal Regulations 29 CFR 1910, 1991 edition. US Government Printing Office, Office of the Federal Register, Washington DC.

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