MARYLAND DIVISION OF LABOR AND INDUSTRY
MARYLAND FACE PROGRAM

CASE: 96MD02901

TO: **Project Officer, State FACE Project, Division of Safety Research, NIOSH, CDC**

FROM: **Maryland FACE Program, Division of Labor and Industry**

SUBJECT: **Mill Operator caught in a conveyor discharge hopper and died of mechanical compression asphyxia.**

SUMMARY:

On May 25, 1996, a 32-year-old, Mill Operator (the victim) died when he was caught in a conveyor feed hopper, at a gypsum wallboard and plaster manufacturing plant. The victim had used a rubber tired front end loader to fill the raw material bin outside the building where the conveyor was located. Upon the completion of that task, he was assigned to clean up the area near the conveyor line and to monitor the rock flowing from the raw material bin, along the conveyor and into the discharge chute, which feeds a crusher.

It is unknown why the victim placed himself near the conveyor while it was operating and no one witnessed the incident. However, it appeared that the victim was attempting to adjust the belt scrapper from above the supply side of the conveyor, without locking out the power supply, when he lost his balance and fell onto the moving conveyor belt.

The Advanced Mill Operator found the victim, when he went to investigate why the conveyor stopped running. He found the victim caught in the conveyor discharge chute and immediately called the Supervisor by radio. He then attempted to remove the victim from the chute, but was unsuccessful. The Supervisor responded to the area within three minutes and checked for a pulse and breathing but found none. The Advanced Mill Operator went to call the 911 emergency number while the Supervisor stayed with the victim. Emergency services including police, fire and rescue personnel responded within 20 minutes. A representative of the coroner's office pronounced the victim dead at the scene.

The MD/FACE Field Investigator concluded that to prevent similar future occurrences, employers should:

- *Increase the height of barriers or enclose the top of conveyors with interlocked enclosures that disconnect power when access to the conveyor is required.*
- *Reinstruct employees on the primary rules regarding safety around conveyors.*
- *Instruct mill operators to visually check the conveyor area when the conveyor belt stops*

for any unknown reason.

- *Install a start-up alarm that will sound for a predetermined time prior to starting the conveyor belt.*

INTRODUCTION:

On Saturday, May 25, 1996, a 32-year-old male Mill Operator (the victim) died after being caught in the conveyor's discharge chute. The conveyor carries rocks from the raw material bin, to the discharge chute, where the rocks are dumped into a hopper and then crushed for the manufacturing of gypsum wallboards. The MD/FACE Field Investigator was informed of this incident Tuesday, May 28, 1996, by a MOSH Preliminary Report and a newspaper account of the incident.

The Field Investigator contacted the employer, who respectfully declined to participate in the FACE investigation. Information regarding the incident was collected from the MOSH Inspector, his in-depth report, photographs and other documentation provided by the employer, newspaper accounts of the incident, Workers Compensation Employer's First Report of Injury or Illness, and the Certificate of Death.

The employer in this incident was a manufacturer of gypsum wallboard and plaster. The plant had been in operation for 34 years, had 250 employees and worked three shifts, seven days a week. Three employees were working in the building in which the conveyor line is located
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The employer had an established safety program. Its rule book states never work on any screw or belt conveyor while it is in motion. It also states that employees will not ride, walk on top, crawl over, or reach across or under a moving belt. Verbal instructions to employees require that only maintenance personnel perform service on equipment. Training records show that the victim had received lockout/tagout training on 3-28-96. Safety rules are strictly enforced, by the company, through a documented disciplinary program. Employees are instructed to call maintenance for repairs and service.

The victim had three years and three-month service with the company. The victim had received safety training, on all aspects of the facility's safety program.

INVESTIGATION:

On May 24, 1996, the victim started work at 11:00 P.M. He was assigned to rock supply duty which requires using a rubber tired front end loader to load the raw material bin that feeds the conveyor. After completing the loading, the victim has approximately 1½ to 2 hours before the bin needed to be reloaded. During this period he performed normal housekeeping tasks around the conveyor. These duties involved checking the conveyor belt that carries the rocks used for making gypsum wallboards, from the raw material supply bin, to the funnel shaped discharge chute where the rocks enter the crushing operation.

The conveyor was installed in May of 1995. Overall dimensions from the raw material supply to the discharge chute are approximately 35'-6" in length and 3'-0" in width. The 24" wide

conveyor traveled at a speed of 150 feet per minute and had the capacity to transport 150 tons of rock per hour. A 48" high barrier the full length of the conveyor protected workers from the conveyor. The conveyor was equipped with an emergency stop cable attached to a trip box that would shut down the conveyor belt if pulled. Approximately six feet from where the victim was found is a control panel with shut off switches for the conveyor belt. The main disconnect panel is also located nearby and can be locked out. The conveyor belt and troughing rolls were last replaced on 4/25/96

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The victim was last seen alive at approximately 11:40 P.M. when he told his Supervisor, who was in the control room, that he was going upstairs to clean up the conveyor room area. At approximately 12:40 A.M. the Hourly Supervisor (acting as Relief Foreman) and the Advanced Mill Operator were in the control room. They noticed that indicator lights showed that the synthetic gypsum hopper had run empty and the conveyor stopped running. At that time they began to look for the victim. The Advanced Mill Operator went to the control room area. Upon entering the area he did not see the victim but noticed his broom and shovel leaning against the wall approximately 25 feet away. As he walked past the conveyor toward the tools, he noticed the victim caught in the discharge chute.

He radioed the Supervisor and informed him of the incident. He then attempted to remove the victim but was unsuccessful. When the Supervisor arrived, he checked the victim for a pulse and breathing and found none. The Advanced Mill Operator went back to the control room and called for Emergency Medical Services, while the Supervisor stayed with the victim. Emergency services including police, fire and rescue personnel responded to the scene in approximately 20 minutes. The coroner's office pronounced the victim dead at the scene.

CAUSE OF DEATH:

The autopsy report stated that the cause of death was compression asphyxia.

RECOMMENDATIONS/DISCUSSION:

Recommendation #1: Employers should increase the height of the barriers or enclose the top of conveyors with interlocked enclosures that disconnect power, when access to the conveyor belt is required.

Discussion: In this incident, it is unknown why the victim climbed over the barrier guard to position himself near the running conveyor belt. One scenario suggests that the victim was standing over or in some way straddling the conveyor belt, while it was running, in an attempt to adjust the height of the belt scrapper. Although a barrier guard had been installed, it is reasonable to assume on rare occasions, a worker may reach over the barrier and make contact with the moving conveyor belt. An enclosed, interlocked, conveyor system would not allow the victim access into the belt area while the conveyor is running. If total enclosure is not practical, placing a barrier guard directly at the entrance to the discharge chute is an alternative. Any interlock that interrupts power to the conveyor when the enclosure is accessed would add an additional dimension of safety.

Recommendation #2: Employers should reinstruct employees on the primary rules regarding safety around conveyors.

Discussion: Although the employer had an effective safety, training and disciplinary program, they should continue constant reinforcement of the primary rules regarding conveyors. Among them are: only authorized maintenance personnel make adjustments to conveyors; no one is allowed to ride conveyors; always lockout the conveyor before working on it; always make sure that the emergency stop is secured and in good working order; when shoveling rock on a belt, always face the opposite direction from which the belt is coming. In addition, signs should be posted in the area and on the barriers, to warn against potential hazards and to caution against unsafe practices.

Recommendation #3: Employers should instruct mill operators to visual check the conveyor area when the conveyor belt stops for any unknown reason.

Discussion: Since the mill operators position in the control room cannot see the conveyor area, a visual inspection of the conveyor line would ensure that anyone who may have temporarily interrupted the power is not in danger of being caught up in the conveyor.

Recommendation #4: Employers should install a start-up alarm that will sound for a predetermined time prior to starting the conveyor belt.

Discussion: Since there were no witnesses to the incident, another scenario of the incident is that the victim had stopped the belt but had not locked out the power, and was sitting or kneeling on the belt using a wrench to adjust the belt scrapper. The scrapper is next to the discharge chute and under the return side of the conveyor belt. The adjusting bolts are accessed from the top of the conveyor. The conveyor could be started from the control room causing the victim to be caught in the discharge chute before he had time to react. The installation of an audible, visual or both signaling devices would give employees a warning. A predetermined warning time would ensure that workers could exit the area prior to starting the conveyor system. However, this does not replace an effective lock out tag out procedure.

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FATALITY ASSESSMENT AND CONTROL EVALUATION

The Maryland Division of Labor and Industry administers the Fatality Assessment and Control Evaluation (FACE) Program under a cooperative agreement with the National Institute for Occupational Safety and Health, Division of Safety Research (NIOSH/DSR). The Maryland FACE Program performs Investigations of selected occupational fatalities, prepares summary reports, and engages in prevention activities. The goal of our program is to prevent fatal work injuries in the future by studying the working environment, the worker, the task being performed, the tools employed, the energy exchange resulting in fatal injury, and the role of management in controlling how these factors interact.

NIOSH/DSR developed the FACE research protocol in the early 1980's and continues to perform FACE investigations. To increase the research and prevention activities of NIOSH/DSR, states across the nation have been invited to participate in the State FACE Project. Maryland and thirteen states listed below currently participate in the State Based FACE Project: Alaska, California, Colorado, Iowa, Indiana, Kentucky, Massachusetts, Minnesota, Missouri, Nebraska, New Jersey, Wisconsin, and Wyoming.

Additional information regarding this report or the Maryland FACE Program is available from:

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