

**To:** Director , National Institute for Occupational Safety and Health (NIOSH)

**From:** Ohio Fatality Assessment and Control Evaluation (FACE) Program

**Subject:** Ohio FACE Investigation #99OH023-01

**Worker Dies Due To A Fall From A Conveyor Belt**

**Investigative Authority:**

The Ohio Department of Health (ODH) is supported by cooperative funding from the National Institute for Occupational Safety and Health (NIOSH) and participates in the Fatality Assessment and Control Evaluation (FACE) Program. The FACE team conducts investigations of fatal workplace injuries to identify factors that are responsible for or contribute to workplace injury with the objective of developing recommendations for injury prevention.

**Summary:**

On May 15, 1999, a 40 year old male electrician/machinery operator died of injuries sustained due to a fall from a conveyor belt. The victim was found at the end of a long run of conveyors approximately 1½ hours after his last contact with another employee via 2-way radio. The victim apparently fell onto the conveyor or was crossing or riding the conveyor where he suffered a broken neck resulting in his death. After riding the first conveyor approximately 50 yards, marks indicate that he fell down a chute approximately 6 feet to the lower conveyor, was carried another 50 yards before falling through a second chute, then traveled 150 yards to a point where the conveyor travels upward. The victim's body weight tipped the belt and caused him to fall off the conveyor prior to reaching the packer (final chute and conveyor).

**Recommendations based on our investigation are as follows:**

- Employers should with the participation of all workers conduct a job hazard analysis of all work activities.
- Conveyor lines should be guarded from all belts and conveyor hopper and chute openings.
- Belt conveyors that are fixed in place should have safety guards.
- Employees should be instructed on the rules regarding safety around conveyors.
- All workers should be thoroughly trained in safety aspects of dangerous equipment, and made aware of all shut-off switches and safety devices.

**Introduction:**

On Saturday May 15, 1999, an employee of a compost facility reported to work along with three other employees and began to work as an equipment operator. At approximately 9:00 a.m., the victim received a call from a co-worker to look at a piece of equipment at a remote location and he responded "I'm on my way." He apparently turned off the equipment he was operating and departed with his hard hat and radio. Approximately 1½ hours after his last contact with another employee via 2-way radio, the victim was found in an outside area adjacent to the main building near a conveyor belt. It is speculated that the victim may have fallen on the conveyor or was crossing or riding the conveyor where he suffered a broken neck resulting in his death. No other individual was in that area of the facility that could have witnessed the incident.

Access and egress to the compost digger the victim was operating was a recognized problem at the facility when the "digger" was not operating. The vertical fixed ladders on each side of the digger required one to walk a wall next to the conveyor on one side or climb over the air-moving duct work and lattice structural steel on the other side. According to others, the most convenient and quickest egress route in use was over the conveyor and down the center wall between the two reactors pits.

On May 19, 1999, the Ohio FACE program was notified of the death by the Cleveland Area Office of the Occupational Safety and Health Administration (OSHA). On May 26, 1999, the investigators from Ohio FACE and NIOSH conducted an on-site investigation. The investigators reviewed the incident with the Plant Manager, the Maintenance Supervisor and another employee of the company. The Maintenance Supervisor gave the investigators a tour of the plant while explaining how the facility operated. The facility was photographed.

### **Investigation:**

On Saturday May 15, 1999 a 40 year old male electrician/machinery operator reported to work at his usual time of 7:00 a.m. and began operating a large machine called a "digger". The digger was used to stir the compost. At approximately 9:00 a.m., the victim received a call from a co-worker to look at another piece of equipment at another location on the grounds. The victim acknowledged he was on his way. Routinely, the victim worked as an electrician, but he was also certified as a machine operator and since the facility was not in full operation on the weekend, the victim was working as a machine operator that day.

Approximately 1½ hours after his last contact with a co-worker by 2-way radio, the victim was found in an outside area adjacent to the main building on a platform near a conveyor belt. The circumstances as to what happened, how it happened and how the victim's body got to the platform area remains unclear since no one witnessed the incident. It is believed that the victim fell on the conveyor, thereby suffering a broken neck which resulted in his death. The victim's body then traveled approximately 50 yards, then fell through a chute approximately 6 feet to a lower conveyor, then traveled another 50 yards where he fell through a second chute. He then traveled 150 yards to a point where the conveyor travels upward and his body weight tipped the rollers thereby causing his body to fall off the belt prior to the final chute.

### **Cause of Death:**

The medical examiner's report listed the immediate cause of death as blunt force injuries of the cervical spinal cord and spine due to a fall from a conveyor belt.

**Recommendation/Discussion:**

- **Recommendation #1: Employers should conduct a job hazard analysis of all work activities with the participation of all workers.**

**Discussion:** To prevent incidents such as this, it is recommended that employers conduct a job hazard analysis of all work areas and job tasks with employees. A job hazard analysis should begin by reviewing the work activities that the employee is responsible for and the equipment that is needed. Each task is further examined for fall, electrical, chemical or any other hazard the worker may encounter. The results of the analysis can be used to design or modify a written job description. If employers are unable to do a proper job hazard analysis, they should hire a qualified safety consultant to conduct it.

**Recommendation #2: Conveyors should be guarded from all belts, hopper and chute openings on a conveying line.**

**Discussion:** All openings to hoppers and chutes shall be guarded to prevent personnel from accidentally falling or stepping into them or allowing any part of their body to make contact with conveyors below them. Where guards are not practical, warning signs shall be posted. If the hopper or chute is equipped with a grating to protect against contacting the conveyors below, such grating will be considered as sufficient guarding provided that one dimension of the opening does not exceed 50 mm (2 in.).

In the reactor transfer area, the employer did not ensure that the conveyor chute opening had covers or guardrails to protect personnel from hazards of falls to the moving conveyor approximately 6 feet below.

- **Recommendation #3: Safety guards for belt conveyors that are fixed in place.**

**Discussion:** Nip and shear points shall be guarded. Typical locations are (1) at terminals, drives, take ups, pulleys and snub rollers where the belt changes direction; (2) where belts wrap around pulleys; (3) at the discharge end of a belt conveyor; (4) on transfer and deflectors used with belt conveyors; (5) and at take-ups.

Covers and guardrails were not provided to protect personnel from the hazards of open pits, tanks, vats, ditches, etc.

- **Recommendation #4: Employers should re-instruct employees on the primary rules regarding safety around conveyors.**

**Discussion:** Employers should continue constant reinforcement of the primary rules regarding conveyors. Some rules 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 barriers to warn against potential hazards and to caution against unsafe practices.

- **Recommendation #5: All workers should be thoroughly trained in safety aspects of dangerous equipment, and made aware of all shut-off switches and safety devices.**

**Discussion:** Remotely and automatically controlled conveyors, and conveyors where operator stations are not staffed or are beyond voice or visual contact from drive areas, loading areas, transfer points, and other potentially hazardous locations on the conveyor path not guarded by location, position, or guards, shall be furnished with emergency stop buttons, pull cords, limit switches, or similar emergency stop devices.

In this case, the conveyor was provided with an emergency stop pull cord, but it was difficult to reach when the 32 inch wide conveyor belt was sloped up approximately 14 inches on the side and the cable was approximately 16 inches below the upper edge of the belt. To reach the cable from the belt would require reaching through the rail support brackets which would deflect an arm on a moving conveyor. The reactor area conveyor belt did not provide other stop buttons.

## **References**

Office of the Federal Register: Code of Federal Regulations, Construction 1926  
US Department of Labor, Occupational Health and Safety Administration, Washington, D.C.

Office of the Federal Register: Code of federal Regulations, Labor 1910  
US department of Labor, Occupational health and Safety Administration, Washington, D.C.

Safety Standards for Conveyors and Related Equipment, ASME B20.1-1996, American Society of Mechanical Engineers, New York, NY

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