

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION
METAL AND NONMETAL MINE SAFETY AND HEALTH

REPORT OF INVESTIGATION

Surface Nonmetal Mine
(Sand and Gravel)

Fatal Falling Material Accident
May 23, 2005

Michels Pipeline Construction, Incorporated
Plant #2
Kewaskum, Washington County, Wisconsin
Mine I.D. No. 47-02789

Investigators

Gary L. Belair
Mine Safety and Health Inspector

Jay R. Bell
Mine Safety and Health Inspector

Eugene D. Hennen
Mechanical Engineer

Originating Office
Mine Safety and Health Administration
North Central District
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Steven M. Richetta, District Manager



**Victim Stood Here
Before Falling Off Truck**

**Plate Lowered
Vertically**

OVERVIEW

David A. Randall, laborer, age 57, was fatally injured on May 23, 2005, when he was struck by a steel plate while loading it onto a flatbed truck. A front-end loader was used to lift the plate with a chain hook while Randall steadied the plate with his hand, standing on the edge of the truck bed. As the plate was lowered into the truck bed, it detached from the hook. Both Randall and the plate fell to the ground and the plate crushed him.

The accident occurred because the procedures and equipment used to load the steel plate were inadequate. The victim had to stand in the bed of the truck and guide the suspended plate by hand because the rigging system that was used did not control the steel plate.

GENERAL INFORMATION

Plant #2 was a portable crushing plant owned and operated by Michels Pipeline Construction, Incorporated. At the time of the accident, the crusher was located at the Kewaskum Pit, about five miles south of Kewaskum, Washington County, Wisconsin. The principal operating official was Patrick D. Michels, president. The mine normally operated one, 9-hour shift per day, five days per week. Total employment was three persons.

Sand and gravel material was mined from a single bench with a front-end loader. The mined material was fed into a crusher and conveyed to stockpiles. The finished product was loaded into customer trucks with a front-end loader. It was sold for use in the construction industry.

The last regular inspection at this operation was completed on February 23, 2005.

DESCRIPTION OF THE ACCIDENT

On the day of the accident, David A. Randall (victim) reported for work about 6:30 a.m. to help transport the portable plant to a new mining location. Randall asked William Edwards, loader operator, to help load four steel plates onto a flatbed truck. Randall attached one end of a chain hook to the bucket of a front-end loader and the other end to the plate. The hook was placed in a hole that had been cut out of the plate. Edwards lifted the plate with the front-end loader while Randall steadied the plates by hand as they were moved approximately 25 feet to the flatbed truck.

Randall then climbed into the bed of the truck. He guided the plate as Edwards lowered it vertically onto its edge into the truck bed. Randall signaled to Edwards to lower the front-end loader's boom to slacken the chain. He then pushed the plate toward the opposite side of the truck until the plate leaned on the hook. Edwards lowered the plate onto the bed of the truck with the front-end loader's boom control. The first two plates were loaded into the flatbed truck without incident.

At 6:45 a.m., Randall hooked the third plate and steadied it by hand as the front-end loader lifted and moved it to the truck. Edwards aligned the front-end loader so the steel plate was suspended parallel with the driver's side of the truck.

Randall climbed into the corner of the bed that was nearest the driver's seat and directed Edwards to lower the plate. Edwards lowered the plate until it stood on its edge in the bed of the truck. Randall steadied the plate and signaled Edwards to continue lowering until there was slack in the chain. As the plate lowered, the hook came out of the hole and it became unstable. Randall attempted to wrestle the plate into the truck bed but both he and the plate fell to the ground.

Edwards sounded the front-end loader's horn to get the attention of co-workers. Mark Enright, foreman; and Tony Bukowski and Kevin Sheehan, heavy equipment operators, were in the pit area assisting with the move, heard the crash and horn, and ran to the side of the flatbed truck. They attached the hook and chain to the plate and Edwards used the front-end loader to lift the plate off Randall. Enright called for emergency medical assistance.

Emergency medical personnel arrived and Randall was pronounced dead at 7:24 a.m. by the county medical examiner. Death was attributed to crushing injuries.

INVESTIGATION OF THE ACCIDENT

MSHA was notified of the accident at 8:15 a.m. EDT on May 23, 2005, by a telephone call from Ralph Miller, safety coordinator, to Paul A. Blome, supervisory mine safety and health inspector. An investigation was started that day. An order was issued under the provisions of Section 103(k) of the Mine Act, to ensure the safety of the miners. MSHA's accident investigators traveled to the mine, made a physical inspection at the accident scene, interviewed employees, and reviewed conditions and work procedures relevant to the accident. MSHA conducted the investigation with the assistance of mine management, employees, and the Wisconsin Department of Commerce.

DISCUSSION

Location of the Accident

The accident occurred near the center of the pit about 60 feet south and west of the recently mined pit walls. The pit floor was dry, level, and relatively flat.

Weather

The weather was not considered to be a factor with sunny skies, light winds, and a temperature of 60 degrees.

Front-End Loader

The front-end loader used to load the steel plates was a 1998 Caterpillar, Model 980G. The 65,000 pound loader was powered by a 300 HP Caterpillar, Model 3406C DITA diesel engine. Investigators conducted an operational check of the loader's steering, braking, and hydraulic systems and no defects were found.

Flatbed Truck

The flatbed truck that the steel plates were being loaded on was a 1998 International, Model 4700DT 466E. The truck's front axle load rating was 8,000

pounds and the rear axle was 17,500 pounds, giving the truck a Gross Vehicle Weight Rating of 25,500 pounds. The truck had a steel bed with 8-inch steel side rails around the outside edge. The bed measured 13 feet long by 7 feet 6 inches wide, inside the rails. The height from the top of the bed to the ground was approximately 50 inches. No defects were found with the truck.

Chain

The chain, 14 feet long from the inside connection to the hooks, was a 3/8 inch, grade 100, with a grab hook on one end and a slip hook on the other end. The chain did not fail and did not appear to have been damaged during the accident.

Both hooks were 3/8 inch alloy with clevis-type ends for attachment to the chain. The width of the throat of the slip hook was approximately 1-1/4 inches, and the distance from the bottom of the throat to the tip of the hook was approximately 1-5/8 inches. The slip hook had a pre-drilled hole for the attachment of a safety latch, but it did not have a safety latch. The chain manufacturer recommends that a sling-type hook be used instead of a slip hook in lifting applications.

The chain assembly had a tag indicating a maximum working load limit of 7,100 pounds, which is the same as the limit on the hooks used in the assembly. The amount of weight being lifted at the time of the accident was less than 25 percent of the maximum working load limit of the chain.

Steel Plates

When the plant was running, four steel plates were placed against the crusher trailer, serving as barriers to keep material from accumulating under the trailer. The plate that fell on the victim was approximately 5 feet wide, 10 feet long, 3/4 inches thick, and weighed 1,500 pounds. A 2-1/2 inch wide x 6 inch long hole had been cut approximately 1-3/4 inches from the edge of one of the long sides of each plate to assist in loading. The 2-1/2 inch dimension was parallel to the long edge of the plate and the 6-inch dimension was perpendicular to the long side of the plate.

Signaling

Reportedly, standard lifting signals were used at this operation. The victim signaled Edwards with hand and head gestures to indicate the desired direction to move the plate. The chain was long enough to keep the loader operator's view unobstructed by the bucket as the victim signaled from the truck bed.

Rigging and Loading

Each plate was lifted, moved, and lowered by a front-end loader using a chain that was attached to the bucket by looping it through a clevis on the bucket tilt

mechanism and attaching the grab hook to one of the chain links. The slip hook on the other end of the chain was hooked into a hole in the edge of each plate. Each plate was lifted in the vertical position and moved to the flatbed truck as the victim steadied the plate by hand.

The plate was lifted above the flatbed and lowered until it was standing on its edge on the truck bed. The victim would stand on the front driver's side corner of the flatbed and direct the loader operator to lower the bucket until the chain slackened. Randall would push against the top of the plate until the plate leaned in the opposite direction, against the hook and chain. He would then direct the loader operator to lower the bucket until the plate was lying flat on the truck bed.

During the lifting procedure, the loader operator placed the bucket in the dump position so the cutting edge of the bucket did not contact the chain. The boom lift control was used to raise and lower the plates.

The rigging method used did not provide a means to prevent the slip hook from coming loose when slack was allowed in the chain. Since the plates being loaded did not have any taglines, the victim had to steady and guide the plates by positioning himself close enough to the plate so he could place his hand on it.

The end of the chain attached to the loader bucket did not show signs of slippage during the accident sequence.

Training and Experience

David Randall had 8 years, 8 months of total mining experience. He had received training in accordance with 30 CFR, Part 46. He helped move plants to new mining locations and into the shop for maintenance and repairs approximately two to three times a week.

The loader operator had 26 years experience and loaded plates approximately five times a year, usually into dump truck beds. Portable Plant #2 was moved 12 to 15 times per year.

ROOT CAUSE ANALYSIS

A root cause analysis was conducted and the following causal factor was identified:

Causal Factor: Management policies and controls were inadequate. Procedures were not in place to ensure suitable hitches, slings, and tag lines were used to load the steel plate into the truck bed. The hook came out of the hole in the plate as it was loaded onto the truck.

Corrective Action: Perform a risk assessment to identify and eliminate or control any hazards. Discuss what could go wrong and identify locations where miners should not be positioned to eliminate hazards from suspended loads. Use a tag line to control the load from a safe location. Ensure that rigging suitable for the load being lifted has been provided. Hooks should have safety latches that close the throat opening and secure the suspended load.

CONCLUSION

The accident occurred because the mine operator did not ensure that effective procedures and equipment were utilized to protect persons assigned to load steel plates. The victim stood in the bed of the truck and guided the suspended plate by hand because no rigging system was provided to safely hoist and position the plate into the truck bed.

VIOLATIONS

Order No. 6183607 was issued on May 23, 2005, under the provisions of Section 103(k) of the Mine Act:

A fatal accident occurred at this operation May 23, 2005, when two miners were attempting to load four, ¾-inch steel plates (62-inches wide, 120-inches long, ¾-inch thick, all of the plates were approximately the same size) in the face area of the pit. The crew and two extra men were in the process of moving the plant and equipment to the next designated site. This Order is issued to assure the safety of all persons at this operation. It prohibits all activity at this operation (Michels Corp. Plant #2) until MSHA has determined that it is safe to resume normal operation at this site. The mine operator shall obtain prior approval from an authorized representative for all actions to recover and or restore operations to the affected area.

This order was terminated on May 25, 2005. The conditions that contributed to the accident no longer existed.

Citation No. 6177694 was issued on June 6, 2005, under the provisions of Section 104(a) of the Mine Act for a violation of 30 CFR 56.9201:

A fatal accident occurred at this operation on May 23, 2005, when a miner was struck by a steel plate that fell while being loaded onto a truck. The victim was in the bed of the truck steadying and guiding the plate onto the truck when the hook became detached from the plate, and the miner and plate fell to the ground. The operator failed to ensure that the equipment was loaded and unloaded in a manner that did not create a falling material hazard.

This citation was terminated on June 8, 2005. New policies and procedures were implemented prohibiting persons from standing on truck beds while loading steel plates. All miners were trained to ensure that they stay clear of suspended loads.

Citation No. 6177695 was issued on June 6, 2005, under the provisions of Section 104(d)(1) of the Mine Act for a violation of 30 CFR 56.16007(b):

A fatal accident occurred at this operation on May 23, 2005, when a miner was struck by a steel plate that fell while being loaded onto a truck. A hook that was being used to lift the steel plate became detached from the plate and the miner and plate fell from the truck bed onto the ground. There was no safety latch to close the throat opening on the hook. Failure to utilize hitches or slings suitable to secure the steel plate constitutes more than ordinary negligence and is an unwarrantable failure to comply with a mandatory standard.

This citation was terminated on June 8, 2005. New policies and procedures were implemented requiring that a clevis be attached to all steel plates that are loaded onto truck beds. Also, chain hooks, used for lifting steel plates, will be equipped with a functional safety latch.

Approved by:

Date:

Steven M. Richetta
District Manager
North Central District

APPENDIX

Persons Participating in the Investigation

Michels Pipeline Construction Inc.

Ralph Miller	safety director
Jack Westerman	crushing manager
Mark Enright	foreman
James Sperling	shop supervisor

State of Wisconsin

Patrick Murphy	mine safety specialist
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Mine Safety and Health Administration

Gary L. Belair	mine safety and health inspector
Jay R. Bell	mine safety and health inspector
Eugene D. Hennen	mechanical engineer