

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 Machinery Accident
June 1, 2004

Mead Sand and Gravel
Mead Sand and Gravel
Nashville, Barry County, Michigan
Mine I.D. 20-03131

Investigators

Fred H. Tisdale
Mine Safety and Health Inspector

Gary L. Belair
Mine Safety and Health Inspector

Donald T. Kirkwood
Supervisory Civil Engineer

Stephen G. Sawyer
Civil Engineer

David T. Couillard
Mine Safety and Health Specialist

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Mine Safety and Health Administration
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Steven M. Richetta, District Manager



OVERVIEW

On June 1, 2004, Harry A. Mead, Jr., superintendent, age 49, was fatally injured when his dragline rolled into a 20 foot deep, water filled pit. Mead jumped from the dragline as it rolled into the water; however, he became entangled in the crawler track.

The accident occurred because the victim failed to lock the crawler track brakes before preparing to dig. The inertia of the boom while in the swing mode and the slope of the ground at the water's edge contributed to the dragline rolling into the water.

GENERAL INFORMATION

Mead Sand and Gravel, a sand and gravel operation, owned and operated by Mead Sand and Gravel, was located in Nashville, Barry County, Michigan. The mine was family owned and operated. The principal operating officials were Harry A. Mead, Jr., superintendent (victim), and Mary Ann Mead, owner. The mine was normally operated one, 8-hour shift per day, and five days a week.

Sand and gravel was mined from the pit with a Bucyrus-Erie 38B dragline and stockpiled on the pit bank. The material was then transported to the plant by a front-end loader that dumped the material into the feed hopper. The material was screened, sized, and sold for use in the construction industry.

The last regular inspection at this operation was completed April 24, 2004.

DESCRIPTION OF ACCIDENT

On the day of the accident, Harry A. Mead, Jr. reported for work at 8:30 a.m., his normal starting time. After meeting with Anthony Mead, his son, he helped Anthony replace a hydraulic hose on the front-end loader. Anthony then started the dragline that was parked about 20 feet from the bank of the water-filled pit.

After the dragline warmed up, Harry climbed into the cab and moved the machine to the bank of the pit. The dragline controls provided for travel or swing with a single lever. This lever could be placed in either the swing mode or the travel mode but not at the same time. The ground sloped at about 6% toward the pit edge and Mead positioned the dragline within 8 feet of the water's edge, the normal position for digging. With the tracks pointing toward the water, Mead stopped the dragline and moved the swing/travel lever from the travel mode into the swing mode. He began to swing the boom, bucket, and consequently the cab, to start digging. The movement of the 75-foot boom and 1½ yard bucket added inertia, allowing the dragline to roll toward the water.

Anthony Mead, operating the front-end loader, was traveling back from the plant area after dumping a load of material on the stockpile. He saw the tracks tip up as the dragline rolled into the water. Anthony Mead also saw the dragline's boom move down, then up, and then down again. He stated that he saw the victim moving out of the cab of the machine.

As the dragline entered the water, Harry Mead jumped from the cab. However, the investigators believe that the cab was positioned at a slight angle to the direction of the tracks, placing the door of the cab over the right track. As the victim attempted to jump clear, his left leg became caught in the crawler and drive sprocket of the right track.

INVESTIGATION OF THE ACCIDENT

MSHA was notified of the accident at 2:38 p.m. on June 1, 2004, by a telephone call from Anthony Mead to Gary L. Belair, mine safety and health inspector. An investigation was started the same day. An order was issued pursuant to Section 103(k) of the Mine Act to ensure the safety of the miners.

MSHA's accident investigation team traveled to the mine, conducted a physical inspection of the accident scene, interviewed employees, and reviewed documents and work procedures relevant to the accident. MSHA conducted the investigation with the assistance of mine management, employees, and the Nashville, Michigan Police Department.

DISCUSSION

The pit area being mined was reportedly just over 20 feet deep and filled with water. This water-filled pit was estimated to be 300 to 350 feet long and 100 to 150 feet wide oriented from northwest to southeast. The method being used to excavate the pit created a small 3 to 6 foot drop-off at the water's edge. This resulted in a shallow slope (shelf) extending in from the shore approximately 8 to 10 feet and a steep drop to the 20-foot depth previously mentioned. The shelf was observed intact on the southwest side where the dragline crane entered the water. The water surface area of the pit was approximately one acre. The pit was previously mined using excavators until Mead Sand and Gravel purchased the dragline on April 24, 2004.

The recently purchased dragline was a Bucyrus Erie 38B crane with a gross weight of about 84,000 pounds. It was equipped with a 75 foot boom and a 1½ cubic yard drag bucket. The machine was approximately 45 years old.

The mining method used was to park the dragline crane approximately 8 feet from the bank, with the tracks of the dragline perpendicular to the bank, and dredge the bottom of the pit with the drag bucket. In order to maintain the stability of the bank, the bucket would be pulled from the water when it was approximately 8 to 10 feet from the shoreline. Once the bucket was pulled from the water, the material would be placed in a pile on the shore. When not in use, Harry Mead usually parked the dragline about 15 to 20 feet away from the bank. The dragline crane was normally operated by the victim about 3 hours a day, several days a week.

The Bucyrus Erie 38B had a small gasoline engine (pony motor), to crank over the main engine when starting. This pony motor was used in place of an electric starter. Anthony Mead would usually start the dragline crane's engine by using this pony motor because Harry Mead had difficulty starting it.

An owner's or operator's manual for the dragline crane was not available. A local machine operator had provided limited training on the operation of the dragline. The victim had limited experience on the dragline crane since it was used on a limited basis.

Prior to the accident, Anthony Mead saw the back of the tracks of the dragline crane raise above the ground as the dragline crane entered the water, but he could not tell whether the tracks were turning. He also saw the boom swinging from east to north while the bucket was out of the water. Anthony Mead stated that he saw his father exit the cab but could not see him enter the water. Anthony Mead stated that he observed the boom lower, rise, and then lower again. This movement is consistent with the dragline crane dipping into the water, raising as it traversed the short shallow shelf, and then dipping again as it entered the deep area.

After an inspection of the area where the dragline crane entered the water, and based upon an eyewitness testimony regarding the bank configuration before it was disturbed for retrieval of the dragline crane, the investigators determined that ground failure was not a factor. The dragline crane's final position in the water indicated that it did not flip over. After the dragline crane was removed from the water, the track lock was found to be not engaged. In this position, the tracks were free to roll forward or backward. The swing/travel lever was in the swing position, indicating that the tracks were not being powered. Rather the power was available to swing the cab and boom.

The cab door was fixed open by a pair of vice grips. The right pedal was modified with a piece of sheet metal which reportedly the victim used to help operate the dragline crane because he'd had a sore right leg. There was also a steel strip attached to the forward/reverse lever, which was configured so the operator could use his leg to help move the lever forward. No flotation device was found in the dragline crane.

Environmental Conditions

Weather conditions were not considered a factor. The weather was cool, partly cloudy, and relatively dry, although it had rained the day before. Some visible dust was observed.

Training and Experience

Harry Mead had four years and 16 weeks mining experience, all at this mine. He had received 30 CFR Part 46 training and had received initial instruction on how to operate the recently purchased dragline from a local machine operator.

ROOT CAUSE ANALYSIS

A root cause analysis was conducted and the following causal factors were identified.

Causal Factor – The machine was purchased about five weeks prior to the accident and the victim had received limited training before operating the crane dragline.

Corrective Action – Procedures should be established to ensure that all persons are adequately trained to safely operate equipment.

Causal Factor - The track brake on the crane dragline had not been locked in the “on” position. This allowed the crane to move when the drag bucket, boom, and cab were moved.

Corrective Action - Establish and implement a training program that provides more time to give the operator the necessary skills to safely operate the dragline.

CONCLUSION

The accident occurred because the track brake on the crane dragline had not been engaged to keep the machine in position as it was swinging and digging. The action of the boom and bucket provided forward momentum and, in combination with the slight grade toward the water and the unlocked track brakes, allowed the dragline crane to roll toward the water. If the brake had been set, the dragline would not have moved.

ENFORCEMENT ACTIONS

Order No. 6151134 was issued on June 1, 2004, under the provisions of Section 103(k) of the Mine Act:

A fatal accident occurred at this operation on June 1, 2004, when the operator of a Bucyrus-Erie dragline drowned in a water-filled pit. This order is issued to assure the safety of all persons at this operation. It prohibits all activity at the west side of the pit until MSHA has determined that it is safe to resume normal mining operations in the area. The mine operator shall obtain prior approval from an authorized representative for all actions to recover and/or restore operations in the affected area.

This order was terminated on June 3, 2004, after conditions that contributed to accident no longer existed.

Approved by:

Date:

Steven M. Richetta
District Manager
North Central District

APPENDIX A

Persons Participating in the Investigation

Mead Sand and Gravel

Anthony A. Mead co-owner

Nashville Police Department

Garry Barnes chief of police

Mine Safety and Health Administration

Fred H. Tisdale mine safety and health inspector
Gary L. Belair mine safety and health inspector
Donald T. Kirkwood supervisory civil engineer
Stephen G. Sawyer civil engineer
David T Couillard mine safety and health specialist