

MAI-2005-09

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

REPORT OF INVESTIGATION

Surface Nonmetal Mine
(Sand and Gravel)
Fatal Powered Haulage Accident
April 4, 2005

Darrel Volker Construction
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Auburn, Nemaha County, Nebraska
Mine I.D. No. 25-01224

Investigators

Chrystal A. Dye
Mine Safety and Health Inspector

Larry G. Miller
Mine Safety and Health Specialist

Ronald Medina
Mechanical Engineer

Originating Office
Mine Safety and Health Administration
Rocky Mountain District
P.O. Box 25367, DFC
Denver, Colorado 80225
Irvin T. Hooker, District Manager

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**Darrel Volker Construction
25-01224
Accident Site**

OVERVIEW

Mark A. Keleel, laborer, age 47, was fatality injured on April 4, 2005, when he lost control of the skid steer loader he was operating. He was attempting to dump sand and gravel into the plant grizzly (iron or steel bars used for coarse screening or scalping of bulk materials) when the skid steer loader over-traveled the stop block, traveled onto the grizzly, overturned, and landed on the ground below. Kaleel, who was not wearing a seat belt, was ejected.

The accident occurred because management did not have any policies, procedures, or controls in place to ensure that equipment operators received training before operating equipment. The victim did not maintain control of the skid steer loader he was operating. He was not wearing a seat belt at the time of the accident.

GENERAL INFORMATION

Darrel Volker Construction, a surface sand and gravel operation, owned and operated by Darrel Volker Construction, was located about two miles west of Highway 75, south of Auburn, Nemaha County, Nebraska. The principal operating official was Darrel R. Volker, owner. The mine was normally operated one 7-hour shift a day, five days a week. Total employment was four persons.

Sand and gravel was extracted from the pit with a front-end loader, loaded into haul trucks, and transported to the plant. The material was dumped into the grizzly, screened, and stockpiled. Finished products were sold for use in the construction industry.

MSHA had not been notified that this mine was in operation prior to the accident. An inspection of the mine was conducted following completion of the fatal investigation.

DESCRIPTION OF ACCIDENT

On the day of the accident, Mark Keleel, (victim) reported for work at about 8:00 a.m., his scheduled starting time. Darrel Volker told Keleel to do clean up around the plant and on the dump site haul road. Keleel used the skid steer loader to clean up throughout the morning, while other employees performed repair and maintenance on equipment.

After lunch, at approximately 1:00 p.m., Jerry Olson, plant operator, started the plant. A few minutes later, Olson observed Keleel as he dumped a load of sand and gravel into the grizzly with the skid steer loader. Keleel had previously used a front-end loader to feed the plant. This was the first shift Keleel used the skid steer loader to dump material into the grizzly. At approximately 1:15 p.m., Keleel approached the grizzly to dump his second load. Olson noticed the skid steer loader was traveling fast with the bucket approximately five feet above the ground. He yelled to Keleel to lower the bucket, but the bucket continued to rise as the skid steer loader approached the stop block. Keleel lost control of the skid steer loader as it traveled forward onto the grizzly, overturned, and landed on its wheels at the base of the grizzly.

The initial impact ejected both Keleel and the seat from the operator's compartment. Keleel was not wearing a seat belt. A tow strap that was stored behind the seat had become entangled around the loader's left steering control lever and caused the control level to engage. The skid steer loader rotated 180 degrees, running over Keleel, who was lying on the ground. Olson ran to the skid steer loader, shut off the engine, and told Dustin Volker, son of Darrel Volker, to notify his father of the accident and to summon help.

Emergency personnel arrived a short time later and transported Keleel to a nearby hospital where he was pronounced dead. The cause of death was cardio-respiratory arrest, attributed to trauma.

INVESTIGATION OF THE ACCIDENT

MSHA was notified of the accident at 1:00 p.m. MST, on April 5, 2005, by a telephone call from Bryan Drake, regional OSHA representative, in Kansas City, Missouri, to Jake DeHerrera, assistant district manager. An investigation was started the next day. An order was issued under the provisions of Section 103(k) of the Mine Act to ensure the safety of the miners. MSHA 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 and employees.

DISCUSSION

Location of the Accident

The accident occurred at the dump location for the plant grizzly. The dump location consisted of a steel bin. The grizzly, constructed of steel, was 11 feet 5 inches wide by 12 feet 2 inches long, and was positioned at a grade of 80 percent. The front edge of the grizzly extended upward 15 inches from the ground at the end of the ramp and served as the bumper block at this dump location. The top of the grizzly was 16 feet, 8 inches above the ground.

The weather was clear and the temperature was approximately 60 degrees.

Equipment

The skid steer loader was a 1986, New Holland, Model No. L781, and was powered by a 50.5 horsepower, Deutz, Type F3L912, diesel engine. The loader was equipped with hydrostatic four-wheel drive and had propulsion and hydrostatic braking that were controlled by two hand-operated controls. Power was transferred from the hydrostatic motors to the front and rear wheels through drive chains.

The loader had a rated load lifting capacity of 2,050 pounds and was equipped with roll-over protection and falling object protection (ROPS/FOPS). It was approximately 144 inches long (including the bucket), 70 inches wide, and 76 inches high to the top of the ROPS/FOPS structure. The wheel base was approximately 48 inches. The loader was equipped with Titan 12-16.5 NHS HD 2000 II tires, which was the correct size as specified by New Holland.

The pivot point of the bucket was approximately 10 feet above the ground with the lift arms fully raised. The estimated load in the bucket at the time of the accident was 2,000 pounds, based on the bucket's capacity, the density of sandy gravel (2,820 lbs cubic yard), and witness statements.

Travel and steering were controlled by two hand operated levers on the left and right sides of the operator's seat. The hydrostatic drive system acted as a service brake to stop the loader when the controls were placed in the neutral position. A lever on the right side of the compartment shut down the engine, when activated, by shutting off the fuel. When tested, all these systems functioned properly.

A two position handle on the right side of the operator's compartment allowed the operator to select high or low travel speed. The maximum rated speed in the "low speed" position was 8 mph and the maximum rated speed in the "high speed" position was 12 mph. The two position high-low speed selector handle was held with a wire in the "low-speed" position. The wire prevented the handle from being placed in the "high-speed" position. The maximum travel speed of the loader with the control handle in the "low-speed" position was clocked at 7.7 mph.

Two foot treadles controlled the bucket lift and tilt functions. Pushing the bottom (heel) of the left treadle raised the lift arms and pushing on the toe portion lowered the lift arms. Pushing the bottom (heel) of the right treadle tilted the bucket backward (carry position) and pushing on the toe of this treadle tilted the bucket forward (dump position). Upon release, these treadles returned to the neutral position and bucket movement stopped. The two foot treadles that controlled the bucket lift and tilt functions operated as described in the operator's manual. The bucket was loaded with a sand and gravel mix, the lift arms were raised and lowered, and the bucket was tilted up and down. No operational defects were observed.

The engine throttle speed was controlled by a hand-operated lever on the left side of the operator's compartment. When the handle was released, it remained in the position it was placed in. When tested, it functioned properly.

The loader was designed with a seat switch activated boom lock-out feature in the boom lift circuit which prevented boom operation (lifting or lowering) if the operator was not in the seat. The seat switch was connected to an electronic solenoid. The seat was bolted to a seat base plate. As described in the operator's manual, the seat assembly was spring-loaded so the operator's weight depressed the seat, causing a button switch under the seat to make electrical contact. This sent electrical current to a solenoid valve which moved a plunger in a hydraulic valve allowing oil to flow to and from the boom cylinders. When tested as described in the operator's manual, the boom/seat switch lock-out

safety feature did not operate. The investigation determined this defect did not contribute to the cause of the accident.

The loader was equipped with two mechanical boom lock pins that could support the two lift arms in the elevated position. When tested, they functioned properly.

The seat was attached to a steel plate approximately 19-3/4 inches wide and 25-1/4 inches long. The metal portion of the underside of the seat that bolted to the seat base plate was heavily corroded. Two 1/2 inch long and 5/16 inch diameter pins projected from the back end of the seat base plate and fit into two holes at the rear of the operator's compartment. The front of the seat was held down by two latches. The seat was ejected from the machine during the accident. After the seat base plate was reinstalled, the seat could be pulled free by manually grasping the seat base plate and forcefully pulling in the forward direction. This caused the seat base plate to bow upward enough to pull the rear pins out and free the seat.

Based on photographs that were sent to the manufacturer of the machine, a New Holland engineer stated that the seat base plate was made by New Holland, but that the seat was not made by New Holland.

The loader was provided with a foot-applied, caliper-disc parking brake. The parking brake application force was transferred from the pedal to a pair of caliper-disc assemblies through mechanical linkage. When applied, the pedal would lock in position. However, the mechanical linkage was distorted and the parking brake failed to hold the empty loader on a 10 percent grade. This defect did not contribute to the cause of the accident.

The seat belt was functional and latched and unlatched when tested. It was installed on the machine as described in the operator's manual. The seat belt was not attached to the seat or seat base plate but was attached to the deck of the operator's compartment in the area beside the seat. When the seat belt was buckled, it held both the operator and the seat in the machine.

Training and Experience

Keleel had been employed for two weeks with eight days on the mine site. He had not been given training in accordance with 30 CFR, Part 46.

ROOT CAUSE ANALYSIS

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

Causal Factor: No policies, procedures, or controls were in place to ensure that employees received training to safely operate mobile equipment. The victim did not maintain control of the equipment he was operating.

Corrective Actions: Procedures should be established to provide training to employees before they operate mobile equipment.

Causal Factor: No policies, procedures, or controls were in place to ensure that employees wear seat belts while operating mobile equipment.

Corrective Action: Procedures should be established to ensure that employees wear seat belts at all times while operating mobile equipment.

CONCLUSION

The accident occurred because management did not have any policies, procedures, or controls in place to ensure that equipment operators received training before operating equipment. The victim did not maintain control of the skid steer loader he was operating. He was not wearing a seat belt at the time of the accident.

VIOLATIONS

Order No. 6290762 was issued April 6, 2005, under the provisions of Section 103(k) of the Mine Act:

A fatal accident occurred at this operation on April 4, 2005, when a miner over-traveled the stop block at the dump point and was thrown from and then run over by the skid steer loader he was using to dump sand and gravel into the grizzly. This order is issued to ensure the safety of all persons at this operation. It prohibits all activity at the dump site, grizzly and surrounding area, and the skid steer loader 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 to the affected area.

This order was terminated on April 18, 2005. Conditions that contributed to the accident no longer exist.

Citation No. 6290764 was issued on April 6, 2005, under the provisions of Section 104(a) of the Mine Act for violation of 46.5(a):

A fatal accident occurred on April 4, 2005. Mark A. Keleel (victim), laborer, had not received the MSHA-required 24 hour new miner training. Mr. Keleel had no previous mining experience. The mine operator was not aware of the Part 46 training requirements. The Federal Mine Safety and Health Act of 1977 states that an untrained miner is a hazard to himself and to others.

This citation was terminated on April 6, 2005. The mine operator developed a training plan and implemented new training policies and procedures to ensure new miners received training before they began work at the mine site.

Citation No. 6290775 was issued on April 6, 2005, under the provisions of Section 104(a) of the Mine Act for violation of 56.9101:

A fatal accident occurred on April 4, 2005, when the skid steer loader operator over-traveled the stop block and rolled onto the grizzly and landed on the ground. The victim was thrown out of the skid steer loader. The operator of the skid steer loader did not maintain control of the equipment as he approached the dump site.

This citation was terminated on April 7, 2005. The mine operator obtained a service manual and miners were instructed to operate the equipment according to the procedures listed by the manufacturer.

Citation No. 6290776 was issued April 6, 2005, under the provisions of Section 104(d)(1) of the Mine Act for violation of 56.14130(g):

A fatal accident occurred on April 4, 2005, when a skid steer loader operator over-traveled the stop block and rolled onto the grizzly and landed on the ground. The victim was thrown out of the skid steer loader. The victim was not wearing his seat belt to prevent being thrown out of the equipment. Earlier that shift, the mine operator had observed the victim operate the skid steer loader without his seat belt on and did not enforce his directive to wear them. Owner Volker engaged in aggravated conduct by allowing the victim to operate the skid steer loader without wearing the seat belt. This violation is an unwarrantable failure to comply with a mandatory standard.

This citation was terminated on April 6, 2005. The mine operator implemented a policy requiring persons who operate mobile equipment to wear seat belts.

Approved by:

Date: May 23, 2005

Irvin T. Hooker
District Manager

APPENDIX A

Persons Participating in the Investigation

Darrel Volker Construction

Darrel R. Volker	owner
Dustin J. Volker	son of owner
Jerry W. Olson	plant operator

Mine Safety and Health Administration

Chrystal A. Dye	mine safety and health inspector
Larry G. Miller	mine safety and health specialist
Ronald Medina	mechanical engineer