MAI-2011-13

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION
Metal and Nonmetal Mine Safety and Health

REPORT OF INVESTIGATION

Surface Nonmetal Mine
Limestone (Crushed and Broken)

Fatal Machinery Accident
November 7, 2011

Anderson Sand and Gravel
Anderson Sand and Gravel
Dewitt, Clinton County, Iowa
Mine ID No. 13-02166

Investigators

Thaddeus J. Sichmeller
Mine Safety and Health Inspector

Dale P. Ingold, P.E.
General Engineer

Richard A. King
Mine Safety and Health Specialist

Originating Office
Mine Safety and Health Administration
North Central District
515 W. First Street, Room 333
Duluth, MN 55802-1302
Steven M. Richetta, District Manager

MAI-2011-13

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION
Metal and Nonmetal Mine Safety and Health

REPORT OF INVESTIGATION

Surface Nonmetal Mine
Limestone (Crushed and Broken)

Fatal Machinery Accident
November 7, 2011

Anderson Sand and Gravel
Anderson Sand and Gravel
Dewitt, Clinton County, Iowa
Mine ID No. 13-02166

Investigators

Thaddeus J. Sichmeller
Mine Safety and Health Inspector

Dale P. Ingold, P.E.
General Engineer

Richard A. King
Mine Safety and Health Specialist

Originating Office
Mine Safety and Health Administration
North Central District
515 W. First Street, Room 333
Duluth, MN 55802-1302
Steven M. Richetta, District Manager

OVERVIEW

Bruce A. Anderson, Owner/Crusher Operator, age 82, was killed on November 7, 2011, when he slipped and fell into an operating feed hopper and jaw crusher. He was last seen standing on the bottom edge of a 9-inch by 10-inch observation hole, cut into a protective steel plate on the feed hopper, attempting to dislodge material hung up between the feed hopper and the jaw crusher.

The accident occurred because the victim was not effectively protected when working from the operating crushing equipment. A suitable walkway was not provided along the feed hopper and he fell into the operating equipment. Work was performed on the equipment; however, the power was not de-energized and the equipment was not blocked against hazardous motion.

Ladder was brought into position during the rescue.

Victim was last seen standing with both feet in the lower observation hole.

GENERAL INFORMATION

Anderson Sand and Gravel, a surface limestone mine, owned and operated by Anderson Sand and Gravel, is located in Dewitt, Clinton County, Iowa. Bruce A. Anderson, victim, was the owner. The mine normally operates one shift, 10 hours a day, 5½ days per week. Total employment is six persons.

Limestone is drilled, blasted, and loaded into haul trucks that transport the material to an adjacent processing facility. The material is crushed at the primary jaw crusher and transported by belt conveyor to the secondary crushing facility where it is resized and stockpiled. The finished product is sold in the construction and agricultural industry.

The last regular inspection at this operation was completed on March 15, 2011.

DESCRIPTION OF THE ACCIDENT

On the day of the accident, November 7, 2011, Bruce A. Anderson (victim) reported to work at approximately 7:00 a.m., his normal starting time. Bruce Anderson met with his son Gregory Anderson, Supervisor, to discuss the day's work activities.

At approximately 8:00 a.m., Bruce Anderson began loading trucks with a front-end loader. Thomas Kinney, Loader Operator, arrived, serviced his front-end loader, and began loading trucks. Bruce Anderson then used the front-end loader to load stone into the feed hopper crusher.

At approximately 2:30 p.m., Gregory Anderson came to the crushing plant. He used a skid steer loader to clean up and then told his father he was leaving for the day.

About 3:35 p.m., Kinney observed Bruce Anderson standing and tossing rocks from the side of the crusher to the jaw. Bruce Anderson's feet were positioned in a hole that was cut out in a protective steel plate of the crusher. Persons use this hole to observe if the jaw section of the primary crusher is plugged. Kinney loaded several more trucks and then noticed that Bruce Anderson's front-end loader was still parked on the feed ramp. Kinney could not see him positioned on the steel plate any longer.

About 4:07 p.m., Kinney called Jonathan Riedesel, Sand Plant Operator, for assistance. Riedesel went to the operating crushing plant and found Bruce Anderson in the jaw of the crusher. Riedesel immediately shut down the plant, checked the victim, found him nonresponsive, and called Gregory Anderson. Gregory Anderson returned to the mine, assessed the situation, and called his brothers, Dale Anderson, President, and Russell Anderson, Equipment Operator, for assistance. At 4:34 p.m., Dale Anderson called for Emergency Medical Services. At approximately 6:00 p.m., the victim was pronounced dead by a medical examiner. Death was attributed to multiple blunt force injuries.

INVESTIGATION OF THE ACCIDENT

The Mine Safety and Health Administration (MSHA) was notified of the accident on November 7, 2011, at 6:34 p.m. by a telephone call to the National Call Center from Eric Peterson, Clinton County Medical Examiner. William H. Pomroy, Mine Safety and Health Specialist, was notified and an investigation began the same day. An order was issued pursuant to Section 103(j) of the Mine Act and later modified to 103(k) to ensure the safety of the miners. A citation was issued for untimely reporting of the accident.

MSHA's accident investigation team traveled to the mine, conducted a physical examination of the accident scene, interviewed employees, and reviewed documents, equipment and work procedures relative 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 primary jaw crusher of the limestone crushing plant.

Primary Crushing Equipment

The primary crusher is a Trio, Model CT2436, jaw crusher that was installed in November, 2010, to replace an older model. The crusher jaw opening is a nominal 36 inches wide by 24 inches long. The manufacturer listed the optimum operating speed at 250 rpm. The exit end of the jaw opening measured approximately 3½ inches. The crusher manufacturer's specifications noted the swing jaw moves approximately 1.26 inches toward the fixed jaw when the crusher is in operation. The vertical length of the crushing chamber is approximately 64.3 inches. The top of the cheek plates are positioned approximately $5^{5}/_{8}$ inches above the top of the fixed crusher jaw.

Limestone is fed into the crusher from a Simplicity Engineering, Model OA-10-A8, vibratory feeder and hopper assembly. The feeder bed is approximately 36 inches wide by 13 feet 9 inches long. The feeder forming the bottom of the feed hopper isn't attached. A switch to turn the feeder off and on is located along the west hopper wall. Investigators determined that the switch was functional.

The top of the feed hopper is approximately 68 inches from the ground. The hopper walls are slanted with a vertical height approximately 28 inches on the south side and 40 inches on the north and west sides. A protective steel plate is attached to the hopper frame on the feed side of the crusher hopper. This plate does not vibrate when the feeder is in operation.

Two holes, located adjacent to the crusher, had been cut in a protective steel plate for persons to observe the crusher to determine if it is plugged. The lower

hole is approximately 9 inches high by 10 inches wide and 35 inches above the ground. This hole had been cut when the previous crusher was operating. The second hole is approximately 5 inches high by 7 inches wide and 47 inches above the ground. This hole was cut when the current crusher was placed in operation.

Weather Conditions

The weather on the day of the accident was clear skies, with ambient high temperature of 51 degrees Fahrenheit. Weather was not considered to be a factor in the accident.

Training and Experience

Bruce Anderson (victim) had 26 years of mining experience at this mine. Anderson operated the crushing plant for approximately 16 years and previously operated the wash plant.

A representative of MSHA's Educational Field Services staff conducted an in-depth review of the mine operator's training records. The training records for the victim were examined and found to be in compliance and up-to-date with MSHA training requirements.

ROOT CAUSE ANALYSIS

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

Root Cause: Bruce Anderson was not effectively protected when working from the operating primary crushing plant. He was working on the equipment and the power was not de-energized and the equipment was not blocked against hazardous motion. A suitable walkway was not provided along the feed hopper.

Corrective Action: After the accident, policies and procedures were established to ensure persons are effectively protected when working from the operating primary crushing plant. The newly established policies and procedures prohibit persons from climbing on the operating equipment. The feed hopper will be accessed by using a ladder. Additionally, all power will be de-energized and locked out. A safety meeting was conducted with all miners to discuss these new policies and procedures. The mine operator is exploring the purchase of a rock breaker to eliminate manually unplugging of material in the jaw crusher.

CONCLUSION

The accident occurred because the victim was not effectively protected when working from the operating crushing equipment. A suitable walkway was not provided along the feed hopper and he fell into the operating equipment. Work

was performed on the equipment; however, the power was not de-energized and the equipment was not blocked against hazardous motion.

ENFORCEMENT ACTIONS

Issued to Anderson Sand and Gravel

Order No. 8659781 was issued on November 7, 2011, under the provisions of Section 103(j) of the Mine Act:

> A fatal accident occurred at this operation on November 7, 2011, at approximately 4:45 p.m. This order is being issued, under Section 103 (j) of the Federal Mine Safety and Health Act of 1977, to prevent the destruction of any evidence which would assist in investigating the cause or causes of the accident. It prohibits all activity at the jaw crusher plant area until MSHA has determined that it is safe to resume normal mining operations in this area. This order was initially issued orally to Gregory Anderson, Supervisor, at 7:40 p.m. and has now been reduced to writing.

This order was modified to section 103(k) of the Mine Act when the first Authorized Representative arrived at the mine.

This order was terminated on November 17, 2011, after conditions and practices that contributed to the accident no longer existed.

Citation No. 8664259 was issued on January 19, 2012, under the provisions of 104(a) of the Mine Act for a violation of 30 CFR Part 56.16002(b):

> A fatal accident occurred at this mine on November 7, 2011. The owner/crusher operator was standing on the bottom edge of the 9-inch by 10-inch observation hole cut into the metal skirting for the feed hopper, to dislodge material hung up between the feed hopper and the jaw crusher. A suitable walkway was not provided along the feed hopper and the victim fell into the operating equipment.

This citation was terminated on January 24, 2012. The mine operator covered the observation holes so they can no longer be used as a means of access on the feed hopper skirting. The mine operator established policies and procedures prohibiting persons from climbing on the operating equipment. The feed hopper will be accessed by using a ladder. Additionally, all power will be de-energized and locked out**.** A safety meeting was conducted with all miners to discuss these new policies and procedures. The mine operator is exploring the purchase of a rock breaker to eliminate manually unplugging of material in the jaw crusher.

Citation No. 8664260 was issued on January 19, 2012, under the provisions of 104(a) of the Mine Act for a violation of 30 CFR Part 56.14105:

> A fatal accident occurred at this mine on November 7, 2011. The owner/crusher operator was standing on the bottom edge of a 9-inch by 10-inch observation hole, cut out into the metal skirting for the feed hopper, to dislodge material hung up between the feed hopper and the jaw crusher. Maintenance was performed on the equipment, the power was not de-energized and the equipment was not blocked against hazardous motion. The victim was not effectively protected from the hazardous motion and fell into the operating unit.

This citation is a "Rules to Live By" priority standard and was terminated on January 24, 2012. The mine operator established policies and procedures requiring that the power be locked out or blocked from hazardous motion, prior to performing maintenance in the jaw crusher. A safety meeting was conducted with all miners to discuss these new policies and procedures.

Approved by: Date: 3-16-2012

Steven M. Richetta
District Manager
North Central District

APPENDIX A

Persons Participating in the Investigation

Anderson Sand and Gravel

Gregory Anderson	Supervisor
Dale Anderson	President
Russell Anderson	Equipment Operator
Thomas Kinney	Loader Operator
Jonathan Riedesel	Sand Plant Operator

Dewitt Fire Department

Robert Sandry	Fire Chief

Clinton County Sheriff's Office

Christopher Sivright	Deputy
Steven Diesch	Deputy
Kevin Cain	Chief Deputy

Genesis Medical Center

Debra Fox	Manager
Jeffery Peterson	EMT

Iowa State Medical Examiner's Office

Jonathan Thompson MD	Medical Examiner

Medical Associates of Maquoketa

Eric Peterson DO	Clinton County Medical Examiner

Mine Safety and Health Administration

Thaddeus Sichmeller	Mine Safety and Health Inspector
Dale Ingold	General Engineer
Richard King	Mine Safety and Health Specialist

APPENDIX B

Victim Information: 1

1. Name of Injured/Ill Employee:	2. Sex	3. Victim's Age	4. Degree of Injury:
Bruce A. Anderson	*M*	*82*	*01 Fatal*

5. Date(MM/DD/YY) and Time(24 Hr.) Of Death:	6. Date and Time Started:
a. Date: 11/07/2011 b.Time: 16:15	*a. Date: 11/07/2011 b.Time: 7:00*

7. Regular Job Title:	8. Work Activity when Injured:	9. Was this work activity part of regular job?
181 Crusher pan op. attendant	*023 Get on/off machines*	Yes | X | No |

10. Experience	Years	Weeks	Days		Years	Weeks	Days		Years	Weeks	Days		Years	Weeks	Days
a. This Work Activity:	*16*	*0*	*0*	b. Regular Job Title:	*26*	*0*	*0*	c: This Mine:	*26*	*0*	*0*	d. Total Mining:	*26*	*0*	*0*

11. What Directly Inflicted Injury or Illness?	12. Nature of Injury or Illness:
076 Machines NEC	*170 crushing*

13. Training Deficiencies

Hazard:		New/Newly-Employed Experienced Miner:		Annual:		Task:	

14. Company of Employment: (If different from production operator)
Operator

Independent Contractor ID: (if applicable)

15. On-site Emergency Medical Treatment

Not Applicable:		First-Aid:		CPR:		EMT:		Medical Professional:	X	None:	

16. Part 50 Document Control Number: (form 7000-1) *220113220012*

17. Union Affiliation of Victim: