MAI-2013-10

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

REPORT OF INVESTIGATION

Surface Nonmetal Mine
(Crushed and Broken Limestone)

Fatal Machinery Accident
August 5, 2013

MJL Crushing LLC
MJL Crushing LLC
Lowville, Lewis County, New York
Mine ID No. 30-03570

Investigators

Matthew H. Mattison
Mine Safety and Health Inspector

Kevin G. Forgette
Mine Safety and Health Inspector

Dustin W. Hinchman
Mining Equipment Compliance Specialist

Link R. Bowers
General Engineer

Walter E. Morgan
Mine Safety and Health Specialist

Originating Office
Mine Safety and Health Administration
Northeast District
178 Thorn Hill Rd., Suite 100
Warrendale, PA 15086
Donald J. Foster, Jr., Northeast District Manager

OVERVIEW

On August 5, 2013, Willard J. Moser, Plant Operator, age 55, was killed while standing near an operating cone crusher. When he looked into the cone crusher, a tooth, that had broken free from an excavator bucket, was ejected from the cone crusher and struck him.

The accident occurred due to management's failure to establish and implement policies and procedures to safely clear a cone crusher. There were no policies or procedures which should have included provisions to deenergize and lock out the power source; and block the cone crusher against hazardous motion. The cone crusher was not equipped with a guard, shield, or other device to protect miners from flying/falling materials created by its operation. Additionally, Moser did not receive task training addressing safe work procedures for clearing or dislodging material in a cone crusher and the potential hazards associated with the task.

GENERAL INFORMATION

MJL Crushing LLC, a surface crushed limestone operation, owned and operated by MJL Crushing LLC, is located in Lowville, Lewis County, New York. The principal operating official is Michael J. Lyndaker, Owner. The mine typically operates one 8-hour shift, five days per week. Total employment is two persons.

Limestone is drilled and blasted from the multiple-bench quarry. A track-mounted excavator is used to load a haul truck which transports the broken limestone to the processing plant. The material is crushed and sized to specifications. Finished products are sold as construction aggregate.

The Mine Safety and Health Administration (MSHA) completed the last regular inspection at this mine on October 10, 2012.

DESCRIPTION OF THE ACCIDENT

On August 5, 2013, Willard J. Moser (victim) reported for work at 6:30 a.m., his usual starting time. Moser helped Justin Arndt, Excavator Operator, complete mobile equipment checks and then operated a front-end loader to move material to existing stockpiles. Moser then parked the front-end loader on the north side of the processing plant to access the control booth and start the belt conveyors. After moving a few truck loads of material through the plant, Moser noticed that airborne dust was increasing and he shut the plant down.

Moser went to the water pump where Arndt was attempting to repair the broken pump. Moser and Arndt disassembled the water pump and found a clogged line. After

completing repairs, Moser returned to the plant control booth and started crushing again.

After the next load was dumped into the stone hopper, Arndt contacted Moser by phone to inform him that the excavator boom had cracked and needed to be welded. At about 9:00 a.m., Moser left the control booth and used a front-end loader to transport a portable welder to the pit to repair the excavator. Moser then returned to the plant area to load customer trucks and complete paperwork while Arndt worked on the excavator.

At approximately 11:50 a.m., Moser and Arndt stopped for lunch. About 12:20 p.m., Arndt started the processing plant. Shortly after, Moser relieved Arndt in the control booth. Arndt returned to the quarry and called Moser by phone to alert him that the excavator was missing another bucket tooth and "to keep a look out for it." When a customer truck arrived at the mine, Moser left the control booth to load the truck and Arndt took over in the control booth. At that time, Arndt noticed the material was building up in the cone crusher feed hopper and he shut off the material feed. When Moser returned to the plant, Arndt saw him walk to the jaw crusher and then walk to the cone crusher, stopping momentarily near the crusher control panel.

About 2:06 p.m., Moser climbed to the second level cone crusher deck and then stepped up onto the platform's mid-handrail to observe the inside of the cone crusher. As Moser looked into the cone crusher, Arndt saw something eject from the operating cone crusher and strike Moser. Arndt immediately left the control booth and called the local authorities to request emergency assistance. He then went to Moser to render aid. Emergency Medical Services arrived at 2:15 p.m. The victim was pronounced dead at the scene by the Lewis County Coroner.

INVESTIGATION OF THE ACCIDENT

MSHA was notified of the accident at 2:40 p.m. by a telephone call from Justin Arndt, Excavator Operator, to the National Call Center. The National Call Center notified Kevin Abel, Assistant District Manager, and an investigation was started the same day. An order was issued under provisions of Section 103(j) of the Mine Act. This order was later modified to Section 103(k) of the Mine Act after the arrival of an Authorized Representative at the mine site. 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 local law enforcement and rescue agencies.

DISCUSSION

Location of the Accident

The accident occurred on the second level platform at the cone crushing plant near the stone hopper. The accident location was dry and free of debris.

Weather

On the day of the accident, weather conditions were clear with an average temperature of 76 degrees Fahrenheit and wind gusts to approximately 12 mph. Sunrise was at 5:56 a.m. The investigators determined that the weather conditions and lighting were not contributing factors in the accident.

Physical Factors

A Komatsu PC220 track-mounted excavator was the primary machine for loading broken limestone from the quarry; however, at the time of the accident, it was off site for repairs. On July 24, 2013, the mine operator brought a Hitachi EX200-5 track-mounted excavator to the mine to maintain production. It was equipped with a John Deere dipper boom and had a 36" bucket (capacity 1.16 cubic yard). During the short time the Hitachi excavator was used in the quarry, two teeth were lost from its bucket. The excavator manufacturer's recommendations stated that the bucket should be checked for bent, broken, loose, or missing parts. This recommendation was not being followed (see Appendix C).

Broken limestone was transported from the quarry and dumped into the primary feed hopper and processed using two portable crushing plants. The primary crushing plant was diesel-powered unit consisting of a grizzly-type vibrating feeder and a Brown Lenox 4232 jaw crusher with an under jaw discharge conveyor. The plant was designed to be mobile but the mine operator had set it up as a stationary unit. The jaw crusher was v-belt and sheave driven engaged by clutch and all electric motors on the crusher were powered by an onsite generator.

Once crushed, the material was conveyed to a screen. The undersized material flowed to a stacker conveyor and the oversized material was conveyed to a BL Pegson 1000XC cone crusher for additional crushing. Electrical power for the 200-horsepower crusher motor was supplied by an onsite generator. The cone crusher was equipped with a 6-foot by 6-foot unguarded feed hopper. After the material exited the cone crusher, it was conveyed to an adjacent screening plant where it was sized and distributed to the appropriate stacking belt conveyors.

Based on the physical inspection of the site and the information obtained through persons interviewed, the investigators determined that:

- The shot rock pile in the quarry contained long, flat pieces of broken limestone.

- The Brown Lenox 4232 jaw crusher had been poorly maintained. All of the main bearing bolts on the crusher were either loose or broken. There was a large crack in the steel frame (see Appendix D). Wear of the jaw plates and failure to maintain the jaw crusher to a specific size range setting allowed large, flat rocks to enter the downstream cone crusher. This caused numerous clogging and bridging of flat materials in the cone crusher that occurred on a daily basis.

- The two crushing plants were not equipped with a metal detector or magnet on the respective crusher feed to prevent metallic objects, such as a missing excavator bucket tooth, from entering the crusher.

- The Pegson cone crusher stone hopper was not provided with a mechanical device or other effective means to handle the material so that persons were not required to enter the hopper during normal crushing operations. When a blockage occurred, miners would routinely enter the stone filled hopper to physically move or break up the material, exposing them to potential crushing injuries or entrapment. A non-contributory 104(d)(1) order was issued for violation of 56.16002(a)(1).

- Miners were required to routinely enter the Pegson cone crusher stone hopper to perform maintenance and inspections. Proper access was not provided and the common work practice was to enter the stone hopper while the crusher was running. At these times, the miners did not wear proper personal protection and follow the requirements of mandatory safety standard 56.16002 (c) regarding fall and entrapment prevention. A non-contributory 104(d)(1) order was issued for this violation.

- Long pry/chisel bars and sledge hammers were found on the cone and jaw crusher platforms. These tools were regularly used by miners to clear a blockage while the crushers were in operation. The condition of these tools showed they had been used on a regular basis. Three of these tools were badly damaged and should have been removed from service. A non-contributory 104(d)(1) order was issued for violation of 56.14100(c).

- Safe access was not provided to the stone hopper of the Pegson crusher to perform inspections, cleaning, and maintenance. Miners were required to regularly climb up and stand on the second level platform hand railings while the crusher was running. At the time of the accident, the victim had positioned

himself by standing on the mid-handrail to look into the crusher. A non-contributory 104(d)(1) order was issued for violation of 56.11001.

TRAINING AND EXPERIENCE

Willard J. Moser (victim) had 5 years of mining experience as a plant operator/ manager, all at this mine.

A representative of MSHA's Educational Field Services reviewed the training records for Moser. Although these records documented that Moser had received all required training, including task training and annual refresher training, he did not receive task training addressing safe work procedures for clearing a crusher and the potential hazards associated with the task.

ROOT CAUSE ANALYSIS

The investigators conducted a root cause analysis and identified the following root causes and the corresponding corrective actions implemented to prevent a recurrence:

***Root Cause*:** Management failed to establish and implement proper work procedures to ensure the cone crushing plant was locked out, tagged out, and blocked against motion prior to persons entering, viewing, or performing work inside the crusher and to train miners in these new procedures.

***Corrective Action*:** Management has established written policies and safe work procedures to lock out, tag out, and block equipment against motion prior to any work being performed. The miners were trained in the new policies and procedures.

***Root Cause*:** Management failed to install a shield/guard at the cone crusher feed hopper to protect miners from falling/flying material generated by the operating crusher.

***Corrective Action*:** Management installed guarding around the crusher feed hopper to protect miners and established policies and procedures to maintain the guarding.

***Root Cause*:** The victim did not receive task training regarding procedures to clear or dislodge material from the cone crusher. Existing policies and procedures failed to ensure that miners stayed clear of an operating cone crusher, specifically during clearing and dislodging material.

***Corrective Action*:** Management established written policies and safe work procedures for safely clearing and dislodging material to ensure that miners stayed clear of the operating cone crusher. The new procedures incorporate the manufacturer's

recommendations for cleaning/dislodging material. Miners were trained in the new policies and procedures.

CONCLUSION

The accident occurred due to management's failure to establish and implement policies and procedures to safely clear a crusher which should have included provisions to deenergize and lock out the power source; and block the crusher against hazardous motion. The cone crusher was not equipped with a guard, shield, or other device to protect miners from flying/falling materials created by its operation. Additionally, Moser did not receive task training addressing safe work procedures for clearing or dislodging material in a cone crusher and the potential hazards associated with the task.

ENFORCEMENT ACTIONS

Issued to MJL Crushing LLC

Order No. 8714720 – Issued on August 5, 2013, under the provisions of Section 103(j) of the Mine Act. An Authorized Representative modified this order to Section 103(k) of the Mine Act upon arrival at the mine site:

> *A fatal accident occurred on August 5, 2013 when a miner was fatally injured when an object came from the Pegson cone crusher. This order is issued to assure the safety of all persons at this operation. It prohibits all activity at the crushing and screening processing plant until MSHA has determined that is safe to resume normal mining operations in this 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.*

The order was terminated on August 28, 2013, when conditions that contributed to the accident no longer existed.

Order No. 8717058 – Issued under the provisions of 104(d)(2) of the Mine Act for a violation of 30 CFR 56.14105:

> *A fatal accident occurred at this operation on August 5, 2013 when a miner (victim) was struck by an excavator bucket tooth as it was ejected from a Pegson cone crusher. The cone crusher was not powered off and blocked against motion prior to the victim looking inside.*
>
> *Management engaged in aggravated conduct constituting more than ordinary negligence by condoning this practice as a means to clear the crusher without protecting miners from hazardous motion and potential projectiles from materials located within the cone. This violation is an unwarrantable failure to comply with a mandatory safety standard.*

In the alternative, this is also a violation of mandatory standard 56.12016 which requires that electrically powered equipment shall be deenergized, power switches shall be locked out, and warning notices posted at the power switches, before mechanical work is performed.

Order No. 8717059 – Issued under the provisions of 104(d)(2) of the Mine Act for a violation of 30 CFR 56.14110:

A fatal accident occurred at this operation on August 5, 2013 when a miner (victim) was struck by an excavator bucket tooth as it was ejected from a Pegson cone crusher. The crusher was not equipped with a guard, shield or other device to protect miners from flying/falling materials created by its operation.

Management engaged in aggravated conduct constituting more than ordinary negligence by not providing protection for miners from hazardous conditions created by the operating cone crusher. This violation is an unwarrantable failure to comply with a mandatory safety standard.

Order No. 8717060 – Issued under the provisions of 104(d)(2) of the Mine Act for violation of 30 CFR 46.7(a):

A fatal accident occurred at this operation on August 5, 2013 when a miner (victim) was struck by an excavator bucket tooth as it was ejected from a Pegson cone crusher. Management failed to provide proper task training in safe work procedures and associated hazards when manually cleaning/dislodging material from the crusher. Such procedures should have included staying clear of the operating cone crusher.

Management engaged in aggravated conduct constituting more than ordinary negligence by training the miners in unsafe procedure for cleaning/clearing the operating cone crusher. This violation is an unwarrantable failure to comply with a mandatory safety standard.

Approved: Donald Foster Date: October 24, 2013

Donald J. Foster, Jr.
District Manager

LIST OF APPENDICES

APPENDIX A

PERSONS PARTICIPATING IN THE INVESTIGATION

MJL Crushing LLC

Michael Lyndaker	Owner
Justin Arndt	Excavator Operator
Matthew Martin	Former Employee

Lewis County Sheriff Department

Dale W. Roberts	Senior Investigator

Lewis County Search and Rescue

Mark A. Tuttle	EMT, Chief of Operations

Lewis County Coroner Office

Mark A. Tuttle	Medical Death Investigator

Mine Safety and Health Administration

Matthew H. Mattison	Mine Safety and Health Inspector
Kevin G. Forgette	Mine Safety and Health Inspector
Walter E. Morgan	Mine Safety and Health Training Specialist
Dustin W. Hinchman	Mining Equipment Compliance Specialist
Link R. Bowers	General Engineer

APPENDIX B

VICTIM INFORMATION

Accident Investigation Data - Victim Information
Event Number: 6 6 2 3 0 9 6

U.S. Department of Labor
Mine Safety and Health Administration

Victim Information: 1

1. Name of Injured/Ill Employee:	2. Sex	3. Victim's Age	4. Degree of Injury:
Wilard J. Moser	*M*	*55*	*01 Fatal*

5. Date(MM/DD/YY) and Time(24 Hr.) Of Death:	6. Date and Time Started:
a. Date: 08/05/2013 b.Time: 14:26	*a. Date: 08/05/2013 b.Time: 6:30*

7. Regular Job Title:	8. Work Activity when Injured:	9. Was this work activity part of regular job?
149 Plant Manager	*042 Looking into cone crusher*	Yes X No

10. Experience	Years	Weeks	Days		Years	Weeks	Days		Years	Weeks	Days		Years	Weeks	Days
a. This Work Activity:	*5*	*8*	*0*	b. Regular Job Title:	*5*	*8*	*0*	c: This Mine:	*5*	*8*	*0*	d. Total Mining:	*5*	*8*	*0*

11. What Directly Inflicted Injury or Illness?	12. Nature of Injury or Illness:
127 Excavator Bucket Tooth	*390 Blunt force trauma*

13. Training Deficiencies:
Hazard: X | New/Newly-Employed Experienced Miner: | Annual: | Task: X

14. Company of Employment: (If different from production operator)	Independent Contractor ID: (if applicable)
Operator	

15. On-site Emergency Medical Treatment:
Not Applicable: | First-Aid: | CPR: | EMT: X | Medical Professional: | None:

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

17. Union Affiliation of Victim: *9999 None (No Union Affiliation)*

APPENDIX C

EXCAVATOR BUCKET PHOTO

Figure 1 – The excavator bucket was poorly maintained. The right side shank (as shown) experienced a considerable amount of wear from using the excavator without reinstalling a tooth over the exposed shank.

APPENDIX D

JAW CRUSHER PHOTO

Figure 2 - A very large crack (as shown) in the steel frame of the throat of the jaw crusher. (Note: An accident investigator appears in the photo.)