

**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 14, 2003

**San Emidio Plant
Calmat Co
Mettler, Kern County, California
ID. No. 04-01800**

Investigators

**Steve Pilling
Supervisory Mine Safety and Health Inspector**

**Paul Wildrick
Mine Safety and Health Inspector**

**Isabel Williams
Mine Safety and Health Specialist**

**Richard Skrabak
Mechanical Engineer**

**Originating Office
Mine Safety and Health Administration
Western District
2060 Peabody Road, Suite 610
Vacaville, California 95687
Lee D. Ratliff, District Manager**

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OVERVIEW

On June 14, 2003, Jason P. Salyards, maintenance repair foreman, age 25, was fatally injured while changing liner plates in a jaw crusher. Salyards was inside the crusher positioning a wedge bar to secure the upper liner plate when the liner dislodged striking him.

The accident occurred because the procedure used to remove and install the crusher liner plates was inadequate. A section of angle iron was wedged against the metal crusher wall to secure the liner plate. The foreman entered the crusher and stood on a narrow ledge while attempting to install the wedge bar to fasten the liner plate. The angle iron dislodged and the 3,100 pound liner toppled over.

Salyards had a total of 5 years, 12 weeks of mining experience all at this mine.

GENERAL INFORMATION

San Emidio Plant, a sand and gravel operation, owned and operated by Calmat Co., was located at 16101 Hwy 166, Mettler, Kern County, California. The principal operating officials were Gary Goellner, regional operations manager, and Frank Parra, plant manager. The mine normally operated three 8 hour shifts a day, two production and one maintenance, 6 days a week. Total employment was 36 persons.

Sand and gravel was mined from a single bench pit. Mined material was transported by trucks to the primary jaw crusher. The material was crushed and conveyed to the main plant where it was sized, washed, stockpiled, and sold for construction aggregate.

The last regular inspection of this operation was completed on June 10, 2003.

DESCRIPTION OF ACCIDENT

On the day of the accident, Jason P. Salyards (victim) reported to work at 12:00 p.m., his normal starting time. Salyards directed Frank Buffuna, repairman/welder, and Jason Morris, plant repairman, to work on the screens. Salyards went to the pit where he operated a dozer to build a road. At about 2:00 p.m., Morris and Buffuna finished working on the screens, gathered tools, and got the crane ready to change out the stationary liners in the primary jaw crusher. Morris and Buffuna washed down the crusher and the new liners in preparation to install them. About 4:00 p.m., they drove to the pit area to pick up Salyards and ate lunch. After lunch, they went to the primary jaw crusher to remove the stationary liner plates and install the new liners.

Morris and Buffuna loosened the bolts on the retaining wedge. Salyards climbed over a 46 inch railing and descended into the jaw crusher to weld on an eye to lift out the old liner. He then climbed out and directed Buffuna, who was operating the crane, to lift the liner out. The same procedure was used for the removal of the second liner. Salyards then told Buffuna to wash out the crusher and grind area and prepare to reinstall the new liners. During this time Salyards and Morris went to get the dozer from the pit and fuel it up for the next shift, before returning to the primary crusher.

The first liner was lowered into the crusher with the crane. Salyards entered the crusher to install a 1 ½ inch by ¼ inch angle iron bar by wedging it against the liner and the opposite side of the crusher wall. The angle iron bar was used to hold the 3,100 pound liner in place. It also provided a place to stand while the wedge bar was bolted to hold the liner in place. The second liner was lowered into the crusher using the same procedure. At about 8:00 p.m., Salyards was having difficulty positioning the wedge bar to secure the liner and presumably stepped onto the angle iron support. Salyards fell into the crusher and the liner toppled over pinning him in the crusher.

Morris yelled to Salyards to see if he was okay but didn't get a response. He then shouted to Buffuna that the liner had pinned Salyards. Morris went to the conveyor belt

to check on Salyards. Buffuna called on the radio for help and went to help Morris. The 3rd shift employees started to arrive and heard the call. Jerry Declippel, loader operator, Lenord Aleman, Jr., loader operator, and Gary Crowell, dump truck operator, went to the primary crusher and helped hook up the crane to the liner plate to lift it and free Salyards. Crowell and Buffuna started CPR and first aid until the EMT arrived. Salyards was taken by life flight to the hospital where he was pronounced dead. Death was attributed to crushing trauma.

INVESTIGATION OF THE ACCIDENT

MSHA was notified at 8:30 p.m., the same day, by a telephone call, from Stephen Hopkins, safety and health specialist, to Ron Goldade, assistant district manager. An investigation was started the next day. An order was issued pursuant to Section 103(k) of the Mine Act to ensure the safety of miners. MSHA's accident investigation team traveled to the mine, conducted a physical inspection of the accident site, interviewed a number of persons, and reviewed training records and information relating to the job being performed by the victim. MSHA conducted the investigation with the assistance of mine management, miners, the California Division of Occupational Safety and Health, and Local 12, International Union of Operating Engineers.

DISCUSSION

Location of the Accident

The accident occurred at the primary crusher located in the plant area.

The Nordberg Jaw Crusher

The crusher was a Nordberg Model C140 jaw crusher. The feed opening of the crusher was approximately 55 inches wide and 42 inches deep. The minimum discharge setting was 5 inches and the maximum was 12 inches. The jaw crusher was being used for primary crushing. It was purchased new in September, 2000, and installed at its present location.

The jaws were set in an open-bottom V. One jaw was fixed to the frame, while the movable jaw was pivoted to swing from its top edge. The powered movable jaw was driven toward the fixed jaw to impose a crushing force on the material between them. The movable jaw then moved back to allow the material to drop further into or through the gap. The size of the material was progressively reduced during the successive crushing strokes of the movable jaw. The crushed material dropped onto a conveyor belt and was transported to the plant for further milling.

Liner Plates and Braces

The fixed and moveable jaws consisted of two liner plates made of manganese steel. These plates were about 53 ½ inches wide, 41 inches high and weighed 3,100 pounds

each. The liner plates were interchangeable and reversible and were considered replaceable wear parts. According to interviews, the plates were rotated approximately every three months and replaced about every six months.

The lower liner plate was held in place by a tightening wedge and three T-head bolts. The upper plate was held in place by an upper wedge, a tightening wedge, and three T-head bolts. The victim had replaced the lower plate on the fixed jaw and was attempting to install the wedges and T-head bolts to secure the upper plate.

A brace was placed between the liner plates during the replacement procedure. A 16 inch long piece of 1 ½ inch by ¼ inch angle iron had been placed between the lower jaw plates to hold the new plate in position until the wedge was bolted to fasten it. A 36 inch long piece of the same angle iron was used to temporarily support the upper liner at the time of the accident. The ends of the angle iron braces were not tapered to match the angle between the liner plates, resulting in a minimal metal to metal contact between the surfaces.

Access

Access into the crusher was made by climbing over a 46 inch hand rail and then descending into the crusher that was about 6 feet deep. The crusher had slick metal sides and there was no adequate place for employees to stand, while performing the task of replacing the liner plates. Upon entering the crusher employees stood on a narrow steel ledge located along the crusher wall.

Training

Salyards had a total of 5 years, 12 weeks mining experience all at this mine. Salyards received all of his training in accordance with CFR 30, Part 46. He had changed the liner plates in the jaw crusher several times prior to the accident.

ROOT CAUSE ANALYSIS

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

Causal Factor: A risk assessment to identify possible hazards and establish safe procedures was not conducted prior to performing the task of replacing the liner plates in the jaw crusher.

Corrective Action: A policy should be implemented requiring risk assessments to be conducted prior to performing maintenance or repair tasks. Potential hazards should be identified and procedures to safely complete the task should be established and followed.

Causal Factor: The liner plate was not properly blocked against motion to prevent it from moving. A piece of 1 ½ x ¼ inch angle iron was wedged between the installed liner

and the new liner that had been positioned in the jaw. This created a small area of metal to metal contact resulting in an unsafe blocking method.

Corrective Action: The operator should develop and implement procedures that ensure machinery components are blocked securely in place before any work is done in or around them. Personnel assigned to perform maintenance or repair tasks should be knowledgeable in the safe work procedures.

Casual Factor: A safe method was not provided for miners to enter the crusher and install the liner plates. The victim had to stand on a narrow steel ledge inside the jaw crusher in order to install the wedge that fastened the liner plate.

Corrective Action: The operator should develop and implement work procedures that ensures a safe means of access is provided for persons assigned to enter the jaw crusher.

CONCLUSION

The accident occurred because Salyards was not provided a safe access to install the liner plates in the jaw crusher. The angle iron bar that secured the liner plate in place dislodged and the liner plate fell into the crusher, striking him.

ENFORCEMENT ACTIONS

Order No. 6349972 was issued on June 15, 2003, under the provisions of Section 103 (k) of the Mine Act:

A fatal accident occurred at this operation on June 14, 2003, when three miners were relining a crusher at the primary jaw crusher. This order is issued to assure the safety of all persons at this operation. It prohibits all activity at the primary jaw crusher 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.

The order was terminated on June 18, 2003. The conditions that contributed to the accident have been corrected and normal mining operations can resume.

Citation No. 6343804 was issued on June 16, 2003, under the provisions of Section 104 (d)(1) of the Mine Act for violation of 30 CFR 56.11001:

A fatal accident occurred at this mine on June 14, 2003, when a repair crew foreman was installing a liner plate on an interior wall of a crusher. The 3,100-pound liner plate had been lowered into the crusher and set in place as part of required maintenance. The maintenance task consisted of removal of the worn liner plates and installation of two new liner plates. The operator did not provide a safe method for miners to enter the crusher to install and align the liner plate

wedge bar that secured the liner plate in place. The foreman entered the crusher, which had slick metal sides, to perform this task. The angle iron bar wedged against the liner plate dislodged and the liner plate fell into the crusher striking the foreman. Failure to provide a safe means of access to complete this assigned maintenance task constitutes more than ordinary negligence and is an unwarrantable failure to comply with a mandatory safety regulation.

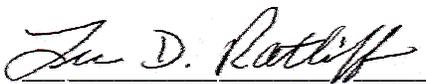
This citation was terminated on June 18, 2003. The mine operator has implemented a procedure to safely remove or install liner plates in the jaw crusher. These procedures provide safe access for persons who are required to enter the crusher. The employees assigned to perform this task have been trained in these procedures.

Order No. 6343805 was issued on June 16, 2003, under the provisions of Section 104 (d)(1) of the Mine Act for violation of 30 CFR 56.14105:

A fatal accident occurred at this mine on June 14, 2003 when a repair crew foreman was installing a liner plate on an interior wall of a crusher. The 3,100-pound liner plate had been lowered into the crusher and set in place as part of required maintenance. The maintenance task consisted of removal of the worn liner plates and installation of two new liner plates. The operator did not provide a method for miners to adequately block the machinery component while it was being secured. A section of 1½ x ¼ inch wide angle iron had been wedged between the liner plate and the opposite crusher wall to block the liner and prevent movement of the component. The foreman entered the crusher to align the liner plate wedge bar that secured the liner plate in place. The angle iron dislodged and the liner plate, which fell into the crusher, struck the foreman. Failure to provide adequate blocking to prevent hazardous motion of machinery components constitutes more than ordinary negligence and is an unwarrantable failure to comply with a mandatory safety regulation.

This citation was terminated on June 18, 2003. The mine operator has implemented procedure to safely block machinery components when removing or installing liner plates in the crusher. Tapered, wedged, working platforms have been fabricated and will be used for blocking to prevent hazardous motion of the plates. The employees assigned to perform this task have been trained in these procedures.

Approved by:



Lee D. Ratliff, District Manager

Date: October 2, 2003

APPENDICES

- A. Persons Participating in the Investigation
- B. Persons interviewed

APPENDIX A

Persons Participating in the Investigation

San Emidio Plant

Frank Parra	plant manager
Cynthia Kirby	manager of safety and health & environmental
Stephen Hopkins	safety and health specialist
Biagio Ventura	safety and health specialist
Scott Dunham	attorney
Ron James	Local 12, International Union of Operating Engineers

Mine Safety & Health Administration

Steve Pilling	supervisory mine safety and health inspector
Paul Wildrick	mine safety and health inspector
Richard Skrabak	mechanical engineer
Isabel Williams	mine safety and health specialist

CAL-OSHA

Dan Ford	associate engineer
Matthew Switzer	industrial hygienist

APPENDIX B

Persons Interviewed

San Emidio Plant

Frank W. Buffuna	repairman/welder
Jason Morris	plant repairman
Lenord Aleman Jr.	loader operator
Gary Crowell	dump truck operator
Onesimo S. Alfaro	loader operator
Jerry A. Declippel	loader operator
Jonathan B. Latham	plant repairman/welder